CV Giorgio Arcadi

Percorso di Studi:

2006: **Laurea Triennale in Fisica**
Università degli studi di L'Aquila, L'Aquila, Italia.
Titolo della Tesi: *Instabilità nel problema delle doppia buca di potenziale.*
Relatore: Prof. Alessandro Teta.
Voto: 110/110 cum laude.
2008: Laurea Specialistica in Fisica
Università degli studi di Roma "La Sapienza", Roma, Italia.
Titolo della Tesi: *Effetti di violazione di sapore nei decadimenti radiativi dei leptoni carichi in modelli Supersimmetrici.*
Relatore: Prof. Guido Martinelli, Dr. Luca Silvestrini.
Voto: 110/110 cum laude.
2008-2012 Ph.D. in Astroparticle Physics
"Scuola Internazionale di Studi Superiori Avanzati" (SISSA/ISAS), Trieste, Italia.
Relatore: Prof Piero Ullio.
PhD ottenuto in data 20-09-2012.
Titolo della Tesi *: Interplay between Generation Mechanisms and Detection of SuperSymmetric Dark Matter in the LHC Era.*

Carriera Accademica

2012-2014 *Senior ESR.* Institute for Theoretical Physics, Georg-August Universität, Göttingen. Fellowship from the Marie Curie ITN Network Invisibles.
2014-2016 *Postdoc* at LPT (Laboratorie the Physique Theorique) Orsay.
2016-13/02/2019 *Postdoc* at the Max Planck Institut für Kernphysik Heidelberg (Germany).
Posizione Attuale: *Ricercatore di tipo A presso* l'Università degli studi di Roma Tre (Italia).

Qualifiche

- Abilitazione Scientifica Nazionale alle funzioni di Professore di Seconda Fascia settore scintifico disciplinare 02/A2 settore concorsuale FIS/02, ottenuta in data 28/03/2018.
- "Habilitation" in Fisica ottenuta presso l'Università di Heidelberg in data 30/01/2019. Suddetta abilitazione conferisce il titolo di "Privat Dozent" ed il diritto di tenere corsi e supervisionare studenti, anche al livello dottorale, presso l'Università di Heidelberg. Essa rende inoltre elegibili per la posizione di W3 Professor (full Professor).

- Abilitazione Scientifica Nazionale alle funzioni di Professore di Prima Fascia settore scintifico disciplinare 02/A2 settore concorsuale FIS/02, ottenuta in data 09/11/2020.

Supervisione di Studenti

- Supervisore, per lo Stage di livello M1, dello studente Mathieu Dedenon, presso l'Università di Paris-Saclay.
- Contributo alla supervisione dello studente di dottorato Federico Dradi, presso la Georg-August University di Göttingen (Germania).
- Contributo alla supervisione dello studente di dottorato Mathias Pierre presso LPT Orsay.
- Mentore dello studente Andrei Angelescu presso LPT Orsay.
- Mentore dello studente Thomas Hugle Mentoring presso MPIK Heidelberg.
- Mentore dello studente Miguel Campos presso MPIK Heidelberg.
- Relatore di tesi Triennale dello studente Andrea di Lecce presso l'Università di Roma Tre.
- Relatore di tesi Triennale dello studente Filippo Cutrona presso l'Università di Roma Tre.
- Relatore di tesi Triennale dello studente Francesco Girardello presso l'Università di Roma Tre.
- Relatore di tesi Triennale dello studente Matteo Nardini presso l'Università di Roma Tre.
- Co-relatore di tesi Magistrale dello studente Marciano presso l'Università degli Studi di Roma La Sapienza.

Incarichi di insegnamento

- Incarico di tutor per il corso "General Relativity", tenuto presso l'Università di Göttingen durante il semestre invernale 2013-2014.
- Incarico di insegnamento, in collaborazione con il professor Manfred Lindner, del corso "Dark Matter" presso l'Università di Heidelberg, tenuto durante il semestre invernale 2017.
- Incarico di insegnamento per il corso "Advanced Dark Matter" presso l'Università di Heidelberg, tenuto durante il semestre estivo 2018.
- Incarico di insegnamento, in collaborazione con Priv. Doz. Teresa Marrodan, per il corso "Dark Matter", tenuto presso l'Università di Heidelberg durante il semestre invernale 2018.
- Titolare del corso "Teoria di Relatività" presso l'Università di Roma Tre per gli anni accademici 2018-2019, 2019-2020.

- Incarico di insegnamento per il corso “Advanced Dark Matter”, da tenere presso l’Università di Heidelberg durante il semestre estivo 2020.
- Incarico di insegnamento: esercitazioni per il corso di Analisi Matematica 1, corso di Laurea in Ingegneria Civile, Università di Roma Tre a.a. 2020-2021.
- Incarico di insegnamento: esercitazioni per il corso di Metodi Matematici per la Fisica, Università di Roma Tre, a.a. 2020-2021.

Partecipazione a gruppi di ricerca ed a grant internazionali come Investigator o Principal Investigator

- 2012-2014 : Investigator per il Grant Marie Curie FP7 ITN “Invisibles".
- 2014-2016: Investigator per ERC Advanced Grant Higgs@LHC.
- 2016-2019: Partecipazione al Gruppo di ricerca diretto al Prof. Dott. Manfred Lindner presso MPIK Heidelberg.

Attività di Referee

Referee per JHEP, JCAP, Physics Letters B, European Physics Journal C, Physical Review D e Physical Review Letters.

Esperienza editoriale

Editor per lo Special Issue “New Physics Landmarks:Dark Matter and Neutrino Masses” per la rivista Advances in High Energy Physics.

Organizzazione di conference e workshop

Coordinatore della sezione di teoria della sezione di Cosmologia ed Astroparticelle della conferenza IFAE 2019.

Contributo all’organizzazione della Scuola Autunnale di dottorato Göttingen-Desy-Odense 2013.

Attività di Outreach (Terza Missione)

Lezione di divulgazione “Dark Matter”, presso MPIK Heidelberg, dedicata a studenti di scuola superiore.

Lezione pubblica di divulgazione (tenuta in lingua tedesca) “Dunkler Weltraum”, in occasione del “Offnen Tur Tag” presso MPIK Heidelberg.

Contributo all’organizzazione delle attività di outreach del Network “Invisibles”.

Lezione di divulgazione sulle Onde Gravitazionali tenuta in occasione del centenario della dimostrazione sperimentale della Teoria della Relatività Generale presso l'Università di Roma Tre.

Lezione pubblica di divulgazione "Looking for the Invisibles", tenuta in occasione del "Woche von Wissenshaft" organizzata dall'Università di Göttingen.

Altri titoli utili alla valutazione

Organizzazione dell'attività di seminari settimanali del LPT Orsay.

Organizzatore locale dei "webinar" organizzati dal Network "Invisibles".

Periodo di lavoro (secondment) presso la GMV Technologies Madrid (Spagna).

Competenze Informatiche

Programmazione Fortran, C, C++;
Wolfram Mathematica;
Uso di software and tools numerici, come Darksusy, Micromegas, Madgraph.

Lista completa delle pubblicazioni

Pubblicazioni su riviste:

[1] G. Arcadi, P. Ullio, *Accurate estimate of relic density and kinetic decoupling in non-thermal dark matter models*, arXiv: 1104.3591 [hep-ph], **Phys. Rev. D84:043520, 2011**.

[2] G. Arcadi, L. Di Luzio, M. Nardecchia, *Gravitino Dark Matter in Tree Level Gauge Mediation with and without R-parity*, arXiv:1110.2759 [hep-ph], **JHEP 1112 (2011) 040.**

[3] G. Arcadi, L. Di Luzio, M. Nardecchia, *Minimal Flavor Violation and neutrino masses without R-parity*, arXiv:1111.3491 [hep-ph**], JHEP 1205 (2012) 048.**

[4] G. Arcadi, L. Covi, *Minimal Decaying Dark Matter and the LHC*, arXiv:1305.6587 [hep-ph], **JCAP 1308 (2013) 005.**

[5] G. Arcadi, L. Covi, M. Nardecchia, *Out-of-equilibrium Baryogenesis and SuperWIMP Dark Matter*, arXiv:1312.5703 [hep-ph], **Phys. Rev. D89 (2014) 9, 095020.**

[6] G. Arcadi, Y. Mambrini, M. Tytgat, B. Zaldivar, *Invisible Z' and Dark Matter: LUX vs LHC constraints*, arXiv:1401.0221 [hep-ph], **JHEP 1403 (2014), 134.**

[7] A. Abada, G. Arcadi, M. Lucente*, Dark Matter in the Minimal Inverse See-Saw mechanism*, arXiv:1406.6556 [hep-ph], **JCAP 10(2014) 001.**

[8] G. Arcadi, L. Covi, F. Dradi*, LHC prospects for minimal decaying Dark Matter*, arXiv:1408.1005 [hep-ph], **JCAP 1410(2014)10, 063.**

[9] F. Richard, G. Arcadi, Y. Mambrini, *Search for Dark Matter at colliders*, arXiv:1411.0088 [hep-ex], **Eur.Phys.J. C75 (2015) 4, 171.**

[10] G. Arcadi, Y. Mambrini, F. Richard, *Z-portal Dark Matter*, arXiv:1411.2985 [hep-ph], **JCAP1503 (2015) 03, 018.**

[11] G. Arcadi, L. Covi, F. Dradi*, 3.55 KeV line in Minimal Decaying Dark Matter Scenarios*, arXiv:1412.6351 [hep-ph], **JCAP 1507 (2015) 07, 023.**

[12] G. Arcadi, L. Covi, M. Nardecchia, *Gravitino Dark Matter and low-scale Baryogenesis*, arXiv:1507.05584 [hep-ph], **Phys. Rev. D92 (2015), 115006.**

[13] A. Abada, G. Arcadi, V. Domcke, M. Lucente*, Lepton number violation as a key to low-scale leptogenesis*, arXiv: 1507.06215 [hep-ph], **JCAP 1511 (2015), 041.**

[14] G. Arcadi, Abdelhak Djouadi, Y. Mambrini, *The LHC diphoton resonance and dark matter,* arXiv: 1512.04913 [hep-ph], **Phys. Lett. B755 (2016), 426-432.**

[15] G. Arcadi, Pradipta Ghosh, Yann Mambrini, Mathias Pierre, *Re-opening Dark Matter windows compatible with a diphoton excess,* arXiv:1603.05601 [hep-ph], **JCAP 1607 (2016) 005.**

[16**]** G. Arcadi, Pradipta Ghosh, Yann Mambrini, Mathias Pierre, *Scrutinizing a di-photon resonance through Moscow zero,* arXiv:1608.04755 [hep-ph], **JCAP 1611 (2016), 054.**

[17] G. Arcadi, Christian Gross, Oleg Lebedev, Yann Mambrini, Stefan Pokorski, Takashi Toma, *Multi-Component Dark Matter from Gauge Symmetry,* arXiv:1611.00365, **JHEP 1612 (2016) 081.**

[18] A. Angelescu, G. Arcadi, *Dark Matter Phenomenology of SM and Enlarged Higgs Sector Extended with Vector-like Leptons,* arXiv:1611.06186, **Eur.Phys.J. C77 (2017), 456.**

[19] G. Arcadi, Christian Gross, Oleg Lebedev, Stefan Pokorski, Takashi Toma, *Evading Dark Matter Direct Detection in Higgs Portal Models,* arXiv:1611.09675, **Phys.Lett. B769 (2017) 129-133.**

[20] A. Alves, G. Arcadi, P.V. Dong, L. Duarte, F.S. Queiroz, J.W. Valle, *R-parity as a residual Gauge Symmetry,* arXiv:1612.04383, **Phys.Lett. B772 (2017) 825-831.**

[21] A. Alves, G. Arcadi, Y. Mambrini, S. Profumo, F.S. Queiroz, *Augury of Darkness: The Low-Mass Dark Z' portal,* arXiv:1612.07282, **JHEP 1704 (2017) 164.**

[22] G. Arcadi, M. Dutra, P. Ghosh, M. Lindner, Y. Mambrini, M. Pierre, S. Profumo, F. S. Queiroz, The *Waning of the WIMP? A Review of Models, Searches, and Constraints***,** arXiv:1703.07364**, Eur.Phys.J. C78 (2018), 203.**

[23] G. Arcadi, M. Lindner, Y. Mambrini, M. Pierre, F. Queiroz, *GUT Models at Current and Future Colliders and Implications for Dark Matter Searches,* arXiv:1704.02328**, Phys. Lett. B771 (2017) 508-514.**

[24] G. Arcadi, C. Siqueira, F. S. Queiroz, *The Semi-Hooperon:Gamma-ray and Antiproton excess in the Galactic Center,* arXiv:1706.02336, **Phys. Lett. B775 196-205**.

[25] G. Arcadi, P. Ghosh, Y. Mambrini, M. Pierre, F. S. Queiroz, *Z' portal to Chern-Simons Dark Matter*, arXiv:1706.04198**, JCAP 1711 (2017) 020**.

[26] G. Arcadi, M. D. Campos, M. Lindner, A. Masiero, F. S. Queiroz, *The Dark Sequential Z': Collider and Direct Detection Experiments,* arXiv:1708.00890, **Phys. Rev. D97 (2018), 043009**.

[27] A. Abada,G. Arcadi, V. Domcke, M. Lucente, *Neutrino masses, Leptogenesis and Dark Matter from Small Lepton Number Violation,* arXiv:1709.00415, **JCAP 1712 (2017) 024.**

[28] G. Arcadi, M. Lindner, F.S. Queiroz, W. Rodejohann, S. Vogl, *Pseudoscalar Mediators: A WIMP model at the Neutrino Floor,* arXiv:1711.02110**, JCAP 1803 (2018), 042.**

[29] G. Arcadi, C.P. Ferreira, F. Goertz, M. M. Guzzo, A. C. O. Santos*; Lepton Flavor Violation Induced by Dark Matter,* arXiv:1712.02373*,* **Phys.Rev. D97 (2018), 075022**

[30] G. Arcadi, T. Hugle, F.S. Queiroz, *The Dark Lμ-Lτ Rises via Kinetic Mixing,* arXiv: 1803.05723, **Phys. Lett. B784 (2018) 151-158.**

[31] G. Arcadi, *2HDM portal for Singlet-Doublet Dark Matter,* arXiv:1804.04930, **Eur. Phys. J. C78 (2018), 864.**

[32] E. Akhmedov, G. Arcadi, M. Lindner, S. Vogl, *Coherent Scattering and macroscopic coherence: Implications for neutrino, dark matter and axion detection,* arXiv:1806.10962, **JHEP 1810 (2018) 045.**

[33] A. Abada, G. Arcadi, V. Domcke, M. Drewes, J. Klaric, M. Lucente, *Low-scale leptogenesis with three heavy neutrinos,* arXiv: 1810.12463, **JHEP 1901 (2019) 164.**

[34] G. Arcadi, J. Heeck, F. Heizmann, S. Mertens, F. S. Queiroz, W. Rodejohann, M. Slezak, *Tritium beta decay with additional emission of new light bosons,* arXiv: 1811.03530, **JHEP 1901 (2019) 206.**

[35] G. Arcadi, Oleg Lebedev, Stefan Pokorski, Takashi Toma, *Real Scalar Dark Mattter: Relativistic Treatment;* arXiv: 1906.07659, **JHEP 1908 (2019) 050.**

[36] G. Arcadi, C. Döring, C. Hasterok, S. Vogl; *Inelastic Dark Matter Nucleus Scattering;* arXiv:1906.10466; **JCAP 1912 (2019), 053.**

[37] G. Arcadi, A. Djouadi, M. Raidal, *Dark Matter Throught the Higgs Portal,* **Phys. Rep. 842 (2020), 1-180.**

[38] G. Arcadi, A. Djouadi, M. Kado, *The Higgs Portal for Vectorial Dark Matter and the Effective Theory Approach: a Reappraisal*, arXiv:2001.10750, ***Phys.Lett.B* 805 (2020) 135427.**

[39] G. Arcadi, G. Busoni, T. Hugle, V. Tenorth, *Comparing 2HDM+ Scalar and Pseudoscalar Simplified Models at LHC,* arXiv:2001.10540, **JHEP 06 (2020) 098.**

[40] G. Arcadi, M. Lindner, J. Martins, F. S. Queiroz, *New Physic Probes: Atomic Parity Violation, Polarized Electron Scattering and Neutrino-Nucleus Coherent Scattering;* arXiv: 1906.04755, **Nuclear Physics B959 (2020) 115158**

[41] T. Alanne, G. Arcadi, F. Goertz, V. Tenorth, S. Vogl, *Model-independent constraints with extended dark matter EFT,* arXiv:2006.07174, **JHEP 10 (2020) 172**

[42] G. Arcadi, S. Profumo, F. S. Queiroz, C. Siqueira, *Right-handed Neutrino Dark Matter, Neutrino Masses and non-Standard Cosmology in a 2HDM,* arXiv: 2007.07920 **(JCAP accettata per la pubblicazione, lettera di accettazione allegata alla domanda).**

[43] G. Arcadi, M. Krauss, D. Meloni, *Dark Matter Interactions in a $S_4 \times Z_5$ flavour symmetry framework,* arXiv:2007.10833, **(Physical Review D accettata per la pubblicazione, lettera di accettazione allegata alla domanda).**

Conference Proceedings

G. Arcadi, P. Ullio, *Aspects of production and kinetic decoupling of non-thermal dark matter*, arXiv:1111.6532**, J.Phys.Conf.Ser. 375 (2012) 012044**, Proceedings for the conference TAUP2011.

G. Arcadi*, Theoretical Models for Dark Matter*, Proceedings of the conference Incontri di Fisica delle Alte Energie, IFAE2014, **Nuovo Cim. C038 (2015) 01, 27.**

G. Arcadi, Yann Mambrini, Mathias Pierre, *Impact of Dark Matter Direct and Indirect Detection on simplified Dark Matter Models,* arXiv:1510.02297 [hep-ph], **PoS EPS-HEP2015 (2016) 396.**

G. Arcadi, *Dark Matter Phenomenology of GUT inspired models,* arXiv: 1511.03203, Proceedings of the TAUP2015 Conference, **J.Phys.Conf.Ser. 718 (2016) no.4, 042003.**

G. Arcadi, Dark Matter and Baryon Asymmetry production from decays of Supersymmetric States, ***J. Phys. Conf. Ser. 689 (2016), 012001****.*

G. Arcadi, Impact of next future Direct Detection Experiments on Dark Portals and Beyond, **EPJ Web of Conferences 136 UNSP 05003.**

M. Lucente, A. Abada, G. Arcadi, V. Domcke, M. Drewes, J. Klaric, *Freeze-in Leptogenesis with three right-handed neutrinos,* **PoS ICHEP2018 (2018) 306.**

G. Arcadi, A. Abada, M. Lucente, *Leptogenesis from tiny Violation of the Lepton Number*, **PoS NOW2018 (2018) 090.**

Lavori non ancora pubblicati

G. Arcadi, A. Bally, F. Goertz, K. Tame-Narvaez, V. Tenorth, *EFT Interpretation of XENON1T Electron Recoil Excess: Neutrinos and Dark Matter,* 2007.08500

Talk plenari a conferenze internazionali

Giu 2020, *Leptogenesis,* conferenza NEUTRINO2020, organizzata dal FERMILAB (Chigago USA) e svoltasi in remoto causa emergenza Covid-19.

Giu 2020, *Connection between DM and flavor,* conferenza DM@LHC, organizzata dalla divisione teorica di DESY (Amburgo, Germania) e svoltasi in remoto causa emergenza Covid-19.

Ott 30, 2019 *Dark Matter Through the Higgs Portals,* Institute's Pascal Astroparticle Symposium 2019.

Ago 31, 2017 *WIMP Dark Matter and Portals",* workshop "Collider Physics and Cosmos, GGI Institute, Arcetri (Italy).

Set 25, 2015 *Review on Dark Portals,* Workshop New Possibilities in Physics of Quarkonia, Institute Henry Poincarrè, Paris (France).

Mar 16, 2015 *3.55 KeV line in Minimal Dark Matter*, Rencontres de Moriond 2015, Electroweak session, La Thuille (Italy).

Apr 09, 2014 *Theoretical Models for Dark Matter*, IFAE2014 Conference, GSSI-LNGS L'Aquila (Italy).

Giu 24, 2012 *Interplay between direct detection and collider for neutralino Dark Matter*, ITN Network Invisibles Meeting, Arcetri, Florence.

Mar 29, 2012 *Gravitino Dark Matter in Tree-Level Gauge Mediation*, ITN Network Invisibles Pre-Meeting, Madrid.

Jun 21, 2010 *Non thermal production of neutralino Dark Matter*, Inifa2010, Frascati, Rome (Italy).

Colloqui di Fisica

Sep 10, 2019 *Particle Dark Matter: Theory and Detection,* Università di Roma Tre.

Mag 17, 2018 *WIMP Dark Matter: from Simplified to more Realistic Models,* University of Heidelberg (Germany).

Relazioni (contributed talks) a conferenze internazionali

Set 25, 2019 *Accurate Relativistic Treatment of the Cosmological Evolution of Real Scalar Dark Matter*, DESY THEORY WORKSHOP 2019, Hamburg Germany.

Set 10, 2018 *Leptogenesis and Dark Matter in Low Energy See-Saw*, NOW 2018 Conference, Ostuni (Italy).

Mag 23, 2018 *Leptogenenesis from Small Lepton Number Violation*, PLANCK 2018 Conference, Bonn (Germany).

Giu 22, 2017 *Probing the WIMP paradigm at future experiments*, Pascos2017 Conference, Madrid (Spain).

Mag 25, 2017 *Augury of Darkness*, Planck2017 Conference, Varsavia (Poland).

Nov 11, 2016 *Dark Matter Beyond (Simple) Wimps*, Theorie LHC France Workshop, IPN Orsay (France).

Set 01, 2016 *Diphoton resonance and Dark Matter*, Higgs Hunting Conference, LPTHE Paris (France)

Giu 23, 2016 *Impact of next future Direct Detection Experiments on Dark Portals*, RICAP2016 Conference, Villa Tuscolana, Frascati (Italy).

Mag 25, 2016 *750 GeV Resonance as Portal to DM Interactions*, GDR@Terascale meeting, Nantes (France).

Ott 13, 2015 *Dark Matter and Baryon Asymmetry production from decays of Supersymmetric States*, 6th Young Researchers Meeting, GSSI Institute, L'Aquila (Italy).

Set 08, 2015 *Impact of Dark Matter Direct and Indirect Detection on (GUT Inspired) Simplified DM models*, TAUP2015 Conference, Torino (Italy).

Lug 24, 2015 *Impact of Dark Matter Direct and Indirect Detection on Simplified DM models*, EPS-HEP 2015 Conference, Wien (Austria).

Giu 15, 2015 *Accurate determination of Baryon and DM abundances in Supersymmetric Scenarios*, ITN 'Invisibles' network workshop, Madrid (Spain).

Apr 16, 2015 *Correlation between ID signals and LHC*, Workshop Off-the-Beaten-Track, ICTP Trieste (Italy).

Gen 16, 2015 *Dark Portal scenarios*, Rencontres de Physique de Particules, Paris (France).

Nov 24, 2014 *Interplay between collider and Dark Matter searches in dark portal scenarios*, ITN Invisibles Workshop, Paris (France).

Mag 28, 2014 *Out-of-Equilibrium Baryogenesis with Gravitino Dark Matter*, Planck2014 Conference, Paris (France).

Dic 02, 2013 *Bayesian Forecast from Dark Matter Direct Detection and LHC*, Physics at the Terascale workshop, Karlsruhe (Germany).

Set 25, 2013 *Minimal Decaying Dark Matter and the LHC*, Desy Theory Workshop 2013, Hamburg (Germany).

Lug 9, 2013 *Correlations between Indirect Detection and Collider Signals in Decaying Dark Matter Scenarios*, ITN Invisibles School+Workshop, Durham (England).

Mag 22, 2013 *Correlation between Indirect Detection and Collider Signals for Decaying Dark Matter*, Planck2013 Conference, Bonn (Germany).

Set 4, 2011 *Accurate estimate of relic density and kinetic decoupling in non-thermal dark matter models*, TAUP 2011, Munich (Germany).

Giu 2, 2011 *Accurate estimate of relic density and kinetic decoupling in non-thermal dark matter models*, Planck 2011, Lisbon (Portugal).

Seminari su invito

Nov 04, 2020 *Collider Prospects for Vector Dark Matter coupled with the Higgs*, Seminario svolto in remote su invito dell'Università di Helsinki (Finlandia).

Mag 21, 2019 *Light Bosons from Tritium Decay*, Laboratori Nazionali di Frascati.

Nov 12, 2018 *From Simplified to Gauge Invariant Realizations of a light Pseudoscalar Portal*, Laboratori Nazionali di Frascati.

Mag 8, 2018 *Evading Dark Matter Direct Detection through light mediatiors and extended Dark Sectors*, ITP Heidelberg (Germany).

Ago 31, 2017 *WIMP Dark Matter and Portals",* workshop "Collider Physics and Cosmos, GGI Institute, Arcetri (Italy).

Mag 16, 2017 *Probing Wimp Paradigm with Direct Detection and Collider*, ITP Heidelberg (Germany).

Feb 27, 2017 *Theoretical Models for Dark Matter*, IFT Madrid (Spain).

Dic 14, 2016 *Evading Direct Detection Constraints in Theoretically Motivated WIMP Scenarios*, University of Goettingen (Germany).

Lug 18, 2016 *Direct Detection Prospects of Single- and Multi-Component Dark Portals*, MPIK Heidelberg (Germany).

Dic 14, 2015 *Review on Dark Portals*, University of Genova (Italy).

Dic 09, 2015 *Dark Portals: From Simplified Models to Theoretically motivated Embeddings*, Laboratori Nazionali di Frascati (Italy).

Apr 24, 2015 *Recent Excesses in Dark Matter Indirect Detection and Possible Interpretations*, DAMPT, Cambridge (England).

Apr 08, 2015 *Dark Matter at Colliders*, Gran Sasso Institute (GSSI), L'Aquila (Italy).

Mar 05, 2015 *Phenomenology of Minimal Decaying Dark Matter Scenarios*, University of Barcellona (Spain).

Nov 26, 2014 Baryogenesis and Dark Matter Production in the Minimal Supersymmetric Standard Model, Institüt of Astrophysics, University of Göttingen (Germany).

Apr 04, 2014 *Out-of-Equilibrium Baryogenesis and Dark Matter Production*, ULB Bruxelles, Belgium.

Nov 25, 2013 *Correlation between Dark Matter Production Mechanisms with Dark Matter Detection and Baryogenesis*, Epfl, Losanne (Switzerland).

Lug 27, 2013 *Minimal Decaying Dark Matter and the LHC*, Laboratoire de Phisique Theorique, Orsay (Paris).

Gen 21, 2013 *Bayesian Forecasts from Dark Matter Direct Detection to LHC*, CP3 Origins Centre, Odense (Denmark).

Nov 26, 2012 *Generation Mechanisms and Collider Prospects of Wimp Dark Matter*, Institüt für Theoretische Physik, University of Göttingen.

Chiara Arina

Curriculum Vitae

Education

2003-2007 **PhD in Physics**, *Università degli Studi di Torino*, Torino (Italy), *Dipartimento di Fisica Teorica*.

Title *Sneutrino phenomenology in supersymmetric models: relevance as Cold Dark Matter in the light of its cosmological and detection properties.*

Supervisor Prof. N. Fornengo

Date 05/12/2007

1998-2003 **Master Sc. in Physics**, *Università degli Studi di Torino*, Torino (Italy), *110/110 e lode*.

Title *Re-summation of QED corrections applied to electron-neutrino scattering.*

Supervisor Prof. G. Passarino

Date 10/04/2003

Working experience

2015–present **Research scientist, PI of Innoviris grant ATTRACT - Brains for Brussels 2015**, Université catholique de Louvain, Louvain-la-Neuve (Belgium).

06–09/2018 **Maternity leave**.

04–07/2016 **Maternity leave**.

2013–2015 **Postdoc**, Institut d'Astrophysique de Paris, Paris (France).
Postdoctoral research associate with Prof. J. Silk.

2012–2013 **Postdoc**, University of Amsterdam, Amsterdam (The Netherlands).
Postdoctoral research associate at the GRAPPA Institute with Prof. G. Bertone.

2010–2012 **Postdoc**, RWTH, Aachen (Germany).
Postdoctoral research associate at TTK with Prof. Y. Wong.

2008–2010 **Postdoc**, Université Libre de Bruxelles, Bruxelles (Belgium).
Postdoctoral fellowship at the Service de Physique Théorique with Prof. T. Hambye and Prof. M. Tytgat.

2008 **Postdoc**, Università degli Studi di Torino, Torino (Italy).
Research associate at the Astroparticle Group, Physics Department, with Prof. N. Fornengo.

Research Interests

High Energy Physics, Cosmology, Dark Matter Phenomenology, Statistical data analysis, Phenomenology of Theories beyond the Standard Model, Black Hole physics, Numerical tools, Neutrino

Physics.

Scientific activities

11/2020 **Invited review talk** at the TOOLS2020 conference, Lyon (France) remote conference (COVID-19 pandemic).

04/2020 **Invited plenary talk** at the DM@LHC 2020 conference (remote talk, COVID-19 pandemic).

04/2020 **Invited tutorial (hands-on) session** at the DMWG Spring workshop (remote talk, COVID-19 pandemic).

02/2020 **Invited talk** at the DMWG t-channel ,CERN.

01/2020 **Invited talk** at the ATLAS common dark matter meeting, CERN.

10/2019 **Invited talk** at the IRN Terascale meeting, Bruxelles (Belgium).

06/2019 **Invited seminar** at Bethe Center for Theoretical Physics, Bonn (Germany)

02/2018 **Invited seminar** at Particle Physics Theory Group, Osaka University, Osaka (Japan).

12/2017 **Invited seminar** at the School of Physics, University of Melbourne, Melbourne (Australia).

06/2017 **Invited talk** at the workshop 'Dark Matter signatures', CP3-Origins, Odense (Denmark).

01/2017 **Invited seminar** at the Technische Universitaet Muenchen, Munich (Germany).

11/2015 **Invited seminar** at HEP@VUB seminar session, Bruxelles (Belgium).

10/2015 **Invited seminar** at the Research Unit meeting, Bonn (Germany).

09/2015 **Invited talk** at the workshop PACIFIC 2015, Moorea (French Polynesia).

08/2015 **Talk** at the international conference SUSY 2015, Lake Tahoe (US).

03/2015 **Invited seminar** at Department of Physics and Astronomy (TEP) of UCLA, Los Angeles (US).

02/2015 **Invited astroparticle colloquium** at SISSA, Trieste (Italy).

01/2015 **Talk** at Rencontre de Physique des Particules 2015, Paris (France).

12/2014 Attended the IAP Colloquium 'The primordial universe after Planck', Paris (France).

11/2014 **Talk** at the X international workshop 'Dark Side of the Universe 2014', Cape Town (South Africa).

11/2014 **Invited Talk** at the workshop 'Interdisciplinary Workshop on Statistical and Analysis Methods in Nuclear, Particle and Astrophysics', ECT*, Trento (Italy).

09/2014 **Talk** at the workshop 'Physics Challenges in the face of LHC-14', IFT, Madrid (Spain).

06/2014 **Invited seminar** at IAP, Paris (France).

06/2014 **Invited talk** at the meeting 'GDR Terascale@Palaiseau', Ecole Polytechnique Paris (France).

05/2014 Attended the 17th International Conference 'From the Planck Scale to the Electroweak Scale', Paris (France).

03/2014 **Invited talk** at the workshop 'Implications of the 125 GeV Higgs Boson: the dark matter and cosmology connection', LPSC Grenoble (France).

02/2014 **Invited seminar** at LUPM, Montpellier (France).

02/2014 **Invited seminar** at LAPTh, Annecy-le-Vieux (France).

02/2014 **Invited seminar** at LPSC, Grenoble (France).

02/2014 **Invited seminar** at IPPP Durham University, Durham (UK).

01/2014 **Talk** at Rencontre de Physique des Particules 2014, Strasbourg (France).

11/2013 **Talk** at PASCOS 2013, 19th International Symposium on Particles, Strings and Cosmology, Taipei (Taiwan).

11/2013 **Invited seminar** for the Dark Matter week at CP3 center, Louvain-la-Neuve (Belgium).

07/2013 **Invited seminar** at Max Plank Institut für Physik, Munich (Germany).

06/2013 **Invited talk** for the Cosmology meeting, University of Amsterdam (Netherlands).

05/2013 **Invited talk** at the workshop 'Hunting for Dark Matter: Building a cross-disciplinary, multi-pronged approach', KITP Santa Barbara (USA).

04/2013 **Invited seminar** at DESY, Hamburg (Germany).

03/2013 **Invited talk** at APS workshop, Stockholm (Sweden).

03/2013 **Invited talk** at BIRS workshop Cosmostats2013, Banff (Canada).

02/2013 **Invited seminar** at IPhT CEA-Saclay, Paris (France).

01/2013 **Invited lecture** at Hamburg/Paris/Oxford Workshop on Astroparticle Physics with Multiple Messengers, Oxford (UK).

12/2012 **Invited seminar** at Institut d'Astrophysique de Paris, Paris (France).

12/2012 **Invited seminar** at the Bethe Center for Theoretical Physics, Bonn (Germany).

11/2012 **Invited seminar** at CP3 center, Louvain-la-Neuve (Belgium).

06/2012 **Talk** at PASCOS 2012, 18th International Symposium on Particles, Strings and Cosmology, Merida (Mexico).

05/2012 **Invited seminar** at Imperial College London (UK).

04/2012 **Invited talk** at the Amsterdam-Paris-Stockholm Workshop (APS), Amsterdam (The Netherlands).

03/2012 **Invited seminar** at the Institute for theoretical Physics, University of Münster, Münster (Germany).

02/2012 **Invited seminar** at LPSC Grenoble (France).

02/2012 **Invited seminar** at Laboratoire Charles Coulomb L2C, Montpellier (France).

09/2011 **Talk** at the DESY Theory Workshop 2011, Cosmology meets Particle Physics: Ideas & Measurements, Hamburg (Germany).

09/2011 **Talk** at TAUP 2011 Conference, Munich (Germany).

05/2011 **Talk** at the 6. Kosmologietag, Bielefeld (Germany).

04/2011 **Invited seminar** at RWTH Aachen (Germany).

11/2010 **Talk** at GDR Terascale 2010, Bruxelles (Belgium).

09/2010 **Talk** at the Horiba International Conference COSMO/CosPA 2010, Tokyo (Japan).

04/2010 **Invited talk** at Inter-University Attraction Pole meeting, Bruxelles (Belgium).

07/2009 **Talk** at International Conference on Topics in Astroparticle and Underground Physics (TAUP) 2009, Rome (Italy).

03/2009 **Talk** at XLIVth Rencontres de Moriond, EW session 2009, La Thuile (Italy).

01/2009 **Talk** at Inter-University Attraction Pole meeting, Louvain-la-Neuve (Belgium).

11/2008 **Invited seminar** at the Service de Physique Théorique, ULB (Belgium).

06/2008 **Talk** at the 4th International workshop 'Dark Side of the Universe 2008', Cairo (Egypt).

03/2008 **Invited seminar** at IPhT CEA-Saclay (France).

02/2008 **Invited seminar** at Istituto de Fisica Corpuscolar, Valencia (Spain).

11/2007 **Invited talk** at EURO-GDR SUSY2007 International Meeting, Bruxelles (Belgium).

Teaching

2016–2017 **Lecturing** the "Astrophysique et éléments d'Astrophysique nucléaire" (LPHY2263) course (8 hours), Physics degree (bachelor), Université catholique de Louvain.

2012–2013 **Lecturing** the "Astroparticle Physics" course (2 lectures), Physics degree (master), University of Amsterdam.

2012–2013 **Lecturing** at the IFTA workshop (2 lectures), Physics degree (bachelor), University of Amsterdam.

2011–2012 **Teaching assistant** for the "General Relativity and Cosmology" course (30 hours), Physics degree (master), RWTH Aachen.

2009–2010 **Teaching assistant** for the "Beyond the Standard Model" course (9 hours), Physics degree (master), Université Libre de Bruxelles.

2007–2008 **Teaching Assistant** for the "Waves, Fluid dynamics and Thermo dynamics" course (12 hours), Physics degree (master), Università degli Studi di Torino.

Student supervision and/or mentoring

Undergraduate students:

2020– **Supervision** of master thesis: Sensitivity of KM3NeT to neutrino line in dark matter simplified models, Veronika Fedotova, UCL/Bologna University.

2019 **Co-supervision** of master thesis: Loop induced processes within MadDM, Daniele Massaro, UCL/Bologna University.

2011 **Supervision** of a bachelor thesis: Dark Matter and Sommerfeld enhancement, Felix Lublasser, RWTH Aachen.

PhD students

2012 - 2013 **Mentoring** H. Silverwood, PhD student of G. Bertone, GRAPPA Institute, Amsterdam University (publication of one paper).

2015 - 2017 **Mentoring** A. Martini, PhD student of F. Maltoni, UCL (publication of one paper), supported partially by the Innoviris ATTRACT grant.

2017- 2020 **Co-supervisor** of Philipp Klose, together with M. Drewes, partially supported by the Innoviris ATTRACT grant.

2017 - 2018 **Supervision** of Federico Ambrogi, UCL, under the MCnet IT funding (publication of one paper).

2018 – **Mentoring** Luca Mantani, PhD student of F. Maltoni, UCL, under the MCnet IT funding (publication of three papers).

Postdocs

2016 Dr. Michele Lucente (publication of one paper).

2019 – Dr. Andrew Cheek (publication of one paper, several projects in progress).

Administrative activities

2017 **Jury member** for the PhD defense of A. Martini, UCL, Louvain-la-Neuve (Belgium).

Since 2017 **External referee** for the French National Research Agency (France).

2015–2017 **Organizer** of the Dark Matter journal club at my current institution CP3 (bi-weekly, on Monday).

Since 2015 **Organizer** of the Dark Matter seminars at my current institution CP3 (once per month).

2014–2015 **Organizer** of the postdoc seminars at IAP, Paris (France).

Since 2013 **Review Editor** of Frontiers in Physics.

Since 2011 **Referee** for scientific journals (JCAP, JHEP, Physical Review D, Nuclear Physics B, Advances in High Energy Physics, Physical Review Letters, European Physical Journal C).

2009–2010 **Responsible** for the website of the Service de Physique Théorique, ULB (Belgium).

Scientific meeting organisation

12/2017 **Organiser** of a Dark Matter workshop at CP3 (3 days, 35 people, 20 talks), UCL (Belgium).

03/2016 **Organizer** of the 6th CosPa meeting at CP3, UCL (Belgium).

12/2013 **Organizer** of third APS workshop (3 days, 40 people, 12 talks), Paris (France).

11/2010 **Organizer** of the TTK jamboree meeting, RWTH Aachen (Germany).

Grants, awards and outreach

10/2015 **Awarded the Innoviris ATTRACT-Brains for Brussels Grant 2015** for 5 years at UCL (700k euros - `http://www.uclouvain.be/591892`).

11/2003 **Awarded national Ph.D. fellowship** at Università degli Studi di Torino (Italy).

2020 **Awarded title** of outstanding referee 2020 from American Physical Society.

2016 **Obtained the status of** "chercheur qualifié" in Belgium.

03/2015 **Obtained Abilitazione Nazionale** for applying to "Professore Associato" positions in Italy.

02/2012 **Obtained Qualification** as "Maître de conférences" in France.

12/2017 **Shortlisted** for the faculty position at the School of Physics, Melbourne (Australia).

03/2015 **Shortlisted** for the faculty position at the Department of Physics and Astronomy of UCLA (US).

10/2014 **Shortlisted** for the Associate Professor, University of Stavanger (Norway).

05/2014 **Shortlisted** for "Maître de conférences" position at LUPM (France).

04/2013 **Shortlisted** for Particle Phenomenology tenure track position, Delta-Institute for Theoretical Physics (Netherlands).

09/2020 **Interview** for the Vera Rubin show @ UCL (Belgium).

04/2015 **Visitor fellowship** for two weeks at CERN (CH).

01/2015 **PRL Editors' suggestion** for the paper 'Dark Matter with Pseudoscalar-Mediated Interactions Explains the DAMA Signal and the Galactic Center Excess'.

05–06/2013 **Visitor position** at KITP Santa Barbara for 3 weeks (US).

02/2008 **Visitor position** at IFIC for 3 weeks, Valencia (Spain).

Chiara Arina
Publication list

Peer-reviewed articles

[1] C. Arina, B. Fuks, L. Mantani, H. Mies, L. Panizzi, and J. Salko, *Closing in on t-channel simplified dark matter models*, `arXiv:2010.07559`, submitted to Phys.Lett.B.

[2] C. Arina, A. Cheek, K. Mimasu, and L. Pagani, *Light and Darkness: consistently coupling dark matter to photons via effective operators*, `arXiv:2005.12789`, submitted to JHEP.

[3] LHC Reinterpretation Forum Collaboration, W. Abdallah et al., *Reinterpretation of LHC Results for New Physics: Status and Recommendations after Run 2*, *SciPost Phys.* **9** (2020), no. 2 022, [`arXiv:2003.07868`].

[4] C. Arina, B. Fuks, and L. Mantani, *A universal framework for t-channel dark matter models*, *Eur. Phys. J. C* **80** (2020), no. 5 409, [`arXiv:2001.05024`].

[5] C. Arina, A. Beniwal, C. Degrande, J. Heisig, and A. Scaffidi, *Global fit of pseudo-Nambu-Goldstone Dark Matter*, *JHEP* **04** (2020) 015, [`arXiv:1912.04008`].

[6] C. Arina, *Impact of cosmological and astrophysical constraints on dark matter simplified models*, *Frontiers in Astronomy and Space Sciences* **5** (2018) 30 , Invited review for the Research Topic 'From the Fermi scale to Cosmology', [`arXiv:1805.04290`].

[7] F. Ambrogi, C. Arina, M. Backovic, J. Heisig, F. Maltoni, L. Mantani, O. Mattelaer, and G. Mohlabeng, *MadDM v.3.0: a Comprehensive Tool for Dark Matter Studies*, *Phys. Dark Univ.* **24** (2019) 100249, [`arXiv:1804.00044`].

[8] C. Arina, M. Backović, J. Heisig, and M. Lucente, *Solar γ-rays as a Complementary Probe of Dark Matter*, *Phys. Rev.* **D96** (2017) 063010, [`arXiv:1703.08087`].

[9] C. Arina, M. Chala, V. Martin-Lozano, and G. Nardini, *Confronting SUSY models with LHC data via electroweakino production*, *JHEP* **12** (2016) 149, [`arXiv:1610.03822`].

[10] C. Arina et al., *A comprehensive approach to dark matter studies: exploration of simplified top-philic models*, *JHEP* **11** (2016) 111, [`arXiv:1605.09242`], top cite 50+.

[11] C. Arina, S. Kulkarni, and J. Silk, *Monochromatic neutrino lines from sneutrino dark matter*, *Phys. Rev.* **D92** (2015), no. 8 083519, [`arXiv:1506.08202`].

[12] C. Arina, M. E. C. Catalan, S. Kraml, S. Kulkarni, and U. Laa, *Constraints on sneutrino dark matter from LHC Run 1*, *JHEP* **1505** (2015) 142, [`arXiv:1503.02960`].

[13] C. Arina, T. Bringmann, J. Silk, and M. Vollmann, *Enhanced Line Signals from Annihilating Kaluza-Klein Dark Matter*, *Phys.Rev.* **D90** (2014) 083506, [`arXiv:1409.0007`].

[14] C. Arina, E. Del Nobile, and P. Panci, *Not so Coy Dark Matter explains DAMA (and the Galactic Center excess)*, *Phys.Rev.Lett.* **114** (2015) 011301, [`arXiv:1406.5542`], top cite 100+.

[15] C. Arina, V. Martin-Lozano, and G. Nardini, *Dark matter versus $h \to \gamma\gamma$ and $h \to \gamma Z$ with supersymmetric triplets*, *JHEP* **1408** (2014) 015, [arXiv:1403.6434].

[16] C. Arina and M. E. Cabrera, *Multi-lepton signatures at LHC from sneutrino dark matter*, *JHEP* **1404** (2014) 100, [arXiv:1311.6549].

[17] C. Arina, *Bayesian analysis of multiple direct detection experiments*, *Physics of the Dark Universe* **5-6** (2014) 1–17, [arXiv:1310.5718].

[18] C. Arina, G. Bertone, and H. Silverwood, *Complementarity of direct and indirect Dark Matter detection experiments*, *Phys.Rev.* **D88** (2013), no. 1 013002, [arXiv:1304.5119].

[19] C. Arina, R. N. Mohapatra, and N. Sahu, *Co-genesis of Matter and Dark Matter with Vector-like Fourth Generation Leptons*, *Phys.Lett.* **B720** (2013) 130–136, [arXiv:1211.0435], top cite 50+.

[20] C. Arina, *Chasing a consistent picture for dark matter direct searches*, *Phys.Rev.* **D86** (2012) 123527, [arXiv:1210.4011].

[21] C. Arina, J.-O. Gong, and N. Sahu, *Unifying darko-lepto-genesis with scalar triplet inflation*, *Nucl.Phys.* **B865** (2012) 430–460, [arXiv:1206.0009].

[22] C. Arina, J. Hamann, R. Trotta, and Y. Y. Wong, *Evidence for dark matter modulation in CoGeNT*, *JCAP* **1203** (2012) 008, [arXiv:1111.3238].

[23] C. Arina and N. Sahu, *Asymmetric Inelastic Inert Doublet Dark Matter from Triplet Scalar Leptogenesis*, *Nucl.Phys.* **B854** (2012) 666–699, [arXiv:1108.3967], top cite 50+.

[24] C. Arina, J. Hamann, and Y. Y. Wong, *A Bayesian view of the current status of dark matter direct searches*, *JCAP* **1109** (2011) 022, [arXiv:1105.5121], top cite 50+.

[25] C. Arina and M. H. Tytgat, *Constraints on Light WIMP candidates from the Isotropic Diffuse Gamma-Ray Emission*, *JCAP* **1101** (2011) 011, [arXiv:1007.2765].

[26] C. Arina, F.-X. Josse-Michaux, and N. Sahu, *A Tight Connection Between Direct and Indirect Detection of Dark Matter through Higgs Portal Couplings to a Hidden Sector*, *Phys.Rev.* **D82** (2010) 015005, [arXiv:1004.3953].

[27] C. Arina, F.-X. Josse-Michaux, and N. Sahu, *Constraining Sommerfeld Enhanced Annihilation Cross-sections of Dark Matter via Direct Searches*, *Phys.Lett.* **B691** (2010) 219–224, [arXiv:1004.0645].

[28] S. Andreas, C. Arina, T. Hambye, F.-S. Ling, and M. H. Tytgat, *A light scalar WIMP through the Higgs portal and CoGeNT*, *Phys.Rev.* **D82** (2010) 043522, [arXiv:1003.2595], top cite 100+.

[29] C. Arina, T. Hambye, A. Ibarra, and C. Weniger, *Intense Gamma-Ray Lines from Hidden Vector Dark Matter Decay*, *JCAP* **1003** (2010) 024, [arXiv:0912.4496], top cite 50+.

[30] C. Arina, F.-S. Ling, and M. H. Tytgat, *IDM and iDM or The Inert Doublet Model and Inelastic Dark Matter*, *JCAP* **0910** (2009) 018, [arXiv:0907.0430], top cite 50+.

[31] C. Arina, F. Bazzocchi, N. Fornengo, J. Romao, and J. Valle, *Minimal supergravity sneutrino dark matter and inverse seesaw neutrino masses*, *Phys.Rev.Lett.* **101** (2008) 161802, [arXiv:0806.3225], top cite 50+.

[32] C. Arina and N. Fornengo, *Sneutrino cold dark matter, a new analysis: Relic abundance and detection rates*, *JHEP* **0711** (2007) 029, [arXiv:0709.4477], top cite 100+.

Conference proceedings

[33] C. Arina, *Review on Dark Matter Tools*, submitted to *PoS* **TOOLS2020**.

[34] C. Arina et al., *Studying dark matter with MadDM: a short user guide* , submitted to *PoS* **TOOLS2020**.

[35] M. Lucente, C. Arina, M. Backović, and J. Heisig, *Probing Dark Matter Long-lived Mediators with Solar γ rays*, *PoS* **EPS-HEP2017** (2017) 628, [arXiv:1710.03947].

[36] C. Arina, *Triplet seesaw model: from inflation to asymmetric dark matter and leptogenesis*, *J.Phys.Conf.Ser.* **485** (2014) 012039, [arXiv:1209.1288].

[37] C. Arina, *Bayes and present dark matter direct search status*, *J.Phys.Conf.Ser.* **375** (2012) 012009, [arXiv:1110.0313].

[38] C. Arina, *Inert Doublet Model and DAMA: Elastic and/or inelastic dark matter candidates*, *J.Phys.Conf.Ser.* **203** (2010) 012041.

[39] C. Arina, *Sneutrino in non minimal supersymmetric models: Relevance as cold dark matter candidate*, *AIP Conf.Proc.* **1115** (2009) 254–259.

[40] C. Arina, *Reconciling dark matter and neutrino masses in mSUGRA*, *Proceedings of XLIVth Rencontres de Moriond, ElectroWeak session* (2009) [arXiv:0905.2394].

[41] C. Arina, *Sneutrino cold dark matter in extended MSSM models*, *Proceedings of XLIIIrd Rencontres de Moriond, ElectroWeak session* (2008) [arXiv:0805.1991].

Other articles

[42] C. Arina et al., *Letter of Interest: EW effects in very high-energy phenomena*, submitted to SnowMass2021, contribution TF/SNOWMASS21-TF7_TF0-EF4_EF0-026.

[43] C. Arina, Invited outreach article for the CERN EP newsletter, to appear in December 2020.

Bibliometric data

- Three top cite 100+ and seven top cite 50+
- Hirsch index (h-index): 20
- Total citations: 1436
- Data from Inspire

I have a proven ability to conduct equally projects alone by publishing as single author, as well as to work well with quite large teams (with 'large' I intend about 15 people, which is considered typically a quite large team in the astroparticle phenomenology field). All these collaborations provided me the ground to construct a wide international network of collaborators all over the world, going from America to Asia. Additionally, I acknowledge the recognition of my work by the scientific community as I have been invited to write two reviews. I am currently being invited every year to give seminars and talks at conferences or workshops (the details are given in my CV) and most notably I have been invited to give a review talk on dark matter tools at the TOOLS2020 international workshop, which was very well received.

Chiara Arina

Research and Teaching Statements

Research interests

From precision cosmology it is established that 80% of the matter content of the universe appears to be in a invisible form dubbed as dark matter (DM), whose properties are mostly unknown. If considered as a particle, its characteristics (non-baryonic, neutral, massive and stable at least on cosmological scales) point to theories beyond the Standard Model (SM) of particle physics. The SM is manifestly successful in explaining our knowledge of the electroweak scale, which is accessible to existing colliders. Nevertheless, it has unresolved theoretical issues and cannot account for instance for a DM candidate nor for the neutrino mass spectrum. These are some motivations to look for theories beyond the SM (BSM) and contain at least stable and neutral particles as DM candidates. Among dozens of DM candidates, interesting are the Weakly Interacting Massive Particles (WIMPs), which naturally lead to the correct relic abundance and are potentially promising for detection by providing a variety of signals at accessible energy scales. **Below my main research interests and the most important results that I have obtained so far are outlined.**[1]

Development of `MadDM` (Ref. [7]): I have supervised the release of `MadDM` v.3.0, a numerical tool to compute particle DM observables in generic new physics models. The new version features a comprehensive and automated framework for DM searches at the interface of collider physics, astrophysics and cosmology and is deployed as a plugin of the `MadGraph5_aMC@NLO` platform, inheriting most of its features. `MadDM` v.3.0 can now provide predictions for indirect DM signatures in astrophysical environments, such as the annihilation cross section at present time and the energy spectra of prompt photons, cosmic rays and neutrinos resulting from DM annihilation. `MadDM` indirect detection features support both $2 \to 2$ and $2 \to n$ DM annihilation processes. In addition, **I have provide the ability to compare theoretical predictions with experimental constraints by including the experimental Fermi-LAT likelihood for gamma-ray constraints from dwarf spheroidal galaxies** and by providing an interface to `PyMultinNest` to perform high dimensional parameter space sampling efficiently.

Complementarity of DM searches (Refs. [2,5,14,15,18,26,27,28]): This investigation strategy is based on **combining results from direct detection and indirect detection experimental data to constrain DM particle physics models**, sometimes complemented with LHC DM searches. Both former search methods are extensively developed by experimental collaborations aiming at detecting WIMPs. At present the Fermi-LAT and AMS 02 satellites and the XENON1T detector have released extremely sensitive exclusion limits, while future astroparticle observatories such as the Cherenkov Telescope Array (CTA), the multi-ton-scale detector LZ will probe most of the DM parameter space in a few-years time. I have used the complementarity among these search methods to obtain unprecedented constraints and forecasts on the DM sector in both model-dependent and model-independent frameworks.

DM and LHC searches (Refs. [1,3,4,6,9,10,12,16,20]): DM LHC searches have been re-casted in the context of simplified DM models and supersymmetry, with the following impact:

[1] The numbers in the references correspond to the papers of my publication list.

1. **Simplified DM models:** If DM is considered a thermal relic, typically LHC mono-X searches fall out the physical model region, whereas relaxing this hypothesis they can probe a significant region of the parameter space. On the contrary for thermal relics, the resonant searches for new mediators reveal extremely more sensitive than the missing energy channel searches. Interestingly direct detection and LHC are sensitive to different portions of the parameter space.
2. **Supersymmetric DM:** By collaborating with the authors of the `SModelS` numerical tool, which recasts simplified model spectra (SMS) constraints of CMS and ATLAS collaborations, I have found that it always occurs to have configurations in which supersymmetric DM escapes all current LHC bounds. To improve the sensitivity of LHC searches to supersymmetric DM candidates, an optimal strategy is to recast mono-lepton or soft-lepton searches in terms of SMS. Generically leptonic signatures are smoking guns for supersymmetric models and might even disentangle the supersymmetric model among the variety of possibilities.

DM model building (Refs. [19,21,23,30,31,32]): These works are motivated by addressing the DM problem and other SM issues in a unique framework.

1. I have been the first in pursuing a full analysis of supersymmetric models accounting for both **DM and neutrino masses**. To supersymmetrize the seesaw mechanism that gives mass to neutrinos, it is necessary to introduce right handed neutrino superfields. Its fermionic fields contribute to the neutrino mass term, while its scalar components modify the sneutrino sector, the superpartner of the neutrino. By virtue of this modification, the sneutrino can be a successful DM candidate in the same way as the best known neutralino. The different nature of the DM particle is relevant for supersymmetric searches at the LHC as it predicts a handful of leptonic signatures.
2. As the mechanism that provides the DM relic density is unknown, it is interesting to investigate scenarios in which the DM presents an asymmetry similarly to the visible sector, namely it is made only by particles or anti-particles. I have successfully proposed a model in which DM and visible matter are generated simultaneously via the Leptogenesis mechanism (hence accounting for neutrino masses as well) mediated by scalar triplets of $\mathrm{SU(2)_L}$. Knowing that baryons and DM have the same initial conditions in the early universe, they must have been generated by the decay of the same field after Inflation, which could be the inflaton itself. I have investigated a Higgs-like inflation model generated by the scalar triplets, finding that slow-roll is compatible with the requirements of co-genesis of visible and asymmetric DM. The numerical results are based on Markov-Chain Monte Carlo techniques.

Bayesian analysis of direct DM searches (Refs. [17,20,22,24]): The interpretation of direct (and indirect) detection experiments in terms of a DM signal is complicated by the presence of astrophysical uncertainties, backgrounds and experiment-specific systematic effects. This multi-parameter inference problem can be addressed in a simple and consistent way using Bayesian statistical methods, widespread in cosmology. **I have applied for the first time these statistical methods (parameter inference and model comparison) to DM direct detection data, demonstrating the relevance of using such techniques.** For DM parameter inference, Bayesian statistics provides results compatible with maximum likelihood analyses if the data are constraining enough, otherwise it alleviates the tension between experimental data sets and exclusion limits, leading to more conservative and robust upper bounds.

Gamma-ray and neutrino phenomenology (Refs. [8,11,13,25,29]): **Gamma rays and neutrinos can be used not only to constrain the WIMP annihilation properties, but to provide an handful of smoking gun signatures.** Kaluza-Klein models with one or more extra-dimensions can lead to a forest of gamma-ray lines in the vicinity of a black hole. This unique signature is in the reach of the CTA observatory, and if ever detected, it will point out the nature of the DM. The detection of

gamma rays directly from the Sun provides insight on the portal mediating between the dark sector and the SM particles, as it should be long lived particle. In the context of using black holes as accelerators to probe BSM physics, neutrino physics reveals as interesting as the gamma-ray signals. The detection of monoenergetic neutrino lines coming from DM annihilation close to the black hole would underline a connection between DM and neutrino physics.

Future Research strategy

The need for DM has been established from almost one century however only its gravitational interaction has been confirmed so far. In this respect, there are two ways of depicting the DM nature: either a modification of general relativity either a matter constituent (a new elementary particle or an aggregate of new particles or SM particles). This latter hypothesis is the most widespread and will be the assumption underlying the rest of the proposal. This is not at all a restrictive hypothesis, as the viable mass range for the DM spans 90 orders of magnitude. The uncertainty about its interaction cross section with ordinary matter is even larger, as DM does not necessarily need to interact with the SM particles. In the past decades, the class of scenarios that has received the biggest attention is the WIMP category, the main reason being that WIMPs are produced (genesis) in the early universe with the same mechanism as ordinary matter (known as freeze-out), hence are thermal objects (the genesis does not depend on initial conditions) and have necessarily an interaction with the SM particles. The fact that this interaction is of the order of the electroweak scale, around 0.1 pb for GeV masses, is what has made WIMPs so popular: (i) experiments in the 90's started to be sensitive to exactly that ballpark and (ii) WIMPs appear in the most popular Beyond the SM (BSM) theories. Since then, experiments have become more and more sensitive and have developed in the many directions WIMPs can be searched for, however no sign of detection so far. Hence, the model parameter space, which was somehow confined (WIMPs occupy a very small portion of the whole DM parameter space) has lately started to grow and spread above and below the TeV and GeV scales respectively. The widening of the DM landscape is due to either new avenues and new DM candidates that have emerged in, like WIMPs, highly motivated theoretical results or appealing experimental data either old well motivated proposals that have been revisited in the light of new experimental data or improved analyses, see e.g. (Battaglieri2017, Beacham2020). The first category includes in general hidden sector models, FIMPs (Feebly Interacting Massive Particles), SIMPs (Strongly Interacting Massive Particles) and ALPs (Axion-like Particles) (see e.g. Pospelov2008, Hall2010, Antipin2015, Arina2015, Dolan2015, Daci2015, Bernal2017). The second category includes for instance the QCD axion, super-heavy and/or composite candidates, macroscopic DM and PBHs. This list is by no means exhaustive but is just meant to give an idea of the zoo of candidates and the model subdivisions. All these models have been explored to different extents in the literature, some have been comprehensively investigated (FIMPs, PBHs, axions), other much less (super-heavy candidates, composite DM). New avenues entail as well qualitatively different genesis mechanisms in the early universe (e.g. freeze-in, dark freeze-out, superWIMP, reannihilation, cannibalism, non-thermal DM) and/or experimental implications (e.g. multi-scatter direct detection, electronic recoil direct detection, long lived particles LLPs). This calls for the need of a strategy to comprehend and organize the various facets of DM models and their signatures, in order to maximise the experimental sensitivity and select the models which are compatible with existing data.

The subdivision is done as a function of the DM mass, as this is the key characteristic to select the best suited experimental search to tackle it, as far as it concerns the elementary particle physics models for DM. This also holds true for macroscopic DM and PBHs, which are typically heavier than the Planck mass ($M_{\rm pl}$), and have common experimental signatures, while their production mechanism is completely different. Also in the case of elementary particles, the genesis mechanism is not necessarily the proper indicator for categorising the DM for a systematic approach. For example, both DM particles below the GeV (e.g. FIMPs) and super-heavy DM (Kolb2017) can achieve the correct relic density via the freeze-in mechanism, but only the former category can be detected with LLPs, while the latter being way too heavy to be produced at any intensity or high energy

experiment. The DM models will be regrouped into four categories:

1. Few keV to 100 TeV. WIMPs, which are not even slightly ruled out, are viable from GeV up to 100 TeV in the mass scale, however the most common theoretical models describing them are more and more fine-tuned. In the same mass range, new hidden scenarios encompass DM models with extended dark sectors that might be almost completely decoupled from the SM one (FIMPs), making their detection a very challenging task, which requires new strategies.
2. 10^{-22} eV to keV. Here lives ultra-light non-thermal bosonic DM, such as ALPs and dark photons.
3. 100 TeV to $M_{\rm pl}$. Two main categories of candidates exist with opposite interaction strength: (i) super-heavy DM, which may interact only gravitationally; (ii) SIMPs, which interact strongly among themselves and with SM particles and can give rise to composite DM models. In general targeted indirect and direct searches can probe part of this parameter space, however both categories haven't been so far explored comprehensively and there is room for improuvment to propose new experimental directions.
4. Planck Mass to multi-Solar masses. Giving up the idea of DM as being a particle constituent, composite DM objects dominate here, first with Macroscopic objects called MACROs (arising from strongly interacting hidden sectors or from the SM QCD sector) and finally with Primordial Black Holes (PBHs). The interest on PBHs, proposed long time ago has experienced a huge revival after the first detection in 2016 of gravitational waves by the LIGO/VIRGO collaboration.

In each category, it is relevant to investigate what are the main genesis mechanism of the most widespread models, as well as the associated experimental signatures. This will allow us to list the predictions needed to confront a certain mass window with the data. These predictions, which will be addressed in the most general way possible, i.e. formulated in terms of simplified models to maximize their coverage, are the central outcome of my research project. The predictions will be encoded into a comprehensive numerical platform in order to build a software tool capable of handling any DM model, irrespective of its composition or candidate mass. This software will then permit the user to confront his/her model with a large variety of experimental data and limits in order to determine the parameter space consistent with observations. **This plethora of very different DM models makes it difficult to study all the possible scenarios efficiently. In order to select the DM models, which are consistent with experimental observations, it is necessary to combine the maximum amount of available experimental information. This calls for the continuous development of a platform for comprehensive DM studies and for the identification of new directions for the experimental searches to look for DM signatures.** The building of a comprehensive framework for analysing DM models in the spirit of (see e.g. Arina2016, Arina2019, Arina2020a, Arina2020b, Arina2020c), exploiting all viable experimental probes, is ongoing for a very limited part of the mass range which encompasses WIMPs and partly FIMPs. The most notable endeavours are the numerical tools DarkSUSY (Bringmann2018), `MicrOMEGAs` (Belanger2018), the impressive global tools developed by the `GAMBIT` collaboration (see e.g. Kvellestad2019),and the `MadDM` code which I have developed in (Ambrogi2019), which is based on the MadGraph platform (Alwall2015) and has the capability of computing DM observables for any BSM model from MeV to hundreds of TeV, assuming the relic density is achieved via standard freeze-out. At the moment, there is an increasing interest in the community to sub-GeV models and PBHs and experimental/theoretical proposals to tackle them are developing very fast, betting on short-time scale and low cost probes. Nonetheless a wide range of DM scenarios remain mostly uncovered. My future research line aims at unifying our knowledge in the whole available mass range of the theoretical landscape by providing an original and unique framework within which to confront any DM model with experiments, development which is relevant in the light of the HEP software

document vision (Albrecht2019). **I will deploy a research strategy that encompasses data analysis and numerical coding with advanced techniques.** I have the right expertise to pursue this proposal, having for instance a throughout knowledge of global fits with advanced techniques (see e.g. Arina2011,Arina2012,Arina2014).
This research direction is very timely with respect to the current and future experimental situation. For WIMPs, as these candidates are not ruled out (Leane2018), the search program foresees the deployment of big direct detection experiments such as LZ (Akerib2018) and DARWIN (Aalbers2016), the use of the Large Hadron Collider (LHC) in its high-luminosity (HL) phase (Bruning2015). **I am already actively participating to CERN e-groups (DMWG with the white paper on t-channel simplified models and the LHC Reinterpretation forum, Abdallah2020) and I am planning to invest more efforts in future collider developments in view of my research project, such as the muon collider proposals (Ellis2019)**. The future indirect detection of DM is also bright and foresees for instance the Cerenkov Telescope Array (CTA, Ong2019) and **the neutrino telescope KM3NeT (Gozzini2019), with which I have already started a fruitful collaboration (with S. Basegmez) to study simplified models providing neutrino lines with an angular power spectrum analysis (Dekker2019).** For light DM (below 5 GeV), the SHiP beam dump experiment (Alekhin2016) is also foreseen in 15 years of time. Alongside these big projects, experimentalists and theorists are (i) trying to re-use the current resources to build small sensitive detectors targeting a variety of specific signatures and (ii) building innovative small scale detectors sensitive to new detection mechanisms. In the former category fall FASER (Feng2018), MATHUSLA (Curtin2019), NA62 (Cortina2017), CODEX-b (Alimena2019), SeaQuest (Aidala2017), to name a few, which are mostly fixed target experiments using the facilities already in place at CERN or FermiLab. In the latter category fall for instance SENSEI (Crisler2018), iAXO and JURA (see (Battaglieri2017) for details), covering the whole sub-GeV and ultra-light DM range. Hence the experimental efforts for DM searches are not declining, as feared, after all the unsuccessful searches so far; on the contrary, the new trend for short timescale, low cost and/or 'side-effect' experiments are gathering momentum. Summarising, the future research goal can be split into the following specific objectives:

1. To classify DM models of particle physics from keV to Planck mass scale in terms of simplified models and to determine all viable and new signatures exploitable in experimental searches;
2. To build a platform (numerical tool) connecting the theoretical models to the most relevant and promising experiments in each mass range;
3. To extend the strategy outlined above to ultra-light and macroscopic DM models to cover the complete mass window, encompassing astrophysical/cosmological tools in the numerical platform.

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Teaching project

During my postdoctoral experiences, I have taken every opportunity to teach, as I believe it is a primary experience, complementary to research, for an academic career.
I have been lecturing for different 'Astroparticle physics' courses at bachelor and master level. Most notably the bachelor course at UvA has been an interesting and enriching experience, as it was set up as a workshop to make the students participating with their own ideas during the class. I formulated the lecture on the basis of active learning. For instance, after introducing the key concepts, we discussed about how the formula should look like intuitively until we reached the right expression. Then I used the hands-on approach, asking the students how they would compute the formula. Each of them employed what they thought to be the best method to build up all the pieces of the master formula in `Mathematica`. Of course, during this phase, I helped them in solving bugs and doubts. Eventually, all students participated actively and wrote a simple code to get the result, some with more effort, some with less, as every one learns in a unique way. When I started my position at UCLouvain, I postulated successfully for lecturing part of the 'Astrophysique et éléments de physique nucléaire' course at master level, where I could freely choose the format of the lectures and the level of technicality.
I have been teaching assistant for various courses at bachelor and master level. Usually, tutorial classes aim at working on applied problems to understand and clarify the material presented in the lectures. My tutorials at RWTH on 'General Relativity' improved the most my experience. Students were divided into small working groups. Certainly, the work in groups can have its disadvantages, but I found that students learn better and make more progresses when they confront themselves and discuss to find the solution. After an assignment was turned in, I got it graded, back to the students and provided handwritten solutions as appropriate. Students appreciated, and it was useful to determine what parts I needed to re-emphasize and whose students I had to follow with greater attention.
Even though my teaching experience does not consist in a large volume, it still does cover a wide spectrum of situations and it is of international nature. Indeed, I have been teaching in several universities, in english, italian and french. All these experiences have been enriching to different extents. The pedagogical approach required in each university is proper to the cultural environment of the country, to the number of students and to the topic taught. In this respect I believe to be able to deal without difficulties to a variety of new courses. For instance, I am in favor of using technology in my classes if needed, *e.g.* to show plots or simulations, otherwise I believe that the best way students learn theoretical material is with the blackboard technique. I never had the chance to give the same course multiple times while with an academic position I will be able to see what can be improved, what really works and to modify accordingly my teaching methods. Distance learning, imposed now by the COVID-19 pandemic, will affect future pedagogical method. Besides technical issues, the main challenge is to avoid students dropout, which can be addressed by constantly interact with them throughout the platforms available within the university.
With my long-term position at UCLouvain, I have deepened my experience in pedagogical projects by supervising students at different stages of their education. At CP3, I have been basically responsible for the supervision of most of the DM projects in the past few years (PhD students: L. Mantani, D. Massaro, P. Klose in co-supervision with M. Drewes, F. Ambrogi; master students: D. Massaro in co-supervision with the postdoc J. Heisig, V. Fedotova). Everyone has his own learning capabilities and requires more or less commitment to elaborate new concepts and produce results, thus I adapt my way of following his/her progress. In case of young inexperienced students, such as master students, I even plan daily meeting if needed. In some cases, the student is very smart and is

already rather independent in finding its own way to address new problems, doing literature searches and solve technical issues, but might need guidance for disseminating his/her results. Overall, it is enjoyable to see how the student attitude evolves after a few months/years of working, due to their learning and to their newly acquired independent thinking.

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em

Emanuele Angelo Bagnaschi

Current position

10/2018 - present **Postdoctoral researcher**, *PSI*, Villigen, Switzerland.
Member of the LTP theory group under the supervision of Dr. Michael Spira.

Education

10/2011–09/2014 **Ph.D. in Particle Physics**, *Université Paris Diderot*, Paris, *Mention très honorable avec les félicitations du jury.*

10/2009–10/2011 **Laurea Magistrale (M. S.) in Physics**, *Università degli studi di Milano*, Milano, *110/110 cum laude.*

10/2004–10/2009 **Laurea Triennale (B. S.) in Physics**, *Università degli studi di Milano*, Milano, *110/110 cum laude.*

Doctoral thesis

Title *Precision phenomenology at the LHC and characterization of theoretical uncertainties*

Supervisor Prof. Matteo Cacciari (Université Paris Diderot-Paris 7)

Master thesis

Title *Implementation of the gluon fusion process in the POWHEG framework in the SM and in the MSSM*

Supervisors Prof. Alessandro Vicini (University of Milano) and Prof. Giuseppe Degrassi (University of Rome 3)

Bachelor thesis

Title *Extension of harmonic polylogarithms to the complex plane*

Supervisor Prof. Alessandro Vicini (University of Milano)

Experience

10/2014–09/2018 **Postdoctoral researcher**, *DESY*, Hamburg, Germany.
Member of the DESY theory group under the supervision of Dr. Georg Weiglein.

09/2012–12/2012 **Internship**, *Wolfram Research Inc.*, Champaign, IL, USA.
Top-level implementation in Mathematica of Mathieu functions. This internship was organized in the framework of the LHCPhenonet Initial Training Network.

2008–2010 **System administrator for the LCM laboratory**, *Department of Physics of the University of Milan*, Milan, Italy.
The Laboratorio Calcolo e Multimedia (LCM) cluster has more than four hundred active users and it is composed of about forty nodes, three servers (for various tasks - NFS server, web server and log server), four firewall/gateway systems and a dedicated batch farm for computing intensive application that I personally built with the collaboration of another staff member and that I maintained alone personally for more than a year. The computing farm, used by members of the Theoretical Physics group, consists of several clients connected in a double gigabit-ethernet/Infiniband network and managed by TORQUE/MAUI. All systems run Debian Linux.
This work was funded by a joint private-public partnership of the Department of Physics and Messagenet (`http://www.messagenet.it/`).

07/2010-08/2010 **Summer student**, *CERN*, Geneva, Switzerland.
Automation of CERN accounting data collection for the World Large Computing Grid (WLCG). The task was solved by writing a Python program that interfaced to several database and monitoring systems to collect the data. The latter were in turn presented to the user through a Django-based web interface.

Fellowships

2014-2018 **DESY**, Hamburg, Germany.
Fellowship of the SFB676 collaborative research center.

2011-2014 **Marie Curie Early Stage Researcher (ESR) doctoral fellowship**.
From the LHCPhenonet European initial training network (`http://www.lhcphenonet.eu/`).

Habilitations

- ASN2019 – habilitation to the role of associate professor in Italy ("Professore universitario di seconda fascia").

Research areas

- Collider physics.
- Monte Carlo event generators.
- Precision physics of the Higgs and electroweak sectors.
- BSM physics at collider.
- Global likelihood studies of BSM models.
- Interplay between collider and non-collider experiments in the quest for dark matter.
- Computational physics, with a specific interest in high-performance software and technologies for scientific computing.

Student supervisions

2015 **Julia Gehrlein, summer student**, *DESY*, Hamburg, Germany.
Revisiting Higgs production at LEP. Co-supervision with Dr. Georg Weiglein.

2017 **Margarita Gavrilova, summer student**, *DESY*, Hamburg, Germany.
A re-appraisal of Higgs production in vector boson associated production in the 2HDM. Co-supervision with Dr. Georg Weiglein and Dr. Stefan Liebler.

2017 **Roberto Corral Lopez, summer student**, *DESY*, Hamburg, Germany.
MSSM Higgs scenarios in light of the current LHC constraints. Co-supervision with Dr. Georg Weiglein and Dr. Stefan Liebler.

2018 **Sebastian Trifa, MSci project student**, *U. Bristol*, Bristol, United Kingdom.
Global study of DMSM with a vector mediator. Co-supervision with Dr. Henning Flächer.

2018 **Thea Engler, summer student**, *DESY*, Hamburg, Germany.
MSSM Higgs scenarios with Heavy Higgs decay to electroweakinos. Co-supervision with Dr. Georg Weiglein and Dr. Tim Stefaniak.

2018 **Alexander Spies, summer student**, *DESY*, Hamburg, Germany.
MSSM Higgs scenarios with Heavy Higgs decay to staus. Co-supervision with Dr. Georg Weiglein and Dr. Tim Stefaniak.

2019 **Gabriele Vergani, bachelor student**, *U. Milano*, Milano, Italy.
Boosted top quark tagging with neural networks. Co-supervision with Prof. Alessandro Vicini.

2019 **Ian Yi En Pang, bachelor student**, *NTU Singapore/CERN*.
Global likelihood study of the CMSSM in light of the latest experimental constraints. Co-supervision with Prof. John Ellis.

2019 **Edwin Goh Duo Yao, bachelor student**, *NTU Singapore/CERN*.
Global likelihood study of a leptophilic vector dark matter simplified model. Co-supervision with Prof. John Ellis.

Scientific responsibilities

- Co-organizer of the *LHCPhenonet workshop on particle physics*, Paris, France, 4-6 June 2014.
- Organizer of the *12th KUTS workshop*, PSI, Switzerland, 25-26 June 2020 (moved to 2021 due to the coronavirus pandemic).
- Co-convener of the electroweak session of the 2020 International Workshop on the High Energy Circular Electron Positron Collider, Shanghai, China, 26-28 October 2020.
- Co-organizer of the LTP Thursday colloquia at PSI (2018 - present).
- Organizer of the LTP Theory seminars at PSI (2019 - present).

Working groups and forums

- Participation and contributions to the Higgs Cross Section Working Group (HXSWG).
- Theory convener of the MSSM subgroup of the HXSWG (2020 - present).
- Participation and contributions to the Electroweak Working Group (EWWG).
- Participation to the Forum on the Interpretation of the LHC Results for BSM studies.
- Participation and contributions to KUTS working group on the Higgs mass prediction in SUSY models.

Association and society memberships

- Marie Curie Alumni Association.
- Deutsche Physikalische Gesellschaft e.V..

Other academic activities

- I presented my scientific activity at 9 seminars in research institutes.
- Reviewer for the European Physical Journal C (EPJC).
- Reviewer for the Journal of High Energy Physics (JHEP).
- Visiting researcher at the U. Bristol (2017 - present).
- Visiting scientist (VISC) at CERN (2019 - present).

Interaction with the private sector

- Through U. Bristol, collaboration with Oracle to understand the feasibility of using their bare-metal cloud services for particle physics research (2017-2018).

Publications

1. E. Bagnaschi, G. Degrassi, P. Slavich, and A. Vicini. *Higgs production via gluon fusion in the POWHEG approach in the SM and in the MSSM.* JHEP, 1202:088, 2012
2. E. Bagnaschi, R. Harlander, S. Liebler, H. Mantler, P. Slavich, et al. *Towards precise predictions for Higgs-boson production in the MSSM.* JHEP, 1406:167, 2014
3. E. Bagnaschi, G. F. Giudice, P. Slavich, and A. Strumia. *Higgs Mass and Unnatural Supersymmetry.* JHEP, 1409:092, 2014
4. E. Bagnaschi, M. Cacciari, A. Guffanti, and L. Jenniches. *An extensive survey of the estimation of uncertainties from missing higher orders in perturbative calculations.* JHEP, 02:133, 2015
5. K. J. de Vries et al. *The pMSSM10 after LHC Run 1.* Eur. Phys. J., C75(9):422, 2015
6. E. Bagnaschi and A. Vicini. *The Higgs transverse momentum distribution in gluon fusion as a multiscale problem.* JHEP, 01:056, 2016
7. E. A. Bagnaschi et al. *Supersymmetric Dark Matter after LHC Run 1.* Eur. Phys. J., C75:500, 2015

8. E. Bagnaschi, R. V. Harlander, H. Mantler, A. Vicini, and M. Wiesemann. *Resummation ambiguities in the Higgs transverse-momentum spectrum in the Standard Model and beyond.* JHEP, 01:090, 2016
9. E. Bagnaschi, F. Brümmer, W. Buchmüller, A. Voigt, and G. Weiglein. *Vacuum stability and supersymmetry at high scales with two Higgs doublets.* JHEP, 03:158, 2016
10. E. Bagnaschi, J. Costa, K. Sakurai, et al. *Likelihood Analysis of Supersymmetric SU(5) GUTs.* Eur. Phys. J., C77(2):104, 2017
11. E. Bagnaschi, M. Borsato, K. Sakurai, et al. *Likelihood Analysis of the Minimal AMSB Model.* Eur. Phys. J., C77(4):268, 2017
12. E. Bagnaschi, J. Pardo Vega, and P. Slavich. *Improved determination of the Higgs mass in the MSSM with heavy superpartners.* Eur. Phys. J., C77(5):334, 2017
13. E. Bagnaschi, K. Sakurai, et al. *Likelihood Analysis of the pMSSM11 in Light of LHC 13-TeV Data.* Eur. Phys. J., C78(3):256, 2018
14. J. C. Costa, E. Bagnaschi, K. Sakurai, et al. *Likelihood Analysis of the Sub-GUT MSSM in Light of LHC 13-TeV Data.* Eur. Phys. J., C78(2):158, 2018
15. J. Gomes, E. Bagnaschi, I. Campos, M. David, L. Alves, J. Martins, J. Pina, A. López-García, and P. Orviz. *Enabling rootless Linux Containers in multi-user environments: the udocker tool.* Comput. Phys. Commun., 232:84–97, 2018
16. E. Bagnaschi, F. Maltoni, A. Vicini, and M. Zaro. *Lepton-pair production in association with a $b\bar{b}$ pair and the determination of the W boson mass.* JHEP, 07:101, 2018
17. E. Bagnaschi et al. *Supersymmetric Models in Light of Improved Higgs Mass Calculations.* Eur. Phys. J., C79(2):149, 2019
18. E. Bagnaschi, J. Costa, K. Sakurai, et al. *Global Analysis of Dark Matter Simplified Models with Leptophobic Spin-One Mediators using MasterCode.* Eur. Phys. J., C79(11):895, 2019
19. E. Bagnaschi et al. *MSSM Higgs Boson Searches at the LHC: Benchmark Scenarios for Run 2 and Beyond.* Eur. Phys. J., C79(7):617, 2019
20. E. Bagnaschi, G. Degrassi, S. Paßehr, and P. Slavich. *Full two-loop QCD corrections to the Higgs mass in the MSSM with heavy superpartners.* Eur. Phys. J., C79(11):910, 2019
21. E. Bagnaschi and A. Vicini. *A new look at the estimation of the PDF uncertainties in the determination of electroweak parameters at hadron colliders.* Submitted to PRL, 2019

Reports and notes

1. S. Dittmaier, S. Dittmaier, C. Mariotti, G. Passarino, R. Tanaka, et al. *"Handbook of LHC Higgs Cross Sections: 2. Differential Distributions".* arXiv, 1201.3084, 2012
2. S. Heinemeyer et al. *"Handbook of LHC Higgs Cross Sections: 3. Higgs Properties".* arXiv, 1307.1347, 2013
3. E. Bagnaschi et al. *Benchmark scenarios for low* $\tan\beta$ *in the MSSM.* LHCHXSWG-2015-002, 2015
4. D. de Florian et al. *Handbook of LHC Higgs Cross Sections: 4. Deciphering the Nature of the Higgs Sector.* arXiv, 1610.07922, 2016
5. E. Bagnaschi, P. Bechtle, J. Haller, R. Kogler, T. Peiffer, T. Stefaniak, and G. Weiglein. *Global SM and BSM Fits using Results from LHC and other Experiments.* In J. Haller and M. Grefe, editors, *Particles, Strings and the Early Universe: The Structure of Matter and Space-Time*, pages 203–230. 2018
6. J. Alison et al. *Higgs boson potential at colliders: Status and perspectives.* Rev. Phys., 5:100045, 2020
7. W. Abdallah et al. *Reinterpretation of LHC Results for New Physics: Status and Recommendations after Run 2.* SciPost Phys., 9(2):022, 2020

Conference proceedings

1. E. Bagnaschi and L. Jenniches. *Missing higher-order theoretical uncertainties in a Bayesian statistics.* Proceedings, 49th Rencontres de Moriond on QCD and High Energy Interactions, pages 301–308, 2014
2. E. Bagnaschi. *Estimation of uncertainties from missing higher orders in perturbative calculations.* Proceedings, 50th Rencontres de Moriond, QCD and high energy interactions, pages 131–134, 2015

3. E. A. Bagnaschi. *Prospects for SUSY discovery after the LHC Run 1.* PoS, EPS-HEP2015:183, 2015
4. E. A. Bagnaschi. *Prospects for SUSY dark matter after the LHC Run 1.* PoS, EPS-HEP2015:411, 2015
5. E. Bagnaschi. *Matching uncertainties in the prediction of the Higgs boson transverse momentum in the SM and beyond.* PoS, LHCP2016:077, 2016
6. E. Bagnaschi. *Low-energy SUSY facing LHC constraints.* Nuovo Cim., C40(5):190, 2018

Schools, workshops and conferences

- I have attended 3 schools, 35 workshops, 17 conferences and 20 meetings.
- I have presented my scientific activity in 39 talks of which 9 were invited ones.
- I have designed one poster.
- List of events where I have presented my work
  - *LHCPhenonet Winter School 2012*, Ascona, Switzerland, 22-29 January 2012. **Contributed talk (student session)**, "Higgs boson production in the POWHEG approach in the SM and in the MSSM".
  - *LHCPhenonet Annual Meeting 2012*, Durham, United Kingdom, 19-22 March 2012. **Contributed talk**, "Higgs boson production in the POWHEG approach in the SM and in the MSSM".
  - *Higgs Hunting 2012*, Orsay, France 18-20 July 2012. **Contributed talk (student session)**, "Developments in Higgs production through gluon fusion in the SM and in MSSM in the POWHEG framework".
  - *GDR Terascale@Annecy*, Annecy, France, 28-30 October 2013. **Contributed talk**, "Effect of quark masses in gluon fusion processes: a theoretical review".
  - *Rencontres de Moriond: QCD and High Energy interactions*, La Thuile, Italy, 22-29 March 2014. **Contributed talk**, "Missing higher order theoretical uncertainties in the Cacciari-Houdeau framework: extension to hadronic observables".
  - *LHCPhenonet workshop on particle physics*, Paris, France, 4-6 June 2014. **Contributed talk**, "QCD theoretical uncertainties in a Bayesian framework".
  - *BSM Parameter Fitting Workshop*, DESY, Hamburg, 29-30 September 2014. **Contributed talk**, "Characterization of Theoretical Uncertainties in Higgs Phenomenology".
  - *Heraeus Seminar: Physics Landscape after the Higgs discovery at the LHC*, Bad Honnef, Germany, 4-7 November 2014. **Contributed poster**, "Towards precise predictions for Higgs boson production in the MSSM"
  - *Higgs (N)NLO MC and Tools Workshop for LHC RUN-2*, CERN, Switzerland, 17-19 December 2014. **Contributed talk**, "Higgs p_T in gluon fusion beyond the Standard Model".
  - *Rencontres de Moriond: QCD and High Energy interactions*, La Thuile, Italy, 21-28 March 2015. **Contributed talk**, "Estimation of uncertainties from missing higher orders in perturbative calculations".
  - *The 10th Workshop of the LHC Higgs Cross Section Working Group*, CERN, Switzerland, 15-17 July 2015. **Contributed talk**, "Towards precise predictions for pT Higgs distributions in BSM physics".
  - *European Physical Society (EPS) conference on High Energy Physics 2015*, Vienna, Austria, 22-29 July 2015. **Contributed two talks**, "Prospects for SUSY dark matter after the LHC Run 1" and "Prospects for SUSY discovery after the LHC Run 1 ".

- *2nd Workshop REF 2015 (Resummation, Evolution, Factorization)*, DESY, Hamburg, Germany, 02-03 November 2015. **Invited talk**, "The Higgs transverse momentum in gluon fusion as a multiscale problem: ambiguities and predictions in different pt-resummation frameworks".
- *XI ATLAS Italia workshop on Run 2*, Cosenza, Italy, 04-06 November 2015. **Invited talk**, "Prospects for BSM Higgs boson phenomenology at Run 2".
- *Milano Christmas meeting 2015*, Milano, Italy, 21-23 December 2015. **Contributed talk**, "Higgs mass and unnatural Supersymmetry".
- *4th KUTS workshop*, Heidelberg, Germany, 20-22 January 2016. **Contributed talk**, "Heavy SUSY with a light THDM".
- *Fourth Annual Large Hadron Collider Physics Conference (LHCP2016)*, Lund, Sweden, 13-18 June 2016. **Invited talk**: "Resummation ambiguities in the Higgs transverse-momentum spectrum in the Standard Model and beyond".
- *Matter and the universe meeting*, Mainz, Germany 12 December 2016. **Contributed talk**: "Higgs mass computation in BSM".
- *Milano Christmas workshop 2016*, Milano, Italy, 22 December 2016. **Contributed talk**: "Perspective for Supersymmetry after current LHC runs".
- *6th KUTS workshop*, Aachen, Germany, 23-25 January 2017. **Contributed talk**: "Improved estimation of the EFT uncertainty in the determination of the Higgs mass with heavy superpartners".
- *Les Rencontres de Physique de la Vallée d'Aoste (La Thuile 2017)*, La Thuile, Italy, 05-11 March 2017. **Invited talk**: "Low-energy SUSY facing LHC constraints".
- *29th Rencontres de Blois*, Blois, France, 28 May/2 June 2017. **Invited talk**: "Perspectives on the Higgs p_T as a probe of BSM physics".
- *QCD@LHC 2017*, Debrecen, Hungary, 28 August/01 September 2017. **Invited talk**: "Status of QCD corrections for BSM Higgs physics"; **Contributed talk**: "$l\bar{l}\ b\bar{b}$ associated production and its impact on the W mass measurement".
- *11th Annual meeting of the Helmoltz Alliance "Physics at the Terascale"*, Hamburg, Germany, 27-29 November 2017. **Contributed two talks**: "Perspectives on the pMSSM11 in light of current LHC results"; "Container technology for phenomenology tools: the udocker middleware suite".
- *(Re)interpreting the results of new physics searches at the LHC*, CERN, Switzerland, 14-16 May 2018. **Invited talk**: "Perspectives on the pMSSM11 in light of current LHC results".
- *9th KUTS workshop*, Würzburg University, Würzburg, Germany, 16-18 July 2018. **Contributed talk**: "Update on the EFT Higgs mass computation in FlexibleSUSY"
- *SUSY2018*, Barcelona, Spain, 23-27 July 2018. **Contributed four talks**: "Towards high-precision for high-scale SUSY: status and perspectives on the EFT Higgs-mass computation in FlexibleSUSY"; "Global perspectives on dark matter simplified models"; "Prospects for SUSY discovery in light of LHC Run 2 results"; "Prospects for SUSY dark matter in light of LHC Run 2 results".
- *10th KUTS workshop*, Dresden, Germany, 8-10 April 2019. **Contributed talk**: "A preliminary study of effects and approximations in the SM matching at 2-loops".
- *KIT-NEP '19*, Karlsruhe, Germany, 7-9 October 2019. **Invited talk**: "Vacuum stability and supersymmetry at high scales with two Higgs doublets".

- *LHC EW precision sub-group workshop*, CERN, Switzerland, 14-18 October 2019. **Contributed talk**: "A new look at the estimation of the PDF uncertainties in the determination of electroweak parameters at hadron colliders".
- *Ultimate precision at hadron colliders workshop*, Institut Pascal, Paris-Saclay, France, 25-29 November 2019. **Contributed talk**: "Revisiting the role of bin-bin correlations in PDF uncertainties for the M_W measurement".
- *Kick-off meeting "Precision Electroweak Physics at the CERN Large Hadron Collider", PRIN 2017F28R78*, Scuola Normale Superiore, Pisa, Italy, 7th February 2020. **Contributed talk**: "Impact of the PDFs on the determination of MW".
- *LHC-EW WG: Jets and EW bosons meeting*, online, 16 March 2020. **Invited talk**: "Matching uncertainties and choices of the PS scales in Z+bb".
- *LHC Higgs group general meeting*, online, 9-11 November 2020. **Contribution with a talk**: "MSSM subgroup status report".

Languages

Italian	Native speaker.
English	Advanced knowledge, both written and spoken.
French	Advanced knowledge, both written and spoken.
German	Intermediate knowledge, both written and spoken.

Computer skills

Operating systems	Linux (Gentoo, Debian, Fedora, Arch), FreeBSD, Windows.
Programming languages	C, C++, Fortran77/90, Python, Perl (basic knowledge), Common Lisp (basic knowledge), Haskell (basic knowledge), Julia (basic knowledge).
Scripting languages	sh, bash, awk, sed.
Databases	SQLite.
Scientific tools	Mathematica, GiNaC, ROOT.
Text authoring	LaTeX, MS Office, Open Office.
Version control	cvs, svn, git.

Voluntary experience

Gentoo Linux	Several contributions to the Gentoo project in form ebuilds and eclasses. This experience enriched my knowledge of shell scripting, sed, awk and of the inner working of the Linux toolchain.

Daniele Barducci

Università degli Studi di Roma La Sapienza
Piazzale Aldo Moro 5, 00185, Roma, Italy

Personal Information

Current activity

Researcher at the University of Roma La Sapienza, Roma (Italy)
Type A researcher of the Italian University system
From 11th February 2019 to 10th February 2022
Associated to the INFN ENP Group from February 2019, CSN4

Theoretical collaborator of the CMS group from April 2014
Associated with the CMS group of the Rutherford Appleton Laboratory (UK)

Previous activities

- Ph.D. Student in Particle Physics Phenomenology at the NExT Institute
  School of Physics and Astronomy at the University of Southampton (UK) and
  STFC Rutherford Appleton Laboratory (RAL), Didcot (UK)
  From 29th September 2011 to 11th September 2014
  Supervisors: Prof. Alexander Belyaev, Prof. Stefano Moretti (Theory group, University of Southampton) and Dr. Claire Shepherd-Themistocleous (CMS group, RAL)
- Visitor at CERN (Switzerland), CMS group from 25th April to 28th July 2014
- Post Doctoral researcher for the Centre National de la Recherche Scientifique (CNRS) at the Laboratoire d'Annecy-le-Vieux de Physique Théorique (LAPTh), Annecy-le-Vieux (France)
  From 1st October 2014 to 30th September 2016
- Post Doctoral researcher at the Scuola Internazionale Superiore di Studi Avanzati (SISSA), Trieste (Italy)
  From 1st October 2016 to 10th February 2019
  Associated to the INFN AAE Group from October 2016 to February 2019, CSN4

Education

- Scientific high school degree, Liceo Agnoletti, Sesto Fiorentino (Italy), July 2005
  100 out of 100

- Bachelor in Physics
  University of Firenze (Italy), 17th December 2008
  110 cum laude out of 110
  Thesis: *The neutral K mesons: Regeneration and Strangeness Oscillations*
  Supervisor: Prof. Roberto Casalbuoni
- Master in Physical and Astrophysical Sciences
  University of Firenze (Italy), 13th December 2011
  110 cum laude out of 110
  Thesis: *Phenomenological Analysis of a Minimal Model with a Composite Higgs Boson*
  Supervisor: Dr. Stefania De Curtis
- Ph.D. in Particle Physics Phenomenology
  University of Southampton (UK), 11th September 2014
  Ph.D. Thesis: *Collider Phenomenology of the 4D Composite Higgs Model*
  Supervisors: Prof. Alexander Belyaev, Prof. Stefano Moretti Dr. Claire Shepherd-Themistocleous

References

Dr. Geneviève Bélanger, CNRS LAPTh, belanger@lapth.cnrs.fr
Prof. Alexander Belyaev, University of Southampton, a.belyaev@soton.ac.uk
Dr. Stefania De Curtis, INFN Section of Firenze, decurtis@fi.infn.it
Dr. Marco Fabbrichesi, INFN Section of Trieste, marco.fabbrichesi@ts.infn.it
Prof. Stefano Moretti, University of Southampton, s.moretti@soton.ac.uk
Dr. Alexander Nikitenko, Imperial College London and CERN, alexandre.niktenko@cern.ch
Prof. Andrea Romanino, SISSA, romanino@sissa.it
Prof. Aleksandr Azatov, SISSA, azatov@sissa.it

Research activity and interests

My research interests lie in the field of physics beyond the Standard Model (SM). In particular I am interested in the aspects of theoretical particle physics related to the origin of the electroweak symmetry breaking (EWSB) mechanism and to the hierarchy between the Fermi and the Planck scale, both in weakly and in strongly coupled extensions of the Standard Model, in their model building aspects and in their implication for present and future collider, underground and astrophysical experiments, including the rapidly developing field of gravitational wave astronomy. I am also interested in theories that are not directly related to the explanation of the naturalness of the weak scale but that seek a solution for other observational shortcomings of the SM. In particular I am interested in various aspects of Dark Matter (DM) phenomenology, neutrino mass generation and baryogenesis and in the general interplay between particle physics and cosmology, as well as in flavour physics also in relation to the possibility of the existence of lepton flavour universality violation in the B meson sector. My current activity also involves the study of new methods to precisely measure SM observables and thus efficiently constrain higher dimensional operators in the context of the SM effective field theory at present and future experiments.

Part of my research activity is furthermore devoted to the development of publicly

available tools for high-energy physics phenomenology.

I am also directly involved with the CMS collaboration in experimental analyses searching for light scalar bosons at the LHC. In particular I have contributed to various experimental publications with preliminary theoretical analyses and final interpretations of the experimental results in the context of minimal and non minimal Supersymmetric theories.

Organisational activities

- Referee for Physical Review D (since 2016), Physical Review Letters (2017), European Physical Journal C (2018), Advances in High Energy Physics (2018) and Journal of High Energy Physics (2019)
- Convener for the session Frontiera dell'Energia at the IFAE 2016 Conference, Genova, Italy
- Seminar organiser at SISSA for the years 2016-2017, 2017-2018 and 2018-2019
- Co-organiser of the DaMESyFla workshop, 15-17 March 2017, SISSA, Trieste, Italy
- Seminar organiser at the University of Roma La Sapienza from February 2019
- Organizer of the series of lectures *Inflation and cosmological perturbations* at the University of Roma la Sapienza held by Professor Antonio Riotto, October 2019

Students

- Claudio Toni - Master Thesis
  Emission of a new particle from ^{8}*Be and* ^{4}*He excited nuclei* 30 September 2020
- Carlotta Nunzi - Bachelor Thesis
  Neutrino oscillation and possible existence of a sterile neutrino December 2020

Thesis Referee

- Referee for the Master Thesis of Giovanni Galati
  Exotic theories of strongly coupled gravity and duality 30th September 2019
- Referee for the Bachelor Thesis of Tiziano Natale
  Two states systems 28th September 2020
- Referee for the Bachelor Thesis of Jacopo Lestingi
  Finite dimensional representations of the Lorentz group and the Dirac equation 13th October 2020
- Referee for the Bachelor Thesis of Aldo Coraggio
  Negative thermodynamic temperatures 16th November 2020

Academic Qualifications

- French Qualification to the function of *Maître de Conférences* for the section *Elementary Constituents* (Qualification aux fonctions de *maître de conférences* pour la section

Constituants élémentaires). Qualification N. 16229291686 valid until 31st December 2020

- Italian National Scientific Abilitation for the function of *Second Class University Professor* for the Sector *02/A2 - Theoretical Physics of Fundamental Interactions*, Subsector *FIS/02 - Theoretical Physics, models and mathematical methods* (Abilitazione Scientifica Nazionale alle funzioni di Professore Universitario di seconda Fascia per il Settore Concorsuale *02/A2 - Fisica Teorica delle Interazioni Fondamentali*, Settore Scientifico Disciplinare *FIS/02 - Fisica teorica, modelli e metodi matematici).* Abilitation valid until 13th July 2027

Member of the following working groups

- LHC Higgs Cross Section Working Group
  Contribution to the CERN Yellow Report *Deciphering the nature of the Higgs sector* arXiv:1610.07922 [hep-ph] DOI: 10.23731/CYRM-2017-002
- LHC TOP Working Group
  Contribution to the theory note *Interpreting top-quark LHC measurements in the standard-model effective field theory*
  arXiv:1802.07237 [hep-ph]
- Physics of the HL-LHC, and Perspectives at the HE-LHC Working Group
  Contribution to the Reports
  Beyond the Standard Model Physics arXiv:1812.07831 [hep-ph] 10.23731/CYRM-2019-007.585
  Higgs Physics arXiv:1902.00134 [hep-ph] 10.23731/CYRM-2019-007.221
- FCC Collaboration
  Contribution to the Conceptual Design Report
  Volume 1: Physics Opportunities Eur.Phys.J. C79 (2019) no.6, 474
  Volume 2: FCC-ee The lepton collider Eur.Phys.J.ST 228 (2019) no.2, 261-623
  Volume 3: FCC-hh The hadron collider Eur.Phys.J.ST 228 (2019) no.4, 755-1107
  Volume 4: HE-LHC The High-Energy Large Hadron Collider Eur.Phys.J.ST 228 (2019) no.5, 1109-1382
- LHC Reinterpretation forum
  Contribution to the report *Reinterpretation of LHC Results for New Physics: Status and Recommendations after Run 2*
  arXiv:2003.07868 [hep-ph] DOI: 10.21468/SciPostPhys.9.2.022

Computing Skills

Unix-Linux and OS X operating systems

Fortran, C, C++, Python, Perl, FORM, Mathematica

Physics tools

MadGraph, Pythia, Delphes, ROOT, MadAnalyis, LanHEP, CalcHEP, micrOMEGAs, Feynrules, Whizard, CosmoTransitions

Teaching activities

2011-2012

- Demonstrator for the course *Energy and Matter* (36 hours)
  First year of the Bachelor degree in Physics
  University of Southampton

2012-2013

- Demonstrator for the course *Wave Physics* (36 hours)
  Second year of the Bachelor degree in Physics
  University of Southampton

2016-2017

- Lectures on Higgs and Supersymmetry phenomenology at the LHC for the course *Beyond the Standard Model* held by Professor Andrea Romanino (5 hours)
  First year of the Ph.D. program
  SISSA

2018-2019

- Course *Mathematical Methods for Physics* (30 hours)
  Second year of the Bachelor degree in Physics
  Course shared with Dr. Fabio Riccioni
  University of Roma La Sapienza

2019-2020

- Course *Weak Interactions in the Standard Model and Beyond* (2 hours)
  Second year of the Master degree in Physics
  Course held by Prof. Marco Nardecchia
  University of Roma La Sapienza

- Course *Mathematical Methods for Physics* (60 hours)
  Second year of the Bachelor degree in Physics
  Course shared with Dr. Fabio Riccioni
  University of Roma La Sapienza

- Mini-course *Green Functions and Numerical Methods* (4 hours)
  Class Held for the Honours Program in Physics (*Percorso di Eccellenza*)
  University of Roma La Sapienza

2020-2021

- Course *Weak Interactions in the Standard Model and Beyond* (24 hours)
  Second year of the Master degree in Physics
  Course shared with Prof. Marco Nardecchia
  University of Roma La Sapienza

- Course *Mathematical Methods for Physics* (36 hours)
  Second year of the Master degree in Physics
  Course shared with Dr. Fabio Riccioni
  University of Roma La Sapienza

Outreach activities

- More than 300 hours of private lessons in Physics and Mathematics to High School and Bachelor students in the years 2005 - 2011

- Participation in a Parliamentary Reception at the British House of Commons. During this reception I gave a presentation of the research activities of the South East Physics Network and the NExT Institute to the members of the British Parliament. The theme of the presentation was the recently discovered Higgs particle and the importance of such discovery for our understanding of the fundamental interactions amongst elementary particles.

  Parliamentary Reception, British House of Commons
  Westminster Palace, London, UK
  8th July 2013
  Presentation: The Higgs boson: elementary or composite?

- Presentation of the research activity of the SISSA theoretical particle physics group to six artist from Romania involved in the international pro-ESOF 2020 program (EuroScience Open Forum). The project aims at providing the artist with a framework to investigate the relationship between contemporary art and advanced scientific research. More information are available at `http://www.proesof2020.eu`

  Scuola Internazionale Superiore di Studi Avanzati (SISSA)
  Trieste, Italy
  17th October 2018

- Participation at the activity *SISSA for schools*, a program with which elementary, middle and high schools students visit SISSA during the scholastic year. This weekly activity consists in presenting the aspects of the everyday life of a researcher through short presentations, small scale table experiments realizable with everyday life material and guiding students in visiting the various parts of the SISSA building. The project has a twofold goal: trigger the students interest towards a scientific career and promote SISSA in the schools. More information are available at `https://www.sissa.it/visite-le-scuole`.

  Scuola Internazionale Superiore di Studi Avanzati (SISSA)
  Trieste, Italy
  Academic year 2018-2019

- Interview for the newspaper *Il Messaggero* on the status of the non permanent researcher in the italian University system. The interview appeared on the 19th of March 2019.

- Participation to the activity *Porte Aperte 2020* at the University of Roma La Sapienza. This activity consists in an open day to present the Faculty of Physics to the students who recently finished their high school studies and are in the process of deciding which University course to join.

  University of Roma La Sapienza
  Roma, Italy
  July 2020

Emilio Bellini | Curriculum Vitae

University of Genève, Department of Physics, 24 quai Ernest-Ansermet
1211 Genève – Switzerland

Working Experience

Present

Postdoctoral Researcher — **Genève, Switzerland**
Department of Physics, University of Genève — *2020–present*

Past

Beecroft fellow (Postdoctoral Researcher) — **Oxford, UK**
Department of Physics, BIPAC, University of Oxford — *2016–2020*
Supervisor: Prof. Pedro Gil Ferreira

Postdoctoral Researcher — **Barcelona, Spain**
Institute of Cosmos Sciences, University of Barcelona — *2014–2016*
Supervisor: Prof. Licia Verde

Visiting Postdoc — **Heidelberg, Germany**
Institute for Theoretical Physics, University of Heidelberg — *2013–2014*
Supervisor: Prof. Luca Amendola
Position funded by "Fondazione Ing. Aldo Gini" and "Fondazione Angelo Della Riccia".

Education

Ph.D. in Physics — **Padova, Italy**
Department of Physics and Astronomy, University of Padova — *2010–2013*
Supervisors: Prof. Sabino Matarrese and Prof. Nicola Bartolo
Thesis title: On the growth of structures in Galileon cosmologies

Master degree in Physics, Theoretical and Computational Physics — **Trento, Italy**
Department of Physics, University of Trento — *2006–2009*
Supervisor: Prof. Sergio Zerbini.

Bachelor degree in Physics — **Trento, Italy**
Department of Physics, University of Trento — *2003–2006*
Supervisor: Prof. Sergio Zerbini.

Fellowships and Awards

- **Professor Agregat**: Catalan (Agencia per a la Qualitat del Sistema Universitari de Catalunya) recognition to become associate professor;
- **Professorat Lector**: Catalan (Agencia per a la Qualitat del Sistema Universitari de Catalunya) recognition to become lecturer;
- **Abilitazione Scientifica Nazionale FIS02/A2**: Italian recognition to become Associate professor

in Theoretical Physics (valid until 2024);

- **Extraordinary Research Fellowship**: Queen's College, University of Oxford, UK (2017). *£3k/year for subsistence, £2k/year for research*;
- **Beecroft Fellowship**: Department of Physics, University of Oxford, UK (2016). *£35k/year*;
- **Fondazione Angelo Della Riccia Fellowship**: spent at the Institute for Theoretical Physics, University of Heidelberg, Germany (2014). *€14k*;
- **Fondazione Ing. Aldo Gini Fellowship**: spent at the Institute for Theoretical Physics, University of Heidelberg, Germany (2013). *€7k*.

Teaching Statement

Supervision of students

2017 – present: PhD Student: Dina Traykova. Topic: *Tests of dark energy and modified gravity*. Department of Physics, University of Oxford (UK);

2017: Master Student: Alessandro Casalino. Now PhD at University of Trento, Italy. Title: *Cosmological perturbation in Horndeski gravity: a case study*. Department of Physics, University of Oxford (UK).

Teaching Activities

2018 – 2020: Co-lecturer of "Cosmology". Master degree course. University of Oxford (UK);

2017 – 2020: Tutor of "Cosmology". Master degree course. University of Oxford (UK);

2017 – 2020: Tutor of "General Relativity and Cosmology". Bachelor's degree course. Queen's College, University of Oxford (UK);

2016: Manipulation of tensors with xAct. Course to students and faculty members, University of Barcelona (Spain).

Organization of Scientific Meetings

2019: Local Organizing Committee. *Theory Working Group Meeting* of the Euclid consortium. 50+ people. University of Oxford (UK);

2017, Feb: Organizer. *EFTCAMB/hi_class meeting*. 20+ people. University of Oxford (UK);

2016, June: Local Organizing Committee. *Meeting on Fundamental Cosmology*. 80+ people. University of Barcelona (Spain);

2016, March: Organizer. *Manipulation of tensors with xAct*. 30+ people. University of Barcelona (Spain).

Institutional Responsibilities

2017 – 2019: Organizer, *Cosmology Seminars*, 20+ people, University of Oxford, UK;

2017 – present: Graduate Student Advisor, University of Oxford, UK.

Comissions of Trust

Journal referee for Physical Review D (**PRD**), Journal of Cosmology and Astroparticle Physics (**JCAP**), Journal of High Energy Physics (**JHEP**), **Physics of the Dark Universe**, European

Physical Journal C (**EPJC**), General Relativity and Gravitation (**GERG**), Monthly Notices of the Royal Astronomical Society (**MNRAS**).
Referee for **REPRISE**, the Register of Scientific Experts set up at the MIUR (Italian Ministry of Instruction, University and Research).

Professional Affiliations

Major Collaborations

2019 – present: Member of LISA Mission, Cosmology Working Group, `www.elisascience.org`;

2016 – present: Member of Euclid Consortium, Theory Working Group, `www.euclid-ec.org`.

Membership of Scientific Societies

2011 – 2016: Member, Research Network "CosmoClassic". Collaborative project between: ICC (University of Barcelona), ICIC (Imperial College, London), University of Padova, Institute Lagrange de Paris and IFIC and Canfranc Laboratory;

2010 – 2013: Associated Member, INFN (National Institute of Nuclear Physics), University of Padova, Italy.

Computer skills

- **hi_class** (`www.hiclass-code.net`): main developer. Modified version of the Boltzmann code CLASS created in order to include non standard gravity scenarios as the Horndeski class of models;
- **CLASS, MontePython, Cosmosis, CCL, GetDist, . . .** : detailed knowledge and experienced user of astrophysics and cosmology tools to get accurate predictions on the evolution of the universe and to relate theory with observations;
- **Mathematica**: detailed knowledge and experienced user;
- **xAct**: detailed knowledge and experienced user. Mathematica package for tensorial manipulation;
- **Python (numpy, scipy, astropy, matplotlib, . . .)**: experienced user;
- **C, C++**: experienced user;

Languages

English: Proficient

Spanish: Proficient

Italian: Mother tongue

French: Basic

Conferences and Talks

Talks Given

2020, Jan: Invited. University of Nottingham (UK). *The `hi_class` way for testing gravity*;

2019, Nov: Invited. Queen Mary University of London, London (UK). *The `hi_class` way for testing gravity*;

2019, Nov: Invited. University of Torino, Torino (Italy). *The `hi_class` way for testing gravity*;

2019, April: Invited. Theoretical Cosmology meetings, Institute Lorentz, Leiden (The Netherlands). *Sheer shear: weak lensing with one mode*;

2019, March: Invited. Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste (Italy). *Maximal freedom at minimum cost: on the future of general scalar-tensor theories in cosmology*;

2018, Dec: Department of Physics and Astronomy, University of Padova, Padova (Italy). *Sheer shear: Cosmic shear with 2 modes*;

2017, Oct: Invited. University of Aachen, Aachen (Germany). *Maximal freedom at minimum cost: efficient description of general scalar-tensor theories*;

2017, Sept: Invited. "Dark Energy and Modified-Gravity cosmologies: DARKMOD" workshop, Paris (France). *Towards a unified description of theories with a single scalar degree of freedom*;

2017, Apr: Invited. University of Trento, Trento (Italy). *Maximal freedom at minimum cost: efficient description of general scalar-tensor theories*;

2016, Feb: Invited. University of Valencia, Valencia (Spain). *Maximal freedom at minimum cost: Horndeski in Class*;

2016, Jan: Invited. Institut de Physique Théorique, Saclay, Paris (France). *Signatures of Horndeski gravity on the Dark Matter Bispectrum*;

2015, Nov: Invited. "Cosmological tests: mini-workshop". Lorentz Center, Leiden (The Netherlands). *Hi-Class*;

2015, Sept: "From inflation to galaxies: A workshop in honour of Sabino Matarrese", Castiglioncello (Italy). *Signatures of Horndeski gravity on the Dark Matter Bispectrum*;

2015, June: Invited. Centre de Physique Théorique, Marseille (France). *Signatures of Horndeski gravity on the Dark Matter Bispectrum*;

2015, June: Invited. COBESIX collaboration, Toulouse (France). *From Class to Hi-Class*;

2015, March: "Extended Theories of Gravity" workshop at Nordita, Stockholm (Sweden). *Maximal freedom at minimum cost in general scalar-tensor theories*;

2014, Dec: Invited. ICC-University of Barcelona Christmas Meeting (Spain). *Minimal description for general scalar-tensor theories*;

2014, July: Invited. University of Nottingham (UK). *Maximal freedom in general scalar-tensor theories*;

2014, May: Institute for Theoretical Physics - University of Heidelberg (Germany). *Maximal freedom in general scalar-tensor theories*;

2014, March: Institute for Theoretical Physics - University of Heidelberg (Germany). *Basics of the xAct package*;

2014, Feb: University of Geneve (Switzerland). *Minimal description for Large-Scale Structure in general scalar-tensor theories*;

2014, Feb: Invited. GRavitation AstroParticle Physics Amsterdam (GRAPPA) Institute - University of Amsterdam (The Netherlands).*Non-linearities in cosmology: the Dark Matter bispectrum*;

2013: Institute for Theoretical Physics - University of Heidelberg (Germany). *The Dark Matter Bispectrum in Galileon cosmologies*;

2012: Invited. University of Insubria (Italy). *On the problem of the late-time cosmic acceleration*;

2012: *CosmoClassic* meeting. Imperial College, London (UK). *Matter bispectrum in Galileon Cosmologies*;

2012: *PhenoCoffe* meeting. University of Padova (Italy). *Screening mechanisms in cosmology.*

Conferences

2019, Apr: "Theory Working Group Euclid meeting", at the University of Oxford, Oxford (UK);

2018, Apr: "Statistical challenges for large-scale structure in the era of LSST", at the University of Oxford, Oxford (UK);

2017, Sept: "Dark Energy and Modified-Gravity cosmologies: DARKMOD", at the Institut de Physique Théorique, CEA Saclay, Paris (France);

2017, June: "Euclid meeting", at the University College, London (UK);

2017, May: "Theory Working Group Euclid meeting", at the University of Heidelberg, Heidelberg (Germany);

2017, Apr: "BritGrav17", at the University of Oxford, Oxford (UK);

2016, June: "Meeting on Fundamental Cosmology", at the Institute of Cosmos Sciences, Barcelona (Spain);

2015, Nov: "Cosmological tests: mini-workshop", at the Lorentz Center in Leiden (The Netherlands);

2015, Oct: "The vacuum of the Universe: from cosmology to particle physics", University of Barcelona ICC (Spain);

2015, Sept: "From inflation to galaxies: A workshop in honour of Sabino Matarrese", Castiglioncello (Italy);

2015, March: "Extended Theories of Gravity" workshop at Nordita, Stockholm (Sweden);

2015, Jan: "Beyond ΛCDM" conference in Oslo (Norway);

2014, Oct: "Barcelona Workshop on Tools for Cosmology: The CLASS and Monte Python codes" at the University of Barcelona (Spain);

2014, July: "Non-Linear Structure in the Modified Universe" at the Lorentz Center in Leiden (The Netherlands);

2014, March: "Special workshop on CLASS and MontePython" at the Garching Max Planck Institute, Munich (Germany);

2012, Aug: "Workshop on large scale structure" at the Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste (Italy);

2012, July: "Summer school on Cosmology" at the Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste (Italy);

2011, Sept: "Workshop on Infrared Modifications of Gravity" at the Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste (Italy);

2011, July: Summer school "Prospect in Theoretical Physics (PiTP) - Frontiers of Physics in Cosmology", Princeton (US);

2010, Sept: "XIX Sigrav conference" at Scuola Normale Superiore, Pisa (Italy).

Outreach

2019, May: *Testing gravity at cosmological scales*, Queen's College Symposium, Oxford, UK;

2013, April: *Introduction to Astrophysics*, Scuola Secondaria Cappelletti-Turco, Verona, Italy.

References

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  Heidelberg University
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  email: l.amendola@thphys.uni-heidelberg.de

Publications

[1] F. Pace, R. Battye, E. Bellini, L. Lombriser, F. Vernizzi, and B. Bolliet, "Comparison of different approaches to the quasi-static approximation in Horndeski models," arXiv:2011.05713 [astro-ph.CO].

[2] D. Alonso, E. Bellini, C. Hale, M. J. Jarvis, and D. J. Schwarz, "Cross-correlating radio continuum surveys and CMB lensing: constraining redshift distributions, galaxy bias and cosmology," arXiv:2009.01817 [astro-ph.CO].

[3] E. Barausse *et al.*, "Prospects for Fundamental Physics with LISA," *Gen. Rel. Grav.* **52** no. 8, (2020) 81, arXiv:2001.09793 [gr-qc].

[4] C. García-García, E. Bellini, P. G. Ferreira, D. Traykova, and M. Zumalacárregui, "Theoretical priors in scalar-tensor cosmologies: Thawing quintessence," *Phys. Rev.* **D101** no. 6, (2020) 063508, arXiv:1911.02868 [astro-ph.CO].

[5] E. Bellini, I. Sawicki, and M. Zumalacárregui, "hi_class: Background Evolution, Initial Conditions and Approximation Schemes," *JCAP* **2002** (2020) 008, arXiv:1909.01828 [astro-ph.CO].

[6] C. García-García, D. Alonso, and E. Bellini, "Disconnected pseudo-C_ℓ covariances for projected large-scale structure data," *JCAP* **1911** (2019) 043, arXiv:1906.11765 [astro-ph.CO].

[7] E. Bellini, D. Alonso, S. Joudaki, and L. van Waerbeke, "Sheer shear: weak lensing with one mode," *Open J. Astrophys.* (2019) , arXiv:1903.04957 [astro-ph.CO].

[8] D. Traykova, E. Bellini, and P. G. Ferreira, "The phenomenology of beyond Horndeski gravity," *JCAP* **1908** (2019) 035, arXiv:1902.10687 [astro-ph.CO].

[9] M. Lagos, E. Bellini, J. Noller, P. G. Ferreira, and T. Baker, "A general theory of linear cosmological perturbations: stability conditions, the quasistatic limit and dynamics," *JCAP* **1803** no. 03, (2018) 021, arXiv:1711.09893 [gr-qc].

[10] T. Baker, E. Bellini, P. G. Ferreira, M. Lagos, J. Noller, and I. Sawicki, "Strong constraints on cosmological gravity from GW170817 and GRB 170817A," *Phys. Rev. Lett.* **119** no. 25, (2017) 251301, arXiv:1710.06394 [astro-ph.CO].

[11] E. Bellini *et al.*, "Comparison of Einstein-Boltzmann solvers for testing general relativity," *Phys. Rev.* **D97** no. 2, (2018) 023520, arXiv:1709.09135 [astro-ph.CO].

[12] N. Bellomo, E. Bellini, B. Hu, R. Jimenez, C. Pena-Garay, and L. Verde, "Hiding neutrino mass in modified gravity cosmologies," *JCAP* **1702** no. 02, (2017) 043, arXiv:1612.02598 [astro-ph.CO].

[13] L. Verde, E. Bellini, C. Pigozzo, A. F. Heavens, and R. Jimenez, "Early Cosmology Constrained," *JCAP* **1704** (2017) 023, arXiv:1611.00376 [astro-ph.CO].

[14] D. Alonso, E. Bellini, P. G. Ferreira, and M. Zumalacárregui, "Observational future of cosmological scalar-tensor theories," *Phys. Rev.* **D95** no. 6, (2017) 063502, arXiv:1610.09290 [astro-ph.CO].

[15] M. Zumalacárregui, E. Bellini, I. Sawicki, J. Lesgourgues, and P. G. Ferreira, "hi_class: Horndeski in the Cosmic Linear Anisotropy Solving System," *JCAP* **1708** no. 08, (2017) 019, arXiv:1605.06102 [astro-ph.CO].

[16] P. Bull *et al.*, "Beyond ΛCDM: Problems, solutions, and the road ahead," *Phys. Dark Univ.* **12** (2016) 56–99, arXiv:1512.05356 [astro-ph.CO].

[17] E. Bellini, A. J. Cuesta, R. Jimenez, and L. Verde, "Constraints on deviations from ΛCDM within Horndeski gravity," *JCAP* **1602** no. 02, (2016) 053, arXiv:1509.07816 [astro-ph.CO]. [Erratum: JCAP1606,no.06,E01(2016)].

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[19] E. Bellini, R. Jimenez, and L. Verde, "Signatures of Horndeski gravity on the Dark Matter Bispectrum," *JCAP* **1505** no. 05, (2015) 057, arXiv:1504.04341 [astro-ph.CO].

[20] I. Sawicki and E. Bellini, "Limits of Quasi-Static Approximation in Modified-Gravity Cosmologies," *Phys. Rev. D* **92** (Oct, 2015) 084061, arXiv:1503.06831 [astro-ph.CO].

[21] B. Audren *et al.*, "Robustness of cosmic neutrino background detection in the cosmic microwave background," *JCAP* **1503** (2015) 036, arXiv:1412.5948 [astro-ph.CO].

[22] E. Bellini and I. Sawicki, "Maximal freedom at minimum cost: linear large-scale structure in general modifications of gravity," *JCAP* **1407** (2014) 050, arXiv:1404.3713 [astro-ph.CO].

[23] E. Bellini and R. Jimenez, "The parameter space of Cubic Galileon models for cosmic acceleration," *Phys.Dark Univ.* **2** (2013) 179–183, arXiv:1306.1262 [astro-ph.CO].

[24] N. Bartolo, E. Bellini, D. Bertacca, and S. Matarrese, "Matter bispectrum in cubic Galileon cosmologies," *JCAP* **1303** (2013) 034, arXiv:1301.4831 [astro-ph.CO].

[25] E. Bellini, N. Bartolo, and S. Matarrese, "Spherical Collapse in covariant Galileon theory," *JCAP* **1206** (2012) 019, arXiv:1202.2712 [astro-ph.CO].

[26] E. Bellini, R. Di Criscienzo, L. Sebastiani, and S. Zerbini, "Black Hole entropy for two higher derivative theories of gravity," *Entropy* **12** (2010) 2186, arXiv:1009.4816 [gr-qc].

December 2, 2020

Giuseppe Bevilacqua

Curriculum Vitæ

Formazione

2005 - 2008 **Dottorato di Ricerca in Fisica**, *Università degli Studi di Torino*.
Calcolo efficiente di ampiezze multipartoniche e metodi Monte Carlo applicati allo studio fenomenologico dello scattering di bosoni vettori a LHC.

2003 - 2005 **Laurea Magistrale in Fisica**, *Università degli Studi di Torino*.
Formazione in fisica teorica orientata alla fenomenologia delle interazioni fondamentali.

06/2003 - 08/2003 **Stage**, *CERN*.
Ho sviluppato il mio progetto di tesi di laurea triennale ("Digitization of the CSM Drift Tube Chambers") in collaborazione con il gruppo CMS di Torino, partecipando al contempo alle attività didattiche e formative del CERN Summer Student Programme.

2000 - 2003 **Laurea di Primo Livello in Fisica**, *Università degli Studi di Torino*.

Esperienza professionale

2015 - ad oggi **Senior Research Fellow**, *MTA-DE Particle Physics Research Group*, Debrecen University (Ungheria).

2013 - 2015 **Borsista INFN**, *Laboratori Nazionali di Frascati*.

2010 - 2013 **Postdoctoral Associate**, *Rheinisch-Westfälische Technische Hochschule*, Aachen (Germania).

2008 - 2010 **Marie Curie RTN Experienced Researcher**, *National Center for Scientific Research "Demokritos"*, Atene (Grecia).

Interessi di ricerca

- Fenomenologia del Modello Standard ai collider
- QCD perturbativa
- Fisica del quark Top
- Generatori Monte Carlo

Titoli accademici

28/03/2017 **Abilitazione Scientifica Nazionale**, *MIUR*.
Abilitato alle funzioni di Professore Universitario di Seconda Fascia.
Settore concorsuale 02/A2 - Fisica Teorica delle Interazioni Fondamentali.

10/11/2008 **Dottorato di Ricerca in Fisica**, *Università degli Studi di Torino*.
Tesi: "Vector Boson Scattering as a probe of Electroweak Symmetry Breaking: a six-fermion perspective"
Relatore: Dr. A. Ballestrero (INFN Torino)

22/07/2005 **Laurea Magistrale in Fisica delle Interazioni Fondamentali**, *Università degli Studi di Torino*.
Tesi: "Contributi di QCD per la fisica dei sei fermioni a LHC"
Relatore: Dr. A. Ballestrero (INFN Torino)
Votazione: 110/110 e lode

26/09/2003 **Laurea di Primo Livello in Fisica**, *Università degli Studi di Torino*.
Tesi: "Digitization of the CMS Drift Tube Chambers"
Relatori: Prof. A. Romero, Dr. N. Amapane (Università di Torino)
Votazione: 110/110 e lode

Esperienza didattica e incarichi accademici

2017 - ad oggi **PhD Committee**, *Debrecen University*.
Referee di tesi ed esaminatore per la Scuola di Dottorato in Fisica.

2017 **Instructor**, *Debrecen University*.
Collaborazione alla didattica del Corso di Laurea in Fisica in lingua inglese (BSc) con lezioni frontali ed esercitazioni.
Corsi assegnati:
- *Mathematical Tools for Physics* (a.a. 2017/2018, 12 ore)

2011 - 2013 **Teaching Assistant**, *RWTH Aachen*.
Preparazione di cicli indipendenti di esercitazioni con lezioni frontali e correzione dei compiti su base settimanale.
Corsi assegnati:
- *The Singular Nature of Quantum Field Theory* (a.a. 2012/2013, 12 ore)
- *Quantum Field Theory II* (a.a. 2011/2012, 26 ore)
- *Quantum Field Theory I* (a.a. 2011/2012, 26 ore)
- *Quantum Field Theory II* (a.a. 2010/2011, 20 ore)

Esperienza organizzativa

2018 **PARTICLEFACE Feynman Memorial Meeting (BALATON2018)**, Balatonfüred (Ungheria), 17-19 Settembre 2018.
Membro del comitato organizzatore locale.

2017 **QCD@LHC 2017**, Debrecen (Ungheria), 28 Agosto - 1 Settembre 2017.
Membro del comitato organizzatore locale.
Coordinatore della sessione "Top, heavy quarks and searches".

2014 **XVII Frascati Spring School "Bruno Touschek"**, Frascati, 12-16 Maggio 2014.
Membro del comitato organizzatore locale.

Partecipazione a progetti e network di ricerca

2017 - in corso **PARTICLEFACE - Unraveling new physics at the LHC through the precision frontier**, *Commissione Europea*, COST Action CA16201.
Ruolo: *Secondary proposer*. (Main Proposer: G. Rodrigo)
Supporto quadriennale per attività di ricerca e networking a livello europeo.

2017 - in corso **LHC Higgs Cross Section Working Group**.
Ruolo: *Partecipante*.
Attività di ricerca nell'ambito del **ttH/tH Working Group**:
- studio del processo $pp \to t\bar{t}b\bar{b} + X$ con quark b massivi ("4 Flavor Scheme)";
- identificazione e analisi delle principali incertezze teoriche mediante confronto tra diversi generatori Monte Carlo a livello NLO+PS.

2017 - in corso **Theoretical tools for colliders of today and tomorrow**, *Hungarian National Research, Development and Innovation Office*, grant K 125105.
Ruolo: *Co-proposer*. (Principal Investigator: Z. Trocsanyi)
Supporto quadriennale alle attività di ricerca del gruppo locale MTA-DE (Debrecen).

2015 - in corso **MTA-DE Particle Physics Research Group**, *Hungarian Academy of Sciences*.
Ruolo: *Investigator*. (Group Leader: Z. Trocsanyi)
Responsabilità:
- estensione dello schema di sottrazione CoLoRFulNNLO a stati iniziali adronici e sua implementazione in un programma di calcolo per applicazioni fenomenologiche a LHC;
- studio di precisione di processi con produzione associata di quark pesanti ai collider adronici; applicazioni nel contesto della determinazione della massa del quark top e del fit di distribuzioni partoniche (PDF) a LHC.

2013 - 2015 **Phenomenology of elementary particle interactions at colliders**, *INFN*.
Borsa di studio post-dottorato INFN.
Attività di ricerca nell'ambito dell'**Iniziativa specifica PhenoLNF**:
- ottimizzazione del framework `HELAC-NLO` per il calcolo efficiente di processi multipartonici;
- studio al NLO della produzione associata di coppie di quark pesanti a LHC (ricerca di correlazioni tra $t\bar{t}b\bar{b}$ e $t\bar{t}jj$, analisi degli effetti di offshellness in $t\bar{t} +$ jet);
- calcolo completo degli splitting kernel relativi alla radiazione di stato iniziale in QCD nei limiti "doubly-unresolved".

2010 - 2013 **SFB/TR9 "Computational Particle Physics"**, *Deutsche Forschungsgemeinschaft*.
Ruolo: *Partecipante*. (Coordinatore: M. Krämer)
Responsabilità:
- sviluppo completo di un nuovo schema di sottrazione per calcoli NLO basato sul formalismo di Nagy-Soper e sua implementazione nel framework di `HELAC-NLO`;
- studi accurati al NLO sulla produzione di coppie di quark pesanti a LHC ($t\bar{t}t\bar{t}$, $b\bar{b}b\bar{b}$).

2008 - 2010 **HEPTOOLS - Tools and Precision Calculations for Physics Discoveries at Colliders**, *Commissione Europea*, MRTN-CT-2006-035505.
Ruolo: *Partecipante*. (Coordinatore: C. Papadopoulos)
Responsabilità:
- sviluppo di un framework per il calcolo automatizzato delle correzioni di QCD al next-to-leading order: `HELAC-NLO`;
- studio al NLO di importanti background del Modello Standard nell'ambito delle ricerche a Tevatron e LHC ($t\bar{t}b\bar{b}$, $t\bar{t}jj$, $b\bar{b}WW$).

Competenze informatiche

- Programmazione: Fortran, C/C++, Python
- Calcolo simbolico: FORM, Wolfram Mathematica™
- Analisi dati: ROOT
- Scripting: Bash
- Co-autore e sviluppatore di generatori Monte Carlo per la fisica delle alte energie:

  - **PHANTOM**
    arXiv:0801.3359 [hep-ph]
  - **HELAC-NLO**
    arXiv:1110.1499 [hep-ph]
  - **PowHel** `ttbb_4FS`
    arXiv:1709.06915 [hep-ph]

Competenze linguistiche

- *Inglese*: livello C1
- *Francese*: livello B2
- *Tedesco*: livello A2
- *Greco*: livello A2

Livelli: A1/2 Livello base – B1/2 Livello intermedio – C1/2 Livello avanzato.
Quadro Comune Europeo di Riferimento delle Lingue

Seminari e presentazioni

- *"$t\bar{t}W^{\pm}$ at NLO accuracy with realistic final states"*, talk su invito. 13th International Workshop on Top Quark Physics (TOP2020), online edition. 15 Settembre 2020
- *"Off-shell effects in $t\bar{t}+\gamma/Z$ production at the LHC"*, talk su invito. 8th Edition of the Large Hadron Collider Physics Conference (LHCP2020), online edition. 25 Maggio 2020
- *"Irreducible backgrounds for Dark Matter searches at the LHC: $t\bar{t}Z(Z\to\nu\bar{\nu})$"*, talk. Working Group Meeting and MC Meeting of the COST Action CA1620 (PARTICLEFACE 2020), Cracovia, 13 Febbraio 2020
- *"Effects of top-quark decay modeling in $t\bar{t}\gamma$ at the LHC"*, talk su invito. XXVI Cracow EPIPHANY Conference "LHC physics: Standard Model and beyond", Cracovia, 10 Gennaio 2020
- *"Precise predictions for $t\bar{t}+E_T^{miss}$ at the LHC"*, talk su invito. XLIII International Conference of Theoretical Physics "Matter To The Deepest", Katowice, 3 Settembre 2019
- *"On the $t\bar{t}\gamma/t\bar{t}$ cross section ratio at the LHC"*, talk. XXVII International Workshop on Deep Inelastic Scattering and Related Subjects (DIS2019), Torino, 9 Aprile 2019

- *"Precise predictions for the $t\bar{t}\gamma/t\bar{t}$ cross section ratio at the LHC"*, talk. Working Group Meeting and MC Meeting of the COST Action CA1620 (PARTICLEFACE 2019), Coimbra, 26 Febbraio 2019
- *"NLO QCD corrections to off-shell $t\bar{t}\gamma$ production at the LHC"*, talk. Seventh International Workshop on High Precision for Hard Processes at the LHC (HP2 2018), Freiburg, 1 Ottobre 2018
- *"Top quark mass studies with $t\bar{t}j$ at the LHC"*, talk. Working Group Meeting and MC Meeting of the COST Action CA16201 (PARTICLEFACE 2018), Valencia, 27 Febbraio 2018
- *"Off-shell $t\bar{t}j$ production and top quark mass studies at the LHC"*, talk su invito. XLI International Conference of Theoretical Physics "Matter To The Deepest", Podlesice, 5 Settembre 2017
- *"Off-shell effects in top pair production with jet activity at the LHC"*, seminario su invito. Eötvös Loránd University (Budapest), 22 Febbraio 2017
- *"Top-antitop + jet production with off-shell effects at NLO QCD"*, talk. Sixth International Workshop on High Precision for Hard Processes at the LHC (HP2 2016), ICAS-UNSAM (Buenos Aires), 8 Settembre 2016
- *"Complete off-shell effects for top-antitop + jet production with leptonic decays at the LHC"*, talk. 24th International Workshop on Deep-Inelastic Scattering and Related Subjects (DIS2016), DESY Hamburg, 13 Aprile 2016
- *"Off-shell, off-the-shelf: top quark pair production with jet activity at the LHC"*, seminario. Debrecen University, 1 Dicembre 2015
- *"NLO predictions on the ratio of $\mathbf{t\bar{t}b\bar{b}}$ and $\mathbf{t\bar{t}jj}$ cross sections at the LHC"*, talk. Fifth HP2 Workshop: High Precision for Hard Processes, Galileo Galilei Institute (Firenze), 3 Settembre 2014
- *"On the ratio of $\mathbf{t\bar{t}b\bar{b}}$ and $\mathbf{t\bar{t}jj}$ cross sections at the LHC"*, talk. LNF Spring Institute "High-energy physics after LHC Run I", 14 Marzo 2014
- *"Nagy-Soper subtraction for NLO calculations: overview and applications"*, seminario. Laboratori Nazionali di Frascati, 18 Novembre 2013
- *"Recent developments with HELAC-NLO"*, talk su invito. QCD@LHC2013, DESY Hamburg, 4 Settembre 2013
- *"NLO mass effects in $\mathbf{b\bar{b}b\bar{b}}$ production at the LHC"*, talk. 19th Meeting of SFB/TR9, Aachen, 19 Marzo 2013
- *"Back to Top: production, decay and jet activity at hadron colliders"*, seminario su invito. Freiburg University, 6 Novembre 2012
- *"HELAC-NLO: recent developments and phenomenological results"*, talk su invito. LoopFest XI, Pittsburgh, 12 Maggio 2012
- *"The Nagy-Soper NLO subtraction method in QCD"*, talk. 16th Meeting of SFB/TR9, Aachen, 15 Novembre 2011
- *"The HELAC framework for NLO calculations: overview and phenomenological applications"*, seminario. RWTH Aachen, 10 Novembre 2011
- *"Recent progress in theoretical predictions for top-pair phenomenology"*, talk su invito. Helmholtz Alliance Workshop on Top Quark Physics, Wuppertal, 7 Aprile 2011

- *"Complete off-shell effects in $\mathbf{t\bar{t}}$ hadroproduction with leptonic decay at NLO"*, talk. DPG Früjarhrstagung 2011, Karlsruhe, 30 Marzo 2011
- *"NLO QCD corrections to $\mathbf{W^+W^-b\bar{b}}$ production at hadron colliders"*, talk. HEPTOOLS Final Meeting, Granada, 26 Novembre 2010
- *"NLO QCD calculations with HELAC-NLO"*, seminario su invito. Università di Torino, 21 Settembre 2010
- *"A NLO study of $\mathbf{t\bar{t}b\bar{b}}$ at the LHC"*, seminario su invito. Universidad de Granada, 14 Gennaio 2010
- *"NLO QCD corrections to $\mathbf{t\bar{t}b\bar{b}}$ production: the HELAC-NLO perspective"*, seminario su invito. Zurich University, 8 Dicembre 2009
- *"NLO QCD corrections to $\mathbf{t\bar{t}b\bar{b}}$ production at the LHC"*, talk. Third HEPTOOLS Annual meeting, Vienna, 30 Novembre 2009
- *"Recent developments in automated NLO calculations"*, talk. Workshop on the Standard Model and Beyond - Standard Cosmology, Corfu Summer Institute, 31 Agosto 2009
- *"Probing EWSB at LHC and ILC: Vector Boson Scattering from a six-fermion perspective"*, seminario. Università di Torino, 25 Novembre 2008
- *"PHANTOM: a Monte Carlo event generator for six parton final states at high energy colliders"*, talk su invito. ILC-ECFA Workshop, Varsavia, 10 Giugno 2008
- *"Vector Boson Scattering at LHC: a six-fermion perspective"*, talk su invito. IFAE 2008, Bologna, 27 Marzo 2008
- *"PHANTOM at ILC"*, talk. "ILC Physics in Florence", Galileo Galilei Institute, 14 Settembre 2007
- *"Physics studies at the LHC with PHANTOM"*, talk. Workshop on Monte Carlo's, Physics and Simulations at the LHC, Laboratori Nazionali di Frascati, 23 Ottobre 2006

Descrizione dell'attività di ricerca

La mia attività di ricerca si colloca nell'ambito dello studio di precisione del Modello Standard. Sono interessato in particolare alla fenomenologia ai grandi acceleratori come il Large Hadron Collider (LHC), dove le alte energie in gioco consentono di produrre stati finali con elevata molteplicità di leptoni e jet adronici. Processi di questo tipo forniscono un'opportunità unica per lo studio di precisione delle proprietà e dei meccanismi di produzione di particelle massive instabili, come ad esempio il bosone di Higgs o il quark top, ma anche più in generale per far luce sugli effetti di nuova fisica che possono manifestarsi in questi canali. E' possibile individuare almeno tre direzioni lungo le quali procedere per migliorare la descrizione teorica di questi processi: (i) migliorare l'accuratezza degli elementi di matrice a ordine perturbativo fissato, superando l'approssimazione dettata dal *narrow-width limit*, in cui risonanze intermedie vengono prodotte *on-shell* e decadono; (ii) contribuire ad una descrizione più realistica degli stati finali adronici attraverso il matching di calcoli a ordine perturbativo fissato con effetti di Parton Shower e adronizzazione; (iii) migliorare l'accuratezza nello sviluppo perturbativo della sezione d'urto attraverso il calcolo delle correzioni radiative.

Gli obbiettivi sopra elencati rappresentano una sfida notevole dal punto di vista computazionale: per questo motivo ritengo utile dedicare parte del mio lavoro allo sviluppo di strumenti di calcolo efficienti. Due programmi, di cui sono coautore, sono utili riferimenti del lavoro da me svolto in questo ambito: PHANTOM e HELAC-NLO. Il primo è un generatore di eventi dedicato alla simulazione efficiente di processi con sei partoni nello stato finale, utilizzato per una serie di studi fenomenologici sullo scattering di bosoni vettori a LHC ed attualmente in uso da parte della collaborazione CMS per analisi del canale $H \to WW/ZZ$. Il secondo programma, HELAC-NLO, è dedicato al calcolo automatizzato delle correzioni di QCD per processi multipartonici ed è stato utilizzato, tra le varie applicazioni, per realizzare le prime predizioni teoriche al next-to-leading order in QCD per importanti background del Modello Standard, tra cui $pp \to t\bar{t} + 2$ jet, $pp \to b\bar{b}W^+W^-$ e $pp \to t\bar{t}t\bar{t}$. Queste analisi hanno contribuito a completare la lista di riferimento meglio nota come *Les Houches NLO Wishlist*.

Attualmente il mio lavoro di ricerca è orientato in varie direzioni. La principale linea di ricerca è rivolta allo studio fenomenologico dei contributi "*off-shell*" e non risonanti in processi rappresentativi della produzione associata di quark top. Ci si propone di realizzare predizioni teoriche il più possibile realistiche, analizzando allo stesso tempo eventuali criticità della Narrow Width Approximation (NWA) nella descrizione delle osservabili di interesse fisico per le analisi condotte presso gli esperimenti ATLAS e CMS. Esempi recenti di risultati ottenuti in questo ambito sono le prime predizioni teoriche complete al NLO in QCD per la produzione associata $t\bar{t}+X(X=j,\gamma,Z,W^{\pm})$ nel canale di decadimento leptonico a LHC. Questi risultati trovano applicazione, ad esempio, nella misura di precisione della massa del quark top $(t\bar{t}+j)$ o dello studio di eventuali *anomalous coupling* a LHC $(t\bar{t}+\gamma)$. Contribuiscono inoltre ad una stima più accurata di importanti background in relazione allo studio della produzione associata di Higgs nel canale $t\bar{t}H$ $(t\bar{t}+W^{\pm})$ e alla ricerca di Dark Matter nel canale $t\bar{t}+E_T^{miss}$ a LHC $(t\bar{t}+Z(Z\to\nu\bar{\nu}))$. Le nostre predizioni teoriche sono state recentemente utilizzate dalla collaborazione ATLAS per l'analisi del processo $t\bar{t}+\gamma$ nel canale $e\mu$ a 13 TeV. E' attualmente in corso un confronto analogo con la collaborazione CMS. In aggiunta ai suddetti studi fenomenologici ho lavorato personalmente allo sviluppo di nuove funzionalità ed ottimizzazioni nel framework di `Helac-Nlo`: il contributo più recente è l'implementazione della NWA in forma completa, comprensiva cioè dei possibili effetti radiativi e delle correzioni di QCD nei decadimenti delle particelle instabili. Questo faciliterà il calcolo in NWA di processi particolarmente complessi, come ad esempio $t\bar{t}b\bar{b}$, $t\bar{t}+n$ jet e $t\bar{t}t\bar{t}$, per i quali non vi sono ad oggi studi sistematici dell'impatto degli effetti radiativi nei decadimenti. Dall'esigenza di rendere i risultati del nostro lavoro più facilmente accessibili alla comunità di fisica delle alte energie ho anche sviluppato un software per l'analisi statistica degli eventi generati con HELAC-NLO, denominato HEPLOT.

La seconda direzione di ricerca è rivolta allo studio degli effetti di massa dei quark pesanti a LHC. L'obbiettivo è fornire assistenza alle analisi degli esperimenti CMS e ATLAS mediante predizioni teoriche accurate e il più possibile realistiche, combinando calcoli accurati al NLO con effetti di Parton Shower e adronizzazione. A questo scopo ho contribuito ad estendere il generatore di eventi POWHEL (che si basa sul framework di HELAC-NLO per quanto riguarda il calcolo delle ampiezze di scattering) al calcolo di stati finali con quark *bottom* e *charm* massivi, uno step necessario per realizzare calcoli nei cosiddetti schemi *4-Flavor Number* e *3-Flavor Number*. Questo

lavoro trova interessanti applicazioni nell'ambito della misura delle distribuzioni partoniche a LHC, ad esempio tramite lo studio di precisione del processo $W^{\pm}+$ *charm* che consentirà una modellazione più accurata del contenuto in *strangeness* del protone. Un'altra applicazione di interesse è lo studio delle incertezze teoriche connesse al processo $pp \to t\bar{t}b\bar{b}$ - un importante background di QCD nello studio del processo $t\bar{t}H(H \to b\bar{b})$ - per il quale è in corso un confronto sistematico con le predizioni di altri generatori disponibili nell'ambito dell'*LHC Higgs Cross Section Working Group*.

Infine, in collaborazione con il gruppo di Debrecen ho dedicato una parte della mia attività allo sviluppo di uno schema di sottrazione per calcoli al next-to-next-to-leading order (NNLO) noto come *CoLoRFulNNLO subtraction*, più precisamente alla sua estensione al caso di stati iniziali adronici. Si tratta di un progetto di più ampio respiro al quale ho contribuito con il calcolo completo degli *splitting kernel* per la radiazione di stato iniziale e successivamente con la definizione dei termini di sottrazione necessari per regolarizzare i contributi di doppia emissione reale. Un primo traguardo è stato raggiunto con l'implementazione completa di tali contributi nel programma di calcolo MCCSM. E' attualmente in corso l'integrazione dei termini di sottrazione, step necessario per completare la costruzione dello schema ed aprire la strada alla sua applicazione fenomenologica nell'ambito di LHC.

Riassunto della produzione scientifica

Lista completa delle pubblicazioni:

[1] G. Bevilacqua, *"Off-shell effects in $t\bar{t} + \gamma/Z$ production at the LHC"*, PoS(LHCP2020)066 [arXiv:2009.13213 [hep-ph]].

[2] G. Bevilacqua, H. Y. Bi, H. B. Hartanto, M. Kraus and M. Worek, *"The simplest of them all: $t\bar{t}W^{\pm}$ at NLO accuracy in QCD"*, JHEP 08 (2020), 043 [arXiv:2005.09427 [hep-ph]].

[3] G. Bevilacqua, *"Effects of top-quark decay modeling in $t\bar{t}\gamma$ production at the LHC"*, Acta Phys. Pol. B 51, 1267 (2020) [arXiv:2003.14293 [hep-ph]].

[4] G. Bevilacqua, H. B. Hartanto, M. Kraus, T. Weber and M. Worek, *"Off-shell vs on-shell modelling of top quarks in photon associated production"*, JHEP 03 (2020), 154 [arXiv:1912.09999 [hep-ph]].

[5] G. Bevilacqua, *"Precise predictions for $t\bar{t} + E_T^{miss}$ at the LHC"*, Acta Phys. Polon. B 50 (2019) 1881.

[6] S. Alekhin, M. Benzke, G. Bevilacqua, M.V. Garzelli, A. Kardos, B. Kniehl, S.O. Moch and O. Zenaiev, *"Heavy-flavour production processes relevant for PDF fits"*, PoS(DIS2019)013.

[7] G. Bevilacqua, H. B. Hartanto, M. Kraus, T. Weber and M. Worek, *"Towards constraining Dark Matter at the LHC: Higher order QCD predictions for $t\bar{t} + p_T^{miss}$"*, JHEP 1911 (2019) 001 [arXiv:1907.09359 [hep-ph]].

[8] G. Bevilacqua, *"On the ratio of $t\bar{t}\gamma$ and $t\bar{t}$ cross sections at the LHC"*, PoS(DIS2019)115 [arXiv:1906.10534 [hep-ph]].

[9] G. Bevilacqua, H. B. Hartanto, M. Kraus, T. Weber and M. Worek, *"Precise predictions for $t\bar{t}\gamma/t\bar{t}$ cross section ratios at the LHC"*, JHEP01 (2019) 188 [arXiv:1809.08562 [hep-ph]].

[10] A. Kardos, G. Bevilacqua, G. Somogyi, Z. Trocsanyi and Z. Tulipant, *"CoLoRFulNNLO for LHC processes"*, PoS LL 2018 (2018) 074 [arXiv:1807.04976 [hep-ph]].

[11] G. Bevilacqua, H. B. Hartanto, M. Kraus, T. Weber and M. Worek, *"Hard Photons in Hadroproduction of Top Quarks with Realistic Final States"*, JHEP 1810 (2018) 158 [arXiv:1803.09916 [hep-ph]].

[12] G. Bevilacqua, H. B. Hartanto, M. Kraus, M. Schulze and M. Worek, *"Off-shell $t\bar{t}j$ production and top quark mass studies at the LHC"*, Acta Phys. Polon. B48 (2017) no. 12, 2251 [arXiv:1711.01831 [hep-ph]].

[13] G. Bevilacqua, H. B. Hartanto, M. Kraus, M. Schulze and M. Worek, *"Top quark mass studies with $t\bar{t}j$ at the LHC"*, JHEP 1803 (2018) 169 [arXiv:1710.07515 [hep-ph]].

[14] G. Bevilacqua, M. V. Garzelli, A. Kardos, *"$t\bar{t}b\bar{b}$ hadroproduction with massive bottom quarks with PowHel"*, arXiv:1709.06915 [hep-ph].

[15] G. Bevilacqua, H. B. Hartanto, M. Kraus and M. Worek, *"Off-shell Top Quarks with One Jet at the LHC: A comprehensive analysis at NLO QCD"*. JHEP 1611 (2016) 098 [arXiv:1609.01659 [hep-ph]]

[16] G. Bevilacqua, *"Complete off-shell effects for top-antitop + jet production with leptonic decays at the LHC"*. PoS DIS2016 (2016) 151 [arXiv:1606.09501 [hep-ph]]

[17] G. Bevilacqua, H. B. Hartanto, M. Kraus and M. Worek, *"Top Quark Pair Production in Association with a Jet with NLO QCD Off-Shell Effects at the Large Hadron Collider"*. Phys. Rev. Lett. 116 (2016) 5, 052003 [arXiv:1509.09242 [hep-ph]].

[18] G. Bevilacqua and M. Worek, *"On the ratio of ttbb and ttjj cross sections at the CERN Large Hadron Collider"*. JHEP1407 (2014) 135 [arXiv:1403.2046 [hep-ph]].

[19] G. Bevilacqua, M. Czakon, M. Kubocz and M. Worek, *"Complete Nagy-Soper subtraction for next-to-leading order calculations in QCD"*. JHEP1310 (2013) 204 [arXiv:1308.5605 [hep-ph]].

[20] G. Bevilacqua, M. Czakon, M. Krämer, M. Kubocz and M. Worek, *"Quantifying quark mass effects at the LHC: A study of $pp \to b\bar{b}b\bar{b} + X$ at next-to-leading order"*. JHEP1307 (2013) 095 [arXiv:1304.6860 [hep-ph]].

[21] G. Bevilacqua, M. Czakon, M. V. Garzelli, A. van Hameren, A. Kardos, C. G. Papadopoulos, R. Pittau and M. Worek, *"HELAC-NLO"*. Comput. Phys. Commun. 184 (2013) 986 [arXiv:1110.1499 [hep-ph]].

[22] G. Bevilacqua and M. Worek, *"Constraining BSM Physics at the LHC: Four top final states with NLO accuracy in perturbative QCD"*. JHEP1207 (2012) 111 [arXiv:1206.3064 [hep-ph]].

[23] M. Kubocz, G. Bevilacqua, M. Czakon, M. Krämer and M. Worek, *"Alternative subtraction method in QCD using Nagy-Soper scheme"*. PoS RADCOR2011 (2011) 019.

[24] G. Bevilacqua, M. Czakon, C. G. Papadopoulos and M. Worek, *"Hadronic top-quark pair production in association with two jets at Next-to-Leading Order QCD"*. Phys. Rev. D84, 114017 (2011) [arXiv:1108.2851 [hep-ph]].

[25] G. Bevilacqua, M. Czakon, A. van Hameren, C. G. Papadopoulos and M. Worek, *"Complete off-shell effects in top quark pair hadroproduction with leptonic decay at next-to-leading order"*. JHEP1102 (2011) 083 [arXiv:1012.4230 [hep-ph]].

[26] G. Bevilacqua, M. Czakon, M. V. Garzelli, A. van Hameren, Y. Malamos, C. G. Papadopoulos, R. Pittau and M. Worek, *"NLO QCD calculations with HELAC-NLO"*. Nucl. Phys. Proc. Suppl. 205-206 (2010) 211 [arXiv:1007.4918 [hep-ph]].

[27] G. Bevilacqua, *"Recent developments in automated NLO calculations: the HELAC-NLO case"*. Fortschr. Phys 58, No. 7-9, 651-655 (2010).

[28] G. Bevilacqua, M. Czakon, M. V. Garzelli, A. van Hameren, C. G. Papadopoulos, R. Pittau and M. Worek, *"A NLO study of $t\bar{t}H \to t\bar{t}b\bar{b}$ signal versus $t\bar{t}b\bar{b}$ background"*. Published in the report of the SM and NLO Multileg Working Group for the Workshop "Physics at TeV Colliders", Les Houches, France 8-26 June, 2009 [arXiv:1003.1241 [hep-ph]].

[29] G. Bevilacqua, M. Czakon, C. G. Papadopoulos and M. Worek, *"Dominant QCD Backgrounds in Higgs Boson Analyses at the LHC: A Study of $pp \to t\bar{t} + 2$ jets at Next-To-Leading Order"*. Phys. Rev. Lett. 104 (2010) 162002 [arXiv:1002.4009 [hep-ph]].

[30] A. Ballestrero, G. Bevilacqua, D. B. Franzosi and E. Maina, *"How well can the LHC distinguish between the SM light Higgs scenario, a composite Higgs and the Higgsless case using VV scattering channels?"*. JHEP0911 (2009) 126 [arXiv:0909.3838 [hep-ph]].

[31] G. Bevilacqua, M. Czakon, C. G. Papadopoulos, R. Pittau and M. Worek, *"Assault on the NLO Wishlist: $pp \to ttbb$"*. JHEP0909 (2009) 109 [arXiv:0907.4723 [hep-ph]].

[32] G. Bevilacqua, *"Physics studies at the LHC with PHANTOM"*. Proceedings of the Workshop on Monte Carlo's, Physics and Simulations at the LHC, Ed. P Nason, Frascati Physics Series, Volume XLIX, ISBN 978-88-86409-58-2.

[33] A. Ballestrero, G. Bevilacqua, E. Maina, *"A complete parton level analysis of boson-boson scattering and ElectroWeak Symmetry Breaking in $\ell\nu$ + four jets production at the LHC"*. JHEP0905 (2009) 015 [arXiv:0812.5084 [hep-ph]].

[34] A. Ballestrero, A. Belhouari, G. Bevilacqua, V. Kashkan, E. Maina, *"PHANTOM: a Monte Carlo generator for six parton final states at high energy colliders"*. Comput. Phys. Commun. 180 (2009) 401 [arXiv:0801.3359 [hep-ph]].

[35] G. Bevilacqua, *"Vector Boson Scattering at LHC from a six fermion perspective"*. Nuovo Cim. 123B (2008) 6.

[36] A. Ballestrero, G. Bevilacqua, E. Maina, *"A new analysis of $pp \to bb\ell\nu jj$ at the LHC: Higgs and W boson associated production with two tag jets"*. JHEP0808 (2008) 059 [arXiv:0806.4075v1 [hep-ph]].

[37] N. Amapane, A. Ballestrero, R. Bellan, G. Bevilacqua, S. Bolognesi, D. Franzosi, G. Cerminara, P. Govoni, E. Maina, C. Mariotti, G. Mila, M. Paganoni, G. Petrillo, A. Sznajder, V. Tancini, *"Study of VV-scattering processes as a probe of electroweak symmetry breaking"*. CMS Analysis Note 2007/005.

[38] E. Accomando, N. Amapane, A. Ballestrero, A. Belhouari, R. Bellan, G. Bevilacqua, S. Bolognesi, G. Cerminara, V. Kashkan, E. Maina, C. Mariotti, *"VV–fusion in CMS: a model-independent way to investigate EWSB"*. Published in the report of *CP Studies and Non-Standard Higgs Physics* (CPSNH) Workshop, CERN-2006-009 [hep-ph/0608079].

Debrecen, 2 dicembre 2020

MATTEO BIAGETTI

CURRENT POSITION

Institute for Fundamental Physics of the Universe Sep 2020– Present
VENI postdoctoral fellow
Funding: NWO VENI grant

REFEREES

Prof. Daniel Baumann

University of Amsterdam
Science Park 904
1098XH Amsterdam (NL)
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Prof. Vincent Desjacques

Israel Institute of Technology
Technion
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Prof. Antonio Riotto

University of Geneva
24 quai E. Ansermet
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Prof. Daniel Green

University of San Diego
9500 Gilman Dr.
La Jolla (US)
email: drgreen@physics.ucsd.edu

Prof. Cristiano Porciani

Argelander-Institut für Astronomie
Auf dem Hüger 71
D-53121 Bonn (D)
porciani@astro.uni-bonn.de

EDUCATION

University of Geneva Mar 2012 – Jun 2016
PhD in Theoretical Physics
Advisor: Prof. Vincent Desjacques
Dissertation: *Theoretical Aspects of Large-Scale Clustering of Dark Matter Halos*

University of Padova Sep 2009 – Dec 2011
Master's Degree in Theoretical Physics
Advisors: Profs. Nicola Bartolo and Sabino Matarrese
Dissertation: *Non-Gaussianity in multi-field models of inflation*

University of Padova Sep 2006 – Jul 2009
Bachelor's Degree in Physics
Advisor: Prof. Andrea Vitturi
Dissertation: *Superdeformation in Atomic Nuclei*

RESEARCH EXPERIENCE

University of Amsterdam Oct 2016 – Aug 2020
Postdoctoral Researcher
Supervisor: Prof. Daniel Baumann

University of Geneva Jul 2016 – Sep 2016
Postdoctoral Researcher
Supervisor: Vincent Desjacques

GRANTS AND AWARDS

Abilitazione Scientifica Nazionale Nov 2020
Qualified as Associate Professor in Theoretical Physics (SC FIS/02)
Valid through: 9/11/2020 – 9/11/2029

VENI grant Aug 2018
Netherlands Organisation for Scientific Research (NWO)
Proposal: Pushing the boundaries of the cosmological particle collider
Amount: 250 000 Euro

Travel funding Jul 2014 and Jul 2015
Ernst et Lucie Schmidheiny foundation (CH)
Amount: 1600 Euro

Computing Time at National Facility Oct 2018 – Oct 2020
Netherlands Organization for Scientific Research (NWO)
Proposal: Cosmological Simulations of a Non-Gaussian Universe
Amount: 2 500 000 SBU[1]

RESEARCH ACTIVITY

My research focuses on the physics of the Early Universe and its imprint on the Large-Scale Structures of the Universe. With this goal in mind, I have acquired combined expertise in the study of high-energy processes relevant during inflation and in modelling physics of the late Universe.

STUDIES OF THE EARLY UNIVERSE

- Inflationary consistency relations [10,14,23,24]
- Symmetries of vector perturbations during inflation [22]
- Primordial gravitational waves [3,16,21]
- Primordial black holes [8]

STUDIES OF THE LATE UNIVERSE

- Large scale clustering of dark matter halos and voids [1-7,9,11-13,15,17-20]
- N-body simulations [1,2,4,7,9,11,12]
- Cosmology with massive neutrinos [19]
- Clustering models including primordial non-Gaussianity [1,2,3,4,7,9,11,12,15]
- Constraints on primordial features using large scale structures [6]
- Topological data analysis applied to large scale structures [2]

Output indicators
As of October 2020, I have 22 published papers, a citation count of 448 and a h_{hep} index of 14 on INSPIRE-HEP. For a detailed citation record of my papers, see http://inspirehep.net/author/profile/M.Biagetti.1.

All my publications are in the journals with the highest impact factors in the field of Cosmology:

- 6 papers in *Monthly Notices of the Royal Astronomical Society* (MNRAS) - 2018 impact factor: 5.231
- 6 papers in *Physical Review D* (PRD) - 2018 impact factor: 4.394
- 7 papers in *Journal of Cosmology and Astroparticle Physics* (JCAP) - 2018 impact factor: 5.524
- 1 paper in *The Astrophysical Journal (ApJ)* – 2018 impact factor: 5.580
- 1 paper in *Physical Review Research 1 (PRR)*
- 1 review paper in *Galaxies (MDPI)*

[1] One SBU corresponds to the usage of one core of the system (24 CPU) for one hour

Computational Resources
I have acquired expertise in running and analyzing cosmological N-Body simulations and I currently own one of the largest sets of simulations with non-Gaussian initial conditions[2]. A subset of this data has been already used in several publications [1,2,4,7,9,11,12].
In order to produce these datasets, I have successfully applied for CPU time both at University of Geneva (Baobab supercluster) and at the National Dutch Computing Facilities (Cartesius supercluster).

INTERNATIONAL ACTIVITIES

- **Selected list of most recent invited talks**
  - *AstroCoffee(zoom)* at IAS Princeton, US (Oct 2020)
  - *Special Seminar* (zoom), IFPU Trieste, IT (Oct 2020)
  - *Euclid Theory Working Group Meeting*, (zoom), (Jun 2020)
  - *Cosmology Seminar*, Lorentz Institute Leiden, NL (Oct 2019)
  - *Cosmology Seminar*, ICTP Trieste, IT (Oct 2019)
  - *Cosmology Seminar*, Groningen, NL (Sep 2019)
  - *Cosmology Lunch Seminar*, Cambridge, UK (Nov 2018)
  - *Cosmology seminar,* Geneva, Switzerland (Oct 2017)
  - *Cosmology Journal Club,* Padova, Italy (Oct 2017)
  - *Cosmology Journal Club*, Utrecht, Netherlands (Jun 2017)
  - *GRAPPA seminar*, Amsterdam, Netherlands (Nov 2016)
  - *Cosmocoffee*, CERN, Switzerland (Sep 2016)

- **Selected list of conference/workshop talks:**
  - "*The non-Gaussian Universe",* Cambdridge, UK (Sep 2019)
  - "*String theory and Cosmology",* Castelldefels, Spain (June 2019)
  - "*Theoretical Challenges for Precision Galaxy Clustering",* Sesto, Italy (Jul 2016)
  - "*Unbiased cosmology from biased tracers"* IAS (Princeton), US (Oct 2015)
  - "*Modern Cosmology: Early Universe, CMB and LSS*" Benasque, Spain (Aug 2014)
  - "*Large Scale Structure*" ICTP, Trieste, Italy (Aug 2012)

- **Network of collaborators**
  I have an international network of collaborators in the following institutions:
  - Brookhaven National Laboratory, Upton, NY, USA
  - Flatiron Institute, New York, USA
  - Institute of Advanced Studies, Princeton, NY, USA
  - Inter-University Centre for Astronomy & Astrophysics, Pune, India
  - Ludwig-Maximilians University, Munich, Germany
  - Max Planck Institute for Astrophysics, Garching, Germany
  - National Technical University of Athens, Athens, Greece
  - Osservatorio Astronomico di Trieste, Italy
  - Perimeter Institute for Theoretical Physics, Ontario, Canada
  - Scuola Internazionale Superiore di Studi Avanzati (SISSA), Italy
  - Sun Yat-Sen University, Guanzhou, China
  - Technion, Haifa, Israel
  - Universidad Autonoma de Madrid, Spain
  - University of Amsterdam, Netherlands
  - University of Bologna, IT
  - University of California, San Diego, USA
  - University of Cambridge, UK
  - University of Geneva, Switzerland
  - University of Groningen, NL
  - University of Leiden, NL
  - University of Mainz, Germany
  - University of Padova, Italy
  - University of Pennsylvania, USA

[2] Full info at https://mbiagetti.gitlab.io/cosmos/nbody/eos/

- University of Portsmouth, UK
- University of Wisconsin-Madison, USA
- Valparaiso University, Valparaiso, Chile

INTERNATIONAL MEMBERSHIPS

Member of the Euclid Collaboration Feb 2019 – Present
Science Working Group
Working Package: "Higher-Order Statistics"
Theory Working Group
Working Package: "Initial Conditions"

MANAGEMENT AND COORDINATION

Lead organizer and funder of International Workshop Jul 2021
Lorentz Center, Leiden (NL)
Title: *Inflationary Imprints in Large-Scale Structure*
Website: https://www.lorentzcenter.nl/inflationary-imprints-in-large-scale-structure-2021.html

Member of PhD defense committee Sep 2019
University of Leiden
PhD candidate: Georgios Papadomanolakis

Organizer Sep 2018 – Sep 2020
Dutch cosmology meetings
Website: *http://cosmology.nl*

Journal Club Organizer Sep 2018 – Sep 2019
University of Amsterdam
Joint GRAPPA and Cosmology groups

PEER-REVIEWING

Referee for the journals
- Monthly Notices of the Royal Astronomical Society (MNRAS)
- Journal of Cosmology and Astroparticle Physics (JCAP)
- Astrophysical Journal (ApJ)
- Astronomy and Astrophysics (A&A)

TEACHING ACTIVITY

Academic Teaching Assistance

Theory of fundamental interactions Jan 2018
Galileo Galilei Institute in Florence (IT)
International Doctoral School

Mathematical Methods for Physics II Academic years: 2015 -2016 and 2014 - 2015
University of Geneva (CH)
Bachelor's degree in Physics

Cosmology II Academic year: 2013 - 2014
University of Geneva (CH)
Master's degree in Theoretical Physics

Mathematical Methods for Physics Academic year: 2012 - 2013 (in French)
University of Geneva (CH)

Bachelor's degree in Physics

Tutoring program

Mathematics and Physics Courses Academic year: 2011 -2012 (in Italian)
Gregorianum college in Padova (IT)
Bachelor's degree in Physics, Mathematics and Engineer

PUBLIC OUTREACH

Interview
National Geographic Magazine (NL) Apr 2019
Title: *Op zoek naar het begin der tijden*
Published in the July 2019 issue

Writer
Gushmag Social Magazine Nov 2013 – Jun 2016
Title: *Un caffé col fisico* (in Italian)
Link: http://www.gushmag.it/un-caffe-col-fisico/

Writer
UNOX Website Apr 2015 – Jun 2016
Title: *Science of Cooking*
Link: blog.unox.com/category/science-of-cooking/?lang=en

Public Talk
Festival Emergency Oct 2014
Fonderie Kugler, Geneva (CH)
Title: *Our Universe in a lifetime*

GENERAL SKILLS

Languages		**Programming**		**Cosmological N-body simulations**	
Italian	(native)	Fortran	(intermediate)	2LPTic	(intermediate)
English	(advanced)	Mathematica	(intermediate)	Gadget (v2.0)	(intermediate)
French	(intermediate)	Python	(intermediate)	Rockstar Halo Finder	(intermediate)
Dutch	(basic)	Supermongo	(intermediate)	Amiga Halo Finder	(basic)
		C	(basic)		
		Html/CSS	(basic)		

PUBLICATION LIST

Below I list my full publication record, updated to November 2020. A disclaimer on author ordering: my research is placed at the connection of the field of Astrophysics and Theoretical Physics. These two fields have different conventions in author ordering: the former predominantly orders author by contributions, the second by alphabetical order. Therefore, author ordering in my publication record is not uniform.

1. A. Moradinezhad Dizgah, **M. Biagetti**, E. Sefusatti, V. Desjacques, J. Noreña, *"Primordial Non-Gaussianity from Biased Tracers: Likelihood Analysis of Real-Space Power Spectrum and Bispectrum", submitted to JCAP, arXiv: 2010.14523*
2. **M. Biagetti**, A. Cole, G. Shiu, *"The Persistence of Large Scale Structures I: Primordial non-Gaussianity"*, submitted to *JCAP*, *arXiv:2009.04819*
3. **M. Biagetti**, G. Orlando, *"Primordial Gravitational Waves from Galaxy Intrinsic Alignments", JCAP 07 (2020) 005*, *arXiv:2001.05930*
4. K. C. Chan, Y. Li, **M. Biagetti**, N. Hamaus, *"Measurement of Void Bias Using Separate Universe Simulations"*, *ApJ 2, 889 (2020), arXiv: 1909.03736*
5. **M. Biagetti**, "The Hunt for Primordial Interactions in the Large Scale Structures of the Universe", *Galaxies 7, 3 (2019), arXiv:1906.12244*
6. F. Beutler, **M. Biagetti**, D. Green, A. Slosar, B. Wallisch, "Primordial Features from Linear to Nonlinear Scales", *PRR 1 ,3, 033209 (2019)*, *arXiv: 1906.08758*
7. K. C. Chan, N. Hamaus, **M. Biagetti**, "Constraint of Void Bias on Primordial non-Gaussianity", *PRD D99, 121304 (2019), arXiv:1812:04024*
8. **M. Biagetti**, G. Franciolini, A. Kehagias, A. Riotto, "Primordial Black Holes from Inflation and Quantum Diffusion", *JCAP 1807, 032 (2018), arXiv:1804.07124*
9. A. Nusser, **M. Biagetti**, V. Desjacques, "Abundance of peaks and dips in three-dimensional mass and halo density fields: a test for cosmology", *MNRAS 480, 1599 (2018), arXiv:1804.05328*
10. **M. Biagetti**, M. Fasiello, E. Dimastrogiovan*ni,* "Possible Signatures of the Inflationary Particle Content: Spin-2 fields"*, JCAP 1710, 038 (2017), arXiv:1708.01587*
11. **M. Biagetti**, T. Lazeyras, T. Baldauf, V. Desjacques, F. Schmidt, "Verifying the consistency relation for the scale dependent bias from local primordial non-Gaussianity", *MNRAS 468, 3 (2017), arXiv:1611.04901*
12. A. Moradinezhad, K. C. Chan, J. Noreña, **M. Biagetti**, V. Desjacques, "Squeezing the halo bispectrum: a test of bias models", *JCAP 1609, 030 (2016), arXiv:1512.06084*
13. **M. Biagetti**, A. Kehagias, D. Racco, A. Riotto, "The Halo Boltzmann Equation", *JCAP 1604, 040 (2016), arXiv:1508.07330*
14. **M. Biagetti**, A. Kehagias, A. Riotto, "What can we learn from the running of the spectral index if no tensors are detected in the cosmic microwave background anisotropy", *PRD D91 103527 (2015), arXiv:1502.02289*
15. **M. Biagetti**, V. Desjacques, "Scale dependent bias from an inflationary bispectrum: the effect of a stochastic moving barrier", *MNRAS 451 no.4, 3643-3648 (2015), arXiv:15012.04982*
16. **M. Biagetti**, M. Fasiello, E. Dimastrogiovanni, M. Peloso, "Gravitational Waves and Scalar Perturbations from Spectator Fields", *JCAP 1504, 011 (2015), arXiv:1411.3029*
17. **M. Biagetti**, V. Desjacques, A. Kehagias, A. Riotto, "Halo Velocity Bias", *PRD D90 103529 (2014), arXiv:1408.0293*
18. V. Desjacques, A. Moradinezhad, **M. Biagetti**, "Ultraviolet background fluctuations with clustered sources", *MNRAS 444 no.3, 2793-2807 (2014), arXiv:1406.6379*
19. **M. Biagetti**, V. Desjacques, A. Kehagias and A. Riotto, "Nonlocal halo bias with and without massive neutrinos", *PRD D90, 045022 (2014), arXiv:1405.1435*
20. **M. Biagetti**, K. C. Chan, V. Desjacques, A. Paranjape, "Measuring nonlocal Lagrangian peak bias", *MNRAS 441 no.2, 1457-1467 (2014), arXiv:1310.1401*
21. **M. Biagetti**, M. Fasiello, A. Riotto, "Enhancing Inflationary Tensor Modes Through Spectator Fields", *PRD D88 103518 (2013), arXiv:1305.7241*

22. **M. Biagetti**, A. Kehagias, E. Morgante, H. Perrier, A. Riotto, "Symmetries of vector perturbations during DeSitter epoch", *JCAP 1307, 030 (2013), arXiv: 1304.7785*

23. **M. Biagetti**, H. Perrier, A. Riotto, V. Desjacques, "Testing the running of non-Gaussianity through the CMB mu-distorsion and the halo bias", *PRD D87 063521 (2013), arXiv:1301.2771*

24. **M. Biagetti**, V. Desjacques, A. Riotto, "Testing Multi-Field Inflation with Galaxy Bias", *MNRAS 1774-1780 (2013), arXiv:1208.1616*

Curriculum Vitae

Personal Data

Name:	**Giuseppe Bozzi**
Present position:	**Researcher (RTDa)** *Università degli Studi di Pavia*

Qualifications

- **02/2020 - 12/2024**: Qualified for a position of **Professor in Theoretical Physics** (Professeur des Universités - Section 29 - Constituants Élémentaires) in French Universities
- **07/2018 - 07/2027**: Qualified for a position of **Associate Professor in Theoretical Physics** (Professore Associato - 02/A2 - Fisica Teorica delle Interazioni Fondamentali) in Italian Universities
- **25/06/2004 PhD** in Physics (University of Florence)
- **24/10/2000 Master Degree** in Physics (University of Pisa)

Scientific Path

- **07/2016 - present: Researcher (RTDa)** - University of Pavia (IT)
- **09/2014 - 06/2016: Contract Professor** - University of Milano (IT)
- **08/2013 - 07/2016: Contract Professor** - E-Campus University (IT)
- **03/2013 - 03/2016: Teaching Fellow** - Politecnico Milano (Italy)
- **01/2009 - 12/2012: Post-doctoral research associate** - University of Milano (IT)
- **10/2006 - 12/2008: Post-doctoral research associate** - ITP, Karlsruhe (DE)
- **09/2004 - 09/2006: Post-doctoral research associate** - University of Grenoble (FR)
- **04/2001 - 04/2004: Ph.D. student in Physics** - University of Florence (IT).
  Thesis discussed on June 25th, 2004.
  PhD Thesis: "Higgs boson production at hadron colliders and its transverse-momentum distribution"
  Supervisor: Dr. Stefano Catani
- **10/1995 - 10/2000: Undergraduate student in Physics** - University of Pisa (IT).
  Laurea in Physics obtained on October 24th, 2000 *with highest grade and cum laude*
  Master Thesis:"Fermioni chirali su reticolo" *(in italian)*
  Advisor: Prof. Adriano Di Giacomo

Research

- **Research Interests**
  - Perturbative QCD: radiative corrections and all-order (resummed) predictions for electroweak observables (Higgs, Drell-Yan and multi-boson final states) at hadron colliders; phenomenology of SM and BSM processes at hadron colliders.
  - Non-perturbative QCD: impact of proton internal structure on precision electroweak observables at hadron colliders; fit of transverse momentum dependent (TMD) PDFs from Drell-Yan and Semi-Inclusive DIS data; TMD factorisation.
  - *Aim*: promote the synergy and exploit the complementarity between LHC and EIC, both bringing my high-energy expertise in the hadronic community and promoting the physics case for TMD studies at CERN, in order to provide a better description of the nucleon structure and an increasingly precise understanding of the strong interactions.
- **Research Products** (INSPIRE data)
  - 47 research products (papers and proceedings)
  - Bibliometrics (w/o proceedings): 2500+ citations, h-index = 22, avg. cit./paper = 86.2
- **Ongoing collaborations**
  - Member of the LHC Electroweak Working Group (high precision electroweak measurements, benchmarking of different formalisms for low transverse-momentum processes)
  - Member of the Electron Ion Collider User Group (identification of measurements for existing or new physics topics at the EIC, and their impact on detector design)
  - Active collaboration with U. Pavia, U. Cagliari, U. Alcalà, Penn State U., JLab, CEA Saclay (global TMD fit, TMD factorisation at subleading twist, interplay between LHC and EIC)
  - Active collaboration with U. Tübingen, U. Sapienza (Drell-Yan at low invariant mass)
  - Active collaboration with U. Milano, PSI, ATLAS W Mass Team (reduction of theoretical systematics for W mass measurements)

Teaching

- **2020-20201 : University of Pavia (34 h)**
  - Problem sessions for "Analytical Mechanics" (24 h) and "Quantum Electrodynamics" (10 h)
- **2019-2020 : University of Pavia (34 h)**
  - Problem sessions for "Analytical Mechanics" (24 h) and "Quantum Electrodynamics" (10 h)
- **2018-2019 : University of Pavia (44 h)**
  - Problem sessions for "Analytical Mechanics" (24 h) and "Quantum Electrodynamics" (10 h)
  - Introduction to resummation methods for the "Strong Interactions" PhD course (10 h)
- **2017-2018 : University of Pavia (34 h)**
  - Problem sessions for "Analytical Mechanics" (24 h) and 'Quantum Electrodynamics" (10 h)
- **2016-2017 : University of Pavia (24 h)**
  - Problem sessions for "Analytical Mechanics" (24 h)
- **2015-2016 : University of Milano (48h)**
  - Full course (Lectures and Problem sessions) of "Quantitative methods for social sciences" (48h)

- **2015-2016 : Politecnico Milano (60 h)**
  - Problem sessions for "Analytical Mechanics" (40 h) and "Geometry and Linear Algebra" (20 h)
- **2015-2016 : E-Campus University (online)**
  - Full course (Lectures and Problem sessions) of "Analytical Mechanics"
- **2014-2015 : University of Milano (68h)**
  - Full course (Lectures and Problem sessions) of "Quantitative methods for social sciences" (48h)
  - Problem session for "Mathematics" (20h)
- **2014-2015 : Politecnico Milano (156 h)**
  - Problem sessions for "Analytical Mechanics" (112 h), "Mathematics and Mechanics of Solids" (14 h) and "Geometry and Linear Algebra" (30 h)
- **2014-2015 : E-Campus University (online)**
  - Full course (Lectures and Problem sessions) of "Analytical Mechanics"
- **2013-2014 : Politecnico Milano (84h)**
  - Problem sessions for "Analytical Mechanics" (74 h) and "Geometry and Linear Algebra" (10 h)
- **2013-2014 : University of Milano (40h)**
  - Problem sessions for "Elements of Nuclear Physics" (20 h) and "Quantum Mechanics" (20 h)
- **2013-2014 : E-Campus University**
  - Full course (Lectures and Problem sessions) of "Analytical Mechanics"
- **2012-2013 : Politecnico Milano (30h)**
  - Problem sessions for "Analytical Mechanics" (20 h) and "Geometry and Linear Algebra" (10 h)
- **2012-2013 : University of Milano (50h)**
  - Problem sessions for "Elements of Nuclear Physics" (20 hours) "Quantum Mechanics" (30 h)
- **2011-2012 : University of Milano (50h)**
  - Problem sessions for "Theoretical Physics" (20 h) and "Quantum Mechanics" (30 h)
- **2010-2011 : University of Milano (80h)**
  - Problem sessions for "Quantum Mechanics" (30 h), "Theoretical Physics" (20 h) and "Elements of Nuclear Physics" (30 h)
- **2009-2010 : University of Milano (20h)**
  - Problem sessions for "Quantum Mechanics" (20 h)
- **2006-2007 : University of Karlsruhe (24h)**
  - Problem sessions for "Theoretical Particle Physics I" (24 h)
- **2005-2006 : University of Grenoble (108h)**
  - Problem sessions and laboratory for "General Physics" (66 h) and "Fundamental Physics" (42 h)

Students

- **04/2019 - 12/2019** : **supervisor** of a **Bachelor student** (Federica Moroni) - U. of Pavia
  Thesis: "Il vettore di Laplace-Runge-Lenz e la simmetria nel problema di Keplero e nell'atomo di idrogeno"
- **04/2011 - 09/2012** : **co-supervisor** of a **Bachelor student** (Davide Napoletano) - U. of Milano
  Thesis: "Studio dei contributi non perturbativi alla produzione di bosoni vettori ai collisori adronici"

- **11/2008 - 02/2009**: **external referee** for a **PhD thesis** (Luca Panizzi) - U. of Trieste
  Thesis: "One-loop electroweak analysis for third family scalar quarks production at the LHC'
- **09/2004 - 09/2006**: **co-supervisor** of a **PhD student** (Benjamin Fuks) - U. of Grenoble
  Thesis: "QCD resummation and non-minimal flavour-violation for supersymmetric particle production at hadron colliders"

Organisation and coordination duties

- **Member** of the Local Organising Committee - Transversity 2020 - Pavia
- **Member** of the Local Organising Committee - REF 2019 - Pavia
- **Member** of the INFN Scientific Committee of the "Asimov Prize" for science books
- **Member** of the Selection Committee for the admission to "Collegio Universitario S.Caterina", Pavia
- **Co-organiser** of the "Strong Interactions" course for the PhD in Physics at the University of Pavia
- **Referee** for Nuclear Physics B, Journal of High Energy Physics, European Physics Journal C
- Postdoctoral researchers' (elected) **representative** - University of Milano, 2009-2012
- Preparation and submission of proposals for national research grants (FIRB/MIUR)
- **Organiser** of the Theoretical Physics Seminar Series in Milano, 2009-2012
- **Organiser** of the ITP Weekly Research Seminar in Karlsruhe, 2006-2008

Outreach

- Editorial consultant for "Raffaello Cortina Editore" ("Scienza e Idee" series)
- Scientific and technical (LaTeX) consultant for "Codice edizioni" and "Treccani"
- Scientific and literary translations (ENG-ITA)
  - R. Panek "The Trouble with Gravity" - Houghton Mifflin Harcourt
    ("Il mistero sotto i nostri piedi" - Raffaello Cortina Editore - 2020)
  - L.Susskind, G. Hrabovsky "The Theoretical Minimum" - Basic Books
    ("Il minimo teorico" - Raffaello Cortina Editore - 2019)
  - S. Hossenfelder "Lost in Math" - Basic Books
    ("Sedotti dalla matematica" - Raffaello Cortina Editore - 2019)
  - N. Polson, J. Scott "AIQ" - St. Martin's Press
    ("Numeri intelligenti" - UTET - 2019)
  - L. Susskind, A. Friedman " The Theoretical Minimum - Special relativity and classical field theory"
    ("Relatività ristretta e teoria classica dei campi" - Raffaello Cortina Editore - 2018)
  - D. Stipp "A most elegant equation" - Basic Books
    ("L'equazione di Dio - Eulero e la bellezza della matematica" - Codice Edizioni - 2018)
  - N. deGrasse Tyson "Astrophysics for people in a hurry" - W.W.Norton and Company
    ("Astrofisica per chi va di fretta" - Raffaello Cortina Editore - 2018)
  - L. Susskind, A. Friedman "The Theoretical Minimum - Quantum Mechanics" - Basic Books
    ("Meccanica quantistica" - Raffaello Cortina Editore - 2015)
  - J.J. Sakurai, J. Napolitano "Modern Quantum Mechanics" - Addison Wesley
    ("Meccanica quantistica moderna" - Zanichelli - 2013)

- Interactive installation on the concept of Void in physics, art and philosophy, selected for the International Festival **"The Story of Space"**, Goa, India, November 2017 (financial support by Italian Ministry of Foreign Affairs)
- *Coordinator* of the Physics section for the ViaLattea scientific divulgation website
- *Contributor* to the QueryOnline magazine of the Italian Skeptics Association (CICAP)
- Public speech
  - 02/04/2020 Physics Department, Pavia - Speakable and unspeakable in data fitting
  - 17/12/2019 Physics Department, Pavia - Common misunderstandings in science divulgation
  - 26/09/2019 European Researchers Night, Pavia - Debunking of climate change denial
  - 11/03/2019 Collegio Unversitario S.Caterina da Siena, Pavia - Void in Physics and Art
  - 28/09/2018 European Researchers Night, Pavia - Statistics of gambling
  - 07/04/2017 Liceo Scientifico N. Moreschi, Milano - Void and Elementary Particles
  - 27/03/2014 Liceo Scientifico S.Ambrogio, Milano - Elementary Particles
  - 24/05/2013 Liceo Scientifico Vittorio Veneto, Milano - Elementary Particles
  - 09/11/2012 Circolo ARCI La Scighera, Milano - The Higgs Boson

Other skills

- **Foreign languages**
  - *Italian*: native
  - *English*: fluent
  - *French*: fluent
- **Computing**
  - *Operating systems*: Linux, Mac OS (user and administrator)
  - *Coding*: Fortran, LaTeX, Mathematica, Shell-scripting, Python
  - *Working experience in*: Monte Carlo simulation, cluster management (PBS/gLite), repositories (SVN, git), Wordpress
- **Volunteering**
  - Italian Red Cross - Volunteer: first aid in emergencies, ambulance, support for refugees, international cooperation, first-aid teaching for schools and private companies: (2009-present)
- **Music**
  - Polyphonic Choir "V. Galilei" (Pisa) - Bass/Baritone: baroque and renaissance music (1995-2001)
  - Polyphonic Choir "Città Studi" (Milan) - Bass/Baritone: baroque and romantic music (2011-2015)
  - Polyphonic Ensemble "Aenigma" (Milan) - Bass/Baritone: early baroque and renaissance music (2014-present)

List of Publications

1. **G. Bozzi, S. Catani, D. de Florian, M. Grazzini**
   "The q_T spectrum of the Higgs boson at the LHC in QCD perturbation theory"
   Phys. Lett. B564, 65 (2003) (hep-ph/0302104)
2. **G. Bozzi**
   "Q_T resummation in Higgs boson production at the LHC"
   in "Proceedings of the XV IFAE - Italian Meeting on High Energy Physics"
   hep-ph/0311194
3. **K. A. Assamagan et al.**
   "The Higgs working group: summary report 2003"
   in "Proceedings of the 3rd Les Houches Workshop: Physics at TeV Colliders"
   hep-ph/0406152
4. **G. Bozzi, B. Fuks, M. Klasen**
   "Slepton production at polarized hadron colliders"
   Phys. Lett. B609, 339 (2005) (hep-ph/0411318)
5. **G. Bozzi, B. Fuks, M. Klasen**
   "Non-diagonal and mixed squark pair production at hadron colliders"
   Phys. Rev. D72, 035016 (2005) (hep-ph/0507073)
6. **G. Bozzi, S. Catani, D. de Florian, M. Grazzini**
   "Transverse-momentum resummation and the spectrum of the Higgs boson at the LHC"
   Nucl. Phys. B737, 73 (2006) (hep-ph/0508068)
7. **G. Bozzi, B. Fuks, M. Klasen**
   "Transverse-momentum resummation for slepton-pair production at the LHC"
   Phys. Rev. D74, 015001 (2006) (hep-ph/0603074)
8. **G. Bozzi**
   "QCD corrections to Higgs physics at the LHC"
   in "Proceedings of the XVIII IFAE - Italian Meeting on High Energy Physics"
   hep-ph/0609171
9. **G. Bozzi, B. Jäger, C. Oleari and D. Zeppenfeld**
   "Next-to-leading order QCD corrections to W^+Z and W^-Z production via vector-boson fusion"
   Phys. Rev. D75, 073004 (2007) (hep-ph/0701105)
10. **G. Bozzi, B. Fuks, M. Klasen**
    "Threshold resummation for slepton-pair production at Hadron Colliders"
    Nucl. Phys. B777, 157 (2007) (hep-ph/0701202)
11. **G. Bozzi, B. Fuks, B. Herrmann, M. Klasen**
    "Squark and gaugino hadroproduction and decays in Non-Minimal Flavour Violating Supersymmetry"
    Nucl. Phys. B787, 1 (2007) (arXiv:0704.1826)
12. **G. Bozzi, S. Catani, D. de Florian, M. Grazzini**
    "Higgs boson production at the LHC: transverse-momentum and rapidity dependence"
    Nucl. Phys. B791, 1 (2008) (arXiv:0705.3887)
13. **G. Bozzi, B. Fuks, M. Klasen**
    "Joint resummation for slepton-pair production at Hadron Colliders"
    Nucl. Phys. B794, 46 (2008) (arXiv:0709.3057)
14. **G. Bozzi, B. Jäger, C. Oleari and D. Zeppenfeld**
    "Vector boson pair production via vector-boson fusion at NLO QCD"
    J. Phys. Conf. Ser. 110:042006 (2008) (arXiv:0710.1572)

15. **G. Bozzi, B. Jäger, C. Oleari and D. Zeppenfeld,**
"Vector Boson Pair Production via Vector Boson Fusion at NLO QCD"
DOI 10.1007/978 − 88 − 470 − 0747 − 510

16. **G. Bozzi**
"Threshold effects in slepton pair production at the LHC"
J. Phys. Conf. Ser. 110:072004 (2008) (arXiv:0710.1573)

17. **G. Bozzi**
"Soft-gluon resummation for Higgs differential distributions at the LHC"
in "Proceedings of SUSY 07 - Karlsruhe, Germany"
(arXiv:0710.2422)

18. **del Aguila et al.**
"Collider aspects of flavor at high Q"
Eur. Phys. J. C 57, 183 (2008) (arXiv:0801.1800)

19. **S. Bolognesi, G. Bozzi and A. Di Simone**
"Higgs at LHC"
Nuovo Cim. 123B, 499 (2008) (arXiv:0804.4401)

20. **G. Bozzi**
"Selected Items in Jet Algorithms"
Nuovo Cim. 123B, 744 (2008) (arXiv:0808.0792)

21. **K. Arnold et al.**
"VBFNLO:A parton level Monte Carlo for processes with electroweak bosons"
Comput. Phys. Commun. 180, 1661 (2009) (arXiv:0811.4559)

22. **G. Bozzi, S. Catani, G. Ferrera, D. de Florian, M. Grazzini**
"Transverse-momentum resummation: a perturbative study of Z production at the Tevatron"
Nucl. Phys. B815, 174 (2009) (arXiv:0812.2862)

23. **G. Bozzi**
"Higgs boson production at the LHC: Transverse-momentum resummation and rapidity dependence"
PoS RADCOR 2007, 039 (2007)

24. **G. Bozzi**
"Soft-gluon resummation for Higgs differential distributions at the Large Hadron Collider"
Nuovo Cim. 123B, 772 (2008)

25. **G. Bozzi, F. Campanario, V. Hankele, D. Zeppenfeld**
"NLO QCD corrections for $W^+W^-\gamma$ and $ZZ\gamma$ production with leptonic decays"
Phys. Rev. D81, 094030 (2010) (arXiv:0911.0438)

26. **B. Jäger, G. Bozzi, C. Englert, C.Oleari, M. Worek, D. Zeppenfeld**
"Weak boson scattering at the Large Hadron Collider"
PoS RADCOR 2009, 057 (2009) (arXiv:1001.2649)

27. **D. Zeppenfeld, G. Bozzi, F. Campanario, C. Englert, V. Hankele, S. Platzer, B. Jäger, C.Oleari,M. Spannowsky, M. Worek**
"NLO QCD corrections to processes with multiple electroweak bosons"
PoS RADCOR 2009, 017 (2009) (arXiv:1002.0292)

28. **G. Bozzi, S. Catani, G. Ferrera, D. de Florian, M. Grazzini**
"Production of Drell-Yan lepton pairs in hadron collisions: transverse-momentum resummation at next-to-next-to-leading logarithmic accuracy."
Phys. Lett. B696, 207 (2011) (arXiv:1007.2351)

29. **G. Bozzi, F. Campanario, M. Rauch, H. Rzehak, D. Zeppenfeld**
"NLO QCD corrections for $WZ\gamma$ production with leptonic decays"
Phys. Lett. B696, 380 (2011) (arXiv:1011.2206)

30. **G. Bozzi, F. Campanario, M. Rauch, D. Zeppenfeld**
"NLO QCD corrections for $W\gamma\gamma$ production with leptonic decays"
Phys. Rev. D83, 114035 (2011)(arXiv:1103.4613)

31. **G. Bozzi, J. Rojo, A. Vicini**
"The impact of PDF uncertainties on the measurement of the W boson mass at the Tevatron and the LHC"
Phys. Rev. D83, 113008 (2011) (arXiv:1104.2056)

32. **G. Bozzi, F. Campanario, M. Rauch, D. Zeppenfeld**
"$Z\gamma\gamma$ production with leptonic decays and triple photon production at NLO QCD"
Phys. Rev. D84, 074028 (2011) (arXiv:1107.3149)

33. **K. Arnold et al.**
"VBFNLO:A parton level Monte Carlo for processes with electroweak bosons – Manual for version 2.5.0"
(arXiv:1107.4038)

34. **G. Bozzi, F. Campanario, C. Englert, M. Rauch, M. Spannowsky, D. Zeppenfeld**
"Precision Multiboson Phenomenology"
(arXiv:1205.2506)

35. **K. Arnold et al.**
"Release Note - VBFNLO 2.6.0"
(arXiv:1207.4975)

36. **G. Bozzi, L. Citelli and A. Vicini**
"Parton density function uncertainties on the W boson mass measurement from the lepton transverse momentum distribution"
Phys. Rev. D 91, no. 11, 113005 (2015)

37. **G. Bozzi, L. Citelli, M. Vesterinen and A. Vicini**
"Prospects for improving the LHC W boson mass measurement with forward muons"
Eur. Phys. J. C 75, no. 12, 601 (2015)

38. **H. W. Lin et al.**
"Parton distributions and lattice QCD calculations: a community white paper"
Prog. Part. Nucl. Phys. 100 (2018) 107

39. **A. Bacchetta, G. Bozzi, M. Radici, M. Ritzmann and A. Signori**
"Effect of flavor-dependent partonic transverse momentum on the determination of the W boson mass in hadronic collisions"
Phys. Lett. B788, 542 (2019) (arXiv:1807.02101 [hep-ph])

40. **G. Bozzi and A. Signori**
"Non-perturbative uncertainties on the transverse momentum distribution of electroweak bosons and on the determination of the W boson mass at the LHC"
Advances in High Energy Physics, vol. 2019 (arXiv:1901.01162 [hep-ph])

41. **A. Bacchetta, G. Bozzi, M. Lambertsen, F. Piacenza, J. Steiglechner, W. Vogelsang**
"Difficulties in the description of Drell-Yan processes at moderate invariant mass and high transverse momentum"
Phys. Rev. D100, 014018 (2019) (arXiv:1901.06916 [hep-ph])

42. **C. Aidala et al.**
"The LHCSpin Project"
in **Probing Nucleons and Nuclei in High Energy Collisions, 204 (arXiv:1901.08002 [hep-ex])**

43. **A. Bacchetta, G. Bozzi, M. G. Echevarria, C. Pisano, A. Prokudin, M. Radici,**
"Azimuthal asymmetries in unpolarized SIDIS and Drell-Yan processes: a case study towards TMD factorization at subleading twist,"
Phys. Lett. B797, 134850 (2019) (arXiv:1906.07037 [hep-ph])
44. **F. Piacenza, A. Bacchetta, G. Bozzi, M. Lambertsen, J. Steiglechner, W. Vogelsang**
"Difficulties in the description of Drell-Yan processes at moderate invariant mass and high transverse momentum"
PoS SPIN2018 (2019) 056
45. **M. Radici, A. Bacchetta, G. Bozzi, M. Ritzmann and A. Signori**
"Effect of flavor-dependent partonic transverse momentum on the determination of the W boson mass in hadronic collisions"
PoS DIS2019 (2019) 133
46. **S. Camarda** *et al.*
"DYTurbo: Fast predictions for Drell-Yan processes"
Eur Phys. J. C 80, 251 (2020) (arXiv:1910.07049 [hep-ph])
47. **A. Bacchetta, V. Bertone, C. Bissolotti, G. Bozzi, F. Delcarro, F. Piacenza and M. Radici**
"Transverse-momentum-dependent parton distributions up to N^3LL from Drell-Yan data,"
JHEP 07 (2020), 117 (arXiv:1912.07550 [hep-ph])

Detailed research activity

Lattice QCD

The work done for my master thesis at Pisa University, under the supervision of Adriano Di Giacomo and Luigi Del Debbio, was devoted on the possibility of formulating QCD on the lattice trying to preserve the chiral properties of the continuum theory.

Lattice QCD has the great advantage of being able to treat both the perturbative and non-perturbative regime of hadron phenomenology. Within this formulation the theory is defined on a four-dimensional euclidean space-time lattice of finite dimension and lattice spacing a. The introduction of the lattice regularises the theory by cutting off momentums greater than $1/a$, and at the same time it permits the numerical calculations of physical observables by means of Monte Carlo methods.
Actually at finite lattice spacing it is much difficult to obtain some properties of the continuum theory, because this regularisation breaks several symmetries: among the others, chiral symmetry. As an example, a "no-go" theorem exists that prevents from constructing a Dirac operator anti-commuting with γ_5 and that, in the limit of small momenta, gives the standard continuum propagator.
A possible solution to overcome this problem is to construct Dirac operators that satisfy a precise relation (Ginsparg-Wilson condition) and, inside this class, we have chosen to consider the one that in literature is known as "Neuberger operator". The numerical simulation of this operator is very difficult mainly because it has an infinite interaction range and because of the huge dimension of the matrices involved.
The original part of my work was the investigation of the possible implementing procedures of the Neuberger operator and their comparation in order to choose the most convenient one and suitable to be inserted in a full QCD MonteCarlo algorithm.

Higgs/DY Physics and Soft-Gluon Resummation

During my Ph.D. course at Florence University, I worked with Stefano Catani, Massimiliano Grazzini (CERN) and Daniel de Florian (Buenos Aires University) on soft gluon resummation in perturbative QCD, with particular emphasis on the transverse momentum spectrum of the Higgs boson produced in hadron collisions. The main SM Higgs production mechanism at high energy colliders is the gluon-gluon fusion which is ex-

pected to receive large radiative corrections. As the QCD predictions for the total cross section are under good control now, we chose to investigate another important observable: the transverse-momentum (q_T) distribution of the Higgs boson. An accurate theoretical prediction of this observable at the LHC is very important to enhance the statistical significance of the signal over the background and to improve strategies for the extraction of the signal.
We can separate the q_T spectrum in three regions. In the large q_T region ($q_T > m_H$), the perturbative series is controlled by a small expansion parameter and thus gives reliable predictions. In the small q_T region ($q_T \ll m_H$) it is well known that the multiple soft emissions from initial state greatly enhance the coefficients of the perturbative series, thus spoiling the convergence of the series itself: so we need to use the resummation formalism to correctly take into account these effects. Finally in the intermediate q_T region it is necessary to match the fixed order result with the resummed one to prevent possible double counting.
We have implemented the matching of the resummation result at NNLL order with the fixed order result at NLO, thus achieving a matching at order α_S^4.
The results in the case of Higgs production at the LHC were presented in [1] and show, besides the great importance of resummation effects for this observable, the stability of the main features of the distribution with respect to scale variations or inclusion of higher order terms in the resummed expansion and the modest influence of non-perturbative effects [3].

In a second paper [6] we performed a more phenomenological study for SM Higgs production at LHC and we gave the details of our resummation formalism, which is actually quite general and applies to the production of generic high-mass systems (lepton pairs, vector bosons, Higgs particles,...) in hadronic collisions.
We also pointed out the main differences of our approach with respect to other implementations of the resummation procedure: universality (i.e. process independence) of the form factor which embodies all the logarithmic contributions; implementation of resummation formula at the level of the partonic cross section (to avoid the extrapolation of parton distributions at non-perturbative energies); and slight modification of the resummation formula (imposing a constraint of perturbative unitarity) in order to avoid unjustified resummed contributions at intermediate and large q_T.

In [12] we further extended the resummation formalism to include rapidity dependence using the impact parameter and double Mellin moments to implement and factorise the multiparton kinematics constraint of transverse- and longitudinal-momentum conservation.

In [22] we applied the method described above to the Drell-Yan case and compared our predictions at NLL+LO with the available Tevatron data, finding a good agreement within the theoretical uncertainties.

In [28] we have extended the results presented in [22] to the NNLL+NLO accuracy. The NNLL corrections are not large and make the qT spectrum slightly harder, while the size of the scale uncertainties is considerably reduced in going from NLL+LO to NNLL+NLO accuracy. We have compared the resummed calculation with the results of measurements of the normalised qT spectrum at the Tevatron Run II. The perturbative uncertainty of the NNLL+NLO results turns out to be comparable with the experimental errors. The NNLL+NLO results (without the inclusion of any non-perturbative effects) are consistent with the experimental data in a wide region of transverse momenta.

In [46] we introduced a new numerical program, DYTurbo, for the calculation of the QCD transverse-momentum resummation of Drell-Yan cross sections up to next-to-next-to-leading logarithmic accuracy, combined with the fixed-order results at next-to-next-to-leading order (α_S^2), including the full kinematical dependence of the decaying lepton pair with the corresponding spin correlations and the finite-width effects. The DYTurbo program is an improved reimplementation of the previous DYqT, DYRes and DYNNLO programs, which provides fast and numerically precise predictions through the factorisation of the cross section into production and decay variables, and the usage of quadrature rules based on interpolating functions for the integration over kinematic variables. DYTurbo is already widely used in experimental collaborations working on DY processes (ATLAS, in particular).

SUSY and Flavour Phenomenology

I joined the Theory Group at LPSC in Grenoble as a post-doc research associate in september 2004 and I started to work with Michael Klasen and a PhD student, Benjamin Fuks, on the phenomenology of slepton and squark pair production at hadron colliders.

In [4] we presented a new calculation of cross sections and asymmetries for slepton pair production through neutral and charged electroweak currents in polarised hadron collisions. Our analytical results are valid for general slepton masses and include the mixing of the left- and right-handed interaction eigenstates relevant for third generation sleptons.
Numerically, we have studied in detail the dependence of the longitudinal single-spin asymmetry on the tau slepton mixing angle for pair production of the lighter tau slepton mass eigenstate. Its physical mass and the mixing angle at the electroweak scale have been calculated with the help of renormalisation group equations after imposing restricted sets of SUSY breaking parameters at the unification scale.
The determination of these parameters in measurements of the longitudinal single-spin asymmetry at the only existing polarised pp collider RHIC was found to be difficult due to its limited center-of-mass energy and luminosity, even in a gauge mediated SUSY breaking model with a very light tau slepton.
In contrast, a polarisation upgrade for the proton beam of the Tevatron would give direct access to the trilinear coupling A_0 in a typical minimal supergravity model, independently of the tau slepton mass and the unpolarised cross section.
At the LHC, where larger masses are easily accessible and where we have studied an alternative minimal supergravity model with enhanced tau slepton masses and mixings, the sensitivity of the longitudinal single-spin asymmetry to the mixing angle and the trilinear coupling A_0 is found to be reduced and hampered by a large uncertainty from the not well-known polarised parton densities at small values of their longitudinal momentum fractions in the proton.
For all colliders, an asymmetry measurement would allow for a straightforward discrimination of the SUSY signal from the associated SM background of tau lepton pair production due to the opposite sign of SUSY and SM asymmetries.

In [5] we analyse the squark pair production at hadron colliders, namely stop and sbottom pairs. We extend the previous LO calculations for the stop sector including the polarisation effects, while in the non-diagonal case (stop1-stop2 or sbottom1-sbottom2 pair production) we compute the QCD contribution (sbottom loops) and the EW contribution (which turns out to be by far the dominant one). We also considered, for the first time, mixed squark pair production (stop1-sbottom2 or stop2-bottom1) via W-boson exchange. We provided squared helicity amplitudes for all considered channels in analytic form, as they expose the left- and right-handed contributions in the EW channels, allow for future applications to polarised hadron collisions, and may be easily implemented in general purpose Monte Carlo programs. Numerically, we have focused on top and bottom squark production, including mixing in both cases, at the Tevatron and the LHC. We found that associated light sbottom and stop production may allow for confirmation or exclusion of light sbottom scenarios at the Tevatron. In more traditional scenarios (SPS 1a or SPS 5), non-diagonal and mixed squark production can probably only be studied at the LHC, where these channels may allow for additional constraints on SUSY masses, mixing angles, or the SUSY CKM matrix.

In [7] we performed the first precision calculation of the q_T-spectrum in slepton- (or slepton-sneutrino associated-) pair production at the LHC. We implemented soft-gluon resummation up to NLL and subsequently matched the result to the LO α_S result. We gave numerical results for $\tilde{\tau}_1\tilde{\tau}_1^*$ et $\tilde{\tau}_1\tilde{\nu}_\tau^* + \tilde{\tau}_1^*\tilde{\nu}_\tau$, also including some recent proposals for the parametrisation of non-perturbative effects. The results show the relevance of the resummed contributions both in the small- and intermediate-q_T region and small dependence on scale variations and non-perturbative effects.

In [10] we presented a first and extensive study of threshold resummation effects for supersymmetric (SUSY) particle production at hadron colliders, still focusing on Drell-Yan like slepton-pair and slepton-sneutrino associated production. After confirming the known next-to-leading order (NLO) QCD corrections and generalizing the NLO SUSY-QCD corrections to the case of mixing squarks in the virtual loop contributions,

we employed the usual Mellin N-space resummation formalism with the minimal prescription for the inverse Mellin-transform and improved it by resumming $1/N$-suppressed and a class of N-independent universal contributions. Numerically, our results increase the theoretical cross sections by 5 to 15% with respect to the NLO predictions and stabilize them by reducing the scale dependence from up to 20% at NLO to less than 10% with threshold resummation.

In [13] we presented a precision calculation of the transverse-momentum and invariant-mass distributions for supersymmetric particle pair production at hadron colliders, focusing on Drell-Yan like slepton pair and slepton-sneutrino associated production at the CERN Large Hadron Collider. We implemented the joint resummation formalism at the next-to-leading logarithmic accuracy with a process-independent Sudakov form factor, thus ensuring a universal description of soft-gluon emission, and consistently match the obtained result with the pure perturbative result at the first order in the strong coupling constant, i.e. at $\mathcal{O}(\alpha_s)$. We also implemented three different recent parameterisations of non-perturbative effects. Numerically, we give predictions for selectron pair production and compare the resummed cross section with the perturbative result. The dependence on unphysical scales is found to be reduced, and non-perturbative contributions remain small.

In [11] we presented an extensive analysis of squark and gaugino hadroproduction and decays in non-minimal flavour violating supersymmetry. We employed the so-called super-CKM basis to define the possible misalignment of quark and squark rotations, and we used generalised (possibly complex) charges to define the mutual couplings of (s)quarks and gauge bosons/gauginos. The cross sections for all squark-(anti-)squark/gaugino pair and squark-gaugino associated production processes as well as their decay widths have then been given in compact analytic form. For four different constrained supersymmetry breaking models with non-minimal flavour violation in the second/third generation squark sector only, we established the parameter space regions allowed/favoured by low-energy, electroweak precision, and cosmological constraints and display the chirality and flavour decomposition of all up- and down-type squark mass eigenstates. Finally, we computed numerically the dependence of a representative sample of production cross sections at the LHC on the off-diagonal mass matrix elements in the experimentally allowed/favoured ranges.

Vector-boson production

I joined the ITP as a post-doc research associate in October 2006 and I started to work with Dieter Zeppenfeld and his research group on the phenomenology of vector-boson production at hadron colliders.

In [9] we have described the calculation of the NLO QCD corrections to $W^{\pm}Zjj$ production at the LHC, and its implementation in a fully flexible parton-level Monte Carlo program that allows for the computation of kinematic distributions within realistic experimental cuts. We found that the scale uncertainties of the NLO predictions for total cross sections are at the 2% level, which indicates that the perturbative calculation is under excellent control. Care has to be taken, however, if NLO distributions are to be approximated by LO results, as shapes can change considerably when going from LO to NLO. In this regard, a "proper" choice of factorisation scale can help. We found that, with a factorisation scale chosen as the momentum transfer, Q, of the t-channel electroweak boson, the LO calculation can better reproduce the shape of NLO distributions than when taking a fixed scale, $\mu_F = m_V$.

Together with the phenomenology group at the ITP, we developed [21,33] a fully flexible parton level Monte Carlo program (VBFNLO) for the simulation of vector boson fusion, double and triple vector boson production in hadronic collisions at next-to-leading order in the strong coupling constant. VBFNLO includes Higgs and vector boson decays with full spin correlations and all off-shell effects. In addition, VBFNLO implements CP-even and CP-odd Higgs boson via gluon fusion, associated with two jets, at the leading-order one-loop level. A variety of effects arising from beyond the Standard Model physics are implemented for selected processes. This includes anomalous couplings of Higgs and vector bosons and a Warped Higgsless extra dimension model. The program offers the possibility to generate Les Houches Accord event files for all processes available at leading order.

In [25,29,30,32] we performed the computation of the NLO QCD corrections to the cross sections for WWA, ZZA, WZA, WAA, ZAA, AAA production in hadronic collisions. We considered the case of real photons in the final state, but included full leptonic decays of the W and Z bosons. Numerical results for the LHC and the Tevatron have been obtained through a fully flexible parton level Monte Carlo based on the structure of the VBFNLO program, allowing an easy implementation of arbitrary cuts and distributions. We showed the dependence on scale variations of the integrated cross sections and provided evidence that NLO QCD corrections strongly modify the LO predictions for observables at the LHC both in magnitude and in shape.

Precision physics for EW observables

Together with Alessandro Vicini and the phenomenology group of the Physics Department in Milano, from early 2009 I started working in the framework of the W Mass Workshop. The workshop collects experimentalists of both the Tevatron and the LHC and phenomenologists interested in precision measurements of the W boson mass, with the common effort of reliably estimating the various possible sources of (theoretical and experimental) uncertainties.

In [31] we studied at a quantitative level the impact of the uncertainties on the value of the W boson mass measured at hadron colliders due to: *i*) the proton parton distribution functions (PDFs), *ii*) the value of the strong coupling constant α_s and *iii*) the value of the charm mass used in the PDF determination. The value of the W boson mass was extracted, by means of a template fit technique, from the lepton-pair transverse mass distribution measured in the charged current Drell-Yan process. We studied the determination of M_W at the Tevatron and at the LHC with 7 and 14 TeV of center-of-mass energy in a realistic experimental setup. The analysis has been done at the Born level using the event generator HORACE and at NLO-QCD using the event generators DYNNLO and ResBos. We considered the three global PDF sets, CTEQ6.6, MSTW2008 and NNPDF2.1. We estimated that the total PDF uncertainty on M_W is below 10 MeV both at the Tevatron and at the LHC for all energies and final states. We concluded that PDF uncertainties do not challenge a measurement of the W boson mass at the level of 10 MeV accuracy.

In [36] we applied the same analysis of [31] to the case of the lepton transverse-momentum distribution, obtaining an uncertainty on M_W that ranges between 18 and 24 MeV, depending on the final state and collider energy.

In [37] we discussed the potential of a M_W measurement by the LHCb experiment based on the lepton transverse momentum spectrum in W decays. The unique forward acceptance of LHCb means that the PDF uncertainties would be anti-correlated with those of p_T based measurements by ATLAS and CMS. We computed an average of ATLAS, CMS and LHCb measurements of m_W from the p_T distribution, and we found that this average is a factor of 1.3 more precise than an average of ATLAS and CMS alone.

Hadronic structure

In July 2016 I joined the group of Alessandro Bacchetta in Pavia and we started collaborating on the 3DSPIN project, an ERC-funded project focused on the study of the internal structure of the proton. We are currently working on the extraction of TMD PDFs from relevant observables at hadron colliders, implementing the most advanced perturbative and non-perturbative theoretical predictions, on Drell-Yan lepton pair production at low-Q^2, and on the impact of flavour-dependent intrinsic k_T on precision EW measurements.

In [39], within the framework of transverse-momentum-dependent factorisation, we investigated for the first time the impact of a flavour-dependent intrinsic transverse momentum of quarks on the production of $W^\pm$ bosons in proton-proton collisions at $\sqrt{s} = 7$ TeV. We estimated the shift in the extracted value of the W boson mass M_W induced by different choices of flavour-dependent parameters for the intrinsic quark transverse momentum by means of a template fit to the transverse-mass and the lepton transverse-momentum distributions of the W-decay products. We obtained shifts in M_W comparable to those induced by PDF variations, thus calling for more detailed investigations of flavour-dependent non-perturbative effects linked to the proton structure at hadron colliders.

In [40] we presented an overview of recent results concerning the impact of a possible flavour dependence of the intrinsic quark transverse momentum on electroweak observables. In particular, we focused on the q_T spectrum of electroweak gauge bosons produced in proton-proton collisions at the LHC and on the direct determination of the W boson mass. We showed that these effects are comparable in size to other non-perturbative effects commonly included in phenomenological analyses, and should thus be included in precise theoretical predictions for present and future hadron colliders.

In [41] We studied the Drell–Yan cross section differential with respect to the transverse momentum of the produced lepton pair, in the case of moderate invariant mass Q of the leptonic system (between 4.5 GeV and 13.5 GeV) and similar values of the transverse momentum q_T. We found that the collinear framework predicts cross sections that in most cases are significantly below available data at high q_T. We discussed additional perturbative and possible non-perturbative effects that increase the predicted cross section, but not by a sufficient amount.

In [43] we considered the azimuthal distribution of the final observed hadron in semi-inclusive deep-inelastic scattering and the lepton pair in the Drell-Yan process. In particular, we focused on the $\cos\phi$ modulation of the unpolarised cross section and on its dependence upon transverse momentum. At low transverse momentum, for these observables we proposed a factorised expression based on tree-level approach and conjectured that the same formula is valid in transverse-momentum dependent (TMD) factorisation when written in terms of subtracted TMD parton distributions. Our formula correctly matches with the collinear factorisation results at high transverse momentum, solves a long-standing problem and is a necessary step towards the extension of the TMD factorisation theorems up to the subleading twist.

In [47] we presented an extraction of unpolarised Transverse-Momentum-Dependent Parton Distribution Functions based on Drell-Yan production data from different experiments, including those at the LHC, and spanning a wide kinematic range. We dealt with experimental uncertainties by properly taking into account correlations and we included resummation of logarithms of the transverse momentum of the vector boson up to N3LL order together with non-perturbative contributions, obtaining a remarkable agreement with data.

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Personal Information

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Employment History

October 2018 -
Research fellow (5 year position), University of Milano-Bicocca, Milano, Italy.

October 2015 - September 2018
Post-doctoral fellow, Technical University of Munich, Munich, Germany.

December 2012 - September 2015
Post-doctoral fellow, Paul Scherrer Institute (PSI), Villigen, Switzerland.

Education

January 2020
Habilitated as Associate Professor in the Italian University system

November 2009 - February 2013
Ph.D. in Physics, Johannes Gutenberg University, Mainz.
Fellow of the DFG Graduate School "Symmetry Breaking in Fundamental Interactions".
Thesis title: "*Applications of SCET to the pair production of supersymmetric particles at hadron colliders*"
Adviser: Prof. Dr. M. Neubert

October 2006 - October 2009
Master Degree in Theoretical Physics, 110/110 cum laude, University of Padova.
Thesis title: "*Quantum effects in the two Higgs doublet model*"
Supervisors: Dr. M. Passera (INFN Padova), Prof. Dr. G. Degrassi (University of Rome III)

October 2003 - October 2006
Bachelor Degree in Physics, University of Padova.
Thesis title: "*Search of hidden explosives with the technique of neutron radiography*"
Supervisor: Prof. G. Viesti

Invited Seminars

September 2020, Theory Seminar, University of Padova, Italy, *"Resummation techniques for precision physics at the LHC"*.

May 2020, Theory Seminar, University of Pisa, Italy, *"Sudakov resummation for WIMP dark matter annihilation"*.

October 2019, Heavy-Quark Hadroproduction from Collider to Astroparticle Physics workshop, MITP Mainz, Germany; *"Resummation techniques for heavy-quark production and Dark Matter annihilation processes"*.

October 2018, Milan Joint Phenomenology Seminar, University of Milano-Bicocca, Milano, Italy, *"Sudakov resummation for WIMP dark matter annihilation processes"*.

July 2018, QFET Seminar, Universität Siegen, Siegen, Germany, *"Sudakov resummation for WIMP dark matter annihilation processes"*.

May 27 - Jun 1, 2018, Heavy Quarks and Leptons 2018, Yamagata, Japan; *"Review talk on $t\bar{t}+V$ processes at the LHC"*.

February 19-23, 2018, The evaluation of the leading hadronic contribution to the muon anomalous magnetic moment, MITP Mainz, Germany; *"Expansion by region analysis for μe scattering "*.

December 2017, HU-DESY Zeuthen Seminar, Humboldt-Universität, Berlin, Germany, *"Associated production of a top-antitop pair with a heavy boson"*.

September 24-29, 2017, RADCOR 2017, St. Gilgen, Austria; *"Associated production of a top-antitop pair with a heavy boson at NLO+NNLL accuracy"*.

September 4-5, 2017, μe scattering Workshop, Padova, Italy; *"Expansion by region analysis for μe scattering "*.

August 27-September 1, 2017, QCD@LHC, Debrecen, Hungary; *"Associated production of a top-antitop pair with a heavy boson at NLO+NNLL accuracy"*.

July 27, 2017, Research area D day, PRISMA Cluster, Munich, Germany; *"Associated production of a top-antitop pair with a heavy boson at NLO+NNLL accuracy"*.

September 13-16, 2016, Regularization scheme workshop, Zürich, Switzerland; *"SCET approach to regularization-scheme dependence of QCD amplitudes"*.

May 3-6, 2016, SM@LHC 2016, Pittsburgh, USA; *"Associated production of a top pair and a SM boson beyond NLO"*.

March 21-24, 2016, SCET Workshop 2016, DESY Hamburg, Germany; *"Associated production of a top pair and a Higgs boson beyond NLO"*.

November 2014, Particle Physics Seminar, ETH/University of Zürich, Zürich, Switzerland, *"RG-improved predictions for the production of heavy particles at the LHC"*.

June 18-20, 2014, LoopFest XIII, New York, USA; *"RG-improved fully differential predictions for top-pair production at hadron colliders"*.

October 2013, New York City College of Technology, CUNY, New York, USA, *"Soft-gluon resummation for the production of supersymmetric particles at the LHC"*.

May 2013, LTP Seminar, Paul Scherrer Institut, Switzerland; *"Stop-pair production"*.

March 14-16, 2013, SCET 2013, Durham, USA; *"Approximate NNLO predictions for the stop-pair production cross section at the LHC"*.

January 2013, Particle Theory Seminar, Paul Scherrer Institut, Switzerland, *"Soft-gluon resummation for the production of supersymmetric particles"*.

July 21-27, 2011, EPS-HEP 2011, Grenoble, Rhône-Alpes, France; *"Soft-gluon resummation for slepton-pair production"*.

Attended Workshops

February 4-8, 2019, Theory for muon-electron scattering at 10ppm, Zürich, Switzerland.

November 5-7, 2018, Next-to-leading power corrections workshop, Amsterdam, Netherlands.

July 24 - August 5, 2017, Automated, Resummed and Effective: Precision Computations for the LHC and Beyond, München, Germany.

January 24-29, 2016, Next-to-leading power corrections workshop, Higgs center for theoretical physics, Edinburgh, Scotland.

September 26-28, 2014, Topical workshop on top quark differential distributions, Cannes, France.

March 26-28, 2014, SCET 2014, Munich, Germany.

Attended Schools

PSI Summer School, More than Higgs - Effective Theories for Particle Physics, Lyceum Alpinum, Zuoz, Switzerland, August 17-23, 2014.

Summer School on Symmetries, Fundamental Interactions and Cosmology 2011, Island "Frauenchiemsee", Bavaria, Germany, September 11-16, 2011.

Annual Retreat of the Graduate School Symmetry Breaking in Fundamental Interactions and the Research Center Elementary Forces and Mathematical Foundations, Bingen, Germany, September 27-29, 2010.

Students Supervision

2013 - 2020: Joint supervision of four Ph.D. students: Andrea Visconti (PSI, graduated 2016), Caspar Hasner (TUM, graduated 2020), Sebastian Jaskiewicz (TUM) and Kai Urban (TUM).

2016 Summer term: complete supervision of a bachelor thesis at TU Munich.

Teaching Experience

2017 Winter term, Technical University of Munich, exercises classes of "*Quantum Field Theory*".

2016 Winter term, Technical University of Munich, exercises classes of "*Classical Electrodynamics*".

2015 Winter term, Technical University of Munich, exercises classes of "*Quantum Mechanics 2*".

2012 Summer term, Johannes Gutenberg-University Mainz, exercises classes of "*Supersymmetry*".

2011 Winter term, Johannes Gutenberg-University Mainz, exercises classes of "*Symmetries in Physics*".

2011 Summer term, Johannes Gutenberg-University Mainz, exercises classes of "*Quantum Field Theory II*".

Professional Activities

Member of the "GENEVA" Monte Carlo collaboration.

Referee for the European Physical Journal C and Physical Review D.

Participation to the "LHC Higgs Cross Section Working Group".

Organization of the "Milan joint phenomenology seminar".

Organization of PSI/LTP Colloquia at the Paul Scherrer Institute.

Languages

Mother tongue: Italian

Excellent knowledge: English

Working knowledge: German

Computer Skills

Operating Systems
`Linux`, `MacOS X`: very good knowledge

Programming Languages
`Fortran 90`, `FORM`, `Mathematica`, LaTeX: very good knowledge
`C++`, `BASH`: good knowledge

Version Control Systems
`git`, `svn`: good knowledge

HPC systems
`Slurm`, `PBS`: good knowledge

Developer
`GENEVA Monte Carlo`

Book

T. Becher, A. Broggio, A. Ferroglia,
Introduction to Soft-Collinear Effective Theory,
Lecture Notes in Physics vol. 896 (2015), Springer, [arXiv:1410.1892].

Publications and preprints

1. S. Alioli, A. Broggio, A. Gavardi, S. Kallweit, M.A. Lim, R. Nagar, D. Napoletano, L. Rottoli, *Precise predictions for photon pair production matched to parton showers in GENEVA,* [arXiv:2010.10498].

2. S. Alioli, A. Broggio, A. Gavardi, S. Kallweit, M.A. Lim, R. Nagar, D. Napoletano, L. Rottoli, *Resummed predictions for hadronic Higgs boson decays,* [arXiv:2009.13533].

3. M. Beneke, A. Broggio, S. Jaskiewicz, L. Vernazza,
Threshold factorization of the Drell-Yan process at next-to-leading power,
JHEP 20 (2020) 078, [arXiv:1912.01585].

4. S. Alioli, A. Broggio, S. Kallweit, M.A. Lim, L. Rottoli,
Higgsstrahlung at NNLL′+NNLO Matched to Parton Showers in GENEVA,
Phys. Rev. D 100, 096016, [arXiv:1909.02026].

5. A. Broggio, A. Ferroglia, R. Frederix, D. Pagani, B. D. Pecjak, I. Tsinikos, *Top-quark pair hadroproduction in association with a heavy boson at NLO+NNLL including EW corrections,* JHEP 1908 (2019) 039, [arXiv:1907.04343].

6. M. Beneke, A. Broggio, C. Hasner, K. Urban, M. Vollmann, *Resummed photon spectrum from dark matter annihilation for intermediate and narrow energy resolution,* JHEP 1908 (2019) 103, [arXiv:1903.08702].

7. M. Beneke, A. Broggio, M. Garny, S. Jaskiewicz, R. Szafron, L. Vernazza, J. Wang, *Leading-logarithmic threshold resummation of the Drell-Yan process at next-to-leading power,* JHEP 1903 (2019) 043, [arXiv:1809.10631].

8. R. Bonciani, A. Broggio, L. Cieri, A. Ferroglia, *Master Integrals for double real radiation emission in heavy-to-light quark decay,* Eur.Phys.J. C 78 8 (2018) 674, [arXiv:1807.01681].

9. M. Beneke, A. Broggio, C. Hasner, M. Vollmann, *Energetic γ-rays from TeV scale dark matter annihilation resummed,* Phys.Lett. B 786 (2018) 347-354, [arXiv:1805.07367].

10. A. Broggio, A. Ferroglia, M. C. N. Fiolhais, A. Onofre, *Pseudoscalar couplings in $t\bar{t}H$ production at NLO+NLL accuracy,* Phys. Rev. D 96, 073005, [arXiv:1707.01803].

11. C. Gnendiger et al., *To d, or not to d: recent developments and comparisons of regularization schemes,* Eur.Phys.J. C77 (2017) no. 7, 471, [arXiv:1705.01827].

12. A. Broggio, A. Ferroglia, G. Ossola, B. D. Pecjak, R. D. Sameshima, *Associated production of a top pair and a Z boson at the LHC to NNLL accuracy,* JHEP 1704 (2017) 105, [arXiv:1702.00800].

13. A. Broggio, A. Ferroglia, B. D. Pecjak, L. Yang, *NNLL resummation for the associated production of a top pair and a Higgs boson at the LHC,* JHEP 1702 (2017) 126, [arXiv:1611.00049].

14. A. Broggio, A. Ferroglia, G. Ossola, B. D. Pecjak, *Associated production of a top pair and a W boson at next-to-next-to-leading logarithmic accuracy,* JHEP 1609 (2016) 089, [arXiv:1607.05303].

15. A. Broggio, A. Ferroglia, B. D. Pecjak, A. Signer, L. Yang, *Associated production of a top pair and a Higgs boson beyond NLO,* JHEP 1603 (2016) 124, [arXiv:1510.01914].

16. A. Broggio, C. Gnendiger, A.Signer, D. Stöckinger, A. Visconti, *SCET approach to regularization-scheme dependence of QCD amplitudes,* JHEP 1601 (2016) 078, [arXiv:1506.05301].

17. A. Broggio, C. Gnendiger, A.Signer, D. Stöckinger, A. Visconti, *Computation H→gg in DRED and FDH: renormalization, operator mixing, and explicit two-loop results,* Eur.Phys.J. C75 (2015) no. 9, 418, [arXiv:1503.09103].

18. A. Broggio, A. Ferroglia, B.D. Pecjak, Z. Zhang, *NNLO hard functions in massless QCD,* JHEP 1412 (2014) 005, [arXiv:1409.5294].

19. A. Broggio, E.J. Chun, M. Passera, K.M. Patel, S.K. Vempati, *Limiting two-Higgs-doublet models,* JHEP 1411 (2014) 058, [arXiv:1409.3199].

20. A. Broggio, A.S. Papanastasiou, A. Signer, *Renormalization-group improved fully differential cross sections for top pair production,* JHEP 1410 (2014) 98, [arXiv:1407.2532].

21. A. Broggio, A. Ferroglia, M. Neubert, L. Vernazza, L. Yang, *NNLL Momentum-Space Resummation for Stop-Pair Production at the LHC,* JHEP 1403 (2014) 066, [arXiv:1312.4540].

22. A. Broggio, A. Ferroglia, M. Neubert, L. Vernazza, L. Yang, *Approximate NNLO Predictions for the Stop-Pair Production Cross Section at the LHC,* JHEP 1307 (2013) 042, [arXiv:1304.2411].

23. A. Broggio, M. Neubert, L. Vernazza, *Soft-gluon resummation for slepton-pair production at hadron colliders,* JHEP 1205 (2012) 151, [arXiv:1111.6624].

Proceedings and Reports

1. A. Broggio, *Associated production of a top-antitop pair with a heavy boson at NLO+NNLL accuracy* PoS HQL2018 (2018) 020.

2. A. Broggio, *NNLL resummation for the associated production of a top pair with a heavy boson at the LHC,* PoS RADCOR2017 (2018) 056, [arXiv:1801.06806].

3. A. Broggio, A. Ferroglia, N. Greiner, G. Ossola, *Recent Developments in Higher-Order Calculations: Hard Functions at NLO with GoSam,* PoS EPS-HEP2017 (2017) 392, [arXiv:1711.09462].

4. LHC Higgs Cross Section Working Group, *Handbook of LHC Higgs Cross Sections: 4. Deciphering the Nature of the Higgs Sector, [arXiv:1610.07922].*

5. A. Broggio, M. Neubert, L. Vernazza, *Soft-gluon resummation for slepton-pair production,* PoS EPS-HEP2011 (2011) 269, [arXiv:1111.0864].

November 22, 2020

Alessandro Broggio

Curriculum Vitae

LORENZO CALIBBI

Nationality:	Italian
Work address:	Nankai University, School of Physics, 94 Weijin Road, Tianjin 300071, P. R. China

Scientific appointments

- **From March 2019.** Associate Professor (tenure track to full professor), School of Physics, Nankai University, Tianjin, China (*current position*).
- **April 2015 - February 2019.** Senior research associate ($\sim$ Associate Professor, non-tenured), Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing, China.
- **October 2012 - March 2015.** Postdoc position at the Service de Physique Théorique, Université Libre de Bruxelles, Belgium.
- **October 2009 - September 2012.** Postdoc position at Max-Planck-Institut für Physik, Munich, Germany.
- **October 2007 - September 2009.** Postdoc position at SISSA/ISAS, Trieste, Italy.
- **March - September 2007.** Visitor at the Departament of Theoretical Physics of the University of Valencia, Spain, with the support of the foundation "Angelo Della Riccia".
- **2004 - 2007.** PhD student at the University of Padova, Italy.

Education

- **2007, March 29th.** PhD in Physics at the University of Padova, Italy. Title of the thesis: *"Lepton Flavour Violation from SUSY GUTs"*. Advisor: Prof. Antonio Masiero, University of Padova.
- **2003, July 3rd.** Degree (110/110 cum laude) in Physics at the University of Ferrara, Italy, with the thesis: *"Anomalie chirali"* (*Chiral anomalies*). Advisor: Prof. Luca Caneschi, University of Ferrara.

Awards, fellowships, and grants

- **Italian National Scientific Qualification.**
  Awarded by the Italian Ministry of Education, University and Research on November 24th 2017. The qualification allows to compete for second level (associate) professor positions in all Italian universities (validity: 6 years).
- **Starting grant.**
  Awarded by School of Physics of the Nankai University, China; Starting date: March 2019; Duration: 3 years; Amount: 200,000 CNY ($\approx$ 25,000 €).
- **Starting grant.**
  Awarded by the Institute of Theoretical Physics of the Chinese Academy of Sciences; Starting date: April 1st 2015; Duration: 3 years; Amount: 240,000 CNY ($\approx$ 30,000 €).
- **Max-Planck fellowship.**
  Awarded by the Max-Planck Society, Germany; Starting date: October 1st 2009; Duration: 3 years.
- **"Assegno di ricerca" (research fellowship).**
  Awarded by SISSA/ISAS, Italy; Starting date: October 1st 2007; Duration: 2 years.
- **Scholarship for research periods in international institutions.**
  Awarded by the foundation "Angelo Della Riccia", Italy; Starting date: March 1st 2007; Duration: 7 months; Amount: 7,000 €.

Organizational activities

- Member of the International Organizing Committee of the 3rd International Conference on Charged Lepton Flavor Violation, Kyushu University in Fukuoka, Japan, 17-19 June 2019.
- Member of the International Advisory Committee of the International School on Charged Lepton Flavor Violation, Institute of High Energy Physics, Beijing, China, 3-8 June 2019.
- Convener of the Flavour Session of the The 25th International Conference on Supersymmetry and the Unification of Fundamental Interactions (SUSY17), held at the Tata Institute for Fundamental Research, Mumbai, India, 11-15 December 2017.

- Member of the International Organizing Committee of the 2nd International Conference on Charged Lepton Flavor Violation, held at the University of Virginia, Charlottesville, USA, 20-22 June 2016.
- Member of the International Organizing Committee of the 1st International Conference on Charged Lepton Flavor Violation, held at the University of Lecce, Italy, 6-8 May 2013.
- 2013-2014. Organizer of theoretical physics seminars at ULB.
- 2010-2012. Organizer of AstroParticle seminars at MPP.
- 2008-2009. Organizer of high-energy phenomenology seminars at SISSA.

Activities as a referee

- Reviewer for the following journals: Journal of High Energy Physics (JHEP), Physical Review Letters (PRL), Physics Letters B (PLB), Physical Reviews D (PRD), European Physics Journal C (EPJC), and Nuclear Physics B (NPB).
- Grant proposal reviewer for the French National Research Agency (ANR).
- Book proposal reviewer for CRC press.

Skills

- *Languages*: Italian (native), English (fluent), Spanish (fluent), French (intermediate), German (basic).
- *Programming*: Mathematica, Fortran 77/90, Perl, C++.

Research interests

Particle Physics beyond the Standard Model, Flavour Physics (Hadronic Flavour/CP violation, Lepton Flavour Violation, Flavour Models), Searches for New Physics at Colliders (LHC, future leptonic/hadronic machines), Dark Matter Phenomenology and Model Building, and the interplay among the above subjects.

Teaching

Regular courses

- *Electromagnetism*, course for the undergraduate programme in physics of Nankai University, spring semester 2020, 34 lectures (68 h).

Summer schools

- *Theory of Charged Lepton Flavor Violation in the Standard Model and Beyond*, 3 lectures (4.5 h), at the International School on Charged Lepton Flavor Violation, Institute of High Energy Physics, Beijing, China, 3-8 June 2019.

Oral presentations at national and international workshops and conferences

1. *Probing new physics with LFV Z decays at the CEPC*, invited at "The 2020 international workshop on the high energy Circular Electron-Positron Collider", Shanghai Jiao Tong Univerisity, China 26-28 October 2020.

2. *The potential for new physics at BESIII energies*, invited plenary talk at workshop on "2020 BESIII New Physics Symposium", Tianjin, China 17-19 October 2020.

3. *Freeze-in Dark Matter and displaced vertices at the LHC*, invited talk at the final conference of the "IAS Program on High Energy Physics 2020", Hong Kong University of Science and Technology, 20-22 January 2020.

4. *Freeze-in Dark Matter and displaced vertices at the LHC*, invited plenary talk at the mini-workshop "Composite 2019: Hunting New Physics in Higgs, Dark Matter, Neutrinos, Composite Dynamics and Extra-Dimensions", Sun Yat-sen University, Guangzhou, China, 21-24 November 2019.

5. *Z and tau flavour physics at the CEPC*, invited talk at the "The 2019 international workshop on the high energy Circular Electron-Positron Collider", IHEP, Beijing, China, 18-20 November 2019.

6. *Freeze-in Dark Matter and displaced vertices at the LHC*, invited plenary talk at the Workshop "Next Frontiers in the Search for Dark Matter", Galileo Galilei Institute, Florence, Italy August 26-October 11 2019.

7. *Flavor Opportunities with Tau and Z*, invited plenary talk at the "CEPC Physics Workshop", Peking University, Beijing, China, 1-5 July 2019.

8. *Lepton-flavor-violating decays into axion-like particles*, invited plenary talk at the "3rd International Conference on Charged Lepton Flavor Violation", Kyushu University in Fukuoka, Japan, 17-19 June 2019.

9. *Charged Lepton Flavour Violation*, invited plenary review at the workshop "Flavor 2019: new physics in flavor from LHC to Belle II", MIAPP, Munich, Germany, 20-22 May 2019.

10. *Predictions of Neutrino Mass Models for Charged Lepton Flavour Violation*, invited plenary review at the workshop "Prospects on Neutrino Physics", Kavli IPMU, Tokyo, Japan, 8-12 April 2019.

11. *Hadronic and leptonic flavour-violating decays into axion-like particles*, invited plenary talk at COST Workshop on Higgs and Flavour Physics, IST, Lisbon, Portugal, 14-17 January 2019.

12. *Tau Lepton Flavour Violation*, invited plenary review at the "Joint workshop on future tau-charm factory", LAL, Orsay, France, 4-7 December 2018.

13. *Charged Lepton Flavour Violation*, invited plenary review at the 2018 WPI-next mini-workshop "Hints for New Physics in Heavy Flavors", Nagoya University, Japan, 15-17 November 2018.

14. *Freeze-in Dark Matter and displaced vertices at the LHC*, invited plenary talk at the Workshop on the Standard Model and Beyond, Corfu Summer Institute, Greece, August 31-September 9 2018.

15. *Examples of the interplay between LHC and Dark Matter*, invited plenary talk at the Workshop on frontiers of particle physics, Yantai, China, 9-11 June 2018.

16. *Testing new physics with flavour violation*, invited plenary talk at The 25th International Conference on Supersymmetry and the Unification of Fundamental Interactions (SUSY17), TIFR, Mumbai, India, 11-15 December 2017.

17. *Minimal models for the muon g-2 and Dark Matter*, invited plenary talk at the EW and Flavor Physics CEPC workshop, IHEP, Beijing, China, 9-10 November 2017.

18. *Axion from Flavour*, invited plenary talk at the 7th KIAS Workshop on Particle Physics and Cosmology, KIAS, Seoul, South Korea, 6-10 November 2017.

19. *Dark Matter and the muon g-2*, invited plenary talk at the Flavour and Dark Matter workshop, University of Heidelberg, Germany, 25-28 September 2017.

20. *Axion from Flavour*, talk at the Workshop on Axion Physics and Experiments, ITP-CAS, Beijing, China, 14-15 August 2017.

21. *Minimal models for the muon g-2 and Dark Matter*, invited plenary talk at the 6th KIAS Workshop on Particle Physics and Cosmology, KIAS, Seoul, South Korea, 24-28 October 2016.

22. *Neutron-antineutron oscillations as a probe of supersymmetry beyond the LHC*, plenary talk at the workshop New Physics at the LHC Run 2, KITPC, Beijing, China, July 11-August 8 2016.

23. *Simplified Models for SUSY: Lepton Flavour Violation and LHC interplay*, plenary talk at the KEK Theory Meeting on Particle Physics Phenomenology, KEK, Japan, February 9-12 2016.

24. *The Flavour Portal to Dark Matter*, plenary talk at the conference Dark Side of the Universe 2015, University of Kyoto, Japan, December 14-18 2015.

25. *Simplified Models for SUSY: Dark Matter, Flavour and LHC interplay*, plenary talk at the XVI mini-workshop on the frontier of the LHC, Dalian, China, October 16-18 2015.

26. *Phenomenology of low-energy flavour models: rare processes and dark matter*, invited seminar at MIAPP workshop, Indirect searches for new physics in the LHC and flavour precision era, Munich Institute for Astro- Particle Physics, June 1-26 2015.

27. *LFV in supersymmetric models*, invited plenary review talk at ZPW2015: The flavour of new physics, University of Zurich, Switzerland, January 7-9 2015.

28. *Theory of Lepton Flavor Violation*, invited plenary talk at NUFACT 2014, International Workshop on Neutrino Factories, Super Beams and Beta Beams, University of Glasgow, Scotland, August 25-30 2014.

29. *Probing light Neutralino Dark Matter at the LHC*, invited talk at MITP workshop: Probing the TeV scale and beyond, University of Mainz, Germany, 30 June - 25 July 2014.

30. *Simplified models for lepton flavour violation at the LHC*, talk at Planck 2014: From the Planck Scale to the ElectroWeak Scale, Paris, France, 26-30 May 2014.

31. *Testing New Physics with flavour violation*, invited plenary talk at IFAE 2014, L'Aquila, Italy, April 9-11 2014.

32. *Light Neutralino Dark Matter $>$ 24 GeV from LHC*, plenary talk at Recontres de Moriond EW 2014, La Thuile, Italy, March 15-22 2014.

33. *Lepton Flavor Violation beyond present limits*, invited review talk at PHIPSI 2013, International Workshop on e+e- collisions from Phi to Psi, "Sapienza" University of Rome, Italy, September 9-12 2013.

34. *Charged Lepton Flavor Violation, Brief Theory Overview*, invited plenary talk at NUFACT 2013, International Workshop on Neutrino Factories, Super Beams and Beta Beams, IHEP, Beijing, China, August 19-24 2013.

35. *Gauge Mediation beyond Minimal Flavor Violation*, talk at Planck 2013: From the Planck Scale to the ElectroWeak Scale, Bonn, Germany, 20-24 May 2013.

36. *Testing light neutralino dark matter with multi-tau signals at the LHC*, invited plenary talk at Portoroz 2013: Probing the Standard Model and New Physics at Low and High Energies, Portoroz, Slovenia, 15-18 April 2013.

37. *Lepton Flavor Violation vs. θ_{13}*, invited review talk at NUFACT 2012, International Workshop on Neutrino Factories, Super Beams and Beta Beams, Williamsburg, VA USA, July 23-28 2012.

38. *Phenomenology of the flavour messenger sector*, talk at FLASY 12, Workshop on flavor symmetries, Dortmund, Germany, 30 June - 4 July 2012.

39. *Phenomenology of the flavour messenger sector*, talk at Planck 2012: From the Planck Scale to the ElectroWeak Scale, Warsaw, Poland, 28 May - 1 June 2012.

40. *Light Neutralino in the MSSM*, talk at Planck 2011: From the Planck Scale to the ElectroWeak Scale. IST, Lisbon, Portugal, 30 May - 3 June 2011.

41. *Lepton flavor violation at LHC*, invited talk at Workshop on Synergy between High Energy and High Luminosity Frontiers, Tata Institute, Mumbai, India, January 10-12 2011.

42. *Slepton mass-splittings as a signal of LFV at the LHC*, talk at Mini-workshop on BSM and the early LHC, IPNL, Lyon, France, December 13-17 2010.

43. *Slepton mass-splittings as a signal of LFV at the LHC*, Planck 2010: From the Planck Scale to the ElectroWeak Scale. CERN, Geneve, Switzerland, 31 May - 4 June 2010.

44. *Gauge coupling unification with magic fields*, talk at Planck 2009: From The Planck Scale To The Electroweak Scale, Padova, Italy, May 25-29 2009.

45. *Distinguishing mSUGRA and SUSY-GUT using Neutralino Dark Matter and colliders*, talk at the Workshop LC08: e+e- Physics at the TeV scale, Frascati, Italy, September 22-25 2008.

46. *Lepton Flavour Violation and electron EDM in a SUSY flavour model*, talk at the 16th International Conference on Supersymmetry and the Unification of Fundamental Interactions, Seoul, South Korea, June 16-21 2008.

47. *Neutralino Dark Matter and τ polarization: a way to distinguish SUSY-GUT from CMSSM?,* talk at the Xth Workshop on high energy physics phenomenology, Chennai, India, January 2-13 2008.

48. *Neutralino Dark Matter and τ polarization: a way to distinguish SUSY-GUT from CMSSM?*, talk at the ILC Physics in Florence, Firenze, Italy, September 12-14 2007.

49. *SUSY-GUTs, SUSY-Seesaw and the Neutralino Dark Matter*, talk at the 15th International Conference on Supersymmetry and the Unification of Fundamental Interactions, Karlsruhe, Germany, July 26th - August 1st 2007.

50. *Lepton flavour violation from SUSY-GUTs*, talk at IFAE 2007, Napoli, Italy, April 11-13 2007.

51. *Lepton flavour violation from SUSY-GUTs*, talk at Flavour in the era of the LHC, a Workshop on the interplay of flavour and collider physics, CERN, 17 May 2006.

Seminars given by invitation of national and international universities

- *Flavour-violating decays of leptons into axion-like particles*
  - Web seminar for IHEP-CAS, Beijing, 9 July 2020.
- *Lepton-flavor-violating decays into axion-like particles*
  - Web seminar for the Sydney CPPC, Australia, 7 May 2020.
  - Web seminar for Brookhaven HET, US, 29 April 2020.

  - University of Genova, Italy, 17 December 2019.

- *Flavoured axion-like particles*
  - ICC, University of Barcelona, Spain, 26 September 2019.

- *Probing physics beyond the Standard Model with leptonic flavours*
  - CHEP, Peking University, China, 27 June 2018.

- *Two ways of connecting flavour and Dark Matter: flavour portals and axiflavon*
  - University of Padova, Italy, 21 December 2017.
  - Paul Scherrer Institut (PSI), Villigen, Switzerland, 22 September 2017.
  - NCTS, Hsinchu, Taiwan, 13 July 2017.

- *Minimal models for the muon g-2 and Dark Matter*
  - IFAE, Barcelona, Spain, 12 May 2017.
  - University of Granada, Spain, 9 May 2017.
  - University of Madrid, Spain, 4 May 2017.

- *Neutron-antineutron oscillations as a probe of supersymmetry beyond the LHC*
  - "Latin American Webinars on Physics", web-broadcasted seminar, 13 July 2016.
  - University of Delaware, US, 16 June 2016.
  - CHEP, Peking University, China, 10 May 2016.

- *Phenomenology of low-energy flavour models: rare processes and dark matter*
  - Saitama University, Japan, 8 February 2016.
  - Kavli IPMU Tokyo, Japan, 2 February 2016.
  - IHEP, Chinese Academy of Sciences, Beijing, China, 13 May 2015.
  - University of Ferrara, Italy, 16 March 2015.
  - University of Barcelona, Spain, 26 February 2015.

- *Simplified Models for SUSY: Dark Matter, Flavour and LHC interplay*
  - LPTHE, Paris, France, 30 October 2015.
  - University of Zaragoza, Spain, 3 March 2015.

- *Probing light Neutralino Dark Matter at the LHC*
  - IPPP, Durham, UK, 25 April 2014.
  - Technion, Haifa, Israel, 27 February 2014.
  - LPT Paris Sud, Orsay, France, 13 February 2014.

- *Phenomenology of the flavour messenger sector*
  - University of Padova, Italy, 25 January 2013.

- *Phenomenology of SUSY with intermediate scales*
  - SISSA, Trieste, Italy, 23 January 2013.
  - University of Warsaw, Poland, 11 December 2012.
- *Light Neutralino in the MSSM*,
  - University of Montpellier, France, 29 November 2011.
  - LPT Paris Sud, Orsay, France, 22 November 2011.
  - IFAE Barcelona, Spain, 21 October 2011.
- *Slepton mass-splittings as a signal of LFV at the LHC*,
  - University of Warsaw, Poland, 29 March 2011.
  - IIS Bangalore, India, 18 January 2011.
- *Gauge coupling unification with magic fields*,
  - KIAS Seoul, South Korea, 1 February 2010.
  - ICTP Trieste, Italy, 9 February 2009.
  - MPI Munich, Germany, 2 February 2009.
  - Stefan Institut Ljubljana, Slovenia, 22 January 2009.
- *Distinguishing mSUGRA and SUSY-GUT using Neutralino Dark Matter and colliders*,
  - IPhT Saclay, France, 8 January 2009.
  - KIAS Seoul, South Korea, 27 June 2008.
  - ICTP Trieste, Italy, 29 April 2008.
- *LFV from SUSY-GUTs: the impact of* U_{e3},
  - University of Padova, Italy, 30 January 2007.

Publications

Preprints

- L. Calibbi, D. Redigolo, R. Ziegler and J. Zupan, "Looking forward to Lepton-flavor-violating ALPs," arXiv:2006.04795 [hep-ph].

Articles published in international peer-reviewed journals

1. L. Calibbi, T. Li, Y. Li and B. Zhu, "Simple model for large CP violation in charm decays, B-physics anomalies, muon g-2, and Dark Matter," JHEP **10** (2020), 070 [arXiv:1912.02676 [hep-ph]].
2. L. Calibbi, M. L. López-Ibáñez, A. Melis and O. Vives, "Muon and electron $g-2$ and lepton masses in flavor models," JHEP **06** (2020), 087 [arXiv:2003.06633 [hep-ph]].
3. M. Ablikim *et al.* [BESIII], "Future Physics Programme of BESIII," Chin. Phys. C **44** (2020) no.4, 040001 [arXiv:1912.05983 [hep-ex]].
4. L. Calibbi, A. Crivellin, F. Kirk, C. A. Manzari and L. Vernazza, "Z' models with less-minimal flavour violation," Phys. Rev. D **101** (2020) no.9, 095003 doi:10.1103/PhysRevD.101.095003 [arXiv:1910.00014 [hep-ph]].
5. L. Calibbi, L. Lopez-Honorez, S. Lowette and A. Mariotti, "Singlet-Doublet Dark Matter Freeze-in: LHC displaced signatures versus cosmology," JHEP **1809** (2018) 037 [arXiv:1805.04423 [hep-ph]].
6. L. Calibbi, R. Ziegler and J. Zupan, "Minimal models for dark matter and the muon g-2 anomaly," JHEP **1807** (2018) 046 [arXiv:1804.00009 [hep-ph]].
7. W. Ahmed, L. Calibbi, T. Li, S. Raza, J. S. Niu and X. C. Wang, "Naturalness and Dark Matter in a Realistic Intersecting D6-Brane Model," JHEP **1806** (2018) 126 [arXiv:1711.10225 [hep-ph]].
8. L. Calibbi, A. Crivellin and T. Li, "A model of vector leptoquarks in view of the B-physics anomalies," Phys. Rev. D **98** (2018) no.11, 115002 [arXiv:1709.00692 [hep-ph]].
9. L. Calibbi and G. Signorelli, "Charged Lepton Flavour Violation: An Experimental and Theoretical Introduction," Riv. Nuovo Cim. **41** (2018) no.2, 1, [arXiv:1709.00294 [hep-ph]]. Invited review article, 110p.
10. L. Calibbi, E. J. Chun and C. S. Shin, "LSP baryogenesis and neutron-antineutron oscillations from R-parity violation," JHEP **1710** (2017) 177 [arXiv:1708.06439 [hep-ph]].
11. L. Calibbi, F. Goertz, D. Redigolo, R. Ziegler and J. Zupan, "Minimal axion model from flavor," Phys. Rev. D **95** (2017) no.9, 095009 [arXiv:1612.08040 [hep-ph]].

12. W. Ahmed, L. Calibbi, T. Li, A. Mustafayev and S. Raza, "Low Fine Tuning in Yukawa-deflected Gauge Mediation," Phys. Rev. D **95** (2017) no.9, 095031 [arXiv:1612.07125 [hep-ph]].

13. L. Calibbi, T. Li, A. Mustafayev and S. Raza, "Improving naturalness in gauge mediation with nonunified messenger sectors," Phys. Rev. D **93** (2016) no.11, 115018 [arXiv:1603.06720 [hep-ph]].

14. L. Calibbi, G. Ferretti, D. Milstead, C. Petersson and R. Pöttgen, "Baryon number violation in supersymmetry: $n-\overline{n}$ oscillations as a probe beyond the LHC," JHEP **1605** (2016) 144 [arXiv:1602.04821 [hep-ph]].

15. J. Abdallah *et al.*, "Simplified Models for Dark Matter Searches at the LHC," Phys. Dark Univ. **9-10** 8 [arXiv:1506.03116 [hep-ph]].

16. L. Calibbi, A. Crivellin and T. Ota, "Effective field theory approach to $b \to s\ell\ell^{(\prime)}$, $B \to K^{(*)}\nu\bar{\nu}$ and $B \to D^{(*)}\tau\nu$ with third generation couplings," Phys. Rev. Lett. **115** (2015) 18, 181801 [arXiv:1506.02661 [hep-ph]].

17. L. Calibbi, A. Mariotti and P. Tziveloglou, "Singlet-Doublet Model: Dark matter searches and LHC constraints," JHEP **1510** (2015) 116 [arXiv:1505.03867 [hep-ph]].

18. L. Calibbi, I. Galon, A. Masiero, P. Paradisi and Y. Shadmi, "Charged Slepton Flavor post the 8 TeV LHC: A Simplified Model Analysis of Low-Energy Constraints and LHC SUSY Searches," JHEP **1510** (2015) 043 [arXiv:1502.07753 [hep-ph]].

19. L. Calibbi, A. Crivellin and B. Zaldivar, "The Flavour Portal to Dark Matter," Phys. Rev. D **92** (2015) 016004 [arXiv:1501.07268 [hep-ph]].

20. L. Calibbi, J. M. Lindert, T. Ota and Y. Takanishi, "LHC Tests of Light Neutralino Dark Matter without Light Sfermions," JHEP **1411** (2014) 106 [arXiv:1410.5730 [hep-ph]].

21. L. Calibbi, P. Paradisi and R. Ziegler, "Lepton Flavor Violation in Flavored Gauge Mediation," Eur. Phys. J. C **74** (2014) 12, 3211 [arXiv:1408.0754 [hep-ph]].

22. L. Calibbi, A. Mariotti, C. Petersson and D. Redigolo, "Selectron NLSP in Gauge Mediation," JHEP **1409** (2014) 133 [arXiv:1405.4859 [hep-ph]].

23. L. Calibbi, J. M. Lindert, T. Ota and Y. Takanishi, "Cornering light Neutralino Dark Matter at the LHC," JHEP **1310** (2013) 132 [arXiv:1307.4119 [hep-ph]].

24. L. Calibbi, P. Paradisi and R. Ziegler, "Gauge Mediation beyond Minimal Flavor Violation," JHEP **1306** (2013) 052 [arXiv:1304.1453 [hep-ph]].

25. S. Antusch, L. Calibbi, V. Maurer, M. Monaco and M. Spinrath, "Naturalness of the Non-Universal MSSM in the light of the recent Higgs results," JHEP **1301** (2013) 187 [arXiv:1207.7236 [hep-ph]].

26. L. Calibbi, D. Chowdhury, A. Masiero, K. M. Patel and S. K. Vempati, "Status of supersymmetric type-I seesaw in SO(10) inspired models," JHEP **1211** (2012) 040 [arXiv:1207.7227 [hep-ph]].

27. C. Biggio, L. Calibbi, A. Masiero and S. K. Vempati, "Postcards from oases in the desert: phenomenology of SUSY with intermediate scales," JHEP **1208** (2012) 150 [arXiv:1205.6817 [hep-ph]].

28. L. Calibbi, Z. Lalak, S. Pokorski and R. Ziegler, "Universal Constraints on Low-Energy Flavour Models," JHEP **1207** (2012) 004 [arXiv:1204.1275 [hep-ph]].

29. L. Calibbi, Z. Lalak, S. Pokorski and R. Ziegler, "The Messenger Sector of SUSY Flavour Models and Radiative Breaking of Flavour Universality," JHEP **1206** (2012) 018 [arXiv:1203.1489 [hep-ph]].

30. S. Antusch, L. Calibbi, V. Maurer, M. Monaco, M. Spinrath, "Naturalness and GUT Scale Yukawa Coupling Ratios in the CMSSM ," Phys. Rev. D **85** (2012) 035025 [arXiv:1111.6547 [hep-ph]].

31. L. Calibbi, R. N. Hodgkinson, J. Jones-Perez, A. Masiero, O. Vives, "Flavour and Collider Interplay for SUSY at LHC7," Eur. Phys. J. C **72** (2012) 1863 [arXiv:1111.0176 [hep-ph]].

32. S. Antusch, L. Calibbi, V. Maurer, M. Spinrath, "From Flavour to SUSY Flavour Models," Nucl. Phys. **B852** (2011) 108-148. [arXiv:1104.3040 [hep-ph]].

33. L. Calibbi, T. Ota, Y. Takanishi, "Light Neutralino in the MSSM: a playground for dark matter, flavor physics and collider experiments," JHEP **1107** (2011) 013. [arXiv:1104.1134 [hep-ph]].

34. C. Biggio, L. Calibbi, "Phenomenology of SUSY SU(5) with type I+III seesaw," JHEP **1010** (2010) 037. [arXiv:1007.3750 [hep-ph]].

35. L. Calibbi, E. J. Chun, L. Velasco-Sevilla, "Bridging flavour violation and leptogenesis in SU(3) family models," JHEP **1011** (2010) 090. [arXiv:1005.5563 [hep-ph]].

36. A. J. Buras, L. Calibbi and P. Paradisi, "Slepton mass-splittings as a signal of LFV at the LHC," JHEP **1006** (2010) 042 [arXiv:0912.1309 [hep-ph]].

37. L. Calibbi, M. Frigerio, S. Lavignac and A. Romanino, "Flavour violation in supersymmetric SO(10) unification with a type II seesaw mechanism," JHEP **0912** (2009) 057 [arXiv:0910.0377 [hep-ph]].

38. L. Calibbi, J. Jones-Perez, A. Masiero, J. h. Park, W. Porod and O. Vives, "FCNC and CP Violation Observables in a SU(3)-flavoured MSSM," Nucl. Phys. B **831** (2010) 26 [arXiv:0907.4069 [hep-ph]].

39. L. Calibbi, L. Ferretti, A. Romanino and R. Ziegler, "Gauge coupling unification, the GUT scale, and magic fields," Phys. Lett. B **672** (2009) 152 [arXiv:0812.0342 [hep-ph]].

40. L. Calibbi, L. Ferretti, A. Romanino and R. Ziegler, "Consequences of a unified, anarchical model of fermion masses and mixings," JHEP **0903** (2009) 031 [arXiv:0812.0087 [hep-ph]].

41. L. Calibbi, J. Jones-Perez and O. Vives, "Electric dipole moments from flavoured CP violation in SUSY," Phys. Rev. D **78** (2008) 075007 [arXiv:0804.4620 [hep-ph]].

42. M. Raidal *et al.*, "Flavour physics of leptons and dipole moments," Eur. Phys. J. C **57** (2008) 13 [arXiv:0801.1826 [hep-ph]].

43. L. Calibbi, Y. Mambrini and S. K. Vempati, "SUSY-GUTs, SUSY-Seesaw and the Neutralino Dark Matter," JHEP **0709** (2007) 081 [arXiv:0704.3518 [hep-ph]].

44. L. Calibbi, A. Faccia, A. Masiero and S. K. Vempati, "Running U_{e3} and BR($\mu \to e + \gamma$) in SUSY-GUTs," JHEP **0707** (2007) 012 [arXiv:hep-ph/0610241].

45. L. Calibbi, A. Faccia, A. Masiero and S. K. Vempati, "Lepton flavour violation from SUSY-GUTs: Where do we stand for MEG, PRISM / PRIME and a super flavour factory," Phys. Rev. D **74** (2006) 116002 [arXiv:hep-ph/0605139].

Contributions in the proceedings of international conferences
(* based on presentations by L. Calibbi)

- L. Calibbi, G. Ferretti, D. A. Milstead, C. Petersson and R. Poettgen, "Baryon number violation in supersymmetry: Neutron-antineutron oscillations as a probe beyond the LHC," PoS LHCP **2016** (2016) 152, in the Proceedings of the 4th Large Hadron Collider Physics Conference (LHCP 2016), Lund, Sweden, June 13-18, 2016.

- L. Calibbi, J. M. Lindert, T. Ota and Y. Takanishi, "A lower bound on light neutralino dark matter from LHC data," arXiv:1405.3884 [hep-ph], to appear in the proceedings of the 49th Rencontres de Moriond, Electroweak Interactions and Unified Theories session (2014).*

- L. Calibbi, "Lepton flavour violation beyond the present limits," Int. J. Mod. Phys. Conf. Ser. **35** (2014) 1460391, in the proceedings of PHIPSI 2013.*

- L. Calibbi, "On the messenger sector of (SUSY) flavour models," in I. d. M. Varzielas, C. Hambrock, G. Hiller, M. Jung, P. Leser, H. Pas, S. Schacht and M. Aoki *et al.*, "Proceedings of the 2nd Workshop on Flavor Symmetries and Consequences in Accelerators and Cosmology (FLASY12)," arXiv:1210.6239 [hep-ph].*

- L. Calibbi, T. Ota and Y. Takanishi, "Light Neutralino in the MSSM: An Update with the Latest LHC Results," J. Phys. Conf. Ser. **375** (2012) 012041 [arXiv:1112.0219 [hep-ph]], in the proceedings of TAUP 2011.

- L. Calibbi, R. N. Hodgkinson, J. Jones-Perez, A. Masiero and O. Vives, "SUSY Flavour at LHC7," PoS EPS-HEP2011 (2011) 160 [arXiv:1111.6376 [hep-ph]], in the proceedings of EPS-HEP 2011, Grenoble, France, 21-27 July 2011.

- O. Vives, J. Jones-Perez, L. Calibbi, A. Masiero, J. H. Park, W. Porod, "Flavour symmetries and SUSY soft breaking at the LHC," Acta Phys. Polon. Supp. **3** (2010) 97-102.

- L. Calibbi, J. Jones-Perez, A. Masiero, J. -h. Park, W. Porod, O. Vives, "SU(3) Flavour Symmetries and CP Violation," PoS EPS-HEP2009 (2009) 167 [arXiv:0909.2501 [hep-ph]] (proceedings of EPS-HEP 2009).

- L. Calibbi, "Lepton flavour violation and electron EDM in SUSY with a non-Abelian flavour symmetry," AIP Conf. Proc. **1078** (2009) 366 (proceedings of SUSY09).*

- L. Calibbi, R. Godbole, Y. Mambrini and S. K. Vempati, "Distinguishing SUSY scenarios using tau polarisation and chi0(1) Dark Matter," eConf C **0705302** (2007) SUS19 [arXiv:0710.0726 [hep-ph]], in the proceedings of 2007 International Linear Collider Workshop (LCWS07 and ILC07), Hamburg, Germany, 30 May - 3 Jun 2007.
- L. Calibbi, "Neutralino Dark Matter in SUSY-SU(5) with RH neutrinos," In *Karlsruhe 2007, SUSY 2007* 902-905 [arXiv:0710.1759 [hep-ph]], in the proceedings of SUSY07.*
- L. Calibbi, "Lepton Flavour Violation in SUSY $SO(10)$", in the proceedings of IFAE 2007.*

Science popularization

- L. Calibbi, "Sapori di famiglia. La conservazione dei numeri leptonici" (Family flavours. Conservation of lepton numbers), published in the magazine of INFN *Asimmetrie*, number 23, p. 15, October 2017; doi:10.23801/asimmetrie.2017.23.2 (in Italian).

CURRICULUM

INTERESSI DI RICERCA

Fisica del Neutrino e Fisica Astroparticellare

CARRIERA ACCADEMICA

Ricercatore Post-dottorato, Virginia Tech *11/2020 – Presente*

Ricercatore Post-dottorato, Max Planck Institute For Physics *11/2017 – 10/2020*

Ricercatore Post-dottorato, Ohio State University *02/2017 – 10/2017*

Ricercatore Post-dottorato, Università degli Studi di Padova *01/2016 – 01/2017*

Dottorato in Fisica, Università degli studi di Bari *01/2013 – 12/2015*
Tutori: Eligio Lisi and Antonio Marrone

CARRIERA UNIVERSITARIA

Laurea Magistrale in Fisica Teorica, Università degli studi di Bari *10/2010 – 12/2012*
Grade: 110/110 cum Laude

Laurea triennale in Fisica, Università degli studi di Bari *09/2007 – 07/2010*
Grade: 110/110 cum Laude

PRESENTAZIONI A CONFERENZE E SEMINARI

Webinar su invito dal titolo "New challenges in reactor neutrinos: mapping between TAO and JUNO and dealing with nuclear uncertainties"
Institute of High Energy Physics, Pechino, Cina *Settembre 2020*

Webinar su invito dal titolo "New challenges in reactor neutrinos: mapping between TAO and JUNO and dealing with nuclear uncertainties"
Institute for Basic Science, Corea *Settembre 2020*

Webinar su invito dal titolo "Axion and neutrino red-giant bounds updated with geometric distance determinations"
Virtual Axion Institute *Luglio 2020*

Colloquium su invito dal titolo "Frontiers in Neutrino Oscillations: Precision and New Phenomena"
Colorado State University (Fort Collins, Colorado, USA) *Gennaio 2020*

Presentazione su invito dal titolo “Status of 3-neutrino mass-mixing parameters”
International Conference on Neutrinos and Dark Matter (Hurghada, Egitto) *Gennaio 2020*

Seminario su invito dal titolo “Frontiers in Neutrino Oscillations: Precision and New Phenomena”
SISSA (Trieste, Italia) *Novembre 2019*

Presentazione su invito dal titolo “Current status of neutrino mass-mixing parameters”
GDR Neutrino meeting (Bordeaux, Francia) *Ottobre 2019*

Presentazione su invito dal titolo “Supernova Neutrinos”
Neutrino Platform Week (CERN, Ginevra) *October 2019*

Presentazione su invito dal titolo “Current status of neutrino mass-mixing parameters”
39th International Symposium on Physics in Collisions (Taipei, Taiwan) *Settembre 2019*

Presentazione su invito dal titolo “Current status of neutrino mass-mixing parameters”
19th Lomonosov Conference on Elementary Particle Physics (Mosca, Russia) *Agosto 2019*

Seminario su invito dal titolo “Neutrino oscillations in dark background”
Tata Institute of Fundamental Research (Mumbai, India) *Febbraio 2019*

Seminario su invito dal titolo “Status of three-neutrino mass-mixing parameters”
Indian Institute of Technology (Guwahati, India) *Febbraio 2019*

Presentazione su invito dal titolo “Solar neutrino: status and prospects”
NuPhys 2018 (Londra, UK) *Dicembre 2018*

Presentazione su invito dal titolo “DUNE as the next generation solar neutrino experiment”
Instituto de Fsica Corpuscular (Valencia, Spagna) *Novembre 2018*

Presentazione su invito dal titolo “DUNE as the next generation solar neutrino experiment”
GDR Neutrino meeting (Strasburgo, Francia) *Novembre 2018*

Presentazione dal titolo “Distinguishing SNν equalization from a pure MSW effect”
Neutrino Oscillation Workshop (Ostuni, Italia) *Settembre 2018*

Presentazione su invito dal titolo “Neutrino oscillations in dark backgrounds”
Advanced Workshop on Physics of Atmospheric Neutrinos (Trieste, Italia) *Maggio 2018*

Presentazione su invito dal titolo “DUNE as the next generation solar neutrino experiment”
Tata Institue of Fundamental Research (Mumbai, India) *Febbraio 2018*

Presentazione su invito dal titolo “Current unknowns in neutrino physics”
Nu Horizons 2018 (Allahabad, India) *Febbraio 2018*

Presentazione su invito dal titolo “Global Analysis of Neutrino Mixing Parameters: Recent results and prospects”
Next generation Nucleon Decay and Neutrino Detectors (Warwick, Inghilterra) *Ottobre 2017*

Presentazione dal titolo “Fast neutrino flavour conversion near the supernova core”
TeV Particle Astrophysics Conference (Columbus, USA) *Agosto 2017*

Presentazione dal titolo “Solar Neutrinos as a Probe of Dark Matter-Neutrino Interactions”
New Directions in Dark Matter and Neutrino Physics (Waterloo, Canada) *Luglio 2017*

Seminario su invito dal titolo “DUNE as the next generation solar neutrino experiment” Ohio State University (Columbus, USA) Luglio 2017

Seminario su invito dal titolo “Solar Neutrinos as a Probe of Dark Matter-Neutrino Interactions”
Fermilab (Chicago, USA) *Luglio 2017*

Presentazione dal titolo “Solar Neutrinos as a Probe of Dark Matter-Neutrino Interactions”
International Workshop on Baryon and Lepton Number Violation (Cleveland, USA) *Maggio 2017*

Presentazione dal titolo “Solar Neutrinos as a Probe of Dark Matter-Neutrino Interactions”
IceCube Particle Astrophysics Symposium (Madison, USA) Maggio 2017

Presentazione dal titolo “CP violation from light sterile neutrinos in long baseline oscillations”
Precision Investigations of the Neutrino Sector (SLAC, USA) *Marzo 2017*

Seminario su invito dal titolo “Neutrino flavour conversions in supernova: recent developments”
Ohio state University (Columbus, USA) *Novembre 2016*

Presentazione dal titolo “Status of three-neutrino mixing”
Neutrino Oscillation Workshop (Otranto, Italia) *Settembre 2016*

Presentazione dal titolo “Self-induced temporal instability from a neutrino antenna”
Planck Conference (Valencia, Spagna) *Maggio 2016*

Presentazione dal titolo “Phenomenology of neutrino masses and mxings”
Meeting of the Italian“Theoretical Astroparticle Physics Project” (Torino, Italia) *Luglio 2015*

Presentazione dal titolo “PINGU and the mass hierarchy: statistical and systematical aspects”
Incontri di Fisica delle alte energie (Roma, Italia) *Aprile 2015*

Seminario su invito dal titolo “Current bounds on neutrino oscillation parameters and future prospects with medium baseline reactor oscillations”, DESY (Amburgo, Germania) *Maggio 2014*

Presentazione dal titolo “Probing mass hierarchy in reactor neutrino oscillations”
Moriond: Electroweak Interactions and Unified Theories (La Thuile, Italia) *Marzo 2014*

BORSE

Fellowship di un mese fornita dal Neutrino Physics Center del Fermilab, utilizzata per una visita da Novembre a Dicembre 2016

Fondi di 4 anni per ricercatori "senior" post-dottorato stranieri con inizio a Luglio 2021, finanziati dalla regione Valenciana (CDEIGENT 2020)

INCARICHI PROFESSIONALI

Referee per le seguenti riviste scientifiche: Journal of Cosmology and Astroparticle Physics, Physical Review Letters, Physics Letters B, Physical Review D, Nuclear Physics B

DIDATTICA

Co-supervisore di uno studente di Master in visita al Max Planck Institute For Physics, con conseguente pubblicazione sulla rivista JCAP *Maggio – Luglio 2018*

Assistente presso un corso di laboratorio di fisica per Biologia, Università degli Studi di Bari *Primavera 2015*

ORGANIZZAZIONE DI CONFERENZE

Membro del comitato locale, Invisibles Workshop (Padova, Italia) *12 – 16 Settembre 2016*

INCARICHI LOCALI

Organizzatore dei seminari di fisica astroparticellare al Max Planck Institute for Physics *02/2018 – 10/2020*

LINGUE

Italiano – Madre Lingua
Inglese – Livello C2
Tedesco – Livello A1

COMPETENZE INFORMATICHE

Linguaggi di programmazione: Fortran, C++ (Advanced), Python (Basic)
Software per calcolo numerico: MATLAB, Mathematica
Librerie per il calcolo numerico: Cernlib, NAG, ROOT, GLoBES

REFERENTI

Prof. John Beacom, The Ohio State University (Columbus, Ohio), beacom.7@osu.edu
Dr. Eligio Lisi, Istituto Nazionale di Fisica Nucleare (Bari, Italia), eligio.lisi@ba.infn.it
Dr. Georg Raffelt, Max Planck Institute For Physics (Monaco, Germania), raffelt@mpp.mpg.de

CURRICULUM VITAE 29th November 2020

Personal information

Name:	Andrea Cavaglià
INSPIRE author profile:	http://inspirehep.net/author/profile/A.Cavaglia.1

Education

- 19th January 2015 : PhD in Mathematical Physics, City University London.
  Title of Thesis: "Nonsemilinear one-dimensional PDEs: analysis of PT deformed models and numerical study of compactons". Supervisor: Prof. Andreas Fring.
- 15th December 2009 : MSc level Degree in Physics of the Fundamental Interactions, at the University of Torino, Italy, specialized in Theoretical Physics, cum laude. Title of Thesis: "Integrable models and the AdS/CFT correspondence". Supervisor: Prof. Roberto Tateo.
- 25th September 2007: BSc level degree in Physics at the University of Torino, cum laude. Title of final project: "Potential scattering and Regge poles". Supervisor: Prof. Stefano Sciuto.
- 25th September 2006: Music Diploma in Classical Guitar, at the Conservatorio G. Cantelli, Novara, Italy.
- 7th July 2004: High School Diploma at the Liceo C. Botta, Ivrea, Italy, 100/100.

Research interests

My main research interests are non-perturbative properties of quantum field theories, the AdS/CFT correspondence, and integrable systems. Currently I am working to develop new methods, based on quantum integrability, to compute correlation functions in $\mathcal{N}$=4 Super Yang-Mills theory and other four-dimensional conformal field theories in the planar limit. A second line of investigation concerns integrable systems in lower dimensions, the associated mathematical methods, and the study of exact deformations of two-dimensional theories driven by the operator $T\bar{T}$.

Research career

- October 2017 - present: postdoctoral Research Associate in the Theoretical Physics group, Department of Mathematics at King's College London. Advisor: Prof. Nikolay Gromov. I have been initially hired on a 3 years postdoctoral fellowship, and later I was offered an extension for 2 extra years, as part of Prof Gromov's ERC project "Solving gauge theories in 4D: Exact correlation functions from integrability".

- September 2013 - August 2017: junior/post-doctoral researcher at the Department of Theoretical Physics of the University of Torino. Advisor: Prof. Roberto Tateo.

  My work in Torino was funded through the following grants:

  - April 2015 – August 2017: Research Fellowship of the University of Torino (Assegno di Ricerca DD 565), "Applications of the Thermodynamic Bethe Ansatz to condensed matter physics and gauge theories".
  - October 2014 – March 2015: Research Bursary of the University of Torino (9/2014 DF), "Modern Applications of String Theory"
  - September 2013 – August 2014: Research Fellowship co-funded by the University of Torino and the Italian Ministry of University and Research (MIUR - XV), "Integrable models and quantum gauge theories".

- May 2010 – April 2013, PhD student at City University London, funded through a City University Research Fellowship.

Tutoring and teaching experience

- While in Torino, I had the great pleasure to be directly involved as co-supervisor of a PhD student and five MSc students (main supervisor: Prof. Roberto Tateo):

  - Massimo Mattelliano. PhD Thesis: "Integrability in the 1D Hubbard model", September 2016.
  - Riccardo Conti. MSc Thesis: "Nonperturbative results in integrable gauge theories", October 2016, co-supervised with R. Tateo and Diego Bombardelli.
  - Giuseppe Daqua. MSc Thesis: "Integrability and ODE/IM correspondence", July 2015.
  - Lorenzo Anselmetti. MSc Thesis: "Integrability and perturbative expansion in gauge theory", July 2015.
  - Beatrice Conti. MSc Thesis: "The quark-anti-quark potential and the thermodynamic Bethe ansatz", July 2015.
  - Martina Cornagliotto. MSc Thesis: "Integrability and gauge theory", July 2014.

- I gave a three hours PhD level course on $T\bar{T}$ deformations as part of the Young Researchers Integrability School 2019 in Vienna.

- During the postdoc at King's College London, I have on occasion replaced Prof. Gromov for lectures of the course *Numerical and Computational Methods* of the BSc degree in Mathematics at King's College.

- During my PhD at City University, I have worked as a teaching assistant for the courses *Programming Part 1*, *Programming Part 2*, *Mathematical Typesetting* and *Probability and Statistics* of the BSc degree in Mathematics. Reference person: Dr Maud De Visscher.

Nonacademic Between my MSc and the start of my PhD I have worked as a music teacher: from January to May 2009 at the Liceo Musicale di Rivarolo, Rivarolo, Italy; from November 2009 to April 2010 at the Accademia Musicale di Saint-Vincent, Saint-Vincent, Italy.

Experience of administrative duties

Since 2019, I have been one of the representatives for postdoctoral researchers in the Mathematics Department at King's College London. I am participating in the Faculty Research Staff Committee, the Department Research Staff Committee, and the Equality, Diversity and Inclusion Committee, and I have been organising events on grants and fellowships applications for postdocs in the Department.

Experience of seminar organisation

Since December 2019, I have organised weekly seminars for a London-based journal club on topics related to integrability (website: https://integrability-london.weebly.com/). The journal club has now moved online and has more than 300 registered participants from the worldwide community working in this research field.

Refereeing

I am a referee for SciPost and JPhysA.

Talks/presentations/lectures

- 21st September 2020: "Conformal Field Theory from fishnet diagrams", informal talk at King's College London Theoretical Physics group meeting.

- 26th August 2020: I have led a discussion session on "Quantum Spectral Curve and Fishnets" during the conference Integrability in Gauge and String Theory 2020, ICFT-SAIFR, Sao Paulo, Brazil.

- 18th Oct 2019, "What are Color Twist Operators and why they are useful for Integrability", talk at University of Durham, UK.

- 16th July 2019: "Color Twist Fields and Separation of Variables", talk at the conference Integrability in Gauge and String Theory 2019, Nordita, Stockholm, Sweden.

- Apr 2019, "From CDD factors to TTbar via Integrability", talk at the Workshop "TTbar and other solvable deformations of Quantum Field Theories", Simons Center for Geometry and Physics, Stony Brook, USA.
- in Feb 2019, I held a course on "Deformations part II ", focusing on $T\bar{T}$ deformations, at the Young Researchers Integrability School and Workshop, Vienna, Austria.
- 5th Feb 2019: "Towards three-point functions in N=4 super Yang-Mills theory with the Quantum Spectral Curve", talk at University of Surrey, Guildford, UK.
- 16th Jan 2019: "Towards correlation functions in N=4 super Yang-Mills theory with the Quantum Spectral Curve", talk at IGFAE, Santiago de Compostela, Spain.
- 19th Dec 2018, lecture on "$T\bar{T}$ deformations" at the Avogadro Meeting 2018, Rome, Italy.
- 23rd July 2018: "Correlators in N=4 SYM via the quantum spectral curve", talk in the South-East Mathematical Physics Seminars series, Oxford, Department of Mathematics.
- 7th August 2018, "Quantum Spectral Curve and Correlators in N=4 SYM: Part 2", talk at the workshop Conformal Field Theories in Higher Dimensions, Independent University of Moscow,
- 21st May 2018, "The $T\bar{T}$-deformation of 2D quantum field theories", talk at the workshop "Correlation functions in solvable models", Nordita, Stockholm, Sweden.
- 11th October 2017: "On the exact interpolating function of ABJ theory", seminar at King's College London.
- 25th October 2016: divulgative presentation "Integrable systems and applications to high-energy physics" at AperiTheory, an event organized by AISF (Italian Association of Physics Students) in Torino, Italy.
- August 2016: "Numerical solution of the Quantum Spectral Curve for AdS_4/CFT_3", poster presented with D. Bombardelli at the conference Integrability in Gauge and String Theory 2016, Humboldt, Berlin, Germany.
- 14th July 2014: "The quantum spectral curve for ABJM theory", Integrability in Gauge and String Theory 2014, Desy, Hamburg, Germany.
- 14th February 2014: "The $\mathbf{P}\mu$-system for the ABJM theory", Strongly Coupled Gauge Theories workshop, King's College, London, UK.
- 17th December 2012: "Stable and unstable compacton solutions to an integrable nonlinear evolution equation", seminar at the Department of Physics and Astronomy, University of Bologna, Italy.
- 26th April 2012: "Nonlinear dispersive wave equations: compact solitons in integrable and nonintegrable models", talk at City University Annual Research Symposium, City University, London, UK.

List of Publications

Articles

1) A. Cavaglià, D. Grabner, N. Gromov and A. Sever, "Large N Twist Operators I: Spectrum and Wave Functions", JHEP 06 (2020) 092.
2) A. Cavaglià, N. Gromov and F. Levkovich-Maslyuk, "Separation of variables and scalar products at any rank," JHEP 1909, 052 (2019).
3) D. Bombardelli, A. Cavaglià, R. Conti and R. Tateo, "Exploring the spectrum of AdS_4/CFT_3 at finite coupling", JHEP 1804 (2018) 117.
4) A. Cavaglià, N. Gromov and F. Levkovich-Maslyuk, "Quantum Spectral Curve and Structure Constants in $\mathcal{N} = 4$ SYM: Cusps in the Ladder Limit", JHEP 1810 (2018) 060.
5) D. Bombardelli, A. Cavaglià, D. Fioravanti, N. Gromov and R. Tateo, "The full Quantum Spectral Curve for AdS_4/CFT_3", JHEP09(2017)140.
6) A. Cavaglià, S. Negro, I. Szecsenyi and R. Tateo, "$T\bar{T}$-deformed 2D quantum field theories", JHEP10(2016)112.
7) A. Cavaglià, N. Gromov and F. Levkovich-Maslyuk, "On the Exact Interpolating Function of ABJ Theory", JHEP12(2016) 086.
8) L. Anselmetti, D. Bombardelli, A. Cavaglià and R. Tateo, "12 loops and triple wrapping in ABJM theory from integrability", JHEP10(2015)117.
9) A. Cavaglià, M. Cornagliotto, M. Mattelliano and R. Tateo, "A Riemann-Hilbert formulation for the finite temperature Hubbard model", JHEP06(2015)015.
10) A. Cavaglià, D. Fioravanti, N. Gromov and R. Tateo, "Quantum Spectral Curve of the $\mathcal{N} = 6$ Supersymmetric Chern-Simons Theory", Phys. Rev. Lett. 113 (2014) 2, 021601.
11) A. Cavaglià, D. Fioravanti and R. Tateo, "Discontinuity relations for the AdS_4/CFT_3 correspondence," Nucl. Phys. B 877 (2013) 852 .
12) A. Cavaglià and A. Fring, "PT-symmetrically deformed shock waves", Journal of Physics A: Mathematical and Theoretical, Volume 45 444010 (2012).
13) A. Cavaglià, A. Fring and B. Bagchi, "PT-symmetry breaking in complex nonlinear wave equations and their deformations", Journal of Physics A: Mathematical and Theoretical, Volume 44, Issue 32, 325201 (2011).
14) A. Cavaglià, D. Fioravanti, M. Mattelliano and R. Tateo, "On the AdS_5/CFT_4 TBA and its analytic properties", RIMS Kokyuroku Bessatsu B28 017-048 (2011).
15) A. Cavaglià, D. Fioravanti and R. Tateo, "Extended Y-system for the AdS_5/CFT_4 correspondence", Nucl. Phys. B 843, 302 (2011).

PhD Thesis

A. Cavaglià, "Nonsemilinear one-dimensional PDEs: analysis of PT deformed models and numerical study of compactons", available at URL: http://openaccess.city.ac.uk/13074/.

Marco Cè

Education

11/2013 to 27/2/2017 — ***Diploma di Perfezionamento* (PhD) in Physics**, *Scuola Normale Superiore di Pisa*, Italy, *cum laude*.
advisor: Leonardo Giusti; supervisor: Enrico Trincherini; thesis title: *Solving the* $\mathrm{U}(1)_A$ *problem of QCD: new computational strategies and results*.

10/2011 to 24/9/2013 — ***Laurea magistrale* (MSc) in Physics**, *Università degli Studi di Milano-Bicocca*, Italy, *110/110 cum laude*.
advisor: Leonardo Giusti; coadvisor: Georg P. Engel; thesis title: *Testing the Witten–Veneziano mechanism with the gradient flow on the lattice*.

9/2008 to 27/9/2011 — ***Laurea* (BSc) in Physics**, *Università degli Studi di Milano-Bicocca*, Italy, *110/110 cum laude*.
advisor: Claudio Destri; thesis title: *Studi numerici dell'equazione di Schrödinger con campo elettromagnetico (Numerical studies of the Schrödinger equation with electromagentic field)*.

9/2003 to 3/7/2008 — ***Maturità scientifica* (scientific high school diploma)**, *Liceo scientifico Bertrand Russell*, Garbagnate Milanese, Milan, Italy, *100/100*.

Experience

11/2019 to present — **Senior Fellow**, *Department of Theoretical Physics, CERN*, Geneva, Switzerland, and *Marie Skłodowska-Curie Actions (MSCA) fellow*, grant agreement No. 843134: multiQCD.

11/2016 to 10/2019 — **Postdoctoral Researcher**, *Helmholtz-Institut Mainz, Johannes Gutenberg-Universität Mainz*, Germany, and *GSI Helmholtzzentrum für Schwerionenforschung*, Darmstadt, Germany.

11/2013 to 10/2016 — **PhD candidate**, *Scuola Normale Superiore di Pisa*, Italy, and Scientific Associate, *INFN Sezione di Pisa*, Italy.

11/2013 to 7/2014 — **Tutoring to first year physics course students**, *Scuola Normale Superiore di Pisa*, Italy.

2009 to 2014 — Private tutoring in physics and mathematics to high-school and university students.

Honors and Awards

2/2018 **Premio Nazionale "Sergio Fubini" 2017**, *awarded by INFN for the three best PhD thesis in theoretical physics discussed in the academic year 2016/2017.*

5/2007 Bronze medal at the final phase of the XXIII national mathematics Olympiads.

Funding

11/2019 **Marie Skłodowska-Curie Actions (MSCA) Individual Fellowship**, *European Union's Horizon 2020 research and innovation programme*, grant agreement No. 843134: multiQCD.

Publications

For an updated list see `https://inspirehep.net/authors/1327175`.

Articles & Letters

2020 T. Aoyama et al., 'The anomalous magnetic moment of the muon in the Standard Model', Phys. Rep. **887**, 1–166 (2020) [arXiv:2006.04822].

M. Cè, T. Harris, H. B. Meyer, A. Steinberg and A. Toniato, 'Rate of photon production in the quark-gluon plasma from lattice QCD', Phys. Rev. D **102**, 091501(R) (2020) [arXiv:2001.03368].

2019 M. Cè, 'Locality and multi-level sampling with fermions', Eur. Phys. J. Plus **134**, 299 (2019).

A. Gérardin et al., 'Leading hadronic contribution to $(g-2)_\mu$ from lattice QCD with $N_\mathrm{f} = 2+1$ flavors of $\mathrm{O}(a)$ improved Wilson quarks', Phys. Rev. D **100**, 014510 (2019) [arXiv:1904.03120].

2017 M. Cè, L. Giusti and S. Schaefer, 'Local factorization of the fermion determinant in lattice QCD', Phys. Rev. D **95**, 034503 (2017) [arXiv:1609.02419].

2016 M. Cè, M. García Vera, L. Giusti and S. Schaefer, 'The topological susceptibility in the large-N limit of $\mathrm{SU}(N)$ Yang-Mills theory', Phys. Lett. B **762**, 232–236 (2016) [arXiv:1607.05939].

M. Cè, L. Giusti and S. Schaefer, 'Domain decomposition, multilevel integration, and exponential noise reduction in lattice QCD', Phys. Rev. D **93**, 094507 (2016) [arXiv:1601.04587].

2015 M. Cè, C. Consonni, G. P. Engel and L. Giusti, 'Non-Gaussianities in the topological charge distribution of the $\mathrm{SU}(3)$ Yang-Mills theory', Phys. Rev. D **92**, 074502 (2015) [arXiv:1506.06052].

Proceedings

2019 M. Cè et al., 'The hadronic contribution to the running of the electromagnetic coupling and the electroweak mixing angle', PoS **LATTICE2019**, 010 (2020) [arXiv:1910.09525].

2018 M. Cè, A. Gérardin, K. Ottnad and H. B. Meyer, 'The leading hadronic contribution to the running of the weinberg angle using covariant coordinate-space methods', PoS **LATTICE2018**, 137 (2018) [arXiv:1811.08669].

2017 M. Cè, L. Giusti and S. Schaefer, 'Local multiboson factorization of the quark determinant', EPJ Web Conf. **175**, 11005 (2018) [arXiv:1711.01592].

L. Giusti, M. Cè and S. Schaefer, 'Multi-boson block factorization of fermions', EPJ Web Conf. **175**, 01003 (2018) [arXiv:1710.09212].

2016 M. Cè, L. Giusti and S. Schaefer, 'Domain decomposition and multilevel integration for fermions', PoS **LATTICE2016**, 263 (2017) [arXiv:1612.06424].

M. Cè, M. García Vera, L. Giusti and S. Schaefer, 'The large-N limit of the topological susceptibility of Yang-Mills gauge theory', PoS **LATTICE2016**, 350 (2017) [arXiv:1610.08797].

2015 M. Cè, 'Non-Gaussianity of the topological charge distribution in $\mathrm{SU}(3)$ Yang-Mills theory', PoS **LATTICE 2015**, 318 (2016) [arXiv:1510.08826].

2014 M. Cè, C. Consonni, G. P. Engel and L. Giusti, 'Testing the Witten-Veneziano mechanism with the Yang-Mills gradient flow on the lattice', PoS **LATTICE2014**, 353 (2015) [arXiv:1410.8358].

Thesis

2017 M. Cè, 'Solving the $\mathrm{U}_A(1)$ problem of QCD: new computational strategies and results', PhD thesis (Scuola Normale Superiore di Pisa, 2017), `https://hdl.handle.net/11384/85885`.

Conferences, seminars & colloquia

2020 colloquium 'The hadronic contributions to the running of Standard Model couplings from lattice QCD' in the *Virtual Lattice Field Theory Colloquium Series*, 20 July 2020, MIT, Cambridge, MA, USA.

2019 invited seminar 'hadronic contributions to the running of the electromagnetic coupling and the electroweak mixing angle', 18 September 2019, LBNL, Berkeley, CA, USA.

contributed talk 'hadronic contributions to the running of the electromagnetic coupling and the electroweak mixing angle' at *Hadronic contributions to* $(g-2)_\mu$ workshop, 9-13 September 2019, INT, Seattle, WA, USA.

contributed talk 'The hadronic contribution to the running of the electroweak mixing angle' at *The 37th International Symposium on Lattice Field Theory*, 16-22 June 2019, Wuhan, PRC.

invited talk 'the hadronic contribution to the running of the electroweak mixing angle' at *From Euclidean spectral densities to real-time physics* workshop, 11-15 March 2019, CERN, Switzerland.

contributed talk 'the hadronic contribution to the running of the electroweak mixing angle' at *'Matter and the Universe' days* workshop, 14-15 February 2019, DESY, Hamburg, Germany.

2018 invited talk 'locality and multi-level sampling of hadronic correlators' at *Scattering Amplitudes and Resonance Properties from Lattice QCD* workshop, 27-31 August 2018, Mainz Institute for Theoretical Physics, Germany.

contributed talk 'The leading hadronic contribution to $\sin^2\theta_{\mathrm{W}}$ using covariant coordinate-space methods' at *The 36th International Symposium on Lattice Field Theory*, 22-28 July 2018, Kellogg Hotel and Conference Center, East Lansing, MI, USA.

invited seminar 'multilevel Monte Carlo simulations with fermions', 29 June 2018, Goethe-Universität Frankfurt am Main, Germany.

2017 contributed talk 'Local multiboson factorization of the quark determinant' at *The 35th International Symposium on Lattice Field Theory*, 18-24 July 2017, Palacio de Congresos de Granada, Spain.

2016 contributed talk 'Domain decomposition and multilevel integration for fermions' at *The 34th International Symposium on Lattice Field Theory*, 24-30 July 2016, Southampton University, UK.

invited seminar 'Domain decomposition and multilevel integration for fermion propagators' 10 June 2016, Johannes Gutenberg-Universität Mainz, Germany.

contributed talk 'The topological susceptibility in the large-N limit of Yang–Mills theory' at *New Frontiers in Theoretical Physics*, 17-20 May 2016, Galileo Galilei Institute, Florence, Italy.

2015 contributed talk 'Non-Gaussianity of the topological charge distribution in $\mathrm{SU}(3)$ Yang–Mills theory' at *The 33rd International Symposium on Lattice Field Theory*, 14-18 July 2015, Kobe International Conference Center, Japan.

2014 contributed talk 'Testing the Witten–Veneziano mechanism with the Yang–Mills gradient flow on the lattice' at *The 32nd International Symposium on Lattice Field Theory*, 23-28 June 2014, Columbia University, New York, NY, USA.

contributed talk 'Testing the Witten–Veneziano mechanism with the Yang–Mills gradient flow on the lattice' at *New Frontiers in Theoretical Physics*, 28-31 May 2014, Cortona, Italy.

Languages

Italian	Mother tongue
English	Full professional proficiency
German	Elementary proficiency
Frech	Elementary proficiency

Computer skills

Languages	C, C++ (MPI, OpenMP), Python (numpy, scipy, matplotlib), Bash, TEX/LATEX
Platforms	Linux (Debian, Ubuntu, Fedora distributions), Windows
Tools	IPython/Jupyter, Wolfram Mathematica, MATLAB, Microsoft Office/LibreOffice suite

Giovanni Antonio Chirilli
Curriculum Vitae

Institute for Theoretical Physics
University of Regensburg
93040 Regensburg
Germany

Education

2009 **Ph.D.** Department of Physics, Old Dominion University, Norfolk, VA USA
& Thomas Jefferson National Accelerator Facility, Newport News, VA USA
(defended on April 9th, 2009; received on August 28th, 2009)

- **Thesis:** High Energy Amplitudes in Gauge Theories in the next-to-leading-order.
- **Advisor:** Ian Balitsky

2005 **M.Sc.** Department of Physics, Old Dominion University, Norfolk, VA USA

2003 **B.Sc.** (Laurea quadriennale), Department of Physics Università del Salento, Lecce, Italy

- **Thesis:** Deeply Virtual Compton Scattering and non Diagonal Parton Distributions.
- **Advisor:** Claudio Corianò

Other Academic Training (Scholarships Awarded)

2008 (Mar 25 - Apr 4) School on Hadronic collision at the LHC and QCD at high density, Les Houches, France.

- Talk title: *Next-to-leading Order Evolution of Color Dipole.*

2007 (1-14 July) School on QCD, Low x Physics, Saturation and Diffraction, Copanello, Calabria, Italy.

- Talk title: *NLO Evolution of Color Dipole.*

2007 (30 May - 7 June) CTEQ Summer School on QCD Analysis and Phenomenology, Madison, WI USA.

2006 (23 July - 5 August) National Nuclear Physics Summer School, Indiana University, Bloomington, IN USA.

- Talk title: *Small-x Evolution of Wilson lines.*

2005 (31 May - 17 June) Hampton University Graduate Studies Summer School, Thomas Jefferson National Accelerator Facility (JLAB), Newport News, VA USA).

- Talk title: *BFKL Equation.*

Awards and Distinctions

2015 National Scientific Qualification for Associate Professor of Theoretical Physics of Fundamental Interactions, Italy *Abilitazione Nazionale Scientifica 02/A2 - II Fascia*

2009 Old Dominion University, College of Science Award: Outstanding Ph.D. Dissertation Award.

2008 Southern Universities Research Association (SURA) Graduate Research Fellowship at Thomas Jefferson National Accelerator Facility (JLAB): https://www.odu.edu/news/news-archive/2008/06/TwoODUD_10346#.Xwa7tZMzbR0 *"Each fellowship award is comprised of one-half of an academic year research assistant stipend, plus a $2,000 supplement. The home institution matches half of the research assistantship. The award includes up to an additional $2,000 for research related travel support for the student."*

2005 Old Dominion University, College of Science and Physics Department Award: Outstanding Score on Qualifying Exam. https://www.odu.edu/news/news-archive/2005/04/COLLEGEOFS_8949#.Xwa9QZMzbR0

Research Experience - Employment

Jan 2016 - Present Research associate (Beamter, Civil Servant) 3+3-years position at the Institute for Theoretical Physics of the University of Regensburg, Germany.

Oct 2012 - Dec 2015 Post Doctoral position at The Ohio State University, Columbus, OH - USA.

Oct 2010 - Sep 2012 Post Doctoral position at the Lawrence Berkeley National Laboratory, Berkeley, CA - USA.

Oct 2009 - Sep 2010 Post Doctoral position at the Centre de Physique Théorique at Ecole Polytechnique, Paris and at Laboratoire de Physique Théorique d'Orsay, Paris.

May 2004 - Aug 2009 Research in Theoretical Nuclear and Particle Physics as graduate student at Old Dominion University and at Thomas Jefferson National Accelerator Facility (JLAB), VA - USA.

2001 - 2003 Research in Theoretical Nuclear and Particle Physics as undergraduate student at the Università del Salento, Lecce, Italy.

Community Service

- Convener for 2018 (October 29-November 9) INT program *Probing Nucleons and Nuclei in High Energy Collisions* at the Institute for Nuclear Theory University of Washington, Seattle, WA - USA.

- Referee: Journal of High Energy Physics (JHEP); Nuclear Physics B (NPB); Nuclear Physics A (NPA); Physical Review D (PRD); Physical Review Letters (PRL).

- Referee for Czech Science Foundation.

- Member of the Electron-Ion Collider User Group (EICUG).

Teaching Experience

Nov 2020 - Feb 2021	Lecturer for Classical Electrodynamics exercise class (five hours per week for 15 weeks) at the University of Regensburg, Germany.
Apr - Jul 2020	Lecturer for Advanced Classical Mechanics (Meccanica Razionale) exercise class (five hours per week for 14 weeks) at the University of Regensburg, Germany.
Oct 2019 - Feb 2020	Lecturer for Quantum Mechanics exercise class (five hours per week for 15 weeks) at the University of Regensburg, Germany.
Apr - Jul 2019	Lecturer for General Relativity exercise class (five hours per week for 14 weeks) at the University of Regensburg, Germany.
Oct 2018 - Feb 2019	Lecturer for Quantum Chromodynamics exercise class (five hours per week for 15 weeks) at the University of Regensburg, Germany.
Apr - Jul 2018	Lecturer for Quantum Electrodynamics exercise class (five hours per week for 14 weeks) at the University of Regensburg, Germany.
Oct 2017 - Feb 2018	Lecturer for Classical Electrodynamics exercise class (five hours per week for 15 weeks) at the University of Regensburg, Germany.
Apr - Jul 2017	Lecturer for Advanced Classical Mechanics (Meccanica Razionale) exercise class (five hours per week for 14 weeks) at the University of Regensburg, Germany.
Oct 2016 - Feb 2017	Lecturer for Classical Electrodynamics exercise class (five hours per week for 15 weeks) at the University of Regensburg, Germany.
Apr - Jul 2016	Lecturer for Thermodynamics and Quantum Statistics exercise class (five hours per week for 14 weeks) at the University of Regensburg, Germany.
27-29 Jan 2012	Lecturer at the *pre-workshop Exploring QCD frontiers: from RICH and LHC to Electron Ion Collider summer school*. Stellenbosch Institute for Advanced Study, Stellenbosch, South Africa.
Spring 2006	Lab instructor for *University Physics 231* course at the Physics Department of Old Dominion University, Norfolk - VA, USA.
Spring 2005	Recitation for *University Physics 231* course at the Physics Department of Old Dominion University, Norfolk - VA, USA.
Fall 2004	Lab instructor and recitation for *University Physics 231* course at the Physics Department of Old Dominion University, Norfolk - VA, USA.

Conferences and Workshops

- 7 - 11 December 2020 *Resummation, Evolution, Factorization 2019.* (University of Edinburgh, Edinburgh, UK)
  - Talk title: "Quark and Gluon quasi-PDFs at low-x"
- 25 - 29 November 2019 *Resummation, Evolution, Factorization 2019.* (University of Pavia, Pavia, Italy)
  - Talk (invited) title: "Conformal invariance of TMD rapidity evolution"
- 16 - 20 September 2019 *LC2019 - QCD on the light cone: from hadrons to heavy ions* (Ecole Polytechnique, Palaiseau, France)
  - Talk title: "Sub-eikonal corrections and low-x helicity evolution"
  - Talk title: "Conformal invariance of TMD rapidity evolution"
- 10 -13 September 2019 *Towards accuracy at small x* (University of Edinburgh, Edinburgh, UK)
  - (1h) Talk (invited) title: "BFKL and impact factors at NLO"
  - (20m) Talk title: "Conformal invariance of TMD rapidity evolution"
- 8 - 12 April, 2019 *XXIV International Workshop on Deep-Inelastic Scattering and Related Subjects* (University of Turin, Turin, Italy).
  - Talk title: "Sub-eikonal spin corrections and g_1 structure function at low-x"
- 25 - 28 June, 2018 *QCD@ Work - International Workshop on QCD - Theory and Experiment* (Matera, Italy).
  - Talk title: "OPE in Wilson lines with sub-eikonal spin corrections for TMDs and g1 structure function"
- 21 - 25 May, 2018 *Probing QCD at the high energy frontier* (Trento, Italy).
  - Talk title: "High energy Operator Product Expansion with sub-eikonal spin corrections"
- 19 - 22 March, 2018 *International Conference on Physics Opportunities at an ElecTron-Ion Collider* (University of Regensburg, Regensburg, Germany).
  - Talk title: "Operator Product Expansion in Wilson lines with sub-eikonal spin corrections"
- 13 - 18 June, 2017 *Low-x Meeting Workshop* (Bisceglie, Italy).
  - Talk title: "Odderon and twist-3 light-ray Operators"
- 26 - 28 April, 2017 *Saturation: Recent Developments, New Ideas and Measurements* (Upton - NY, USA).
  - Talk title: "Rapidity factorization of high-energy scattering processes at NLO"
- 3 - 7 April, 2017 *XXIV International Workshop on Deep-Inelastic Scattering and Related Subjects* (University of Birmingham, Birmingham, UK).
  - Talk title: "Non-linear dynamics in DIS at NLO"
- 27 - 30 June, 2016 *QCD @ Work - International Workshop on QCD - Theory and Experiment* (Martina Franca, Italy).

  - Talk title: "Classical gluon production amplitude in heavy ion collisions"

- 30 May - 3 June, 2016 *QCD Evolution 2016* (Nikhef, Amsterdam, Netherlands).
  - Talk title: "Sub-gauge Conditions for the Gluon Propagator Singularities in Light-Cone Gauge"

- 07 - 11 September, 2015 *International Conference on Physics Opportunities at an ElecTron-Ion Collider (Poetic6)* (Ecole Polytechnique, Paris, France).
  - Talk title: "Classical gluon production amplitude in heavy ion collisions"

- 01 - 05 September, 2015 *Low-x meeting Workshop* (Sarmata Hotel, Sandomierz, Poland).
  - Talk title: "Classical gluon production amplitude in heavy ion collisions"

- 26 - 30 May, 2015 *QCD Evolution Workshop* (Newport News - JLAB - VA, USA).
  - Talk title: "Non-linear QCD Dynamics and Wilson Lines"

- April 27 - May 1, 2015 *XXIII International Workshop on Deep-Inelastic Scattering and Related Subject* (Dallas - TX, USA).
  - Talk title: "High-energy evolution of Wilson lines at the next-to-leading order"

- 03 - 07 December, 2014 *The 2nd International Conference on the Initial Stages in High-Energy Nuclear Collisions* (Napa - CA, USA).
  - Talk title: "The Balitsky-JIMWLK evolution equation at next-to-leading order"

- 03 - 06 September, 2014 *The LHC Forward Physics and Diffraction Working Group meeting* (Lawrence and Kansas City - KS, USA).
  - Talk title: "Non-linear QCD Dynamics and Wilson lines"

- 16 - 19 June, 2014 *QCD@Work - International Workshop on QCD - Theory and Experiment* (Bari, Italy).
  - Talk title: "Rapidity evolution of Wilson lines at the next-to-leading order: Balitsky-JIMWLK equation at NLO"

- 19 - 23 May, 2014 *Quark Matter 2014* (Darmstadt, Germany).
  - Talk title: "Rapidity evolution of Wilson lines at the next-to-leading order: Balitsky-JIMWLK equation at NLO"

- 12 - 16 May, 2014 *QCD Evolution Workshop* (Santa Fe - NM, USA).
  - Talk title: "Solution of the NLO BFKL Equation and $\gamma^*\gamma^*$ cross section at NLO"

- 10 - 14 February, 2014 *Scattering Amplitudes & the Multi-Regge Limit 2014* (Institute for Theoretical Physics, Autonomous University of Madrid, Madrid, Spain).
  - Talk title: "Solution of the NLO BFKL Equation and $\gamma^*\gamma^*$ cross section at NLO"

- 08 - 14 September, 2013 *International Conference on the Initial Stages in High-Energy Nuclear Collisions* (Illa de A Toxa, Galicia, Spain).
  - Talk title: "Solution of the NLO BFKL Equation and analytic NLO $\gamma^*\gamma^*$ cross section from High-Energy OPE in Wilson-line operators"

- 02 - 05 September, 2013 *Physics Opportunities at an ElecTron-Ion Collider workshop* (Jyvaskyla, Finland).
  - Talk title: "Solution of the NLO BFKL equation and Operator Product Expansion at high-energy"
- 06 - 10 May, 2013 *QCD evolution workshop* (Newport News - JLAB, VA, USA).
  - Talk title: "Solution of the NLO BFKL equation"
- 14 - 17 May, 2012 *QCD evolution workshop* (Newport News - JLAB, VA - USA).
  - Talk title: "High-Energy QCD factorization from DIS to pA"
- 26 - 30 March, 2012 *XX International Workshop on Deep-Inelastic Scattering and Related Subjects (DIS 2012)* (University of Bonn, Germany).
  - Talk title: "Photon impact factor for BFKL pomeron at next-to-leading order"
- 30 January - 3 February, 2012 *Exploring QCD frontiers: from RICH and LHC to Electron Ion Collider*, (Stellenbosch, South Africa).
  - Talk title: "Photon impact factor for BFKL pomeron at next-to-leading order"
- 19 September - 18 November, 2011 *Frontiers in QCD* (Institute of Nuclear Theory, Seattle - WA, USA).
  - Talk title: "High-energy Amplitudes and Impact Factors at next-to-leading-order"
- 03 - 07 June, 2011 *Low-x Meeting Workshop*, (Santiago de Compostela, Spain).
  - Talk title: NLO Photon Impact Factor for DIS at small-x.
- 30 May - 2 June, 2011 *Standard and Novel QCD Phenomena at Hadron Colliders*, (European Centre for Theoretical Studies in Nuclear Physics and Related Areas, Trento, Italy).
  - Talk title: Non linear dynamics of the structure of hadronic matter at high-energy.
- 23 - 28 May, 2011 *22nd International Conference on Ultra-Relativistic Nucleus-Nucleus (Quark Matter 2011)* , (Annecy, France).
  - Talk title: Next-to-leading order structure function for DIS off a large nucleus.
- 11 - 15 April, 2011 *XIX International Workshop on Deep-Inelastic Scattering and Related Subjects (DIS 2011)*, (Newport News - VA, USA).
  - Talk title: NLO structure functions at small-x.
- 08 - 09 April, 2011 *QCD Evolution Workshop: from collinear to non collinear case*, (Newport News - VA, USA).
  - Talk title: NLO evolution of structure functions at small-x.
- 13 September 19 November, 2010 *Gluons and the quarks sea at the high energies: distributions, polarizations, tomography* (Institute of Nuclear Theory, Seattle - WA, USA).
  - Talk title: "DIS in the high-energy limit at next-to-leading order"

- 10 - 15 September, 2010 *DIFFRACTION 2010 International Workshop on Diffraction in High-Energy Physics*, (Otranto, Italy).
  - Talk title: The Photon Impact Factor for DIS at NLO: analytic result.
- 22 - 28 July, 2010 *35th International Conference on High Energy Physics*, (Paris, France).
  - Poster title: The Photon Impact Factor for DIS at NLO: analytic result.
- 05 - 09 July, 2010 *Hadron Structure and QCD: from LOW to HIGH energies*, (Gatchina, St. Petersburg, Russia).
  - Talk title: The Photon Impact Factor for DIS at NLO: analytic result.
- 23 - 27 June, 2010 *Low-x Meeting Workshop*, (Kavala, Greece).
  - Talk title: Next-to-leading order Photon Impact Factor in Deep Inelastic Scattering at small-x.
- 26 - 29 May, 2010 *Convegno Nazionale di Fisica Teorica*, (Cortona, Italy).
  - Talk title: High-energy evolution of scattering amplitudes in gauge theories.
- 19 - 23 April, 2010 *XVIII International Workshop on Deep-Inelastic Scattering and Related Subjects*, (Florence, Italy).
  - Talk title: High-Energy Amplitudes and Impact Factors at next-to-leading order.
- 08 - 13 September, 2009 *Low-x Meeting Workshop*, (Ischia Island, Italy).
  - Talk title: High-Energy Operator Product Expansion at NLO.
- 20 - 25 July, 2009 *Recent Advances in Perturbative QCD and Hadronic Physics*, (Trento, Italy).
  - Talk title: Small-x Evolution in the Next-to-Leading Order.
- 26 - 31 May, 2009 *Tenth Conference on the Intersections of Particle and Nuclear Physics (CIPANP 2009)*, (San Diego - CA, USA).
  - Talk title: Small-x Evolution of Structure Functions in the next-to-leading Order.
- 11 - 16 May, 2009 *Photon09*, (Hamburg, Germany).
  - Talk title: Small-x Evolution of Structure Functions in the next-to-leading Order.
- 08 - 14 Sep, 2008 *International Workshop on Diffraction in High-Energy Physics (Diffraction 2008)*, (La Londe-les-Maures, France).
  - Talk title: NLO Evolution of Color Dipole in QCD and $\mathcal{N} = 4$ SYM.
- 14 - 18 Jul, 2008 *Structure of Hadrons and Nuclei at an Electron Ion Collider* (Trento, Italy).
  - Talk title: NLO evolution of Color Dipole in QCD and $\mathcal{N} = 4$ SYM.
- 06 - 10 Jul, 2008 *Low-x meeting workshop* (Kolimpari, Crete, Greece).
  - Talk title: Next-to-leading Order Evolution of Color Dipole.

- 19 - 23 May, 2008 *4th Electron-Ion Collider Workshop* (Hampton University, Hampton - VA, USA).
  - Talk title: Next-to-leading Order Evolution of Color Dipole.

Invited Seminars

- December 16, 2020 *The Ohio State University* (Columbus - OH, USA).
  - Talk title: Quark and Gluon quasi-PDFs at low-x.

- March 8, 2016 *Institute of Nuclear Physics* (Krakow, Poland).
  - Talk title: Factorization for Inclusive Hadron Production in proton-Nucleus collisions.

- October 23, 2014 *College of William and Mary* (Williamsburg - VA, USA).
  - Talk title: QCD dynamics at high-energy: linear and non-linear evolution equations.

- October 22, 2014 *Thomas Jefferson National Accelerator Facility (JLAB)* (Newport News - VA, USA).
  - Talk title: Hierarchy of non-linear evolution equations of Wilson lines at next-to-leading order.

- January 16, 2014 *Institute for Nuclear Theory (INT)* (Seattle - WA, USA).
  - Talk title: Linear and Non-linear High-Energy QCD Dynamics including NLO and Higher-Order Corrections.

- December 02, 2013 *Thomas Jefferson National Accelerator Facility (JLAB)* (Newport News - VA, USA).
  - Talk title: Solution of the NLO BFKL Equation.

- December 11, 2012 *Università della Calabria* (Cosenza, Italy).
  - Talk title: Linear and Non-linear Dynamics of Quantum Chromodynamics at High-Energy.

- July 08, 2011 *Brookhaven National Laboratory* (Upton - NY, USA).
  - Talk title: High-energy Amplitudes and Impact Factors at next-to-leading-order.

- May 19, 2011 *European Centre for Theoretical Studies in Nuclear Physics and Related Areas* (Trento, Italy).
  - Talk title: Non linear dynamics of the structure of hadronic matter at high-energy.

- December 16, 2010 *Bielefeld University* (Bielefeld, Germany).
  - Talk title: Scattering Amplitudes and Evolution Equations at High-Energy.

- March 19, 2010 *Oulu University* (Oulu, Finland).
  - Talk title: The Structure of the Hadronic Matter at high-energy.

- January 27, 2010 *Lawrence Berkeley National Laboratory* (Berkeley - CA, USA).

  - Talk title: High-energy evolution of amplitudes in gauge theories in the next-to-leading order.

- June 26, 2009 *Brookhaven National Laboratory* (Upton - NY, USA).
  - Talk title: NLO evolution of Color Dipole in QCD and $\mathcal{N} = 4$ SYM.

- January 6, 2009 *Laboratoire de Physique Théorique d'Orsay* (Université Paris-Sud 11, Paris, France).
  - Talk title: NLO evolution of Color Dipole in QCD and $\mathcal{N} = 4$ SYM.

Publications

- Giovanni Antonio Chirilli,
  "Quark and Gluon quasi-PDFs at low-x" (in preparation)

- Giovanni Antonio Chirilli,
  "High energy Operator Product Expansion for polarized scattering" (in preparation)

- I. Balitsky and G. A. Chirilli,
  "Conformal invariance of TMD rapidity evolution"
  Phys. Rev. D **100** (2019) no.5, 051504 [arXiv:1905.09144[hep-ph]].

- Giovanni A. Chirilli
  "Sub-eikonal corrections to scattering amplitudes at high energy"
  JHEP **1901**, 118 (2019) [arXiv:1807.11435 [hep-ph]].

- Giovanni A. Chirilli, Yuri V. Kovchegov, Douglas E. Wertepny
  "Regularization of the Light-Cone Gauge Gluon Propagator Singularities Using Sub-Gauge Conditions", JHEP **1512**, 138 (2015) [arXiv:1508.07962[hep-ph]].

- Giovanni A. Chirilli, Yuri V. Kovchegov, Douglas E. Wertepny
  "Classical Gluon Production Amplitude for Nucleus–Nucleus Collisions: First Saturation Correction in the Projectile", JHEP **1503**, 015 (2015) [arXiv:1501.03106[hep-ph]].

- Giovanni A. Chirilli and Yuri V. Kovchegov
  "$\gamma^*\gamma^*$ Cross Section at NLO and Properties of the BFKL Evolution at Higher Orders",
  JHEP **1405**, 099 (2014) [arXiv:1403.3384 [hep-ph]].

- I. Balitsky and G. A. Chirilli, "Rapidity evolution of Wilson lines at the next-to-leading order",
  Phys. Rev. D**88**, (2013) 111501 [arXiv:1309.7644 [hep-ph]].

- Giovanni A. Chirilli and Yuri V. Kovchegov
  "Solution of the NLO BFKL Equation and the Strategy for Solving the All-Order BFKL Equation",
  JHEP **1306**, 055 (2013) [arXiv: 1305.1924[hep-ph]].

- I. Balitsky and G. A. Chirilli
  "Photon impact factor and k_T-factorization for DIS in the next-to-leading order",
  Phys. Rev. D **87**, (2013) 014013 [arXiv: 1207.3844[hep-ph]].

- Giovanni A. Chirilli, Bo-Wen Xiao and Feng Yuan,
  "Inclusive Hadron Productions in pA Collisions",
  Phys. Rev. D **86** (2012) 054005 [arXiv: 1203.6139 [hep-ph]].

- Giovanni A. Chirilli, Bo-Wen Xiao and Feng Yuan,
  "One-loop Factorization for Inclusive Hadron Production in pA Collision in the Saturation Formalism",
  Phys. Rev. Lett. **108**, 122301 (2012) [arXiv: 1112.1061 [hep-ph]].

- I. Balitsky and G. A. Chirilli
  "Photon impact factor in the next-to-leading order",
  Phys. Rev. D **83**, 031502 (2011) [arXiv: 1009.4729 [hep-ph]].

- G. A. Chirilli, L. Szymanowski and S. Wallon
  "Uncovering the triple Pomeron vertex from Wilson line formalism",
  Phys. Rev. D **83**, 014020 (2011) [arXiv: 1010.0285 [hep-ph]].

- I. Balitsky and G. A. Chirilli,
  "High-energy amplitudes in $\mathcal{N}$=4 SYM in the next-to-leading order",
  Phys. Lett. B **687**, 204 (2010) [arXiv: 0911.5192 [hep-ph]].

- I. Balitsky and G. A. Chirilli, "NLO evolution of color dipoles in N=4 SYM",
  Nucl. Phys. B **822**, 45 (2009) [arXiv: 0903.5326 [hep-ph]].

- I. Balitsky and G. A. Chirilli, "Conformal kernel for NLO BFKL equation in $\mathcal{N}$=4 SYM",
  Phys. Rev. D **79**, 031502 (2009) [arXiv: 0812.3416 [hep-ph]].

- I. Balitsky and G. A. Chirilli, "Next-To-Leading Order Evolution Of Color Dipoles",
  Phys. Rev. D **77**, 014019 (2008) [arXiv: 0710.4330 [hep-ph]].

Proceedings

- G. A. Chirilli "Sub-eikonal spin corrections and g_1 structure function at low-x"
  PoS DIS 2019 (2019) 253
  27th International Workshop on Deep-Inelastic Scattering and Related Subjects (DIS2019)
  8-12 April, 2019, Torino, Italy.

- G. A. Chirilli, "OPE in Wilson lines with sub-eikonal spin corrections for TMDs and g_1 structure function"
  9th International Workshop on QCD - Theory and Experiment (QCD@Work 2018) EPJ Web Conf. **192**, 00013 (2018). doi:10.1051/epjconf/201819200013.

- G. A. Chirilli, "Non-linear dynamics in DIS at NLO," PoS DIS **2017**, 066 (2018).
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  03-07 April 2017, Birmingham, UK.

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- G. A. Chirilli "Classical gluon production amplitude in heavy-ion collisions", published in EPJ-web of Conferences.
  6th International Conference on Physics Opportunities at an ElecTron-Ion Collider (POETIC VI) *September 07 - 11, 2015, École Polytechnique, Palaiseau, France.*

- G. A. Chirilli "Non-Linear QCD Dynamics and Wilson Lines ", PoS QCDEV2015 (2015) 033.
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- G. A. Chirilli "High-energy evolution of Wilson lines at the next-to-leading order", Nucl. Phys. A, **931**, November 2014, Pages 1130-1135.
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- G. Chirilli, B. -W. Xiao and F. Yuan, "The NLO inclusive forward hadron production in pA collisions," Nucl. Phys. A **904-905**, 841c (2013).
  23rd International Conference on Ultra-Relativistic Nucleus-Nucleus Collisions (Quark Matter 2012) *August 13 - 18, 2012, Washington, DC, USA.*

- G. A. Chirilli "High-Energy QCD factorization from DIS to pA collisions", Int. J. Mod. Phys. Conf. Ser. **20**, 200 (2012) [arXiv: 1209.1614 [hep-ph]].
  QCD Evolution Workshop *May 14 - 17, 2012, Thomas Jefferson National Accelerator Facility, Newport News, VA.*

- G. Chirilli, B. -W. Xiao and F. Yuan, "The NLO inclusive forward hadron production in pA collisions," Int. J. Mod. Phys. Conf. Ser. **20**, 208 (2012).
  QCD Evolution Workshop *May 14 - 17, 2012, Thomas Jefferson National Accelerator Facility, Newport News, VA.*

- G. A. Chirilli "Photon impact factor for BFKL pomeron at next-to-leading order", 20th International Workshop on Deep-Inelastic Scattering and Related Subjects (DIS 2012) *March 26 - 30, 2012, Bonn, Germany.*

- G. A. Chirilli, "The photon impact factor for DIS at NLO: Analytic result" AIP Conf. Proc. **1350**, 228 (2011).
  6th International Workshop on Diffraction in High Energy Physics (Diffraction 2010) *September 10 - 15 2010, Otranto, Lecce, Italy.*

- G. A. Chirilli "Next-to-leading order structure functions for DIS off a large nucleus", J. Phys. G **38**, 124065 (2011).

22nd International Conference on Ultra-Relativistic Nucleus-Nucleus (Quark Matter 2011) *May 23 - 28, 2011, Annecy, France.*

- G. A. Chirilli "NLO evolution of structure functions at small x",
  Int. J. Mod. Phys. Conf. Ser. **4**, 46 (2011).
  QCD Evolution Workshop: From Collinear to Non-Collinear Case *April 8 - 9, 2011, Thomas Jefferson National Accelerator Facility, Newport News, VA.*

- G. A. Chirilli, "Analytic NLO photon impact factor for deep inelastic scattering," PoS ICHEP **2010**, 129 (2010).
  35th International Conference on High Energy Physics (ICHEP 2010) *July 21 - 28, 2010, Paris, France.*

- G. A. Chirilli "High-energy amplitudes and impact factors at next-to-leading order",
  PoS(DIS 2010), 063, 2010 [arXiv: 1007.0036 [hep-ph]].
  18th International Workshop on Deep Inelastic Scattering and Related Subjects (DIS 2010) *April 19 - 23, 2010, Florence, Italy.*

- G. A. Chirilli "Small-x Evolution in the Next-to-Leading Order",
  Mod. Phys. Lett. A **24**, 3052 (2009) [arXiv: 1001.2742 [hep-ph]].
  Workshop on Recent Advances in Perturbative QCD and Hadronic Physics *July 20 - 25, 2009, Trento, Italy.*

- G. A. Chirili "Small-x evolution of structure functions in the next-to-leading order" AIP Conf. Proc. **1182**, 913 (2009).
  10th Conference on the Intersections of Particle and Nuclear Physics (CIPANP 2009) *May 26 - 31, 2009, San Diego, California.*

- G. A. Chirilli "Small-x evolution of structure functions in the next-to-leading order",
  DESY-PROC-2009-03, JLAB-THY-09-982. International Conference on the Structure and the Interactions of the Photon including the 18th International Workshop on Photon-Photon Collisions and the International Workshop on High Energy Photon Linear Colliders (Photon 2009) *11-15 May 2009, Hamburg, Germany.*

- G. A. Chirilli, "NLO Evolution of Color Dipoles in N = 4 SYM",
  AIP Conf. Proc. **1105**, 331 (2009) [arXiv: 0811.3642 [hep-ph]].
  5th International Workshop on Diffraction in High Energy Physics (Diffraction 2008) *September 9 - 14 2008, La Londe-les-Maures, France.*

- I. Balitsky and G. A. Chirilli, "NLO Evolution of Color Dipoles",
  Acta Phys. Polon. Supp. **1**, 545 (2008).
  8th Workshop on Continuous Advances in QCD (CAQCD-08) *May 15 - 18 2008, Minneapolis, Minnesota.*

- I. Balitsky and G. A. Chirilli, "NLO Evolution of Color Dipole",
  Acta Phys. Polon. B **39**, 2561 (2008).
  Summer School on QCD, Low X Physics, Saturation and Diffraction *July 1 - 14 2007, Calabria, Italy.*

- C. Coriano, G. Chirilli and M. Guzzi, "Using and constraining non-forward parton distributions: Deeply virtual neutrino scattering in cosmic rays and light dark matter searches", [arXiv: 0309069 [hep-ph]].
  QCD @ Work 2003: 2nd International Workshop on Quantum Chromodynamics: Theory and Experiment *June 14 - 18 2003, Conversano, Italy.*

Curriculum Vitæ

Marco Crisostomi

Present Position

From 10/2019 **Postdoctoral researcher** @ SISSA

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Education and Past Positions

10/2017 – 10/2019	**Postdoctoral researcher** Université Paris Saclay (IPhT, LPT, DAp), France
10/2014 – 10/2017	**Postdoctoral researcher** Institute of Cosmology and Gravitation, University of Portsmouth, UK
02/2014 – 10/2014	**Visiting researcher** School of Physics and Astronomy, University of Nottingham, UK

List of Publications

Authors are always listed in alphabetical order, except in [14,23,24].

[24] **Dynamics of screening in modified gravity**
L. ter Haar, M. Bezares, M. C., E. Barausse and C. Palenzuela
[arXiv:2009.03354] [INSPIRE]

[23] **K-dynamics: well-posed initial value 1+1 evolutions in K-essence**
M. Bezares, M. C., C. Palenzuela and E. Barausse
[arXiv:2008.07546] [INSPIRE]

[22] **Consistency relations for large-scale structure in modified gravity and the matter bi-spectrum**
M. C., M. Lewandowski and F. Vernizzi
Phys. Rev. D **101**, no. 12, 123501 (2020) [arXiv:1909.07366] [INSPIRE]

[21] **Perturbations of a rotating black hole in DHOST theories**
C. Charmousis, M. C., D. Langlois and K. Noui
Class. Quant. Grav. **36**, no. 23, 235008 (2019) [arXiv:1907.02924] [INSPIRE]

[20] **Testing modified gravity at cosmological distances with LISA standard sirens**
21 authors on behalf of the LISA Cosmology Working Group
JCAP **1907**, no. 07, 024 (2019) [arXiv:1906.01593] [INSPIRE]

[19] **Vainshtein regime in Scalar-Tensor gravity: constraints on DHOST theories**
M. C., M. Lewandowski and F. Vernizzi
Phys. Rev. D **100**, no. 2, 024025 (2019) [arXiv:1903.11591] [INSPIRE]

[18] **Rotating Black Holes in Higher Order Gravity**
C. Charmousis, M. C., R. Gregory and N. Stergioulas
Phys. Rev. D **100**, no. 8, 084020 (2019) [arXiv:1903.05519] [INSPIRE]

[17] **Cosmological evolution in DHOST theories**
M. C., K. Koyama, D. Langlois, K. Noui and D. A. Steer
JCAP **1901**, no. 01, 030 (2019) [arXiv:1810.12070] [INSPIRE]

[16] **Self-accelerating universe in scalar-tensor theories after GW170817**
M. C. and K. Koyama
Phys. Rev. D **97**, no. 8, 084004 (2018) [arXiv:1712.06556] [INSPIRE]

[15] **Vainshtein mechanism after GW170817**
M. C. and K. Koyama
Phys. Rev. D **97**, no. 2, 021301 (2018) [arXiv:1711.06661] [INSPIRE]

[14] **Beyond Lovelock gravity: Higher derivative metric theories**
M. C., K. Noui, C. Charmousis and D. Langlois
Phys. Rev. D **97**, no. 4, 044034 (2018) [arXiv:1710.04531] [INSPIRE]

[13] **Higher Derivative Field Theories: Degeneracy Conditions and Classes**
M. C., R. Klein and D. Roest
JHEP **1706**, 124 (2017) [arXiv:1703.01623] [INSPIRE]

[12] **Degenerate higher order scalar-tensor theories beyond Horndeski up to cubic order**
J. Ben Achour, M. C., K. Koyama, D. Langlois, K. Noui and G. Tasinato
JHEP **1612**, 100 (2016) [arXiv:1608.08135] [INSPIRE]

[11] **Extended Scalar-Tensor Theories of Gravity**
M. C., K. Koyama and G. Tasinato
JCAP **1604**, no. 04, 044 (2016) [arXiv:1602.03119] [INSPIRE]

[10] **Horndeski: beyond, or not beyond?**
M. C., M. Hull, K. Koyama and G. Tasinato
JCAP **1603**, no. 03, 038 (2016) [arXiv:1601.04658] [INSPIRE]

[9] **New Branches of Massive Gravity**
D. Comelli, M. C., K. Koyama, L. Pilo and G. Tasinato
Phys. Rev. D **91**, no. 12, 121502 (2015) [arXiv:1505.00632] [INSPIRE]

[8] **Cosmology of bigravity with doubly coupled matter**
D. Comelli, M. C., K. Koyama, L. Pilo and G. Tasinato
JCAP **1504**, 026 (2015) [arXiv:1501.00864] [INSPIRE]

[7] **FRW Cosmological Perturbations in Massive Bigravity**
D. Comelli, M. C. and L. Pilo
Phys. Rev. D **90**, 084003 (2014) [arXiv:1403.5679] [INSPIRE]

[6] **Restoring General Relativity in massive bigravity theory**
E. Babichev and M.C.
Phys. Rev. D **88**, 084002 (2013) [arXiv:1307.3640] [INSPIRE]

[5] **Degrees of Freedom in Massive Gravity**
D. Comelli, M. C., F. Nesti and L. Pilo
Phys. Rev. D **86**, 101502(R) (2012) [arXiv:1204.1027] [INSPIRE]

[4] **Perturbations in Massive Gravity Cosmology**
D. Comelli, M. C. and L. Pilo
JHEP **06** (2012) 085 [arXiv:1202.1986] [INSPIRE]

[3] **FRW cosmology in ghost free massive gravity from bigravity**
D. Comelli, M. C., F. Nesti and L. Pilo
JHEP **03** (2012) 067 [arXiv:1111.1983] [INSPIRE]

[2] **Spherically Symmetric Solutions in Ghost-Free Massive Gravity**
D. Comelli, M. C., F. Nesti and L. Pilo
Phys. Rev. D **85** (2012) 024044 [arXiv:1110.4967] [INSPIRE]

[1] **Finite Energy for a Gravitational Potential Falling Slower than 1/r**
D. Comelli, M. C., F. Nesti and L. Pilo
Phys. Rev. D **84** (2011) 104026 [arXiv:1105.3010] [INSPIRE]

PROCEEDINGS:

[1] **On the Cosmology of Massive Bigravity**
M. C., D. Comelli and L. Pilo
Nuovo Cim. C **38**, no. 1, 30 (2015) [INSPIRE]

VISITS & SEMINARS

Several periods spent for collaboration at:

- INFN Ferrara, Italy
- Laboratoire de Physique Théorique d'Orsay, France
- School of Physics and Astronomy, University of Nottingham, UK
- APC – AstroParticule et Cosmologie, Paris, France
- CERN – Theoretical Physics Department, Geneva, Switzerland

INVITED SEMINARS:

- Institute of Cosmology and Gravitation, University of Portsmouth, UK

- Department of Physics, Swansea University, UK
- Astrophysics, University of Oxford, UK
- Van Swinderen Institute for Particle Physics and Gravity, University of Groningen, The Netherlands
- Institut de Physique Théorique, CEA Saclay, France
- Département d'Astrophysique, CEA Saclay, France
- Institut d'Astrophysique de Paris, France
- SISSA, Italy
- IFPU, Italy

Conferences and Workshops

- 30th Texas Symposium on Relativistic Astrophysics – Portsmouth (UK), 15-20 December 2019
  Contributed talk
- Black Holes and Neutron Stars in Modified Gravity – Meudon (France), 18-20 November 2019
  Invited speaker
- Workshop: Dark Energy Theories – IHP, Paris (France), 19 November 2019
  Invited speaker
- 7th LISA Cosmology Working Group Workshop – Padova (Italy), 23-27 September 2019
  Contributed talk
- GR 22 & AMALDI 13 – Valencia (Spain), 7-12 July 2019
  2 contributed talks
- Fundamental Physics with LISA – GGI, Florence (Italy), 12-14 November 2018
- Workshop: Modern Aspects of Gravity and Cosmology – LPT, Orsay (France), 3-4 October 2018
  Organiser
- Gravity and Cosmology 2018 – YITP Kyoto (Japan), 19 February - 2 March 2018
  Contributed talk
- Dark Energy and Modified-Gravity cosmologies: DARKMOD
  Saclay (France), 25 September - 6 October 2017
  Invited speaker
- 9th Aegean Summer School "Einstein's theory of gravity and its modifications: from theory to observations" – Sifnos (Greece), 18-23 September 2017
  Invited speaker
- COSMO 2017 @ APC Paris (France), 28 August - 1 September 2017
  Contributed talk
- UK Cosmology meeting – Portsmouth, 5 April 2017
  Organiser
- UK Cosmology meeting – Nottingham, 15 December 2016
  Contributed talk
- Workshop: Modified Gravity – LMPT, Tours (France), 23-24 November 2016
  Invited speaker
- Theoretical Cosmology in the Era of Large Surveys – GGI, Florence (Italy), 2-6 May 2016
  Contributed talk
- Workshop: Modern Aspects of Gravity and Cosmology
  LPT, Orsay (France), 23-24 November 2015
  Invited speaker

- ICTP Advanced School on Cosmology – Trieste (Italy), 18-29 May 2015
  Contributed talk
- IFAE 2014 - 26th Conference on High Energy Physics – L'Aquila (Italy), 9-11 April 2014
  Invited speaker
- 7th Aegean Summer School "Beyond Einstein's theory of gravity"
  Paros (Greece), 23-28 September 2013
  Contributed talk
- COSMO 2013 @ DAMTP Cambridge (UK), 2-6 September 2013
  Contributed talk
- Tales of Lambda – Nottingham (UK), 1-5 July 2013
  Contributed talk
- 2D–IDAPP Meeting @ Ferrara (Italy), 29-31 October 2012
  Contributed talk
- ISAPP 2012 "CMB and High Energy Physics" – La Palma (Spain), 16-24 July 2012
- Cortona 2012 "Convegno di Fisica Teorica" (Italy), 30 May - 1 June 2012
  Contributed talk
- ISAPP 2011 "The dark side of the Universe" – Heidelberg (Germany), 8-15 July 2011
- 2D–IDAPP Meeting @ APC Paris (France), 20-22 June 2011
  Contributed talk

Miscellanea

◇ Teaching:

General Relativity, Lectures for PhD students, University of Portsmouth – 2015/2016

◇ Journal referee:

Physical Review D, Physical Review Letters, Journal of High Energy Physics (JHEP), Journal of Cosmology and Astroparticle Physics (JCAP), Physics Letters B, European Physical Journal C

◇ Fundings:

- "INFN Fellini Fellowship" (Marie Sklodowska-Curie Actions, Cofund Programme) – Declined
- "Enhanced Eurotalents" (Marie Sklodowska-Curie Actions, Cofund Programme) – 10/2017 to 12/2018
- Fellowship from Fondazione Angelo Della Riccia – 02/2014 to 10/2014

◇ Major collaborations:

LISA Consortium – Cosmology Working Group, Fundamental Physics Working Group

◇ Habilitations:

Italy: Associate professor in theoretical physics

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Luigi Delle Rose

Curriculum vitae

Personal details

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Date of birth

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Work address Institut de Fisica d'Altes Energies, Campus UAB, 08193 Bellaterra, Spain

Education

Jul 2013 **Ph.D. in Physics**, *Università del Salento*, Lecce (IT), title of the thesis: "*The Standard Model in a weak gravitational background. Dilatons, scale anomalies and conformal methods*", supervisor Prof. Claudio Corianò.

Oct 2009 **Master degree in Physics**, *Università del Salento*, Lecce (IT), title of the thesis: "*Studies on gauge and conformal anomalies*", supervisor Prof. Claudio Corianò, final grade 110/110 *cum laude*.

Jul 2007 **Bachelor degree in Physics**, *Università del Salento*, Lecce (IT), title of the thesis: "*Aspects of the path integral in quantum mechanics*", supervisor Prof. Claudio Corianò, final grade 110/110 *cum laude*.

Jul 2004 **High school diploma**, *Liceo Scientifico "Q. Ennio"*, Gallipoli (IT), final grade 100/100.

Employment

Post-doctoral positions

2013–2015 **Università del Salento**, *Lecce (IT)*.
Research activity: Renormalisation group evolution, Phenomenology of $U(1)'$ extensions and seesaw models, Electroweak corrections, Conformal and superconformal extensions of the Standard Model, Higgs and Dilaton physics. Phase transitions at finite temperature in the Standard Model.

2016–2017 **NExT Institute at University of Southampton**, *Southampton (UK)*, "Angelo Della Riccia" fellowship.
Research activity: Phenomenology and MonteCarlo analyses of Z' models, heavy neutrino physics and extended Higgs sectors at the LHC. Renormalisation group studies and model building from GUT extensions.

2016–2018 **NExT Institute at Rutherford Appleton Laboratory**, *Didcot (UK)*, "Marie Skłodowska-Curie Fellowship as part of STFC/COFUND Rutherford International Fellowship Programme".
Research activity: Search for heavy resonances (Z' and W'), search for leptonic signatures with displaced vertices and missing E_T, investigation of heavy Higgs signals. Data analysis in CMS.

2018–2020 **Università di Firenze**, *Firenze (IT)*.
Research activity: Theory and phenomenology of composite Higgs models. Cosmology and dark matter in composite scenarios. Study of future collider capabilities.

2020–2020 **INFN, Sezione di Firenze**, *Firenze (IT)*.
Research activity: Theory and phenomenology of composite Higgs models. Cosmology and dark matter in composite scenarios. Study of future collider capabilities.

2020–present **IFAE**, *Barcellona (ES)*, "Marie Skłodowska-Curie Fellowship as part of la Caixa/COFUND Junior Leader Fellowship".
Research activity: Phase transitions in the early Universe. Theory and phenomenology of non-minimal Higgs sectors.

Visiting positions

2017–present **University of Southampton**, *Southampton (UK)*.

Fellowships and awards

- Angelo Della Riccia Fellowship
- Marie Skłodowska-Curie Fellowship as part of STFC/COFUND Rutherford International Fellowship Programme (RIFP)
- Alexander von Humboldt Fellowship for Postdoctoral Researchers (awarded, to be spent at TUM)
- Marie Skłodowska-Curie Fellowship as part of la Caixa/COFUND Junior Leader Fellowship
- Beatriu de Pinos (2019) grant

Publications, Preprints and Proceedings

Publications

[44] L. Delle Rose, G. Panico, M. Redi, A. Tesi, "*Gravitational Waves from Supercool Axions*", JHEP 04 (2020) 025, arXiv:1912.06139 [hep-ph]].

[43] S. De Curtis, L. Delle Rose, G. Panico, "*Composite Dynamics in the Early Universe*", JHEP 1912 (2019) 149, [arXiv:1909.07894 [hep-ph]].

[42] L. Delle Rose, S. Khalil, S.J.D. King, S. Moretti, "*R_K and R_{K^*} in an Aligned 2HDM with Right-Handed Neutrinos*", Phys.Rev.D 101 (2020) 11, 115009 [arXiv:1903.11146 [hep-ph]].

[41] L. Delle Rose, S. Khalil, S.J.D. King, S. Moretti, "*New Physics suggested by Atomki Anomaly*", Frontiers in Physics 7 (2019 73) [arXiv:1812.05497 [hep-ph]].

[40] L. Delle Rose, S. Khalil, S.J.D. King, S. Moretti, A.M. Thabt, "*Atomki Anomaly in Family-Dependent $U(1)'$ Extension of the Standard Model*", Phys.Rev. D99 (2019) no.5, 055022 [arXiv:1811.07953 [hep-ph]].

[39] S. De Curtis, L. Delle Rose, S. Moretti, K. Yagyu, "*A Concrete Composite 2-Higgs Doublet Model*", JHEP 1812 (2018) 051 [arXiv:1810.06465 [hep-ph]].

[38] L. Delle Rose, A. Hammad, O. Fischer, "*Prospects for Heavy Scalar Searches at the LHeC*", IJMPA, Vol. 34, No. 23, 1950127 (2019) [arXiv:1809.04321 [hep-ph]].

[37] D.A. Camargo, L. Delle Rose, S. Moretti, F.S. Queiroz, "*Collider Bounds on 2-Higgs Doublet Models with $U(1)_X$ Gauge Symmetries*", Phys.Lett. B793 (2019) 150-160 [arXiv:1805.08231 [hep-ph]].

[36] S. De Curtis, L. Delle Rose, S. Moretti, K. Yagyu, "*Supersymmetry versus Compositeness: 2HDMs tell the story*", Phys.Lett. B786 (2018) 189-194 [arXiv:1803.01865 [hep-ph]].

[35] L. Delle Rose, S. Khalil, S.J.D. King, S. Kulkarni, C. Marzo, S. Moretti, C.S. Un, "*Sneutrino Dark Matter in the BLSSM*", JHEP 1807 (2018) 100 [arXiv:1712.05232 [hep-ph]].

[34] E. Accomando, L. Delle Rose, S. Moretti, E. Olaiya, C.H. Shepherd-Themistocleous, "*Extra Higgs Boson and Z' as Portals to Signatures of Heavy Neutrinos at the LHC*", JHEP 1802 (2018) 109 [arXiv:1708.03650 [hep-ph]].

[33] L. Delle Rose, S. Khalil, S. Moretti, "*Explanation of the 17 MeV Atomki Anomaly in a $U(1)'$-Extended 2-Higgs Doublet Model*", Phys.Rev. D96 (2017) no.11, 115024 [arXiv:1704.03436 [hep-ph]].

[32] L. Delle Rose, A.E. Faraggi, C. Marzo,J. Rizos, "*Wilsonian Dark Matter in String Derived Z' Model*", Phys.Rev. D96 (2017) no.5, 055025 [arXiv:1704.02579 [hep-ph]].

[31] L. Delle Rose, S. Khalil, S.J.D. King, C. Marzo, S. Moretti, C.S. Un, "*Naturalness and Dark Matter in the supersymmetric $B-L$ extension of the Standard Model*", Phys.Rev. D96 (2017) no.5, 055004 [arXiv:1702.01808 [hep-ph]].

[30] E. Accomando, L. Delle Rose, S. Moretti, E. Olaiya, C.H. Shepherd-Themistocleous, "*Novel SM-like Higgs decay into displaced heavy neutrino pairs in $U(1)'$ models*", JHEP 1704 (2017) 081 [arXiv:1612.05977 [hep-ph]].

[29] N. Afshordi, C. Corianò, L. Delle Rose, E. Gould, K. Skenderis, "*From Planck data to Planck era: Observational tests of Holographic Cosmology*", Phys.Rev.Lett. 118 (2017) no.4, 041301 [arXiv:1607.04878 [hep-ph]].

[28] P. Bandyopadhyay, C. Corianò, A. Costantini, L. Delle Rose, "*Bounds on the Conformal Scale of a Minimally Coupled Dilaton and Multi-Leptonic Signatures at the LHC*", JHEP 1609 (2016) 084 [arXiv:1607.01933 [hep-ph]].

[27] J. Ashfaque, L. Delle Rose, A.E. Faraggi, C. Marzo, "*LHC di-photon excess and gauge coupling unification in extra Z' heterotic-string derived models* ", Eur.Phys.J. C76 (2016) no.10, 570 [arXiv:1606.01052 [hep-ph]].

[26] E. Accomando, C. Corianò, L. Delle Rose, J. Fiaschi, C. Marzo, S. Moretti, "*Z', Higgses and heavy neutrinos in $U(1)'$ models: from the LHC to the GUT scale* ", JHEP 1607 (2016) 086 [arXiv:1605.02910 [hep-ph]].

[25] C. Corianò, L. Delle Rose, C. Marzo, "*Constraints on Abelian Extensions of the Standard Model from Two-Loop Vacuum Stability and $U(1)_{B-L}$* ", JHEP 1602 (2016) 135 [arXiv:1510.02379 [hep-ph]].

[24] L. Delle Rose, C. Marzo, A. Urbano, "*On the fate of the Standard Model at finite temperature* ", JHEP 1605 (2016) 050 [arXiv:1507.06912 [hep-ph]].

[23] L. Delle Rose, C. Marzo, A. Urbano, "*On the stability of the electroweak vacuum in the presence of low-scale seesaw models* ", JHEP 1512 (2015) 050 [arXiv:1506.03360 [hep-ph]].

[22] C. Corianò, A. Costantini, M. Dell'Atti, L. Delle Rose, "*Neutrino and Photon Lensing by Black Holes: Radiative Lens Equations and Post-Newtonian Contributions*", JHEP 1507 (2015) 160 [arXiv:1504.01322 [hep-ph]].

[21] C. Corianò, L. Delle Rose, M.M. Maglio, M. Serino, "*Electroweak Corrections to Photon Scattering, Polarization and Lensing in a Gravitational Background and the Near Horizon Limit*", JHEP 1501 (2015) 091 [arXiv:1411.2804 [hep-ph]].

[20] C. Corianò, L. Delle Rose, C. Marzo, "*Vacuum Stability in $U(1)'$ Extensions of the Standard Model with TeV Scale Right Handed Neutrinos*", Phys.Lett. B738 (2014) 13-19 [arXiv:1407.8539 [hep-ph]].

[19] C. Corianò, A. Costantini, L. Delle Rose, M. Serino, "*Superconformal sum rules and the spectral density flow of the composite dilaton (ADD) multiplet in $\mathcal{N}=1$ theories*", JHEP 1406 (2014) 136 [arXiv:1402.6369 [hep-th]].

[18] C. Corianò, L. Delle Rose, E. Gabrielli, L. Trentadue, "*Fermion Scattering in a Gravitational Background: Electroweak Corrections and Flavour Transitions*", JHEP 1403 (2014) 136 [arXiv:1312.7657 [hep-ph]].

[17] C. Corianò, L. Delle Rose, C. Marzo, M. Serino, "*The dilaton Wess–Zumino action in six dimensions from Weyl gauging: local anomalies and trace relations*", Class.Quant.Grav. 31 (2014) 105009 [arXiv:1311.1804 [hep-th]].

[16] C. Corianò, L. Delle Rose, C. Marzo, M. Serino, "*Conformal Trace Relations from the Dilaton Wess-Zumino Action*", Phys.Lett. B726 (2013) 4-5, 896-905 [arXiv:1306.4248 [hep-th]].

[15] C. Corianò, L. Delle Rose, E. Mottola, M. Serino, "*Solving the Conformal Constraints for Scalar Operators in Momentum Space and the Evaluation of Feynman's Master Integrals*", JHEP 1307 (2013) 011 [arXiv:1304.6944 [hep-th]].

[14] C. Corianò, L. Delle Rose, E. Gabrielli, L. Trentadue, "*Mass Corrections to Flavor-Changing Fermion-Graviton Vertices in the Standard Model*", Phys.Rev. D88 (2013) 085008 [arXiv:1303.1305 [hep-th]].

[13] C. Corianò, L. Delle Rose, E. Gabrielli, L. Trentadue, "*One loop Standard Model corrections to flavor diagonal fermion-graviton vertices*", Phys.Rev. D87 (2013) 5, 054020 [arXiv:1212.5029 [hep-ph]].

[12] C. Corianò, L. Delle Rose, M. Serino, "*Three and Four Point Functions of Stress Energy Tensors in D=3 for the Analysis of Cosmological Non-Gaussianities*", JHEP 1212 (2012) 090 [arXiv:1210.0136 [hep-th]].

[11] C. Corianò, L. Delle Rose, C. Marzo, M. Serino, "*Higher Order Dilaton Interactions in the Nearly Conformal Limit of the Standard Model*", Phys.Lett. B717 (2012) 182-187 [arXiv:1207.2930 [hep-ph]].

[10] C. Corianò, L. Delle Rose, A. Quintavalle, M. Serino, "*Dilaton interactions and the anomalous breaking of scale invariance of the Standard Model*", JHEP 1306 (2013) 077 [arXiv:1206.0590 [hep-ph]].

[9] C. Corianò, L. Delle Rose, E. Mottola, M. Serino, "*Graviton Vertices and the Mapping of Anomalous Correlators to Momentum Space for a General Conformal Field Theory*", JHEP 1208 (2012) 147 [arXiv:1203.1339 [hep-th]].

[8] R. Armillis, C. Corianò, L. Delle Rose, A.R. Fazio, "*Comments on Anomaly Cancellations by Pole Subtractions and Ghost Instabilities with Gravity*", Class.Quant.Grav. 28 (2011) 145004 [arXiv:1103.1590 [hep-ph]].

[7] C. Corianò, L. Delle Rose, M. Serino, "*Gravity and the Neutral Currents: Effective Interactions from the Trace Anomaly*", Phys.Rev. D83 (2011) 125028 [arXiv:1102.4558 [hep-ph]].

[6] C. Corianò, L. Delle Rose, A. Quintavalle, M. Serino, "*The Conformal Anomaly and the Neutral Currents Sector of the Standard Model*", Phys.Lett. B700 (2011) 29-38 [arXiv:1101.1624 [hep-ph]].

[5] R. Armillis, C. Corianò, L. Delle Rose, "*Trace Anomaly, Massless Scalars and the Gravitational Coupling of QCD*", Phys.Rev. D82 (2010) 064023 [arXiv:1005.4173 [hep-ph]].

[4] R. Armillis, C. Corianò, L. Delle Rose, L. Manni, "*The Trace Anomaly and the Gravitational Coupling of an Anomalous $U(1)$*", Int.J.Mod.Phys. A26 (2011) 2405-2435 [arXiv:1003.3930 [hep-ph]].

[3] R. Armillis, C. Corianò, L. Delle Rose, "*Conformal Anomalies and the Gravitational Effective Action: The TJJ Correlator for a Dirac Fermion*", Phys.Rev. D81 (2010) 085001 [arXiv:0910.3381 [hep-ph]].

[2] R. Armillis, C. Corianò, L. Delle Rose, "*Anomaly Poles as Common Signatures of Chiral and Conformal Anomalies*", Phys.Lett. B682 (2009) 322-327 [arXiv:0909.4522 [hep-ph]].

[1] R. Armillis, C. Corianò, L. Delle Rose, M. Guzzi, "*Anomalous $U(1)$ Models in Four and Five Dimensions and their Anomaly Poles*", JHEP 0912 (2009) 029 [arXiv:0905.0865 [hep-ph]].

Contributions to reports

[8] "*The Large Hadron-Electron Collider at the HL-LHC*", [arXiv:2007.14491 [hep-ex]].

[7] "*Searching for long-lived particles beyond the Standard Model at the Large Hadron Collider*", [arXiv:1903.04497 [hep-ex]].

[6] "*Working Group 3: Beyond the Standard Model Physics at the HL-LHC and HE-LHC*", CERN Yellow Rep.Monogr. 7 (2019) 585-865, [arXiv:1812.07831 [hep-ph]].

[5] L. Delle Rose, et al., FCC Collaboration, "*HE-LHC: The High-Energy Large Hadron Collider: Future Circular Collider Conceptual Design Report Volume 4*", Eur.Phys.J.ST 228 (2019) no.5, 1109-1382 [CERN-ACC-2018-0059].

[4] L. Delle Rose, et al., FCC Collaboration, "*FCC-hh: The Hadron Collider: Future Circular Collider Conceptual Design Report Volume 3*", Eur.Phys.J.ST 228 (2019) no.4, 755-1107 [CERN-ACC-2018-0057].

[3] L. Delle Rose, et al., FCC Collaboration, "*FCC-ee: The Lepton Collider: Future Circular Collider Conceptual Design Report Volume 2*", Eur.Phys.J.ST 228 (2019) no.2, 261-623 [CERN-ACC-2018-0057].

[2] L. Delle Rose, et al., "*FCC Physics opportunities: Future Circular Collider Conceptual Design Report Volume 1*", Eur.Phys.J. C79 (2019) no.6, 474 [CERN-ACC-2018-0056].

[1] L. Delle Rose, et al., "*Long-Lived Particles at the Energy Frontier: The MATHUSLA Physics Case*", Rept.Prog.Phys. 82 (2019) 11, 116201 [arXiv:1806.07396 [hep-ph]].

Conference proceedings

[18] S. De Curtis, L. Delle Rose, S. Moretti, K. Yagyu, "*A Composite 2-Higgs Doublet Model*", Presented at Conference: 2019 European Physical Society Conference on High Energy Physics (EPS-HEP2019), 10-17 Jul 2019. Ghent, Belgium [arXiv:1910.13699 [hep-ph]].

[17] L. Delle Rose, S. Khalil, S.J.D. King, S. Moretti, A. M. Thabt, "*^{8}Be Decay Anomaly and Light Z'*", Presented at Conference: 54rd Rencontres de Moriond - EW 2019, 16-23 March 2018, La Thuile, Italy [arXiv:1905.05031 [hep-ph]].

[16] L. Delle Rose, et al., "*Future Opportunities in Accelator-based Neutrino Physics*", [arXiv:1812.06739 [hep-ex]].

[15] L. Delle Rose, S. Khalil, S.J.D. King, S. Kulkarni, C. Marzo, S. Moretti, C.S. Un, "*Prospects of Sneutrino Dark Matter in the BLSSM*", Les Rencontres de Physique de la Vallée d'Aoste, 25 February - 03 March 2018, La Thuile, Italy [arXiv:1804.09470 [hep-ph]].

[14] L. Delle Rose, S. Khalil, S.J.D. King, S. Kulkarni, C. Marzo, S. Moretti, C.S. Un, "*Sneutrino Dark Matter, Constraints and Perspectives*", Presented at Conference: 53rd Rencontres de Moriond - EW 2018, 10-17 March 2018, La Thuile, Italy [arXiv:1804.07753 [hep-ph]].

[13] L. Delle Rose, S. Khalil, S.J.D. King, C. Marzo, S. Moretti, C.S. Un, "*Supersymmetric Gauged B-L Model of Dark Matter and Fine Tuning* ", Presented at Conference: EPS-HEP 2017, European Physical Society conference on High Energy Physics, 5-12 July 2017, Venice, Italy. Published in PoS EPS-HEP2017 (2017) 067 [arXiv:1710.01116 [hep-ph]].

[12] L. Delle Rose, S. Khalil, S. Moretti, "*Explanation of the Beryllium Anomaly in a $U(1)'$-Extended 2-Higgs Doublet Model* ", Presented at Conference: EPS-HEP 2017, European Physical Society conference on High Energy Physics, 5-12 July 2017, Venice, Italy. Published in PoS EPS-HEP2017 (2017) 692 [arXiv:1708.08806 [hep-ph]].

[11] L. Delle Rose, S. Khalil, S.J.D. King, C. Marzo, S. Moretti, C.S. Un, "*Naturalness and Dark Matter Properties of the BLSSM*", Presented at Conference: 25th International Workshop on Deep Inelastic Scattering and Related Topics (DIS 2017). Published in PoS DIS2017 (2018) 301 [arXiv:1706.01301 [hep-ph]].

[10] E. Accomando, C. Corianò, L. Delle Rose, J. Fiaschi, C. Marzo, S. Moretti, "*Search for Z', vacuum (in)stability and hints of high-energy structures*", Presented at Conference: QCD@Work 2016 8th International Workshop on QCD - Theory and Experiment. Published in EPJ Web Conf. 129 (2016) 00007 [arXiv:1609.05652 [hep-ph]].

[9] E. Accomando, C. Corianò, L. Delle Rose, J. Fiaschi, C. Marzo, S. Moretti, "*Phenomenology of minimal Z' models: from the LHC to the GUT scale*", Presented at Conference: QCD@Work 2016 8th International Workshop on QCD - Theory and Experiment. Published in EPJ Web Conf. 129 (2016) 00006 [arXiv:1609.05029 [hep-ph]].

[8] C. Corianò, L. Delle Rose, C. Marzo, "*Stability constraints of the scalar potential in extensions of the Standard Model with TeV scale right handed neutrinos*", Presented at Conference: NOW 2014: Neutrino Oscillation Workshop. Published in Nucl.Part.Phys.Proc. 265-266 (2015) 311-313 [arXiv:1411.7168 [hep-ph]].

[7] A. Costantini, L. Delle Rose, M. Serino, "*Sum rules and spectral density flow in QCD and in superconformal theories*", Presented at Conference: QCD @ Work 2014: International Workshop on QCD - Theory and Experiment. Published in EPJ Web Conf. 80 (2014) 00017 [arXiv:1409.5075 [hep-th]].

[6] L. Delle Rose, C. Marzo, M. Serino, "*Conformal anomaly actions for dilaton interactions*", Presented at Conference: QCD @ Work 2014: International Workshop on QCD - Theory and Experiment. Published in EPJ Web Conf. 80 (2014) 00015 [arXiv:1409.4184 [hep-th]].

[5] L. Delle Rose, M. Serino, "*Dilaton Interactions in QCD and in the Electroweak Sector of the Standard Model*", Presented at Conference: QCD @ Work 2012: International Workshop on QCD - Theory and Experiment. Published in AIP Conf.Proc. 1492 (2012) 210-213 [arXiv:1208.6432].

[4] L. Delle Rose, M. Serino, "*Massless Scalar Degrees of Freedom in QCD and in the Electroweak Sector from the Trace Anomaly*", Presented at Conference: QCD @ Work 2012: International Workshop on QCD - Theory and Experiment. Published in AIP Conf.Proc. 1492 (2012) 205-209 [arXiv:1208.6425].

[3] R. Armillis, C. Corianò, L. Delle Rose, "*The Trace Anomaly and the Couplings of QED and QCD to Gravity*", Presented at Conference: QCD @ Work 2010: International Workshop on QCD - Theory and Experiment. Published in AIP Conf.Proc. 1317 (2011) 185-190 [arXiv:1007.2141].

[2] R. Armillis, C. Corianò, L. Delle Rose, M. Guzzi, A. Mariano, "*The Effective Actions of Pseudoscalar and Scalar Particles in Theories with Gauge and Conformal Anomalies*", Presented at Conference: 9th Hellenic School and Workshops on Elementary Particle Physics and Gravity (CORFU 2009). Published in Fortsch.Phys. 58 (2010) 708-711 [arXiv:1001.5240].

[1] R. Armillis, C. Corianò, L. Delle Rose, "*Trilinear Gauge Interactions in Extensions of the Standard Model and Unitarity*", Presented at Conference: IFAE 2009 (Incontri di Fisica delle Alte Energie 2009). Published in Nuovo Cim. C32N3-4 (2009) 261-264 [arXiv:0905.4410].

Preprints

[1] F. Bishara, S. De Curtis, L. Delle Rose, P. Englert, C. Grojean, M. Montull, G. Panico, A.N. Rossia, "*Precision from the diphoton Zh channel at FCC-hh*", [arXiv:2011.13941 [hep-ph]].

[2] C. Corianò, L. Delle Rose, K. Skenderis, "*Two-point function of the energy-momentum tensor and generalised conformal structure*", [arXiv:2008.05346 [hep-th]].

[3] L. Delle Rose, G. Hutsi, C. Marzo, L. Marzola, "*Impact of loop-induced processes on the boosted dark matter interpretation of the XENON1T excess*", [arXiv:2006.16078 [hep-ph]].

[4] L. Delle Rose, C. Marzo, L. Marzola, "*Simplified leptoquark models for precision $\ell_i \to \ell_f \gamma$ experiments: two-loop structure of $\mathcal{O}(\alpha_S Y^2)$ corrections*", [arXiv:2005.12389 [hep-ph]].

Coordination, organisation and administration activities

Organisation activity

- **11-2020**. Convener of the International Conference on Beyond Standard Model: From Theory to Experiment (BSM- 2021). 29/03/2021, Online.
- **03-2019**. Convener of the conference: IFAE 2019 - Incontri di Fisica delle Alte Energie. 08/04/2019, Napoli.
- **03-2019**. Organiser of the school: International School on Amplitudes and Cosmology, Holography and Positive Geometries. 27/05/2019, Lecce.
- **04-2017–01-2018**. Organiser of the Particle Physics Department Seminars at the Rutherford Appleton Laboratory
- **04-2016**. Organiser of the NExT Seminar Meeting in Southampton. 27/04/2016, Southampton.
- **05-2012**. Scientific secretary of the workshop: International Workshop on QCD 2012 - Theory and Experiment, Lecce.

Teaching, Supervision and Tutorial experiences

- **12-2020**. Supervision of one PhD student (A. G. Muyor) at IFAE.
- **07.2019**. Lectures on "Perturbative Renormalisation" (10 hours) delivered to PhD students at the University of Salento.
- **06.2019-06.2020**. Co-supervision of one master student (A. Guiggiani) at the University of Florence.
- **06.2017**. Tutor for the JOINT FGZ-PH Summer School on Methods of Effective Field Theory and Lattice Field Theory in Munich.
- **03.2017**. Lectures on "Loop computations and renormalisation in QFT" delivered to PhD students at the University of Southampton.
- **09.2016-09.2019**. Co-supervision of one PhD student (S.J.D. King) at the University of Southampton.
- **05.2013-12.2015**. Co-supervision of one PhD student (C. Marzo) at the University of Salento. The student finished four papers under my supervision (see [20], [23], [24] and [25]).
- **02.2015-05.2015**. Co-supervision of one master student (M. Dell'Atti) at the University of Salento. The student earned the master degree in physics with a publication [22].
- **02.2015**. Lectures on "Wolfram Mathematica in physics" (8 hours) given in the master level course "Computational Physics" at the University of Salento, Lecce.
- **06.2014**. Lectures on "Renormalisation in the Standard Model" (10 hours) given in the PhD course "Elementary particle theory" at the University of Salento, Lecce.
- **01.2010-10.2010**. Co-supervision of one master student (M. Serino) at the University of Salento. The student earned the master degree in physics with a publication [7].

Referee activity

Physical Review D (PRD), Nuclear Physics B (NPB), Physics Letters B (PLB), Computer Physics Communications (CPC), European Physics Journal (EPJ), Letters in High Energy Physics (LHEP)

Outreach activities

Outreach

12-01-2012 Science popularisation seminar: "*Materia Oscura*" at Liceo Scientifico "Q. Ennio", Gallipoli (IT)

21-11-2009 Science popularisation seminar: "*Viaggio nel Modello Standard delle particelle elementari*" at Liceo Scientifico "Q. Ennio", Gallipoli (IT)

Impact

The study on the *holographic description of the Universe*, published on Phys.Rev.Lett., has attracted the attention of the general public. It appeared on many national UK and Italian newspapers and information agencies (*e.g. The Guardian, ANSA, INFN News*).

Conferences and workshops

Conferences where I gave (or I will give) a contribution are marked with *

11-09-2020	* Anomalies 2020 - International conference, Online
14-04-2020	* On-line "Newton 1665" seminars
15-01-2020	* 3rd FCC Physics and Experiments Workshop, CERN (CH)
10-10-2019	* Next Frontiers in the Search for Dark Matter, Galileo Galilei Institute, Florence (IT)
12-07-2019	* EPS HEP2019, EPS Conference on High Energy Physics, Ghent (BE)
13-05-2019	Charting Fundamental Interactions: from Freedom to Safety, GGI, Florence (IT)
14-01-2019	* COST Workshop on Higgs and Flavour Physics: Present and Future, Lisboa (P)
18-12-2018	7th Rome Joint Workshop: Current topics in Particle Physics, Frascati (IT)
22-10-2018	* European Neutrino "Town" meeting and ESPP 2019 discussion, CERN (CH)
18-06-2018	* Workshop on the physics of HL-LHC and perspectives at HE-LHC, CERN (CH)
23-05-2018	* New Frontiers in Theoretical Physics - XXXVI Convegno Nazionale di Fisica Teorica, Cortona (IT)
01-11-2017	* NExT Seminar Meeting in RHUL, London (UK)
17-10-2017	Searches for long-lived particles at the LHC: Second workshop of the LHC LLP Community, Trieste (IT)
25-09-2017	* Flavour and Dark Matter, Heidelberg (DE)
14-08-2017	CERN TH Institute, Probing the dark sector and general relativity at all scales, CERN (CH)
05-07-2017	* EPS HEP2017, EPS Conference on High Energy Physics, Venice (IT)
26-05-2017	JOINT FGZ-PH Summer School on Methods of Effective Field Theory and Lattice Field Theory, Munich (DE)
06-03-2017	* NonMinimalHiggs RISE Meeting 2017, Toyama (JP)
05-03-2017	* HPNP 2017, Higgs as a Probe of New Physics 2017, Toyama (JP)
15-02-2017	* KEK Theory Meeting on Particle Physics Phenomenology, Tsukuba (JP)
09-11-2016	* NExT Seminar Meeting in QMUL, London (UK)
12-07-2016	* PASCOS 2016, International Symposium on Particles, Strings and Cosmology, Quy Nhon (VN)
27-06-2016	* QCD@Work 2016, International Workshop on QCD - Theory and Experiment, Martina Franca (IT)
21-05-2015	Higgs criticality mini-workshop, Zurich (CH)
09-09-2014	* NOW 2014, Neutrino Oscillation Workshop, Otranto (IT)
18-06-2014	* QCD@Work 2014, International Workshop on QCD - Theory and Experiment, Giovinazzo (IT)
04-06-2014	XXVI Seminario Nazionale di Fisica Nucleare e Subnucleare, Otranto (IT)
06-05-2013	1st Conference on Charged Lepton Flavour Violation, Lecce (IT)
08-09-2012	Summer School and Workshop on the Standard Model and Beyond, Corfu (GR)

18-06-2012 * QCD@Work 2012, International Workshop on QCD - Theory and Experiment, Lecce (IT)

13-09-2010 4th UniverseNet School, Frontiers of Particle Cosmology, Lecce (IT)

14-06-2010 Summer School on "The physics of LHC", Martignano (IT)

Selected invited seminars

04-07-2019 Universita' del Salento, (IT), presentation of the seminar: "*Composite Dynamics in the Early Universe*"

19-10-2018 Laboratori Nazionali di Frascati, (IT), presentation of the seminar: "*A light Z' as a solution of the 17 MeV anomaly*"

17-08-2017 CERN, (CH), presentation of the seminar: "*Signatures of heavy neutrinos at the LHC*"

01-06-2017 University of Oxford, (UK), presentation of the seminar: "*Explanation of the 17 MeV Atomki Anomaly in a $U(1)'$-Extended 2-Higgs Doublet Model*"

25-05-2017 University of Warwick, (UK), presentation of the seminar: "*Explanation of the 17 MeV Atomki Anomaly in a $U(1)'$-Extended 2-Higgs Doublet Model*"

03-05-2017 Universita' di Firenze, (IT), presentation of the seminar: "*From Planck Data to Planck Era: Observational Tests of Holographic Cosmology*"

29-11-2016 University of Liverpool, (UK), presentation of the seminar: "*From Planck data to Planck era: Observational tests of Holographic Cosmology*"

30-03-2016 Universita' del Salento, (IT), presentation of the seminar: "*On the stability of the electroweak vacuum in the presence of low-scale seesaw models*"

24-02-2016 University of Liverpool, (UK), presentation of the seminar: "*On the stability of the electroweak vacuum in the presence of low-scale seesaw models*"

23-02-2016 University of Liverpool, (UK), presentation of the seminar: "*Superconformal sum rules and the spectral density flow of the dilaton multiplet in $N = 1$ theories*"

03-06-2015 SISSA, Trieste (IT), presentation of the seminar: "*Vacuum stability in Standard Model extensions with TeV scale right handed neutrinos*"

08-05-2015 Technical University of Munich, (DE), presentation of the seminar: "*Vacuum stability in Standard Model extensions with TeV scale right handed neutrinos*"

10-02-2015 University of Southampton, (UK), presentation of the seminar: "*Vacuum stability in Standard Model extensions with TeV scale right handed neutrinos*"

15-10-2013 Laboratori Nazionali di Frascati, (IT), presentation of the seminar: "*The Standard Model in a Weak Gravitational Background. Dilatons and Conformal anomalies*"

20-05-2013 Universita' di Parma, (IT), presentation of the seminar: "*The Standard Model in a Weak Gravitational Background. Dilatons and Conformal anomalies*"

09-12-2011 Universita' di Bari, (IT), presentation of the seminar: "*Conformal anomalies and the gravitational effective action*"

Other academic activities

- **2020**. Contribution to the LHeC and FCC-he Study Group. Contribution to the report: arXiv:2007.14491
- **2018-2019**. Contribution to the FCC Woring Group. Contribution to the reports: Eur.Phys.J.ST 228 (2019) no.5, 1109-1382; Eur.Phys.J.ST 228 (2019) no.4, 755-1107; Eur.Phys.J.ST 228 (2019) no.2, 261-623; Eur.Phys.J. C79 (2019) no.6, 474
- **2018**. Contribution to the HL-LHC and HE-LHC CERN Yellow Report. Contribution to the report: CERN Yellow Rep.Monogr. 7 (2019) 585-865
- **12.2017-present**. Contribution to the Amherst Center for Fundamental Interactions (ACFI) white paper "Neutrinos at the High Energy Frontier".
- **08.2017**. Visit to the theory division at CERN.
- **2016-2018**. Contribution to the physics case paper of the MATHUSLA surface detector concept. Contribution to the report: Rept.Prog.Phys. 82 (2019) 11, 116201
- **02.2017-03.2017**. One-month secondment to Toyama University, Toyama (Japan) under the H2020-MSCA-2014-RISE project "NonMinimalHiggs".
- **12.2013**. Visit to the theory division at CERN.
- **07.2011**. One-month collaboration visit to University of Crete, (Greece)
- **09.2010**. Collaboration visit to Aristotle University of Thessaloniki, (Greece)

Computer Skills

Programming language

- Mathematica, C/C++, Python, Fortran

Software for high-energy particle physics

- CalcHep, MadGraph/MadAnalysis, Pythia, Delphes, ROOT, HiggsBounds/HiggsSignals
- FeynCalc, FeynArts, FormCalc, LoopTools, FeynRules, SARAH, SPheno, MicrOmegas, NMSSMTools
- Cosmotransitions

Curriculum Vitae without personal information

Scientific interests

Quantum Gravity, Loop Quantum Gravity, Spin Foam models, Group Field Theory, Asymptotic Safety, Functional Renormalization Group

Work Experience

July 2019 → Current
Postdoctoral Research Fellow
Institution: Centre de Physique Theorique de Luminy, Case 907, Luminy, Marseille, France
Research subjects: Loop Quantum Gravity, Spin Foam, Numerical methods for Loop Quantum Gravity
Mentoring: co-tutoring of two PhD students and a Master student.

September 2017 → June 2019
Postdoctoral Research Fellow
Institution: Institute for Gravitation and the Cosmos, The Pennsylvania State University, University Park, PA 16802, USA
Research subjects: Loop Quantum Gravity, Spin Foam, Entropy, Information Theory

September 2016 → September 2017
Postdoctoral Research Fellow
Institution: Centre de Physique Theorique de Luminy, Case 907, Luminy, Marseille, France
Research subjects: Loop Quantum Gravity, Spin Foam, Numerical methods for Loop Quantum Gravity

December 2014 → August 2016
Postdoctoral Research Fellow
Institution: Department of Physics, Fudan University, Guanghua Tower West Sub-Building, Office 705, 220 Handan Road, Shanghai 200433, China
Research subjects: Cosmology, Non-Local theories of gravity, Functional Renormalization Group, Asymptotic Safety

Education and Training

October 2010 → September 2014
Ph.D. - Theoretical Particle Physics
Institution: SISSA/ISAS, Via Bonomea 265, 34136 Trieste (Italy)
Thesis Title: Matter fields in Asymptotic Safety, advisor: Roberto Percacci

September 2008 - September 2010
Master in Physics 110/110 with Honors
Thesis Title: "Polyhedra in Loop Quantum Gravity" - advisors: Prof. Pietro Menotti and Dr. Simone Speziale
Institution: Università di Pisa

September 2008 - September 2010

Allievo ordinario classe di Scienze

Institution: Scuola Normale Superiore di Pisa

September 2005 - July 2008

Bachelor in Physics 110/110 with Honors

Thesis Title: "Lie Algebras in Particle Physics" - advisor: Prof. Damiano Anselmi

Institution: Università di Pisa

Personal Skills

Digital skills

- Excellent knowledge of Windows OS, Linux/Unix OS
- Excellent knowledge Python, C++, Visual Basic, .NET framework programming languages
- Excellent knowledge of LaTeX typesetting system
- Excellent knowledge of Mathematica computational language
- Advanced knowledge of HTML, PHP
  Designer and Webmaster of the group website SISSA Theoretical Particle Physics www.sissa.it/tpp
- Advanced knowledge of MySQL syntax

Honours and awards

Winner of the IGC Post-Doctoral Scholar award from PennState University for the academic years 2017/2018 and 2018/2019

Winner of an Erasmus Placement scholarship for the academic year 2009/2010 to visit the Centre de Physique Théorique - UMR-7332 in Marseille (FR) from January 2010 - July 2010

Winner of Scuola Normale Superiore di Pisa - Master scolarship and member of the Class of Science

Teaching and Mentoring

Teaching

Spring 2015

co-instructor with Prof. Antonino Marciano for the course of “Advanced topics on Quantum Field Theory” in Fudan University, Shanghai, China.

Teaching load of 6 hours of frontal lectures plus office hours. The course was addressed to Master and Ph.D. students.

Autumn 2015

co-instructor with Prof. Antonino Marciano for the course of “Quantum Field Theory” in Fudan University, Shanghai, China.

Teaching load of 12 hours of frontal lectures plus office hours. The course was addressed to Bachelor, Master and Ph.D. students.

Spring 2016

co-instructor with Prof. Antonino Marciano for the course of “Gauge Field Theory” for a total of 15 hours of frontal lectures

Teaching load of 15 hours of frontal lectures plus office hours. The course was addressed to Bachelor, Master and Ph.D. students.

Summer 2019

invited lecturer at the Bard Summer School on Quantum Gravity, Bard College, NY, USA

The course was "Numerical methods for Loop Quantum gravity" and consiste in in 6 hours of frontal lectures.

The summer school took place June 17th-21st 2019.

Winter 2020

integration to the course of “Quantum gravity” of Prof Carlo Rovelli in the CPT, Marseille, France

Teaching load of 8 hours of frontal lectures plus office hours. The course was addressed to Master and Ph.D. students.

Mentoring

master — co-mentored Dr. Giorgio Sarno for his master thesis during Autumn 2016 and Winter 2017
Thesis title "Simplicial and Generalized Spinfoams in Loop Quantum Gravity: Analytical and Numerical Results"
defended in April 2017 at Università degli Studi di Torino - 110 L/110

master — mentoring Alessandro Nicotra for his master thesis during Autumn 2020 and Winter 2021
Thesis title "Wick rotation of the EPRL spin foam models"
due in February 2021 at Università degli Studi di Bologna

Ph.D. — co-mentored Dr. Giorgio Sarno for his Ph.D. work from September 2017 to September 2020
Thesis title "A numerical approach to spin foam models of quantum gravity"
defended in September 2020 at the Centre de Physique Théorique in Marseille

Conferences and Seminars

Conferences

January 13-17, 2020, The Quantum Information Structure of Spacetime, Hong Kong University, Hong Kong

June 24-27, 2019, IGC@25, PennState University, State College, PA, USA

June 17-21, 2019, LOOPS19, PennState University, State College, PA, USA

June 9-16, 2019, The Bard Summer School on Quantum Gravity, Bard College, NY, USA

March 5-9, 2018, Quantum Gravity on the Computer, Nordita Stockholm, Sweden

November 3-5, 2017, MAS-APS, Newark, NJ, USA - American Physical Society

July 3-7, 2017, LOOPS17, Warsaw, Poland - University of Warsaw

August 10-15, 2016, 21st International Conference on General Relativity and Gravitation, Columbia University, New York, USA

April 14-15, 2016, Fudan-Tokyo-Yonsei Workshop on Particle and Nuclear Physics, Fudan University, Shanghai, China

December 14-18, 2015, 2nd LeCosPA International Symposium “Everything about Gravity”, National Taiwan University, Taipei, Taiwan

September 28-29, 2015, Early Universe Workshop, Tangzhongying National Lab, Nanjing, China

July 12-18, 2015, 14th Marcel Grossmann Meeting - MG14, University of Rome “La Sapienza”, Rome, Italy

July 28-30 2015, LOOPS15, Erlangen, Germany - Institute for Quantum Gravity (Friedrich-Alexander University)

May 28-30 2014, 1st FLAG meeting, "The Quantum and Gravity", Bologna, Italy

April 22-25 2014, Renormalization Group Approaches to Quantum Gravity at Perimeter Institute for Theoretical Physics, Waterloo, ON, Canada

July 22-26 2013, *LOOPS13*, Perimeter Institute for Theoretical Physics, Waterloo, ON, Canada

September 2-7 2012, *ERG2012*, Centre Paul Langevin, Aussois, France

Seminars and Lectures

January 13th, 2020, Hong Kong University, Invited Speaker - *“Quantum Information of Loop Quantum Gravity States”*

June 18th, 2019, LOOPS19, PSU, Plenary Speaker - *“Numerical Study of Spin Foam Theories”*

June 10th, 11th and 13th, 2019, Bard College, Invited Lecturer for 6 hours of lectures - *“Numerical Methods in LQG”*

April 26th, 2018, Perimeter Institute, Canada, Invited Speaker - *“Spin Foams: a numerical revolution”*

October 10th 2017 as part of International Loop Quantum Gravity Seminar - *“SU(2) graph invariants, Regge actions and polytopes”*

July 7th, 2017, LOOPS17, Warsaw, Poland - *“Computing Lorentzian Spin Foam Amplitudes:Overview”*

January 16th, 2017, Laboratoire de Physique Theorique d’Orsay , Paris- *“Cosmological applications of coherent states”*

April 14th, 2016 at Fudan University - Shanghai - *“Non-Perturbative Yang-Mills Condensate as Dark Energy”*

December 14th, 2015 at NLU - Taipei - *'Asymptotic safety in an interacting system of gravity and matter"*

September 29th, 2015 at Tangzhongying National Lab - Nanjing - *"Non-Perturbative Yang-Mills Condensate as Dark Energy"*

December 13th 2014 at Beijing Normal University - *"Matter Matters in Asymptotically Safe Quantum Gravity"*

April 28th 2014 at Primordial Universe and Gravity Discussions at Institute for Gravitation and Cosmos - *"Matter Matters in Asymptotically Safe Quantum Gravity"*

January 21st 2014 as part of International Loop Quantum Gravity Seminar - *"Matter Matters in Asymptotically Safe Quantum Gravity"*

December 2nd 2013 as part of The Asymptotic Safety web seminars - *"Matter Matters in Asymptotically Safe Quantum Gravity"*

November 7th 2013 at Perimeter Institute for Theoretical Physics, Waterloo, ON, Canada - *"Matter Matters in Asymptotically Safe Quantum Gravity"*

May 18th 2013 at Centre de Physique Theorique, Marseille, France - *"Fermions and Tetrads in Asymptotic Safety"*

October 15th 2012 as part of The Asymptotic Safety web seminars - *"Fermions and Tetrads in Asymptotic Safety"*

Gauthier Durieux

Academic record

2020–2022 *Postdoctoral fellow*, **CERN**, Geneva, Switzerland.

2018–2020 *Postdoctoral fellow*, **Technion**, Haifa, Israel. Yael Shadmi's group.
Lady Davis fellowship.

2015–2018 *Postdoctoral fellow*, **DESY**, Hamburg, Germany. Christophe Grojean's group.

2014–2015 *Postdoctoral fellow*, **Cornell University**, Ithaca, NY, USA.
FNRS and BAEF fellowships.

2011–2014 *PhD in physics*, **UCLouvain**, Belgium. FNRS fellowship.

Dissertation: *Baryon number violation at the TeV scale*,
Advisors: Jean-Marc Gérard and Fabio Maltoni
Committee: Giacomo Bruno, Christophe Grojean, Jernej F. Kamenik

Jun 2013: PiTP, *LHC Physics*, first week,
Institute for Advanced Study, Princeton, USA.
Jun 2012: TASI, *Searching for New Physics at Small and Large Scales*,
University of Colorado, Boulder, USA.

2009–2011 *MSc in physics*, **UCLouvain**, Belgium. Summa cum laude.

Dissertation: *Effective approach to baryon number violation at the LHC*
Advisors: Jean-Marc Gérard and Fabio Maltoni
Feb–May 2011: *MSc/PhD in Particles, Strings and Cosmology*,
IPPP, **Durham University**, United Kingdom.
Feb–Jun 2010: *Postgraduate studies in Theoretical Physics*,
IFT, **Universidad Autónoma de Madrid**, Spain.

2006–2009 *BSc in physics*, **UCLouvain**, Belgium. Summa cum laude.
First year completed in engineering before refining interests for physics.

Awards and fellowships

June 2019 *Postdoctoral researcher*, **FNRS**, Belgium (three-year funding, on leave).

2019-2020 *Fellow*, **Lady Davis Fellowship Trust**, Israel.

2014-2015 *Fellow*, **Belgian American Education Foundation** (BAEF), USA.

2011-2015 *Research fellow*, **FNRS**, Belgium.

May 2012 *Best master thesis prize*, **Belgian Physical Society**.

Supervision, teaching and outreach

2017-2020 PhD co-supervisor of Martín Perelló Roselló, IFIC, Valencia, with Marcel Vos.

20 Mar 19 *Probing fundamental interactions systematically at colliders*, DESY-GIF Young Scientists' Meeting, DESY, Hamburg.

22 Nov 18 *Effective field theory at e^+e^- colliders*,
FeynRules/Madgraph school on collider phenomenology, Hefei, China.

Apr 2017 *CP violation: Another piece of the puzzle*, GD, Y. Grossman, Nature Phys. 13 (2017) 322

2016-2018 *Flavour violation with the Higgs* and *Charged B-anomalies and BSM interpretations*, single lectures at *DESY Workshop Seminars*.

2012-2014 Speaker (2012) and coordinator (2013-14), *Master Classes in Particle Physics*. Two days of talks and workshops for high-school students.

2011-2013 Teaching assistant, *Quantum mechanics*, physics major, 2 semesters, 30h each.

Scientific responsabilities

2021 Convener, Top-quark sessions, LHCP 2021.

2021 Convener, Tools and Monte-Carlos, Les Houches BSM Programme.

2020-22 Convener, LHC Effective Field Theory Working Group (LHC EFT WG).

from 2019 Referee for: National Research Foundation (NRF), South Africa; Schweizerische Akademie der Technischen Wissenschaften (SATW), Switzerland.

2018-20 International Organisation Committee, HEFT 2019 and 2020 workshops.

2018-19 Editor, *Proposal for the validation of Monte Carlo implementations of the standard model effective field theory*, LHC HXS, TOP, EW WGs.

2017-18 Editor, *Interpreting top-quark LHC measurements in the standard-model effective field theory*, LHC TOP WG.

from 2014 Referee for: Phys. Rev. Letter, Phys. Rev. D, JHEP, Eur. Phys. J. C., Phys. Lett. B

2012-14 Coordinator of internal and invited seminars in the Center for Particle Physics and Phenomenology (CP3), UCLouvain.

Publications

inspire:G.Durieux.1

Papers

Automated one-loop computations in the SMEFT, C. Degrande, GD, F. Maltoni, K. Mimasu, E. Vryonidou, C. Zhang, [2008.11743]

Constructing massive on-shell contact terms, GD, T. Kitahara, C. Machado, Y. Shadmi, Y. Weiss, accepted in JHEP, [2008.09652]

Enumerating higher-dimensional operators with on-shell amplitudes, GD, C. Machado, Phys.Rev. D101 (2020) 095021, [1912.08827]

The electroweak effective field theory from on-shell amplitudes, GD, T. Kitahara, Y. Shadmi, Y. Weiss, JHEP 01 (2020) 119, [1909.10551]

The electro-weak couplings of the top and bottom quarks: global fit and future prospects, GD, A. Irles, V. Miralles, A. Peñuelas, M. Perelló, R. Pöschl, M. Vos, JHEP 12 (2019) 098, [1907.10619]

On the future of Higgs, electroweak and diboson measurements at lepton colliders, J. de Blas, GD, C. Grojean, J. Gu, A. Paul, JHEP 12 (2019) 117, [1907.04311]

Probing top-quark couplings indirectly at Higgs factories, GD, J. Gu, E. Vryonidou, C. Zhang, Chin.Phys. C42 (2018) 123107, [1809.03520]

The top-quark window on compositeness at future lepton colliders, GD, O. Matsedonskyi, JHEP 01 (2019) 072, [1807.10273]

Top-quark physics at the CLIC electron-positron linear collider, H. Abramowicz et al. (CLICdp Collaboration), JHEP 11 (2019) 003, [1807.02441]

Global and optimal probes for the top-quark effective field theory at future lepton colliders, GD, M. Perelló, M. Vos, C. Zhang, JHEP 10 (2018) 168, [1807.02121]

A global view on the Higgs self-coupling at lepton colliders, S. Di Vita, GD, C. Grojean, J. Gu, Z. Liu, G. Panico, M. Riembau, T. Vantalon, JHEP 02 (2018) 178, [1711.03978]

CP violation: Another piece of the puzzle, GD, Y. Grossman, Nature Phys. 13 (2017) 322

The leptonic future of the Higgs, GD, C. Grojean, J. Gu, K. Wang, JHEP 09 (2017) 014, [1704.02333]

Minimally extended SILH, M. Chala, GD, C. Grojean, L. de Lima, O. Matsedonskyi, JHEP 06 (2017) 088, [1703.10624]

CP violation in multibody decays of beauty baryons, GD, JHEP 10 (2016) 005, [1608.03288]

Rare Z decays and neutrino flavor universality, GD, Y. Grossman, M. König, E. Kuflik, S. Ray, Phys.Rev. D93 (2016) 093005, [1512.03071]

Probing CP violation systematically in differential distributions, GD, Y. Grossman, Phys.Rev. D92 (2015) 076013, [1508.03054]

Global approach to top-quark flavor-changing interactions, GD, F. Maltoni, C. Zhang, Phys.Rev. D91 (2015) 074017, [1412.7166]

The same-sign top signature of R-parity violation, GD, C. Smith, JHEP 10 (2013) 068, [1307.1355]

Three-generation baryon and lepton number violation at the LHC, GD, J.-M.Gérard, F.Maltoni, C.Smith, Phys.Lett. B721 (2013) 82-85, [1210.6598]

Baryon number violation at the LHC: the top option, Z. Dong, GD, J.-M. Gérard, T. Han, F. Maltoni, Phys.Rev. D85 (2012) 016006, [1107.3805]

Reports

Proposal for the validation of Monte Carlo implementations of the standard model effective field theory, [1906.12310]

Global fit for indirect constraints on the trilinear Higgs self-coupling, in *Higgs Physics at the HL-LHC and HE-LHC*, CERN Yellow Report, [1902.00134]

Global effective-field-theory interpretation of top-quark FCNCs, in *Opportunities in Flavour Physics at the HL-LHC and HE-LHC*, CERN Yellow Report, [1812.07638]

Global perspective on the Higgs self-coupling, and *Global effective-field-theory analysis of top-quark pair production*, and *BSM interpretation*, and *Top-quark FCNC production*, in *The CLIC potential for new physics*, CERN Yellow Rep. Monogr. Vol. 3 (2018), [1812.02093]

Interpreting top-quark LHC measurements in the standard-model effective field theory, J.A. Aguilar-Saavedra, C. Degrande, GD, F. Maltoni, E. Vryonidou, C. Zhang (editors), [1802.07237]

Proceedings

Precision constraints on the top-quark effective field theory at future lepton colliders, DIS 2017, PoS DIS2017 (2018) 088, [1708.09849]

The same-sign top probe for baryon number violation at the LHC, 25th Rencontres de Blois on Particle Physics and Cosmology, [1309.4310]

Flavourful baryon and lepton number violation at the LHC, 48th Rencontres de Moriond EW, [1305.3488]

Presentations

17 Nov 20 *Massive amplitude approach to the SMEFT*, Joint theory seminar, UC Davis.

28 Oct 20 *Higgs precision at future lepton colliders*, Higgs 2020.

20 Oct 20 *EFT formalism*, First general meeting of the LHC EFT WG.

21 Jul 20 *Towards global EFTs*, Snowmass energy frontier workshop.

15 May 20 *Top-quark precision at lepton colliders*, FCC France, LPNHE, Paris.

17 Apr 20 *Two theory agreements for SMEFT@LHC*, LHC EFT WG.

17 Mar 20 *The electroweak effective field theory from on-shell amplitudes*, Fundamental interaction seminar, L2C, Montpellier.

6 Feb 20 *The electroweak effective field theory from on-shell amplitudes*, Particle Physics Seminar, LPT, Orsay.

22 Jan 20 *The electroweak effective field theory from on-shell amplitudes*, TH BSM Forum, CERN, Geneva.

15 Jan 20 *Impact of top loops for Higgs precision measurements*, 3rd FCC physics and experiments workshop, CERN, Geneva.

6 Nov 19 *The electroweak EFT from on-shell amplitudes*, Joint particle physics seminar, Ben Gurion University, Beer-Sheva.

29 Oct 19 *Complementarities between Higgs and electroweak measurements at future lepton colliders*, LCWS 2019, Sendai.

28 Oct 19 *Higgs boson physics*, LCWS 2019, Sendai.

24 Oct 19 *Proposal for the validation of Monte Carlo implementations of the standard model effective field theory*, VBSCan WG1, online.

14 Oct 19 *Complementarities between Higgs and electroweak measurements at future lepton colliders*, Precision physics at future colliders, CFHEP, Beijing.

11 Oct 19 *The electroweak EFT from on-shell amplitudes*, Theory seminar, ITP, Beijing.

9 Oct 19 *The electroweak EFT from on-shell amplitudes*, Theory seminar, IHEP, Beijing.

27 Sep 19 *Top quarks at next-generation lepton colliders*, TOP 2019, Beijing.

12 Sep 19 *The electroweak effective field theory from on-shell amplitudes*, Theoretical Physics Seminar, Fermilab, Batavia.

27 Jun 19 *Complementarities between Higgs and electroweak measurements at future lepton colliders*, FCC Week 2019, Brussels.

28 May 19 *Top-quark EFT: recent theory progresses*, LHC TOP WG, CERN, Geneva.

25 Apr 19 *Top-quark flavour-changing neutral current*, Top LHC France, Grenoble.

14 Mar 19 *Top-quark physics: challenges and opportunities*, La Thuile 2019, La Thuile.

24 Jan 19 *High-energy precision*, CLIC Workshop, CERN, Geneva.

20 Dec 18 *Probing the SMEFT quantum structure at future lepton colliders*, EOS Solstice Meeting, ULB, Brussels.

14 Dec 18 *Probing the top-quark EFT at future lepton colliders*, Joint particle physics seminar, Tel Aviv University, Tel Aviv.

29 Nov 18 *Probing top-quark couplings indirectly at Higgs factories*, Higgs Couplings 2018, Tokyo.

17 Sep 18 *Top-quark physics and EFT: theory overview*, CKM 2018, Heidelberg.

28 Aug 18 *Global probes for the top-quark EFT*, CLICdp Collaboration Meeting, CERN.

11 Jun 18 *Optimal probes for the top-quark EFT at future lepton colliders and implications*, Particle phenomenology seminar, ITP, Heidelberg.

8 Jun 18 *Future lepton collider theory*, LHCP 2018, Bologna.

16 May 18 *Common standards for the EFT interpretation of top-quark measurements at the LHC*, LHC TOP WG, CERN, Geneva.

18 Apr 18 *A global view on the Higgs self-coupling at lepton colliders*, HEFT 2018, MITP, Mainz.

16 Apr 18 *Probing CP in multi-body and baryon decays*, Towards the ultimate precision in flavour physics, University of Warwick.

27 Mar 18 *Common standards for the EFT interpretation of top-quark measurements at the LHC*, Workshop of the LHC Higgs Cross Section WG, CERN, Geneva.

12 Jan 18 *Global constraints on the top-quark EFT at lepton colliders*, IAS Program on High Energy Physics, HKUST, Hong Kong.

12 Dec 17 *Establishing common standards for EFT interpretations of top-quark measurements at the LHC*, ATLAS single top-quark workshop, Humboldt U., Berlin.

27 Nov 17 *A global view on the Higgs self-coupling at lepton colliders*, Helmholtz Alliance Terascale Meeting, DESY, Hamburg.

15 Nov 17 *Hammering the SMEFT with tops at the LHC*, CMS Top! Hammertime Workshop, CERN, Geneva.

8 Nov 17 *Global Higgs EFT constraints at future lepton colliders*, Higgs Couplings 2017, Heidelberg.

2 Nov 17 *Constraining the SMEFT in the top sector at the LHC*, LHC TOP WG, CERN, Geneva.

8 Jun 17 *Global effective field theory for top physics at lepton colliders*, Workshop on top physics at the LC, CERN, Geneva.

7 Jun 17 *Constraining the SMEFT in the top sector at the LHC*,
LHC TOP WG, CERN, Geneva.

25 May 17 *Global effective field theory for top physics at lepton colliders*,
Planck 2017, Warsaw.

5 Apr 17 *Precision constraints on the top EFT at future lepton colliders*,
DIS 2017, Birmingham.

24 Mar 17 *Top EFT at lepton colliders*,
LHC Theory ERC Meeting, CP3, Louvain-la-Neuve.

19 Jan 17 *Rare Z decays and neutrino flavour universality*,
First FCC physics workshop, CERN, Geneva.

22 Dec 16 *Probing CP through differential distributions*,
Invited seminar, CP3, Louvain-la-Neuve.

13 Dec 16 *Probing CP through differential distributions* (poster),
Second Matter and the Universe Symposium, Helmholtz Institute, Mainz.

23 Nov 16 *EFT for top quark FCNCs*,
LHC TOP WG, CERN, Geneva.

21 Nov 16 *Searching for CP violation in differential distributions of multibody decays*,
LPHE seminar, EPFL, Lausanne

13 Oct 16 *CP violation in baryons: theoretical perspective*,
Implications of LHCb measurements and future prospects, CERN, Geneva.

22 Sep 16 *Global effective-field-theory approach to top-quark FCNCs*,
Ninth international workshop on top quark physics (TOP 2016), Olomouc.

12 Sep 16 *Searching for CP violation in differential distributions*,
BSM faces LHC run-two realities, DESY, Hamburg.

24 Aug 16 *Global effective field theory for top physics*,
Effective field theories as discovery tools, MITP, Mainz.

7 Jul 16 *Effective field theory for top physics at linear colliders*,
Workshop on top physics at linear colliders 2016, KEK, Tsukuba.

2 Jun 16 *Global effective-field-theory approach to top-quark FCNCs*,
Third CMS single-top workshop, IPHC, Strasbourg.

5 Nov 15 *Probing CP violation systematically in differential distributions*,
Implications of LHCb measurements and future prospects, CERN, Geneva.

1 Apr 15 *A global approach to top-quark FCNCs*,
HET/RIKEN seminar, BNL, Brookhaven.

4 Mar 15 *Global analysis of direct searches for top-quark FCNC interactions*,
Flavor and top physics at 100 TeV workshop, IHEP, Beijing.

24 Oct 14 *Baryon number violation at the LHC*, Particle theory seminar, Cornell, Ithaca.

11 Jul 13 *The same-sign top signature of R-parity violation*,
High Energy Physics Seminar, Northeastern University, Boston.

28 May 13 *The same-sign top probe for baryon number violation at the LHC*, Rencontres de Blois, Blois.

15 Apr 13 *Three-generation baryon and lepton number violation at the LHC*, Portoroz 2013, Portoroz.

8 Apr 13 *Three-generation BLV at the LHC*, BLV 2013, MPI, Heidelberg.

5 Mar 13 *Three-generation baryon and lepton number violation at the LHC*, Rencontres de Moriond EW, La Thuile.

17 Jan 13 *Three-generation B and L violation at the LHC*, RPP 2013, LPSC, Grenoble.

20 Dec 12 *Viable baryon and lepton number violation at the TeV scale*, IAP Meeting, ULB, Brussels.

7 Sep 12 *Baryon number violation at the LHC: the top option*, ATLAS Workshop on LHC Physics, KUBEC, Brussels.

23 Mar 12 *Baryon number violation at the LHC: the top option*, Alliance Top Quark Workshop, Humboldt Universität, Berlin.

21 Sep 11 *Effective approach to baryon number violation with tops at the LHC*, MadGraph Meeting, Academia Belgica, Rome.

Specific skills

Languages French: native speaker
English: full proficiency
Dutch, Spanish, German: intermediate

Computing Linux, Bash, Python, FORM: advanced
C++, Fortran, Mathematica: basics

Education and Research Positions

Oct. 2019 –
Postdoctoral researcher at the Institute for Theoretical Particle Physics,
Karlsruhe Institute of Technology, Karlsruhe (D).

Sept. 2019
Visiting fellow, Institute of Nuclear Theory (INT), University of Washington, Seattle (USA).

Nov. 2017 – Sept. 2019
Postdoctoral researcher at the Theoretical Particle Physics Group,
University of Siegen (D).

Oct. 2014 – Oct. 2017
Postdoctoral researcher at the Institute for Theoretical Physics,
University of Bern (CH).

Jan. 2011 – Mar. 2014
Ph.D. in Physics, joint doctorate, University of Zurich & University of Padova;
Supervisors: Prof. T. Gehrmann and Dr. M. Passera;
Thesis: Electromagnetic dipole moments of fermions;
Date of defense: March 18th, 2014.

Oct. 2008 – Oct. 2010
Master Degree in Physics, University of Padova;
Supervisors: Dr. M. Passera and Prof. S. Eidelman;
Thesis: Studio del momento magnetico del leptone tau nei suoi decadimenti radiativi leptonici (Study of tau lepton anomalous magnetic moment via its leptonic radiative decays);
Grade: 110/110 summa cum laude.

Teaching Experience

- Teaching assistant, Quantum Mechanics 2 (Moderne Theoretische Physik 2). Lecturer: Prof. M. Steinhauser, Karlsruhe Institute of Technology, Fall semester 2020
- Teaching assistant, master course "Theoretical Particle Physics I". Lecturer: Prof. U. Nierste, Karlsruhe Institute of Technology, Summer semester 2020.
- Teaching assistant, master course "Theoretical Particle Physics II". Lecturer: Dr. O. Cata, Universität Siegen, Fall semester 2018.
- Teaching assistant, master course "Quantum field theory III" (Introduction to supersymmetry). Lecturer: Prof. T. Gehrmann, ETH & Universität Zürich, Fall semester 2012.
- Teaching assistant, master course"Quantum field theory II" (Non-abelian gauge theories). Lecturer: Prof. T. Gehrmann, ETH & Universität Zürich, Spring semester 2012.

Student Supervision

- **Sept. 2018 -** Co-supervisor Ph.D. student XXXXX YYYYY (Supervisor Prof. E. Passemar), Indiana University.
- **Jan. 2018 - Jul. 2019** Co-supervisor master student XXXXXX YYYYYY (Supervisor Prof. T. Mannel), University of Siegen.
- **2014 - 2017** Co-supervisor Ph.D. student XXXXX YYYYYY (Supervisor Prof. C. Greub), University of Bern.

Outreach Talks

High school lectures *"First tour in the world of elementary particles,"* Liceo "G.B. Brocchi", Bassano del Grappa (Italy), Apr. 17, 2019.

High school lecture *"First tour in the world of quantum mechanics,"* in the context of the physics masterclass project for high school students of the University of Padova, Liceo "G.B. Brocchi", Bassano del Grappa (Italy), Feb. 12, 2016 and Feb. 17, 2017.

High school lectures *"An introduction to quantum mechanics,"* Liceo "G.B. Brocchi", Bassano del Grappa (Italy), Mar. 12, 2018; Liceo "J. Da Ponte", Bassano del Grappa (Italy), Mar. 13 - 14, 2018.

Research

Publications

- M. Fael, K. Schönwald, M. Steinhasuer, *Third order corrections to the semi-leptonic $b \to c$ and the muon decays*, arXiv: 2011.13654.
- M. Fael, K. Schönwald, M. Steinhasuer, *On the relation between the $\overline{\text{MS}}$ and the kinetic mass of heavy quarks*, arXiv: 2011.11655.
- M. Fael, K. Schönwald, M. Steinhasuer, *Exact results for Z_m^{OS} and Z_2^{OS} with two mass scales and up to three loops*, JHEP **2010** (2020) 087 [arXiv: 2008.01102 [hep-ph]].
- M. Fael, K. Schönwald, M. Steinhasuer, *Kinetic Heavy Quark Mass to Three Loops*, Phys. Rev. Lett. 125 (2020) 052003 [arXiv: 2005.06487 [hep-ph]].
- P. Banerjee, C. Carloni Calame, M. Chiesa, S. Di Vita, T. Engel, M. Fael, S. Laporta, P. Mastrolia, G. Montagna, O. Nicrosini, G. Ossola, M. Passera, F. Piccinini, A. Primo, J. Ronca, A. Signer, W. Torres Bobadilla, L. Trentadue, Y. Ulrich and G. Venanzoni, *Theory for muon-electron scattering at 10ppm: A report of the MUonE theory initiative*, Eur. Phys. J. C **80** (2020) 591 [arXiv:2004.13663 [hep-ph]].

- P. Blackston, M. Fael, E. Passemar, *$\tau \to \mu\mu\mu$ at a rate of one out of 10^{14} tau decays?*, Eur. Phys. J. C **80** (2020) 506 [arXiv:1912.09862 [hep-ph]].
- M. Fael, T. Mannel, K. K. Vos, *The heavy quark expansion for inclusive semileptonic charm decays revisited*, JHEP **1912** (2019) 067 [arXiv:1910.05234 [hep-ph]].
- M. Fael, M. Passera, *"Muon-electron scattering at NNLO: the hadronic corrections,"* Phys. Rev. Lett. 122 (2019) 192001 [arXiv:1901.03106 [hep-ph]].
- M. Fael, T. Mannel, K. K. Vos, *"V_{cb} determination from inclusive $b \to c$ decays: an alternative method,"* JHEP **1902** (2019) 177 [arXiv:1812.07472 [hep-ph]].
- M. Fael, *"Hadronic corrections to μ-e scattering at NNLO with space-like data,"* JHEP **1902** (2019) 027 [arXiv:1808.08233 [hep-ph]].
- M. Fael, T. Mannel, *"On the decays $B \to K^{(*)}+$ leptonium,"* Nucl.Phys. B **932** (2018) 370-384 [arXiv:1803.08880 [hep-ph]].
- J. Aebischer, M. Fael, C. Greub, J. Virto, *"B physics Beyond the Standard Model at One Loop: Complete Renormalization Group Evolution below the Electroweak Scale,"* JHEP **1709** (2017) 158 [arXiv:1704.06639 [hep-ph]].
- M. Fael, C. Greub, *"Next-to-leading prediction for the decay $\mu \to e\,(e^+e^-)\,\nu\bar{\nu}$,"* JHEP **1701** (2017) 084 [arXiv:1611.03726 [hep-ph]].
- S. Eidelman, D. Epifanov, M. Fael, L. Mercolli and M. Passera, *"τ dipole moments via radiative leptonic τ decays,"* JHEP **1603** (2016) 140 [arXiv:1601.07987 [hep-ph]].
- J. Aebischer, A. Crivellin, M. Fael and C. Greub, *"Matching of gauge invariant dimension-six operators for $b \to s$ and $b \to c$ transitions,"* JHEP **1605** (2016) 037 [arXiv:1512.02830 [hep-ph]].
- M. Fael, L. Mercolli and M. Passera, *"Radiative μ and τ leptonic decays at NLO,"* JHEP **1507** (2015) 153 [arXiv:1506.03416 [hep-ph]].
- M. Fael and M. Passera, *"Positronium contribution to the electron g-2,"* Phys. Rev. D **90** (2014) no.5, 056004 [arXiv:1402.1575 [hep-ph]].
- M. Fael, L. Mercolli and M. Passera, *"W-propagator corrections to μ and τ leptonic decays,"* Phys. Rev. D **88** (2013) no.9, 093011 [arXiv:1310.1081 [hep-ph]].
- M. Fael and T. Gehrmann, *"Probing top quark electromagnetic dipole moments in single-top-plus-photon production,"* Phys. Rev. D **88** (2013) 033003 [arXiv:1307.1349 [hep-ph]].

Conference Proceedings

- Editors: J. Aebischer, M. Fael, A. Lenz, M. Spannowsky, J. Virto, *"Computing tools for the SMEFT,"* arXiv:1910.11003 [hep-ph].

- M. Fael, *"NLO prediction for the decays $\tau \to \ell\ell'\ell'\nu\bar{\nu}$ and $\mu \to ee e\nu\bar{\nu}$,"* SciPost Phys. Proc. 1 (2019) 009 [arXiv:1811.10965 [hep-ph]].
- M. Fael, *"$b \to s\mu^+\mu^-$ and $b \to c\tau\nu$ in the SM EFT,"* in *"PSI/UZH Workshop: Impact of $B \to \mu^+\mu^-$ on New Physics Searches,"* arXiv:1803.10097 [hep-ph].
- J. Aebischer, A. Crivellin, M. Fael and C. Greub, *"1-Loop Matching of gauge invariant dim-6 operators for B decays,"* PoS BEAUTY **2016** (2016) 064 [arXiv:1606.02588 [hep-ph]].
- M. Fael, *"Radiative τ leptonic decays and the possibility to determine the τ dipole moments,"* EPJ Web Conf. **118** (2016) 01012.
- M. Fael, *"Radiative μ and τ leptonic decays,"* J.Univ.Sci.Tech.China **46** (2016) 383.
- M. Fael and M. Passera, *"Precision tests via radiative μ and τ leptonic decays,"* PoS RADCOR **2015** (2015) 091, [arXiv:1602.00457 [hep-ph]].
- M. Fael and M. Passera, *"On the positronium contribution to the electron g-2,"* arXiv:1412.7714.
- M. Fael, L. Mercolli and M. Passera, *"Towards a determination of the tau lepton dipole moments,"* Nucl. Phys. Proc. Suppl. **253-255** (2014) 103 [arXiv:1301.5302 [hep-ph]].

Working groups

- T. Aoyama, et al., *The anomalous magnetic moment of the muon in the Standard Model*, arXiv: 2006.04822 [hep-ph]
- MUonE collaboration, *"Letter of Intent: the MUonE project,"* CERN-SPSC-2019-026 /SPSC-I-252. 05/06/2019

Ph.D. Thesis

- M. Fael, *"Electromagnetic dipole moments of fermions,"* Ph.D. thesis, University of Padova, Italy & University of Zurich, Switzerland, 2014, opac.nebis.ch/ediss/20142170.pdf.

Conferences and Workshops (Including talks)

- *PSI 2019*, Paul Scherrer Institute, Switzerland, Oct. 20 - 25 2019; **Talk:** $\tau \to \mu\mu\mu$ at a rate of one out of 10^{14} tau decays?
- *3rd Plenary Workshop of the Muon g-2 Theory Initiative*, Seattle, USA, Sept. 9 - 13 2019; **Invited Talk:** Radiative corrections for MUonE.
- *INT program: heavy-quark physics and fundamental symmetries*, Seattle, USA, Aug. 12 - Sept. 6 2019; **Invited Talk:** Heavy quark expansion for inclusive cham decays.

- *Incontri di Fisica delle Alte Energie (IFAE 2019)*, Napoli, Italy, Apr. 8 - 10 2019;
  Invited Talk: Vcb dai decadimenti semileptonici inlcusivi del B: un metodo alternativo.
- *Rencontres de Moriond QCD*, La Thuile, Italy, Mar. 23 - 30 2019;
  Talk: V_{cb} from inclusive $b \to c$ decays: an alternative method.
- *1st MUonE Collaboration meeting at CERN*, CERN, Mar. 25 - 26 2019;
  Invited Talk: Recent advances in NNLO hadronic calculations.
- *12th International Workshop on e^+e^- collisions from Phi to Psi*,
  BINP Novosibirsk, Russia, 25 Feb. - 1 Mar. 2019;
  Invited Talk: Leptonic decays of the tau lepton.
- *Theory for muon-electron scattering at 10ppm*,
  Zurich, Svizzera, Feb. 4 - 7 2019;
  Talk: To $R(s)$ or not to $R(s)$, that is the question: hadronic NNLO corrections to μ-e scattering.
- *The 15th International Workshop on Tau Lepton Physics*,
  Amsterdam, Netherlands, Sept. 24 - 28 2018;
  Talk: NLO prediction for the decays $\tau \to \ell\ell'\ell'\nu\bar{\nu}$ and $\mu \to eee\nu\bar{\nu}$.
- *The 9th International Workshop on Charm Physics*,
  BINP Novosibirsk, Russia, May 21 - 25 2018;
  Talk: Status of radiative and rare leptonic tau decays at NLO.
  Talk: Heavy quark expansion for inclusive charm decays.
- *The Evaluation of the Leading Hadronic Contribution to the Muon Anomalous Magnetic Moment*, MITP Mainz, Germany, Feb. 19 - 23, 2018;
  Talk: Hadronic NLO contributions to μ-e scattering.
- *Impact of $B \to \mu\bar{\mu}$ on New Physics Searches*, Paul Scherrer Institute, Switzerland, Dec. 18 - 19 2017;
  Talk: $b \to s\ell\ell$ and $b \to c\ell\nu$ in the SMEFT.
- *Muon-electron Scattering: Theory Kickoff Workshop*, Padova, Italy, Sept. 4 - 5, 2017;
  Talk: Preliminary considerations on hadronic contributions to mu-e scattering at NLO.
- *Flavour Physics and CP Violation (FPCP2017)*, Prague, Czech Rep., Jun. 5 - 9, 2017;
  Poster: B physics Beyond the Standard Model at One Loop: Complete Renormalization Group Evolution below the Electroweak Scale.
- *Physics of fundamental Symmetries and Interactions*, Paul Scherrer Institute, Switzerland, Oct. 16 - 20, 2016;
  Talk: NLO prediction for $\mu \to e\gamma\nu\bar{\nu}$ and $\mu \to e\,(e^+e^-)\,\nu\bar{\nu}$ decays.
- *2nd International Conference on Charged Lepton Flavor Violation*, UVA, Charlottesville (VA), USA, Jun. 20 - 22, 2016;
  Poster: NLO correction to $\mu \to e\gamma\nu\bar{\nu}$ and $\mu \to e\,(e^+e^-)\,\nu\bar{\nu}$ decays.

- *10th International Workshop on e+e- collisions from Phi to Psi,* USTC, Hefei, China, Sept. 23 - 26, 2015;
  Talk: Radiative tau leptonic decays.

- *Workshop on flavour changing and conserving processes 2015,* Anacapri, Italy, Sept. 10 - 12, 2015;
  Invited Talk: Radiative mu and tau leptonic decays and the possibility to determine the tau dipole moments.

- *13th International Workshop on Tau Lepton Physics,* RWTH, Aachen, Germany, Sept. 15 - 19, 2014;
  Talk: Towards a determination of the tau lepton dipole moments.

- *LHCPhenoNet Workshop on Particle Physics,* LPNHE/LPTHE, Paris, France, Jun. 4 - 6, 2014;
  Talk: Positronium contribution to the electron g-2.

- *International Symposium on Lepton and Hadron Physics at Meson-Factories,* Messina, Italy, Oct. 13 - 15, 2013;
  Invited Talk: Towards a determination of the tau lepton dipole moments.

- *II WORKSHOP on tau lepton decays: hadronic currents from data of Belle and BaBar and new physics signatures at LHC,* IFJ PAN, Cracow, Poland, Sept. 15 - 22, 2013;
  Talk: Probing tau lepton electromagnetic dipole moments through its leptonic radiative decays.

- *LHCPhenoNet MidTerm Meeting,* Ravello, Italy, Sept. 16 - 20, 2013;
  Talk: Probing top quark anomalous magnetic moment at LHC.

- *LHCPhenoNet Annual Meeting,* Durham, UK, Mar. 19 - 22, 2012;
  Talk: The anomalous magnetic moment of tau lepton and its leptonic radiative decays.

Invited Seminars

- The MUonE project,
  University of Würzburg, Germany, Nov. 19, 2020.

- Towards the ultimate precision in V_{cb},
  University of Padua, Italy, Aug. 18, 2020.

- *Theory for μ-e scattering at 10 ppm,*
  HU Berlin, Germany, Jul. 11, 2019.

- *Theory for μ-e scattering at 10 ppm,*
  TTP Karlsruhe, Germany, Jun. 25, 2019.

- *V_{cb} from inclusive $b \to c\ell\nu$ decays: an alternative method,*
  Los Alamos National Lab, (NM) USA, Dec. 19 2018.

- *V_{cb} from inclusive $b \to c\ell\nu$ decays: an alternative method,*
  University of Padua, Italy, Dec. 5, 2018.
- *Hadronic contributions to μ-e scattering at NLO,*
  University of Bern, Switzerland, Oct. 12, 2017.
- *SMEFT for B physics,*
  University of Siegen, Germany, Jul. 10, 2017.
- *Precision test via radiative tau decays,*
  University of Bern, Switzerland, Mar. 10th 2016.
- *Positronium contribution to the electron g-2,*
  EPFL, Lausanne, Switzerland, Dec. 14th 2015.
- *Positronium contribution to the electron g-2,*
  University of Bern, Switzerland, Oct. 9th 2014.
- *Probing top quark electromagnetic dipole moments in single-top-plus-photon,*
  Cross collider Talks, CERN, Dec. 5th 2013.

Organized Workshops and Conferences

- Workshop on heavy quark masses, 26 Oct. 2020, KIT Karlsruhe, D
- Workshop SMEFT-Tools 2019, 12 – 14 Jun. 2019, IPPP Durham, UK.

Other Activities

Referee for

- *European Physical Journal C (EPJC)* since Sept. 2019,
- *Physics Review Letters (PRL)* since Aug. 2019,
- *Physics Letters B (PLB)* since Dec. 2016,
- *Physical Review D (PRD)* since Jun. 2016,
- *Journal of High Energy Physics (JHEP)* since Jul. 2013.

Honors and Awards

- Physics Letters B, “Most Valued Reviewer” Prize 2018 (Ed. G. Giudice)
- 2nd Conference on Charged Lepton Flavor Violation 2016, Best Theory Poster.

Academic referees

Prof. Thomas Mannel
Department of Physics – Universität Siegen (D)
+49 271 740 3840
mannel@physik.uni-siegen.de

Dr. Massimo Passera
INFN Sez. Padova – Padova (I)
+39 049 967 7180
passera@pd.infn.it

Prof. Matthias Steinhauser
Institute for Theoretical Particle Physics – KIT (D)
+49 721 608 47149
matthias.steinhauser@kit.edu

Education

2012–2015 **PhD** Università degli Studi di Torino
Thesis "*The infrared structure of gauge theory scattering amplitudes*"
Advisor Prof. L. Magnea (PhD defence on the 18th of March 2015).

2008–2011 **Master's Degree in Physics** Università degli Studi di Firenze
Thesis "*Gravitational scattering beyond the Planck Scale*"
Advisor Prof. M. Ciafaloni (degree granted on the 27th of April 2011),
Final mark 110/110 cum laude

2005–2008 **Bachelor's Degree in Physics** Università degli Studi di Firenze
Thesis "*The eikonal approximation in high energy scattering*"
Advisor Prof. M. Ciafaloni,
Final mark 110/110 cum laude

Employment

1 Oct 2018–Present **Postdoctoral research associate at the Higgs Centre for Theoretical Physics**

I am involved in the research activity of the Particle Physics Theory group. I collaborate to research projects of the group in different areas, including scattering amplitudes, factorisation of the parton distribution functions and distribution amplitudes for flavour physics. My results were published in international journals and I reported my work in international workshops and in seminars at different universities in the UK. I am working to establish two new research programmes at the University of Edinburgh, focusing on effective field theories and on parton density evolution, in collaboration with an international network of researchers. In this academic year I will be involved in the training of graduate and undergraduate students, supervising two students on a Senior Honours project and proposing a Masters project for summer 2021.

1 Oct 2016–30 Sep 2018 **Postdoctoral researcher at Nationaal instituut voor subatomaire fysica (Nikhef)**
I worked on higher-order calculations in quantum field theory, developing new methods for the analytic calculation of renormalisation group functions. I achieved the state-of-the-art accuracy in the renormalisation of Quantum Chromodynamic. I reported this result in a biennial conference (RADCOR 2017), which is the reference for the international community working on precision calculations in quantum field theory. I also completed a research project in collaboration with my previous group at DESY, computing heavy quark form factors to two loops. I was involved in teaching at the University of Amsterdam and at Utrecht University, as teaching assistant for a joint course in the Masters' programmes of the two institutions.

13 Mar 2015–
30 Sep 2016

Early Stage Researcher at Deutsches Elektronen-Synchrotron (DESY)

I was an Early Stage Researcher (ESR) within the International Training Network HiggsTools, supported by the European Commission. I conducted research in the area of heavy quark physics, performing precision analytic and numeric calculations of the deep inelastic scattering process and of heavy quark form factors. I reported my results in several international conferences and meetings. As an ESR within a large international network, I received training in advanced topics in particle physics, attending to two summer schools, as well as in communication and team building, participating to two young researcher meetings focusing on teamwork and collaboration.

Scientific activity

Publications in international journals

[1] *Two- and three-loop anomalous dimensions of Weinberg's dimension-6 CP-odd gluonic operator*,
J. de Vries, G. Falcioni, F. Herzog, B. Ruijl,
Phys. Rev. D 102 (2020) no.1, 016010, [arxiv:1907.04923 [hep-ph]]

[2] *Relating amplitude and PDF factorisation through Wilson-line geometries*,
G. Falcioni, E. Gardi, C. Milloy,
JHEP **1911** (2019) 100, [arxiv:1909.00697 [hep-ph]]

[3] *The heavy quark form factors at two loops*,
J. Ablinger, A. Behring, J. Blümlein, G. Falcioni, A. De Freitas, P. Marquard, N. Rana, C. Schneider,
Phys.Rev.D97 (2018) no.9, 094022, [arxiv:1712.09889 [hep-ph]]

[4] *Five-loop renormalisation of QCD in covariant gauges*,
K. G. Chetyrkin, G. Falcioni, F. Herzog, J. A. M. Vermaseren,
JHEP **1710** (2017) 179, Addendum JHEP 1712 (2017) 006,
[arxiv:1709.08541 [hep-ph]]

[5] *Asymptotic 3-loop heavy flavor corrections to the charged current structure function* $F_L^{W^+-W^-}(x,Q^2)$ *and* $F_2^{W^+-W^-}(x,Q^2)$,
A. Behring, J. Blümlein, G. Falcioni, A. De Freitas, A. von Manteuffel, M. Round, C. Schneider,
Phys.Rev.D94 (2016) no.11, 114006, [arxiv:1609.06255 [hep-ph]]

[6] *The complete* $\mathcal{O}(\alpha_s^2)$ *Non-Singlet heavy flavour corrections to the structure functions* $g_1^{ep}(x,Q^2)$ *and* $F_{1,2,3}^{\nu\,(\overline{\nu})\,p}(x,Q^2)$ *and the associated sum rules*,
J. Blümlein, G. Falcioni, A. De Freitas,
Nucl.Phys.B910 (2016) 568-617, [arxiv:1605.05541 [hep-ph]]

[7] *Analyzing high-energy factorization beyond the next-to-leading logarithmic accuracy*,
V. del Duca, G. Falcioni, L. Magnea and L. Vernazza,
JHEP **1502** (2015) 029, [arxiv:1409.8330 [hep-ph]]

[8] *Multiple Gluon Exchange Webs*,
G. Falcioni, E. Gardi, M. Harley, L. Magnea and C.D. White,
JHEP **1410** (2014) 10, [arxiv:1407.3477 [hep-ph]]

[9] *High energy QCD amplitudes at two loops and beyond*,
V. del Duca, G. Falcioni, L. Magnea and L. Vernazza,
Phys. Lett. B **732** (2014) 233-240, [arXiv:1311.0304 [hep-ph]].

[10] *Unitarity alternatives in the reduced-action model for gravitational collapse*,
M. Ciafaloni, D. Colferai and G. Falcioni,
JHEP **1109** (2011) 044, [arXiv:1106.5628 [hep-th]].

To appear

[11] *Climbing three-Reggeon ladders: four-loop amplitudes in the high-energy limit in full colour*
G. Falcioni, E. Gardi, C. Milloy, L. Vernazza
[arXiv:2012.xxxxx [hep-ph]]

Conference Proceedings

[12] *Wilson-line geometries and the relation between IR singularities of form factors and the large-x limit of DGLAP splitting functions*,
C. Milloy, G. Falcioni, E. Gardi
PoS RADCOR2019 (2019), [arxiv:1911.09544 [hep-ph]]

[13] *The method of global R^* and its applications*,
K. G. Chetyrkin, G. Falcioni, F. Herzog, J. A. M, Vermaseren,
PoS RADCOR2017 (2017) 004, [arxiv:1801.03024 [hep-ph]]

[14] *Heavy quark form factors at two loops in perturbative QCD*,
J. Ablinger, A. Behring, J. Blümlein, G. Falcioni, A. De Freitas, P. Marquard, N. Rana, C. Schneider,
Matter to Deepest and RADCOR 2017, [arxiv:1711.04880 [hep-ph]]

[15] *New Results on Massive 3-Loop Wilson Coefficients in Deep-Inelastic Scattering*,
J. Ablinger, A. Behring, J. Blümlein, G. Falcioni, A. De Freitas, A. Hasslehuhn, A. von Manteuffel, M. Round, C. Schneider, F. Wißbrock,
PoS LL2016 (2016) 065, [arxiv:1609.03397 [hep-ph]]

[16] *Beyond Reggeization for two- and three-loop QCD amplitudes*,
V. Del Duca, G. Falcioni, L. Magnea, L. Vernazza,
PoS RADCOR2013 (2013) 046, [arxiv 1312.5098 [hep-ph]]

Talks

9 Jun 2020 *Building blocks for amplitudes and cross sections at the LHC* – Cambridge HEP seminars, Cambridge

5 Mar 2020 *Wilson line geometries in amplitude and PDF factorisation* – The infrared in QFT, Paris

28 Jan 2020 *Wilson line geometries in amplitude and PDF factorisation* – International Workshop on Precision QCD at LHC, Hyderabad

12 Dec 2019 *Renormalisation of the dimension-6 CP-odd Weinberg operator beyond the leading order in QCD* – Theory seminar, Durham

21 Nov 2018 *Anomalous dimensions to high orders in perturbation theory* – Theory seminar, Edinburgh

16 Feb 2018	*High-order QCD corrections for Higgs (and more)* – HPP meeting, Amsterdam
20 Dec 2017	*Five-loop renormalisation of QCD with global infrared rearrangements* – Milan Christmas Meeting, Milan
20 Nov 2017	*Global infrared rearrangements and the renormalisation of QCD* – Webinar, IIT Hyderabad
26 Sep 2017	*The method of global R^* and its applications* – RADCOR2017, St. Gilgen
27 Apr 2017	*The global R^* operation in multiloop calculations* – Theory seminar, Florence
18 Jun 2016	*The complete $\mathcal{O}(\alpha_s^2)$ non-singlet heavy flavor corrections to DIS structure functions and sum rules* – International school of subnuclear physics, Erice
28 Apr 2016	*Power corrections to flavour non-singlet structure functions and sum rules at NLO* – Loops and Legs in Quantum Field Theory, Leipzig
13 Apr 2016	*Two-loop power corrections to non-singlet structure functions* – Second annual meeting of ITN HiggsTools, Granada
17 Apr 2015	*The infrared structure of gauge theory amplitudes* – First annual meeting of ITN HiggsTools, Freiburg
12 Feb 2015	*On infrared divergences of gauge theory amplitudes* – DESY theory seminar, Zeuthen
26 Aug 2014	*High-energy QCD amplitudes at two loops and beyond* – Particle physics theory seminars, Edinburgh
28 May 2014	*Multiple Gluon Exchange Webs* – XXXIV Convegno Nazionale di Fisica Teorica, Cortona

Teaching experience

Feb – Jun 2018	**Teaching assistant for the course *Field theory in particle physics*** Joint course of the University of Amsterdam and Utrecht University *Field theory in particle physics* is an advanced quantum field theory course at Masters level, attended by about 50 students every year, combined between Amsterdam and Utrecht. The topics covered include Abelian and non Abelian gauge theories, renormalisation, quantum chromodynamics, spontaneous symmetry breaking, concluding with the Higgs mechanism and the electro-weak sector of the Standard Model. The tutor responsibility included preparing solutions to the assigned exercises and explaining them to the class, marking homework problems and exams. Most importantly, tutors were strongly involved in interacting with students in order to engage them. Tutorial sessions took about four hours, during which students were encouraged to work on the problems alone or in groups. Teaching assistants would discuss, answer questions and provide hints in order to make everyone reach the solution following their own path.
2009–2011	Tutoring undergraduate students at the University of Florence

Responsibilities

Referee for international journals

From Mar 2020 **Referee for the *Journal of High Energy Physics*** (JHEP)

JHEP is one of the most important international journals in the field of particle physics (Impact factor (2019): 5.875). I completed my first referee report for JHEP on 27 Mar 2020.

Organisation of scientific events

2018–Present **Particle Physics Theory seminars at the University of Edinburgh**
I am in charge of selecting and inviting speakers among the experts in different communities of theoretical particle physics, beyond my specific research area. I organise the calendar and manage the Particle Physics Theory seminar page on the website of the School of Physics and Astronomy, as well as the visitor pages on the website of the Higgs Centre for Theoretical Physics. I coordinate the seminar activity with the Social Media team of the Higgs Centre.

2015–2016 **DESY Zeuthen theory seminar**
I selected and invited international speakers working in the area of higher-order perturbative calculations for precision physics. I maintained the page of the theory seminar on the website of the institute.

Outreach activities

From 2020 **Member of the Higgs Centre Social Media team**
I collect material for publishing posts on the social media accounts of the Higgs Centre for Theoretical Physics. I also coordinate a series of posts regarding the talks of the Particle Physics Theory seminar.

November 2020 Inspirehep profile: [l] ; Google Scholar: [l]; Webpage: [l]

Curriculum Vitæ

Matteo R. Fasiello

- **Contact information**:
  Instituto de Fisica Teorica UAM-CSIC, Calle Nicolas Cabrera 13-15, Campus de Cantoblanco, 28049, Madrid, Spain
  e

Current Position:

September 2020 - :
Faculty at the Institute for Theoretical Physics (IFT) UAM-CSIC, Madrid, Spain
& Long-term Visiting Academic at ICG, Portsmouth, UK

Previous Positions:

October 2017 - September 2020:
Research Fellow, Institute of Cosmology and Gravitation, Portsmouth, UK

September 2014 - August 2017:
Research Associate, Stanford University and Stanford Institute for Theoretical Physics, Stanford, CA, USA

September 2011 - August 2014:
Postdoctoral Fellow, Case Western Reserve University, Cleveland, OH, USA

January 2011 - August 2011:
"Della Riccia" Fellow 2011, DAMTP, University of Cambridge, Cambridgeshire, UK

Education

Jan. 2008 - Feb. 2011:
Physics Department, University of Milano-Bicocca, Italy, Ph.D in Physics.
Advisors: Prof. Sabino Matarrese (University of Padova) and Prof. Claudio Destri (University of Milano-Bicocca).
Thesis: *"Effective Field Theory for Inflation"*.

Sep. 2004 - Mar. 2007:
Physics Department, University of Chicago, USA,
Master's Degree in Physics.

Sep. 1999 - Sep. 2003:
Physics Department, University of Lecce, Italy,
Laurea in Physics, mark: 110/110.

Selected Conferences and Workshops

Sep. 2020: ***"Cosmological Correlators"***, *Virtual Wokshop*, indico.cern.ch/event/943614/
Feb. 2020: ***"From Inflation to the Hot Big Bang"***,
KITP, Santa Barbara, CA, USA
Sep. 2019: ***"7th LISA Cosmology Working Group Workshop"***,
University of Padova, Italy
Sep. 2019: ***"Gravitational Waves from the Early Universe",***
Nordita, Stockholm, Sweden
Sep. 2019: ***"COSMO 2019"***, Aachen, Germany
July 2019: ***"22nd International Conference on GR & Gravitation — 13th Amaldi Conference on Gravitational Waves"***, Valencia, Spain
May 2019: ***"Workshop on Gravity and Cosmology"***, Warsaw, Poland
April 2019: ***"BritGrav 2019"***, Durham, UK
Jan 2019: ***"6th LISA Cosmology Working Group Workshop"***, Madrid, Spain
June 2018: ***"Venice Cosmology Workshop 2018"***, Venice, Italy
Mar. 2018: ***"53rd Rencontres de Moriond: Cosmology"***, La Thuile, Italy
Mar. 2018: ***"Probing fundamental physics with CMB spectral distortions"***, CERN, Switzerland.
Feb. 2018: ***"YKIS2018 Symposium, General Relativity - The Next Generation"***, YITP, Kyoto, Japan
Sep. 2017: ***"Dark Energy and Modified-Gravity cosmologies: DARKMOD"***, Paris, France.
Aug. 2017: ***"Understanding cosmological observations"***, Benasque, Spain.
July 2017: ***"Advances in theoretical cosmology in light of data"***, Nordita, Stockholm, Sweden.
Jan. 2017: ***"Testing Gravity 2017"***, SFU, Vancouver, Canada
Aug. 2016: ***"Cosmo 2016"***, University of Michigan, Ann Arbor, MI, USA.
July 2016: ***"Unifying Tests of General Relativity"***, Burke Institute, Caltech, CA, USA.
Apr. 2016: ***"Theoretical Cosmology in the Era of Large Surveys"***, Galileo Galilei Institute, Florence, Italy.
June 2015: ***"General Relativity&Gravitation, a Centennial Perspective",*** Penn State University, State College, USA.
Apr. 2015: ***"Superluminalities in Effective Theories for Cosmology",*** Perimeter Institute, Waterloo, Canada
Mar. 2015: ***"Extended Gravity"***, Nordita, Stockholm, Sweden.
Aug. 2014: ***"Cosmo 2014"***, University of Chicago, Chicago, USA.
Feb. 2014: ***"EFT for Large Scale Structures"***, PCTS, Princeton, USA.
Sep. 2013: ***"Cosmo 2013"***, DAMTP, Cambridge, UK.
July 2013: ***"Cosmological Frontiers in Fundamental Physics"***, Perimeter Institute, Waterloo, Canada
June 2013: ***"Cosmology and Fundamental Physics with Planck"***, CERN, Switzerland.
Apr 2013: ***"New Challenges for Early Universe Cosmologists"***, Lorentz Center, Leiden, Netherlands.
Apr 2013: ***"Observations and Theoretical Challenges in Primordial Cosmology"***,

KITP, Santa Barbara, USA.
Apr 2013: ***"Cosmology Beyond the Power Spectrum"***, UC Berkeley, USA.
Apr 2013: ***"Workshop on Cosmic Acceleration"***, State College, USA.
May 2012: ***"Hot Topics in Modern Cosmology "***, IESC, Cargese, France.
Apr 2012: ***"15 East Coast Gravity Meeting"***, Syracuse University, USA.
Aug 2011 : ***"COSMO 2011"***, University of Porto, Portugal.
July 2011 : ***"PASCOS 2011"***, DAMTP, Cambridge, UK.
Oct. 2010: ***"IR Issues and Loops in de Sitter"***, Perimeter Institute, Canada.
Sep. 2009: ***"Cosmo 2009"***, Cern, Geneve, Switzerland.

Long Term Visits

- *KITP, Santa Barbara, USA*: January-February 2020.
- *Johns Hopkins University, USA*: November 2019, January 2015, July 2014, March 2014.
- *CERN, Switzerland*: June 2019.
- *Perimeter Institute, Canada*: August 2017 – October 2017.
- *Mainz Institute for Theoretical Physics, Mainz, Germany*: March 2017
- *Galileo Galilei Institute, Florence, Italy*: April – May 2016
- *IPMU, Japan*: May 2015
- *Perimeter Institute, Canada*: May 2014.
- *University of Padova, Italy*: December 2012 – January 2013.

Teaching and Mentoring Experience

- November 2019:
Lecturer at the "2nd Sydney Spring School on Particle Physics and Cosmology".

- February 7th 2018:
Qualification (habilitation) as "Professeur des Universités" in "Astronomie, Astrophysique". Ministère de l'Enseignement Supérieur et de la Recherche, France.

- *Fall 2017 – Fall 2019*:
ICG Portsmouth, UK, *Lectures valid for the Ph.D program*

Courses:
"An introduction to inflationary physics";
"Early universe cosmology".

- *Fall 2004 – Dec 2006*:
Physics Department, University of Chicago, Teaching Assistant:
responsible for one-hour problem solving sessions at the blackboard, homework grading, lab reports grading, exams grading and lab assistance (about 16h per week).

Courses:
Phys 121 (General Physics Level A), twice;
Phys 131 (General Physics Level B), three times;
Phys 154 (Modern Physics);

Phys 225 (Intermediate Electricity and Magnetism);
Phys 237 (Nuclei and Elementary Particles), twice.

Ph.D Students Supervised:
- Robert J. Hardwick (ICG Portsmouth, 2017-2019, then postdoc at Imperial College London);
- Laura Iacconi (ICG Portsmouth, 2018 - current).

Informal mentoring:
- Matteo Biagetti (2012-2016, Ph.D student at U. of Geneva, then postdoc at Amsterdam U.)
- Tomohiro Fujita (2015-2017, postdoc at Stanford, then postdoc at Kyoto U. & YITP)
- Ameek Malhotra (2020 - current, PhD student at UNSW Sydney)

Publications

[1] L. Iacconi, M. Fasiello, H. Assadullahi and D. Wands, "Small-scale Tests of Inflation," [arXiv:2008.00452]. **Accepted** for publication in JCAP.

[2] P. Adshead, N. Afshordi, E. Dimastrogiovanni, M. Fasiello, E. A. Lim and G. Tasinato, "Multimessenger Cosmology: correlating CMB and SGWB measurements," [arXiv:2004.06619].

[3] E. Dimastrogiovanni, M. Fasiello and G. Tasinato, "Searching for Fossil Fields in the Gravity Sector," Phys. Rev. Lett. **124**, no. 6, 061302 (2020) [arXiv:1906.07204]

[4] E. Barausse *et al.* [LISA Collaboration], "Prospects for Fundamental Physics with LISA," Gen. Rel. Grav. **52**, no.8, 81 (2020), [arXiv:2001.09793]

[5] L. Iacconi, M. Fasiello, H. Assadullahi, E. Dimastrogiovanni and D. Wands, "Interferometer Constraints on the Inflationary Field Content," [arXiv:1910.12921], JCAP (2020) **031**.

[6] E. Belgacem *et al.* [LISA Cosmology Working Group], [arXiv:1906.01593], JCAP **1907**, no. 07, 024 (2019).

[7] E. Dimastrogiovanni, M. Fasiello, G. Tasinato and D. Wands, "Tensor non-Gaussianities from Non-minimal Coupling to the Inflaton," JCAP **1902**, no. 02, 008 (2019), [arXiv:1810.08866].

[8] A. S. Deutsch, E. Dimastrogiovanni, M. Fasiello, M. C. Johnson and M. Munchmeyer, "Primordial gravitational wave phenomenology with polarized Sunyaev Zel'dovich tomography," Phys. Rev. D **100**, 083538 (2019) [arXiv:1810.09463]

[9] M. Fasiello, Z. Vlah, "A Tale of two Scales: Screening in Large Scale Structure", Published in the "**Cosmology Book 2018**" of the "Proceedings of the 43rd Rencontres de Moriond," [1811.06089].

[10] E. Dimastrogiovanni, M. Fasiello, R. J. Hardwick, H. Assadullahi, K. Koyama, D. Wands, "Non-Gaussianity from Axion-Gauge Fields Interactions during Inflation", JCAP **1811**, no. 11, 029 (2018), [arXiv:1806.05474].

[11] E. Dimastrogiovanni, M. Fasiello and G. Tasinato, "Probing the inflationary particle content: extra spin-2 field", JCAP **1808**, no. 08, 016 (2018) [arXiv:1806.00850].

[12] M. Biagetti, E. Dimastrogiovanni and M. Fasiello, "Possible Signatures of Inflationary Particle Content: Spin-2 Fields", **JCAP** 10 (2017) 038, [arXiv:1708.01587].

[13] M. Fasiello and Z. Vlah, "Screening in perturbative approaches to LSS", Phys. Lett. B **773**, 236 (2017), [arXiv:1704.07552].

[14] M. Fasiello and Z. Vlah, "On Observables in a Dark Matter-Clustering Quintessence System", **JCAP** 05 (2019) 033, [arXiv:1611.00542].

[15] E. Dimastrogiovanni, M. Fasiello and T. Fujita, "Primordial Gravitational Waves from Axion-Gauge Fields

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[16] M. Fasiello and Z. Vlah, "Nonlinear fields in generalized cosmologies," Phys. Rev. D **94**, no. 6, 063516 (2016), [arXiv:1604.04612].

[17] M. Fasiello and R. H. Ribeiro, "Mild bounds on bigravity from primordial gravitational waves", **JCAP** 07 (2015) 027, [arXiv:1505.00404].

[18] E. Dimastrogiovanni, M. Fasiello and M. Kamionkowski, "Imprints of Massive Primordial Fields on Large-Scale Structure," JCAP **1602**, no. 02, 017 (2016), [arXiv:1504.05993].

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[23] M. Fasiello and S. Renaux-Petel, "Non-Gaussian inflationary shapes in G^3 theories beyond Horndeski", JCAP **1410**, no. 10, 037 (2014), [arXiv:1407.7280].

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[25] M. Fasiello and A. J. Tolley, "Cosmological Stability Bound in Massive Gravity and Bigravity", JCAP **1312**, 002 (2013), [arXiv:1308.1647].

[26] F. Arroja, N. Bartolo, E. Dimastrogiovanni and M. Fasiello, "On the Trispectrum of Galileon Inflation", JCAP **1311**, 005 (2013), [arXiv:1307.5371].

[27] M. Biagetti, M. Fasiello and A. Riotto, "Enhancing Inflationary Tensor Modes through Spectator Fields", Phys. Rev. D **88**, 103518 (2013), [arXiv:1305.7241].

[28] N. Bartolo, E. Dimastrogiovanni and M. Fasiello, "The Trispectrum in the Effective Theory of Inflation with Galilean symmetry", JCAP **1309**, 037 (2013), [arXiv:1305.0812].

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[30] E. Dimastrogiovanni, M. Fasiello and A. J. Tolley, "Low-Energy Effective Field Theory for Chromo-Natural Inflation", JCAP **1302**, 046 (2013), [arXiv:1211.1396].

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[32] M. Fasiello and A. J. Tolley, "Cosmological perturbations in Massive Gravity and the Higuchi bound", JCAP **1211**, 035 (2012), [arXiv:1206.3852].

[33] M. Fasiello, "Effective Field Theory for Inflation", Ph.D Thesis, BICOCCA-FT-11, [arXiv:1106.2189].

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[36] N. Bartolo, M. Fasiello, S. Matarrese and A. Riotto, "Large non-Gaussianities in the Effective Field Theory Approach to Single-Field Inflation: the Bispectrum", JCAP **1008**, 008 (2010), [arXiv:1004.0893].

White papers:

[37] S. Shandera *et al.*, "Probing the origin of our Universe through cosmic microwave background constraints on gravitational waves," Bull. Am. Astron. Soc. **51**, 338 (2019) [arXiv:1903.04700]

[38] J. Chluba *et al.*, "Spectral Distortions of the CMB as a Probe of Inflation, Recombination, Structure Formation and Particle Physics," Bull. Am. Astron. Soc. **51**, no.3, 184 (2019), [arXiv:1903.04218]

[39] P. D. Meerburg *et al.*, "Primordial Non-Gaussianity," [arXiv:1903.04409]

Selected Seminars

Oct. 2020: *"Probing Inflation with Primordial Messengers"*,
- Institut d'Astrophysique de Paris, France

June. 2020: *"Probing the Inflationary Particle Content"*,
- YITP Cosmology Seminar - Yukawa Institute and Kyoto University, Japan

May. 2020: *"Testing Inflation with Primordial Messengers"*,
- Spring workshop on gravity and cosmology - Jagiellonian University, Poland

Feb. 2020: *"Non-Gaussianities and their Offsprings"*,
- KITP Program: From Inflation to the Hot Big Bang - Santa Barbara, CA, USA

Jan. 2020: *"Probing Inflation with Primordial Messengers"*,
- Colloquium - , The University of Chicago & KICP

Sep. 2019: *"Probing the Inflationary Field Content with Primordial GW"*,
- COSMO 2019- , RWTH, Aachen, Germany

May. 2019: *"Probing the Inflationary Field Content with Primordial GW and more"*,
DAMTP, University of Cambridge, UK

April. 2019: *"Primordial gravitational waves as a probe of the inflationary particle content"*,
Durham University, UK

Mar. 2019: *"Probing the Inflationary Particle Content"*,
University of Melbourne theory seminar, Melbourne, Vic, Australia

Jan. 2019: *"Primordial Gravitational Waves and the Inflationary Field Content"*,
– 6th LISA Cosmology Working Group Workshop – , Madrid, Spain

Dec. 2018: *"Primordial Gravitational Waves and the Inflationary Field Content"*,
– Weinberg Theory Group Seminar, The University of Texas at Austin, USA

June 2018: *"Primordial Gravitational Waves from Axion-Gauge Fields Dynamics"*,
– 5th LISA Cosmology Working Group Workshop – , Helsinki, Finland

Mar. 2018: *"Probes of late-time Cosmic Acceleration"*,
– 53rd Rencontres de Moriond: Cosmology – , La Thuile, Italy

Feb. 2018: *"LSS Probes of Cosmic Acceleration"*,
– YKIS2018 Symposium, General Relativity - The Next Generation – YITP, Kyoto

Sep. 2017: *"LSS probes of late-time cosmic acceleration"*,
– Dark Energy & Modified Gravity cosmologies: DARKMOD – Paris, France

Aug. 2017: *"LSS Probes of Acceleration, a phenomenological implementation of Screening"*,
– Understanding cosmological observations – Benasque, Spain

July 2017: *"LSS Probes of Acceleration: a phenomenological implementation of Screening"*,
– Advances in theoretical cosmology in light of data – Nordita, Sweden

Mar. 2017: *"Probes of Cosmic Acceleration"*,
– CERN TH Cosmology seminar – , Switzerland

Mar. 2017: *"LSS probes of Cosmic Acceleration"*,
– Quantum Vacuum and Gravitation – Mainz, Germany

Feb. 2017: *"LSS probes of Dark Energy"*, Los Alamos National Laboratory, NM, USA

Jan. 2017: *"LSS probes for Dark Energy and Modified Gravity"*,
– Testing Gravity 2017 – Vancouver, Canada
Sep. 2016: *"Probing Cosmic Acceleration"*, Perimeter Institute, Canada
Aug. 2016: *"LSS probes for Dark Energy and Modified Gravity"*,
– Cosmo 2016 – Ann Arbor, Michigan, USA
May 2016: *"Cosmic Acceleration from Modified Gravity"*, ICTP Trieste, Italy
May 2016: *"Cosmic Acceleration from Modified Gravity"*, ICG Portsmouth, UK
May 2016: *"Cosmic Acceleration from Modified Gravity"*,
– Theoretical Cosmology in the Era of Large Surveys –, GGI, Florence, Italy
April 2016: *"Approaches to late-time Acceleration"*, Oxford University, UK
April 2016: *"From massive gravity to bigravity and back"*, University of Oslo, Norway
June 2015: *"Cosmological Signatures from Massive Gravity Theories"*,
– GR&Gravitation, a Centennial Perspective –, Penn State University, USA
June 2015: *"The quest for a Stable, Compelling, Cosmology of Massive Gravity"*,
Yukawa Institute for Theoretical Physics, Kyoto, Japan
June 2015: *"From Massive Gravity to Bigravity and back"*, IPMU, University of Tokyo, Japan
Mar. 2015: *"From Massive Gravity to Bigravity"*,
University of Nottingham, Nottingham, UK
Mar. 2015: *"From Massive Gravity to Bigravity"*, University of Sussex, Brighton, UK
Mar. 2015: *"The Graviton and its Masses"*,
– Extended Gravity –, Nordita, Stockholm, Sweden
Nov. 2013: *"BiGravity: from Cosmological Solutions to Dual Galileons"*,
New York University, New York, NY, USA
Nov. 2013: *"BiGravity: from Cosmological Solutions to Dual Galileons"*,
University of Pennsylvania, Philadelphia, PA, USA
Nov. 2013: *"BiGravity: from Cosmological Solutions to Dual Galileons"*,
Perimeter Institute, Waterloo, Canada
Oct. 2013: *"The Many Ways to Galileon Inflation"*, Princeton University, Princeton, NJ, USA
Oct. 2013: *"The Many Ways to Galileon Inflation"*,
Carnegie Mellon University, Pittsburgh, PA, USA
Oct. 2013: *"On Galileon Inflation"*, University of Wisconsin, Madison, WI, USA
Sep 2013: *"Stability Bound in Massive Gravity and Bigravity"*
– Cosmo 2013 –, DAMTP, Cambridge, UK.
May 2013: *"Inflation from Co-dimension 2(n) Galileons "*
FITP Theory Seminar, UMN, Minneapolis, USA.
Apr 2013: *"The Many Ways to Galileon Inflation and their Trispectrum"*
Talk, – Cosmology Beyond the Power Spectrum –, UC Berkeley, USA.
Apr 2013: *"The Many Ways to Galileon Inflation"*
Talk, – Workshop on Cosmic Acceleration –, Penn State U. , USA
Sep 2012: *"Interplay of Stability Requirements&Observations in Massive Gravity"*
Talk, – 22nd Midwest Relativity Meeting –, KICP, Chicago, USA.
May 2012: *"Higuchi VS Vainshtein ".*
Talk, "Hot topics in Modern Cosmology" Workshop , Cargese, France.
Apr 2012: *"Higuchi VS Vainshtein ".*
Talk, – Case-Columbia-NYU-Penn Meeting – , NYU, New York , USA.

Apr 2012: *"A Calculation in Massive Gravity"*.
Talk, 15th East Coast Gravity Meeting, Syracuse , USA.
Aug 2011: *"New shapes of non-Gaussianities from the effective theory of inflation"*.
Talk, – COSMO 2011 – Conference, Porto, Portugal.
July 2011: *"Effective Field Theory for Inflation"*.
Talk, – PASCOS 2011 – Conference, DAMTP, Cambridge, UK.
Nov 2010: *"Effective Field Theory and Inflation"*
Talk, University of California at Berkeley, Berkeley, USA.
Nov 2010: *"The EFT Approach for Higher Order Curvature Perturbations"*
Kipac Tea Talk, Slac, Stanford, USA.
June 2010: *"Bispectrum and Trispectrum from Effective Field Theory of Inflation"*
Pheno seminar, University of Padova (Italy).

Grants & Awards

- "Atraccion de Talento" grant 2019-T1/TIC-15784, Comunidad de Madrid program 2019. This combined €400,000 grant supports a fixed-term faculty position at IFT Madrid and the hiring of a small group.

- "Angelo Della Riccia" award 2011, won as a Ph.D student.
This award is aimed at supporting research performed in leading foreign Institutions; it is based on a national competition open to all physics Ph.D students and postdocs.
Host Institution: Department of Applied Mathematics and Theoretical Physics (DAMTP), University of Cambridge, UK, *Jan. 2011 - Aug. 2011.*

Professional Affiliations and Service

- **Large Collaborations:**

  Member, LISA Consortium (2018 -) ;
  Member, EUCLID Consortium (2018 -).

- *Co-Organizer*, Theoretical Cosmology Seminar, ICG, Portsmouth, 2017-2020.

- *Organizer*, SITP Colloquia and SITP Seminars, Stanford University, 2015-2016.

- *Co-Organizer*, Particle and Astrophysics Seminar, CWRU, 2011-2012-2013.

- *Referee*:
Annals of Physics;
Classical & Quantum Gravity;
European Physical Journal C;
International Journal of Modern Physics D;
Journal of Cosmology & Astroparticle Physics;
General Relativity and Gravitation;
Nuclear Physics B;
Physics of the Dark Universe;
Physics Letters B; Universe.

- *Editor*, Frontiers in Astronomy and Space Sciences (2020 -)
- *Member*: American Physical Society (2017 -);

- *Ph.D External Examiner*:
  - Dr. Lucia Fonseca de la Bella, University of Sussex, 2018, UK;
  - Dr. Cari Powell, Swansea University, 2020, UK.

- *External Grant Reviewer*:
  Research Grants Council of Hong Kong (2019);
  Engineering and Physical Sciences Research Council (EPSRC), UK (2019);
  Research Grants Council of Hong Kong (2020).

- *Panelist*:
  @ Conference – Theoretical Cosmology in the Era of Large Surveys – G.G.I. Florence. Theme: "Theoretical Prospects for Dark Energy and Modified Gravity" (2016).
  @ Conference – The Venice Cosmology Workshop –, Venice. Theme: "Theory and DM models" (2018).

- *Conference Convener*:
  "TeV Particle Astrophysics conference" (TeVPA 2019), University of Sydney (2019);
  "30th Texas Symposium on Relativistic Astrophysics", Univ. of Portsmouth (2019).

DARIO FRANCIA

CURRICULUM VITAE

A) FORMAZIONE

February 2006	**Ph. D. in Theoretical Physics** (mention: Excellent) University of Rome Roma Tre Title of the Thesis: *Free Geometric Theory for Higher-Spin Fields* Advisor: prof. A. Sagnotti – Faculty: prof. V. Lubicz
July 2001	**Laurea degree in Theoretical Physics** (Summa cum Laude) University of Rome La Sapienza Title of the Thesis: Non-perturbative study of Supersymmetric Theories by means of the Exact Renormalization Group Technique [in Italian] Advisor: prof. K. Yoshida

B) ATTIVITÀ DIDATTICA E DI SERVIZIO AGLI STUDENTI, IN ITALIA E ALL'ESTERO

a) Attività didattica istituzionale in Italia

AY 2017/2018 2016/2017 2015/2016 2014/2015	General Relativity (52h + tutoring) *IV and V year undergraduate students* Department of Physics - Roma Tre U
AY 2017/2018 2016/2017	Advanced Mathematical Methods for Physics (34h + 18h exercises + tutoring) *IV year undergraduate students* Department of Physics - Roma Tre U
AY 2016/2017 2015/2016	Quantum Field Theory and Gravity I (50h + tutoring) *IV and V year undergraduate students and graduate students* Scuola Normale Superiore, Pisa, Italy
AY 2014/2015	Quantum Field Theory and Gravity I (20h _ tutoring) *IV and V year undergraduate students and graduate students* Scuola Normale Superiore, Pisa, Italy
AY 2014/2015	Quantum Field Theory and Gravity II (20h + tutoring) *IV and V year undergraduate students and graduate students* Scuola Normale Superiore, Pisa, Italy
AY 2013/2014	Constrained Hamiltonian systems (25h + tutoring) *IV and V year undergraduate students and graduate students* Scuola Normale Superiore, Pisa, Italy
AY 2011/2012	Lectures on Higher-Spin Theory (10h + tutoring) *as part of* Quantum and Statistical Fields - prof. A. Sagnotti *IV and V year undergraduate students and graduate students* Scuola Normale Superiore, Pisa, Italy
AY 2005/2006 2004/2005 2003/2004	Mathematical Methods for Physics — teaching assistance (22h + tutoring) *II year undergraduate students in Physics* Department of Physics - Roma Tre U

b) Cicli di lezioni su invito presso istituti universitari e scuole internazionali

July 2017	Elementary particles and relativistic fields: free higher spins in metric-like language *School on new ideas on higher spin gravity and holography* Kyung Hee University, Seoul, July 9-16 2017 https://sites.google.com/site/khuworkshop/home
February 2016	Lectures on Higher-Spin Theory *IPM school on Higher-Spin Theory* Institute for Research in Fundamental Sciences-IPM Tehran, February 15-19 2016 physics.ipm.ac.ir/conferences/hst/
September 2015	Introduction to Higher-spin Theory *Training program of the Workshop ''Particles, Fields and Strings''* Baku, Azerbaijan, September 29 - October 2, 2015 https://sites.google.com/site/bakupfs2015/program
July 2014	Lectures on Higher-Spin Theory *Introductory School in String Field Theory and Higher Spin Theory* *SISSA, Trieste, Italy* *http://www.sissa.it/tpp/activity/conferences/SFT2014/*
October 2013	Higher-Spin Theories *Mini-school on theoretical methods in particle physics* The Higgs Centre for Theoretical Physics, Edinburgh, Scotland https://higgs.ph.ed.ac.uk/workshops/mini-school-theoretical-methods-particle-physics
September 2013	Higher-spin theory: problems and perspectives *19th ``Saalburg'' Summer School} Foundations and New Methods in Theoretical Physics* *Wolfersdorf, Thüringen, Germany* *http://www.itp.uni-hannover.de/saalburg/index.php*
March 2013	Introduction to Free Higher-Spin Theories *GGI school on Higher Spins, Strings and Duality* The Galileo Galilei Institute for Theoretical Physics (GGI), Arcetri, Firenze, Italy http://www.ggi.fi.infn.it/
April 2012	Introduction to Free Higher-Spin Theories *Sixth International School on Field Theory and Gravitation* Petrópolis, Brasil http://inspirehep.net/record/1216718
February 2009	Lectures on Higher-Spin Theory *Physics Department, University of Turin, Italy*
AY 2007/2008	Advanced Topics in QFT - I: the S-Matrix and the Cluster Decomposition Principle *Chalmers University of Technology, Gothenburg, Sweden*
AY 2006/2007	Advanced Topics in QFT - II: Functional Integrals and the Wilsonian RG *Chalmers University of Technology, Gothenburg, Sweden*

c) Studenti

AY 2019/2020	**Andrea Melcarne —** Bachelor student at Roma Tre U Title of the thesis: ``*Entropy and area laws for free quantum fields*'' [summa cum laude - 29/10/2020]
AY 2018/2019	**Lorenzo Carducci** — Master student at Roma Tre U Title of the thesis: ``*Vielbein gravity as a double copy of Yang-Mills theories*'' [summa cum laude - 18/02/2020]
AY 2018/2019 **2017/2018** **2016/2017**	**Carlo Heissenberg** — Ph.D. student Scuola Normale Superiore; Title of the thesis: ``*Topics in Asymptotic Symmetries and Infrared Effects*'' [``Perfetto in Fisica'' — cum laude -14/09/2019]
AY 2017/2018	**Pietro Ferrero** — Master student Scuola Normale Superiore; Title of the thesis: ``*On the Lagrangian formulation of gravity as a double copy of two Yang-Mills theories*'' [summa cum laude - 24/07/2018]
AY 2015/2016	**Fabrizio Del Monte** — Master student Pisa U Title of the thesis: ``*From interacting spin-2 fields to multimetric supergravities*'' [summa cum laude - 25/07/2016]
AY 2015/2016	**Carlo Heissenberg** — Master student Scuola Normale Superiore; Title of the thesis: ``*Asymptotic symmetries in gravity and higher-spin theory''* [summa cum laude - 26/09/2016]
AY 2015/2016	**Gabriele Lo Monaco** — Master student Pisa U; Title of the thesis: ``*On the interactions of Maxwell-like higher spins: Noether procedure for constrained gauge theories''* [summa cum laude - 26/09/2016]
AY 2012/2013	**Giacomo De Palma** — Master student Scuola Normale Superiore; Title of the thesis: ``Can free field theory tell us anything on String Theory?'' [summa cum laude - 16/07/2013 (co-advisor with A. Sagnotti)]

C) ***ATTIVITÀ DI RICERCA SCIENTIFICA E DI SERVIZIO***

FORMAZIONE E CARRIERA ACCADEMICA PRESSO ISTITUTI ITALIANI E STRANIERI:

June 2018 - present	Post-doc (``Assegnista di ricerca'') Enrico Fermi Center & Roma Tre U
June 2013 -- June 2018	Assistant professor of Theoretical Physics (RTDA) Scuola Normale Superiore, Pisa — Italy
September 2011 -- May 2013	Research Fellow Enrico Fermi Center & Scuola Normale Superiore, Pisa

September 2010 -- August 2011	Post-doc EURYI Grant GACR EYI/07/E010 Institute of Physics, Academy of Sciences of the Czech Republic, Prague
September 2008 -- August 2010	Post-doc UFR de Physique & CNRS Université Paris VII, AstroParticules et Cosmologie (APC), Paris
July 2007	Selected participant to the summer school Les Houches 2007 — ``String Theory and the Real World''
September 2006 -- August 2008	Post-doc of Marie Curie Research Training Network Chalmers University of Technology, Gothenburg — Sweden
June 2006 -- August 2006	Research Fellow Roma Tre U
January 2006 -- April 2006	Marie Curie Visiting Research Fellow Albert Einstein Institute - Max Planck Institute, Golm — Germany
November 2002- February 2006	Ph.D. student in Physics — Roma Tre U
2002	INFN pre-doctoral fellow — INFN Roma - Tor Vergata

PARTECIPAZIONE A GRUPPI DI RICERCA; ATTIVITÀ EDITORIALI

01/2017 — present	Participation to INFN IS ``GSS''
06/2016 — 06/2018	Participation to the project ``Supersymmetry breaking with fields and branes'' -- Scuola Normale Superiore; collaborations: CERN; Ecole Polytechnique; LNF-INFN; Seoul National U.; ULB Bruxelles; U. Milano Bicocca; U. Ferrara; U. Padova; Tokyo Metropolitan U.; U. Mons; U. Tours.U
04/2014 — 04/2016	Participation to the project ``Aspects of Supersymmetry Breaking and Locality for Gauge Fields and Strings'' -- Scuola Normale Superiore; collaborations: INAF and INFN – Bologna; LNF-INFN; Seoul National U.; U. Ferrara; Tokyo Metropolitan U.; U. Roma "Tor Vergata"; Czech Academy of Sciences, Prague.
01/2014 — 12/2016	Participation to INFN IS ``ST&FI''
01/2013 — 12/2013	Participation to INFN IS ``TV12''
10/2011 — 10/2013	Participation to PRIN 2009: ``Simmetrie dell'Universo e delle Interazioni Fondamentali''

— Attività di natura editoriale:

Editor	International Journal of Geometric Methods in Modern Physics, World Scientific (2013 — present)

Referee activity	_European Journal of Physics C (EPJC), _General Relativity and Gravitation, _Institute of Physics (IOP), _Journal of High Energy Physics (JHEP), _Nuclear Physics B, _Physics Letters B, _SIGMA _Springer proceedings

FINANZIAMENTI COMPETITIVI IN QUALITÀ DI RESPONSABILE DI PROGETTO:

06/2018 — present	Responsabile del progetto: ``*Higher spins and their symmetries*'' — Centro Studi e Ricerche Enrico Fermi
02 - 06/2018	Responsabile del progetto: ``*Symmetries, locality and infrared phenomena*'' — Scuola Normale Superiore
03/2017 — 02/2018	Responsabile del progetto: ``*Infrared phenomena and locality in fundamental physics*'' — Scuola Normale Superiore
09/2011 — 05/2013	Responsabile del progetto: ``*On the geometry of fundamental interactions: arbitrary-spin particles in String Theory and beyond*'' — Centro Studi e Ricerche Enrico Fermi

ATTIVITÀ GESTIONALI, ORGANIZZATIVE E DI SERVIZIO:

- **<u>Organizzazione di eventi scientifici:</u>**

May 2018	*Cortona 2018 - New Frontiers in Theoretical Physics - XXXVI Meeting on Theoretical Physics* Cortona, Arezzo — May 18-20 2018
April 2018	*Higher-Spin Theory: Past and Future - Mini workshop on the status and perspective of higher-spin theories* IHP Paris, France — April 25, 2018
February 2018	*IX Tuscan Meeting on Theoretical Physics* Pisa U, February 7 2018
March 2017	*VIII Tuscan Meeting on Theoretical Physics* GGI Arcetri, Florence — March 23 2017
October 2016	*VII Tuscan Meeting on Theoretical Physics* Scuola Normale Superiore, October 4 2016
May 2016	*``Cortona 2016'' - New Frontiers in Theoretical Physics-XXXV Convegno nazionale di fisica teorica & GGI 10th anniversary* GGI, Arcetri, Firenze — May 17-20 2016

February 2016	*VI Tuscan Meeting on Theoretical Physics* University of Pisa and INFN, February 4 2016
October 2015	*V Tuscan Meeting on Theoretical Physics* Firenze — October 7 2015
February 2015	*IV Tuscan Meeting on Theoretical Physics* Scuola Normale Superiore, Pisa — February 27 2015
December 2014	*X Avogadro Meeting on Strings, Supergravity and Gauge theories* Scuola Normale Superiore, Pisa — December 17-19 2014
October 2014	III Tuscan Meeting on Theoretical Physics Pisa U and INFN — October 14 2014
July 2014	*SFT 2014, String Field Theory and Related Aspects VI* Trieste, Italy — July 28 - August 1 2014
May 2014	*Cortona 2014 - Frontiers in Theoretical Physics-XXXIV Convegno nazionale di fisica teorica* Cortona, Arezzo — May 18-20 2014
February 2014	II Tuscan Meeting on Theoretical Physics Firenze U — February 25 2014
December 2013	*IX Avogadro Meeting on Strings, Supergravity and Gauge theories* SISSA, Trieste — December 18-20 2013
November 2013	*I Tuscan Meeting on Theoretical Physics* Scuola Normale Superiore, Pisa — November 19 2013
May 2013	*Symmetries of the Universe and of the Fundamental Interactions* Scuola Normale Superiore, Pisa — May 16-17 2013
March-May 2013	*Higher Spins, Strings and Dualities, Galileo Galilei Institute (GGI) workshop* Arcetri, Firenze — March-May 2013
December 2012	*VIII Avogadro Meeting on Strings, Supergravity and Gauge theories* Scuola Normale Superiore, Pisa — December 19-21 2012
September 2012	*ERC SUPERFIELDS - Workshop on Supersymmetry, Quantum Gravity and Gauge Fields* Scuola Normale Superiore, Pisa — September 12-14, 2012
September 2011	*SFT 2011, String Field Theory and Related Aspects IV* IOP, Academy of Sciences of the CR Prague, Czech Republic — September 20-24 2011
August 2011	*QTS-7, Quantum Theory and Symmetries - 7th International Conference* Prague, Czech Republic — August 7-13 2011
November 2009	*Workshop: Loops meet Strings* Tours, France — November 2009

- **<u>Attività istituzionali:</u>**

- Partecipazione a commissioni di laurea master e di dottorato;
- Partecipazione a commissioni per l'ammissione al primo ed al quarto anno del corso ordinario presso la Scuola Normale Superiore;

- Supervisione di studenti per il colloquio di ammissione al quarto anno presso la Scuola Normale Superiore
- Partecipazione a commissioni per la selezione di post-doc
- Partecipazione al Consiglio della Classe di Scienze - Scuola Normale Superiore 2013 - 2018

D) *CONSEGUIMENTO DI PREMI E RICONOSCIMENTI NAZIONALI E INTERNAZIONALI PER ATTIVITÀ DI RICERCA;*

- **Premio SIGRAV 2012** per la Gravità Classica e Quantistica
http://sigrav.na.infn.it/attivita/premi-sigrav/?lang=en

Two SIGRAV Prizes, one for Classical and Quantum Gravity and one for Astrophysics, Cosmology and Experimental Gravity, are awarded every two years by the Italian Society of General Relativity and Gravitation to Italian scientists aged not more than 40 years who have given relevant contributions to General Relativity and Gravitational Physics.

- **Abilitazione Professore II Fascia:**
ASN 02/A2 SSD FIS/02 - II fascia, Bando 2012
ASN 02/A2 SSD FIS/02 - II fascia, Bando 2016-2018

- **European doctorate label:** *title of merit attributed to doctoral thesis whose research was partially carried out at EU institutions outside Italy, after the positive evaluation of three non-Italian EU experts (Proff. Marc Henneaux - ULB Brussels, Chris M. Hull - Imperial College London, Jihad Mourad - APC Paris VII)*

E) *PARTECIPAZIONE IN QUALITÀ DI RELATORE A CONGRESSI E CONVEGNI DI INTERESSE INTERNAZIONALE;*

August-September 2021	*Geometry for Higher Spin Gravity: Conformal Structures, PDEs, and Q-manifolds* ESI/Erwin Schrödinger International Institute for Mathematics and Physics Vienna, August 27 - September 17, 2021
June 2021	*Quarks 2021 - 21th edition of the Quarks International Seminar* Pereslav, Russia — June 6-12, 2021
May 2021	*Sakharov Centennial Conference on Physics* Lebedev Institute, Moscow, Russia — May 31-June 5 2021
September 2020	*Mathematical Physics of Fundamental Interactions* Alikhanyan National Laboratory Yerevan Physics Institute - Armenia — September 7-11, 2020
June 2020	*Joint Belgian theoretical seminar* KUL - ULB - UMons - VLB — June 3, 2020

December 2019	*Annual Meeting of Enrico Fermi Ctr* *Presentation of individual theoretical projects* Rome, December 11-12, 2019
October 2019	*Higher-spin Gravity — Chaotic, Conformal and Algebraic Aspects* Asian-Pacific Center for Theoretical Physics (APCTP) Pohang South Korea September 23 - October 2, 2019
April 2019	*Higher spins and Holography (invited key participant)* Erwin Schrödinger International Institute for Mathematics - Vienna, Austria March 11, April 4, 2019
December 2018	*Higher Symmetries and Quantum Gravity* Albert Einstein Institute - MPI, Germany — December 3-7 2018
September 2018	*SIGRAV 2018 -- XXIII SIGRAV Conference on General Relativity and Gravitational Physics* Santa Margherita di Pula, Cagliari — September 9 - 15 2018
July 2018	*QFTG2018 - Quantum Field Theory and Gravity* Center for Theoretical Physics, TSPU Tomsk, Russia — July 30-August 5 2018
May 2018	*Quarks 2018 - 20th edition of the Quarks International Seminar* Valday, Russia — May 27 - June 2, 2018
April 2018	*Higher-Spin Theory: Past and Future - Mini workshop on the status and perspective of higher-spin theories* IHP Paris, France — April 25, 2018
August 2017	*ICNFP 2017 - 6th International Conference on New Frontiers in Physics* Orthodox Academy of Crete, Greece — August 27-29 2017
August 2017	*SQS 2017, Supersymmetries and Quantum Symmetries* JINR, Dubna, Russia — July 31 - August 5 2017
July 2017	*New ideas on higher spin gravity and holography* Kyung Hee University, Seoul, South Korea — July 9-16 2017
June 2017	*Ginzburg Centennial Conference on Physics* Lebedev Institute, Moscow, Russia — May 29-June 3 2017
April 2017	*Workshop on Higher-Spin Gauge Theories* Service de Mécanique et Gravitation, Mons U Belgium — April 26-28 2017
August 2016	*QFTG2016 - Quantum Field Theory and Gravity* Center for Theoretical Physics, TSPU Tomsk, Russia — August 1 - 7 2016
June 2016	*Quarks 2016 - 19th edition of the Quarks International Seminar* Pushkin, Russia — May 29 - June 4 2016
May 2016	*Higher Spin Theory and Duality (invited key participant)* Munich Institute for Astro and Particle Physics (MIAPP), Germany — May 2-27 2016
April 2016	*Workshop on Higher-Spin Gauge Theories* Service de Mécanique et Gravitation, Mons U Belgium — April 21-22 2016
November 2015	*VII Round Tables Italy-Russia@Dubna: Hundred years of GR's birth, SUGRA gets into its forties; on the occasion of the 60th jubilee of JINR* JINR, Dubna, Russia — November 24-28 2015

November 2015	*Higher Spin Theory and Holography 3* Lebedev Institute, Moscow, Russia — November 23 -25 2015
September 2015	*Particles, Fields and Strings* Baku, Azerbaijan — September 29 - October 2,2015
August 2015	*Workshop on Higher Spin* Penn State U, Institute for Gravitation and the Cosmos, USA — August 27-29 2015
May 2015	*SFT 2015, String Field Theory and Related Aspects VII* Chengdu, China — May 11-15 2015
September 2014	*Frontiers in Field and String Theory* Yerevan, Armenia — September 22-26 2014
July 2014	*SFT 2014, String Field Theory and Related Aspects VI* Trieste, Italy — July 28 - August 1 2014
June 2014	*Quarks 2014 - 18th edition of the Quarks International Seminar* Suzdal, Russia — June 2-8 2014
July 2013	*SQS 2013, Supersymmetries and Quantum Symmetries* JINR, Dubna, Russia — July 29 - August 3 2013
February 2013	*Meeting of the Scientific Committee of Centro Fermi* Roma, February 14, 2013
February 2013	*2nd Solvay Workshop on Higher Spin Gauge Theories* Brussels, Belgium — February 5-8 2013
December 2012	*St. Nicolas seminar on Strings and Higher spins* IOP, Academy of Sciences of the CR Prague, Czech Republic — December 6,7 2012
October 2012	*SIGRAV 2012 -- XX SIGRAV Conference on General Relativity and Gravitational Physics* Napoli — October 22-26 2012
September 2012	*Workshop on higher-spin gravities and related topics* Service de Mécanique et Gravitation, Mons U Belgium — September 4-6 2012
July 2012	*ICHEP2012 - 36th International Conference on High Energy Physics* Melbourne, Australia — July 4-11 2012
May 2012	*Ginzburg Conference on Physics* Lebedev Institute, Moscow, Russia — May 28-June 2 2012
April 2012	*Seconda Conferenza dei Progetti del Centro Fermi* Salone delle Conferenze del Ministero dell'Interno, Roma — April 19-20 2012
January 2012	*Theory of Fundamental Interactions 2012* SISSA, Trieste — January 9-11 2012
September 2011	*SFT 2011, String Field Theory and Related Aspects IV* IOP, Academy of Sciences of the CR Prague, Czech Republic — September 20-24 2011
July 2011	*SQS 2011, Supersymmetries and Quantum Symmetries* JINR, Dubna, Russia — July 18 - 23 2011
October 2010	*SFT 2010, String Field Theory and Related Aspects III* Yukawa Institute for Theoretical Physics, Kyoto - Japan — October 18-22 2010

September 2010	*SIGRAV 2010 -- XIX SIGRAV Conference on General Relativity and Gravitational Physics* Scuola Normale Superiore, Pisa — September 27-October 1 2010
July 2010	*QFTG2010 - Quantum Field Theory and Gravity* Center for Theoretical Physics, TSPU Tomsk, Russia — July 5-9 2010
March 2010	*XVI Conference on Current Problems in Theoretical Physics* Vietri sul Mare, Italy — March 26-31 2010
March 2010	*Workshop on higher-spin gauge theories* Service de Mécanique et Gravitation, Mons U Belgium —March 24-25 2010
Ferbruary 2010	*Journées P2I - Physique des deux infinis* Institut d'Astrophysique de Paris, France — February 4-5 2010
September 2009	*1st Mediterrean Conference on Classical and Quantum Gravity* Orthodox Academy of Crete, Greece — September 14-19 2009
May 2009	*4th International Sakharov Conference on Physics* Lebedev Institute, Moscow, Russia — May 18-23 2009
April 2009	*New Perspectives in String Theory, workshop of the G. Galilei Institute for Theoretical Physics (GGI)* Arcetri, Firenze — April 20-May 10 2009
April 2009	*XV Conference on Current Problems in Theoretical Physics* Vietri sul Mare, Italy — April 6-8 2009
July 2008	*Strings@Amsterdam - Eurostrings 2008* University of Amsterdam, Netherlands — June 30 - July 4 2008
September 2007	*Eötvös Superstring Workshop 2007, European Superstring Theory Network* Budapest, Hungary — September 3-7 2007
July 2007	*Eurostring 2007, midterm meeting of the European Superstrings network* Orthodox Academy of Crete, Greece — July 1-4 2007
May 2007	*Cortona 2007 - XXIX Conference in Theoretical Physics* Cortona, Arezzo — May 28-June 1 2007
September 2006	*Eurostring workshop II* Masaryk University, Brno, Czech Republic — September 10-17 2006
November 2005	*Physics of fundamental interactions, Gravity and Strings* Pisa U — November 4-5 2005
October 2005	*First Young researchers workshop of the European Superstring Theory Network* Heraklion, Crete, Greece — October 17-28 2005
October 2001	*Non-Perturbative Renormalization Group Aspects in (SUSY) Gauge Theories* La Sapienza U, Roma — October 29-31 2001

F) ***PUBBLICAZIONI***

- **Research interests:** Classical and Quantum Field Theory, Higher-Spin Theory, String Theory, General Relativity and its extensions, Supergravity.

- **Citations:** At the time of writing my papers have collected more than 1380 citations on the inSPIREhep.net database (Average citation per paper = 47,7 — h-index = 19.) They include 10 top-cited papers: three papers are 100+ top cites (with two of them counting 200 and 234 citations, respectively, at the time of writing) while seven papers are 50+ top cites.

I am single author of six peer-reviewed papers. (Average citation per single-authored paper = 34)

For the detailed inSPIRE record see **publications**

- On the Lagrangian formulation of the double copy to cubic order.
P. Ferrero (Oxford U, Inst Math) and D. Francia (E. Fermi Ctr & INFN & Roma Tre U),
arXiv:2012.00713 [hep-th]

- On asymptotic symmetries in higher dimensions for any spin.
A. Campoleoni (Mons U), D. Francia (E. Fermi Ctr & INFN & Roma Tre U), C. Heissenberg (Nordita & Uppsala U)
accepted for publication in **JHEP** — *arXiv:2011.04420 [hep-th]*

- Electromagnetic and color memory in even dimensions.
A. Campoleoni (ETH Zurich), D. Francia (E. Fermi Ctr & INFN & Roma Tre U), C. Heissenberg (SNS & INFN)
Phys. Rev. D 100 no.8 (2019); *arXiv:1907.05187 [hep-th]*

- Two-Form Asymptotic Symmetries and Scalar Soft Theorems.
D. Francia (E. Fermi Ctr & INFN & Roma Tre U), C. Heissenberg (SNS & INFN)
Phys. Rev. D 98 no.10 (2018); *arXiv:1810.05634 [hep-th]*

- Asymptotic symmetries and charges at null infinity: from low to high spins .
A. Campoleoni (ETH Zurich), D. Francia (E. Fermi Ctr & INFN & Roma Tre U), C. Heissenberg (SNS & INFN)
EPJ Web Conf. 191 (2018); *arXiv:1808.01542 [hep-th]*

- Asymptotic Charges at Null Infinity in Any Dimension.
A. Campoleoni (ETH Zurich), D. Francia (SNS & INFN), C. Heissenberg (SNS & INFN)
Universe 4 no. 3, 47 (2018); *arXiv:1712.09591 [hep-th]*

- On higher-spin supertranslations and superrotations.
A. Campoleoni (ULB Brussels), D. Francia (SNS & INFN), C. Heissenberg (SNS & INFN)
JHEP 1705 120 (2017); *arXiv:1703.01351 [hep-th]*

- Cubic interactions of Maxwell-like higher spins.
D. Francia (SNS & INFN), G. Lo Monaco (Pisa U. & Milano Bicocca U.), K. Mkrtchyan (AEI Potsdam)
JHEP 1704 068 (2017); *arXiv:1611.00292 [hep-th]*

- Multimetric Supergravities.
F. Del Monte (Pisa U.), D. Francia (SNS & INFN), P.A. Grassi (DISIT & INFN, Torino.)
JHEP 1609 064 (2016); *arXiv:1605.06793 [hep-th]*

• Mixed-symmetry multiplets and higher-spin curvatures.
X. Bekaert (LMPT Tours), N. Boulanger (Mons U.) and D. Francia (SNS & INFN)
J. Phys. A: Math. Theor. 48 (2015); *arXiv:1501.02462 [hep-th]*

• On the gauge symmetries of Maxwell-like higher-spin Lagrangians.
D. Francia (SNS & INFN), S. L. Lyakhovich, A. A. Sharapov (Tomsk S. U.)
Nucl.Phys. B 881 (2014) 248-268; *arXiv:1310.8589 [hep-th]*

• Maxwell-like Lagrangians for higher spins.
A. Campoleoni (MPI Grav. Phys., Potsdam), D. Francia (Enrico Fermi Ctr., Rome, SNS & INFN)
JHEP 1303 168 (2013); *arXiv: 1206.5877 [hep-th*]

• Generalised connections and higher-spin equations.
D. Francia (Enrico Fermi Ctr., Rome and SNS & INFN)
Class.Quant.Grav. 29 (2012) 245003; *arXiv: 1209.4885 [hep-th]*

• Aspects of metric-like higher-spin geometry.
D. Francia (Enrico Fermi Ctr., Rome and SNS & INFN)
AIP Conf. Proc. 1483 (2012) 118-134

• Low-spin models for higher-spin Lagrangians.
D. Francia (Prague, Inst. Phys.)
Prog.Theor.Phys.Suppl. 188 (2011); *arXiv:1103.0683 [hep-th]*

• String theory triplets and higher-spin curvatures.
D. Francia (APC, Paris)
Phys.Lett. B690 (2010); *arXiv:1001.5003 [hep-th]*

• On the Relation between Local and Geometric Lagrangians for Higher spins.
D. Francia (APC, Paris)
J. Phys. Conf. Ser. 222 (2010) 012002; *arXiv: 1001.3854 [hep-th]*

• Unconstrained Higher Spins of Mixed Symmetry. II. Fermi Fields.
A. Campoleoni (SNS & INFN), D. Francia, J. Mourad (Paris U. VII, APC), A. Sagnotti (SNS & INFN)
Nucl.Phys. B 828 (2010) 405-514; *arXiv: 0904.4447 [hep-th]*

• Unconstrained Higher Spins of Mixed Symmetry. I. Bose Fields.
A. Campoleoni (SNS & INFN & APC, Paris & E. Polytechnique, CPHT), D. Francia (Chalmers U. Tech. & APC, Paris), J. Mourad (APC, Paris),A. Sagnotti (SNS & INFN & APC, Paris & E. Polytechnique, CPHT)}
Nucl.Phys. B 815 (2009) 289-367; *arXiv: 0810.4350 [hep-th]*

• Geometric massive higher spins and current exchanges.
D. Francia (Chalmers U. Tech.)
Fortsch. Phys. 56 (2008) 800-808; *arXiv: 0804.2857 [hep-th]*

• (A)dS exchanges and partially-massless higher spins.
D. Francia (Chalmers U. Tech.), J. Mourad (APC, Paris), A. Sagnotti (SNS & INFN)
Nucl.Phys. B 804 (2008) 383-420; *arXiv: 0803.3832 [hep-th]*

• Geometric Lagrangians for massive higher-spin fields.
D. Francia (Goteborg, ITP)
Nucl.Phys. B 796 (2008) 77-122; *arXiv: 0710.5378 [hep-th]*

- Current Exchanges and Unconstrained Higher Spins.
D. Francia (Goteborg, ITP), J. Mourad (APC, Paris), A. Sagnotti (SNS & INFN)
Nucl. Phys. B 773 (2007) 203-237; *arXiv: hep-th/0701163*

- Higher-spin geometry and string theory.
D. Francia (Rome III U. & INFN & Potsdam, Max Planck Inst.), A. Sagnotti (CERN & SNS & INFN)
J. Phys. Conf. Ser. 33 (2006) 57; *arXiv: hep-th/0601199*

- Minimal local Lagrangians for higher-spin geometry.
D. Francia (Rome III U. & INFN), A. Sagnotti (Rome U.,Tor Vergata & INFN)
Phys. Lett. B 624 (2005) 93-104; *arXiv: hep-th/0507144*

- Higher-spin gauge fields and duality.
D. Francia (Rome III U. & INFN), C.M. Hull (Imperial Coll., London)
Proc. from the 1st Solvay Workshop on Higher Spin Gauge Theories; *arXiv: hep-th/0501236*

- On the geometry of higher spin gauge fields.
D. Francia, A. Sagnotti (Rome U.,Tor Vergata & INFN)
Class. Quant. Grav. 20 (2003) S473-S486; *arXiv: hep-th/0212185*

- Free geometric equations for higher spins.
D. Francia, A. Sagnotti (Rome U.,Tor Vergata & INFN)
Phys. Lett. B 543 (2002) 303-310; *arXiv: hep-th/0207002*

- Exact renormalization group equation in presence of rescaling anomaly. 2. The Local potential approximation.
S. Arnone (Southampton U.), D. Francia, K. Yoshida (Rome U. & INFN)
Mod. Phys. Lett. A17 (2002) 1191; *arXiv: hep-th/0110104*

Luogo e data: Roma, 2/12/2020

Curriculum Vitæ

Daniele Gaggero

Scientific highlights

Group Leader in Madrid *(funded by "La Caixa" Junior Leader fellowship grant); I am leading a group including* **2 Ph.D. students** *(in co-supervision) The group has included* **1 post-doc** *(October 2019 - January 2020) and 1 M.Sc. student (thesis defended on 1/07/2020)*

45 **papers published on peer-reviewed journals.** *(7 on Physical Review Letters)*

Total Citations: 4076 *(source: Scopus, October 2020)*

Official WoS citation count: 3500 *(source: Web of Science, October 2020.* 1200 *citations for short-author-list papers only.)*

h-Index*:* 24 *(source: Web of Science, October 2020)*

15 invited talks at international conferences *and workshops (including 3 plenary talks at TeVPa, 1 plenary talk at ICRC)*

Grants and Awards

2019: Co-I of Spanish National Project "Particles, Astroparticles and Dark Matter in the Universe" (3 year grant, **80,000 €***)*

2018: PI of La Caixa Junior Leader Fellowship (3 year grant, **300,000 €***)*

Abilitazione Scientifica Nazionale - *Settore Concorsuale 02/A2 - II Fascia - Quarto Quadrimestre Dal 28/03/2018*

October 2015: Distinguished GRAPPA Fellowship (3 years) at the GRAPPA Center of Excellence (Amsterdam, The Netherlands)

April 2015: SFB Fellowship (2 months, 4,400 €) at DESY (Hamburg, Germany)

2012: PhD thesis selected for publication in the series "Springer Theses, Recognizing Outstanding Ph.D. Research"

Current Position

October 2018 - present, *La Caixa* **Junior Leader postdoctoral fellow**

Previous positions

October 2015 - October 2018, **Distinguished GRAPPA fellow**, *University of Amsterdam*

October 2012 - October 2015, **Post-doctoral researcher** *at SISSA (Scuola Internazionale Superiore di Studi Avanzati)*

October 2011 - October 2012, **Short-term visits** *at: Laboratoire d'Annecy-le-Vieux de Physique Théorique (LAPTh); Karlsruher Institut für Technologie; Max-Planck-Institut für Physik (München).*

Education

October 24th, 2011, *Galileo Galilei school of Graduate studies in Pisa:* **Ph.D.** *in* **Physics***; thesis on "Cosmic Ray diffusion in the Galaxy and diffuse gamma emission"; supervisors: Prof. Ronaldo Bellazzini, Dr. Dario Grasso.*

October 18th, 2007, *Università degli Studi di Pisa: M.Sci. (***Laurea Magistrale***) in* **Astrophysics***; full marks: 110/110 cum laude; thesis on "Neutrino and Gamma ray diffuse emission from the Galaxy" (in Italian); supervisors: Prof. Vincenzo Cavasinni, Dr. D. Grasso.*

IT knowledges

Operating systems: Linux/Unix, MacOSX, Windows.
Programming: C/C++ (very good); Python (very good); Java (basic level)
Typesetting packages: Latex, MSOffice, OpenOffice.
Mathematical and Numerical Packages: IDL (good), HEALPix.
Statistical tools: Minuit, MultiNest, BAT

Languages

Native Italian speaker
Very good written and spoken English
Very good written and spoken Spanish
Basic knowledge of French

Reference persons

Prof. Gianfranco Bertone
GRAPPA (Gravitation and Astroparticle Physics Amsterdam)
Universiteit van Amsterdam
Science Park 904
1098 XH Amsterdam
The Netherlands E-mail address: `g.bertone@uva.nl`

Prof. Piero Ullio
SISSA
via Bonomea 265
I-34136 Trieste
E-mail address: `piero.ullio@sissa.it`

Dr. Stefano Gabici
Laboratoire APC - AstroParticule et Cosmologie
10 Rue Alice Domon et Lonie Duquet
F-75013 Paris, France
E-mail address: `stefano.gabici@apc.univ-paris7.fr`

Dr. Dario Grasso
INFN Sezione di Pisa, Polo Fibonacci, Largo B. Pontecorvo 3, 56127 Pisa, Italy
E-mail address: `dario.grasso@pi.infn.it`

Dr. Pasquale Dario Serpico
LAPTh, Univ. Grenoble Alpes, USMB, CNRS, F-74000 Annecy, France
E-mail address: `serpico@lapth.cnrs.fr`

Recent activities - October 2020

Daniele Gaggero

List of activities, seminars and teaching experiences after the PhD.

- **Seminars, visits and other activities**
  - **Invited plenary talks** at conferences and workshops:
    - 5th IBS-IFT-Multidark workshop (online, October 2020): **Invited talk** on "Dark and Shiny dresses around Primordial Black Holes"
    - CTA consortium meeting (Bologna, October 2019): **Invited report** on "Cosmic-ray Science Working Group activities"
    - 4th IBS-Multidark-IPPP workshop (Korea, October 2019): **Invited highlight talk** on "Primordial Black Holes"
    - Perspectives in Astroparticle physics from High Energy Neutrinos 2019 (Berlin, September 2019): **Invited highlight talk** on "Galactic neutrinos"
    - TeVPa 2018 (Berlin, Germany, August 2018): **Invited highlight talk** on *"Learning the physics of CR transport from the gamma-ray sky"*
    - BAROLO Astroparticle workshop (Barolo, Italy, September 2018): Invited talk
    - Rencontres du Vietnam: Very high energy phenomena in the universe (August 2018): Invited talk (declined)
    - CRATER workshop (Gran Sasso Science Institute, L'Aquila, Italy, May 2018): **Invited talk** on *"Understanding cosmic-ray propagation in the Galaxy"*
    - MIAPP workshop (Munich, Germany, March 2018): **Invited review talk** on *"Understanding cosmic-ray propagation in the Galaxy"*
    - Amsterdam-Paris-Stockholm meeting (Woerden, The Netherlands, October 2017); **Invited review talk** on *"Primordial black holes"*
    - TeVPa 2017 (Columbus, Ohio, August 2017); **invited plenary talk** on *"Recent results in CR modeling"*
    - 11th International Workshop on Astroparticle Physics at Ooty (Ooty, India, December 2016); **Invited talk** on *"An overview on cosmic-ray propagation and modeling of gamma-ray emission from the Galaxy"*
    - ICRC 2015 (The Hague, Netherlands, July 2015); **invited plenary talk** on *"Connecting cosmic-ray physics, gamma-ray data and Dark Matter detection"*
    - CASPAR 2014 (Cosmic-Ray Acceleration, Sources and Propagation: A Rendez-vous, Hamburg, September 2014): Seminar and tutorial on the `DRAGON` code.
    - TeVPa 2012 (TATA Institute, Mumbai, India, December 2012); **invited plenary talk** on *"Cosmic-ray anisotropies"*
    - 13th ICATPP Conference on Astroparticle, Particle, Space Physics and Detectors for Physics Applications (Como, Italy, October 2011); **Invited talk**.

  - **Recent invited seminars (2017 - 2020):**
    - *Online seminar on "Primordial black holes"* (SNOLAB, Canada, July 6th 2020)
    - *Online seminar on "Primordial black holes"* (IFIC, Valencia, Spain, May 12th 2020)
    - *"Dark and shiny dresses around primordial black holes"* (INFN Torino, July 2nd 2019)
    - *"Dark and shiny dresses around primordial black holes"* (Elusives/Invisibles webinar, May 28th, 2019)
    - *"Dark and shiny dresses around primordial black holes"* (IFAE, Barcelona, May 24th, 2019)
    - *"Astronomical searches for primordial black holes"* (Instituto de Ciencias del Cosmos, Barcelona, May 21st, 2019)
    - *"Astronomical searches for primordial black holes"* (Instituto de Física Teórica, Madrid, March 4th, 2019)
    - *"Primordial black holes"* (National Institute of Nuclear Physics (INFN) Meeting, National Scientific Committee n. 2 (CNS2), Pavia, Italy, April 10th, 2018)
    - *"Learning the physics of CR transport from non-thermal Galactic emission"* (Princeton University, Astroplasma Seminar, USA, March 2nd, 2018)

* *"Primordial Black Holes: A promising and testable dark matter candidate?"* (University of California, Irvine, USA, February 20th, 2018)
* *"CR transport modeling and diffuse non-thermal emission from the Galaxy"* (DESY Zeuthen, plasma physics group seminar, Germany, November 29th, 2017)
* *"Analyzing diffuse gamma rays to understand the physics of cosmic-ray propagation"* (DESY Zeuthen, Germany, March 31st, 2017)
* *"Searching for primordial black holes and WIMPs in the inner Galaxy"* (University of Padova, Italy, February 22nd, 2017)
* *"Searching for different dark matter candidates in the inner Galaxy"* (Laboratoire de Physique Théorique et Hautes Energies, Paris, February 14th, 2017)
* *"Analyzing diffuse gamma rays to understand the physics of cosmic-ray propagation"* (Laboratoire APC (Astroparticules et Cosmologie), Université Paris Diderot, February 8th, 2017)
* *"Primordial black holes as dark matter candidates?"* (University of Pisa, Italy, January 12th, 2017)

– **Invited seminars** at LAPTH (Annecy, 2011), KIT (Karlsruhe, 2012), MPP (Munich, 2012), DESY (Hamburg, 2013), University of Oslo (Oslo, 2015), GRAPPA (Amsterdam, 2015), INFN Pisa (several times in 2014, 2015)

– **Selected contributed talks/posters at conferences and workshops**:
* MultiDark 2019 Consolider workshop (Zaragoza, Spain, April 2019), oral contribution on *"Astronomical searches for primordial black holes"*
* TeVPa 2018 (Berlin, Germany, August 2018), oral contribution on *"Primordial Black Holes: A promising and testable dark matter candidate?"*
* DM18 (University of California Los Angeles, USA, February 2018), oral contribution on *"Primordial Black Holes: A promising and testable dark matter candidate?"*
* GRAPPA @5 (Amsterdam, The Netherlands, October 2017, oral contribution on *"Searching for primordial black holes"*);
* TeVPa 2017 miniworkshops (Columbus, OH, USA, August 6th 2017), 2 oral contributions on *Origin of the spectral hardening of proton, helium and other nuclei* and *Looking for primordial black holes in the radio and X-ray sky*
* ICRC 2017 (Busan, South Korea, July 2017, oral contribution on *Cosmic rays and gamma rays from supernova remnants: time evolution*)
* Fundamental Physics with SKA, cosmology workshop (Flic-en-Flac, Mauritius, May 2017, oral contribution on *"Searching for Primordial Black Holes with SKA"*)
* e-ASTROGAM workshop 2017 (Padova, March 2017, oral contribution on *"Potential of e-ASTROGAM for the discovery of Dark Matter and new particles"*)
* TeVPa 2016 (CERN, Switzerland, September 2016, oral contribution on *"Cosmic-ray propagation with* `DRAGON 2`*"*).
* Amsterdam-Paris-Stockholm meeting (Gouvieux, France, August 2016, oral contribution on *"Cosmic-ray propagation with* `DRAGON 2`*"*);
* Neutrino 2016 (London, UK, July 2016, poster contribution on *"Diffuse neutrino emission from the Galaxy above the TeV"*);
* Gamma Rays and Dark Matter (Obergurgl, Austria, December 2015, oral contribution on *"A realistic astrophysical interpretation of the GeV Galactic center excess"*);
* TeVPa 2015 (Tokyo, Japan, October 2015, oral contribution);
* TeVPa 2014 (Amsterdam, Netherlands, July 2014, oral contribution);
* Workshop on the Future of Dark Matter Astro-Particle Physics: Insights and Perspectives (ICTP, Italy, October 2013, oral contribution);
* Dark Side of the Universe 2013 (SISSA, Italy, October 2013, oral contribution);
* CASPAR 2013 (Cosmic-Ray Acceleration, Sources and Propagation: A Rendez-vous, Hamburg, September 2013, oral contribution)
* ICRC 2013 (Rio De Janeiro, Brazil, July 2013, 3 contributions, 1 oral);

- **Visits for scientific collaborations**:
  * 2-month visit at DESY (Hamburg), April and June 2015 [Host: Prof. Günther Sigl], founded by the SFB fellowship (2.2kEuro/month)
  * Research visit at APC (Paris), July 2014 [Host: Dr. Stefano Gabici]
  * 1-month visit at *Max-Planck-Institut für Physik (München)*, June 2012 [Host: Dr. Luca Maccione]
  * 2-month visit at *Karlsruher Institut für Technologie (Karlsruhe)*, March-April 2012 [Host: Dr. Iris Gebauer]
  * 2-month visit at *Laboratoire de Annecy-le-Vieux de Physique Thorique (Annecy)*, November-December 2011 [Host: Dr. Pasquale Serpico]

- **Coordinator of the cosmic-ray science working group in the CTA consortium**, starting in January 2020 [previously, deputy coordinator of the same group]
- Member of the CTA Consortium since February 2017
- Responsible for the modeling of the Galactic gamma-ray diffuse emission within the CTA Consortium
- Member of the editoral board of the Consortium paper *Astrophysics of the Galactic Center* within the CTA consortium
- Member of the Fermi-LAT collaboration from 2008 to 2015

- Co-organizer of the GRAPPA seminars and of the weekly GRAPPA journal club (2015 - ongoing) at the University of Amsterdam
- Co-organizer of the Amsterdam-Paris-Stockholm meeting 2017
- Co-founder and co-supervisor of the `DRAGON` team since 2008
- Daily technical support and supervision of `DRAGON`/`HeSKY`/`HelioProp` users since 2008, in particular with students at Pisa INFN and Pisa University (2009-ongoing), SISSA (Trieste, 2012-2015), GRAPPA (Amsterdam, 2015-ongoing)

- Referee for Physical Review Letters, ApJ, ApJ Letters, Physical Review D, Astronomy and Astrophysics, JCAP.
- Referee for the PhD thesis of D. Benyamin (Hebrew University of Jerusalem)

• **Teaching/Tutoring/Mentoring experience**

- **Supervision of the Electronic circuits laboratory class**, B.Sc. (*Grado*) in Computer Science and Engineering, Escuela Politecnica Superior *Alan Turing*, Madrid Autonomous University (September - December 2019, 40h of lectures).
- **Lectures on dark matter and cosmology** and **Tutoring on coding projects about dark matter and cosmology** in the *GRAPPA student seminar* M.Sc. course (Amsterdam, June 2018, 28h of lectures and tutoring).
- **Lectures on indirect dark matter detection** in the *GRAPPA student seminar* M.Sc. course (Amsterdam, June 2017).
- **Lectures on cosmic-ray acceleration, propagation and dark matter indirect detection** at the *Ooty winter school of Astroparticle Physics* (Ooty, India, December 2016). The classes were attended by a selection of excellent master students from different Indian states.
- **Lectures on cosmic-ray acceleration, propagation and dark matter indirect detection** at the *Petnica Summer School on Astrophysics and Astroparticles* (Valjevo, Serbia, July 2015). The classes were attended by a selection of excellent master students from different Eastern Europe countries.
- **Student and postdoc supervision**:
  * Official co-supervision of **Ph.D. student** Ottavio Fornieri (2019-present, with Prof. P.S. Marrocchesi)
  * Official co-supervision of **Ph.D. student** Francesca Scarcella (2019-present, with Dr. M.A. Sánchez-Conde)
  * Supervision of **M.Sc student** Tania Franco Munoz (M.Sc. thesis defended on July 1st 2020)
  * Supervision of **postoctoral researcher** Mathieu Boudaud (October 2019 - January 2020)

- Official daily supervision of GRAPPA undergraduate student Julien Manshanden (2017/18, with Prof. G. Bertone)
- Official daily co-supervision of GRAPPA undergraduate student Mart Pothast (2017/18, with Prof. C. Weniger)
- Informal project supervision of API undergraduate student Alex Cooper (2017/18, with Prof. S. Markoff) on the topic *Contribution of X-ray binaries to the CR flux.*
- Project supervision of graduate student Mauro Valli at SISSA (informal). Thesis title: *A glimpse on Dark Matter particles shining through the gamma-ray sky* (2014/2016, with Prof. Piero Ullio). I have co-supervised three projects on cosmic-ray transport and indirect dark matter detection.
- Project supervision of undergraduate student Giuseppe Di Bernardo at Pisa University (2010, informal, with Dr. Dario Grasso). I have co-supervised a project on the interpretations of the leptonic CR measurements performed by the Fermi-LAT experiment.

- **Outreach**

  Science and art slam, public lecture on dark matter with free jazz improvisation, Amsterdam, May 2017

List of Publications

Daniele Gaggero

Preprints and manuscripts under review:

[49] Fornieri, O.; **Gaggero, D.**; Cerri, S. S.; De La Torre Luque, P.; Gabici, S., *"The theory of cosmic-ray scattering on pre-existing MHD modes meets data"*, `arXiv:2011.09197`, *submitted to The Astrophysical Journal*

[48] Abdalla, H., *et al.* [CTA Consortium], *"Sensitivity of the Cherenkov Telescope Array for probing cosmology and fundamental physics with gamma-ray propagation"*, `arXiv:2010.01349`, *submitted to Journal of Cosmology and Astroparticle Physics*

[47] Acharyya, A., *et al.* [CTA Consortium], *"Pre-construction estimates of the Cherenkov Telescope Array sensitivity to a dark matter signal from the Galactic centre"*, `arXiv:2007.16129`, *submitted to Journal of Cosmology and Astroparticle Physics*

[46] Fornieri, O.; **Gaggero, D.**; Guberman, D.; Brahimi, L.; Marcowith, A., *"Changes in cosmic-ray transport properties connect the high-energy features in the electron and proton data"*, `arXiv:2007.15321`, *PRD/PRL joint submission in progress*

Review papers:

[45] Gabici, S., *et al.*, *"The origin of Galactic cosmic rays: challenges to the standard paradigm"*, *International Journal of Modern Physics D, Volume 28 (2019) n.15, 1930022*

[44] **Gaggero, D.**; Valli M., *"Impact of cosmic-ray physics on dark matter indirect searches"*, *Advances in High Energy Physics, Volume 2018, Article ID 3010514*

[43] Barack, L., *et al.*, *"Black holes, gravitational waves and fundamental physics: a roadmap"*, *Class. Quant. Grav. 36 (2019) no.14, 143001*

Short-author-list papers published on refereed journals:

[42] Kavanagh, B.J.; Nichols, D.; Bertone, G.; **Gaggero, D.**, *"Detecting Dark Matter around Black Holes with Gravitational Waves: Effects of dark-matter dynamics on the gravitational waveform"*, *Physical Review D, Volume 102 (2020), id. 083006*

[41] Ballesteros, G., Coronado-Blázquez, J.; **Gaggero, D.**, *"X-ray and gamma-ray limits on the primordial black hole abundance from Hawking radiation"*, *Physics Letters B, Volume 808 (2020), 135624*

[40] Cooper, A.; **Gaggero, D.**; Markoff, S.; Zhang, S., *"High-energy Cosmic Ray production in X-ray Binary Jets"*, *Monthly Notices of the Royal Astronomical Society, Volume 493 (2020), Issue 3, p.3212-3222*

[39] Fornieri, O.; **Gaggero, D.**; Grasso, D., *"Features in cosmic-ray lepton data unveil the properties of nearby cosmic accelerators"*, *Journal of Cosmology and Astroparticle Physics, Issue 02 (2020), article id. 009*

[38] Bertone, G.; Coogan, A., **Gaggero, D.**, Kavanagh, B.J.; Weniger, C., *"Primordial Black Holes as Silver Bullets for New Physics at the Weak Scale"*, *Physical Review D, Volume 100 (2019) no.12, 123013*

[37] Manshanden, J.; **Gaggero, D.**; Bertone, G.; Connors, R.M.T; Ricotti, M., *"Multi-wavelength astronomical searches for primordial black holes", Journal of Cosmology and Astroparticle Physics, Issue 06 (2019), article id. 026*

[36] Pothast, M.; **Gaggero, D.**; Storm, E.; Weniger, C., *"On the progressive hardening of the cosmic-ray proton spectrum in the inner Galaxy", Journal of Cosmology and Astroparticle Physics, Issue 10 (2018), article id. 045*

[35] Kavanagh, B.J.; **Gaggero, D.**; Bertone, G., *"Merger rate of a subdominant population of primordial black holes", Physical Review D, Volume 98 (2018), Issue 2, id.023536*

[34] Evoli, C.; **Gaggero, D.**; Vittino, A.; Di Mauro, M.; Grasso, D.; Mazziotta, M. N., *"Cosmic-ray propagation with DRAGON2: II. Nuclear interactions with the interstellar gas", Journal of Cosmology and Astroparticle Physics, Issue 07 (2018), article id. 006.*

[33] Feyereisen, M.R., **Gaggero, D.**, Ando, S., *"One-point fluctuation analysis of IceCube neutrino events outlines a significant unassociated isotropic component and constrains the Galactic contribution", Physical Review D, Volume 97 (2018), id. 103017*

[32] **Gaggero, D.**; Zandanel, F.; Cristofari, P.; Gabici, S., *"Time Evolution of Gamma Rays from Supernova Remnants", Monthly Notices of the Royal Astronomical Society, Volume 475 (2018), Issue 4, 21*

[31] Cerri, S. S.; **Gaggero, D.**; Vittino, A.; Evoli, C.; Grasso, D., *"A signature of anisotropic cosmic-ray transport in the gamma-ray sky.", Journal of Cosmology and Astroparticle Physics, Issue 10 (2017), article id. 019*

[30] **Gaggero, D.**; Grasso, D.; Marinelli, A.; Taoso, M.; Urbano, A., *"Diffuse cosmic-rays shining in the Galactic Center: A novel interpretation of H.E.S.S. and Fermi-LAT gamma-ray data", Physical Review Letters (2017), Volume 119, id. 031101*

[29] **Gaggero D.**, Bertone G., Calore F., Connors R., Lovell M., Markoff S., Storm E. *"Searching for Primordial Black Holes in the radio and X-ray sky", Physical Review Letters, Volume 118 (2017), id. 241101*

[28] Bartels, R., **Gaggero, D.**, Weniger, C., *"Prospects for indirect dark matter searches with MeV photons", [arXiv:1703.02546], Journal of Cosmology and Astroparticle Physics, Issue 05 (2017), article id. 001*

[27] Evoli C., **Gaggero D.**, Vittino A., Di Bernardo G., Di Mauro M., Ligorini A., Ullio P., Grasso D., *"Cosmic-ray propagation with DRAGON2: I. numerical solver and astrophysical ingredients", Journal of Cosmology and Astroparticle Physics, Issue 02 (2017), article id. 015*

[26] Mazziotta, M. N.; Cerutti, F.; Ferrari, A.; **Gaggero, D.**; Loparco, F.; Sala, P. R., *"Production of secondary particles and nuclei in cosmic rays collisions with the interstellar gas using the FLUKA code", Astroparticle Physics, Volume 81 (2016), p. 21-38*

[25] **Gaggero, D.**; Taoso, M.; Urbano, A.; Valli, M.; Ullio, P., *"Towards a realistic astrophysical interpretation of the gamma-ray Galactic center excess", Journal of Cosmology and Astroparticle Physics, Issue 12 (2015), article id. 056*

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[23] **Gaggero, D.**; Grasso, D.; Marinelli, A.; Urbano, A.; Valli, M., *"The Gamma-Ray and Neutrino Sky: A Consistent Picture of Fermi-LAT, Milagro, and IceCube Results", The Astrophysical Journal Letters, Volume 815 (2015), Issue 2, article id. L25*

[22] **Gaggero, D.**; Urbano, A.; Valli, M.; Ullio, P., *"Gamma-ray sky points to radial gradients in cosmic-ray transport", Physical Review D, Volume 91 (2015), Issue 8, id.083012*

[21] Cirelli, M.; **Gaggero, D.**; Giesen, G.; Taoso, M.; Urbano, A., *"Antiproton constraints on the GeV gamma-ray excess: a comprehensive analysis", Journal of Cosmology and Astroparticle Physics, Issue 12 (2014), article id. 045*

[20] **Gaggero, D.**; Maccione, L.; Grasso, D.; Di Bernardo, G; Evoli, C., *"PAMELA and AMS-02 e+ and e- spectra are reproduced by three-dimensional cosmic-ray modeling", Physical Review D, Volume 89 (2014), Issue 8, id. 083007*

[19] **Gaggero, D.**; Maccione, L., *"Model independent interpretation of recent CR lepton data after AMS-02", Journal of Cosmology and Astroparticle Physics, Issue 12 (2013), article id. 011*

[18] **Gaggero, D.**; Maccione, L.; Di Bernardo, G; Grasso, D.; Evoli, C., *"Three-Dimensional Model of Cosmic-Ray Lepton Propagation Reproduces Data from the Alpha Magnetic Spectrometer on the International Space Station", Physical Review Letters, Volume 111 (2013), Issue 2, id. 021102*

[17] Di Bernardo, G.; Evoli, C.; **Gaggero, D.**; Grasso, D.; Maccione, L., *"Cosmic ray electrons, positrons and the synchrotron emission of the Galaxy: consistent analysis and implications", Journal of Cosmology and Astroparticle Physics, Issue 03 (2013), article id. 036*

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[13] Grasso, D.; Profumo, S.; Strong, A. W.; Baldini, L.; Bellazzini, R.; Bloom, E. D.; Bregeon, J.; Di Bernardo, G.; **Gaggero, D.**; Giglietto, N.; Kamae, T.; Latronico, L.; Longo, F.; Mazziotta, M. N.; Moiseev, A. A.; Morselli, A.; Ormes, J. F.; Pesce-Rollins, M.; Pohl, M.; Razzano, M.; Sgro, C.; Spandre, G.; Stephens, T. E., *"On possible interpretations of the high energy electron-positron spectrum measured by the Fermi Large Area Telescope", Astroparticle Physics, Volume 32 (2009), Issue 2, p. 140-151*

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[11] Acharyya, A., *et al.* [CTA Consortium], *"Monte Carlo studies for the optimisation of the Cherenkov Telescope Array layout", Astroparticle Physics 111 (2019), 35-53*

[10] Weltman, A.., *et al., "Fundamental Physics with the Square Kilometer Array", Publications of the Astronomical Society of Australia (PASA) 37 (2019), E002*

[9] De Angelis, A. *et al.* [e-ASTROGAM collaboration], *"Science with e-ASTROGAM. A space mission for MeV-GeV gamma-ray astrophysics", Journal of High Energy Astrophysics, Volume 19 (2018), p. 1-106*

[8] Albert, A. *et al.* [ANTARES and IceCube collaboration] and **Gaggero, D.** and Grasso, D. , *"Joint Constraints on Galactic Diffuse Neutrino Emission from the ANTARES and IceCube Neutrino Telescopes", The Astrophysical Journal Letters, Volume 868 (2018), Issue 2, article id. L20.*

[7] Albert, A. *et al.* [ANTARES collaboration] and **Gaggero, D.** and Grasso, D. , *"New Constraints on all flavour Galactic diffuse neutrino emission with the ANTARES telescope", Physical Review D, vol. 96 (2017), id. 062001 .*

[6] Ackermann, M. *et al.* [Fermi-LAT Collaboration], *"Fermi-LAT Observations of the Diffuse gamma-Ray Emission: Implications for Cosmic Rays and the Interstellar Medium", The Astrophysical Journal, Volume 750 (2012), Issue 1, article id. 3*

[5] Ackermann, M. *et al.* [Fermi-LAT Collaboration], *"Searches for cosmic-ray electron anisotropies with the Fermi Large Area Telescope", Physical Review D, vol. 82 (2010) , Issue 9, id. 092003*

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[3] Abdo, A. A. *et al.* [Fermi-LAT Collaboration], *"Spectrum of the Isotropic Diffuse Gamma-Ray Emission Derived from First-Year Fermi Large Area Telescope Data", Physical Review Letters, vol. 104 (2010), Issue 10, id. 101101.*

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Proceedings:

[*p*38] Viana, A. *et al.* [for the CTA Consortium], *"The Cherenkov Telescope Array view of the Galactic Center region", PoS ICRC2019 (2020) 817. Contribution to: ICRC 2019, 817.*

[*p*37] Fornieri, O.; **Gaggero, D.**; Grasso, D.*; "Unveiling the Origin of Cosmic-ray Leptons in Light of the Recent HAWC TeV-halo Observations", PoS ICRC2019 (2020) 068. Contribution to: ICRC 2019, 068*

[*p*36] Bertone, G.; Coogan, A., **Gaggero, D.**, *"Probing the nature of Dark Matter with astrophysical and gravitational wave observations", Bulletin of the American Astronomical Society, Vol. 51, No. 4. American Astronomical Society Meeting n. 234, id. 123.03*

[*p*35] **Gaggero, D.**; Gabici S.; Zandanel, F.*; "Gamma rays from supernova remnants: time evolution", PoS ICRC2017 (2018) 571. Contribution to: ICRC 2017, 571*

[*p*34] Vittino A.; Evoli, C.; **Gaggero, D.***; "Cosmic-ray transport in the heliosphere with HelioProp", PoS ICRC2017 (2018) 024, PoS, 2018, Volume 301. Contribution to: ICRC 2017, 024*

[*p*33] Cerri, S. S.; **Gaggero, D.**; Vittino, A.; Evoli, C.; Grasso, D.*; "A signature of anisotropic cosmic-ray transport in the gamma-ray sky", PoS ICRC2017 (2018) 272. Contribution to: ICRC 2017, 272*

[*p*32] Marinelli, A.; **Gaggero, D.**; Grasso, D.; ; Taoso, M.; Urbano, A.; Ventura, S.*; "High Energy Neutrino expectations from the Central Molecular Zone", PoS ICRC2017 (2018) 939. Contribution to: ICRC 2017, 939*

[*p*31] **Gaggero, D.**; Grasso, D.; Marinelli, A.; Taoso, M.; Urbano, A.; Ventura, S.*; "Hard Cosmic Ray Sea in the Galactic Center: a consistent interpretation of H.E.S.S. and Fermi-LAT gamma-ray data", PoS ICRC2017 (2018) 739. Contribution to: ICRC 2017, 739*

[*p*30] **Gaggero, D.**; Grasso, D.; Marinelli, A.; Taoso, M.; Urbano, A.*; "The very high energy gamma-ray diffuse emission from the Galactic Center",PoS EPS-HEP2017 (2017) 014. Contribution to: 2017 European Physical Society Conference on High Energy Physics (EPS-HEP 2017), 014*

[p29] Grasso D., **Gaggero, D.**, Marinelli A., Taoso, M., Urbano A., *"Galactic diffuse neutrino component in the astrophysical excess measured by the IceCube experiment", Nuovo Cimento C 40 (2017) 3, 140. Contribution to 11th Workshop on Science with the New generation of High Energy Gamma-ray Experiments (SciNeGHE 2016).*

[p28] Marinelli A., **Gaggero, D.**, Grasso D., Taoso, M., Urbano A., Valli, M., *"Modeling the Galactic center emission from GeV to PeV", EPJ Web Conf. 136 (2017) 03016. Contribution to RICAP16.*

[p27] Grasso D., **Gaggero, D.**, Marinelli A., Taoso, M., Urbano A., Valli M., *"Anomalies in the gamma-ray diffuse emission of the Galaxy and implications for the interpretation of IceCube results", EPJ Web Conf. 136 (2017) 03014. Contribution to RICAP16.*

[p26] Gabici S.; **Gaggero, D.**; Zandanel, F.*; "Can supernova remnants accelerate protons up to PeV energies?", e-Print: 1610.07638 [astro-ph.HE]. Contribution to: 28th Rencontres de Blois on Particle Physics and Cosmology.*

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[p24] Evoli, C.; **Gaggero, D.**; Grasso, D.*; "Cosmic ray antiproton as a dark matter probe", Frascati Phys.Ser. 61 (2016) 127-132. Contribution to: Physics Prospects for Linear and other Future Colliders after the Discovery of the Higgs (LFC15), 127-132.*

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[p22] Gebauer, I.; Weinreuter, M.; Kunz, S.; **Gaggero, D.***; "The Local Bubble as a cosmic-ray isotropizer", ASTRA Proceedings, Volume 2, pp. 1-3 (2015). Cosmic-ray anisotropy workshop proceeding.*

[p21] **Gaggero, D.**; Taoso, M.; Ullio P.; Urbano, A.; Valli, M.*; "The Galactic center excess brought down-to-earth", PoS ICRC2015 (2016) 909, 34th International Cosmic Ray Conference (ICRC 2015)*

[p20] **Gaggero, D.**, *"Connections between cosmic-ray physics, gamma-ray data analysis and Dark Matter detection", PoS ICRC2015 (2016) 020, plenary talk at 34th International Cosmic Ray Conference (ICRC 2015)*

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[p17] **Gaggero, D.**; Grasso, D.; Marinelli, A.; Urbano, A.; Valli, M., *"Gamma-ray and neutrino diffuse emissions of the Galaxy above the TeV", J.Phys.Conf.Ser. 718 (2016) 5, 052018. Contribution to TAUP 2015.*

[p16] **Gaggero, D.**; Grasso, D.; Marinelli, A.; Urbano, A.; Valli, M., *"Gamma-ray and neutrino diffuse emissions of the Galaxy above the TeV", PoS ICRC2015 (2016) 1126. Contribution to 34th International Cosmic Ray Conference (ICRC 2015)*

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Summary of research activity

Daniele Gaggero

Summary of my research activity

My research is focused on key aspects of astroparticle physics: cosmic-ray transport, gamma-ray/neutrino astrophysics, dark matter searches, astronomical searches for primordial black holes.

I have published 45 papers on refereed journals (7 papers on Physical Review Letters, including 3 Fermi-LAT collaboration papers)

My h-index is 24. My papers have collected more than 4000 citations.

I am currently **PI of the "Junior leader Caixa fellowship"** (**298.500 EUR**) since 24/09/2018. I am **leading a group including 2 PhD students** (co-supervisions started in 2019: Theses titles: "Multi-wavelength searches for exotic physics" and "High-energy leptonic accelerators in the Galaxy").

I am **science coordinator of the cosmic-ray working group within the CTA consortium**. I collaborate with the ANTARES collaboration. I am involved in a wide network of international collaborators. I frequently give plenary reviews in conferences and workshops (14 invitations so far). I was a member of the Fermi-LAT collaboration from 2008 to 2015.

I am **co-author of the public DRAGON code**, designed to simulate cosmic-ray propagation in the Galaxy. The code was presented in 2008 (the paper published on JCAP collected 200 citations). More than 30 papers (besides those signed by me) report the use of this code.

Prior to this position, I was a **"GRAPPA fellow"** in Amsterdam (2015-2018). I collaborated with Prof. G. Bertone, Prof. C. Weniger, and Prof. S. Markoff and co-supervised two M.Sc. theses entitled "Gamma Rays as Probes of Cosmic-Ray Diffusion Throughout the Galaxy" and "Black hole dark matter". The results presented in these theses have been published or submitted to peer-review journals.

Before moving to Amsterdam, I worked as a **post-doc at SISSA**, Trieste (2012-2015), under the supervision of Prof. P. Ullio. During this period, I informally supervised Ph.D. student M. Valli on three projects about cosmic-ray, gamma-ray and neutrino astrophysics and indirect dark matter detection.

I got the PhD at the University of Pisa, as member of the Fermi-LAT collaboration, under the supervision of Prof. V. Cavasinni and Dr. D. Grasso; my PhD thesis was published by Springer in 2012.

Research statement

Daniele Gaggero

General context

My research is focused on several key aspects of **Theoretical Astroparticle Physics**, High-Energy Astrophysics and Cosmology: Cosmic-Ray propagation, Gamma-ray/Neutrino astrophysics, Dark Matter searches, Primordial Black Hole phenomenology.

I have developed over the years a deep expertise in the study of cosmic-ray physics. These particles probe the most violent phenomena in the Universe and their study plays a central role in Astroparticle Physics for a variety of reasons. On the one hand, the physics behind their acceleration and their propagation is connected to a major unsolved problem in classical physics, i.e. the phenomenon of **turbulence**, and opens up a multidisciplinary connection with cutting-edge plasma physics research. On the other hand, they offer a unique opportunity to look for signatures of beyond-standard-model physics over a remarkable energy range: In particular, they allow to search for events of annihilation or decay involving the hypothetical *weakly interacting massive particles (WIMPs)* that may constitute the bulk of the dark matter (DM) in the universe.

More recently, I have been exploring the **fascinating connections between the phenomenology of compact objects, the multi-wavelength emission associated to accretion onto them, and the gravitational-wave emission** associated to their mergers, in the wider context of the **interplay between multi-messenger astronomy and Dark Matter searches.** In fact, the recently opened window on the high-energy universe provided by the detection of **gravitational waves**, together with the upcoming improvements in radio astronomy, may allow to probe the hypothesis that a portion of the DM is constituted by black holes of primordial origin, whose presence may also reveal properties of possible other components of the dark matter.

My main scientific objectives can be summarized as follows.

- Identify clear **astrophysical and cosmological signatures of Dark Matter** in different contexts, in relation to the WIMP and the Primordial Black Hole (PBH) hypothesis and probe the properties of other Dark Matter components in presence of black holes of primordial origin, by exploring the **multiple connections between the phenomenology of compact objects and the field of radio/X-ray and gravitational wave astronomy.**
- Provide a significant **step forward in the numerical modeling of CR transport**, by implementing for the first time a set of full three-dimensional **anisotropic transport** models based on **first principles**, relying on a realistic picture for the microphysics of the interaction between CRs and interstellar turbulence.
- Carry on an extensive phenomenological analysis on the **diffuse non-thermal Galactic emission, from radio waves all the way up to gamma rays and neutrinos**, in order to identify signatures of the theoretical processes under scrutiny and find natural explanations for the many anomalies currently outlined in the data.

PART A: Dark Matter and Compact Objects

- Objective A1: **Probe primordial black holes as a Dark Matter candidate**

  The idea that primordial black holes (PBHs) [1] exist in the Universe has been widely discussed over the past few decades. These objects could have formed deep in the radiation era, before big-bang nucleosynthesis, out of the collapse of small-scale large-amplitude density fluctuations originated during inflation, or through a variety of other mechanisms.

  One of the most interesting mass window appears to be the one associated with the massive black-hole-binary merger events reported by the LIGO and VIRGO collaborations, centered on $\mathcal{O}(10)\ M_{\rm Sun}$. **The existence of PBHs is triggering more and more interest in the community, since they could amount to a significant fraction of the elusive Dark Matter (DM) that permeates the Universe.** Even if they were to constitute a sub-dominant component of this substance, their discovery would have a profound impact on our knowledge of the properties of the DM itself and on fundamental physics in general.

  In a recent paper [2] **I coordinated a multi-disciplinary group of people working in the University of Amsterdam** with different types of expertise: We considered the hypothesis that massive PBHs constitute a fraction

of the Dark Matter, modeled the gas accretion onto a population of these objects distributed in the Galaxy, and compared the predicted radio and X-ray emission with data. We showed that the possibility that $\mathcal{O}(10)$ solar masses PBHs can account for all of the DM in the Milky Way is excluded by a comparison with VLA, Chandra and NuSTAR catalogs. The paper is published on Physical Review Letters and got $\simeq 100$ citations, and a detailed follow-up (based on results obtained by the M.Sc. student J. Manshanden, co-supervised by me) has been recently published [3]. The follow-up is based on a an improved treatment of the physics of gas accretion onto isolated, moving compact objects, based on a set of state-of-the-art numerical simulations performed by M. Ricotti [U. of Maryland] and collaborators.

My results have opened up a novel and promising line of research in prospect of the aforementioned future accurate data from the forthcoming radio facilities, and can be successfully applied to the guaranteed astrophysical black holes as well. In fact, the future radio facilities, in particular the Square Kilometer Array (SKA), will provide a significant increase in sensitivity and resolution and provide the unique opportunity to detect both a population of isolated astrophysical black holes, and a hypothetical population of PBHs, even if they constitute a very subdominant portion of the DM.

In connection to this topic, I have performed a detailed calculation of the merger rate of a population of primordial black holes of $1 - 100$ solar masses under the hypothesis that they constitute a sub-dominant portion of the dark matter in the universe, and I have considered for the first time in this context the impact of the dark-matter mini-halos around those objects [3].

A future discovery of a population of PBHs, even if sub-dominant with respect to the bulk of the dark matter, can have relevant consequences on our knowledge of the DM, and on popular theories of beyond-standard-model physics. In [4] I have identified three main avenues to discovery. Besides the already mentioned radio/X-ray searches, I outlined the observation of nearby mergers of sub-solar mass BHs, and the detection of high-redshift mergers. I have shown that **even a small number of detections would place stringent constraints on self-annihilating Dark Matter. These constraints would be many orders of magnitude stronger than currents constraints from gamma-ray telescopes and would completely rule out thermal WIMPs** which constitute a substantial fraction of the DM. These scenarios thus rule out large regions of parameter space for proposed models of new physics at the weak scale (even those with sub-dominant WIMPs), making a compelling case for the search for primordial black holes now and in the near future.

My future plans aim at exploring different avenues towards a potential detection of a population of primordial black holes, with important applications to the study of the guaranteed population of isolated astrophysical black holes.

- **"Shiny dresses" around black holes.** I will extend my study centered on the possibility to detect PBHs in the Galaxy with current and forthcoming radio and X-ray experiments, relying on a realistic phenomenological treatment of accretion of baryonic matter and associated non-thermal emission in different bands. To this aim, **I am currently supervising a Ph.D. student at the IFT in Madrid**: The project is aimed at extending the aforementioned works [2,3] and will explore different methods to discover PBHs and disentangle them from astrophysical BHs. In this context, a detailed and comprehensive study on the detection prospects of the guaranteed astrophysical population is about to be released by my student and me, in collaboration with experts of accretion physics, with focus on the future prospects in the radio domain provided by the Square Kilometer Array experiment. The long-term research program includes a careful assessment of a variety of effects, including the potential of discovery of a sub-dominant population in the 1-100 $M_{\rm Sun}$ range in the context of wide, multi-modal mass functions currently widely discussed in the literature, and in presence of significant clustering. Moreover, I will perform a multi-messenger data analysis with focus on both the radio and X-ray band on the existing data, aimed at pinpointing potential accreting black hole candidates in the current data, and assessing future prospects for next-generation experiments.
- **Mergers in the Dark Ages.** Another promising avenue of detection for PBHs is associated to their merger at large redshift, with particular reference to the Cosmic Dark Ages, which will be probed by future gravitational wave facilities such as the Einstein Telescope and Cosmic Explorer. I have recently supervised – together with Ph.D. student F. Scarcella — a M.Sc. project on this topic and assessed in a preliminary way the expected event rate at different redshifts from a population of PBHs that amount to a variable fraction of the Dark Matter, and from the guaranteed population of astrophysical black holes. This line of research will be further developed in the future, and a comprehensive study to assess the prospect of Einstein Telescope of detecting an increase of merger rate with redshift compatible with the existence of a population of PBHs will be carried out over the next year in my group.
- **Dark ages and 21 cm signal.** I will also widen the perspective to a cosmological context, and explore the possibility to detect the cosmological signal associated to a redshifted 21 cm line that probes the re-ionization

epoch. I will assess the impact of a population of accreting PBHs in that context: By altering the thermal and ionization history of the intergalactic medium (IGM), both annihilating (decaying) DM particles and a PBH population can leave a detectable imprint in this signal. SKA will play a major role and will allow to either detect a population of PBHs (or a signature of WIMP annihilation), or place competitive bounds on their existence.

- Objective B2: **Detect the "Dark Dress" around massive Black Holes with Gravitational Waves.**

  Besides being dark matter candidates by themselves, compact objects are promising portals towards fundamental physics and are expected to play a crucial role in dark matter searches in the future.

  Key systems in this context are the Extreme Mass Ratio Inspirals (EMRI). In a recent work [6] I studied in particular intermediate mass-ratio inspirals of stellar-mass compact objects around intermediate-mass black holes "dressed" with dark matter. I demonstrated that previous estimates based on a fixed dark-matter dress are unphysical for a range of binaries and dark-matter distributions by showing that the total energy dissipated by the compact object through dynamical friction, as it inspirals through the dense dark matter environment toward the black hole, is larger than the gravitational binding energy of the dark-matter dress itself. Then, I introduced a new formalism that allowed to self-consistently follow the evolution of the dark-matter dress due to its gravitational interaction with the binary. The dephasing of the gravitational waveform induced by dark matter is therefore smaller than previously thought, but still potentially detectable with the LISA space interferometer. The gravitational waves from such binaries could provide powerful diagnostics of the particle nature of dark matter.

  This work is the starting point of a long-term research program aimed at assessing with much greater precision the details of the EMRI waveform in presence of a "dark dress" of DM. A variety of processes need to be carefully studied in the future, including: (i) post-Newtonian corrections, (ii) the role of eccentricity, (iii) interplay with baryon accretion, and (iv) a careful assessment of the capability of a future experiment like LISA to distinguish different DM profiles and ultimately gather previous information on the DM properties.

PART B: Cosmic rays and non-thermal emission from the Galaxy

More than one century after their discovery, our understanding of the processes yielding cosmic radiation and involved in their transport cannot still be considered satisfactory.

There are two well-known theories for these processes, and the general picture [7] appears quite well established in terms of diffusive shock acceleration (DSA) of CRs, at work in one or more classes of sources (supernova remnants, superbubbles or other objects), followed by a random walk through the Galaxy governed by quasi-linear theory of pitch-angle scattering on magneto-hydrodynamic turbulence (QLT). These theoretical ideas have been implemented in comprehensive phenomenological frameworks by means of numerical/semi-analytical codes designed to model Galactic CR production and propagation. These packages have been representing a precious tool for a long time, and are considered a big achievement in the community, since they offer the possibility to fit a wide spectrum of observables, within a consistent framework. However, they usually feature a naive picture of constant, homogeneous diffusion all through the Galaxy, inspired by the simplest version of the aforementioned theories. The dramatic recent increase in the quality of the data now provides a severe challenge to this simple picture, and many unexplained anomalies with respect to theoretical predictions are currently being debated in the community.

The problem of understanding CR interactions requires a broad knowledge of different disciplines, from plasma to particle physics. In particular, it is compelling to understand the microphysics of the complex interactions between charged CRs and MHD turbulence.

I have a central role in this research field: I have been working for almost a decade on a complete suite of innovative codes designed to model the propagation of GeV-PeV particles in the Galaxy and the Heliosphere, and compute the associated non-thermal emission. These tools represent a very promising attempt to move beyond the limitations of current modeling, while consistently taking all observables into account.

`DRAGON` [8] **is the core package. It computes all the relevant processes associated to Galactic CR transport.** It is able to solve the diffusion-loss equation for all CR species, from heavy nuclei to leptons, either originating from ordinary CR acceleration mechanisms, or from more exotic processes (DM annihilation/decay); the source term may be steady-state or transient, and the possibility to track the emission from moving sources (e.g. DM clumps) is implemented as well. I have extensively used this code in order to reproduce the data coming from CR experiments, identifying and studying the anomalies and their interpretations[1]. `DRAGON` **is part of a suite of numerical codes that comprehensively cover most**

[1] `DRAGON` is available at `https://github.com/cosmicrays`

cutting-edge astroparticle research topics: A separate tool called `GammaSky` is designed to compute the secondary radiation over an extended energy range (from radio frequencies up to gamma rays and PeV neutrinos) produced by the interactions of Galactic CRs with interstellar gas, magnetic field and diffuse radiation field. On the low-energy side, the interactions of sub-GeV CRs with the Heliosphere are modeled by `HelioProp`. **These codes are now used by a growing community interested in different fields of physics, including CR propagation physics and DM searches; more than 30 peer-reviewed papers (besides those signed by me) report their use.**

I am now co-leading a major upgrade of these codes.

On the one hand, the `DRAGON2` project is in development, and several papers covering the physics and the technical implementation have already been released. In particular, in [8] I provided a detailed description of the new solver and the most relevant astrophysical ingredients. Moreover, a description of a new solver including 2D fully anisotropic transport, with a the discussion of a relevant physical signature of this process in gamma-ray data is presented in [9]. A beta version of `DRAGON2` is already online.

On the other hand, the `HERMES` project will represent a break-through in the field. The concept of `HERMES` originates as an evolution of the `GammaSky` code, and is designed to compute gamma-ray models of the Galaxy and will provide full-sky radio and gamma-ray maps associated to the following non-thermal radiative processes: a) Faraday rotation from polarized radio sources; b) synchrotron emission from Galactic CR leptons in the MHz - GHz domain; c) Emission and absorption due to free-free scattering onto the ionized component of the ISM; d) Inverse Compton scattering onto diffuse low-energy background photons; e) Neutral pion decay; f) Bremsstrahlung. The technical paper will be released shortly, and a beta version is already online.

Moreover, I will provide a further significant step forward in the numerical modeling of CR transport, by implementing for the first time a set of full three-dimensional anisotropic transport models based on first principles, relying on a realistic picture for the microphysics of the interaction between CRs and interstellar turbulence.

The detailed plan regarding these aspects is the following.

Specific Objectives

- Objective B1: **Develop 3D anisotropic models of CR transport.**

  A **profound revision of the conventional scenario currently implemented in phenomenological models** is needed. The non-local observables, in particular γ-rays, play a major role, and two recent analyses showed that Fermi-LAT data point towards a gradient in the CR proton slope with respect to the Galacto-centric radius, a feature that can be interpreted in terms of a radially-dependent scaling of the diffusion coefficient with rigidity [10]; as discussed above and presented in [9], this feature can be considered as a signature of ongoing anisotropic transport. On the theoretical side, the main motivation to consider anisotropic diffusion relies on QLT. The fundamental assumption behind QLT is that the power associated to the turbulent fluctuations of the magnetic field, δB, is much smaller than the one associated to the regular field B_0, and this assumption holds for the energies I will investigate (GeV - multi-TeV domain). In fact, while the turbulent spectrum is believed to be injected by supernova explosions at scales of O(100) pc, the dominant contribution to CR diffusion is given by resonant scattering at the scale of the particle Larmor radius. This scale, for rigidities $\sim$1 GV, roughly corresponds to an astronomical unit: Therefore, given the properties of the turbulent cascade, in the energies of interest the turbulent power is highly suppressed. **The crucial prediction of this theory is a highly anisotropic diffusive regime**, since QLT predicts the ratio between the perpendicular and parallel diffusion coefficients to be related to the power associated to the turbulent modes resonating with the particles carrying momentum p. Other processes could actually be at work and complicate this picture, without altering the bottom line: the compelling need for anisotropic diffusion.

  I will implement 3D anisotropic transport in `DRAGON2` and produce a set of transport models tuned on local and non-local CR data. The models will be based on: *(i)* a state-of-the art description of the 3D topology of the Galactic magnetic field: See in particular the recent ones presented in [11]; *(ii)* a realistic description of the spiral-arm structure of the Galaxy; *(iii)* a set of models for the rigidity scaling and normalization of the parallel and perpendicular diffusion coefficients. Numerical simulations play a major role in this context. I will mainly refer to [12,13], based on synthetic realizations of isotropic MHD turbulence. The models will be tuned on the local CR measurements provided by AMS. With the `HERMES` package, I will prepare the corresponding simulated **maps of the associated non-thermal emission over 20 orders of magnitude in energy**, from the MHz synchrotron emission all the way up to multi-TeV gamma rays and neutrinos, and I will exploit all available data from current and forthcoming experiments in the radio, gamma-ray and neutrino channels to test those models.

- Objective B2: **Implement CR transport models from first principles.**

  As mentioned above, a useful theoretical guideline for CR transport modeling is the QLT of pitch-angle scattering on Alfvénic turbulence: A simplified, isotropic and homogeneous diffusion equation inspired by this theory is usually

implemented in current numerical and semi-analytical codes, and both normalization and slope of the diffusion coefficient are not determined by first principles, but fitted to secondary-to-primary ratios (e.g. B/C).

However, **our picture of MHD turbulence has dramatically improved during the latest decades, and these developments can lead to a more modern and appropriate description of CR transport.** According to the current scenarios [15], MHD turbulence can be decomposed into Alfvén waves, slow magnetosonic modes, and isotropic fast magnetosonic modes, as theoretically demonstrated and numerically confirmed by several simulations. As a consequence of this paradigm, **the scattering efficiency on Alfvén waves turns out to be low because of the anisotropy of their cascade**, and **magnetosonic modes are expected to dominate** gyroresonance interaction. A non-linear theory of scattering on magnetosonic modes (NLT) has been developed e.g. in [16]; a seminal attempt to implement these phenomena in a numerical code, and compare the predictions with a wide set of data, has been recently presented in [17]. This theory naturally leads to a non-homogeneous, anisotropic diffusion scenario and a set of well-defined predictions for the diffusion tensor, depending on the local ISM properties. In fact, magnetosonic modes are subject to various damping processes that differ from a region to the other. NLT allows to compute the parallel and perpendicular diffusion coefficients in a wide rigidity range, depending on several parameters including the Alfvénic mach number.

I will implement these theoretical findings in the 3D anisotropic framework describe above and compare to experimental data.

The **first important building block of this research line has been recently released as a preprint** [23]. This work presents the first comprehensive calculation of the diffusion coefficients associated to scattering onto MHD modes as a function of a variety of relevant parameters, and an application of these coefficients in the (isotropic) version of `DRAGON`. The next step along this line will be the implementation of the same formalism within an *anistropic* setup.

I want to emphasize the radical **paradigm shift** brought by my proposal: The diffusion coefficients are now the output of a computation based on first principles, and not free parameters tuned to the data. Even more remarkably, the most promising aspect of the project is the realistic possibility to identify clear observable signatures.

My project is complementary with respect to other relevant and recently growing lines of research, in particular the study of non-linear CR self-confinement via streaming instability, which is expected to play a major role in the low-energy range [19]. While the focus of those studies is the multi-GeV domain, my project mainly deals with larger rigidities, in particular the ~ 100 GV to ~ 10 TV domain. These energies are in part already covered in the gamma-ray channel by Fermi-LAT data, more measurements are expected in the following year by the already operating H.E.S.S. and HAWC experiments, and from the CTA consortium in the forthcoming years. A **very detailed study of unique spectral signatures** potentially associated to the theory of CR scattering onto magnetosonic modes will be presented soon. In particular, a high-energy feature connected to the energy region where Alfvénic confinement start to overcome the magnetosonic one is particularly promising and will be addressed in a dedicated, forthcoming work.

- Objective B3: **Gamma-ray and neutrino analyses.**

  I have produced a set of phenomenological models of the radio/gamma/neutrino emission resulting from CR interactions with the interstellar environment in our Galaxy. The models are computed with the aforementioned set of codes and are based on the seminal paper [10] that identifies a trend towards a progressive hardening of the CR spectrum towards the inner Galaxy.

  That paper **pointed out for the first time a trend towards a significant hardening of the cosmic-ray spectrum in the inner Galaxy, inferred by gamma-ray data**. That paper was heavily discussed in the community. It opened up a debate about different theoretical interpretations, also in terms of anisotropic transport.

  On a phenomenological perspective, such a trend would imply a relevant and testable gamma-ray and neutrino signal from the inner Galaxy in the multi-TeV domain, much larger than conventional predictions, as discussed in detail in [24,25]. The trend was later confirmed by the Fermi-LAT collaboration. I have recently supervised a M.Sc. Student (together with Prof. C. Weniger at GRAPPA, Amsterdam) and better characterized the trend by means of a comprehensive analysis based on the code SkyFACT, which combines image reconstruction techniques with standard template fitting.

  I aim at exploiting the capability of the `HERMES` code to produce a set of state-of-the-art models for the high-energy gamma-ray and neutrino emission from the Galaxy, based on different assumptions on the CR sea and bracketing our uncertainties on the variations of the CR spectrum. The trend mentioned above is an important ingredient of these models. The first version of these models is presented in the aforementioned papers [24,25], and I am currently **leading a major further development and refinement on the gamma-ray side in close synergy with the activities of the CTA consortium, where I am also coordinating the CR science working group.**

The CTA consortium on the one hand, and the IceCube and Antares collaboration on the other hand, are using these models for the gamma-ray and neutrino sky as a reference, and they are used as important building block in several official papers of the two collaborations. In particular, on the neutrino side, there is an ongoing joint effort by the CTA and ANTARES collaborations aimed at confirming or constraining these models [26].

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Teaching statement

Daniele Gaggero

I have a relevant teaching experience in the context of Theoretical Astroparticle Physics and Cosmology.

- I coordinated a *hands-on session* about the numerical code `DRAGON` at the workshop **Codes in AStroPArticle Research (CASPAR)** help on 1519 September 2014 at DESY (Hamburg).
- I delivered classes of Astroparticle Physics — with particular focus on Cosmic-Ray acceleration and transport (theory and phenomenology) and indirect Dark Matter detection — in the **Petnica Summer School on Astrophysics and Astroparticles** (24 July - 2 August, 2015). The lectures were taught to senior undergraduate and early graduate students mainly from the Balkan region. The school was designed to include daily discussion sessions and independent work beside lectures.
- I delivered classes about Cosmic-Ray physics and Dark Matter searches at the **Winter School on Astroparticle Physics (WAPP)**, organized at the Cosmic Ray Laboratory of TIFR, Ooty (India) in association with the Bose Institute, Kolkata, during December 21-29, 2016 in Ooty. The school was directed to exceptionally bright students in the final year of M.Sc. interested in pursuing a research career in AstroParticle physics, and young research scholars working in this area of research.
- I gave lectures on Dark Matter searches and Cosmology at the GRAPPA Institute (University of Amsterdam) in the context of the M.Sc. course **GRAPPA student seminar** in Spring 2017 and Spring 2018. Within that course, I co-supervised (together with B. Kavanagh) **coding projects** related to different topics in **Astroparticle Physics and Cosmology**, including computation of J-factors, aspects of DM decoupling, computation of the acoustic peaks in the CMB power spectrum.
- I was responsible of the Laboratory class of **Electronic Circuits** for the B.Sc. (Grado) in Computer Science and Engineering at the *Escuela Politecnica Superior Alan Turing* in the Madrid Autonomous University (September - December 2019, 40h of lectures).
- I will deliver lectures on Cosmic Rays at the ISAPP Ph.D. school **Gamma rays to shed light on dark matter**, currently planned for July 2021.

As far as **mentoring/supervision** is concerned:

- I have informally co-supervised several projects carried on by undergraduate and PhD students during my PhD in Pisa, and during my post-doc at SISSA. In particular, I informally supervised M. Valli in three different projects at SISSA, resulting in three publications on refereed journals (*Gamma-ray sky points to radial gradients in cosmic-ray transport*, PRD 2015; *Towards a realistic astrophysical interpretation of the gamma-ray Galactic center excess*, JCAP 2015; *The Gamma-Ray and Neutrino Sky: A Consistent Picture of Fermi-LAT, Milagro, and IceCube Results*, ApJ Letters 2015).
- During my GRAPPA fellowship, I performed the **daily supervision two Master students** (J. Manshanden, M. Pothast) at the University of Amsterdam (GRAPPA astroparticle track), on projects related to primordial black hole searches and gamma-ray analyses. Both thesis projects resulted in publications on refereed journals.
- I am now **leading a group** consisting of **two Ph.D. students** (Ottavio Fornieri, Francesca Scarcella) on two different research lines regarding cosmic-ray transport on the one hand, and primordial black hole phenomenology on the other hand. The group included a **post-doc researcher** (Mathieu Boudaud, until January 2020), and a **M.Sc. student** (Tania Franco Munoz, thesis defended in July 2020). I have now started the supervision of two more M.Sc. students on project centered on the study of low-energy positrons in the Galaxy and primordial black hole merger rate at high redshift.

PIER PAOLO GIARDINO
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10/2020–Present	*IGFAE, Universidad de Santiago de Compostela*	Investigador asociado
01/2020–01/2029	*Abilitazione scientifica nazionale professore di seconda fascia*	Settore Concorsuale 02/A2 Validità: 07/01/2020 - 07/01/2029
10/2015–presente	*Brookhaven National Laboratory*	Research Associate
10/2013–09/2015	*Università di Roma3*	Assegnista di Ricerca
02/2013–06/2013	*Theory Division* *CERN*	Visitor

Con borsa della "Fondazione Angelo della Riccia"
Inviting Scientist: Prof. Gian Francesco Giudice

EDUCAZIONE

01/2010 - 12/2013	*Università di Pisa*	Dottorato di Ricerca in Fisica

Tesi: *Aspects of LHC phenomenology*
Relatore: Prof. Alessandro Strumia

10/2007-09/2009	*Università di Roma* *"La Sapienza"*	Laurea Specialistica in Fisica

Tesi: *Modelli di simmetrie di sapore in uno spaziotempo curvo con dimensioni extra.*
Relatore: Prof. Guido Martinelli
Voto: 110/110 e Lode

10/2004-09/2007	*Università di Roma* *"La Sapienza"*	Laurea Triennale in Fisica

Tesi: *Meccanica quantistica con l'integrale sui cammini. Applicazioni.*
Relatore: Prof. Massimo Testa
Voto: 110/110 e Lode

attività didattica

10/2020 - Presente	*Universidad de Santiago de Campostela*	Supervisore di tesi di dottorato
05/2020	*Universidad de Santiago de Campostela*	Docente ospite

Corso: *Fisica delle particelle II*

02/2012 - 06/2012	*Università di Pisa*	Esercitatore

Corso: *Fisica III* (Elettromagnetismo)
Titolare: Prof. Marco Sozzi

09/2011 - 01/2012	*Università di Pisa*	Esercitatore

Corso: *Fisica II* (Elettrostatica e Magnetostatica)
Titolare: Prof. Alessandro Strumia

02/2011 - 06/2011	*Università di Pisa*	Esercitatore

Corso: *Fisica III* (Elettromagnetismo)
Titolare: Prof. Marco Sozzi

attività di revisore

JHEP
European Physical Journal C
PRD

conferenze e workshop

10/2020	*Shanghai Jiao Tong University*	CEPC Workshop

Talk su **invito**: *NLO EWPO in SMEFT and Higgs trilinear coupling determination*

04/2020	*Universidad de Granada*	HEFT2020

Talk **plenario** su **invito**: *EWPO in the SMEFT at NLO.*

01/2020	*CERN*	3rd FCC Physics and Experiments Workshop

Talk **plenario** su **invito**: *Impact of NLO QCD/EW corrections in EFT fits.*

10/2019	*Sendai*	LCWS2019

Talk su **invito**: *EWPO with dim-6 operators.*

03/2019	*La Thuile*	Rencontres de Moriond

Talk **plenario** su **invito**: *QED and EW in precision measurements.*

12/2018	*Frascati National Laboratory*	7th Rome Joint Workshop

Talk **plenario** su **invito**: *Variation of α from a dark force.*

07/2018	*Michigan State University*	LoopFest 2018

Talk **plenario** su **invito**: *Title A New Analytical Approach to $gg \to HH$ at NLO*

05/2018	*Pittsburgh University*	2018 Phenomenology Symposium

Talk: *Higgs to ZZ and $Z\gamma$ in the SMEFT at NLO*

10/2017	*Brookhaven National Laboratory*	Brookhaven Forum 2017: In Search of New Paradigms

Talk: *Dark Matter in the Exo-Higgs scenario*

08/2017	*Kolymbari*	6th International Conference on New Frontiers in Physics

Talk su **invito**: *Single Higgs production at LHC as a probe for an anomalous Higgs self coupling*

05/2017	*Pittsburgh University*	2017 Phenomenology Symposium

Talk: *Probing the Higgs self coupling via single Higgs production at the LHC*

03/2017	*Toyama University*	Higgs as a probe of New Physics 2017

Talk **plenario**: *Probing the Higgs self coupling via single Higgs production at the LHC*

08/2016	*Chicago*	38th International Conference on High Energy Physics

Talk: *Single Higgs production at LHC as a probe for an anomalous Higgs self coupling*

05/2016	*Pittsburgh University*	2016 Phenomenology Symposium

Talk: *On the analytic two-loop corrections to double Higgs production in the SM*

03/2014	*Laboratori Nazionali di Frascati*	LNF Spring Institute 2014

Talk: *(Meta) stability of the electroweak vacuum*

04/2013 *Marseille* XXI International Workshop on DIS and Related Subjects

Talk su **invito**: *Higgs boson properties from hadron collider experiments*

SEMINARI

11/2020 *IFT, Universidad Autónoma de Madrid*
Talk: *Indirect search for New Physics: precision measurements and EFT.*

02/2019 *Padua University*
Talk: *Precision physics in the LHC era.*

02/2019 *Berlin Humboldt*
Talk: *Looking for the Higgs trilinear coupling: Higgs pair and single production.*

10/2018 *Zurich University*
Talk: *In search of the Higgs trilinear coupling: double and single Higgs processes.*

09/2018 *Michigan State University*
Talk: *In search of the Higgs trilinear coupling: double and single Higgs processes.*

09/2016 *Bonn University*
Talk: *Constraining the Higgs trilinear coupling*

09/2016 *ITP Heidelberg*
Talk: *Stability of the Electro-Weak Vacuum*

04/2013 *CP3-origin Odense*
Talk: *Is that a Standard Higgs? And now?*

PUBBLICAZIONI

1. **Higgs boson pair production at colliders: status and perspectives**,
B. Di Micco et al.,
Rev.Phys. 5 (2020) 100045,
arXiv:1910.00012 [hep-ph].

2. **Electroweak and QCD Corrections to Z and W pole observables in the SMEFT**,
S. Dawson and P. P. Giardino,
Phys. Rev. D **101**, no. 1, 013001 (2020),
arXiv:1909.02000 [hep-ph].

3. **A Numerical Routine for the Crossed Vertex Diagram with a Massive-Particle Loop**,
R. Bonciani, G. Degrassi, P. P. Giardino and R. Gröber,
Comput. Phys. Commun. **241** (2019) 122,
arXiv:1812.02698.

4. **SMEFT and the Drell-Yan Process at High Energy**,
S. Dawson, P. P. Giardino and A. Ismail,
Phys. Rev. D **99** (2019) no.3, 035044,
arXiv:1811.12260.

5. **Electroweak Corrections to Higgs to $\gamma\gamma$ and W^+W^- in the SMEFT**,
S. Dawson and P. P. Giardino,
Phys. Rev. D **98** (2018) no.9, 095005,
arXiv:1807.11504 [hep-ph].

6. **An Analytical Method for the NLO QCD Corrections to Double-Higgs Production**,
R. Bonciani, G. Degrassi, P. P. Giardino, R. Gröber,
Phys. Rev. Lett. **121** (2018) no.16, 162003,
arXiv:1806.11564 [hep-ph].

7. **Variation of α from a Dark Force**,
H. Davoudiasl and P. P. Giardino,
Phys. Lett. B **788**, 270 (2019),
arXiv:1804.01098 [hep-ph].

8. **Higgs Decays to ZZ and $Z\gamma$ in the SMEFT: an NLO analysis** ,
S. Dawson and P. P. Giardino,
Phys. Rev. D **97** (2018), no.9, 093003,
arXiv:1801.01136 [hep-ph].

9. **Unified Scenario for Composite Right-Handed Neutrinos and Dark Matter**,
H. Davoudiasl, P. P. Giardino, E. T. Neil and E. Rinaldi,
Phys. Rev. D **96** (2017) no.11, 115003,
arXiv:1709.01082 [hep-ph].

10. **Probing the top-quark width using the charge identification of b jets**,
P. P. Giardino and C. Zhang,
Phys. Rev. D **96** (2017), 011901(R),
arXiv:1702.06996 [hep-ph].

11. **Constraints on the trilinear Higgs self coupling from precision observables**,
G. Degrassi, M. Fedele and P. P. Giardino,
JHEP **1704** (2017) 155,
arXiv:1702.01737 [hep-ph].

12. **Asymmetric Dark Matter in Extended Exo-Higgs Scenarios**,
H. Davoudiasl, P. P. Giardino and C. Zhang,
Phys. Lett. B **772** (2017) 512,
arXiv:1612.05639 [hep-ph].

13. **Gravitational Waves from Primordial Black Holes and New Weak Scale Phenomena**,
H. Davoudiasl and P. P. Giardino,
Phys. Lett. B **768** (2017) 198,
arXiv:1609.00907 [gr-qc].

14. **Probing the Higgs self coupling via single Higgs production at the LHC**,
G. Degrassi, P. P. Giardino, F. Maltoni and D. Pagani,
JHEP **1612** (2016) 080,
arXiv:1607.04251 [hep-ph].

15. **Higgs-like boson at 750 GeV and genesis of baryons**,
H. Davoudiasl, P. P. Giardino and C. Zhang,
Phys. Rev. D **94** (2016) no.1, 015006,
arXiv:1605.00037 [hep-ph].

16. **On the two-loop virtual QCD corrections to Higgs boson pair production in the Standard Model**,
G. Degrassi, P. P. Giardino and R. Groeber,
Eur. Phys. J. C **76** (2016) no.7, 411,
arXiv:1603.00385 [hep-ph].

17. **The $m_W - m_Z$ interdependence in the Standard Model: a new scrutiny**,
G. Degrassi, P. Gambino and P. P. Giardino,
JHEP **1505** (2015) 154,
arXiv:1411.7040 [hep-ph].

18. **Investigating the near-criticality of the Higgs boson**,
D. Buttazzo, G. Degrassi, P. P. Giardino, G. F. Giudice, F. Sala, A. Salvio and A. Strumia,
JHEP **1312** (2013) 089,
arXiv:1307.3536 [hep-ph].

19. **The universal Higgs fit**,
P. P. Giardino, K. Kannike, I. Masina, M. Raidal and A. Strumia,
JHEP **1405** (2014) 046,
arXiv:1303.3570 [hep-ph].

20. **Is the resonance at 125 GeV the Higgs boson?**,
P. P. Giardino, K. Kannike, M. Raidal and A. Strumia,
Phys. Lett. B **718** (2012) 469,
arXiv:1207.1347 [hep-ph].

21. **Reconstructing Higgs boson properties from the LHC and Tevatron data**,
P. P. Giardino, K. Kannike, M. Raidal and A. Strumia,
JHEP **1206** (2012) 117,
arXiv:1203.4254 [hep-ph].

22. **Threshold Corrections to Hard Supersymmetric Relations**,
P. P. Giardino and P. Lodone,
Mod. Phys. Lett. A **29** (2014) no.19, 1450101,
arXiv:1112.2635 [hep-ph].

23. **LHC bounds on large extra dimensions**,
R. Franceschini, P. P. Giardino, G. F. Giudice, P. Lodone and A. Strumia,
JHEP **1105** (2011) 092,
arXiv:1101.4919 [hep-ph].

CONFERENCE PROCEEDINGS

1. **Single Higgs production at LHC as a probe for an anomalous Higgs self coupling**,
P. P. Giardino,
PoS ICHEP **2016** (2016) 406.

2. **Higgs boson properties from hadron colliders experiments**,
P. P. Giardino,
PoS DIS **2013** (2013) 096.

3. **Experimental bounds on large extra dimensions from di-jet event production in hadron collisions**,
P. P. Giardino and P. Lodone,
J. Phys. Conf. Ser. **323** (2011) 012017.

01/12/2020

Curriculum Vitae

Christian Gross

Education and Research Experience

since 06.'19	Postdoc researcher *at Pisa University*
12.'18 - 05.'19	visiting scientist at CERN
11.'17 - 11.'18	Postdoc researcher *at Pisa University*
10.'14 - 10.'17	Postdoc researcher *at University of Helsinki*
10.'11 - 09.'14	Postdoc researcher *at Universität Basel*
11.'09 - 09.'11	Postdoc researcher *at Technische Universität Dortmund*
11.'06 - 07.'09	Ph.D. studies in Physics *at Universität Hamburg* (grade: "very good") supervisors: Laura Covi and Jan Louis
04.'00 - 07.'06	Physics studies *Universität Heidelberg* (grade: "1.0 with distinction") supervisor for diploma thesis: Arthur Hebecker
03.'03 - 12.'03	Physics studies *at University of Adelaide*

Grants/Scholarships

– Research grant from *Basel University*: ca. CHF 78.000

– Research Fellowship from the *Deutsche Forschungsgemeinschaft* (German Research Foundation): ca. EUR 34.000 (declined)

– Scholarship from *Landesprogramm Baden-Württemberg* for one year study at Master's level at the *University of Adelaide*

Research Visits (> 1 week)

08.'19	CERN
07.'19	MITP, Mainz
06-10.'18	CERN
06.'17	LPT, Orsay
08.'16	MITP, Mainz
04.'15	LPT, Orsay
12.'14	LPT, Orsay
06.'13	GGI, Florence
07.-09.'11	Boston University

Selected Seminar Talks and Talks at Conferences/Workshops

07.'19 MITP Mainz, workshop "Indirect Searches for New Physics across the Scale", *talk: "ANITA and Dark Matter"*

05.'19 CERN, BSM forum, *talk: "New Physics for ANITA"*

11.'18 Scuola Normale Superiore Pisa, theory seminar, *talk: "Higgs portal Dark Matter"*

06.'17 LPTHE Paris, theory seminar, *talk: "Dark matter from dark gauge groups"*

06.'17 LPT Orsay, theory seminar, *talk: "Dark matter from dark gauge groups"*

05.'17 Warsaw, Planck 2017 conference, *invited talk: "Dark matter from dark gauge groups"*

04.'17 Portoroz, conference "New physics at the junction of flavor and collider phenomenology", *invited talk: "Dark matter from dark gauge groups"*

02.'17 Tallinn, theory seminar, *talk: "Dark matter from hidden gauge groups"*

09.'16 Hamburg, DESY Theory Workshop 2016, *talk: "Multicomponent WIMP Dark Matter from Gauge Symmetries"*

09.'16 Mainz, MITP program "Effective Field Theories as Discovery Tools", *talk: "Multicomponent Dark Matter from Gauge Symmetry"*

05.'16 Valencia, Planck 2016 conference, *talk: "Drell-Yan Constraints on New Electroweak States and the Di-photon Anomaly"*

04.'16 Hamburg, DESY seminar, *talk: "Gauge fields as dark matter"*

11.'15 Helsinki, department seminar, *talk: "Gauge fields as dark matter"*

10.'15 Albufeira, conference "The Standard Theory and Beyond in the LHC Era", *talk: "Gauge fields as dark matter"*

09.'15 Hamburg, DESY Theory Workshop 2015, *talk: "Gauge fields as dark matter"*

05.'15 Tampere, particle cosmology meeting, *talk: "Gauge fields as dark matter"*

05.'15 Ioannina, Planck 2015 conference, *talk: "A second Higgs from the Higgs portal"*

04.'15 LPT Orsay, Particle Physics Seminar, *talk: "A second Higgs from the Higgs portal"*

12.'14 Helsinki, department seminar, *talk: "SUSY GUT models with non-Abelian flavour symmetry"*

07.'13 Niigata, FLASY13 workshop, *talk: "A flavor GUT model with* $\theta_{13}^{\rm PMNS} = \theta_C/\sqrt{2}$*"*

09.'12 Hamburg, DESY Theory Workshop 2012, *talk: "Squark Flavor Implications from* $\bar{B} \to \bar{K}^{(*)} l^+ l^-$*"*

08.'12 Beijing, SUSY 2012 conference, *talk: "Squark Flavor Implications from* $\bar{B} \to \bar{K}^{(*)} l^+ l^-$*"*

05.'12 Cambridge, HEP phenomenology joint Cavendish-DAMTP seminar, *talk: "Squark Flavor Implications from* $\bar{B} \to \bar{K}^{(*)} l^+ l^-$*"*

09.'11 Fermilab, SUSY 2011 conference, *talk: "Squark flavor constraints from* $\bar{B} \to \bar{K}^{(*)} l^+ l^-$*"*

05.'11 DESY Hamburg, LHC-D SUSY/BSM + Neutrinos and LFV workshop, *talk: "Flavorful hybrid anomaly-gravity mediation"*

04.'11 Mainz, Theory Seminar, *talk: "Flavorful hybrid anomaly-gravity mediation"*

03.'11 MPI für Physik, Munich, Astroparticle Seminar, *talk: "Flavorful hybrid anomaly-gravity mediation"*

12.'10 Rome, Discrete 2010 conference, *talk: "Hybrid anomaly-gravity mediation"*

05.'10 MPI Munich, Theory Seminar, *talk: "de Sitter vacua and inflation in no-scale string models"*

09.'09 TU Dortmund, Theory Seminar, *talk: "de Sitter vacua and inflation in no-scale string models"*

05.'09	Padua, Planck 2009 conference, *talk: "de Sitter vacua in no-scale string models without uplifting"*
03.'09	Hamburg, SFB 676 meeting, *talk: "de Sitter vacua and inflation in supergravity and string theory"*
03.'08	Bad Honnef, "Beyond the Standard Model" workshop, *talk: "de Sitter vacua in no-scale supergravity from string theory"*
05.'06	Heidelberg, "Beyond the Standard Model" seminar, *talk: "Stabilizing supersymmetric orbifold models"*

Teaching

fall '15	University of Helsinki *Tutorial for lecture "Theories in Particle Physics" by O. Lebedev*
spring '15	University of Helsinki **Lecture** *"Physics beyond the Standard Model" (jointly with V. Keus)*
fall '13	Universität Basel *Tutorial for lecture "Early Universe Cosmology" by S. Antusch*
spring '13	Universität Basel *Tutorial for lecture "Higher Quantum Mechanics" by S. Antusch*
fall '12	Universität Basel *Tutorial for lecture "Theoretical Elementary Particle Physics" by S. Antusch*
spring '12	Universität Basel *Tutor for undergraduate seminar "The Early Universe" by S. Antusch*
spring '12	Universität Basel *Tutorial for lecture "Higher Quantum Mechanics" by S. Antusch*
summer '11	TU Dortmund *Tutorial for lecture "Higher Quantum Mechanics" by G. Hiller*
summer '10	TU Dortmund *Tutorial for lecture "Quantum Field Theory" by A. Lenz*
winter '05	Universität Heidelberg *Tutorial for lecture "Quantum Mechanics" by O. Nachtmann*
summer '05	Universität Heidelberg *Tutorial for lecture "Theoretical Mechanics" by A. Hebecker*

Other

-co-organizer of online seminar series "Newton 1665" `https://agenda.infn.it/event/22106/`
-co-organizer of seminars during my postdoc stay at Basel University
-outreach activity "Saturday morning physics" during my postdoc stay at Basel University

Research papers under review

C. Gross, A. Strumia, D. Teresi and M. Zirilli
Is negative kinetic energy meta-stable?
arXiv:2007.05541 [hep-th]

Research papers published in peer-reviewed journals

M. Flores, C. Gross, J. S. Kim, O. Lebedev and S. Mondal
Multi-Higgs Boson Probes of the Dark Sector
Phys. Rev. D **102** (2020) no.1, 015004; [arXiv:1912.02204 [hep-ph]]

D. Buttazzo, L. Di Luzio, P. Ghorbani, C. Gross, G. Landini, A. Strumia, D. Teresi, J. W. Wang
Scalar gauge dynamics and Dark Matter
JHEP **2001** (2020) 130; [arXiv:1911.04502 [hep-ph]]

A. Crivellin, C. Gross, S. Pokorski and L. Vernazza
Correlating ϵ'/ϵ to hadronic B decays via $U(2)^3$ flavour symmetry
Phys. Rev. D **101** (2020), 015022; [arXiv:1909.02101 [hep-ph]]

J. M. Cline, C. Gross, W. Xue
Can the ANITA anomalous events be due to new physics?
Phys. Rev. D **100** (2019) no.1, 015031; [arXiv:1904.13396 [hep-ph]]

C. Gross, A. Mitridate, M. Redi, J. Smirnov, A. Strumia
Cosmological Abundance of Colored Relics
Phys. Rev. D **99** (2019) no.1, 016024; [arXiv:1811.08418 [hep-ph]]

C. Gross, A. Polosa, A. Strumia, A. Urbano and W. Xue
Dark Matter in the Standard Model?
Phys. Rev. D **98** (2018) no.6, 063005; [arXiv:1803.10242 [hep-ph]]

C. Gross, O. Lebedev and T. Toma
Cancellation Mechanism for Dark-Matter-Nucleon Interaction
Phys. Rev. Lett. **119** (2017) no.19, 191801; [arXiv:1708.02253 [hep-ph]]
(selected by Phys. Rev. Lett. as editors' suggestion)

G. Arcadi, C. Gross, O. Lebedev, S. Pokorski and T. Toma
Evading Direct Dark Matter Detection in Higgs Portal Models
Phys. Lett. B **769** (2017) 129; [arXiv:1611.09675 [hep-ph]]

G. Arcadi, C. Gross, O. Lebedev, Y. Mambrini, S. Pokorski and T. Toma
Multicomponent Dark Matter from Gauge Symmetry
JHEP **1612** (2016) 081; [arXiv:1611.00365 [hep-ph]]

C. Gross, O. Lebedev and J. M. No
Drell-Yan Constraints on New Electroweak States: LHC as a $pp \to \ell^+\ell^-$ Precision Machine
Mod. Phys. Lett. A**32** (2017), 1750094; [arXiv:1602.03877 [hep-ph]]

C. Gross, O. Lebedev and M. Zatta
Higgs-inflaton coupling from reheating and the metastable Universe
Phys. Lett. B **753** (2016) 178; [arXiv:1506.05106 [hep-ph]]

C. Gross, O. Lebedev and Y. Mambrini
Non-Abelian gauge fields as dark matter
JHEP **1508** (2015) 158; [arXiv:1505.07480 [hep-ph]]

A. Falkowski, C. Gross and O. Lebedev
A second Higgs from the Higgs portal
JHEP **1505** (2015) 057; [arXiv:1502.01361 [hep-ph]]

S. Antusch, C. Gross, V. Maurer and C. Sluka
Inverse neutrino mass hierarchy in a flavour GUT model
Nucl. Phys. B **879** (2014) 19; [arXiv:1306.3984 [hep-ph]]

S. Antusch, C. Gross, V. Maurer and C. Sluka
A flavour GUT model with $\theta_{13}^{\rm PMNS} = \theta_C/\sqrt{2}$
Nucl. Phys. B **877** (2013) 772; [arXiv:1305.6612 [hep-ph]]

C. Gross, G. Marques Tavares, M. Schmaltz and C. Spethmann
Light axigluon explanation of the Tevatron $t\bar{t}$ asymmetry and multijet signals at the LHC
Phys. Rev. D **87** (2013) 014004; [arXiv:1209.6375 [hep-ph]]

A. Behring, C. Gross, G. Hiller and S. Schacht
Squark Flavor Implications from $\bar{B} \to \bar{K}^{(*)} l^+ l^-$
JHEP **1208** (2012) 152; [arXiv:1205.1500 [hep-ph]]

S. Antusch, C. Gross, V. Maurer and C. Sluka
$\theta_{13}^{\mathrm{PMNS}} = \theta_C/\sqrt{2}$ from GUTs
Nucl. Phys. B **866**, 255 (2013); [arXiv:1205.1051 [hep-ph]]

C. Gross and G. Hiller
Flavorful hybrid anomaly-gravity mediation
Phys. Rev. D **83** (2011) 095015; [arXiv:1101.5352 [hep-ph]]

C. Gross and A. Hebecker
A Realistic Unified Gauge Coupling from the Micro-Landscape of Orbifold GUTs
Nucl. Phys. B **821**, 354 (2009); [arXiv:0812.4267 [hep-ph]]

L. Covi, M. Gómez-Reino, C. Gross, G. A. Palma and C. A. Scrucca
Constructing de Sitter vacua in no-scale string models without uplifting
JHEP **0903**, 146 (2009); [arXiv:0812.3864 [hep-th]]

L. Covi, M. Gómez-Reino, C. Gross, J. Louis, G. A. Palma and C. A. Scrucca
Constraints on modular inflation in supergravity and string theory
JHEP **0808**, 055 (2008); [arXiv:0805.3290 [hep-th]]

L. Covi, M. Gómez-Reino, C. Gross, J. Louis, G. A. Palma and C. A. Scrucca
De Sitter vacua in no-scale supergravities and Calabi-Yau string models
JHEP **0806**, 057 (2008); [arXiv:0804.1073 [hep-th]]

Theses

C. Gross
De Sitter vacua and inflation in no-scale string models
PhD thesis (at Hamburg University), 2009; DESY-THESIS-2009-029
http://www-library.desy.de/preparch/desy/thesis/desy-thesis-09-029.pdf

C. Gross
Radius stabilization for supersymmetric gauge theories on 5d orbifolds
Diploma thesis (at Heidelberg University), 2006

Andrea Leonardo Guerrieri — CV

Contact Information

ICTP-SAIFR and IFT-UNESP
Rua Dr. Bento Teobaldo Ferraz 271
Bloco 2 - Barra Funda
01140-070 São Paulo, SP Brazil

Research Interests

My research focuses on the study of non-perturbative properties of the S-matrix of generic QFTs using numerical bootstrap techniques.

Employments

Postdoctoral Researcher, **Tel-Aviv University**, Tel-Aviv, IL	2020–
Postdoctoral Researcher, **ICTP-SAIFR and IFT-UNESP**, São Paulo, BR	2017–2020
Associate member, Simons Collaboration on the Non-perturbative Bootstrap	2017–
Postdoctoral researcher, **Chulalongkorn University**, Bangkok, TH	2016–2017
Associate member, INFN sez. Roma 2	2014–2016
Associate member, INFN sez. Roma 1	2013–2014

Education

PhD in Physics, **Università di Roma Tor Vergata**, Rome, IT — 2013–2016
Thesis: *Soft theorems: from strings to conformal quantum fields*
Advisor: Massimo Bianchi

MSc in Physics, **Sapienza Università di Roma**, Rome, IT — 2011–2013
Thesis: *Computation of the static quark-antiquark potential on the lattice*
Supervisor: Massimo Testa
mark 110/110 cum laude

BSc in Physics, **Sapienza Università di Roma**, Rome, IT — 2008–2011
mark 110/110 cum laude

Visiting

Perimeter Insitute, Waterloo, ON–CA	Jun.–Aug. 2019
EPFL, Lausanne, CH	Mar. 2019
Perimeter Institute, Waterloo, ON–CA	Oct.–Nov. 2018
Perimeter Institute, Waterloo, ON–CA	Nov.–Dec. 2017
EPFL, Lausanne, CH	Sep.–Oct. 2017
Aristotle University, Thessaloniki, EH	Mar.–Apr. 2016
Cern Theory Group, CERN	May–Jun. 2014

Grants & Honors

"Novel approaches to strongly coupled field theories"
SPRINT 3/2017 Grant Fapesp — 2018

Short Term Scientific Missions Grant
COST Action, MP1210 The String Theory Universe — 2016

Percorso di Eccellenza per il corso di Laurea in Fisica
"Excellent student award in Physics", La Sapienza Università di Roma — 2010–2011

Publications

[1] "'Dual S-matrix Bootstrap I: 2D Theory", A. L. Guerrieri, A. Homrich and P. Vieira, JHEP **11** (2020), 084, arXiv:2011.02802 [hep-th]

"Flux Tube S-matrix Bootstrap," J. Elias Miro, A. L. Guerrieri, A. Hebbar, J. Penedones and P. Vieira, Phys. Rev. Lett. **123**, no. 22, 221602 (2019), arXiv:1906.08098 [hep-th]

"Bootstrapping QCD Using Pion Scattering Amplitudes," A. L. Guerrieri, J. Penedones and P. Vieira, Phys. Rev. Lett. **122**, no. 24, 241604 (2019), arXiv:1810.12849 [hep-th]

"On the exactness of soft theorems," A. L. Guerrieri, Y. t. Huang, Z. Li and C. Wen, JHEP **1712**,

[1] The authors always appear in alphabetic order.

052 (2017), arXiv:1705.10078 [hep-th]

"The analytic structure of conformal blocks and the generalized Wilson-Fisher fixed points," F. Gliozzi, A. L. Guerrieri, A. C. Petkou and C. Wen, JHEP **1704**, 056 (2017), arXiv:1702.03938 [hep-th]

"Generalized Wilson-Fisher Critical Points from the Conformal Operator Product Expansion," F. Gliozzi, A. Guerrieri, A. C. Petkou and C. Wen, Phys. Rev. Lett. **118**, no. 6, 061601 (2017), arXiv:1611.10344 [hep-th]

"Exploring soft constraints on effective actions," M. Bianchi, A. L. Guerrieri, Y. t. Huang, C. J. Lee and C. Wen, JHEP **1610**, 036 (2016), arXiv:1605.08697 [hep-th]

"The free σCFTs," A. Guerrieri, A. C. Petkou and C. Wen, JHEP **1609**, 019 (2016), arXiv:1604.07310 [hep-th]

"On the soft limit of closed string amplitudes with massive states," M. Bianchi and A. L. Guerrieri, Nucl. Phys. B **905**, 188 (2016), arXiv:1512.00803 [hep-th]

"Observation of light nuclei at ALICE and the X(3872) conundrum," A. Esposito, A. L. Guerrieri, L. Maiani, F. Piccinini, A. Pilloni, A. D. Polosa and V. Riquer, Phys. Rev. D **92**, no. 3, 034028 (2015), arXiv:1508.00295 [hep-ph]

"Color structure of Yang-Mills theory with static sources in a periodic box," L. Giusti, A. L. Guerrieri, S. Petrarca, A. Rubeo and M. Testa, Phys. Rev. D **92**, no. 3, 034515 (2015), arXiv:1508.00152 [hep-lat]

"On the soft limit of open string disk amplitudes with massive states," M. Bianchi and A. L. Guerrieri, JHEP **1509**, 164 (2015), arXiv:1505.05854 [hep-th]

"Note on the newly observed $Y(4220)$ resonance," R. Faccini, G. Filaci, A. L. Guerrieri, A. Pilloni and A. D. Polosa, Phys. Rev. D **91**, no. 11, 117501 (2015), arXiv:1412.7196 [hep-ph]

"Four-Quark Hadrons: an Updated Review," A. Esposito, A. L. Guerrieri, F. Piccinini, A. Pilloni and A. D. Polosa, Int. J. Mod. Phys. A **30**, 1530002 (2015), arXiv:1411.5997 [hep-ph]

"Probing the nature of $Z_c^{(\prime)}$ states via the $\eta_c\,\rho$ decay," A. Esposito, A. L. Guerrieri and A. Pilloni, Phys. Lett. B **746**, 194 (2015), arXiv:1409.3551 [hep-ph]

"Production of Tetraquarks at the LHC," A. L. Guerrieri, F. Piccinini, A. Pilloni and A. D. Polosa, Phys. Rev. D **90**, no. 3, 034003 (2014), arXiv:1405.7929 [hep-ph]

ArXiv & Preprints

"S-matrix Bootstrap for Effective Field Theories: Massless Pions," A. L. Guerrieri, J. Penedones and P. Vieira, arXiv:2011.02802 [hep-th]

Conference Proceedings

"On the soft limit of tree-level string amplitudes," M. Bianchi and A. L. Guerrieri, The Fourteenth Marcel Grossmann Meeting, pp. 4157-4163 (2017), arXiv:1601.03457 [hep-th]

"The $Z_c^{(\prime)} \to \eta_c\rho$ decay as a discriminant between tetraquarks and meson molecules," A. Esposito, A. L. Guerrieri and A. Pilloni, Proceedings, 7th International Workshop on Charm Physics, CHARM 2015, arXiv:1508.07058 [hep-ph]

"Soft behavior of string amplitudes with external massive states," A. L. Guerrieri, Nuovo Cim. C **39**, no. 1, 221 (2016), Proceedings, 24th Conference on High Energy Physics (IFAE 2015), arXiv:1507.08829 [hep-th]

"Flavored tetraquark spectroscopy," A. L. Guerrieri, M. Papinutto, A. Pilloni, A. D. Polosa and N. Tantalo, PoS LATTICE **2014**, 106 (2015), arXiv:1411.2247 [hep-lat]

"$q\bar{q}$-potential: a numerical study," A. L. Guerrieri, S. Petrarca, A. Rubeo and M. Testa, PoS LATTICE **2013**, 470 (2014), arXiv:1311.1325 [hep-lat]

Coordination Activity

Organizer

Workshop on S-matrix Bootstrap, ICTP-SAIFR/IFT-UNESP, São Paulo, BR — 9–13 Sep. 2019

Workshop on S-matrix Bootstrap IV, (postponed due to Covid pandemic) — 2021

Organizer of the Tel-Aviv University Seminars.

Organizer of the joint ICTP Trieste-Sao Paulo Journal Club. — Mar–Jul 2020

Organizer of the theory group Journal Club at ICTP-SAIFR. 2019

Conference talks

Invited Talk: "Flux Tube S-matrix Bootstrap"
Large N theories and strings, PCTS, Princeton, NJ – US 19 Feb. 2020

Invited Talk: "Bootstrapping Flux-Tubes" – video link
Workshop on S-matrix Bootstrap, ICTP-SAIFR/IFT-UNESP, São Paulo, BR 11 Sep. 2019

Invited Talk: "Flux Tube S-matrix Bootstrap" – video link
Bootstrap 2019, Perimeter Institute, Waterloo, ON–CA 19 Jul. 2019

Invited Talk:"Bootstrapping the QCD Flux-Tube"
Nonperturbative methods for conformal theories, IIP, Natal, BR 4 Apr. 2019

Invited Talk:"The pion lake"
Bootstrap 2018, Caltech, Pasadena, US 16 Jul. 2018

Invited Talk:"Bounding the space of S-matrices: Rebooting the Bootstrap" – slides
Joint Rome Seminar, Dip. di Fisica, La Sapienza, Rome, IT 21 Dec. 2017

Invited Talk:"Constraining effective actions via scattering amplitudes"– slides
XII-th Quark Confinement and Hadron Spectrum, Thessaloniki, GR 2 Sep. 2016

Invited Talk:"Soft behaviour of string amplitudes with massive insertions"
Mathematics and Physics at the Crossroads, INFN Frascati, IT 15 Jun. 2016

"On the soft limit of string amplitudes"
Fourteenth Marcel Grossmann Meeting, Rome, IT 17 Jul. 2015

"Production of tetraquarks at LHC" – slides
Incontro sulla fisica con ioni pesanti a LHC, Bologna, IT 27 May 2015

"Tetraquark spectroscopy at Belle II"
2nd Belle II Theory Interface Platform (B2TiP), Krakow, PL 27 Apr. 2015

"Flavored tetraquark spectroscopy" – slides
Lattice 2014, Columbia University, New York, NY-US 25 Jun. 2014

Seminars

"EFT Bootstrap and the pion S-matrix"
Tel-Aviv University theory group seminar, Tel-Aviv, IL 22 Oct. 2020

"Exploring the Dual S-matrix Bootstrap"
Bootstrap Zoom seminar – Youtube link, 7 Oct. 2020

"Bootstrapping EFTs: Pion amplitudes and QCD strings"
Università di Roma Tor Vergata, Rome, IT 20 Dec 2019

"Bootstrapping QCD: the Lake, the Peninsula and the Kink"
Particle Physics journal club, ICTP-SAIFR, São Paulo, BR 2 May 2019

"Bootstrapping QCD: the pion lake and the peninsula"
Purdue University, West Lafayette, IN–US 13 Nov. 2018

"The pion lake and the peninsula" – video link
Perimeter Institute, Waterloo, ON–CA 1 Nov. 2018

"Soft theorems and string theory"
Journal Club XXIX Ciclo, Univ. di Roma Tor Vergata, Rome, IT 16 Sep. 2015

"Exotic spectroscopy and Lattice QCD"
Università di Pavia, Pavia, IT 9 Jun. 2015

"Exotic hadron spectroscopy"
Università di Roma Tor Vergata, Rome, IT 9 Jan. 2015

Conference Posters

"Soft behavior of string amplitudes with massive external states" – (poster)
IFAE 2015, Rome, IT 8–10 Apr. 2015
Eurostring 2015, Cambridge, UK 23–27 Mar. 2015

"Classification of quark-antiquark sources in Yang-Mills Theories"

Lattice 2013, Mainz, DE 29 Jul.–3 Aug. 2013

Conferences, Workshops, Schools attended

Bootstrap 2020 (zoom conference), Harvard, MA–US	1–26 June 2020
Large N theories and strings: conformal, confining and holographic, PCTS	19–22 Feb. 2020
Simons Collaboration on the Nonperturbative Bootstrap Annual Meeting 2019	7–8 Nov. 2019
Developments in the Numerical Bootstrap, Stony Brook, NY–US	4–6 Nov. 2019
Bootstrap 2019, Perimeter Institute, Waterloo, ON–CA	15 Jul.–2 Aug. 2019
Nonperturbative methods for conformal theories, IIP, Natal, BR	1–12 Apr. 2019
Simons Collaboration on the Nonperturbative Bootstrap Annual Meeting	8–9 Nov. 2018
Bootstrap 2018, Caltech, Pasadena, CA–US	2–27 Jul. 2018
Simons Collaboration Project Meeting: S-matrix Bootstrap, Azores, PT	20–25 May 2018
6-th Rome Joint Workshop: Weird Theoretical Ideas, INFN Frascati, IT	18–20 Dec. 2017
Simons Collaboration on the Nonperturbative Bootstrap Annual Meeting	9–10 Nov. 2017
Bootstrap 2017, São Paulo, BR	15 May–15 Jun. 2017
Discrete Geometry and Statistics, Chulaongkorn Univ., Bangkok, TH	30 Jan.–3 Feb. 2017
6-th Bangkok Workshop on high-energy th., Chulalongkorn Univ, Bangkok, TH	9–13 Jan. 2017
XII-th Quark Confinement and Hadron Spectrum, Thessaloniki, GR	28 Aug.–2 Sep. 2016
Amplitudes 2016 International Conference, Nordita, Stockholm, SE	4–8 Jul. 2016
TFI 2015, Univ. di Napoli Federico II, Naples, IT	18–20 Nov. 2015
Mathematics and Physics at the Crossroads, INFN Frascati, IT	6 Jun.–29 Jul. 2016
Fourteenth Marcel Grossmann Meeting, Rome, IT	12–18 Jul. 2015
Strings 2015, ICTS-TIFR, Bengaluru, IN	22–26 Jun. 2015
Incontro sulla fisica con ioni pesanti a LHC, Bologna, IT	26–27 May 2015
2nd Belle II Theory Interface Platform (B2TiP), Krakow, PL	27–29 Apr. 2015
IFAE 2015, Rome, IT	8–10 Apr. 2015
Eurostring 2015, Cambridge, UK	23–27 Mar. 2015
CERN Winter School on Supergravity, Strings and Gauge Theories 2015	2–6 Feb. 2015
Quarkonium 2014, CERN	10–14 Nov. 2014
INFN Piano Triennale 2015–2017, Trento, IT	7–8 Nov. 2014
Lattice 2014, Columbia University, New York, NY–US	23–28 Jun. 2014
INFN What Next, Rome, IT	7–8 Apr. 2014
Lattice Practices, DESY, Zeuthen, DE	5–7 Mar. 2014
Lattice QCD and hadron physics, ECT*, Trento, IT	14–16 Jan. 2014
Lattice 2013, Mainz, DE	29 Jul.–3 Aug. 2013

Research Computing Skills

- Proficient in Mathematica programming
- Proficient in SDPB (semi-definite programming code)
- Very good level of programming in C and C++
- Very good level of Linux and script languages

Languages

Italian: mother tongue

English: fluent

Portuguese: fluent

References

Massimo Bianchi
Full Professor
Università di Roma Tor Vergata, Rome, IT
Via della Ricerca Scientifica 1
00133 Roma (RM), Italy
massimo.bianchi@roma2.infn.it

Joao Penedones
Professor
Fields and String Laboratory, Institute of Physics
École Polytechnique Fédérale de Lausanne (EPFL)
Rte de la Sorge, BSP 728, CH-1015 Lausanne, Switzerland
joao.penedones@epfl.ch

Pedro Vieira
Professor
Perimeter Institute for Theoretical Physics
31 Caroline St N Waterloo, Ontario N2L 2Y5, Canada;
Visiting Professor
Instituto de Fisica Teorica, UNESP
ICTP South American Institute for Fundamental Research
Rua Dr Bento Teobaldo Ferraz 271, 01140-070, São Paulo, Brazil
pedrogvieira@gmail.com

Curriculum Vitae Europass

Informazioni personali

Cognome(i/)/Nome(i)	**Javarone Marco Alberto**
Indirizzo(i)	—
Telefono(i)	— Mobile ——
E-mail	——
Cittadinanza	Italiana
Data di nascita	——
Sesso	M

Esperienza professionale

Date	Dal 01/07/2019 al 30/09/2020
Lavoro o posizione ricoperti	Lecturer in Applied Mathematics
Principali attività e responsabilità	Attività di ricerca e didattica
Nome e indirizzo del datore di lavoro	University College London (UCL), London, UK
Tipo di attività o settore	Università

Date	10/09/2018 - 15/03/2019
Lavoro o posizione ricoperti	Senior Lecturer in Statistical Physics
Principali attività e responsabilità	Attività di ricerca e didattica
Nome e indirizzo del datore di lavoro	Coventry University, Coventry, UK
Tipo di attività o settore	Università

Date	10/09/2018 - 09/09/2018
Lavoro o posizione ricoperti	Research Associate
Principali attività e responsabilità	Attività di ricerca
Nome e indirizzo del datore di lavoro	University of Kent, Chatam, UK
Tipo di attività o settore	Università

Date	Aprile 2018
Lavoro o posizione ricoperti	Visiting Lecturer
Principali attività e responsabilità	Attività didattica e scientifica
Nome e indirizzo del datore di lavoro	ITMO University, St Petersburg, Russia
Tipo di attività o settore	Università

Date	08/01/2018 - 22/12/2018
Lavoro o posizione ricoperti	Senior Researcher
Principali attività e responsabilità	Attività di ricerca su bitcoin networks e blockchain based technologies
Nome e indirizzo del datore di lavoro	nChain, London, UK
Tipo di attività o settore	Azienda

Date	03/04/2017 - 31/01/2018
Lavoro o posizione ricoperti	Senior Research Fellow
Principali attività e responsabilità	Attività di ricerca
Nome e indirizzo del datore di lavoro	University of Hertfordshire, Hatfield, UK
Tipo di attività o settore	Università

Date	01/10/2014 - 30/09/2015
Lavoro o posizione ricoperti	Assegno di ricerca
Principali attività e responsabilità	Attività di ricerca
Nome e indirizzo del datore di lavoro	Università di Sassari, Sassari, Italia
Tipo di attività o settore	Università

Date	19/05/2014 - 19/06/2014
Lavoro o posizione ricoperti	Invited Researcher
Principali attività e responsabilità	Attività di ricerca
Nome e indirizzo del datore di lavoro	Ecole Polytechnique de Paris, Paris, France
Tipo di attività o settore	Università

Date	16/07/2012 - 15/07/2014
Lavoro o posizione ricoperti	Assegno di ricerca
Principali attività e responsabilità	Attività di ricerca
Nome e indirizzo del datore di lavoro	Università di Sassari, Sassari, Italia
Tipo di attività o settore	Università

Date	AA 2016/2017 e AA 2017/2018
Lavoro o posizione ricoperti	Professore a Contratto
Principali attività e responsabilità	Attività didattica in Fisica
Nome e indirizzo del datore di lavoro	Università di Sassari, Sassari, Italia
Tipo di attività o settore	Università

Istruzione e formazione

Date	01/01/2014 - 31/12/2016
Titolo della qualifica rilasciata	Dottore di Ricerca in Matematica e Informatica. Indirizzo: Matematica, Valutazione: SUMMA CUM LAUDE
Principali tematiche/competenza professionali possedute	Attività di formazione alla ricerca e attività di ricerca in Fisica Matematica e Fisica Statistica dei sistemi complessi
Nome e tipo d'organizzazione erogatrice dell'istruzione e formazione	Università di Cagliari, Cagliari, Italia
Livello nella classificazione nazionale o internazionale	Scuola di Dottorato

Date	03/2010 - 02/2013
Titolo della qualifica rilasciata	Dottore di Ricerca in Ingegneria Elettronica e Informatica. Indirizzo: Sistemi di Elaborazione delle Informazioni, ING-INF/05. Valutazione: Eccellente
Principali tematiche/competenza professionali possedute	Attività di formazione alla ricerca e attività di ricerca in Reti Complesse e loro applicazione ai sistemi sociali
Nome e tipo d'organizzazione erogatrice dell'istruzione e formazione	Università di Cagliari, Cagliari, Italia
Livello nella classificazione nazionale o internazionale	Scuola di Dottorato

Capacità e competenze personali

Madrelingua **Italiano**

Altra(e) lingua(e) **Inglese e Francese**

Autovalutazione	Comprensione		Parlato		Scritto
Livello europeo (*)	Ascolto	Lettura	Interazione orale	Produzione orale	
Inglese	Ottimo	Ottimo	Ottimo	Ottimo	
Francese	Base	Buono	Base	Base	

(*) Quadro comune europeo di riferimento per le lingue

Capacità e competenze informatiche	Linguaggi di programmazione Python, C. Utilizzo database SQL, NOSQL, utilizzo API, tecniche di machine learning quali Neural Networks.
Patente	A,B

Elenco Pubblicazioni

Titolo, autori, journal/conferenza, anno	A mean field approach to model levels of consciousness from EEG recordings. Marco A. Javarone et al., Journal of Statistical Mechanics: Theory and Experiment, 083405, 2020
Titolo, autori, journal/conferenza, anno	Strategy equilibrium in dilemma games with off-diagonal payoff perturbations, M.A. Amaral and Marco A. Javarone, Physical Review E, 101(6), 2020
Titolo, autori, journal/conferenza, anno	Heterogeneity in evolutionary games: an analysis of the risk perception, M.A. Amaral and Marco A. Javarone, Proceedings of the Royal Society A 476 (2237), 20200116, 2020
Titolo, autori, journal/conferenza, anno	The Host-Pathogen Game: an evolutionary approach to biological competitions. Marco Alberto Javarone. Frontiers in Physics 6(94), 2018
Titolo, autori, journal/conferenza, anno	Heterogeneous update mechanisms in evolutionary games: mixing innovative and imitative dynamics. Marco A. Amaral and Marco Alberto Javarone. Physical Review E 97 2018
Titolo, autori, journal/conferenza, anno	Dilution of Ferromagnets via a Random Graph-based Strategy. Marco Alberto Javarone and Daniele Marinazzo. Complexity, 2845031, 2018
Titolo, autori, journal/conferenza, anno	From Bitcoin to Bitcoin Cash: a Network Analysis. MA Javarone and Craig S. Wright, ACM MobiSys, CryBlock2018 Munich Germany, 2018
Titolo, autori, journal/conferenza, anno	Evolutionary Dynamics of Group Formation. Marco Alberto Javarone and Daniele Marinazzo, PloS ONE 12(11) e0187960, 2017
Titolo, autori, journal/conferenza, anno	Solving Optimization Problems by the Public Goods Game. Marco Alberto Javarone EPJ-B 90:171, 2017
Titolo, autori, journal/conferenza, anno	The beneficial role of 'mobility' for the emergence of Innovation. Giuliano Armano and Marco Alberto Javarone. Scientific Reports (7) 1781, 2017
Titolo, autori, journal/conferenza, anno	A Statistical Physics Perspective to Understand Social Visual Attention in Autism Spectrum Disorder. Alessio Liberati, Roberta Fadda, Giuseppe Doneddu, Sara Congiu, Marco Alberto Javarone, Tricia Striano and Alessandro Chessa. Perception, doi:10.1177/0301006616685976, Perception 2017
Titolo, autori, journal/conferenza, anno	Modeling Poker Challenges by Evolutionary Game Theory. Marco Alberto Javarone, 7(4) 39, Games, 2016
Titolo, autori, journal/conferenza, anno	An Evolutionary Strategy based on Partial Imitation for Solving Optimization Problems. M.A. Javarone, Physica A: Statistical Mechanics and Its Applications 463, 2016
Titolo, autori, journal/conferenza, anno	The Role of Noise in the Spatial Public Goods Game. MA Javarone and F Battiston. Journal of Statistical Mechanics: Theory and Experiment P073404 2016
Titolo, autori, journal/conferenza, anno	Conformity-driven agents support ordered phases in the spatial Public Goods Game. MA Javarone, AA and F Caravelli EPL 114(3) 38001, 2016

Titolo, autori, journal/conferenza, anno	Modeling Radicalization Phenomena in Heterogeneous Populations. S Galam and MA Javarone. PloS ONE 11(5): e0155407 2016
Titolo, autori, journal/conferenza, anno	Statistical Physics of the Spatial Prisoner's Dilemma with Memory-aware Agents. MA Javarone. European Physical Journal B (89:2) 2 2016
Titolo, autori, journal/conferenza, anno	Modeling Evolutionary Dynamics of Lurking in Social Networks. Marco Alberto Javarone, Roberto Interdonato, Andrea Tagarelli, CompleNet16 Springer-Verlag Studies in Computational Intelligence 2016
Titolo, autori, journal/conferenza, anno	Emerging Heterogeneities in Italian Customs and Comparison with Nearby Countries. E Agliari, A Barra, A Galluzzi, M A Javarone, A Pizzoferrato, D Tantari. PloS ONE 10(12): e0144643 2015
Titolo, autori, journal/conferenza, anno	Conformism-driven phases of opinion formation on heterogeneous networks: The q-voter model case. MA Javarone and T Squartini, Journal of Statistical Mechanics: Theory and Experiment, P10002, 2015
Titolo, autori, journal/conferenza, anno	The Role of Competitiveness in the Prisoner's Dilemma. MA Javarone and A E Atzeni. Computational Social Networks (2) 2015
Titolo, autori, journal/conferenza, anno	Fermionic Networks: Modeling Adaptive Complex Networks with Fermionic Gases. MA Javarone. International Journal of Modern Physics – C, 2015
Titolo, autori, journal/conferenza, anno	Is Poker a Skill Game? New Insights from Statistical Physics. MA Javarone. EuroPhysics Letters (EPL), 110 – 58003, 2015
Titolo, autori, journal/conferenza, anno	Poker as a Skill Game: Rational vs Irrational Behaviors. MA Javarone. Journal of Statistical Mechanics: Theory and Experiment, P03018, 2015
Titolo, autori, journal/conferenza, anno	Gaussian networks generated by random walks. MA Javarone. Journal of Statistical Physics, 159-1, 2015
Titolo, autori, journal/conferenza, anno	Emergence of Extreme Opinions in Social Networks. MA Javarone and S Galam. CrimeNet – SociInfo2014 Barcelona Springer, 8852, 2015
Titolo, autori, journal/conferenza, anno	Social Influences in Opinion Dynamics: the Role of Conformity. MA Javarone. Physica A: Statistical Mechanics and Its Applications – volume 414, 2014
Titolo, autori, journal/conferenza, anno	The Role of the Shannon Entropy in the identification of acronyms. M A Javarone. Studies in Computational Intelligence Volume 549. CompleNet14 Bologna March, Springer, 2014
Titolo, autori, journal/conferenza, anno	Network Strategies in the Election Campaigns. Marco Alberto Javarone. Journal of Statistical Mechanics: Theory and Experiment – volume 2014 – P08013, 2014
Titolo, autori, journal/conferenza, anno	Competitive dynamics of lexical innovations in multi-layer networks. MA Javarone. International Journal of Modern Physics C. DOI: 10.1142/S012918311450048X, 2014
Titolo, autori, journal/conferenza, anno	Emergence of acronyms in a community of language users. MA Javarone and G Armano. European Physical Journal – B. 86:474, 2013

Titolo, autori, journal/conferenza, anno	Perception of similarity: a model for social networks dynamics. MA Javarone and G Armano. Journal of Physics A: Mathematical and Theoretical. 46-455102, 2013
Titolo, autori, journal/conferenza, anno	Quantum-classical transitions in complex networks. Marco Alberto Javarone and Giuliano Armano. Journal of Statistical Mechanics: Theory and Experiment. P04019, 2013
Titolo, autori, journal/conferenza, anno	P Clustering Datasets by complex networks analysis. G Armano and MA Javarone. Complex Adaptive Systems Modeling 1:5, 2013
Titolo, autori, journal/conferenza, anno	Phase Transitions in Fermionic Networks. MA Javarone and G Armano. 11th International Conference on Adaptive and Natural Computing Algorithms (ICANNGA13), LNCS Springer, 2013
Titolo, autori, journal/conferenza, anno	A Fitness Model for Epidemic Dynamics in Complex Networks. MA Javarone and G Armano. The 8th International Conference on Signal Image Technology and Internet Based Systems (SITIS2012) - IEEE Workshop on Complex Networks and Their Applications, 2012

Libri e Capitoli su Libri

Titolo, autori, Editore, anno	Statistical Physics and Computational Methods for Evolutionary Game Theory. MA Javarone, Springer, 2018
Titolo, autori,Editore, anno	Complex Networks and Epidemiology. MA Javarone and G Armano. Complex Networks and Their Applications – Chapter 8. Cambridge Scholars Publishing. 2014

Tesi di Dottorato

Titolo, autori,Editore, anno	Statistical Physics of Evolutionary Game Theory and its Applications. MA Javarone. Supervisori: Prof. Salvatore Mignemi and Prof. Adriano Barra, Cagliari 2017. Tesi di dottorato in Matematica
Titolo, autori,Editore, anno	Models and Frameworks for Studying Social Behaviors. MA Javarone. Supervisori: Prof.Giuliano Armano. Cagliari 2013. Tesi di dottorato in Ingegneria Informatica

Presentazioni presso conferenze

Titolo, autori, conferenza, anno	Emerging Patterns in the Bitcoin Network. BlockNet2018, Paris, June 2018
Titolo, autori, conferenza, anno	From Bitcoin to Bitcoin Cash: a Network analysis. CryBlock2018, Munich, June 2018
Titolo, autori, conferenza, anno	Uncovering the Dynamics of Consciousness on Multiplex Networks: a preliminary analysis. Network Neuroscience, Paris, June 2018
Titolo, autori, conferenza, anno	Investigating consciousness and its disorders by network analysis. Data Natives, London 2018

Titolo, autori, conferenza, anno	Tutorial: Evolutionary Game Theory: Models and Applications. European Conference on Artificial Life 2017, Lyon (France), 2017
Titolo, autori, conferenza, anno	An Evolutionary Game for Modeling the Emergence of Innovation in Social Systems. Dubrovnik (Croatia), 2017
Titolo, autori, conferenza, anno	Poker Games on Complex Networks. International Workshop on Complex Systems and their Applications. Milano, 2016
Titolo, autori, conferenza, anno	The Public Goods Game as Heuristic for Solving Optimization Tasks. CCS16, Amsterdam, Sept. 2016
Titolo, autori, conferenza, anno	Conformity-driven agents support ordered phases in the spatial public goods game. CCS16, Amsterdam, Sept. 2016
Titolo, autori, conferenza, anno	Skill games versus gambling: from Poker to financial markets. An old debate faced by Statistical Physics. Satellite co-located at CCS16 Computational Social Science: Social Contagion, Collective Behaviour, and Networks Amsterdam, Sept. 2016
Titolo, autori, conferenza, anno	***Invited tutorial.*** Social Behaviors through Networks: Models and Applications. International Workshop on Knowledge Discovery on the Web - KDWeb2016. Cagliari, 8-10 Sept. 2016
Titolo, autori, conferenza, anno	Statistical Physics of Evolutionary Games: from the emergence of cooperation to optimization problems. STATPHYS26, Lion France, July 2016
Titolo, autori, conferenza, anno	A mean field approach to the emergence of cooperation in evolutionary games. Econophysics Colloquium 15, Prague, September 2015
Titolo, autori, conferenza, anno	Is Poker a skill game? IC2S2 – International Conference on Computational Social Science, Helsinki, June 2015
Titolo, autori, conferenza, anno	Modeling Group Polarization in Terrorism Dynamics. IC2S2 – International Conference on Computational Social Science, Helsinki, June 2015
Titolo, autori, conferenza, anno	***Keynote Speaker*** Opinion Dynamics in Criminal Contexts. NetCrime 2015, co-located at NetSci 2015, Saragoza (Spain), June 2015
Titolo, autori, conferenza, anno	***Invited-talk*** Poker Challenges: a sociophysical perspective. Workshop on Sociophysics. 30-31 March 2015 (Paris - France)
Titolo, autori, conferenza, anno	Emergence of Cooperation in Competitive Environments. Signal-Image Technology and Internet-Based Systems (SITIS) 2014 IEEE – Complex Networks 2014 (Marrakech – Morocco), 2014
Titolo, autori, conferenza, anno	Emergence of Extreme Opinions in Social Networks. CrimeNet – SociInfo2014 – Barcelona
Titolo, autori, conferenza, anno	Poker as a Skill Game: Rational vs Irrational Behaviors. Lucca-ECCS14
Titolo, autori, conferenza, anno	Conformism-driven phase transition on heterogeneous networks: the q-voter model case. Lucca-ECCS14, 2014
Titolo, autori, conferenza, anno	The Role of the Shannon Entropy in the identification of acronyms. CompleNet14 Bologna March (Springer), 2014

Titolo, autori, conferenza, anno	The Acronyms Game, ECCS13 - Satellite 'CSS: from Social Contagion to Collective Behavior'. Barcelona 2013
Titolo, autori, conferenza, anno	Phase Transitions in Fermionic Networks, 11th International Conference on Adaptive and Natural Computing Algorithms (ICANNGA13), 2013
Titolo, autori, conferenza, anno	A Fitness Model for Epidemic Dynamics in Complex Networks, The 8th International Conference on Signal Image Technology and Internet Based Systems (SITIS2012) - IEEE Workshop on Complex Networks and Their Applications, 2012

Attività didattica

Corso, Università, Anno Accademico	Lecturer - Operational Research, UCL, London, 2019/2020
Corso, Università, Anno Accademico	Tutor - Applied Mathematics, UCL, London, 2019/2020
Corso, Università, Anno Accademico	Lecturer - Mathematics for theoretical physics and mathematical analysis. Coventry University, Coventry, UK, 2018/2019
Corso, Università, Anno Accademico	Tutor - Applied Mathematics 1 and Applied Mathematics 2. Coventry University, Coventry, UK, 2018/2019
Corso, Università, Anno Accademico	Visiting Lecturer at ITMO University teaching Mathematical and Computational Models for Complex Systems, St Petersburg, Russia, Aprile 2018
Corso, Università, Anno Accademico	Adjunct Professor of Physics at University of Sassari, 2017/2018
Corso, Università, Anno Accademico	**Invited seminar.** Evolutionary Game Theory: a brief introduction. International Summer School: Mediterranean School of Complex Networks. Salina, Sicily (Italy), 06/09/2017
Corso, Università, Anno Accademico	Adjunct Professor of Physics at University of Sassari, 2016/2017
Corso, Università, Anno Accademico	Tutor in Analytical Mechanics, Università di Cagliari, 2016/2017
Corso, Università, Anno Accademico	Tutor in Analytical Mechanics, Università di Cagliari, 2015/2016
Corso, Università, Anno Accademico	Adjunct Professor of Computer Science at University of Sassari, 2014/2015
Corso, Università, Anno Accademico	Adjunct Professor of Computer Science at University of Sassari, 2013/2014
Corso, Università, Anno Accademico	Adjunct Professor of Computer Science at University of Sassari, 2011/2012
Corso, Università, Anno Accademico	Adjunct Professor of Computer Science at University of Sassari, 2010/2011

Supervisione Tesi

MS Degree Theoretical Physics. University of Cagliari. Student: omesso. Agent-based Models in Game Theory: Cooperation as an Emergent Phenomenon. Advisor: Prof. P. Olla (co-supervisor), 2014

BA Tourism Sciences. University of Sassari. Student: omesso. Marketing and Social Networks: an analysis on human factors that influence decisions. Advisor: Prof. B. Pinna, 2014

Supervisore di 2 summer project presso UCL, London, per MSc Mathematical Modeling (nomi studenti omessi)

(1) Understanding cooperation: analysing human behaviours by mathematical models

(2) Modelling emergent phenomena in the human brain

Supervisore di 5 summer project presso UCL, London, per MSc Financial Mathematics

(1) Cybersecurity and fraudulent behaviours in Blockchain based systems

(2) Cryptographic protocols in blockchain based technologies

(3) Econophysics models for studying financial markets

(4) The evolution of financial markets with the advent of blockchain based technologies and cryptocurrencies.

(5) Modelling the dynamics of cryptocurrencies

Attività Editoriale

Elenco riviste

Scientific Reports – Nature, Reviewer; Proceedings of the Royal Society, Reviewer; Physical Review (APS), Reviewer; Social Network Analysis and Mining (SNAM), Reviewer; Europhysics Letters, Reviewer; Entropy, Reviewer and Topic Board; EPJ Data Science, Reviewer; EPJ-B Reviewer; PlosOne, Reviewer; Games, Reviewer; Physica A: Statistical Mechanics and its Applications, Reviewer; Journal of Statistical Mechanics: Theory and Experiment (JSTAT), Reviewer; Applied Network Science, Reviewer; Journal of. Physics: Complexity; Physics Letters A, Reviewer; Frontiers in Physics, Reviewer; Modern Physics Letters B, Reviewer; Frontiers in ICT – Quantum Computing, Review Editor; Frontiers in Human Neuroscience, Reviewer; Casmodeling – SpringerOpen Journal, Reviewer; Sensors mdpi, Reviewer; Int Journal of Research and Public Health, Reviewer; Frontiers in Psychology; Reviewer.

Sassari, 02/12/2020

Marco Alberto Javarone

Giacomo Marmorini - CV

Affiliazione: Department of Physics and Mathematics, Aoyama Gakuin University

Istruzione

Perfezionamento (Ph.D.) in Fisica, *Cum Laude*, Decembre 2007
Scuola Normale Superiore, Pisa
Tesi: Non-Abelian solitons and confinement
Supervisore: Prof. Kenichi Konishi (referente interno: Prof. Riccardo Barbieri)

Laurea Specialistica in Fisica, *Cum Laude*, Ottobre 2003
Università di Pisa
Tesi: Matrix models, generalized Konishi anomalies and effective description of $\mathcal{N} = 1$ supersymmetric gauge theories
Relatore: Prof. Kenichi Konishi

Laurea in Fisica, *Cum Laude*, Marzo 2003
Università di Pisa
Tesi: Minimal Standard Model and extensions with massive neutrino
Relatore: Prof. Kenichi Konishi

Esperienze professionali (accademia)

Giugno 2019 - Marzo 2021. Ricercatore part-time e tutor, Department of Physics, Aoyama Gakuin University

Aprile 2017 - Marzo 2020. Postdoc presso Department of Physics and Research and Education Center for Natural Sciences, Keio University

Ottobre 2015 - Marzo 2017. Docente part-time presso Graduate School of Human and Environmental Studies, Kyoto University

Aprile 2015 - Marzo 2017. Yukawa Fellow (Research Assistant Professor) presso Yukawa Institute for Theoretical Physics, Kyoto University

Marzo 2012 - Febbraio 2015. Foreign Postdoctoral Researcher presso Condensed Matter Theory Lab, The Institute of Physical and Chemical Research (RIKEN)

Aprile 2011 - Febbraio 2012. Postdoc presso Department of Physics, Tokyo University of Science

Marzo 2009 - Settembre 2010. Postdoc presso Department of Physics e Research and Education Center for Natural Sciences, Keio University

Ottobre 2007 - Gennaio 2008. Research Fellow presso School of Mathematics, Trinity College Dublin

Esperienze professionali (altro)

Autunno 2010. Insegnante di Matematica presso Liceo "Giosuè Carducci", Piombino (LI).

Estate 2008. Insegnante di Matematica presso I.S.I.S "Marco Polo", Cecina (LI).

Borse di studio e di ricerca, finanziamenti

Finanziamento Mochizuki (Yukawa Memorial Foundation) 2015
Borsa di ricerca Yukawa 2015-2017
RIKEN FPR Fellowship 2012-2015
JSPS Fellowship FY2009
Borsa di ricerca"Della Riccia" 2009
Foreign Graduate Invitation Program (FGIP), Tokyo Institute of Technology, 2006
Borsa di studio della Scuola Normale Superiore (Pisa) 2004-2006
Borsa di studio della Regione Toscana 1998-2003

Pubblicazioni scientifiiche

D. Yamamoto, Chihiro Suzuki, Giacomo Marmorini, Sho Okazaki and Nobuo Furukawa
"Quantum and Thermal Phase Transitions of the Triangular SU(3) Heisenberg Model under Magnetic Fields",
Phys. Rev. Lett. **125**, 057204 (2020) [arXiv:2004.03250 [cond-mat]]

D. Yamamoto, G. Marmorini, M. Tabata, K. Sakakura, and I. Danshita
"Magnetism driven by the interplay of fluctuations and frustration in the easy-axis triangular XXZ model with transverse fields",
Phys. Rev. B **100**, 140410(R) (2019) [arXiv:1808.08916 [cond-mat]]

D. Yamamoto, H. Ueda, I. Danshita, G. Marmorini, T. Momoi and T. Shimokawa,
"Exact diagonalization and cluster mean-field study of triangular-lattice XXZ antiferromagnets near saturation",
Phys. Rev. B **96**, 014431 (2017) [arXiv:1704.04024 [cond-mat]]

G. Marmorini, M. Pepe and P. Calabrese,
"One-body reduced density matrix of trapped impenetrable anyons in one dimension",
J. Stat. Mech. (2016) 073106 [arXiv:1605.00838 [cond-mat]]

G. Marmorini, D. Yamamoto, and I. Danshita,
"Umbrella-coplanar transition in the triangular XXZ model with arbitrary spin",
Phys. Rev. B **93**, 224402 (2016) [arXiv:1510.07969 [cond-mat]]

D. Yamamoto, G. Marmorini and I. Danshita,
"Magnetization process of spin-1/2 Heisenberg antiferromagnets on a layered triangular lattice",
J. Phys. Soc. Jpn. **85**, 024706 (2016) [arXiv:1510.04402 [cond-mat]]

D. Yamamoto, G. Marmorini and I. Danshita,
"Microscopic Model Calculations for the Magnetization Process of Layered Triangular-Lattice Quantum Antiferromagnets",

Phys. Rev. Lett. **114**, 027201 (2015) [arXiv:1411.4233 [cond-mat]]
featured in RIKEN Research Highlight

R. Yoshii, S. Takada, S. Tsuchiya, G. Marmorini, H. Hayakawa and M. Nitta,
"Fulde-Ferrell-Larkin-Ovchinnikov states in a superconducting ring with magnetic fields: Phase diagram and the first-order phase transitions",
Phys. Rev. B **92**, 224512 (2015) [arXiv:1404.3519 [cond-mat]]

G. Marmorini and T. Momoi,
"Magnon condensation with finite degeneracy on the triangular lattice",
Phys. Rev. B **89**, 134425 (2014) [arXiv:1312.5935 [cond-mat]]

D. Yamamoto, G. Marmorini and I. Danshita,
"Quantum Phase Diagram of the Triangular-Lattice *XXZ* Model in a Magnetic Field",
Phys. Rev. Lett. **112**, 127203 (2014) [Erratum: Phys. Rev. Lett. **112**, 259901 (2014)] [arXiv:1309.0086 [cond-mat]]

R. Yoshii, G. Marmorini and M. Nitta,
"Spin Imbalance Effect on Josephson Junction and Grey Soliton",
J. Phys. Soc. Jpn. **81**, 094704 (2012)

Luca Ferretti, Michele Cortelezzi, Bin Yang, Giacomo Marmorini and Ginestra Bianconi,
"Features and heterogeneities in growing network models",
Phys. Rev. E **85**, 066110 (2012) [arXiv:1111.3652 [physics.soc-ph]]

R. Yoshii, S. Tsuchiya, G. Marmorini and M. Nitta,
"Spin imbalance effect on Larkin-Ovchinnikov-Fulde-Ferrel state",
Phys. Rev. B **84**, 024503 (2011) [arXiv:1101.1578 [cond-mat]]

T. Fujimori, G. Marmorini, M. Nitta, K. Ohashi and N. Sakai,
"The Moduli Space Metric for Well-Separated Non-Abelian Vortices",
Phys. Rev. D **82**, 065005 (2010) [arXiv:1002.4580 [hep-th]]

M. Eto, J. Evslin, K. Konishi, G. Marmorini, M. Nitta, K. Ohashi, W. Vinci and N. Yokoi,
"On the moduli space of semilocal strings and lumps",
Phys. Rev. D **76**, 105002 (2007) [arXiv:0704.2218 [hep-th]]

M. Eto, L. Ferretti, K. Konishi, G. Marmorini, M. Nitta, K. Ohashi, W. Vinci and N. Yokoi,
"Non-Abelian duality from vortex moduli: a dual model of color confinement",
Nucl. Phys. B **780**, 161 (2007) [arXiv:hep-th/0611313]

M. Eto, K. Hashimoto, G. Marmorini, M. Nitta, K. Ohashi and W. Vinci,
"Universal reconnection of non-Abelian cosmic strings",
Phys. Rev. Lett. **98**, 091602 (2007) [arXiv:hep-th/0609214]

M. Eto, K. Konishi, G. Marmorini, M. Nitta, K. Ohashi, W. Vinci and N. Yokoi,
"Non-Abelian vortices of higher winding numbers",
Phys. Rev. D **74**, 065021 (2006) [arXiv:hep-th/0607070]

K. Konishi, G. Marmorini and N. Yokoi,
"Nonabelian confinement near nontrivial conformal vacua",
Nucl. Phys. B **741**, 180 (2006) [arXiv:hep-th/0511121]

S. Bolognesi, K. Konishi and G. Marmorini,
"Light nonabelian monopoles and generalized r-vacua in supersymmetric gauge theories",
Nucl. Phys. B **718**, 134 (2005) [arXiv:hep-th/0502004]

Proceedings con peer-review

G. Marmorini, R. Yoshii, S. Tsuchiya and M. Nitta
"Analytic Self-Consistent Condensates in quasi-1D Superfluid Fermi Gases in the Andreev approximation",
J. Low Temp. Phys. **175**, 420 (2014) - Proceedings (with peer-review) of *The International Conference on Quantum Fluids and Solids QFS2013*, 1 -6 Agosto 2013, Matsue, Japan

Proceedings

S. Bolognesi, K. Konishi and G. Marmorini
"Light nonabelian monopoles: constructing dual nonabelian superconductor of more general types",
Prog. Theor. Phys. Suppl. **164**, 186 (2006) - Proceedings of the *International Workshop "Frontiers of Quantum Physics"*, 17 - 19 February 2005, Yukawa Institute for Theoretical Physics, Kyoto, Japan

Insegnamenti

Semestre autunnale 2015 e 2016. Metodi matematici della fisica - Kyoto University (Graduate School of Human and Environmental Studies) - 50 ore.

Altre attività professionali

Referee per Physical Review Letters, Physical Review B, Physical Review E, Scientific Reports.
Partecipazione all'Iniziativa Specifica INFN PI21 e poi PI14 dal 01-01-2004 al 30-06-2007.

Presentazioni orali

"Unconventional phase transitions in SU(N) Heisenberg models under external fields", Kindai University, online, 28 ottobre 2020.

"Exploring frustration on the triangular lattice: from novel quantum order-by-disorder to BKT physics" Università di Pisa , 6 marzo 2018; Johannes Gutenberg University, Mainz, 19 marzo 2018; Chuo University, Tokyo, 26 luglio 2019.

[Su invito] "On the different kinds of superfluid vortices in the interior of neutron stars", NORDITA program *Phase Transitions in Astrophysics*, 11 maggio 2017, Stockholm, Sweden

"New results for triangular-lattice quantum antiferromagnets in a magnetic field", Waseda University, Tokyo, 4 marzo 2016.

"New results for triangular-lattice quantum antiferromagnets in a magnetic field", *20th International Conference on Magnetism (ICM2015)*, 7 luglio 2015, Barcelona.

"Microscopic modeling of the quantum triangular antiferromagnet Ba3CoSb2O9", Yukawa Institute for Theoretical Physics, Kyoto University, 8 aprile 2015.

"New results for quantum antiferromagnets in high magnetic fields", Yukawa Institute for Theoretical Physics, Kyoto University, 22 maggio 2014, Kyoto, Giappone; Scuola Normale Superiore, 16 luglio 2014, Pisa; Joint SISSA/ICTP Seminars, 21 luglio 2014, Trieste; Université Pierre et Marie Curie, Paris, 18 dicembre 2014.

"High magnetic field phases of the J_1-J_2 and J_1-J_3 triangular antiferromagnet", *JPS Fall Meeting 2013*, 25 settembre 2013, Tokushima, Giappone; APS March meeting, 7 marzo 2014, Denver CO, USA.

"Exact self-consistent condensates in (imbalanced) superfluid Fermi gases", Department of Physics, Niigata University, 2 settembre 2010, Niigata, Giappone; Yukawa Institute for Theoretical Physics, Kyoto University, 7 settembre 2010, Kyoto, Giappone; APS March meeting, 20 marzo 2013, Baltimore MD, USA.

"An invitation to Topological Quantum Computation", Keio University, 14 luglio 2009, Yokohama, Giappone.

"On the moduli space of semilocal strings and lumps", *School "Gauge fields and strings"*, Isaac Newton Institute for Mathematical Sciences, 24 settembre 2007, Cambridge, UK

"Nonabelian vortices of higher winding number", HEP theory group seminar, University of Tokyo at Hongo, 24 agosto 2006, Tokyo, Giappone; Theory seminar, The Institute of Physical and Chemical Research (RIKEN), 25 agosto 2006, Wako, Giappone

"Nonabelian duality and confinement", FGIP seminar, Tokyo Institute of Technology, 4 agosto 2006, Tokyo, Giappone

"The moduli space of composite nonabelian vortices", *XVth Oporto Meeting in Geometry, Topology and Physics "Mathematical aspects of supersymmetry"*, 23 luglio 2006, Porto, Portogallo; Theoretical Particle Physics seminar, Tokyo Institute of Technology, 2 agosto 2006, Tokyo, Giappone

"Light Nonabelian Monopoles and Generalized r-Vacua in Supersymmetric Gauge Theories", *XXVII Theoretical Physics Meeting*, 26 maggio 2005, Cortona (AR)

Presentazioni con poster

"Frustrated Magnetism with Coherently-Coupled Binary Fermi Gases in Triangular Optical Lattices", *The Fourth Kyoto-Beijing-Tokyo Workshop on Ultracold Atomic Gases*, 1 ottobre 2019, Kyoto, Japan

"Umbrella-coplanar transition in the triangular XXZ model with arbitrary spin", *Highly*

Frustrated Magnetism 2016, 8 settembre 2016, Taipei, Taiwan.

"New results for quantum antiferromagnets in high magnetic fields", *Higgs Modes in Condensed Matter and Quantum Gases*, Yukawa Institute for Theoretical Physics, Kyoto University, 24 giugno 2014, Kyoto, Giappone

"Magnon condensation with finite degeneracy on the triangular lattice", *Novel Quantum Materials and Phases (NQMP2014)*, 14 marzo 2014, Okinawa Institute of Technology, Okinawa, Giappone; *Highly Frustrated Magnetism 2014*, 8 luglio 2014, Cambridge, UK

"High magnetic field phases of the J1-J2-J3 triangular antiferromagnet", *The International Conference on Strongly Correlated Electron Systems SCES2013*, Tokyo University, 6 agosto 2013, Tokyo, Giappone

"High magnetic field phases of the J1-J3 triangular antiferromagnet", *Physics of Quantum Spin Systems*, Yukawa Institute for Theoretical Physics, Kyoto University, 13 novembre 2012, Kyoto, Giappone

"Exact Self-Consistent Condensates in (Spin-Imbalanced) Fermionic Gases", *International Conference on Novel SuperConductivity in Taiwan 2011 (ICNSCT2011)*, National Cheng Kung University, 6 agosto 2011, Tainan, Taiwan; *International Workshop for Young Researchers on Topological Quantum Phenomena in Condensed Matter with Broken Symmetries*, 1 - 5 novembre 2011, Biwa-ko (Shiga), Giappone; *The International Conference on Quantum Fluids and Solids QFS2013*, 3 agosto 2013, Matsue, Giappone

"Exact self-consistent condensates in (imbalanced) superfluid Fermi gases", *Ultracold Fermi Gas: Superfluidity and Strong-Correlation (USS-2010)*, CCSE, Japan Atomic Energy Agency, 14 maggio 2010, Tokyo, Giappone.

"Off-diagonal correlations of anyons in one dimension", *Infinite Analysis 09 - New trends in quantum integrable systems*, Department of Mathematics, Kyoto University, 29 luglio 2009, Kyoto, Giappone

Scuole, conferenze, workshops

Organizzatore del *Topological Science Symposium 2017*, Keio University, 21 - 22 novembre 2017, Yokohama, Japan.

Partecipante in 38 eventi internationali and 8 domestici.

Visite accademiche

SISSA, Trieste, Decembre 2014; agosto 2016; marzo 2018
Waseda University, Tokyo, Giappone, aprile 2015; marzo 2016
Institute of Photonic Science (ICFO), Castelldefels, Spagna, giugno 2012
Dipartimento di Fisica, Università di Pisa, maggio 2012
Yukawa Institute for Theoretical Physics, Kyoto University, Kyoto, Giappone, settembre 2010
Institute for the Physics and the Mathematics of the Universe, Tokyo University, Tokyo,

Giappone, febbraio 2010
Theoretical Physics Laboratory, The Institute of Physical and Chemical Research (RIKEN), Wako, Giappone - agosto 2006
Department of Physics, Tokyo Institute of Technology, Tokyo, Giappone - luglio/agosto 2006
Physique Théorique et Mathématique, Université Libre de Bruxelles, Bruxelles, Belgio - dicembre 2005; Ottobre 2006.

Altre competenze

- *Lingue*: Italiano (madrelingua), Inglese (fluente), Giapponese (buono), Spagnolo (buono), Francese (basilare),
- *Competenze informatiche*
  Sistemi operativi: Mac OS, Linux, Windows
  Applicazioni: Microsoft Office, iWork (Keynote), Open Office
  Linguaggi di programmazione: LaTeX, Mathematica, C, Python

Curriculum Vitæ et Studiorum

Name : Alessio MARRANI

Current Affiliation : Museo Storico della Fisica e Centro Studi e Ricerche "Enrico Fermi"
Piazza del Viminale, 1, I-00184 Roma, Italy

Education :

2002-05 : **Ph.D.** in Theoretical Physics at the University of Rome "Roma Tre", Rome, Italy.
Date: March 3, 2005.
Title of Ph.D. Thesis:
"Symmetry and Dynamics:
Mathematical Topics in 5-Dimensional Deformed Relativity".
Supervisor: Prof. R. Mignani.

1996-2001 : **Laurea Degree** in Theoretical Physics at the University of Rome "Roma Tre", Rome, Italy. Date: October 31, 2001.
Final mark: 110/110 *cum laude.*
Title of Laurea Thesis: *"Killing Symmetries of Generalized Minkowski Spaces".*
Supervisor: Prof. R. Mignani.

1991-96 : **Maturità Scientifica Degree**.
Scientific Lyceum F. Enriques, Ostia Lido, Rome, Italy.
Final mark: 60/60 *with Honors.*
Short Thesis on Relativity, Big Bang and Black Holes.

Appointments and Awards

2019 : **Visiting Scientist**
Theoretical Physics Group, University of Murcia, Spain, November - December 2019.

2018 : **Abilitazione**
I Fascia (Full Professor), settore concorsuale 02/A2, s.s.d. FIS/02, 16/11/2018 - 16/11/2027.

2017 : **Jimenez de la Espada Fellow**
Theoretical Physics Group, University of Murcia, Spain, September - December.

2016 : **Visiting Scientist**
CERN Theory Division, September - October 2016.

2013 : **Abilitazione**
II Fascia (Assistant Professor), settore concorsuale 02/A2, s.s.d. FIS/02, 08/01/2014 - 08/01/2023.

2013 : **Julian Schwinger Diploma,**
at the International School of Subnuclear Physics, 51st Course:
Reflections on the Next Step for LHC,
"Ettore Majorana" Foundation and Centre for Scientific Culture (EMFCSC),
June 24 - July 3, Erice, Italy.

2006 : **Young Graduate Student Award** by the Italian Physics Society, Turin, Italy, September 18, 2006.

2005 : **The Best Student Award**
at the International School of Subnuclear Physics, 43rd Course:
Towards New Milestones in our Quest to go Beyond the Standard Model,
"Ettore Majorana" Foundation and Centre for Scientific Culture (EMFCSC),
Erice, Italy, August 29 - September 7, 2005.

2002-2004 : *Research Grant* supported by *Italian Catholic University Centre* (CUC).

2002 : Mentioned *with Honors* in the International Award *"Ostia Mare di Roma"*, Roma, Italy.

2000 : **"Enrico Persico" Fellowship** by Accademia Nazionale dei Lincei, Roma, Italy.

Teaching Duties :

Nov. 2013 : Tutoring Bachelor Project [2 students] *"Classical Spin : an Intrinsic Property of Extended Media"*, KU Leuven, Belgium.

2012-13 : Exercise Tutoring in the course *"Electroweak and Strong Interactions"* (Prof. A.Sevrin) [Graduate level, 15 students], KU Leuven, Belgium.

2004-05 : Teaching assistant in the course ***Theory of General Relativity*** (Prof. R.Mignani) [Graduate level, 13 students],
University of Rome "Roma Tre", *"Edoardo Amaldi"* Physics Dept., Italy.

2004-05 : Teaching assistant in the course ***Classical Electrodynamics and Special Relativity*** (Prof. R.Mignani) [Graduate level, 22 students]:
lectures on *"Paradoxes in Special Relativity"*,
University of Rome "Roma Tre", *"Edoardo Amaldi"* Physics Dept., Italy.

2002-03 : Teaching assistant in the course ***Physics of NonLinear Systems*** (Prof. O.Ragnisco) [Ph.D. level, 5 students]:
lectures on *"Classical Solitons in Field Theory"*,
University of Rome "Roma Tre", *"Edoardo Amaldi"* Physics Dept., Italy.

Research Papers and Contributions to Proceedings

At December 1, 2020 : total number of citeable papers (on INSPIRES HEP) : **128** (**2,791** citations), h (Hirsch) index : **30**.

Research Papers (Preprints)

1. *On Generalized Lemaitre-Tolman-Bondi Metric. Fractal Matter at the end of Matter-Antimatter Recombination*, S. L. Cacciatori, A. Marrani, F. Re, `arXiv:2011.11086 [gr-qc]`.
2. *BPS Black Hole Entropy and Attractors in Very Special Geometry. Cubic Forms, Gradient Maps and their Inversion*, B. van Geemen, A. Marrani, F. Russo, `arXiv:2009.10647 [hep-th]`.
3. *Monstrous M-theory*, A. Marrani, M. Rios, D. Chester, `arXiv:2008.06742 [hep-th]`.
4. *Black Holes and Higher Composition Laws*, L. Borsten, M.J. Duff, A. Marrani, `arXiv:2006.03574 [hep-th]`.
5. *Beyond the standard model with six-dimensional spacetime*, D. Chester, M. Rios, A. Marrani, `arXiv:2002.02391 [physics.gen-ph]`.
6. *Exceptional Periodicity and Magic Star Algebras. II : Gradings and HT-Algebras*, P. Truini, A. Marrani, M. Rios, `arXiv:1910.07914 [math.RT]`.
7. *Exceptional Periodicity and Magic Star Algebras. I : Foundations*, P. Truini, A. Marrani, M. Rios, `arXiv:1909.00357 [math.RT]`.
8. *Freudenthal duality and conformal isometries of extremal black holes*, L. Borsten, M.J. Duff, A. Marrani, `arXiv:1812.10076 [gr-qc]`.
9. *Non-Planar Spin Bits beyond two loops*, S. Bellucci, A. Marrani, `hep-th/0505106`.

Research Papers (Published)

1. *Exceptional Super Yang-Mills in $D = 27 + 3$ and Worldvolume M-Theory*, M. Rios, A. Marrani, D. Chester, Phys. Lett. **B808**, 135674 (2020), `arXiv:1906.10709 [hep-th]`, DOI: 10.1016/j.physletb.2020.135674.
2. *Real forms of embeddings of maximal reductive subalgebras of the complex simple Lie algebras of rank up to 8*, W. A. de Graaf, A. Marrani, J. Phys. A: Math. Theor. **53** 155203 (2020), `arXiv:1911.06575 [math.RA]`, DOI: 10.1088/1751-8121/ab7c8c.
3. *Jordan Algebraic Interpretation of Maximal Parabolic Subalgebras : Exceptional Lie Algebras*, V. Dobrev, A. Marrani, J. Phys. **A53** (2020) no.5, 055203, `arXiv:1905.00289 [math.RT]`, DOI: 10.1088/1751-8121/ab5f84.
4. *Orbits in Non-Supersymmetric Magic Theories*, A. Marrani, L. Romano, Int. J. Mod. Phys. **A34**, no. 32, 1950190 (2019), `arXiv:1906.05830 [hep-th]`, DOI: 10.1142/S0217751X19501902.
5. *Lagrangian Grassmannians and spinor varieties in characteristic two*, B. Van Geemen, A. Marrani, SIGMA **15** (2019) 064, `arXiv:1903.01228 [math-ph]`, DOI: 10.3842/SIGMA.2019.064.

6. *Black holes and general Freudenthal transformations*, L. Borsten, M.J. Duff, J.J. Fernandez-Melgarejo, A. Marrani, E. Torrente-Lujan, JHEP **1907** (2019) 070, `arXiv:1905.00038 [hep-th]`, DOI: 10.1007/JHEP07(2019)070.

7. *Twin conformal field theories*, L. Borsten, M.J. Duff, A. Marrani, JHEP **1903** (2019) 112, `arXiv:1812.11130 [hep-th]`, DOI: 10.1007/JHEP03(2019)112.

8. *The Geometry of Exceptional Super Yang-Mills Theories*, M. Rios, A. Marrani, D. Chester, Phys. Rev. **D99** (2019) 046004, `arXiv:1811.06101 [hep-th]` DOI : 10.1103/PhysRevD.99.046004.

9. *The q-linked complex Minkowski space, its real forms and deformed isometry groups*, R. Fioresi, E. Latini, A. Marrani, Int. J. Geom. Meth. Mod. Phys. **16** (2018) no.01, 1950009, `arXiv:1803.04730 [hep-th]`, DOI: 10.1142/S0219887819500099.

10. *Are all Supergravity Theories Yang-Mills Squared?*, A. Anastasiou, L. Borsten, M.J. Duff, A. Marrani, S. Nagy, M. Zoccali, Nucl. Phys. **B934** (2018) 606, `arXiv:1707.03234 [hep-th]`, https://doi.org/10.1016/j.nuclphysb.2018.07.023.

11. *Extremal Black Holes, Stueckelberg Scalars and Phase Transitions*, A. Marrani, O. Miskovic, P. Quezada Leon, JHEP **02** (2018) 080, `arXiv:1712.01425 [hep-th]`, https://doi.org/10.1007/JHEP02(2018)080.

12. *A Kind of Magic*, L. Borsten, A. Marrani, Class. Quant. Grav. **34** 235014 (2017), `arXiv:1707.02072 [hep-th]`, DOI: 10.1088/1361-6382/aa8fe2.

13. *Quantum Klein Space and Superspace*, R. Fioresi, E. Latini, A. Marrani, SIGMA **14** (2018) 066, `arXiv:1705.01755 [hep-th]`, DOI: 10.3842/SIGMA.2018.066.

14. *Supersymmetric Black Holes and Freudenthal Duality*, T. Mandal, A. Marrani, P. K. Tripathy, Int. J. Mod. Phys. **A32** (2017) 1750114, `arXiv:1703.08669 [hep-th]`, DOI: 10.1142/S0217751X17501147.

15. *Nonlinear symmetries of black hole entropy in gauged supergravity*, D. Klemm, A. Marrani, N. Petri, M. Rabbiosi, JHEP **1704** (2017) 013, `arXiv:1701.08536 [hep-th]`, DOI: 10.1007/JHEP04(2017)013.

16. *Non-Supersymmetric Magic Theories and Ehlers Truncations*, A. Marrani, G. Pradisi, F. Riccioni, L. Romano, Int. J. Mod. Phys. **A32** (2017) 1750120, `arXiv:1701.03031 [hep-th]`, DOI: 10.1142/S0217751X17501202.

17. *Peccei-Quinn Transformations and Black Holes : Orbit Transmutations and Entanglement Generation*, T. Prudencio, A. Marrani, D. J. Cirilo-Lombardo, Universe **3** (2017) 12, `arXiv:1612.00344 [hep-th]`, DOI:10.3390/universe3010012.

18. $D = 3$ *Unification of Curious Supergravities*, M. J. Duff, S. Ferrara, A. Marrani, JHEP **1701** (2017) 023, `arXiv:1610.08800 [hep-th]`, DOI: 10.1007/JHEP01(2017)023.

19. *Twin Supergravities from Yang-Mills Squared*, A. Anastasiou, L. Borsten, M. J. Duff, M. J. Hughes, A. Marrani, S. Nagy, M. Zoccali, Phys.Rev. **D96** (2017) no.2, 026013, `arXiv:1610.07192 [hep-th]`, DOI : 10.1103/PhysRevD.96.026013.

20. *One-Dimensional Super Calabi-Yau Manifolds and their Mirrors*, S. Noja, S. L. Cacciatori, F. Dalla Piazza, A. Marrani, R. Re, JHEP **1704** (2017) 094, `arXiv:1609.03801 [hep-th]`, DOI:10.1007/JHEP04(2017)094.

21. *Klein and Conformal Superspaces, Split Algebras and Spinor Orbits*, R. Fioresi, E. Latini, A. Marrani, Rev. Math. Phys. **29**, 1750011 (2017), `arXiv:1603.09063 [hep-th]`, DOI: http://dx.doi.org/10.1142/S0129055X17500118.

22. *BPS Black Holes in a Non-Homogeneous Deformation of the stu model of $\mathcal{N} = 2$, $D = 4$ Gauged Supergravity*, D. Klemm, A. Marrani, N. Petri, C. Santoli, JHEP **1509** (2015) 205, `arXiv:1507.05553 [hep-th]`, DOI: 10.1007/JHEP09(2015)205.

23. *Sextonions, Zorn Matrices, and $e_{71/2}$*, A. Marrani, P. Truini, Lett. Math. Phys. **107** (2017) 1859, `arXiv:1506.04604 [math.RA]`, DOI: 10.1007/s11005-017-0966-7.

24. *Real weights, bound states and duality orbits*, A. Marrani, F. Riccioni, L. Romano, Int. J. Mod. Phys. **A31**, 1550218 (2016), `arXiv:1501.06895 [hep-th]`, DOI: 10.1142/S0217751X15502188.

25. *Symplectic Deformations of Gauged Maximal Supergravity*, G. Dall'Agata, G. Inverso, A. Marrani, JHEP **1407** (2014) 133, `arXiv:1405.2437 [hep-th]`, DOI: 10.1007/JHEP07(2014)133.

26. *Exceptional Lie Algebras, SU(3) and Jordan Pairs Part 2: Zorn-type Representations*, A. Marrani, P. Truini, J.Phys. **A47** (2014) 265202, `arXiv:1403.5120 [math-ph]`, DOI: 10.1088/1751-8113/47/26/265202.

27. *No Fermionic Wigs for BPS Attractors in 5 Dimensions*, G. L. C. Gentile, P. A. Grassi, A. Marrani, A. Mezzalira, W. A. Sabra, Phys. Lett. **B735** (2014) 231, `arXiv:1403.5097 [hep-th]`, DOI: 10.1016/j.physletb.2014.06.026.

28. *Iwasawa nilpotency degree of non compact symmetric cosets in $\mathcal{N}$-extended Supergravity*, S. L. Cacciatori, B. L. Cerchiai, S. Ferrara, A. Marrani, Fortsch.Phys. **62** (2014) 350, `arXiv:1402.5063 [hep-th]`, DOI: 10.1002/prop.201400010.

29. *Fermions, Wigs, and Attractors*, G. L. C. Gentile, P. A. Grassi, A. Marrani, A. Mezzalira, Phys. Lett. **B732**, 263 (2014), `arXiv:1309.0821 [hep-th]`, DOI: 10.1016/j.physletb.2014.03.046.

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Thesis Title: *"Selected Topics in Quantum Gravity : a Maiden Voyage"*
Date: Jan. 2011. Mark: *Ottimo.*

2. Master student: F. Muscolino, University of Milano, Italy.
   Thesis Title: *"Supersymmetry Breaking in Supergravity via the Double Copy Approach"*
   Date: Apr. 2018.

PhD Committee member :

1. Ph.D. student: C. S. Shabhazi, IFT, UAM - CSIC, Madrid, Spain.
   Thesis Title: *"Black Holes in Supergravity with Applications to String Theory"*
   Date: June 2013. Mark: *Excellent.*

Seminars and Talks :

2019, November, 13 : *On Exceptional Periodicity and Magic Star Algebras.*
DIAS, Dublin, Ireland.

2019, September, 25 : *On Exceptional Periodicity and Magic Star Algebras.*
University of Trento, Dept. of Mathematics, Trento, Italy.

2019, June, 27 : *On Exceptional Periodicity.*
INRNE, Sofia, Bulgaria.

2019, June, 25 : *The Freudenthal Duality Map and New Groups of type E_7.*
INRNE, Sofia, Bulgaria.

2019, June, 20 : *The Freudenthal Map and (New) Groups of type E_7.*
BAS, Varna, Bulgaria.

2018, June, 29 : *On the Magic Star and the Exceptional Periodicity.*
UCLA, Dept. of Astronomy and Physics, Los Angeles, CA, USA.

2018, May, 23 : *On Freudenthal Duality.*
University of Murcia, Dept. of Physics, Murcia, Spain.

2018, May, 15 : *Freudenthal Duality and (New) Groups of type E_7.*
DIAS, Dublin, Ireland.

2018, April, 18 : *The World in Eleven Dimensions* ***(Invited Colloquium)****.*
PUCV, Valparaiso, Chile.

2018, April, 13 : *Freudenthal Symmetry of Black Hole Entropy.*
Pucon, Chile.

2018, March, 8 : *Black Hole Entropy and its Non-Linear Mysteries.*
Geilo, Norway.

2018, February, 28 : *Non-Linear Mysteries of Black Hole Entropy.*
Nordita, Stockholm, Sweden.

2018, January, 19 : *A Mystery of Black Hole Entropy.*
University of Murcia, Dept. of Physics, Murcia, Spain.

2018, January, 9 : *A Black Hole Mystery.*
University of Calabria, Dept. of Physics, Cosenza, Italy.

2017, September, 28 : *U-Duality and F-Duality. Linear and Non-Linear Symmetries of Black Hole Entropy.*
University of Trento, TIFPA, Dept. of Physics, Trento, Italy.

2017, September, 13 : *A Black Hole Mystery.*
University of Trento, Dept. of Physics, Trento, Italy.

2017, July, 8 : *Non-Linear Invariance of Black Hole Entropy.*
Palazzo del Casinó, Venice, Italy.

2017, June, 1 : *A Mystery of Black Hole Entropy.*
UB, Dept. of Physics, Barcelona, Spain.

2017, May, 22 : *Exceptional Periodicity and the Magic Star.*
Quantum Gravity Research headquarters, Los Angeles, CA USA.

2017, April, 28 : *Non-linear anti-involutive symmetries of black hole entropy.*
Mainz Institute for Theoretical Physics, Johannes Gutenberg University, Mainz, Germany.

2017, Jan, 12 : *Bekenstein and Hawking meet Jordan and Freudenthal : Non-Linear Symmetries of Black Hole Entropy.*
PUCV, Institute of Physics, Valparaiso, Chile.

2016, September, 26 : *Bekenstein and Hawking meet Jordan and Freudenthal : Non-Linear Symmetries of Black Hole Entropy.*
University of Padova, Phys. Dept., Padova, Italy.

2016, May, 11 : *Jordan and Freudenthal meet Bekenstein and Hawking : Non-Linear Symmetries of Black Hole Entropy.*
University of Ferrara, Dept. of Physics, Ferrara, Italy.

2016, May, 10 : *Bekenstein and Hawking meet Jordan and Freudenthal : Non-Linear Symmetries of Black Hole Entropy.*
University of Bologna, Dept. of Physics, Bologna, Italy.

2016, May, 5 : *Almost-Complex Structures for Symplectic Spaces and Non-Linear Symmetries of Black Hole Entropy.*
Centro de Ciencias de Benasque *"Pedro Pascual"*, Benasque, Spain.

2016, April, 11 : *Anti-Involutive Maps for Electromagnetic Fluxes and Non-Linear Symmetries of Black Hole Entropy.*
DIAS, Dublin, Ireland.

2016, March, 30 : *Almost-Complex Structures for Electromagnetic Fluxes and Non-Linear Symmetries of Black Hole Entropy.*
University of Genova, Phys. Dept., Genova, Italy.

2016, March, 16 : *Almost-Complex Structures for Symplectic Spaces and Non-Linear Symmetries of Black Hole Entropy.*
DISAT, University of Insubria, Como, Italy.

2016, February, 23 : *Freudenthal and Exceptional : Symmetries of Gravity and Black Hole Entropy.*
"Statale" Univ. of Milan, Phys. Dept., Milan, Italy.

2016, January, 25 : *Quantum Gravity : from Black Holes to Quantum Entanglement.*
"Enrico Fermi" Center, Roma, Italy.

2015, December, 1 : *Freudenthal Symmetries and U-Orbits : from Groups of Type E_7 to Pre-Homogeneous Vector Spaces.*
IPhT, CEA, Saclay (Paris), France.

2015, November, 24 : *Freudenthal Symmetries and U-Orbits : from Groups of Type E_7 to Pre-Homogeneous Vector Spaces.*
Los Angeles, CA, USA.

2015, October, 1 : *Freudenthal Duality, Lie Groups of Type E_7, and Pre-Homogeneous Vector Spaces.*
Univ. of Bologna, Mathematics Dept., Bologna, Italy.

2015, July, 13 : *Freudenthal Duality and Black Holes : from Groups of type E_7 to Pre-Homogeneous Spaces.*
Univ. of Roma "La Sapienza", Physics Dept., Roma, Italy.

2015, April, 28 : *Black Hole Attractors, Charge Orbits and Moduli Spaces.*
CERN, Geneva, Switzerland.

2015, March, 5 : *Gravity, Supersymmetry and Attractors.*
"Statale" Univ. of Milan, Phys. Dept., Milan, Italy.

2014, November, 7 : *Freudenthal Duality in Gravity: from Groups of Type E_7 to Pre-Homogeneous Spaces.*
IPAM, UCLA, Los Angeles, CA, USA.

2014, September, 17 : *The Role of Freudenthal Duality in Gravity: from Groups of Type E_7 to Pre-Homogeneous Spaces.*
Univ. of Genova, Physics Dept., Genova, Italy.

2014, September, 9 : *Global Symmetries in (Super)Gravity: Freudenthal Duality, Groups of Type E_7 and Pre-Homogeneous Spaces.*
Univ. of Roma "La Sapienza", Physics Dept., Roma, Italy.

2013, October, 25 : *Groups of Type E_7 in (Super)Gravity: from Freudenthal Duality to Pre-Homogeneous Spaces.*
Univ. of Genova, Physics Dept., Genova, Italy.

2013, October 23 : *Dualities Near the Horizon.*
Univ. of Ferrara, Physics Dept., Ferrara, Italy.

2013, October 15 : *Freudenthal Duality, Groups of Type E_7, and Pre-Homogeneous Spaces.*
Univ. of Turin, Theoretical Physics Dept., Turin, Italy.

2013, June, 5 : *Dualities Near the Horizon.*
CSIC, Piemonte Orientale Univ., Alessandria, Italy.

2013, April, 24 : *Dualities Near the Horizon.*
ITF, KUL, Leuven, Belgium.

2013, January, 9 : *Attractive Dynamics and Local Supersymmetry.*
Univ. of Ferrara, Physics Dept., Ferrara, Italy.

2012, November, 6 : *Freudenthal Gauge Theory.*
Univ. of Insubria, Como, Italy.

2011, November, 17 : *Multi-Centered Black Hole Structures and Groups of Type E_7.*
IPHT CEA Saclay, Paris, France.

2011, November, 11 : *Invariant Structures of Multi-Centered Black Holes.*
"Statale" Univ. of Milan, Phys. Dept., Milan, Italy.

2011, June, 1 : *Horizontal Invariants in Multi-Centered Black Holes.*
UCB, Physics Dept., Berkeley, CA, USA.

2011, May, 24 : *Multi-Centered Black Holes and Horizontal Symmetry.*
UCLA, Physics and Astronomy Dept., Los Angeles, CA, USA.

2010, January, 21 : *Black Attractors.*
"Statale" Univ. of Milan, Phys. Dept., Milan, Italy.

2010, January, 12 : *Attractors in Black.*
Univ. of Turin, Theoretical Physics Dept., Turin, Italy.

2009, December, 1 : *On the Attractor Mechanism.*
Imperial College, Physics Dept., London, UK.

2009, November, 25 : *Attractors in Supergravity.*
King's College, Mathematics Dept., London, UK.

2009, March, 19 : *Moduli Spaces, Charge Orbits and Space-Time.*
Univ. of Minnesota, Fine Theoretical Physics Inst.,
Minneapolis, MN USA.

2008, December, 8 : *Attractor Mechanism and Space-Time Singularities.*
Univ. of Cincinnati, Physics Dept., Cincinnati, OH USA.

2008, October, 24 : *The Attractor Mechanism in Extremal Black Holes. Foundations and Recent Developments.*
Univ. of Rome "Tor Vergata", Physics Dept., Roma, Italy.

2006, September, 20 : *Attractors and Black Holes in Supergravity.*
Univ. of Turin, Theoretical Physics Dept., Turin, Italy.

2006, February, 27 : *The Attractor Mechanism and Black Holes.*
INFN - Frascati National Laboratories (LNF), Rome, Italy.

2002, October, 22 : *CPT Theorem. CPT Violation in Neutral Meson Systems.*
Univ. of Rome "Roma Tre", *"Edoardo Amaldi"* Physics Dept.

2002, October, 6 : *Elements of Gauge Theories. Physical Consistence of Gauge Group.*
Univ. of Rome "Roma Tre", *"Edoardo Amaldi"* Physics Dept.

2002, October, 14 : *Elements of Theory of Algebras. From Poincar-Birkhoff-Witt Theorem to Baker-Campbell-Hausdorff formula.*
Univ. of Rome "Roma Tre", *"Edoardo Amaldi"* Physics Dept.

2002, August, 31 : *Hamilton's Quaternionic R-algebra and the Rotations in R^3.*
Univ. of Rome "Roma Tre", *"Edoardo Amaldi"* Physics Dept.

Reviewer Activity

1. PLB (Physics Letters B) (*The Best Reviewer 2011*);
2. CQG (Classical and Quantum Gravity);
3. LMP (Letters in Mathematical Physics);
4. EPJ+ (European Physics Journal Plus);
5. EPJC (European Physical Journal C);
6. Il Nuovo Cimento;
7. JHEP (Journal of High Energy Physics);
8. NPB (Nuclear Physics B);
9. SIGMA (Symmetry, Integrability and Geometry : Methods and Applications);
10. JGSP (Journal of Geometry and Symmetry in Physics);
11. JPA (Journal of Physics A : Mathematical and Theoretical);
12. IJGMMP (International Journal of Geometric Methods in Modern Physics);
13. Mathematical Reviews (AMS);
14. Filomat;
15. RACSAM (Revista de la Real Academia de Ciencias Exactas, Fisicas y Naturales. Serie A. Matematicas).
16. FUJMA (Fundamental Journal of Mathematics and Applications).

Oleksii Matsedonskyi – CV

Professional address Herzl st. 234, Dept. of Particle Physics and Astrophysics,
Weizmann Institute, 76100 Rehovot, Israel

Professional email

Education

2010 - 2013 PhD student at Padua University under supervision of Prof. A. Wulzer and Prof. F. Zwirner
PhD degree in Theoretical Physics (awarded in April 2014);
Thesis title: "Composite Higgs, Top Partners and the LHC"
Part of the thesis was completed during stays at ETH (Zurich) and EPFL (Lausanne)

2009 - 2010 Paris 11 University, Master 2 of Fundamental and Applied Physics,
NPAC (Nuclei, Particles, Astroparticles and Cosmology)
Master, summa cum laude
Thesis advisor: Dr. G. Moreau

2008 - 2010 Kharkiv National University, Department of Physics and Technology
Master in Theoretical Physics, summa cum laude

2004 - 2008 Kharkiv National University, Department of Physics and Technology
Bachelor diploma of Applied Physics, summa cum laude

Employment History

from 2018 post-doc at Weizmann institute (Rehovot, Israel) in the group of Prof. G. Perez

2015 - 2018 post-doc at DESY (Hamburg, Germany) in the group of Prof. C. Grojean

2013 - 2015 post-doc at Scuola Normale Superiore (Pisa, Italy) in the group of Prof. R. Barbieri

Computer Skills

MadGraph, FeynRules, FeynCalc, ROOT.

Scholarships

2018 - 2020 IASH scholarship (Israel Academy of Sciences and Humanities)
and Faculty of Physics post-doctoral excellence fellowship at Weizmann Institute.

2010 - 2013 ESR fellow of the Marie Curie ITN "Unification in the LHC era" at INFN Padua.

2009 - 2010 French Government Scholarship (BGF).

Travel grants

COST workshop (Jan 2020, Berlin, Germany), NPKI workshop (June 2016, Seul, Korea)

Refereeing articles for international journals

from 2017 Refereeing papers for Physics Letters B.

from 2014 Refereeing papers for JHEP.

Participation in international research groups

2020 Part of the group preparing Review of Fundamental Composite Dynamics for the European Physical Journal

2019 Contribution to the preparation of
Report from Working Group 4 : Opportunities in Flavour Physics at the HL-LHC and HE-LHC, CERN Yellow Rep.Monogr. 7 (2019) 867-1158

2019 External contributor to the work of the CLICdp collaboration,
results published in:
Top-Quark Physics at the CLIC Electron-Positron Linear Collider, JHEP 11 (2019) 003

2018 Contribution to the preparation of report
The CLIC Potential for New Physics, CERN Yellow Rep. Monogr. Vol. 3 (2018)

Organising activities

from 2019 Participation in organisation of joint seminars of Israeli particle phenomenology groups.

2016 Participation in organisation of the workshop "BSM faces LHC run-2 reality"
(Sep 2016, DESY Hamburg).

Outreach activities

2013 Taking part in preparing the poster session "Six reasons to become a particle physicist" during a summer school at SISSA Medialab, explaining the main puzzles of the current fundamental physics for general public, which was later used for the outreach activity.

Talks at conferences and workshops

Jan 2020 "High-T EW symmetry non-restoration with new fermions",
invited talk at COST workshop: Probing BSM physics at different scales (Berlin, Germany)

Oct 2019 "EW Symmetry Non-Restoration at High Temperature with New Fermions",
invited talk at BLV 2019 (Madrid, Spain)

Sep 2019 "EW Symmetry Non-Restoration at High Temperature with New Fermions",
invited talk at Top 2019 (Beijing, China)

Apr 2019 "Non-standard EW phase transition & new light states",
invited talk at "Light scalars" (Benasque, Spain)

Jul 2018 "Electroweak Phase Transition in Composite Higgs Models", at Physics at the LHC and Beyond (CERN)

May 2018 "Baryon Asymmetry from Composite Higgs",
invited talk at Cosmological probes of BSM (Benasque, Spain)

Apr 2018 "Composite Higgs phenomenology", invited talk at Confronting Naturalness, (Hamburg, Germany)

Jan 2018 "Probing Composite Higgs with the Top Portal at CLIC", invited talk at CLIC workshop 2018 (CERN)

May 2017 "Light Higgs from Pole Attractor", at Planck 2017 (Warsaw, Poland)

Mar 2017 "Light Higgs from Pole Attractor", invited talk at HPNP 2017 (Toyama, Japan)

Jun 2016 "EFT for Strongly Coupled Scenarios of 750GeV Resonance", invited talk at NPKI (Seul, Korea)

Aug 2015 "Direct and Indirect Constraints on Composite Higgs Models",
invited talk at FCC-ee conference (Pisa, Italy)

Aug 2014 "Vector-Like Quarks", invited talk at Physics at LHC and Beyond (Qui-Nhon, Vietnam)

May 2014 "Flavour of Composite Higgs", at Planck 2014 (Paris, France)

May 2014 "Composite Higgs", invited talk at What's Next (Biodola, Italy)

May 2013 "Top Partners", invited talk at Rencontres de Blois (Blois, France)

May 2013 "Light Top Partners and Precision Physics", at Planck 2013 (Bonn, Germany)

May 2012 "Light Top Partners for a Light Composite Higgs", at Planck 2012 (Warsaw, Poland)

Publications summary

h-index: 15 (Inspire), 11 (Scopus), 11 (Web of Science)
total number of publications: 22 (Inspire), 17 (Scopus), 17 (Web of Science)
total number of citations: 1416 (Inspire), 696 (Scopus), 628 (Web of Science)

Full list of publications

1. "High-Temperature Electroweak Symmetry Breaking by SM Twins"
   O. Matsedonskyi
   [arXiv:2008.13725 [hep-ph]], submitted to JHEP
2. "Collider searches of scalar singlets across lifetimes"
   E. Fuchs, O. Matsedonskyi, I. Savoray, M. Schlaffer
   [arXiv:2008.12773 [hep-ph]]
3. "Probing the relaxed relaxion and Higgs-portal with S1 & S2"
   R. Budnik, H. Kim, O. Matsedonskyi, G. Perez and Y. Soreq
   [arXiv:2006.14568 [hep-ph]], submitted to JHEP
4. "Probing the Relaxed Relaxion at the Luminosity and Precision Frontiers"
   A. Banerjee, H. Kim, O. Matsedonskyi, G. Perez, M. Safronova
   JHEP **07**, 153 (2020); DOI:10.1007/JHEP07(2020)153
   [arXiv:2004.02899 [hep-ph]]
5. "High-Temperature Electroweak Symmetry Non-Restoration from New Fermions and Implications for Baryogenesis"
   O. Matsedonskyi, G. Servant
   JHEP **09**, 012 (2020); DOI:10.1007/JHEP09(2020)012
   [arXiv:2002.05174 [hep-ph]]
6. "Searching for Earth/Solar Axion Halos"
   A. Banerjee, D. Budker, J. Eby, V. Flambaum, H. Kim, O.Matsedonskyi, G. Perez
   JHEP **09**, 004 (2020); DOI:10.1007/JHEP09(2020)004
   [arXiv:1912.04295 [hep-ph]]

7. "Opportunities in Flavour Physics at the HL-LHC and HE-LHC,"
A. Cerri et al.
CERN Yellow Rep.Monogr. 7 (2019) 867-1158; DOI: 10.23731/CYRM-2019-007.867;
[arXiv:1812.07638[hep-ph]]

8. "The CLIC Potential for New Physics,"
J. de Blas et al.
CERN Yellow Rep. Monogr. Vol. 3 (2018); DOI: 10.23731/CYRM-2018-003;
arXiv:1812.02093 [hep-ph]

9. "The top-quark window on compositeness at future lepton colliders,"
G. Durieux and O. Matsedonskyi,
JHEP 1901 (2019) 072; DOI: 10.1007/JHEP01(2019)072;
arXiv:1807.10273 [hep-ph].

10. "Top-Quark Physics at the CLIC Electron-Positron Linear Collider,"
H. Abramowicz *et al.* [CLICdp Collaboration],
JHEP 1911 (2019) 003;
arXiv:1807.02441 [hep-ex].

11. "Electroweak Phase Transition and Baryogenesis in Composite Higgs Models,"
S. Bruggisser, B. Von Harling, O. Matsedonskyi and G. Servant,
JHEP 1812 (2018) 099; DOI: 10.1007/JHEP12(2018)099;
arXiv:1804.07314 [hep-ph].

12. "The Baryon Asymmetry from a Composite Higgs,"
S. Bruggisser, B. Von Harling, O. Matsedonskyi and G. Servant,
Phys.Rev.Lett. 121 (2018) no.13, 131801; DOI: 10.1103/PhysRevLett.121.131801;
arXiv:1803.08546 [hep-ph].

13. "Light Higgs Boson from a Pole Attractor,"
O. Matsedonskyi and M. Montull,
Phys. Rev. D **98**, no. 1, 015026 (2018); doi:10.1103/PhysRevD.98.015026;
[arXiv:1709.09090 [hep-ph]].

14. "Minimally extended SILH,"
M. Chala, G. Durieux, C. Grojean, L. de Lima and O. Matsedonskyi,
JHEP **1706**, 088 (2017); doi:10.1007/JHEP06(2017)088;
[arXiv:1703.10624 [hep-ph]].

15. "Top Partners Searches and Composite Higgs Models,"
O. Matsedonskyi, G. Panico and A. Wulzer,
JHEP **1604**, 003 (2016); doi:10.1007/JHEP04(2016)003;
[arXiv:1512.04356 [hep-ph]].

16. "Mirror Cosmological Relaxation of the Electroweak Scale,"
O. Matsedonskyi,
JHEP **1601**, 063 (2016); doi:10.1007/JHEP01(2016)063;
[arXiv:1509.03583 [hep-ph]].

17. “On Flavour and Naturalness of Composite Higgs Models,”
O. Matsedonskyi,
JHEP **1502**, 154 (2015); doi:10.1007/JHEP02(2015)154;
[arXiv:1411.4638 [hep-ph]].

18. “On the Interpretation of Top Partners Searches,”
O. Matsedonskyi, G. Panico and A. Wulzer,
JHEP **1412**, 097 (2014); doi:10.1007/JHEP12(2014)097;
[arXiv:1409.0100 [hep-ph]].

19. “Composite Charge 8/3 Resonances at the LHC,”
O. Matsedonskyi, F. Riva and T. Vantalon,
JHEP **1404**, 059 (2014); doi:10.1007/JHEP04(2014)059;
[arXiv:1401.3740 [hep-ph]].

20. “Composite Higgs, Top Partners and the LHC,” O. Matsedonskyi, PhD thesis
http://paduaresearch.cab.unipd.it/6699/

21. “Light top partners and precision physics,”
C. Grojean, O. Matsedonskyi and G. Panico,
JHEP **1310**, 160 (2013); doi:10.1007/JHEP10(2013)160;
[arXiv:1306.4655 [hep-ph]].

22. “A First Top Partner Hunter’s Guide,”
A. De Simone, O. Matsedonskyi, R. Rattazzi and A. Wulzer,
JHEP **1304**, 004 (2013); doi:10.1007/JHEP04(2013)004;
[arXiv:1211.5663 [hep-ph]].

23. “Light Top Partners for a Light Composite Higgs,”
O. Matsedonskyi, G. Panico and A. Wulzer,
JHEP **1301**, 164 (2013); doi:10.1007/JHEP01(2013)164;
[arXiv:1204.6333 [hep-ph]].

01/12/2020

Azadeh Moradinezhad Dizgah, Ph.D.

Contact Information

Department of Theoretical Physics
University of Geneva,
24, quai Ernest Ansermet,
1211 Geneva 4, Switzerland

Research Interests

I am a theoretical cosmologist, broadly interested in studying the origin, the composition and the evolution of the universe by testing the theoretical models against the high-precision data from various cosmological observations. The primary direction of my research has been constraining the physics of the early universe using observations of cosmological large-scale structure (in particular galaxy clustering and line intensity mapping), as well as the cosmic microwave background.

Professional Experience

University of Geneva, Department of Theoretical Physics, Geneva, Switzerland
Senior Research Associate (Maître Assistant), February 2019 - Present

Harvard University, Department of Physics, Cambridge, MA, USA
Associate Scholar, February 2019 - October 2019
Postdoctoral Fellow, September 2016 - February 2019

University of Geneva, Department of Theoretical Physics, Geneva, Switzerland
Tomalla Postdoctoral Fellow, October 2013 - September 2016

The State University of New York at Buffalo, Department of Physics, NY, USA
Research and Teaching Assistant, September 2008 - June 2013

Education

The State University of New York at Buffalo, Buffalo, NY, USA

- Ph.D., Physics, June 2013
  Defense date: May 3rd, 2013
  Advisor: William H. Kinney
  Ph.D. Thesis Title: *Cosmological perturbations and the physics of the early universe: Model-independent studies of viable scenarios*
- Advanced Graduate Certificate in Computational Science (M.S. equivalent), June 2013

University of Tehran, Tehran, Iran

- Bachelor of Science, Physics, October 2007
  Research Advisor: Hossein Mohseni Sajadi
  Undergraduate Thesis Title: *A Review of Scalar Field Models of Dark Energy*

Awards

- The Tomalla postdoctoral Fellowship, The Tomalla Foundation for Gravity Research, University of Geneva, Switzerland, 2013-2016
- Fermilab Graduate Fellowship in Theoretical Physics, Fermi National Accelerator Laboratory, Batavia, IL, USA, 2011-2012
- Full Graduate Tuition Fellowship and Stipend, Department of Physics, The State University of New York at Buffalo, NY, USA, 2008-2013
- Frank B. Silvestro Fellowship, Department of Physics, The State University of New York at Buffalo, NY, USA, 2010, 2012

Professional membership

EUCLID Consortium, member of galaxy clustering science working group (SWG) (most active in higher-order clustering statistics and nonlinear likelihood work-packages)

PUBLICATIONS
(STARRED PUBLICATIONS HAVE ALPHABETICAL AUTHOR-LIST, WHILE THE REST ARE ORDERED BY CONTRIBUTION)

1. **Azadeh Moradinezhad Dizgah**, Matteo Biagetti, Emiliano Sefusatti, Vincent Desjacques, Jorge Noreña
   Primordial non-Gaussianity from Biased Tracers: Likelihood Analysis of Real-Space Power Spectrum and Bispectrum
   Submitted to JCAP [arXiv:2010.14523]
2. Marcel Schmittfull and **Azadeh Moradinezhad Dizgah**,
   Skew spectra in redshift-space
   Submitted to JCAP [arXiv:2010.14267]
3. Emanuele Castorina and **Azadeh Moradinezhad Dizgah**
   Local Primordial Non-Gaussianities and Super-Sample Variance
   JCAP 10 (2020) 007 [arXiv:2005.14677]
4. **Azadeh Moradinezhad Dizgah**, Hayden Lee, Marcel Schmittfull, Cora Dvorkin
   Capturing Non-Gaussianity of the Large-Scale Structure with Weighted Skew-Spectra
   JCAP 04 (2020) 011 [arXiv:1911.05763]
5. Benjamin Bose, Joyce Byun, Fabien Lacasa, **Azadeh Moradinezhad Dizgah**, Lucas Lombriser
   Modelling the non-linear bispectrum in modified gravity
   JCAP 02 (2020) 025 [arXiv:1909.02504]
6. **Azadeh Moradinezhad Dizgah**, Gabriele Franciolini, Antonio Riotto,
   Primordial Black Holes from Broad Spectra: Abundance and Clustering
   JCAP 11 (2019) 001 [arXiv:1906.08978]
7. **Azadeh Moradinezhad Dizgah**, Garrett Keating,
   Line intensity mapping with [CII] and CO(1-0) as probes of primordial non-Gaussianity
   APJ 872 (2019) no.2, 126 [arXiv:1805.10247]
8. **Azadeh Moradinezhad Dizgah**, Gabriele Franciolini, Alex Kehagias, Antonio Riotto,
   Constraints on long-lived, higher-spin particles from galaxy bispectrum
   Phys. Rev. D 98 (2018) no.6, 063520 [arXiv:1805.10247]
9. **Azadeh Moradinezhad Dizgah**, Garrett Keating, Anastasia Fialkov,
   Probing Cosmic Origins with CO and [CII] Emission Lines
   APJ Letters 870 (2019) no.1, L4 [arXiv:1801.10178]
10. **Azadeh Moradinezhad Dizgah**, Hayden Lee, Julian B. Munõz, Cora Dvorkin,
    Galaxy Bispectrum from Massive Spinning Particles
    JCAP 05 (2018) 013 [arXiv:1801.07265]
11. Kwan Chuen Chan, **Azadeh Moradinezhad Dizgah**, Jorge Noreña,
    Bispectrum Supersample Covariance
    Phys. Rev. D 97, 043532 (2018) [arXiv:1709.02473]
12. **Azadeh Moradinezhad Dizgah**, Cora Dvorkin,
    Scale-Dependent Galaxy Bias from Massive Particles with Spin during Inflation
    JCAP 01 (2018) 010 [arXiv:1709.02473]
13. Enea Di Dio, Hideki Perrier, Ruth Durrer, Giovanni Marozzi, **Azadeh Moradinezhad Dizgah**, Jorge Noreña, Antonio Riotto,
    Non-Gaussianities due to Relativistic Corrections to the Observed Galaxy Bispectrum
    JCAP 03 (2017) 006 [arXiv:1611.03720]
14. **Azadeh Moradinezhad Dizgah**, Ruth Durrer,
    Lensing corrections to the $E_g(z)$ statistics from large scale structure
    JCAP 09 (2016) 035 [arXiv:1604.08914]
15. **Azadeh Moradinezhad Dizgah**, Kwan Chuen Chan, Jorge Noreña, Matteo Biagetti, Vincent Desjacques
    Squeezing the halo bispectrum: a test of bias models,
    JCAP 09 (2016) 030 [arXiv: 1512.06084]

∗16. Alex Kehagias, **Azadeh Moradinezhad Dizgah**, Jorge Noreña, Hideki Perrier and Antonio Riotto, *A Consistency relation for the observed galaxy bispectrum and the local non-Gaussianity from relativistic corrections*, JCAP 08 (2015) 018 [arXiv:1503.04467].

∗17. Alex Kehagias, **Azadeh Moradinezhad Dizgah**, Jorge Noreña, Hideki Perrier, Antonio Riotto, *A Consistency relation for the CMB B-mode polarization in the squeezed limit*, JCAP 10 (2014) 011 [arXiv:1407.6223].

18. Vincent Desjacques, **Azadeh Moradinezhad Dizgah**, Matteo Biagetti, *Ultraviolet background fluctuations with clustered sources*, Mon. Not. Roy. Astron. Soc. 444, no. 3, 2793 (2014) [arXiv:1406.6379].

∗19. Alex Kehagias, **Azadeh Moradinezhad Dizgah**, Antonio Riotto, *Remarks on the Starobinsky model of inflation and its descendants*, Phys. Rev. D 89, no. 4, 043527 (2014) [arXiv:1312.1155].

20. **Azadeh Moradinezhad Dizgah**, Scott Dodelson, Antonio Riotto, *Imprint of primordial non-Gaussianity on dark matter halo profiles*, Phys. Rev. D 88, 063513 (2013) [arXiv:1307.2632].

21. **Azadeh Moradinezhad Dizgah**, Nikoly Gnedin, William Kinney, *Reionization history and CMB parameter estimation*, JCAP 05 (2013) 017 [arXiv:1211.7007].

∗22. William Kinney, **Azadeh Moradinezhad Dizgah**, Brian Powelll, Antonio Riotto, *Inflaton or Curvaton? Constraints on bimodal primordial spectra from mixed perturbations*, Phys. Rev. D 86, 023527 (2012) [arXiv:1203.0693].

23. William Kinney, Ghazal Geshnizjani, **Azadeh Moradinezhad Dizgah**, *Inflation, Or What?* C12-03-10.2, p.179-184 Conference Proceedings: 47th Rencontres de Moriond on Cosmology,

∗24. Ghazal Geshnizjani, William Kinney, **Azadeh Moradinezhad Dizgah**, *Horizon-preserving dualities and perturbations in non-canonical scalar field cosmologies*, JCAP 02 (2012) 015 [arXiv:1110.4640].

25. Ghazal Geshnizjani, William Kinney, **Azadeh Moradinezhad Dizgah**, *General conditions for scale-invariant perturbations in an expanding universe*, JCAP 11 (2011) 049 [arXiv:1107.1241].

∗26. William Kinney, **Azadeh Moradinezhad Dizgah**, *Flow in cyclic cosmology*, Phys. Rev. D 82, 083506 (2010) [arXiv:1007.0753].

White papers and porposals

1. Pete Barry, Clarence Chang, Abigail Crites, Kirit S. Karkare, Garrett K. Keating, Jeff McMahon, **Azadeh Moradinezhad Dizgah**, Erik Shirokoff *et al.* *Cosmology with Millimeter-Wave Line Intensity Mapping*, Snowmass2021 Letter of Interest `https://www.snowmass21.org/docs/files/summaries/CF/SNOWMASS21-CF4_CF5_Karkare-242.pdf`

2. Pete Barry, Clarence Chang, Abigail Crites, Kirit S. Karkare, Garrett K. Keating, Jeff McMahon, **Azadeh Moradinezhad Dizgah**, Erik Shirokoff *et al.* *Primordial Non-Gaussianity with Millimeter-Wave Line Intensity Mapping*, Snowmass2021 Letter of Interest `https://www.snowmass21.org/docs/files/summaries/CF/SNOWMASS21-CF5_CF6_Karkare-245.pdf`

3. Pete Barry, Clarence Chang, Abigail Crites, Kirit S. Karkare, Garrett K. Keating, Jeff McMahon, **Azadeh Moradinezhad Dizgah**, Erik Shirokoff *et al.* *Millimeter-Wave Line Intensity Mapping Facilities*, Snowmass2021 Letter of Interest

https://www.snowmass21.org/docs/files/summaries/CF/SNOWMASS21-CF6_CF4_Karkare-246.pdf

4. Pete Barry, Clarence Chang, Abigail Crites, Kirit S. Karkare, Garrett K. Keating, Jeff McMahon, **Azadeh Moradinezhad Dizgah**, Erik Shirokoff *et al.*
Synergies between Millimeter-Wave Line Intensity Mapping with Radio, Optical and Microwave Observations, Snowmass2021 Letter of Interest
https://www.snowmass21.org/docs/files/summaries/CF/SNOWMASS21-CF6_CF4_MoradinezhadDizgah-248.pdf
5. Jacques Delabrouille ..., **Azade Moradinezhad Dizgah** *et al.*
Microwave spectro-polarimetry of matter and radiation across space and time
ESA VOYAGE 2050, (proposal for L-class ESA mission) [arXiv:1909.01591]
6. Marta Silva, Ely Kovetz, Garrett Keating, **Azadeh Moradinezhad Dizgah**, Matthieu Bethermin, Patrick C. Breysse, Kirit Karkare, José Bernal, and Jacques Delabrouille, *Mapping large-scale structure evolution over cosmic time*, ESA Voyage-2050 White Paper, [arXiv:1908.07533]
7. Daniel Meerburg, ..., **Azadeh Moradinezhad Dizgah** *et al.*
Primordial non-Gaussianity,
Astro2020 Science White Paper [arXiv:1903.04409]

Invited Talks

- EUCLID consortium Higher Order Statistics work-package telecon, November 2020
Primordial non-Gaussianity from Biased Tracers: Likelihood Analysis of Real-Space Power Spectrum and Bispectrum
- Sharif University, Cosmology Seminars, Meeting Held Remotely, Tehran, Iran, August 2020
Late time universe as a probe of cosmic origins
- Queen Mary University of London, SPA Cosmology Seminars, Meeting Held via Zoom, London, UK, July 2020
Late time universe as a probe of cosmic origins
- Max Planck Institute for Astrophysics (MPA) Cosmology Seminars, Meeting Held via Zoom,
Munich, Germany, July 2020
Local Primordial Non-Gaussianities and Super-Sample Variance
- Princeton/IAS Cosmology Lunch, Meeting Held via Zoom, Princeton, NJ, USA, April 2020
(Joint Cosmology Seminars of Institute of Advanced Study and Princeton University)
Intensity mapping with CO and CII as probes of primordial non-Gaussianity
- Dutch theoretical cosmology Meeting, University of Groningen,
Groningen, Netherlands, March 2020
Primordial non-Gaussianity (PNG) with the large-scale structure across cosmic times
- Theoretical High Energy Physics Seminars, The Technical University of Munich,
Munich, Germany, October 2019
Cosmological imprints of new massive particles with spin during inflation
- The Non-Gaussian Universe workshop (keynote lecture),
The Stephen Hawking Centre for Theoretical Cosmology (ctc),
University of Cambridge, Cambridge, UK, September 2019
Observational Tests of Primordial non-Gaussianity
- Workshop on Dynamics of large-scale structure formation (overview talk),
Munich Institute of Astro- and Particle Physics (MIAAP), Munich, Germany, July 2019
Primordial non-Gaussianity with large-scale structure: galaxy surveys & intensity mapping
- Cosmology Seminars, University of Amsterdam (UvA),
Amsterdam, Netherlands, April 2019

Intensity mapping with emission lines as probes of primordial non-Gaussianity

- Cosmology and Astrophysics Seminar, The Center for Particle Cosmology, University of Pennsylvania, Philadelphia, PA, USA, October 2018
  Intensity mapping with CO(1-0) and CII as probes of primordial non-Gaussianity
- Galaxies & Cosmology Seminars, Harvard-Smithsonian Center for Astrophysics (CfA), Harvard University, Cambridge, MA, USA, March 2018
  Line intensity mapping as a probe of primordial non-Gaussianity
- The Institute for Theory and Computation (ITC) Luncheons, Harvard University, Cambridge, MA, USA, April 2017
  Signatures of extra particles during inflation on clustering statistics of galaxies
- Cosmology Seminar Series, The Berkeley Center For Cosmological Physics (BCCP), University of California Berkeley, Berkeley, CA, USA, March 2017
  Primordial non-Gaussianity from large scale structure: prospects and challenges
- Physics Seminar series, Department of Physics, The State University of New York at Buffalo, Buffalo, NY, USA, February 2017
  Primordial non-Gaussianity (PNG) from large scale structure: prospects and challenges
- Cosmology and Galaxies Seminars, Harvard-Smithsonian Center for Astrophysics (CfA), Harvard University, Cambridge, MA, USA, October 2016
  Squeezing the halo bispectrum: Test of bias modeling
- High Energy, Cosmology and Astroparticle Physics (HECAP) seminars, International Center for Theoretical Physics (ICTP), Trieste, Italy, March 2016
  Squeezing the galaxy bispectrum: Test of bias models
- Astrophysics-Cosmology Seminars, Center for Particle Cosmology, University of Pennsylvania, Philadelphia, PA, USA, November 2012
  The Physics of the early universe from the CMB and large-scale structure
- Cosmology Seminars, Department of Astrophysics, Princeton University, Princeton, NJ, USA, November 2012
  The Physics of the early universe from the CMB and large-scale structure
- Kavli Institute for Particle Astrophysics and Cosmology, Stanford University, CA, USA, November 2012
  The Physics of the early universe from the CMB and large-scale structure
- INPA Seminars, The Institute for Nuclear and Particle Astrophysics (INPA), Lawrence Berkeley National Laboratory, Berkeley, CA, USA, November 2012
  The physics of the early universe from the CMB and large-scale structure
- Particle/Astrophysics and CERCA seminars, Case Western Reserve University, Cleveland, OH, USA, September 2012
  The interplay between high and low redshift universe

Contributed Talks

- Lines in Large-scale structure, Marseille, France, July 2019
  Line intensity mapping as a probe of primordial non-Gaussianity
- Cosmo Gold, Institute d'Astrophysique de Paris, Paris, France, June 2019
  Line intensity mapping as a probe of primordial non-Gaussianity
- Cosmological Signals from Cosmic Dawn to the Present, Aspen Center for Physics, Aspen, CO, USA, February 2018,
  Probing Cosmic Origins with CO and [CII] intensity mapping
- Statistics of Extrema in Large Scale Structure, Lorentz Center, Leiden, Netherlands, March 2016,
  Squeezing the galaxy bispectrum: Test of bias models

- Swiss cosmo days, EPFL, Switzerland, February 2016,
  Squeezing the galaxy bispectrum: Test of bias models
- Workshop on cosmic acceleration, Carnegie Mellon University,
  Pittsburgh, PA, August 2012,
  General conditions for scale-invariant perturbations in an expanding universe
- Santa Fe 2012 Cosmology Summer Workshop, Santa Fe, NM , July 2012,
  Constraints on mixed inflaton-curvaton perturbations from CMB
- Theoretical Advanced Study Institute in Elementary Particle Physics,
  Boulder, CO, June 2012,
  General Conditions for scale-invariant perturbations in an expanding universe
- 15th East Coast Gravity Meeting, Syracuse, NY , April 2012,
  Constraints on mixed inflaton-curvaton perturbations from CMB
- Prospect in Theoretical Physics 2011, Institute of Advanced Study,
  Princeton, NJ, July 2011,
  General conditions for scale-invariant perturbations in an expanding universe
- Santa Fe 2011 Cosmology Summer Workshop, Santa Fe, NM, July 2011,
  General conditions for scale-invariant perturbations in an expanding universe
- Rust Belt Cosmology Workshop, SUNY at Buffalo, NY, January 2011,
  Flow in cyclic cosmology
- Santa Fe 2010 Cosmology Summer Workshop, Santa Fe, NM, July 2010,
  Flow in cyclic cosmology

Student Advising and Mentoring

- Farnik Nikakhtar (current, supervising on two research projects which will lead to two journal publications), Ph.D. student at University of Pennsylvania, USA (Ph.D. supervisor: Ravi Sheth),
- Matteo Biagetti (co-mentored and collaborated on 2 research projects with Vincent Desjacques at University of Geneva), now post-doc at IFPU, Trieste: published 2 papers
- Hideki Perrier (co-mentored and collaborated on a research project with Antonio Riotto), published 1 paper

Teaching Experience

University Of Geneva: Teaching Assistant
Undergraduate Level Mathematical Methods in Physics, 2015
Undergraduate Level Statistical Physics, 2014

The State University of New York at Buffalo: Teaching Assistant
Undergraduate Introductory Physics, 2011 - 2012
Undergraduate Level Classical Mechanics, 2010
Graduate Level Statistical Mechanics, 2009
Basic Physics Lab in Classical Mechanics, 2008
Basic Physics Lab in Electrostatics and Optics, 2008

Planning and Service

- Reviewer on NASA Astrophysics Database Program (ADAP) Proposal Panel Review, 2018
- Referee for Journal of Cosmology and Astroparticle Physics (JCAP)
- Referee for Monthly Notices of the Royal Astronomical Society (MNRAS)
- Referee for Physical Review D and Physical Review Letter Journals
- Organizer of Cosmology and Particle Physics Seminars, University of Geneva, 2020-2021
- Co-organizer of Cosmology and Particle Physics Seminars, University of Geneva, 2019-2020
- Co-organizer of Cosmology Journal Clubs, University of Geneva, 2019-2020
- Co-organizer of ECU Meetings, University of Geneva, 2019-2020
  (Joint bimonthly meeting between cosmology groups at EPFL, CERN and UNIGE),

- Organizer of Graduate Students Seminar Series, SUNY at Buffalo, 2011 - 2012
- Organizer of Cosmology-High Energy Journal Clubs, SUNY at Buffalo, 2010 - 2011

Computer Skills

Programming: C/C++, Python, Mathematica, Parallel Computing (OpenMP, MPI)
(advanced certificate in computational science)
Computer Packages: CLASS, CAMB, CosmoMC, CosmoSIS
Operating Systems: Linux, Mac OS X, Windows

Languages

Farsi: Native
English: Bilingual fluency
Italian: Intermediate Fluency
French: Basic Fluency

Enrico Morgante

Curriculum vitæ

Education and career

Johannes Gutenberg University Mainz — **Mainz, Germany**
Post-doc — *Since 10/2019*

Deutsches Elektronen-Synchrotron (DESY) — **Hamburg, Germany**
Post-doc — *10/2016 – 09/2019*

University of Geneva — **Geneva, Switzerland**
PhD, Mention: trés bien — *01/2013 – 09/2016*
Thesis title: Aspects of WIMP Dark Matter searches at colliders and other probes
Supervisor: Prof. Antonio Riotto (University of Geneva)

Scuola Normale Superiore — **Pisa (Italy)**
Diploma in Physics, 70/70 cum laude — *10/2007 – 09/2012*

University of Pisa — **Pisa (Italy)**
Master in Theoretical Physics, 110/110 — *10/2010 – 10/2012*
Thesis title: Flavour Physics with $U(2)^3$ Symmetry
Supervisor: Prof. Riccardo Barbieri (Scuola Normale Superiore, Pisa)

University of Pisa — **Pisa (Italy)**
Bachelor in Physics, 110/110 cum laude — *10/2007 – 06/2010*
Thesis title: Search for Supersymmetry with multi-jet events at the LHC
Supervisor: Prof. Luigi Rolandi (Scuola Normale Superiore, Pisa & CERN)

Liceo Scientifico G. Marinelli — **Udine (Italy)**
High School, 100/100 cum laude — *09/2002 – 07/2007*

Abilitazione scientifica nazionale

Obtained on 09/11/2020. Valid until 09/11/2029.

PhD thesis

Title: *Aspects of WIMP Dark Matter searches at colliders and other probes*

Supervisor: Antonio Riotto (University of Geneva)

Defended on: 20th Sep. 2016

Description: The thesis discusses the status of WIMP dark matter searches and their theoretical interpretations, with particular emphasis on LHC probes

Awards: The thesis was selected by Geneva University as "outstanding PhD thesis" and published by Springer in the "Springer theses" series (DOI:10.1007/978-3-319-67606-7)

Research activity

My research focussed on different topics in between elementary particle physics and cosmology. This allowed me to have a broad vision, ranging from new physics searches at colliders to the cosmological evolution during inflation and after the big bang.
I have also actively collaborated to the writing of some white papers on DM searches at the LHC, and to the LHC "Dark Matter Working Group". Currently, I am an associate member of the LISA Consortium.

Axion-like particles:

- Relaxion mechanism as a cosmological solution to the hierarchy problem [1–3, 5, 6]
- Growth of perturbation on a monodromy potential [3]

Early universe:

- DM abundance [15]
- EW vacuum instability [9, 23]

Baryogenesis:

- Baryogenesis with helical magnetic fields from axion inflation [4]

DM searches at the LHC:

- Validity of the EFT approach at colliders [12–14, 24]
- Simplified models [7, 8, 10, 17, 19–22]

Indirect DM searches:

- Degeneracy between the antiproton flux from astrophysics and from DM annihilations [11]

Inflation:

- Vector perturbation and symmetries [16]

Bibliometric indices:

As of 16th November 2020, I published 23 papers (20 on journal, the others as preprints), receiving 1944 citations (1776 counting published papers only). My $\mathrm{h_{HEP}}$ index is 15 (14 counting published papers only) [data from INSPIRE-HEP].
`http://inspirehep.net/author/profile/E.Morgante.1`

Collaborations

- LISA consortium associate member (since 07/2020)
- ATLAS/CMS DM Forum (2015)

Peer review

Referee for JHEP, Modern Physics Letters A

Seminars and talks at conferences

- Zooming in on axions in the Early Universe, online, 06/2020, *Axion fragmentation*
  `https://indico.cern.ch/event/923834/overview`
- Bielefeld Kosmologietag, online, 05/2020, *Relaxion fragmentation*
  `https://www2.physik.uni-bielefeld.de/kosmologietag2020.html`
- COMPOSE-IT, Perugia (Italy), 01/2020, *EFT approach in Dark Matter searches*
  `https://agenda.infn.it/event/20565/`
- GRAPPA Seminar, Amsterdam (Netherlands), 12/2019, *Relaxion fragmentation*
  `http://grappa.amsterdam/grappaseminars/`, `http://cosmology.amsterdam/events/calendar/`
- Mainz Theorie Palaver, Mainz (Germany), 11/2019, *Relaxion mechanism: a cosmological solution to the hierarchy problem*
  `https://iannounce.physik.uni-mainz.de/meeting/user/event/4403`
- LPTHE Jussieu seminar, Paris (France), 06/2019, *Relaxion and relaxion DM*
  `http://semparis.lpthe.jussieu.fr/list?date=7&seriescodes=89`
- DESY Pheno Club, Hamburg (Germany), 06/2019, *The relaxion mechanism*
- The Mysterious Universe: Dark Matter-Dark Energy-Cosmic Magnetic Fields, Mainz (Germany), 05/2019, *Baryogenesis with helical magnetic fields from axion inflation*
  `https://indico.mitp.uni-mainz.de/event/182/overview`
- Light scalars: origin, cosmology, astrophysics and experimental probes, Benasque (Spain), 04/2019, *Relaxion updates*
  `https://indico.cern.ch/event/804047/overview`
- The puzzle of dark matter - assembling the pieces, Hamburg (Germany), 10/2018, *Relaxion dark matter*, chair of the final discussion session
  `https://indico.desy.de/indico/event/19155/`

- Particle Physics Challenges (DESY theory workshop), Hamburg (Germany), 10/2018, *Relaxion dark matter*
  https://indico.desy.de/indico/event/20110/overview
- Planck 2018, Bonn (Germany), 05/2018, *Relaxion dark matter*
  https://indico.desy.de/indico/event/18498/page/0
- DESY Theory Journal Club, Hamburg (Germany), 04/2018, *Higgs potential instability and PBH dark matter*
- DESY Workshop Seminar on the Cosmological Constant, Hamburg (Germany), 02/2018, *Higgs potential instability*
- Scalars 2017, Warsaw (Poland), 12/2017, *Cosmological relaxation of the EW scale after inflation*
  http://indico.fuw.edu.pl/conferenceDisplay.py?confId=52
- DESY Theory Journal Club, Hamburg (Germany), 12/2017, *Higgs potential instability and PBH*
- Fundamental physics in the cosmos (DESY theory workshop), Hamburg (Germany), 09/2017, *Realizing the relaxion mechanism with particle production*
  https://indico.desy.de/indico/event/17479/overview
- Exploring the Dark Universe (Rencontres du Vietnam) Quy Nhon (Vietnam), 07/2017, *Non-SUSY WIMPS: simplified models and Dark Matter @ LHC*
  http://vietnam.in2p3.fr/2017/dm/
- DESY Workshop Seminar on Gravity Waves, Hamburg (Germany), 07/2017, *Gravity waves from cosmic strings*
- DESY Theory Journal Club, Hamburg (Germany), 01/2017, *Fuzzy dark matter*
- DESY Workshop Seminar on Axions, Hamburg (Germany), 12/2016, *Axion DM and large scale structures*
- TeVPA16, CERN Geneva (Switzerland), 09/2016, *Complementarities of Dark Matter searches with Spin-Dependent interactions*
  https://indico.cern.ch/event/469963/contributions/2262784/
- SISSA Astroparticle seminar, Trieste (Italy), 05/2016, *Complementarities of Dark Matter searches with Spin-Dependent interactions*
  http://www.sissa.it/app/activity/calendar.php
- LFC15 workshop, Trento (Italy), 09/2015, *Cosmological history of the Higgs vacuum instability*
  https://agenda.infn.it/event/10047/?ovw=True
- IFAE seminar, Barcelona (Spain), 05/2014, *On the validity of effective field theory for dark matter searches at LHC*
  http://indico.ifae.es/conferenceDisplay.py?confId=38
- Incontri di Fisica delle Alte Energie, Gran Sasso (Italy), 04/2014, *On the validity of effective field theory for dark matter searches at LHC*
  https://agenda.infn.it/conferenceDisplay.py?confId=7405
- Swiss Cosmology Day, Zurich (Switzerland), 02/2014, *On the validity of effective field theory for dark matter searches at LHC*
  https://ethz.ch/content/dam/ethz/special-interest/phys/particle-physics/cosmologygroup-dam/SwissCosmoDays/SCD_2014.pdf
- Cosmology Journal Club, Geneva (Switzerland), 12/2013, *Starobinsky inflation*

Outreach

- Seminar on dark matter for high school students, Torino (Italy), May 2017
- Seminar on dark matter for high school students, Udine (Italy), March 2014
- Seminar on neutrinos for high school students, Udine (Italy), March 2011

Organization

MITP workshop: scientific program *"Probing new physics with Gravitational Waves"*, Mainz Institute for Theoretical Physics (08/2021)

co-organizers: Yanou Cui, Francesco D'Eramo, Lisa Randall, Pedro Schwaller, Raman Sundrum

Mainz Theory Seminar: organizer of the weekly HEP seminar "Theorie Palaver" (04/2020 – present)

`https://www.thep.physik.uni-mainz.de/theorie-palaver/`

DESY Journal Club: organizer of the weekly DESY theory Journal Club (09/2017 – 09/2019)

`https://indico.desy.de/indico/category/331/`

Grants

Fondation Ernst et Lucie Schmidheiny: Grant to cover the cost for partecipation to a conference – 10/2015

`http://www.fondation-schmidheiny.ch`

Awards

- PhD thesis selected as "Outstanding PhD thesis" and published in the "Springer Theses" series, 2017
- Admitted to Scuola Normale Superiore undergraduate course through a national contest (included 5-years full scholarship), 2007
- Gold medal at the Italian Physics Olimpiads, April 2007
- Gold and silver medals at the Italian Mathematics Olimpiads, 2005-2006

Languages

English: Advanced

French: Basic

German: Basic

Teaching

Mainz University **Mainz, Germany**
Thesis supervision *12/2019 – present*
I am currently co-supervising of a master thesis
- Topic of the thesis: Relaxion mechanism
- First supervisor: P. Schwaller

DESY **Hamburg, Germany**
Thesis supervision *01/2017 – 08/2017*
I co-supervised the internship of a visiting master student
- Topic of the thesis: Relaxion mechanism
- First supervisor: G. Servant

Geneva University **Geneva, Switzerland**
Teaching assistant *01/2013 – 09/2016*
- Mathematical methods for physics II, 2nd year bachelor, 2014-15 and 2015-16, *in French*
- Lab. IV, 1st year master, 2013-14, *in English*

Other activities:

Physics course in preparation for the entry exam for medical studies, organized by Associazione Rosmini, University of Udine (Italy), 2010 and 2011

I have a strong interest in teaching, and I believe this is an important part of our job as scientists. First, teaching (in class or one-to-one, as advisor) helps me to critically rethink about the basics of the subject. Second, I like the interaction with young students, encouraging their interests, understanding their difficulties, and considering new points of view.

As for my teaching strategy, I think it is very important to insist on the conceptual basis of any subject. This is what sets the stage for any further learning by the students. I believe a hand-on approach is useful for the students, therefore I like to assign important calculations as exercises. Finally, from my years at Scuola Normale I learned the importance of a fruitful collaboration among students, which I usually encourage as much as possible.

List of publications (including preprints)

Research papers

[1] N. Fonseca and E. Morgante, "Probing photophobic (rel)axion dark matter", (Sept. 2020). 2009.10974.

[2] N. Fonseca, E. Morgante, R. Sato, and G. Servant, "Relaxion Fluctuations (Self-stopping Relaxion) and Overview of Relaxion Stopping Mechanisms", *JHEP* 05 (2020), p. 080. 1911.08473.

[3] N. Fonseca, E. Morgante, R. Sato, and G. Servant, "Axion fragmentation", *JHEP* 04 (2020), p. 010. 1911.08472.

[4] V. Domcke, B. von Harling, E. Morgante, and K. Mukaida, "Baryogenesis from axion inflation", *JCAP* 10 (2019), p. 032. 1905.13318.

[5] N. Fonseca and E. Morgante, "Relaxion Dark Matter", *Phys. Rev. D* 100.5 (2019), p. 055010. 1809.04534.

[6] N. Fonseca, E. Morgante, and G. Servant, "Higgs relaxation after inflation", *JHEP* 10 (2018), p. 020. 1805.04543.

[7] T. Jacques, A. Katz, E. Morgante, D. Racco, M. Rameez, and A. Riotto, "Complementarity of DM searches in a consistent simplified model: the case of Z'", *JHEP* 10 (2016). [Erratum: JHEP 01, 127 (2019)], p. 071. 1605.06513.

[8] E. Morgante, D. Racco, M. Rameez, and A. Riotto, "The 750 GeV Diphoton excess, Dark Matter and Constraints from the IceCube experiment", *JHEP* 07 (2016), p. 141. 1603.05592.

[9] J. R. Espinosa, G. F. Giudice, E. Morgante, A. Riotto, L. Senatore, A. Strumia, and N. Tetradis, "The cosmological Higgstory of the vacuum instability", *JHEP* 09 (2015), p. 174. 1505.04825.

[10] G. Busoni, A. De Simone, T. Jacques, E. Morgante, and A. Riotto, "Making the Most of the Relic Density for Dark Matter Searches at the LHC 14 TeV Run", *JCAP* 03 (2015), p. 022. 1410.7409.

[11] V. Pettorino, G. Busoni, A. De Simone, E. Morgante, A. Riotto, and W. Xue, "Can AMS-02 discriminate the origin of an anti-proton signal?", *JCAP* 10 (2014), p. 078. 1406.5377.

[12] G. Busoni, A. De Simone, T. Jacques, E. Morgante, and A. Riotto, "On the Validity of the Effective Field Theory for Dark Matter Searches at the LHC Part III: Analysis for the t-channel", *JCAP* 09 (2014), p. 022. 1405.3101.

[13] G. Busoni, A. De Simone, J. Gramling, E. Morgante, and A. Riotto, "On the Validity of the Effective Field Theory for Dark Matter Searches at the LHC, Part II: Complete Analysis for the s-channel", *JCAP* 06 (2014), p. 060. 1402.1275.

[14] G. Busoni, A. De Simone, E. Morgante, and A. Riotto, "On the Validity of the Effective Field Theory for Dark Matter Searches at the LHC", *Phys. Lett. B* 728 (2014), pp. 412–421. 1307.2253.

[15] P. Ciafaloni, D. Comelli, A. De Simone, E. Morgante, A. Riotto, and A. Urbano, "The Role of Electroweak Corrections for the Dark Matter Relic Abundance", *JCAP* 10 (2013), p. 031. 1305.6391.

[16] M. Biagetti, A. Kehagias, E. Morgante, H. Perrier, and A. Riotto, "Symmetries of Vector Perturbations during the de Sitter Epoch", *JCAP* 07 (2013), p. 030. 1304.7785.

Reviews and thesis

[17] E. Morgante, "Simplified Dark Matter Models", *Adv. High Energy Phys.* 2018 (2018), p. 5012043. 1804.01245.

[18] E. Morgante, "Aspects of WIMP Dark Matter searches at colliders and other probes". *Springer Theses 2017* (DOI: 10.1007/978-3-319-67606-7). PhD thesis. Geneva U., Dept. Theor. Phys., Sept. 2016.

White papers

[19] D. Abercrombie et al., "Dark Matter Benchmark Models for Early LHC Run-2 Searches: Report of the ATLAS/CMS Dark Matter Forum", *Phys. Dark Univ.* 27 (2020). Ed. by A. Boveia, C. Doglioni, S. Lowette, S. Malik, and S. Mrenna, p. 100371. 1507.00966.

[20] J. Abdallah et al., "Simplified Models for Dark Matter Searches at the LHC", *Phys. Dark Univ.* 9-10 (2015), pp. 8–23. 1506.03116.

[21] J. Abdallah et al., "Simplified Models for Dark Matter and Missing Energy Searches at the LHC", (Sept. 2014). 1409.2893.

Conference proceedings

[22] E. Morgante, "Non-SUSY WIMPS: simplified models and Dark Matter at the LHC", *13th Rencontres du Vietnam: Exploring the Dark Universe*. Nov. 2017. 1711.00767.

[23] E. Morgante, "Cosmological History of the Higgs Vacuum Instability", *Frascati Phys. Ser.* 61 (2016). Ed. by G. Corcella, S. De Curtis, S. Moretti, and G. Pancheri, pp. 115–120.

[24] E. Morgante, "On the validity of the effective field theory for dark matter searches at the LHC", *Nuovo Cim. C* 38.1 (2015), p. 32. 1409.6668.

DANIELE ORITI

I. PRESENT POSITIONS

- January 2019 - present:

  Senior researcher and Heisenberg group leader - Arnold Sommerfeld Center for Theoretical Physics, Ludwig-Maximilians-Universität-Munich; leading a research group in quantum gravity (currently, 3 postdocs, 6 PhD students, 1 Master student)

- January 2019 - present:

  Associate member - Munich Center for Mathematical Philosophy, Ludwig-Maximilians-Universität-Munich

- January 2020 - present

  Member - Center for Advanced Studies - Ludwig-Maximilians-Universität-Munich

II. EDUCATION

- 1989-1994 - Liceo Classico "Orazio" - Rome - "Diploma di maturita' classica", obtained in June 1994 - notation 60/60 (full marks)

- 1994-1999 - University of Rome "La Sapienza" - "Diploma di Laurea" in Physics, obtained in June 1999 with final mark '110/110 cum laude'. Thesis on "Quantization of the spinor field in Rindler spacetime and analysis of the Unruh effect" , advisor: Prof. Vladimir Belinski

- 2000-2003 - **PhD student at the Department of Applied Mathematics and Theoretical Physics, University of Cambridge, UK**; subject: non-perturbative quantum gravity, spin foam models; supervisor: Dr. Ruth Williams. PhD Dissertation on "Spin Foam Models of Quantum Spacetime", defended in August 2003; degree confirmed in October 2003 and awarded in November 2004

III. PREVIOUS POSITIONS

- 10/2003 - 09/2006 - Research Fellow - Department of Applied Mathematics and Theoretical Physics, and Girton College, University of Cambridge

- 10/2006 - 09/2008 - Postdoctoral researcher - Institute for Theoretical Physics and Spinoza Institute, Utrecht University, Netherlands

- 10/2008 - 12/2008 - Senior postdoctoral researcher - Perimeter Institute for Theoretical Physics, Waterloo, Canada

- 10/2008 - 12/2008 - Adjunct Professor - Department of Physics and Astronomy, University of Waterloo, Canada

- January 2009 - September 2019:

  Senior researcher and group leader - appointed at W2 (associate/full professor) level - Max Planck Institute for Gravitational Physics (Albert Einstein Institute), Potsdam-Golm, Germany; leading a research group on quantum gravity ("Microscopic structure and dynamics of quantum spacetime"), counting an average of 9-10 researchers, between PhD students, postdocs, Master students and long-term visiting researchers; funded by a Sofja Kovalevskaja Award of the A. Von Humboldt Foundation until August 2014, by a Templeton Grant from January 2014 to September 2016, various externally-funded fellowships, and by the Albert Einstein Institute. The group has been, by all standards, a leading group for quantum gravity research at the international level.

- 01/2018 - 07/2018 - Visiting Professor - Institute for Theoretical Physics, University of Hamburg, and DESY, Germany

- 10/2018 - 12/2018 - Visiting Professor - Arnold Sommerfeld Center for Theoretical Physics and Munich Center for Mathematical Philosophy, Ludwig-Maximilians-University Munich, Germany

IV. ADMINISTRATIVE EXPERIENCE

- 2003-2006 - member of the Governing Body of Girton College, University of Cambridge
- 2009-2014 - member of the TIB (Teilinstitutsbesprechung - Institute administrative committee) of the Albert Einstein Institute
- 2009-2019 - group leader at the Albert Einstein Institute, Potsdam: in charge of managing personnel and finances of research group
- 2019 - present - group leader at Arnold Sommerfeld Center for Theoretical Physics, LMU, in charge of managing personnel and finances of research group
- 2019 - present - local coordinator of the SISSA-LMU research collaboration
- 2019 - present - member of the Nominating Committee of the International Society of General Relativity and Gravitation

V. REFEREEING AND EXPERT ADVISORY SERVICE

- 2001-2008 - 55 reviews written for "Mathematical Reviews", Math Sci Net, American Mathematical Society
- **referee for 30 scientific journals in Theoretical Physics, Mathematical Physics, Philosophy of Physics, Philosophy of Science**: "Classical and Quantum Gravity", "Journal of Physics A", "Physical Review Letters", "Physical Review D", "Nuovo Cimento B", "Modern Physics Letters A", "General Relativity and Gravitation", "SIGMA (Symmetry, Integrability and Geometry: Methods and Applications"), "European Physics Letters", "Foundations of Physics", "Nuclear Physics B", "Journal of Mathematical Physics", "Journal of High Energy Physics", "New Journal of Physics", "Letters in Mathematical Physics", "European Physical Journal Plus", "Studies in History and Philosophy of Modern Physics", "Canadian Journal of Physics", "European Physical Journal C", "International Journal of Geometric Methods in Modern Physics", "Journal of Theoretical and Applied Physics", "Communications in Mathematical Physics", "Annals of Physics", "International Journal of Modern Physics D", "Synthese", "Fortschritte der Physik (Progress of Physics)", "Nature", "British Journal for the Philosophy of Science", "Physics Letters B", "Scientific Reports", "Mathematical Physics, Analysis and Geometry", "Frontiers in Physics"
- reviewer for Physics Today
- referee for the Cambridge University Press, Springer-Verlag
- referee for NERC, Canadian scientific research council (and funding agency)
- referee for NWO, Dutch scientific funding agency
- referee for the John Templeton Foundation
- referee for the European Science Foundation (ESF)
- referee for the UEFISCDI, Romanian scientific funding agency
- referee for National Science Centre (NCN)), Poland
- referee for the Austrian Academy of Sciences, Austrian Science Fund
- referee for the Italian Ministry of Education, University and Research
- referee for the Swiss National Science Foundation
- referee for the National Fund for Scientific and Technological Development (FONDECYT) of Chile
- member of the Selection Committee of the 2016 Bergmann-Wheeler Prize for PhD theses in Quantum Gravity, awarded by the International Society of General Relativity and Gravitation
- expert judge for the 1st Essay Prize in Quantum Gravity, as part of the Project 'Space and Time After Quantum Gravity', run by the University of Geneva, Switzerland and the University of Illinois at Chicago, in 2016

- member of the Scientific Advisory Committee of the Project: 'Space and Time after Quantum Gravity', funded by Templeton Foundation, run by Prof. C. Wütrich, University of Geneva, Switzerland, and Prof. N. Huggett, University of Illinois at Chicago, USA, from 2015 to 2019
- member of the Scientific Advisory Committe of the Project: 'Paradoxes and Metaphors of Time in Early Universe(s)', funded by the European Research Council, run by Dr. S. De Bianchi, Univ. Autonoma Barcelona, Spain, from 2018 to 2022
- co-editor (with S. Carrozza and S. Gielen) of the special issue "Progress in Group Field Theory and related quantum gravity formalisms"of the journal 'Universe', February 2020
- co-editor (with C. Brukner and J. Mielczarek) of the Research Topic "Qubit and Spacetime"of the journal 'Frontiers in Physics', to be published in Spring 2021
- 2019 - present - member of the Editorial Board of the international journal 'Universe'(ISSN 2218-1997, MDPI)
- member of the Scientific Advisory Committee of the Project: 'Cosmology beyond spacetime', funded by Templeton Foundation, run by Prof. C. Wütrich, University of Geneva, Switzerland, and Prof. N. Huggett, University of Illinois at Chicago, USA, from 2020 to 2023
- member of the Scientific Advisory Committee of the online seminar series 'Quantum Gravity Across Approaches'(https://sites.google.com/view/qg-aa)

VI. CONFERENCES AND WORKSHOPS ORGANIZED

1. member of the local organizing committee of the 3rd ICRA Network Workshop, on "Electrodynamics and magnetohydrodynamics around black holes", Rome-Pescara, July 1999;
2. member of the scientific organizing committee of the workshop "Loops and Foams 2008", Zakopane, Poland, March 2008;
3. organizer of the workshop "Microscopic models of quantum spacetime", at Utrecht University, Utrecht, The Netherlands, September 2008;
4. member of the scientific organizing committe of the conference "Emergent Gravity IV", University of British Columbia, Vancouver, Canada, August 2009
5. member of the scientific organizing committee for the workshop "Open problems in Loop Quantum Gravity", Zakopane, Poland, in March 2010
6. member of scientific and local organizing committe of the workshop "Spacetime as a statistical system", AEI, July 2010
7. organizer (with V. Rivasseau) of workshop "From discrete to continuum spacetime", University of Paris XI-Orsay, March 2011
8. organizer (with M. Lachieze-Rey and M. Geiller) of the workshop "Mathematical, physical and conceptual aspects of Quantum Gravity", University of Paris VII, March 2011
9. member of the scientific organizing committee (with S. Liberati and L. Sindoni) of the Conference "General Relativity as Thermodynamics", SISSA, Trieste, September 2011
10. member of the scientific organizing committee of the VI Aegean School and Conference on Cosmology "Quantum Gravity and Cosmology", Naxos, Greece, September 2011
11. organizer (with V. Rivasseau, J. Magnen, M. Geiller and M. Lachieze-Rey) of the joint Paris XI-Paris VII workshop: "Quantum Gravity in Paris", March 2012
12. organizer (with H. Nicolai) of the workshop: "Reflections on space, time and their quantum nature", AEI, Potsdam, Germany, November 2012
13. organizer (with J-L. Lehners and H. Nicolai) of the workshop: "Quantum Gravity and Fundamental Cosmology", AEI, Potsdam, Germany, March 2013

14. organizer (with V. Rivasseau, T. Damour and R. Gurau) of the second workshop "Quantum Gravity in Paris", Paris XI-Orsay and IHES, March 2013
15. member of the International Scientific Advisory Committee of the Conference "Loops '13", Perimeter Institute for Theoretical Physics, Waterloo, Canada, July 2013
16. organizer (with J-L. Lehners and H. Nicolai) of the workshop: "Quantum Gravity and Fundamental Cosmology II", AEI, Potsdam, Germany, March 2014
17. organizer (with V. Rivasseau, T. Damour, G. Bossard and R. Gurau) of the third workshop "Quantum Gravity in Paris", Paris XI-Orsay and IHES, March 2014
18. organiser (with B. Dittrich, A. Eichhorn and R. Percacci) of the workshop: "Renormalization group approaches to Quantum Gravity", Perimeter Institute, Waterloo, Canada, April 2014
19. organiser of the workshop: "Emergent time, Emergent space in Quantum Gravity", AEI, Potsdam, Germany, December 2014
20. member of the Scientific Advisory Committee of the workshop "Time in Quantum Gravity", Univ. California at San Diego, USA, March 2015
21. organiser (with D. Benedetti, T. Damour, V. Rivasseau, A. Tanasa) of the fourth workshop "Quantum Gravity in Paris", LPT, Paris XI-Orsay and IHES, April 2015
22. organiser of the workshop "Cosmology from Quantum Gravity", AEI, Potsdam, Germany, September 2015
23. organizer of the thematic day on 'Loop Quantum Gravity and Group Field Theory' of the Conference "Current Problems in Theoretical Physics", organized by the Univ. Salerno, Vietri, Italy, March 2016
24. organizer (with J-L. Lehners, H. Nicolai, E. Wilson-Ewing) of the conference "Emergent spacetime and cosmology", AEI, Potsdam, Germany, September 2016
25. organizer (with D. Benedetti, A. Connes, V. Rivasseau) of the fifth workshop "Quantum Gravity in Paris", LPT, Paris XI-Orsay and IHES, March 2017
26. member of the Scientific Organizing Committee of "Loops '17" Conference, Warsaw Univ., Poland, July 2017
27. member of the Organizing Committee of the Conference "Probing the spacetime fabric: from concepts to phenomenology", SISSA-Trieste, Italy, July 2017
28. organizer (with D. Benedetti, V. Rivasseau) of the sixth workshop "Quantum Gravity in Paris", LPT, Paris XI-Orsay and IHP-Paris, April 2019
29. organizer of the thematic day on 'Quantum Spacetime' of the Conference "Current Problems in Theoretical Physics", Vietri, Italy, March 2020 (postponed due to Covid)
30. member of the Scientific Committee of the thematic trimester 'Random Geometry and Quantum Gravity', Institute Henri Poincare, Paris, France, April-July 2020 (postponed due to Covid)
31. member of the Scientific Advisory Committee of the conference "Quantum Gravity 2020", Perimeter Institute for Theoretical Physics, Waterloo, Canada, July 2020
32. member of the Scientific Advisory Committee of the conference "2020 Warsaw Spacetime Conference", International Center for Formal Ontology, Warsaw, Poland, September 2020 (postponed due to Covid)
33. member of the International Scientific Advisory Committee of the "Loops '21" Conference, ENS-Lyon, France, July 2021

VII. INDIVIDUAL PRIZES AND AWARDS

- 2000 - "Antonio Stanghellini" prize for the best graduate in Theoretical Physics, by the Italian Physical Society
- 2001 - distinction - Smith-Rayleigh-Knight Prize for essays in Mathematics, by the University of Cambridge, with the essay: "Spacetime geometry from algebra: spin foam models for non-perturbative quantum gravity"
- 2005 - "Votruba Prize" for the best doctoral thesis in Theoretical Physics, by the Doppler Institute, Prague, Czech Republic, and the Foundation for Support of Theoretical Physics;
- 2008 - **"Sofja Kowalevskaja Award"(worth 1,400,700 Euros), by the A. Von Humboldt Foundation**; this is the most prestigious prize for young researchers in Germany
- 2011 - third prize in the third FQXi Essay competition 'Is reality digital or analog?', with the essay: "On the depth of quantum space"

VIII. RESEARCH FUNDING: SCHOLARSHIPS AND RESEARCH GRANTS

A total of around 2,600,000 EUR, not counting network grants, individual studentships or supported external fellowships, nor declined offers.

A. Studentships

- 2000-2002 - EPSRC research studentship;
- 2000-2002 - Isaac Newton Trust (Cambridge) research studentship in Mathematics;
- 2000-2002 - Girton College (Cambridge) research scholarship;
- 2000-2001 - Rouse Ball Travelling studentship in Mathematics, awarded by Trinity College, Cambridge;
- 2002-2003 - Cambridge European Trust Reseach Studentship;
- 2002-2003 - C. T. Taylor Fund Research Studentship;
- 2003 - Cambridge Philosophical Society Research Studentship;

B. Research Grants

- 2008 - **grant** of 4500 $ by the **FQXi**, for the project "Discrete constituents of emerging spacetime"
- 2008 - **Career Acceleration Fellowship (5 years; worth ca. 500,000 Euros), awarded by the Engineering Physical Sciences Research Council, UK - declined**
- 2008 - **"Sofja Kowalevskaja Award"worth 1,400,700 Euros, by the A. Von Humboldt Foundation**, for establishing an independent research group at the Albert Einstein Institute, Potsdam-Golm, Germany, for the proposal "Quantum Gravity as group field theory and the emergence of spacetime"
- 2009 - (with Dr. Bianca Dittrich) - **grant from the Physical Engineering Science Council of the European Science Foundation (PESC**), worth 13,000 Euros, to support a workshop on "Spacetime as a statistical system", held at the AEI in July 2010
- 2010 - 'Exploratory Workshop' **grant** (with S. Liberati and L. Sindoni) **from the European Science Foundation (ESF)**, worth 13,400 Euros, to support the Conference "General relativity as Thermodynamics", held at SISSA, Trieste, in September 2011
- 2010 - **grant** of 5000$ by the **FQXi**, for the proposal "Emergent time from no space"
- 2011 - funding obtained (as local AEI member) for the **UNIFY research network**, funded by the European Union within the 7th Framework Programme - IRSES

- 2013 - **Templeton Research Grant "Science and the Big Questions", worth 155000 Euros**, for the project "Close to the Origin, beyond Space and Time"
- 2013 - **grant** from the Australia-based Foundation "New Agendas for the Study of Time", worth 10000 Euros, for the project "Emergent Time in Quantum Gravity"
- 2014 - funding obtained as co-applicant of **COST action (MP1405) "Quantum Structure of Spacetime [QSPACE]"- European Union**; five working groups, 115 participants in 19 countries, four years duration
- 2018 - **Heisenberg Grant** - Deutsche Forschung Gesellschaft (DFG), worth approx. 500,000 Euros, for the project "Quantum gravity and the emergence of spacetime"
- 2019 - **large grant** (with S. Hartmann) from the Foundational Questions Institute (FQXi), worth 177100 EUR, for the project 'The Epistemic Nature of Physical Laws: From Intelligent Agents to Quantum Gravity and Cosmology'
- 2020 - **research grant** from Deutsche Forschung Gemeinschaft (DFG), worth 300000 EUR, for the project 'Emergent spacetime physics from quantum gravity'
- 2020 - member of COST action (CA18108) "Quantum Gravity Phenomenology in the multi-messenger approach"(QG-MM) - European Union, past of working group WG1 (Theoretical frameworks for gravity effects below the Planck energy) and WG2 (Phenomenology of quantum gravity), 6 working groups, four years

C. Support of external postdoctoral research fellowships

- F. Markopoulou, Humboldt Fellowship for Experienced Researchers, A. von Humboldt Stiftung, 2010-2012
- F. Sardelli, Research Fellowship, Fondazione Della Riccia, 2012
- C. Tomlin, DAAD fellowship, 2012-2013
- J. Ben Geloun, Humboldt Fellowship for Experienced Researchers, A. von Humboldt Stiftung, 2013-2015
- S. Bianco, Postoctoral Fellowship, Blanceflor Foundation 2015-2017
- M. Zhang, Humboldt Postdoctoral Fellowship, A. von Humboldt Stiftung, 2015-2018
- D. Ousmane Samary, Georg Foster Fellowship for postdoctoral researchers, A. von Humboldt Stiftung, 2015-2017
- R. Cochou, TWAS postdoctoral visiting programme, 2017-2018
- A. Alonso Serrano, Humboldt Postdoctoral Fellowship, A. von Humboldt Stiftung, 2018-2020
- J. Ben Achour, Humboldt Postdoctoral Fellowship, A. von Humboldt Stiftung, 2021-2023
- Christophe Goeller, Humboldt Postdoctoral Fellowship, A. von Humboldt Stiftung, 2021-2023

IX. OTHER QUALIFICATIONS

- 2008 - "Qualification"(habilitation) for the position of "Maitre de Conference" in France, section 29 (Constituants elementaires) - qualification number: 08229140455;
- 2012 and 2018 - "Qualification"(habilitation) obtained for the position of "Professeur" in France - section 29 (Constituants elementaires) - qualification numbers: 12129140455 and 18129140455
- 2013 - "Abilitazione"(habilitation) obtained for the position of 'Professore Associato' (Associate Professor) in Italy - area: theoretical physics of fundamental interactions
- 2013 - "Abilitazione"(habilitation) obtained for the position of 'Professore Ordinario' (Full Professor) in Italy - area: theoretical physics of fundamental interactions

X. MEMBERSHIP OF PROFESSIONAL AND LEARNED SOCIETIES

- 2008 - elected member (by nomination) of the Foundational Questions Institute (FQXi) for Physics and Cosmology (http://www.fqxi.org/)
- 2013 - life member of the International Society for General Relativity and Gravitation
- 2014 - elected member (by nomination) of the Young Academy of Europe (http://www.yacadeuro.org/)
- 2020 - elected member (by nomination) of the Center for Advanced Studies, LMU (https://www.en.cas.uni-muenchen.de/index.html)
- 2020 - member of the International Society for Relativistic Quantum Information (www.isrqi.net)

XI. TEACHING, SUPERVISION AND MENTORING EXPERIENCE

- 2000-2006 - **tutorials to undergraduate students at the University of Cambridge**; subjects taught: classical dynamics, calculus, differential equations, special relativity, general relativity, foundations of quantum mechanics; around 40 hours per year;
- 2003-2007 - **Lecturer for the course "Philosophy of Mathematics"** for the Cambridge College Programme, summer school for high school students, July-August (course consisted of 10 lectures (15 hours), plus exams);
- 2004-2007 - **Lecturer for the course "Quantum Gravity: the search for understanding the nature of Space and Time"** for the Cambridge College Programme, summer school for high school students, July-August (course consisted of 10 lectures (15 hours), plus exams);
- **guest lecturer** on 'Spin Foams and Group Field Theories' (three lectures for a total of 5.5 hours) for the undergraduate course 'Introduction to Quantum Gravity', held by Prof. Lee Smolin, at the **Perimeter Institute for Theoretical Physics**, Canada, March 2006 (available in streaming video at:; http://www.perimeterinstitute.ca/videos/introduction-quantum-gravity-part-19 ; http://www.perimeterinstitute.ca/videos/introduction-quantum-gravity-part-20 ; http://www.perimeterinstitute.ca/videos/introduction-quantum-gravity-part-21)
- **guest lecturer** (two lectures for a total of 2 hours) in the course on "General Relativity" (graduate level) held by Prof. Renate Loll at **Utrecht University**, March 2008
- 2009 - **invited lecturer** at "The BNU International Summer School on Quantum Gravity", Beijing Normal University, Beijing, China, July 26th-31st; course given: "Group Field Theories and their relation with spin foam models", 5 lectures of 1 hour each
- 2009 - **mini-course** for graduate students: "Introduction to group field theories", at the AEI; 4 lectures of 1.5 hours each.
- 2010 - **graduate course**: "Introduction to Quantum Gravity", jointly with Dr. Bianca Dittrich, at Department of Physics and Astronomy, University of Potsdam; summer semester, 3 hours per week, 14 weeks.
- 2011 - **graduate course (PhD level)**: "Introduction to Quantum Gravity", Department of Physics, University of Naples; 5 lectures of 2 hours each, January.
- 2013 - **undergraduate course** "Universo Quantistico" (The Quantum Universe) on open issues in modern theoretical physics and the problem of quantum gravity (in Italian), Department of Physics, University of Naples; 14 hours, October-November 2013
- 2013-2014 - **graduate course** "A basic introduction to Quantum Gravity: from GR and QFT to a quantum spacetime", Department of Physics, University of Naples; 35 hours, December 2013-January-February 2014
- 2014 - supervision of "Praktikum "assignment for high school student Thea Budde, Evangelische Schule Berlin Zentrum, visiting the AEI in January 2014
- 2015 - **graduate course** "Group field theory for Quantum Gravity", at Beijing Normal University, Beijing, China; 9 lectures, 18 hours in total; April

- 2015 - **graduate mini-course** "Group field theories for Quantum Gravity", at King's College London, UK; 4 lectures, 8 hours; May
- 2015 - **graduate lecture** "Quantum gravity: understanding the microstructure of spacetime" , IMPRS graduate school, 2 hours; October
- 2015 - **graduate lecture** "Spacetime in General Relativity and the problem of quantum gravity", Dept. of Philosophy, Univ. of Geneva, 2 hours; October
- 2017 - "Problemi aperti: la gravita' quantistica "(Open problems in theoretical physics: quantum gravity), **undergraduate lecture** (in italian), Scuola Nazionale AIF di Storia della Fisica, for high school teachers and undergraduate students, Cagliari, Italy; 2 hours; February
- 2018/2019, 2019/2020 and 2020/2021- **graduate course** "Introduction to quantum gravity", Faculty of Physics, Ludwig-Maximilians-University Munich, Germany; $\tilde{6}$0 hours; October-February
- 2019 (block course) & 2019/2020 - **graduate course** "Introduction to philosophy of quantum gravity", Faculty of Philosophy, Ludwig-Maximilians-University Munich, Germany; $\tilde{3}$0 hours
- 2020 and 2021- **graduate course** "Laws of Nature"(in 2020, with S. Hartmann), Faculty of Philosophy, Ludwig-Maximilians-University Munich, Germany; $\tilde{3}$0 hours
- 2020 and 2021- **graduate course** "Tensor models and group field theories for quantum gravity", Faculty of Physics, Ludwig-Maximilians-University Munich, Germany; $\tilde{3}$0 hours
- 2020/2021 - **graduate course** "Foundations and interpretations of quantum mechanics", Faculty of Physics and Faculty of Philosophy, Ludwig-Maximilians-University Munich, Germany; $\tilde{3}$0 hours
- **12 undergraduate research internships supervised**
  - four undergraduate students (Valentina Perazzo, Ivano Vettigli, Federica Guida, Valentina Pirozzi Palmese) of the University of Naples, at the AEI in May 2014
  - Archismita Dalal, Indian Institute of Technology, Kolkata, India, at the AEI from May to July 2014 (co-supervised with Dr. I. Premont-Schwarz)
  - Martin Mathieu, ENS-Lyon, France, at AEI from April to July 2015 (co-supervised with Dr. L. Sindoni)
  - Aaditya Salgarkar, Indian Institute of Technology, Kharagpur, India, at AEI from May to July 2015 (co-supervised with Dr. L. Sindoni)
  - Alissa Wilms, Technische Universität Berlin, Germany, at the AEI from December 2015 to July 2016 (co-supervised with Dr. J. Thürigen)
  - Ioanna Kourkoulou, Princeton University, at the AEI in June-July 2016
  - Susanna Azzoni, King's College London, at the AEI in July 2016
  - Roukaya Dekhil, Humboldt University Berlin, at the AEI from January 2017 to June 2017
  - Sarah Ernst, Ludwig-Maximilians-University Munich, from December 2020 to March 2021
- **19 Master-level theses supervised**:
  - Ahmed Youssef, Ecole Normale Superieure, Cachan, France, at D.A.M.T.P. from April 2006 to August 2006; Ahmed became then a PhD student at the University of Paris 7 "D. Diderot", and is now a postdoc at the Humboldt University in Berlin;
  - Samia Drappeau, University Claude Bernard Lyon 1, France, at I.T.P. from March 2007 to July 2007; Samia moved then to a PhD position at the University of Amsterdam and she is now a postdoc at the University of Toulouse;
  - Gianluca Delfino, University of Rome "La Sapienza", Italy, at I.T.P., then Perimeter Institute, then AEI, from July 2008 to March 2009; Gianluca moved then to a PhD position at the University of Nottingham
  - Alessandro Di Mare, University of Catania, Italy, at I.T.P., then Perimeter Institute, then AEI, from July 2008 to April 2009
  - Marco Scalisi, University of Catania, Italy, at the AEI from January 2011 to July 2011 (co-supervised with Dr. G. Calcagni); Marco moved to PhD position at the University of Groeningen

- Tim Kittel, Humboldt University Berlin, Germany, at the AEI from October 2013 to June 2014 (co-supervised with Dr. C. Tomlin); now PhD student at Freie Universitaet Berlin, Germany
- Marco Celoria, University of Milan, Italy, at the AEI from October 2013 to June 2014; now PhD student at Gran Sasso Science Institute, Italy
- Vedran Scrinjar, University of Trieste, Italy, at the AEI from February to July 2014 (co-supervised with Dr. L. Sindoni); then PhD student at SISSA, Italy
- Alexandros Karagiorgos, Univ. of Patras, Greece, at the AEI from April to July 2014 (co-supervised with Dr. A. Coutant); now PhD student at Univ. Athens, Greece
- Alessandro Carotenuto, University of Naples, Italy, at the AEI from May to July 2014 (co-supervised with Dr. J. Ben Geloun)
- Nicolai Friedhoff, Humboldt University Berlin, Germany, at the AEI from September 2014 to June 2016 (co-supervised with Dr. E. Wilson-Ewing)
- Riccardo Martini, University of Bologna, Italy, at the AEI from November 2014 to July 2015 (co-supervised with Dr. J. Ben Geloun); then a PhD student at the Friedrich-Schiller-Universität Jena, Germany
- Giovanni Tricella, Univ. of Milan, Italy, at the AEI from January to September 2016 (co-supervised with Dr. G. Chirco); then PhD student at SISSA (Italy)
- Florian Gerhardt, Technische Universität Dresden, Germany, at AEI from April 2016 to July 2017 (co-supervised with Dr. E. Wilson-Ewing)
- Fabio Mele, Univ. 'Federico II'of Naples, Italy, at the AEI from May to November 2016 (co-supervised with Dr. G. Chirco and Prof. P. Vitale); then PhD student at Univ. Regensburg
- Kevin Thieme, ETH-Zurich, at the AEI from October 2016 to April 2017
- Alex Goessmann, TU-Berlin, at the AEI from October 2017 to June 2018 (co-supervised with Dr. G. Chirco and Dr. M. Zhang)
- Josè Diogo Simao, LMU-Munich, from April 2019 to March 2020
- Yoobin Jeung, LMU-Munich, from April 2019 to March 2020
- Viktoria Kabel, LMU-Munich, from October 2019 to September 2020
- Francesco Pisani, Univ. Trieste, at LMU-Munich from September 2020 to March 2021
- Alexander Jercher, LMU-Munich, from February to October 2021
- Tom Ladstaetter, LMU-Munich, from February to October 2021

- **16 PhD thesis supervised**:
  - James P. Ryan, "Matter fields in the group field theory approach to quantum gravity", University of Cambridge (2007), jointly supervised with Dr. R. Williams; Jimmy has then moved to a postdoctoral research position at the Perimeter Institute of Theoretical Physics
  - Tamer Tlas, "Causality and matter propagation in 3d quantum gravity", University of Cambridge (2008), jointly supervised with Dr. R. Williams; Tim is a faculty member at the American University of Beirut
  - Carlos Guedes, "Non-commutative Fourier transform and Quantum Gravity"since January 2010; interrupted due to illness during writing up stage
  - Matti Rasaakka, "Non-commutative Representation for Quantum Systems on Lie groups", Univ. Potsdam and Freie Univ. Berlin (2014); Matti moved on to a postdoctoral fellowship at the University of Paris XIII
  - Sylvain Carrozza, "Tensorial methods and renormalization in group field theories", Univ. Paris XI-Orsay (2013), jointly supervised with Prof. V. Rivasseau, Université Paris XI-Orsay, France; Sylvain moved on to a postdoctoral position at CPT, Luminy, France, and he is now a postdoctoral researcher at the Perimeter Institute, Canada; thesis published by Springer
  - Johannes Thürigen, "Discrete quantum geometries and their effective dimension", jointly supervised with Dr. G. Calcagni, AEI, since January 2011; Humboldt University, Berlin (2015); Johannes got a postdoctoral fellowship at Humboldt Univ. Berlin, and he is now a postdoc at Univ. Paris XI-Orsay, France.

- Vincent Lahoche, "From perturbative to non-perturbative renormalization in Tensorial Group Field Theories", Univ Paris XI-Orsay (2016), jointly supervised with Prof. V. Rivasseau, Université Paris XI-Orsay, France (2016); Vincent has moved to a postdoctoral position at Univ. Bordeaux, France
- Alexander Kegeles, "Algebraic foundations of group field theories", Univ. Potsdam (2018)
- Marco Finocchiaro, AEI, since October 2013; expected completion: Spring 2021
- Isha Kotecha, AEI, from October 2015; expected completion: September 2020
- Xiankai Pang, ASC-LMU, from October 2019
- Yili Wang, ASC-LMU, from October 2019
- Eugenia Colafranceschi, ASC-LMU and Univ. Nottingham, jointly supervised with Prof. G. Adesso, Univ. Nottingham, UK, at ASC from October 2019
- Luca Marchetti, ASC-LMU and Univ. Pisa, jointly supervised with Prof. G. Cella, Univ. Pisa, Italy, at ASC from January 2020
- Roukaya Dekhil, ASC-LMU, from September 2020
- Giovanni Sommazzi, MCP and ASC, LMU, with S. Hartmann and E. Curiel, from September 2020

• PhD thesis committee member:

- Daniele Pranzetti, Univ. Aix Marseille, France, April 2011
- Matteo Smerlak, Univ. Aix-Marseille, France, September 2011
- Giovanni Palmisano, Univ. of Rome "La Sapienza", Italy, January 2016
- Raul Carballo-Rubio, Univ. of Granada, Spain, March 2016
- Alessio Belenchia, SISSA, Trieste, Italy, September 2016
- Alexandre Feller, ENS-Lyon, France, October 2017
- Gabriele Stagno, Univ. Rome "La Sapienza", Italy, January 2018

• former postdoctoral members of research group:

1. Roberto Pereira - 2009-2011 - then at Univ. of Rio de Janeiro, Brazil
2. Gianluca Calcagni - 2009-2012 - now faculty member at CSIC-Madrid, Spain
3. Arnau Riera - 2011-2012 - then at Univ. Barcelona, Spain
4. Aristide Baratin - 2011-2013 - then at Univ. Waterloo, and McGill University Canada, now at Univ. Montreal, Canada
5. Daniele Pranzetti - 2011-2013 - then at Univ. Erlangen-Nurberg, Germany
6. Matteo Smerlak - 2011-2013 - currently at Max Planck Institue for Mathematics in the Sciences, Leipzig, Germany
7. Steffen Gielen - 2010-2011 - now faculty member at School of Mathematical Sciences, Univ. Nottingham, UK
8. Isabeau Premont-Schwarz - 2010-2013
9. Benjamin Bahr - 2013-2014 - currently at Univ. of Hamburg, Germany
10. Frank Hellmann - 2013-2014 - now permament researcher at the Potsdam Institute for Climate Impact Research, Germany
11. James Ryan - 2012-2014 - then at Raboud Univ. Nijmengen, The Netherlands
12. Casey Tomlin - 2013-2015
13. Lorenzo Sindoni - 2009-2015 - then permament researcher at Microsoft-Invenia Lab, Cambridge, UK
14. Joseph Ben Geloun - 2013-2016 - now faculty member at Institute Galilee, Univ. Paris XIII, France
15. Stefano Bianco - 2015-2017
16. Edward Wilson-Ewing - 2014-2017 - now faculty member at Univ. New Brunswick, Canada
17. Dine Ousmane Samary - 2015-2017, now faculty member at ICMPA, Benin
18. Mingyi Zhang - 2015-2018
19. Goffredo Chirco - 2015 - 2019, now postdoctoral researcher at the University of Naples 'Federico II'
20. Ana Alonso Serrano - 2018-2019, now postdoctoral researcher at the Albert Einstein Institute, Germany

XII. OUTREACH AND PUBLIC ACTIVITIES

- invited speaker at the 'X Festivaletteratura' (International Literature Festival), Mantova, Italy, September 2006, on "Re-thinking space and time: the adventure of quantum gravity", public lecture, interview and public debate;
- 2009 - personal profile (with interview), as part of the series; "Brilliant Minds", appeared in TV programme: "Tomorrow Today", of Deutsche Welle broadcaster; available online at: http://www.dw-world.de/dw/article/0,,4605095,00.html
- invited public talk and panel discussion "The nature of space and time", Chern Institute for Mathematics, Nankai University, Tian Jin, China, August 2012
- invited talk "Quantum Gravity, or the quest for the nature of space and time", at the 9th Frontiers of Science Simposium, Potsdam, October 2012
- public talk and panel discussion (2 scientists, 2 artists, 2 art curators) "The Construction of Space and Time in Science", GrimMuseum, Berlin, March 2013
- public panel discussion "The nature of space, time and matter", Université Paris Diderot, March 2014
- public talk and panel discussion (scientists and artists) on "The relationship between Science and Art"at STATE of Time Festival (a festival for Art and Science), Alte Muenze, Berlin, October 2014
- public talk and discussion "What is space made of? the quest of quantum gravity", as part of the series 'Cafe' Scientifique', Berlin, January 2015
- public lecture "Domande dalla frontiera: di cosa e' fatto lo spazio? cosa e' il tempo? (Questions from the frontier: what is space made of? what is time?)"(in Italian), Cagliari, Italy, February 2017
- member of the "Task Force for Fundamental Science"of the Young Academy of Europe, producing a collection of essays on the value and impact of fundamental science for Europe, to be published on the YAE website and distributed to media, European decision makers and the European Commission, to support funding for fundamental science at the European level
- video interview (by G. Musser): "Looking for the atoms of space", available online at: http://spookyactionbook.com/2017/10/02/an-interview-with-daniele-oriti-video/
- invited panel discussion (with experts from science, administration, industry, and members of the german parliament) "Deutschland – das neue Forschungs "El Dorado": Wie wir jetzt um internationale Forschende werben", organized by the Federal Ministry of Education and Research and the "International Research Marketing" network, German Parliament, March 2018
- scientific host of journalist in residence Conor Purcell, at AEI in May 2019
- profile and interview on The Irish Times, "A heavyweight in the field of gravity research", Thu May 30th, 2019, by Dr. C. Purcell, available at https://www.irishtimes.com/news/science/heavyweight-in-the-field-of-gravity-research-1.3900791
- profile and interview on Scenario Magazine, "Quantum Gravity", Issue 5 (2019), available at http://www.scenariomagazine.com/product/quantum-gravity/
- public lecture "The universe as a quantum gravity condensate and its emergent evolution", Science Lectures Series, German Consulate General in Kolkata, India, December 2020, also available on Youtube at: https://youtu.be/zaK4xFn1YjY
- 2020 - 'Road to quantum gravity', series of (15) outreach dialogues (in italian) on quantum gravity (with D. De Blasio), available on YouTube channel 'Spazi attorcigliati'(https://www.youtube.com/channel/UCiuphe0ieLa8YQ93wGJTb0Q)
- 2021 - 'Le sfide concettuali della Meccanica Quantistica', series of 3 outreach dialogues on the foundations and interpretations of quantum mechanics , (with D. De Blasio), available on YouTube channel 'Spazi attorcigliati'(https://www.youtube.com/channel/UCiuphe0ieLa8YQ93wGJTb0Q)

- 2021 - 'Cos'e' la Scienza', series of 10 outreach dialogues on philosophy of science, (with D. De Blasio), available on YouTube channel 'Spazi attorcigliati'(https://www.youtube.com/channel/UCiuphe0ieLa8YQ93wGJTb0Q)
- among the magazines/newspapers articles discussing the work of our group:
  - 2013 - "The origins of Space and Time", feature article on Quantum Gravity, **Nature**, 500, 516-519 (29 August 2013)
  - 2013 - "Mit Friedmann bis zum Urknall"(in German) , pro-physik.de , September 2013
  - 2013 - "In Quantenschritten zum Urknall"(in German), Sterne-und-Weltraum.de
  - 2013 - "Quantum Steps Towards Big Bang and The Search for New Physics", PhysicsDatabase
  - 2013 - "Physicists Take a New Approach to Unify Quantum Theory and Theory of Relativity", Scitechdaily
  - 2013 - "La Gravitá Quantistica presto spiegherá il Big Bang?"(in Italian), Cyberscienza.it
  - 2016 - "Loop quantum gravity theory offers glimpse beyond the event horizon", online magazine: Phys.org (http://phys.org/news/2016-05-loop-quantum-gravity-theory-glimpse.html)
  - 2016 - "Cosi' funziona l'orizzonte degli eventi "(in Italian), Media INAF (http://www.media.inaf.it/2016/05/27/cosi-funziona-lorizzonte-degli-eventi/)
  - 2018 - "The Big Boil: Why the big bang was not the beginning", feature article focused on our research, **New Scientist**, issue 3169 (17.03.2018), (avaliable online at: https://www.newscientist.com/article/mg23731690-700-why-the-big-bang-was-not-the-beginning/)
  - 2018 - "The origin of the universe called into question", Deccan Chronicle, 01.04.2018, (https://www.deccanchronicle.com/science/science/010418/the-origin-of-the-universe-called-into-question.html)
  - 2018 - "What is spacetime?"(by George Musser Jr), **Scientific American**, June 2018 issue, (https://www.scientificamerican.com/article/what-is-spacetime/) and **Nature**, 557, S3-S6 (2018) (https://www.nature.com/articles/d41586-018-05095-z)
  - 2018 - "The many definitions of a black hole", by E. Curiel, **Nature Physics-Astronomy**, volume 3, 27–34 (2019)
  - 2020 - "Can we construct a theory in which space and time are not assumed to exist?", **Ars Technica** (by C. Purcell, available at: https://arstechnica.com/science/2020/04/a-look-at-the-quest-to-unite-relativity-and-quantum-mechanics/
  - 2020 - "Quantique et relativité : comment unifier les deux théories", **Science et Vie**, (by A. Pihen, available at: https://www.science-et-vie.com/science-et-culture/quantique-et-relativite-unifier-les-deux-theories-59041)

XIII. TALKS AND SEMINARS

Invited and plenary presentations (over 80 in total) are highlighted

1. "The spinor field in Rindler space and an analysis of the Unruh effect", 3rd ICRA Network Workshop, on "Electrodynamics and magnetohydrodynamics around black holes", Rome-Pescara, Italy, July 1999

2. "Spin foam models for Quantum Gravity", Department of Applied Mathematics and Theoretical Physics, University of Cambridge, November 2000

3. "The spinor field in Rindler spacetime and the Unruh effect", 9th Marcel Grossman Meeting on "Recent developments in theoretical and experimental general relativity, gravitation and relativistic field theories", Rome, Italy, July 2000

4. "The Barrett-Crane spin foam model for quantum gravity: a lattice gauge theory derivation", given at the Physics Department, University of Rome "La Sapienza", December 2000

5. "Quantum Gravity from algebra: the Barrett-Crane spin foam model and its classical actions", Physics Department, University of Rome "La Sapienza", April 2001

6. "Causality in spin foam models of non-perturbative quantum gravity", XV SIGRAV conference on General Relativity and gravitational physics, Monteporzio Catone, Rome, Italy, September 2002

7. "Orientation dependent spin foam models", Workshop on "Physics and Geometry of 3-dimensional Quantum Gravity", International Centre for Mathematical Sciences, Edinburgh, July 2003

8. "The Feynman propagator for spin foam quantum gravity", 2nd DICE Workshop on "From Decoherence and Emergent Classicality to Emergent Quantum Mechanics", Piombino, Italy, September 2004

9. "The Feynman propagator for quantum gravity: spin foams, orientation, proper time and causality", Workshop "Quantum Gravity in the Americas: Status and future directions", Waterloo, Canada, October 2004

10. "Quantum Spacetime as a spin foam: discreteness, algebra and causality", Department of Applied Mathematics and Theoretical Physics, University of Cambridge, March 2005

11. "Causal transition amplitudes in spin foam quantum gravity", **invited seminar**, Centre de Physique Theorique, Marseille, France, April 2005

12. "Quantum Spacetime as a spin foam: discreteness, algebra and causality", **invited seminar**, Physics Department, University of Southampton, May 2005

13. "Quantum Gravity as a quantum field theory of simplicial geometry", **invited talk**, Workshop on "Mathematical and Physical Aspects of Quantum Gravity", Blaubeuren, Germany, July 2005

14. "The group field theory approach to quantum gravity", 4th Meeting on "Constrained Dynamics and Quantum Gravity", Cala Gonone, Italy, September 2005

15. "Parametrised group field theories and quantum gravity transition amplitudes", "Loops '05" Conference, Potsdam, Germany, October 2005

16. "Spin foam models and the group field theory formulation of Quantum Gravity", **invited seminar**, Doppler Institute for Theoretical Physics, Prague, Czech Republic, January 2006

17. "Group Field Theories for Quantum Gravity: What? Why?, **invited talk**, Institute for Theoretical Physics, Department of Physics and Astronomy, Utrecht University, Utrecht, Netherlands, February 2006

18. "A generalised formalism for group field theories: quantum gravity transition amplitudes and causality at the Planck scale", talks at the Centre de Physique Theorique, Luminy, France, March 2006, and at the Perimeter Institute, Waterloo, Canada, March 2006

19. "Toward quantum gravity: spin foam models and group field theories", **invited talk**, International School for Advanced Studies (SISSA), Trieste, Italy, April 2006

20. "A quantum field theory picture of simplicial geometry and the emergence of spacetime", **invited talk**, 3rd DICE Workshop on "Quantum Mechanics between Decoherence and Determinism: new aspects from particle physics to cosmology", Piombino, Italy, September 2006

21. "Group Field Theories and the emergence of spacetime", **invited seminars**, Physics Department, Imperial College, London, UK, December 2006, Ecole Normale Superieure, Lyon, France, January 2007, Max Planck Institute for Mathematics, Bonn, Germany, February 2007

22. "Group field theories, or the combinatorial and group-theoretic path to quantum gravity", **invited talk**, Workshop "Combinatorics and Physics", Max Planck Institute for Mathematics, Bonn, Germany, March 2007

23. "Group field theory as the microscopic quantum description of the spacetime fluid", **invited talk**, Workshop "From Quantum to Emergent Gravity: Theory and Phenomenology", SISSA, Trieste, Italy, June 2007

24. "Group field theory: an introduction", **invited lecture**, "Gravtum I"meeting, Amorgos, Greece, June 2007

25. "Group Field Theories: quantum spacetime from microscopic discreteness to an emergent continuum", **invited plenary talk**, "Loops '07"Conference, Morelia, Mexico, June 2007

26. "GFT as the microscopic description of the quantum spacetime fluid", **invited talk**, "Condensed matter meets gravity"workshop, Lorentz Center, Leiden, The Netherlands, August 2007

27. "Group field theory and simplicial quantum gravity", "Quantum Gravity and Quantum Geometry"conference, University of Nottigham, UK, July 2008

28. "Group field theory: what we know and the lot we don't", **invited talk**, "Young Loops and Foams"workshop, Perimeter Institute, Canada, July 2008

29. "On the emergence of spacetime and matter from group field theory", **invited talks**, "III Emergent gravity"conference, M.I.T., Boston, USA, August 2008, "D.I.C.E. 2008: from quantum mecahnics through complexity to spacetime"conference, Castiglioncello, Italy, September 2008

30. "Group field theory and simplicial gravity", "Microscopic models of quantum spacetime"workshop, Utrecht University, The Netherlands, September 2008

31. "Introduction to Quantum Gravity", **invited talk**, 'Young Researchers Conference', Perimeter Institute, Waterloo, Canada, December 2008; available in streaming video at: http://streamer.perimeterinstitute.ca/Flash/e824f10d-1565-4a3d-b235-f4524276774f/viewer.html

32. "Group field theories: some recent results", **invited talk**, "Algebraic and combinatorial methods in quantum field theory"conference, Cargese, France, April 2009

33. "Quantum Gravity: an introduction", **invited seminar**, University of Catania, Italy, April 2009

34. "The group field theory approach to quantum gravity: some recent results", **invited talk**, "XXV Max Born symposium: The Planck Scale", Wroclaw, 29th June-3rd July 2009

35. "Microscopic Discrete Models of Quantum Spacetime", **invited talk**, 2nd FQXi international conference, July 2009, Ponta Delgada, Azores, Portugal , available in streaming video at: http://www.youtube.com/watch?v=kYD56f7-FJY

36. "Group field theory for Quantum Gravity", **plenary talk**, "Loops 09"conference, Beijing Normal University, Beijing, China, August 2009

37. "Group field theory: a candidate description of the atoms of space", **invited talk**, George Ellis Fest "Foundations of Space and Time", Stellenbosch, South Africa, August 2009

38. "Group field theory: microscopics of quantum space and emergent (non-commutative) matter", **invited talk**, "Emergent Gravity IV"conference, University of British Columbia, Vancouver, Canada, August 2009

39. "An overview of the group field theory approach to quantum gravity", **invited plenary talk**, "Focus workshop on Quantum Gravity 2010", Max Planck Institute for Complex Systems, Dresden, Germany, 8th-10th April 2010

40. "The microscopic dynamics of quantum space as a group field theory", **invited seminars**, Ecole Polytechnique, Paris, France, 9th May 2010, and Bayrischzell 2010 Workshop on Non-commutative Geometry and Physics, 14-17th May 2010, and Dept. Physics, Univ. Mainz, 2nd June 2010, Conference 'Quantum field theory and gravity', Regensburg, September 2010, Universita' degli studi di Napoli, Naples, January 2011

41. "Group field theory: recent, current and future developments", **plenary talk**, "Loops '11"conference, Madrid, Spain, May 2011

42. "The group field theory approach to quantum gravity: brief review of recent developments", **invited talk**, Conference 'Quantum Field Theory and Gravity', ETH, Zurich, June 2011

43. "Aether and the theory of relativity: Einstein's Leiden lecture in 1920 (as a source of inspiration for current research in quantum gravity)", **invited lecture**, workshop 'Roots of Quantum Gravity', MPIG, Berlin, June 2011

44. "From loop quantum gravity to group field theory, via spin foams", **two invited lectures**, CERN Theory Institute Program 'Quantum Gravity from UV to IR', CERN, Geneva, September 2011

45. "The group field theory description of quantum geometry", **invited seminar**, Laboratoire de Physique Theorique, Univ. Paris XI-Orsay, November 2011

46. "What is space made of?", **invited general institute Colloquium**, Perimeter Institute for Theoretical Physics, January 2012; video available at: http://www.perimeterinstitute.ca/videos/what-space-made

47. "The group field theory description of quantum spacetime", **invited talks** at: Service de Physique Theorique, Centre de l'Energie Atomique, Saclay; Laboratoire de Physique Theorique, Ecole Normale Superieure, Paris; Laboratoire de Astroparticules et Cosmologie, Univ. Paris VII "Diderot"; February 2012; "499th WE-Heraeus Seminar: Exploring quantum spacetime", Bad Honnef, March 2012

48. "The quantum geometry of group field theories", **invited talk**, Conference "Quantum Gravity in Paris", Univ. Paris XI-Orsay and Univ. Paris VII Diderot, March 2012

49. "Group field theory and quantum gravity phenomenology", **invited seminar**, University of Rome "La Sapienza", April 2012

50. "Recent developments in quantum gravity (and some ideas for cosmology)", **invited lecture**, Inaugural Colloquium of the DFG Research Training Group "Models of gravity", Bielefeld, May 2012

51. "The quantum geometry of tensorial group field theories", **invited talk**, XXIX Conference on Group Theoretical Methods in Physics, Chern Institute for Mathematics, Tian Jin, China, August 2012

52. "Tensorial Group Field Theories: a new type of quantum field theory for quantum gravity", **plenary talk**, conference "New Trends in Algebraic Quantum Field Theory", INFN Laboratories, Frascati, September 2012

53. "Non-commutative spaces: questions from the bottom-up", **invited talk**, workshop "Incontri di Geometria Non-commutativa", Univ. Naples, September 2012

54. "Is spacetime fundamentally discrete?", **invited introductory talk, session and discussion chairing**, conference "Experimental search for Quantum Gravity: the hard facts", Perimeter Institute, Waterloo, Canada, October 2012; video available at: http://www.perimeterinstitute.ca/videos/spacetime-fundamentally-discrete

55. "Quantum Gravity, or the quest for the nature of space and time", **plenary talk**, 9th Japanese-German Frontiers of Science Simposium, Potsdam, October 2012

56. "Cosmology from group field theory", **invited talk**, workshop "Quantum Gravity and Fundamental Cosmology", AEI, March 2013

57. "Cosmological dynamics from group field theory", **invited talk**, conference "Quantum Gravity in Paris", Paris XI-Orsay, March 2013

58. "Quantum Gravity as a Group Field Theory", **invited seminar**, D.A.M.T.P., Univ. Cambridge, May 2013

59. "Disappearance and Emergence of Space and Time in Quantum Gravity", conference "Quantum Gravity in Perspective", LMU, Munich, May 2013

60. "Group field theory: a (renormalizable?) QFT of spin networks and simplicial geometry", "2nd Mediterranean Conference on Classical and Quantum Gravity", Veli Losinj, Croatia, June 2013

61. "Effective cosmological dynamics from group field theory models of quantum gravity", **invited talk**, "1st i-Link Conference: Macro-from-Micro: Quantum Gravity and Cosmology", CSIC, Madrid, Spain, June 2013

62. "Group field theory as the 2nd quantization of Loop Quantum Gravity", Loops '13 Conference, July 2013

63. "On the Emergence of Space and Time in Quantum Gravity", "Foundations of Physics 2013"conference, LMU, Munich, July 2013

64. "Group field theory and quantum geometry", **invited talk**, "Non-commutative field theory and gravity", Corfu Summer Institute, Corfu, Greece, September 2013

65. "Group field theory for quantum gravity: 2nd quantization of spin networks and effective cosmology", **invited talk**, Institute for Gravitation and the Cosmos, Penn State University, State College PA, USA, September 2013

66. "Disappearance and Emergence of Space and Time in Quantum Gravity", workshop "Philosophical Foundations of Quantum Gravity, Univ. of Illinois, Chicago, September 2013; available in streaming from the YouTube channel "Beyond spacetime", at https://www.youtube.com/watch?v=f0CA9eWYM9c

67. "Cosmology from quantum gravity: the universe as a Bose-Einstein condensate", **invited talk**, Ecole Normale Superieure-Lyon, November 2013

68. "Disappearance and Emergence of Space and Time in Quantum Gravity", **invited talk**, 'Physics and Philosophy'series, Laboratoire SPHERE, Univ. Paris VII-Diderot, November 2013

69. "Loop quantum gravity and group field theory", **invited lecture**, 'IX Avogadro Meeting', SISSA, Trieste, December 2013

70. "A 2nd quantized (Fock space) formulation of LQG (and what is can be useful for)", **invited talk**, 'Second EFI winter conference on Quantum Gravity', Tux, Austria, February 2014

71. "The Bronstein hypercube of Quantum Gravity", **invited lecture**, conference 'New Directions in the Foundations of Physics', Mathematical Association of America Carriage House, Washington, USA, April 2014

72. "Renormalization of group field theories: motivations and a brief review", **invited talk**, conference 'Renormalization group approaches to quantum gravity', Perimeter Institute, Waterloo, April 2014

73. "Non-commutative geometry tools in loop quantum gravity, spin foam models and group field theory", **invited talk**, 'Born Symposium: The Planck Scale', Wroclaw, July 2014

74. "Group field theories: the combinatorics of tensor models, the quantum geometry of loop quantum gravity", **invited lecture**, thematic programme 'Combinatorics, geometry and physics', E. Schroedinger Institute for Mathematical Physics, Vienna, July 2014

75. "Group field theory: a quantum field theory for the atoms of space", **invited talk**, workshop on 'Quantum Gravity', part of 'Frontiers of Fundamental Physics'Symposium, Marseille, July 2014

76. "The universe as a quantum gravity condensate", **invited plenary talk**, workshop "Experimental Search for Quantum Gravity", SISSA, Italy, September 2014

77. ''Group field theory and loop quantum gravity", **invited plenary lecture**, 'Conceptual and Technical Challenges for Quantum Gravity', University of Rome 'La Sapienza', September 2014

78. "Quantum Gravity: from the atoms of space to cosmology", **invited plenary talk**, 'NEB 16 - Recent developments in gravity', Mykonos, Greece, September 2014

79. "Time in the geometrogenesis scenario in quantum gravity", **invited keynote talk**, 'Time in Quantum Gravity'conference, Univ. California in San Diego, USA, March 2015; available in streaming from the YouTube channel "Beyond spacetime"website, at: https://www.youtube.com/watch?v=jsd576w4a88

80. "Quantum Gravity from the atoms of space to cosmology", **invited talk**, Physics Department, Imperial College London, May 2015

81. "From quantum gravity to cosmology: the universe as a quantum gravity condensate", **invited plenary talk**, conference 'Cosmology and the quantum vacuum', Rhodes, Greece, June 2015

82. "Foundations of spin foam models: a report from the front", Loops '15 Conference, Erlangen, Germany, July 2015

83. "Cosmology as Quantum Gravity hydrodynamics", **invited plenary talk**, meeting 'Quantum Gravity: Theory and Phenomenology', Univ. of Rome 'La Sapienza', Italy, July 2015

84. "Group field theory renormalisation and effective cosmology", **invited plenary lecture**, 'The Planck Scale II', Wroclaw, Poland, September 2015

85. "Group field theories for the atoms of space', **invited plenary talk**, 'Non-commutative field theory and gravity', Corfu Summer Institute, Corfu, Greece, September 2015

86. "If spacetime is emergent, what is cosmology?", **invited lecture**, Philosophy Dept., Univ. Geneva, Switzerland, October 2015; available in streaming from the YouTube channel "Beyond spacetime", at: https://www.youtube.com/watch?v=SlYV60nKWC8

87. "Group field theories for the atoms of space, and their renormalization", **invited talk**, Workshop on 'Strongly interacting quantum field theories', Friedrich-Schiller-Universität Jena, Germany, November 2015

88. "A multi-scale tsunami", **invited talk**, at 'Constructive field theory: a conference in honor of V. Rivasseau's 60th birthday', Institute H. Poincare, Paris, France, November 2015

89. **invited chair** (including short introductory talk) of panel discussion "Has physics changed - and should it?"(panelists: J. Polchinski, G. Ellis, D. Luest, E. Castellani, G. Dvali, K. Thebault, S. Hossenfelder), within the conference: 'Why trust a theory? Reconsidering Scientific Methodology in Light of Modern Physics', Munich Center for Mathematical Philosophy, Ludwig-Maximilians-Universität, München, Germany, December 2015.

90. "Forks on the road, on the way to quantum gravity", **invited talk**, 4th Tux Workshop on Quantum Gravity, Tux, Austria, February 2016

91. "The group field theory formalism for quantum gravity: progress and prospects", DPG (Deutsche Physikalische Gesellschaft) Meeting, Hamburg, Germany, February 2016

92. "Group field theory: foundations and emergent cosmology", **invited talk**, conference 'Current problems in Theoretical Physics', Vietri, Italy, March 2016

93. "Functional Renormalisation Group approach to the continuum limit of Group Field Theories", **invited talk**, workshop 'Shapes of gravity', Raboud University Nijmegen, The Netherlands, March 2016

94. "Quantum gravity as a group field theory: from the atoms of space to cosmology", **invited seminar**, Dept of Physics and Astronomy, University of Sussex, UK, May 2016

95. "Cosmology as quantum gravity hydrodynamics", **invited seminar**, Imperial College London, UK, May 2016

96. "A rovellian scientific path", **invited talk**, 'CarloFest'conference, Marseille, France, May 2016

97. "Space and time are emergent, in quantum gravity. What is cosmology, then?", 'Foundations of Physics'conference, London School of Economics, UK, July 2016

98. "Quantum gravity or the problem of emergent spacetime: new hopes and results", **invited talk**, workshop 'Dashed Hopes - What hasn't worked in Quantum Gravity (and why)?', Max Planck Institute for the History of Science in Berlin, Germany, July 2016

99. "The universe as a quantum condensate", talk given at the 5th FQXI conference, Banff, Canada, August 2016

100. "Renormalization of (tensorial) group field theories", **invited plenary talk**, conference 'Exact Renormalization Group 2016', ICTP, Trieste, September 2016

101. "Group field theory: from the atoms of space to cosmology", **invited seminar**, Perimeter Institute for Theoretical Physics, Canada, November 2016

102. "Renormalization of group field theories and effective continuum physics", **invited seminars**, Raboud Univ. Nijmegen, The Netherlands, Friedrich-Schiller-Universität Jena, Germany, Univ. of Heidelberg, Germany

103. "Group field theory: the path integral for quantum gravity between discrete and continuum", **invited lecture**, Workshop 'Path Integration in Complex Dynamical Systems', Lorentz Center, Leiden, The Netherlands, February 2017

104. "The continuum limit of spin network dynamics via group field theory renormalization", **invited lecture**, Workshop 'Quantum Spacetime and the Renormalization Group', Lorentz Center, Leiden, The Netherlands, February 2017

105. "Spacetime without spacetime: beyond points, manifolds, fields", **invited talk**, COST network Workshop 'The early Universe as a signature for quantum spacetime', Athens, Greece, March 2017

106. "An emergent universe without fundamental space and time", **invited talk**, workshop 'Time between physics and phenomenology', Univ. Rome 3, April 2017

107. "An emergent universe without fundamental space and time: cosmology as quantum gravity hydrodynamics", **invited talk**, conference 'Cosmology and the future of spacetime', Univ. Western Ontario, London, Canada, June 2017

108. "The special substance that is quantum spacetime: conceptual aspects", **invited keynote lecture**, 3rd Conference on the Philosophy of Quantum Gravity , Univ. Geneva, Switzerland, June 2017

109. "The future of gravitational physics: towards a quantum spacetime", **invited colloquium**, European Week of Astronomy and Space Science, Prague, June 2017

110. "The group field theory formalism for quantum gravity: where from and where to", **plenary talk**, Loops '17 conference, Warsaw, Poland, July 2017

111. "Emergent spacetime, entanglement and cosmology in the group field theory formalism for quantum gravity", **invited talk**, conference 'Probing the spacetime fabric: from concepts to phenomenology', SISSA, Trieste, July 2017

112. "The universe as a quantum gravity condensate", **invited talk**, workshop on 'Testing fundamental physics principles', Corfu Summer Institute, Corfu, Greece, September 2017

113. "Emergent cosmology from quantum gravity: the universe as a quantum condensate", **invited Sommerfeld Theory Colloquium**, LMU, Munich, Germany, October 2017

114. "Quantum spacetime from interacting (non-commutative) simplices", **invited talk**, workshop 'Quantum Spacetime '18', annual COST meeting, Sofia, Bulgaria, February 2018

115. "Open issues in group field theory renormalization", **invited talk**, workshop 'Renormalization Group for Tensor Models', Univ. Heidelberg, Germany, March 2018

116. "What is spacetime? and how does it come about? the quest for quantum gravity", **invited seminar**, Max Planck Institute for Nuclear Physics, Heidelberg, Germany, April 2018

117. "Three ways of dissolving a cosmological singularity in quantum gravity", **invited talk**, workshop 'Singularities of general relativity and their quantum fate', Warsaw, Poland, May 2018

118. "Group field theory and tensor networks: first contacts", **invited talk**, workshop 'Interplay of quantum information, foundations and gravity', Vienna, Austria, May 2018

119. "The continuum limit of discrete quantum gravity via group field theory renormalization", **invited talk**, conference 'Quantum Gravity and the Renormalization Group', Bad Honnef, Germany, June 2018

120. "Emergent time", **invited lecture**, summer school 'Time, time, time (between physics, philosophy, art)', Rome, Italy, August 2018

121. "Lattice quantum gravity and its continuum limit via the group field theory formalism", **invited talk**, workshop 'Quantum gravity meets lattice QFT', ECT*-Trento, Italy, September 2018

122. "Microscopic structure of black holes from the group field theory formalism", **invited talk**, 'XXIII Congresso SIGRAV: Black holes: Theory and Observations'(Italian Society for Gravitational Physics), Cagliari, Italy, September 2018

123. "The philosophical challenges of quantum gravity", **invited general colloquium**, Munich Center for Mathematical Philosophy, LMU-Munich, Germany, November 2018

124. "Key issues to be tackled for model independent searches in quantum gravity", **invited talk**, workshop 'Cross-disciplinary perspectives on model-independent searches', University of Edinburgh, UK, February 2019

125. "Time from classical relativistic physics toward quantum gravity ", **invited lecture**, workshop 'Physics and Philosophy of the Future: the Flow of Time between Physics and Metaphysics', INFN Laboratories, Frascati, Italy, July 2019

126. "The epistemic nature of Physical Laws: from intelligent agents to quantum gravity and cosmology", **invited talk**, FQXi Conference 'Mind matters: Intelligence and Agency in the Physical World', Lucca, Italy, July 2019

127. "Toward emergent spacetime in quantum gravity: Quantum Black Holes from scratch", **invited talk**, Humboldt Kolleg 'Frontiers in Physics, from Electroweak to Planck scales'and 'Workshop on Quantum Geometry, Field theory and Gravity', Corfu Summer Institute, September 2019

128. "Quantum black holes piece by piece", **invited talk**, workshop of Black hole thermodynamics and semi-classical gravity, Cambridge-LMU collaboration, Univ. Cambridge, UK, October 2019

129. "Quantum Gravity: A Brief Review of the Past, a Selective Picture of the Present, a Glimpse of the Future",**invited talk**, workshop "Beyond the Standard Model: Historical-Critical Perspectives", Galileo Galilei Institute, Florence, Italy, October 2019

130. "Entanglement and Emergent Spacetime in Quantum Gravity", **invited talk**, Univ. Grenoble, France, November 2019

131. "Cosmology as quantum gravity hydrodynamics and the fate of cosmological singularities", **invited keynote talk**, conference on 'Foundations of cosmology and quantum gravity', New York University at Abu Dhabi, United Arab Emirates, January 2020

132. "Group field theory condensate cosmology and cosmological singularities", Tux conference on Quantum Gravity, Tux, Austria, February 2020

133. "What is space? what is time? the quest for quantum gravity", **invited general colloquium**, University of Rome 3, Italy, March 2020

134. "The status of Group Field Theory", International Loop Quantum Gravity Seminar (online seminar series), March 2020

135. "The universe as a quantum gravity condensate and effective cosmological dynamics",**invited talk**, Spring workshop on gravity and cosmology, Jagiellonian Univ. Krakow May 2020

136. "What is space? what is time? the quest for quantum gravity", **invited seminar**, online seminar series 'Quantum aspects of space, time and matter', June 2020

137. chair of panel discussion 'Connecting quantum gravity approaches', conference 'Quantum Gravity 2020', Perimeter Institute for Theoretical Physics, Waterloo, Canada, July 2020

138. invited panelist in panel discussion 'Quantum cosmology and quantum gravity', conference 'Quantum Gravity 2020', Perimeter Institute for Theoretical Physics, Waterloo, Canada, July 2020

139. "How matter matters in tensorial group field theory", **invited talk**, (online) conference 'Quantum Gravity and the Renormalization Group', Univ. Odense, Denmark, EU, December 2020

140. "Tensorial group field theories: basics and recent progress", **invited seminar**, Univ. Erlangen-Nurenberg, Germany, December 2020

141. "Deformed Special Relativity from Quantum Gravity: tentative avenues", 'DSR20'(online) meeting , Univ. Naples, Italy, December 2020

142. "Effective relational cosmological dynamics from Quantum Gravity", **invited seminar**, Univ. Sheffield, UK, February 2021

XIV. PUBLICATIONS

Citations count (as of November 2020)
inSpire:
4480 total citations, 12 works with > 100 citations, 18 works with > 50 citations, h-index = 40
GoogleScholar:
5158 total citations, 1 work with > 250 citations, 15 works with > 100 citations, 21 works with > 50 citations, h-index = 42

A. Journal Papers - refereed

1. D. Oriti, R. M. Williams, Gluing 4-simplices: a derivation of the Barrett-Crane spin foam model for Euclidean quantum gravity, Phys. Rev. D 63, 024022 (2001); gr-qc/0010031;
2. E. R. Livine, D. Oriti, Barrett-Crane spin foam model from generalized BF-type action for gravity, Phys. Rev. D65, 044025 (2002); gr-qc/0104043;
3. D. Oriti, Spacetime geometry from algebra: spin foam models for non-perturbative quantum gravity, Rep. Prog. Phys. 64, 1489 (2001), gr-qc/0106091;
4. D. Oriti, Boundary terms in the Barrett-Crane spin foam model and consistent gluing, Phys. Lett. B, 532, 363 (2002); gr-qc/0201077;
5. D. Oriti, H. Pfeiffer, A spin foam model for pure gauge theory coupled to quantum gravity, Phys. Rev. D66, 124010 (2002); gr-qc/0207041;
6. E. R. Livine, D. Oriti, Implementing causality in the spin foam quantum geometry, Nucl. Phys. B663, 231 (2003), gr-qc/0210064;
7. E. R. Livine, D. Oriti, About Lorentz invariance in a discrete quantum setting, JHEP 0406, 050 (2004), gr-qc/0405085;
8. D. Oriti, C. Rovelli, S. Speziale, Spinfoam 2d Quantum Gravity and discrete bundles, Class. Quant. Grav. 22, 85 (2005), gr-qc/0406063;
9. F. Girelli, E. R. Livine, D. Oriti, Deformed Special Relativity as an effective flat limit of quantum gravity, Nucl. Phys. B 708, 411 (2005), gr-qc/0406100;
10. D. Oriti, The Feynman propagator for spin foam quantum gravity, Phys. Rev. Lett. 94, 111301 (2005), gr-qc/0410134;
11. L. Freidel, D. Oriti, J. Ryan, A group field theory for 3d quantum gravity coupled to a scalar field, gr-qc/0506067;
12. E. R. Livine, D. Oriti, Coherents states in 3d Deformed Special Relativity: semiclassical points in a flat quantum spacetime, JHEP, 0511050(2005), hep-th/0509192;
13. E. R. Livine, D. Oriti, Coupling of spacetime atoms and spin foam renormalisation from group field theory, JHEP 0702, 092 (2007), gr-qc/0512002;
14. D. Oriti, Generalised group field theory and quantum gravity transition amplitudes, Phys. Rev. D 76, 061502 (2006), gr-qc/0512069;
15. D. Oriti, J. Ryan, "Group field theory formulation of 3d quantum gravity coupled to matter fields", Class. Quant. Grav. 23, 6543-6576 (2006), gr-qc/0602010;
16. D. Oriti, T. Tlas, Causality and matter propagation in 3d quantum gravity, Phys. Rev. D 74, 104021 (2006), gr-qc/0608116;
17. D. Oriti, T. Tlas, A new class of group field theories for 1st order discrete quantum gravity, Class. Quant. Grav. 25, 085011 (2008), arXiv:0710.2679;
18. D. Oriti, Group field theory and simplicial quantum gravity, ITP-UU-08/58, SPIN-08/45, AEI-2009-022, Class. Quantum Grav. 27 (2010) 145017, arXiv: 0902.3903 [gr-qc];

19. F. Girelli, , E. Livine, D. Oriti, Deformed special relativity from group field theory, ITP-UU-08/57 and SPIN-08/44, AEI-2009-029, Phys. Rev. D 81, 024015 (2010), arXiv:0903.3475 [gr-qc]

20. L. Freidel, R. Gurau, D. Oriti, Group field theory renormalization - the 3d case: power counting of divergences, AEI-2009-031, Phys. Rev. D 80, 044007 (2009) arXiv:0905.3772 [hep-th]

21. D. Oriti, T. Tlas, Encoding simplicial geometry in group field theories, ITP-UU-08/60, SPIN-08/47, AEI-2009-032, Class. Quant. Grav. 27, 135018 (2010) (Editors' recommendation), arXiv:0912.1546 [gr-qc]

22. A. Di Mare, D. Oriti, Emergent matter from generalised 3d group field theories, AEI-2009-126, Class. Quantum Grav. 27 (2010) 145006, arXiv:1001.2702 [gr-qc]

23. A. Baratin, D. Oriti, Group field theories with non-commutative metric variables, AEI-2010-030, Phys.Rev.Lett. 105 (2010) 221302 , arXiv:1002.4723 [hep-th]

24. A. Baratin, B. Dittrich, D. Oriti, J. Tambornino, Non-commutative flux representation of Loop Quantum Gravity, AEI-2010-042, Class.Quant.Grav. 28 (2011) 175011, arXiv:1004.3450 [hep-th]

25. S. Gielen, D. Oriti, Classical General Relativity as BF-Plebanski theory with linear constraints, AEI-2010-084, Class.Quant.Grav. 27 (2010) 185017, arXiv:1004.5371 [gr-qc]

26. D. Oriti, L. Sindoni, Towards classical geometrodynamics from Group Field Theory hydrodynamics, AEI-2010-157, New J.Phys. 13 (2011) 025006, arXiv:1010.5149 [gr-qc]

27. G. Calcagni, S. Gielen, D. Oriti, Two-point functions in (loop) quantum cosmology, AEI-2010-162, Class.Quant.Grav. 28 (2011) 125014, arXiv:1011.4290 [gr-qc]

28. A. Baratin, F. Girelli, D. Oriti, Diffeomorphisms in group field theories, Phys.Rev. D83 (2011) 104051, arXiv:1101.0590 [hep-th]

29. D. Oriti, M. Raasakka, Quantum mechanics on $SO(3)$ via non-commutative dual variables, Phys.Rev. D84 (2011) 025003, arXiv:1103.2098 [hep-th]

30. S. Carrozza, D. Oriti, Bounding bubbles: the vertex representation of 3d group field theory and the suppression of pseudo-manifolds, Phys.Rev. D85 (2012) 044004, arXiv:1104.5158 [hep-th]

31. E. Livine, D. Oriti, J. Ryan, Effective Hamiltonian constraint from group field theory, Class.Quant.Grav. 28 (2011) 245010, arXiv:1104.5509 [gr-qc]

32. M. Arzano, G. Calcagni, D. Oriti, M. Scalisi, Fractional and non-commutative spacetimes, Phys.Rev. D84 (2011) 125002, arXiv:1107.5308 [hep-th]

33. A. Baratin, D. Oriti, Quantum simplicial geometry in the group field theory formalism: reconsidering the Barrett-Crane model, New J. Phys. 13 (2011) 125011, arXiv:1108.1178 [gr-qc]

34. D. Oriti, R. Pereira, L. Sindoni, Coherent states for quantum gravity: a construction based on the flux representation of LQG, J.Phys. A45 (2012) 244004, arXiv:1110.5885 [gr-qc]

35. A. Baratin, D. Oriti, Group field theory and simplicial path integrals: a model for Holst-Plebanski gravity, Phys.Rev. D85 (2012) 044003, arXiv:1111.5842 [hep-th]

36. G. Calcagni, S. Gielen, D. Oriti, Group field cosmology: a cosmological field theory of quantum geometry, Class.Quant.Grav. 29 (2012) 105005 (editor's recommendation), arXiv:1201.4151[gr-qc]

37. D. Oriti, R. Pereira, L. Sindoni, Coherent states for quantum gravity: towards collective variables, Class.Quant.Grav. 29 (2012) 135002, arXiv:1202.0526 [gr-qc]

38. S. Carrozza, D. Oriti, Jackets and bubbles: new scaling bounds in topological group field theories, JHEP 1206 (2012) 092, arXiv:1203.5082 [hep-th]

39. B. Dittrich, C. Guedes, D. Oriti, On the space of generalized fluxes for loop quantum gravity, Class. Quantum Grav. 30 (2013) 055008, arXiv:1205.6166 [gr-qc]

40. S. Carrozza, D. Oriti, V. Rivasseau, Renormalization of Tensorial Group Field Theories: abelian $U(1)$ models in four dimensions, Commun.Math.Phys. 327 (2014) 603-641, arXiv:1207.6734 [hep-th]

41. G. Calcagni, D. Oriti, J. Thürigen, Laplacians on discrete and quantum geometries, Class. Quant. Grav. 30 (2013) 125006, arXiv:1208.0354 [hep-th]

42. C. Guedes, D. Oriti, M. Raasakka, Quantization maps, algebra representation and non-commutative Fourier transform for Lie groups, J. Math. Phys. 54 (2013) 083508, arXiv:1301.7750 [math-ph]

43. D. Oriti, Disappearance and emergence of spacetime in quantum gravity, Stud.Hist.Philos.Mod.Phys. 46 (2014) 186-199, arXiv:1302.2849 [physics.hist-ph]

44. S. Gielen, D. Oriti, L. Sindoni, Cosmology from group field theory formalism for quantum gravity, Phys. Rev. Lett. 111 (2013) 031301, arXiv:1303.3576 [gr-qc]

45. S. Carrozza, D. Oriti, V. Rivasseau, Renormalization of an $SU(2)$ Tensorial Group Field Theory in three dimensions, Commun.Math.Phys. 330 (2014) 581-637, arXiv:1303.6772 [hep-th]

46. W. Kaminski, D. Oriti, J. Ryan, Towards a double scaling limit in tensor models: probing the sub-dominant orders, New J.Phys. 16 (2014) 063048, arXiv:1304.6934 [hep-th]

47. A. Baratin, S. Carrozza, D. Oriti, J. Ryan, M. Smerlak, Melonic phase transition in group field theory, Lett.Math.Phys. 104 (2014) 1003-1017, arXiv:1307.5026 [hep-th]

48. D. Oriti, Group Field Theory as the second quantization of Loop Quantum Gravity, Class.Quant.Grav. 33 (2016) no.8, 085005 (selected for CQG+), arXiv:1310.7786 [gr-qc]

49. S. Gielen, D. Oriti, L. Sindoni, Homogeneous cosmologies as group field theory condensates, JHEP 1406 (2014) 013, arXiv:1311.1238 [gr-qc]

50. G. Calcagni, D. Oriti, J. Thürigen, Spectral dimension of quantum geometries, Class.Quant.Grav. 31 (2014) 135014, arXiv:1311.3340 [hep-th]

51. D. Oriti, M. Raasakka, Asymptotic of the Ponzano-Regge model with metric boundary data, SIGMA 10 (2014) 067, arXiv:1401.5819 [gr-qc]

52. S. Gielen, D. Oriti, Quantum cosmology from quantum gravity condensates: cosmological variables and lattice-refined dynamics, New J. Phys. 16 (2014) 123004, arXiv:1407.8167 [gr-qc]

53. D. Oriti, J. Ryan, J. Thürigen, Group field theories for all loop quantum gravity, New J. Phys. 17 (2015) 023042 (chosen for 'IOP Select'), arXiv:1409.3150 [gr-qc]

54. D. Benedetti, J. Ben Geloun, D. Oriti, Functional Renormalisation Group Approach for Tensorial Group Field Theory: a Rank-3 Model, JHEP 1503 (2015) 084, arXiv:1411.3180 [hep-th]

55. G. Calcagni, D. Oriti, J. Thürigen, Dimensional flow in discrete quantum geometries, Phys.Rev. D91 (2015) 8, 084047, arXiv:1412.8390 [hep-th]

56. D. Oriti, D. Pranzetti, J. Ryan, L. Sindoni, Generalised quantum gravity condensate states for homogeneous geometries and cosmology, Class. Quantum Grav. 32 235016, arXiv:1501.00936 [gr-qc]

57. V. Lahoche, D. Oriti, V. Rivasseau, Renormalization of an abelian Tensorial Group Field Theory: solution at leading order, JHEP 1504 (2015) 095, arXiv:1501.02086 [hep-th]

58. A. Kegeles, D. Oriti, Generalised conservation laws in non-local field theories, J.Phys. A49 (2016) no.13, 135401, arXiv:1506.03320 [hep-th]

59. V. Lahoche, D. Oriti, Renormalization of a tensorial field theory on the homogeneous space $SU(2)/U(1)$, J.Phys. A50 (2017) no.2, 025201, arXiv:1506.08393 [hep-th]

60. J. Ben Geloun, R. Martini, D. Oriti, Functional Renormalization Group analysis of a Tensorial Group Field Theory on $\mathbb{R}^3$, Europhys.Lett. 112 (2015) 3, 31001, arXiv:1508.01855 [hep-th]

61. D. Oriti, D. Pranzetti, L. Sindoni, Horizon entropy from quantum gravity condensates, Phys. Rev. Lett. 116, 211301, arXiv:1510.06991 [gr-qc]

62. J. Ben Geloun, R. Martini, D. Oriti, Functional Renormalisation Group analysis of Tensorial Group Field Theories on $\mathbb{R}^d$, Phys.Rev. D94 (2016) no.2, 024017, arXiv:1601.08211 [hep-th]

63. D. Oriti, L. Sindoni, E. Wilson-Ewing, Emergent Friedmann dynamics with a quantum bounce from quantum gravity condensates, Class.Quant.Grav. 33 (2016) no.22, 224001, arXiv:1602.05881 [gr-qc]

64. D. Oriti, L. Sindoni, E. Wilson-Ewing, Bouncing cosmologies from quantum gravity condensates, Class.Quant.Grav. 34 (2017) no.4, 04LT01, arXiv:1602.08271 [gr-qc]

65. A. Kegeles, D. Oriti, Continuous point symmetries in group field theories, J.Phys. A50 (2017) no.12, 125402, arXiv:1608.00296 [gr-qc]

66. D. Oriti, The universe as a quantum gravity condensate, in 'Testing quantum gravity with cosmology', Comptes Rendus Physique 18 235-245, arXiv:1612.09521 [gr-qc]

67. G. Chirco, D. Oriti, M. Zhang, Group field theory and tensor networks: towards a Ryu-Takanayagi formula in full quantum gravity, Class.Quant.Grav. 35 (2018) no.11, 115011, arXiv:1701.01383 [gr-qc]

68. Y. Ling, D. Oriti, M. Zhang, Group field theory for quantum gravity minimally coupled to a scalar field, Class. Quant. Grav. 34 (2017), no.19, 195001, arXiv:1701.08719 [gr-qc]

69. G. Chirco, F. M. Mele, D. Oriti, P. Vitale, Fisher Metric, Geometric Entanglement and Spin Networks, Phys.Rev. D97 (2018) no.4, 046015, arXiv:1703.05231 [gr-qc]

70. S. Carrozza, V. Lahoche, D. Oriti, Renormalizable Group Field Theory beyond melons: an example in rank four, Phys.Rev. D96 (2017) no.6, 066007, arXiv:1703.06729 [gr-qc]

71. A. Kegeles, D. Oriti, C. Tomlin, Inequivalent coherent representations for group field theory, Class.Quant.Grav. 35 (2018) no.12, 125011, arXiv:1709.00161 [gr-qc]

72. M. De Cesare, D. Oriti, A. Pithis, M. Sakellariadou, Dynamics of anisotropies close to a cosmological bounce in quantum gravity, Class. Quantum Grav. 35 (2018), 015014 (selected for CQG+), arXiv:1709.00994 [gr-qc]

73. S. Gielen, D. Oriti, Cosmological perturbations from full quantum gravity, Phys.Rev. D98 (2018) no.10, 106019, arXiv:1709.01095 [gr-qc]

74. G. Chirco, D. Oriti, M. Zhang, Ruy-Takanayagi formula for symmetric tensor networks, Phys.Rev. D97 (2018) 126002, arXiv:1711.09941 [hep-th]

75. D. Oriti, D. Pranzetti, L. Sindoni, Black holes as quantum gravity condensates, Phys.Rev. D97 (2018) no.6, 066017, arXiv:1801.01479 [gr-qc]

76. I. Kotecha, D. Oriti, Statistical equilibrium in quantum gravity: Gibbs states in group field theory, New J.Phys. 20 073009 (2018), selected for NJP commentary, arXiv:1801.09964 [gr-qc]

77. J. Ben Geloun, T. Koslowski, D. Oriti, A. D. Pereira, Functional Renormalization Group analysis of rank 3 tensorial group field theory: the full quartic invariant truncation , Phys.Rev. D97 (2018) 126018, arXiv:1805.01619 [hep-th]

78. F. Gerhardt, D. Oriti, E. Wilson-Ewing, The separate universe framework in group field theory condensate cosmology, Phys.Rev. D98 (2018) no.6, 066011, arXiv:1805.03099 [gr-qc]

79. G. Chirco, I. Kotecha, D. Oriti, Statistical equilibrium of tetrahedra from maximum entropy principle, Phys.Rev. D99 (2019) no.8, 086011, arXiv:1811.00532 [gr-qc]

80. M. Finocchiaro, D. Oriti, Spin foam models and the Duflo map, Class.Quant.Grav. 37 (2020) no.1, 015010, arXiv:1812.03550 [gr-qc]

81. D. Oriti, G. Rosati, Non-commutative Fourier transform for the Lorentz group via the Duflo map, Phys.Rev. D99 (2019) no.10, 106005, arXiv:1812.08616 [hep-th]

82. G. Chirco, A. Goessmann, D. Oriti, M. Zhang, Group field theory and holographic tensor networks: dynamical corrections to the Ryu-Takanayagi formula, Class.Quant.Grav. 37 (2020) 9, 095011, arXiv:1903.07344 [hep-th]

83. S. Carrozza, S. Gielen, D. Oriti, Editorial: Progress in group field theories and related quantum gravity formalisms, Universe 6 (2020) 1, 19, arXiv:2001.08428 [gr-qc]

84. M. Finocchiaro, D. Oriti, Renormalization of simplicial group field theory models of 4d quantum gravity: new numerical results and some suggestions, to appear in Frontiers in Physics, arXiv:2004.07361 [hep-th]

85. L. Marchetti, D. Oriti, Effective relational cosmological dynamics from quantum gravity, submitted, arXiv:2008.02774 [gr-qc]

86. L. Marchetti, D. Oriti, Quantum fluctuations in the effective relational GFT cosmology, submitted, arXiv:2010.09700 [gr-qc]

87. M. Finocchiaro, Y. Jeong, D. Oriti, Quantum geometric maps and their properties, submitted

88. E. Colafranceschi, D. Oriti, Quantum gravity states, entanglement graphs and 2nd quantized tensor networks, submitted

89. D. Oriti, X. Pang, Accelerated cosmological expansion from quantum gravity, to appear

90. S. Hartmann, D. Oriti, The epistemic character of physical laws. to appear

91. J. Carmona et al., Quantum Gravity phenomenology in the multi-messenger approach, to appear in Prog. Part. Nucl. Phys.

92. D. Oriti, A new route toward analogue gravitational dynamics in quantum fluids?, to appear in Applied Science

B. Conference Papers - refereed

1. D. Oriti, The spinor field in Rindler spacetime: an analysis of the Unruh effect, 3rd ICRA Network Workshop, on "Electrodynamics and magnetohydrodynamics around black holes", Nuovo Cim. B 115, 1005 (2000); gr-qc/9912082;

2. D. Oriti, The Spinor Field in Rindler Spacetime and the Unruh Effect, 9th Marcel Grossman Meeting "Recent developments in General Relativity and Gravitational Physics", Rome (2000);

3. E. R. Livine, D. Oriti, Causality in spin foam models for quantum gravity, XV SIGRAV Conference on general relativity and gravitational physics (2003), published in Recent Developments in Gravitational Physics: Proceedings. Edited by I. Ciufolini, E. Coccia, M. Colpi, V. Gorini, and R. Peron, Taylor & Francis, Boca Raton, Florida, 2006, gr-qc/0302018;

4. D. Oriti, The Feynman propagator for quantum gravity: spin foams, proper time, orientation, causality and timeless ordering, DICE 2004 Workshop, Piombino, Italy, Braz. J. Phys. 35, 481 (2005), gr-qc/0412043;

5. D. Oriti, Quantum gravity as a group field theory: a sketch,4th Meeting on "Constrained Dynamics and Quantum Gravity", Cala Gonone, Italy (2005), J.Phys.Conf.Ser. 33 (2006) 271-278, gr-qc/0512048;

6. D. Oriti, A quantum field theory picture of simplicial geometry and the emergence of spacetime, DICE 2006 workshop, Piombino, Italy, J. Phys. Conf. Ser. 67, 012052 (2007), hep-th/0612301;

7. D. Oriti, A combinatorial and field theoretic path to quantum gravity: The new challenges of group field theory, conference on "Combinatorics and Physics", MPIM Bonn, Germany (2007), *Combinatorics and Physics* - K. Ebrahimi-Fard, M. Marcolli, W. D. van Suijlekom, Editors - AMS, 2011, 465 pp.; arXiv:0709.4157;

8. D. Oriti, Group field theories as the microscopic description of the quantum spacetime fluid: a new perspective on the continuum in quantum gravity, conference "From quantum to emergent gravity: theory and phenomenology", Trieste, Italy (2007), PoS QG-PH (2007) 030, arXiv:0710.3276;

9. D. Oriti, Emergent non-commutative matter fields from Group Field Theory models of quantum spacetime, AEI-2009-030, DICE 2008 workshop, J. Phys. Conf. Ser. 174, 012047 (2009), arXiv:0903.3970 [hep-th]

10. D. Oriti, The group field theory approach to quantum gravity: some recent results, AEI-2009-120, XXV Max Born symposium: "The Planck Scale", Wroclaw, June 2009, arXiv:0912.2441 [hep-th]

11. A. Baratin, D. Oriti, Ten questions on group field theory (and their tentative answers), Loops '11 Conference, J.Phys.Conf.Ser. 360 (2012) 012002, arXiv:1112.3270 [gr-qc]

12. D. Oriti, The quantum geometry of tensorial group field theories, XXIX Colloquium on Group-theoretical Methods in Physics, Chern Institute for Mathematics, Nankai University, Tian Jin, China, August 2012, arXiv:1211.5714 [hep-th]
13. D. Oriti, Non-commutative quantum geometric data in group field theories, Corfu Summer Institute workshop "Non-commutative Field Theory and Gravity", Fortsch.Phys. 62 (2014) 841-854, arXiv:1405.1830 [hep-th]

C. Papers in collective books (refereed)

1. "Manifold" entry for the "Concise Encyclopaedia of Supersymmetry and Non-Commutative structures in Mathematics and Physics", Eds. J. Bagger, S. Duplij, W. Siegel, Kluwer Academic Publishers, Dordrecht (2004);
2. D. Oriti, Quantum Gravity as a quantum field theory of simplicial geometry, in Fauser, B. (ed.) et al.: "Quantum gravity"101-126, Birkhaeuser, Basel (2007), gr-qc/0512103;
3. D. Oriti, The group field theory approach to Quantum Gravity, in: D. Oriti (editor), *Approaches to Quantum Gravity*, Cambridge University Press, Cambridge (2009), gr-qc/0607032;
4. S. Gielen, D. Oriti, Discrete and continuum third quantization of Gravity, published in *Quantum Field Theory and Gravity: Conceptual and Mathematical Advances in the Search for a Unified Framework*, Finster, F.; Müller, O.; Nardmann, M.; Tolksdorf, J.; Zeidler, E. (Editors.), Springer, Basel, 380 p. (2012), arXiv:1102.2226 [gr-qc]
5. D. Oriti, The microscopic dynamics of quantum space as a group field theory, in: *Foundations of space and time*, G. Ellis, J. Marugan, A. Weltman (eds.), Cambridge University Press (2012), arXiv:1110.5606 [hep-th]
6. D. Oriti, Group Field Theory and Loop Quantum Gravity, in *Loop Quantum Gravity*, A. Ashtekar, J. Pullin (eds), World Scientific , arXiv:1408.7112 [gr-qc]
7. D. Oriti, No alternative to proliferation, in 'Why trust a theory?', eds: R. Dardashti, R. Dawid, K. Thebault, Cambridge University Press (2018), arXiv:1705.09858 [physics.hist-ph]
8. D. Oriti, Spacetime as a quantum many-body system, in 'Many-body approaches at different scales : a tribute to Norman H. March on the occasion of his 90th birthday', G. G. N. Angilella and C. Amovilli, editors (New York : Springer, 2018), arXiv:1710.02807 [gr-qc]
9. D. Oriti, The Bronstein hypercube of quantum gravity, in N. Huggett, K. Matsubara, C. Wütrich (eds), 'Beyond Spacetime: The Foundations of Quantum Gravity', Cambridge University Press (2020), arXiv:1803.02577 [physics.hist-ph]
10. D. Oriti, Levels of spacetime emergence in quantum gravity, in N. Huggett, B. Le Bihan, C. Wütrich (eds), 'Philosophy beyond spacetime', Oxford University Press (2020), arXiv:1807.04875 [physics.hist-ph]
11. J. W. Barrett, D. Oriti, R. M. Williams, Tullio Regge's legacy: Regge calculus and discrete gravity, in "Tullio Regge: an eclectic genius, from quantum gravity to computer play", Eds. L Castellani, A. Ceresole, R. D'Auria and P. Frè (World Scientific, 2019), arXiv:1812.06193 [gr-qc]

D. Books

- D. Oriti, editor, *Approaches to Quantum Gravity - Towards a new understanding of space, time and matter*, 604 p., Cambridge University Press, Cambridge (2009), ISBN-10: 0521860458, ISBN-13: 978-0521860451
- S. Carrozza, S. Gielen, D. Oriti, *Progress in group field theory and related quantum gravity formalisms*, (printed version of special issue of journal Universe), MDPI, 2020
- F. Girelli, D. Oriti, *The quantum geometry of group field theory*, to appear for Springer (contract signed) in 2021
- J. Ben Geloun, S. Carrozza, D. Oriti, *Group field theory renormalization: perturbative and non-perturbative results*, to appear for Springer (contract signed) in 2021
- S. Gielen, D. Oriti, D. Pranzetti, L. Sindoni, *Group field theory condensates: cosmology and quantum black holes*, to appear for Springer (contract signed) in 2021
- V. Lam, D. Oriti, *Conceptual challenges for Space and Time in Quantum Gravity*, to appear for Springer (contract signed) in 2021

E. Popular articles and outreach publications

- D. Oriti, "Gravita' Quantistica"(Quantum gravity) and "Teorie fisiche unificate"(Unified Physical Theories) entries for the enciclopaedia: *Enciclopedia del Novecento: Scienza e Tecnologia*, Motta Editore, 2007 (in italian).
- D. Oriti, On the depth of quantum space, 3rd prize essay in the 3rd FQxi essay competition: 'Is reality digital or analog?', arXiv:1107.4534 [physics.pop-ph]
- D. Oriti, What is hidden in an infinity, on the I.L.Q.G.S. blog at http://ilqgs.blogspot.com/
- D. Oriti, How did time evolve?, on 'TheQuestion.ru' popular science website (in russian)
- D. Oriti, Playing with the building blocks of space, 'Classical and Quantum Gravity Plus Insight', available at http://cqgplus.com/2016/09/26/cqg-insight-playing-with-the-building-blocks-of-space
- M. De Cesare, D. Oriti, A. Pithis, M. Sakellariadou, 'Bouncing a cosmic brew', to appear in 'Classical and Quantum Gravity Plus Insight', available at https://cqgplus.com/2017/12/11/bouncing-a-cosmic-brew/
- D. Oriti, 'From the atoms of space to cosmology', in 'Albert Einstein Institute quadriannual report', Max Planck Society (2018)
- D. Oriti, 'L'universo emergente della gravita' quantistica'(in italian), Ithaca: Viaggio nella Scienza, n. XII (2018), p. 145-160, available at $http://ithaca.unisalento.it/nr-12_2018/articolo_I Ip_1 0.pdf$, arXiv:1811.12458 [physics.pop-ph]
- D. Oriti, 'Space and time are emergent. Get used to it!', to appear in 'Inference: International Review of Science', online journal (inference-review.com)
- D. Oriti, Quantum Gravity from within: my advice to physics students, to appear in Physics Insider (PhysicsInsider.com)

Francesco Pace / Curriculum Vitae

Post-doc Positions

DIFA, University of Bologna, Italy; January 2021 - December 2021 (Line manager: Prof Lauro Moscardini)
JBCA, University of Manchester, UK; April 2020 - December 2020 (Line manager: Prof Jens Chluba)
JBCA, University of Manchester, UK; October 2014 - March 2020 (Line manager: Prof Richard Battye)
ICG, University of Portsmouth, UK; October 2011 - September 2014 (Line manager: Prof Robert Crittenden)
ITA, Universität Heidelberg, Germany; November 2007 - September 2011 (Line manager: Prof Matthias Bartelmann)

Academic education

Institut für Theoretische Astrophysik, Universität Heidelberg

Ph.D. (Doktor der Naturwissenschaften), January 2004 - July 2007.

- Dissertation Topic: "On the detection of Galaxy Clusters"
- Advisor: Prof. Matthias Bartelmann

Università degli studi di Bologna, Italy

Graduated with the mark of 110/110 *magna cum laude*, July 2003

- Master Thesis Dissertation topic: "Gravitational lensing effects on high-redshift quasars luminosity function"
- Advisor: Prof. Lauro Moscardini

Scientific recognition

Italian National Academic Qualification (ASN) for the position of associate professor in theoretical physics 02/A2 - FIS/02 (28/03/2018 - 28/03/2027) and in astrophysics 02/C1 - FIS/05 (23/12/2019 - 23/12/2028)

Publications

48 published papers on refereed journals; 1 paper submitted to JCAP; h-index = 19 (nasa ads)

Research Interests

Computational astrophysics; cosmological structure formation; raytracing simulations; theoretical models of dark energy & modified gravity; analytical methods in structure formation; hydrodynamical simulations; filtering techniques; galaxy clusters evolution; weak lensing; linear and non-linear perturbations in dark energy and modified gravity models; axion dark matter

Languages

Italian (native); English good (reading, writing, speaking); German fair (speaking)

Programming skills

Experienced with FORTRAN 90, 95, 2003, 2008; C; C++; Basic knowledge of MPI, OpenMP, Python
Good knowledge of LaTeX, OpenOffice; Operating systems: Linux, Mac, Windows

Teaching Experience

Co-Lecturer for the course of "Advanced Mechanics" for the Physics Degree at the University of Manchester, UK
2-20 Mar 2020, 6 classes on the topic "Dynamics of rigid bodies"

Visiting Lecturer at the physics department of the University of Lisbon, Portugal
6-17 May 2019, grant from the Erasmus+ Staff Mobility Program (16-hour course)
Numerical methods for cosmology: from early to late times

Invited **Lecturer at XL Heidelberg Physics Graduate Days**, 9-13 Apr 2018
Numerical methods for cosmology: from early to late times

Undergraduate Lectures at JBCA, University of Manchester, UK
Quantum mechanics, Electromagnetism, Waves and fields, Lagrangian dynamics; Thermal and Statistical Physics, Fundamentals of Solid State Physics, Wave Optics

Graduate Lectures at ICG, University of Portsmouth, UK
Core Course on General Relativity; Special Course on Numerical simulations

Undergraduate Lectures at the Universität Heidelberg, Germany
Quantum mechanics, Electrodynamics, General Relativity (head-tutor)

Students supervision

3 Ph.D. students, 5 master students, 3 summer students

PhD Thesis Co-supervision

- Sankarshana Srinivasan, "Non-linear evolution in f(R) models", Oct 2018 - , JBCA, Manchester, UK
- Damien Trinh, "Equations of state in Vector-Tensor Theories", Oct 2015 - Mar 2019, JBCA, Manchester, UK
- Sandro Ciarlariello, "Intrinsic correlations between shape and size of galaxies", Oct 2012 - May 2016, ICG, Portsmouth, UK

Diploma Thesis Co-supervision

- Sankarshana Srinivasan, "Detection of axion-like particles from astrophysical and cosmological sources", Oct 2017 - Sep 2018, Manchester, UK
- Sven Meyer, "Relativistic Virialization in the spherical collapse model", Mar 2011 - Mar 2012, ITA, Heidelberg, Germany
- Eleonora Sarli (visiting student from Pavia University), "Accretion flows and light propagation near rotating black holes", Nov 2009 - Feb 2010, ITA, Heidelberg, Germany
- Lavinia Heisenberg, "A critical assessment of the PINOCCHIO model", Nov 2008 - Nov 2009, ITA, Heidelberg, Germany
- Mischa Gerstenlauer, "Structure Formation in Extended Quintessence Models", 2008, ITA, Heidelberg, Germany

Summer students co-supervision

- Zhongyu Zhang, "EFT formalism applied to Horndeski Theory", August 2016

- Vasil Dimitrov, "Model Independent Parametrization of Dark Sector Perturbations Applicable to the Horndeski Theory", July 2015
- Thomas J. Clarke, "Dark energy models with constant w_ϕ", July 2015

Organisational / managerial skills

- Conferences co-organiser: Parallel section at NAM2014: "How galaxies see clusters, how clusters see galaxies", Portsmouth, UK, 23-26 Jun 2014
- Schools' co-organiser: IV winter school in Passo del Tonale, Italy, 5-10 Dec 2010
- Seminar's organiser: Weekly seminar for the discussion of the preprint papers of the week, ITA, Universität Heidelberg, Germany

Referee

Chilean National Science and Technology Commission (2017), MNRAS; A&SS; Journal of Gen. Rel. Gravit.; EPJA; EPJC; Physics of the Dark Universe (PDU); Communications in Theoretical Physics; Physical Review D; Physical Review Letters, IJGMMP. Guest editor in Advances in Astronomy for special issue: "Theoretical, Observational, and Simulation Properties of Models beyond ΛCDM"

Grants & Fellowships

- Erasmus+ Staff Mobility Program (£2000)
- Visiting fellowship to the Institute of Cosmology & Gravitation, Portsmouth (10/2014 - 09/2016)
- Travel grant for scientific cooperation between Italy and Ukraine

Conferences & Presentations

9 schools & 28 international conferences attended
21 talks given at international conferences; 21 invited talks at universities and 1 invited talk at an international conference

9 Schools attended

- **XXIV Heidelberger Graduiertenkurse Physik**
  Heidelberg, Germany, 6-9 Apr, 2010
- **XVIII Heidelberger Graduiertenkurse Physik**
  Heidelberg, Germany, 10-13 Apr, 2007
- **Physics School:** *Dark Matter and Energy*
  Bad Honnef, Germany, 16-21 Jul, 2006
- **XVI Heidelberger Graduiertenkurse Physik**
  Heidelberg, Germany, 18-21 Apr, 2006
- **XV Heidelberger Graduiertenkurse Physik**
  Heidelberg, Germany, 10-14 Oct, 2005
- **NOVICOSMO summer school**
  The Dark and the Luminous Sides of the formation of structures
  Novigrad, Croatia, (HR), 5-17 Sep, 2005
- **XIII Heidelberger Graduiertenkurse Physik**
  Heidelberg, Germany, 11-14 Oct, 2004

- **Astrophysics National School**
  Gravitational lensing - Chaos and its astrophysical implications
  Bertinoro (FC), Italy, 16-21 May, 2004
- **XII Heidelberger Graduiertenkurse Physik**
  Heidelberg, Germany, 13-16 Apr, 2004

28 Conferences & workshops

- **UK COSMO**
  Lancaster, UK, 8-9 Jan, 2020
- **30th Texas Symposium on Relativistic Astrophysics**
  Portsmouth, UK, 15-20 Dec, 2019
- **Cosmo19**
  Aachen, Germany, 02-06 Sep, 2019
- **Beyond General Relativity, Beyond Cosmological Standard Model**
  Warsaw, Poland, 1-5 Jul, 2019
- **First European Physical Society Conference on Gravitation**
  Rome, Italy, 19-21 Feb, 2019
- **New Directions in Theoretical Physics**
  Edinburgh, UK, 9-11 Jan, 2019
- **CosmoBack From inhomogeneous gravity to cosmological back-reaction: Theoretical opportunity? Observational evidence?**
  Marseilles, France, 28-31 May, 2018
- **Gravity beyond Einstein: Quo vadimus?**
  Edinburgh, UK, 24-25 Jan, 2018
- **NAM2016**
  Nottingham, UK, 28 Jun, 2016
- **UK COSMO**
  Brighton, UK, 10 Jun, 2016
- **UK COSMO**
  Edinburgh, UK, 11-12 Nov, 2015
- **COSMO 2015**
  Warsaw, Poland, 7-11 Sep, 2015
- **NAM2015**
  Llandudno, UK, 5-9 Jul, 2015
- **UK COSMO**
  London, UK, 27 Feb, 2015
- **2014 Higgs Symposium: New Horizons in Particle Cosmology** Edinburgh, UK, 30 Jun-2 Jul, 2014
- **NAM2014**
  Portsmouth, UK, 23-26 Jun, 2014
- **COSMO 2013**
  Cambridge, UK, 2-6 Sep, 2013

- **Cosmological tests of gravity**
  Oxford, UK, 13-15 Mar, 2013
- **UK COSMO**
  London, UK, 12 Mar, 2013
- **Gravity beyond Einstein**
  London, UK, 27 Sep, 2012
- **UK COSMO**
  Brighton, UK, 27 Mar, 2012
- **DUEL meeting**
  Sorrento, Italy, 27-30 Oct, 2010
- **eRosita Workshop**
  Garching bei München, Germany, 15 Dec, 2009
- **SZE Workshop**
  Bonn, Germany, 15-17 Jul, 2009
- **DUEL meeting**
  Heidelberg, Germany, 14-16 Jan, 2009
- **Lensing - X-rays mass determination workshop**
  Garching bei München, Germany, 30 Jul, 2008
- **DUEL meeting**
  Victoria, Canada, 25-27 Jun, 2008
- **DUEL meeting**
  Leiden, Netherlands, 14-16 Jan, 2008

Presentations 21 talks at international conferences and workshops

- "*The effect of the quasi-static approximation on cosmological observables*"
  UK COSMO, Lancaster, UK, 8 Jan, 2020
- "*The effect of the quasi-static approximation on cosmological observables*"
  30th Texas Symposium on Relativistic Astrophysics, Portsmouth, UK, 18 Dec, 2019
- Poster and slide presentation "*Dark sector evolution in Horndeski models*"
  COSMO19, Aachen, Germany, 4 Sep, 2019
- Poster and slide presentation "*Dark sector evolution in Horndeski models*"
  Beyond General Relativity, Beyond Cosmological Standard Model, Warsaw, Poland, 2 Jul, 2019
- "*Dark sector evolution in Horndeski models*"
  First EPS Conference on Gravitation, Rome, Italy, 20 Feb, 2019
- "*Do cosmological data rule out $f(R)$ with $w \neq -1$?*"
  CosmoBack2018, University of Marseilles, France, 30 May, 2018
- "*Applications of the EoS formalism to $f(R)$ models*"
  PONT2017, Avignon, France, 25 Apr, 2017

- "*Approximation of the potential in scalar field models*"
  NAM 2016, Nottingham, UK, 28 Jun, 2016
- "*Spherical Collapse Model with Tidal Shear*"
  UK COSMO, University of Sussex, Brighton, 10 Jun, 2016
- "*Reliability of analytical and numerical techniques on lensing studies*"
  UK COSMO, Edinburgh, 11 Nov, 2015
- "*Structure formation in fast transition UDM models*"
  COSMO 2015, Warsaw, Poland, 10 Sep, 2015
- "*Structure formation in fast transition UDM models*"
  NAM 2015, Llandudno, UK, 7 Jul, 2015
- "*Raytracing simulations of coupled dark energy models*"
  Higgs Symposium 2014, Edinburgh, UK, 30 Jun, 2014
- "*Structure formation in non-minimally coupled dark energy models*" COSMO 2013, Cambridge, UK, 2 Sep, 2013
- "*A comparison of structure formation in minimally and non-minimally coupled quintessence models*"
  UK COSMO, London, 12 Mar, 2013
- "*Effects of a varying G on structure formation*"
  ICG, Portsmouth, 18 Jan, 2012
- "*Hydrodynamical Simulations and light-cones for the eROSITA satellite*"
  MPE, Garching bei München, 7 Apr, 2011
- "*Effects of primordial non-Gaussianity on weak-lensing statistics*"
  DUEL workshop, Edinburgh, 21 Jul, 2010
- "*Halo selection functions from simulations*"
  DUEL workshop, Heidelberg, January 15, 2009
- "*Detecting galaxy clusters in X-ray, SZ and lensing data: selection effects*"
  MPE, Garching bei München, July 29, 2008
- "*Weak lensing in non-Gaussian scenarios*"
  DUEL workshop, Victoria, June 26, 2008

Visitor

Oxford University; Kyiv Observatories; The University of Bologna, Trieste, Catania, Heidelberg, Lisbon, Lancaster

- Lancaster University, Lancaster, UK, (9/01/2020 - 10/01/2020)
- The University of Lisbon, Lisbon, Portugal (11/07/2016 - 15/07/2016; 06/05/2019-17/05/2019)
- The University of Heidelberg, Heidelberg, Germany (09/10/2017 - 13/10/2017; 09/04/2018 - 13/04/2018)
- The University of Catania, Catania, Italy (03/11/2014 - 07/11/2014)
- The University of Trieste, Trieste, Italy (26/04/2010 - 30/04/2010; 27/01/2014 - 31/01/2014)
- The University of Bologna, Bologna, Italy (17/06/2013 - 20/06/2013)

- Kyiv Observatory, Kyiv, Ukraine (01/05/2013 - 05/05/2013)
- Oxford University, Oxford, UK (04/06-2008 - 06/06/2008)

Memberships Euclid Consortium, Theory Working Group: WP1+2 (Dark energy & Modified Gravity); WP3 (Dark Matter); WP4 (Initial conditions); WP6 (extended forecasts); WP7 (Analytical methods for non-linear perturbations); WP9 (Relativistic effects)

Leadership roles in international collaborations Co-leader of the forecast paper for the nDGP, JBD, k-mouflage models for WP1 & WP6

Curriculum Vitae

Carlo Pagani

Posizioni in Ambito Accademico

2019 – oggi	Centre national de la recherche scientifique (CNRS – LPMMC), Université Grenoble Alpes, Grenoble (Francia) Postdoc (gruppo della Prof.ssa Léonie Canet)
2015 – 2019	Institut für Physik, Johannes-Gutenberg-Universität, Mainz (Germania) Postdoc (gruppo del Prof. Martin Reuter)
2014 – 2015	Institut für Physik, Johannes-Gutenberg-Universität, Mainz (Germania) Postdoc (borsa di studio "Blanceflor Fellowship", gruppo del Prof. Martin Reuter)

Istruzione e Formazione

2010 – 2014	SISSA, Scuola Internazionale Superiore di Studi Avanzati, Trieste (Italia) Dottorato di Ricerca in Fisica (cum laude)
Supervisore	Prof. Roberto Percacci, SISSA
Titolo di Tesi	*"Applications of the functional renormalization group in curved spacetime"*
2008 – 2010	Università di Trieste – Dipartimento di Fisica, Trieste (Italia) Laurea magistrale in Fisica, curriculum di Fisica Teorica (110/110 e lode)
Supervisore	Prof. Ennio Gozzi, Università di Trieste – Dipartimento di Fisica Teorica
Titolo di Tesi	*"Superfields and local invariances in classical mechanics"*
2005 – 2008	Università di Trieste – Dipartimento di Fisica, Trieste (Italia) Laurea Triennale in Fisica (110/110 e lode)
Supervisore	Prof. Ennio Gozzi, Università di Trieste – Dipartimento di Fisica Teorica
Titolo di Tesi	*"Introduzione ai gruppi di Lie e gruppo di Lorentz"*

Interessi scientifici

I miei interessi scientifici riguardano:

- la gravità quantistica e il gruppo di rinormalizzazione (scenario di sicurezza asintotica);
- i sistemi fuori equilibrio (con particolare attenzione ai fenomeni turbolenti);
- gli aspetti formali e le applicazioni del gruppo di rinormalizzazione funzionale (FRG).

Di seguito descrivo i miei contributi in questi campi (i lavori citati fanno riferimento all'elenco che si trova nella sezione "Pubblicazioni Scientifiche").

Gravità quantistica e il gruppo di rinormalizzazione

Nel 1979 Weinberg propose uno scenario in cui la gravità è non perturbativamente rinormalizzabile grazie ad un punto fisso UV attrattivo non-Gaussiano (tale situazione fu battezzata "sicurezza asintotica"). La presenza di un tale punto fisso per la gravità fu notata in dimensione $d = 2 + \epsilon$. Questo scenario per la gravità quantistica venne ripreso più recentemente quando un'equazione RG non-perturbativa per la gravità venne proposta (Reuter 1996).

La mia attività in questo campo concerne diversi aspetti. Durante il dottorato, sotto la supervisione di Roberto Percacci, ho lavorato sulla dimensione anomala del gravitone [3] e sulla presenza di punti fissi per teorie dove l'invarianza di Weyl è preservata grazie ad un dilatone o ad un vettore [2,6]. Durante il mio postdoc a Mainz, ho continuato a sviluppare la mia ricerca nel campo della gravità quantistica studiando la rinormalizzazione di torsione e non-metricità [9], l'entaglement entropy [15] e l'indipendenza dal background [19,22]. Inoltre, ho iniziato a studiare alcuni operatori geometrici, come la lunghezza geodetica, al fine di poter confrontare le previsioni della sicurezza asintotica con altri scenari per la gravità quantistica [11,17,18,20].

Sistemi fuori equilibrio e turbolenza

Dopo aver concluso il dottorato, ho iniziato a lavorare all'applicazione di alcuni metodi della teoria dei campi ai sistemi fuori equilibrio, con particolare attenzione ai fenomeni turbolenti.

Una delle sfide teoriche più importanti in turbolenza è la predizione dello scaling anomalo delle correlazioni di differenze di velocità a tempi uguali, i.e., $\langle [(\vec{v}(t,x) - \vec{v}(t,0)) \cdot \vec{x} / \|\vec{x}\|]^n \rangle$, dette funzioni di struttura. Nell'ambito del formalismo FRG ho sviluppato delle tecniche per studiare questi fenomeni considerando un semplice modello di trasporto turbolento [8]. Ho iniziato inoltre una collaborazione con la prof.ssa Léonie Canet (Univ. di Grenoble, Francia) per lo studio delle proprietà temporali e di scaling di altri sistemi turbolenti [16]. Da un punto di vista più formale, ho studiato la relazione fra la teoria dei campi fuori equilibrio (formalismo di Schwinger-Keldysh) e la formulazione a path integral della meccanica quantistica à la Moyal, considerando anche le recenti super estensioni [12,23]. Ho inoltre studiato l'applicazione del path integral alla meccanica classica [1,L1].

Aspetti formali e applicazioni del gruppo di rinormalizzazione non perturbativo

Il programma Wilsoniano di rinormalizzazione può essere implementato in teoria dei campi direttamente a vari funzionali quali l'azione (Wilson, Kogut 1974; Polchinski 1984) e l'azione effettiva (Wetterich 1993). La dipendenza di questi funzionali dal cutoff è determinata da equazioni funzionali esatte. L'applicazione pratica di tali equazioni richiede l'utilizzo di schemi di approssimazione.

Mi sono interessato a diversi aspetti formali riguardanti il gruppo di rinormalizzazione funzionale (FRG). Durante il dottorato ho studiato la relazione del FRG con la funzione c di Zamolodchikov [5] e il gruppo di rinormalizzazione locale [7]. In seguito ho iniziato a studiare gli operatori composti nel formalismo FRG [10]. In quest'ottica, ho iniziato una collaborazione con il prof. Hidenori Sonoda (Univ. di Kobe, Giappone) per lo studio dell'"operator product expansion" mediante il FRG, utilizzando sia gli operatori composti [13,21] che un approccio geometrico allo spazio delle teorie [14].

Premi e Borse di Studio

Grants	"Non-perturbative approximation schemes for the operator product expansion via the functional renormalization group" DFG grant PA 3040/3-1 (2018/2019).
Fellowships	"Blanceflor" Fellowship (2014/2015).
	"Luciano Fonda" Fellowship (2008/2009; 2009/2010).

Pubblicazioni Scientifiche

Articoli

23. E. Gozzi, C. Pagani e M. Reuter,
"*The Response Field and the Saddle Points of Quantum Mechanical Path Integrals*",
sottomesso, arXiv:2004.08874.

22. C. Pagani e M. Reuter,
"*Why the Cosmological Constant Seems to Hardly Care About Quantum Vacuum Fluctuations: Surprises From Background Independent Coarse Graining*",
Front. in Phys. 8 (2020) 214.

21. C. Pagani e H. Sonoda,
"*Operator product expansion coefficients in the exact renormalization group formalism*",
Phys.Rev.D 101 (2020) 10, arXiv:2001.07015.

20. M. Becker, C. Pagani e O. Zanusso,
"*Fractal geometry of higher derivative gravity*",
Phys.Rev.Lett. 124 (2020) 15, 151302, arXiv:1911.02415.

19. C. Pagani e M. Reuter,
"*Background Independent Quantum Field Theory and Gravitating Vacuum Fluctuations*",
Annals Phys. 411 (2019) 167972, arXiv:1906.02507.

18. M. Becker e C. Pagani,
"*Geometric operators in the Einstein-Hilbert truncation*",
Universe 5 (2019) 75.

17. M. Becker e C. Pagani,
"*Geometric operators in the asymptotic safety scenario for quantum gravity*",
Phys. Rev. D 99 (2019) 066002, arXiv:1810.11816.

16. M. Tarpin, L. Canet, C. Pagani e N. Wschebor,
"*Stationary, isotropic and homogeneous two-dimensional turbulence: a first non-perturbative renormalization group approach*",
J. Phys. A 52 (2019) 085501, arXiv:1809.00909.

15. C. Pagani e M. Reuter,
"*Finite Entanglement Entropy in Asymptotically Safe Quantum Gravity*",
JHEP 1807 (2018) 039, arXiv:1804.02162.

14. C. Pagani e H. Sonoda,
"*Geometry of the theory space in the exact renormalization group formalism*",
Phys. Rev. D 97 (2018) 025015, arXiv:1710.10409.

13. C. Pagani e H. Sonoda,
"*Products of composite operators in the exact renormalization group formalism*",
PTEP 2018, 023B02 (2018), arXiv:1707.09138.

12. C. Pagani,
"*Note on the super-extended Moyal formalism and its BBGKY hierarchy* ",
Annals Phys. 385 (2017) 695, arXiv:1705.06964.

11. C. Pagani e M. Reuter,
"*Composite operators in Asymptotic Safety*",
Phys. Rev. D 95 (2017) 066002, arXiv:1611.06522.

10. C. Pagani,
"*Note on scaling arguments in the effective average action formalism*",
Phys. Rev. D 94 (2016) 045001, arXiv:1603.07250.

9. C. Pagani e R. Percacci,
"*Quantum gravity with torsion and non-metricity*",
Class. Quant. Grav. 32 (2015) 195019, arXiv:1506.02882.

8. C. Pagani,
"*Functional Renormalization Group approach to the Kraichnan model*",
Phys. Rev. E 92 (2015) 033016, Add.: Phys. Rev. E 97 (2018) 049902, arXiv:1505.01293.

7. A. Codello, G. D'Odorico e C. Pagani,
"*Functional and Local Renormalization Groups*",
Phys. Rev. D 91 (2015) 125016, arXiv:1502.02439.

6. C. Pagani e R. Percacci,
"*Quantization and fixed points of non–integrable Weyl theory*",
Class. Quant. Grav. 31 (2014) 115005, arXiv:1312.7767.

5. A. Codello, G. D'Odorico e C. Pagani,
"*A functional RG equation for the c-function*",
JHEP 40 (2014) 1407, arXiv:1312.7097.

4. E. Cattaruzza, E. Gozzi e C. Pagani,
"*Entanglement, Superselection Rules and Supersymmetric Quantum Mechanics*",
Phys. Lett. A 378 (2014) 2501, arXiv:1308.6212.

3. A. Codello, G. D'Odorico e C. Pagani,
"*Consistent closure of renormalization group flow equations in quantum gravity*",
Phys. Rev. D(R) 89 (2014) 081701, arXiv:1304.4777.

2. A. Codello, G. D'Odorico, C. Pagani e R. Percacci,
"*The Renormalization Group and Weyl-invariance*",
Class. Quant. Grav. 30 (2013) 115015, arXiv:1210.3284.

1. E. Gozzi e C. Pagani,
"*Universal local symmetries and non-superposition in classical mechanics*",
Phys. Rev. Lett. 105 (2010) 150604, arXiv:1006.3029.

Atti di Convegni

C1. G. D'Odorico, A. Codello e C. Pagani,
"*The Background Effective Average Action Approach to Quantum Gravity*",
in the proceedings of the "1st Karl Schwarzschild Meeting on Gravitational Physics", Springer Proc. Phys. 170 (2016) 233.

Libri

L1. E. Gozzi, E. Cattaruzza e C. Pagani,
"*Path Integrals for Pedestrians*",
World Scientific Publishing, Singapore (2016).

L'elenco aggiornato delle pubblicazioni è disponbile al link: https://inspirehep.net/authors/1301159.

Seminari e Conferenze

Interventi su invito

- "OPE coefficients from FRG", Seminario a LPTMC – Sorbonne Université, 11 febbraio 2020, Parigi, Francia.
- "Functional renormalization group approach to 2D turbulence", Conferenza: FRGIM - Functional and Renormalization-Group methods, 16–20 settembre 2019, Trento, Italia.
- "Geometry of the theory space and the functional renormalization group", Conferenza: Gravity and Other Fields under the Volcano, 10–12 giugno 2019, Catania, Italia.
- "Scalar turbulence, anomalous scaling, and the functional renormalization group", Seminario a Kobe University, 24 aprile 2019, Kobe, Giappone.
- "Geometric operators in Asymptotic Safety", Workshop: Quantum Fields – from Fundamental Concepts to Phenomenological Questions, 26–28 settembre 2018, Mainz, Germania.
- "Entanglement entropy in Asymptotic Safety", Conferenza: ERG 2018, 09–13 luglio 2018, Parigi, Francia.
- "Scaling of geometric operators in Asymptotic Safety", Workshop: Quantum spacetime and the renormalization group, 18–22 giugno 2018, Bad Honnef, Germania.
- "Intermittency in the Kraichnan model from a functional renormalization group perspective", Workshop: Turbulence et polaritons, 7 giugno 2017, Grenoble, Francia.
- "Composite operators in Asymptotic Safety", Workshop: Quantum spacetime and the renormalization group, 13–17 febbraio 2017, Leiden, Paesi Bassi.
- "Functional renormalization group and composite operators, some concepts and applications", Seminario all'Università di Jena, 19 ottobre 2017, Jena, Germania.
- "Composite operators in Asymptotic Safety", Seminario a Radboud University, 9 dicembre 2016, Nijmegen, Paesi Bassi.
- "Anomalous scaling in a simple model of scalar turbulence", Seminario all'Università di Heidelberg, 23 novembre 2016, Heidelberg, Germania.

Ulteriori interventi

- "Functional renormalization group approach to scalar turbulence", Conferenza online: ERG 2020, 2–6 novembre 2020.
- "Functional renormalization group approach to spatiotemporal correlation functions of passively advected scalar fields", Seminario online: John Hopkins/Lyon working seminar, 4 giugno 2020.
- "Scalar turbulence, anomalous scaling, and FRG", Seminario al LPMMC, 22 gennaio 2020, Grenoble, Francia.
- "Quantum gravity with torsion and non-metricity", Seminario online: Asymptotic Safety, 29 maggio 2015.
- "The functional RG and the c-function", First FLAG meeting: The Quantum and the Gravity, 28–30 maggio 2014, Bologna, Italia.
- "The functional RG and the c-function", Seminario all'Università di Heidelberg, 11 dicembre 2013, Heidelberg, Germania.
- "The functional RG and the c-function", Seminario all'Università di Mainz, 9 dicembre 2013, Mainz, Germania.
- "Consistent closure of RG flow equations in quantum gravity", Conferenza: 2nd Mediterranean Conference on Classical and Quantum Gravity (2nd MCCQG), 9–15 giugno 2013, Veli Lošinj, Croazia.

Ulteriori conferenze e workshop

- Workshop: Turbulence: reunion of GdR, 21–23 ottobre, Lione, Francia.
- Workshop: 3rd FLAG meeting: the Quantum and the Gravity, 13–14 giugno, Catania, Italia.
- Workshop: Turbulent cascades II, 5–7 dicembre 2017, Lione, France.
- Conferenza: ERG 2016, 19–23 settembre 2016, Trieste, Italia.
  Poster "Functional Renormalization Group approach to the Kraichnan model".
- Workshop: NEQFLUIDS2016 – Classical and Quantum Fluids Out of Equilibrium, 13–16 luglio 2016, Grenoble, Francia.
  Poster "Functional renormalization group approach to the Kraichnan model".
- Workshop: Strongly-Interacting Field Theories, 5–7 novembre 2015, Jena, Germania.
  Poster "Functional and local renormalization groups".
- Conferenza: ERG 2014, 22–26 settembre 2014, Lefkada, Grecia.
  Poster "Quantum gravity with torsion and non-metricity".
- Workshop: Renormalization group approaches quantum gravity, 22–25 aprile 2014, Perimeter Institute, Waterloo, Ontario, Canada.
- Conferenza: ERG 2012, 3–7 settembre 2012, Aussois, Francia.
  Poster: "Weyl invariance and the functional RG".

Periodi di Visita

- Gruppo del Prof. H. Sonoda, 3 aprile – 18 maggio 2019, Kobe, Giappone.
- Gruppo della Prof.ssa L. Canet, 3 – 8 dicembre 2017, Grenoble, Francia.
- Gruppo della Prof.ssa L. Canet, 5 – 17 giugno 2017, Grenoble, Francia.

Host per visitatori esterni

- Prof. H. Sonoda, 3 – 13 settembre 2019 all'Università di Mainz, Germania.
- F. Stoel, 17 – 21 aprile 2017 all'Università di Mainz, Germania.

Attività Didattica

Assistente	"Energetique" (meccanica newtoniana, fluidi e laboratorio) tenuto dal Prof. Denis Roux, settembre 2020 – gennaio 2021, Université Grenoble Alpes. "Quantization via functional integral II" tenuto dal Prof. Martin Reuter, ottobre 2017 – febbraio 2018, Università di Mainz. "Quantization via functional integral I" tenuto dal Prof. Martin Reuter, maggio – luglio 2017, Università di Mainz.
Secondo supervisore	Studente: Frederik Stoel Titolo di Tesi Triennale: "Calculating the critical exponent ν in the 3D Ising model" (2017). Supervisore: Prof. Frank Saueressig, Radboud University, Nijmegen, Paesi Bassi.
Referee	Referee per le riviste: Phys. Rev. Lett., Phys. Rev. A, Phys. Rev. D, Mod. Phys. Lett. A, Universe, Frontiers in Physics.
Organizzatore di eventi	Organizzatore della serie "PhD and Postdoc seminars" al LPMMC, CNRS, Grenoble (da Marzo 2020 a oggi).

Competenze Personali

Madrelingua	Italiano
Altre Lingue	Inglese (fluente), Tedesco (base), Francese (base)
Competenze informatiche	Ottima conoscenza del programma Mathematica e dei relativi pacchetti. Conoscenza base dei linguaggi di programmazione Fortran e C.

Academic Referees

Prof. Ennio Gozzi	Dipartimento di Fisica Teorica, Università di Trieste Strada Costiera 11, 34014 Trieste, Italia e-mail: ennio.gozzi@ts.infn.it
Prof. Roberto Percacci	SISSA, Scuola Internazionale Superiore di Studi Avanzati Via Bonomea 265, 34136 Trieste, Italia e-mail: roberto.percacci@sissa.it
Prof. Martin Reuter	Institut für Physik, Johannes-Gutenberg-Universität Staudingerweg 7, 55099 Mainz, Germania e-mail: reutma00@uni-mainz.de

CURRICULUM VITAE

Luca Panizzi

Education

29 September 2005

Degree in Physics (Laurea), University of Florence, Italy
Thesis Title: *Neutrini a Massa Variabile in Cosmologia e Principio di Equivalenza* (in English: *Mass Varying Neutrinos in Cosmology and the Equivalence Principle*)
Advisors: Prof. Antonio Masiero (University of Padova) and Prof. Roberto Casalbuoni (University of Florence)

13 March 2009

Ph.D. in Physics, University of Trieste, Italy
Thesis Title: *One-Loop Electroweak Analysis for Third Family Scalar Quarks Production at LHC*
Advisor: Prof. Claudio Verzegnassi (University of Trieste)

Qualifications

January 2014

Qualification aux fonctions de maître de confèrences (eligibility to access faculty positions of associate professor in France)

March 2018

Abilitazione scientifica nazionale, seconda fascia (eligibility to access faculty positions of associate professor in Italy)

Positions

2009 - 2012	Postdoctoral position (Chercheur), Institut de Physique Nucléaire de Lyon and CNRS, France
2012 - 2016	Postdoctoral Research Associate, University of Southampton, UK
2016 - 2017	Postdoctoral position (Assegno), University of Genova, Italy
2018	Postdoctoral position (Assegno), University of Pisa, Italy
2018 - present	Researcher, Uppsala University, Sweden

Visiting positions and affiliations

March 2009 - June 2009	Visitor, School of Physics and Astronomy, University of Southampton, UK
July 2009 - November 2009	Visitor, Department of Theoretical Physics, University of Trieste, Italy
November 2010	One-month collaboration visit to KEK, Tsukuba, Japan
February 2011 - March 2011	One-month collaboration visit to Tsinghua University, Beijing, China
October 2012 - Semptember 2016	Visiting Scientist, Rutherford Appleton Laboratory (RAL), UK
July 2015	Two-weeks collaboration visit to FAPESP, Sao Paulo, Brazil
June 2015 - present	Analysis-specific affiliation to the CMS collaboration
October 2016 - present	Visiting Scientist, University of Southampton, UK
April 2017 - present	Affiliation to ORSA (Interdepartmental center for Observations and Research in Astronomical Sciences) at the University of Genova, Italy
July 2017 - August 2017	Two-months visiting position, CERN
December 2017 - present	Visiting Scientist, University of Genova, Italy
February 2018 - March 2018	Two-months visiting position, Laboratoire Physique des Hautes Energies et Astrophysique, Marrakech, Morocco

Grants and awards

March 2009 - June 2009	Royal Society International Travel Grants 2008
July 2009 - November 2009	Grant of the Consorzio per la Fisica, University of Trieste
March 2018	Seal of Excellence by the European Commission for the project *"Characterisation of signals of new physics at the Large Hadron Collider and beyond"*

Teaching, Supervision and Tutorial Experience

Teaching

2012-2013	Demonstrator for the laboratory computing module "PHYS2022, Physics from evidence I", University of Southampton
2014	Demonstrator and examiner for the laboratory module "PHYS6008, Physics from Evidence II", University of Southampton
2014	Demonstrator for the module "MATH1007, Mathematical Methods for Physical Sciences", University of Southampton
2017	Demonstrator and examiner for the module of General Physics (FIS/01) at the Engineering Department, University of Genova
2019	Lecturer for the course "Partikelfysik II" (Advanced particle physics) at Uppsala University
2020	Director and lecturer for the course "Partikelfysik II" (Advanced particle physics) at Uppsala University

Supervision

2013	Supervisor of a student of Master M1 of ENS-Lyon for a three-months internship at the University of Southampton
2014	Participation to the "Postgraduate Certificate in Academic Practice Session 5: Supervising Research Students" at the University of Southampton
2014-2018	Co-supervision of two PhD students in the Southampton High Energy Physics group
2015	Supervision of two students of Master M1 of ENS-Lyon for three-months internships at the University of Southampton
2016	Co-supervision of an undergraduate student of the University of Southampton for his research placement in the Southampton High Energy Physics group
2018-present	Supervision of four Master students at Uppsala University

Tutorial at PhD schools

2014	Tutor for the BUSSTEPP 2014 UK PhD School at the University of Southampton
2015	Tutor for the BUSSTEPP 2015 UK PhD School at the King's College, London
2016	Tutor for the BUSSTEPP 2016 UK PhD School at the University of Manchester

Referee Activity

since 2012	Physical Review D (PRD) and Journal of High Energy Physics (JHEP)
since 2013	Physics Letters B (PLB)
since 2015	Physical Review Letters (PRL)
since 2018	European Physical Journal C (EJPC)

Editorial Activity

2018	Proceedings for the conference *Charged 2018 - Prospects for Charged Higgs Discovery at Colliders*

Organisation and administration activity

2010-2012	Member of the équipe séminaires in the IPN Lyon
2013-2014	Organisation of the Thursday (internal) seminars of the Southampton High Energy Physics group
2014	Member of the LOC of the *Fourth NExT PhD Workshop* at the University of Southampton
2014	Member of the LOC of the *BUSSTEPP 2014 UK PhD School* at the University of Southampton
2014-2016	Organisation of the Friday (external) seminars of the Southampton High Energy Physics group
2017-2019	Responsible for phenomenology and modelization within ORSA (Interdepartmental center for Observations and Research in Astronomical Sciences) at the University of Genova, Italy
2019	Member of the LOC of the *LIO international workshop on Vector-like Fermions*, IPN Lyon, 22-25 July 2019
2020	Member of the LOC of the *Partikeldagarna* (Swedish annual conference in particle and astroparticle physics), Uppsala (online due to COVID), 23-25 November 2020

Computer Competences

Operative Systems	Linux
Software	Good knowledge of C++, Fortran, Perl, Python, ROOT, Mathematica and of specific particle physics software as Madgraph, CalcHep and Feynrules. I have developed a public software, with name XQCAT (eXtra Quark Combined Analysis Tool).

Languages

Italian (native), **English** (fluent), **French** (very good/fluent)

Outreach Activity

2008 - present	activity of science popularization through public conferences organised by the amateur astronomers association in Mantova, Italy, about particle physics and cosmology subjects
2013	Outreach activity at the Winchester Science Centre and Planetarium, UK
2017	Participation to the "Piano Nazionale Lauree Scientifiche" (outreach activity for high school students at the University of Genova, Italy); Lecture at the "Università della Terza Età" (aimed at providing education to older people, around retirement age).
2020	Physics conference with concert for a Jazz album presentation in Mantova, Italy

Conferences, schools and seminars

Conferences

Conferences where I gave (or will be giving) a talk are marked with *

1. *13th International Symposium on Particles, Strings and Cosmology: PASCOS-07*, Imperial College, London, 2-7 July 2007
2. *V workshop italiano sulla fisica p-p ad LHC*, Perugia, 30 January - 2 February 2008
3. **Rencontres de Physique des Particules 2010*, IPN Lyon, 25-27 January 2010
4. *GDR Terascale*, Saclay, 29-31 March 2010
5. *Planck 2010*, CERN, 31 May - 4 June 2010
6. *TOOLS 2010 - Tools for SUSY and the New Physics, Sharpening our Tools*, Winchester, 29 June - 2 July 2010
7. **Rencontres de Physique des Particules 2011*, LPC Clermont-Ferrand, 13-14 January 2011
8. *Implications of LHC results for TeV-scale physics*, CERN, 29 August - 2 September 2011
9. **Frontiers in Neutrino Physics*, APC, Paris, October 4-6, 2011
10. **GDR Terascale*, CPPM Marseille, 11-13 October 2011
11. **Focus Workshop on Heavy Quarks at LHC*, National Taiwan University, 19-20 January 2012
12. *TOP 2012 - 5th International Workshop on Top Quark Physics*, Winchester, 16-21 September 2012
13. *Neutrinos at the forefront of elementary particle physics and astrophysics*, Lyon, 22-24 October 2012
14. **NExT Meeting*, Royal Holloway University of London, 14 November 2012
15. **Rencontres de Physique des Particules 2013*, LPSC Grenoble, 16-18 January 2013
16. **LC13: Exploring QCD from the infrared regime to heavy flavour scales at B-factories, the LHC and a Linear Collider*, ECT* Trento, 16-20 September 2013

17. **New Perspectives in Dark matter*, IPN Lyon, 22-25 October 2013
18. **19th International Symposium on Particles, Strings and Cosmology: PASCOS 2013*, Taipei, 20-26 November 2013
19. *Annual Theory Meeting 2013*, Durham University, 16-18 December 2013
20. **Rencontres de Physique des Particules 2014*, IPHC Strasbourg, 20-22 January 2014
21. **Excited QCD 2014*, Sarajevo, 2-8 February 2014
22. **Astroparticle Physics 2014*, Amsterdam, 23-28 June 2014
23. **26th Recontres de Blois - Particle Physics and Cosmology*, Blois, 18-23 May 2014
24. **Workshop on vector-like quarks 2014*, DESY, Hamburg, 15-16 September 2014
25. **Calculations for Modern and Future Colliders*, Joint Institute for Nuclear Research, Dubna, 23-30 July 2015
26. **NExT Meeting*, Rutherford Appleton Laboratory, Didcot, 4 November 2015
27. **IFAE 2016*, University of Genova, 30 March - 1 April 2016
28. **Special CMS B2G Event at the LPC*, Fermilab, Chicago, 7-8 April 2016
29. **(Re)interpreting the results of new physics searches at the LHC*, CERN, 15-17 June 2016
30. **LIO international conference on Composite Models, Electroweak Physics and the LHC*, Lyon, France, 5-8 September 2016
31. *(Re)interpreting the results of new physics searches at the LHC*, CERN, 12-14 December 2016
32. **6th International Conference on New Frontiers in Physics (ICNFP2017)*, OAC, Creta, 17-29 August 2017
33. **DAνCo: DArk matter, neutrinos and their Connections*, CP3-Origins, Denmark, 17-29 August 2017
34. **Charged 2018 - Prospects for Charged Higgs Discovery at Colliders*, Uppsala, 25-28 September 2018
35. *Partikeldagarna*, Lund, 16-17 October 2018
36. **Top LHC France 2019*, LPSC Grenoble, 24-26 April 2019
37. **7th RISE Collaboration workshop: NonMinimalHiggs*, Helsinki, 27-29 May 2019
38. **Fundamental Composite Dynamics: Opportunities for Future Colliders and Cosmology*, Mainz Institute for Theoretical Physics, Johannes Gutenberg University, 26 August-06 September 2019
39. **LFC19: Strong dynamics for physics within and beyond the Standard Model at LHC and Future Colliders*, ECT* Trento, 9-13 September 2019
40. *Partikeldagarna 2020*, Uppsala (online), 23-25 November 2020

PhD Schools

1. *Summer School on Particle Physics*, ICTP, Trieste, 11-22 June 2007
2. *The 2008 Hadron Collider Physics Summer School*, Fermilab, Chicago, 12-22 August 2008
3. *The 4th UniverseNet School - Frontiers of Particle Cosmology*, Lecce, 13-19 September 2010

Seminars

2009	University of Southampton, University of Freiburg, Institut de Physique Nucleaire de Lyon
2010	KEK (Tsukuba), IPMU (Tokio), University of Nagoya
2011	Tsinghua University, Peking University, IHEP Beijing, King's College London, University College London, LAPTH Annecy, LPC Clermont-Ferrand, LUPM Montpellier, Ecole Polytechnique, LPT Orsay, Universite Catholique de Louvain, University of Southampton
2012	IPhT Saclay, Centre for Mathematical Science (Cambridge), Southern Methodist University (Dallas)
2013	University of Sussex, Rutherford Appleton Laboratory, University of Bern
2014	LUPM Montpellier
2015	Max Planck Institute (Munich), University of Sao Carlos, ICTP Sao Paulo, University of Sussex
2016	University of Edinburgh, University of Genoa
2017	CERN
2018	Cadi Ayyad University (Marrakech), University of Tangiers, University of Munster, University of Pisa, Uppsala University, INFN-Frascati
2019	LPTHE Paris, INFN-Frascati, Lund University
2020	Snowmass 2021 (EF08)

I have also given multiple vidyo presentations within ATLAS and CMS, related to the analyses I was working on in collaboration with the experiment.

Alessandro Pilloni

Curriculum vitæ et studiorum

Contatti

Istituzione	Istituto Nazionale di Fisica Nucleare, Sezione di Roma
Indirizzo	P.le Aldo Moro 2, 00185 Roma (Italy)
E-mail	
ORCiD	
ResearcherID	

Educazione e Formazione

2012–2015 **Dottorato**, *'Sapienza' Università di Roma.*
Tesi: *Exotic hadron spectroscopy* , Relatore: Prof. A.D. Polosa, conseguito il 22/01/2016

2006–2012 **Laurea specialistica**, *'Sapienza' Università di Roma, 110/110 e lode.*
Tesi: $H \to \gamma\gamma$*: a recent discussion*, Relatore: Prof. A.D. Polosa, conseguita il 19/07/2012

2002–2006 **Laurea triennale**, *'Sapienza' Università di Roma, 110/110 e lode.*
Tesi: *Group theory in Quantum Mechanics*, Relatore: Prof. M. Testa, conseguita il 01/03/2006

Esperienza professionale

11/2020–11/2023 **Ricercatore a tempo determinato**, *INFN sez. Roma.*
Chiamata come ricercatore di III livello nel programma FELLINI

2020– **Limited Member**, *CLAS Collaboration.*

01/2019–11/2020 **Associato**, *INFN sez. Genova.*
Affiliato ai gruppi JLab12 (50%) e NINPHA (50%).

11/2018–10/2020 **Postdoc**, *ECT*.*

2016– **Membro Associato**, *LHCb Collaboration.*

11/2015–10/2018 **Postdoc**, *JLAB, Theory center.*
Membro del Joint Physics Analysis Center (JPAC)

2014– **Membro**, *BABAR Collaboration.*

2013–2014 **Membro associato**, *BABAR Collaboration.*

02/2012–06/2015 **Associato Dottorando**, *INFN sez. Roma 1.*
Affiliato ai gruppi RM21/QNP (50%) e *BABAR* (50%).

11/2012–10/2015 **Dottorando**, *'Sapienza' Università di Roma, Dipartimento di Fisica.*

2010-2011 **IT manager**, *Skuola Network SRL*.
Esperienza tecnica: PHP Development, MySQL Management, Network Administration, Server Maintenance.

2007-2011 **Cofondatore and IT manager**, *Glubit SRL*.
Esperienza tecnica: PHP Development, MySQL Management, Network Administration, Server Maintenance.

Premi e Abilitazioni

2020–2029 **Abilitazione Scientifica Nazionale – Professore di I fascia, FIS 02/A2**.

2018–2027 **Abilitazione Scientifica Nazionale – Professore di II fascia, FIS 02/A2**.

2018 **JSA Promising Young Scientist**.

Progetti Finanzati

11/2020–11/2023 **Three Hadron Reactions to Estimate Effects of CP (THREE-CP)**.
Programma FELLINI (INFN and Marie Skłodowska-Curie Cofund Action, grant No. 754496), 50k€/anno.

01/2019–12/2020 **Hadrons with hidden charm**.
PI Dr. Fernández-Ramírez, PAPIIT-DGAPA (UNAM, Mexico) grant No. IA101819, 250kMXN (circa 12.5k€).

10/2019–10/2022 **Development of scattering amplitudes for hadron physics**.
PI Dr. Fernández-Ramírez, CONACYT (Mexico) grant No. 251817, 520kMXN (circa 26k€).

Insegnamento e tutoraggio

2020 **Controrelatore per tesi di dottorato**, D. Marangotto (U. di Milano).

2017-2018 **Supervisore di dottorandi**, J. Nys (Ghent U.), A. Hiller Blin (Mainz U.), A. Rodas (Complutense U.), D. Sadasivan (GWU).

2017 **Docente**, *sessione su "Unitarity, Analiticity, Crossing symmetry"*.
International Summer School on Reaction Theory, Indiana University

2014 **Esercitatore**, *"Meccanica"*.
Corso di Laurea in Fisica, con il Prof. G. Ruocco

2013 **Esercitatore**, *"Fisica 2"*.
Corso di Laurea in Ingegneria dell'Ambiente e del Territorio, con il Prof. S. Sarti

Lingue

Italiano Madrelingua

Inglese Ottimo livello in lettura, scrittura e ascolto

Francese Buon livello in lettura, scrittura e ascolto

Pubblicazioni

Sono autore di 98 articoli su rivista (di cui 50 con la *BABAR* collaboration), di 14 conference proceedings, e 8 preprints, per un totale di 120 pubblicazioni. Le mie pubblicazioni hanno raccolto

3859 citazioni su INSPIRE, e un h-index di 30, aggiornato al 1 Dicembre 2020.

Articoli pubblicati

[Pub1] M. Barabanov et al., *Diquark Correlations in Hadron Physics: Origin, Impact and Evidence*, *Prog.Part.Nucl.Phys.* (2020), [arXiv:2008.07630].

[Pub2] V. Mathieu, A. Pilloni, M. Albaladejo, L. Bibrzycki, A. Celentano, C. Fernández-Ramírez, and A. P. Szczepaniak, *Exclusive Tensor Meson Photoproduction*, *Phys.Rev.* **D102** (2020), 014003 [arXiv:2005.01617].

[Pub3] CLAS Collaboration, *First measurement of direct photoproduction of the $a_2(1320)^0$ meson on the proton*, *Phys.Rev.* **C102** (2020), 032201 [arXiv:2004.05359].

[Pub4] M. Mikhasenko, M. Albaladejo, L. Bibrzycki, C. Fernández-Ramírez, V. Mathieu, S. Mitchell, M. Pappagallo, A. Pilloni, D. Winney, T. Skwarnicki, and A. P. Szczepaniak, *Dalitz-plot decomposition for three-body decays*, *Phys.Rev.* **D101** (2020), 034033 [arXiv:1910.04566].

[Pub5] M. Albaladejo, D. Winney, C. Danilkin, I. Fernández-Ramírez, V. Mathieu, M. Mikhasenko, A. Pilloni, J. A. Silva-Castro, and A. P. Szczepaniak, *Khuri-Treiman equations for 3π decays of particles with spin*, *Phys.Rev.* **D101** (2020), 054018 [arXiv:1910.03107].

[Pub6] D. Winney, C. Fanelli, A. Pilloni, A. Hiller Blin, C. Fernández-Ramírez, M. Albaladejo, V. Mathieu, V. Mokeev, and A. P. Szczepaniak, *Double Polarization Observables in Pentaquark Photoproduction*, *Phys.Rev.* **D100** (2019), 034019 [arXiv:1907.09393].

[Pub7] V. Mathieu, M. Albaladejo, C. Fernández-Ramírez, A. W. Jackura, M. Mikhasenko, A. Pilloni, and A. P. Szczepaniak, *Moments of angular distribution and beam asymmetries in $\eta\pi^0$ photoproduction at GlueX*, *Phys.Rev.* **D100** (2019), 054017 [arXiv:1906.04841].

[Pub8] A. Jackura, S. M. Dawid, C. Fernández-Ramírez, V. Mathieu, M. Mikhasenko, A. Pilloni, S. R. Sharpe, and A. P. Szczepaniak, *Equivalence of Three-Particle Scattering Formalisms*, *Phys.Rev.* **D100** (2019), 034508 [arXiv:1905.12007].

[Pub9] M. Mikhasenko, Y. Wunderlich, A. Jackura, V. Mathieu, A. Pilloni, B. Ketzer, and A. P. Szczepaniak, *Three-body scattering: Ladders and Resonances*, *JHEP* **08** (2019), 080 [arXiv:1904.11894].

[Pub10] C. Fernández-Ramírez, A. Pilloni, M. Albaladejo, A. Jackura, V. Mathieu, M. Mikhasenko, J. Silva-Castro, and A. Szczepaniak, *Interpretation of the LHCb $P_c(4312)$ Signal*, *Phys.Rev.Lett.* **123** (2019), 092001 [arXiv:1904.10021].

[Pub11] A. Hiller Blin, V. Mokeev, M. Albaladejo, C. Fernández-Ramírez, V. Mathieu, A. Pilloni, A. Szczepaniak, V. Burkert, V. Chesnokov, A. Golubenko, and M. Vanderhaeghen, *Nucleon resonance contributions to unpolarised inclusive electron scattering*, *Phys.Rev.* **C100** (2019), 035201 [arXiv:1904.08016].

[Pub12] LHCb Collaboration, *Observation of a narrow pentaquark state, $P_c(4312)^+$, and of two-peak structure of the $P_c(4450)^+$*, *Phys.Rev.Lett.* **122** (2019), 222001 [arXiv:1904.03947].

[Pub13] A. Cerri et al., *Opportunities in Flavour Physics at the HL-LHC and HE-LHC*, *CERN Yellow Rep. Monogr.* **7** (2019), 867–1158 [arXiv:1812.07638]. Report from Working Group 4 on the Physics of the HL-LHC, and Perspectives at the HE-LHC, CERN-LPCC-2018-06.

[Pub14] A. Rodas, A. Pilloni, M. Albaladejo, C. Fernández-Ramírez, A. Jackura, V. Mathieu, M. Mikhasenko, J. Nys, V. Pauk, B. Ketzer, and A. P. Szczepaniak, *Determination of the pole position of the lightest hybrid meson candidate*, *Phys.Rev.Lett.* **122** (2019), 042002 [arXiv:1810.04171].

[Pub15] M. Mikhasenko, A. Pilloni, M. Albaladejo, C. Fernández-Ramírez, A. Jackura, V. Mathieu, J. Nys, A. Rodas, B. Ketzer, and A. P. Szczepaniak, *Pole position of the $a_1(1260)$ from τ-decay*, *Phys.Rev.* **D98** (2018), 096021 [arXiv:1810.00016].

[Pub16] A. Jackura, C. Fernández-Ramírez, M. Mikhasenko, V. Mathieu, J. Nys, A. Pilloni, K. Saldaña, N. Sherrill, and A. P. Szczepaniak, *Phenomenology of Relativistic $\mathbf{3} \to \mathbf{3}$ Reaction Amplitudes within the Isobar Approximation*, *Eur.Phys.J.* **C79** (2019), 56 [arXiv:1809.10523].

[Pub17] J. A. Silva-Castro, C. Fernández-Ramírez, M. Albaladejo, I. V. Danilkin, A. Jackura, V. Mathieu, J. Nys, A. Pilloni, A. P. Szczepaniak, and G. Fox, *Regge phenomenology of the N^* and Δ^* poles*, *Phys.Rev.* **D99** (2019), 034003 [arXiv:1809.01954].

[Pub18] V. Mathieu, J. Nys, C. Fernández-Ramírez, A. N. Hiller Blin, A. Jackura, A. Pilloni, A. P. Szczepaniak, and G. Fox, *Structure of Pion Photoproduction Amplitudes*, *Phys.Rev.* **D98** (2018), 014041 [arXiv:1806.08414].

[Pub19] J. Nys, A. N. Hiller Blin, V. Mathieu, C. Fernández-Ramírez, A. Jackura, A. Pilloni, J. Ryckebusch, A. P. Szczepaniak, and G. Fox, *Global analysis of charge exchange meson production at high energies*, *Phys.Rev.* **D98** (2018), 034020 [arXiv:1806.01891].

[Pub20] A. Pilloni, J. Nys, M. Mikhasenko, M. Albaladejo, C. Fernández-Ramírez, A. Jackura, V. Mathieu, N. Sherrill, T. Skwarnicki, and A. P. Szczepaniak, *What is the right formalism to search for resonances? II. The pentaquark chain*, *Eur.Phys.J.* **C78** (2018), 727 [arXiv:1805.02113].

[Pub21] M. Albaladejo, N. Sherrill, C. Fernández-Ramírez, A. Jackura, V. Mathieu, J. Nys, A. Pilloni, and A. Szczepaniak, *Khuri-Treiman equations for $\pi\pi$ scattering*, *Eur.Phys.J.* **C78** (2018), 574 [arXiv:1803.06027].

[Pub22] V. Mathieu, J. Nys, C. Fernández-Ramírez, A. Jackura, A. Pilloni, N. Sherrill, A. Szczepaniak, and G. Fox, *Vector Meson Photoproduction with a Linearly Polarized Beam*, *Phys.Rev.* **D97** (2018), 094003 [arXiv:1802.09403].

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[Rep1] Letters of Intent for Snowmass 2021:
- L. An et al., "Diquark structures in hadron spectroscopy," RF/SNOWMASS21-RF7_RF0-EF6_EF0-083
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- M. Albaladejo et al., "Need for amplitude analysis in the discovery of new hadrons," RF/SNOWMASS21-RF7_RF0-081
- M. Albaladejo et al., "Hadron Spectroscopy at the Electron Ion Collider," RF/SNOWMASS21-RF7_RF0-090
- M. Albaladejo et al., "$XYZP$ spectroscopy at a charm photoproduction factory," RF/SNOWMASS21-RF7_RF0-120

[Rep2] T. Skwarnicki, Z. Xu, L. Zhang, A. Pilloni, C. Fernández-Ramírez, and A. Szczepaniak, "Discovery of narrow $P_c(4312)^+ \to J/\psi\, p$ state in $\Lambda_b^0 \to J/\psi\, p\, K^-$ decays, and observation of two-peak structure of the $P_c(4450)^+$." LHCb-ANA-2018-043. I signed the analysis note as affiliated theorist, Mar, 2019.

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[Rep5] G. Cavoto and A. Pilloni, "Search for CP violation in $D^+ \to \pi^+\pi^0$." *BABAR* Analysis Document #2649. I am the Principal Analyst of this analysis.

Seminari e interventi at Conferenze e Workshops

Ho presentato 63 interventi a conferenze e workshops nazionali ed internazionali, di cui 42 su invito o plenari, 19 su contributo, 2 posters. Ho anche tenuto 24 seminari in varie università.

Interventi su invito e plenari

1. *Snowmass21, Hadron Spectroscopy RF7*, Online, 16-30 Settembre 2020
   Intervento su invito "Production of Exotic Hadrons at the EIC" [slides].
   Intervento su invito "Analysis of Light Exotic Hadron Measurements" [slides].
   Intervento su invito "$XYZP$ spectroscopy at a charm photoproduction factory" [slides].
2. *1st EIC Yellow Report Workshop*, Filadelfia (USA), 19-21 Marzo 2020
   Intervento su invito "Spectroscopy: overview/theory" [slides].
3. *Exotic Hadron Spectroscopy 2019*, York (UK), 12-13 Dicembre 2019
   Intervento su invito "Amplitude analysis and exotic states" [slides].
4. *Deciphering Strong-Interaction phenomenology through precision hadron-spectroscopy*, Monaco (Germania), 7-31 Ottobre 2019
   Intervento su invito "Predictive power of different theory approaches to heavy-heavy states" [slides].
5. *Workshop on electromagnetic dipole moments of unstable particles*, Milano (Italia), 3-4 Ottobre 2019
   Intervento su invito "Amplitude analysis for EDM/MDM measurements of heavy baryons" [slides].
6. *Diquark Correlations in Hadron Physics: Origin, Impact and Evidence*, ECT*, Trento (Italia), 23-27 Settembre 2019
   Intervento su invito "Diquarks in exotic hadrons" [slides].
7. *Workshop on S-matrix Bootstrap*, ICTP-SAIFR, San Paolo (Brasile), 9-13 Settembre 2019
   Intervento su invito "From S-Matrix to data" [slides] [video].
8. *International Workshop on Partial Wave Analyses and Advanced Tools for Hadron Spectroscopy (PWA11/ATHOS6)*, Rio de Janeiro (Brasile), 2-6 Settembre 2019
   Intervento su invito "Dispersive constraints on amplitude determination" [slides].
   Intervento su invito "Practically implementable advances in PWA theory for meson decays" [slides].
9. *XVIII International Conference on Hadron Spectroscopy (HADRON 2019)*, Guilin (Cina), 16-21 Agosto 2019
   Intervento plenario su invito "Analysis tools in searching for resonances" [slides].
10. *EIC User Group Meeting 2019*, Parigi (Francia), 22-26 Luglio 2019
    Intervento plenario "New proposal: Light and heavy quark spectroscopy at EIC" [slides].
11. *Exotic Hadrons: Theory and Experiment at Lepton and Hadron Colliders*, Shanghai (Cina), 25-27 Giugno 2019

Intervento su invito "Studies of exotic hadrons at JPAC" [slides].

12. *International Conference on the Structure and the Interactions of the Photon (PHOTON2019)*, Frascati (Italia), 3-7 Giugno 2019
    Intervento su invito "Heavy quark Spectroscopy" [slides].
13. *Bound states in QCD and beyond III*, St. Goar (Germania), 9-12 Aprile 2019
    Intervento su invito "The quest for exotic states" [slides].
14. *JPAC/BESIII: A Workshop on Theory-Experiment Collaboration*, Pechino (Cina), 2-4 Aprile 2019
    Intervento su invito "Models for Dalitz plot analyses" [slides].
15. *The spectroscopy program at EIC and future accelerators*, ECT*, Trento (Italia), 19-21 Dicembre 2018
    Intervento su invito "Light and Heavy Hybrids" [slides].
16. *Scattering Amplitudes and Resonance Properties from Lattice QCD*, MITP, Magonza (Germania), 27-31 Agosto 2018
    Intervento su invito "Experimental motivation for studying few-hadron systems on the lattice" [slides].
17. *CLAS Collaboration meeting*, Jefferson Lab, Newport News (USA), 10-13 Luglio 2018
    Intervento su invito "Update on JPAC activities" [slides].
18. *13th Conference on the Intersections of Particle and Nuclear Physics (CIPANP2018)*, Palm Springs (USA), 29 Maggio-3 Giugno 2018
    Intervento su invito "Unitary reaction models and PWA formalisms" [slides].
19. *Exotic Hadrons and Flavor Physics*, Simons Center, Stony Brook (USA), 28 Maggio-2 Giugno 2018
    Intervento su invito "Prompt Production of exotic states" [slides] [video].
20. *International Workshop on Hadron Structure and Spectroscopy (IWHSS 2018)*, Bonn (Germania), 19-21 Marzo 2018
    Intervento su invito "Reaction theory and analysis methods" [slides].
21. *Bound states in strongly coupled systems*, Galileo Galilei Institute, Firenze (Italia), 12-16 Marzo 2018
    Intervento su invito "Amplitude analysis for exotic states" [slides].
22. *Pion-Kaon Interactions Workshop (PKI 2018)*, Jefferson Lab, Newport News (USA), 14-15 Febbraio 2018
    Intervento su invito "Using πK to understand heavy meson decays" [slides].
23. *Multi-Hadron Systems from Lattice QCD*, INT, Seattle (USA), 5-9 Febbraio 2018
    Intervento su invito "Experimental motivation for studying few-hadron systems on the lattice" [slides].
24. *Fall Meeting of the Division of Nuclear Physics of the American Physical Society (APS-DNP2017)*, Pittsburgh (USA), 25-28 Ottobre 2017
    Intervento su invito "Amplitudes for exotic states" [slides].
25. *XVII International Conference on Hadron Spectroscopy (HADRON 2017)*, Salamanca (Spagna), 25-29 Settembre 2017

Intervento su invito "Covariant and helicity formalisms" [slides].
Intervento su invito "Multiquark states" [slides].

26. *Hadronic Physics with Lepton and Hadron Beams*,
Jefferson Lab, Newport News (USA), 5-8 Settembre 2017
Intervento su invito "JPAC program for Hadron Spectroscopy" [slides].

27. *International Workshop on Partial Wave Analyses and Advanced Tools for Hadron Spectroscopy (PWA9/ATHOS4)*, Bad Honnef (Germania), 13-17 Marzo 2017
Intervento su invito "Amplitude analysis for exotic states" [slides].

28. *2nd Workshop in Future Directions in Spectroscopy Analysis (FDSA2017)*,
Città del Messico, 7-11 2017
Intervento su invito "Amplitude analysis and exotic states" [slides].

29. *Exploring Hadrons with Electromagnetic Probes: Structure, Excitations, Interactions*, Jefferson Lab, Newport News (USA), 2-3 2017
Intervento su invito "High Energy Photoproduction at JPAC" [slides].

30. *BABAR Collaboration meeting*, SLAC, Menlo Park (USA), 13-15 Dicembre 2016
Intervento su invito "Modeling exotic $XYZP$ states" [slides].

31. *VIII International Workshop on Charm Physics (CHARM 2016)*,
Bologna (Italia), 5-9 Settembre 2016
Intervento plenario su invito "Introduction to Charmonium and Exotic Physics" [slides].

32. *International Workshop on Hadron Structure and Spectroscopy (IWHSS 2016)*,
Kloster Seeon (Germania), 5-9 Settembre 2016
Intervento su invito "Challenges in the analysis of meson-spectroscopy data: Theory" [slides].

33. *XII Quark Confinement and the Hadron Spectrum (Confinement 2016)*,
Salonicco (Grecia), 28 Agosto-3 Settembre 2016
Intervento su invito "Hadron Reaction and Spectroscopy Studies at JPAC" [slides].

34. *CLAS Collaboration meeting*, Jefferson Lab, Newport News (USA), 15-18 Giugno 2016
Intervento su invito "An update on JPAC activities" [slides].

35. *XVI International Conference on Hadron Spectroscopy (HADRON 2015)*,
Newport News (USA), 13-18 Settembre 2015
Intervento su invito "Production of Tetraquarks at the LHC" [slides].

36. *VII International Workshop, on Charm Physics (CHARM 2015)*,
Detroit (USA), 18-22 Maggio 2015
Intervento plenario "Recent results on violation of discrete symmetries in charm decays at *BABAR* and Belle" [slides].

37. *Incontri di Fisica delle Alte Energie (IFAE 2015)*, Roma (Italia), 8-10 Aprile 2015
Intervento plenario "XYZ: stati a quattro quark?" [slides].

38. *International Symposium "Lepton and Hadron Physics at Meson-Factories"*,
Messina (Italia), 13-15 Ottobre 2013
Intervento su invito "Exotic Hadron Spectroscopy" [slides].

Interventi su contributo

1. *Electron-Ion Collider User Group Meeting 2018*,
   Washington (USA), 30 Luglio-2 Agosto 2018
   Intervento su contributo "Opportunities for Spectroscopy at the EIC" [slides].
2. *Fall Meeting of the Division of Nuclear Physics of the American Physical Society (APS-DNP2017)*,
   Pittsburgh (USA), 25-28 Ottobre 2017
   Intervento su contributo "Amplitudes for exotic states at JPAC" [slides].
3. *XVII International Conference on Hadron Spectroscopy (HADRON 2017)*,
   Salamanca (Spagna), 25-29 Settembre 2017
   Intervento su contributo "Three-body decays of quarkonium states at *BABAR*" [slides].
4. *7th Workshop of the APS Topical Group on Hadronic Physics (APS-GHP 2016)*,
   Washington (USA), 1-3 Febbraio 2017
   Intervento su contributo "Hadron Spectroscopy at JPAC" [slides].
5. *XII Quark Confinement and the Hadron Spectrum (Confinement 2016)*,
   Salonicco (Grecia), 28 Agosto-3 Settembre 2016
   Intervento su contributo "Multiquark resonances" [slides].
6. *38th International Conference on High Energy Physics (ICHEP2016)*,
   Chicago (USA), 3-10 Agosto 2016
   Intervento su contributo "Recent *BABAR* results on mixing and CP violation in the charm sector" [slides].
7. *XII International Conference on Beauty, Charm, and Hyperons in Hadronic Interactions (BEACH 2016)*, Fairfax (USA), 12-18 Giugno 2016
   Intervento su contributo "Modeling new XYZ exotic states at JPAC" [slides].
8. *14th International Workshop on Meson Production, Properties and Interaction (MESON 2016)*,
   Cracovia (Polonia), 2-7 Giugno 2016
   Intervento su contributo "Amplitude analysis of $J/\psi \to \gamma\pi^0\pi^0$" [slides].
9. *Workshop "Spectroscopy of Resonances and QCD"*,
   ECT*, Trento (Italia), 8-12 Febbraio 2016
   Intervento su contributo "Modeling new XYZ exotic states" [slides].
10. *101 SIF Congress*, Roma (Italia), 21-25 Settembre 2015
    Intervento su contributo "A measurement of CP asymmetries in $D^+ \to \pi^+\pi^0$ decay at *BABAR*" [slides].
11. *4th Symposium on Prospects in the Physics of Discrete Symmetries (DISCRETE 2014)*,
    Londra (UK), 2-6 Dicembre 2014
    Intervento su contributo "Study of $B \to K\pi\pi\gamma$ decays" [slides].
12. *Workshop on LENR*, Erice (Italia), 9-12 Ottobre 2014
    Intervento su contributo "Search for Neutron Flux Generation in a Plasma Discharge Electrolytic Cell" [slides].
13. *100 SIF Congress*, Pisa (Italia), 22-26 Settembre 2014
    Intervento su contributo "A measurement of CP asymmetries in $D^+ \to \pi^+\pi^0$ and $D^0 \to \pi^0\pi^0$ decays at *BABAR*" [slides].
14. *XXXIV National Meeting on Theoretical Physics*, Cortona (Italia), 28-31 Maggio 2014
    Intervento su contributo "Multiquark states as Feshbach resonances" [slides].

15. *Workshop "Excited QCD 2014"*, Bjelasnica, Sarajevo (Bosnia), 2-8 Febbraio 2014
Intervento su contributo "Exotic Hadron Spectroscopy" [slides].
16. *Workshop "Lattice QCD and Hadron Physics"*,
ECT*, Trento (Italia), 13-16 Gennaio 2014
Intervento su contributo "Exotic Hadron Spectroscopy" [slides].
17. *10th International Workshop on Heavy Quarkonium (QWG 2014)*, CERN, 10-15 2014
Intervento su contributo "Production of Tetraquarks at the LHC" [slides].
18. *9th International Workshop on Heavy Quarkonium (QWG 2013)*,
Pechino (China), 22-26 Aprile 2013
Intervento su contributo "$Z_c(3900)$ as a tetraquark" [slides].
19. *Cortona 2012 – Informal meeting on Theoretical Physics*,
Cortona (Italia), 30 Maggio-1 Giugno 2012
Intervento su contributo "On the Spin of the $X(3872)$" [slides].

Posters

1. *38th International Conference on High Energy Physics (ICHEP2016)*,
Chicago (USA), 3-10 Agosto 2016
Poster "Measurement of the hadronic cross sections for e^+e^- to final states with neutral kaons with the *BABAR* detector" [poster].
2. *XII International Conference on Beauty, Charm, and Hyperons in Hadronic Interactions (BEACH 2016)*, Fairfax (USA), 12-18 Giugno 2016
Poster "Recent *BABAR* results on mixing in the charm sector" [poster].

Seminari

1. *CNR Messina*, Messina (Italia), 19 Novembre 2019
Seminario "Prospects for Hadron Spectroscopy" [slides].
2. *ECT**, Trento (Italia), 20 Febbraio 2019
Seminario "The polehunter: searching (exotic) resonances in the hadron spectrum" [slides].
3. *College of William and Mary*, Williamsburg (USA), 6 Febbraio 2019
Colloquio "Challenges in Hadron Spectroscopy" [slides].
4. *Florida International University*, Miami (USA), 1 Febbraio 2019
Colloquio "Challenges in Hadron Spectroscopy" [slides].
5. *Jefferson Lab*, Newport News (USA), 24 Ottobre 2018
Seminario "The pole hunter: searching (exotic) resonances in $\eta^{(\prime)}\pi$ and $\rho\pi$ final states" [slides].
6. *University of Manitoba*, Winnipeg (Canada), 5 Ottobre 2018
Colloquio "Challenges in Hadron Spectroscopy" [slides].
7. *Università di Genova*, Genova (Italia), 20 Giugno 2018
Seminario "Spectroscopy at the EIC" [slides].
8. *Hampton University*, Hampton (USA), 26 Aprile 2018
Colloquio "Challenges in Hadron Spectroscopy" [slides].

9. *George Washington University*, Washington (USA), 3 Aprile 2018
   Seminario "The quest for exotic states" [slides].
10. *IFAE*, Barcellona (Spagna), 22 Marzo 2018
    Seminario "The quest for exotic states" [slides].
11. *Università di Genova*, Genova (Italia), 20 Marzo 2018
    Seminario "The quest for exotic states" [slides].
12. *University of South Carolina*, Columbia (USA), 22 Febbraio 2018
    Colloquio "Challenges for Hadron Spectroscopy" [slides].
13. *Universitat de Valencia*, Valencia (Spagna), 5 Ottobre 2017
    Seminario "Modeling XYZ states" [slides].
14. *Indiana University*, Bloomington (USA), 5 Aprile 2017
    Seminario "Modeling exotic XYZ states" [slides].
15. *CINVESTAV*, Città del Messico (Messico), 17 2017
    Seminario "The quest for exotic states" [slides].
16. *UNAM*, Città del Messico (Messico), 15 2017
    Seminario "The quest for exotic states" [slides].
17. *Jan Kochanowski University*, Kielce (Polonia), 19 Ottobre 2016
    Seminario "Modeling XYZ states at JPAC" [slides].
18. *Johannes Gutenberg Universit"at Mainz*, Magonza (Germania), 5 Febbraio 2016
    Seminario "Modeling new XYZ exotic states" [slides].
19. *Jefferson Lab*, Newport News (USA), 2 Dicembre 2015
    Seminario "Modeling new exotic states" [slides].
20. *Università di Pavia*, Pavia (Italia), 9 Giugno 2015
    Seminario "New particles XYZ: an overview on tetraquark spectroscopy" [slides].
21. *Jefferson Lab*, Newport News (USA), 7 Gennaio 2015
    Seminario "Exotic Hadron Spectroscopy" [slides].
22. *"Sapienza" Università di Roma*, Roma (Italia), 24 Giugno 2013
    Seminario "Gauge theories in anti-selfdual variables" [slides].
23. *Università di Pisa*, Pisa (Italia), 29 Maggio 2013
    Seminario "Gauge theories in anti-selfdual variables" [slides].
24. *Technische Universität München*, Monaco (Germania), 26 Settembre 2012
    Seminario "On the spin of the $X(3872)$" [slides].

Partecipazione a Workshop, Scuole e Meetings

Comitati organizzatore

1. Workshop *Unraveling QCD through hadron phenomenology*
   INT, Seattle (USA), 13-17 Settembre 2021.
   Organizzatore.
2. Programma di 3 settimane da remoto, *Accessing and understanding the QCD Spectrum*
   INT, Seattle (USA), 17 Agosto-18 Settembre 2020.

Organizzatore.

3. Workshop, *Incontri di Fisica delle Alte Energie (IFAE2020)*
   Catania, rimandato al 2021.
   Convener della sessione "Frontiera dell'Intensità".
4. *The spectroscopy program at EIC and future accelerators*
   ECT*, Trento (Italia), 19-21 Dicembre 2018.
   Organizzatore.
5. *Bound states in strongly coupled systems*
   GGI Arcetri, Firenze (Italia), 12-16 Marzo 2018.
   Organizzatore.
6. *Hadronic Physics with Lepton and Hadron Beams*
   Jefferson Lab, Newport News (USA), 5-8 Settembre 2017.
   Organizzatore.
7. *2017 International Summer Workshop on Reaction Theory*
   Indiana University, Bloomington (USA), 12-22 Giugno 2017.
   Docente della sessione "Unitarity, Analiticity, Crossing symmetry".
8. *Implications of LHCb measurements and future prospects*
   CERN, 12-14 Ottobre 2016.
   Convener della sessione "Puzzles in QCD and spectroscopy with heavy flavors".
9. Theory Center – Jefferson Lab.
   Organizzatore dei seminari per gli anni accademici 2015/2016, 2016/2017, 2017/2018.

Attività di Referee per riviste

Referee per Physical Review D dal 2014, per Europhysics Letters, Physics Letters B, Physical Review Letters e Journal of High Energy Physics dal 2016, per Chinese Physics C e Review of Modern Physics dal 2017, per Journal of Physics G, European Physics Journal C e Nuclear Physics A dal 2018, per European Physics Journal A dal 2019, per Physical Review C dal 2020. Review editor per Frontiers in Physics dal 2019.
In media revisiono 10 articoli/anno. Publons ID: 1343503

Interessi di ricerca e collaborazioni

La maggior parte del mio lavoro riguarda la QCD nel regime di bassa energia, in particolare la spettroscopia degli stati esotici che non vengono spiegati dal modello a quark. Ho sviluppato diversi modelli per descrivere le reazioni con esotici, quali gli XYZ nel settore del quarkonio, o i mesoni ibridi nel canale $\eta^{(\prime)}\pi$. Sono anche coinvolto nella scrittura dello High Luminosity LHC, dell'Electron Ion Collider Yellow Report, e del White Paper per Snowmass21, per quanto riguarda il futuro della spettroscopia XYZ. Le tecniche dispersive basate su principi primi possono fornire una descrizione solida dei sistemi a tre corpi. Il mio piano a lungo termine è di applicare questi formalismi ai decadimenti charmless dei mesoni pesanti, al fine di tenere sotto controllo le incertezze adroniche nell'estrazione delle fasi che violano CP.
La massima priorità della divisione di Fisica Nucleare del Department of Energy americano è un nuovo collider elettrone-ione (EIC). Dirigo un working group interessato nello studio della spettroscopia adronica all'EIC. Mi occupo delle predizioni per la sezione d'urto di stati di charmonio, sia ordinario

che esotico.
I miei interessi di riceca non riguardano solo la spettroscopia, ma spaziano in vari aspetti della fenomenologia di QCD. Collaboro con esperti di Lattice QCD per implementare ampiezze analitiche nel formalismo di volume finito. Lavoro anche alla generalizzazione dei metodi per studiare lo scattering sul Lattice al regime di temperatura finita.
La mia attività in fenomenologia mi ha portato a lavorare a stretto contatto con gli esperimenti. Sono un membro attivo della *BABAR* Collaboration, e affiliato alle Collaborazioni CLAS e LHCb.

Ho collaborazioni con:

- A. Esposito (EPFL), L. Maiani, A. D. Polosa, V. Riquer (Univ. Sapienza), per la fenomenologia delle risonanze esotiche nel charmonio;
- A. Szczepaniak, E. Passemar (Indiana U.), C. Fernández-Ramírez (UNAM), per le analisi di ampiezze e tecniche dispersive;
- G. Cavoto, F. Anulli (Univ. Sapienza.), per la ricerca di violazioni di CP violation nei mesoni con charm a *BABAR*;
- T. Skwarnicki (Syracuse U.), N. Neri (Univ. Milano) per l'implementazione di ampiezze adroniche a LHCb.
- M. Battaglieri (JLab), R. De Vita (INFN Genova), J. Stevens (W&M) per l'implementazione di ampiezze adroniche a CLAS12, e per lo sviluppo di un programma di spettroscopia per l'EIC.

CURRICULUM VITAE

DANIELE PRANZETTI

• Professional Experience

- ◇ 01/10/2020–Present: **Marie Curie Fellow** at Università degli Studi di Udine, Italy, and Perimeter Institute for Theoretical Physics, Waterloo, Ontario, Canada.
- ◇ 01/10/2017–30/09/2020: **Postdoc Fellow** at Perimeter Institute for Theoretical Physics, Waterloo, Ontario, Canada.
- ◇ 01/10/2015–30/09/2017: **Postdoc Fellow** at Scuola Internazionale Superiore di Studi Avanzati, Trieste, Italy.
- ◇ 01/10/2013–30/09/2015: **Postdoc Fellow** at Institute for Quantum Gravity, University of Erlangen-Nürnberg, Germany.
- ◇ 01/10/2011–30/09/2013: **Postdoc Fellow** at Max Planck Institute for Gravitational Physics, Potsdam, Germany.
- ◇ 01/05/2011–30/09/2011: **Postdoc Fellow** at Centre de Physique Théorique, Marseille, France.

• Education

- ◇ 01/04/2008–07/04/2011: **Doctorate** at Centre de Physique Théorique and Université de Provence, Aix-Marseille I, France
  - PhD Thesis title: *TQFT and Loop Quantum Gravity: 2+1 theory and Black Hole Entropy*
    Supervisors: Prof. T. Schucker and Prof. A. Perez
  - Date of award: 07/04/2011.
- ◇ 01/09/2004-18/07/2007: **Master Degree in Theoretical Physics** (University degree giving access to PhD) at Università Roma Tre, Italy
  - Master Thesis title:*5D Differential Calculus and Noether Analysis of Translation Symmetries in κ-Minkowski Noncommutative Spacetime*
    Supervisors: Dr. G. Amelino-Camelia and Prof. O. Ragnisco
  - Date of award: 18/07/2007 – Final grade: 110/110 cum laude.
- ◇ 01/10/2001-22/07/2004: **Bachelor Degree in Physics** at Università degli Studi di Perugia, Italy
  - Date of award: 22/07/2004 – Final grade: 110/110 cum laude.

• Prizes and Awards

- ◇ 01/09/2020 - 31/08/2023: Marie Sklodowska–Curie Global Fellowship, Number: 841923, 2 years Perimeter Institute + 1 year 'Università di Udine'.
- ◇ Since February 2018: 'Qualification', corps Maître de conférences, Section 25 'Mathématique', Nr. de qualification 18225314970 – Qualification obtained for the position of Associate Professor in France, Section 'Mathematics'.
- ◇ Since February 2018: 'Qualification', corps Maître de conférences, Section 29 'Constituants élémentaires', Nr. de qualification 18229314970 – Qualification obtained for the position of Associate Professor in France, Section 'Elementary constituents'.
- ◇ Since March 2017: 'Abilitazione Scientifica Nazionale', II fascia, settore 02A2 – Qualification obtained for the position of Associate Professor in Italy, Section 'Theoretical physics of fundamental interactions'.

- ◇ 01/04/2008 – 31/03/2011: "Marie-Curie" PhD Fellowship from European project EU-NCG (Research Training Network in Noncommutative Geometry) in collaboration with CNRS, France.
- ◇ 01/07/2008 – 31/03/2011: 'Monitorat' Teaching Scholarship from 'Université de Provence' and CIES (Centres d'Initiation á l'Enseignement Supérieur), France.

• Teaching and Supervising Experience

- ◇ Since 01/12/2019: External supervisor of the Master thesis of the student Pietro Pinotti on the project "Quantum gravitational collapse and singularity resolution", 'Università degli Studi di Trieste', Italy.
- ◇ 01/12/2018 – 31/12/2019: External supervisor of the Master thesis of the student Alessandro Camilletti on the project "Constraint algebra of the effective quantum black hole dynamics", Università 'La Sapienza', Rome, Italy (Master thesis defended on 18/12/2019 with 110/110 cum laude).
- ◇ 01/06/2018 – 30/09/2019: External supervisor of the Master thesis of the student Roukaya Dekhil on the project "Effective Spacetime Geometry for Black Holes and Cosmology', Università di Padova, Italy (Master thesis defended on 23/09/2019 with 110/110).
- ◇ 01/10/2017 – 06/06/2019: Co-supervision of the PhD student Zahra Mirzaiyan on the project "Origin of Hawking quanta from the renormalized stress energy tensor vs. effective temperature", Erwin Schrödinger International Institute for Mathematical Physics, Vienna, Austria (PhD obtained on 09/2019).
- ◇ 01/10/2015 – 30/09/2017: Co-supervision of the PhD student Costantino Pacilio on the project "First order gravity in the orthogonal gauge", SISSA, Trieste, Italy (PhD obtained on 18/09/2018).
- ◇ 01/10/2016 – 30/09/2017: Co-supervision of the PhD student Marco Letizia on the project "Lorentz invariance in quantum spacetime", SISSA, Trieste, Italy (PhD obtained on 14/09/2017).
- ◇ 01/10/2015 – 30/09/2017: Co-supervision of the PhD student Ramit Dey on the projects "The origin of Hawking quanta and the black hole quantum atmosphere", "Spacetime thermodynamics in presence of torsion" SISSA, Trieste, Italy (PhD obtained on 14/09/2017).
- ◇ 24/07/2016 – 02/08/2016: Lectures on "Black Holes" at PSI 2016, Summer School on General Relativity at Petnica Summer Institute, Serbia (Invited Lecturer, total 6 hours).
- ◇ 01/04/2015 – 31/07/2015 :Teaching Assistant of Prof. H. Sahlmann for the course "General Relativity", Master Degree in Physics at 'Friedrich-Alexander-Universität' Erlangen-Nürnberg (total 80 hours).
- ◇ 01/10/2014 – 28/02/2015: Teaching Assistant of Prof. T. Thiemann for the course "QFT-2", Master Degree in Physics at 'Friedrich-Alexander-Universität' Erlangen-Nürnberg (total 80 hours).
- ◇ 01/04/2013 – 31/07/2014: Teaching Assistant of Prof. T. Thiemann for the course "QFT-1", Master Degree in Physics at 'Friedrich-Alexander-Universität' Erlangen-Nürnberg (total 80 hours).
- ◇ 01/10/2013 – 28/02/2014: Teaching Assistant of Prof. H. Sahlmann for the course "Quantum Gravity", Master Degree in Physics at 'Friedrich-Alexander-Universität' Erlangen-Nürnberg (total 80 hours).
- ◇ 01/10/2008 – 30/4/2011: 'Teaching Assistant of Prof. C. Marinoni for the course "Physique I", Licence (Bachelor) Degree in Physics at 'Université de Provence' Marseille (total 190 hours).

• Miscellaneous

- ◇ **h-index:** 19 (Source: Inspirehep.net).
- ◇ **Citations:** 976 (Source: Inspirehep.net).

- ◇ **Guest Editor:** Special Issue "Quantum Gravity Condensates" in *Symmetry* (MDPI) https://www.mdpi.com/journal/symmetry/special_issues/Quantum_Gravity_Condensates#editors
- ◇ **Referee for:** *Physical Review Letters*, *Physical Review D*, *Classical and Quantum Gravity*, *Nuclear Physics B*, *Physics Letters B*, *Annals of Physics*, *Journal of High Energy Physics*, *General Relativity and Gravitation*, *SIGMA*, *Entropy*, *Mathematical Reviews*, *Europhysics Letters*, *Fortschritte der Physik - Progress of Physics*, *European Physical Journal C, Universe, Modern Physics Letters A*.
- ◇ **Research monographs:** *Cosmological Dynamics and Quantum Black Holes from Group Field Theory Condensates*, by Steffen Gielen, Daniele Oriti, Daniele Pranzetti, Lorenzo Sindoni; contract signed with 'Springer International Publishing AG'. To be published in 2021.
- ◇ **Organisation of International conferences:**
  - Co-organizer of "Probing the spacetime fabric: from concepts to phenomenology", July 10 - 14 2017, SISSA, Trieste, Italy.
  - Local co-organizer of "Loops15", July 6 - 10 2015, 'Friedrich-Alexander-Universität' Erlangen-Nürnberg, Germany.
  - Co-organizer of "Workshop on quantum groups and physics", September 6 - 10 2010, University of Caen, France.

• Publications

1. L. Freidel, M. Geiller and D. Pranzetti, **"Edge modes of gravity - III: Corner simplicity constraints"**, e–print: hep-th/2007.12635.
2. E. Alesci, S. Bahrami and D. Pranzetti, **"Asymptotically de Sitter Universe inside a Schwarzschild black hole"**, Phys. Rev. D **102**, 066010 (2020), e–print: gr-qc/2007.06664.
3. L. Freidel, M. Geiller and D. Pranzetti, **"Edge modes of gravity - II: Corner metric and Lorentz charges"**, JHEP **11** (2020), 027, e–print: hep-th/2007.03563.
4. L. Freidel, M. Geiller and D. Pranzetti, **"Edge modes of gravity - I: Corner potentials and charges"**, JHEP **11** (2020), 026, e–print: hep-th/2006.12527.
5. L. Freidel, E. R. Livine and D. Pranzetti, **"Kinematical Gravitational Charge Algebra"**, Phys. Rev. D **101**, 024012 (2020), e–print: gr-qc/1910.05642.
6. L. Freidel, E. R. Livine and D. Pranzetti, **"Gravitational edge modes: From Kac-Moody charges to Poincaré networks"**, Class. Quant. Grav. **36**, no. 19, 195014 (2019), e–print: hep-th/1906.07876.
7. R. Dey, S. Liberati, Z. Mirzaiyan and D. Pranzetti, **"Black hole quantum atmosphere for freely falling observers"**, Phys. Lett. B **797**, 134828 (2019), e–print: gr-qc/1906.02958.
8. E. Alesci, S. Bahrami and D. Pranzetti, **"Quantum gravity predictions for black hole interior geometry"**, Phys. Lett. B **797**, 134908 (2019), e–print: gr-qc/1904.12412.
9. E. Alesci, S. Bahrami and D. Pranzetti, **"Quantum Evolution of Black Hole Initial Data Sets I: Foundations"**, Phys. Rev. D **98**, 046014 (2018), e–print: gr-qc/1807.07602.
10. L. Freidel and D. Pranzetti, **"Electromagnetic duality and central charge"**, Phys. Rev. D **98**, 116008 (2018), e–print: hep-th/1806.03161.
11. E. Alesci, C. Pacilio and D. Pranzetti, **"Orthogonal gauge fixing of first order gravity"**, Phys. Rev. D **98**, no. 4, 044052 (2018), e–print: gr-qc/1802.06251.
12. D. Oriti, D. Pranzetti and L. Sindoni, **"Black Holes as Quantum Gravity Condensates"**, Phys. Rev. D **97**, 066017 (2018), e–print: gr-qc/1801.01479.
13. R. Dey, S. Liberati and D. Pranzetti, **"Spacetime thermodynamics in the presence of torsion"**, Phys. Rev. D **96**, 124032 (2017), e–print: gr-qc/1709.04031.
14. R. Dey, S. Liberati and D. Pranzetti, **"The black hole quantum atmosphere"**, Phys. Lett. B **774**, 308 (2017), e–print: gr-qc/1701.06161.

15. L. Freidel, A. Perez and D. Pranzetti, **"Loop gravity string"**, Phys. Rev. D **95**, no. 10, 106002 (2017), e–print: gr-qc/1611.03668.
16. F. Cianfrani, J. Kowalski-Glikman, D. Pranzetti and G. Rosati, **"Symmetries of quantum spacetime in 3 dimensions"**, Phys. Rev. D **94**, no. 8, 084044 (2016), e–print: hep-th/1606.03085.
17. D. Oriti, D. Pranzetti and L. Sindoni, **"Horizon entropy from quantum gravity condensates"**, Phys. Rev. Lett. **116**, 211301 (2016), e–print: gr-qc/1510.06991.
18. D. Oriti, D. Pranzetti, J. P. Ryan and L. Sindoni, **"Generalized quantum gravity condensates for homogeneous geometries and cosmology"**, Class. Quant. Grav. **32**, no. 23, 235016 (2015), e–print: gr-qc/1501.00936.
19. D. Pranzetti, H. Sahlmann, **"Horizon entropy with loop quantum gravity methods"**, Phys. Lett. B **746** (2015) 209-216, e–print: gr-qc/1412.7435.
20. A. Ghosh, D. Pranzetti, **"CFT/Gravity Correspondence on the Isolated Horizon"**, Nucl. Phys. B **889**, 1 (2014), e–print: gr-qc/1405.7056.
21. D. Pranzetti, **"Turaev-Viro amplitudes from 2+1 Loop Quantum Gravity"**, Phys. Rev. D **89** (2014) 8, 084058, e–print: gr-qc/1402.2384.
22. D. Pranzetti, **"Geometric temperature and entropy of quantum isolated horizon"**, Phys. Rev. D **89**, 104046 (2014), e–print: gr-qc/1305.6714.
23. E. Frodden, A. Perez, D. Pranzetti and C. Röken, **"Modelling black holes with angular momentum in loop quantum gravity"**, Gen. Rel. Grav. **46** (2014) 12, 1828, e–print: gr-qc/1212.5166.
24. D. Pranzetti, **"Dynamical evaporation of quantum horizons"**, Class. Quant. Grav. **30**, 165004 (2013), e–print: gr-qc/1211.2702.
25. D. Pranzetti, **"Radiation from quantum weakly dynamical horizons in Loop Quantum Gravity"**, Phys. Rev. Lett. **109**, 011301 (2012), e–print: gr-qc/1204.0702.
26. K. Noui, A. Perez and D. Pranzetti, **"Non-commutative holonomies in 2+1 LQG and Kauffman's brackets"**, J. Phys. Conf. Ser. 360, 012040 (2012). e–print: gr-qc/1112.1825.
27. J. Diaz-Polo and D. Pranzetti, **"Isolated Horizons and Black Hole Entropy In Loop Quantum Gravity"**, SIGMA **8** (2012) 048, e–print: gr-qc/1112.0291.
28. K. Noui, A. Perez and D. Pranzetti, **"Canonical quantization of non-commutative holonomies in 2+1 loop quantum gravity"**, JHEP **1110** (2011) 036, e–print: gr-qc/1105.0439.
29. J. Engle, K. Noui, A. Perez and D. Pranzetti, **"The SU(2) Black Hole entropy revisited"**, JHEP **1105** (2011) 016, e–print: gr-qc/1103.2723.
30. D. Pranzetti, **"2+1 gravity with positive cosmological constant in LQG: a proposal for the physical state"**, Class. Quant. Grav. **28** (2011) 225025, e–print: gr-qc/1101.5585.
31. A. Perez, D. Pranzetti, **"Static isolated horizons: SU(2) invariant phase space, quantization, and black hole entropy"**, Entropy **13** (2011) 744, e–print: gr-qc/1011.2961.
32. J. Engle, K. Noui, A. Perez, D. Pranzetti, **"Black hole entropy from an SU(2)-invariant formulation of Type I isolated horizons"**, Phys. Rev. D **82** (2010) 044050, e–print: gr-qc/1006.0634.
33. A. Perez, D. Pranzetti, **"On the regularization of the constraints algebra of Quantum Gravity in 2+1 dimensions with non-vanishing cosmological constant"**, Class. Quant. Grav. **27** (2010) 145009, e–print: gr-qc/1001.3292.
34. G. Amelino-Camelia, G. Gubitosi, A. Marciano, P. Martinetti, F. Mercati, D. Pranzetti, R. A. Tacchi, **"First results of the Noether theorem for Hopf-algebra spacetime symmetries"**, Prog. Theor. Phys. Suppl. **171** (2007) 65, e–print: gr-qc/0710.1219.
35. G. Amelino-Camelia, A. Marciano, D. Pranzetti, **"On the 5D differential calculus and translation transformations in 4D kappa-Minkowski noncommutative spacetime"**, Int. J. Mod. Phys. A **24** (2009) 5445, e–print: hep-th/0709.2063.

- **Theses**

  - ◇ D. Pranzetti, **"TQFT and Loop Quantum Gravity: 2+1 theory and Black Hole Entropy"**, PhD Thesis, Université de Provence, 2011, http://www.theses.fr/2011AIX10032.
  - ◇ D. Pranzetti, **"5D Differential Calculus and Noether Analysis of Translation Symmetries in κ-Minkowski Noncommutative Space–time"**, Laurea (Master) Thesis, Università Roma Tre, 2007, e–print: hep-th/0710.1379.

- **Seminars and Conference Contributions**

1. October 2020: University of Warsaw, Poland
   Invited online seminar: *Edge Modes of Gravity.*
2. October 2020: IFPU, Trieste, Italy
   Invited online seminar: *Asymptotically de Sitter universe inside a Schwarzschild black hole.*
3. October 2020: Florida Atlantic University (FAU), USA and Fudan University, Shanghai, China
   Invited online seminar: *Edge Modes of Gravity: Part I-II.*
4. April 2020: International Loop Quantum Gravity Seminar
   Phone seminar: *Edge Modes of Gravity.*
5. June 2019: "Loops19" State College, Pennsylvania, USA
   Invited talk: *Quantum evolution of black hole initial data sets.*
6. June 2018: "Conference on Symmetries, Geometry and Quantum Gravity" Primosten, Croatia
   Plenary speaker: *Quantum deformation of spacetime symmetries in three dimensions.*
7. July 2017: "Probing the spacetime fabric: from concepts to phenomenology" SISSA Trieste, Italy
   Plenary speaker: *Generalized GFT condensates and horizon entropy.*
8. July 2017: "Loops17" University of Warsaw, Poland
   Plenary speaker: *New boundary degrees of freedom.*
9. November 2016: Perimeter Institute, Waterloo, Canada
   Invited seminar: *The loop gravity string.*
10. September 2016: International Loop Quantum Gravity Seminar
    Phone seminar: *CFT degrees of freedom from LQG boundary excitations.*
11. September 2016: "NEB 17 - Recent developments in gravity", Mykonos, Greece
    Talk: *Conformal symmetry and holography from quantum geometry.*
12. April 2016: "Workshop on Quantum Groups in Quantum Gravity", Waterloo, Canada
    Invited talk: *Quantum deformed symmetry and kappa-Poincaré from loop quantization.*
13. March 2016: "PAFT 2016, Current Problems in Theoretical Physics" , Vietri, Italy
    Invited talk: *Black Hole Entropy in Loop Quantum Gravity.*
14. November 2015: AEI, Potsdam, Germany
    Invited seminar: *Horizon entropy from quantum gravity condensates.*
15. July 2015: "Loops15" FAU Erlangen-Nürnberg, Germany
    Talk: *Quantum Black Hole in the full theory.*
16. May 2015: SISSA Trieste, Italy
    Invited seminar: *Black Hole Entropy in Loop Quantum Gravity.*
17. April 2015: IST Lisbon, Portugal
    Invited seminar: *Black Hole Entropy in Loop Quantum Gravity.*
18. April 2015: "Quantum Gravity in Paris", LPT, Paris XI-Orsay, France
    Invited talk: *Horizon entropy with LQG/CFT techniques.*

19. March 2015: University of Wroclaw, Faculty of Physics and Astronomy, Poland
    Invited seminar: *Turaev-Viro amplitudes from 2+1 Loop Quantum Gravity.*
20. December 2014: Université Paris Diderot-Paris 7, Laboratoire APC, Paris, France
    Invited seminar: *Black hole entropy in loop quantum gravity: old results and new perspectives.*
21. November 2014: Perimeter Institute, Waterloo, Canada
    Invited seminar: *CFT/Gravity correspondence on the isolated horizon.*
22. October 2014: UC Davis, California, USA
    Invited seminar: *Black hole entropy in loop quantum gravity.*
23. September 2014: "NEB 16 - Recent developments in gravity", Mykonos, Greece
    Invited talk: *CFT/Gravity correspondence on the isolated horizon.*
24. September 2014: "Conceptual and Technical Challenges for Quantum Gravity", Sapienza University of Rome, Italy
    Talk: *CFT/Gravity correspondence on the isolated horizon.*
25. May 2014: UNAM, Mexico City, Mexico
    Invited seminar: *Black hole entropy in loop quantum gravity.*
26. April 2014: "LQP34", University of Erlangen-Nürnberg, Germany
    Invited talk: *CFT/Gravity correspondence on the isolated horizon.*
27. February 2014: "Second EFI winter conference on Quantum Gravity", Tux, Austria
    Invited talk: *CFT/Gravity correspondence on the isolated horizon.*
28. July 2013: "Loops13", Perimeter Institute, Waterloo, Canada
    Talk: *Black hole entropy from KMS-states of quantum isolated horizons.*
29. July 2013: "GR20", Warsaw, Poland
    Invited talk: *Dynamical evaporation of quantum horizons*.
30. June 2013: "2nd MCCQG", Veli Lošinj, Croatia
    Talk: *Statistical mechanics of quantum horizons*.
31. November 2012: Perimeter Institute, Waterloo, Canada
    Invited seminar: *Dynamical evaporation of quantum horizons*.
32. July 2012: "MG13", Stockholm University, Sweden
    Talk: *Dynamical evaporation of quantum horizons*.
33. March 2012: "Quantum Gravity in Paris", University of Paris XI/VII, France
    Invited talk: *Radiation from quantum weakly dynamical horizons in LQG*.
34. May 2011: "LOOPS 11", CSIC, Madrid, Spain
    Talk: *Canonical quantization of non-commutative holonomies in 2+1 loop quantum gravity*.
35. May 2011:"LOOPS 11", CSIC, Madrid, Spain
    Talk: *Static Isolated Horizons: SU(2) invariant phase space, quantization and black hole entropy*.
36. May 2011: "Black Holes VIII", Niagara Falls, Ontario, Canada
    Talk: *Static Isolated Horizons: SU(2) invariant phase space, quantization and black hole entropy*.
37. April 2011: "IV annual meeting of EU-NCG network", 'S. Stoilow' Institute, Bucharest, Romania
    Invited talk: *Quantum groups and black hole entropy in loop quantum gravity*.
38. November 2010: AEI, Potsdam, Germany
    Invited seminar: *On the SU(2) invariant phase space and the quantization of generic isolated horizons*.
39. September 2010: "Workshop on quantum groups and physics", University of Caen, France
    Invited talk: *Quantum groups and black hole entropy in loop quantum gravity*.
40. September 2009: "II annual meeting of EU-NCG network", University of Copenhagen, Denmark
    Invited talk: *On the regularization of the constraints algebra of Quantum Gravity in 2+1 dimensions with non-vanishing cosmological constant*.

41. August 2009: "LOOPS 09", Beijing Normal University, China
    Talk: *On the regularization of the constraints algebra of Quantum Gravity in 2+1 dimensions with non-vanishing cosmological constant*.

• Funding

- ◇ 01/09/2020 - 31/08/2023: Marie Sklodowska–Curie Individual Fellowship (Project Cost EUR 255,768.00), Number: 841923, duration 3 years, 'Università di Udine', Italy.
- ◇ 01/10/2015–30/09/2017: Member of the Prof. Stefano Liberati's project "Probing the emergent spacetime fabric: from theory to phenomenology" funded by John Templeton Foundation, ID 51876, duration 2 years, SISSA, Italy.
- ◇ 01/10/2013–30/09/2015: Member of the Emerging Fields Initiative project "Quantum Geometry", coordinator Prof. Thomas Thiemann, University of Erlangen-Nürnberg, Germany.
- ◇ 01/10/2011–30/09/2013: Member of the Dr. Daniele Oriti's project "Microscopic structure and dynamics of quantum spacetime" funded by the Sofja Kovalevskaja Award (worth EUR 1,400,700) of the A. Von Humboldt Foundation, duration 5 years, AEI, Germany.
- ◇ 01/04/2008 – 31/03/2011: PhD fellowship from the Marie Curie actions-Research Training Networks project "Noncommutative Geometry", coordinator Prof. David Evans (total cost EUR 1,971,284), ID 31962, duration 4 years, CNRS, France.
- ◇ 01/07/2008 – 31/03/2011: 'Monitorat' Teaching Scholarship from CIES (Centres d'Initiation á l'Enseignement Supérieur), France.

• References

- ◇ **Prof. Laurent Freidel**
  Perimeter Institute for Theoretical Physics, Waterloo, Ontario, Canada,
  Email: lfreidel@perimeterinstitute.ca
- ◇ **Prof. Stefano Liberati**
  Scuola Internazionale Superiore di Studi Avanzati (SISSA), Trieste, Italy,
  Email: liberati@sissa.it
- ◇ **Prof. Alejandro Perez**
  Centre de Physique Théorique de Luminy, Université de Provence, Marseille, France,
  Email: perez@cpt.univ-mrs.fr
- ◇ **Prof. Jerzy Kowalski-Glikman**
  University of Wroclaw, Faculty of Physics and Astronomy, Poland,
  Email: jerzy.kowalski-glikman@ift.uni.wroc.pl

Davide Racco

✉

Academic Titles

Nov. 2020 — *Abilitazione Scientifica Nazionale – Professore II fascia, FIS 02/A2*
Valid until Nov. 2029

Sep. 2018 — Ph.D. Degree from the University of Geneva
Committee: Antonio Riotto (supervisor), Gian F. Giudice, Francesco Riva
Equipollenza con il titolo di dottore di ricerca obtained in Nov. 2019

Education and Research Positions

Oct. 2018 – present — **Postdoctoral Fellow**, Particle Physics group
Perimeter Institute for Theoretical Physics (Canada)

Oct. 2014 – Sep. 2018 — **Ph.D. in Physics**, *Université de Genève* (Switzerland)
Thesis: *"Theoretical Models for Dark Matter: from WIMPs to Primordial Black Holes"*
Supervisor: Antonio Riotto

Mar. 2017 – Sep. 2017 — Visit at *Institut de Física d'Altes Energies (IFAE)*, *UAB*, Barcelona (Spain)
Contact: José Ramón Espinosa

Oct. 2009 – Sep. 2014 — **Galilean School of Higher Education**, *Padova* (Italy)
Mark: 100/100 with honours. GPA: 29.75/30
The School of excellence of Padova, offering a combination of innovative training and research techniques. Galilean students are required to take 60 CFU of specialised courses in addition to the standard curriculum requirements.

Oct. 2012 – Jul. 2014 — **M.Sc. in Physics**, *University of Padova* (Italy)
Mark: 110/110 with honours. GPA: 30.00/30
Supervisors: Andrea Wulzer, Fabio Zwirner

Jul. – Sep. 2012 — CERN Summer Student Programme 2012. Supervisor: Patrizia Azzi
The 250 students selected for this programme have the opportunity to work with their supervisor on the project they are assigned to during their stay at CERN. In addition to the work in the experimental teams, Summer Students attend a dedicated series of lectures.

Oct. 2009 – Jul. 2012 — **B.Sc. in Physics**, *University of Padova* (Italy)
Mark: 110/110 with honours. GPA: 29.43/30
Supervisor: Marco Matone

Teaching Experience

2014 – 2018 — Teaching Assistant for 4 academic years for the course *Méthodes Mathématiques II*
Université de Genève, Professor: Antonio Riotto
Annual course, 2h/week (in French)

Sep. 2017 — Assistant for the Ph.D. course *Beyond the Standard Model*
TAE 2017 - International Summer School on HEP, Benasque (Spain)
Professor: Andrea Wulzer

Prizes and Grants

Jun. 2019 — *Prix Vacheron-Constantin 2019* for the best Ph.D. Thesis in Physics of the University of Geneva. *Award: automatic watch Vacheron-Constantin.*

Jan. 2019 — First Prize in the *Buchalter Cosmology Prize 2018* for the paper Phys. Rev. Lett. **120**, 121301 (2018). *Grant: 10,000 $, split among the three authors.*

Mar. – Sep. 2017 — Mobility Grant for Ph.D. Students from the *Fonds National Suisse de la recherche scientifique (FNS). Grant: 4800 CHF.*

Jul. 2015 — Grant from the University of Padova to support the outreach event *"L'intreccio di due infiniti"* organised with Davide Poletti. *Grant: 500 €.*

Oct. 2009 – Sep. 2014 — Galilean School full scholarship. *Grant: free accommodation and meals in Morgagni college, free extra courses instructed by internationally-famous professors, free language courses, free laptop, 650 €/year for textbooks, travel grant of 4000 €.*

Sep. 2013 — Grant from the Association "Amici dell'Università di Padova" to the top 10 Bachelor students from the University of Padova. *Grant: 2500 €.*

2007 – 2009	Grants from the Italian Ministry of Education for outstanding results in Mathematics and Physics competitions, and top grade in High School Diploma. *Total Grant: 5250 €.*
Jul. 2009	High School diploma, *Liceo Scientifico "A. Tassoni"*, Modena, Italy. Final grade: 100/100 with honours.
2008, 2009	Participated twice to the national level (third phase) of *Physics Olimpiads*; ranked among the top 32 contestants in 2009.
2006 to 2009	Participated four times to the national level (third phase) of *Mathematics Olimpiads*; ranked for three times among the top 40 contestants.
2005 to 2011	Participated seven times to the national competition of *Giochi Matematici*, organised by Bocconi University of Milano; qualified for the International phase in 2009.

Research Interests

The ultimate goal of my research lines is to address some major open questions of particle physics through the study of our present and early universe. In particular, I am interested in dark matter (focusing on various candidates such as WIMPs, PBHs, axions), signatures of the instability of the Higgs potential, and implications of gravitational waves and non-Gaussianities for high-energy physics.

Referee Activity

Peer-review referee for:

- *Journal of High Energy Physics (JHEP)*
- *Physical Review Letters (PRL)*
- *Physical Review D (PRD)*

Organisation of Seminars and Conferences

May 2021	Co-organizer of the "School on table-top experiments for fundamental physics" at Perimeter Institute (Canada). *Organizers*: A. Arvanitaki, S. Dimopoulos, P. Fierlinger, G. Gratta, J. Huang, M. Pospelov, D. Racco
2018 – 2019	Seminar organiser for the Particle Physics group at Perimeter Institute

Invited Talks at International Conferences

Oct. 2019	Gravitational waves outside the boxes, Perimeter Institute (Canada)
Sep. 2019	Next Frontiers in the Search for Dark Matter, GGI, Firenze (Italy)
Sep. 2019	Cosmo19, RTWH Aachen University (Germany)
Jul. 2018	Higgs Hunting 2018, Paris (France)
Feb. 2018	Rencontres de Physique de La Vallée d'Aoste, La Thuile (Italy)
Sep. 2015	Conference LFC15 – Physics prospects for linear and future colliders, ECT*, Trento (Italy)

Invited Seminars

Dec. 2020	"BSM pandemic" online seminar
Dec. 2020	Tel Aviv University (Israel
Nov. 2020	Johannes Gutenberg University Mainz (Germany)
Aug. 2020	IQOQI, Vienna (Austria)
Jan. 2020	University of Maryland (USA)
Dec. 2019	University of Amsterdam (Netherlands)
Nov. 2019	Lawrence Berkeley National Laboratory, Berkeley (USA)
Mar. 2019	TRIUMF, Vancouver (Canada)
Jun. 2018	Institut de Physique Théorique, Saclay (France)
May 2018	University of Nottingham (UK)
Feb. 2018	University of Padova (Italy)
Feb. 2018	University of Heidelberg (Germany)
Jan. 2018	Cosmo Coffee, CERN (Switzerland)
Dec. 2015	Observatoire Astronomique de Genève (Switzerland)
Mar. 2015	EPFL, Lausanne (Switzerland)
Mar. 2015	CMS-ATLAS Forum, CERN (Switzerland)

Books

- D. Racco et al.
  Problemi di matematica e fisica per l'ammissione alle scuole di eccellenza
  Zanichelli, Bologna (2019), ISBN: 9788808620606

Scientific Outreach

Oct. 2020	Organisation of the online outreach event *"Chiavi di Volta 2020"* (Italian) Five outreach scientific conferences about the prediction of the future
Apr. 2019	Conference at the *"Planetario Comunale"*, Modena, Italy
Mar. 2019	Organisation of the outreach event *"Chiavi di Volta 2019"*, Padova, Italy Six outreach scientific conferences about fake news and misinformation
Jul. 2018	Presenter at the outreach event *Nuit de la Science*, Geneva, Switzerland (French)
Apr. 2018	Participation to the competition *"Ma thèse en 3 minutes"* University of Geneva (video in French)
Nov. 2017	Speaker for "*La scienza a scuola*" by Zanichelli, *Liceo Pujati*, Sacile (PN), Italy
Nov. 2017	Speaker for "*La scienza a scuola*" by Zanichelli, *Liceo Da Vinci*, Treviso, Italy
Jul. 2017	Conference at the Festival *Gioie Musicali*, Asolo (TV), Italy
2014 – 2016	Various conferences at the High School *Tassoni*, Modena, Italy
Dec. 2016	Conference at the High School *Curiel*, Padova, Italy (video)
May 2016	Conference at the *Scuola Galileiana di Studi Superiori*, Padova, Italy
Feb. 2016	Conference at the *Centro Culturale "I due mulini"*, Castelfranco Veneto (TV), Italy (video)
May 2015	Participation to the FAMELAB competition, CERN, Switzerland (video in English)
Mar. 2014	Conference at the *"Planetario Comunale"*, Modena, Italy (video)

References

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Université de Genève & INFN Sez. di Roma
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Andrea Wulzer
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Fabio Zwirner
Univ. di Padova & INFN Sez. di Padova
zwirner@pd.infn.it

Languages

Italian	Native speaker
English	Fluent in written and spoken • TOEFL Certificate. Score: 113/120 • First Certificate of English
French	Fluent in written and spoken • Diplôme approfondi de langue française DALF **C1**. Score: 83.5/100
Spanish	Fluent in written and spoken • Diploma de Español DELE **C1**. Score: 73.67/100
German	Intermediate level • Goethe–Zertifikat **A2** (Start Deutsch 2). Score: 92/100

Computer Skills

Operating systems	Proficient: Linux, Windows.
Software	Proficient: Mathematica, LaTeX, MS – Office.
Coding languages	Good knowledge: C++, Python, ROOT.

Publications

1. A. Arvanitaki, S. Dimopoulos, M. Galanis, D. Racco, O. Simon and J. Thompson
   Irreducible contributions to the dark sector abundance
   (to appear)

2. A. Hook, G. Marques-Tavares and D. Racco
   Causal gravitational waves as a probe of free streaming particles and the expansion of the Universe
   arXiv: 2010.03568

3. J. Huang, A. Madden, D. Racco and M. Reig
   Maximal axion misalignment from a minimal model
   JHEP **2010** (2020), 143, arXiv: 2006.07379

4. A. Hook, J. Huang and D. Racco
   Minimal signatures of the Standard Model in non-Gaussianities
   Phys. Rev. D **101** (2020) no.2, 023519, arXiv: 1908.00019

5. A. Hook, J. Huang and D. Racco
   Searches for other vacua II: A new Higgstory at the cosmological collider
   JHEP **2001** (2020) 105, arXiv: 1907.10624

6. G. Franciolini, G. F. Giudice, D. Racco and A. Riotto
   Implications of the detection of primordial gravitational waves for the Standard Model
   JCAP **1905** (2019) no.05, 022, arXiv: 1811.08118

7. N. Bartolo, V. De Luca, G. Franciolini, M. Peloso, D. Racco and A. Riotto
   Testing Primordial Black Holes as Dark Matter through LISA
   Phys. Rev. D **99** (2019) no.10, 103521, arXiv: 1810.12224

8. J. R. Espinosa, D. Racco and A. Riotto
   A Cosmological Signature of the Standard Model Higgs Vacuum Instability: Gravitational Waves
   JCAP **1809** (2018) n. 09, 012, arXiv: 1804.07732

9. J. R. Espinosa, D. Racco and A. Riotto
   Primordial Black Holes from Higgs vacuum instability: avoiding fine-tuning through an ultraviolet safe mechanism
   Eur. Phys. J. C **78**, n. 10, 806 (2018), arXiv: 1804.07731

10. J. R. Espinosa, D. Racco and A. Riotto
    A Cosmological Signature of the Standard Model Higgs Vacuum Instability: Primordial Black Holes as Dark Matter
    Phys. Rev. Lett. **120**, 121301 (2018), arXiv: 1710.11196
    - Featured as **Editors' suggestion** by APS, and accompanied by a press release in Physics
    - Awarded the First Prize of the *Buchalter Cosmology Prize 2018*

11. A. Ismail, A. Katz and D. Racco
    On Dark Matter Interactions with the Standard Model through an Anomalous Z'
    JHEP **1710** (2017) 165, arXiv: 1707.00709

12. F. Farakos, A. Kehagias, D. Racco and A. Riotto
    Scanning of the Supersymmetry Breaking Scale and the Gravitino Mass in Supergravity
    JHEP **1606**, 120 (2016), arXiv: 1605.07631

13. T. Jacques, A. Katz, E. Morgante, D. Racco, M. Rameez, A. Riotto
    Complementarity of DM Searches in a Consistent Simplified Model: the Case of Z'
    JHEP **1610** (2016) 071, arXiv: 1605.06513

14. E. Morgante, D. Racco, M. Rameez and A. Riotto
    The 750 GeV Diphoton excess, Dark Matter and Constraints from the IceCube experiment
    JHEP **1607**, 141 (2016), arXiv: 1603.05592

15. M. Biagetti, V. Desjacques, A. Kehagias, D. Racco and A. Riotto
    The Halo Boltzmann Equation
    JCAP **1604**, no. 04, 040 (2016), arXiv: 1508.07330

16. D. Abercrombie *et al.*
    Dark Matter Benchmark Models for Early LHC Run-2 Searches: Report of the ATLAS/CMS Dark Matter Forum
    Phys. Dark Univ. **26** (2019) 100371, arXiv: 1507.00966

17. J. Abdallah *et al.*
Simplified Models for Dark Matter Searches at the LHC
Phys. Dark Univ. **9-10** 8, arXiv: 1506.03116

18. D. Racco, A. Wulzer and F. Zwirner
Robust collider limits on heavy-mediator Dark Matter
JHEP **1505** (2015) 009, arXiv: 1502.04701

Proceedings

19. D. Racco
A cosmological signature of the Higgs instability: Primordial black holes
Nuovo Cimento C, Vol. 041 Issue 4 (2018)

20. D. Racco
Robust Collider Limits on Heavy-mediator Dark Matter
Frascati Phys. Ser. **61** (2016) 133

Unpublished

21. A. Kashlinsky et al.
Electromagnetic probes of primordial black holes as dark matter
arXiv: 1903.04424

22. D. Racco
Theoretical models for Dark Matter: from WIMPs to Primordial Black Holes
PhD Thesis, Université de Genève, 2018

Dr. ALDO RIELLO **CURRICULUM VITÆ**

RESEARCH & TEACHING POSITIONS HELD

2020-22 **Marie-Curie Fellow**, Physique théorique et mathématique, U. Libre de Bruxelles, Belgium
[Individual Fellowship IF@ULB – Marie Skłodowska-Curie COFUND actions, H2020]

2020 **PSI Fellow**, Perimeter Institute for Theoretical Physisc (PI), Canada
[Lecturer at the Perimeter Scholars International program, Master's and Graduate level]

Fall 2019 **Lecturer**, Dpt. of Mathematics, U. of Waterloo, Canada
[Lecturing for the Dept. of System Design, program of BioMedical Engineering]

May 2019 **CNRS Visiting Researcher**, Centre de Physique Théorique, Aix-Marseille U., France

2014-19 **(Senior) Postdoctoral Fellow**, Perimeter Institute, Canada

2011-14 **PhD student**, Centre de Physique Théorique, Aix-Marseille U., France
Supervisor: Prof. C. Rovelli

2011 Internship, Laboratoire Physique Théorique, U. Paris Sud-XI, Orsay, France
Supervisor: Prof. V. Rivasseau

2010 Internship, Lawrence Berkeley National Labs, Berkeley, USA
Supervisors: Prof. R. Cahn & Dr. S. Ho

keywords theoretical & mathematical physics; general relativity; quantum field theory; quantum gravity; finite and asymptotic boundaries in gravity and gauge theories; deformed phase spaces and deformed symmetries; higher gauge theories;

EDUCATION

2014 **PhD**, Centre de Physique Théorique, Aix-Marseille U., France
Grade: mention Très Honorable (pass with high honors)

2011 **Diplôme de l'ENS Paris Ulm**, École Normale Supérieure de Paris (ENS), France

2011 **MSc Theoretical Physics**, École Normale Supérieure & Paris VI, France
Grade: 16.7/20, mention Très Bien (pass with high honors), rank 4/26

2009 **BA**, Ecole Normale Supérieure de Paris (ENS), France
Grade: mention Très Bien (pass with high honors)

2008-09 Physics undergraduate, Scuola Normale Superiore (SNS), Pisa, Italy

QUALIFICATIONS

2020 **Abilitazione Scientifica Nazionale, 02/A2 FIS/02, Fascia II** (MIUR, Italian Government)
lasts 9 years, it allows to apply for permanent positions at the Assistant Prof. level

2016 **Qualification Maître de Conférence, Sect. 29** (Conseil National des Universités, France)
lasts 4 years, it allows to apply for permanent positions at the Assistant Prof. level

FUNDING, PROMOTIONS, & SCHOLARSHIPS

2020 **Marie Curie Fellowship** (COFUND Marie Skłodowska-Curie actions & U. Libre de Bruxelles)
2-year fellowship, Physique théorique et mathématique, U. Libre de Bruxelles, Belgium

2019 **CNRS Visiting Researcher** (Centre National de la Recherche Scientifique, France)
1-month contract, Centre de Physique Théorique (CPT), Aix-Marseille U., France

2017-19 **Senior Postdoctoral Fellow (promotion)**
promotion awarded by the Perimeter Institute to 2 or 3 postdocs per year
+2 years contract extension, +25% in salary, and +40% in scientific grant

2011-14 **Allocation Moniteur Normalien (AMN)**
3yrs PhD scholarship awarded by ENS Paris, including instructorship contract

2008-11 **Selection Internationale Sciences**
selective 3yrs scholarship awarded by ENS Paris

2008-09 **Allievo della Classe di Scienze**
prestigious 5yrs scholarship awarded by SNS Pisa, rank 11/28

STUDENT SUPERVISION

2019 **Undergraduate student supervision** (with M. Dupuis, PSI Fellow, PI), B. Jayyusi
U. Waterloo, Canada (internship in progress)

2019 **Master student supervision**, D. Artigas Guimarey
U. Paris Sud & U. d'Aix-Marseille, France (grade: 16/20 Très Bien)
(Now PhD student at Paris Sud-XI, France & Jagiellonian U., Poland)

2016-19 **PhD student co-supervision**, C. Goeller
Supervisor: Dr. E. Livine, École Normale Supérieure de Lyon, France (defence: Nov 2019)

2016-19 Contribution to the supervision of two PhD students:
- F. Hopfmüller (PI, supervisor: Prof. L. Freidel): 2 articles + 1 in preparation
(Now a research scientist at 1QBit, Waterloo, ON Canada)
- C. Delcamp (PI, supervisor: Prof. B. Dittrich): 2 articles published
(Now a postdoc at the Max Planck Institute for Physics, Munich, Germany)

2017 **Master student supervision**, S. Srinivasan
PSI master program, Perimeter Institute (PI), Canada
(Then graduate studies in Maths at U. Manitoba, Canada; now PhD student at U. Waterloo)

2016 **Master student supervision**, C. Goeller
École Normale Supérieure de Lyon, France & Perimeter Institute, Canada
(Now PhD student at the Perimeter Institute & ENS Lyon)

2015 **Undergraduate student co-supervision**, J. Tot
NSERC -USRA fellow, co-supervised with Prof. Girelli, U. of Waterloo, Canada

TEACHING

Total contact hours: **232h**
(undergraduate: 170h, masters': 72 // lectures: 58h, tutorials: 56h; labs: 90h; other: 28h)

(2020) **Chern-Simons Theory**, Master's & PhD, Perimeter Institute, Canada
PSI Fellow assisting Prof. K. Costello: 9h Tutorials + 8h Office Hours

(2020) **Quantum Gravity**, Master's & PhD, Perimeter Institute, Canada
PSI Fellow lecturing & assisting Prof. B. Dittrich: 9h Tutorials + 8h Office Hours

2019 **Advanced Engineering Math** [SYDE211], Undergraduate, BioMedical Eng., U. Waterloo, Canada
Lecturer, 36h Lecture + 12h Tutorials + 12h Office Hours + 2 midterms & 1 final exams

2017 **Special Relativity**, Master, African Institute for Mathematical Sciences, Sénégal
Lecturer, 18h lecture + 12h tutorial

2014 **General Relativity**, Master, Aix-Marseille U., France
TA for Prof. C. Rovelli, 4h lecture + 4h tutorial

2011-14 **Geometrical Optics**, Bachelor, Aix-Marseille U., France
TA for Prof. A. Perez and Prof. C. Fauquet, 10h tutorial + 54h lab

2011-14 **Physics for Biologists**, Bachelor, Aix-Marseille U., France
TA for Prof. M. Carrère, 36h lab

2011-13 **Teaching training**, 20 sessions, Aix-Marseille U., France

COMMUNITY & ORGANIZATION

2020 As a **PSI Fellow** (Lecturer), I was:
Teaching and mentoring the current cohort of PSI students
Coordinating the PSI program and its activities
Selecting the future cohort of PSI students

2019 As a **Lecturer** at UW, I mentored and managed 3 TAs (2 Master 's + 1 Graduate student)

2019-20 Member of 3 working groups within the **Perimeter Institute Inclusive Community Initiative**
Goal: to identify critical issues and propose concrete steps forward on a number of topics relevant for the PI community, in particular in relation to its most vulnerable members.
Mental Health (Chair) – advancing the support system available to the PI community through the organization of workshops, events, and round tables with a registered psychotherapist; we also successfully advocated for an in-house psychotherapist
PhD students – building a mentorship program for PhD students
Careers – devising ways to support students and postdocs in their career evolution

2016 **Organizer**: **QG^2 Workshop & School - Quantum Groups in Quantum Gravity**
Dept. of Applied Mathematics, University of Waterloo, ON Canada
co-organized with Prof. F. Girelli and Dr. M. Dupuis (U. of Waterloo)
funded by **Fields Institute** (10kCAD), U. of Waterloo (8kCAD), and PI (3kCAD)
4 mini-courses, 12 invited contributors, extended discussion sessions, 50 participants
Notable speakers: H. Verlinde (Princeton), S. Gukov (Caltech), S. Majid (Queen Mary U.), J. Barrett (U. Nottingham), B. Schroers (Heriot-Watt U.), H. Meinrenken (U. Toronto)

2015-16 **Organizer**: Quantum Gravity seminar series at Perimeter Institute

JOURNAL REFEREE

I serve as a referee for:
Physical Review D; *Nuclear Physics B*; *Classical and Quantum Gravity*; *General Relativity and Gravitation*

LANGUAGES

Italian: mother tongue

English, **French**: fluent

German: basic

SELECTED TALKS AS AN INVITED SPEAKER

2019 *Quantum Gravitational Models of Holography*
invited review talk for the International Loop Quantum Gravity Seminars (ILQGS)
(to be held on November 5, 2019)

2019 *Gauge v. Boundaries – The geometric perspective from field-space*
Fundamental Interactions seminar, Centre de Physique Théorique (CPT), Aix-Marseille U.

2018 *A unified geometric framework for Yang-Mills charges and dressings in finite regions*
seminar of Mathematical Physics, Centre de Recherche Mathématique (CRM), U. of Montreal

A unified geometric framework for Yang-Mills charges and dressings in finite regions
joint High Energy Physics seminar (U. Libre de Bruxelles, Vrije U. Brussel, K.U. Leuven, U. Mons)
Physics of the Universe, Fields and Gravitation, Mons U., Belgium

Quasi-local holography in nonperturbative 3D quantum gravity
Quantum Gravity meets Lattice QCD, ECT*, Trento, Italy

2017 *What's at the edge of 3D quantum gravity?*
ICMS Seminar, Heriot-Watt U. & Edinburgh U., Scotland

Entanglement entropy in 3D gauge theories and quantum gravity
LOOPS 2017, Instytut Fizyki Teoretycznej, U. of Warsaw, Poland
⋆ plenary

2016 *Field-space approach to gauge symmetries at boundaries*
Infrared Problems in QED and Quantum Gravity, Perimeter Institute, Canada

On asymptotic symmetries in classical general relativity
Classical and Quantum Symmetries in Mathematics and Physics
Satellite meeting of 7ECM, Friedrich Schiller U., Germany

2015 *Deformed holonomy-flux algebra in 3+1 gravity with a cosmological constant*
LOOPS 2015, Institute for Quantum Gravity, Friedrich-Alexander U., Germany

2014 *The melon graph in the EPRL-FK spinfoam model*
Quantum Gravity in Paris, U. d'Orsay (Paris Sud XI), France

2013 *Self-energy of the Lorentzian EPRL-FK model*
LOOPS 2013, Perimeter Institute, Canada

COLLOQUIA & OUTREACH

2019 *A Model of Quantum Geometro-Dynamics – On the Road to Quantum Gravity*
invited colloquium for the Physics Program at Bard College, Annandale-on-Hudson, NY, USA

2015 *From Uncle Albert to Quantum Geometry*
invited colloquium at the Scuola Galileiana di Studi Superiori, U. Padova, Italy

2014 *Cosmology - Dark Matter and Dark Energy*, organized with D. Trivisonno
2-day meeting for last-year high-school students at Liceo Fogazzaro, Vicenza, Italy

2013 *Space, Time and Relativity*, poster at the "Fête de la Science"
organized by the city of Marseille (France), for a general public, from children to adults

2012 Tutor at the IREM (Institute for Maths Research and Teaching) at U. d'Aix-Marseille
3-day internship on Cellular Automata for students of the Lycée Professionnel René Caillié

PUBLICATIONS [listings on inSPIRE-HEP, Google Scholar, Orcid, and arXiv]

Note: authors are always listed in alphabetical order
(PhD) = doctoral thesis
`o.a.` = open-access publication

Number of citations = 818; h-index = 17 (all metrics are from inSPIRE-HEP)

1. Asante, Dittrich, Girelli, AR, Tsimiklis. Quantum geometry from higher gauge theory.
Classical Quant.Grav. 37 (2020) [gr-qc/1908.05970] – `[53pp;5cit]`
2. AR. Soft charges from the geometry of field space.
JHEP 05 (2020) 125. – `o.a.[18pp;10cit]`
3. Goeller, Livine, AR. Non-Perturbative 3D Quantum Gravity: Quantum Boundary States and Exact Partition Function. *Gen. Rel. Grav.* 52 (2020), 24. [hep-th/1912.01968] – `[65pp;6cit]`
4. Freidel, Hopfmüller, AR. Asymptotic Renormalization in Flat Space: Symplectic Potential and Charges of Electromagnetism.
JHEP 10 (2019) 126. [hep-th/1904.04384v2] – `o.a.[33pp;10cit]`
5. Gomes, Hopfüller, AR. A unified geometric framework for boundary charges and dressings: non-Abelian theory and matter.
Nucl.Phys.B 941 (2019), 249-315 – `o.a.[67pp;18cit]`
6. Gomes, AR. Unified geometric framework for boundary charges and particle dressings.
Phys.Rev.D 98 (2018) 025013 – `o.a.[7pp;19cit]`
7. AR. Quantum edge modes in 3d gravity and 2+1d topological phases of matter.
Phys.Rev.D 98 (2018) 106002 – `o.a.[23pp;7cit]`
8. Dittrich, Goeller, Livine, AR. Quasi-local holographic dualities in non-perturbative 3d quantum gravity.
Classical Quant.Grav. 35 13LT01 (2018) – *Letters* [hep-th/1803.02759] – `CQG+ [21pp;19cit]`
9. Dittrich, Goeller, Livine, AR. Quasi-local holographic dualities in non-perturbative 3d quantum gravity II. From coherent quantum boundaries to BMS3 characters.
Nucl.Phys.B 938 (2019), 878-934 – `o.a.[57pp;21cit]`

10. Dittrich, Goeller, Livine, AR. Quasi-local holographic dualities in non-perturbative 3d quantum gravity I. Convergence of multiple approaches and examples of Ponzano–Regge statistical duals. *Nucl.Phys.B* 938 (2019), 807-877 – `o.a.[71pp;21cit]`
11. AR. Self-dual phase space for 3+1 lattice Yang–Mills theory. *Phys.Rev.D* 97 (2018) 025003 [hep-th/1706.07811] – `[26pp;11cit]`
12. Delcamp, Dittrich, AR. On entanglement entropy in non-Abelian lattice gauge theory and 3D quantum gravity. *JHEP* 11 (2016) 102 – `o.a.[31pp;33cit]`
13. Delcamp, Dittrich, AR. Fusion basis for lattice gauge theory and loop quantum gravity. *JHEP* 02 (2017) 061 – `o.a.[69pp;42cit]`
14. Gomes, AR. The observer's ghost: notes on a field space connection. *JHEP* 05 (2017) 017 – `o.a.[19pp;22cit]`
15. Han, Haggard, Kamiński, AR. SL(2,C) Chern-Simons theory, flat connections, and four-dimensional quantum geometry. *Adv. Theor. Math. Phys.* 23 (2019) [hep-th/1512.07690v2] – `[60pp;24cit]`
16. Han, Haggard, Kamiński, AR. Four-dimensional quantum gravity with a cosmological constant from three-dimensional holomorphic blocks. *Phys.Lett.B* 752 (2016), 258–262 – `o.a.[5pp;41cit]`
17. Han, Haggard, AR. Encoding curved tetrahedra in face holonomies: a phase space of shapes from group-valued moment maps. *Ann.Henri Poincaré* 17 (2016), 2001–2048 [math-ph/1506.03053] – `[48pp;33cit]`
18. Han, Haggard, Kamiński, AR. SL(2,C) Chern-Simons theory, a non-planar graph operator, and 4D loop quantum gravity with a cosmological constant: semiclassical geometry. *Nucl.Phys.B* 900 (2015), 1–79 – `o.a.[79pp;63cit]`

(PhD) AR. Radiative Corrections in Spinfoam Quantum Gravity. *Ph.D. Thesis*, July 2014

19. Chirco, Haggard, AR, Rovelli. Spacetime thermodynamics without hidden degrees of freedom. *Phys.Rev.D* 90 (2014), 044044 [gr-qc/1401.5262] – `[14pp;30cit]`
20. AR. Radiative corrections to the Lorentzian Engle-Pereira-Rovelli-Livine and Freidel-Krasnov spinfoam graviton. *Phys.Rev.D* 89 (2014), 06402 [gr-qc/1310.2174] – `[11pp;7cit]`
21. AR. Self-energy of the Lorentzian Engle-Pereira-Rovelli-Livine and Freidel-Krasnov model of quantum gravity. *Phys.Rev.D* 88 (2013), 024011 [gr-qc/1302.1781] – `[30pp;65cit]`
22. Christodoulou, Långvik, AR, Röken, Rovelli. Divergences and orientation in spinfoams. *Classical Quant.Grav.* 30 (2013), 055009 [gr-qc/1207.5156] – `[10pp;32cit]`
23. Christodoulou, AR, Rovelli. How to detect an anti-spacetime. *Int.J.Mod.Phys.D* 21 (2012), 1242014 [gr-qc/1206.3903] – *Honorable Mention*, 2012 Essay Competition of the Gravity Research Foundation – `[5pp;21cit]`
24. Bonzom, Gurau, AR, Rivasseau. Critical behavior of colored tensor models in the large N limit. *Nucl.Phys.B* 853 (2011), 174–195 [hep-th/1105.3122v1] – `[20pp;243cit]`

Preprints

24. Gomes, AR. Notes on a few quasilocal properties of Yang-Mills theory.
June 2019. [hep-th/1906.00992] `[30pp;5cit]`

25. Gomes, AR. The quasilocal degrees of freedom of Yang-Mills theory.
March 2020. [hep-th/1910.04222v2] `[50pp;8cit]`
Submitted to: *SciPost Physics* [revisions to be resubmitted]

26. Gomes, AR. Large gauge transformations, gauge invariance, and the QCD θ_{YM}-term.
July 2020. [physics.hist-ph/2007.04013] `[50pp;1cit]`
Submitted to: *Studies in the History and Philosophy of Modern Physics*

27. AR. Symplectic reduction of Yang-Mills theory with boundaries: from superselection sectors to edge modes, and back. Nobvember 2020. [hep-th/2010.15894v2] `[39pp;1cit]`
To be submitted to: *JHEP*

Journal Impact factors (physics)

- Journal of High Energy Physics [5 articles] : 5.83
- SciPost Physics [1 article under revision] : 5.25
- Physical Review D [6 articles] : 4.37
- Physics Letters B [1 article] : 4.16
- Classical and Quantum Gravity [3 articles] : 3.49
- Nuclear Physics B [5 articles] : 3.19

Journal Impact factors (mathematical physics)

- Advances in Theoretical and Mathematical Physics [1 article] : 1.67
- Annales Henri Poincaré [1 article] : 1.58

A MORE COMPLETE LIST OF TALKS

2019 *Gauge v. Boundaries – The geometric perspective from field-space*
▷ Fundamental Interactions seminar, Centre de Physique Théorique (CPT), Aix-Marseille U.

2018 *A unified geometric framework for Yang-Mills charges and dressings in finite regions*
▷ seminar of Mathematical Physics, Centre de Recherche Mathématique (CRM), U. of Montreal

▷ High Energy Physics joint seminar (U.Libre de Bruxelles, Vrije U.Brussel, K.U.Leuven, U.Mons) at the unité de recherche Physics of the Universe, Fields and Gravitation, U. Mons, Belgium

▷ International Loop Quantum Gravity Seminar (ILQGS) (online seminar series, slides available here)

Quasi-local holography in nonperturbative 3D quantum gravity
▷ talk at Quantum Gravity meets Lattice QCD, ECT*, Trento, Italy

What's at the edge of 3d quantum gravity?
▷ seminar at the Laboratoire de Physique Théorique, U. d'Orsay (Paris Sud XI), France

2017 *What's at the edge of 3d quantum gravity?*
▷ seminar at the Centre for Mathematical Sciences, U. of Nottingham, UK
▷ seminar at the ICMS, Heriot-Watt U. & Edinburgh U., Scotland

Entanglement entropy in 3D gauge theories and quantum gravity
▷ talk at LOOPS 2017, Instytut Fizyki Teoretycznej, U. of Warsaw, Poland

2016 *Field-space approach to gauge symmetries at boundaries*
▷ talk at Infrared Problems in QED and Quantum Gravity, Perimeter Institute, Canada

The observer's ghost
▷ International Loop Quantum Gravity Seminar (ILQGS) (online seminar series)

Entanglement entropies in 3d gauge theories
▷ seminar at the Laboratoire Charles Coulomb, U. de Montpellier, France
▷ seminar at the Laboratoire de Physique Théorique de Lyon, ENS Lyon, France
▷ seminar at the Albert Einstein Institute (AEI), Max Planck Gesellschaft, Golm, Germany

The observer's ghost: a covariant differential in field space and its applications to YM and GR
▷ seminar at the Centre de Physique Théorique (CPT), U. d'Aix-Marseille, France

On asymptotic symmetries in classical general relativity
▷ talk at the Classical and Quantum Symmetries in Mathematics and Physics satellite meeting of 7ECM, Friedrich Schiller U., Germany

On finite regions, symmetries, and observers in general relativity
▷ talk at Carlofest, U. d'Aix-Marseille, France

2015 *Deformed holonomy-flux algebra in 3+1 gravity with a cosmological constant*
▷ talk at LOOPS 2015, Institute for Quantum Gravity, Friedrich-Alexander U., Germany

From holonomy observables to 3+1 quantum gravity with a cosmological constant
▷ talk at the Quantum Gravity Meeting in Rome 2015, U. La Sapienza, Roma, Italy

Towards Covariant Loop Quantum Gravity with a Cosmological Constant
▷ talk at the General Relativity and Gravitation, Centennial Conference, Penn State U., USA

Curved-geometry reconstruction from holonomies and 4d spinfoams with a cosmological constant
▷ seminar at the UW Quantum Gravity Group, U. of Waterloo, Canada

Toward 4d Quantum Gravity with a Cosmological Constant from SL(2,C) Chern-Simons Theory
▷ seminar at the Laboratoire de Physique Théorique de Lyon, ENS Lyon, France

2014 *SL(2,C) Chern-Simons theory and spinfoam gravity with a cosmological constant*
▷ International Loop Quantum Gravity Seminar (ILQGS) (phone seminar series)

The melon graph in the EPRL-FK spinfoam model
▷ talk at Quantum Gravity in Paris, U. d'Orsay (Paris Sud XI), France

2013 *Divergences in spinfoam gravity*
▷ seminar for the Quantum Gravity seminar series, Perimeter Institute, Waterloo, Canada

Self-energy of the Lorentzian EPRL-FK model
▷ talk at LOOPS 2013, Perimeter Institute, Canada

Radiative corrections in spinfoam quantum gravity
▷ talk at the Quantum Vacuum and Gravitation (QVG1203) workshop Institut de Recherche en Astrophysique et Planétologie, Toulouse, France

Fabrizio Rompineve Sorbello

Education

11/2013-04/2017: Ph.D. student in Theoretical Physics, University of Heidelberg, Germany.
Advisor: Arthur Hebecker. Thesis: *Imprints of Quantum Gravity on Large Field Inflation and Reheating.* Final Grade: *summa cum laude* (top grade).

08/2016-12/2016: Visiting Ph.D. student at New York University (NYU), Center for Cosmology and Particle Physics (CCPP), USA.
Supervisor: Matthew Kleban. Research area: *string inflation*, *axion cosmology.*

2011-2013: M.Sc. in Physics, Ecole polytechnique fédérale de Lausanne (EPFL), Switzerland. G.P.A. 5.67/6.
Master thesis: *Weak Scale Baryogenesis in a supersymmetric scenario with R-parity violation*, Advisor: Riccardo Rattazzi.

2009-2011: B.Sc. in Physics, "Sapienza" University of Rome, Italy. Final Grade: 110/110 *cum laude.*
Final dissertation: *Evolution of Compact Binary Systems and Emission of Gravitational Waves*, Advisor: Valeria Ferrari.

2008-2009: Bachelor studies in Physics, University of Catania, Italy.

2003-2008: High School studies at Liceo Scientifico "Leonardo", Giarre (CT), Italy. Final Grade: 100/100 *cum laude.*

Professional Experience

10/2019-today: postdoctoral researcher at Tufts University, Institute of Cosmology, Medford, USA.

09/2017-09/2019: postdoctoral researcher at Institut de Física d'Altes Energies (IFAE), Barcelona, Spain.

09/2013: research assistant in the group of Prof. Riccardo Rattazzi at EPFL, Switzerland.

Awards and Scholarships

2018: Otto Haxel Prize for the best Ph.D. thesis in Physics among the Universities of Heidelberg, Karlsruhe and Göttingen (2017): 3rd prize.

2016: Travel Grant from the Heidelberg Graduate School of Fundamental Physics (HGSFP) for a 5 months research stay at the Center for Cosmology and Particle Physics, NYU.

09/2014-09/2015: DAAD (German Academic Exchange Service) PhD fellowship.

10/2013: Winner of the *Prix SHS* at EPFL, awarded for work in Philosophy of Science.

2012, 2014, 2015: Winner of scholarships offered by INPDAP (Italian National Insurance Institute for Civil Servants), based on academic results.

2012: EPFL summer intern in the group of Prof. Riccardo Rattazzi.

2009-2011: *Percorso d'Eccellenza* (Excellence Program), at *Sapienza* University of Rome. The program is reserved to students who maintain a G.P.A. higher than 27/30 during their studies.

Teaching Experience

Tufts University:

2019. Two lectures on *Electricity and Magnetism*, as replacement for Prof. Mark Hertzberg.

March 2020. Four lectures on *General Relativity and Cosmology*, as replacement for Prof. Mark Hertzberg.

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Universidad Autonoma de Barcelona (UAB), 2018: Assistant for *General Relativity and Cosmology*, Prof. Eduard Masso.

University of Heidelberg, 2013-2015: Teaching assistant for

Quantum Field Theory II, Prof. Timo Weigand.

Statistical Physics, Prof. Luca Amendola.

Quantum Field Theory in Curved Backgrounds, Prof. Joerg Jaeckel.

EPF Lausanne, 2011-2013: Teaching assistant for

General Physics I for Chemists, Prof. Giorgio Margaritondo.

General Physics III and IV for Electrical Engineers, Prof. Marco Grioni.

Analytical Mechanics for Physicists, Prof. Paolo De Los Rios.

***Sapienza* University of Rome, 2011**: Teaching assistant for *Laboratory of Electromagnetism and Circuits*, Prof. G. D'Agostini.

Student supervision

Since my PhD studies, I have collaborated with several BSc, MSc and PhD students on the preparation of their theses and/or on specific research papers, as well as offered informal academic advice. In total, I have informally acted as co-supervisor for two BSc theses and I have co-supervised the work of three PhD students for specific research papers.

Invited seminar talks

September 2020. Theory Seminar, Washington University in St. Louis, (USA).

May 2020. Theory talk, University of Bilbao, (Spain).

May 2020. Joint Tufts / MIT Tuesday Cosmology Seminars (USA).

March 2020. Theory Seminar, The Leinweber Center for Theoretical Physics at the University of Michigan, Ann Arbor (USA), (postponed due to covid-19).

March 2020. Theory Seminar, University of Massachusetts, Amherst (USA).

2019. Theory Talk, University of Sussex (UK).

2019. Theory Talk, DESY Hamburg (Germany).

2019. Theory Talk, IFT Madrid (Spain).

2018. Theory Talk, Universidad de Granada (Spain).

2017. Review Talk on *The Weak Gravity Conjecture and String Inflation*, Avogadro Meeting, University of Padua (Italy).

2017. Theory Talk, Universidad de Barcelona (Spain).

2016. Theory Talk, University of Maryland (USA).

2015. Van Swinderen Institute for Particle Physics and Gravity, University of Groningen (Netherlands).

2014. Theory Seminar, Bethe Center for Theoretical Physics, University of Bonn (Germany).

Conference talks and Workshops Invitations

July 2020. Talk at *New England Theoretical Cosmology, Gravity and Fields Workshop*, hosted online by Dartmouth College, USA.

April 2020. Workshop on *Beyond the Standard Models: Particle Physics Meets Cosmology*, Instituto de Fisica Teorica, Madrid, Spain (postponed).

2019. Workshop on *Axions in the Lab and in the Cosmos*, CERN, Switzerland.

2019. Workshop on *Light Scalars: origin, cosmology, astrophysics and experimental probes*, Benasque, Spain.

2018. Parallel session talk at *SUSY 2018*, Barcelona, Spain.

2018. Talk at *Cosmological Probes of Beyond the Standard Model*, Benasque, Spain.

2016. Parallel session talk at *String phenomenology 2016*, Ioannina, Greece.

2016. Parallel session talk at *XXVIII Beyond the Standard Model Workshop*, Bad Honnef, Germany.

2015. Parallel session talk at *String phenomenology 2015*, Madrid, Spain.

2015. Parallel session talk at *XXVII Beyond the Standard Model Workshop*, Bad Honnef, Germany.

Additional skills

Referee for the journals JCAP, JHEP.

Favorable report for tenure-eligible lecturer positions in Catalunya (ES).

Languages: Italian (native), English (fluent), Spanish (fluent), Portuguese (fluent), French (good), German (good).

Computer experience: C, Fortran, Python, Mathematica, Matlab, Latex.

List of publications and preprints

1 M. Hertzberg, F. Rompineve and J. Yang *Decay of Boson Stars with Application to Glueballs and Other Real Scalars*, *arXiv:2010.07927*.

2 M. Hertzberg, F. Rompineve and N. Shah *Quantitative Analysis of the Stochastic Approach to Quantum Tunneling*, Phys. Rev. D **102**, 076003, *arXiv:2009.00017*.

3 M. Gonzalez, M. Hertzberg and F. Rompineve, *Ultralight Scalar Decay and the Hubble Tension*, JCAP **2010** (2020) 028, *arXiv:2006.13959*.

4 G. Ballesteros, A. Notari and F. Rompineve, *The H_0 tension: ΔG_N vs. ΔN_{eff}*, JCAP **2011** (2020), 024, *arXiv:2004.05049*.

5 B. von Harling, A. Pomarol, O. Pujolàs and F. Rompineve, *Peccei-Quinn Phase Transition at LIGO*, JHEP **2004** (2020) 195, *arXiv:1912.01638*.

6 G. Ballesteros, J. Rey and F. Rompineve, *Detuning primordial black hole dark matter with early matter domination and axion monodromy*, JCAP **2006** (2020) 014, *arXiv:1912.01638*.

7 J. Ollé, O. Pujolàs and F. Rompineve *Oscillons and Dark Matter*, JCAP **2002** (2020) no.02, 006, *arXiv:1906.06352*.

8 P. Baratella, A. Pomarol and F. Rompineve, *The Supercooled Universe*, JHEP **1903** (2019) 100, *arXiv:1812.06996*.

9 F. Ferrer, E. Masso, G. Panico, O. Pujolas and F. Rompineve, *Primordial Black Holes from the QCD axion*, Phys.Rev.Lett. **122** (2019) no.10, 101301, *arXiv:1807.01707*.

10 M. Farina, D. Pappadopulo, F. Rompineve and A. Tesi, *The photo-philic QCD axion*, JHEP **1701** (2017) 095, *arXiv:1611.09855*.

11 A. Hebecker, J. Jaeckel, F. Rompineve and L. T. Witkowski, *Gravitational Waves from Axion Monodromy*, JCAP **1611** (2016) no.11, 003, *arXiv:1606.07812*.

12 A. Hebecker, F. Rompineve and A. Westphal, *Axion Monodromy and the Weak Gravity Conjecture*, JHEP **1604** (2016) 157, *arXiv:1512.03768*.

13 A. Hebecker, P. Mangat, F. Rompineve and L. T. Witkowski, *Winding out of the Swamp: Evading the Weak Gravity Conjecture with F-term Winding Inflation?*, Phys. Lett. B **748** (2015) 455, *arXiv:1503.07912*.

14 A. Hebecker, P. Mangat, F. Rompineve and L. T. Witkowski, *Tuning and Backreaction in F-term Axion Monodromy Inflation*, Nucl. Phys. B **894** (2015) 456, *arXiv:1411.2032*.

15 A. Hebecker, P. Mangat, F. Rompineve and L. T. Witkowski, *Dark Radiation predictions from general Large Volume Scenarios*, JHEP **1409** (2014) 140, *arXiv:1403.6810*.

16 F. Rompineve, *Weak Scale Baryogenesis in a Supersymmetric Scenario with R-parity violation*, JHEP **1408** (2014) 014, *arXiv:1310.0840*.

Informazioni personali

Cognome nome

Pagina Web

ORCID

Email

Esperienza professionale

Scuola

Periodo	Settembre 2016-oggi
Nome del datore di lavoro	IIS Russell-Moro-Guarini
Tipo di azienda o settore	Scuola Secondaria di Secondo Grado
Tipo di impiego	Professore di Fisica
Principali mansioni e responsabilità	Insegnamento, Coordinamento Progetti Fondi Strutturali Europei, Amministrazione G Suite

Università e Ricerca

Abilitazione Scientifica Nazionale	Professore di Seconda Fascia - 02/A2 - FISICA TEORICA DELLE INTERAZIONI FONDAMENTALI - DAL 09/11/2020 AL 09/11/2029
Abilitazione Scientifica Nazionale	Professore di Seconda Fascia - 01/A4 - FISICA MATEMATICA - DAL 09/11/2020 AL 09/11/2029
Periodo	Settembre 2014-Settembre 2015
Nome del datore di lavoro	Politecnico di Torino
Tipo di azienda o settore	Università
Tipo di impiego	Assegno di Ricerca, SSD FIS/02
Principali mansioni e responsabilità	Ricerca in Fisica Teorica, Gravitazione
Periodo	2013
Nome del datore di lavoro	Politecnico di Torino
Tipo di azienda o settore	Università
Tipo di impiego	Incarico di Ricerca
Principali mansioni e responsabilità	Ricerca in Fisica Teorica, Gravitazione
Periodo	Novembre 2009-Ottobre 2011
Nome del datore di lavoro	Politecnico di Torino
Tipo di azienda o settore	Università
Tipo di impiego	Borsista Post-Doc
Principali mansioni e responsabilità	Ricerca in Fisica Teorica, Gravitazione
Periodo	Gennaio 2009-Ottobre 2009
Nome del datore di lavoro	Politecnico di Torino
Tipo di azienda o settore	Università
Tipo di impiego	Collaborazione
Principali mansioni e responsabilità	Ricerca in Fisica Teorica, Gravitazione
Periodo	Aprile 2006-Dicembre 2008

Nome del datore di lavoro	Politecnico di Torino
Tipo di azienda o settore	Università
Tipo di impiego	Assegno di Ricerca, SSD FIS/02-FIS/05
Principali mansioni e responsabilità	Ricerca in Fisica Teorica, Gravitazione e Astrofisica
Periodo	Gennaio 2004-Aprile 2006
Nome del datore di lavoro	Politecnico di Torino
Tipo di azienda o settore	Università
Tipo di impiego	Assegno di Ricerca, FIS/08
Principali mansioni e responsabilità	Ricerca in Fisica Teorica, Gravitazione e Astrofisica e Didattica della Fisica
Periodo	Gennaio 2009-Settembre 2020
Nome del datore di lavoro	Politecnico di Torino
Tipo di azienda o settore	Università
Tipo di impiego	Professore a Contratto, SSD FIS/01 MAT/06 MAT/03
Principali mansioni e responsabilità	Affidamento dei corsi di Fisica 1, Complementi di Matematica e Fondamenti di Fisica, Esercitazioni di Laboratorio Physics 1, Esercitazioni di Fisica 2, Geometria, Geometria B1, Matematica II
Periodo	Settembre 2015-Febbraio 2016
Nome del datore di lavoro	Università degli Studi di Torino
Tipo di azienda o settore	Università
Tipo di impiego	Borsista
Principali mansioni e responsabilità	Didattica della Fisica ed E-Learning
Periodo	2012-2015
Nome del datore di lavoro	Università degli Studi di Torino
Tipo di azienda o settore	Università
Tipo di impiego	Professore a Contratto, SSD FIS/08
Principali mansioni e responsabilità	Affidamento dei corsi di Laboratorio di Fondamenti di Didattica della Fisica, Preparazione di Esperienze Didattiche II, Laboratorio di Preparazione di esperienze didattiche I
Periodo	Maggio 2009-Settembre 2009
Nome del datore di lavoro	Università Telematica Internazionale Uninettuno
Tipo di azienda o settore	Università
Tipo di impiego	Ricercatore a Tempo Determinato, SSD FIS/01
Principali mansioni e responsabilità	Ricerca in Fisica Teorica, Insegnamento
Periodo	1 Gennaio 2019-31 Dicembre 2019
Nome del datore di lavoro	INFN, Sezione di Pisa
Tipo di azienda o settore	Ente di Ricerca
Tipo di impiego	Associazione come Docente nella Scuola Secondaria
Principali mansioni e responsabilità	Ricerca in Fisica Teorica, Gravitazione

Istruzione e formazione

Periodo	2013
Nome e tipo di istituto di istruzione e formazione	Ministero dell'Istruzione
Qualifica conseguita	Abilitazione per la classe A020 (ex A038) (insegnamento della fisica nella scuola secondaria superiore), come vincitore del Concorso Ordinario 2012
Periodo	2001-2003

Nome e tipo di istituto di istruzione e formazione	Politecnico di Torino
Qualifica conseguita	Dottorato di Ricerca in Fisica, Ciclo XVI, Vincitore di Borsa di Studio per il triennio 2001-2003
Principali materie / abilità professionali oggetto dello studio	Titolo della Tesi di Dottorato: Rotation Effects in Relativity, discussa il 26 Marzo 2004, Relatore: Prof. Angelo Tartaglia, Dipartimento di Fisica del Politecnico di Torino
Periodo	1994-2000
Nome e tipo di istituto di istruzione e formazione	Università degli Studi di Pisa
Qualifica conseguita	Diploma di Laurea in Fisica, con indirizzo Astrofisica e Fisica dello Spazio
Principali materie / abilità professionali oggetto dello studio	Titolo della Tesi di Laurea: Teoria di Einstein-Cartan come teoria dell'equilibrio di un continuo elastico quadridimensionale, discussa il 10 Luglio 2000, Relatore: Prof. Angelo Tartaglia, Dipartimento di Fisica del Politecnico di Torino, Relatore Interno: Prof. Elio Fabri, Dipartimento di Fisica dell'Università degli Studi di Pisa
Periodo	1989-1994
Nome e tipo di istituto di istruzione e formazione	Liceo Scientifico Statale "Federico II di Svevia", Melfi
Qualifica conseguita	Diploma di Maturità Scientifica

Capacità e competenze professionali

Madrelingua/e

Italiano

Altra/e lingua/e

Autovalutazione
Livello europeo(*)

	Comprensione		Parlato		Scritto
	Ascolto	Lettura	Interazione	Produzione orale	
Inglese	C2 Livello avanzato	C2 Livello avanzato	C1 Livello avanzato	C1 Livello avanzato	C2 Livello avanzato
Francese	B1 Livello intermedio	B2 Livello intermedio	B2 Livello intermedio	B2 Livello intermedio	A2 Livello elementare

(*) *Quadro comune europeo di riferimento per le lingue*

Capacità e competenze sociali	Sono in grado di lavorare in gruppo, perché da anni collaboro con gruppi di ricerca, e in questo periodo ho maturato la capacità di confrontarmi con colleghi, italiani e stranieri, e di collaborare con loro. Sono in grado di esemplificare concetti complessi perché nella mia esperienza di insegnamento cerco di andare incontro alle diverse esigenze di apprendimento degli studenti. Sono in grado di trovare punti di equilibrio fra posizioni discordanti, perché ho la capacità di ascoltare ed elaborare i punti di vista dei miei interlocutori.
Capacità e competenze organizzative	Sono in grado di organizzare, gestire e coordinare gruppo di lavoro. So organizzare eventi, perché ho fatto parte del comitato organizzativo di workshop e conferenze. Sono in grado di redigere domande di finanziamento anche complesse, perché ho contribuito alla realizzazione di domande per il finanziamento di progetti di ricerca in ambito italiano ed europeo.
Capacità e competenze tecniche	Sono un fisico teorico, mi occupo di teorie relativistiche della gravitazione e dei loro test osservativi. Mi occupo inoltre di tecnologie innovative per la didattica (e-learning). Padroneggio gli strumenti software necessari nel mio campo di ricerca e per approntare una didattica moderna, con l'ausilio di strumenti multimediali.
Capacità e competenze informatiche	Sistemi operativi Windows, OS X, Linux Applicativi di base e strumenti di amministrazione in Windows, OS X, Linux Software di calcolo simbolico MAPLE Linguaggio per la preparazione dei testi LaTeX Amministrazione delle piattaforme per la didattica on line Dokeos, Moodle

Amministrazione delle piattaforme per la gestione dei contenuti Joomla, Drupal, Mediawiki, Wordpress

Amministrazione delle piattaforme G Suite e Microsoft 365

Interessi Scientifici

La mia area di interesse principale riguarda lo studio degli effetti di rotazione in Relatività e degli spazi-tempi stazionari a simmetria assiale in cui questi effetti vengono descritti. Dal punto di vista teorico, e in particolare fisico-matematico, ho applicato tecniche di splitting spazio-temporale per lo studio di queste geometrie e per definire operativamente le grandezze misurabili[1]. Dal punto di vista sperimentale-osservativo, ho descritto alcuni effetti misurabili, sia in spazi-tempi piatti che curvi (prendendo in considerazione anche situazioni di interesse astrofisico). Fra questi, l'effetto Sagnac, gli effetti gravito-elettromagnetici [2] nei campi di sorgenti debolmente gravitanti, come l'effetto Lense-Thirring [3], gli effetti dei campi gravitazionali ed inerziali sulla propagazione delle onde di materia e luminose. In particolare, ho sudiato la possibilità di osservare effetti post-Newtoniani, in un laboratorio terrestre, usando ring laser [4]. Ho inoltre studiato teorie alternative alla Relatività Generale, come la teoria di Einstein-Cartan [5], le teorie di ordine superiore $f(R)$ [6], le teorie con torsione $f(T)$ [7], con particolare interesse per i loro limiti Newtoniani e post-Newtoniani, per valutarne la compatibilità con i test gravitazionali nel Sistema Solare [8]. Mi sono occupato dei sistemi di posizionamento relativistici [9], basati sull'introduzione delle coordinate di emissione (o coordinate luce), efficaci per la navigazione intorno alla Terra, utilizzando i segnali di satelliti in orbita terrestre, e per la navigazione nel sistema solare, usando i segnali provenienti da pulsar [10].

Pubblicazioni Selezionate

[1] Guido Rizzi and Matteo Luca Ruggiero. *Relativity in Rotating Frames, in the Series "Fundamental Theories of Physics"*, volume 135. Kluwer Academic Publishers - Springer Science Business Media, DORDRECHT – NLD, 2004. Edited Book

[2] Matteo Luca Ruggiero and Angelo Tartaglia. Gravitomagnetic effects. *Nuovo Cim.*, B117:743–768, 2002

[3] Lorenzo Iorio, Herbert I. M. Lichtenegger, Matteo Luca Ruggiero, and Christian Corda. Phenomenology of the Lense-Thirring effect in the Solar System. *Astrophys. Space Sci.*, 331:351–395, 2011

[4] F. Bosi, G. Cella, A. di Virgilio, A. Ortolan, A. Porzio, S. Solimeno, M. Cerdonio, J. P. Zendri, M. Allegrini, J. Belfi, N. Beverini, B. Bouhadef, G. Carelli, I. Ferrante, E. Maccioni, R. Passaquieti, F. Stefani, M. L. Ruggiero, A. Tartaglia, K. U. Schreiber, A. Gebauer, and J. P. R. Wells. Measuring Gravito-magnetic Effects by Multi Ring-Laser Gyroscope. *Phys. Rev.*, D84:122002, 2011

[5] Matteo Luca Ruggiero and Angelo Tartaglia. Einstein-Cartan theory as a theory of defects in space-time. *Am. J. Phys.*, 71:1303–1313, 2003

[6] Gianluca Allemandi, Mauro Francaviglia, Matteo Luca Ruggiero, and Angelo Tartaglia. Post-Newtonian parameters from alternative theories of gravity. *Gen. Rel. Grav.*, 37:1891–1904, 2005

[7] Lorenzo Iorio, Ninfa Radicella, and Matteo Luca Ruggiero. Constraining f(T) gravity in the Solar System. *JCAP*, 1508(08):021, 2015

[8] Matteo Luca Ruggiero and Lorenzo Iorio. Solar System planetary orbital motions and f(R) theories of gravity. *JCAP*, 0701:010, 2007

[9] Donato Bini, Andrea Geralico, Matteo Luca Ruggiero, and Angelo Tartaglia. Emission versus Fermi coordinates: Applications to relativistic positioning systems. *Class. Quant. Grav.*, 25:205011, 2008

[10] Angelo Tartaglia, Matteo Luca Ruggiero, and Emiliano Capolongo. A Null frame for spacetime positioning by means of pulsating sources. *Adv. Space Res.*, 47:645–653, 2011

Didattica e Formazione

Ambito Accademico

Ho svolto attività di supporto alla didattica durante il dottorato, svolgendo esercitazioni e tutorati per i corsi di Fisica presso il Politecnico di Torino. Successivamente, ho lavorato per l'Università Telematica Internazionale Uninettuno, come tutor per i Corsi di Fisica 1 e Fisica 2. A partire dal 2009, ho avuto la titolarità dei corsi di Matematica II, Geometria e Fisica I, Complementi di matematica e Fondamenti di Fisica presso il Politecnico di Torino, e di Laboratorio di Preparazione di Esperienze Didattiche I e Fondamenti di Didattica della Fisica presso l'Università degli Studi di Torino. Oltre all'attività didattica frontale, per il Politecnico ho lavorato allo sviluppo del sito Fisica in Linea che integra strumenti ipertestuali e multimediali per l'insegnamento della fisica di base, ho elaborato un database di test di autovalutazione on-line, ho realizzato un percorso didattico di autovalutazione per la Fisica di base per le attività di orientamento alla scelta universitaria. Ho lavorato sul sistema automatizzato di valutazione dell'apprendimento "TOL", in uso presso il Politecnico di Torino fino al 2010 [11], [12] e, successivamente, ho gestito la creazione di un database di domande di Fisica 1 e Fisica 2, su piattaforma Moodle, in uso dal 2015 per gli esami informatizzati presso il Politecnico di Torino. Ho collaborato alla realizzazione di un video corso di orientamento alla scelta universitaria, sempre presso il Politecnico di Torino, corredato di testi e materiale di autovalutazione. Sono stato correlatore di diverse tesi di Laurea triennale, su fisica della gravitazione e astrofisica, presso il Politecnico di Torino. Collaboro nell'ambito della ricerca in didattica della fisica con il gruppo di Didattica e Storia della Fisica del dipartimento di Fisica dell'Università di Torino, e sono stato correlatore di diverse tesi di laurea in Scienze dell'Educazione sull'insegnamento della fisica nella scuola primaria. Inoltre, partecipo al progetto Progetto Einsteinian Physics Education Research (EPER), coordinato da David Blair (Western Australia University, Perth) che si propone di introdurre le idee fondanti della fisica moderna, relatività e meccanica quantistica, in tutto il curriculum degli studi, dalla primaria alla secondaria di secondo grado; nell'ambito di questo progetto, sono correlatore di tesi di laurea. Insieme a G. Rizzi e P. Mandracci, ho realizzato il testo, in due Volumi, "Introduzione alla Fisica Classica", Volume I - Meccanica [13], Volume II - Termodinamica [14], rivolto agli studenti dei corsi di Fisica Generale dei primi anni delle facoltà scientifiche. Insieme a D. Daghero, R.C. Iotti, P. Mandracci ho realizzato il testo "Capire e Risolvere - Esercizi di Fisica Generale Meccanica e Termodinamica" [15], raccolta di esercizi e quiz a risposta multipla e "Problemi di Fisica- Meccanica e Termodinamica" [16], che raccoglie problemi e temi d'esame svolti, ed è integrato da una piattaforma di autovalutazione on line.

Pubblicazioni Selezionate

[11] Ruggiero M.L., A. Tartaglia, and E.Tresso. Valutazione dell'apprendimento in fisica: cinque anni di sperimentazione al politecnico di torino. *Giornale di Fisica della Società Italiana di Fisica*, 46:241, 2005

[12] Capizzo M.C., Ruggiero M.L., Tartaglia A., Tresso E., and Zarcone M. Valutazione dell'apprendimento in fisica mediante tol: la sperimentazione al politecnico di torino e all'università di palermo. In *Atti di Didamatica 2005*, ITA, 12-14 Maggio 2005. Associazione Italiana per l'Informatica ed il Calcolo

[13] Rizzi G, RUGGIERO M., and Mandracci P. *INTRODUZIONE ALLA FISICA CLASSICA VOL. I : MECCANICA*. Levrotto e Bella Libreria Editrice Universitaria, Torino – ITA, 2013

[14] Rizzi G, RUGGIERO M., and Mandracci P. *INTRODUZIONE ALLA FISICA CLASSICA VOL. II: TERMODINAMICA*. Levrotto e Bella Libreria Editrice Universitaria, Torino – ITA, 2013

[15] Daghero Dario, Iotti Rita Claudia, Mandracci Pietro, and Ruggiero Matteo Luca. *Capire e risolvere. Esercizi di Fisica Generale Meccanica e Termodinamica*. Società Esculapio Editrice, BOLOGNA – ITA, 2013

[16] Daghero Dario, Iotti Rita Claudia, Mandracci Pietro, and Ruggiero Matteo Luca. *Problemi di Fisica. Meccanica e Termodinamica*. Pearson, Milano, Torino – ITA, 2019

Insegnamenti Accademici

Anno Accademico 2000-2001	Esercitazioni e Tutorato di Fisica B e Fisica Sperimentale 2, Politecnico di Torino
Anno Accademico 2001-2002	Esercitazioni di Fisica Sperimentale II, Politecnico di Torino
Anno Accademico 2002-2003	Esercitazioni di Fisica Generale 1 e Fisica Sperimentale 2, Politecnico di Torino
Anno Accademico 2003-2004	Esercitazioni di Fisica Generale 1 e Fisica Sperimentale 2, Politecnico di Torino
Anno Accademico 2004-2005	Esercitazioni di Fisica Sperimentale 2, Politecnico di Torino
Anno Accademico 2005-2006	Esercitazioni di Fisica Generale 1 e Fisica Sperimentale II, Politecnico di Torino
Anno Accademico 2006-2007	Tutorato di Fisica Generale 1 e 2, Uninettuno
Anno Accademico 2007-2008	Esercitazioni di Fisica Sperimentale 2, Politecnico di Torino; Tutorato di Fisica Generale I e II, Uninettuno
Anno Accademico 2008-2009	Esercitazioni di Fisica Sperimentale 2, Politecnico di Torino; Tutorato di Fisica Generale I e II, Uninettuno
Anno Accademico 2009-2010	Affidamento dei corsi di Geometria e Matematica 2, Politecnico di Torino
Anno Accademico 2010-2011	Affidamento dei corsi di Fisica 1, Geometria, Geometria B e Matematica 2; Tutorato per i Corsi di Fisica Generale 1 e 2, Politecnico di Torino
Anno Accademico 2011-2012	Affidamento dei Corsi di Fisica 1 e Complementi di Matematica e Fondamenti di Fisica; Tutorato (Poli@Home) di Fisica II, Politecnico di Torino; Affidamento del Corso di Laboratorio di Preparazione di Esperienze Didattiche I, Università di Torino
Anno Accademico 2012-2013	Affidamento del Corso di Fisica 1, Politecnico di Torino; Affidamento del Corso di Laboratorio di Fondamenti di Didattica della Fisica, Università di Torino
Anno Accademico 2013-2014	Affidamento del Corso di Fisica 1, Politecnico di Torino; Affidamento dei Corsi di Preparazione di Esperienze Didattiche II e del Laboratorio di Fondamenti di Didattica della Fisica, Università di Torino
Anno Accademico 2014-2015	Affidamento del Corso di Fisica 1, Politecnico di Torino; Affidamento del Corso di Laboratorio di Fondamenti di Didattica della Fisica, Università di Torino
Anno Accademico 2015-2016	Affidamento dei Corsi di Fisica 1 e Complementi di Matematica e Fondamenti di Fisica; Esercitazioni di Fisica 2, Politecnico di Torino
Anno Accademico 2016-2017	Affidamento del Corso Complementi di Matematica e Fondamenti di Fisica e del Laboratorio di Physics 1, Politecnico di Torino
Anno Accademico 2017-2018	Affidamento del Corso Complementi di Matematica e Fondamenti di Fisica e del Laboratorio di Physics 1, Politecnico di Torino
Anno Accademico 2018-2019	Affidamento dei Corso di Fisica 1 e Complementi di Matematica e Fondamenti di Fisica; Esercitazioni di Fisica 1, Politecnico di Torino
Anno Accademico 2019-2020	Affidamento dei Corso di Fisica 1 e Complementi di Matematica e Fondamenti di Fisica, Politecnico di Torino

Ambito Scolastico

Dal 2016 sono docente di Fisica nella scuola secondaria di secondo grado. Oltre a svolgere attività didattica in classe e laboratorio (per il quale ho ottenuto un finanziamento di 3500 euro da parte della Fondazione CRT nel 2016) ho sviluppato diverse risorse digitali sia su piattaforma Moodle che G Suite. Inoltre, nell'ambito del progetto EPER, sperimento la possibilità di introdurre i concetti fondamentali della relatività a partire dal primo anno della scuola secondaria di secondo grado. Coordino il gruppo di lavoro che si occupa delle domande di finanziamento e della gestione dei progetti PON su Fondi Sociali Europei. In ambito didattico, . Faccio parte del Team Digitale della scuola e sono amministratore delle piattaforme G Suite e Microsoft365. Mi occupo di formazione per insegnanti, e ho tenuto diversi corsi e seminari sull'uso delle nuove tecnologie, con particolare riferimento all'insegnamento della Fisica.

Seminari e Corsi di Formazione

Anno Scolastico 2016-2017	Corso per insegnanti su *Sviluppo e Potenziamento delle Piattaforme E-Learning* @ Russell-Moro Guarini; Seminario per insegnanti *Fisica 2.0 (ovvero: una lezione digitale ma non troppo)* @ Dipartimento di Fisica dell'Università di Torino (15 Marzo 2017); Corso per studenti *Navigare con le stelle: la Relatività nei Sistemi di Posizionamento* @ Campus di Relatività, Marina di Massa

Anno Scolastico 2017-2018	Seminario per insegnanti *Come impostare una Didattica Laboratoriale e con l'utilizzo delle nuove tecnologie* @ Università di Torino, Progetto Lauree Scientifiche (7 Novembre 2017); Seminario per insegnanti *Nuove tecnologie e insegnamento della fisica. Alcuni spunti di riflessione* @ Dipartimento di Fisica dell'Università di Torino (30 Maggio 2018)
Anno Scolastico 2018-2019	Seminario per insegnanti *Web Tools for Physics* @ Dipartimento di Fisica dell'Università di Torino (27 Novembre 2018); Corso per insegnanti su *Introduzione all'uso di G Suite, Classroom, Utilizzo di base della LIM, Software per la didattica* @ Russell-Moro-Guarini; Corso per studenti *Fisica - Progetto Orientamento* @ Russell-Moro-Guarini
Anno Scolastico 2019-2020	Seminario per insegnanti *Smartphone in Classe?* @ Dipartimento di Fisica dell'Università di Torino (13 Febbraio 2020)

Soggiorni di Ricerca

Novembre 2010	*Canterbury University*, Christchurch (New Zealand)
Novembre 2017	*University of Western Australia*, Perth (Australia)

Conferenze, Workshop e Presentazioni Orali

Conferenze e Workshop

2001	GRG 16, International Conference on General Relativity and Gravitation, July 2001, Durban, South Africa; 2001 A Relativistic Space Time Odyssey, 25th John Hopkins Workshop, September 2001, Firenze, Italy
2002	Futuristic Space Technologies, First International ASI Workshop, May 2002, Trieste, Italy; Advances in General Relativity and Cosmology, International Conference in Memory of A. Lichnerowicz, June 2002, Isola d'Elba, Italy; Black Holes, Gravitational Waves and Cosmology, X ICRA Network Workshop, Roma-Pescara, July 2002; 15th SIGRAV Conference on General Relativity and Gravitational Physics, Monte Porzio Catone (Roma, Italy), September 2002; Meeting Annuale, Iniziativa Specifica INFN NA12, Vietri sul Mare (Sa), Ottobre 2002
2004	Dynamics and Thermodynamics of Black Holes and Naked Singularities, Dipartimento di Matematica, Politecnico di Milano, May 2004; Analysis, Manifolds and Geometric Structures in Physics, International Conference in Honour of Y. Choquet-Bruhat, June 2004, Isola d'Elba, Italy; GR17, International Conference on General Relativity and Gravitation, July 2004, Dublin, Ireland; 16th SIGRAV Conference on General Relativity and Gravitational Physics, Vietri sul Mare (Salerno, Italy), September 2004; Meeting Annuale, Iniziativa Specifica INFN NA12, S. Margherita Ligure (Genova, Italy), Ottobre 2004
2005	Spacetime in Action: one hundred years of relativity Pavia (Italy), March 29 - April 2, 2005; Didamatica 2005, Convegno promosso dall'Associazione Italiana per l'Informatica ed il Calcolo Automatico, Potenza 12-14 Maggio 2005; Meeting Annuale, Iniziativa Specifica INFN NA12, Torino (Italy), 27-28 Ottobre 2005
2006	Meeting Annuale, Iniziativa Specifica INFN NA12, Napoli (Italy), 26-27 Ottobre 2006
2008	Meeting Annuale, Iniziativa Specifica INFN NA12, Salerno (Italy), 2-3 Ottobre 2008
2009	Meeting Annuale, Iniziativa Specifica INFN NA12, Torino (Italy), 28-29 Settembre 2009
2010	ESA Workshop Relativistic Positioning systems: from a paradigm shift to practical applications, ESTEC, Noordwijk (The Netherlands), April 26 2010; 19th SIGRAV Conference on General Relativity and Gravitational Physics, Pisa (Italy), September 2010; Meeting Annuale, Iniziativa Specifica INFN NA12, Napoli (Italy), 25 Ottobre 2010
2011	GREAT-ES Workshop, Porto (Portugal) 6-9 June 2011; Meeting Collaborazione G-GranSasso, Laboratori Nazionali di Legnaro, INFN - Padova (Italy), 19 Dicembre 2011
2012	The Time Machine Factory, Torino, October 2012
2014	21nd SIGRAV Conference on General Relativity and Gravitational Physics, Alessandria (Italy), September 2014
2015	The Time Machine Factory, Torino, October 2015

2017	ACGRG99, Perth, Western Australia, 27-30 November 2017
2018	Fifteenth Marcel Grossmann Meeting - MG15, Rome, July 1-7, 2018
2019	DI.FI.MA. 2019 - Turin, October 9-11, 2019
2020	Einstein-First International Workshop - Perth, February 18-21, 2020
2020	Workshop INFN per l'infanzia - LNF - Rome, June 25-26, 2020

Presentazioni Orali

2004	*Rotation Effects and The Gravito-Magnetic Approach* @ 16th SIGRAV Conference on General Relativity and Gravitational Physics, Vietri sul Mare (Salerno, Italy), September 2004; *Gravitomagnetic Aharonov-Bohm Effect, Some Rotation Effects Revised* @ Analysis, Manifolds and Geometric Structures in Physics, International Conference in Honour of Y. Choquet-Bruhat, June 2004, Isola d'Elba, Italy
2005	*Post-Newtonian Parameters from Alternative Theories of Gravity* @ Meeting Annuale, Iniziativa Specifica INFN NA12, Torino (Italy), 27-28 Ottobre 2005
2006	*Solar System planetary orbital motions and f(R) Theories of Gravity* @ Meeting Annuale, Iniziativa Specifica INFN NA12, Napoli (Italy), 26-27 Ottobre 2006
2008	*Newtonian and Post-Newtonian Limits of f(R) Theories of Gravity and Physical Constraints* @ Meeting Annuale, Iniziativa Specifica INFN NA12, Salerno (Italy), 2-3 Ottobre 2008
2010	*A Laser Gyroscope System to Detect Gravitomagnetic Effects on Earth* @ 19th SIGRAV Conference on General Relativity and Gravitational Physics, Pisa (Italy), September 2010; *Pulsars as celestial beacons to detect the motion of the Earth* @ Meeting Annuale, Iniziativa Specifica INFN NA12, Napoli (Italy), 25 Ottobre 2010
2011	*Using Ring Laser Systems to Measure Gravitomagnetic Effects on Earth* @ GREAT-ES Workshop, Porto (Portugal) 6-9 June 2011; *Theory and Practice of Gravitomagnetism* @ Laboratori Nazionali di Legnaro, INFN - Padova (Italy), 29 November 2011; *Test di Fisica Fondamentale con G-GranSasso* @ Meeting Collaborazione G-GranSasso, Laboratori Nazionali di Legnaro, INFN - Padova (Italy), 19 December 2011
2014	*Ginger and Tests of General Relativity*@ 21nd SIGRAV Conference on General Relativity and Gravitational Physics, Alessandria (Italy), September 2014
2015	*Navigare con le Stelle*@ Festival dell'Innovazione e della Scienza, Settimo Torinese (Italy), October 2015
2017	*Navigating by the Stars* @ ACGRG99, Perth, Western Australia, 27-30 November 2017
2018	*Measuring the effects of the magnetic-like part of gravitational waves on spinning particles* and *Teaching Einsteinian concepts in the first years of Italian secondary schools: some preliminary results* @ Fifteenth Marcel Grossmann Meeting - MG15, Rome, July 1-7, 2018
2019	*Un percorso sperimentale sull'insegnamento dei concetti della fisica einsteiniana nell'ultimo anno della scuola primaria* @ DI.FI.MA. 2019 - Turin, October 9-11, 2019
2020	*Trials of Einsteinian Physics Education Programs in Italy* @ Einstein-First International Workshop - Perth, February 18-21, 2020
2020	*Is it possible to teach modern physics in primary school?* @ Workshop INFN per l'infanzia - LNF - Rome, June 25-26, 2020

Altre Attività

Attività Professionale

Editor	Universe, Experimental Results, Journal of High Energy Physics, Gravitation and Cosmology
Social Media Editor	Experimental Results
Editor	Guest Editor dello Special Issue di Universe: *Rotation Effects in Relativity*, https://www.mdpi.com/journal/universe/special_issues/rotation_effects

Editor	Guest Editor dello Special Issue di Entropy: *Gravitomagnetism and Quantum Mechanics*, https://www.mdpi.com/journal/entropy/special_issues/quantum_gravitomagnetism
Referee	Classical and Quantum Gravity, Scientific Reports, The Astrophysical Journal, JCAP, Foundations of Physics, New Astronomy, General Relativity and Gravitation, International Journal of Modern Physics D, Mathematical Reviews, Canadian Journal of Physics, Astronomy and Space Science, International Journal of Theoretical Physics, Comptes Rendus de l'Académie des Sciences, Europhysics Letters, Naturwissenschaften, Zeitschrift für Naturforschung A, European Physics Journal C, Physica Scripta, Physics Essays, European Physical Journal-Plus, Int. J. of Bifurcation and Chaos, Journal of Mathematical Physics, Journal of Earth Science Research

Organizzazione di Convegni, Mostre

2005	Organizzazione del Meeting Annuale dell'Iniziativa Specifica INFN NA12, Torino (Italy), Ottobre 2005; Organizzazione della mostra "La relatività nel quotidiano: dal GPS al sistema GALILEO", Politecnico di Torino, Ottobre 2005
2006	Membro del Comitato Organizzativo del Convegno "17th SIGRAV Conference on General Relativity and Gravitational Physics", Torino, Settembre 2006
2009	Organizzazione del Meeting Annuale dell'Iniziativa Specifica INFN NA12, Torino (Italy), Settembre 2009; Organizzazione della Mostra "Navigare con le Stelle" nell'ambito de "La Notte dei Ricercatori", Torino, Settembre 2009
2012	Organizzazione del Convegno "The Time Machine Factory", Torino, Ottobre 2012, Co-Chair, Membro del Comitato Scientifico e del Comitato Organizzatore
2013	Organizzazione del Convegno "Science and the Future", Torino, Ottobre 2013, Membro del Comitato Organizzatore
2015	Organizzazione del Convegno "The Time Machine Factory", Torino, Ottobre 2015, Membro del Comitato Scientifico e del Comitato Organizzatore
2018	Chairperson della Sessione ED1 - Teaching Einsteinian Physics to School Students, Fifteenth Marcel Grossmann Meeting - MG15, Rome, July 1-7, 2018

Partecipazione a progetti di ricerca nazionali e internazionali

PRIN 2005, La pulsar doppia e oltre: verso una nuova era della ricerca sulle pulsar

Progetto Regionale MAESS-2006 Development of a standardized modular platform for low-cost nano- and micro-satellites and applications to low-cost space missions and to Galileo

Progetto GNFM Coordinate Luce, 2005

Progetto Giovani Ricercatori GNFM Coordinate di tipo luce in spazio curvo, 2008

Partecipazione all'Iniziativa Specifica INFN Gravitation and Inflationary Cosmology - QGSKY

Partecipazione all'Iniziativa Specifica INFN G-GranSasso

Progetto Fisic@Lab, finanziamento di 3500 euro da parte della Fondazione CRT (2016) per un laboratorio didattico

Collaborazione al Progetto Einsteinian Physics Education Research (EPER)

Pubblicazioni

Articoli su Rivista

[P1]	Matteo Luca Ruggiero and Antonello Ortolan. Gravitomagnetic resonance in the field of a gravitational wave. *Phys. Rev. D*, 102:101501, Nov 2020
[P2]	Matteo Luca Ruggiero and Antonello Ortolan. Gravito-electromagnetic approach for the space-time of a plane gravitational wave. *Journal of Physics Communications*, 4(5):055013, may 2020
[P3]	Matteo Luca Ruggiero and Lorenzo Iorio. Probing a r^{-n} modification of the Newtonian potential with Exoplanets. *JCAP*, 06:042, 2020

[P4] Matteo Luca Ruggiero and Angelo Tartaglia. Test of gravitomagnetism with satellites around the Earth. *Eur. Phys. J. Plus*, 134(5):205, 2019

[P5] Lorenzo Iorio and Matteo Luca Ruggiero. Constraining some r^{-n} extra-potentials in modified gravity models with LAGEOS-type laser-ranged geodetic satellites. *JCAP*, 1810(10):021, 2018

[P6] Angelo Tartaglia, David Lucchesi, Matteo Luca Ruggiero, and Pavol Valko. How to use the Sun-Earth Lagrange points for fundamental physics and navigation. *Gen. Rel. Grav.*, 50:9, 2018

[P7] Emmanuele Battista, Angelo Tartaglia, Giampiero Esposito, David Lucchesi, Matteo Luca Ruggiero, Pavol Valko, Simone Dell' Agnello, Luciano Di Fiore, Jules Simo, and Aniello Grado. Quantum time delay in the gravitational field of a rotating mass. *Class. Quant. Grav.*, 34(16):165008, 2017

[P8] Angelo Tartaglia, Angela Di Virgilio, Jacopo Belfi, Nicolo' Beverini, and Matteo Luca Ruggiero. Testing general relativity by means of ringlasers. *Eur. Phys. J. Plus*, 132(2):73, 2017

[P9] Gabriel Farrugia, Jackson Levi Said, and Matteo Luca Ruggiero. Solar System tests in f(T) gravity. *Phys. Rev.*, D93(10):104034, 2016

[P10] Lorenzo Iorio, Matteo Luca Ruggiero, Ninfa Radicella, and Emmanuel N. Saridakis. Constraining the Schwarzschild-de Sitter Solution in Models of Modified Gravity. *Phys. Dark Univ.*, 13:111–120, 2016

[P11] Matteo Luca Ruggiero. Light bending in $f(T)$ gravity. *Int. J. Mod. Phys.*, D25(06):1650073, 2016

[P12] Matteo Luca Ruggiero. Gravitomagnetic Field of Rotating Rings. *Astrophys. Space Sci.*, 361(4):140, 2016

[P13] Lorenzo Iorio, Ninfa Radicella, and Matteo Luca Ruggiero. Constraining f(T) gravity in the Solar System. *JCAP*, 1508(08):021, 2015

[P14] Matteo Luca Ruggiero. Sagnac Effect, Ring Lasers and Terrestrial Tests of Gravity. *Galaxies*, 2015:84–102, 2015

[P15] Matteo Luca Ruggiero and Ninfa Radicella. Weak-Field Spherically Symmetric Solutions in $f(T)$ gravity. *Phys. Rev.*, D91:104014, 2015

[P16] Matteo Luca Ruggiero. Gravito-electromagnetic Effects of Massive Rings. *Int. J. Mod. Phys.*, D24(08):1550060, 2015

[P17] Matteo Luca Ruggiero and Angelo Tartaglia. A Note on the Sagnac Effect for Matter Beams. *Eur. Phys. J. Plus*, 130(5):90, 2015

[P18] Angela Di Virgilio, Maria Allegrini, Alessandro Beghi, Jacopo Belfi, Nicolo Beverini, Filippo Bosi, Bachir Bouhadef, Massimo Calamai, Giorgio Carelli, Davide Cuccato, Enrico Maccioni, Antonello Ortolan, Giuseppe Passeggio, Alberto Porzio, Matteo Luca Ruggiero, Rosa Santagata, and Angelo Tartaglia. A ring lasers array for fundamental physics. *Comptes rendus - Physique*, 15:866–874, 2014

[P19] A. Tartaglia and M.L. Ruggiero. Sagnac effect and pure geometry. *American Journal of Physics*, 83:427–432, 2015

[P20] Matteo Luca Ruggiero and Angelo Tartaglia. A Note on the Sagnac Effect and Current Terrestrial Experiments. *Eur.Phys.J.Plus*, 129:126, 2014

[P21] M.L. RUGGIERO. Perturbations of Keplerian Orbits in Stationary Spherically Symmetric Spacetimes. *Int.J.Mod.Phys.*, D23:1450049, 2014

[P22] IORIO L, RUGGIERO M.L., and CORDA C. Novel considerations about the error budget of the lageos-based tests of frame-dragging with grace geopotential models. *ACTA ASTRONAUTICA*, 91:141–148, 2013

[P23] CARDONE V. F., CAPONE M., RADICELLA N., and RUGGIERO M.L. Spiral galaxies rotation curves in the Horava - Lifshitz gravity theory. *MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY*, 423:141–148, 2012

[P24] F. Bosi, G. Cella, A. di Virgilio, A. Ortolan, A. Porzio, S. Solimeno, M. Cerdonio, J. P. Zendri, M. Allegrini, J. Belfi, N. Beverini, B. Bouhadef, G. Carelli, I. Ferrante, E. Maccioni, R. Passaquieti, F. Stefani, M. L. Ruggiero, A. Tartaglia, K. U. Schreiber, A. Gebauer, and J. P. R. Wells. Measuring Gravito-magnetic Effects by Multi Ring-Laser Gyroscope. *Phys. Rev.*, D84:122002, 2011

[P25] IORIO L. and RUGGIERO M.L. Horava-lifshitz gravity: tighter constraints for the kehagias-sfetsos solution from new solar system data. *INTERNATIONAL JOURNAL OF MODERN PHYSICS D*, 20:1025–1038, 2011

[P26] TARTAGLIA A., RUGGIERO M.L., and CAPOLONGO E. A relativistic navigation system for space. *ACTA FUTURA*, 4:33–40, 2011

[P27] Lorenzo Iorio, Herbert I. M. Lichtenegger, Matteo Luca Ruggiero, and Christian Corda. Phenomenology of the Lense-Thirring effect in the Solar System. *Astrophys. Space Sci.*, 331:351–395, 2011

[P28] RUGGIERO M.L., CAPOLONGO E., and TARTAGLIA A. Pulsars as celestial beacons to detect the motion of the earth. *INTERNATIONAL JOURNAL OF MODERN PHYSICS D*, 20:1025–1038, 2011

[P29] Angelo Tartaglia, Matteo Luca Ruggiero, and Emiliano Capolongo. A Null frame for spacetime positioning by means of pulsating sources. *Adv. Space Res.*, 47:645–653, 2011

[P30] IORIO L. and RUGGIERO M. Constraining the kehagias-sfetsos solution in the horava-lifshitz gravity with extrasolar planets. *THE OPEN ASTRONOMY JOURNAL*, 3:167–171, 2010

[P31] CAPONE M., CARDONE V.F., and RUGGIERO M.L. Accelerating cosmology in rastall's theory. *IL NUOVO CIMENTO B*, 125:1133–1142, 2010

[P32] IORIO L. and RUGGIERO M.L. Phenomenological constraints on the kehagias-sfetsos solution in the horava-lifshitz gravity from solar system orbital motions. *INTERNATIONAL JOURNAL OF MODERN PHYSICS A*, 25:5399–5408, 2010

[P33] CAPONE M and RUGGIERO M.L. Jumping from higher-order to scalar-tensor theories and the relations between their ppn parameters. *CLASSICAL AND QUANTUM GRAVITY*, 27:125006, 2010

[P34] RUGGIERO M.L. and IORIO L. Gravitomagnetic time-varying effects on the motion of a test particle. *GENERAL RELATIVITY AND GRAVITATION*, 42:2393–2402, 2010

[P35] CARDONE V.F, RADICELLA N, RUGGIERO M.L., and CAPONE M. The milky way rotation curve in horava - lifshitz theory. *MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY*, 406:1821–1829, 2010

[P36] RUGGIERO M.L. Gravito-magnetic gyroscope precession in palatini f(r) gravity. *PHYSICAL REVIEW D, PARTICLES, FIELDS, GRAVITATION, AND COSMOLOGY*, 79:084001–, 2009

[P37] IORIO L and RUGGIERO M.L. Gravitomagnetic effects in kerr-de sitter space-time. *JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS*, 2009:024, 2009

[P38] RUGGIERO M.L. Gravitational lensing and f(r) theories in the palatini approach. *GENERAL RELATIVITY AND GRAVITATION*, 41:1497–1509, 2009

[P39] IORIO LORENZO and RUGGIERO M.L. Solar system tests of some models of modified gravity proposed to explain galactic rotation curves without dark matter. *SCHOLARLY RESEARCH EXCHANGE*, 2008:968393, 2008

[P40] Donato Bini, Andrea Geralico, Matteo Luca Ruggiero, and Angelo Tartaglia. Emission versus Fermi coordinates: Applications to relativistic positioning systems. *Class. Quant. Grav.*, 25:205011, 2008

[P41] RUGGIERO M.L. and TARTAGLIA ANGELO. Mapping cartesian coordinates into emission coordinates: some toy models. *INTERNATIONAL JOURNAL OF MODERN PHYSICS D*, 17:311, 2008

[P42] IORIO L and RUGGIERO M.L. Constraining models of modified gravity with the double pulsar psr j0737-3039a/b system. *INTERNATIONAL JOURNAL OF MODERN PHYSICS A*, 22:5379, 2007

[P43] RUGGIERO M.L. and ALLEMANDI G. Constraining extended theories of gravity using solar system tests. *GENERAL RELATIVITY AND GRAVITATION*, 39:1381, 2007

[P44] Matteo Luca Ruggiero and Lorenzo Iorio. Solar System planetary orbital motions and f(R) theories of gravity. *JCAP*, 0701:010, 2007

[P45] RUGGIERO M.L. and A. TARTAGLIA. Gravitational faraday rotation in binary pulsar systems. *MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY*, 315:847, 2007

[P46] RUGGIERO M.L., A. TARTAGLIA, and L. IORIO. Doppler effects from bending of light rays in curved space-times. *INTERNATIONAL JOURNAL OF MODERN PHYSICS D*, 15:1183, 2006

[P47] RUGGIERO M.L. and TARTAGLIA A. Post-keplerian parameter to test gravitomagnetic effects in binary pulsar systems. *PHYSICAL REVIEW D, PARTICLES, FIELDS, GRAVITATION, AND COSMOLOGY*, 72:084030–, 2005

[P48] TARTAGLIA A., NAGAR A, and RUGGIERO M.L. Time delay in binary systems. *PHYSICAL REVIEW D, PARTICLES, FIELDS, GRAVITATION, AND COSMOLOGY*, 71:1–7, 2005

[P49] Gianluca Allemandi, Mauro Francaviglia, Matteo Luca Ruggiero, and Angelo Tartaglia. Post-Newtonian parameters from alternative theories of gravity. *Gen. Rel. Grav.*, 37:1891–1904, 2005

[P50] RUGGIERO M.L. The sagnac effect in curved space-times from an analogy with the aharonov-bohm effect. *GENERAL RELATIVITY AND GRAVITATION*, 37:1845, 2005

[P51] Ruggiero M.L., A. Tartaglia, and E.Tresso. Valutazione dell'apprendimento in fisica: cinque anni di sperimentazione al politecnico di torino. *Giornale di Fisica della Società Italiana di Fisica*, 46:241, 2005

[P52] Capizzo M.C., Ruggiero M.L., Tartaglia A., Tresso E., and Zarcone M. Valutazione dell'apprendimento in fisica mediante tol: la sperimentazione al politecnico di torino e all'università di palermo. In *Atti di Didamatica 2005*, ITA, 12-14 Maggio 2005. Associazione Italiana per l'Informatica ed il Calcolo

[P53] RUGGIERO M.L. Gravito-electromagnetic aharonov-bohm effect: some rotation effects revised. *IL NUOVO CIMENTO DELLA SOCIETÀ ITALIANA DI FISICA. B, GENERAL PHYSICS, RELATIVITY, ASTRONOMY AND MATHEMATICAL PHYSICS AND METHODS*, 119:893, 2004

[P54] G. RIZZI, RUGGIERO M.L., and A. SERAFINI. Synchronization gauges and the principles of special relativity. *FOUNDATIONS OF PHYSICS*, 34:1835, 2004. Invited paper in honour of F. Selleri

[P55] RUGGIERO M.L. and TARTAGLIA A. Gravito-electromagnetism versus electromagnetism. *EUROPEAN JOURNAL OF PHYSICS*, 25:203, 2004

[P56] RUGGIERO M.L. and TARTAGLIA A. Gravitomagnetic measurement of the angular momentum of celestial bodies. *GENERAL RELATIVITY AND GRAVITATION*, 36:293, 2004

[P57] RUGGIERO M.L. The relative space: Space measurements on a rotating platform. *EUROPEAN JOURNAL OF PHYSICS*, 24:563, 2003

[P58] Matteo Luca Ruggiero and Angelo Tartaglia. Einstein-Cartan theory as a theory of defects in space-time. *Am. J. Phys.*, 71:1303–1313, 2003

[P59] RUGGIERO M.L. and RIZZI G. A direct kinematical derivation of the relativistic sagnac effect for light or matter beams. *GENERAL RELATIVITY AND GRAVITATION*, 35:2129, 2003

[P60] RUGGIERO M.L. and RIZZI G. The sagnac phase shift suggested by the aharonov-bohm effect for relativistic matter beams. *GENERAL RELATIVITY AND GRAVITATION*, 35:1745, 2003

[P61] RUGGIERO M.L. and TARTAGLIA A. Lorentz contraction and accelerated systems. *EUROPEAN JOURNAL OF PHYSICS*, 24:215, 2003

[P62] Matteo Luca Ruggiero and Angelo Tartaglia. Gravitomagnetic effects. *Nuovo Cim.*, B117:743–768, 2002

[P63] RUGGIERO M.L. and G. RIZZI. Space geometry of rotating platforms, an operational approach. *FOUNDATIONS OF PHYSICS*, 32:1525, 2002

[P64] RUGGIERO M.L. and A. TARTAGLIA. Angular momentum effects in michelson-morley type experiments. *GENERAL RELATIVITY AND GRAVITATION*, 34:1371, 2002

Atti di Convegno

[C1] Angela Di Virgilio et al. The GINGER Project and status of the ring-laser of LNGS. *PoS*, NEUTEL2015:070, 2015

[C2] Angelo Tartaglia, Jacopo Belfi, Nicolo Beverini, Angela Di Virgilio, Antonello Ortolan, Alberto Porzio, and Matteo Luca Ruggiero. Light and/or atomic beams to detect ultraweak gravitational effects. *EPJ Web Conf.*, 74:03001, 2014

[C3] M.L. RUGGIERO. Using Ring Laser Systems to Measure Gravitomagnetic Effects on Earth. *Memorie della Società Astronomica Italiana*, 83:1017–1019, 2013

[C4] CAPONE M, CARDONE V.F., and RUGGIERO M.L. The possibility of an accelerating cosmology in rastall's theory. In *JOURNAL OF PHYSICS. CONFERENCE SERIES*, volume 222, pages 012012–, 2010

[C5] MONICA C., CARDONE V.F., and RUGGIERO M.L. Cardassian-like model from rastall's theory. In *AIP CONFERENCE PROCEEDINGS*, volume 1241, pages 534–542, 2010

[C6] TARTAGLIA A. and RUGGIERO M.L. Space-time topography. In *Fifth International Conference on Informatics and Systems*, pages 316–320, CAIRO – EGY, 24-26 March 2007. Faculty of Computers and Information - Cairo Unive

[C7] Capizzo M.C., Ruggiero M.L., Tartaglia A., Tresso E., and Zarcone M. Valutazione dell'apprendimento in fisica mediante tol: la sperimentazione al politecnico di torino e all'università di palermo. In *Atti di Didamatica 2005*, ITA, 12-14 Maggio 2005. Associazione Italiana per l'Informatica ed il Calcolo

[C8] TARTAGLIA A., TRESSO E, and RUGGIERO M.L. Valutazione dell'apprendimento in fisica: cinque anni di sperimentazione al politecnico di torino. In *Expo e-learning 2004*, pages 1–5, FERRARA – ITA, 9-12 Ottobre 2004. Expo e-learning

[C9] RUGGIERO M.L. Rotation effects and the gravito-magnetic approach. In *Proceedings of the 16th SIGRAV Conference on General Relativity and Gravitational Physics, Eds. G. Esposito, G. Lambiase, G. Marmo, G. Scarpetta, G. Vilasi*, MELVILLE (NY) – USA, Settembre 2004. AIP Conference Proceedings

[C10] RUGGIERO M.L. and TARTAGLIA A. The gravitomagnetic measurement of the angular momentum of celestial bodies. In *Proceedings of the Tenth Marcel Grossman Meeting On General Relativity, Rio de Janeiro, July 2003, Eds. M. Novello, S. Perez-Bergliaffa, R. Ruffini,*, SINGAPORE – SGP, Luglio 2003. World Scientific

Capitoli di Libro

[Ch1] CAPOLONGO E., RUGGIERO M.L., and TARTAGLIA A. *Solar System: Structure, Formation and Exploration*, chapter A relativistic positioning system exploiting pulsating sources for navigation across the Solar System and beyond, pages –. NOVA Science Publishers, Hauppauge, NY – USA, 2011

[Ch2] RUGGIERO M.L. and IORIO LORENZO. *The Problems of Modern Cosmology", special volume on the occasion of Prof. S.D. Odintsov's 50th birthday. Editor: Prof. P. M. Lavrov, Tomsk State Pedagogical University*, chapter Constraining Post-Newtonian f(R) Gravity in the Solar System, pages 261–272. P.M. Lavrov, Tomsk, 2009

[Ch3] RUGGIERO M.L. and TARTAGLIA A. *The Measurement of Gravitomagnetism: A Challenging Enterprise*, chapter Analogies and differences between gravito-electromagnetism and Electromagnetism. Nova Science Publishers, USA, 2006

[Ch4] RIZZI G. and RUGGIERO M.L. *Relativity in Rotating Frames, series "Fundamental Theories of Physics"*, volume 135, chapter The relativistic Sagnac Effect: two derivations, pages 179–220. Kluwer Academic Publishers - Springer Science Business Media, DORDRECHT – NLD, 2004

Monografie

[B1] Daghero Dario, Iotti Rita Claudia, Mandracci Pietro, and Ruggiero Matteo Luca. *Problemi di Fisica. Meccanica e Termodinamica*. Pearson, Milano, Torino – ITA, 2019

[B2] A. Tartaglia, C. Mele, and M.L. Ruggiero, editors. *Proceedings, Science and the Future* , volume 2. EDP Sciences, 2014

[B3] M. Crosta, M. Gramegna, and M.L. Ruggiero, editors. *Proceedings, Time Machine Factory (TM 2012)*, volume 58. EDP Sciences, 2013

[B4] Daghero Dario, Iotti Rita Claudia, Mandracci Pietro, and Ruggiero Matteo Luca. *Capire e risolvere. Esercizi di Fisica Generale Meccanica e Termodinamica*. Società Esculapio Editrice, BOLOGNA – ITA, 2013

[B5] Rizzi G, RUGGIERO M., and Mandracci P. *INTRODUZIONE ALLA FISICA CLASSICA VOL. I : MECCANICA*. Levrotto e Bella Libreria Editrice Universitaria, Torino – ITA, 2013

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[B7] Guido Rizzi and Matteo Luca Ruggiero. *Relativity in Rotating Frames, in the Series "Fundamental Theories of Physics"*, volume 135. Kluwer Academic Publishers - Springer Science Business Media, DORDRECHT – NLD, 2004. Edited Book

Curriculum vitae

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(last updated on December 1, 2020)

EMPLOYMENT

- Since 11/2019: Senior Research Fellow in the **CERN** Theory Department.
- 10/2016 – 10/2019: Postdoctoral Scholar in the Theoretical Particle Physics at Colliders group of Andreas Weiler, **Technical University of Munich**. From 12/2016 onwards: appointment as Akademischer Rat (A13), equivalent to RTDb according to DM 662.
- 10/2013 – 09/2016: Postdoctoral Scholar in the High Energy Theory group of the **University of California, Davis** (faculty mentors: Markus Luty and Hsin-Chia Cheng).

EDUCATION

- 01/2010 – 09/2013: Ph.D. in theoretical high-energy physics, **University of Padova**. Thesis "Phenomenology of Compositeness at the LHC," supervisors: Christophe Grojean and Fabio Zwirner.
- 10/2007 – 09/2009: M.S. in Physics, University of Padova. Specialization in theoretical physics, grade 110/110 *cum laude*. Thesis "$U(1)$ extensions of the Standard Model," supervisor: Fabio Zwirner; co-supervisor: Giovanni Villadoro.
- 10/2004 – 09/2007: B.S. in Physics, University of Padova. Grade 110/110 *cum laude*. Thesis "Quasicristalli Unidimensionali" ("One-dimensional Quasicrystals"), supervisor: Pieralberto Marchetti.
- 07/2004: graduated from Liceo Classico E. Montale, San Donà di Piave (Venice), Italy. Grade 100/100 with highest honors.

HONORS AND PRIZES

- 07/2018: national habilitation to Associate Professor position in Italian universities, valid until July 2024 (ASN di II Fascia, settore concorsuale 02/A2).
- 04/2015: special mention awarded by the committee of the 2014 INFN "S. Fubini" Prize to the Ph.D. thesis "Phenomenology of Compositeness at the LHC."
- 07/2010: "G. Bernardini" Prize for young graduates in Physics, received from SIF (Italian Physical Society).
- 04/2010: awarded by the Scientific Committee of IFAE 2010 (Rome) one of four prizes for the best presentations by Ph.D. students at the conference.
- 06/2009: selected by US - Italy Fulbright Commission as one of three Italian candidates to the Fulbright International Science and Technology Award 2010-2011.
- 07/2008: INFN National Scholarship for first-level graduates in Physics (renewed in 2009).

RESEARCH FUNDING

- 11/2019 – 10/2021: two-year CERN Senior Research Fellowship. Research in any area of theoretical physics of relevance to the Laboratory. Total value: 193k CHF.
- 10/2010 – 09/2013: three-year Early Stage Researcher position in the CERN Theory Group, to pursue research in physics beyond the Standard Model while enrolled as PhD student at the University of Padova. Local supervisor: Christophe Grojean, funding through his shared ERC grant. Total value: 144k CHF.
- 04/2010: Fulbright "Self-Placed" Scholarship for the academic year 2010-2011. Full support for the first year of graduate school at a US institution (38k USD). Award declined.
- 02/2010: MacCracken Graduate Fellowship for 2010 – 2014, NYU, Physics Department. Full support for the 9-month academic year (total of 95k USD) plus summer support for the first year (10.5k USD). Award declined.
- 11/2009 – 12/2009: post-lauream Fellowship, Physics Department, University of Padova. Research on "$U(1)$ extensions of the Standard Model," total value: 2k EUR.

INVITED PLENARY TALKS AT CONFERENCES AND WORKSHOPS

- "Z portal to a confining hidden sector." Workshop "Stealth physics at LHCb," Santiago de Compostela, 02/2020; Workshop "Probing BSM Physics at different scales," Magnus Haus, Berlin, 01/2020; 3rd FCC Physics and Experiments workshop, CERN, 01/2020.
- "Neutral naturalness, VBS and VBF." Review talk at the workshop on BSM theories in Vector Boson Scattering processes, Lisbon, 12/2019.
- "Light Hidden Mesons through the Z portal." LFC2019, ECT* Trento, 09/2019; 15th Rencontres du Vietnam, Quy Nhon, 09/2019.
- "Faint, Hidden, or Dark: New Paths to Physics beyond the Standard Model." Max Planck Research Group Selection Symposium, Berlin, 02/2019.
- "Composite pNGB dark matter." 7th Joint Rome Workshop, Frascati, 12/2018.
- "Dark matter shifts away from direct detection." 14th VCES, "Global and local symmetries," Austrian Academy of Sciences and TU Wien, 11/2018.
- "Neutral Naturalness." Review talk at the workshop "Beyond Standard Model: where do we go from here?," GGI Florence, 09/2018; Review talk/discussion leader at the CERN-Korea TH Institute "Physics at the LHC and beyond," CERN, 07/2018.
- "SUSY neutral naturalness: the Tripled Top." Workshop "Confronting naturalness: from LHC to future colliders," DESY Hamburg, 04/2018; 12th MC4BSM workshop, IPPP Durham, 04/2018.
- "Extended composite Higgs sectors and dark matter." Review talk at the 2nd FCC Physics workshop, CERN, 01/2018.
- "Boosted and off-shell Higgs at the FCC-hh." 1st FCC Physics workshop, CERN, 01/2017.
- "Probing the ultraviolet completion of the Twin Higgs." 3rd NPKI workshop, Seoul, 06/2016.
- "Strong tW scattering at the LHC." HEFT 2015, U. of Chicago, 11/2015.
- "Composite Higgs." Review talk at the 9th MC4BSM workshop, Fermilab, 05/2015.
- "Phenomenology of induced EWSB." 2nd NPKI workshop, Jeju Island, South Korea, 09/2014.

- "Single top + Higgs, theory." CMS Single Top workshop, Naples, 12/2013.
- "Double Higgs production via gluon fusion in composite models." Higgs Hunting 2012, Paris, 07/2012.
- "A weakly constrained W' at the early LHC." Meeting of the CNRS/CEA Groupement de Recherche Terascale, Lyon, 04/2011.

INVITED SEMINARS

- (upcoming) "The present and future of four tops." Technion and CFTP Lisbon, 12/2020.
- "Dark matter from new strong interactions." U. of Sussex, 11/2020.
- "Split SIMPS with decays." CERN, 07/2020.
- "Dark meson dark matter." Humboldt U. Berlin/DESY Zeuthen, 06/2020; Scuola Normale Superiore, Pisa, 05/2020.
- "Dark matter shifts away from direct detection." SISSA, Trieste, 04/2019.
- "New physics in LHC and dark matter searches: challenging standard assumptions." U. of Padova, 11/2018.
- "Charged composite scalar dark matter." Joint Particle Physics Seminar, Weizmann Institute, 03/2018; L2C Montpellier, 11/2017; U. of Maryland, 09/2017; NYU, 09/2017.
- "Going beyond the Standard Model Higgs at the LHC." MLL-Kolloquium, LMU&TUM, Munich, 12/2016.
- "Probing the ultraviolet completion of the Twin Higgs." UC Irvine, 05/2016.
- "Exotic quarks in Twin Higgs models." UC Santa Cruz, 02/2016; U. of Oregon, 10/2015.
- "Phenomenology of induced EWSB." SLAC, 05/2015; U. of Chicago, 05/2015; Northwestern U., 05/2015; UC Berkeley, 01/2015; U. of Heidelberg, 12/2014; U. of Mainz, 11/2014.
- "Boosted or cascading: chasing BSM Higgses at LHC14." NYU, 03/2014; Cornell U., 03/2014.
- "Uncovering the Higgs' identity through subleading production channels." L2C Montpellier, 04/2013.
- "Shedding light on the Higgs' identity through subleading production channels." LAPTh, Annecy, 12/2012.
- "Higgs Low-Energy Theorem (and its corrections) in Composite Models." Harvard U., 07/2012; MIT, 07/2012; UC Berkeley, 05/2012; U. of Granada, 05/2012.
- "A weakly constrained W' at the early LHC." CERN, 03/2011.

TEACHING ACTIVITY

- Summer semester 2019 + Summer semester 2018: main assistant for the Master's course "Quantum Field Theory II" (non-Abelian gauge theories, spontaneous symmetry breaking, anomalies; instructor: A. Weiler), TU Munich. Duties: preparation of exercise sheets, exams and solutions; tutorial sessions (8 classroom hours), lectures on special topics (9 h).
- Winter semester 2018/2019: main assistant for the Master's course "Quantum Field Theory I" (path integrals, renormalization, Poincaré group and fermions; instructor: A. Weiler), TU Munich. Duties: preparation of exercise sheets, exams and solutions; tutorial sessions (4 h).

- Summer semester 2017: main assistant for the Master's course "Relativity, Particles and Fields" (special relativity, classical field theory, canonical quantization; instructor: A. Weiler), TU Munich. Duties: preparation of exercise sheets, exams and solutions; tutorial sessions (22 h), lectures on special topics (2 h).

STUDENT MENTORSHIP

- Mentorship through collaboration: Matthias Schlaffer (then Ph.D. candidate at DESY with A. Weiler, currently postdoc at U. Chicago) on Ref. [8], Jeff Dror (then Ph.D. candidate at Cornell with Y. Grossman, currently postdoc at UC Santa Cruz) on Ref. [12], Reuven Balkin (then Ph.D. candidate at TUM with A. Weiler, currently postdoc at the Technion) on Refs. [16, 19]. Extensive interaction with the students, ranging from frequent discussions to help develop their big-picture view, to detailed comparisons of the results of numerical computations.
- Co-supervision of Master's thesis projects (unofficial): Maximilian Ruhdorfer, TU Munich 2017, and Tobias Theil, TU Munich 2019. In each case the project led to a research article: Ref. [16] with M. Ruhdorfer, and the preprint Ref. [24] with T. Theil.

PROFESSIONAL SERVICE

- Theory Expert within the joint ATLAS-CMS-Theory Task Force on off-shell Higgs measurements at the LHC (since 03/2020).
- Organizer of the First EuCAPT Annual Symposium, CERN, 09/2020 [postponed to 05/2021].
- BSM Forum organizer, CERN, 2019 – present; Group seminar/journal club organizer, TU Munich, 2018 – 2019; Seminar organizer, UC Davis, 2014 – 2016.
- Organizer of the SUSY 2015 Conference, 08/2015, Tahoe City.
- Regular referee for Journal of High Energy Physics, European Physical Journal C, Physics Letters B, SciPost Physics.

PUBLIC ENGAGEMENT

- Moderator for International Masterclasses (introduction to particle physics for high school students around the world), CERN, 03/2020.
- "Il bosone di Higgs e i misteri della fisica fondamentale," talk at Collegio Pio X, Treviso, 04/2017.
- "LHC e lo stato attuale della fisica delle particelle," talk at Liceo Classico E. Montale, San Donà di Piave, 05/2009.

LANGUAGES

- Italian (native), English (C1/C2), French (B1), Spanish (B1), German (A2).
  Reference: http://www.coe.int/t/dg4/linguistic/cadre1_en.asp.

The up-to-date list is available at

https://inspirehep.net/authors/1077871

from where the full texts are openly accessible via arXiv and/or the journal websites, except where marked. Please note that in particle physics it is customary to list authors in alphabetical order. Citation data as of December 1, 2020, restricted to published articles: approximately 1250 total citations, on average 54 per paper, $h = 18$.

PREPRINTS

[24] G. Banelli, E. Salvioni, J. Serra, T. Theil and A. Weiler, "The present and future of four tops," arXiv:2010.05915 [hep-ph], currently under peer review.

PUBLISHED ARTICLES

[23] A. Katz, E. Salvioni and B. Shakya, "Split SIMPs with decays," JHEP 10 (2020) 049, arXiv:2006.15148 [hep-ph].

[22] U. Haisch, M. Ruhdorfer, E. Salvioni, E. Venturini and A. Weiler, "Singlet night in Feynmanville: one-loop matching of a real scalar," JHEP 04 (2020) 164 [Erratum: JHEP 07 (2020) 066], arXiv:2003.05936 [hep-ph].

[21] M. Ruhdorfer, E. Salvioni and A. Weiler, "A global view of the off-shell Higgs portal," SciPost Physics 8 (2020) 027, arXiv:1910.04170 [hep-ph].

[20] H.-C. Cheng, L. Li, E. Salvioni and C. Verhaaren, "Light hidden mesons through the Z portal," JHEP 11 (2019) 031, arXiv:1906.02198 [hep-ph].

[19] R. Balkin, M. Ruhdorfer, E. Salvioni and A. Weiler, "Dark matter shifts away from direct detection," JCAP 11 (2018) 050, arXiv:1809.09106 [hep-ph].

[18] H.-C. Cheng, L. Li, E. Salvioni and C. Verhaaren, "Singlet scalar top partners from accidental supersymmetry," JHEP 05 (2018) 057, arXiv:1803.03651 [hep-ph].

[17] L. Li, E. Salvioni, Y. Tsai and R. Zheng, "Electroweak-charged bound states as LHC probes of hidden forces," PRD 97 (2018) 015010, arXiv:1710.06437 [hep-ph].

[16] R. Balkin, M. Ruhdorfer, E. Salvioni and A. Weiler, "Charged composite scalar dark matter," JHEP 11 (2017) 094, arXiv:1707.07685 [hep-ph].

[15] H.-C. Cheng, E. Salvioni and Y. Tsai, "Exotic electroweak signals in Twin Higgs," PRD 95 (2017) 115035, arXiv:1612.03176 [hep-ph].

[14] A. Azatov, C. Grojean, A. Paul and E. Salvioni, "Resolving gluon fusion loops at current and future hadron colliders," JHEP 09 (2016) 123, arXiv:1608.00977 [hep-ph].

[13] H.-C. Cheng, S. Jung, E. Salvioni and Y. Tsai, "Exotic quarks in Twin Higgs models," JHEP 03 (2016) 074, arXiv:1512.02647 [hep-ph].

[12] J. Dror, M. Farina, E. Salvioni and J. Serra, "Strong tW scattering at the LHC," JHEP 01 (2016) 071, arXiv:1511.03674 [hep-ph].

[11] R. Primulando, E. Salvioni and Y. Tsai, "The Dark Penguin Shines Light at Colliders," JHEP 07 (2015) 031, arXiv:1503.04204 [hep-ph].

[10] S. Chang, J. Galloway, M. Luty, E. Salvioni and Y. Tsai, "Phenomenology of Induced Electroweak Symmetry Breaking," JHEP 03 (2015) 017, arXiv:1411.6023 [hep-ph].

[9] A. Azatov, C. Grojean, A. Paul and E. Salvioni, "Taming the off-shell Higgs boson," ZhETF 147 (2015) 410 [JETP 120 (2015) 354] (special issue in honor of the 60th birthday of V. Rubakov), arXiv:1406.6338 [hep-ph].

[8] C. Grojean, E. Salvioni, M. Schlaffer and A. Weiler, "Very boosted Higgs in gluon fusion," JHEP 05 (2014) 022, arXiv:1312.3317 [hep-ph].

[7] M. Montull, F. Riva, E. Salvioni and R. Torre, "Higgs Couplings in Composite Models," PRD 88 (2013) 095006, arXiv:1308.0559 [hep-ph].

[6] M. Farina, C. Grojean, F. Maltoni, E. Salvioni and A. Thamm, "Lifting degeneracies in Higgs couplings using single top production in association with a Higgs boson," JHEP 05 (2013) 022, arXiv:1211.3736 [hep-ph].

[5] M. Gillioz, R. Gröber, C. Grojean, M. Mühlleitner and E. Salvioni, "Higgs Low-Energy Theorem (and its corrections) in Composite Models," JHEP 10 (2012) 004, arXiv:1206.7120 [hep-ph].

[4] M. Farina, C. Grojean and E. Salvioni, "(Dys)Zphilia or a custodial breaking Higgs at the LHC," JHEP 07 (2012) 012, arXiv:1205.0011 [hep-ph].

[3] C. Grojean, E. Salvioni and R. Torre, "A weakly constrained W' at the early LHC," JHEP 07 (2011) 002, arXiv:1103.2761 [hep-ph].

[2] E. Salvioni, A. Strumia, G. Villadoro and F. Zwirner, "Non-universal minimal Z' models: present bounds and early LHC reach," JHEP 03 (2010) 010, arXiv:0911.1450 [hep-ph].

[1] E. Salvioni, G. Villadoro and F. Zwirner, "Minimal Z' models: present bounds and early LHC reach," JHEP 11 (2009) 068, arXiv:0909.1320 [hep-ph].

WORKING GROUP REPORTS

4. M. Gallinaro et al., editors, "Beyond the Standard Model in Vector Boson Scattering Signatures," arXiv:2005.09889 [hep-ph].

3. J. Alimena et al., editors, "Searching for long-lived particles beyond the Standard Model at the Large Hadron Collider," arXiv:1903.04497 [hep-ex].

2. T. Golling et al., editors, "Physics at a 100 TeV pp collider: beyond the Standard Model phenomena," CERN Yellow Report (2017) Vol. 3, arXiv:1606.00947 [hep-ph].

1. L. Linssen et al., editors, "Physics and Detectors at CLIC: CLIC Conceptual Design Report," CERN Yellow Report (2012) Vol. 3, arXiv:1202.5940 [physics.ins-det].

PUBLISHED CONFERENCE PROCEEDINGS

5. E. Salvioni, "Z portal to a confining hidden sector," LFC 2019, Trento, September 2019. Published in Frascati Physics Series, Vol. LXX.

4. E. Salvioni, "Some Z' and W' models facing current LHC searches," DIS 2012, Bonn, March 2012. Published in DESY-PROC-2012-02.

3. [not OA] E. Salvioni, "Relevance of the decay $W' \to W\gamma$ at the early LHC," IFAE 2011, Perugia, April 2011. Published in Il Nuovo Cimento C **34**, 06 (195).

2. E. Salvioni, "Minimal Z' models and the early LHC," 2nd Young Researchers Workshop, Frascati, May 2010. Published in Frascati Physics Series, Vol. LI, arXiv:1007.0490 [hep-ph].

1. [not OA] E. Salvioni, "Minimal Z' models and the early LHC," IFAE 2010, Rome, April 2010. Published in Il Nuovo Cimento C **33**, 06 (160).

PH.D. THESIS

- E. Salvioni, "Phenomenology of Compositeness at the LHC," University of Padova, July 2013. Available at http://paduaresearch.cab.unipd.it/6166/.

Luca Santoni

Work history

11-2018 – Present **Postdoc**, *Department of Physics, Center for Theoretical Physics, Columbia University*, 538 West 120th Street, New York, NY 10027, USA.

10-2016 – 10-2018 **Postdoc**, *Institute for Theoretical Physics, Utrecht University*, Princetonplein 5, 3584CC Utrecht, Netherlands.

11-2013 – 10-2016 **Ph.D. student**, *Scuola Normale Superiore*, Piazza dei Cavalieri 7, 56126 Pisa, Italy.

Teaching experience

16-10-2020 **Guest lecture** for the "Contemporary Physics/Astronomy" course held by Rachel A. Rosen at Columbia University, Master program.

10-2020 – present **Lectures** at Columbia University, Science Honors Program (SHP) for talented High School students. Title: *Modern Cosmology*.

01-2020 – 05-2020 **Lectures** (6 lectures, 18 hours) at Columbia University, Science Honors Program (SHP) for talented High School students. Title: *Modern Cosmology*.

09-2019 – 12-2019 **Lectures** (6 lectures, 18 hours) at Columbia University, Science Honors Program (SHP) for talented High School students. Title: *Modern Cosmology*.

09-10-2017 – 13-10-2017 **Lectures** (5 lectures, 15 hours) at the **39th Heidelberg Physics Graduate Days**, Heidelberg, Germany. Title: *The theory of cosmic inflation*. Content: introduction to cosmology and the inflationary background, perturbations and adiabatic modes, quantization in de Sitter and power spectra, non-gaussianity, soft-theorems and consistency conditions, effective theory of inflation.
Link: https://gsfp.physi.uni-heidelberg.de/graddays_oktober_2017/

28-03-2017 **Guest lecture** for the cosmology course held by Enrico Pajer at Utrecht University, Master program. Title: *Violation of the Null Energy Condition in Cosmology*.

11-2014 – 10-2015 **Tutoring** to first year Physics course students, *Scuola Normale Superiore*, Pisa, Italy.

Education

11-2013 – 10-2016 **Ph.D. in Physics**, *Scuola Normale Superiore*, Pisa, Italy, *70/70 cum laude*.
Advisor: Enrico Trincherini

09-2011 – 10-2013 **Master of Science in Physics**, *Università di Pisa*, Pisa, Italy, *110/110 cum laude*.
Advisor: Mihail Mintchev

09-2008 – 09-2011 **Bachelor of Science in Physics**, *Università di Pisa*, Pisa, Italy, *110/110 cum laude*.
Advisor: Luciano Bracci

09-2003 – 07-2008 **Scientific High School Diploma**, *Liceo Scientifico "Il Pontormo"*, Empoli (FI), Italy, *100/100* cum laude.

07-2007 **French Language Diploma (DELF B2)**, *Commission Nationale du DELF et du DALF*, DELF level B2.

Prizes, awards and honours received

2018 Mention of Merit in "Premio Nazionale Sergio Fubini" 2017, awarded by INFN (Italy) for the three best PhD thesis in theoretical physics of the academic year 2016/2017.

Awards ROTARY club scholarship, Empoli (FI), Italy, May 2008.

2005, 2007, 2008 Mathematical Games "Boconi", participation in the National Finals, PRISTEM – ELEUSI Center, *Università Bocconi*, Milano, Italy.

Ph.D. thesis

Title *Weakly Broken Galileon Symmetry in Cosmology*

Advisor Enrico Trincherini

Description Theories with internal Galileon symmetry possess interesting theoretical and phenomenological properties, which have been extensively studied. We introduce the notion of Weakly Broken Galileon invariance, which characterises the unique class of couplings of such theories to gravity that maximally retain their defining symmetry. The curved-space remnant of the Galileon's quantum properties allows to construct (quasi) de Sitter backgrounds largely insensitive to loop corrections. We exploit this fact to build novel cosmological models with interesting phenomenology, relevant for both inflation and late-time acceleration of the Universe. Moreover, in the context of alternatives to standard cosmologies, we propose a class of scalar models that are deformations of the Galileon Lagrangian and allow to smoothly and stably connect an inflationary quasi-de Sitter Universe to a low, or even zero, curvature maximally symmetric space-time in the asymptotic past, strongly violating the Null Energy Condition.

Reference arXiv:1612.01154 [hep-th]

Master thesis

Title *Efficiency of Schrödinger junctions in non-equilibrium steady states*

Advisor Mihail Mintchev

Description The thesis is an application of a finite temperature quantum field theory to one-dimensional non-equilibrium systems, modelled as star graphs, where the interaction is localised in the vertex and described by a scattering matrix. A suitable steady state, parametrised in terms of the temperatures and the chemical potentials of the heat reservoirs, is explicitly constructed. The quantum transport properties on such systems are studied analytically beyond the linear response theory and particular attention has been devoted to the analysis of the thermoelectric efficiency, providing an example of modification of the dynamics that enables remarkable enhancements.

Professional Activities

2018 – present **Referee** for JHEP, JCAP, American Physical Society.

01-2019 – Present **Organizer** of the theory seminars at Columbia University.

09-2019 – 01-2020 **Organizer** of the group meetings at the Theory Center, Columbia University.

10-2017 – 09-2018 **Organizer** of the cosmology seminars at the ITP, Utrecht University.

Languages

		Comprehension		**Speaking**		**Writing**
		Listening	Reading	Interaction	Production	
Italian	Mother Tongue	*C2*	*C2*	*C2*	*C2*	*C2*
English	Advanced	*C1*	*C1*	*C1*	*C1*	*C1*
French	Intermediate	*B2*	*B2*	*B2*	*B2*	*B2*
				(Diplome d'études en langue française DELF B2)		
Dutch	Basic	*A1*	*A1*	*A1*	*A1*	*A1*
		(Dutch introductory course, BABEL institute, Utrecht, The Netherlands)				

Personal skills

Computer skills C programming

Driving licence A1, B

References

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Publications

High Energy Physics

- Rachel A. Rosen, Luca Santoni. ***Black hole perturbations of massive and partially massless spin-2 fields in (anti) de Sitter spacetime***. arXiv:2010.00595 [hep-th].
- Lam Hui, Austin Joyce, Riccardo Penco, Luca Santoni, Adam R. Solomon. ***Static response and Love numbers of Schwarzschild black holes***. arXiv:2010.00593 [hep-th].
- Johannes Noller, Luca Santoni, Enrico Trincherini, Leonardo G. Trombetta. ***Scalar-tensor cosmologies without screening***. arXiv:2008.08649 [astro-ph.CO].
- Johannes Noller, Luca Santoni, Enrico Trincherini, Leonardo G. Trombetta. ***Black Hole Ringdown as a Probe for Dark Energy***. Phys. Rev. D 101 (2020) 084049, arXiv:1911.11671 [gr-qc].
- Lam Hui, Daniel Kabat, Xinyu Li, Luca Santoni, Sam S.C. Wong. ***Black Hole Hair from Scalar Dark Matter***. JCAP 06 (2019) 038, arXiv:1904.12803 [gr-qc].
- Gabriele Franciolini, Lam Hui, Riccardo Penco, Luca Santoni, Enrico Trincherini. ***Stable wormholes in scalar-tensor theories***. JHEP 01 (2019) 221, arXiv:1811.05481 [hep-th].
- Gabriele Franciolini, Lam Hui, Riccardo Penco, Luca Santoni, Enrico Trincherini. ***Effective Field Theory of Black Hole Quasinormal Modes in Scalar-Tensor Theories***. JHEP 02 (2019) 127, arXiv:1810.07706 [hep-th].
- Luca Santoni, Enrico Trincherini, Leonardo G. Trombetta. ***Behind Horndeski: structurally robust higher derivative EFTs***. JHEP 08 (2018) 118, arXiv:1806.10073 [hep-th]
- Bernardo Finelli, Garrett Goon, Enrico Pajer and Luca Santoni. ***The Effective Theory of Shift-Symmetric Cosmologies***. JCAP 05 (2018) 060, arXiv:1802.01580 [hep-th].
- Bernardo Finelli, Garrett Goon, Enrico Pajer and Luca Santoni. ***Soft Theorems For Shift-Symmetric Cosmologies***. Phys. Rev. D 97 (2018) 063531, arXiv:1711.03737 [hep-th].
- Paolo Creminelli, David Pirtskhalava, Luca Santoni and Enrico Trincherini. ***Stability of Geodesically Complete Cosmologies***. JCAP 11 (2016) 047, arXiv:1610.04207 [hep-th].
- David Pirtskhalava, Luca Santoni and Enrico Trincherini. ***Constraints on Single-Field Inflation***. JCAP 06 (2016) 051, arXiv:1511.01817 [hep-th].
- David Pirtskhalava, Luca Santoni, Enrico Trincherini and Filippo Vernizzi. ***Large Non-Gaussianity in Slow-Roll Inflation***. JHEP 04 (2016) 117, arXiv:1506.06750 [hep-th].
- David Pirtskhalava, Luca Santoni, Enrico Trincherini and Filippo Vernizzi. ***Weakly Broken Galileon Symmetry***. JCAP 09 (2015) 007, arXiv:1505.00007 [hep-th].
- David Pirtskhalava, Luca Santoni, Enrico Trincherini and Patipan Uttayarat. ***Inflation from Minkowski Space***. JHEP 12 (2014) 151, arXiv:1410.0882 [hep-th].

Statistical Physics and Finite Temperature QFT

- Mihail Mintchev, Luca Santoni and Paul Sorba. ***Microscopic Features of Bosonic Quantum Transport and Entropy Production***. Annalen der Physik 530 (2018) 201800170, arXiv:1805.07087 [cond-mat.stat-mech].
- Mihail Mintchev, Luca Santoni and Paul Sorba. ***Quantum Fluctuations of Entropy Production for Fermionic Systems in Landauer-Buttiker State***. Phys. Rev. E 96 (2017) 052124, arXiv:1706.00561 [cond-mat.stat-mech].
- Mihail Mintchev, Luca Santoni and Paul Sorba. ***Quantum Transport in Presence of Bound States – Noise Power***. Annalen Phys. 529 (2017) 8 1600274, arXiv:1609.05427 [cond-mat.stat-mech].
- Mihail Mintchev, Luca Santoni and Paul Sorba. ***Non-equilibrium current cumulants and moments with a point-like defect***. J. Phys. A: Math. Theor, 49:26 (2016) 265002, arXiv:1601.01819 [cond-mat.stat-mech].
- Mihail Mintchev, Luca Santoni and Paul Sorba. ***Non-linear quantum noise effects in scale invariant junctions***. J. Phys. A: Math. Theor, 48:28 (2015) 285002, arXiv:1502.05234 [cond-mat.stat-mech].
- Mihail Mintchev, Luca Santoni and Paul Sorba. ***Energy transmutation in non-equilibrium quantum systems***. J. Phys. A: Math. Theor. 48:5 (2015) 055003, arXiv: 1409.2994 [cond-mat.stat-mech].
- Mihail Mintchev, Luca Santoni and Paul Sorba. ***Thermoelectric efficiency of critical quantum junctions***. arXiv:1310.2392 [cond-mat.stat-mech].

Selected invited talks and seminars

Nov 18, 2020 "**Symmetries of black hole perturbations**", Swansea University, UK.

Aug 11, 2020 "**Unveiling fundamental aspects of gravity with spacetime symmetries in the era of the gravitational-wave astronomy**", University of Padua, Padova, Italy.

Nov 11, 2019 "**From symmetries to cosmological observables: new soft theorems for cosmological correlators**", IAS and Princeton University, Princeton.

March 26, 2019 "**Effective Field Theory of Black Hole Quasi-Normal Modes in Scalar-Tensor Theories**", NYU, New York.

Nov 15, 2017 "**Soft theorems for shift-symmetric cosmologies**", Institut de Physique Théorique, Saclay, France.

Nov 13, 2017 "**Shift-symmetric adiabatic modes**", Institut d'Astrophysique de Paris, France.

Nov 3, 2017 "**Investigating the infrared structure of curved spacetimes**", DELTA ITP Retreat, Woerden, The Netherlands.

Nov 1, 2017 "**Stability of geodesically complete cosmologies**", Imperial College, London, United Kingdom.

Oct 31, 2017 "**Investigating the infrared in cosmology: shift-symmetric adiabatic modes**", DAMTP, University of Cambridge, United Kingdom.

June 19, 2017 "**Stability of geodesically complete cosmologies**", Institute of Physics, University of Amsterdam, Amsterdam, The Netherlands.

May 23, 2017 "**Weakly broken galileon symmetry and non-renormalization theorem**", Van Swinderen Institute, Groningen University, Groningen, The Netherlands.

June 23, 2016	"**Inflation with weakly broken galileon symmetry**", Institute for Theoretical Physics, Utrecht University, Utrecht,The Netherlands.
Nov 16, 2015	"**Inflation with weakly broken galileon symmetry**", École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland.
Nov 11, 2015	"**Inflation with weakly broken galileon symmetry**", Scuola Normale Superiore, Pisa, Italy.

Selected workshops, conferences, and extended visits

Conference	*Cosmological Correlators*, September 7-9, 2020 (virtual conference on Zoom).
Workshop	*Probing Effective Theories of Gravity in Strong Fields and Cosmology*, August 17, 2020 - September 4, 2020, KITP, UC Santa Barbara, CA.
Conference	*Cosmic Controversies*, October 5-8, 2019, Kavli Institute for Cosmological Physics, UChicago Gleacher Center, Chicago, IL.
Conference	*24th Itzykson meeting: Effective Field Theory in Cosmology, Gravitation and Particle Physics*, June 5-7, 2019, Institut de Physique Théorique (IPhT) CEA-Saclay, France.
Visit	September 6-19, 2018, Department of Applied Mathematics and Theoretical Physics (DAMTP), University of Cambridge, UK.
Conference and Talk	*Post-Inflationary String Cosmology*, September 18-21, 2017, Department of Physics and Astronomy, University of Bologna, Bologna, Italy. Title of the talk: "**Shift-symmetric adiabatic modes**".
Conference and Talk	*Advances in Theoretical Cosmology in Light of Data*, July 3-28, 2017, NORDITA, Stockholm, Sweden. Title of the talk: "**Constraints and symmetries in the EFT of single-field inflation**".
Conference	*Utrecht Cosmology Symposium*, June 27-July 1, 2016, Utrecht, The Netherlands.
Conference and Talk	*New Frontiers in Theoretical Physics – XXXV National Meeting*, May 17-20, 2016, Galileo Galilei Institute, Florence, Italy. Title of the talk: "**Inflation with weakly broken galileon symmetry**".
School	GGI school on the Theory of Fundamental Interactions, January 11-29, 2016, Galileo Galilei Institute, Florence, Italy.
Conference	*Physics on the Riviera 2015: an isthmus between high energy and condensed matter theoretical physics*, September 16-18, 2015, Grand Hotel Villa Balbi, Sestri Levante, Italy.
School and Talk	*First ICTP Advanced School on Cosmology*, May 18-29, 2015, ICTP, Trieste, Italy. Title of the talk: "**Inflation with weakly broken galileon symmetry**".
Conference and Talk	*Extended Theories of Gravity*, March 2-20, 2015, NORDITA, Stockholm, Sweden. Title of the talk: "**Inflation from Galilean Genesis**".
School	GGI school on the Theory of Fundamental Interactions, January 12-29, 2015, Galileo Galilei Institute, Florence, Italy.
Conference	*New Frontiers in Theoretical Physics – XXXIV National Meeting*, May 28-31, 2014, Cortona, Italy.

School GGI school on the Theory of Fundamental Interactions, January 07-24, 2014, Galileo Galilei Institute, Florence, Italy.

CURRICULUM VITAE

Lorenzo Sebastiani

FORMAZIONE

- dicembre 2011:
  Dottorato in Fisica, Università di Trento
  Titolo della tesi: *"General aspects of modified theories of gravity"*
  Supervisore: Prof. S. Zerbini;

- febbraio 2008:
  Laurea Specialistica in Fisica, Università di Trento
  Titolo della tesi: *"One modified gravity model for inflation and current epoch of cosmic acceleration"*
  Supervisore: Prof. S. Zerbini;

- ottobre 2005:
  Laurea triennale in Fisica, Università di Trento
  Titolo della tesi: *"L'equazione di Dirac"*
  Supervisore: Prof. L. Vanzo;

- luglio 2001:
  Diploma di maturità classica presso il "Liceo Classico G. Prati" di Trento.

ESPERIENZE POSTDOTTORATO

- 4 dicembre 2019:
  Titolare di assegno di ricerca INFN presso la Sezione INFN di Pisa;

- 3 luglio 2017-02 luglio 2019:
  Borsa postdottorato INFN presso il Centro TIFPA di Trento;

- 28 maggio 2012 - 30 maggio 2017:
  Visiting Professor, Eurasian National University, Astana (Kazakhstan);

- aprile-maggio 2012:
  Visiting postdoctoral fellow, Università di Trento;

- febbraio-marzo 2012:
  Visiting postdoctoral fellow, Consell Superior d'Investigacions Científiques, Barcelona (Spain).

Altre attività:

- giugno - settembre 2008:
  Operatore TIMSS (Trends in International Mathematics and Science Study), presso l'Istituto IPRASE della Provincia di Trento.

PARTECIPAZIONE A PROGETTI DI RICERCA

- 2012, Project grant
  Titolo: Black hole solutions in extended theories of gravity
  Host Institute: Università di Trento
  Host Professor: Prof. S. Zerbini
  Stanziamento: 2000 EUR;

- 2012, Short Visit Grant of European Science Foundation
  Titolo: New Trends and Applications of the Casimir Effect
  Host Institute: Consell Superior d'Investigacions Científiques, Barcelona (Spain)
  Host Professor: Prof. E. Elizalde
  Stanziamento: 2000 EUR;

- 2009 - 2011:
  Exchange Grant Italy-Spain (INFN-MEC) 2008-2009; 2009-2010; 2010-2011
  Collaborazione scientifica
  Host Institute: Consell Superior d'Investigacions Científiques, Barcelona (Spain)
  Host Professors: Prof. E. Elizalde e Prof. S.D. Odintsov
  Stanziamento: 5000 EUR per ogni anno.

ABILITAZIONI SCIENTIFICHE (ASN)

- Valida fino al 28 marzo 2023: Abilitazione Scientifica Nazionale in Fisica teorica delle interazioni fondamentali (02/A2) per Professore di II Fascia;

- Valida fino all'11 luglio 2024: Abilitazione Scientifica Nazionale in Astronomia, Astrofisica, Fisica della terra e dei pianeti (02/C1) per Professore II Fascia.

ATTIVITÀ DI INSEGNAMENTO

- settembre 2020-febbraio 2021
  Incarico di docenza del corso di Analisi III per fisici
  Universitá di Trento;

- settembre 2019-febbraio 2020; settembre 2020-febbraio 2021
  Esercitatore del corso di Meccanica Analitica
  Università di Trento;

- febbraio- settembre 2018; febbraio - settembre 2019:
  Esercitatore del corso di Fisica I per ingegneri
  Università di Trento;

- settembre 2012-maggio 2017:
  Docente dei corsi di Mathematical methods for physicists; Special Relativity; General Relativity and Cosmology; Topics in Modern Physics
  Eurasian National University, Astana (Kazakhstan);

- settembre 2009 - giugno 2010:
  Esercitatore del corso di Metodi Matematici per la Fisica
  Università di Trento.

ATTIVITÀ DI SUPERVISORE

- Correlatore per la tesi di Laurea Specialistica in Fisica di Bruno Sanna (Universitá di Pisa), attivitá in corso;

- Reviewer per Concurcio Nacional de proyectos FONDECYT 2020, Chile;
- Correlatore per la tesi di Laurea Specialistica in Fisica di Manuel Bertipagani, 21 ottobre 2020, Universitá di Trento;
- Reviewer per Concurcio Nacional de proyectos FONDECYT 2019, Chile;
- Correlatore per la tesi di Laurea Specialistica in Fisica di Marco Calzá, 20 marzo 2018, Università di Trento;
- Reviewer per Concurcio Nacional de proyectos FONDECYT 2018, Chile.

ATTIVITÀ DI REFERAGGIO

- Reviewer per: CQG; PLB; EPJC; EPJ Plus; GRG; Entropy; Galaxies; Canadian Journal of Physics; IJGMMP; Physics of the Dark Universe.

ASSOCIAZIONI SCIENTIFICHE

- Da luglio 2017: INFN;
- Da novembre 2016: membro del Working Group 1 "Modified Gravity" per la COST Action "Cosmology and Astrophysics Network for Theoretical Advances and Training Actions (CANTATA)".

PARAMETRI BIBLIOMETRICI (*INSPIRE, novembre 2020*)

- Numero totale di pubblicazioni: 58;
- Numero totale di citazioni: 2700;
- h-index: 26.

PARTECIPAZIONE A CONVEGNI E CONFERENZE NAZIONALI E INTERNAZIONALI

- 7 maggio 2020:
  seminario (webminar): "Quasi normal modes and echoes of black holes, wormholes and horizonless compact stars"
  Universitá di Pisa (Italia);
- 13-17 aprile 2019:
  PAFT 2019
  Vietri sul Mare (Italia);
- October 20-21, 2018:
  "Foundational problems of black holes and gravitational radiations"
  Munich (Germany);
- 24-28 marzo 2018:
  PAFT 2018
  Talk: "Action growth for static black holes in modified gravity"
  Vietri sul Mare (Italia);

- 14-15 dicembre 2017:
  FLAG Meeting
  Talk:“Action growth for black holes in modified gravity”
  Como (Italia);

- 24-28 luglio 2017:
  Karl Schwarzschild Meeting 2017
  Talk: “Thermodynamical aspects of black holes in modified gravity”
  Frankfurt (Germany);

- 08-09 ottobre 2014:
  The 2th Eurasian International Conference “Astrophysics, Gravity and Cosmology”
  Talks: “Inflation from modified gravity’ (plenary section); “Bounce cosmology” (sectional meeting)
  Astana (Kazakhstan);

- 19-20 novembre 2012:
  The 1th Eurasian International Conference “Astrophysics, Gravity and Cosmology”
  Talks: “Black holes in extended theories of gravity” (plenary section); “Finite-time singularities in modified gravity theories” (sectional meeting)
  Astana (Kazakhstan);

- 18-19 gennaio 2012:
  Riunione Nazionale BO11 (INFN)
  Talk: “Black holes in modified gravity: the energy issue”
  Bologna (Italia);

- 25-27 ottobre 2011:
  Dark Workshop at GGI (Galileo Galilei Institute)
  Firenze (Italia);

- 26-30 settembre 2011:
  7th international workshop “The Dark Side of the Universe” (DSU 2011)
  Beijing (China);

- 30 maggio-03 giugno 2011:
  8th Friedmann Seminar
  Rio de Janeiro (Brazil);

- 02-03 ottobre 2010:
  Conference SIGRAV School of General Relativity and Gravitational Physics
  Scuola Normale Superiore di Pisa (Italia);

- 27 settembre-01 ottobre 2010:
  XIX SIGRAV Conference on General Relativity and Gravitational Physics
  Scuola Normale Superiore di Pisa (Italia);

- 05-09 luglio 2010:
  19th International Conference on General Relativity and Gravitation (GR19)
  Talk: “Finite-time singularities in Gauss-Bonnet gravity” (parallel section)
  Mexico City (Mexico);

- 08-10 marzo 2010:
  "Cosmology, the Quantum Vacuum and Zeta Function", in honour of Professor Emilio Elizalde on the occasion of his 60th birthday
  Talk: “Finite-time singularities in $\mathcal{F}(R, G)$ gravity and singularity avoidance”
  Barcelona (Spain);

- 29 giugno-03 luglio 2009:
  Invisible Universe International Conference
  Paris (France);
- 08-09 aprile 2009:
  Riunione Nazionale BO11 (INFN)
  Talk:"Modified gravity models: successes and open problems"
  Bologna (Italia);
- 20-21 marzo 2008:
  Riunione Nazionale BO11 (INFN)
  Talk: "Modified gravity models"
  Bologna (Italia);
- 5 dicembre 2008; 3 marzo 2010:
  Phd workshop 2008-2009; Phd workshop 2009-2010
  Poster section: "From black holes to modified gravity"(con R. Di Criscienzo)
  Università di Trento (Italia).

PUBBLICAZIONI

1. A. Casalino, L. Sebastiani and S. Zerbini, Phys. Rev. D **101** (2020) no.10, 104059 [arXiv:2003.08204 [gr-qc]];
2. A. Casalino, L. Sebastiani, L. Vanzo and S. Zerbini, Phys. Dark Univ. **29** (2020), 100594 [arXiv:1912.09307 [gr-qc]];
3. M. Calzá, A. Casalino, O. Luongo and L. Sebastiani, Eur. Phys. J. Plus **135**, no. 1, 1 (2020) [arXiv:1910.04594 [gr-qc]];
4. L. Sebastiani, L. Vanzo and S. Zerbini, Int. J. Geom. Meth. Mod. Phys. **16**, no. 12, 1950181 (2019) [arXiv:1808.06939 [gr-qc]];
5. A. Casalino, M. Rinaldi, L. Sebastiani and S. Vagnozzi, Class. Quant. Grav. **36**, no. 1, 017001 (2019) [arXiv:1811.06830 [gr-qc]];
6. A. Casalino, M. Rinaldi, L. Sebastiani and S. Vagnozzi, Phys. Dark Univ. **22**, 108 (2018) [arXiv:1803.02620 [gr-qc]];
7. L. Sebastiani, Int. J. Geom. Meth. Mod. Phys. **15**, no. 09, 1850152 (2018) [arXiv:1807.06592 [gr-qc]]. ;
8. M. Calzá, M. Rinaldi and L. Sebastiani, Eur. Phys. J. C **78**, no. 3, 178 (2018) [arXiv:1802.00329 [gr-qc]];
9. L. Sebastiani, L. Vanzo and S. Zerbini, Phys. Rev. D **97** (2018) no.4, 044009 [arXiv:1710.05686 [hep-th]];
10. L. Sebastiani, S. Myrzakul and R. Myrzakulov, Eur. Phys. J. Plus **132**, no. 12, 514 (2017) [arXiv:1712.00738 [gr-qc]];
11. L. Sebastiani, S. Myrzakul and R. Myrzakulov, Eur. Phys. J. Plus **132** (2017) no.10, 433 [arXiv:1702.00064 [gr-qc]];
12. S. D. Odintsov, V. K. Oikonomou and L. Sebastiani, Nucl. Phys. B **923** (2017) 608 [arXiv:1708.08346 [gr-qc]];
13. L. Sebastiani, S. Myrzakul and R. Myrzakulov, Gen. Rel. Grav. **49**, no. 7, 90 (2017) [arXiv:1707.03702 [gr-qc]];

14. E. Elizalde, S. D. Odintsov, L. Sebastiani and R. Myrzakulov, Nucl. Phys. B **921**, 411 (2017) [arXiv:1706.01879 [gr-qc]];

15. L. Sebastiani and R. Myrzakulov, Int. J. Geom. Methods Mod. Phys. **14**, 1750093 (2017) arXiv:1603.09675 [gr-qc];

16. L. Sebastiani, S. Vagnozzi and R. Myrzakulov, Adv. High Energy Phys. **2017**, 3156915 (2017) [arXiv:1612.08661 [gr-qc]];

17. R. Myrzakulov and L. Sebastiani, Symmetry **8**, no. 7, 57 (2016) [arXiv:1606.00711 [gr-qc]];

18. G. Cognola, R. Myrzakulov, L. Sebastiani, S. Vagnozzi and S. Zerbini, Class. Quant. Grav. **33**, no. 22, 225014 (2016) [arXiv:1601.00102 [gr-qc]];

19. S. Myrzakul, R. Myrzakulov and L. Sebastiani, Astrophys. Space Sci. **361**, no. 8, 254 (2016) [arXiv:1605.02726 [gr-qc]];

20. R. Myrzakulov, S. Odintsov and L. Sebastiani, Nucl. Phys. B **907**, 646 (2016) [arXiv:1604.06088 [hep-th]];

21. R. Myrzakulov and L. Sebastiani, Astrophys. Space Sci. **361**, no. 6, 188 (2016) [arXiv:1601.04994 [gr-qc]];

22. R. Myrzakulov, L. Sebastiani, S. Vagnozzi and S. Zerbini, Class. Quant. Grav. **33**, 12 (2016) [arXiv:1510.02284 [gr-qc]];

23. R. Myrzakulov and L. Sebastiani, Astrophys. Space Sci. **361**, no. 2, 62 (2016) [arXiv:1512.00402 [gr-qc]];

24. S. Myrzakul, R. Myrzakulov and L. Sebastiani, Int. J. Mod. Phys. D **25**, no. 04, 1650041 (2016) [arXiv:1509.07021 [gr-qc]];

25. L. Sebastiani and R. Myrzakulov, Int. J. Geom. Meth. Mod. Phys. **12**, no. 09, 1530003 (2015) [arXiv:1506.05330 [gr-qc]];

26. R. Myrzakulov, L. Sebastiani, S. Vagnozzi and S. Zerbini, Fund. J. Mod. Phys. **8**, 119 (2015) [arXiv:1505.03115 [gr-qc]];

27. R. Myrzakulov, L. Sebastiani and S. Vagnozzi, Eur. Phys. J. C **75**, 444 (2015) [arXiv:1504.07984 [gr-qc]];

28. R. Myrzakulov and L. Sebastiani, Gen. Rel. Grav. **47**, no. 8, 89 (2015) [arXiv:1503.04293 [gr-qc]];

29. S. Myrzakul, R. Myrzakulov and L. Sebastiani, Astrophys. Space Sci. **357**, no. 2, 168 (2015) [arXiv:1504.03173 [gr-qc]];

30. R. Myrzakulov, L. Sebastiani and S. Zerbini, Eur. Phys. J. C **75**, no. 5, 215 (2015) [arXiv:1502.04432 [gr-qc]];

31. R. Myrzakulov, S. Odintsov and L. Sebastiani, Phys. Rev. D **91**, no. 8, 083529 (2015) [arXiv:1412.1073 [gr-qc]];

32. S. Myrzakul, R. Myrzakulov and L. Sebastiani, Eur. Phys. J. C **75**, no. 3, 111 (2015) [arXiv:1501.01796 [gr-qc]];

33. R. Myrzakulov and L. Sebastiani, Astrophys. Space Sci. **357**, no. 1, 5 (2015) [arXiv:1411.0422 [gr-qc]];

34. R. Myrzakulov and L. Sebastiani, Astrophys. Space Sci. **356**, no. 1, 205 (2015) [arXiv:1410.3573 [gr-qc]];

35. D. Momeni, R. Myrzakulov, L. Sebastiani and M. R. Setare, Int. J. Geom. Meth. Mod. Phys. **12**, 1550015 (2015) [arXiv:1210.7965 [hep-th]];

36. S. Myrzakul, R. Myrzakulov and L. Sebastiani, Astrophys. Space Sci. **353**, 667 (2014) [arXiv:1406.1576 [gr-qc]];

37. K. Bamba, R. Myrzakulov, S. D. Odintsov and L. Sebastiani, Phys. Rev. D **90**, 043505 (2014) [arXiv:1403.6649 [hep-th]];

38. R. Myrzakulov and L. Sebastiani, Astrophys. Space Sci. **352**, 281 (2014) [arXiv:1403.0681 [gr-qc]];

39. S. Myrzakul, R. Myrzakulov and L. Sebastiani, Astrophys. Space Sci. **350** (2014) 845 [arXiv:1311.6939 [gr-qc]];

40. L. Sebastiani, G. Cognola, R. Myrzakulov, S. D. Odintsov and S. Zerbini, Phys. Rev. D **89**, 023518 (2014) [arXiv:1311.0744 [gr-qc]];

41. L. Sebastiani, D. Momeni, R. Myrzakulov and S. D. Odintsov, Phys. Rev. D. **88** 104022 (2013) arXiv:1305.4231 [gr-qc];

42. R. Di Criscienzo, R. Myrzakulov and L. Sebastiani, Class. Quant. Grav. **30** (2013) 235013 [arXiv:1306.4750 [gr-qc]];

43. R. Myrzakulov, L. Sebastiani and S. Zerbini, Galaxies, 1 (2013) [arXiv:1307.4854 [gr-qc]];

44. G. Cognola, R. Myrzakulov, L. Sebastiani and S. Zerbini, Phys. Rev. D **88**, 024006 (2013) [arXiv:1304.1878 [gr-qc]];

45. R. Myrzakulov, L. Sebastiani and S. Zerbini, International Journal of Modern Physics D Vol. 22, No. 9 1330017 (2013) [arXiv:1302.4646 [gr-qc]];

46. R. Myrzakulov, L. Sebastiani and S. Zerbini, Gen. Rel. Grav. **45**, 675 (2013) [arXiv:1208.3392 [gr-qc]];

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49. E. Elizalde, S. D. Odintsov, L. Sebastiani and S. Zerbini, Eur. Phys. J. C **72** (2012) 1843 [arXiv:1108.6184 [gr-qc]].

50. G. Cognola, O. Gorbunova, L. Sebastiani and S. Zerbini, Phys. Rev. D **84** (2011) 023515 [arXiv:1104.2814 [gr-qc]];

51. L. Sebastiani and S. Zerbini, Eur. Phys. J. C **71** (2011) 1591 [arXiv:1012.5230 [gr-qc]];

52. E. Elizalde, S. Nojiri, S. D. Odintsov, L. Sebastiani and S. Zerbini, Phys. Rev. D **83** (2011) 086006 [arXiv:1012.2280 [hep-th]];

53. E. Bellini, R. Di Criscienzo, L. Sebastiani and S. Zerbini, Entropy **12** (2010) 2186 [arXiv:1009.4816 [gr-qc]];

54. G. Cognola, E. Elizalde, L. Sebastiani and S. Zerbini, Phys. Rev. D **83** (2011) 063003 [arXiv:1007.4676 [hep-th]];

55. L. Sebastiani, Eur. Phys. J. C **69** (2010) 547 [arXiv:1006.1610 [gr-qc]];

56. O. Gorbunova and L. Sebastiani, Gen. Rel. Grav. **42** (2010) 2873 [arXiv:1004.1505 [gr-qc]];

57. K. Bamba, S. D. Odintsov, L. Sebastiani and S. Zerbini, Eur. Phys. J. C **67** (2010) 295 [arXiv:0911.4390 [hep-th]];

58. G. Cognola, E. Elizalde, S. Nojiri, S. D. Odintsov, L. Sebastiani and S. Zerbini, Phys. Rev. D **77** (2008) 046009 [arXiv:0712.4017 [hep-th]].

Proceedings:

1. L. Sebastiani, J. Phys. Conf. Ser. **942**, no. 1, 012016 (2017) [arXiv:1709.09986 [gr-qc]].

2. K. Bamba, A. Lopez-Revelles, R. Myrzakulov, S. D. Odintsov and L. Sebastiani, TSPU Bulletin 3 (128), 2012, n 13 p.19-24 (2012) [arXiv:1301.3049 [gr-qc]];

3. G. Cognola, L. Sebastiani and S. Zerbini, Contribution to MG13 Proceedings, Stockholm (2012) [arXiv:1301.3031 [gr-qc]];

4. L. Sebastiani, Springer Proc. Phys. **137** (2011) 261 [arXiv:1008.3041 [gr-qc]];

5. G. Cognola, L. Sebastiani and S. Zerbini, Proceeding of 12th Marcel Grossmann Meeting on General Relativity (MG 12, 2009) [arXiv:1006.1586 [gr-qc]].

Curriculum Vitae

Daniele Teresi

Attività scientifica

Impiego Accademico

- Ott 2020–Set 2022: **Senior Research Fellow**
  CERN, Ginevra, Svizzera.
  Dipartimento di Fisica Teorica.

- Ott 2018–Set 2020: **Assegnista di Ricerca**
  Università di Pisa, Italia.
  Nell'ambito del gruppo di ricerca internazionale
  finanziato dal grant ERC NEO-NAT:
  "Capire le scale di massa in natura"
  coordinato dal Prof. Alessandro Strumia.
  Inoltre associato alla Sezione INFN di Pisa.

- Ott 2015–Set 2018: **Postdoctoral Research Fellow**
  Université Libre de Bruxelles, Bruxelles, Belgio.
  Partecipazione alle attività di ricerca del consorzio
  "Interuniversity Attraction Pole P7/37"
  finanziato dalla "Belgian Federal Science Policy",
  e del gruppo del Dott. Thomas Hambye finanziato
  dai grant ULB-ARC "Probing Dark Matter with neutrinos"
  e "be.h" EOS n. 30820817.
  Da Nov 2016 vincitore di fondi propri: ULB Fellowship.

Educazione

- Set 2011–Giu 2015: **Particle Physics PhD**
  University of Manchester, Manchester, Regno Unito.
  Supervisor: Prof. Apostolos Pilaftsis
  Titolo della tesi: Quantum Field Theory for the Early Universe
  disponibile a:
  `www.escholar.manchester.ac.uk/item/?pid=uk-ac-man-scw:268010`
  Partecipazione alle attività di ricerca del gruppo
  del Prof. Apostolos Pilaftsis, associato al grant STFC ST/J000418/1.

- Nov 2007–Lug 2010: **Laurea Specialistica in Fisica - Curriculum Fisica Teorica**
  Università di Palermo, Palermo, Italia.
  Relatore: Prof. Giuseppe Compagno
  Titolo della tesi: Entanglement fra campi quantizzati interagenti
  Votazione finale: 110/110 e lode

- Ott 2004–Ott 2007: **Laurea in Fisica**
  Università di Palermo, Palermo, Italia.
  Relatrice: Prof.ssa Anna Napoli
  Titolo dell'elaborato finale:
  Entanglement in un sistema di tre spin a temperatura T
  Votazione finale: 110/110 e lode

Abilitazioni, finanziamenti e onori

- Abilitazione Scientifica Nazionale come Professore di Seconda Fascia, Settore 02/A2, 2019–2025.
- ULB Fellowship, Université Libre de Bruxelles, 2016–2018.
  € 66500 lordi (€ 58000 netti) in due anni. A seguito di bando con revisione fra pari.
- EPS Faculty Scholarship, University of Manchester, 2011–2015.
  £ 42000 in tre anni. A seguito di bando competitivo.
- Premio di Laurea "Eduardo Gugino", Università di Palermo, 2011.
  € 1291 lordi (€ 1037 netti).

Esperienza di Insegnamento Accademico

- 2020 **Co-relatore di Tesi Specialistica**
  Università di Pisa, Italia.
  Studenti: Marco Ardu e Matteo Zirilli.

- 2019-2020 **Tutoraggio di studente di Dottorato**
  Università di Pisa, Italia.
  Studente: Giacomo Landini.

- Feb 2018–Giu 2018 **Esercitazioni**
  Université Libre de Bruxelles, Belgio.
  Esercitazioni (24 ore) per il corso specialistico "Cosmologia" .
  Coordinatore: Thomas Hambye.

- Apr 2017–Lug 2017 **Supervisore di stage**
  Université Libre de Bruxelles, Belgio.
  Supervisore per lo stage di Anne Nguyen and Sami Boulebnane, studenti specializzandi dell'École Polytechnique, Parigi, Francia.

- Set 2011–Giu 2015 **Assistente di insegnamento**
  University of Manchester, Manchester, Regno Unito.
  Tutorial (3–6 ore a settimana, retribuite) per i corsi:
  Mathematics 1, Introduction to Astrophysics and Cosmology,
  Mathematics 2, Properties of Matter.

Lista di tutte le pubblicazioni

Numero totale di citazioni: 1048; h-index: 17
Profilo autore INSPIRE: `D.Teresi.1`

1. D. Buttazzo, P. Panci, D. Teresi and R. Ziegler, "Xenon1T excess from electron recoils of non-relativistic Dark Matter," [arXiv:2011.08919 [hep-ph]]. Under peer review.

2. M. Ardu, L. Di Luzio, G. Landini, A. Strumia, D. Teresi and J. W. Wang, "Axion quality from the (anti)symmetric of SU(N)," JHEP **11**, 090 (2020) doi:10.1007/JHEP11(2020)090 [arXiv:2007.12663 [hep-ph]].

3. C. Gross, A. Strumia, D. Teresi and M. Zirilli, "Is negative kinetic energy meta-stable?," arXiv:2007.05541 [hep-th]. Under peer review.

4. K. Kannike, M. Raidal, H. Veermäe, A. Strumia and D. Teresi, "Dark Matter and the XENON1T electron recoil excess," arXiv:2006.10735 [hep-ph]. Accepted for publication on PRD.

5. A. Strumia and D. Teresi, "Relaxing the Higgs mass and its vacuum energy by living at the top of the potential," Phys. Rev. D 101 (2020) no.11, 115002. arXiv:2002.02463 [hep-ph].

6. D. Buttazzo, L. Di Luzio, P. Ghorbani, C. Gross, G. Landini, A. Strumia, D. Teresi and J. W. Wang, "Scalar gauge dynamics and Dark Matter," JHEP 01 (2020), 130. arXiv:1911.04502 [hep-ph].

7. P. Ghorbani, A. Strumia and D. Teresi, "A landscape for the cosmological constant and the Higgs mass," JHEP 01 (2020), 054. arXiv:1911.01441 [hep-th].

8. D. Buttazzo, L. Di Luzio, G. Landini, A. Strumia and D. Teresi, "Dark Matter from self-dual gauge/Higgs dynamics," JHEP 10 (2019), 067. arXiv:1907.11228 [hep-ph].

9. A. Strumia and D. Teresi, "Cosmological constant: relaxation vs multiverse," Phys. Lett. B 797 (2019), 134901. arXiv:1904.07876 [gr-qc].

10. L. Di Luzio, M. Redi, A. Strumia and D. Teresi, "Coset Cosmology," JHEP 1906 (2019) 110. arXiv:1902.05933 [hep-ph].

11. J.Heeck, D. Teresi, "Pati-Salam explanations of the B-meson anomalies," JHEP 1812 (2018) 103. arXiv:1808.07492 [hep-ph].

12. T. Hambye, A. Strumia and D. Teresi, "Super-cool Dark Matter," JHEP 1808 (2018) 188. arXiv:1805.01473 [hep-ph].

13. D. Teresi, "Clockwork without supersymmetry," Phys. Lett. B 783 (2018) 1 [arXiv:1802.01591 [hep-ph]].

14. S. Boulebnane, J. Heeck, A. Nguyen and D. Teresi, "Cold light dark matter in extended seesaw models," JCAP 1804 (2018) no.04, 006. arXiv:1709.07283 [hep-ph].

15. J. Heeck and D. Teresi, "Cold keV dark matter from decays and scatterings," Phys. Rev. D 96 (2017) 035018. arXiv:1706.09909 [hep-ph].

16. T. Hambye and D. Teresi, "Baryogenesis from L-violating Higgs-doublet decay in the density-matrix formalism," Phys. Rev. D 96 (2017) 015031. arXiv:1705.00016 [hep-ph].

17. A. Pilaftsis and D. Teresi, "Exact RG Invariance and Symmetry Improved 2PI Effective Potential," Nucl. Phys. B 920 (2017) 298. arXiv:1703.02079 [hep-ph].

18. T. Hambye, D. Teresi and M. H. G. Tytgat, "A Clockwork WIMP," JHEP 1707 (2017) 047. arXiv:1612.06411 [hep-ph].

19. J. Heeck and D. Teresi, "Leptogenesis and neutral gauge bosons," Phys. Rev. D 94 (2016) 095024. arXiv:1609.03594 [hep-ph].

20. L. Heurtier and D. Teresi, “Dark matter and observable lepton flavor violation,” Phys. Rev. D 94 (2016) 125022. arXiv:1607.01798 [hep-ph].

21. T. Hambye and D. Teresi, “Higgs doublet decay as the origin of the baryon asymmetry,” Phys. Rev. Lett. 117 (2016) 091801. arXiv:1606.00017 [hep-ph].

22. P. S. B. Dev and D. Teresi, “Asymmetric dark matter in the Sun and diphoton excess at the LHC,” Phys. Rev. D 94 (2016) 025001. arXiv:1512.07243 [hep-ph].

23. A. Pilaftsis and D. Teresi, “Symmetry-Improved 2PI Approach to the Goldstone-Boson IR Problem of the SM Effective Potential,” Nucl. Phys. B 906 (2016) 381. arXiv:1511.05347 [hep-ph].

24. A. Pilaftsis and D. Teresi, “Mass bounds on light and heavy neutrinos from radiative minimal-flavor-violation leptogenesis,” Phys. Rev. D 92 (2015) 085016. arXiv:1506.08124 [hep-ph].

25. P. S. B. Dev, P. Millington, A. Pilaftsis and D. Teresi, “Corrigendum to "Flavour Covariant Transport Equations: an Application to Resonant Leptogenesis",” Nucl. Phys. B 897 (2015) 749. arXiv:1504.07640 [hep-ph].

26. P. S. Bhupal Dev, P. Millington, A. Pilaftsis and D. Teresi, “Kadanoff-Baym approach to flavour mixing and oscillations in resonant leptogenesis,” Nucl. Phys. B 891 (2015) 128. arXiv:1410.6434 [hep-ph].

27. P. S. Bhupal Dev, P. Millington, A. Pilaftsis and D. Teresi, “Flavour Covariant Transport Equations: an Application to Resonant Leptogenesis,” Nucl. Phys. B 886 (2014) 569. arXiv:1404.1003 [hep-ph].

28. A. Pilaftsis and D. Teresi, “Symmetry Improved CJT Effective Action,” Nucl. Phys. B 874 (2013) 594. arXiv:1305.3221 [hep-ph].

Invited review articles:

29. B. Dev, M. Garny, J. Klaric, P. Millington and D. Teresi, “Resonant enhancement in leptogenesis,” Int. J. Mod. Phys. A 33 (2018) 1842003. [arXiv:1711.02863 [hep-ph]].

30. M. Drewes, B. Garbrecht, P. Hernandez, M. Kekic, J. Lopez-Pavon, J. Racker, N. Rius, J. Salvado and D. Teresi, “ARS Leptogenesis,” Int. J. Mod. Phys. A 33 (2018) 1842002. [arXiv:1711.02862 [hep-ph]].

31. P. S. B. Dev, P. Di Bari, B. Garbrecht, S. Lavignac, P. Millington and D. Teresi, “Flavor effects in leptogenesis,” Int. J. Mod. Phys. A 33 (2018) 1842001. [arXiv:1711.02861 [hep-ph]].

Conference proceedings:

32. J. Heeck and D. Teresi, "Pati-Salam and lepton universality in B decays," Contribution to Proceedings of the 54th Rencontres de Moriond on EW Interactions and Unified Theories, 2019. arXiv:1905.05211 [hep-ph].

33. D. Teresi, "Clockwork Dark Matter," Contribution to Proceedings of the 52nd Rencontres de Moriond on EW Interactions and Unified Theories, 2017. arXiv:1705.09698 [hep-ph].

34. P. S. Bhupal Dev, P. Millington, A. Pilaftsis and D. Teresi, "Flavour effects in Resonant Leptogenesis from semi-classical and Kadanoff-Baym approaches," J. Phys. Conf. Ser. 631 (2015) 012087 Contribution to Proceedings of DISCRETE 2014. arXiv:1502.07987 [hep-ph].

35. A. Pilaftsis and D. Teresi, "Symmetry Improved 2PI Effective Action and the Infrared Divergences of the Standard Model," J. Phys. Conf. Ser. 631 (2015) 012008 Contribution to Proceedings of DISCRETE 2014. arXiv:1502.07986 [hep-ph].

36. P. S. Bhupal Dev, P. Millington, A. Pilaftsis and D. Teresi, "Flavour Covariant Formalism for Resonant Leptogenesis," Nucl. Part. Phys. Proc. 273-275 (2016) 268 Contribution to Proceedings of ICHEP 2014. arXiv:1409.8263 [hep-ph].

Non particle-physics works:

37. D. Teresi and G. Compagno, "Entanglement between quantum fields," arXiv:1012.3915 [quant-ph].

38. D. Teresi, A. Napoli and A. Messina "Thermal Localizable Entanglement in a Simple Multipartite System,", Physica Scripta 2009 014038.

39. D. Teresi, A. Napoli and A. Messina "Building an Entanglement Measure on Physical Ground," Journal of Geometric Methods in Modern Physics 9, no. 2, 1260023. arXiv:0805.4345 [quant-ph].

Presentazioni a conferenze, workshop e seminari

In corsivo il titolo del talk.

1. Seminario al Caltech Theory Group (invitato), online seminar (Set 2020). *Precarious Naturalness.*
2. Newton 1665 online seminar series (invitato), (Mar 2020). *Precarious Naturalness.*
3. Seminario al IPhT Saclay (invitato), Parigi, Francia (Feb 2020). *Precarious Naturalness.*
4. Seminario all'Università di Roma Tre (invitato), Roma, Italia (Dic 2019). *On sliding, hiccupping and the multiverse.*

5. Seminario alla Scuola Normale Superiore (invitato), Pisa, Italia (Dic 2019). *Coset cosmology.*
6. Seminario al DESY Theory Group (invitato), Amburgo, Germania (Nov 2019). *Dark Matter from self-dual gauge/Higgs dynamics.*
7. SCALARS 2019, Varsavia, Polonia (Set 19). *The Hiccupping Universe.*
8. GGI Workshop "Next Frontiers in the Search for Dark Matter", Firenze, Italia (Ago 2019), *Dark Matter from self-dual gauge/Higgs dynamics.*
9. PASCOS 2019, Manchester, Regno Unito (Lug 19). *The Hiccupping Universe.*
10. Seminario all'Università di Pisa, Italia (Feb 2019). *Symmetry-improved 2PI Effective Action.*
11. CERN BSM Forum (invitato), CERN (Feb 2019). *A Clockwork Tale.*
12. Scale Invariance in Particle Physics and Cosmology, CERN (Gen 2019). *Scale invariance: super-cooling and Dark Matter.*
13. Seminario alla University of Nottingham (invitato), Regno Unito (Dic 2018). *A Clockwork Tale.*
14. Seminario all'Università di Firenze (invitato), Italia (Nov 2018). *Super-cool Dark Matter.*
15. SUSY 2018, Barcelona, Spagna (Lug 2018). *Clockwork theory and phenomenology.*
16. 30th Rencontres de Blois (invitato), Blois, Francia (Giu 2018). *Clockwork without supersymmetry.*
17. La Thuile 2018 - Les Rencontres de Physique de la Vallée d'Aoste, La Thuile, Italia (Mar 2018). *Clockwork theory and phenomenology.*
18. The Future of Searches for Invisible Particles (invitato), Aachen, Germania (Dic 2017). *Clockwork dark matter.*
19. Seminario a MPIK Heidelberg (invitato), Germania (Nov 2017). *A clockwork tale.*
20. 8th CosPa meeting (invitato), Bruxelles, Belgio (Ott 2017). *Clockwork dark matter.*
21. Seminario alla Université catholique de Louvain (invitato), Belgio (Ott 2017). *A clockwork tale.*
22. Seminario alla University of Manchester (invitato), Regno Unito (Set 2017). *A clockwork tale.*
23. DAνCo: Dark matter, neutrinos and their connections, Odense, Denmark (Set 2017). *Cold keV dark matter from decays and scatterings.*
24. The fate of naturalness (invitato), Vrije Universiteit Brussel, Belgio (Giu 2017). *A clockwork tale.*
25. Seminario alla University of Montpellier (invitato), Francia (Giu 2017). *Testable Leptogenesis: A (biased) review.*
26. BLV 2017, Cleveland, USA (May 2017). *Testable Leptogenesis: A (biased) review.*
27. Neutrinos: the quest for a new physics scale (invitato), CERN (Mar 2017). *Resonant Leptogenesis: A (biased) review focused on testability.*

28. 52nd Rencontres de Moriond EW (invitato), La Thuile, Italia, (Mar 2017). *A clockwork WIMP.*
29. Seminario alla University of Bonn (invitato), Germania (Feb 2017). *Leptogenesis in its testable regimes.*
30. IAP Winter Solstice Meeting 2016, Bruxelles (Dic 2016). *Brout-Englert-Higgs doublet decay as the origin of the baryon asymmetry.*
31. DISCRETE 2016, Warsaw, Poland (Nov-Dic 2016).
    Higgs doublet decay as the origin of the baryon asymmetry.
    Towards an Exact RG-Invariant and Symmetry-Improved 2PI Effective Potential.
32. TeVPA 2016, CERN (Set 2016). *Higgs doublet decay as the origin of the baryon asymmetry.*
33. 2016 MIAPP programme "Why is there more Matter than Antimatter in the Universe?", Munich, Germania (5-19 Giu 2016). *Higgs doublet decay as the origin of the baryon asymmetry.*
34. Seminario alla University of Southampton (invitato), UK (Feb 2016). *The Full Flavour of (Resonant) Leptogenesis.*
35. On the diphoton excess (invitato), Vrije Universiteit Brussel, Belgio (Gen 2016). *Variations in the dark matter interpretation of the diphoton excess.*
36. Seminario al King's College London (invitato), UK (Gen 2016). *The Full Flavour of (Resonant) Leptogenesis.*
37. Progress in Quantum Field Theory and Gravity: from Colliders to Cosmology (invitato), Nottingham, UK (Gen 2016). *Symmetry-improved 2PI approach to the Goldstone-boson IR problem of the SM effective potential.*
38. 53rd International School of Subnuclear Physics (invitato), Erice, Italia. (Giu-Lug 2015). *Symmetry-improved Cornwall–Jackiw–Tomboulis Effective Action.*
39. Lancaster-Manchester-Sheffield Consortium Meeting 2015, Lancaster University (May 2015). *Symmetry-improved 2PI approach to the IR divergences of the Standard Model.*
40. DISCRETE 2014 (invitato), London, UK (Dic 2014). *Flavour Effects in Resonant Leptogenesis from Semi-classical and Kadanoff-Baym Approaches. Symmetry-improved 2PI Approach to the Infrared Divergences of the Standard Model Effective Potential.*
41. Seminario alla University of Heidelberg, Germania (Nov 2014). *Symmetry-improved CJT Effective Action.*
42. Seminario al Max Planck Institute for Physics, Munich, Germania (Nov 2014). *Symmetry-improved CJT Effective Action.*
43. Seminario alla Technische Universität München (invitato), Munich, Germania (Nov 2014). *Symmetry-improved CJT Effective Action.*
44. SUSY 2014, Manchester, UK (Lug 2014). *Flavour Covariant Transport Equations for Resonant Leptogenesis.*
45. Planck 2014, Paris, Francia (May 2014). *Flavour Covariant Transport Equations for Resonant Leptogenesis.*

46. Lancaster-Manchester-Sheffield Consortium Meeting 2013, University of Manchester (Set 2013). *Symmetry-Improved CJT Effective Action.*
47. Advances in Quantum Field Theory and Gravity, University of Sussex, Brighton (Giu 2013). *Symmetry-Improved CJT Effective Action: Renormalization, Thresholds and Effective Potential.*
48. Nonperturbative Aspects in Quantum Field Theory, King's College, London (Nov 2012). *Symmetry-Improved CJT Effective Action.*

Scuole di dottorato e specializzazione

- 53rd International School of Subnuclear Physics , Erice, Italia (Giu-Lug 2015).
- Pre-SUSY School 2014, Manchester, Regno Unito (Lug 2014).
- 42nd BUSSTEPP Summer School, Durham, Regno Unito (Set 2012).

Attività di coordinamento

Incarichi

- Revisore di articoli per le riviste:
  - Physical Review Letters
  - JHEP
  - Physical Review D
  - Physics Letters B
  - JCAP
  - European Physical Journal C
  - Journal of Physics G
- Valutatore indipendente del progetto per l'assegnazione della borsa di post-dottorato "Programme Prestige", Francia. Candidatura PRESTIGE-2017-2-0008.
- Organizzazione dei seminari online "Newton 1665".
  Pagina web `https://agenda.infn.it/event/22106/`
- Convener per la conferenze:
  - BLV 2019, Madrid, Spagna (Ott 2019). Organizzazione della sessione parallela: *Baryo/leptogenesis.* In allegato poster della conferenza riportante il nome dei convener.

  - PASCOS 2019, Manchester, Regno Unito (Lug 2019). Organizzazione della sessione parallela: *Cosmological probes*. Evidenza all'indirizzo `http://indico.hep.manchester.ac.uk/conferenceProgram.py?confId=5326`

- Chair per le conferenze:
  - SUSY 2018, Barcelona, Spagna (Lug 2018). Sessione parallela: *Dark Matter, Astroparticle Physics*.
  - CrossTalk Workshop: Flavour Anomalies, Bruxelles, Belgio (Mar 2018). Sessione plenaria.

- Organizzazione seminari al Service de Physique Théorique, Université Libre de Bruxelles, per l'a.a. 2017/2018.

Attività di terza missione

Apparizione su media/divulgazione scientifica

- La Stampa - Tuttoscienze. Intervista per l'articolo "Com'è precario l'Universo, vicino al collasso o alla disintegrazione". Versione online apparsa il 17/06/2020.

- Intervista per articoli divulgativi su vari media, fra cui ANSA, Adnkronos, Rai News, sul mio articolo di ricerca *Relaxing the Higgs mass and its vacuum energy by living at the top of the potential*.

- Intervista per la sezione *Nuvola del Corriere* del Corriere della Sera. Articolo "Il giovane fisico e il bosone di Higgs". Versioni online e stampata (apparsa il 19/11/2018).

****

Informazioni aggiuntive

- Lingue: Italiano (madrelingua), Inglese (fluente), Francese (base).
- Conoscenze informatiche: Programmazione in Wolfram Mathematica, C e C++, CalcHEP, MicrOMEGAs, tecniche di calcolo scientifico numerico, esperienza in programmazione parallela, LaTeX.

Curriculum Vitae

Arsenii Titov

1 December 2020

Education

Oct 2013 – Sep 2017 **PhD in Theoretical Particle Physics** (*cum laude*)
Theoretical Particle Physics Group,
International School for Advanced Studies (SISSA),
Trieste, Italy
Thesis: *Phenomenology of the Discrete Symmetry Approach to Neutrino Mixing and Leptonic CP Violation*
SISSA Digital Library [INSPIRE]
Supervisor: Professor Serguey Petcov

Sep 2011 – Jun 2013 **Master of Physics** (diploma *with distinction*)
Department of High Energy and Elementary Particle Physics,
Faculty of Physics, Saint Petersburg State University,
Saint Petersburg, Russia
Thesis: *Net Charge Fluctuations in the String Model of Proton-Proton and Nucleus-Nucleus Interactions at High Energies*
Supervisor: Professor Vladimir Vechernin

Sep 2007 – Jun 2011 **Bachelor of Physics** (diploma *with distinction*)
Department of Molecular Biophysics,
Faculty of Physics, Saint Petersburg State University,
Saint Petersburg, Russia
Graduation project: *Influence of Salt Concentration on Spectral Properties of Silver and Gold Nanoparticles in Aqueous Solution*
Supervisor: Professor Nina Kasyanenko

Sep 1997 – Jun 2007 School No. 602,
Lomonosov, Saint Petersburg, Russia
Certificate of secondary (complete) education *with distinction*
Gold Medal for outstanding academic achievements

Employment and Research Experience

Dec 2020 – Present **Senior Postdoctoral Researcher**
Department of Theoretical Physics, University of Valencia,
Institute for Corpuscular Physics (IFIC), University of Valencia & CSIC,
Valencia, Spain

Oct 2019 – Oct 2020 **Postdoctoral Researcher**
Department of Physics and Astronomy "Galileo Galilei",
University of Padua,
Padua, Italy

Jun 2019 – Sep 2019 **Postdoctoral Research Associate**
ERC grant "NuMass"
Institute for Particle Physics Phenomenology (IPPP),
Department of Physics, Durham University,
Durham, United Kingdom

Jun 2017 – May 2019 **Early Stage Researcher**
Marie Skłodowska-Curie Innovative Training Network "Elusives"
Institute for Particle Physics Phenomenology (IPPP),
Department of Physics, Durham University,
Durham, United Kingdom

Sep 2012 – Sep 2013 **Junior Researcher**
Laboratory of Ultra-High Energy Physics,
Faculty of Physics, Saint Petersburg State University,
Saint Petersburg, Russia

Jul 2012 – Aug 2012 **Summer Student**
CERN Summer Student Programme,
Theory Unit, Physics Department, CERN,
Geneva, Switzerland
Project: *Net Charge Fluctuations in AA Collisions in a String-Inspired Picture of Hadronic Interactions*
Supervisors: Dr Urs Achim Wiedemann, Professor Vladimir Vechernin

Indicators of Scientific Production

Total number of publications:	30
Articles published in peer-reviewed journals:	21
Contributions to conference proceedings:	9
Total number of citations (INSPIRE):	**656**
Average number of citations per article (INSPIRE, published):	31
h-index (INSPIRE):	**15**

Publications

Journal Articles

21. M. Chala and A. Titov, *One-loop running of dimension-six Higgs-neutrino operators and implications of a large neutrino dipole moment*, *JHEP* **09** (2020) 188 [arXiv:2006.14596] [INSPIRE].

20. M. Blennow, M. Ghosh, T. Ohlsson and A. Titov, *Probing Lepton Flavor Models at Future Neutrino Experiments*, *Phys. Rev. D* **102** (2020) 115004 [arXiv:2005.12277] [INSPIRE].

19. M. Chala, P. Kozów, M. Ramos and A. Titov, *Effective field theory for vector-like leptons and its collider signals*, *Phys. Lett. B* **809** (2020) 135752 [arXiv:2005.09655] [INSPIRE].

18. M. Blennow, M. Ghosh, T. Ohlsson and A. Titov, *Testing Lepton Flavor Models at ESSnuSB*, *JHEP* **07** (2020) 014 [arXiv:2004.00017] [INSPIRE].

17. M. Chala and A. Titov, *One-loop matching in the SMEFT extended with a sterile neutrino*, *JHEP* **05** (2020) 139 [arXiv:2001.07732] [INSPIRE].

16. J. M. Butterworth, M. Chala, C. Englert, M. Spannowsky and A. Titov, *Higgs Phenomenology as a Probe of Sterile Neutrinos*, *Phys. Rev. D* **100** (2019) 115019 [arXiv:1909.04665] [INSPIRE].

15. P. P. Novichkov, J. T. Penedo, S. T. Petcov and A. V. Titov, *Generalised CP Symmetry in Modular-Invariant Models of Flavour*, *JHEP* **07** (2019) 165 [arXiv:1905.11970] [INSPIRE].

14. J. Alcaide, S. Banerjee, M. Chala and A. Titov, *Probes of the Standard Model Effective Field Theory Extended with a Right-Handed Neutrino*, *JHEP* **08** (2019) 031 [arXiv:1905.11375] [INSPIRE].

13. M. Blennow, E. Fernandez-Martinez, A. Olivares-Del Campo, S. Pascoli, S. Rosauro-Alcaraz and A. V. Titov, *Neutrino Portals to Dark Matter*, *Eur. Phys. J. C* **79** (2019) 555 [arXiv:1903.00006] [INSPIRE].

12. P. P. Novichkov, J. T. Penedo, S. T. Petcov and A. V. Titov, *Modular A_5 Symmetry for Flavour Model Building*, *JHEP* **04** (2019) 174 [arXiv:1812.02158] [INSPIRE].

11. P. P. Novichkov, J. T. Penedo, S. T. Petcov and A. V. Titov, *Modular S_4 Models of Lepton Masses and Mixing*, *JHEP* **04** (2019) 005 [arXiv:1811.04933] [INSPIRE].

10. S. T. Petcov and A. V. Titov, *The A_4, S_4 and A_5 Flavor Symmetries in Light of Data on Neutrino Mixing*, *Int. J. Mod. Phys. A* **33** (2018) 1844024 [INSPIRE].

9. S. T. Petcov and A. V. Titov, *Assessing the Viability of A_4, S_4 and A_5 Flavour Symmetries for Description of Neutrino Mixing*, *Phys. Rev. D* **97** (2018) 115045 [arXiv:1804.00182] [INSPIRE].

8. S. K. Agarwalla, S. S. Chatterjee, S. T. Petcov and A. V. Titov, *Addressing Neutrino Mixing Models with DUNE and T2HK*, *Eur. Phys. J. C* **78** (2018) 286 [arXiv:1711.02107] [INSPIRE].

7. J. T. Penedo, S. T. Petcov and A. V. Titov, *Neutrino Mixing and Leptonic CP Violation from S_4 Flavour and Generalised CP Symmetries*, *JHEP* **12** (2017) 022 [arXiv:1705.00309] [INSPIRE].

6. J. Gehrlein, S. T. Petcov, M. Spinrath and A. V. Titov, *Renormalisation Group Corrections to Neutrino Mixing Sum Rules*, *JHEP* **11** (2016) 146 [arXiv:1608.08409] [INSPIRE].

5. I. Girardi, S. T. Petcov and A. V. Titov, *Predictions for the Majorana CP Violation Phases in the Neutrino Mixing Matrix and Neutrinoless Double Beta Decay*, *Nucl. Phys. B* **911** (2016) 754 [arXiv:1605.04172] [INSPIRE].

4. I. Girardi, S. T. Petcov, A. J. Stuart and A. V. Titov, *Leptonic Dirac CP Violation Predictions from Residual Discrete Symmetries*, *Nucl. Phys. B* **902** (2016) 1 [arXiv:1509.02502] [INSPIRE].

3. I. Girardi, S. T. Petcov and A. V. Titov, *Predictions for the Dirac CP Violation Phase in the Neutrino Mixing Matrix*, *Int. J. Mod. Phys. A* **30** (2015) 1530035 [*Adv. Ser. Direct. High Energy Phys.* **25** (2015) 69] [arXiv:1504.02402] [INSPIRE].

2. I. Girardi, S. T. Petcov and A. V. Titov, *Predictions for the Leptonic Dirac CP Violation Phase: a Systematic Phenomenological Analysis*, *Eur. Phys. J. C* **75** (2015) 345 [arXiv:1504.00658] [INSPIRE].

1. I. Girardi, S. T. Petcov and A. V. Titov, *Determining the Dirac CP Violation Phase in the Neutrino Mixing Matrix from Sum Rules*, *Nucl. Phys. B* **894** (2015) 733 [arXiv:1410.8056] [INSPIRE].

Conference Papers

9. M. Blennow, E. Fernandez-Martinez, A. Olivares-Del Campo, S. Pascoli, S. Rosauro-Alcaraz and A. V. Titov, *Neutrino-Dark Matter Portals*, in proceedings of the *NuPhys2018: Prospects in Neutrino Physics*, 19–21 December 2018, London, UK, *eConf* **C181219** (2019) 159 [arXiv:1904.04132] [INSPIRE].

8. J. T. Penedo, S. T. Petcov and A. V. Titov, *Neutrino Mixing and Leptonic CP Violation from S_4 and Generalised CP Symmetries*, in proceedings of the *NuPhys2017: Prospects in Neutrino Physics*, 20–22 December 2017, London, UK, *eConf* **C171220** (2018) 174 [arXiv:1803.11009] [INSPIRE].

7. I. Girardi, S. T. Petcov and A. Titov, *CPV Predictions from Flavour Symmetries*, in proceedings of the *Neutrino Oscillation Workshop (NOW 2016)*, 4–11 September 2016, Otranto, Italy, *PoS* **NOW2016** (2017) 027 [INSPIRE].

6. I. Girardi, S. T. Petcov and A. V. Titov, *The Leptonic Dirac CP-Violating Phase from Sum Rules*, in proceedings of the *XIV International Conference on Topics in Astroparticle and Underground Physics (TAUP 2015)*, 7–11 September 2015, Turin, Italy, *J. Phys. Conf. Ser.* **718** (2016) 062060 [INSPIRE].

5. I. Girardi, S. T. Petcov and A. Titov, *Predicting the Leptonic Dirac CP Violation Phase from Sum Rules*, in proceedings of the *European Physical Society Conference on High Energy Physics 2015 (EPS-HEP 2015)*, 22–29 July 2015, Vienna, Austria, *PoS* **EPS-HEP2015** (2016) 039 [INSPIRE].

4. I. Girardi, S. T. Petcov and A. V. Titov, *Predictions for the Dirac Phase in the Neutrino Mixing Matrix and Sum Rules*, in proceedings of the *4th Symposium on Prospects in the Physics of Discrete Symmetries (DISCRETE 2014)*, 2–6 December 2014, London, UK, *J. Phys. Conf. Ser.* **631** (2015) 012051 [INSPIRE].

3. A. Titov and V. Vechernin, *Net Charge Fluctuations in AA Collisions in a Simple String-Inspired Model*, in proceedings of the *XXI International Baldin Seminar on High Energy Physics Problems "Relativistic Nuclear Physics and Quantum Chromodynamics" (Baldin ISHEPP XXI)*, 10–15 September 2012, JINR, Dubna, Russia, *PoS* **Baldin ISHEPP XXI** (2013) 047 [INSPIRE].

2. A. Titov, *Net Charge Fluctuations in AA Collisions in the Color Strings Approach*, in proceedings of the *III International Student Conference "Science and Progress"*, 12–16 November 2012, Peterhof, Saint Petersburg, Russia, *Conference Proceedings* (2012) 136.

1. A. V. Titov, M. S. Varshavskii, K. G. Lopatko and N. A. Kasyanenko, *Study of DNA Interaction with Silver Nanoparticles in Water (Salt Solution)*, in proceedings of the *III International Conference "Modern Problems of Molecular Biophysics"*, 14–15 June 2011, Peterhof, Saint Petersburg, Russia, *Vestnik St.Petersburg University Ser. 4* **4** (2011) 229. (In Russian.)

Conference Proceedings

1. F. Di Lodovico, T. Katori, S. Pascoli, A. V. Titov and J. R. Wilson (editors), *Proceedings of the NuPhys2018: Prospects in Neutrino Physics*, 19–21 December 2018, London, UK, *eConf* **C181219** (2019) [INSPIRE].

Letters of Interest

1. J. Gehrlein, S. Pascoli, S. Petcov, M. Spinrath and A. Titov, *Snowmass Letter of Interest: Leptonic Sum Rules*, 2020.

Seminars

11. *All Things EFT international online lecture*, 25 November 2020.
Effective Field Theory of the Standard Model Extended with Right-Handed Neutrinos [YouTube].

10. *High Energy Theory Group seminar*, 26 October 2020, University of Granada, Granada, Spain.
Modular-Invariant Lepton Flavour Models. (Online seminar.)

9. *Pheno Coffee*, 10 December 2019, University of Padua and INFN, Padua, Italy.
   Phenomenology of the SMEFT Extended with a Right-Handed Neutrino.

8. *Department of Physics Awards for Excellence 2019 ceremony*, 16 September 2019, Durham University, Durham, UK.
   Neutrinos and Symmetries behind Them.

7. *Elusives Virtual Institute Early Stage Researcher webinar*, 27 May 2019.
   Gauge-Invariant Models of Sizeable DM-Neutrino Interactions.

6. *TH Cosmo Coffee*, 27 March 2019, CERN, Geneva, Switzerland.
   Neutrino Portals to Dark Matter.

5. *IPPP internal seminar*, 1 March 2019, IPPP, Durham University, Durham, UK.
   Modular Symmetry and Flavour.

4. *APEC seminar*, 28 March 2018, Kavli IPMU, University of Tokyo, Kashiwanoha, Kashiwa, Japan.
   Neutrino Mixing and CP Violation from Discrete Flavour Symmetries.

3. *SHEP seminar*, 23 February 2018, University of Southampton, Southampton, UK.
   Leptonic CP Violation from Discrete Flavour Symmetries.

2. *Elusives Virtual Institute Early Stage Researcher webinar*, 20 November 2017.
   Leptonic CP Violation from Discrete Flavour Symmetries.

1. *IPPP internal seminar*, 20 October 2017, IPPP, Durham University, Durham, UK.
   Phenomenology of the Discrete Symmetry Approach to Neutrino Mixing and Leptonic CP Violation.

Conferences & Workshops

23. *Higgs and Effective Field Theory 2020 (HEFT 2020)*, 15–17 April 2020, Granada, Spain. (Online workshop.)

22. *FLASY2019: 8th Workshop on Flavor Symmetries and Consequences in Accelerators and Cosmology*, 22–27 July 2019, Shanghai and Hefei, China.
    Talk: *Modular A_5 Symmetry for Flavour Model Building*.

21. *XXV International Symposium PASCOS 2019: Particle Physics, String Theory and Cosmology*, 1–5 July 2019, Manchester, UK.
    Talk: *Neutrino Portals to Dark Matter*.

20. *Higgs Maxwell Workshop 2019*, 20 February 2019, Edinburgh, UK.

19. *NuPhys2018: Prospects in Neutrino Physics*, 19–21 December 2018, London, UK.
    Co-organiser.

18. *Invisibles18 Workshop*, 3–7 September 2018, Karlsruhe, Germany.
    Plenary talk: *Neutrino Portal to Dark Matter*.

17. *FLASY 2018: 7th Workshop on Flavour Symmetries and Consequences in Accelerators and Cosmology*, 2–5 July 2018, Basel, Switzerland.
    Plenary talk: *Assessing the Viability of A_4, S_4 and A_5 Flavour Symmetries for Description of Neutrino Mixing*.

16. *New Frontiers in Theoretical Physics*, 23–26 May 2018, Cortona, Italy.
    Talk: *Viability of A_4, S_4 and A_5 Lepton Flavour Symmetries*.

15. *Higgs Maxwell Meeting*, 14 February 2018, Edinburgh, UK.

14. *Neutrino Platform Week*, 29 January – 2 February 2018, CERN, Geneva, Switzerland.

13. *NuPhys2017: Prospects in Neutrino Physics*, 20–22 December 2017, London, UK.
    Poster: *Probing Neutrino Mixing Schemes in DUNE and T2HK.*

12. *Invisibles17 Workshop*, 12–16 June 2017, Zurich, Switzerland.

11. *Invisibles16 Workshop*, 12–16 September 2016, Padua, Italy.
    Talk & poster: *Leptonic CP Violation Predictions from Discrete Flavour Symmetry Approach*.

10. *Neutrino Oscillation Workshop 2016 (NOW 2016)*, 4–11 September 2016, Otranto, Italy.
    Talk: *CPV Predictions from Flavour Symmetries*.

9. *18th International Workshop on Neutrino Factories and Future Neutrino Facilities Search (NuFact 2016)*, 21–27 August 2016, Quy Nhon, Vietnam.
   Talk & poster: *Leptonic CP Violation Predictions from Discrete Flavour Symmetry Approach*.

8. *XIV International Conference on Topics in Astroparticle and Underground Physics (TAUP 2015)*, 7–11 September 2015, Turin, Italy.
   Talk: *The Leptonic Dirac CP Violation Phase from Sum Rules*.

7. *European Physical Society Conference on High Energy Physics 2015 (EPS-HEP 2015)*, 22–29 July 2015, Vienna, Austria.
   Talk: *Predicting the Leptonic Dirac CP Violation Phase from Sum Rules*.

6. *25th International Workshop on Weak Interactions and Neutrinos (WIN2015)*, 8–13 June 2015, Heidelberg, Germany.
   Talk: *Determining the Dirac CP Violation Phase in the PMNS Matrix from Sum Rules*.

5. *Topical Research Meeting on Prospects in Neutrino Physics (NuPhys2014)*, 15–17 December 2014, London, UK.
   Poster: *Determining the Dirac CP Violation Phase in the Neutrino Mixing Matrix from Sum Rules.*

4. *III International Student Conference "Science and Progress"*, 12–16 November 2012, Peterhof, Saint Petersburg, Russia.
   Talk: *Net Charge Fluctuations in AA Collisions in the Color Strings Approach.*

3. *XXI International Baldin Seminar on High Energy Physics Problems "Relativistic Nuclear Physics and Quantum Chromodynamics" (Baldin ISHEPP XXI)*, 10–15 September 2012, JINR, Dubna, Russia.
   Talk: *Net Charge Fluctuations in AA Collisions in a Simple String-Inspired Model.*

2. *CERN Summer Student Poster Session 2012*, 8 August 2012, CERN, Geneva, Switzerland.
   Poster: *Net Charge Fluctuations in AA Collisions in a String-Inspired Picture of Hadronic Interactions.*

1. *III International Conference "Modern Problems of Molecular Biophysics"*, 14–15 June 2011, Peterhof, Saint Petersburg, Russia.
   Poster: *Study of DNA Interaction with Silver Nanoparticles in Water (Salt Solution).*

Schools

6. *Invisibles18 School*, 28 August – 1 September 2018, Burghausen, Germany.
   Tutor.

5. *Invisibles17 School*, 6–10 June 2017, Murten, Switzerland.

4. *International School of Subnuclear Physics 2013*, 24 June – 3 July 2013, Erice, Sicily, Italy.
3. *XLVII Winter School of Petersburg Nuclear Physics Institute*,
   25 February – 2 March 2013, Roschino, Saint Petersburg Area, Russia.
2. *CERN Summer Student Programme*, 2 July – 24 August 2012, CERN, Geneva, Switzerland.
1. *XLVI Winter School of Petersburg Nuclear Physics Institute*,
   26 February – 2 March 2012, Roschino, Saint Petersburg Area, Russia.

Teaching Experience

Jun 2019	*Finite Group Theory in a Nutshell*, 8 hours, within MSc in Particles, Strings and Cosmology, Durham University, Durham, UK
Aug 2018	*Tutor*, 6 hours, for Master's and PhD students in Particle Physics and Astroparticle Physics, *Invisibles18 School*, Burghausen, Germany
Feb 2017	*Finite Group Theory in a Nutshell*, 8 hours, for PhD students in Theoretical Particle Physics and Astroparticle Physics, SISSA, Trieste, Italy

Research Visits and Secondments

18 Mar – 18 Apr 2019	Theoretical Physics Department, CERN, Geneva, Switzerland
11 Sep – 12 Oct 2018	Theoretical Physics Group, Department of Physics and Astronomy "Galileo Galilei", University of Padua and INFN, Padua, Italy
2–24 Aug 2018	Theoretical Particle Physics Group, SISSA and INFN, Trieste, Italy
28 May – 1 Jun 2018	IFT, Autonomous University of Madrid, Madrid, Spain
2–20 Apr 2018	Electron Tube Division, Hamamatsu Photonics, Shimokanzo, Iwata City, Japan
26–30 Mar 2018	Kavli IPMU, University of Tokyo, Kashiwanoha, Kashiwa, Japan
11–15 Dec 2017	SISSA Medialab, Trieste, Italy
2 Jul – 24 Aug 2012	Theory Unit, Physics Department, CERN, Geneva, Switzerland

Awards

16 Sep 2019	Department of Physics Award for Excellence 2019 Durham University, Durham, UK *"For his outstanding research in neutrino physics and dark matter, particularly in the exploration of the origin of the leptonic flavour structure using modular symmetries"*

Fellowships and Grants

Feb 2020	Two-year "Juan de la Cierva Formación 2018" postdoctoral fellowship, University of Granada, Spain, declined
Jan 2020	One-year postdoctoral fellowship within the ERC grant "NEO-NAT", University of Pisa, Italy, declined
Jun 2017 – May 2019	Marie Curie Early Stage Researcher training fellowship
Oct 2013 – Sep 2017	PhD fellowship in Theoretical Particle Physics curriculum at SISSA
Jul 2013	Research training fellowship for postgraduate students of SISSA
Jul 2012 – Aug 2012	CERN Summer Student fellowship
Jul 2012 – Jun 2013	Fellowship of the Russian non-profit Dynasty Foundation

Organisational Activities

5. *Theory Group Seminar*,
   spring semester of academic year 2019/2020,
   Department of Physics and Astronomy "Galileo Galilei",
   University of Padua and INFN, Padua, Italy.

4. *Pheno Coffee Journal Club*,
   academic year 2019/2020,
   Department of Physics and Astronomy "Galileo Galilei",
   University of Padua and INFN, Padua, Italy.

3. International conference *NuPhys2019: Prospects in Neutrino Physics*,
   16–18 December 2019, London, UK.

2. International conference *NuPhys2018: Prospects in Neutrino Physics*,
   19–21 December 2018, London, UK.

1. *Neutrino Journal Club*,
   academic year 2017/2018,
   IPPP, Durham University, Durham, UK.

Evaluation Activities

Referee for *JHEP*, *Eur. Phys. J. C*, *Phys. Rev. D*, *Nucl. Phys. B*, *Phys. Lett. B*, *New J. Phys.*, *Int. J. Mod. Phys. A* and *Indian J. Phys.*

Outreach

5. *Paper of the month* on the Innovative Training Network "Elusives" website.
   A. Titov and A. Caputo, *Origin of the Asymmetric Ring around M87's Black Hole*, April 2019.

4. Participating in development and presentation of the *Ghosts in the Universe* exhibit dedicated to neutrinos, *Royal Society Summer Science Exhibition*, 2–8 July 2018, London, UK.

3. *Talk on Neutrinos*, 18 April 2018, Hamamatsu Photonics, Shimokanzo, Iwata City, Japan.

2. *Paper of the month* on the Innovative Training Network "Elusives" website.
   J. Gehrlein and A. Titov, *DAMPE: a Spectral Break and a New Excess in the TeV Spectrum of Cosmic-Ray Electrons and Positrons*, December 2017.

1. Participating as a guide in the *SISSA for Schools* programme, 2016–2017, SISSA, Trieste, Italy.

Computer Knowledge

Operating Systems:	macOS, Linux, Windows
Programming Languages:	Python, C, C++
Software Packages:	Wolfram Mathematica, MATLAB, Maple LaTeX, Keynote, Microsoft Office, LibreOffice

Miscellaneous Information

Sep 1998 – Jun 2005	Class of Piano, Igor F. Stravinsky Music School, Lomonosov, Saint Petersburg, Russia Certificate with distinction
Sep 1997 – Jun 2004	Class of Button Accordion, Igor F. Stravinsky Music School, Lomonosov, Saint Petersburg, Russia Certificate with distinction

POSIZIONE ATTUALE	Assegnista presso SISSA via Bonomea 265 34136 Trieste, Italy
POSIZIONI PRECEDENTI	Postdoc a Tel Aviv University, Israele, Ottobre 2014 - Settembre 2017 Postdoc a Universität Bonn, Germania, Luglio 2011 - Settembre 2014
INTERESSI DI RICERCA	Materia oscura, Problema di CP nelle interazioni forti, Assioni, Supersimmetria, Baryogenesis, Astrofisica, Cosmologia
FORMAZIONE	*Studi universitari*

Settembre 2000 - Dicembre 2005

Università di Bologna, Dipartimento di Fisica

Laurea vecchio ordinamento in Fisica (110 e lode)
Supervisore di tesi: Prof. Fiorenzo Bastianelli
Titolo tesi: "Formalismo di linea di mondo e sue applicazioni"

Settembre 2003 - Giugno 2004

Programma di scambio OVERSEAS a **University of California, Santa Cruz**, California, USA

Dottorato

Settembre 2006 - Marzo 2011

University of California, Santa Cruz, California, USA

Dipartimento di Fisica

Supervisori: Prof. Michael Dine and Prof. Stefano Profumo
Titolo tesi: "Lights in the dark"

PREMI	Marilyn Stevens Scholarship, 2010 (borsa di studio per eccellenza accademica, sevizio dentro e fuori l'University of California, Santa Cruz e contributo alla vita di dipartimento)
QUALIFICHE ACCADEMICHE	Abilitazione Scientifica Nazionale per professore di seconda fascia nel settore concorsuale 02/A2 - *Fisica teorica delle interazioni fondamentali* valida dal 13/07/2018 al 13/07/2024

Partecipazione a scuole internazionali da studente

Prospects in Theoretical Physics, "The Standard Model and Beyond", 16 - 27 Luglio 2007, Institute for Advanced Study, Princeton, NJ, USA

TASI 2009, "Physics of the Large and the Small", 1-26 Giugno 2009, University of Colorado, Boulder, Colorado, USA

Les Houches 2011, "Theoretical Physics to face the challenge of LHC", 1-26 Agosto 2011, Les Houches, Francia

School on Strongly Coupled Physics Beyond the Standard Model, Trieste, Gennaio 2012

Selezione delle principali relazioni a conferenze e workshops

- Rencontres de Moriond, 6-13 Marzo 2010, La Thuile, Valle d'Aosta
  - Seminario: *Probing dark matter with AGN jets*
- Indirect and direct detection of dark matter, 6-12 Febbraio 2011, Aspen, Colorado
  - Seminario: *Probing dark matter with AGN jets*
- Cosmology meets particle physics, 27-30 Settembre 2011, DESY, Amburgo, Germania
  - Seminario: *Cosmic ray - dark matter scattering*
- Aspen summer workshop, 26 Agosto - 9 September 2012, Colorado
  - Seminario: *WIMP dark matter and baryogenesis*
- Planck 2013 conference, 20 - 24 Maggio 2013, Bonn, Germania
  - Seminario: *WIMP dark matter and baryogenesis*
- CETUP*2013 workshop, 24 Giugno - 5 Luglio 2013, South Dakota
  - Seminario: *White dwarfs constraints on light particles*
  - Discussion leader: *Stellar constraints on particle physics*
- Avogadro Meeting, Dicembre 2015, Bologna
  - Lezione su invito: *Axion dark matter*
- Aspen summer workshop, 29 Maggio - 19 Giugno 2016, Colorado
  - Discussion leader: *Cosmology and electroweak naturalness*
- Weizmann workshop, Novembre 2017, Israele
  - Seminario introduttivo su Relaxion, per una platea mista di fisici delle particelle e fisici atomici
- Discrete18 conference, 26 - 10 Novembre 2018, Vienna
  - Seminario: *Right handed neutrinos and B anomalies*
- Precision Era in High Energy Physics, 16 - 19 Aprile 2019, Portoroz, Slovenia
  - Seminario: *Vector dark matter from inflation*
- Pacific NW Theory Workshop, 10 - 11 Maggio 2019, Eugene, Oregon, USA
  - Seminario: *Vector dark matter from inflation*
- GGI Workshop, 30 Settembre - 11 Ottobre 2019, Firenze
  - Seminario: *Inflaxion dark matter*

Organizzazione di attività scientifiche

Sono stato l'organizzatore dei seminari di fisica teorica a Bonn e a Tel Aviv. In entrambi i casi i seminari erano a cadenza settimanale e mi occupavo di invitare speakers di calibro internazionale.
Attualmente sono l'organizzatore dei seminari di fisica teorica alla SISSA.

Sono stato uno dei quattro organizzatori del workshop "Understanding the Origin of the Baryon Asymmetry of the Universe", che ha avuto luogo ad Aspen dal 26 Agosto al 16 Settembre 2018.

Sono il Principal Investigator (PI) della linea di ricerca su Axions al nuovo Institute for Fundamental Physics of the Universe (IFPU) a Trieste. In tale veste ho organizzato un workshop di una settimana a fine Novembre 2019, sul tema "Axion dark matter and Bose-Einstein condensates".

Sono organizzatore e uno dei principali promotori di regolari incontri trilaterali sul tema di fenomenologia di fisica delle particelle, che coinvolgono la SISSA e l'ICTP (Trieste), il Jozef Stefan Institute di Ljubljana e l'Università di Nova Gorica.

Sono uno degli organizzatori della conferenza "Fundamental Physics at 21 cm", inizialmente prevista all'IFPU dal 30 Marzo al 2 Aprile 2020 e ora rinviata a primavera 2021.

Attività amministrative

Sono rappresentate del personale di ricerca al senato accademico della SISSA.

Partecipazione alle attività di gruppi di ricerca con collaborazioni internazionali

2008 - 2010

Come studente di dottorato all'Università della California, Santa Cruz, ho partecipato al progetto di ricerca finanziato dal NASA grant NNX08AV72G, coordinato da Stefano Profumo (PI) e in collaborazione con Mikhail Gorchtein, all'epoca ricercatore a Indiana University. Il progetto è culminato con la pubblicazione dell'articolo "Probing dark matter with Active Galactic Nuclei jets".

2011 - 2014

Come postdoc a Bonn ho partecipato all'attività del gruppo del prof. Dreiner, finanziato dal grant tedesco DFG SFB TR 33 "The Dark Universe". Tra gli articoli prodotti, "White dwarfs constrain dark forces" stato il risultato di una collaborazione con Herbi Dreiner, Jeff Fortin (all'epoca postdoc a Stanford) e Jordi Isern, professore di astrofisica al CSIC di Barcellona.

2014 - 2017

Come postdoc a Tel Aviv University, ho partecipato alle attività del gruppo del prof. Tomer Volansky, finanziato da grants israeliani e da un ERC, ed ho mantenuto le precedenti collaborazioni internazionali.

2017 - presente

Come postdoc alla SISSA, partecipo alle attività del gruppo del prof. Andrea Romanino, finanziato da un grant PRIN. Continuo a mantenere le precedenti collaborazioni internazionali.

Supervisione studenti

Insieme al Prof. Herbi Dreiner sono stato supervisore dello studente Stefano Colucci, prima per la sua laurea specialistica (2014, titolo tesi: Baryogenesis from dark matter annihilation), poi per il suo dottorato (2018, titolo tesi: A dark matter quest through vector-like portals and decaying axinos).

Didattica

University of California, Santa Cruz Settembre 2006 - Marzo 2011

Sono stato assistente (teaching assistant) per vari corsi di fisica e astronomia (di livello analogo ai primi tre anni di università in Italia). Ho tenuto corsi di laboratorio (analoghi ai laboratori dei primi due anni di un corso di laurea in Fisica in Italia), sessioni di esercitazione e ho tenuto regolarmente due ore di ricevimento a settimana per gli studenti.

Universität Bonn Giugno 2012

Ho tenuto due lezioni, per un corso a livello di laurea specialistica, su istantoni e problema di CP nelle interazioni forti.

Universität Bonn Semestre Autunno/Inverno 2013/2014

Ho tenuto due lezioni su buchi neri e radiazione di Hawking per una classe di Relatività Generale.

Universität Bonn Semestre Primavera/Estate 2014

Ho insegnato, in collaborazione con il prof. Dreiner, un corso a livello di laurea specialistica su Astroparticelle e Cosmologia. Abbiamo selezionato insieme gli argomenti da trattare nel corso ed ho tenuto 20 ore di lezioni su argomenti che includono: oscillazioni di neutrini nel vuoto e nella materia, neutrini atmosferici e solari, big bang nucleosintesi e inflazione. Ho preparato la maggior parte delle esercitazioni a cadenza settimanale, ho preparato l'esame e stabilito il voto finale di ogni studente del corso.

Servizi alla comunità scientifica

Referee per varie riviste scientifiche internazionali: Journal of High Energy Physics (JHEP), Journal of Cosmology and Astroparticle Physics (JCAP), Physics Letters B, Physical Review D, Physics of the Dark Universe

Divulgazione

Ho tenuto un seminario divulgativo sulla materia oscura a Novembre 2011, nel programma "Weltemaschine" all'università di Bonn, inteso per la divulgazione di fisica delle particelle e cosmologia.

Ho tenuto un seminario a Settembre 2013 su big bang nucleosintesi, parte di un programma di formazione in Germania indirizzato agli insegnanti di fisica delle scuole superiori.

Ho completamente riadattato il seminario di big bang nucleosintesi per un gruppo di studenti e studentesse (non di fisica) coreani in visita all'università di Bonn ad Aprile 2014.

Sono uno degli attori principali nello spettacolo di fisica delle particelle, ideato da Herbi Dreiner e creato dallo stesso Prof. Dreiner in collaborazione con un gruppo di studenti dell'università di Bonn e con il sottoscritto. Lo spettacolo è una sorta di piece teatrale che include quasi 30 esperimenti e dimostrazioni dal vivo, con l'idea di portare il pubblico attraverso un viaggio che parte dalla comprensione della struttura dell'atomo e arriva al bosone di Higgs. Abbiamo totalizzato più di venti repliche dello spettacolo in varie città di Europa dal 2014 a oggi: Oxford, Londra, Padova, Trieste, Copenhagen, Odense, Valencia, Barcelona, Lisbona, Madrid.

Ho partecipato allo "Student Day" alla SISSA il 20 Febbraio 2019, giornata dedicata alla divulgazione scientifica e rivolta agli studenti degli ultimi due anni delle scuole superiori (circa 500 studenti in totale). Per l'occasione ho condotto un dialogo di scienza con un gruppo di circa 25 studenti sul tema delle particelle elementari.

Ho tenuto un seminario divulgativo dal titolo "La fisica teorica delle particelle elementari: quali i prossimi passi?" il 15/10/2020 al Salone degli Incanti a Trieste, nell'ambito della rassegna "Le forze della natura" organizzata da INFN e Università di Trieste.

Referenti Senior

Michael Dine - Professor at the University of Santa Cruz, California
mdine@ucsc.edu

Stefano Profumo - Professor at the University of Santa Cruz, California
profumo@ucsc.edu

Herbi Dreiner - Professor at the University of Bonn
dreiner@uni-bonn.de

Tomer Volansky - Professor at the University of Tel Aviv
tomerv@post.tau.ac.il

List of Publications

[1] T. Kobayashi and L. Ubaldi, "Reheating-Induced Axion Dark Matter After Low Scale Inflation," JHEP **09**, 052 (2020) doi:10.1007/JHEP09(2020)052 [arXiv:2006.09389 [hep-ph]].

[2] T. Kobayashi and L. Ubaldi, "Inflaxion Dark Matter," JHEP **1908**, 147 (2019) doi:10.1007/JHEP08(2019)147 [arXiv:1907.00984 [hep-ph]].

[3] M. Bastero-Gil, J. Santiago, L. Ubaldi and R. Vega-Morales, "Vector dark matter production at the end of inflation," JCAP **1904**, no. 04, 015 (2019) doi:10.1088/1475-7516/2019/04/015 [arXiv:1810.07208 [hep-ph]].

[4] A. Azatov, D. Barducci, D. Ghosh, D. Marzocca and L. Ubaldi, "Combined explanations of B-physics anomalies: the sterile neutrino solution," JHEP **1810**, 092 (2018) doi:10.1007/JHEP10(2018)092 [arXiv:1807.10745 [hep-ph]].

[5] N. J. Outmezguine, O. Slone, W. Tangarife, L. Ubaldi and T. Volansky, "Accretion of Dissipative Dark Matter onto Active Galactic Nuclei," JHEP **1811**, 005 (2018) doi:10.1007/JHEP11(2018)005 [arXiv:1807.04750 [astro-ph.GA]].

[6] S. Colucci, H. K. Dreiner and L. Ubaldi, "Supersymmetric R - parity violating Dine-Fischler-Srednicki-Zhitnitsky axion model," Phys. Rev. D **99**, no. 1, 015003 (2019) doi:10.1103/PhysRevD.99.015003 [arXiv:1807.02530 [hep-ph]].

[7] M. Dine, L. Stephenson Haskins, L. Ubaldi and D. Xu, "Some Remarks on Anthropic Approaches to the Strong CP Problem," JHEP **1805**, 171 (2018) doi:10.1007/JHEP05(2018)171 [arXiv:1801.03466 [hep-th]].

[8] W. Tangarife, K. Tobioka, L. Ubaldi and T. Volansky, "Dynamics of Relaxed Inflation," JHEP **1802**, 084 (2018) doi:10.1007/JHEP02(2018)084 [arXiv:1706.03072 [hep-ph]].

[9] W. Tangarife, K. Tobioka, L. Ubaldi and T. Volansky, "Relaxed Inflation," arXiv:1706.00438 [hep-ph].

[10] L. Di Luzio, E. Nardi and L. Ubaldi, "Accidental Peccei-Quinn symmetry protected to arbitrary order," Phys. Rev. Lett. **119**, no. 1, 011801 (2017) doi:10.1103/PhysRevLett.119.011801 [arXiv:1704.01122 [hep-ph]].

[11] H. K. Dreiner *et al.*, ""What's (the) Matter?", A Show on Elementary Particle Physics with 28 Demonstration Experiments," arXiv:1607.07478 [physics.pop-ph].

[12] F. Staub *et al.*, "Precision tools and models to narrow in on the 750 GeV diphoton resonance," Eur. Phys. J. C **76**, no. 9, 516 (2016) doi:10.1140/epjc/s10052-016-4349-5 [arXiv:1602.05581 [hep-ph]].

[13] R. S. Gupta, Z. Komargodski, G. Perez and L. Ubaldi, "Is the Relaxion an Axion?," JHEP **1602**, 166 (2016) doi:10.1007/JHEP02(2016)166 [arXiv:1509.00047 [hep-ph]].

[14] S. Colucci, H. K. Dreiner, F. Staub and L. Ubaldi, "Heavy concerns about the light axino explanation of the 3.5 keV X-ray line," Phys. Lett. B **750**, 107 (2015) doi:10.1016/j.physletb.2015.09.009 [arXiv:1507.06200 [hep-ph]].

[15] G. Festuccia, T. Opferkuch and L. Ubaldi, "Dynamical Generation of the Peccei-Quinn Scale in Gauge Mediation," Phys. Rev. D **92**, no. 1, 015020 (2015) doi:10.1103/PhysRevD.92.015020 [arXiv:1504.07634 [hep-ph]].

[16] L. Feng, S. Profumo and L. Ubaldi, "Closing in on singlet scalar dark matter: LUX, invisible Higgs decays and gamma-ray lines," JHEP **1503**, 045 (2015) doi:10.1007/JHEP03(2015)045 [arXiv:1412.1105 [hep-ph]].

[17] H. K. Dreiner, F. Staub and L. Ubaldi, "From the unification scale to the weak scale: A self consistent supersymmetric Dine-Fischler-Srednicki-Zhitnitsky axion model," Phys. Rev. D **90**, no. 5, 055016 (2014) doi:10.1103/PhysRevD.90.055016 [arXiv:1402.5977 [hep-ph]].

[18] H. K. Dreiner, J. F. Fortin, C. Hanhart and L. Ubaldi, "Supernova constraints on MeV dark sectors from e^+e^- annihilations," Phys.

Rev. D **89**, no. 10, 105015 (2014) doi:10.1103/PhysRevD.89.105015 [arXiv:1310.3826 [hep-ph]].

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[24] M. Dine, G. Festuccia, L. Pack, C. S. Park, L. Ubaldi and W. Wu, "Supersymmetric QCD: Exact Results and Strong Coupling," JHEP **1105**, 061 (2011) doi:10.1007/JHEP05(2011)061 [arXiv:1104.0461 [hep-th]].

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[28] L. M. Carpenter, M. Dine, G. Festuccia and L. Ubaldi, "Axions in Gauge Mediation," Phys. Rev. D **80**, 125023 (2009) doi:10.1103/PhysRevD.80.125023 [arXiv:0906.5015 [hep-th]].

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Sunny Vagnozzi

Newton-Kavli Fellow, University of Cambridge

Academic appointments

2019 – present Newton-Kavli Fellow, **Kavli Institute for Cosmology**, **University of Cambridge**
Also affiliated to the Institute of Astronomy (IoA) and the Department of Applied Mathematics and Theoretical Physics (DAMTP), University of Cambridge

2019 – present College Research Associate, **Homerton College**, **University of Cambridge**

2015 – 2019 Research assistant, **Oskar Klein Centre**, **Stockholm University**

Education

2015 – 2019 PhD in Theoretical Physics, **Oskar Klein Centre**, **Stockholm University**
Advisors: Prof. Katherine Freese and Prof. Lars Bergström

2013 – 2014 Master of Science in Physics, **University of Melbourne**
Advisor: Dr. Robert Foot *Final grade:* H1 (First Class Honours) with *Distinction*

2012 – 2013 Erasmus Fellow, **Imperial College London**

2009 – 2012 Bachelor of Science in Physics, **University of Trento**
Advisor: Prof. Valter Moretti *Final grade:* 110/110 *Physics GRE*: 960/990

Professional Certifications

2020 – 2029 **Abilitazione Scientifica Nazionale** alle funzioni di Professore di II fascia nel settore concorsuale 02/A2 - Fisica Teorica delle Interazioni Fondamentali, ai sensi della Legge 30.12.2010, n. 240 (National Scientific Habilitation for the role of Associate Professor in the competition sector 02/A2 - Theoretical Physics of Fundamental Interactions), valid until November 11, 2029

Research interests

Brief description I am an astroparticle physicist and cosmologist working at the interface of theory and data. My aim is to construct viable data-driven particle physics and gravitation models, and to probe fundamental particle physics using cosmological data. My focus is on dark matter, dark energy, inflation, models of gravity, black hole physics, Cosmic Microwave Background, Large-Scale Structure, data analysis, cosmological tensions, and neutrino cosmology.

Publications Full list of preprints and publications provided below, see also my INSPIRE, ADS, and Google Scholar profiles for continuously up-to-date lists of my publications
Bibliometric metrics (from INSPIRE): 44 papers (39 published/accepted for publication in peer-reviewed journals); h-index=31; 3000 total citations, 75.1 average citations per refereed paper; m-index: 5.0

International visits and other research experiences

2019 Short-term research visit, **University of Michigan** (*Host:* Prof. Dragan Huterer)

2018 Short-term research visit, **Harvard University** (*Host:* Prof. Cora Dvorkin)

2016 Visiting researcher, **University of Michigan** (*Host:* Prof. Katherine Freese)

2015 – 2016 Affiliated PhD student, **Nordic Institute for Theoretical Physics (NORDITA)**

2015 Visiting researcher, **CP^3 Origins** (*Host:* Prof. Mads Frandsen)

2014 – 2015 Long-term visiting researcher, **Niels Bohr Institute** (*Host:* Prof. Subir Sarkar)

Participation in research and development programs

2019 – 2022 Isaac Newton Trust and Kavli Foundation, Newton-Kavli Fellowship, Principal Investigator Dr. Sunny Vagnozzi, 2019-2022, approximately 150.000,00 Euro

2015 – 2019 Swedish Research Council, contract No. 638-2013-8993, Principal Investigator Prof. Katherine Freese, 2014-2024, approximately 10.000.000,00 Euro. I took part as a PhD student and research assistant at Stockholm University

Collaboration memberships

2017 – present Member of the *Simons Observatory* collaboration

Grants, fellowships, honors, awards, and scholarships

2020 – present Included in the list of *Top Italian Scientists* established by the Virtual Italian Academy (MacroArea: Physics)

2020 Outstanding Reviewer Award, *Classical and Quantum Gravity (IOP Publishing)*

2020 Springer Thesis Award, *Springer Nature*

2019 "Pio Picchi" Prize, *Società Italiana di Fisica* (*Italian Physical Society*)

2019 Grant from *Stiftelsen Elisabeth och Herman Rhodins Minne*

2019 Top Peer Reviewer Award, *Web of Science Group*

2019 Newton-Kavli Fellowship, *KICC*, *University of Cambridge*

2019 Chamberlain Fellowship, *Berkeley Lab* and *UC Berkeley* [**declined**]

2018 CITA Fellowship, *CITA*, *University of Toronto* [**declined**]

2015 Dean's Honours List, *University of Melbourne*

2015 Higgs Centre International Studentship, *Scottish Funding Council* [**declined**]

2015 Fellows Award and Fellows Medal 2015, *University College, Melbourne*

2015 Chancellors' Fellowship, *University of California, Irvine* [**declined**]

2015 Regents' Fellowship, *University of California, Santa Cruz* [**declined**]

2015 CSE Fellowship, *University of Minnesota* [**declined**]

2015 Huygens Fellowship, *Leiden University* [**declined**]

2014 Australian Postgraduate Award, *Australian Federal Government* [**declined**]

2014 Dr Jean E Laby bursary, *Laby Foundation, Melbourne*

2014 Fellows Award and Fellows Medal 2014, *University College, Melbourne*

2013 ND Goldsworthy Scholarship, *University of Melbourne*

2012 International Postgraduate Coursework Award, *University of Melbourne*

2012 "Premio di Merito" (Merit Prize), *University of Trento*

2012 Erasmus Fellowship, *Imperial College London*

2009 "Premio di Merito" (Merit Prize), *Ministry of Public Education, Italy*

Teaching experience

2017 – 2018 *Programming, numerical methods and statistics for physicists*, Stockholm University (in Swedish)

2016 – 2018 *Cosmology and Particle Astrophysics*, Stockholm University

2016 – 2017 *Mathematical Methods for Physicists*, Stockholm University

2014 *Experimental design and data analysis*, University of Melbourne

2014 *Physics for Biomedicine*, University of Melbourne

2014 *Mathematics for Biomedicine*, University of Melbourne

2014 *Physics 2*, University of Melbourne

2013 *Physics 1*, University of Melbourne

Publications

Full bibliographic details available from INSPIRE: 44 papers (39 published/accepted for publication in peer-reviewed journals); h-index=31; 3000 total citations, 75.1 average citations per refereed paper; m-index: 5.0
Note: Papers marked with an asterisk* are signed alphabetically

Impact breakdown according to INSPIRE:
- 1 famous paper (250-499 citations)
- 7 very well-known papers (100-249 citations)
- 16 well-known papers (50-99 citations)

The following sections include, in the following order: peer-reviewed publications, preprints, and other academic works

Peer-reviewed publications

1 M. Khodadi, A. Allahyari, **S. Vagnozzi** & D. F. Mota, *Black holes with scalar hair in light of the Event Horizon Telescope*, *JCAP* **2009** (2020) 026, 33 pages [arXiv:2005.05992]
23 citations

2* E. Di Valentino, S. Gariazzo, O. Mena & **S. Vagnozzi**, *Soundness of Dark Energy properties*, *JCAP* **2007** (2020) 045, 45 pages [arXiv:2005.02062]
11 citations

3 **S. Vagnozzi**, C. Bambi & L. Visinelli, *Concerns regarding the use of black hole shadows as standard rulers*, *Class. Quant. Grav.* **37** (2020) 087001, 16 pages [arXiv:2001.02986]
18 citations

4 A. Allahyari, M. Khodadi, **S. Vagnozzi** & D. F. Mota, *Magnetically charged black holes from non-linear electrodynamics and the Event Horizon Telescope*, *JCAP* **2002** (2020) 003, 28 pages [arXiv:1912.08231]
50 citations

5 **S. Vagnozzi**, L. Visinelli, O. Mena & D. F. Mota, *Do we have any hope of detecting scattering between dark energy and baryons through cosmology?*, *Mon. Not. Roy. Astron. Soc.* **493** (2020) 1139, 14 pages [arXiv:1911.12374]
13 citations

6* E. Di Valentino, A. Melchiorri, O. Mena & **S. Vagnozzi**, *Nonminimal dark sector physics and cosmological tensions*, *Phys. Rev.* D **101** (2020) 063502, 20 pages [arXiv:1910.09853]
83 citations

7* E. Di Valentino, A. Melchiorri, O. Mena & **S. Vagnozzi**, *Interacting dark energy in the early 2020s: a promising solution to the H_0 and cosmic shear tensions*, *Phys. Dark Univ.* **30** (2020) 100666, 12 pages [arXiv:1908.04281]
97 citations

8 M. H. Abitbol *et al.* (incl. **S. Vagnozzi**) for the *Simons Observatory* collaboration, *The Simons Observatory: Astro2020 Decadal Project Whitepaper*, *Bull. Am. Astron. Soc.* **51** (2019) 147, 17 pages, submitted in response to the Astro2020 APC White Papers call [arXiv:1907.08284]
23 citations

9 L. Visinelli, **S. Vagnozzi** & U. Danielsson, *Revisiting a negative cosmological constant from low-redshift data*, *Symmetry* **11** (2019) 1035, 25 pages, invited feature paper [arXiv:1907.07953]
26 citations

10 **S. Vagnozzi**, *New physics in light of the H_0 tension: an alternative view*, *Phys. Rev.* D **102** (2020) 023518, 28 pages [arXiv:1907.07569]
76 citations

11 W.Yang, S. Pan, **S. Vagnozzi**, E. Di Valentino, D. F. Mota & S. Capozziello, *Dawn of the dark: unified dark sectors and the EDGES Cosmic Dawn 21-cm signal*, *JCAP* **1911** (2019) 044, 30 pages [arXiv:1907.05344]
27 citations

12* **S. Vagnozzi** & Luca Visinelli, *Hunting for extra dimensions in the shadow of M87**, *Phys. Rev.* D **100** (2019) 024020, 7 pages [arXiv:1905.12421]
71 citations

13 W. Yang, **S. Vagnozzi**, E. Di Valentino, R. C. Nunes, S. Pan & D. F. Mota, *Listening to the sound of dark sector interactions with gravitational wave standard sirens*, *JCAP* **1907** (2019) 037, 27 pages [arXiv:1905.08286]
40 citations

14* C. Bambi, K. Freese, **S. Vagnozzi** & L. Visinelli, *Testing the rotational nature of the supermassive object M87* from the circularity and size of its first image*, *Phys. Rev.* D **100** (2019) 044057, 9 pages [arXiv:1904.12983]
83 citations

15* A. Casalino, M. Rinaldi, L. Sebastiani & **S. Vagnozzi**, *Alive and well: mimetic gravity and a higher-order extension in light of GW170817*, *Class. Quant. Grav.* **36** (2019) 017001, 14 pages [arXiv:1811.06830]
38 citations

16 L. Visinelli & **S. Vagnozzi**, *Cosmological window onto the string axiverse and the supersymmetry breaking scale*, *Phys. Rev.* D **99** (2019) 063517, 12 pages [arXiv:1809.06382]
49 citations

17 P. Ade *et al.* (incl. **S. Vagnozzi**) for the *Simons Observatory* collaboration, *The Simons Observatory: science goals and forecasts*, *JCAP* **1902** (2019) 056, 105 pages [arXiv:1808.07445]
338 citations

18* W. H. Kinney, **S. Vagnozzi** & L. Visinelli, *The zoo plot meets the swampland: mutual (in)consistency of single-field inflation, string conjectures, and cosmological data*, *Class. Quant. Grav.* **36** (2019) 117001, 10 pages [arXiv:1808.06424]
118 citations

19 **S. Vagnozzi**, T. Brinckmann, M. Archidiacono, K. Freese, M. Gerbino, J. Lesgourgues & T. Sprenger, *Bias due to neutrinos must not uncorrect'd go*, *JCAP* **1809** (2018) 001, 20 pages [arXiv:1807.04672]
33 citations

20 W. Yang, S. Pan, E. Di Valentino, R. C. Nunes, **S. Vagnozzi** & D. F. Mota, *Tale of stable interacting dark energy, observational signatures, and the H_0 tension*, *JCAP* **1809** (2018) 019, 31 pages [arXiv:1805.08252]
133 citations

21* A. Casalino, M. Rinaldi, L. Sebastiani & **S. Vagnozzi**, *Mimicking dark matter and dark energy in a mimetic model compatible with GW170817*, *Phys. Dark Univ.* **22** (2018) 108, 8 pages [arXiv:1803.02620]
48 citations

22 E. Giusarma, **S. Vagnozzi**, S. Ho, S. Ferraro, K. Freese, R. Kamen-Rubio & K.-B. Luk, *Scale-dependent galaxy bias, CMB lensing-galaxy cross-correlation, and neutrino masses*, *Phys. Rev.* D **98** (2018) 123526, 10 pages [arXiv:1802.08694]
54 citations

23 **S. Vagnozzi**, S. Dhawan, M. Gerbino, K. Freese, A. Goobar & O. Mena, *Constraints on the sum of the neutrino masses in dynamical dark energy models with $w(z) \geq -1$ are tighter than those obtained in ΛCDM*, *Phys. Rev.* D **98** (2018) 083501, 20 pages [arXiv:1801.08553]
76 citations

24* J. Dutta, W. Khyllep, E. N. Saridakis, N. Tamanini & **S. Vagnozzi**, *Cosmological dynamics of mimetic gravity*, *JCAP* **1802** (2018) 041, 32 pages [arXiv:1711.07290]
63 citations

25 L. Visinelli, N. Bolis & **S. Vagnozzi**, *Brane-world extra dimensions in light of GW170817*, *Phys. Rev.* D **97** (2018) 064039, 9 pages [arXiv:1711.06628]
66 citations

26 **S. Vagnozzi**, *Recovering a MOND-like acceleration law in mimetic gravity*, *Class. Quant. Grav.* **34** (2017) 185006, 14 pages [arXiv:1708.00603]
50 citations

27 **S. Vagnozzi**, *New solar metallicity measurements*, *Atoms* **7** (2019) 41 (Proceedings of the 51st Rencontres de Moriond, Cosmology Session, ARISF (2016) 175), 6 pages [arXiv:1703.10834]
8 citations

28 **S. Vagnozzi**, E. Giusarma, O. Mena, K. Freese, M. Gerbino, S. Ho & M. Lattanzi, *Unveiling ν secrets with cosmological data: neutrino masses and mass hierarchy*, *Phys. Rev.* D **96** (2017) 123503, 26 pages, resulted quoted in *Review of Particle Physics* [arXiv:1701.08172]
213 citations

29 L. Sebastiani, **S. Vagnozzi** & R. Myrzakulov, *Mimetic gravity: a review of recent developments with applications to cosmology and astrophysics*, *Adv. High Energy Phys.* **2017** (2017) 3156915, 43 pages, invited review [arXiv:1612.08661]
128 citations

30 M. Gerbino, K. Freese, **S. Vagnozzi**, M. Lattanzi, O. Mena, E. Giusarma & S. Ho, *Impact of neutrino properties on the estimation of inflationary parameters from current and future observations*, *Phys. Rev.* D **95** (2017) 043512, 22 pages [arXiv:1610.08830]
54 citations

31 E. Giusarma, M. Gerbino, O. Mena, **S. Vagnozzi**, S. Ho & K. Freese, *Improvement of cosmological neutrino mass bounds*, *Phys. Rev.* D **94** (2016) 083522, 8 pages, resulted quoted in *Review of Particle Physics* [arXiv:1605.04320]
124 citations

32 **S. Vagnozzi**, K. Freese & T. H. Zurbuchen, *Solar models in light of new high metallicity measurements from solar wind data*, *Astrophys. J.* **839** (2017) 55, 10 pages [arXiv:1603.05960]
23 citations

33* R. Foot & **S. Vagnozzi**, *Solving the small-scale structure puzzles with dissipative dark matter*, *JCAP* **1607** (2016) 013, 24 pages [arXiv:1602.02467]
72 citations

34* G. Cognola, R. Myrzakulov, L. Sebastiani, **S. Vagnozzi** & S. Zerbini, *Covariant Hořava-like and mimetic Horndeski gravity: cosmological solutions and perturbations*, *Class. Quant. Grav.* **33** (2016) 225014, 20 pages [arXiv:1601.00102]
77 citations

35* R. Myrzakulov, L. Sebastiani, **S. Vagnozzi** & S. Zerbini, *Static spherically symmetric solutions in mimetic gravity: rotation curves & wormholes*, *Class. Quant. Grav.* **33** (2016) 125005, 21 pages [arXiv:1510.02284]
98 citations

36* R. Myrzakulov, L. Sebastiani, **S. Vagnozzi** & S. Zerbini, *Mimetic covariant renormalizable gravity*, *Fund. J. Mod. Phys.* **8** 2 (2015) 119, 6 pages, invited contribution [arXiv:1505.03115]
32 citations

37* R. Myrzakulov, L. Sebastiani & **S. Vagnozzi**, *Inflation in $f(R,\phi)$ theories and mimetic gravity scenario*, *Eur. Phys. J.* C **75** (2015) 444, 11 pages [arXiv:1504.07984]
118 citations

38* R. Foot & **S. Vagnozzi**, *Diurnal modulation signal from dissipative hidden sector dark matter*, *Phys. Lett.* B **748** (2015) 61, 6 pages [arXiv:1412.0762]
77 citations

39* R. Foot & **S. Vagnozzi**, *Dissipative hidden sector dark matter*, *Phys. Rev.* D **91** (2015) 023512, 23 pages, selected as an *Editors' Suggestion* [arXiv:1409.7174]
196 citations

Preprints

1 **S. Vagnozzi**, A. Loeb & M. Moresco *Eppur è piatto? The cosmic chronometer take on spatial curvature and cosmic concordance*, under review in *Astrophys. J.*, 30 pages [arXiv:2011.11645]
0 citations

2 **S. Vagnozzi**, E. Di Valentino, S. Gariazzo, A. Melchiorri, O. Mena & J. Silk, *Listening to the BOSS: the galaxy power spectrum take on spatial curvature and cosmic concordance*, under review in *JCAP*, 33 pages [arXiv:2010.02230]
7 citations

3 **S. Vagnozzi**, *Implications of the NANOGrav pulsar timing results for inflation*, under review in *Mon. Not. Roy. Astron. Soc. Lett.*, 7 pages [arXiv:2009.13432]
9 citations

4 S. Hagstotz, P. D. de Salas, S. Gariazzo, M. Gerbino, M. Lattanzi, **S. Vagnozzi**, K. Freese & S. Pastor, *Bounds on light sterile neutrino mass and mixing from cosmology and laboratory searches*, under review in *JCAP*, 29 pages [arXiv:2003.02289]
16 citations

5 T. Schwetz, K. Freese, M. Gerbino, E. Giusarma, S. Hannestad, M. Lattanzi, O. Mena & **S. Vagnozzi**, *Comment on "Strong Evidence for the Normal Neutrino Hierarchy"*, 3 pages [arXiv:1703.04585]
34 citations

Other academic works

1 **S. Vagnozzi**, *Viva la revolución cosmológica*, *Nat. Astron.* **4** (2020) 312, invited book review on *The Cosmic Revolutionary's Handbook* (*Cambridge University Press*) by L. A. Barnes and G. F. Lewis

2 **S. Vagnozzi**, *Weigh them all! - Cosmological searches for the neutrino mass scale and mass ordering*, PhD thesis at the Department of Physics, Stockholm University (ISBN 978-91-7797-729-2), winner of the Springer Thesis Award and published in the *Springer Theses* series (ISBN 978-3-030-53502-5) [arXiv:1907.08010]

Computer skills

Operating systems	Microsoft Windows, Linux (Ubuntu)
Programming languages	`Python` (particularly SciPy, NumPy, PySpark, Keras, Scikit-learn; advanced user) `C++`, `C`, `Fortran` (upper intermediate user) `Bash` (basic user)
Tools	`Mathematica`, `Gnuplot`, `Minitab`, `Git`, `Vi`, `MPI`, `OpenMP`, LaTeX, OpenOffice Suite
Cosmological software	`CAMB`, `CosmoMC` (expert user) `MontePython` (upper intermediate user) `CLASS`, `HEALPix`, `hi_class`, `EFTCAMB`, `EFTCosmoMC`, `RecFast` (basic user)

Other skills	Machine learning (including deep learning), job management on HPC clusters

Languages

Italian	Native/bilingual proficiency	*Spanish*	Full professional proficiency
English	Native/bilingual proficiency TOEFL: 118/120 (10/2014)	*Danish*	Limited working proficiency
Swedish	Full professional proficiency	*Norwegian (Bokmål)*	Elementary proficiency

Seminars, colloquia, and conference talks (including planned)

January 2021	Invited webinar, **TIFPA-INFN**, **University of Trento** (planned)
January 2021	Invited webinar, **Presidency University, Kolkata** (planned)
January 2021	Invited webinar, **University of California, Los Angeles** (planned)
December 2020	Invited webinar, **University College London** (planned)
December 2020	Invited webinar, **University of Portsmouth** (planned)
November 2020	Invited plenary talk at **Connecting the Young World Fair**
November 2020	Invited webinar, **Indira Gandhi Institute of Technology, Sarang**
October 2020	Invited webinar at the **joint Cambridge-Munich cosmology journal club**
August 2020	Talk at **Cosmology from Home 2020**
July 2020	Invited VIA lecture, **Virtual Institute of Astroparticle Physics**
July 2020	Invited webinar, **ETH Zürich**
June 2020	Invited astrophysics webinar, **University of Sussex**
June 2020	Invited theoretical physics webinar, **University of Tartu**
March 2020	Invited colloquium, **Institute of Theoretical Astrophysics, University of Oslo**
March 2020	Invited seminar, **Institute of Theoretical Astrophysics, University of Oslo**
February 2020	Invited TPPC seminar, **King's College London**
December 2019	Talk at CMB-LSS group meeting, **DAMTP, University of Cambridge**
November 2019	Wednesday seminar, **Institute of Astronomy, University of Cambridge**
September 2019	Talk at *KICC 10th Anniversary Symposium*, **KICC, University of Cambridge**
June 2019	PhD defense seminar, **Stockholm University**
May 2019	Short talk at *OKC day* (Stockholm, Sweden)
April 2019	Special invited HEP-Astro seminar, **University of Michigan**
April 2019	PhD pre-defense seminar, **Stockholm University**
March 2019	Invited seminar, **SISSA**
February 2019	Invited seminar, **Universitäts-Sternwarte**, **LMU Munich**
December 2018	Invited RPM seminar, **Berkeley Lab** and **UC Berkeley**
December 2018	Cosmology, Particle Astrophysics & String Theory lunch talk, **Stockholm University**
December 2018	Invited seminar, **Harvard University**
May 2018	Invited seminar, **TIFPA-INFN**, **University of Trento**
December 2017	Cosmology, Particle Astrophysics & String Theory lunch talk, **Stockholm University**
July 2017	Talk at *Advances in Theoretical Cosmology in Light of Data* **NORDITA program** (Week IV, *Low Redshift Universe*)
July 2017	Talk at *Advances in Theoretical Cosmology in Light of Data* **NORDITA program** (Week I, *Messengers*)
June 2017	Cosmology, Particle Astrophysics & String Theory lunch talk, **Stockholm University**
May 2017	Invited webinar, **CoEPP**, **University of Melbourne**
March 2017	Invited seminar, **IFIC-CSIC**, **University of Valencia**
February 2017	Talk at *Cosmology on Safari 2017* (Hluhluwe, South Africa)

December 2016	Invited seminar at OKC Dark Matter working group, **Stockholm University**
August 2016	Talk at *Neutrinos Underground & in the Heavens II* school, **Niels Bohr Institute**
March 2016	Invited seminar, **Laboratori Nazionali del Gran Sasso**
March 2016	Talk at *51st Rencontres de Moriond Cosmology session* (La Thuile, Italy)
June 2015	Invited seminar, **TIFPA-INFN**, **University of Trento**
April 2014	Physics Students' Society seminar, **University of Melbourne**

Academic service, advisory, and outreach

2020 – present	Associate Editor of *Universe (MDPI)*
2020 – present	Organizer for the *Cosmology Lunch* seminar series at the University of Cambridge
2020 – present	Maintainer of the *His Dark CMBlog* blog
2019 – present	Member of the production team of the University of Cambridge Institute of Astronomy's podcast (*Astropod*)
2019 – present	Lead editor for the special issue "*Dark Matter and Dark Energy: Particle Physics, Cosmology, and Experimental Searches*" of *Universe (MDPI)*
2019 – present	Editorial board member of *Experimental Results* (Cambridge University Press)
2019 – present	Editorial board member of *Advances in High Energy Physics*
2019	Organizer and volunteer for *AstroFika* (Ask An Astronomer), Stockholm
2018	Organizer and volunteer for *ForskarFredag* (European Researchers' Night), Stockholm
2017 – 2018	Organizer for the *Cosmology and Gravity Working Group* meetings at the OKC
2016 – present	Referee for several peer-reviewed physics journals, including ○ Main journals (impact factor ≥ 3.0): *Nature Astronomy*, *Phys. Rev. Lett.*, *Phys. Lett. B*, *Phys. Rev. D*, *JCAP*, *Mon. Not. Roy. Astron. Soc.*, *Class. Quant. Grav.*, *Phys. Dark Univ.*, *Eur. Phys. J. C* ○ Other journals (impact factor < 3.0): *Mod. Phys. Lett. A*, *Astrophys. Space Sci.*, *Adv. High Energy Phys.*, *Eur. Phys. J. Plus*, *Eur. J. Phys.*, *Int. J. Geom. Methods Mod. Phys.*, *Found. Phys.*, *Int. J. Mod. Phys. A*, *Universe*, *Galaxies*, *Symmetry*, *Physics* I review on average ∼50 papers/year, see my *Publons* profile for further details
2014 – present	Member of the *Italian Physical Society* and the *European Physical Society*
2014	Elected secretary of *Postgraduate Physics Students' Society*, University of Melbourne
2014	Elected member of *Physics Academic Programs Committee*, University of Melbourne
2014	Organizer and volunteer for the *Open Day*, University of Melbourne
2013	Elected member of *Physics Staff Student Liaison Committee*, University of Melbourne

Student supervision and mentoring

Official supervision

2020 – present	Main advisor for Alexander Reeves (Part III student, equivalent to MSc, University of Cambridge; co-advisors: Prof. George Efstathiou and Dr. Blake Sherwin)
2020 – present	Co-advisor for Øyvind Augdal Fløvig (MSc student, University of Oslo; main advisor: Prof. David Mota)
2020 – present	Co-advisor for Fulvio Ferlito (MSc student, University of Bologna; main advisors: Prof. Marco Baldi and Prof. David Mota)
2019 – present	Co-advisor for Isabelle Tanseri (PhD student, Stockholm University; main advisor: Prof. Katherine Freese)

Unofficial supervision (mentored students)

2020 – present	Mentored Youjia Wu (PhD student, University of Michigan; main advisor: Prof. Katherine Freese)

2020 – present	Mentored Carlos García-García (PhD student, University of Barcelona, now Beecroft Fellow at the University of Oxford; main advisors: Prof. Pilar Ruiz-Lapuente and Dr. Miguel Zumalacárregui)
2020 – present	Mentored Rittick Roy (MSc student, Fudan University; main advisor: Prof. Cosimo Bambi)
2020 – present	Mentored Abdolali Banihashemi (PhD student, Shahid Beheshti University; main advisor: Prof. Nima Khosravi)
2020 – present	Mentored Olof Nebrin (MSc student, Stockholm University; main advisor: Prof. Garrelt Mellema)
2019 – present	Mentored Rishi Babu (PhD student, Michigan Technological University; main advisor: Prof. Elena Giusarma)

Press coverage and media appearance (main articles)

March 2020	"*Sunny Vagnozzi wins Springer Thesis Award*", **Oskar Klein Centre news**
September 2018	"*Hunting for extra dimensions with gravitational waves*", **Oskar Klein Centre blog**
August 2018	"*Zoos, Swamplands and Cosmology*", **Astrobites**
July 2018	"*Astronomers can't decide what the Sun is made of*", **The Atlantic**
July 2018	"*Di che cosa è fatto il Sole e quando morirà?*" (in Italian), **Le Scienze** (Italian version of Scientific American)
July 2018	"*¿De qué está hecho el Sol y cuándo morirá?*" (in Spanish), **Investigación y ciencia** (Spanish version of Scientific American)
July 2018	"*What is the Sun made of and when will it die?*", **Quanta Magazine**
October 2017	"*On a perdu un morceau de Soleil*" (in French), **L'Express**
October 2017	"*Hiding in plain sight: the mystery of the Sun's missing matter*", **New Scientist**

Other non-academical work experiences and titles

2014	Choir Accompanist, *University College, Melbourne*
2013	First Violin, *ICSO (Imperial College Symphony Orchestra)*, London
2009 – 2012	Second Violin, *J. Futura Orchestra*, Trento
2009	Violin Diploma from *Conservatorio di Musica "S. Cecilia"*, Rome
2003 – present	Experienced sea diver, possess *Advanced Open Water Diver*, *Night Diver*, *Navigation Diver*, *Rescue Diver* & *First Aid* licenses

References

Katherine Freese, Full Professor (PhD advisor)
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Personal info

Last name, First name: **VALLI, MAURO**

Citizenship: **Italian**

Researcher profile

Current position: **Postdoctoral fellow at University of California, Irvine – Department of Physics and Astronomy –** (Sept 2018 – Aug 2021)

Previous position: **Postdoctoral researcher at Italian National Institute for Nuclear Physics (INFN) – Department of Physics, Sapienza, Rome –** (June 2017 – Aug 2018)

Research visiting

- **Astroparticle and Cosmology group at GRAPPA, Amsterdam** (April 2018)
- **HEP theory group at University of California, Riverside** (Nov 2016 – Feb 2017, Sept 2017 – Oct 2017)
- **HEP theory group at Sapienza, Rome** (Oct 2016, March 2017 – May 2017)
- **Theoretical Particle Physics group at SISSA, Trieste** (June 2012 – July 2012)

Education

- **Ph.D. at SISSA, International School for Advanced Studies** (4 years)
  - **Ph.D. in Astroparticle Physics with honors (summa cum laude)**
  - Sept 19th 2016, Trieste, Italy. Ph.D. supervisor: Prof. **Piero Ullio**
  - Ph.D. thesis: "A glimpse on Dark Matter particles shining through the gamma-ray sky"
- **Master of Science in Physics at Sapienza, Rome** (2 years)
  - **110/110 with honors (summa cum laude)** (Jan 2012)
  - M.Sc. thesis: **"CP violation in the charm sector in supersymmetry"**
- **Bachelor of Science in Physics at Sapienza, Rome** (3 years)
  - **110/110 with honors (summa cum laude)** (Nov 2009)
  - B.Sc. thesis: **"Group theory and applications to quantum mechanics"**

Awarded of

- Italian National Scientific Qualification (ASN) for Associate-Professor positions in Theoretical Physics of Fundamental Interactions
- UCI postdoctoral fellowship supported by NSF Grant No. PHY-1620638 and NSF Grant No. PHY-1915005 won by the HEP Theory Group at UCI.
- INFN research contract for 1+1 years, INFN job opening 18724/2017.
- Ph.D. fellowship offered by the Astroparticle Physics group at SISSA, Sept 2012 – Sept 2016, obtained via written and oral entrance examinations.
- Undergraduate fellowship from the Theoretical Particle Physics group at SISSA, June 2012 – July 2012.

List of publications

1) *"Gamma-ray sky points to radial gradients in cosmic-ray transport"*, arXiv:1411.7623, **Phys.Rev. D91 (2015) 8, 083012** , with *Daniele Gaggero, Alfredo Urbano, Piero Ullio*

2) *"The gamma-ray and neutrino sky: a consistent picture of Fermi-LAT, Milagro, and IceCube results"*, arXiv:1504.00227, **Astrophys.J. 815 (2015) 2, L25**, with *Daniele Gaggero, Dario Grasso, Antonio Marinelli, Alfredo Urbano*

3) *"Towards a realistic astrophysical interpretation of the Galactic center excess"*, arXiv:1507.06129, **JCAP 1512 (2015) 12, 056**, with *Daniele Gaggero, Marco Taoso, Alfredo Urbano, Piero Ullio*

4) *"$B \to K^* \ell^+ \ell^-$ decays at large recoil in the Standard Model: a theoretical reappraisal"*, arXiv:1512.07157, **JHEP 1606 (2016) 116**, with *Marco Ciuchini, Marco Fedele, Enrico Franco, Satoshi Mishima, Ayan Paul, Luca Silvestrini*

5) *"A critical reassessment of particle Dark Matter limits from dwarf satellites"*, arXiv:1603.07721, **JCAP 1607 (2016) 07, 025**, with *Piero Ullio*

6) *"On Flavourful Easter eggs for New Physics hunger and LFUV"*, arXiv:1704.05447, **Eur.Phys.J. C77 (2017) 10, 688**, with *Marco Ciuchini, Antonio Coutinho, Marco Fedele, Enrico Franco, Ayan Paul, Luca Silvestrini*

7) *"Dark matter self-interactions from the internal dynamics of dwarf spheroidals"*, arXiv:1711.03502, **Nat.Astron. 2 (2018) 907-912**, with *Hai-Bo Yu*

8) *"Impact of cosmic-ray physics on DM indirect searches"*, arXiv:1802.00636, **Adv.High Energy Phys. 2018 (2018) 3010514**, with *Daniele Gaggero*

9) *"On velocity-dependent dark matter annihilations in dwarf satellites"*, arXiv:1804.05052, **JCAP 1812 (2018) 12, 039**, with *Mihael Petac, Piero Ullio*

10) *"Model-independent Bounds on the Standard Model EFT from Flavour Physics"*, arXiv:1812.10913, **Phys. Lett. B 135062**, with *Luca Silvestrini*

11) *"New Physics in $b \to s\ell^+\ell^-$ confronts new data on Lepton Universality"*, arXiv:1903.09632, **Eur.Phys.J. C79 (2019) 8, 719**, with *Marco Ciuchini, Antonio Coutinho, Marco Fedele, Enrico Franco, Ayan Paul, Luca Silvestrini*

12) *"Too Big To Fail in Light of Gaia"*, arXiv:1904.04939, **MNRAS 490 (2019) 1**, with *Manoj Kaplinghat, Hai-Bo Yu*

13) *"HEPfit: a Code for the Combination of Indirect and Direct Constraints on High Energy Physics Models"*, arXiv:1910.14012, **Eur.Phys.J.C 80 (2020) 5, 456**, *HEPfit collaboration, see https://hepfit.roma1.infn.it*

14) *"Entering the Era of Dark Matter Astronomy? Near to Long-Term Forecasts in X-Ray and Gamma-Ray Bands"*, arXiv:2003.00148, **Phys. Rev. D102 (2020), 083008**, with *Kevork Abazajian, Dawei Zhong*

15) *"B anomalies under the lens of EW precision"*, arXiv:2007.04400, **JHEP 2011 (2020) XXX**, with *Lina Alasfar, Aleksandr Azatov, Jorge de Blas, Ayan Paul*

16) *"Minimal Froggatt-Nielsen textures"*, arXiv:2009.05587, **in revision for publication in JHEP**, with *Marco Fedele, Alessio Mastroddi*

17) *"Lessons from the $B^{0,+} \to K^{*0,+}\mu^+\mu^-$ angular analyses"*, arXiv:2011.01212, **prepared for PRL submission**, with *Marco Ciuchini, Marco Fedele, Enrico Franco, Ayan Paul, Luca Silvestrini*

In preparation

18) *"Observable Anti-Helium Event Rates from Standard WIMP Dark Matter"*, with *Jonathan L. Feng, Manoj Kaplinghat*

Online profile

- inSPIRE: http://inspirehep.net/author/profile/Mauro.Valli.1
- ORCID iD: https://orcid.org/0000-0002-0899-3735
- Google Scholar: scholar.google/Mauro.Valli

Highlights on work in progress

- *"50 years of GIM: The Flavour of the Standard Model Effective Theory"*, with *Marco Ciuchini, Enrico Franco, Luca Silvestrini*
- *"Boosting BBN as a probe of BSM with Machine Learning"*, with *Pierre Baldi, Anne-Katherine Burns, Tim Tait*
- *"New Avenues for Gravitational Production of Dark Matter"*, with *Alexander Lazar, Tim Tait*
- *"Self-Interacting Dark Matter at the Small Scale: Beyond Light Mediators"*, with *Manoj Kaplinghat, Yu-Dai Tsai, Hai-Bo Yu*
- *"Tensions in Cosmology: Dark Energy, (Sterile) Neutrinos, or Both?"*, with *Kevork Abazajian, Dawei Zhong*
- *"Testing the Standard Model precisely with $B \to D^{(*)}\ell\nu$"*, with *Guido Martinelli, Ayan Paul, Luca Silvestrini, Ludovico Vittorio*

Lines of Research

- ⋆ Beyond the Standard Model Phenomenology
- ⋆ Dark Matter Zoology: Theory, Observations and Detection
- ⋆ Early & Late Universe Cosmology in the Visible and Dark Sectors
- ⋆ Effective Field Theories: Bottom-up Approaches to New Physics
- ⋆ Flavour and CP Problems within and Beyond the Standard Model
- ⋆ Statistical Advanced Tools for High Energy Physics

Teaching & Supervision

Lecturer on "The Dark Matter problem" at Petnica Summer Institute 2015, Valjevo, Serbia. I have supervised work in the M.Sc. program of Aliki Litsa (GRAPPA, Amsterdam), Alessio Mastroddi, Ludovico Vittorio (Sapienza, Rome), Dawei Zhong (UCI, Irvine) and in the Ph.D. research of Antonio Coutinho (Roma Tre, Rome), Marco Fedele (Sapienza, Rome), Mihael Petač (SISSA, Trieste), Kevin Andrade, Anne-Katherine Burns, Alexander Lazar, Rebecca Riley, Maya Silverman (UCI, Irvine).

Assignments

I am a referee for JHEP, MNRAS, Phys. Dark Univ.. I wrote recommendation letters to undergrad students. I am co-supervising a Ph.D. project awarded of the NSF MAPS.

Media

Science divulgation about my Nature Astronomy publication can be found here. See also "news and views". My webinar on "Self-Interacting Dark Matter" for Latin America lawphysics is on youtube. My talk on B-anomalies at CERN in 2017 is recorded here.

Seminars

- SCGP, Stony Brook, USA, **"TBD"**, Workshop "Lighting new Lampposts for Dark Matter and Beyond the Standard Model", Jan 2021
- Cornell, online, **"B anomalies under the lens of EW precision"**, Oct 2020
- UCI+UCSC, online, **"B anomalies under the lens of EW precision"**, Aug 2020
- UCI, Irvine, USA, **"BSM hints from B physics"**, Workshop "SoCalBSM 2019", Sept 2019
- UCI, Irvine, USA, **"Dark Matter self-interactions in Milky Way dSphs"**, Workshop "GalFRESCA 2019", Aug 2019
- MITP, Mainz, Germany, **"Model-independent bounds on the SMEFT from Flavour Physics"**, Workshop "LHCb and Belle II Opportunities for Model Builders 2019", Jan 2019
- UCI, Irvine, USA, **"Dwarf spheroidal galaxies as a tool for New Physics"**, Nov 2018
- RWTH, Aachen, Germany, **"Hints for New Physics from $b \to s$ transitions"**, Jun 2018
- GRAPPA, Amsterdam, Netherlands, **"Hints for New Physics from $b \to s$ transitions"**, May 2018
- Latin America Webinar, lawphysics, **"The Self-Interacting Dark Matter paradigm and the Satellites of the Milky Way'**, Jan 2018
- University of Oslo, Norway, **"Bayesian inference of Self-Interactions in the Dark Matter Halo of Milky Way Dwarfs"**, Nov 2017
- Barolo (University of Turin), Italia, **"J- and D-factors determination"**, Workshop "Barolo Astroparticle Meeting", Sept 2017
- NBIA, Copenaghen, Denmark, **"Opportunities for a new Dark Matter paradigm with the internal dynamics of Milky Way dwarfs"**, Workshop "Self-Interacting Dark Matter", Aug 2017
- CERN, Geneve, Switzerland, **"Knowns and Unknowns in Lepton Flavour Universality Violation fits"**, "Instant workshop on B anomalies", May 2017
- GRAPPA, Amsterdam, Netherlands, **"Searching for New Physics through Dwarf Spheroidal Galaxies"**, Mar 2017
- UCR, Riverside, USA, **"Hints for New Physics from $b \to s$ transitions"**, Jan 2017
- SISSA, Trieste, Italy, **"A glimpse on Dark Matter particles shining through the gamma-ray sky"**, Ph.D. defense, Sept 2016
- International Center for Theoretical Physics, Trieste, Italy, **"B to K^*ll at larger recoil: a theoretical reappraisal"**, Feb 2016
- CERN, Geneve, Switzerland, **"Extracting QCD corrections from data"**, Workshop "LHCb implications and future prospects 2015", Nov 2015
- California Tour: UCSC, Santa Cruz + BCTP, Berkeley + SLAC, Stanford, + UCI, Irvine, **"Back to the Standard lore: About the LHCb anomaly and the Galactic Center excess"**, Aug – Sept 2015
- University of Turin, Italy, **"Looking for Dark Matter in Dwarf Spheroidal Galaxies"**, Workshop "Theoretical Astroparticle Physics", Jul 2015
- HCTP, Edinburgh, Scotland, **"$B \to K^* \mu\, \mu$: Charming Penguins strike back again?"**, Workshop "Rare B decays in 2015", May 2015

Talks at international conferences

- Northeastern University, Boston, USA, **"An EFT look at LFUV in $b \to s\ell^+\ell^-$"**, Conference "APS-DPF 2019", Jul 2019
- Northeastern University, Boston, USA, **"Dark Matter self-interactions in Milky Way dSphs"**, Conference "APS-DPF 2019", Jul 2019
- IPNL, Lyon, France, **"On B anomalies: Fitting outside the box"**, Conference "LIO International Conference on Flavour Physics", Apr 2018
- Venice (University of Padova), Italy, **"A systematic study of discriminators between New Physics & Standard Model in b $\to$ s transitions"**, Conference "EPS-HEP 2017", Jul 2017
- Venice (University of Padova), Italy, **"Looking for New Physics in the Satellites of the Milky Way"**, Conference "EPS-HEP 2017", Jul 2017
- Kavli IPMU, Kashiwa, Japan, **"Towards a refined understanding of the GC excess"**, Conference "TeVPa 2015", Oct 2015
- Tahoe Lake (UC Davis), California, **"$B \to K^* \mu\,\mu$: Charming Penguins strike back again?"**, Conference "SUSY 2015", Aug 2015
- Tahoe Lake (UC Davis), California, **"On the robustness of DM limits from dSph galaxies"**, Conference "SUSY 2015", Aug 2015
- SISSA, Trieste, Italy, **"On the robustness of DM limits from dSph galaxies"**, Workshop "Astro@TS 2015", Jun 2015

Other conferences, workshops and schools attended

- Snowmass 2020 (online)
- Workshop "Novel Ideas for Dark Matter 2019", Princeton - USA
- Workshop "GalFRESCA 2018", Caltech - USA
- Workshop "Off-the-Beaten-Track Dark Matter and Astrophysical Probes of Fundamental Physics", International Center for Theoretical Physics - Trieste
- Workshop "CASPAR 2014", DESY - Hamburg
  oral contribution: "dSphs, J-factors and DM limits"
- Lectures on Fundamental Interactions at the Galileo Galilei Institute, 2014, Ph.D. school of 3 weeks - Florence
- Conference "Dark Side of the Universe 2013", SISSA - Trieste
- Workshop "Future of Dark Matter Astroparticle Physics: Insights and Prospectives", International Center for Theoretical Physics - Trieste
- Conference "SUSY 2013", International Center for Theoretical Physics - Trieste
- Summer School on Supersymmetry and Unification of Fundamental Interactions, International Center for Theoretical Physics - Trieste
- Conference "Higgs and Beyond the SM Physics at the LHC", International Center for Theoretical Physics - Trieste
- Summer School on Particle Physics, 2013, International Center for Theoretical Physics - Trieste

RESEARCH STATEMENT

Very exciting times may actually be ahead in High Energy Physics. We are going to test the Standard Model (SM) with unprecedented experimental sensitivity, looking for clues on deep quests about Nature like *the origin of Dark Matter (DM) and Dark Energy (DE)*, *the dynamics underlying electroweak (EW) symmetry breaking*, and *a raison d'être for fermion mass hierarchies and the three generations*. This set of questions motivates my main lines of research:

- *Mysteries of the Dark Universe, i.e. the origin and properties of Universe's main components.*

  A striking set of evidences is nowadays in favour of the existence of DM, covering a range of scales bracketed from below by kiloparsec-sized galaxies and from above by cosmological scales reaching the gigaparsec magnitude. The emerging clues strongly correlate the DM problem to the existence of some new degrees of freedom beyond the SM (BSM). The projected sensitivities of a multitude of current experimental facilities, together with next-generation astrophysical and cosmological surveys, may bring us into a data-driven era where we could be finally uncovering the DM microscopic nature. Revealing DM particle properties with a joint effort of searches from underground laboratories, multi-wavelength sky signals, and from dedicated analyses at colliders, is for me the most promising road to the discovery of New Physics (NP) in this century. Such a vast program necessitates to be carried out within a multidisciplinary approach as the one pertaining to Astroparticle Physics. Extending such a program to a wide-ranging investigation on dark sectors, including also possible connections with the DE problem – namely what DE really is at the fundamental level – is another relevant aspect of my future research. Excitingly, a multitude of observational campaigns are aiming at a cosmological revolution in the offing, as state-of-the-art determinations of Universe's expansion rate may be already underpinning.

- *Origin of the SM Yukawa sector and the fundamental mechanism stabilizing the EW scale.*

  As of today, the hierarchy in the quark and lepton masses among three generations, the origin of neutrino masses, and the different pattern of mixing angles in the quark and lepton sectors, call for a comprehensive NP picture, potentially related to other strong hints for BSM physics like gauge-coupling unification. In addition to that, new flavour- and CP-violating sources are also generically predicted by a fundamental theory of the Early Universe, where Sakharov's conditions need to be met for the matter – anti-matter asymmetry we infer today. At the same time, generic extensions of the SM typically predict sizable flavour and CP violation, turning into multi-TeV constraints on NP thanks to a handle of precise experimental tests of the SM, as the ones provided by flavour-violating processes and electric-dipole-moment limits. Such high NP scale is in sharp contrast with the selection rules one would expect to be at work in order for the EW theory to encompass the traits of naturalness. Therefore, the dynamics underlying the structure of the SM quark and lepton Yukawa matrices, spurions of the $U(3)^5$ flavour group, is a puzzle that can potentially unveil intimate links with the hierarchy problem. It is one of my primary interests of research to deepen this connection, and to extract as much information as possible on the UV completion of the SM via the language of effective field theories (EFTs).

MY RESEARCH SO FAR

Research in Astroparticle Physics. Under the supervision of Prof. Piero Ullio, during my Ph.D. program at the International School for Advanced Studies in Trieste (2012-2016), I carried out a series of works focussed on indirect searches for DM. These works ended up into four publications in renowned journals (*Physical Review D*, *Astrophysical Journal Letters*, *Journal of Cosmology and Astroparticle Physics*). These studies have been devoted to: The physics of cosmic-ray acceleration and propagation in the Galaxy in relation to gamma-ray and neutrino astronomy; The analysis of the GeV excess at the Galactic Center; The inspection of the Dark Matter halo in dwarf spheroidal galaxies for DM thermal-relic constraints. The results have been presented in several international conferences and workshops, lead to the production of different proceedings, and are all part of my Ph.D. thesis, published under the title "A glimpse on Dark Matter particles shining through the gamma-ray sky". On the basis of the work in my Ph.D. thesis, I have been subsequently invited to write a review on the subject of DM indirect searches published in *Advances for High Energy Physics*. Among my contributions on the DM problem, in 2018 I have been visiting the Physics Department at UC Riverside to collaborate with Prof. Hai-Bo Yu on a project on self-interacting DM in dwarf spheroidal galaxies. The visit lead to a publication in the prestigious journal *Nature Astronomy*.

Research in High Energy. In tight collaboration with Prof. Luca Silvestrini, during my postdoc at the Italian Institute for Nuclear Physics in Rome (2016-2018), I worked on the current hints for NP coming from B physics, following up on a study I carried out on hadronic uncertainties in the rare decay $B \to K^* \ell^+ \ell^-$, published in the *Journal of High Energy Physics*. The results on my studies on NP in semileptonic B decays have been very influential for the theory and experimental communities, providing a state-of-the-art picture on the subject. My analyses on B anomalies lead to well-cited publications in the *European Physical Journal C*, to several proceedings from talks at international conferences and workshops, and to further on-going work. In Rome, I have also contributed to develop `HEPfit`, a software to combine indirect and direct searches in High Energy Physics; I have initiated a vast program on surveying the constraints on the SMEFT, with the aim of exploiting the most sensitive probes on new dynamics above the EW scale, and publishing a paper in *Physics Letters B*; eventually, I have started a broad program on the study of the flavour puzzle in the SM and beyond.

Current research at UC Irvine. During my postdoc at UC Irvine (2018-2021) I have deepened and broadened my research on the study of the Dark Universe. With Prof. Kevork Abazajian, I have been assessing forecasts for DM signals in the X-ray and gamma-ray sky using state-of-the-art N-body simulations, leading to a recent publication in *Physical Review D*. With Prof. Manoj Kaplinghat I have been focussing on several aspects of the exciting study case offered by self-interacting DM scenarios, with a publication in *Monthly Notices of the Royal Astronomical Society* and several future directions to proceed with. With both Kev and Manoj I have also been recently performing cosmological analyses on the H_0 tension in connection to the physics of sterile neutrinos and of dark energy. With Manoj and Prof. Jonathan Feng I am carrying on a detailed study on nuclear coalescence that may open up new avenues for the DM indirect detection program. With Prof. Tim Tait, I am working on novel cosmological imprints of DM and, foremost, on the application of Machine Learning to BSM physics in the Early Universe, with current focus on Big Bang Nucleosynthesis as a probe of dark sectors.

SHORT-TERM AND LONG-TERM PLANS

From the main research lines illustrated above, my research plans flow along the following highlights:

- **Analysis and interpretation of astroparticle anomalies.** Today, I bring with me an expertise on cosmic-ray physics, X-ray, gamma-ray and neutrino astronomy that I will be able to apply to the search of anomalies in forthcoming data from a variety of telescopes and sky surveys, e.g. XRISM, CTA and IceCube-Gen2, with the final goal of carefully gauging promising NP footprints out of complex astrophysical background. Of particular significance for DM searches, I am also currently interested in the prediction of the flux of anti-nuclei in the Solar neighborhood. Experiments like AMS-02 may have already performed a detection that would be historic, and the advent of facilities like GAPS increases the hype. This motivated my recent interest in nuclear coalescence, and in the measurements of anti-nuclei yields, e.g., by ALICE. One of my forthcoming goals is to shed new light on the physics of coalescence, and on the expected anti-nuclei events from astrophysical processes and well-motivated DM candidates.

- **Analysis and interpretation of flavour anomalies.** In the incoming months/years a wealth of new experimental information is expected to come from the upgrade of LHCb, and eventually from Belle II, that will refine the present picture on semileptonic B decays, in particular on the current experimental hints for Lepton Universality Violation. Whether these anomalies will be confirmed, I plan to nail down the corresponding NP interpretation using the general framework of EFTs and delineate the underlying UV completion of the SM combining flavour and EW precision data with ATLAS + CMS Higgs signal strengths and direct searches at collider. Whether hints for Lepton Universality Violation will fade away, rare B decays will still allow us to put strong bounds on NP, and to learn more about non-factorizable QCD effects. Beyond B anomalies, with the advent of next-generation facilities I eagerly follow up on experimental and theoretical progress on the Unitarity Triangle, with very sensitive probes to NP as ϵ'/ϵ, on short-distance dominated decays as $K \to \pi\nu\bar{\nu}$, on CP violation in charm physics.

- **Astroparticle investigations beyond Cold DM.** I am extremely interested today in deepening the connections between the set of current astrophysical and cosmological data hinting for a scenario beyond the collisionless Cold DM (CDM) paradigm and a BSM theory that features in the spectrum such a DM candidate. For instance, if DM particles had sizable self-interactions, this would affect the density profile of DM halos and it may actually provide a concrete exciting study case beyond CDM that would embrace the theory of galactic dynamics and observational programs as the forthcoming LSST one; the physics of N-body simulations; the analysis of the distribution of matter both at the small and large scales. Similarly, if interacting dark sectors or sterile-neutrino interactions would be behind the curtains of the Dark Universe, one would envisage detectable imprints on the matter power spectrum as well as on the CMB itself, that may be key for the current cosmological discrepancies in the determination of H_0 and of σ_8. Concerning other notable DM candidates, I am keen to further inspect astrophysical and cosmological aspects of the QCD axion (e.g., cosmic strings and axion miniclusters) and of ultralight

bosons (e.g., analogies with condensed-matter systems), as well as of primordial black holes (e.g., imprints in gravitational astronomy). Within a theory of DM, I look forward to correlate microscopic properties extracted at the galactic and/or cosmological scale with signals coming from present and future experiments that directly probe the couplings of DM. Those opportunities may have been recently exemplified by the XENON1T anomaly, and are concretely foreseeable for incoming facilities as, e.g., FASER and SHiP, targeting axion-like/dark-sector landscapes.

- **EFTs for NP discovery.** Delineating the most informative picture on viable SM UV completions from the bottom-up is an ambitious program I particularly care of. On a long-term scale, I plan to realize a comprehensive investigation on the model-independent constraints on the SMEFT (and its variations) in an exhaustive fashion, paving eventually the way for the most likely BSM physics scenarios. In such a context, the interplay and complementarity of EW precision tests, flavour-violating processes, Higgs measurements, will play a key role together with direct searches at colliders. Modern on-shell amplitude techniques can offer new theory insights enriching those programs, while tools like `HEPfit`, a package I have contributed to, will allow for deep broad analyses determining correlations of effective couplings pinpointing to NP.

- **Machine learning for BSM and dark sectors in the Early Universe.** The study of the Early Universe offers a unique window on BSM physics, and a crucial testbed for dark sectors with a rich cosmological history. At present, I am developing a novel code for Big Bang Nucleosynthesis (BBN) that encodes a fast solver of differential equations and the use of deep neural networks (DNN). In this new numerical package a wide range of NP effects will be included, with particular focus on dark-sector physics. The goal is to offer a computationally efficient, physics-wise comprehensive tool to study BSM signatures at BBN, timely to the cosmological precision era around the corner. Along these lines, I plan in the future to apply DNN algorithms to the study of other computationally challenging problems related to BSM physics in the Early Universe. A net application would be in the study of phase transitions and of topological defects, where machine-learning algorithms may help us enriching and refining the outcome of cosmological lattice simulations (see, e.g., LATTICEEASY code). Other applications of DNNs for NP in the Early Universe may be carried out in Boltzmann solvers for CMB and large-scale structures (see, e.g., ETHOS project), or for the physics of the dark ages and of cosmic reionization.

- **The flavour puzzle and naturalness criteria.** I have recently developed a bottom-up approach to quantify the tuning involved in specific theoretical proposals aimed at addressing the SM flavour puzzle. Such method opens up to the possibility of defining a systematic procedure that assesses the "goodness" of a dynamical explanation of the origin of the SM Yukawa sector. I plan to expand on this program in connection with other notable SM puzzles: the naturalness of the EW scale; the origin of neutrino masses; Universe's matter - anti-matter asymmetry. On more general grounds, I am interested in deepening the link of bottom-up approaches to the flavour puzzle with top-down ones provided by grand unified theories and/or stringy scenarios.

TEACHING STATEMENT

In my undergrad and graduate experience in Italy, students were typically afraid of questioning professors, and almost no feedback was asked and given to them. Moreover, the interaction of professors with students was essentially relegated to hours-long written and oral final examinations. During my experience as a postdoc fellow at UC Irvine (UCI) I have become aware of a completely different teaching philosophy that turned out to be a wonderful cultural surprise for me. Indeed, I have always considered an environment where students feel comfortable about asking questions and can freely interact with professors to be the ideal one for their personal and professional growth. This is what I found at UCI, and through my interactions with UCI students I have soon realized it to be really effective. A key aspect of my teaching philosophy is therefore to undertake this attitude, i.e. to listen to and to solve concerns of students, to learn from their feedback, and to daily work for their needs.

As a professor, I would be really excited to share with students my knowledge on Physics & Astronomy as well as the enthusiasm I feel about research in Particle Physics and Cosmology. From this point of view, I had already the opportunity of partially mentoring both undergraduate and graduate students in my career, and I have always found it to be motivating for my own research as well. Mentoring a student brings both great responsibility and commitment, but it is also a unique occasion where I can particularly perceive the need of getting the best out of a project that I am working on with her/him. Eventually, I really consider mentoring to be a very valuable opportunity where I can transmit my knowledge and skills to someone else while, at the same time, I can refine and broaden mine thanks to an unbiassed point of view as the one typically shared by students. I look forward to supervise students curious about my work and eager to start doing research with me. There are three fundamental skills I would like my graduate students to develop in order to become successful researchers: 1) critical-thinking, 2) strong verbal and written communication and 3) ability to work both independently and collaboratively. Creativity would be the addition I love to bring out.

As a lecturer, I believe that a well–organized lecture should have a core subject, clearly outlined at the beginning of the class, together with a motivation on why one should really care about it. Indeed, I think it is crucial to highlight the relevance of the subject to the students at the very beginning of the course, trying to contextualize it as much as possible with explicit examples on current research through divulgative-science articles, or making peer-reviewed papers accessible and understandable: I think this would offer a great source of excitement to students. The lecture should also be enjoyable, since I strongly believe that the learning process must be fun in order to be effective in the best way possible. I also think that stressing multiple times the same key concepts and take-home messages during a lecture would be a very good habit to help students that may have hard times to follow. Teaching is also a matter on how to structure a course and each course presents unique challenges. I believe it is important to provide lecture notes for each class, and to select accurately textbooks and references where students can find further details on specific topics of my lectures. Also, I think it would be of primary importance to coordinate as much as possible with my colleagues in order to better fit my courses into the whole training program offered by the department to the students. My attitude towards teaching would be the one of a teacher that loves to be at the blackboard, with the aim of explaining step-by-step any derived equation, of writing down all the key concepts that make up the lesson. I would try to avoid the use of slides as much as possible, unless the explanation at the blackboard would result difficult to follow with respect to the projection of plots, figures and/or videos. I matured this consideration not only on the basis of my past experience as a student, but also in the

role of an instructor. In particular, in 2015 I have been one of the lecturers of the "Summer School on Astrophysics and Astroparticles" at the Petnica Summer Institute, in Serbia, where I provided a series of lectures on "The Dark Matter Problem" to advanced undergrad and graduate students. At the time, I chose to discuss evidences and detection of Dark Matter with the use of slides, and discuss more theoretically-oriented topics directly at the blackboard. I clearly remember the students of the school to be much more interacting with me when I was giving step-by-step derivations at the blackboard.

In my lectures, I would certainly like students to take an active role in class. To trigger their interaction, I think one good option would be to pose questions at the end of each lecture. This would be a matter of a $\sim 5 - 10$ minutes "pair and share" discussion (*Lyman 1981*, *Barkley et al. 2014*) at the beginning of each of my classes. I think this activity would help me to make sure that students are following and understanding the topics covered in class. Alternatively, at the beginning of some class, I could ask a couple of students, chosen at random, to ask questions regarding the topics of previous lectures. In both cases, the guaranteed benefit would be the fact that they would reprocess the concepts and the ideas that I have been teaching, leading them to a better comprehension of what was discussed. I also retain that an excellent instructor should be able to adapt teaching strategies on a student-by-student basis. For example, in the scenario described above, the questions could also remain anonymous to favor students who do not feel comfortable in manifesting their own doubts or curiosity. For this purpose, questions could be put into a box and I could randomly pick up a few of them in order to give them an immediate answer, and/or bring the whole set of answers written down on a paper at the next class.

More in general, it belongs to my teaching philosophy to implement ideas that combine concept-testing and learning assessments with the notion of "flipping the classroom" (*Berrett 2012*) in order to address specific needs from students, while engaging them as much as possible with my lectures. These are proven techniques that allows one to stimulate the interest of the students, to obtain important feedback on the lectures given and that produce a better learning process (see, e.g., *Brissenden et al. 2002*, *Prather 2009*). At the graduate level, it would be important promoting oral presentation skills by asking students to present their weekly homework at the blackboard in front of the class (at least once within the duration of the course). The weekly meetings with teaching assistants (TAs), usually consisting in TAs solving problems at the blackboard, could be sometimes turned into group meetings where students solve in small groups exercises assigned by me. Both the TA and I would attend these "collaborative learning" sessions (see, for instance, *Rao and DiCarlo 2000*), moving from one group to the other giving feedback and help to students working on the assignments. In some courses, attending "collaborative learning" could be awarded of a few points in the final class score, in order to improve the session attendance. Also, I think that the learning curve of a student becomes much smoother when she/he is directly involved in a project. There are proven benefits that learners get when working in a group (*Turpen and Finkelstein 2009*). First, students need to communicate in order to solve a given problem. Second, when a question is raised in a group, different students can have different answers and they can learn new things from each another, but also learn to listen to different perspectives. Third, they need to learn to trust each other working as a team. Also, working as a team would help shy students to be more involved (*Sampsel 2013*). Eventually, teaching is constantly evolving and I will keep on experimenting new ideas to deliver the best engaging, high-quality, fun lectures possible.

REFERENCES

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Curriculum Vitae

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Education

22/05/2020 – 22/05/2029
"Abilitazione Scientifica Nazionale", settore concorsuale 02/A2, Fisica teorica delle interazioni fondamentali. (Habilitation (Italy), gives right to access a position at the level of associate professor at a university in Italy).

16/10/2009
Ph.D in Theoretical Physics with score "Magna cum laude" at the RWTH Aachen University. Thesis title: "Aspects of Hadronic B Decays in and Beyond the Standard Model". Advisor: Prof. Dr. Martin Beneke.

21/07/2005
Graduation in Physics (Laurea specialistica) with score of 110/110 cum laude (maximum available) at the University of Genoa. Thesis title: "Origin of the Hierarchy Among Fermion Masses in Supersymmetric Theories". Advisor: Prof. Dr. Giovanni Ridolfi.

21/07/2003
First-level graduation in Physics (Laurea di primo livello) with score of 110/110 cum laude (maximum available) at the University of Genoa. Thesis title: "Path Integral and the Bidimensional Ising Model". Advisor: Prof. Dr. Camillo Imbimbo.

07/2000
High school diploma at Liceo Orazio Grassi, Savona, Italy. Grade: 100/100.

Positions

October 2019 - present
Fellini Fellow at INFN (senior postdoc), University of Torino.

October 2017 - September 2019
Postdoctoral research associate at Nikhef and at the University of Amsterdam.

October 2014 - September 2017
Postdoctoral research associate and Marie-Curie experienced researcher at the Higgs Centre for Theoretical physics, School of Physics and Astronomy, University of Edinburgh.

November 2012 - September 2014
Postdoctoral research associate at INFN, sezione di Torino and dipartimento di Fisica Teorica, University of Torino.

November 2009 - October 2012
Postdoctoral research associate and Alexander Von Humboldt fellow at the Johannes-Gutenberg University of Mainz.

November 2005 - October 2009
Ph.D Fellowship at the RWTH-Aachen University.

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Affiliations

01/01/2019 - present
Affiliate member of the Higgs Centre for Theoretical Physics, Edinburgh, UK.

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Prizes, Awards and Fellowships

INFN “Fellini” - Fellowship for Innovation at INFN, funded by the European Union’s Horizon 2020 research programme, under the Marie Skłodowska-Curie Cofund Action, grant agreement no. 754496, 01/10/2019-present, 151560 €, Turin, Italy.

Marie Curie Individual fellowship - funded under the People Programme (Marie Curie Actions) of the European Union’s Horizon 2020 Framework Programme H2020- MSCA-IF-2014 under REA grant No. 656463 — “Soft Gluons”, 01/10/2015 - 31/09/2017, 184156 €, Edinburgh, UK.

Alexander Von Humboldt fellowship, 01/11/2009 - 31/10/2011, 73200 €, Mainz, Germany.

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L. Calibbi, A. Crivellin, F. Kirk, C. A. Manzari and L. Vernazza, "*Z' models with less-minimal flavour violation*", [arXiv:1910.00014 [hep-ph]].

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A. Crivellin, C. Gross, S. Pokorski and L. Vernazza, "*Correlating epsilon'/epsilon to hadronic B decays via $U(2)^3$ flavour symmetry*", Phys. Rev. D101 (2020) no.1, 015022, doi:10.1103/PhysRevD.101.015022, [arXiv:1909.02101 [hep-ph]].

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11)
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V. Ahrens, M. Neubert and L. Vernazza, "*Structure of Infrared Singularities of Gauge-Theory Amplitudes at Three and Four Loops*", JHEP 1209 (2012) 138 doi:10.1007/JHEP09(2012)138, [arXiv:1208.4847 [hep-ph]].

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L. Vernazza, “*Analysis of the anomalous-dimension matrix of n-jet operators at 4 loops*”, PoS EPS-HEP2011 (2011) 284, arXiv:1112.3375 [hep-ph].

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A. Broggio, M. Neubert and L. Vernazza, “*Soft gluon resummation for slepton-pair production at hadron colliders*”, JHEP 1205 (2012) 151, doi:10.1007/JHEP05(2012)151, [arXiv:1111.6624v2 [hep- ph]].
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L. Hofer, D. Scherer and L. Vernazza, “*Probing new physics in electroweak penguins through* B_d *and* B_s *decays*”, J.Phys.Conf.Ser. 335 (2011) 012039, doi:10.1088/1742-6596/335/1/012039, [arXiv:1104.5521 [hep-ph]].

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L. Hofer, D. Scherer and L. Vernazza, “*Electroweak penguins in isospin-violating Bs decays*”, PoSICHEP 2010 (2010) 286, [arXiv:1012.3551 [hep-ph]].

4*)**
L. Hofer, D. Scherer and L. Vernazza, “$Bs \to \varphi\rho_0$ *and* $Bs \to \varphi\pi_0$ *as a handle on isospin-violating New Physics*”, JHEP 1102 (2011) 080, doi:10.1007/JHEP02(2011)080, [arXiv:1011.6319 [hep-ph]].

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M. Beneke, X. Q. Li and L. Vernazza, “*Hadronic B decays in the MSSM with large tan* β”, Eur. Phys. J. C 61 (2009) 429, doi:10.1140/epjc/s10052-009-0989-z, [arXiv:0901.4841 [hep-ph]].

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M. Beneke and L. Vernazza, “$B \to \chi_{cJ}K$ *decays revisited*”, Nucl. Phys. B 811 (2009) 155, doi:10.1016/j.nuclphysb.2008.11.025, [arXiv:0810.3575 [hep-ph]].

Invited talks at conferences (since 2009)

“*Resummation of large logarithms at next-to-leading power for scattering processes near threshold*”, invited talk at the conference “International Workshop on Precision QCD@LHC”, IIT Hyderabad, 28-31 January 2020.

“*Factorisation and resummation of next-to-leading power logarithms for scattering processes near threshold*”, invited talk at the conference “15th Central European Seminar on Particle Physics and Quantum Field Theory”, Vienna, 28-29 November 2019.

“*Multiloop corrections to two-parton scattering amplitudes in the Regge limit from BFKL evolution*”, invited talk at the workshop “Towards accuracy at small x”, Higgs Centre for Theoretical Physics, Edinburgh, UK, 10-13 September 2019.

“*Resummation of NLP logarithms in particle scattering near threshold*”, invited talk at the workshop “Parton Showers and Resummation 2019”, ESI, Vienna, Austria, 11-14 June 2019.

"*The BFKL equation and two parton scattering in the high-energy limit*", invited talk at the conference "SCET 2019", San Diego, USA, 25-28 March 2019.

"*Next-to-leading power corrections in particle scattering near threshold*", invited talk at QCD@LHC, Dresden, Germany, 27-31 August 2018.

"*Infrared singularities of QCD scattering amplitudes in the Regge limit to all orders*", invited talk at the conference "Loops and Legs 2018", St. Goar, Germany, 29 April - 4 May 2018.

"*Next-to-leading power logarithms in particle scattering near threshold*", invited talk at the workshop "Particleface 2018", Valencia, Spain, 26-28 February 2018.

"*Next-To-Leading Power Threshold Logarithms in Electroweak Annihilation*", talk at the program "Automated, Resummed and Effective: Precision Computations for the LHC and Beyond" and "Mathematics and Physics of Scattering Amplitudes" at MIAPP, TUM, Munich, Germany, 24 July - 18 August 2017 and 21 August - 15 September 2017.

"*Two-parton scattering in the high-energy limit*", invited talk at the conference Amplitudes 2017, Edinburgh, UK, 10-14 July 2017.

"*Two-parton scattering in the high-energy limit and the three Reggeon cut*", invited talk at the workshop "Iterated integrals and the Regge limit", Higgs Centre for Theoretical Physics, Edinburgh, UK, 10-14 April 2017.

"*Two-parton scattering in the high-energy limit*", invited talk at the program "Amplitudes - practical and theoretical developments", MITP & THEP, Mainz, Germany, 6-17 February 2017.

"*Factorisation of 2 to 2 scattering amplitudes in the high-energy limit*", invited talk at the program "Challenges and Concepts for Field Theory and Applications in the Era of LHC Run-2", ESI, Vienna, Austria, 18 July - 12 August 2016.

"*A Factorisation Approach to Soft Radiation in Drell-Yan Beyond Leading Power*", talk given at the workshop "Threshold Logarithms Beyond Leading Power", Edinburgh, 25-29 January 2016

"*Next-To-Leading Power Threshold Logarithms in Electroweak Annihilation*", talk at the program "Higher Orders and Jets for LHC", MITP, Mainz, 29 June - 17 July 2015.

"*On Next-to-Eikonal Corrections to Threshold Resummation for Electroweak Annihilation Cross Sections*", presented at the conference LoopFest XIII, NewYork City College of Technology, New York, 17-20 June 2014.

"*The Regge Limit of Gauge Amplitudes at Two Loops and Beyond*", presented at the conference SCET 2014, TUM, Munich, Germany, 26-28 March 2014.

"*The $B \to \pi K$ Puzzle and its Relation to $Bs \to \varphi\pi$ and $Bs \to \varphi\rho$*", invited talk at the conference CKM 2012, Cincinnati, USA, 28 September - 2 October 2012.

"*Analysis of the anomalous-dimension matrix of n-jet operators up to 4 loops*", presented at the conference SCET 2012, Madrid, Spain, 27-29 March 2012.

"*Infrared singularities of gauge-theory scattering amplitudes from the anomalous- dimension matrix of n-jet operators in SCET*", presented at the program "Frontiers of QCD", INT, Seattle, USA, 19 September - 18 November 2011.

"*Analysis of the anomalous-dimension matrix of n-jet operators to four loops in SCET*", presented at the conference "HEP EPS 2011", Grenoble, France, 21-27 July 2011.

“*Soft gluon resummation for Drell-Yan and slepton-pair production at (N)NNLL in supersymmetry*”, presented at the conference “Planck 2011”, Lisbon, Portugal, 30 May - 3 June 2011.

“*Probing New Physics in Electroweak Penguins through Bd and Bs decays*”, presented at the conference “Discrete 2010”, Rome, Italy, 6-11 December 2010.

“*Non-leptonic B decays in various extensions of the Standard Model*”, presented at the annual meeting of the Graduate College “Elementarteilchenphysik an der TeV-Skala”, Bad Honnef, September 2009.

“*Non-leptonic B decays with new physics in the electroweak penguin sector*”, presented at the Flavianet Topical Workshop “Low energy constraints on extensions of the Standard Model”, Kazimierz, Poland, July 2009.

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Invited Seminars and Colloquia (since 2008)

“*Aspects of non-leptonic B decays in and beyond the Standard Model*”, invited remote seminar at the University of Torino, June 2020.

“*Aspects of non-leptonic B decays in and beyond the Standard Model*”, invited remote seminar at the University of Warsaw, May 2020.

“*Non-leptonic B decays in and beyond the SM*”, invited seminar at PSI, Villigen, Switzerland, February 2020.

“*Factorisation and resummation of next-to-leading power logarithms for scattering processes near threshold*”, invited seminar at the University of Milano Bicocca, Italy, December 2019.

“*Factorisation and resummation of next-to-leading power logarithms for scattering processes near threshold*”, invited seminar at the University of Würzburg, Germany, November 2019.

“*Factorisation and resummation of threshold logarithms at next-to-leading power for electroweak annihilation processes*”, invited seminar at the Johannes Gutenberg University, Mainz, Germany, November 2019.

“*Next-to-leading power corrections in particle scattering near threshold*”, invited seminar at the University of Edinburgh, Higgs Centre for Theoretical physics, Edinburgh, UK, July 2018.

“*Next-to-leading power logarithms in particle scattering near threshold*”, invited seminar at the University of Edinburgh, Higgs Centre for Theoretical physics, Edinburgh, UK, November 2017.

“*Two-parton scattering in the high-energy limit*”, invited seminar at Hyderabad, India, HEP Remote Video Seminar Series, 25 July 2017.

“*Two-parton scattering in the high-energy limit and the three Reggeon cut*”, invited seminar at ETH, Zurich, Switzerland, March 2017

“*Threshold Logarithms Beyond Leading Power*”, invited seminar at the Niels Bohr Institute, Copenhagen, Denmark, May 2016.

“*Comparing High-Energy with Infrared Factorisation in Four-Parton Scattering Amplitudes in QCD*”, invited seminar at IPPP, University of Durham, October 2014.

“*On Next-to-Eikonal Corrections to Threshold Resummation for Electroweak Annihilation Cross Sections*”, invited seminar at the University of Edinburgh, June 2014.
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“*On Next-to-Eikonal Corrections to Threshold Resummation for Electroweak Annihilation Cross Sections*”, invited seminar at the University of Genua, March 2014.

“*Infrared singularities in QCD and soft gluon resummation in the production of supersymmetric particles*”, invited seminar at the institute of Theoretical Physics at the University of Siegen, December 2012.

“*Infrared divergencies in QCD and application to soft gluon resummation in the production of supersymmetric particles*”, invited seminar at the Institute of Theoretical Physics of the University of Turin, September 2012.

“*Soft gluon resummation in SCET at hadron colliders*”, invited seminar at the Southern Methodist University, Dallas, February 2012.

“*Supersymmetry effects in non-leptonic B decays*”, invited seminar at THEP, Johannes-Gutenberg Universität, Mainz, April 2010.

“*QCD Factorization for Non-Leptonic B decays*”, invited seminar at the Universität Karlsruhe (TH), November 2008.

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Teaching Experience

Summer Semester 2018
Course on “Soft Collinear Effective Field Theory”, for Ph.D and Master students, Nikhef, Amsterdam;
Teaching assistant for the course “Field Theory in Particle Physics”, University of Utrecht.

Summer Semester 2017
Tutorials for the course “Jet physics at the LHC” (lectures given by Prof. Gavin Salam at the “Higgs Centre School of Theoretical Physics”, May 2017).

Summer Semester 2016
Tutorials for the course “Soft-Collinear Effective Field Theory and collider physics” (lectures given by Prof. Thomas Becher at the “Higgs Centre School of Theoretical Physics”, May 2016).

Winter Semester 2015/2016
Lectures on “Effective Field Theories”, for Ph.D and Master students, University of Edinburgh.

Summer Semester 2015
Tutorials for the course “The Standard Model at the Energy Frontier and Beyond” (lectures given by Dr. Maurizio Piai at the “Higgs Centre School of Theoretical Physics”, May 2015).

Summer Semester 2013
Lecture on “Soft Collinear Effective Field Theory”, University of Torino.

Summer Semester 2008
Teaching assistant for the course “Thermodynamics and Statistical Physics”, RWTH Aachen.

Winter semester 2006/2007
Teaching assistant for the course “Quantum Field Theory 1”, RWTH Aachen.

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Co-Supervision of Graduate Students

Co-supervision of 1 Ph.D student, together with prof. Eric Laenen, Nikhef and University of Amsterdam, November 2016 - present.

Co-supervision of 1 Ph.D student, together with prof. Einan Gardi, Edinburgh University, January 2015 - present.

Co-supervision of 1 Ph.D student, together with prof. Lorenzo Magnea, Turin University, November 2012 - October 2014.

Co-supervision of 1 Ph.D student, together with prof. Matthias Neubert, Mainz University, November 2009 - October 2012.

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Co-Supervision of Master Students

Co-supervision of 1 master student, together with prof. Einan Gardi, Edinburgh University, September - March 2017.

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Conference and Workshop co-organisation

"*Next-to-leading power corrections in particle physics*", 5-7/11/2018, organised at Nikhef, Amsterdam. Webpage: https://indico.cern.ch/event/730184/

"*SCET 2018*", 19-22/03/2018, organised at the University of Amsterdam.
Webpage: https://indico.cern.ch/event/628868/

"*Iterated integrals and the Regge limit*", 10-14/04/2017, organised at the Higgs Centre for Theoretical Physics, Edinburgh.
Webpage: http://higgs.ph.ed.ac.uk/workshops/iterated-integrals-and-regge-limit

"*Threshold Logarithms Beyond Leading Power*", 25-29/01/2016, organised at the Higgs Centre for Theoretical Physics, Edinburgh.
Webpage: https://higgs.ph.ed.ac.uk/workshops/threshold-logarithms-beyond-leading-power

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Other skills

Mother tongue: Italian
Other languages: Fluent in English, good knowledge of German and French.
Computer skills: Good command on Linux, Mac OS X, Windows; C and C++; LATEX; Mathematica, Maple.
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Curriculum Vitae of
NATASCIA VIGNAROLI

Department of Physics “E. Fermi", University of Pisa, Largo Bruno Pontecorvo, 3, 56127 Pisa, Italy

WEB PROFILES:

RESEARCH INTERESTS

My research activity is focused on the phenomenology of theories beyond the Standard Model (BSM), with emphasis on the search for new physics at colliders (LHC and future colliders), and on the interpretation and prediction of the results coming from the experiments. I am particularly interested in understanding (directly and indirectly) the mechanisms behind the electroweak symmetry breaking (EWSB) and I find especially attracting the theories with a new strongly-interacting sector responsible for the EWSB. To reach my research goals, beyond collider tests, I am also interested in model building, in the study of the flavor structure of BSM theories and in developing new techniques to extract information on the Higgs sector. Recently, I also got interested in particle astrophysics, in understanding the origin of dark matter and the mechanisms related to the electroweak phase transition and baryogenesis.

RESEARCH EXPERIENCE

Sept 2019 – Present	PostDoc Researcher at University of Pisa, Department of Physics “E. Fermi", Pisa, Italy
Sept 2017 – Sept 2019	PostDoc Researcher at “INFN, theory group of Padova”, Padova, Italy
Sept 2015 – Sept 2017	PostDoc Researcher at “Centre for Cosmology and Particle Physics Phenomenology – CP3-Origins”, University of Southern Denmark, Odense, Denmark
Sept 2012 – Aug 2015	PostDoc Researcher at “Michigan State University, Department of Physics and Astronomy”, East Lansing, MI, USA
Oct 2011 – Aug 2012	PostDoc Researcher at “Iowa State University, Department of Physics and Astronomy”, Ames, IA, USA

PROFESSIONAL ACHIEVEMENTS

28 March 2018 – 28 March 2024

Italian National Scientific Qualification to function as Associate Professor in Theoretical Physics (Abilitazione Scientifica Nazionale per il ruolo di Professore di seconda fascia per il settore concorsuale FIS 02/A2 - Fisica Teorica delle Interazioni Fondamentali)

EDUCATION

Nov 2008 – Feb 2012

Ph.D. in Physics University of Rome "La Sapienza"

Thesis: "Phenomenology of heavy fermion and vector resonances in Composite Higgs Models"

Supervisor: Roberto Contino

Examiners: Giovanni Ridolfi, Antonio D. Polosa, Mauro Dell' Orso

Defense Date: February 14th 2012

Sept 2006 – Oct 2008

Master Degree in Theoretical Physics, University of Rome "La Sapienza"

Summa cum Laude (110/110 e Lode)

Thesis: "The Higgs boson in the μ+μ- channel at the LHC: expected differences in conformal models with a dilaton-Higgs"

Advisors: Barbara Mele, Silvano Petrarca

Defense date: October 24th 2008

2007 – 2008

Excellence Program* of the Faculty of Mathematical, Physical and Natural Sciences of "La Sapienza" (admitted for academic merit)

**The Excellence Program is a supplemental program for deserving students, providing additional courses and activities*

Aug, Sept 2007

Summer Student Trainee at the Fermi National Accelerator Laboratory (**Fermilab**), Batavia, IL,USA

Collaboration with the CDF Rome 1 group.

I worked on "SM predictions for Z+(b)jet processes at NLO using MCFM"

Courses taken: C++ programming; Data-analysis with ROOT

Sept 2003 – Oct 2006

Bachelor Degree in Physics, University of Rome "La Sapienza"

Summa cum Laude (110/110 e Lode)

Thesis: "Exit times in stochastic processes"

Advisors: Angelo Vulpiani, Massimo Falcioni
Defense date: October 2nd 2006

Sept 1998 - Jul 2003
High School Diploma on Scientific Studies, Science High School "Gregorio da Catino"
100/100 with honors

SCHOOLS ATTENDED

2015 Odense Winter School on Theoretical Physics, University of Southern Denmark

2013 Prospects In Theoretical Physics, "LHC Physics", Institute for Advanced Studies (IAS), Princeton, NJ, USA

2009 Hadron Collider Physics Summer School, CERN, Geneva, Swiss

2008 Frascati Spring School "Bruno Touschek" in Nuclear, Subnuclear and Astroparticle Physics, Frascati (Rome), Italy

AWARDS and FELLOWSHIPS

2019 winner of the selection for a Post-Doctoral position at the University of Pisa for working in the project ERC NEO-NAT of Prof. A. Strumia

2017 INFN post-doctoral fellowship for research activity in Theoretical Physics at Padua
(I won one of the 15 INFN fellowships of the 2017 INFN fellowship program for activity in theoretical Physics)

2008-2011 Ph.D. Scholarship, University of Rome "La Sapienza" (obtained as a winner of the public competitive examination)

ADISU (Agency for the Right to University Studies) Fellowship for academic merit
for the academic years 2004/05, 2005/06, 2006/07, 2007/08

2008 ADISU award for the M.Sc

2007 Joint DoE (US Department of Energy)/INFN Fellowship for summer training at Fermilab (obtained after a merit-based selection)

2006 ADISU award for the B.Sc

TEACHING EXPERIENCE

2009-2010

Teaching assistant for the course of Physics, degree in Biology, of the University of Rome "La Sapienza" (contract obtained after a merit-based selection)

2018

"**Discussion leader**" (upon CERN invitation) for the CERN-JINR school of High Energy Physics, ESHEP 2018, 20 June-3 July, Maratea, Italy

PROFESSIONAL ACTIVITY

Referee for the Journals:

Physics Letters B, Physical Review D, Annals of Physics, Physical Review Letters

2016 **Organizer of Seminars** at CP3-Origins

2012-2015 **Organizer** of HEP and Journal Club **Seminars** at Michigan State University

2015 **chair** for the BSM I session at the Phenomenology 2015 Symposium (PHENO), Pittsburgh, PA, USA

2014 **chair** for the BSM Higgs II session at PHENO 2014, Pittsburgh

OUTREACH

Contribution to the outreach program "Quantum Rascals" from CP3-Origins, University of Southern Denmark (http://www.kvantebanditter.dk/en/about)

COLLABORATION IN INTERNATIONAL PROJECTS

Member of the collaboration: **Future Circular Collider (FCC)**.

CERN-ACC-2018-0056 (Vol. 1 Physics opportunities), CERN-ACC- 2018-0057 (Vol. 2 The Lepton Collider), CERN-ACC-2018-0058 (Vol. 3 The Hadron Collider), CERN-ACC-2018-0059 (Vol. 4 The High- Energy LHC)

Physics at a 100 TeV pp collider: beyond the Standard Model phenomena.

Physics opportunities in the search and study of physics beyond the Standard Model at a 100 TeV pp collider.

http://inspirehep.net/record/1467223

CERN Yellow Report (2017) no.**3**, 441-634

Top Quark Working Group Collaboration.
Work of the Energy Frontier Top Quark working group of the 2013 Community Summer Study (Snowmass).
http://inspirehep.net/record/1263763
SLAC-econf-C130729.2, FERMILAB-CONF-13-648, SLAC-PUB-15960, arXiv:1311.2028

LHC Reinterpretation Forum Collaboration
aimed at improving the reinterpretation of searches and measurements at the LHC in terms of models for new physics
https://inspirehep.net/record/1785921
arXiv:2003.07868, SciPost Physics, Vol. 9, issue 2

PARTECIPATION IN GRANTS / PROJECTS

2019 - Partecipation in the activity of the Pisa theory group (ERC grant NEO-NAT) and INFN Pisa theory group

2017- 2019 Partecipation in the activity of the INFN Padua theory group

2017- 2019 Partecipation in the network "elusives: neutrinos, dark matter and dark energy physics", European ITN project (H2020-MSCA-ITN-2015//674896-ELUSIVES)

2015-2017 Danish National Research Foundation, project DNRF-90, CP3-Origins, University of Southern Denmark

2012-2015 "QCD, Electroweak Symmetry Breaking, and Physics Beyond the Standard Model", NSF grant PHY-0854889, Michigan State University

2012-2015 "Global QCD Analysis and Electroweak Symmetry Breaking in High Energy Collider Phenomenology", NSF grant PHY-0855561, Michigan State University

2011-2012 "Investigations in Experimental and Theoretical High Energy Physics", DOE grant DE-FG02-01ER41155, Iowa State University

2009-2012 association to the INFN Rome 1 group

PARTECIPATION IN WORKSHOPS

2019 Jun "Physics at TeV Colliders", Les Houches Workshop Series, Les Houces, France

2018 Sept-Oct "Beyond Standard Model: Where do we go from here?", Galileo Galilei Institute, Firenze, Italy

2018 Jun "The Future of BSM Physics, theoretical MITP program", Anacapri, Italy

2017 Dec “6th Rome Joint Workshop: Weird Theoretical Ideas”, Frascati National Laboratory, Frascati (RM), Italy

2017 Jan “1st FCC Physics Workshop”, CERN, Geneva, Swiss

2016 Sept “9th International Workshop on Top Quark Physics TOP 2016”, Olomouc, Czech Republic

2016 Apr “Composite Dynamics: from Lattice to the LHC Run II”, Mainz Institute for Theoretical Physics (MITP), Mainz, Germany

2015 Nov “CoDyCE 5, Composite Dynamics and Dark Matter”, Institut de Physique Nucléaire de Lyon (IPNL), Lyon, France

2015 May “Vector-Like Quark (VLQ) Workshop”, Argonne National Laboratory, USA

2009 Oct “Searching for New Physics at the LHC”, Galileo Galilei Institute (GGI), Florence, Italy

2008 Feb “Workshop on Monte Carlo, Physics and Simulations at LHC”, Frascati National Laboratory (LNF), Frascati, Italy

Contribution to

LHCSki 2016 - A First Discussion of 13 TeV Results, Obergurgl, Austria

2015 Mar “Sakata Memorial KMI Workshop on Origin of Mass and Strong Coupling Gauge Theories”, Nagoya, Japan

2013 Community Summer Study: “Snowmass on the Mississippi”, Minneapolis, MN, USA
on the future program of particle physics in the U.S
(I was part of the Top Working Group Collaboration)

2012 Dec “KMI-GCOE Workshop on Strong Coupling Gauge Theories in the LHC Perspective”, Nagoya, Japan

2012 Nov “Understanding the TeV Scale Through LHC Data, Dark Matter, and Other Experiments”, GGI, Florence, Italy

SELECTED PLENARY INVITED TALKS

20 May 2019 "Discovery Prospects of Leptoquarks at the High luminosity LHC", Origin of Mass 2019 Conference, CP3-Origins SDU, Odense, Denmark

9 Apr 2019 "Leptoquarks in B-meson anomalies: simplified models and HL-LHC reach", Incontri di Fisica delle Alte Energie, Napoli, Italy

6 Mar 2018 "tt/tb Resonances", invited theory speaker at "ATLAS Heavy Quark and Top Workshop", CERN, Geneva, Swiss

19 Jan 2017 "Composite Resonances", "1st FCC Physics Workshop", CERN, Geneva, Swiss

20 Sept 2016 "Top Signatures From Composite Higgs Theories", plenary talk at the Young Scientist Forum in the 9th International Workshop on Top Quark Physics TOP 2016, Olomouc, Czech Republic

1 Jun 2016 "Diphoton Excess From Minimal Composite Dynamics", "Origin of Mass 2016" Conference, Odense, Denmark

13 Apr 2016 "Exotics combinations", invited theoretical speaker at "ATLAS Beyond the Standard Model Higgs and Exotics Joint Workshop", Laboratoire de physique subatomique et de cosmologie de Grenoble (LPSC), Grenoble, France

8 Apr 2016 "Topological Terms in Composite Models and their Phenomenology", Composite Dynamics: from Lattice to the LHC Run II workshop, MITP, Mainz, Germany

27 May 2015 "Vector-Like Quark Phenomenology Overview", "VLQ Workshop", Argonne National Laboratory, USA

26 Jan 2015 "New strategies for W-prime searches at the LHC", ATLAS meeting of the Exotics group, CERN

29 Apr 2013 "Top-partners in Single-EW Production", ATLAS meeting: 4th generation and top group, CERN

INVITED SEMINARS

15 July 2020 "a_τ in heavy ion collisions at the LHC: modelling and theoretical aspects", (online) talk at ATLAS meeting for g-2 tau analyses

12 May 2020 "Constraints on a_τ from UPC at the LHC", (online) talk at ATLAS meeting, University of Pisa, Italy

19 Sept 2019 "Investigating and Revealing New Physics Beyond the SM", University of Liverpool,

Liverpool, Great Britain

14 Sept 2018 "Searching for Leptoquarks at the High-Luminosity LHC", Frascati National Laboratories, Frascati, Italy

21 Dec 2017 "Unveiling BSM strong dynamics at future colliders", Joint Rome Seminar, University of Rome "La Sapienza", Rome, Italy

16 Feb 2017 "Collider Phenomenology of Composite Higgs Models", Theory seminar, Laboratoire de physique subatomique et de cosmologie de Grenoble (LPSC), Grenoble, France

23 Apr 2016 "Collider Phenomenology of Higgs Compositeness", Theory seminar, Frascati National Laboratory, Frascati (RM), Italy

23 Apr 2015 "Distinguishing dijet resonances at the LHC", Theory Seminar, Fermilab, USA

2014 "BSM strong dynamics at the LHC" HEP Seminar, Michigan State University, East Lansing, USA

2014 "W-prime search at the LHC", HEP Seminar, Michigan State University, East Lansing, USA

2013 "Discriminating Higgs production mechanisms using jet energy profiles", HEP Seminar, Michigan State University, East Lansing, USA

2012 "Top Partners at the LHC", HEP Seminar, Michigan State University, East Lansing, USA

2011 "Phenomenology of heavy fermion and vector resonances in Composite Higgs Models", HEP Seminar, Iowa State University, Ames, USA

OTHER TALKS

2017 "Revealing BSM Composite Dynamics Through Topological Interactions at Future Colliders ", parallel talk at the "European Physical Society Conference on High Energy Physics (EPS-HEP)", Venice, Italy

2015 "Distinguishing dijet resonances at the LHC using jet energy profile", parallel talk at PHENO 2015, Pittsburgh, USA

2014 "New W-prime signals at the LHC" parallel talk at PHENO 2014, Pittsburgh, USA

2012 "Discovering the composite Higgs through the decay of a heavy fermion", parallel talk at PHENO 2012, Pittsburgh, USA

2011 "Discovering Heavy Colored Vectors at the LHC", plenary talk at IFAE 2011, Incontri di

Fisica delle Alte Energie, Perugia, Italy

2010 "b → sγ in Composite Higgs Models ", parallel talk at Cortona Theoretical Physics Conference, Cortona (AR), Italy

PUBLICATIONS

23 papers published in international peer-reviewed journals, of which 7 as single author
12 papers published in conference proceedings
1 book from the Ph.D. Thesis
5 reports (including a CERN Yellow Report) of international collaborations

(From database: Inspire-HEP)
Total number of citable papers: **35** (Published only: **23**)
Total number of citations: **1739** (Published only: **1396**)
H-index: **17** (Published only: **16**)

EXPERIMENTAL SEARCHES PARTLY BASED ON STUDIES OF MINE

i.*e. which have used as a benchmark a model and/or a search strategy suggested in a work of mine*

ATLAS Collaboration, "Search for single production of vector-like quarks decaying into Wb in pp collisions at √s = 8 TeV with the ATLAS detector," arXiv:1602.05606

and

ATLAS Collaboration, "Search for pair and single production of new heavy quarks that decay to a Z boson and a third-generation quark in pp collisions at √s=8 TeV with the ATLAS detector," JHEP **1411**, 104 (2014), arXiv:1409.5500 [hep-ex]

f*or which I also provided my Monte Carlo implementation of the theoretical model in NV, PRD **86** (2012) 075017 for signal simulations*

CMS Collaboration, "Search for a W' boson decaying to a vector-like quark and a top or bottom quark in the all-jets final state,"
CMS-PAS-B2G-18-001, arXiv:1811.07010

*Considered the search channel suggested in NV, Phys. Rev. D**89** (2014) no.9, 095027 and adopted the theoretical description of that study*

ATLAS Collaboration, "Search for the production of single vector-like and excited quarks in the Wt final state in pp collisions at √s = 8 TeV with the ATLAS detector,"
JHEP **1602** (2016) 110, arXiv:1510.02664 [hep-ex]

f*or which I also provided my Monte Carlo implementation of the theoretical model in NV, JHEP*

1207 *(2012) 158*

CMS Collaboration, "Search for heavy resonances decaying to top and vector-like quarks in the all-hadronic channel at √s=13 TeV", CMS-PAS-B2G-16-013, arXiv:1703.06352

for which I calculated values of signal cross sections and I provided my Monte Carlo implementation of the theoretical model in Bini, Contino, NV, JHEP 1201 (2012) 157

CMS Collaboration, "Search for the production of an excited bottom quark decaying to tW in proton-proton collisions at √s=8 TeV," JHEP **1601** (2016) 166, arXiv:1509.08141 [hep-ex]

ATLAS Collaboration, "Search for single b*-quark production with the ATLAS detector at √s=7 TeV," Phys. Lett. B **721** (2013) 171-189, arXiv:1301.1583 [hep-ex]

ATLAS Collaboration, "Search for single production of a vector-like quark via a heavy gluon in the 4b final state with the ATLAS detector in pp collisions at √s = 8 TeV," Phys. Lett. B **758**, 249 (2016), arXiv:1602.06034

CMS Collaboration, "Search for single production of vector-like quarks decaying to a Z boson and a top or a bottom quark in proton-proton collisions at 13 TeV " CMS-PAS-B2G-17-007

Considered the search channels suggested in Bini, Contino, NV, JHEP 1201 (2012) 157

REFERENCES

Roberto Contino
Professor at Scuola Normale Superiore, Pisa, Italy
Piazza dei Cavalieri, 7, 56126 Pisa PI, Italy

Francesco Sannino
Professor, Director of the CP3-Origins Center at University of Southern Denmark.
CP³-Origins, University of Southern Denmark, Campusvej 55, 5230 Odense M, Denmark

R. Sekhar Chivukula
Professor at the University of California San Diego;
Office: Mayer Hall Addition 5601

Chien-Peng (C.-P.) Yuan
Wu-Ki Tung Professor of Particle Physics
High Energy Physics - Theoretical
Biomedical-Physical Sciences Bldg.
567 Wilson Rd., Room 3213, East Lansing, MI 48824-2320, USA

Elizabeth H. Simmons
Executive vice chancellor for Academic Affairs at the University of California San Diego;
University Distinguished Professor;
9500 Gilman Drive #0001, University of California, San Diego, La Jolla, CA 92093-0001

Paride Paradisi
Professor at University of Padova,
Galileo Galilei physics department, via Francesco Marzolo, 8, 35121 Padova PD, Italy

Alessandro Strumia
Professor at University of Pisa
Largo Bruno Pontecorvo, 3, 56127, Pisa, Italy

LUCA VISINELLI

"Fellini" Fellow
Laboratori Nazionali di Frascati

Education

December 16, 2011 — **Ph.D. in Physics**, *The University of Utah*, Salt Lake City, USA.
Advisor: Dr. Paolo Gondolo. Thesis: *Axions in CDM and inflation models*

August 6, 2011 — **M.Sc. in Physics**, *The University of Utah*, Salt Lake City, USA.
Advisor: Dr. Paolo Gondolo. Topics: Theoretical physics

June 22, 2007 — **M.Sc. in Physics**, *University of Bologna*, Italy.
Advisor: Dr. Fiorenzo Bastianelli. Thesis: *Neutrino oscillations in curved spacetime.*
Grade: 110/110 *cum Laude*

October 14, 2005 — **B.Sc. in Physics**, *University of Bologna*, Italy.
Advisor: Dr. Giovanni Carlo Bonsignori. Thesis: *The Interacting Boson Model.*
Grade: 110/110 *cum Laude*

July 4, 2002 — **High School Diploma**, *High School "E. Fermi"*, Bologna, Italy.
Grade: 100/100

Research Experience

2019 – 2020 — **Post-doctoral researcher**, GRAPPA Amsterdam (Netherlands)
Principal investigator: Prof. Christopher Weniger (GRAPPA Amsterdam)
I am currently working on models linking the evolution of dark energy with Planck and supernovae data, aimed at easing the H_0 tension. I am also working on astroparticles, in particular on models of light bosons as the dark matter.

2018 – 2019 — **Post-doctoral researcher**, Uppsala University (Sweden)
Principal investigator: Prof. Ulf Danielsson (Uppsala University)
I have worked on models linking the evolution of dark energy with Planck and supernovae data, aimed at easing the H_0 tension.

2016 – 2018 — **Post-doctoral researcher**, Stockholm University and Nordita (Sweden)
Principal investigator: Prof. Katherine Freese (U. of Michigan and Stockholm U.)
I have worked on axion cosmology, the Higgs field as a spectator during inflation, capture of dark matter by massive bodies and by primordial black holes, modelling and evolution of dark stars with the MESA stellar code. Here is my interview at Stockholm University.

2013 – 2015 — **Postdoctoral fellow**, Mediterranean Center on Climate Changes (CMCC), Bologna (Italy)
Principal investigators: Simona Masina (2013-2015), Marcello Vichi (2013-2014);
I have developed a numerical code for assessing the global ocean carbon uptake, aiming to assess the global carbon flux within the GeoCarbon project http://www.geocarbon.net.

2007 – 2011 — **Doctoral thesis researcher**, The University of Utah (USA)
Advisor: Prof. Paolo Gondolo (U. of Utah)
I worked on axions in models of cold dark matter and inflation.

2007 – 2011 — **Bachelor thesis researcher**, University of Bologna (Italy)
Advisors: Prof. Fiorenzo Bastianelli (Bologna U.), Prof. Paolo Gondolo (U. of Utah)
Bachelor thesis on neutrino flavour oscillations in curved space-time.

Participation in Research and Development Contracts

2020-today Horizon 2020 research and innovation programme, issued by the European Union under the Marie Skłodowska-Curie grant agreement No. 754496 (H2020-MSCA-COFUND-2016 FELLINI) "Tools for Axions, Leptogenesis, and Neutrino Theories". Principal Investigator: Dott. Luca Visinelli, 2020-2023. Approx. 52.000 EUR/year.

2019-2020 Dutch Research Council, contract No. 680.92.18.03 "The Hidden Universe of Weakly Interacting Particles", Principal Investigator: Prof. Paul De Jong (University of Amsterdam), 2018-2023. I took part as GRAPPA Fellow at University of Amsterdam.

2016-2019 Swedish Research Council, contract No. 638-2013-8993, Principal Investigator Prof. Katherine Freese (UT Austin and Stockholm University), 2014-2024. Approximately 10.000.000,00 EUR. I took part at Stockholm University and Uppsala University.

2015 EU FP7-SPACE "MyOcean followup", Principal Investigator Prof. Simona Masina (Research division director, Euro-Mediterranean Centre on Climate Changes), 2014-2015. 99.244,19 EUR. I participated as a post-doctoral researcher at CMCC.

2013-2014 EU FP7-SPACE "MyOcean2", Principal Investigator Prof. Simona Masina (Research division director, Euro-Mediterranean Centre on Climate Changes), 2012-2014. 464.980,00 EUR. I participated as a post-doctoral researcher at CMCC.

2013-2014 EU FP7-ENV "GEOCARBON", Principal Investigator Prof. Simona Masina (Research division director, Euro-Mediterranean Centre on Climate Changes), 2012-2014. 95.000,00 EUR. I participated as a post-doctoral researcher at CMCC.

Certifications

2020 **Abilitazione Scientifica Nazionale** a Professore di II fascia nel SC 02/A2 - Fisica Teorica delle Interazioni Fondamentali (valid over 09/11/2020-09/11/2029)

Grants and Fellowships Awarded

November 2020 **Tenure-track position** offered as Associate Professor at Shanghai Jiao Tong University, jointly with a Fellowship at the Tsung-Dao Lee Institute.

November 2020 Fellini Fellowship under Marie Sklodowska-Curie COFUND Action, 2020-2023.
Project: "Tools for Axions, Leptogenesis and Neutrino Theories (TALeNT)".
Approximately 52.000 EUR/year, to be spent at INFN Frascati.

July 2020 KIAS Assistant Professorship (Non-tenure track), Declined.

2007-2008 Award for PhD students abroad (26.318,70 EUR), University of Bologna

Fall 2006 Undergraduate Student Award (approx. 2.000 EUR), University of Bologna

Other Awards

Fall 2019 Tax Relief Award "Rientro dei Cervelli" (Brain Gain) issued by the Italian Government

Fall 2019 Tax Relief Award for highly skilled immigrants in the Netherlands

Fall 2016 Tax Relief Award for foreign key personnel in Sweden

Spring 2011 Outstanding Teaching Assistantship Award, The University of Utah.

2001-2002 Honorable Mention at the Italian Physics Olympiads.

Research in Physics

Topics Theoretical physics, astroparticle physics, and cosmology.
Sample talk: my presentation in Georgetown University (Washington D.C.) for the Vera Rubin Symposium, link: https://www.youtube.com/watch?v=iazE3tBg2cw

Interests Phenomenology of the physics beyond the Standard Model of particle physics

Statistics (INSPIRE) 39 articles, 32 JCR publications, 1400+ citations, 41.5 average citations per referred paper, **h-index=22** (as of November 28, 2020)

INSPIRE My article list on https://inspirehep.net

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Scopus 34168444500

Google Scholar https://scholar.google.it/citations

ArXiv My article list on https://arxiv.org

GIT Repository https://github.com/lucavisinelli

Teaching Experience

2017 Lecturer for FK5024 "Nuclear physics", Stockholm University, Stockholm (Sweden)

2015-2016 Lecturer for "Introductory Mathematics", Department of Political Sciences, University of Bologna (Italy)

2015 Teaching assistant in Mathematics for International Markets, Department of Economics, University of Bologna. Supervisor: Prof. Sabrina Mulinacci

2015 Teaching assistant for "Mathematics for Economics and Finance", Department of Economics, University of Bologna. Supervisor: Prof. Alessandra Giovagnoli

2010-2011 Teaching assistant for Physics 3740, "Special relativity and quantum mechanics", The University of Utah. Supervisors: Prof. Kyle Dawson and Prof. Jordan Gerton

2009 Teaching assistant for Physics 5020, "Electromagnetism", The University of Utah. Supervisor: Prof. Mikhail Raikh

2008 Teaching assistant for Physics 5010, "Classical and Quantum Mechanics", The University of Utah. Supervisor: Prof. Mikhail Raikh

Supervision and Mentoring

2019–today I am mentoring Ph.D. student Youjia Wu (University of Michigan).
Advisor: Katherine Freese; topics: dark matter physics and stellar formation.

2019–2020 I **supervised** Master student Nicklas Ramberg (Uppsala University), now at Mainz University. [LINK TO NICKLAS RAMBERG'S MASTER THESIS]

2018–2019 I have mentored Ph.D. student Irina Galstyan (Stockholm University).
Advisor: Katherine Freese; topics: neutrino detection.

2017 I have mentored Ph.D. student Janina Renk (Stockholm University).
Advisors: Katherine Freese, Joakim Edsjö; topics: stellar evolution with MESA.

Additional work experience

2015 **Editing work for JCAP and JHEP**, Sissa-Medialab publications, Trieste (Italy)

2015 – 2016 **High school teacher**, Private High School "M. Malpighi", Bologna (Italy)

2015 – 2016 **High school teacher**, Public High School "E. Majorana", Bologna (Italy)

2011 – 2016 **Private tutoring** in mathematics and physics for high school and university students.

2012 – 2013 **Quantitative Analyst**, Iason LTD, Milan www.iasonltd.com.
I have implemented a set of numerical codes aimed at pricing defaultable coupon bonds in C/C++, Matlab, Excel. My personal contribution has been cited in:
A. Castagna and F. Fede, *Measuring and Managing Liquidity Risk*, Wiley (2013).

2011 – 2012 **Editor for high-school mathbooks**, Zanichelli Editore.

Service in Editorial Boards

2020-2021 I am among the guest editors for the Special Issue of the journal Universe *"Dark Matter and Dark Energy: Particle Physics, Cosmology, and Experimental Searches"*, to be published in 2021. Link: www.mdpi-com/journal/universe/special_issues/DM_DE.

Academic Service

2017-2018 Nordita Postdoc Representative (Administrative position), Stockholm (Sweden).

2017-2018 Organising the bi-weekly "Beyond the Standard Model" Workgroup at Oskar Klein Centre, Stockholm (Sweden).

2016-Today Regular refereeing for Physical Review Letters (PRL), Physical Review D (PRD), Physics Letters B (PLB), Journal of Cosmology & Astroparticle Physics (JCAP), Modern Physics Letters A (MPLA), Universe.

Programming skills

Systems	Linux, UNIX, Mac OS, Microsoft.
Programming	Python, Fortran, C/C++, Visual Basic, Pascal, parallel computing with MPI.
Calculus	Mathematica, Matlab, R.
Databases	Maintenance of numerical codes using the GIT repository
Datasets	Manipulating large datasets in different format: NetCDF, ASCII, NCO, CDO.
Supercomputer	High performance computing (IBM iDataplex cluster "Athena", 7712 cores).
Text editor	Microsoft Office, LaTeX, Vi.
Software used	GALPROP, DarkSUSY, Gadget2, MESA, NEMO, BFM.

Languages

Italian	Mother tongue
English	Writing, Speaking, Listening. 2007- TOEFL English Certification. 2002 - University of Cambridge FCE, Bologna.

Articles published in peer-reviewed international journals

A complete list of my publications can be found at: http://inspirehep.net/author/profile/L.Visinelli.1

32. B. Carr, F. Kühnel, and **L. Visinelli**, *Constraints on Stupendously Large Black Holes*, Accepted on Mon. Not. Roy. Astron. Soc. [astro-ph/2008.08077] (2020).

31. L. Di Luzio, M. Giannotti, E. Nardi, and **L. Visinelli**, *The landscape of QCD axion models*, Physics Reports **1**, 870 [hep-ph/2003.01100] (2020).

30. S. Vagnozzi, C. Bambi, and **L. Visinelli**, *Concerns regarding the use of black hole shadows as standard rulers*, Class. Quant. Grav. **37**, 8 [gr-qc/2001.02986] (2020).

29. S. Vagnozzi, **L. Visinelli**, O. Mena, and D. Mota, *Do we have any hope of detecting scattering between dark energy and baryons through cosmology?*, Mon. Not. R. Astron. Soc. **493** 1, 1139 [gr-qc/1911.12374] (2020).

28. **L. Visinelli** and J. Redondo, *Axion Miniclusters in Modified Cosmological Histories*, Phys. Rev. D **101**, 023008 [hep-ph/1808.01879] (2020).

27. **L. Visinelli**, S. Vagnozzi, and U. Danielsson, *Revisiting a negative cosmological constant from low-redshift data*, Symmetry *11*(8), 1035, Special Issue [astro-ph/1907.07953] (2019).

26. T. Tenkanen and **L. Visinelli**, *Axion dark matter from Higgs inflation with an intermediate H_**, JCAP **1908**, 033 [astro-ph/1906.11837] (2019).

25. E. Di Valentino, R. Ferreira, **L. Visinelli**, and U. Danielsson, *Late time transitions in the quintessence field and the H_0 tension*, Phys. Dark Univ. **26**, 100385 [astro-ph/1906.11255] (2019).

24. C. Bambi, K. Freese, S. Vagnozzi, and **L. Visinelli**, *Testing the rotational nature of the supermassive object M87* from the circularity and size of its first image*, Phys. Rev. D **100**, 044057 [gr-qc/1904.12983] (2019).

23. S. Vagnozzi and **L. Visinelli**, *Hunting for extra dimensions in the shadow of M87**, Phys. Rev. D **100**, 024020 [gr-qc/1905.12421] (2019).

22. N. Ramberg and **L. Visinelli**, *Probing the Early Universe with Axion Physics and Gravitational Waves*, Phys. Rev. D **99**, 123513 [astro-ph/1904.05707] (2019).

21. W. H. Kinney, S. Vagnozzi, and **L. Visinelli**, *The Zoo Plot Meets the Swampland: Mutual (In)Consistency of Single-Field Inflation, String Conjectures, and Cosmological Data*, Class. Quant. Grav. **36**, 11 [astro-ph/1808.06424] (2019).

20. **L. Visinelli** and S. Vagnozzi, *Cosmological window onto the string axiverse and the supersymmetry breaking scale*, Phys. Rev. D **99**, 063517 [hep-ph/1809.06382] (2019).

19. S. Boucenna, F. Kühnel, T. Ohlsson, and **L. Visinelli**, *Novel Constraints on Mixed Dark-Matter Scenarios of Primordial Black Holes and WIMPs*, JCAP **1807**, 003 [hep-ph/1712.06383] (2018).

18. K. Freese, E. Sfakianakis, P. Stengel, and **L. Visinelli**, *The Standard Model Higgs Boson can delay Reheating in Inflation*, JCAP **1805**, 067 [hep-ph/1712.03791] (2018).

17. **L. Visinelli**, N. Bolis, and S. Vagnozzi, *Brane-world extra dimensions in light of GW170817*, Phys. Rev. D **97**, 064039 [gr-qc/1711.06628] (2018).

16. **L. Visinelli**, S. Baum, J. Redondo, K. Freese, F. Wilczek, *Dilute and dense axion stars*, Phys. Lett. B **777**, 64 [astro-ph/1710.08910] (2018).

15. **L. Visinelli**, *(Non-)thermal production of WIMPs during kination*, Symmetry **10**, 546 [astro-ph/1710.11006] (2018).

14. **L. Visinelli**, *Light axion-like dark matter must be present during inflation*, Phys. Rev. D **96**, 023013 [astro-ph/1703.08798] (2017).

13. S. Baum, **L. Visinelli**, K. Freese, and P. Stengel, *Dark matter capture, sub-dominant WIMPs, and neutrino observatories*, Phys. Rev. D **95**, 043007 [astro-ph/1611.09665] (2017).

12. **L. Visinelli**, *Observational Constraints on Monomial Warm Inflation*, JCAP **1607**, 054 [astro-ph/1605.06449] (2016).

11. **L. Visinelli**, *Condensation of Galactic Cold Dark Matter*, JCAP **1607**, 009 [hep-ph/1509.05871] (2016).

10. **L. Visinelli** and P. Gondolo, *Kinetic decoupling of WIMPs: analytic expressions*, Phys. Rev. D **91** 8, 083526 [astro-ph/1501.02233] (2015).

9. **L. Visinelli**, *Neutrino flavor oscillations in a curved space-time*, Gen. Rel. Grav. **47** 5, 62 [gr-qc/1410.1523] (2015).

8. **L. Visinelli**, *Cosmological perturbations for an inflaton field coupled to radiation*, JCAP **1501**, 005 [astro-ph/1410.1187] (2015).

7. **L. Visinelli**, S. Masina, M. Vichi, A. Storto, and T. Lovato, *Impacts of Data Assimilation on the Global Ocean Carbonate System*, Journal of Marine Systems **158**, 106 (2015).

6. **L. Visinelli**, S. Masina, M. Vichi, and A. Storto, *Impacts of Physical Data Assimilation on the Global Ocean Carbonate System*, Biogeosciences Discussions **11** (4), 5399-5441 (2014).

5. P. Gondolo and **L. Visinelli**, *Axion Cold Dark Matter in view of BICEP2 results*, Phys. Rev. Lett. **113**, 011802, Editor's Suggestion [hep-ph/1403.4594] (2014).

4. **L. Visinelli**, *Axion-Electromagnetic Waves*, MPLA **28**, 35 [physics.class-ph/1401.0709] (2013).

3. **L. Visinelli**, *Natural Warm Inflation*, JCAP **1109**, 013 [astro-ph/1107.3523] (2011).

2. **L. Visinelli** and P. Gondolo, *Axions Cold Dark Matter in Nonstandard Cosmologies*, Phys. Rev. D **81**, 063508 [astro-ph/0912.0015] (2010).

1. **L. Visinelli** and P. Gondolo, *Dark Matter Axions Revisited*, Phys. Rev. D **80**, 035024 [astro-ph/0903.4377] (2009).

Articles currently under review or recently accepted

6. T. Edwards, B. Kavanagh, **L. Visinelli**, and C. Weniger, *Transient Radio Signatures from Neutron Star Encounters with QCD Axion Miniclusters*, Submitted to Phys. Rev. Lett. [hep-ph/2011.05378] (2020).

5. B. Kavanagh, T. Edwards, **L. Visinelli**, and C. Weniger, *Stellar Disruption of Axion Miniclusters in the Milky Way*, Submitted to Phys. Rev. D [astro-ph/2011.05377] (2020).

4. T. Rindler-Daller, K. Freese, R. Townsend, and **L. Visinelli**, *Stability and Pulsation of the First Dark Stars*, Submitted to Mon. Not. Roy. Astron. Soc. [astro-ph/2011.00231] (2020).

3. A. Litsa, K. Freese, E. Sfakianakis, P. Stengel, and **L. Visinelli**, *Primordial non-Gaussianity from the Effects of the Standard Model Higgs during Reheating after Inflation*, Submitted to Phys. Rev. Lett. [hep-ph/2011.11649] (2020).

2. A. Litsa, K. Freese, E. Sfakianakis, P. Stengel, and **L. Visinelli**, *Large Density Perturbations from Reheating to Standard Model particles due to the Dynamics of the Higgs Boson during Inflation*, Submitted to Phys. Rev. D [hep-ph/2009.14218] (2020).

1. B. Carr, F. Kühnel, and **L. Visinelli**, *Black Holes and WIMPs: All or Nothing or Something Else*, Submitted to Mon. Not. Roy. Astron. Soc. [astro-ph/2011.01930] (2020).

Technical reports

1. D. Alesini *et al.* , *KLASH Conceptual Design Report*, ins-det/1911.02427 (2019).

Proceedings

2. **L. Visinelli**, *Analytic expressions for the kinetic decoupling of WIMPs*, Journal of Physics - Conference Series **718** [astro-ph/1601.00817] (2016).

1. **L. Visinelli** and P. Gondolo, *Axion Cold Dark Matter Revisited*, Journal of Physics - Conference Series **203** [astro-ph/0910.3941] (2010).

Articles in preparation

3. P. Brax, A. C. Davis, J. Sakstein, S. Vagnozzi, and **L. Visinelli**, *Solar Chameleons fit the XENON1T excess*, In preparation.

2. Y. Wu, S. Baum, K. Freese, **L. Visinelli**, and H. Yu, *Dark Stars with Self-Interacting dark matter*, In preparation.

1. E. di Valentino *et al.* , *Cosmology Intertwined White Paper*, In preparation.

Letters of Intent (contributed)

4. E. di Valentino *et al.* , *Cosmology Intertwined IV: The Age of the Universe and its Curvature*, astro-ph/2008.11286 (2020).

3. E. di Valentino *et al.* , *Cosmology Intertwined III: $f\sigma_8$ and S_8*, astro-ph/2008.11285 (2020).

2. E. di Valentino *et al.* , *Cosmology Intertwined II: The Hubble Constant Tension*, astro-ph/2008.11284 (2020).

1. E. di Valentino *et al.* , *Cosmology Intertwined I: Perspectives for the Next Decade*, astro-ph/2008.11283 (2020).

Articles unpublished

2. **L. Visinelli** and P. Gondolo, *An integral equation for distorted wave amplitudes*, [hep-ph/1007.2903] (2010).

1. **L. Visinelli** and P. Gondolo, *Neutrino Oscillations & Decoherence*, [hep-ph/0810.4132] (2008).

Outreach: Presenting science to popular audience

August 2020	Public lecture "Buchi neri e onde gravitazionali: La ricerca in Italia" (In Italian). Youtube links: PART 1 PART 2
March 2016	Public lecture "Capire le onde gravitazionali" (In Italian), Bologna.
November 2015	Public lecture "Physics for everybody!" (In Italian), Bologna.
February 2013	Public lecture "Galileo, father of the scientific method" (In Italian), Bologna.
April 2011	Public lecture "Dark Matters", The University of Utah, Math Department.

Workshop attendance

April 2017	The 5th MCTP Spring Symposium, Ann Arbor, MI (USA)
September 2014	Data Assimilation in Ocean Physics, Trieste (Italy)
June 2013	Advanced School on Data Assimilation, Bologna (Italy)
December 2009	Focus week on indirect dark matter search, IPMU Tokyo (Japan)

Visiting researcher

4/20–5/20 2019	University of Michigan (MI)
Apr 10–20 2019	Barry University (FL)
Jan 20–31 2019	INFN Frascati (IT)
May 1–15 2017	Perimeter Institute (CA)
Mar 6 –10 2017	Harvard University (MA)
Feb 25–30 2017	MIT (MA)
Jan–Feb 2017	University of Michigan (MI)

Invited talks

36. 11/04/20 Institute of Physics, Academia Sinica (TW), *Compact objects and dark matter*

35. 10/13/20 Undergraduate seminar, Colgate University (NY), *One dark matter candidate: the axion*

34. 06/04/20 International Institute of Physics, Natal (BR), *Radio and gravitational wave signals from cosmic axions* [*LINK to the YouTube video on the IIP channel: https://rb.gy/tsg0of*]

33. 05/11/20 Newton 1665 webinars series, *New physics out of the Shadow*
[*LINK to the YouTube video on the Newton1665 channel: https://www.youtube.com/watch?v=yCDUfzv8oKY*]

32. 04/29/20 Latin American Webinars (LAWphysics) series, *Astrophysics with axion stars and miniclusters*
[*LINK to the YouTube video on the LAWphysics channel: https://www.youtube.com/watch?v=ilfmBKMgyH8*]

31. 04/07/20 University of Texas at Austin (USA), *The future of light boson dark matter*

30. 03/02/20 DAMTP Institute of Astronomy, University of Cambridge (UK), *Light boson dark matter*

29. 12/20/19 National Institute Of Chemical Physics And Biophysics, Tallinn (ES), *Light boson dark matter*

28. 11/27/19 Fudan University, Shanghai (CHN), *Testing the rotational nature of the supermassive object M87**

27. 11/25/19 Shanghai Jiao Tong University, Shanghai (CHN), *Light bosons as dark matter candidates*

26. 11/07/19 Nordita, Stockholm (SE), *Testing the rotational nature of the supermassive object M87**

25. 05/21/19 INFN Frascati, Rome (IT), *Axion miniclusters and implications for axion detection*

24. 05/10/19 Wayne State University, MI (USA), *Probing the Early Universe with Axion Physics*

23. 05/01/19 Kavli Institute for Cosmological Physics, IL (USA), *Probing the Early Universe with Axions*

22. 04/30/19 Argonne National Laboratory, IL (USA), *Probing the Early Universe with Axions*

21. 04/25/19 University of Michigan, MI (USA), *The Quest for the Axion*

20. 04/17/19 Barry University, FL (USA), *Introduction to Cosmology and Particle Physics*

19. 04/12/19 University of Florida, FL (USA), *Probing the Early Universe with Axion Physics*

18. 04/04/19 IFIC, Valencia (ES), *Probing the Early Universe with Axions*

17. 01/08/19 SISSA, Trieste (IT), *The Cold Dark Matter axion and Axion Stars*

16. 10/23/18 Nikhef Amsterdam (NL), *The Quest for the Axion*

15. 11/30/18 INFN Frascati, Rome (IT), *Motivations for the search of light axions*

14. 10/23/18 University of Bologna (IT), *Searching for Axions and the String Axiverse in the Cosmo*

13. 10/18/18 INFN Frascati, Rome (IT), *Searching for Axions in the Lab and in the Cosmo*

12. 04/11/18 Latin American Webinars (LAWphysics) series, *The axion in cosmology and astrophysics*
[*LINK to the YouTube video on the LAWphysics channel: https://www.youtube.com/watch?v=YWqVpPrpLjw*]

11. 02/01/18 CEICO, Prague (CZ), *The Cold Dark Matter axion and Axion Stars*

10. 12/01/17 University of Turin (IT), *The Cold Dark Matter axion and Axion Stars*
9. 08/16/17 University of Oslo (NO), *Dark matter capture and neutrino observatories*
8. 06/15/17 University of Bologna (IT), *Dark matter capture and neutrino observatories*
7. 02/01/07 University of Michigan, MI (USA), *Axion cold dark matter, miniclusters, and axion stars*
6. 10/25/16 University of Helsinki (FI), *Axion cold dark matter, status and perspectives*
5. 01/21/16 University of Zaragoza (ES), *Axion cold dark matter, status and perspectives*
4. 06/03/13 CMCC Lecce (IT), *Impacts of Data Assimilation on the Global Ocean Carbonate System*
3. 06/15/11 University of Pisa (IT), *Axion cold dark matter in standard and non-standard cosmologies*
2. 10/12/10 University of New Mexico, NM (USA), *An integral equation for distorted-wave amplitudes*
1. 05/21/09 University of Bologna (IT), *Axion cold dark matter revisited*

Conference talks

27. 10/13-16/20 The 5th IBS-IFT-MultiDark Workshop, Institute for Basic Science (IBS), Daejeon (KR), *Recent and future developments of dark matter axion physics*
26. 09/24/20 CoCo 2020: Cosmology in Colombia, Bogotá (CO), *Constraints on Reheating to SM Particles due to Large Effective Higgs Boson Mass*
25. 08/24/20 Cosmology from Home, *Axion Miniclusters: Tidal Disruption and Radioastronomy*
24. 07/21/20 IDM2020, Zurich (CH), *The future of Axion Physics*
23. 09/2-6/19 TeVPA 2019, Sydney (AU), *Probing the Early Universe with Axion Physics*
22. 06/24-06/26 Vera Rubin Fest, Washington DC (USA), *Axions*
21. 06/10-14/19 Invisibles19, Valencia (ES), *Coordinating one of the panel discussion session*
20. 12/18/18 SLAP 2018, King's College London (UK), *The Cold Dark Matter axion and Axion Stars*
19. 12/11/18 The quest for New Physics, Instituto de Física Corpuscular (ES), *Axion Stars*
18. 09/05/18 Invisibles18 Workshop, Karlsruhe Institute of Technology (DE), *Dilute and dense axion stars*
17. 06/20/18 14th Patras Workshop, DESY Hamburg (DE), *The Higgs Boson can delay Reheating after Inflation*
16. 06/12/18 Preparing for Dark Matter Particle Discovery, Chalmers University of Technology, Goteborg (SE), *The Higgs Boson can delay Reheating after Inflation*
15. 03/07/18 Ultralight Dark Matter and Axions, University of Michigan (USA), *The parameter space of axion-like particles*
14. 02/22/18 UCLA Dark Matter 2018, UCLA (USA), *Axions in cosmology and astrophysics*
13. 08/31/17 DaνCO, CP^3 Origin (DK), *Axions and ALPs as the Cold Dark Matter*
12. 08/04/17 Self-interacting dark matter, Niels Bohr Institute (DK), *Sharpening Fuzzy Dark Matter*

11. 07/19/17 Advances in Theoretical Cosmology in Light of Data Nordita (SE), *Axion dark matter*
10. 12/06/16 Axion Dark Matter workshop, Nordita (SE), *Axion dark matter, miniclusters, and axion stars*
9. 08/12/16 IDM2016, Sheffield (UK), *Galactic Cold Dark Matter from First Principles*
8. 09/07/15 TAUP 2015, Turin (IT) *Analytical expressions for the kinetic decoupling of WIMPs*
7. 11/19/14 GEOCARBON Final Meeting, Paris (FR),
   Summary contribution to GEOCARBON from Land and Ocean Components
6. 07/08/14 NEMO Users Meeting, Grenoble (FR),
   Assimilation of Physical and Carbonate Data on the Global Ocean Carbonate System
5. 10/15/10 American Physical Society Four Corners Meeting, Ogden (USA),
   An integral equation for distorted-wave amplitudes
4. 07/13/10 PPC 2010 Conference, Turin (IT), *An integral equation for distorted-wave amplitudes*
3. 03/28/10 SnowPac & SnowCluster 2010, Alta (USA), *Axion dark matter in non-standard cosmologies*
2. 07/02/09 TAUP 2009, Rome (IT), *Axion cold dark matter revisited*
1. 10/20/07 American Physical Society Four Corners, Flagstaff (USA),
   Oscillation amplitude for neutrino wave packets

Other Experiences

May 2014 - September 2016 **Elected as Town Councilor**, *Comune di Loiano (Bologna)*, Italy.

September 2011 - March 2012 **Mathematics and Finance**, *Università di Bologna*, Italy.
Intensive six-months course on: Stochastic Calculus, Assessment of Financial Risk, Computational Finance, Application of Big Data to Finance, Interest Rates and Risk

Other Interests

Music I play both electric and classical guitar. I have played in several groups spanning different styles (blues, rock, metal).

Sport I have practiced Chinese Martial Arts (Wushu) for several years. I train regularly.

Books I usually read during holidays, especially science fiction and historical reconstructions.

References (currently writing letters for my profile)

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Autorizzo il trattamento dei miei dati personali presenti nel curriculum vitae ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 e del GDPR (Regolamento UE 2016/679).

November 28, 2020 Luca Visinelli