Elenco Pubblicazioni Trasmesse dal candidato Giorgio Arcadi

1. Giorgio Arcadi, Piero Ullio ; *Accurate estimate of the relic density and kinetic decoupling in non thermal Dark Matter Models*; **Phys. Rev. D84 (2011) 043520;**
2. Giorgio Arcadi, Laura Covi; *Minimal Decaying Dark Matter and the LHC;* **JCAP 1308 (2013) 005;**
3. Giorgio Arcadi, Yann Mambrini, Michel Tytgat, Bryan Zaldivar ;*Invisible Z' and Dark Matter: LHC vs LUX constraints;* **JHEP 1403 (2014) 003;**
4. Asmaa Abada, Giorgio Arcadi, Michele Lucente; *Dark Matter in the Minimal Inverse Seesaw Mechanism*; **JCAP 1410 (2014) 001;**
5. Giorgio Arcadi, Laura Covi, Federico Dradi; *LHC Prospects for Minimal Decaying Dark Matter;* **JCAP 1410 (2014), 063;**
6. Giorgio Arcadi, Yann Mambrini, Francois Richard; *Z-portal Dark Matter;* **JCAP 1503 (2015) 018;**
7. Asmaa Abada, Giorgio Arcadi, Valerie Domcke, Michele Lucente; *Lepton Number Violation as a key to low scale leptogenesis;* **JCAP 1511 (2015) 041 ;**
8. Giorgio Arcadi, Abdelhak Djouadi, Yann Mambrini; *The LHC diphoton resonance and dark matter;* **Phys. Lett. B755 (2016) 426-432.**
9. Giorgio Arcadi, Pradipta Ghost, Yann Mambrini, Mathias Pierre; *Re-opening dark matter windows compatible with a diphoton excess;* **JCAP 1607 (2016), 005.**
10. Giorgio Arcadi, Christian Gross, Oleg Lebedev, Yann Mambrini, Stefan Pokorski, Takashi Toma; *Multicomponent Dark Matter from Gauge Symmetry;* **JHEP 1612 (2016) 081.**

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11. Andrei Angelescu, Giorgio Arcadi; *Dark Matter Phenomenology of SM and Enlarged Higgs Sectors Extended with Vector Like Leptons;* **Eur. Phys. J. C77 (2017), 456.**

12. Alexandre Alves, Giorgio Arcadi, Yann Mambrini, Stefano Profumo, Farinaldo Queiroz; *Augury of Darkness: the low mass Z' portal*; **JHEP 1704 (2017) 164.**

Data

HEIDELBERG
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Firma

Giorgio Arcadi

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Daniele Barducci

Scuola Internazionale Superiore di Studi Avanzati (SISSA)

www.lib.sissa.it 12/09/18

Elenco 12 pubblicazioni presentate

[1] *Exploring Drell-Yan signals from the 4D Composite Higgs Model at the LHC*
D. Barducci, A. Belyaev, S. De Curtis, S. Moretti and G. M. Pruna
JHEP 1304 (2013) 152, arXiv:1210.2927 [hep-ph]
DOI: 10.1007/JHEP04(2013)152

[2] *The 4-Dimensional Composite Higgs Model (4DCHM) and the 125 GeV Higgs-like signals at the LHC*
D. Barducci, A. Belyaev, M.S. Brown, S. De Curtis, S. Moretti and G.M. Pruna
JHEP 1309 (2013) 047, arXiv:1302.2371 [hep-ph]
DOI: 10.1007/JHEP09(2013)047

[3] *Towards Model-independent approach to the analysis of interference effects in pair production of new heavy quarks*
D. Barducci, A. Belyaev, J. Blamey, S. Moretti, L. Panizzi and H. Prager
JHEP 1407 (2014) 142, arXiv:1311.3977 [hep-ph]
DOI: 10.1007/JHEP07(2014)142

[4] *Framework for Model Independent Analyses of Multiple Extra Quark Scenarios*
D. Barducci, M. Buchkremer, A. Belyaev, G. Cacciapaglia, A. Deandrea, S. De Curtis, J. Marrouche, S. Moretti and L. Panizzi
JHEP 1412 (2014) 080, arXiv:1405.0737 [hep-ph]
DOI: 10.1007/JHEP12(2014)080

[5] *Uncovering Natural Supersymmetry via the interplay between the LHC and Direct Dark Matter Detection*
D. Barducci, A. Belyaev, A. Bharucha, W. Porod and V. Sanz
JHEP 1507 (2015) 066, arXiv:1504.02472 [hep-ph]
DOI: 10.1007/JHEP07(2015)066

[6] *Top pair production at a future e^+e^- machine in a composite Higgs scenario*
D. Barducci, S. De Curtis, S. Moretti and G.M. Pruna
JHEP 1508 (2015) 127, arXiv:1504.05407 [hep-ph]
DOI: 10.1007/JHEP08(2015)127

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[7] *Status and prospects of the nMSSM after LHC Run-1*
D. Barducci, G. Bélanger, C. Hugonie and A. Pukhov
JHEP 1601 (2016) 050, arXiv:1510.00246 [hep-ph]
DOI: 10.1007/JHEP01(2016)050

[8] *One jet to rule them all: monojet constraints and invisible decays of a 750 GeV diphoton resonance*
D. Barducci, A. Goudelis, S. Kulkarni and D. Sengupta
JHEP 1605 (2016) 154, arXiv:1512.06842 [hep-ph]
DOI: 10.1007/JHEP05(2016)154

[9] *Implications of a High-Mass Diphoton Resonance for Heavy Quark Searches*
S. Banerjee, D. Barducci, G. Bélanger and C. Delaunay
JHEP 1611 (2016) 154 , arXiv:1606.09013 [hep-ph]
DOI: 10.1007/JHEP11(2016)154

[10] *Monojet searches for momentum-dependent dark matter interactions*
D. Barducci, A. Bharucha, N. Desai, M.Frigerio, B. Fuks, A. Goudelis, S. Kulkarni, G. Polesello and D. Sengupta
JHEP 1701 (2017) 078, arXiv:1609.07490 [hep-ph]
DOI: 10.1007/JHEP01(2017)078

[11] *Constraints on top quark non-standard interactions from Higgs and $t\bar{t}$ production cross sections*
D. Barducci, M. Fabbrichesi and A. Tonero
Phys. Rev. D96 (2017) 7 075022, arXiv:1704.05478
DOI: 10.1103/PhysRevD.96.075022

[12] *Cornering pseudoscalar-mediated dark matter with the LHC and cosmology*
S. Banerjee, D. Barducci, G. Bélanger, B. Fuks, A. Goudelis and B. Zaldivar
JHEP 1707 (2017) 080, arXiv:1705.02327
DOI: 10.1007/JHEP07(2017)080

+ Tesi di dottorato

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29/2/18

Stefano Gariazzo

List of selected Publications

Last update: 04/02/2018

Stefano Gariazzo

Publications

A complete list of my publications can be found at:
`http://inspirehep.net/author/profile/Stefano.Gariazzo.1`

Reviews

[R1] **S. Gariazzo**, C. Giunti, M. Laveder, Y. F. Li, E. M. Zavanin.
"Light sterile neutrinos".
J. Phys. G 43 (2016), p. 033001. DOI: 10.1088/0954-3899/43/3/033001.
arXiv: 1507.08204 [hep-ph].

Articles

[A1] **S. Gariazzo**, C. Giunti, M. Laveder.
"Light Sterile Neutrinos in Cosmology and Short-Baseline Oscillation Experiments".
JHEP 11 (2013), p. 211. DOI: 10.1007/JHEP11(2013)211.
arXiv: 1309.3192 [hep-ph].

[A2] M. Archidiacono, N. Fornengo, **S. Gariazzo** et al.
"Light sterile neutrinos after BICEP-2".
JCAP 06 (2014), p. 031. DOI: 10.1088/1475-7516/2014/06/031.
arXiv: 1404.1794 [astro-ph.CO].

[A3] **S. Gariazzo**, C. Giunti, M. Laveder.
"Light Sterile Neutrinos and Inflationary Freedom".
JCAP 04 (2015), p. 023. DOI: 10.1088/1475-7516/2015/04/023.
arXiv: 1412.7405 [astro-ph.CO].

[A4] E. Di Valentino, **S. Gariazzo**, E. Giusarma, O. Mena.
"Robustness of cosmological axion mass limits".
Phys. Rev. D 91 (2015), p. 123505. DOI: 10.1103/PhysRevD.91.123505.
arXiv: 1503.00911 [astro-ph.CO].

[A5] E. Di Valentino, **S. Gariazzo**, M. Gerbino, E. Giusarma, O. Mena.
"Dark Radiation and Inflationary Freedom after Planck 2015".
Phys. Rev. D 93 (2016), p. 083523. DOI: 10.1103/PhysRevD.93.083523.
arXiv: 1601.07567 [astro-ph.CO].

[A6] R. Murgia, **S. Gariazzo**, N. Fornengo.
"Constraints on the Coupling between Dark Energy and Dark Matter from CMB data".
JCAP 04 (2016), p. 014. DOI: 10.1088/1475-7516/2016/04/014.
arXiv: 1602.01765 [astro-ph.CO].

[A7] M. Archidiacono, **S. Gariazzo**, C. Giunti et al.
"Pseudoscalar–sterile neutrino interactions: reconciling the cosmos with neutrino oscillations".
JCAP 08 (2016), p. 067. DOI: 10.1088/1475-7516/2016/08/067.
arXiv: 1606.07673 [astro-ph.CO].

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[A8] R. Diamanti, S. Ando, **S. Gariazzo**, O. Mena, C. Weniger.
"Cold dark matter plus not-so-clumpy dark relics".
JCAP 06 (2017), p. 008. DOI: 10.1088/1475-7516/2017/06/008.
arXiv: 1701.03128 [astro-ph.CO].

[A9] **S. Gariazzo**, C. Giunti, M. Laveder, Y. F. Li.
"Updated Global 3+1 Analysis of Short-BaseLine Neutrino Oscillations".
JHEP 06 (2017), p. 135. DOI: 10.1007/JHEP06(2017)135.
arXiv: 1703.00860 [hep-ph].

[A10] **S. Gariazzo**, M. Escudero, R. Diamanti, O. Mena.
"Cosmological searches for a non-cold dark matter component".
Phys. Rev. D 96 (2017), p. 043501. DOI: 10.1103/PhysRevD.96.043501.
arXiv: 1704.02991 [astro-ph.CO].

[A11] P. F. de Salas, **S. Gariazzo**, J. Lesgourgues, S. Pastor.
"Calculation of the local density of relic neutrinos".
JCAP 09 (2017), p. 034. DOI: 10.1088/1475-7516/2017/09/034.
arXiv: 1706.09850 [astro-ph.CO].

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LISTA DELLE PUBBLICAZIONI DI FEDERICA GIACCHINO

1) F. Giacchino, L. Lopez-Honorez and M.H.G. Tytgat,
   Scalar Dark Matter Models with Significant Internal Bremsstrahlung
   JCAP 1310(2013)025
2) F. Giacchino, L. Lopez-Honorez and M.H.G. Tytgat,
   Bremsstrahlung and Gamma-Ray Lines in 3 Scenarios of Dark Matter Annihilation
   JCAP 08(2014)04
3) F.Giacchino, A. Ibarra, L. Lopez-Honorez, M.H.G. Tytgat and S. Wild,
   Signatures from Scalar Dark Matter with a Vector-like Quark Mediator
   JCAP 1602(2016)002
4) PhD Thesis F. Giacchino
   A Dark Matter Through the Vector-like Portal
   September 22nd, 2017

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Elenco Pubblicazioni e Tesi | Martin B. Krauss

Tesi di dottorato

"Testing Models with Higher Dimensional Effective Interactions at the LHC and Dark Matter Experiments", MBK, Würzburg University, Germany, 2013 (137 fogli)

Journal articles

arXiv:1712.07969 *submitted to journal*	*"Compatibility of a dark matter discovery at XENONnT/LZ with the WIMP thermal production mechanism"* R. Catena, J. Conrad, MBK (16 fogli)
arXiv:1709.06051 *submitted to Phys. Rev. D*	*"Determining dark matter properties with a XENONnT/LZ signal and LHC-Run3 mono-jet searches"* S. Baum, R. Catena, J. Conrad, K. Freese, MBK (16 fogli)
Phys.Rev. D97 (2018), 023007 arXiv:1706.09471	*"Dark matter spin determination with directional direct detection experiments"* R. Catena, J. Conrad, C. Döring, A. D. Ferella, MBK (12 f.ogli)
Phys.Lett. B755 (2016), 168 arXiv:1511.02524	*"Dark Matter from the Vector of SO(10)"* Sofiane M. Boucenna, MBK, Enrico Nardi (9 fogli)
Phys.Lett. B748 (2015), 191 arXiv:1503.01119	*"Minimal Asymmetric Dark Matter"* Sofiane M. Boucenna, MBK, Enrico Nardi (8 fogli)
JHEP 1402 (2014), 056 arXiv:1312.0009	*"Higher Dimensional Effective Operators for Direct Dark Matter Detection"* MBK, Stefano Morisi, Werner Porod, Walter Winter (22 fogli)
JHEP 1305 (2013), 121 arXiv:1301.4221	*"Neutrino Mass from d=7 Effective Operators in a SUSY-GUT Framework"* MBK, Davide Meloni, Werner Porod, Walter Winter (20 fogli)
Phys.Rev. D84 (2011), 115023 arXiv:1109.4636	*"Neutrino mass from higher than d=5 effective operators in SUSY, and its test at the LHC"* MBK, Toshihiko Ota, Werner Porod, Walter Winter (14 fogli)

Proceedings

Frascati Phys.Ser. 59 (2014), 37	*"Testing Models with Higher Dimensional Effective Interactions at the LHC and Dark Matter Experiments"* *MBK (6 fogli)*
J.Phys.Conf.Ser. 447 (2013), 012039	*"Proceedings of 3rd Symposium on Prospects in the Physics of Discrete Symmetries (DISCRETE 2012)"* Branco, et al. (8 fogli)

Göteborg (Svezia), 13 febbraio 2018

(Firma)

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Elenco delle publicazioni e della tesi di dottorato

- **Slepton Non-Universality in the Flavor-Effective MSSM**
  M.L. López-Ibáñez, Aurora Melis, M. Jay Pérez, Óscar Vives.
  Journal of High Energy Physics, JHEP11(2017) 162
  ArXiv EPrint: https://arxiv.org/abs/1710.02593

- **Higgs and flavour phenomenology at the LHC era**
  PhD dissertation by M.L. López-Ibáñez under the supervision of Óscar Vives.
  http://roderic.uv.es/handle/10550/56822

- **Effective Theories of Flavor and the Non-Universal MSSM**
  Dipankar Das, M.L. López-Ibáñez, M. Jay Pérez, Oscar Vives.
  Phys. Rev. D95 (2017) 035001
  ArXiv EPrint: https://arxiv.org/abs/1607.06827

- **The 125 GeV Higgs boson as the lightest Higgs in a general MSSM model with explicit CP-violation**
  M.L. López-Ibáñez
  Proceedings, 37th International Conference on High Energy Physics (ICHEP 2014). Nucl. Part. Phys. Proc., 273-275 (2016) 522-527.
  http://www.sciencedirect.com/science/article/pii/S2405601415005660

- **Flavor-changing Higgs boson decays into bottom and strange quarks in supersymmetric models**
  G. Barenboim, C. Bosh, J. S. Lee, M.L. López-Ibáñez and O. Vives
  Phys. Rev. D.92, 095017 (2015)
  ArXiv EPrint: https://arxiv.org/abs/1507.08304

- **Improved τ-weapons for Higgs hunting**
  G. Barenboim, C. Bosch, M.L. López-Ibáñez and O. Vives
  Phys. Rev. D.90, 015003 (2014)
  ArXiv EPrint: https://arxiv.org/abs/1311.7321

- **Eviction of a 125 GeV heavy-Higgs from the MSSM**
  G. Barenboim, C. Bosh, M.L. López-Ibáñez and O. Vives
  Journal of High Energy Physics, JHEP11(2013) 051
  ArXiv EPrint: https://arxiv.org/abs/1307.5973

Data: 22.02.2018 Firma:

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ELENCO DELLE PUBBLICAZIONI TRASMESSE

1
Identification of a Gravitational Arrow of Time
Julian Barbour, Tim Koslowski, Flavio Mercati
Phys. Rev. Lett. 113, 181101 (2014) (Editor's suggestion)
doi: 10.1103/PhysRevLett.113.181101
citazioni (Google Scholar): 44

2
Taming nonlocality in theories with deformed Poincaré symmetry
Giovanni Amelino-Camelia, Marco Matassa, Flavio Mercati, Giacomo Rosati
Phys. Rev. Lett. 106 071301 (2011)
doi: 10.1103/PhysRevLett.106.071301
citazioni (Google Scholar): 72

3
Constraining the energy-momentum dispersion relation with Planck-scale sensitivity using cold atoms
Giovanni Amelino-Camelia, Claus Lämmerzahl, Flavio Mercati, Guglielmo M. Tino
Phys. Rev. Lett. 103, 171302 (2009)
doi: 10.1103/PhysRevLett.103.171302
citazioni (Google Scholar): 87

4
Relative Locality in κ-Poincaré
Giulia Gubitosi, Flavio Mercati
Class. Quant. Grav. 30, 145002 (2013)
doi: 10.1088/0264-9381/30/14/145002
citazioni (Google Scholar): 64

5
The gravity/CFT correspondence
Henrique Gomes, Sean Gryb, Tim Koslowski, Flavio Mercati
Eur. Phys. J. C73, 2275 (2013)
doi: 10.1140/epjc/s10052-013-2275-3
citazioni (Google Scholar): 23

6
A no-pure-boost uncertainty principle from spacetime noncommutativity
Giovanni Amelino-Camelia, Giulia Gubitosi, Antonino Marcianò, Pierre Martinetti, Flavio Mercati
Phys. Lett. B671, 298–302 (2009)
doi: 10.1016/j.physletb.2008.12.032
citazioni (Google Scholar): 29

7
Noether analysis of the twisted Hopf symmetries of canonical noncommutative spacetimes
Giovanni Amelino-Camelia, Fabio Briscese, Giulia Gubitosi, Antonino Marcianò, Pierre Martinetti, Flavio Mercati
Phys. Rev. D78, 025005 (2008)

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doi: 10.1103/PhysRevD.78.025005
citazioni (Google Scholar): 28

8
Probing the quantum-gravity realm with slow atoms
Flavio Mercati, Diego Mazon, Giovanni Amelino-Camelia, Jose Manuel Carmona, Jose Luis Cortes, Javier Indurain, Claus Lämmerzahl, Guglielmo M. Tino
Class. Quant. Grav. 27 215003 (2010)
doi: 10.1088/0264-9381/27/21/215003
citazioni (Google Scholar): 31

9
Relativistic kinematics beyond special relativity
Jose Manuel Carmona, Jose Luis Cortes, Flavio Mercati
Phys. Rev. D 86, 084032 (2012)
doi: 10.1103/PhysRevD.86.084032
citazioni (Google Scholar): 20

10
Modifications to Lorentz invariant dispersion in relatively boosted frames
Uri Jacob, Flavio Mercati, Giovanni Amelino-Camelia, Tsvi Piran
Phys. Rev. D82, 084021 (2010)
doi: 10.1103/PhysRevD.82.084021
citazioni (Google Scholar): 46

11
Minimal length in quantum space and integrations of the line element in Noncommutative Geometry
Pierre Martinetti, Flavio Mercati, Luca Tomassini
Rev. Math. Phys. 24, 1250010 (2012)
doi: 10.1142/S0129055X12500109
citazioni (Google Scholar): 24

12
Discreteness of area in noncommutative space
Giovanni Amelino-Camelia, Giulia Gubitosi, Flavio Mercati,
Phys. Lett. B 676, 180-183 (2009)
doi: 10.1103/PhysRevD.84.085010
citazioni (Google Scholar): 17

Roma, 22 Dicembre 2017

Flavio Mercati

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Elenco delle pubblicazioni allegate

Luca Panizzi

Tesi di dottorato dal titolo: *"One-Loop Electroweak Analysis for Third Family Scalar Quarks Production at LHC"*.

L'elenco completo delle mie pubblicazioni è documentato nel CV. Il seguente elenco delle pubblicazioni il cui testo è allegato alla domanda è in ordine cronologico.

1. G. Cacciapaglia, R. Chierici, A. Deandrea, L. Panizzi, S. Perries, S. Tosi, "Four tops on the real projective plane at LHC," JHEP **1110** (2011) 042, DOI: 10.1007/JHEP10(2011)042. arXiv:1107.4616 [hep-ph], https://arxiv.org/abs/1107.4616
2. G. Cacciapaglia, A. Deandrea, N. Gaur, D. Harada, Y. Okada and L. Panizzi, "Heavy Vector-like Top Partners at the LHC and flavour constraints," JHEP **1203** (2012) 070, DOI: 10.1007/JHEP03(2012)070. arXiv:1108.6329 [hep-ph], https://arxiv.org/abs/1108.6239
3. G. Cacciapaglia, A. Deandrea, L. Panizzi, "Superluminal neutrinos in long baseline experiments and SN1987a," JHEP **1111** (2011) 137, DOI: 10.1007/JHEP11(2011)137. arXiv:1109.4980 [hep-ph], https://arxiv.org/abs/1109.4980
4. Y. Okada and L. Panizzi, "LHC signatures of vector-like quarks," Adv. High Energy Phys. **2013** (2013) 364936, DOI: 10.1155/2013/364936. arXiv:1207.5607 [hep-ph], https://arxiv.org/abs/1207.5607
5. G. Cacciapaglia, A. Deandrea, J. Ellis, J. Marrouche and L. Panizzi, "LHC Missing-Transverse-Energy Constraints on Models with Universal Extra Dimensions," Phys. Rev. D **87** (2013) 075006, DOI: 10.1103/PhysRevD.87.075006. arXiv:1302.4750 [hep-ph], https://arxiv.org/abs/1302.4750
6. M. Buchkremer, G. Cacciapaglia, A. Deandrea and L. Panizzi, "Model Independent Framework for Searches of Top Partners," Nucl. Phys. B **876** (2013) 376, DOI: 10.1016/j.nuclphysb.2013.08.010. arXiv:1305.4172 [hep-ph], https://arxiv.org/abs/1305.4172
7. D. Barducci, S. Belyaev, M. Buchkremer, G. Cacciapaglia, A. Deandrea, S. De Curtis, J. Marrouche, S. Moretti and L. Panizzi, "Framework for Model Independent Analyses of Multiple Extra Quark Scenarios," JHEP **1412** (2014) 080, DOI: 10.1007/JHEP12(2014)080. arXiv:1405.0737 [hep-ph], https://arxiv.org/abs/1405.0737
8. S. F. King, A. Merle and L. Panizzi, "Effective theory of a doubly charged singlet scalar: complementarity of neutrino physics and the LHC," JHEP **1411** (2014) 124, DOI: 10.1007/JHEP11(2014)124. arXiv:1406.4137 [hep-ph], https://arxiv.org/abs/1406.4137
9. G. Cacciapaglia, A. Deandrea, N. Gaur, D. Harada, Y. Okada and L. Panizzi, "Interplay of vector-like top partner multiplets in a realistic mixing set-up," JHEP **1509** (2015) 012, DOI: 10.1007/JHEP09(2015)012. arXiv:1502.00370 [hep-ph], https://arxiv.org/abs/1502.00370
10. S. Kraml, U. Laa, L. Panizzi and H. Prager, "Scalar versus fermionic top partner interpretations of $t\bar{t} + E_T^{\rm miss}$ searches at the LHC," JHEP **1611** (2016) 107, DOI: 10.1007/JHEP11(2016)107. arXiv:1607.02050 [hep-ph], https://arxiv.org/abs/1607.02050
11. A. Belyaev, L. Panizzi, A. Pukhov and M. Thomas, "Dark Matter characterization at the LHC in the Effective Field Theory approach," JHEP **1704** (2017) 110, DOI:10.1007/JHEP04(2017)110. arXiv:1610.07545 [hep-ph], https://arxiv.org/abs/1610.07545
12. S. Moretti, D. O'Brien, L. Panizzi and H. Prager, "Production of extra quarks at the Large Hadron Collider beyond the Narrow Width Approximation," Phys. Rev. D **96** (2017) no.7, 075035, DOI:10.1103/PhysRevD.96.075035 arXiv:1603.09237 [hep-ph], https://arxiv.org/abs/1603.09237.

15/02/2018

www.phdthesis.it 2018

Erica Vagnoni

List of publications, Ph.D. Thesis and titles

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Personal details

First name
Surname
Birth place
Nationality
Date of birth
Age
Gender
Mobile Phone
Email

Titles

2014 - 2016 **Ph.D.**, *Physics.*
Università degli Studi Roma Tre, Rome, Italy.
Thesis: *Theoretical description and reconstruction of neutrino interactions, and systematic uncertainties of long-baseline oscillation experiments.*
Advisors: Dr. Davide Meloni and Prof. Omar Benhar.

2011 - 2013 **Laurea Magistrale (Master of Science)**, *Physics*, 110/110 *cum laude*, 22/10/2013.
Sapienza Università di Roma, Rome, Italy.
Thesis: *Effetti nucleari nelle oscillazioni di neutrini.*
Advisors: Prof. Omar Benhar and Dr. Davide Meloni.

Scientific Publications

1. A. M. Ankowski, O. Benhar, P. Coloma, P. Huber, C.-M. Jen, C. Mariani, D. Meloni and E. Vagnoni, *Comparison of the calorimetric and kinematic methods of neutrino energy reconstruction in disappearance experiments.* Phys. Rev. **D92**, 073014 (2015).
2. A. M. Ankowski, P. Coloma, P. Huber, C. Mariani, and E. Vagnoni, *Missing energy and the measurement of the CP-violating phase in neutrino oscillations.* Phys. Rev. **D92**, 091301 (2015).
3. A. M. Ankowski, O. Benhar, P. Coloma, P. Huber, C.-M. Jen, C. Mariani, D. Meloni and E. Vagnoni, *Neutrino energy reconstruction in disappearance experiments with calorimetric and kinematic methods.* Nuovo Cim. **C39**, 233 (2016).
4. A. M. Ankowski, O. Benhar, C. Mariani, and E. Vagnoni, *Effect of the 2p-2h cross-section uncertainties on an analysis of neutrino oscillations.* Phys. Rev. **D93**, 113004 (2016).
5. E. Vagnoni, *Neutrino energy reconstruction in long-baseline experiments.* `arXiv:1604.08392` (2016).
6. E. Vagnoni, O. Benhar and D. Meloni, *Inelastic Neutrino-Nucleus Interactions within the Spectral Function Formalism.* Phys. Rev. Lett. **118**, 142502 (2017)

Ph.D. Thesis

Theoretical description and reconstruction of neutrino interactions, systematic uncertainties of long-baseline oscillation experiments.
Università degli Studi Roma Tre, Rome, Italy.
Advisors: Dr. Davide Meloni and Prof. Omar Benhar.

Autorizzo il trattamento dei dati personali contenuti nel mio curriculum vitae in base art. 13 del D. Lgs. 196/2003

Luogo e data

Roma, 18/02/18

Firma del dichiarante

Erica Vagnini

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CV Giorgio Arcadi

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Titoli di Studio:

2006: Laurea Triennale (equivalente a Bachelor Degree) in Fisica
Università degli studi di L'Aquila, L'Aquila, Italia.
Titolo delle tesi: *Instabilità nel problema della doppia buca di potenziale.*
Relatore: Prof. Alessandro Teta.
Voto: 110/110 cum laude.
2008: Laurea Specialistica (equivalente a Master Degree) 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.
Titolo ottenuto il 20-09-2012.
Titolo della Testi: *Interplay between Generation Mechanisms and Detection of SuperSymmetric Dark Matter in the LHC Era.*

Carriera (Posizione attule inclusa)

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-in corso *Postdoc* at MPIK (Max Planck Institut fur Kernphysik) Heidelberg, Germany

Periodi di visita (di durata uguale o superiore ad un mese)

Jun 2013 **Laboratoire Physique Theorieque, University Paris Sud, Orsay (Paris).**
Nov 2013 **Cern (Ginevra).**

Lista delle Pubblicazioni

[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, R. Catena, P. Ullio, *Dark Matter Signals at LHC: forecast from ton scale direct detection experiments*, arXiv:1211.5159 [hep-ph].
[5] G. Arcadi, L. Covi, *Minimal Decaying Dark Matter and the LHC*, arXiv:1305.6587 [hep-ph], **JCAP 1308 (2013) 005.**
[6] 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.**
[7] 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.**
[8] A. Abada, G. Arcadi, M. Lucente, *Dark Matter in the Minimal Inverse See-Saw mechanism*, arXiv:1406.6556 [hep-ph], **JCAP 10(2014) 001.**
[9] G. Arcadi, L. Covi, F. Dradi, *LHC prospects for minimal decaying Dark Matter*, arXiv:1408.1005 [hep-ph], **JCAP 1410(2014)10, 063.**
[10] F. Richard, G. Arcadi, Y. Mambrini, *Search for Dark Matter at colliders*, arXiv:1411.0088 [hep-ex], **Eur.Phys.J. C75 (2015) 4, 171.**
[11] G. Arcadi, Y. Mambrini, F. Richard, *Z-portal Dark Matter*, arXiv:1411.2985 [hep-ph], **JCAP1503 (2015) 03, 018.**
[12] 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.**
[13] G. Arcadi, L. Covi, M. Nardecchia, *Gravitino Dark Matter and low-scale Baryogenesis*, arXiv:1507.05584 [hep-ph], **Phys. Rev. D92 (2015), 115006.**
[14] 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.**
[15] G. Arcadi, Abdelhak Djouadi, Y. Mambrini, *The LHC diphoton resonance and dark matter*, arXiv: 1512.04913 [hep-ph], **Phys. Lett. B755 (2016), 426-432.**
[16] 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.**
[17] 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**
[18] 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**

www.gianarcadi.wordpress.com

[19] 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**
[20] 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**
[21] 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**
[22] 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**
[23] 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
[24] 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**
[25] 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 (2017), 196-205**
[26] G. Arcadi, P. Ghosh, Y. Mambrini, M. Pierre, F. S. Queiroz, *Z' portal to Chern-Simons Dark Matter*, 1706.04198, **JCAP 1711 (2017), 020**
[27] 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**
[28] 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.**
[29] G. Arcadi, M. Lindner, F. S. Queiroz, W. Rodejohann, S. Vogl, *Pseudoscalar Mediators:a WIMP model at the Neutrino Floor*,arXiv:1711.02110.
[30] G. Arcadi, C. P. Ferreira, F. Goertz, M. M. Guzzo, F. S. Queiroz, A.C.O. Santos, *Lepton Flavor Violation Induced by Dark Matter*, arXiv:1712.02373.

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.**

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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.**

Talk a conferenze e seminari

Feb 22, 2018 Seminario, *Renormalizable Models for Portals between the Dark Matter and the Higgs Sector,* LUPM, Montpellier, France.
Aug 31, 2017 Seminario, *WIMP Dark Matter and Portals,* Galileo Galilei Institute, Florence, Italy
Giu 22, 2017 Talk, *Probing the WIMP paradigm at future experiments,* Pascos2017 Conference, Madrid (Spagna)
Mag 25, 2017 Talk, *Augury of Darkness,* Planck2017 Conference, Varsavia (Polonia)
Mag 16, 2017 Seminario, *Probing Wimp Paradigm with Direct Detection and Collider,* ITP Heidelberg (Germania)
Feb 27, 2017 Seminairo, *Theoretical Models for Dark Matter,* IFT Madrid (Spain)
Dec 14, 2016 Seminario, *Evading Direct Detection Constraints in Theoretically Motivated WIMP Scenarios,* University of Goettingen (Germany)
Nov 11, 2016 Talk, *Dark Matter Beyond (Simple) Wimps,* Theorie LHC France Workshop, IPN Orsay (France)
Sep 01, 2016 Talk, *Diphoton resonance and Dark Matter,* Higgs Hunting Conference, LPTHE Paris (France)
Jul 18, 2016 Seminario, *Direct Detection Prospects of Single- and Multi-Component Dark Portals,* MPIK Heidelberg (Germany)
Jun 23, 2016 Talk, *Impact of next future Direct Detection Experiments on Dark Portals,* RICAP2016 Conference, Villa Tuscolana, Frascati (Italy).
May 25, 2016 Talk, *750 GeV Resonance as Portal to DM Interactions,* GDR@Terascale meeting, Nantes (France).
Dec 14, 2015 Seminario, *Review on Dark Portals,* University of Genova (Italy).
Dec 09, 2015 Seminario, *Dark Portals: From Simplified Models to Theoretically motivated Embeddings,* Laboratori Nazionali di Frascati (Italy).
Oct 13, 2015 Talk, *Dark Matter and Baryon Asymmetry production from decays of Supersymmetric States,* 6th Young Researchers Meeting, GSSI Institute, L'Aquila (Italy).
Sep 25, 2015 Talk, *Review on Dark Portals,* Workshop New Possibilities in Physics of Quarkonia, Institute Henry Poincarrè, Paris (France).
Sep 08, 2015 Talk *Impact of Dark Matter Direct and Indirect Detection on (GUT Inspired) Simplified DM models,* TAUP2015 Conference, Torino (Italy).
Jul 24, 2015 Talk *Impact of Dark Matter Direct and Indirect Detection on Simplified DM models,* EPS-HEP 2015 Conference, Wien (Austria).
Jun 15, 2015 Talk *Accurate determination of Baryon and DM abundances in Supersymmetric Scenarios,* ITN 'Invisibles' network workshop, Madrid (Spain).
Apr 24, 2015 Seminario *Recent Excesses in Dark Matter Indirect Detection and Possible Interpretations,* DAMPT, Cambridge (England).
Apr 16, 2015 Talk *Correlation between ID signals and LHC,* Workshop Off-the-Beaten-Track, ICTP Trieste (Italy).
Apr 08, 2015 Seminario *Dark Matter at Colliders,* Gran Sasso Institute (GSSI), L'Aquila (Italy).
Mar 16, 2015 Talk *3.55 KeV line in Minimal Dark Matter,* Rencontres de Moriond 2015, Electroweak session, La Thuille (Italy).
Mar 05, 2015 Seminario *Phenomenology of Minimal Decaying Dark Matter Scenarios,* University of Barcellona (Spain).
Jan 16, 2015 Talk *Dark Portal scenarios,* Rencontres de Physique de Particules, Paris (France).

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Nov 26, 2014 Seminario Baryogenesis and Dark Matter Production in the Minimal Supersymmetric Standard Model, Institüt of Astrophysics, University of Göttingen (Germany).
Nov 24, 2014 Talk *Interplay between collider and Dark Matter searches in dark portal scenarios*, ITN Invisibles Workshop, Paris (France).
May 28, 2014 Talk *Out-of-Equilibrium Baryogenesis with Gravitino Dark Matter*, Planck2014 Conference, Paris (France).
Apr 09, 2014 Talk *Modelli Teorici di Materia Oscura*, IFAE2014 Conference, GSSI-LNGS L'Aquila (Italy).
Apr 04, 2014 Seminario *Out-of-Equilibrium Baryogenesis and Dark Matter Production*, ULB Bruxelles, Belgium.
Dic 02, 2013 Talk *Bayesian Forecast from Dark Matter Direct Detection and LHC*, Physics at the Terascale workshop, Karlsruhe (Germany).
Nov 25, 2013 Seminario *Correlation between Dark Matter Production Mechanisms with Dark Matter Detection and Baryogenesis*, Epfl, Losanne (Switzerland).
Sep 25, 2013 Talk *Minimal Decaying Dark Matter and the LHC*, Desy Theory Workshop 2013, Hamburg (Germany).
Jul 9, 2013 Talk *Correlations between Indirect Detection and Collider Signals in Decaying Dark Matter Scenarios*, ITN Invisibles School+Workshop, Durham (England).
Jun 27, 2013 Seminario *Minimal Decaying Dark Matter and the LHC*, Laboratoire de Phisique Theorique, Orsay (Paris).
May 22, 2013 Talk *Correlation between Indirect Detection and Collider Signals for Decaying Dark Matter*, Planck2013 Conference, Bonn (Germany).
Jan 21, 2013 Seminario *Bayesian Forecasts from Dark Matter Direct Detection to LHC*, CP3 Origins Centre, Odense (Denmark).
Nov 26, 2012 Seminario *Generation Mechanisms and Collider Prospects of Wimp Dark Matter*, Institüt für Theoretische Physik, University of Göttingen.
Jun 24, 2012 Talk *Interplay between direct detection and collider for neutralino Dark Matter*, ITN Network Invisibles Meeting, Arcetri, Florence (Italy).
Mar 29, 2012 Talk *Gravitino Dark Matter in Tree-Level Gauge Mediation*, ITN Network Invisibles Pre-Meeting, Madrid (Spain).
Sept 4, 2011 Talk *Accurate estimate of relic density and kinetic decoupling in non-thermal dark matter models*, TAUP 2011, Munich (Germany).
Jun 2, 2011 Talk *Accurate estimate of relic density and kinetic decoupling in non-thermal dark matter models*, Planck 2011, Lisbon (Portugal).
Jun 21, 2010 Talk Non thermal production of neutralino Dark Matter, Inifa2010, Frascati, Rome (Italy).

Attività di Referee

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

Attività di Editor

Guest Editor per lo special Issue "New Physics Landmarks: Dark Matter and Neutrino Masses" per la rivista Advances in High Energy Physics.

Competenze informatiche

Programmazione nei linguaggi Fortran, C, C++;
Wolfram Mathematica;
Uso di softwares e strumenti di analisi numerica, come Darksusy, Micromegas, Madgraph.

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Attività Didattica

Attività di tutorato per il corso di "Relatività Generale", tenuto presso l'Università di Goettingen durante il semestre invernale 2013-2014.

Relatore dello Stage, livello M1, dello studente Mathiew Dedenon, presso l'Università di Paris-Saclay.

Altro

Organizzatore del programma di seminari settimanali presso LPT Orsay.

Organizzatore locale dei webseminari organizzati dal Network "Invisibles".

Contributo all'organizzazione di attività di outreach organizzate dal Network "Invisibles".

Contributo all'organizzazione della scuola invernale congiunta Goettingen-Desy-Odense.

Lezione pubblica di divulgazione scientifica, dal titolo "Looking for the Invisibles", tenuta durante le "Wissen Woche" organizzata dall'Università di Goettineng.

Periodo di lavoro (secondment) presso la GMV Technologies, Madrid, nel Maggio 2014.

Data

HEIDELBERG
19/02/2018

Firma

Giorgio Arcadi

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Daniele Barducci

Personal Information

Current activity

Post Doctoral researcher at the Scuola Internazionale Superiore di Studi Avanzati (SISSA), Trieste (Italy)
From 1st October 2016 to 30th September 2019

Previous activities

- Mayflower Ph.D. Student in Particle Physics Phenomenology at the NExT Institute School of Physics and Astronomy at the University of Southampton (United Kingdom) Particle Physics Department at the STFC Rutherford Appleton Laboratory (RAL), Didcot (United Kingdom)
  From 29th September 2011 to 11th September 2014
  Supervisors: Prof. Alexander Belyaev and Prof. Stefano Moretti (Theory group, University of Southampton)
  Advisor: Dr. Claire Shepherd-Themistocleous (CMS group, RAL)
  From 25th April to 28th July 2014 displaced at CERN (Switzerland) associated with the CMS group
- 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

Education

- Scientific high school degree, Liceo A.M.E. Agnoletti, Sesto Fiorentino, Florence (Italy), July 2005
  100 out of 100

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- Bachelor in Physics
  University of Florence (Italy), 17th December 2008
  110 cum laude out of 110
  Graduation work: *The neutral K mesons: Regeneration and Strangeness Oscillations*
  Supervisor: Prof. Roberto Casalbuoni
- Master in Physical and Astrophysical Sciences
  University of Florence (Italy), 13th December 2011
  110 cum laude out of 110
  Graduation work: *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 (United Kingdom), 11th September 2014
  Ph.D. Thesis: *Collider Phenomenology of the 4D Composite Higgs Model*
  Supervisors: Prof. Alexander Belyaev and Prof. Stefano Moretti

References

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

Research activity and interests [1]

My research interests lie in the field of phenomenology of physics beyond the Standard Model (BSM). In particular, I have so far devoted my research to the study of theories related to the origin of the electroweak symmetry breaking (EWSB) mechanism, such as Composite Higgs theories and Supersymmetric (SUSY) theories, and their implication for collider and astrophysical experiments, as well as to the study of theories not directly related to the naturalness of the weak scale but that seek an explanation for other shortcomings of the SM such as the existence of Dark Matter (DM). I am also interested in various other aspects of DM phenomenology related to its searches at collider, underground and astrophysical experiments, both within the framework of simplified models as well as related to ultraviolet (UV) complete theories. My current activity also involves the investigation of the potentiality of the Large Hadron Collider (LHC), and of future proposed colliders, to precisely measure SM observables and thus efficiently constrain higher dimensional operators in the context of the SM effective field theory. Another key part of my research activity is the development of publicly available tools for high energy physics phenomenology. Finally, I am also directly involved in experimental analyses with the CMS collaboration.

[1] Labelled with † the references to the section *Other scientific works*.

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Composite Higgs and Vector-Like-Quarks

After the discovery of the Higgs boson in 2012, the question of whether the properties of this state are consistent with those of the elementary scalar predicted by the SM has become of paramount importance. Composite Higgs theories, where the Higgs boson is a composite pseudo Nambu-Goldstone arising as a bound state of a new strongly interacting sector, have been the main subject of my Master and Ph.D. Thesis.
More specifically, my doctoral work has been mainly, but not exclusively, devoted to the study of the phenomenology of a particular realisation of a model with a Composite Higgs. A comprehensive analysis of it, both at the large hadron collider (LHC) as well as for future proposed colliders, has led to several publications [1-5,10,12] where I have shown the compatibility of such a scenario with the available experimental data and then highlighted the most important signatures predicted by these kind of theories to be searched for at the LHC. Moreover, in these works great attention has been paid to peculiar features of these scenarios, such as the possible presence of nearby degenerate multiple vector resonances and to an extended quark sector. These characteristics are of great relevance for experimental analyses, since they can significantly impact the model signatures, for example via strong interference effects with the SM background, therefore altering the exclusion or discovery power of present and future experimental searches. In this respect a theoretical work with members of the CMS collaboration, aimed at the study of specific signatures of models where multiple vector resonances cause strong interference effects, and with a broader application than just Composite Higgs theories, has been performed, ultimately proposing observables which can improve the sensitivity of experimental analyses on these kind of scenarios [17].

Related, but not limited to theories with a Composite Higgs, is my interest in extended quark sectors that can appear in many scenarios BSM. In particular, these extra states generally appear as Vector-Like Quarks (VLQs), less constrained by Higgs data with respect to the almost excluded hypothesis of a fourth generation of quarks. These coloured particles are in general, by naturalness arguments, expected to be present at the TeV scale. The possibility of producing them copiously via QCD interactions, makes this one of the primary research directions of the LHC experiment.
While the experimental collaborations usually set the limits on the masses of these states under the assumption that just one extra quark is present as an extra matter content, realistic BSM scenarios can present in their spectrum more than one VLQ. In order to fully exploit the large amount of information present in the data provided by the LHC experiment, it is therefore crucial to be able to reinterpret in a given model the experimental results for VLQs searches. A particular scenario can in fact present, due to an extended quark sector, different signatures with respect to those assumed by the experimental analyses [6,7]. In this respect, a dedicated computer code (`XQCAT`) has been developed and published [9]. The aim of this code is precisely to test in a fast and conservative way a given BSM theory, only providing as an input the VLQ spectrum of the model. The code compares the model signatures with the publicly available experimental results and determines if the given point of the parameter space is excluded or not. Moreover, by reinterpreting non dedicated VLQ searches (for example SUSY analyses), the code is also able to constrain scenarios not yet fully tested by the LHC data, such as configurations in which the extra quarks decay in a SM boson and light SM quarks [7]. Therefore this study, apart from providing

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a useful tool to constrain generic BSM theory, also allows to investigate kinematic regions not yet explored by the experimental searches, with the goal of proposing improved selection cuts to the experimental collaborations so as to be more sensitive to new physics signals.
Clearly, in the fortunate case that the LHC discovers a signal compatible with the production of a VLQ, one of the primary questions to be addressed will be to identify the possible new physics model, or at least a class of models, to which the heavy quark belongs. Due to the different chiral structure of the coupling of the VLQ to the SM quarks and bosons which arises in different new physics scenarios, the decay products arising from the VLQs decay have different kinematic properties that can be exploited to pin down the chirality of the VLQ coupling, thus effectively narrowing down the possible interpretations of a discovered VLQ in terms of new physics models. In this respect a study tackling this issue at the LHC as well as future prototype colliders with a centre of mass energy of 33 and 100 TeV has recently been performed, also analysing the potentiality of these high energy prototype hadron colliders in discovering, or else excluding, heavy VLQs [26].

Heavy quarks have also received great attention when preliminary 13 TeV data have been released, due to a $\sim 3\sigma$ deviation with respect to the SM prediction in the diphoton spectrum at an invariant mass of 750 GeV. This deviation, that was not confirmed with new data and which then revealed itself to be just a statistical fluctuation, could have been interpreted as the resonant production of a new scalar particle. Interestingly, due to its apparently large production cross section, many theory interpretations required the presence of heavy quarks mediating the loop-induced production of the scalar via gluon fusion. I have therefore studied the consequences of the possible decay of heavy VLQs in a final state containing the putative resonance and analysed the implication that this new channel could have had for VLQ searches at the LHC, proposing new search strategies and highlighting how current searches could have been adapted if this resonance were to be confirmed. Interestingly, the proposed strategy proved to be relevant for any scenario featuring a heavy quark decaying into a new scalar resonance, irrespectively of its mass, and can thus be applied to broad classes of VLQ models where additional scalar states are present at the TeV scale [20].

Supersymmetry and Dark Matter

Providing a dark matter (DM) candidate, and other solutions to the open questions of the SM, supersymmetric theories are still one of the most promising BSM scenarios to be tested at the LHC. However, the results so far obtained at the CERN machine have pushed the bounds on SUSY particles higher and higher in mass. These bounds have nevertheless a certain degree of model dependency and situations with light SUSY particles are still viable, as in the case of compressed spectra, where the small mass splitting between SUSY states makes their decay products not energetic enough to be detected, therefore making it difficult to test this scenario experimentally. I have studied this open question in the context of the minimal supersymmetric SM (MSSM), showing the capabilities of the LHC in excluding (or discovering) a light DM candidate in a compressed scenario. After having proposed a dedicated search strategy, great attention has been devoted to illustrating how different levels of control on the background systematic uncertainties, achievable at the 13 TeV stage of the LHC, can strongly affect its mass reach on the DM candidate, and on how collider based analy-

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ses can be complemented by underground direct detection DM experiments, such as LUX or XENON1T [8,11].

While minimal SUSY extensions of the SM have been deeply investigated both from the theoretical and experimental point of view, non minimal SUSY realisation have so far received less attention, despite having attractive features and interesting phenomenological implications for both Higgs and DM physics, such as the presence of light states singlet under the SM gauge group that have escaped the searches performed at LEP, Tevatron and, so far, the LHC. The LHC however, despite being a high energy collider designed to deeply test the TeV scale, has also revealed itself to be an ideal machine to investigate light new physics and turned out to be able to surpass the performance of previous accelerators in testing resonant new physics with a mass lighter than the one of the Higgs.
Motivated by this consideration I have investigated the phenomenology of a non minimal SUSY extension of the SM, namely the new minimal MSSM (nMSSM), whose main characteristic is the possibility of a light, ~ 5 GeV, DM candidate accompanied by a light pseudoscalar state with a mass roughly the double of that of the DM particle. A comprehensive study of the current constraints, both from DM direct and indirect searches and collider experiments has been made. Then, a detailed analysis of the prospect of the 13 TeV run of the LHC has been performed [13], with the important goal of providing the ATLAS and CMS collaborations with benchmark points presenting peculiar nMSSM signatures, suitable for a deeper experimental analysis, through the interaction with the LHC Cross Section Working Group [23].

I am also interested in more generic studies of DM searches, both in complete theories other than supersymmetry as well as following a simplified model approach. For example, still related to the 750 GeV resonance excess initially observed in early 13 TeV data, I have studied the implication of the decay of the putative pseudoscalar resonance into a DM pair (an hypothesis motivated by the large resonance width hinted by the ATLAS collaboration) and shown how monojet searches were able to efficiently constrain this hypothesis and complement with astrophysical constraints, thus effectively narrowing down the possible interpretation of that state in terms of new physics models [16].

More generally, models in which DM particles communicate with the visible sector sector through a pseudoscalar mediator are well motivated both from a theoretical and from a phenomenological standpoint and are one of the main targets of current experimental searches. With direct detection bounds being subleading, given the CP odd nature of the mediator, the main tests of these scenarios arise from collider searches and from indirect DM detection experiments. I have recently investigated the complementarity between these two kind of measurements in simplified models where the visible and the DM sector communicate through a pseudoscalar mediator, further showing that searches for the mediator itself decaying into visible SM states can compete and even supersede standard DM searches. I have also showed that the accurate measurements of the top quark pair production cross-section allows one to completely exclude mediators in the 100-1000 GeV mass range with large coupling to top quarks, and that future collider and astrophysical measurements will be able to further constrain the available parameter space [25].

Another topic related to DM physics which I have investigated concerns the possibility

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of discriminating an underlying model structure, or some of its characteristics, if a DM signal were to be observed at the LHC in the tails of, for example, missing transverse energy distributions. In particular I have studied the possibility of disentangling momentum independent and momentum dependent (*i.e.* non derivative and derivative) DM interactions with generic mediators, which for example can both arise in Composite Higgs theories, by exploiting monojets events at the LHC after having shown the different reach that the experimental searches have in the two configurations, due to the different Lorentz structure of the interaction in the two cases [18,22].

Effective field theory

While the LHC will keep pursuing searches for resonant production on new physics states, the lack of signals so far observed could point to the fact that new dynamical degrees of freedom, which are expected to be present around the TeV scale in order to solve or at least to alleviate the shortcomings of the SM, might be too heavy to be resonantly produced in proton-proton collisions. However, they might manifest themselves as indirect effects altering the predictions of the SM in various precision observables. A powerful tool to investigate this possibility is that of the SM effective field theory, where higher dimensional operators (*i.e.* suppressed by certain powers of a new physics scale and hence non renormalizable) built from SM fields and compatible with the SM gauge symmetry are added to the SM lagrangian. The experimental results are then translated in bounds on the coefficients of these operators, and consequently on the scale of new physics, and can then be mapped into the parameters of a given new physics model when dynamical degrees of freedom are integrated out.

Motivated by the observation that top quark physics has already entered the precision era, due to the large number of top quark pairs that the LHC is able to produce, I have investigated, in the context of the SM effective field theory, how a combination of top quark and Higgs measurements could be used to set stringent bounds on effective operators modifying the top quark coupling to gluons. Ultimately with this study I have proposed observables that will allow to independently measure the strong analogue of the Dirac and Pauli form factors illustrating how the proposed method will be able to set the most stringent limits on these quantities in the future runs of the LHC [24,29].

Higgs physics has also entered the precision era and the LHC is expected to measure, at the end of its high-luminosity phase, the couplings of the Higgs boson to pairs of gauge bosons and third generation same flavour fermions with an accuracy of a few percent. Moreover, measurements for non standard Higgs decays, such as flavour violating decays both in the quark and in the lepton sector, are a powerful probe for many BSM theories. Contrary to the lepton sector, where the sensitivity on the branching ratio $\mathrm{BR}(h \to \tau\mu)$ and $\mathrm{BR}(h \to \tau e)$ is already at the percent level, in the quark sector the situation is more challenging, due to the large QCD backgrounds arising in the hadronic environment of the LHC. I have thus investigated the possibility of directly observing quark flavour violating Higgs decay in the context of the SM effective field theory at future leptonic facilities such as the International Linear Collider. By designing a search strategy to be sensitive to these exotic Higgs decay modes for various Higgs boson production channels, I have shown that direct limits on rates such as $\mathrm{BR}(h \to bs)$ can reach the permill level, thus effectively complementing

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the bounds arising from flavour physics [27].

Finally, I am also interested in finding novel ways of constraining higher dimensional operators whose leading order effects in SM observables, *i.e.* the effect arising from the interference of the SM amplitude with the one induced by the effective operators, vanish as a consequence of helicity selection rules in the high energy regime. However, focusing on exclusive angular observables, these interference effects can be recovered, thus enabling the LHC to set competitive bounds on higher dimensional operators and to constrain BSM physics in a powerful way. I am investigating this problem in the context of SM diboson production [31] thus effectively contributing to the so called *precision program* of the LHC.

Other interests

The lack of new physics signals at the LHC could also suggest that the paradigm of naturalness, predicting new dynamical degrees of freedom at the TeV scale, might not be the only principle that we should follow in the exploration of the fundamental structure of Nature. In this respect, evidences such as neutrino masses and oscillations, the existence of DM, the baryon asymmetry present in the Universe and some longstanding anomalies in rare decays of B mesons confirmed by the LHCb collaboration and theoretical motivations such as gauge coupling unification or the concept of asymptotic safety should be taken as a guide in building and studying BSM theories.

More specifically I am interested in theories with new fermions charged under a new strongly interacting force and vectorial under the SM gauge group, dubbed in literature Vector-Like confinement. The new strongly interacting force confines delivering pseudo Goldstone boson (technipions) similar to the case of pions in QCD, without strongly affecting the EWSB pattern of the SM. In this sense the Higgs should be seen as an almost elementary state. The attractive feature of these kind of scenarios is the possibility of having accidental symmetries which guarantee the stability of certain technihadrons that can thus behave as cold DM. Interestingly, these theories are poorly constrained by collider searches, with typical bounds on the masses of the technipions of the order of 100 GeV. I am thus exploring the possibility of testing these theories at the LHC, designing search strategies which target the unconvential exotic signatures of these states and showing that the LHC could deeply test these kind of scenarios [30].

I am also interested in studying the phenomenological implication of theory dubbed in literature as *asymptotic safe* theories. These theories are built under the requirements that all the couplings of the SM reach a UV interacting or free fixed point. This is typically obtained by adding several generations of vector-like fermions charged only under the SM gauge group. While the range for the possible assignment of quantum numbers for the extra fermion is quite vast, phenomenological constraints from cosmology, astrophysics, high-energy and flavour physics can narrow down the viable extensions in terms of group representations, masses and decay modes of the extra fermions [32]

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Experimental Collaboration

During my research career I have also had the opportunity to directly work with the CMS group, thanks to the support of the Rutherford Appleton Laboratory, collaboration which is still ongoing. During this collaboration I became interested in the still open possibility of the existence of light (pseudo)scalars states, and in testing this hypothesis at the LHC. Light scalars, not yet excluded by LEP, Tevatron and LHC data, typically appear in non minimal SUSY extensions, such as the next-to-minimal supersymmetric SM (NMSSM), and are at the time being one of the priorities in the LHC program. In this respect I have actively worked with the CMS group directly contributing, with theoretical motivations and model interpretations, to the publication of an experimental analysis searching for decays of the SM Higgs boson in a 4τ final state via intermediate decays through a light (< 10 GeV) pseudo scalar Higgs boson [14]. My collaboration with the CMS group is still ongoing and current work includes the publication of final 8 TeV results for low mass scalar searches in the $2\mu + 2b$ final state [33] as well as preliminary 13 TeV analyses. A theoretical work which also involved members of the CMS collaborations aimed at the possibility of detecting light additional scalars arising from the decay of the SM Higgs boson through their decay into a pair of SM fermions, thus exploiting the $h^{SM} \to AA \to 4f$ process, has also been performed [21].

Tools and LHC analyses reinterpretation

With the purpose of making the interaction between theorists and experimentalists profitable, and taking full advantage of the results delivered by the LHC, I also became interested in the area of reinterpretation of the experimental analyses and I have joined the recasting team of the `MadAnalsys5` group. The aim of this group is to provide a database of recasted and validated experimental analyses implemented in a computer language, through which Monte Carlo samples generated from a given BSM scenario can be tested. With a fast computation, the code will then tell if the given model point is still allowed, or excluded, by the available LHC results. This work, which requires a close collaboration with the experimental groups in order to obtain the necessary details of a given analysis, is of great interest, since all the recasted analyses are made public and available to the whole theoretical community for phenomenological analyses. Moreover, by testing particular models with specific signatures for which the experimental analyses are not yet fully sensitive, it allows to study how the selection cuts could be improved, in order to design search strategies which are more sensitive to the presence of new physics.

I have contributed to this project with the recast of the ATLAS search for DM in mono-photon events [2]† and the CMS search for VLQs with charge 5/3 [3]†. The latter analysis has then been used to investigate elusive composite spin one resonances which, due to their suppressed decay rates into SM leptons and gauge bosons, have so far eluded all the experimental limits. Through this reinterpretation it has however been shown that currently available LHC data are already able to set a limit on the mass of these states, and that particular proposed choices of selection cuts could greatly improve the sensitivity of a similar analysis on this scenario at the 13 TeV LHC [15].

Related to this activity in the area of the reinterpretation of LHC searches, I have also contributed to a proposal of an analysis accord description for LHC searches [18].

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This accord, which has been developed together with ATLAS and CMS members, aims at creating a common computer interface in which beyond the SM searches could be written by the experimental collaborations and be easily interpreted by the theoretical high energy physics community. While this proposal is still in its initial phase, it has the important twofold goal of making the reinterpretation of the experimental analyses more straightforward for the theoretical community and efficiently preserving the results of the experimental searches in the near and far future.

Apart from my work on the aforementioned computer code `XQCAT`, I have also contributed to the development of the DM code `micrOMEGAs`, which is widely used in the high energy physics community to study DM properties of various BSM scenarios. With the most recent update [19] the code is now able not only to test constraints arising from relic abundance measurement and direct/indirect DM searches, but also LHC constraints on direct DM production (for example in monojet events) as well as constraints on other particles present in various DM models, such as sparticles in SUSY theories and vector mediator in other DM theories.

I am strongly motivated to continue my research in the field of phenomenology of physics beyond the SM. In particular, I am interested in continuing my studies in the areas described, and also in possibly expanding my research topics to new areas, always trying to keep a close interaction with the experimental groups.

Other Scientific Activities

- Referee for Physical Review D since 2016 and Physical Review Letters since 2017
- Convener for the session *Frontiera dell'Energia* at the IFAE 2016 Conference, Genova, Italy
- Seminar organiser at SISSA for the years 2016-2017 and 2017-2018
- Organiser of the DaMESyFla workshop, 15-17 March 2017, SISSA, Trieste, Italy

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

Computing Skills

Unix-Linux and OS X operating systems

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

Physics tools

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

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Teaching activities

2011-2014

During my first two years of Ph.D. studies at the University of Southampton, I had the opportunity to perform various teaching activities. In particular, I was a *demonstrator* for the classes *Energy and matter* (PHYS 1013) during the Academic year 2011–2012, and *Wave physics* (PHYS 2023) during the Academic year 2012–2013. These classes were compulsory modules for the first and second year studies for the Bachelor in Physics.
Among the various activities as a *demonstrator*, I had to follow the students during their class exercises two hours per week, and evaluate the problems that the head of the course assigned to them, and on which a part of the final evaluation of the module was made. This experience allowed me to have a direct contact with the teaching activity and with the responsibilities associated with this work. I also had the possibility of explaining to the students those aspects of the subject which were not clear to them, therefore effectively integrating the Professor's teaching.
I also had to conduct group meetings, one hour per week, as the official *tutor* of five students who were assigned to me. During these meetings, I had to interact in a closer and deeper way with the students, and review in more detail those parts of the course which were less clear to them.
Finally, I also had to correct a part of the final exam for both courses and I learned to evaluate the students not only on the basis of the results of their work, but also taking into account their effective comprehension of the problem and the originality of the solution proposed.

- Mayflower coordinator for demonstrating activities in the academic year 2011–2012 at the University of Southampton (United Kingdom) for the class *Energy and Matter* (36 hours)
- Mayflower coordinator for demonstrating activities in the academic year 2012–2013 at the University of Southampton (United Kingdom) for the class *Wave physics* (36 hours)

2016-2017

- 5 hours of lectures on Higgs and Supersymmetry phenomenology at the LHC for the first yearh Ph.D. student at SISSA for the class *Beyond the Standard Model* held by Professor Andrea Romanino

Conferences, Workshops and Schools [2]

Erice International School of Subnuclear Physics 2012: What We Would Like LHC to give us †
Erice (Italy), 23 June - 2 July 2012
Talk: DY Analysis of a 4D Composite Higgs Model.

[2]Labelled with † the conferences, workshops and schools were I have presented a talk or a poster.

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42nd BUSSTEPP Summer School †
Institute for Particle Physics Phenomenology (IP^3)
Durham (United Kingdom), 2-14 September 2012
Talk: DY Analysis of a 4D Composite Higgs Model.

5th International Workshop on Top Quark Physics
Winchester (United Kingdom), 16-21 September 2012

Workshop at the Galileo Galilei Institute for Theoretical Physics
Understanding the TeV scale through LHC data, Dark Matter and other experiments
Florence (Italy) 19-23 November 2012

YETI'13: Young Experimentalists and Theorists Institute Forum
Institute for Particle Physics Phenomenolog (IP^3)
Durham (United Kingdom), 6-9 January 2013

The Higgs Symposium
Higgs Centre for Theoretical Physics
Edinburgh (United Kingdom), 9-11 January 2013

First LHCP Conference †
Barcellona (Spain), 13-18 May 2013
Poster: Z' and W' at the LHC in the 4D Composite Higgs Model

16th International Conference From the Planck Scale to the Electroweak Scale †
Bethe Center for Theoretical Physics
Bonn (Germany), 20-24 May 2013
Talk: Higgs signal at the LHC for the 4D Composite Higgs model

Training Week at the Galileo Galilei Institute For Theoretical Physics
Beyond the Standard Model after the first run of the LHC
Florence (Italy), 10-14 June 2013

Third NExT PhD Workshop: At the frontier of our knowledge †
Queen Mary, University of London
London (United Kingdom), 17-19 June 2013
Talk: Higgs signal at the LHC for the 4D Composite Higgs model

The European Physical Society Conference on High Energy Physics -EPS-HEP2013 †
Stockholm (Sweden) 18-24 July 2013
Poster: Higgs Boson in the 4DCHM: LHC phenomenology

IFAE 2014: High Energy Physics Meeting †
National Laboratory of Gran Sasso
Assergi (Italy), 9-11 April 2014
Talk: Composite Higgs searches at the LHC and beyond

GDR Terascale: †
Internationales Wissenschaftsforum Heidelberg (IWH)
Heilderberg (Germany), 11-13 December 2014
Talk: Framework for Model Independent Analyses of Multiple Extra Quark Scenarios

Mini-workshop on recasting ATLAS and CMS new physics searches
Laboratory of Subatomic Physics & Cosmology (LPSC)
Grenoble (France), 16-20 February 2015

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GDR Terascale †
Institut de Physique Théorique (IPhT) Saclay
Saclay (France), 30 March - 1 April 2015
Talk: Uncovering Natural SUSY with the LHC and Dark Matter Direct Detection Experiments Interplay

Les Houches Workshop Series, Physics at TeV Colliders
Les Houches (France), 10-19 June 2015

Planck 2015: From the Planck Scale to the Electroweak scale †
Karolos Papoulias Conference Centre
Ioannina (Greece), 25-29 May 2015
Talk: Uncovering Natural SUSY with the LHC and Dark Matter Direct Detection Experiments Interplay

LCF15: Physics Prospects for Linear and other Future Colliders After the Discovery of the Higgs †
European Centre for Theoretical Studies in Nuclear Physics and Related Areas (ECT*)
Trento (Italy), 7-11 September 2015
Talk: Composite Higgs models and $t\bar{t}$ production at future e^+e^- colliders

GDR Terascale †
Laboratory of Subatomic Physics & Cosmology (LPSC)
Grenoble (France), 23-25 November 2015
Invited Speaker: MadAnalys5: recasting and reinterpreting LHC searches

Rencontre de Physique des Particules (RPP) †
Laboratorie d'Annecy-le-Vieux de Physics Théorique (LAPTh)
Annecy-le-Vieux (France), 25-27 January 2016
Talk: Wide Composite Vector Resonances at the LHC

IFAE 2016: High Energy Physics Meeting
University of Genova
Genova (Italy), 30 March - 1 April 2016
Convener for the session *Frontiera dell'Energia*

New Frontiers in Theoretical Physics, XXXV Convegno Nazionale di Fisica Teorica †
Galileo Galilei Institute
Florence (Italy), 17-20 May 2016
Talk: Wide Composite Vector Resonances at the LHC

Workshop on (re)interpreting the results of new physics searches at the LHC †
CERN
Geneva (Switzerland), 15-17 June 2016
Talk: Same Sign Signals of Wide Vector Resonances

SUSY Conference 2016 †
University of Melbourne
Melbourne (Australia), 3-8 July 2016
Talk: Implications of a High-Mass Diphoton Resonance for Heavy Quark Searches

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LCWS 2016, International Workshop on Future Linear Colliders †
Aiina Center & MALIOS
Morioka (Japan), 5-9 December 2016
Invited Speaker: Review of LHC low mass scalar searches in multi Higgs models

LFC17: Old and New Strong Interactions from LHC to Future Colliders †
European Centre for Theoretical Studies in Nuclear Physics and Related Areas (ECT*)
Trento (Italy), 11-15 September 2017
Invited Speaker: DM searches at the LHC in the context of strongly coupled theories

Workshop on the physics of HL-LHC, and perspectives at HE-LHC †
CERN
Geneva (Switzerland), 30 October - 1 November 2017
Talk: VLQs coupling discrimination at the LHC and future hadron colliders

One day workshop on light scalars in non minimal SUSY extensions†
LUPM Montpellier (France)
6th March 2018
Talk: Light singlino dark matter and pseudoscalars in the nMSSM

Other Talks:

First, second and third year Ph.D internal seminar at the University of Southampton (United Kingdom)

NExT institute meeting
Rutherford Appleton Laboratory, Didcot (United Kingdom)
20 March 2013
Talk: Higgs signal at the LHC for the 4D Composite Higgs model

Internal seminar at the Department of Astronomy and Theoretical Physics at Lund University (Sweden)
4th December 2013
Invited Speaker: LHC phenomenology of a Composite Higgs model

Internal seminar at the Max Planck Institute for Physics, München (Germany)
19th May 2014
Invited Speaker: XQCAT: a tool for analysis of scenarios with multiple Extra Quarks

Internal seminar at the Laboratorie d'Annecy-le-Vieux de Physics Théorique LAPTh, Annecy-le-Vieux (France)
12th June 2014
Invited Speaker: Model independent framework for analysis of scenarios with multiple Heavy Extra Quarks

Internal seminar at the University of Southampton
13th February 2016
Invited Speaker: Wide Composite Vector Resonances at the LHC (Recast of experimental searches)

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Internal seminar at LUPM Montpellier (France)
21th March 2017
Invited Speaker: Exotic signals of compositness

Internal seminar at LPSC Grenoble (France)
23th March 2017
Invited Speaker: Exotic signals of compositness

LHC Top Working group meeting
CERN
Geneva (Switzerland), 6-7 June 2017
Talk: Bounding top-quark non standard strong interactions

Others:

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

Research

Articles

[1] *Exploring Drell-Yan signals from the 4D Composite Higgs Model at the LHC*
D. Barducci, A. Belyaev, S. De Curtis, S. Moretti and G. M. Pruna
JHEP 1304 (2013) 152, arXiv:1210.2927 [hep-ph]
DOI: 10.1007/JHEP04(2013)152

[2] *Leptonic final states from di-boson production at the LHC in the 4-Dimensional Composite Higgs*
D. Barducci, S. De Curtis, L. Fedeli, S. Moretti and G. M. Pruna
JHEP 1304 (2013) 038, arXiv:1212.4875 [hep-ph]
DOI: 10.1007/JHEP04(2013)152

[3] *Multiple $Z' \to t\bar{t}$ signals in a 4D Composite Higgs Model*
D. Barducci, S. De Curtis, K. Mimasu and S. Moretti
Phys. Rev. D 88 (2013) 7 074024, arXiv:1212.5948 [hep-ph]
DOI: 10.1103/PhysRevD.88.074024

[4] *The 4-Dimensional Composite Higgs Model (4DCHM) and the 125 GeV Higgs-like signals at the LHC*
D. Barducci, A. Belyaev, M.S. Brown, S. De Curtis, S. Moretti and G.M. Pruna
JHEP 1309 (2013) 047, arXiv:1302.2371 [hep-ph]
DOI: 10.1007/JHEP09(2013)047

[5] *Future Electron-Positron Colliders and the 4D Composite Higgs Model*
D. Barducci, S. De Curtis, S. Moretti and G.M. Pruna
JHEP 1402 (2014) 005, arXiv:1311.3305 [hep-ph]
DOI: 10.1007/JHEP02(2014)005

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[6] *Towards Model-independent approach to the analysis of interference effects in pair production of new heavy quarks*
D. Barducci, A. Belyaev, J. Blamey, S. Moretti, L. Panizzi and H. Prager
JHEP 1407 (2014) 142, arXiv:1311.3977 [hep-ph]
DOI: 10.1007/JHEP07(2014)142

[7] *Framework for Model Independent Analyses of Multiple Extra Quark Scenarios*
D. Barducci, M. Buchkremer, A. Belyaev, G. Cacciapaglia, A. Deandrea, S. De Curtis, J. Marrouche, S. Moretti and L. Panizzi
JHEP 1412 (2014) 080, arXiv:1405.0737 [hep-ph]
DOI: 10.1007/JHEP12(2014)080

[8] *Les Houches 2013: Physics at TeV Colliders: New Physics Working Group Report*
D. Barducci, A. Belyaev, A. Bharucha, W. Porod and V. Sanz
Contribution: The interplay of the LHC and Direct Dark Matter Detection in unravelling Natural Supersymmetry at the Focus Point
D. Barducci, L. Basso, A. Belyaev, M. Buchkremer, G. Cacciapaglia, A. Deandrea, T. Flacke, J.H. Kim, S.J. Lee, S.H. Lim, F. Mahmoudi, L. Panizzi and J. Ruiz-Álvarez
Contribution: Model Independent Analyses of Vector-Like Quarks
arXiv:1405.1617 [hep-ph]

[9] *XQCAT: eXtra Quark Combined Analysis Tool*
D. Barducci, A. Belyaev, M. Buchkremer, J. Marrouche, S. Moretti and L. Panizzi
Comput. Phys. Commun. 197 (2015) 263-275, arXiv:1409.3116 [hep-ph]
DOI: 10.1016/j.cpc.2015.08.016

[10] *Unitarity in composite Higgs approaches with vector resonances*
D. Barducci, H. Cai, F.J. Llanes-Estrada and S.Moretti
Phys. Rev. D91 (2015) 9 095013, arXiv:1501.01830 [hep-ph]
DOI: 10.1103/PhysRevD.91.095013

[11] *Uncovering Natural Supersymmetry via the interplay between the LHC and Direct Dark Matter Detection*
D. Barducci, A. Belyaev, A. Bharucha, W. Porod and V. Sanz
JHEP 1507 (2015) 066, arXiv:1504.02472 [hep-ph]
DOI: 10.1007/JHEP07(2015)066

[12] *Top pair production at a future e^+e^- machine in a composite Higgs scenario*
D. Barducci, S. De Curtis, S. Moretti and G.M. Pruna
JHEP 1508 (2015) 127, arXiv:1504.05407 [hep-ph]
DOI: 10.1007/JHEP08(2015)127

[13] *Status and prospects of the nMSSM after LHC Run-1*
D. Barducci, G. Bélanger, C. Hugonie and A. Pukhov
JHEP 1601 (2016) 050, arXiv:1510.00246 [hep-ph]
DOI: 10.1007/JHEP01(2016)050

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[14] *Search for a very light NMSSM Higgs boson produced in decays of the 125 GeV scalar boson and decaying into τ leptons in pp collisions at $\sqrt{s}$= 8 TeV*
The CMS collaboration
JHEP 1601 (2016) 079, arXiv:1510.06534 [hep-ex]
DOI: 10.1007/JHEP01(2016)079

[15] *Bounding Wide Composite Vector Resonances at the LHC*
D. Barducci and C. Delaunay
JHEP 1602 (2016) 055, arXiv:1511.01101 [hep-ph]
DOI: 10.1007/JHEP02(2016)055

[16] *One jet to rule them all: monojet constraints and invisible decays of a 750 GeV diphoton resonance*
D. Barducci, A. Goudelis, S. Kulkarni and D. Sengupta
JHEP 1605 (2016) 154, arXiv:1512.06842 [hep-ph]
DOI: 10.1007/JHEP05(2016)154

[17] *Drell-Yan production of multi Z'-bosons at the LHC within Non-Universal ED and 4D Composite Higgs Models*
E. Accomando, D. Barducci, S. De Curtis, J. Fiaschi, S. Moretti and C.H. Shepherd-Themistocleous
JHEP 1607 (2016) 068, arXiv:1602.05438 [hep-ph]
DOI: 10.1007/JHEP07(2016)068

[18] *Les Houches 2015: Physics at TeV Colliders: New Physics Working Group Report*
D. Barducci, A. Bharucha, N. Desai, M. Frigerio, B. Fuks, A. Goudelis, S. Kulkarni, S. Lacroix, G. Polesello and D. Sengupta
Contribution: Momentum-dependent dark matter interactions and monojets at the LHC
D. Barducci, A. Buckley, G. Chalons, E. Conte, N. Desai, N. de Filippis, B. Fuks, P. Gras, S. Kraml, S. Kulkarni, U. Laa, M. Papucci, C. Pollard, H. B. Prosper, K. Sakurai, D. Schmeier, S. Sekmen, D. Sengupta, J. Sonneveld, J. Tattersall, G. Unel, W. Waltenberger and A. Weiler
Contribution: Towards an analysis description accord for the LHC
D. Barducci, G. Chalons, N. Desai, N. de Filippis, P. Gras, S. Kraml, S. Kulkarni, U. Laa, M. Papucci, H. B. Prosper, K. Sakurai, D. Schmeier, S. Sekmen, D. Sengupta, J. Sonneveld, J. Tattersall, G. Unel, W. Waltenberger and A. Weile
Contribution: A proposal for a Les Houches Analysis Description Accord
C15-06-01.1, arXiv:1605.02684 [hep-ph]

[19] *Collider limits on new particles within micrOMEGAs*
D. Barducci, G. Bélanger, J. Bernon, F. Boudjema, J. Da Silva, S. Kraml, U. Laa and A. Pukhov
Comput. Phys. Commun. 222 (2018) 327-338, arXiv:1606.03834 [hep-ph]
DOI: 10.1016/j.cpc.2017.08.028

[20] *Implications of a High-Mass Diphoton Resonance for Heavy Quark Searches*
S. Banerjee, D. Barducci, G. Bélanger and C. Delaunay
JHEP 1611 (2016) 154 , arXiv:1606.09013 [hep-ph]
DOI: 10.1007/JHEP11(2016)154

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[21] *Review of LHC experimental results on low mass bosons in extended two Higgs doublet models*
D. Barducci, N. Erik-Bomark, R. Cameron Aggleton, S. Moretti and C. Shepherd-Themistocleous
JHEP 1702 (2017) 035, arXiv:1609.06089 [hep-ph]
DOI: 10.1007/JHEP02(2017)035

[22] *Monojet searches for momentum-dependent dark matter interactions*
D. Barducci, A. Bharucha, N. Desai, M.Frigerio, B. Fuks, A. Goudelis, S. Kulkarni, G. Polesello and D. Sengupta
JHEP 1701 (2017) 078, arXiv:1609.07490 [hep-ph]
DOI: 10.1007/JHEP01(2017)078

[23] *Handbook of LHC Higgs cross sections: 4. Deciphering the nature of the Higgs sector. Part IV Beyond the Standard Model Predictions*
CERN Yellow Report, arXiv:1610.07922
DOI: 10.1007/JHEP01(2017)078

[24] *Constraints on top quark non-standard interactions from Higgs and $t\bar{t}$ production cross sections*
D. Barducci, M. Fabbrichesi and A. Tonero
Phys. Rev. D96 (2017) 7 075022, arXiv:1704.05478
DOI: 10.1103/PhysRevD.96.075022

[25] *Cornering pseudoscalar-mediated dark matter with the LHC and cosmology*
S. Banerjee, D. Barducci, G. Bélanger, B. Fuks, A. Goudelis and B. Zaldivar
JHEP 1707 (2017) 080, arXiv:1705.02327
DOI: 10.1007/JHEP07(2017)080

[26] *Vector-like quarks coupling discrimination at the LHC and future hadron colliders*
D. Barducci and L. Panizzi
JHEP 1712 (2017) 057, arXiv:1710.02325
DOI: 10.1007/JHEP12(2017)057

[27] *Quark-flavor violating Higgs decays at the ILC*
D. Barducci and A. J. Helmboldt
JHEP 1712 (2017) 105 arXiv:1710.06657
DOI: 10.1007/JHEP12(2017)105

[28] *Characterising Dark Matter Interacting with Extra Charged Leptons*
D. Barducci, A. Deandrea, S. Moretti, L. Panizzi and H. Prager
arXiv:1801.02707

[29] *Interpreting top-quark LHC measurements in the standard-model effective field theory*
J.A. Aguilar Saavedra, D. Barducci et al.
arXiv:1802.07237

[30] *Phenomenology of an almost elementary Higgs*
D. Barducci, M. Redi and A. Tesi
In preparation

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[31] *Precision diboson measurements at the LHC*
A. Azatov, D. Barducci and E. Venturini
In preparation

[32] *Asymptotically safe extensions of the standard model: models and their signatures*
D. Barducci, C.M.N. Guerrero, M. Fabbrichesi, R. Percacci and V. Skrinjarc
In preparation

[33] *Search for light dimuon resonances produced in association with bottom quarks in pp collisions at $\sqrt{s}$=8 TeV, PAS HIG-15-009*
The CMS collaboration
In preparation, PAS not yet public

Other Scientific Works

[1] *Collider phenomenology of the 4D composite Higgs model*
D. Barducci, Ph.D Thesis
arXiv:1411.5800 [hep-ph]

[2] *MadAnalysis5 implementation of the ATLAS Search for new phenomena in events with a photon and a missing transverse momentum in pp collision at $s = \sqrt{8}$ TeV, ATLAS-EXOT-2014-06*
D. Barducci
http://inspirehep.net/record/1353627

[3] *MadAnalysis5 implementation of the CMS Search for top quark partners with charge 5/3 in the same-sign dilepton final state, CMS-B2G-12-012*
D. Barducci and C. Delaunay
https://inspirehep.net/record/1402144

Conference proceedings [3]

[1] *A 4D Composite Higgs Model: Testing its Scalar Sector at the LHC*
Toyama International Workshop on Higgs as a Probe of New Physics 2013, Toyama (Japan)
D. Barducci, A. Belyaev, M.S. Brown, S. De Curtis, S. Moretti and G.M. Pruna
C13-02-13.1, arXiv:1304.4639 [hep-ph]

[2] *Production of Z' and W' via Drell-Yan processes in the 4D Composite Higgs Model at the LHC*
XII IFAE Edition, Cagliari (Italy)
D. Barducci, A. Belyaev, S. De Curtis, S. Moretti and G.M. Pruna
Nuovo Cim. C037 (2014) no.01, 265-267 , C13-04-03.3, arXiv:1306.5652 [hep-ph]
DOI: 10.1393/ncc/i2014-11702-x

[3] *The Higgs sector of the 4DCHM after the XLVIII Rencontres de Moriond*
XII IFAE Edition, Cagliari (Italy)
D. Barducci, A. Belyaev, M.S. Brown, S. De Curtis, S. Moretti and G.M. Pruna
Nuovo Cim. C037 (2014) no.01, 172-174, C13-04-03.3, arXiv:1306.6876 [hep-ph]
DOI: 10.1393/ncc/i2014-11684-7

[3]Labelled with * the proceedings related to conference where I have been the presenter.

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[4] *LHC physics of extra gauge bosons in the 4D Composite Higgs Model* *
LHCP 2013, Barcelona (Spain)
D. Barducci, A. Belyaev, S. De Curtis, S. Moretti and G.M. Pruna
EPJ Web Conf. 60 (2013) 20049, C13-05-13.1, arXiv:1307.1782 [hep-ph]
DOI: 10.1051/epjconf/20136020049

[5] *Higgs Boson in the 4DCHM: LHC phenomenology* *
EPSHP 2013, Stockholm (Sweden)
D. Barducci, A. Belyaev, M.S. Brown, S. De Curtis, S. Moretti and G.M. Pruna
PoS EPS HEP2013 (2014) 036, C13-07-18, arXiv:1310.1201 [hep-ph]

[6] *BSM Physics: What the Higgs Can Tell Us*
41st ITPE Winter School, Moscow (Russia)
D. Barducci, A. Belyaev, M.S. Brown, S. De Curtis, S. Moretti, G.M. Pruna and A. Pukhov
C13-02-12, arXiv:1310.2579 [hep-ph]

[7] *Composite Higgs: searches for new physics at future e^+e^- colliders*
LC13 Workshop, Trento (Italy)
D. Barducci, S. De Curtis, S. Moretti, G.M. Pruna
Nuovo Cim. C037 (2014) no.02, 119-124, C13-09-16.6, arXiv:1312.5130 [hep-ph]
DOI: 10.1393/ncc/i2014-11744-0

[8] *Composite Higgs searches at the LHC and beyond* *
XIII IFAE Edition, Laboratori nazionali del Gran Sasso (Italy)
D. Barducci, A. Belyaev, M.S. Brown, S.Moretti and G.M. Pruna
Nuovo Cim. C38 (2015) no.1, 4, C14-04-09, arXiv:1408.4553 [hep-ph]
DOI: 10.1393/ncc/i2015-15004-7

[9] *Imprints of Composite Higgs Models at e^+e^- Colliders*
2nd Toyama International Workshop on Higgs as a Probe of New Physics, Toyama (Japan)
D. Barducci, S.De Curtis, S.Moretti and G.M. Pruna
C15-02-11, arXiv:1505.03788 [hep-ph]

[10] *Exclusion and discovery via Drell-Yan in the 4DCHM*
DIS 2015: XIII International Workshop on Deep Inelastic Scattering and Related Subjects, Dallas (USA)
E. Accomando, D. Barducci, S. De Curtis, J. Fiaschi, S. Moretti and C. Shepherd-Themistocleous
PoS DIS2015 (2015) 105, C15-04-27, arXiv:1507.04245 [hep-ph]

[11] *Natural SUSY: LHC and Dark Matter direct detection experiments interplay* *
Planck 2015: From the Planck Scale to the Electroweak scale, Ioannina (Greece)
D. Barducci, A. Belyaev, A. Bharucha, W. Porod and V. Sanz
PoS PLANCK2015 (2015) 015, C15-05-25.1, arXiv:1510.01882 [hep-ph]

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[12] *Composite Higgs models and $t\bar{t}$ production at future e^+e^- colliders* *
LCF15: Physics Prospects for Linear and other Future Colliders After the Discovery of the Higgs, Trento (Italy)
D. Barducci, S. De Curtis, S. Moretti and G.M. Pruna
Frascati Phys.Ser. 61 (2016) 89, C15-09-07.7, arXiv:1512.04397 [hep-ph]

[13] *Review of Higgs-to-light-Higgs searches at the LHC* *
LCWS: International Workshop on Future Linear Colliders, Morioka (Japan)
R. Aggleton, D. Barducci, N-E. Bomark, S. Moretti and C. Shepherd-Themistocleous
C16-12-05.4 arXiv:1703.08029 [hep-ph]

[14] *Status and discovery prospects for light pseudoscalars in the NMSSM*
EPSHP 2017, Venice (Italy)
R. Aggleton, D. Barducci, N-E. Bomark, S. Moretti and C. Shepherd-Themistocleous
C17-07-05 arXiv:1709.02689 [hep-ph]

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24/1/18

Stefano Gariazzo

Curriculum Vitae

Last update: 04/02/2018

Personal Data

Education

2013–2016 **PhD in Physics and Astrophysics**, *University of Torino*, Torino, 22/03/2016.
Supervisors: Dr. Carlo Giunti, Prof. Nicolao Fornengo
Thesis title: *New Developments in Cosmology*
Full PDF available at `http://arxiv.org/abs/1603.09102`

2010–2012 **Master's degree in Physics**, *University of Torino*, Torino, *110/110 cum laude*, 20/07/2012.
Theoretical curriculum
Supervisor: Prof. Fiorenza Donato
Thesis title: *Signals of Dark Matter in Active Galactic Nuclei*

2007–2010 **Bachelor in Physics**, *University of Torino*, Torino, *110/110 cum laude*, 20/07/2010.
Supervisor: Prof. Nicolao Fornengo
Thesis title: *Dark Matter Relic Abundance in Alternative Cosmologies*

2002–2007 **High School Diploma**, *Liceo Scientifico "A. Avogadro"*, Biella, *100/100*.

Fellowships

starting 2018 Marie Skłodowska Curie Action, Individual Fellowship – call H2020-MSCA-IF-2017 – project 796941 (ENCORE)

2016–present Member of the AHEP group at IFIC, CSIC–University of Valencia

2013–2016 Associate member of INFN, Torino section

Awards

2016 Premio Nazionale "Sergio Fubini" 2016, awarded by INFN for the three best PhD thesis in theoretical physics discussed in Italy in the academic year 2015/2016

2007 Honorable Mention at the Italian Mathematical Olympiad

Experience

Teaching

Spring 2018 Mentoring for *"Waves, Fluids and Thermodynamics"* course, University of Torino, in collaboration with Dr. Luisa Ostorero

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Master's Degree Theses

2014–2015 **Cotutor for student Riccardo Murgia**, University of Torino, *Master's Degree in Physics, 24/07/2015, (link).*
With Prof. Nicolao Fornengo (Tutor), University of Torino.
Title: "Bounds on the coupling between dark matter and dark energy from CMB data"
Winner of the Premio Molinari (INFN Torino) - best thesis in Theoretical Physics discussed in Torino in 2015.

Conferences and Schools Organization

2015 Collaboration with the Local Organizing Committee of *TAUP 2015*, Torino (IT), September 7–11

2014 Member of the Local Organizing Committee for the International Doctoral School *ISAPP 2014*, Belgirate (IT), July 21–30

Referee

2017–present Physics Review D

Languages

Italian	**Mother tongue**	
English	**Good**	*FCE obtained in December 2006, Grade B*
Spanish	**Good**	
French	**Basic**	

Computer skills and responsibilities

ECDL	Full European Computer Driving License (2006)
Operating Systems	Linux (Ubuntu, Fedora), Microsoft Windows (XP, Vista, 7, 8)
Programming	`Python`, `C++`, `Fortran`, `Mathematica`, `Perl`
Web Programming	`HTML`, `CSS`, `PHP`, `JavaScript`, `jQuery`
Database	Administration and development with `MySQL`, Microsoft Access, LibreOffice Base, `SQLite`
Scientific	`CAMB`, `CosmoMC`, `CLASS`, `MontePython`, `MultiNest`, `PolyChord`
Miscellaneous	`Bash` scripting, LaTeX, TeX (basic), Microsoft Office, LibreOffice, `Git`, `Docker`
Computation	Scientific computing, pool configuration and administration with HTCondor (for the theoretical group of of the Physics Department, University of Torino)
Cloud	Virtual Machines management with OpenNebula and Eucalyptus tools (manager of the cloud system for the theoretical group of the Physics Department, University of Torino, 2013–2016)
N.U.	I am one of the authors of the website "Neutrino Unbound" (`http://www.nu.to.infn.it/`), since April 2016

Talks at International Conferences, Workshops and Schools

2017 **Kick-off meeting of the PTOLEMY project** (link), Gran Sasso (IT), December 11.
(*Invited*) "Direct detection, PTOLEMY and the clustering of relic neutrinos"

VI Postgraduate Meeting On Theoretical Physics (link), Valencia (ES), November 29.
"Neutrino mass ordering: current status"

Collider Physics and the Cosmos (link), Firenze (IT), October 9.
(*Invited*) "Cosmology and Sterile Neutrinos" .

Meeting on Fundamental Cosmology (link), Teruel (ES), September 13.
(*Invited*) "Relic neutrinos, direct detection and clustering in the Milky Way"

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18^{th} Lomonosov Conference on Elementary Particle Physics (link), Moscow (RU), August 25.
"Neutrino clustering in the Milky Way"

WIN 2017 (link), Irvine (CA–US), June 20.
(*Invited*) "Neutrino clustering in the Milky Way"

2016 **Axions & IAXO in Spain** (link), Zaragoza (ES), October 27.
(*Invited*) "Axions and the CMB"

Neutrino Oscillation Workshop (NOW) 2016 (link), Otranto (IT), September 5.
"Light sterile neutrinos with pseudoscalar interactions in Cosmology"

2015 **TAUP 2015** (link), Torino (IT), September 7.
"Dark Radiation and Inflationary Freedom"

17^{th} Lomonosov Conference on Elementary Particle Physics (link), Moscow (RU), August 24.
"Light Sterile Neutrinos in Cosmology"

2014 **New Frontiers in Theoretical Physics** (link), Cortona (IT), May 29.
"Reconciling cosmology and short-baseline experiments with invisible decay of light sterile neutrinos"

2013 **ISAPP 2013**, *International Doctoral School*, Canfranc (ES), July 20.
"Testing 3+1 Neutrino Mass Models with Cosmology and Short-Baseline Experiments"

Seminars

2018 **IFIC, CSIC–University of Valencia** (link), Valencia (ES), January 26.
"Bayesian model comparison applied to neutrino masses and their ordering"

2017 **Physics Department, University of Torino** (link), Torino (IT), December 21.
"Direct detection of relic neutrinos"

INFN CSN4 (link), Catania (IT), April 6.
"New Developments in Cosmology"

2016 **IFIC, CSIC–University of Valencia** (link), Valencia (ES), April 27.
"New Developments in Cosmology"

Physics Department, University of Torino, *Internal seminar*, Torino (IT), March 16.
"New Developments in Cosmology"

Posters at International Conferences, Workshops and Schools

2015 **NuPhys 2015** (link), London (UK), December 16–18.
"Dark Radiation and Inflationary Freedom"

2014 **The Primordial Universe after Planck** (link), Paris (FR), December 15–19.
"Light Sterile Neutrinos and Inflationary Freedom"

Planck 2014 (link), Ferrara (IT), December 1–5.
"Light Sterile Neutrinos and Inflationary Freedom"

2013 **ISAPP 2013**, *International Doctoral School*, Canfranc (ES), July 14–23.
"Testing 3+1 Neutrino Mass Models with Cosmology and Short-Baseline Experiments"

Participation at Conferences, Workshops and Schools

2017 **Kick-off meeting of the PTOLEMY project**, Gran Sasso (IT), December 11–12.

VI Postgraduate Meeting On Theoretical Physics, Valencia (ES), November 29–December 1.

Physics opportunities with a new universe's view: the SKA radio telescope, Valencia (ES), November 6–7.

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Collider Physics and the Cosmos, Firenze (IT), October 9–13.

Meeting on Fundamental Cosmology, Teruel (ES), September 11–13.

18th Lomonosov Conference on Elementary Particle Physics, Moscow (RU), August 23–30.

WIN 2017, Irvine (CA–US), June 18–24.

2016 **Axions & IAXO in Spain**, Zaragoza (ES), October 27–28.

Neutrino Oscillation Workshop (NOW) 2016, Otranto (IT), September 4–11.

TorinoCloud Users Workshop, Torino (IT), May 26.

What Next 2016, Rome (IT), February 16–17.

2015 **NuPhys 2015**, London (UK), December 16–18.

TAUP 2015, Torino (IT), September 7–11.

Fermi Open Day, Torino (IT), September 4.

17th Lomonosov Conference on Elementary Particle Physics, Moscow (RU), August 20–26.

Theoretical Astroparticle Physics Workshop, Torino (IT), July 9–10.

PASCOS 2015, Trieste (IT), June 29–July 3.

2014 **The Primordial Universe after Planck**, Paris (FR), December 15–19.

Planck 2014, Ferrara (IT), December 1–5.

Neutrino Oscillation Workshop (NOW) 2014, Conca Specchiulla, Otranto (IT), September 8–14.

ISAPP 2014, *International Doctoral School*, Belgirate (IT), July 21–30.
"Multi-Wavelength and Multi-Messenger Investigation of the Visible and Dark Universe"

New Frontiers in Theoretical Physics, Cortona (IT), May 28–31.

2013 **ISAPP 2013**, *International Doctoral School*, Canfranc (ES), July 14–23.
"Neutrino Physics and Astrophysics"

Outreach and Education

2011 **Invited seminar**, *"A. Avogadro" High School*, Biella (IT), May 4, 2011.
"The Universe: a History Spanning Billions of Years" (*in Italian*)

Interests

Music I studied Trombone at the Conservatorio "G. Verdi" of Torino (2010–2016), where I got the Diploma (13/07/2016, *9.25/10*). I play this and analogous instruments in several groups and wind orchestras of different size, from 4 to 110 members. Additionally, I used to sing in a few choirs and I was the director of the choir in my parish.

Sport I used to play Handball in the Pallamano Biella team (2004–2010) and tennis (until 2003). I like running (I completed my first Marathon in Valencia, 19/11/2017), swimming, skiing.

Do It Yourself Occasionally I like spending time with small electrical, carpentry and hydraulic works at home.

Reading I usually read book during holidays and when I travel.

References

Dr. Carlo Giunti, INFN, Torino.
carlo.giunti@to.infn.it

Dr. Olga Mena, IFIC – CSIC/University of Valencia.
omena@ific.uv.es

Dr. Sergio Pastor, IFIC – CSIC/University of Valencia.
pastor@ific.uv.es

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Prof. J.W.F. Valle, IFIC – CSIC/University of Valencia.
jose.valle@ific.uv.es

Prof. Nicolao Fornengo, University and INFN, Torino.
nicolao.fornengo@unito.it

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FEDERICA GIACCHINO

PERSONAL INFORMATION

DATE AND PLACE OF BIRTH	
SEX	
CITIZENSHIP	
TEL	
E-MAIL	
CURRENT ADDRESS	
CONTACT PERSONS	

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WORK EXPERIENCES

FEBRUARY 2013 - SEPTEMBER 2017	**Ph.D in Theoretical and Particle Physics (FRIA grant)** Université Libre de Bruxelles (ULB), Bruxelles (Belgium) Advisor: Michel Tytgat **Thesis:** *A Dark Matter through the Vector-like portal* defended on September 22nd, 2017
SEPTEMBER 2014 - DECEMBER 2016	**Teaching Assistant in ULB** • Laboratories of Thermodynamics (PhysF201) 40h • Laboratories of General Physics (PhysF110) 20h • Laboratories of General Physics (PhysF102) 20h • Travaux Pratique of Introduction of Particle Physics (PhysF305) 12h • Travaux Pratique of Mechanics (PhysF104) 2 x 24h
SEPTEMBER 2017 - CURRENT	**Private Lessons** of Maths and Physics at different degrees

EDUCATION AND INTERNSHIP

APRIL - NOVEMBER 2012	**Master Internship** Université Paris-Sud, Orsay (France) Advisor: Y. Mambrini, Subject: Dark Matter and Higgs Physics at the LHC
NOVEMBER 2010 - DECEMBER 2012	**Master Degree in Nuclear and Subnuclear Physics** Università di Bologna, Italy Advisors: R. Balbinot and Y. Mambrini **Thesis:** *Dark Matter and Higgs Physics at the LHC* defended on December 21st, 2012 **Graduation:** 110/110 *cum laude*
JUNE - OCTOBER 2010	**Internship** Consiglio Nazionale delle Ricerche, Palermo, Italy Subject: *Cosmic Rays and the Auger experiment*
JANUARY - JUNE 2010	**Internship** Astronomical Observatory of Palermo, Italy Subject: *Dark Matter Phenomenology*
SEPTEMBER 2005 - OCTOBER 2010	**Bachelor Degree in Physics** Università degli Studi di Palermo, Italy Advisor: G. Peres **Thesis:** *Fenomenologia della Materia Oscura* defended on October 28th, 2010 **Graduation:** 103/110

PUBLICATIONS

- F. Giacchino, L. Lopez-Honorez and M.H.G. Tytgat,
Scalar Dark Matter Models with Significant Internal Bremsstrahlung
JCAP 1310(2013)025
- F. Giacchino, L. Lopez-Honorez and M.H.G. Tytgat,
Bremsstrahlung and Gamma-Ray Lines in 3 Scenarios of Dark Matter Annihilation
JCAP 08(2014)046
- F.Giacchino, A. Ibarra, L. Lopez-Honorez, M.H.G. Tytgat and S. Wild,
Signatures from Scalar Dark Matter with a Vector-like Quark Mediator
JCAP 1602(2016)002
- S. Colucci, B. Fuks, F. Giacchino, L. Lopez Honorez, J. Vandecasreele and M.H.G. Tytgat
When top-philic scalar dark matter meet vector-like mediators

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in preparation

- S. Colucci, F. Giacchino, J. Vandecasteele and M.H.G. Tytgat

Internal bremsstrahlung effects for singlet scalar dark matter annihilating into heavy quarks

in preparation

PARTICIPATION IN INTERNATIONAL SCHOOLS AND CONFERENCES

SEPTEMBER 2016	Conference "**TeVPA 2016**", CERN (Switzerland)
SEPTEMBER 2016	Summer School "**Invisible 2016**", SISSA (Trieste, Italy) poster: *Signature From Dark Matter in the Vector-like Portal*
JUNE 2016	Conference "**Dark Matter Beyond Supersymmetry**", University of Bonn (Germany)
NOVEMBER 2015	**CosPa**, VUB (Bruxelles, Belgium)
OCTOBER 2015	Summer School "**Schule für Astroteilchenphysik**" (Obertrubach, Germany) talk: *Signature from Dark Matter in the Vector-like Portal*
OCTOBER 2015	**Journée des doctorants de l'école Panda**, University of Mons (Belgium) talk: *Signature from Dark Matter in the Vector-like Portal*
JUNE 2015	**IAP**, ULB (Belgium)
MAY 2015	**Neutrino Workshop**, Solvay Institue (Belgium)
NOVEMBER 2014	**IAP**, UCL (Belgium)
JULY 2014	Summer School "**MultiTeV Probes of the Standard Model and beyond with the LHC**", Cargese (France) talk: *Real Singlet Scalar DM and spectral features*
JUNE 2014	**CosPA**, UGent (Belgium)
JULY 2013	Summer School "**Dark Matter Composition and Detection ISAPP**", Djuronaset (Sweden)
MAY 2013	Workshop, "**Facing the Scalar Sector**", Solvay Institute (Belgium)

Language skills: Italian: native speaker; English: fluent; French: fluent;

Computer skills: Osx, Windows; LaTeX, Office packages, Pages/Keynotes; C++, Python; Pythia, Mathematica, Micromega/Calchep, FormCalc/FeynCalc;

23/02/2018

F. Giacchino

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Curriculum Vitae | Martin B. Krauss

Personal Information

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Education and Academic Career

Research fields	*Extensions of the SM, Neutrino Physics, Collider Searches, Dark Matter*
Since 06/2017	**Postdoc Chalmers University of Technology,** Gothenburg, Sweden Group of R. Catena
05/2014-05/2016	**Postdoc INFN – Laboratori Nazionali di Frascati,** Frascati, Italy Theory Division, Group of E. Nardi
10/2010-02/2014 *(Date of final exam: 02/2014).*	**PhD in high energy physics** *"Testing Models with Higher Dimensional Effective Interactions at the LHC and Dark Matter Experiments"*, Würzburg University, Germany Supervisors: W. Porod, W. Winter Overall grade: *Magna cum laude*
10/2006-09/2010	**Student of Physics** Würzburg University, Würzburg, Germany
09/2010	**Master of science with honors** *"Massive neutrinos in supersymmetric models from higher than d=5 effective operators"*, Würzburg University, Supervisors: W. Porod, W. Winter, Overall grade: *Excellent*
07/2009	**Bachelor of science** *"Selection of the sample for data-driven $Z\rightarrow \nu\bar{\nu}$ background estimation in SUSY-searches"*, Würzburg University, Supervisor: T. Trefzger Overall grade: *Excellent*
07/2006	**High school final exam (Abitur)** Markgraf-Georg-Friedrich-Gymnasium, Kulmbach, Germany Overall grade: *Very good*

Employment and Fellowships

Since 06/2016	**Postdoc Fellowship** Chalmers University, Gothenburg, Sweden Funded by the Knut and Alice Wallenberg Foundation
05/2014-05/2014	**Postdoc (Assegno di Ricerca)** INFN – Laboratori Nazionali di Frascati
02/2014-04/2014	**Postdoc Fellowship of the Research Training Group GRK1147** Funded by Deutsche Forschungsgemeinschaft (DFG)
04/2013-12/2013	**Research Assistent** Würzburg University
10/2010-03/2013	**PhD Fellowship of the Research Training Group GRK1147** Funded by Deutsche Forschungsgemeinschaft (DFG)

Awards

10/2011	**Recognition of outstanding academic achievement** within the "Elitenetzwerk Bayern" by the state of Bavaria
12/2010	**Wilhelm-Conrad-Röntgen-Preis** Award for master thesis by Würzburg University

Teaching

10/2012-02/2012 10/2010-07/2011	Tutor in courses on mathematical methods for physics students

Conference Organization

05/2016	**XVIII Frascati Spring School** Member of Local Organizing Committee

Schools and Further Research Experience

03/2017	**Munich Institute for Astro- and Particle Physics** Topical program on *"Astro-, particle and nuclear physics of dark matter direct detection"*, Munich, Germany
09/2011	**"Maria Laach" school for High Energy Physics,** Bautzen, Germany
02/2010	**50th Schladming Winter School 2012** *"Masses and Constants"*, Schladming, Austria
03 - 04/2009	**Research Stay, Max-Planck-Institut für Physik, Munich and CERN** Advisors: T. Trefzger (Würzburg), V. Zhuravlov (MPI/CERN)

Languages

German (Native Language), **English** (fluent), **Italian** (fluent), **Swedish** (basics)

Skills

General programming	C/C++, Python, FORTRAN
HEP related programs	Mathematica, WHIZARD, Sarah, FeynCalc

Göteborg (Svezia), 13 febbraio 2018

(Firma)

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Curriculum vitae

Firma: Mª Luisa López Ibáñez Data: 22.02.2018

PERSONAL INFORMATION / *INFORMACIÓN PERSONAL*

CURRENT PROFESSIONAL STATUS / *ESTADO PROFESIONAL ACTUAL*

INSTITUTION / ORGANISMO Università degli studi Roma Tre-INFN
FACULTY / FACULTAD Dipartimento di Matematica e Fisica
DEPARTMENT / DEPARTAMENTO Fisica Teorica
ADDRESS / DIRECCIÓN Via della Vasca Navale, 84, 00146, Roma (Italia)

TELEPHONE NUMBER / TELÉFONO +34 650334011
E-MAIL maloi2@uv.es

PROFESSIONAL CATEGORY / CATEGORÍA PROFESIONAL Temporary Research Fellow / Assegnista di Ricerca

DEDICATION / DEDICACIÓN Full time / Tiempo completo
START DATE / FECHA DE INICIO 04/01/2018

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EDUCATION / *FORMACIÓN*

PhD *DOCTORADO*	INSTITUTION *CENTRO*	OBTAINED IN DATE *FECHA DE FINALIZACIÓN*
PhD in Theoretical Physics / Doctorado en Física Teórica	University of Valencia / Universidad de Valencia	27/01/2017

ADVANCED STUDIES *ESTUDIOS 3º CICLO*	INSTITUTION *CENTRO*	NUMBER OF CREDITS *Nº DE CRÉDITOS*	OBTAINED IN DATE *FECHA DE FINALIZACIÓN*
Master in Advanced Physics / Máster en Física Avanzada	University of Valencia / Universidad de Valencia	120	23/09/2011

DEGREE *ESTUDIOS UNIVERSITARIOS*	INSTITUTION *CENTRO*	NUMBER OF CREDITS *Nº DE CRÉDITOS*	OBTAINED IN DATE *FECHA DE FINALIZACIÓN*
Degree in Physics / Licenciada en Física	University of Murcia / Universidad de Murcia	302,5	February 2010 Febrero 2010

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LANGUAGES / *IDIOMAS*

LANGUAGE *IDIOMA*	SPEAKING *HABLA*	READING *LEE*	WRITING *ESCRIBE*
Spanish / Español	Native / Nativo	Native / Nativo	Native / Nativo
English / Inglés	C1	C1	C1
Italian / Italiano	A2	A1	A1

OFFICIAL CERTIFICATES / *CERTIFICADOS OFICIALES DE IDIOMAS*

Grade B
Certificate in Advanced English (Council of Europe Level C1)
Univeristy of Cambridge, ESOL Examinations.
March, 2015.

Grade B
First Certificate in English (Council of Europe Level B2)
University of Cambridge, ESOL Examinations.
June, 2012.

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PARTICIPATION IN RESEARCH PROJECTS /
PARTICIPACIÓN EN PROYECTOS DE INVESTIGACIÓN FINANCIADOS

NAME OF THE PROJECT / TÍTULO DEL PROYECTO
Elemental particles: the Standard Model and its extensions /
Partículas elementales: el modelo estándar y sus extensiones

FUNDING INSTITUTION / ENTIDAD FINANCIADORA
Ministerio de Economía, Industria y Competitividad
Unión Europea, Fondo Europeo de Desarrollo Regional (FEDER)

FROM / DURACIÓN DESDE
2015

TO / HASTA
2017

PRINCIPAL INVESTIGATOR / INVESTIGODOR/A PRINCIPAL
Arcadi Santamaría Luna, J. A. Peñarrocha.

NAME OF THE PROJECT / TÍTULO DEL PROYECTO
Fundamental Interactions and their experimental implications /
Interacciones Fundamentales y sus Implicaciones Experimentales (FPA2012-23596)

FUNDING INSTITUTION / ENTIDAD FINANCIADORA
Ministerio de Economía y Competitividad

FROM / DURACIÓN DESDE
2012

TO / HASTA
2014

PRINCIPAL INVESTIGATOR / INVESTIGODOR/A PRINCIPAL
Francisco Botella Olcina

NAME OF THE PROJECT / TÍTULO DEL PROYECTO
From LHC physics to the primordial universe /
De la Física del LHC a las claves del universo primordial (GVPROMETEO2008-004)

FUNDING INSTITUTION / ENTIDAD FINANCIADORA
Conselleria d'Educació i Ciencia. Generalitat Valenciana.

FROM / DURACIÓN DESDE
2008

TO / HASTA
2012

PRINCIPAL INVESTIGATOR / INVESTIGODOR/A PRINCIPAL
José Bernabeu Alberola

NAME OF THE PROJECT / TÍTULO DEL PROYECTO
Design of a concentrated solar power system /
Diseño de concentrador solar

FUNDING INSTITUTION / ENTIDAD FINANCIADORA
Soltec Spain

FROM / DURACIÓN DESDE
2009

TO / HASTA
2010

PRINCIPAL INVESTIGATOR / INVESTIGODOR/A PRINCIPAL
Norberto López Gil

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PUBLICATIONS / PUBLICACIONES

INTERNATIONAL / INTERNACIONAL

AUTHORS / *AUTORES*
M.L. López-Ibáñez, Aurora Melis, M. Jay Pérez, Óscar Vives

TITLE / *TÍTULO*
Slepton Non-Universality in the Flavor-Effective MSSM

REFERENCE / REFERENCIA REVISTA O LIBRO
JHEP 11 (2017) 162

TYPE / CLAVE
Article / Artículo

INTERNATIONAL / INTERNACIONAL

AUTHORS / *AUTORES*
Dipankar Das, M.L. López-Ibáñez, M. Jay Pérez, Óscar Vives

TITLE / *TÍTULO*
Effective Theories of Flavor and the Non-Universal MSSM

REFERENCE / REFERENCIA REVISTA O LIBRO
Phys. Rev. D 95 (2017) 035001

TYPE / CLAVE
Article / Artículo

INTERNATIONAL / INTERNACIONAL

AUTHORS / AUTORES
M.L. López-Ibáñez

TITLE / TÍTULO
The 126 GeV Higgs boson in a general MSSM with explicit CP-violation

REFERENCE / REFERENCIA REVISTA O LIBRO
Nuclear and Particle Physics Proceedings 273-275 (2016) 522-527

TYPE / CLAVE
Article / Artículo

INTERNATIONAL / INTERNACIONAL

AUTHORS / AUTORES
Gabriela Barenboim, Cristian Bosch, J.S. Lee, M.L. López-Ibáñez, Óscar Vives

TITLE / TÍTULO
Flavor-changing Higgs boson decays into bottom and strange quarks

REFERENCE / REFERENCIA REVISTA O LIBRO
Phys. Rev. D92 (2015) 095017

TYPE / CLAVE
A

INTERNATIONAL / INTERNACIONAL

AUTHORS / AUTORES
Gabriela Barenboim, Cristian Bosch, M.L. López-Ibáñez, Óscar Vives

TITLE / TÍTULO
Improved tau-weapons for Higgs hunting

REFERENCE / REFERENCIA REVISTA O LIBRO
Phys. Rev. D90 (2014) 015003

TYPE / CLAVE
A

---

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INTERNATIONAL / INTERNACIONAL

AUTHORS / AUTORES
Gabriela Barenboim, Cristian Bosch, M.L. López-Ibáñez, Óscar Vives

TITLE / TÍTULO
Eviction if a 125 GeV "heavy"-Higgs from the MSSM

REFERENCE / REFERENCIA REVISTA O LIBRO ***TYPE / CLAVE***
JHEP 11 (2013) 051 A

NATIONAL / NATIONAL

AUTHORS / AUTORES
M.L. López-Ibáñez, Marta Galindo, Antonio Guirao Piñera

TITLE / TÍTULO
"Ver" la escena del crimen: técnicas e instrumentos ópticos en las ciencias forenses

REFERENCE / REFERENCIA REVISTA O LIBRO ***TYPE / CLAVE***
Ver y oir, 25 (2008) 223, 94-99 A

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RESEARCH EMPLOYMENT / *CONTRATOS DE INVESTIGACIÓN*

NAME OF THE CONTRACT / *TÍTULO DEL CONTRATO*
Temporary Research Fellow / Assegnista di Ricerca

FUNDING ORGANITATION OR INSTITUTION / *EMPRESA-ADMINISTRACIÓN FINANCIADORA*
Università degli studi di Roma Tre

FROM / *DURACIÓN DESDE*
01/01/2018

TO / HASTA
31/12/2019

SUPERVISOR / INVESTIGADOR RESPONSABLE
Davide Meloni

NAME OF THE CONTRACT / *TÍTULO DEL CONTRATO*
Postdoc Short Employment Contract
Contrato temporal como técnico superior de apoyo a la investigación

FUNDING ORGANITATION OR INSTITUTION / *EMPRESA-ADMINISTRACIÓN FINANCIADORA*
Ministerio de Economía, Industria y Competitividad. Unión Europea, Fondo Europeo de Desarrollo Regional (FEDER)

FROM / *DURACIÓN DESDE*
06/02/2017

TO / HASTA
31/12/2018

SUPERVISOR / INVESTIGADOR RESPONSABLE
Óscar M. Vives García.

NAME OF THE CONTRACT / *TÍTULO DEL CONTRATO*
Two-year contract within the FPI program for graduate students
Contrato en prácticas en el marco del Subprograma de Formación de Personal Investigador (FPI-MINECO)

FUNDING ORGANITATION OR INSTITUTION / *EMPRESA-ADMINISTRACIÓN FINANCIADORA*
Miniterio de Economía y Competitividad

FROM / *DURACIÓN DESDE*
01/12/2014

TO / HASTA
30/11/2016

SUPERVISOR / INVESTIGADOR RESPONSABLE
Óscar M. Vives García.

NAME OF THE CONTRACT / TÍTULO DEL CONTRATO
Short Employment Contract within the PROMETEO program for excellent investigation groups.
Tècnic superior de suport a la investigació (personal investigador novel) de la Universitat de València

FUNDING ORGANITATION OR INSTITUTION / EMPRESA-ADMINISTRACIÓN FINANCIADORA
Conselleria d'Educació

FROM / DURACIÓN DESDE
20/10/2011

TO / HASTA
30/06/2012

SUPERVISOR / INVESTIGADOR RESPONSABLE
Óscar M. Vives García.

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RESEARCH STAYS / *ESTANCIAS DE INVESTIGACIÓN*

CENTRE / *CENTRO*
University of Padova – INFN / Universidad de Padova - INFN

CITY / *LOCALIDAD*	**YEAR / AÑO**	**DURATION / DURACIÓN**
Padova	2015	3 months / 3 meses

COUNTRY / PAÍS	**SUPERVISOR / *INVESTIGADOR RESPONSABLE***
Italy / italia	Paride Paradisi

CENTRE / *CENTRO*
Chonnam National University / Universidad Nacional de Chonnam

CITY / LOCALIDAD	***YEAR / AÑO***	***DURATION / DURACIÓN***
Gwangju	2014	2 meses

COUNTRY / PAÍS	**SUPERVISOR / *INVESTIGADOR RESPONSABLE***
Corea del Sur	Jae Sik Lee

CENTRE / *CENTRO*
IFIC

CITY / LOCALIDAD	***YEAR / AÑO***	***DURATION / DURACIÓN***
Valencia	2012	1 mes

COUNTRY / PAÍS	**SUPERVISOR / *INVESTIGADOR RESPONSABLE***
España	Ángeles Faus

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CONFERENCES AND SEMINARS / *CONGRESOS Y SEMINARIOS*

AUTHORS / ***AUTORES***
M. L. López-Ibáñez

TITLE / ***TÍTULO***
Higgs and flavour phenomenology at the LHC era

TYPE / ***TIPO DE PARTICIPACIÓN***
Seminar / Seminario

LOCATION / ***LUGAR DE REALIZACIÓN***
Universita degli Studi Roma Tre, Roma.

YEAR / ***AÑO***
2017

INTERNATIONAL

AUTHORS / ***AUTORES***
M. L. López-Ibáñez, Aurora Melis, M. Jay Pérez, Óscar Vives

TITLE / ***TÍTULO***
Slepton Non-Universality in the Flavor-Effective MSSM

TYPE / ***TIPO DE PARTICIPACIÓN***
Talk / Charla

CONGRESS / ***CONGRESO***
VI Postgraduate Meeting on Theoretical Physics

LOCATION / ***LUGAR DE REALIZACIÓN***
Universidad de Valencia, Valencia.

YEAR / ***AÑO***
2017

AUTHORS / ***AUTORES***
M. L. López-Ibáñez, Aurora Melis, M. Jay Pérez, Óscar Vives

TITLE / TÍTULO
Slepton Non-Universality in the Flavor-Effective MSSM

TYPE / TIPO DE PARTICIPACIÓN
Seminario

LOCATION / LUGAR DE REALIZACIÓN
Universidad de Valencia, Valencia

YEAR / AÑO
2017

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INTERNATIONAL

AUTHORS / *AUTORES*
M. L. López-Ibáñez, G. Barenboim, C. Bosch, Óscar Vives

TITLE / TÍTULO
The 126 GeV Higgs boson in a general MSSM with explicit CP-violation

TYPE / TIPO DE PARTICIPACIÓN
Talk / Charla

CONGRESS / CONGRESO
37th International Conference on High Energy Physics

PUBLICATION / *PUBLICACIÓN*
Nuclear and Particle Physics Proceedings 273-275 (2016) 522-527

LOCATION / LUGAR DE REALIZACIÓN
Palacio de Congresos, Valencia

YEAR / AÑO
2014

AUTHORS / *AUTORES*
M. L. López-Ibáñez, G. Barenboim, C. Bosch, Óscar Vives

TITLE / TÍTULO
The 126 GeV Higgs boson in a general MSSM with explicit CP-violation

TYPE / TIPO DE PARTICIPACIÓN
Seminario

LOCATION / LUGAR DE REALIZACIÓN
KIAS, Seúl (Corea del Sur)

YEAR / AÑO
2014

AUTHORS / *AUTORES*
M. L. López-Ibáñez, G. Barenboim, C. Bosch, Óscar Vives

TITLE / TÍTULO
The 126 GeV Higgs boson in a general MSSM with explicit CP-violation

TYPE / TIPO DE PARTICIPACIÓN
Seminario

LOCATION / LUGAR DE REALIZACIÓN
Chonnam National University, Gwangju (Corea del Sur)

YEAR / AÑO
2014

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INTERNATIONAL

AUTHORS / *AUTORES*
M. L. López-Ibáñez, G. Barenboim, C. Bosch, Óscar Vives

TITLE / TÍTULO
The 126 GeV Higgs boson in a general MSSM with explicit CP-violation

TYPE / TIPO DE PARTICIPACIÓN
Talk / Charla

CONGRESS / CONGRESO
II Postgraduate Meeting on Theoretical Physics

LOCATION / LUGAR DE REALIZACIÓN
Instituto de Física Terórica-UAM/CSIC, Madrid

YEAR / *AÑO*
2013

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TEACHING / DOCENCIA

University	Faculty	Course	Credits	Date
University of Valencia / Universidad de Valencia	Faculty of Physics / Facultad de Física	Mechanics II / Mecánica II	4,5	2015-2016
University of Valencia / Universidad de Valencia	Faculty of Physics / Facultad de Física	Mechanics II / Mecánica II	4,5	2014-2015

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OTHER MERITS / *OTROS MÉRITOS*

SEMINARS, SCHOOLS AND SPECIFIC EDUCATION / SEMINARIOS, ASISTENCIA A ESCUELAS Y FORMACIÓN ESPECÍFICA

PhD courses / Cursos de doctorado	**Imparted by / Impartido por**	**Duration / Duración**
From QFT to holography and back	Dr. José L. Fernández Barbón	25/04/17 – 28/04/17
The Higgs as a way to discover new physics	Dr. Verónica Sanz	06/04/17 – 12/04/17
Monte Carlo tools for LHC Physics	Dr. Jong Soo Kim	21/03/17 – 24/03/17
Phase transitions and critical phenomenae	Prof. Carlos García Canal	03/10/16 – 14/04/16
Scientific python	Dr. Jacek Generowicz	02/05/16 – 06/05/16
Computational tools in particle physics	Dr. Avelino Vicente	01/02/16 – 05/02/16
Geometry and Supersymmetry	Prof. José Adolfo de Azcárraga	18/01/16 – 15/03/16
Group Theory	Dr. Daniel Hernández	02/06/15 – 12/06/15
Anomalies	Prof. William Bardeen	27/05/15 – 29/05/15
Effective Field Theories	Prof. Antonio Pich Zardoya	20/04/15 – 23/04/15
Higgs look-alikes	Prof. Joseph Lykken	31/03/14 – 03/04/14
Lepton Flavour Physics	Prof. Sacha Davidson	25/11/13 – 29/11/13
Introduction to C++ Programming	Dr. Jacek Generowicz	09/04/13 – 12/04/13
CKM matrix, CP violation and the fermion sector of the Standard Model	Prof. Eli Ben-Haim	04/06/12 – 08/06/12
Neutrinos	Dr. Carlos Peña	24/04/12 – 04/05/12

Schools / Escuelas	**Place / Lugar**	**Date / Fecha**
EFT in Particle Physics and Cosmology	Ecole de Physique des Houches (Les Houches, France)	04/07/17 – 28/07/17
Summer School on Particle Physics	ICTP (Trieste, Italia)	10/06/13 – 21/06/13
IDPASC	Universidad Santiago Compostela	21/01/13 – 01/02/13
Taller de Altas Energías 2012	Universidad Complutense de Madrid	16/07/12 – 27/12/12

Workshops and Conferences	**Place / Lugar**	**Date / Fecha**
Workshop on the Standard Model and Beyond	Corfu (Grecia)	02/09/17 – 10/09/17
A matter of flavour 1st PRISMA Interactive Symposium	Mainz (Germany)	19/02/17 – 22/02/17
Higgs Effective Field Theories	Madrid	28/09/14 – 30/09/14

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XL International Meeting on Fundamental Physics (Flavour and LHC miniworkshops) | Centro de Ciencias de Benasque Pedro Pascual (Huesca, España) | 24/05/12 – 03/06/12

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Curriculum Vitae - Flavio Mercati

Marie Skłodowska-Curie Fellow

University of Rome La Sapienza,
P.le Aldo Moro 2, 00185 Rome, Italy

www.AlboDocenti.it 12/09/18

Personal Data

Grants

2017-18 **FQXi Mini-Grant for conference organization,** amount: $ 8 000.

2013-15 **FQXi Large Grant,** amount: $ 139 650
Project: *"Information, Complexity and the Arrow of Time in Shape Dynamics"*
Principal Investigators: T. Koslowski, F. Mercati; Co-Investigator: Julian Barbour;

2016-17 **FQXi Mini-Grant,** amount: $ 2 500.

2013-16 **Templeton Frontiers grant** at Perimeter Institute, amount: $ 60 000;

2015-16 **FQXi Mini-Grant,** amount: $ 2 000.

2011-12 **Visiting grant** from Sapienza University of Rome to Nottingham University, amount: € 7 740;

Awards

2016 **1st prize ($ 10 000), Buchalter Cosmology Prize 2015**
For the paper: "Identification of a gravitational arrow of time"
The judging committee recognized the work as "an insightful step towards showing that an arrow of time is a natural expectation in cosmology, rather than a feature that requires significant fine-tuning as suggested by current theories."

2014 **Editor's suggestion** article in Phys. Rev. Lett. and Viewpoint from S. Carlip on 'Physics'
Title of the paper: "Identification of a gravitational arrow of time"
Co-authors: J. Barbour, T. Koslowski

2014 **Fourth prize ($ 1000)** in the FQXi essay competition 'How should humanity steer the future'
Title: *"U-turn or u die"*

2013 **Editor's choice** article in Gen. Rel. Grav.
Title of the paper:*"Scale anomaly as the origin of Time"*
Co-authors: J. Barbour, Matteo Lostaglio

2012 **Fourth prize ($ 1000)** in the FQXi essay competition 'Questioning the foundations'
Title of the essay: *"Right about Time?"*
Co-author: S. Gryb

2010 **Honorable mention** for the essay competition of the Gravity Research Foundation
Title of the essay: *"Gravity in quantum spacetime"*
Co-authors: G. Amelino-Camelia, N. Loret and G. Mandanici

Teaching experience

Nov 2016 — **Introduction to Quantum Gravity**,
part of the course held by prof. Amelino–Camelia
Department of Physics - University of Rome La Sapienza.

Sep 2013 — **An introduction to Shape Dynamics**, invited joint course with Julian Barbour
IHP Trimester summer school on Gravitation Astrophysics and Cosmology
Institut Henri Poincaré, Paris.

Jan 2009 - Jun 2009 — Teaching assistant for **General Physics course**
Biology Department - University of Rome "Sapienza".

2004 - 2006 — Tutoring for the **Programming (C language) course**
Department of Physics - University of Rome La Sapienza.

Student supervision

2017 — **Supervisor of Master theses**, students: Matteo Sergola,
Marco Sciannamea;
Department of Physics - University of Rome La Sapienza,

2014 — **Supervisor of Master thesis**, student: Andrea Napoletano, Marks: 110/110 *cum laude*
Project title: *"Black Holes in Shape Dynamics"*
Department of Physics - University of Rome La Sapienza,
Perimeter Institute for Theoretical Physics

2014 — **Supervisor of Master thesis**, student: Mykola Murskyj,
Project title: *"Homogeneous Cosmologies in Shape Dynamics"*
Perimeter Institute for Theoretical Physics - Perimeter Scholars International Program

2014 — **Supervisor of Master thesis**, student: Monica Rincon-Ramirez,
Project title: *"Relativity Without Relativity"*
Perimeter Institute for Theoretical Physics - Perimeter Scholars International Program

2013 — **Supervisor of Summer research project**, student: Matt Beach,
Project title: *"The relational quantum 3-body problem"*
University of Guelph, University of Waterloo, Perimeter Institute;

2012 — **Supervisor of Master thesis**, student: Matteo Lostaglio, Marks: 110/110 *cum laude*
Thesis title: *"Quantum anomaly as the origin of time"*
Department of Physics - University of Oxford and University of Pavia,

2008-10 — **Co-supervisor of Master theses**, Principal supervisor: Giovanni Amelino-Camelia
Students:
- Isabella Malacari (marks: 110/110),
- Giacomo Rosati (marks: 110/110 *cum laude*),
- Niccolò Loret (marks: 110/110 *cum laude*)

Department of Physics - University of Rome La Sapienza,

Conferences and seminars organization

1. Organizer of the international workshop *"SD pow-wow"*, College Farm, Oxfordshire, 4–10/10/2015.
2. Organizer of the international workshop *"SD@Convergence: A Shape Dynamics workshop"*, Perimeter Institute, 25–26/7/2015.
3. Organizer of the parallel sessions *"Quantum Gravity phenomenology and noncommutative geometry"* and *"Shape Dynamics and conformal approaches to Quantum Gravity"* at the Loops 2013 conference, held at Perimeter Institute, 22/7/2013 – 26/7/2013.
4. Member of the organizing committee of the *"Quantum Gravity Workshop"* held at University of Rome Sapienza, Rome, Italy, 6–7/5/2010.

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Education

2007 - 2010 **Ph.D. (Physics)**, University of Rome "Sapienza"
Title of the thesis: *"On the theory and phenomenology of quantum spacetime"*
Thesis defended on date 18/02/2011
Supervisor: Giovanni Amelino-Camelia

2005 - 2007 **Master Degree (Physics)**, University of Rome "Sapienza"
Grade: 110/110, *summa cum laude*
Title of the thesis:
"Noether analysis for field theory in κ-Minkowski noncommutative spacetime"
Thesis defended on date 28/09/2007
Supervisor: Giovanni Amelino-Camelia

2002 - 2005 **Bachelor Degree (Physics)**, University of Rome "Sapienza"
Grade:110/110, *summa cum laude*
Title of the thesis: *"Dimensioni extra e deviazioni dalla legge di Newton"*
Thesis defended on date 02/11/2005
Supervisor: Fabio Zwirner

Research appointments / Fellowships (postdocs are underlined)

Aug 2016 - Aug 2018 University of Rome La Sapienza, Italy
Marie Sklodowska-Curie **Postdoctoral Fellowship**

2016-2018 Juan de la Cierva Incorproración fellowship,
Ministry of Research and Innovation, Spain **(declined)**

2012 - 2016 Templeton Frontiers Fellow at Perimeter Institute for Theoretical Physics

Oct 2012 - Aug 2016 Perimeter Institute for Theoretical Physics, Canada
Postdoctoral Fellow

2013 - present Foundational Questions Institute (FQXi) Member

Nov 2011 - June 2012 University of Nottingham, UK
Postdoctoral Fellow

Oct 2010 - Oct 2011 University of Zaragoza, Spain
Postdoctoral Fellow

2007 - 2010 3-years PhD fellowship
Roma Tre University, Italy **(declined)**

2004 - 2007 Collaboration scholarship, Computer Programming Laboratory & Library,
Sapienza University of Rome, Physics Department.

Habilitations

2017 National Scientific Habilitation for Associate Professor in Theoretical Physics,
Ministry of Education, University and Research, **Italy**

2017 Habilitation for Permanent Researcher in Theoretical Physics,
Rudjer Boskovich Institute, **Croatia**

2017 Habilitation (idoneità) for Permanent Researcher in Applied Mathematics,
National Research Centre (CNR), **Italy**

Other professional duties

Referee for Physics Letters B, Classical and Quantum Gravity, European Physical Journal C, General Relativity and Gravitation, Annals Of Physics, Journal of Physics A.

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Seminars and Conference Talks

I have delivered **20 talks** at international conferences (four invited plenary talks), and have been invited to give **22 seminars** in world-wide recognized physics centres. I participated to **two summer schools**.

A few selected seminars available online

Mar 2016 **Plenary Lecture:** *"SD: a status report and a new result on the big-bang singularity"*
at "Shapes of Gravity", Radboud University Nijmegen, Netherlands
Video of the talk: Youtube video

Aug 2015 **Plenary talk:** *"Shape Dynamics @ different scales"*
at "Gravity @ all scales"
University of Nottingham, UK

Jul 2015 **Plenary talk:** *"Entropy and the typicality of universes"*
at "Quantum Gravity Workshop"
University of Rome "Sapienza", Italy

Jan 2015 **Colloquium:** *"Doing Physics with Shape Dynamics"*
Perimeter Institute for Theoretical Physics,
Video of the talk: http://pirsa.org/15020115/

Sep 2014 **Plenary talk:** *"A Gravitational Arrow of Time"*
at "Conceptual and Technical challenges for Quantum Gravity" conference
Perimeter Institute for Theoretical Physics

Feb 2014 **Colloquium:** *"À la recherche du temps perdu"*
Perimeter Institute for Theoretical Physics,
Video of the talk: http://pirsa.org/14020100/

Jan 2013 **Colloquium:** *"What is motion? What is time?"*
Perimeter Institute for Theoretical Physics
Video of the talk: http://pirsa.org/13010003

Nov 2011 *"Relative Locality, kappa-Poincaré and the Relativity Principle"*
Quantum Gravity Seminar of the Perimeter Institute for Theoretical Physics
Video of the talk: http://pirsa.org/11110138

July 2013 *"The Arrow of Time, Complexity and Bulk Entropy in Gravity"*
"Loops 13" conference, Perimeter Institute, Waterloo, Canada
Video of the talk: http://pirsa.org/13070040/

Publication record, citations, impact

Published papers: 31
- Phys. Rev. Lett.: 3 papers
- Phys. Lett. B: 6 papers
- Phys. Rev. D: 7 papers
- Europhys. Lett.: 1 paper
- Eur. Phys. J.: 2 papers
- Class. Quant. Grav.: 3 papers
- Gen. Rel. Grav.: 2 paper
- Int J. Mod. Phys. A: 1 paper
- Int J. Mod. Phys. D: 5 papers
- Rev. Math. Phys.: 1 paper
- J. Neurol. Sci.: 1 paper

Published books: 1, **Book chapters: 2**, **Conference proceedings: 6**

Total number of citations: 1036 on Google Scholar

Topcites (50+): 6,

Known papers (10-49 citations): 29,

h-index: 20, **i-10 index:** 28.

www.libroonline.it 12/09/18

Books

1. F. Mercati. ***Shape Dynamics: Relativity and Relationalism***. Oxford University Press, Feb. 2018. draft available at arXiv:1409.0105 .... *citations: 48*

Papers in refereed journals

1. G. Amelino-Camelia, C. Laemmerzahl, F. Mercati, and G. M. Tino. *Constraining the Energy-Momentum Dispersion Relation with Planck-Scale Sensitivity Using Cold Atoms*. Phys. Rev. Lett., 103:171302, 2009c. doi: 10.1103/PhysRevLett.103.171302 .... *citations: 87*
2. G. Amelino-Camelia, M. Matassa, F. Mercati, and G. Rosati. *Taming Nonlocality in Theories with Planck-Scale Deformed Lorentz Symmetry*. Phys. Rev. Lett., 106:071301, 2011b. doi: 10.1103/PhysRevLett.106.071301 .... *citations: 72*
3. J. Barbour, T. Koslowski, and F. Mercati. *Identification of a gravitational arrow of time*. Phys. Rev. Lett., 113(18):181101, 2014b. doi: 10.1103/PhysRevLett.113.181101 .... *citations: 44*
4. A. Stefani, A. Martorana, S. Bernardini, M. Panella, F. Mercati, A. Orlacchio, and M. Pierantozzi. *CSF markers in Alzheimer disease patients are not related to the different degree of cognitive impairment*. J. Neur. Sci., 251(1):124–128, 2006. doi: 10.1016/j.jns.2006.09.014 .... *citations: 52*
5. G. Gubitosi and F. Mercati. *Relative Locality in κ-Poincaré*. Class. Quant. Grav., 30:145002, 2013. doi: 10.1088/0264-9381/30/14/145002 .... *citations: 64*
6. G. Amelino-Camelia, G. Gubitosi, N. Loret, F. Mercati, G. Rosati, and P. Lipari. *OPERA-reassessing data on the energy dependence of the speed of neutrinos*. Int. J. Mod. Phys., D20:2623–2640, 2011a. doi: 10.1142/S0218271811020780 .... *citations: 74*
7. U. Jacob, F. Mercati, G. Amelino-Camelia, and T. Piran. *Modifications to Lorentz invariant dispersion in relatively boosted frames*. Phys. Rev., D82:084021, 2010. doi: 10.1103/PhysRevD.82.084021 .... *citations: 46*
8. H. Gomes, S. Gryb, T. Koslowski, F. Mercati, and L. Smolin. *A Shape Dynamical Approach to Holographic Renormalization*. Eur. Phys. J., C75:3, 2015. doi: 10.1140/epjc/s10052-014-3238-z .... *citations: 36*
9. G. Amelino-Camelia, G. Gubitosi, A. Marciano, P. Martinetti, and F. Mercati. *A No-pure-boost uncertainty principle from spacetime noncommutativity*. Phys. Lett., B671:298–302, 2009a. doi: 10.1016/j.physletb.2008.12.032 .... *citations: 29*
10. G. Amelino-Camelia, F. Briscese, G. Gubitosi, A. Marciano, P. Martinetti, and F. Mercati. *Noether analysis of the twisted Hopf symmetries of canonical noncommutative spacetimes*. Phys. Rev., D78:025005, 2008a. doi: 10.1103/PhysRevD.78.025005 .... *citations: 28*
11. J. Barbour, T. Koslowski, and F. Mercati. *The Solution to the Problem of Time in Shape Dynamics*. Class. Quant. Grav., 31:155001, 2014a. doi: 10.1088/0264-9381/31/15/155001 .... *citations: 37*
12. F. Mercati, D. Mazon, G. Amelino-Camelia, J. M. Carmona, J. L. Cortes, J. Indurain, C. Laemmerzahl, and G. M. Tino. *Probing the quantum-gravity realm with slow atoms*. Class. Quant. Grav., 27:215003, 2010. doi: 10.1088/0264-9381/27/21/215003 .... *citations: 31*
13. G. Amelino-Camelia, N. Loret, G. Mandanici, and F. Mercati. *UV and IR quantum-spacetime effects for the Chandrasekhar model*. Int. J. Mod. Phys., D21:1250052, 2012b. doi: 10.1142/S0218271812500526
14. H. Gomes, S. Gryb, T. Koslowski, and F. Mercati. *The gravity/CFT correspondence*. Eur. Phys. J., C73 (1):2275, 2013. doi: 10.1140/epjc/s10052-013-2275-3
15. G. Amelino-Camelia, G. Gubitosi, and F. Mercati. *Discreteness of area in noncommutative space*. Phys. Lett., B676:180–183, 2009b. doi: 10.1016/j.physletb.2009.04.045
16. S. Meljanac, D. Meljanac, F. Mercati, and D. Pikutić. *Noncommutative spaces and Poincaré symmetry*. Phys. Lett., B766:181–185, 2017. doi: 10.1016/j.physletb.2017.01.006

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17. J. M. Carmona, J. L. Cortes, D. Mazon, and F. Mercati. *About Locality and the Relativity Principle Beyond Special Relativity*. Phys. Rev., D84:085010, 2011. doi: 10.1103/PhysRevD.84.085010

18. G. Amelino-Camelia, N. Loret, G. Mandanici, and F. Mercati. *Gravity in quantum spacetime*. Int. J. Mod. Phys., D19:2385–2392, 2010c. doi: 10.1142/S0218271810018451

19. J. M. Carmona, J. L. Cortes, and F. Mercati. *Relativistic kinematics beyond Special Relativity*. Phys. Rev., D86:084032, 2012. doi: 10.1103/PhysRevD.86.084032

20. S. Gryb and F. Mercati. *2+1 gravity on the conformal sphere*. Phys. Rev., D87(6):064006, 2013. doi: 10.1103/PhysRevD.87.064006

21. P. Martinetti, F. Mercati, and L. Tomassini. *Minimal length in quantum space and integrations of the line element in Noncommutative Geometry*. Rev. Math. Phys., 24:1250010, 2012. doi: 10.1142/S0129055X12500109

22. J. Barbour, M. Lostaglio, and F. Mercati. *Scale Anomaly as the Origin of Time*. Gen. Rel. Grav., 45: 911–938, 2013b. doi: 10.1007/s10714-013-1516-y

23. G. Amelino-Camelia, G. Gubitosi, N. Loret, F. Mercati, and G. Rosati. *Weakness of accelerator bounds on departures from Lorentz symmetry for the electron*. EPL, 99(2):21001, 2012a. doi: 10.1209/0295-5075/99/21001

24. F. Mercati, H. Gomes, T. Koslowski, and A. Napoletano. *Gravitational collapse of thin shells of dust in asymptotically flat Shape Dynamics*. Phys. Rev., D95(4):044013, 2017. doi: 10.1103/PhysRevD.95.044013

25. J. Barbour, T. Koslowski, and F. Mercati. *Entropy and the Typicality of Universes*. 2015

26. G. Amelino-Camelia, L. Gualtieri, and F. Mercati. *Threshold anomalies in Horava-Lifshitz-type theories*. Phys. Lett., B686:283–287, 2010a. doi: 10.1016/j.physletb.2010.02.057

27. F. Mercati. *Quantum κ-deformed differential geometry and field theory*. Int. J. Mod. Phys., D25(05): 1650053, 2016b. doi: 10.1142/S021827181650053X

28. T. A. Koslowski, F. Mercati, and D. Sloan. *Through the Big Bang*. Phys. Lett., B778:339–343, 2018. doi: 10.1016/j.physletb.2018.01.055

29. F. Mercati. *On the fate of Birkhoff's theorem in Shape Dynamics*. Gen. Rel. Grav., 48(10):139, 2016c. doi: 10.1007/s10714-016-2134-2

30. N. Loret, S. Meljanac, F. Mercati, and D. Pikutić. *Vectorlike deformations of relativistic quantum phase-space and relativistic kinematics*. Int. J. Mod. Phys., D26(11):1750123, 2017. doi: 10.1142/S0218271817501231

31. D. C. Guariento and F. Mercati. *Cosmological self-gravitating fluid solutions of shape dynamics*. Phys. Rev., D94(6):064023, 2016. doi: 10.1103/PhysRevD.94.064023

Prize-winning Essays

1. S. Grybm and F. Mercati. Right about time? In ***Questioning the Foundations of Physics***, pages 145–157. Springer, 2015. doi: 10.1007/978-3-319-13045-3_6

2. F. Mercati. U-turn or u die. In ***How Should Humanity Steer the Future?***, pages 145–157. Springer, 2016a. doi: 10.1007/978-3-319-20717-9_14

Conference proceedings

1. G. Amelino-Camelia, G. Gubitosi, A. Marciano, P. Martinetti, F. Mercati, D. Pranzetti, and R. A. Tacchi. *First results of the Noether theorem for Hopf-algebra spacetime symmetries*. Prog. Theor. Phys. Suppl., 171:65–78, 2007. doi: 10.1143/PTPS.171.65

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2. G. Amelino-Camelia, G. Gubitosi, and F. Mercati. *On the theory and phenomenology of space-time symmetries at the Planck scale*. Int. J. Mod. Phys., A23:1157–1164, 2008c. doi: 10.1142/S0217751X08040019

3. G. Amelino-Camelia, N. Loret, and F. Mercati. *Quantum-gravity phenomenology of soft ultraviolet/infrared mixing*. AIP Conf. Proc., 1318:3–13, 2010d. doi: 10.1063/1.3531640

4. F. Mercati and A. Sitarz. *κ-Minkowski differential calculi and star product*. PoS, CNCFG2010:030, 2010

5. F. Mercati. *Shape dynamics and AdS/CFT*. J. Phys. Conf. Ser., 360:012062, 2012. doi: 10.1088/1742-6596/360/1/012062

Preprints

1. G. Amelino-Camelia, G. Gubitosi, and F. Mercati. *On the distance observable in the Moyal plane and in a novel two-dimensional space with string-theory pregeometry*. 2008b

2. G. Amelino-Camelia and F. Mercati. *String-Inspired Ultraviolet/Infrared Mixing and Preliminary Evidence of a Violation of the de Broglie Relation for Nonrelativistic Neutrons*. 2010

3. G. Amelino-Camelia, G. Gubitosi, F. Mercati, and G. Rosati. *Conserved charges and quantum-group transformations in noncommutative field theories*. 2010b

4. J. Barbour, T. Koslowski, and F. Mercati. *A Gravitational Origin of the Arrows of Time*. 2013a

5. E. Anderson and F. Mercati. *Classical Machian Resolution of the Spacetime Reconstruction Problem*. 2013

6. J. Barbour, T. Koslowski, and F. Mercati. *Janus Points and Arrows of Time*. 2016

7. F. Mercati. *Thin shells of dust in a compact universe*. 2017

8. F. Mercati and M. Sergola. *Pauli-Jordan Function and Scalar Field Quantization in κ-Minkowski Noncommutative Spacetime*. 2018

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Invited Seminars

15/2/2018	***"A noncommutative light cone from κ-Poincaré invariant QFT"*** University of Burgos, Spain
1/12/2017	***"Pauli-Jordan function in noncommutative QFT and noncommutative light cone"*** University of Burgos, Spain
16/12/2016	***"Noncommutative differential geometry and field theory"*** University of Rome La Sapienza
16/12/2016	***"Introduction to Shape Dynamics"*** University of Burgos, Spain
22/9/2016	***"Noncommutative differential geometry and κ-deformed field theory"*** Rudjer Boskovich Institute, Zagreb, Croatia
1/6/2016	***"Noncommutative differential geometry and field theory"*** Perimeter Institute for Theoretical Physics
3/3/2016	"Through the Big Bang" Physics department, Radboud University Nijmegen
25/2/2015	**Colloquium:*"Doing Physics with Shape Dynamics"*** Perimeter Institute for Theoretical Physics, **Video of the talk:** http://pirsa.org/15020115/
15/12/2014	***"Shape Dynamics"*** IFT, Universidad Autonoma de Madrid, Spain
26/2/2014	**Colloquium:*"À la recherche du temps perdu"*** Perimeter Institute for Theoretical Physics, **Video of the talk:** http://pirsa.org/14020100/
4/2/2014	***"Shape Dynamics"*** LPSC Grenoble, France
28/1/2014	***"Shape Dynamics: an overview"*** APC Paris, France
21/1/2014	***"What is Shape Dynamics?"*** ENS Lyon, France
6/12/2013	***"A Gravitational Arrow of Time"*** University of California at Davis, US
23/1/2013	**Colloquium:*"What is motion? What is time?"*** Perimeter Institute for Theoretical Physics **Video of the talk:** http://pirsa.org/13010003
21/12/2012	***"Quantum anomaly as the origin of time"*** Perimeter Institute for Theoretical Physics
28/02/2012	***"Relativity without relativity"*** School of Mathematical Sciences, University of Nottingham, UK
21/11/2011	***"Relative Locality, kappa-Poincaré and the Relativity Principle"*** Quantum Gravity Seminar of the Perimeter Institute for Theoretical Physics **Video of the talk:** http://pirsa.org/11110138
23/3/2011	***"kappa-Poincaré and the relativity of locality"*** School of Mathematical Sciences, University of Nottingham, UK
13/5/2010	***"Probing the quantum gravity realm with cold particles"*** Department of Physics of UC Berkeley, California, US

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19/11/2009 ***"Generalizing the Noether theorem for field theories over noncommutative spacetimes"***
Theoretical Physics seminar at Imperial College, London, UK

18/11/2009 ***"Noncommutative spacetimes and quantum gravity phenomenology"***
School of Mathematical Sciences, University of Nottingham, UK

29/10/2009 ***"Probing the quantum-gravity realm with cold atoms"***
ICRA seminar at University of Rome "Sapienza"

Conference talks

Jan 2018 ***"Observers in Quantum Gravity: introduction'***
Observers in Quantum Gravity Workshop, Sapienza University Rome
22/01/2018 - 23/01/2018

Lug 2017 ***"Shape Dynamics: describing gravity with conformal 3-geometry"***
Loops 17, Warsaw, Poland
03/07/2016 - 07/07/2016

Mag 2016 ***''Compact spherically symmetric solutions and gravitational collapse in SD"***
Shape Dynamics Workshop, Perimeter Institute
15/05/2016 - 17/05/2016

Lug 2016 ***"Noncommutative field theory and quantum deformations of centrally extended algebras"***
Problemi Moderni di Fisica Teorica, Vietri sul Mare, Italy

Nov 2016 ***"Gravitational Collapse in SD: The Twin Shell Universe"***
at "Shape Dynamics Workshop", UNAM, Mexico City
21/11/2016 - 26/11/2016

Lug 2016 ***"Covariant κ-deformed field theory in the language of differential forms"***
at "Noncommutative geometry, quantum symmetries and quantum gravity II"
XXXVII Max Born Symposium, Wroclaw University, Poland
4/7/2016 - 7/7/2016

Mar 2016 **Plenary Lecture:*"SD: a status report and a new result on the big-bang singularity"***
at "Shapes of Gravity", Radboud University Nijmegen, Netherlands
Video of the talk: Youtube video
30/3/2016 - 1/4/2016

Ago 2015 **Plenary talk:*"Shape Dynamics @ different scales"***
at "Gravity @ all scales"
University of Nottingham, UK
24/8/2015 - 28/8/2015

Lug 2015 **Plenary talk:*"Entropy and the typicality of universes"***
at "Quantum Gravity Workshop"
University of Rome "Sapienza", Italy
20/7/2015 - 23/7/2015

Apr 2015 ***"A gravitational arrow of time"***
"IberiCOS 2015" cosmology meeting,
Aranjuez, Spain
30/3/2015 - 1/4/2015

Set 2014 **Plenary talk:*"A Gravitational Arrow of Time"***
at "Conceptual and Technical challenges for Quantum Gravity" conference
Perimeter Institute for Theoretical Physics
8/9/2014 - 12/9/2014

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Lug 2014 ***"Gravitational collapse in Shape Dynamics"***
at "XIV Marcel Grossmann meeting"
University of Rome "Sapienza", Italy
12/7/2014 - 18/7/2014

Giu 2014 ***"Welcomes and introduction"***
at 'SD@Convergence"
Perimeter Institute for Theoretical Physics
25/6/2014 - 26/6/2014

Mag 2014 ***"Shape Dynamics: an introduction and a status report"***
Opening lecture of the "Shape Dynamics Workshop"
within the "Atlantic GR 2014" conference
University of New Brunswick, Canada
2/5/2014 - 9/5/2014

Lug 2013 ***"The Arrow of Time, Complexity and Bulk Entropy in Gravity"***
"Loops 13" conference, Waterloo, Canada
Video of the talk: http://pirsa.org/13070040/
22/7/2013 - 26/7/2013

Mag 2012 ***"Shape Dynamics: Relativity without Relativity"***
"The conformal nature of the Universe" workshop, Perimeter Institute for Theoretical Physics
Video of the talk: http://pirsa.org/12050067
9/5/2012 - 12/5/2012

Mag 2011 ***"Shape Dynamics and the Gravity/CFT correspondence"***
"Loops 2011" international conference, Madrid, Spain
23/5/2011 - 28/5/2011

Mag 2010 ***"IR/UV mixing and an anomaly with cold neutrons"***
"Quantum Gravity Workshop", University of Rome "Sapienza", Italy
6/5/2010 - 7/5/2010

Lug 2009 ***"Sensitivity to Planck scale effects in cold atom experiments"***
XII Marcel Grossmann Meeting, Paris, France
12/07/2009 - 18/7/2009

Lug 2008 ***"A no-pure-boost uncertainty principle from space-time noncommutativity"***
Workshop "Noncommutative deformations of special relativity"
ICMS, Edinburgh, UK
07/07/2008 - 11/07/2008

Signature

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CURRICULUM VITAE

Luca Panizzi

15/02/2018

Personal Data

Education and qualifications

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)

January 2014
Qualification aux fonctions de maître de conférences (eligibility to access faculty positions of associate professor in France)

Positions

2009 - 2012 Postdoctoral position (Chercheur CNRS), Institut de Physique Nucléaire de Lyon and CNRS
2012 - 2016 Postdoctoral Research Associate, University of Southampton, UK
2016 - 2017 Postdoctoral position, University of Genova, Italy

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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-based 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

March 2009 - June 2009	Royal Society International Travel Grants 2008
July 2009 - November 2009	Grant of the Consorzio per la Fisica, University of Trieste

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

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-present	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

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

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Referee Activity

from 2012	Physical Review D (PRD) and Journal of High Energy Physics (JHEP)
from 2013	Physics Letters B (PLB)
from 2015	Physical Review Letters (PRL)
from 2018	European Physical Journal C (EJPC)

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

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).

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

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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*

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

I have also given multiple vidyo presentations within CMS related to the analyses I was working on.

Publications, preprints and proceedings

Publications

1. M. Beccaria, G. Macorini, L. Panizzi, F. M. Renard and C. Verzegnassi, "Supersymmetry spectroscopy in stop-chargino production at LHC", Phys. Rev. **D74** (2006) 093009, [arXiv: hep-ph/0610075].
2. F. del Aguila et al., "Collider aspects of flavour physics at high Q," Eur. Phys. J. **C57** (2008) 183-308, arXiv:0801.1800 [hep-ph].
3. M. Beccaria, G. Macorini, L. Panizzi, F. M. Renard and C. Verzegnassi, "Stop-antistop and sbottom-antisbottom production at LHC: a one-loop search for model parameters dependence," Int. J. Mod. Phys. **A23** (2008) 4779-4810, arXiv:0804.1252 [hep-ph].

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4. M. Beccaria, G. Macorini, E. Mirabella, L. Panizzi, F. M. Renard and C. Verzegnassi, "One-loop electroweak effects on stop-chargino production at LHC," Int. J. Mod. Phys. **A24** (2009) 5539, arXiv:0812.4375 [hep-ph].
5. M. Beccaria, G. Macorini, L. Panizzi, F. M. Renard and C. Verzegnassi, "Associated production of charged Higgs and top at LHC: the role of the complete electroweak supersymmetric contribution," Phys. Rev. **D80** (2009) 053011, arXiv:0908.1332 [hep-ph].
6. M. Beccaria, G.O. Dovier, G. Macorini, E.Mirabella, L. Panizzi, F. M. Renard and C. Verzegnassi, "Semi-inclusive bottom-Higgs production at LHC: The complete one-loop electroweak effect in the MSSM," Phys. Rev. **D82** (2010) 093018, arXiv:1005.0759 [hep-ph].
7. G. Macorini, S. Moretti, L. Panizzi, "Strong and Electro-Weak Supersymmetric Corrections to Single Top Processes at the Large Hadron Collider," Phys. Rev. **D82** (2010) 054016, arXiv:1006.1501 [hep-ph].
8. G. Cacciapaglia, R. Chierici, A. Deandrea, L. Panizzi, S. Perries, S. Tosi, "Four tops on the real projective plane at LHC," JHEP **1110** (2011) 042, arXiv:1107.4616 [hep-ph].
9. G. Cacciapaglia, A. Deandrea, N. Gaur, D. Harada, Y. Okada and L. Panizzi, "Heavy Vector-like Top Partners at the LHC and flavour constraints," JHEP **1203** (2012) 070, arXiv:1108.6329 [hep-ph].
10. G. Cacciapaglia, A. Deandrea, L. Panizzi, "Superluminal neutrinos in long baseline experiments and SN1987a," JHEP **1111** (2011) 137, arXiv:1109.4980 [hep-ph].
11. Y. Okada and L. Panizzi, "LHC signatures of vector-like quarks," Adv. High Energy Phys. **2013** (2013) 364936, arXiv:1207.5607 [hep-ph].
12. G. Cacciapaglia, A. Deandrea, S. Perries, V. Sordini and L. Panizzi, "Heavy Vector-like quark with charge 5/3 at the LHC," JHEP **1303** (2013) 004, arXiv:1211.4034 [hep-ph].
13. G. Cacciapaglia, A. Deandrea, J. Ellis, J. Marrouche and L. Panizzi, "LHC Missing-Transverse-Energy Constraints on Models with Universal Extra Dimensions," Phys. Rev. D **87** (2013) 075006, arXiv:1302.4750 [hep-ph].
14. M. Buchkremer, G. Cacciapaglia, A. Deandrea and L. Panizzi, "Model Independent Framework for Searches of Top Partners," Nucl. Phys. B **876** (2013) 376, arXiv:1305.4172 [hep-ph].
15. D. Barducci, S. Belyaev, J. Blamey, S. Moretti, L. Panizzi and H. Prager, "Towards a model-independent approach to the analysis of interference effects in pair production of new heavy quarks," JHEP **1407** (2014) 142, arXiv:1311.3977 [hep-ph].
16. N. Chen, Y. Zhang, Q. Wang, G. Cacciapaglia, A. Deandrea and L. Panizzi, "Higgsphobic and fermiophobic Z' as a single dark matter candidate," JHEP **1405** (2014) 088, arXiv:1403.2918 [hep-ph].
17. D. Barducci, S. Belyaev, M. Buchkremer, G. Cacciapaglia, A. Deandrea, S. De Curtis, J. Marrouche, S. Moretti and L. Panizzi, "Framework for Model Independent Analyses of Multiple Extra Quark Scenarios," JHEP **1412** (2014) 080, arXiv:1405.0737 [hep-ph].
18. S. F. King, A. Merle and L. Panizzi, "Effective theory of a doubly charged singlet scalar: complementarity of neutrino physics and the LHC," JHEP **1411** (2014) 124, arXiv:1406.4137 [hep-ph].
19. D. Barducci, A. Belyaev, M. Buchkremer, J. Marrouche, S. Moretti and L. Panizzi, "XQCAT: eXtra Quark Combined Analysis Tool,", Comput. Phys. Commun. **197** (2015) 263, arXiv:1409.3116 [hep-ph].
20. G. Cacciapaglia, A. Deandrea, N. Gaur, D. Harada, Y. Okada and L. Panizzi, "Interplay of vector-like top partner multiplets in a realistic mixing set-up," JHEP **1509** (2015) 012, arXiv:1502.00370 [hep-ph].
21. T. Geib, S. F. King, A. Merle, J. M. No and L. Panizzi, "Probing the Origin of Neutrino Masses and Mixings via Doubly Charged Scalars: Complementarity of the Intensity and the Energy Frontiers," Phys. Rev. D **93** (2016) no.7, 073007, arXiv:1512.04391 [hep-ph].
22. S. Moretti, D. O'Brien, L. Panizzi and H. Prager, "Production of extra quarks at the Large Hadron Collider beyond the Narrow Width Approximation," arXiv:1603.09237 [hep-ph], Phys. Rev. D **96** (2017) no.7, 075035.
23. S. Jain, F. Margaroli, S. Moretti and L. Panizzi, "The 750 GeV threshold to a new particle world," arXiv:1605.08741 [hep-ph], Phys. Rev. D **95**, no. 1, 014037 (2017).
24. S. Kraml, U. Laa, L. Panizzi and H. Prager, "Scalar versus fermionic top partner interpretations of $t\bar{t}+E_T^{\rm miss}$ searches at the LHC," JHEP **1611** (2016) 107, arXiv:1607.02050 [hep-ph].
25. A. Belyaev, L. Panizzi, A. Pukhov and M. Thomas "Dark Matter characterization at the LHC in the Effective Field Theory approach," JHEP **1704** (2017) 110, arXiv:1610.07545 [hep-ph].
26. S. Moretti, D. O'Brien, L. Panizzi and H. Prager, "Production of extra quarks decaying to Dark Matter beyond the Narrow Width Approximation at the LHC," Phys. Rev. D **96** (2017) no.3, 035033, arXiv:1705.07675 [hep-ph].
27. D. Barducci and L. Panizzi, "Vector-like quarks coupling discrimination at the LHC and future hadron colliders," JHEP **1712** (2017) 057, arXiv:1710.02325 [hep-ph].
28. D. Barducci, A. Deandrea, S. Moretti, L. Panizzi and H. Prager, "Characterising Dark Matter Interacting with Extra Charged Leptons," arXiv:1801.02707 [hep-ph].

Author Preprint

Publications and preprints with experimental collaborations

1. A. M. Sirunyan *et al.* [CMS Collaboration], "Search for single production of a vector-like T quark decaying to a Z boson and a top quark in proton-proton collisions at sqrt(s) = 13 TeV," arXiv:1708.01062 [hep-ex].
2. A. M. Sirunyan *et al.* [CMS Collaboration], "Search for single production of vector-like quarks decaying to a b quark and a Higgs boson," arXiv:1802.01486 [hep-ex].

Proceedings

I only list proceedings for conferences in which I have personally given a talk.

1. L. Panizzi, "Vector-like quarks: t' and partners," Nuovo Cim. C **037** (2014) 02, 69.
2. L. Panizzi, "Model-independent Analysis of Scenarios with Vector-like Quarks," Acta Phys. Polon. Supp. **7** (2014) 3, 631.

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SUMMARY OF RESEARCH ACTIVITY

Luca Panizzi

Throughout my research career I have being working on the phenomenological aspects at colliders of different new physics scenarios and I have developed a wide range of skills and competences in both theoretical and experimental aspects. My approach is *model-independent* and *bottom-up*, and it is nowadays widely adopted by the phenomenological community: it consists in identifing and analysing relevant signatures in minimal extensions of the SM (*e.g.* effective field theories or simplified models) and reinterpret them to reconstruct more complex scenarios which approximate the complete signatures predicted by theoretically motivated models of new physics.

In the first years of my activity I have worked on the calculation of NLO corrections in the electroweak sector to different processes of production of SM and supersymmetric states at the LHC, such as in Refs. [1, 2].

The main focus of my work so far, however, has consisted in the analysis of signatures generated by the production and decay of new heavy quarks, mostly with vector-like properties. My studies resulted in the production of relevant publications [3, 4, 5, 6, 7, 8, 9] and in the generation of public models for numerical simulations [5, 6], which are systematically used and referenced by both ATLAS and CMS experimental collaborations and in phenomenological papers. As a result of my studies I also developed a public tool to recast LHC public data in these scenarios [7, 8].

My established reputation in the field allowed me to be directly involved in the development and publication of experimental searches. I actively collaborate with CMS, first through the Rutherford Appleton Laboratory (RAL) in UK and currently through the CMS group in the University of Genova. Through this collaboration I can directly contribute to the editing of experimental publications, have access to the relevant subset of non-public data and influence the way results are presented to the scientific community, while keeping my independence as theoretical physicist for the rest of my research projects. This has resulted in my authorship of one CMS publication [9] and, in the forthcoming future, I will be included as author of at least another one which is already in its final stage of develoment [10].

My research interests have also gradually spanned into different aspects of new physics, and my focus has shifted to the in-depth characterisation of possible signals and excesses to allow their interpretation in terms of theoretical scenarios and narrow down the possibilities, which is the research path I am willing to follow in the next years.

Since recently, I have started the analysis of signatures with missing transverse energy, which can be interpreted as originating from dark matter (DM) candidates, with the purpose of characterising the properties of DM and especially its spin. The strategy I adopted is to identify and analyse combinations of observables with the aim of associating specific features of the final states to the spin of DM and therefore discriminate between different scenarios. The importance of this analysis is due to the fact that if signals compatible with the presence of a DM candidate are observed at the LHC, a precise and detailed characterisation of their properties would allow to embed the DM state in a subset of theoretical scenarios and exclude other scenarios. I have already produced different important results, where signatures originated by fermionic DM were compared with analogous signatures with bosonic DM [6, 11, 12] in different contexts. The characterisation of DM properties at colliders has been given mild attention in literature, but my approach is gaining growing popularity. I am working with the CMS groups of São Paulo (Brasil) for applying shape-analysis techniques with the aim of discriminating signals in the context of a two-Higgs doublet model.

Parallelly to my main research activity, I have worked on different projects, related to extra-dimensions [13] and neutrino physics [14] and I have recently taken part to a project for the measurement of the Hubble constant at the University of Genoa, in which I proposed novel observational techniques and analysis strategies for extracting data from non-resolved astrophysical objects, which are being currently used in observational campaigns of gravitationally lensed quasars with an optical telescope [15].

References

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[7] D. Barducci et al. *JHEP* **12** (2014) 080, [arXiv:1405.0737].

[8] D. Barducci et al. *Comput. Phys. Commun.* **197** (2015) 263–275, [arXiv:1409.3116].

[9] **CMS** Collaboration, A. M. Sirunyan et al. arXiv:1708.0106.

[10] **CMS** Collaboration, CMS-PAS-B2G-17-009.

[11] G. Cacciapaglia et al. *Phys. Rev.* **D87** (2013), no. 7 075006, [arXiv:1302.4750].

[12] A. Belyaev et al. arXiv:1610.0754.

[13] G. Cacciapaglia, R. Chierici, A. Deandrea, L. Panizzi, S. Perries, and S. Tosi *JHEP* **10** (2011) 042, [arXiv:1107.4616].

[14] S. F. King, A. Merle, and L. Panizzi *JHEP* **11** (2014) 124, [arXiv:1406.4137].

[15] http://www.orsa.unige.net/index.php/en/research/time-delay-for-gravitationally-lensed-quasar/.

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Erica Vagnoni

Curriculum Vitae

Personal details

First name
Surname
Birth place
Nationality
Date of birth
Age
Gender
Mobile Phone
Email

Education

2014 - 2016 **Ph.D.**, *Physics.*
Università degli Studi Roma Tre, Rome, Italy.
Thesis: *Theoretical description and reconstruction of neutrino interactions, and systematic uncertainties of long-baseline oscillation experiments.*
Advisors: Dr. Davide Meloni and Prof. Omar Benhar.

2011 - 2013 **Laurea Magistrale (Master of Science)**, *Physics*, 110/110 *cum laude*, 22/10/2013.
Sapienza Università di Roma, Rome, Italy.
Thesis: *Effetti nucleari nelle oscillazioni di neutrini.*
Advisors: Prof. Omar Benhar and Dr. Davide Meloni.

2007 - 2011 **Laurea Triennale (Bachelor of Science)**, *Physics*, 31/03/2011.
Sapienza Università di Roma, Rome, Italy.
Thesis: *Integrali sui cammini.*
Advisor: Prof. Silvano Petrarca.

2002 - 2007 **Maturità scientifica**, 04/07/2007.
Liceo Scientifico B. Rosetti, San Benedetto del Tronto (AP), Italy.

Work Experience

Aug. 2017 - today **Software Analyst.**
PC CUBE s.r.l., Rome, Italy.

Mar. 2017 - July 2017 **Borsa di Studio**, *attività di ricerca sulle proprietà di oscillazione di antineutrini elettronici in esperimenti da reattore.*
Physics Department of Università degli Studi Roma Tre, Rome, Italy.

Feb. 2016 - Jun. 2016 **Graduate Teaching Assistant**, *Course: Fisica 2*, Corso di Laurea in Matematica.
Mathematics Department of Università degli Studi Roma Tre, Rome, Italy.

Other Information

Oct. 2014 **Visitor Scholar.**
Center for Neutrino Physics of Virginia Tech, (Blacksburg, USA).

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Computer skills

Operating systems	Unix, Linux O.S., Windows O.S.
Programming	Advanced knowledge: `C`, `C++`, Wolfram Mathematica, `Fortran`
	Basic knowledge: Apache Hadoop, `Python`, `R`, Apache Spark, TensorFlow, SQL
Web programming	`HTML`, `Angular`
Software	Proficent in Microsoft Office package: Excel, Word, Power Point
Others	LaTeX, Beamer, Emacs

Certifications

- 3rd School on Scientific Data Analytics and Visualization
  CINECA, Rome, Italy. Monday, June 12th to Friday, June 16th, 2016.
- Python for Computational Science, *PACS Course*
  CINECA, Rome, Italy. Tuesday, December 1st to Thursday, December 3rd, 2015.
- Tools and techniques for massive data analysis
  CINECA, Rome, Italy. Tuesday, December 14th to Thursday, December 16th, 2015.
- Introduzione all'utilizzo di R, *Corsi di Formazione su Software Statistico*
  Sapienza, Rome, Italy. Tuesday, July 21st to Thursday, July 23rd, 2016.

Scientific Publications

1. A. M. Ankowski, O. Benhar, P. Coloma, P. Huber, C.-M. Jen, C. Mariani, D. Meloni and E. Vagnoni, *Comparison of the calorimetric and kinematic methods of neutrino energy reconstruction in disappearance experiments*. Phys. Rev. **D92**, 073014 (2015).
2. A. M. Ankowski, P. Coloma, P. Huber, C. Mariani, and E. Vagnoni, *Missing energy and the measurement of the CP-violating phase in neutrino oscillations*. Phys. Rev. **D92**, 091301 (2015).
3. A. M. Ankowski, O. Benhar, P. Coloma, P. Huber, C.-M. Jen, C. Mariani, D. Meloni and E. Vagnoni, *Neutrino energy reconstruction in disappearance experiments with calorimetric and kinematic methods*. Nuovo Cim. **C39**, 233 (2016).
4. A. M. Ankowski, O. Benhar, C. Mariani, and E. Vagnoni, *Effect of the 2p-2h cross-section uncertainties on an analysis of neutrino oscillations*. Phys. Rev. **D93**, 113004 (2016).
5. E. Vagnoni, *Neutrino energy reconstruction in long-baseline experiments*. `arXiv:1604.08392` (2016).
6. E. Vagnoni, O. Benhar and D. Meloni, *Inelastic Neutrino-Nucleus Interactions within the Spectral Function Formalism*. Phys. Rev. Lett. **118**, 142502 (2017)

Doctoral Schools

1. The XVII LNF Spring School Bruno Touschek in Nuclear, Subnuclear and Astroparticle Physics. INFN National Laboratories in Frascati, Italy.
   May 12th to May 16th, 2014.
2. NuStec: Neutrino Scattering Theory Experiment Collaboration 2014. Training in Neutrino Nucleus Scattering Physics. FermiLab, Batavia IL, USA.
   Oct. 21st to Oct. 29th, 2014.
3. NuStec: Neutrino Scattering Theory Experiment Collaboration 2015. Training in Neutrino Nucleus Scattering Physics. Okayama, Japan.
   Oct. 7th to Oct. 14th, 2015.

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Conferences and Workshops

1. Poster presented at IFAE, Incontri di Fisica delle alte energie, 2015. INFN & Università degli studi di Roma, Tor Vergata , Italy.
   April 8th to April 10th, 2015.
2. Poster presented at NuPhys 2015: Prospects in Neutrino Physics. London, UK.
   Dec. 16th to Dec 18th, 2015.
3. Talk at XIV Workshop on Lepton-Nucleus Scattering. Isola d'Elba, Italy.
   June 27th to July 1st, 2016.
4. Talk at NuFact 2016. Quy Nhon, Vietnam.
   Aug. 21st to Aug. 27th, 2016.

Languages

Italian Mother tongue

	Understanding		Speaking		Writing
English	Listening	Reading	Spoken interaction	Spoken production	
	B2	C1	B1	B1	C1

Levels: A1/2 Basic user - B1/2 Independent user - C1/2 Proficient user
Common European Framework of Reference for Languages

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Autorizzo il trattamento dei dati personali contenuti nel mio curriculum vitae in base art. 13 del D. Lgs. 196/2003

Luogo e data
ROMA, 18/02/18

Firma del dichiarante
Erica Vagnoni