ELENCO DELLE PUBBLICAZIONI

DICHIARA

- di aver presentato le seguenti pubblicazioni:

1. T. Alberti, F. Lepreti, A. Vecchio, E. Bevacqua, V. Capparelli, and V. Carbone:
   "Natural periodicities and Northern Hemisphere-Southern Hemisphere connection of fast temperature changes during the last glacial period: EPICA and NGRIP revisited",
   Climate of the Past, **10**, 1751-1762, doi:10.5194/cp-10-1751-2014, 2014.
2. T. Alberti, L. Primavera, A. Vecchio, F. Lepreti, and V. Carbone:
   "Spatial interactions in a modified Daisyworld model: heat diffusivity and greenhouse effects",
   Physical Review E, **92**, 052717,
   doi:http://dx.doi.org/10.1103/PhysRevE.92.052717, 2015.
3. T. Alberti, M. Laurenza, E.W. Cliver, M. Storini, G. Consolini, and F. Lepreti:
   "Solar activity from 2006-2014 and short-term forecasts of solar proton events using the ESPERTA model",
   The Astrophysical Journal, **838**, 59, 2017.
4. T. Alberti, G. Consolini, F. Lepreti, M. Laurenza, A. Vecchio, and V. Carbone:
   "Timescale separation in the solar wind-magnetosphere coupling during St. Patrick's Day storms in 2013 and 2015",
   Journal of Geophysical Research, Special Issue on "Geospace system responses to the St. Patrick's Day storms in 2013 and 2015", **122**, 4266-4283, doi:10.1002/2016JA023175, 2017.

5. T. Alberti, G. Consolini, P. De Michelis, M. Laurenza, and M. F. Marcucci:
"On fast and slow Earth's magnetospheric dynamics during geomagnetic storms: a stochastic Langevin approach",
Journal of Space Weather and Space Climate, **8**, A56, 2018.

6. T. Alberti, G. Consolini, V. Carbone, E. Yordanova, M. F. Marcucci, and P. De Michelis:
"Multifractal and chaotic properties of solar wind at MHD and kinetic domains: an Empirical Mode Decomposition approach",
Entropy, **21**, 320, 2019.

7. T. Alberti, F. Giannattasio, P. De Michelis, and G. Consolini:
"Linear versus nonlinear methods for detecting magnetospheric and ionospheric current systems patterns",
Earth and Space Science, **7**, 1-13, 10.1029/2019EA000559, 2020.

8. T. Alberti, J. Lekscha, G. Consolini, P. De Michelis, and R.V. Donner:
"Disentangling nonlinear geomagnetic variability during magnetic storms and quiescence by timescale dependent recurrence properties",
Journal of Space Weather and Space Climate, **10**, 25, 10.1051/swsc/2020026, 2020.

9. T. Alberti, M. Laurenza, G. Consolini, A. Milillo, M. F. Marcucci, V. Carbone, and S. D. Bale:
"On the Scaling Properties of Magnetic-field Fluctuations through the Inner Heliosphere",
The Astrophysical Journal, **902**, 84, 10.3847/1538-4357/abb3d2, 2020.

10. T. Alberti, G. Consolini, and P. De Michelis:
"Complexity measures of geomagnetic indices in the last two solar cycles",
J. Atmos. Sol.-Terr. Phys., **217**, 105583, doi:10.1016/j.jastp.2021.105583, 2021.

11. T. Alberti, D. Faranda, R.V. Donner, T. Caby, V. Carbone, G. Consolini, B. Dubrulle, and S. Vaienti:
"Small-scale induced large-scale transitions in solar wind magnetic field",
The Astrophysical Journal Letters, **914**, L6, doi:10.3847/2041-8213/ac0148, 2021.

12. T. Alberti, R.V. Donner, and S. Vannitsem:
"Multiscale fractal dimension analysis of a reduced order model of coupled ocean-atmosphere dynamics",
Earth System Dynamics, **12**, 1-19, doi:10.5194/esd-12-1-2021, 2021.

- di aver presentato la seguente tesi di dottorato:

    1. T. Alberti:
       "Effects of the solar activity on Space Weather and Earth's climate",
       Supervisore: Dr. Fabio Lepreti

Dichiarazioni rese sotto la propria responsabilità, consapevole delle sanzioni penali nel caso di dichiarazioni non veritiere, di formazione o uso di atti falsi, richiamate dall'art. 76 del D.P.R. 445 del 28 dicembre 2000.

Roma, 18 ottobre 2021

Domanda per l'ammissione alla procedura selettiva
per l'assunzione di un ricercatore a tempo determinato
ex art.24, comma 3, lettera b) della L.240/2010 presso presso il Dipartimento di Matematica e Fisica dell?Universit‡ degli Studi Roma TRE,
settore concorsuale 02/C1 Astronomia, Astrofisica, Fisica della Terra e dei Pianeti

Candidato: Federico Bianchini

ELENCO DELLE PUBBLICAZIONI

1. The BICEP/Keck and SPTpol Collaborations, P. A. R. Ade et al. [compreso F. Bianchini], *A demonstration of improved constraints on primordial gravitational waves with delensing*, Phys. Rev. D 103, (2021) 022004

2. F. Bianchini, W.L.K. Wu, et al, *Searching for Anisotropic Cosmic Birefringence with Polarization Data from SPTpol*, Phys. Rev. D 102, 083504 (2020)

3. F. Bianchini, W.L.K. Wu, et al, *Constraints on Cosmological Parameters from the 500 deg^2 SPTpol Lensing Power Spectrum*, The Astrophysical Journal 888 (2020) 2

4. J.T. Sayre, C. L. Reichardt et al. [compreso F. Bianchini], *Measurements of B-mode Polarization of the Cosmic Microwave Background from 500 Square Degrees of SPTpol Data*, Phys. Rev. D 101 (2020) 122003

5. The POLARBEAR Collaboration, Adachi, S., Aguilar, M., et al. [compreso F. Bianchini], *Internal delensing of cosmic microwave background polarization B-modes with the POLARBEAR experiment*, Physical Review Letter 124 (2020) 13, 131301

6. The POLARBEAR Collaboration, M. Aguilar Faúndez, et al. [compreso F. Bianchini], *Cross-correlation of POLARBEAR CMB Polarization Lensing with High-z Sub-mm Herschel-ATLAS galaxies*, The Astrophysical Journal 886 (2019) 1

7. The Simons Observatory Collaboration, Ade, P. A. R., Aguirre, J., et al. [compreso F. Bianchini], *The Simons Observatory: Science goals and forecasts*, Journal of Cosmology and Astroparticle Physics 1902 (2019) 056

8. S. Raghunathan, F. Bianchini, C. L. Reichardt, *Imprints of gravitational lensing in the Planck cosmic microwave background data at the location of WISE×SCOS galaxies*, Physical Review D 98 (2018) 4, 043506

9. F. Bianchini & C. L. Reichardt, *Constraining Gravity at Large Scales with the 2MASS Photometric Redshift Catalog and Planck Lensing*, The Astrophysical Journal 862 (2018) 81

10. The POLARBEAR Collaboration, Ade, P. A. R., Aguilar, M., et al. [compreso F. Bianchini], *A Measurement of the Cosmic Microwave Background BB-Mode Polarization Power Spectrum at Sub-Degree Scales from 2 years of POLARBEAR Data*, The Astrophysical Journal 842 (2017) 2, 121

11. F. Bianchini & A. Silvestri, "*The kinetic Sunyeav-Zel'dovich effect in modified gravity*", Physical Review D 93 (2016) 06, 064026

12. F. Bianchini, P. Bielewicz, A. Lapi, J. Gonzalez-Nuevo, C. Baccigalupi, G. de Zotti, L. Danese, N. Bourne, A. Cooray, L. Dunne, R. Ivison, S. Maddox, M. Negrello, E. Valiante, M.W.L. Smith, D. Scott, S. Eales, S. Dye, "*Cross-correlation between the CMB lensing potential measured by Planck and high-z sub-mm galaxies detected by the Herschel-ATLAS survey*", The Astrophysical Journal 802 (2015) 1, 64

Palo Alto, 18 Ottobre 2021

ELENCO DELLE PUBBLICAZIONI E TESI DOTTORATO PRESENTATE

1) Pettinelli, E., Lauro, S. E., Mattei, E. *et al.* Stratigraphy versus artefacts in the Chang'e-4 low-frequency radar. *Nat Astron* **5,** 890–893 (2021). https://doi.org/10.1038/s41550-021-01432-x.

2) Cosciotti B., Lauro S. E., Gabbai F., Mattei E., Di Paolo F., Pratesi G., Pettinelli E., Laboratory investigation into the dielectric properties of a L-chondrite (NWA 12857), Icarus, Volume 362, 2021, 114426, ISSN 0019-1035, https://doi.org/10.1016/j.icarus.2021.114426 (**Corresponding author**).

3) Lauro S. E., Pettinelli E., Caprarelli G., Guallini L., Rossi A.P. Mattei E., Cosciotti B., Cicchetti A., Soldovieri F., Cartacci M., Noschese R., Pettinelli E., Multiple subglacial water bodies below the south pole of Mars unveiled by new MARSIS data. *Nat Astron* **5,** 63–70 (2021). https://doi.org/10.1038/s41550-020-1200-6.

4) Li. C., Su Y., Pettinelli E., Xing S., Ding C., J. Liu, X. Ren, Lauro S. E., Soldovieri F., Zeng X., Gao X., Chen W., Dai S., Liu D., Zhang G., Zuo W., Wen W., Zhang Z., Zhang X., Zhang H., "The Moon's farside subsurface structure unveiled by Chang'E-4 Lunar Penetrating Radar", Science Advances, vol. 6, ISSN: 2375-2548, doi: 10.1126/sciadv.aay6898.

5) Lauro, S. E., Soldovieri, F., Orosei, R., Cicchetti, A., Cartacci, M., Mattei, E., Cosciotti B., Di Paolo F., Noschese R., Pettinelli, E. "Liquid Water Detection under the South Polar Layered Deposits of Mars-a Probabilistic Inversion Approach". Remote Sensing,vol. 11, ISSN: 2072-4292, doi: 10.3390/rs11202445.

6) Orosei R., Lauro S. E., Pettinelli E., Cicchetti A., Coradini M., Cosciotti B., Di Paolo, F. Flamini, E.Mattei, E. Pajola, M. Soldovieri, F. Cartacci, M. Cassenti, F. Frigeri, A. Giuppi, S. Martufi, R. Masdea,A. Mitri, G. Nenna, C. Noschese, R. Restano, M. Seu (2018). Radar evidence of subglacial liquid water on Mars. *Science*, vol. 361, p. 490-493, ISSN: 0036-8075.

7) Li, Chunlai, Xing, Shuguo, Lauro S. E., Su, Yan, Dai, Shun, Feng, Jianqing, Cosciotti, Barbara, Di Paolo, Federico, Mattei, Elisabetta, Xiao, Yuan, Ding, Chunyu, Pettinelli, Elena (2018). Pitfalls in GPR Data Interpretation: False Reflectors Detected in Lunar Radar Cross Sections by Chang'e-3. *IEEE Transactions on Geoscience and Remote Sensing*, p. 1-11, ISSN: 0196-2892, doi: 10.1109/TGRS.2017.2761881.

8) Lauro S. E., Mattei, E., Cosciotti, B., Di Paolo, F., Arcone, S. A., Viccaro, M., & Pettinelli, E. Electromagnetic signal penetration in a planetary soil simulant: Estimated attenuation rates using GPR and TDR in volcanic deposits on Mount Etna. *Journal of Geophysical Research: Planets*, 2017.

9) E. Mattei , S. E. Lauro, G. Vannaroni, B. Cosciotti, F. Bella, E. Pettinelli, Dielectric measurements and radar attenuation estimation of ice/basalt sand mixtures as martian Polar Caps analogues. Icarus, vol. 229, ISSN: 0019-1035, 2014.

10) Lauro S. E., Mattei E., Barone P.M., Pettinelli E., Vannaroni G., Valerio G., Galli A., Estimation of subsurface dielectric target depth for GPR planetary exploration: Laboratory measurements and modeling, Journal of Applied Geophysics, ISSN: 0926-9851, 2013.

11) S. E. Lauro, E. Mattei, F. Soldovieri, E. Pettinelli, R. Orosei, G. Vannaroni, Dielectric constant estimation of the uppermost Basal Unit layer in the martian Boreales Scopuli region, Icarus, Volume 219, Issue 1, pages 458-467, 2012.

12) S. E. Lauro, E. Mattei, E. Pettinelli, F. Soldovieri, R. Orosei, M. Cartacci, A. Cicchetti, R. Noschese, S. Giuppi, Permittivity estimation of layers beneath the northern polar layered deposits, Mars, Geophysical Research Letters, VOL. 37, L14201, 4 PP., 2010, doi:10.1029/2010GL043015.

13) Tesi di Dottorato dal titolo: *Applicazioni ingegneristiche dei metamateriali per la realizzazione di componenti a microonde e a frequenze ottiche, S. E. Lauro 2009.*

Luogo e data **Roma, 22/10/201**

PUBLICATIONS

PhD Thesis

Title: MHD Turbulence in Astrophysical Phenomena: Low Dimensional Models

SSD FIS/05, Dottorato di Ricerca in Fisica XVIII ciclo - December 2005

Dipartimento di Fisica, Università della Calabria

Supervisor: prof. Pierluigi Veltri

1. **A journey of exploration to the polar regions of a star: probing the solar poles and the heliosphere from high helio-latitude**

   Louise Harra, Vincenzo Andretta, Thierry Appourchaux, Frédéric Baudin, Luis Bellot-Rubio, Aaron C. Birch, Patrick Boumier, Robert H. Cameron, Matts Carlsson, Thierry Corbard, Jackie Davies, Andrew Fazakerley, Silvano Fineschi, Wolfgang Finsterle, Laurent Gizon, Richard Harrison, Donald M. Hassler, John Leibacher, Paulett Liewer, Malcolm MacDonald, Milan Maksimovic, Neil Murphy, Giampiero Naletto, **Giuseppina Nigro**, Christopher Owen, Valentín Martínez-Pillet, Pierre Rochus, Marco Romoli, Takashi Sekii, Daniele Spadaro, Astrid Veronig, Werner Schmutz

   Experimental Astronomy. 31 July 2021

   ISSN: 0922-6435, doi: https://doi.org/10.1007/s10686-021-09769-x

   https://link.springer.com/article/10.1007%2Fs10686-021-09769-x

2. **Fractality of an MHD shell model for turbulent plasma driven by solar wind data: A review**

   Muñoz V., Domínguez M., **Nigro G**., Riquelme M., Carbone V.

   Journal of Atmospheric and Solar-Terrestrial Physics, vol. 214, 105524 (2021)

   ISSN: 1364-6826, doi: 10.1016/j.jastp.2020.105524

   https://www.sciencedirect.com/science/article/pii/S1364682620303230

3. **Plasma physics and astrophysics: retrospects, state-of-the art, and prospects**

   Giuseppina Nigro, Francesco Pegoraro, Francesco Valentini

   Rendiconti Lincei. Scienze Fisiche e Naturali, vol. 32, pages 25-44 (2020)

   ISSN: 2037-4631, doi: 10.1007/s12210-020-00965-z

   https://link.springer.com/article/10.1007/s12210-020-00965-z

4. **Study of the fractality in a magnetohydrodynamic shell model forced by solar wind fluctuations**

   Domínguez M., **Nigro G.**, Muñoz V., Carbone V., Riquelme M.

   Nonlinear Processes in Geophysics, vol. 27 (2), 175-185 (2020)

   ISSN: 1607-7946, doi: https://doi.org/10.5194/npg-27-175-2020

   https://npg.copernicus.org/articles/27/175/2020/

5. **Turbulence in a Coronal Loop Excited by Photospheric Motions**

   Nigro G., Malara F., Vecchio A., Primavera L., Di Mare F., Carbone V., Veltri P.

   Atmosphere, 11 (4), 409 (2020)

   ISSN: 2073-4433, doi: 10.3390/atmos11040409

   https://www.mdpi.com/2073-4433/11/4/409

6. **Sign singularity of the local energy transfer in space plasma turbulence**
   Sorriso-Valvo L., De Vita G., Fraternale F., Gurchumelia A., Perri S., **Nigro G.**, (...);
   Frontiers in Physics, vol 7, pag. 108 (2019)
   ISSN: 2296-424X, doi: 10.3389/fphy.2019.00108
   https://www.frontiersin.org/articles/10.3389/fphy.2019.00108/full

7. **Parametric Instability in Two-dimensional Alfvénic Turbulence**
   Primavera L., Malara F., Servidio S., **Nigro G.**, Veltri. P.
   The Astrophysical Journal, vol. 880 (2), pag. 156 (2019)
   ISSN: 0004-637X, doi: 10.3847/1538-4357/ab29f5
   https://iopscience.iop.org/article/10.3847/1538-4357/ab29f5/meta

8. **Parametric Instability and Turbulent Cascades in Space Plasmas**
   Primavera L., Malara F., Servidio S, **Nigro G.**
   Turbulent Cascades II, pages 159-168 (2019)
   ERCOFTAC BULLETIN, doi: https://doi.org/10.1007/978-3-030-12547-9_17
   https://link.springer.com/chapter/10.1007/978-3-030-12547-9_17

9. **Attracted by the fascinating magnetism of the Sun**
   G. Nigro
   IL NUOVO CIMENTO C, vol. 42, issue 1, article 2 (2019)
   ISSN: 2037-4909, doi: 10.1393/ncc/i2019-19002-5
   https://www.sif.it/riviste/sif/ncc/econtents/2019/042/01/article/1

10. **Electron Heating by Kinetic Alfvén Waves in Coronal Loop Turbulence**
    Malara F., **Nigro G.**, Valentini F., Sorriso-Valvo L.
    The Astrophysical Journal, vol. 871, number 1, pag. 66 (2019)
    ISSN: 1538-4357, doi: 10.3847/1538-4357/aaf168
    https://iopscience.iop.org/article/10.3847/1538-4357/aaf168

11. **Study on the Fractality of Magnetized Plasma using an MHD Shell Model driven by Solar Wind Data**
    Dominguez M., **Nigro G.**, Munõz V., Carbone V.
    Physics of Plasmas, vol. 25, 092302 (2018)
    https://aip.scitation.org/doi/10.1063/1.5034129

12. **Evolution of fractality in space plasmas of interest to geomagnetic activity**
    Munõz V., Dominguez M., Valdivia J.A., Good S., **Nigro G.**, Carbone V.
    Nonlin. Processes Geophys., Review article in Special Issue: Nonlinear Waves and Chaos, vol. 25, 207-216 (2018)
    ISSN: 1023-5809, doi: https://doi.org/10.5194/npg-25-207-2018
    https://npg.copernicus.org/articles/25/207/2018/

13. **Study of Fractal Features of Geomagnetic Activity Through an MHD Shell Model**
Dominguez M., **Nigro G.**, Munõz V., Carbone V.
Physics of Plasmas, vol. 24, 072308 (2017)
ISSN: 1070-664X, doi: 10.1063/1.5034129
https://aip.scitation.org/doi/10.1063/1.4993200

14. **What is a large-scale dynamo?**
Nigro G., Pongkitiwanichakul P., Cattaneo F., Tobias S.M.
Monthly Notices of the Royal Astronomical Society Letters, vol. 464, L119-L123 (2017)
ISSN: 1745-3933, doi: 10.1093/mnrasl/slw190
https://academic.oup.com/mnrasl/article/464/1/L119/2282803

15. **A fast algorithm for a three-dimensional synthetic model of intermittent turbulence**
Malara F., Di Mare F., **Nigro G.**, Sorriso-Valvo L.
Physical Review E, vol. 94, 053109 (2016)
ISSN: 2470-0053, doi: 10.1103/PhysRevE.94.053109
https://journals.aps.org/pre/abstract/10.1103/PhysRevE.94.053109

16. **Shear-Driven Dynamo Waves in Fully Nonlinear Regime**
Pongkitiwanichakul P., **Nigro G.**, Cattaneo F., Tobias S.M.
The Astrophysical Journal, vol. 825, issue 1, article id. 23, 8 pp (2016)
ISSN: 0004-637X, doi: 10.3847/0004-637X/825/1/23
https://iopscience.iop.org/article/10.3847/0004-637X/825/1/23

17. **Finite-time singularities and flow regularization in a hydromagnetic shell model at extreme magnetic Prandtl numbers**
Nigro, G. and Carbone, V.
New Journal of Physics, vol. 17, 073038 (2015)
ISSN: 1367-2630, doi: 10.1088/1367-2630/17/7/073038
https://iopscience.iop.org/article/10.1088/1367-2630/17/7/073038

18. **Heating Mechanisms for Intermittent Loops in Active Region Cores from AIA/SDOEUV Observations**
Cadavid A. C.; Lawrence J. K.; Christian D. J.; Jess D. B.; **Nigro G.**
The Astrophysical Journal, vol. 795, issue 1, id. 48, 12 pp. (2014)
ISSN: 0004-637X, doi: 10.1088/0004-637X/795/1/48
https://iopscience.iop.org/article/10.1088/0004-637X/795/1/48

19. **Cancellation properties in Hall-magnetohydrodynamics with strong guide magnetic field**
Martin L.N., De Vita G., Sorriso-Valvo L., Dmitruk P., **Nigro G.**, Primavera L., Carbone V.
Physical Review E, vol. 88, issue 6, id. 063107 (2013)
ISSN: 1539-3755, doi: 10.1103/PhysRevE.88.063107
https://journals.aps.org/pre/abstract/10.1103/PhysRevE.88.063107

20. **Simplified model for an α 2-ω dynamo fed by dynamical evolution of the zonal shear**
Nigro G., Primavera L., Carbone V.
Monthly Notices of the Royal Astronomical Society, vol. 433, issue 3, pp. 2206-2214 (2013)
ISSN: 1365-2966, doi: 10.1093/mnras/stt887
https://academic.oup.com/mnras/article/433/3/2206/1226223

21. **A Shell Model for Large–Scale Turbulent Dynamo**
Giuseppina Nigro
Geophysical & Astrophysical Fluid Dynamics, vol. 107, issue 1-2, pp. 101-113 (2013)
ISSN: 0309-1929, doi: 10.1080/03091929.2012.664141
https://www.tandfonline.com/doi/abs/10.1080/03091929.2012.664141

22. **Alfvén Waves: Coherent Phenomena in Coronal Loop sand Open-Field Regions**
Malara F., **Nigro G.**, Veltri P., Onofri M.
Space Science Reviews, vol. 172, issue 1-4, pp. 157-167 (2012)
ISSN: 0038-6308, doi: 10.1007/s11214-010-9722-3
https://link.springer.com/article/10.1007%2Fs11214-010-9722-3

23. **A Study of the Dynamo Transition in a Self-consistent Nonlinear Dynamo Model**
Giuseppina Nigro, Pierluigi Veltri
The Astrophysical Journal Letters, vol. 740, L37 5pp (2011)
ISSN: 2041-8205, doi: 10.1088/2041-8205/740/2/L37
https://iopscience.iop.org/article/10.1088/2041-8205/740/2/L37

24. **A Shell Model Turbulent Dynamo**
Perrone D., **Nigro G.**, Veltri P.
The Astrophysical Journal, vol. 735, 73 6pp (2011)
ISSN: 0004-637X, doi: 10.1088/0004-637X/735/2/73
https://iopscience.iop.org/article/10.1088/0004-637X/735/2/73

25. **Magnetic reversals in a modified shell model for magnetohydrodynamics turbulence**
Giuseppina Nigro, Vincenzo Carbone
Physical Review E, vol. 82, 016313 (2010)
ISSN: 1539-3755, doi: 10.1103/PhysRevE.82.016313
https://journals.aps.org/pre/abstract/10.1103/PhysRevE.82.016313

26. **Fluctuating Energy Storage and Nonlinear Cascade in an Inhomogeneous Coronal Loop**
Malara F., **Nigro G**, Onofri M., Veltri P.
The Astrophysical Journal, vol. 720, pp. 306-327 (2010)
ISSN: 0004-637X, doi: DOI: 10.1088/0004-637X/720/1/306
https://iopscience.iop.org/article/10.1088/0004-637X/720/1/306

27. **Explosive In stability and Coronal Heating**
Dahlburg R. B., Liu J.-H., Klimchuk J. A., **Nigro G.**
The Astrophysical Journal, vol. 704, pp. 1059-1064 (2009)
ISSN: 0004-637X, doi: 10.1088/0004-637X/704/2/1059
https://iopscience.iop.org/article/10.1088/0004-637X/704/2/1059

28. **Self Organization in MagnetohydrodynamicTurbulence**
Veltri P., Carbone V., Lepreti F., **Nigro G.**
Encyclopedia of Complexity and Systems Science, vol. 19, pp. 8009-8028 (2009)
https://www.springer.com/gp/book/9780387758886

29. **Resonant Behavior and Fluctuating Energy Storage in Coronal Loops**
Nigro G., Malara F., Veltri P.
The Astrophysical Journal, vol. 685, issue 1, pp. 606-621 (2008)
ISSN: 0004-637X, doi: 10.1086/590653
https://iopscience.iop.org/article/10.1086/590653

30. **Modeling magnetohydrodynamic turbulence by low-dimensional dynamical systems**
Carbone V., Lepreti F., **Nigro G.**, Sorriso-Valvo L., Vecchio A., Veltri P.,
Anomalous Fluctuation Phenomena in Complex System: Plasma, Fluids and Financial Markets, pp.57-100 (2008)
ISBN: 978-81-308-0255-8 Editors: Claudia Riccardi and H. Eduardo Roman

31. **A statistical analysis of polarity reversals of the geomagnetic field**
Sorriso-Valvo L., Stefani F., Carbone V., **Nigro G.**, Lepreti F., Vecchio A., Veltri P.
Physics of the Earth and Planetary Interiors, vol 164, issue 3-4, pp. 197- 207 (2007)
ISSN: 0031-9201, doi: 10.1016/j.pepi.2007.07.001
https://www.sciencedirect.com/science/article/abs/pii/S0031920107001458?via%3Dihub

32. **Modeling a Coronal Loop Heated by Magnetohydrodynamic Turbulence Nanoflares**
Reale F., **Nigro G.**, Malara F., Peres G., Veltri P.
The Astrophysical Journal, vol. 633, issue 1, pp. 489-498 (2005)
ISSN: 0004-637X, doi: 10.1086/444409
https://iopscience.iop.org/article/10.1086/444409

33. **Large-Amplitude Velocity Fluctuations in Coronal Loop: Flare Drivers?**
Nigro G., Malara F., Veltri P.
The Astrophysical Journal, vol. 629, issue 2, pp. L133-L136 (2005)
ISSN: 2041-8205, doi: 10.1086/449310
https://iopscience.iop.org/article/10.1086/449310

34. **Intermittency in MHD turbulence and coronal nanoflares modeling**
Veltri P., **Nigro G.**, Malara F., Carbone V., Mangeney A.
Nonlinear Processes in Geophysics, vol. 12, issue 2, pp. 245-255 (2005)
ISSN: 1023-5809, doi: https://doi.org/10.5194/npg-12-245-2005
https://npg.copernicus.org/articles/12/245/2005/npg-12-245-2005.html

35. **Nanoflares and MHD Turbulence in Coronal Loops: A Hybrid Shell Model**
Nigro G., Malara F., Carbone, V., Veltri P.
Physical Review Letters, vol. 92, 194501 (2004)
ISSN: 0031-9007, doi: 10.1103/ PhysRevLett.92.194501
https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.92.194501

36. **A Coronal Loop RMHD Shell Model for Turbulence generated Nanoflares**
Nigro G., Malara F., Carbone, V., Veltri P.
In: Plasmas in the Laboratory and in the Universe: New Insights and New Challenges. Como,
AIP Conference Proceedings, vol. 703, p. 219-222 (2004)
doi: 10.1063/1.1718459
https://aip.scitation.org/doi/abs/10.1063/1.1718459

37. **A shell model for turbulent dynamos**
Nigro G., Perrone D., Veltri P.
Proceedings of the International Astronomical Union, IAU Symposium, vol. 274, pp. 159-161 (2010)
SSN: 1743-9213, doi: 10.1017/S1743921311006818
http://articles.adsabs.harvard.edu/full/2011IAUS..274..159N

38. **Large-scale energy balance and MHD turbulence in solar coronal structures**
Malara F., **Nigro G.**, Onofri M., Veltri P.
In: Proceedings of the 12th International Solar Wind Conference
AIP Conference Proceedings, vol. 1216, 44-47 (2010)
ISSN: 0094-243X, doi: 10.1063/1.3395901
https://aip.scitation.org/doi/abs/10.1063/1.3395901

39. **Energy balance and cascade in MHD turbulence in the solar corona**
Malara F., **Nigro G.**, Veltri P.
Proceedings of the International Astronomical Union, IAU Symposium, vol. 257, pp. 543-553 (2009)
http://articles.adsabs.harvard.edu/full/2009IAUS..257..543M

40. **Large Amplitude Velocity Fluctuations as Precursor of Flares in Solar Coronal Loops**

Nigro G., Malara F., Veltri P.

Proceedings of the Solar Wind 11/SOHO 16, "Connecting Sun and Heliosphere" Conference, ESA SP-592 (2005)

http://articles.adsabs.harvard.edu/full/2005ESASP.592..515N

41. **Velocity Fluctuations in Coronal Loops as Flare Drivers**

Nigro G., Malara F., Veltri P.

Proceedings of the 11th European Solar Physics Meeting (2005)

http://articles.adsabs.harvard.edu/full/2005ESASP.600E..92N

europass Curriculum vitae

EXPERTISE complexity in geosciences, space plasma, and planetary environments

data analysis and modeling

dynamical systems, chaos, statistical mechanics, stochastic processes

turbulence, space weather/climate, climate variability and modeling

WORK EXPERIENCE

Current position

Researcher, INAF-Istituto di Astrofisica e Planetologia Spaziali, via del Fosso del Cavaliere 100, 00133 Roma

01 Dec 2020 - now Investigation of interplanetary medium properties during the cruise phase of the ESA Bepi-Colombo mission and its interactions with planetary environments (Mercury, Venus, Earth) within the projects “SERENA fase E1 su BepiColombo MPO attività scientifiche” and “Expert support to SERENA Science Operations–ESA”.

Previous positions

01 Dec 2017 - 30 Nov 2020 Post-doc position INAF-Istituto di Astrofisica e Planetologia Spaziali, via del Fosso del Cavaliere 100, 00133 Roma

01 Feb 2017 - 30 Nov 2017 Post-doc position at Department of Physics, University of Calabria, “Effects of the solar variability on the Earth’s environment”, 02/C1 - FIS/06

Academic teaching

A.Y. 2017/2018 Solar physics and Sun-Earth relations [Fisica solare e relazioni Sole-Terra, 2 CFU]

Master Degree in Physics, Dep. of Physics, University of Calabria

A.Y. 2016/2017 General Physics [Fisica Generale, Tutor]

Master Degree in Architecture and Building Engineering, Dep. of Civil Eng.,University of Calabria

A.Y. 2016/2017 Solar physics and Sun-Earth relations [Fisica solare e relazioni Sole-Terra, 2 CFU]

Master Degree in Physics, Dep. of Physics, University of Calabria

A.Y. 2015/2016 Physics [Fisica, Tutor)]

Master Degree in Pharmacy, Dep. of Pharmacy, University of Calabria

A.Y. 2015/2016 Solar physics and Sun-Earth relations [Fisica solare e relazioni Sole-Terra, 2 CFU]

Master Degree in Physics, Dep. of Physics, University of Calabria

A.Y. 2013/2014 Electromagnetic waves and optics [Onde elettromagnetiche ed ottica, Tutor]

Bachelor Degree in Material Science, Dep. of Physics, University of Calabria

RESEARCH ACTIVITY

Summary

My research activity is focused on data analysis and modeling, via dynamical system and statistical mechanics approaches, to understand complexity in geoscience, space plasma, and planetary environment. My interests cover all aspects of geosciences (magnetosphere, ionosphere, climate variability), planetary environments (coupling with solar wind, plasma physics, exosphere), and space plasma (turbulence, intermittency, MHD vs. sub-proton physics) on both theoretical and data analysis aspects.

Keypoints

- **Complexity in geosciences and planetary environments**
  - nonlinear/non-stationary description of magnetospheres, ionospheres, and exospheres
  - information transfer methods to investigate solar wind effects on planetary environments
  - multiscale characterization of current system patterns (ring current, electrojects, Sq)
  - nonlinear/non-stationary approaches to characterize Dansgaard-Oeschger events
  - recurrent patterns in paleoclimate variability at Milankovitch scales across the Pleistocene
  - multiscale complexity of the ocean-atmosphere coupling via modeling and reanalysis data
  - climate modeling via energy-balance models and stochastic approaches
- **Complexity in space plasma**
  - multifractal analysis at MHD and sub-proton scales
  - strange attractors and fixed points at MHD and sub-proton scales
  - theoretical developments via dynamical systems to describe space plasma at MHD scales
  - stochastic and chaotic approaches for dealing with sub-proton dynamics
  - turbulence and intermittency through the Heliosphere and implications for plasma modeling
  - real-time prediction for Space Weather purposes via the ESPERTA tool

Skills

- **Data analysis methods and tools**
  - univariate and multivariate decomposition methods
    + Fourier Transform (FT) + Empirical Orthogonal Function (EOF)
    + Empirical Mode Decomposition (EMD) + Intrinsic Timescale Decomposition (ITD)
    + Multivariate Empirical Mode Decomposition (MEMD) + Wavelet Transform (WT)
  - information theory
    + Mutual Information (MI) + Transfer Entropy (TE)
  - dynamical systems theory
    + Chaotic measures: fractal dimensions, Lyapunov exponents, entropic measures
    + Extreme Value Theory (EVT) measures: local dimension and persistence
    + Recurrence Quantification Analysis (RQA)
    + Stochastic approaches: generalized Langevin equations
  - non-parametric procedures
    + bootstrap + Monte-Carlo modeling + Kernel Density Estimation (KDE)
  - spectral and scaling law estimation
    + EMD-based and Wavelet-based methods + Hilbert Spectral Analysis (HSA)
    + MultiFractal Detrended Fluctuation Analysis (MF-DFA) + Structure Functions (SFs)
- **Numerical simulations and tools**
  + partial nonlinear differential equations + energy-balance climate models (0-D, 1-D, 2-D)
  + data analysis + MHD simulations

EDUCATION AND TRAINING

01 Nov 2013 - 31 Oct 2016 PhD in Scienze e Tecnologie Fisiche, Chimiche e dei Materiali

Cycle	XXIX
Supervisor	Dr. Fabio Lepreti
Name and type of organization	University of Calabria, Rende (CS), Italy
Research Project	The active Sun and its effects on Space Weather and Earth's Climate
Keywords	Space Weather, solar wind, magnetic field, Sun-Earth relations, Earth's climate
Summary of the project	The extreme variability of the Sun's physical conditions, spreading over a wide range of spatial and temporal scales, is the primary source determining global and local changes in the heliosphere and in the near-Earth space. In addition, the Earth-Sun system presents an extreme complexity that emphasizes the importance of nonlinear interactions between the different elements of this system, increasing the range of the physical processes involved. Fluctuations in the magnetic field within the solar atmosphere cause variations in the flow of solar energetic particles that have an impact on our technological society, and probably also on our climate change throughout complex interactions with the Earth's atmosphere, as well as processes of interaction between the solar wind and the magnetosphere of the Earth.
Title of the PhD thesis	Effects of the solar activity on Space Weather and Earth's climate
Vote	Ottimo/Ottimo
Date of defense	13 June 2017
Examination Committee	Prof. Francesco Berrilli (francesco.berrilli@roma2.infn.it)
	Prof. Francesco Califano (francesco.califano@unipi.it)
	Dr. Enrico Camporeale (E.Camporeale@cwi.nl)
External referees	Prof. Guido Boffetta (guido.boffetta@unito.it)
	Dr. Ingmar Sandberg (isandberg@phys.uoa.gr)

01 Oct 2011 - 25 Jul 2013 2nd Level Degree - Master

Title of the thesis	Analysis and modeling of paleoclimate changes
Supervisors	Prof. Vincenzo Carbone, Dr. Fabio Lepreti, Dr. Antonio Vecchio
Name and type of organization	University of Calabria, Rende (CS), Italy
Vote	110/110 cum laude
Date of defense	25 July 2013
Keywords	Paleoclimate, Dansgaard-Oeschger events, Empirical Mode Decomposition (EMD)
	Multiple climate states, Langevin equation, stochastic resonance

01 Oct 2008 - 26 Jul 2011 1st Level Degree - Bachelor

Title of the thesis	Solar irradiance and its impact on the Earth's climate stability
Supervisors	Prof. Vincenzo Carbone, Dr. Leonardo Primavera
Name and type of organisation	University of Calabria, Rende (CS), Italy
Vote	110/110 cum laude
Date of defense	26 July 2011
Keywords	Daisyworld-like model, climate model, greenhouse effect, climate, Sun-Earth relations

01 Sep 2003 - 05 Jul 2008 Scientific Certificate

Title of qualification awarded	Italian secondary school diploma
Name and type of organisation	Liceo Scientifico "E. Mattei" - Mormanno (CS)
Vote	100/100 cum laude

PERSONAL SKILLS

Mother tongue: Italian

Other languages	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	B2	B2	B2	B2
French	B1	B1	B1	B1	B1

SCIENTIFIC SKILLS AND COMPETENCES

Advanced compentences in:

– Chaos and dynamical system theory
– Dynamics of the Sun-Earth interactions
– Physics of the magnetosphere and ionosphere
– Plasma physics with applications to the solar wind and the Earth's magnetosphere
– Geomagnetic and geodynamic processes
– Solar physics, dynamical processes, activity, structures
– Physics of the atmosphere and climate
– Theoretical seismology and internal structure of the Earth

Specific subjects and academic courses:

– Advanced methods for numerical calculus
– Complex Systems
– Computational physics
– High performance computing
– Magnetohydrodynamics
– Observational techniques in astrophysics
– Physics of Space Plasmas
– Seismology
– Solar physics
– Stellar processes
– Theory of chaotic systems
– Theory of turbulence: from fluids to plasmas
– Turbulence and transport in fluid flows

COMPUTER SKILLS AND COMPETENCES

– Matlab (expert) – Python (advanced) – IDL (expert) – Fortran (advanced)
– Gnuplot (advanced) – R (standard) – LaTeX (expert) – Microsoft Office (expert)

MEMBERSHIPS

– Member of the American Geophysical Union (AGU)
– Member of the European Geosciences Union (EGU)
– Member of the International Association of Geomagnetism and Aeronomy (IAGA)
– Member of the Società Italiana di Fisica (SIF)
– Member of the Space Weather Italian Community (SWICo)

PUBLICATIONS

Refereed: 52, Citations: 401, H-index: 14 (Source: Scopus)
Citations: 390, H-index: 14 (Source: ISI-WOS)

2021

Stumpo et al. Open issues in statistical forecasting of solar proton events: A machine learning perspective, *Space Weather*, **19**, e2021SW002794, doi:10.1029/2021SW002794, 2021.

Hadid et al. BepiColombo's cruise phase: unique opportunity for synergistic observations, *Frontiers in Astronomy and Space Sciences*, **8**, 718024, doi:10.3389/fspas.2021.718024, 2021.

Alberti, Donner & Vannitsem Multiscale fractal dimension analysis of a reduced order model of coupled ocean-atmosphere dynamics, *Earth System Dynamics*, **12**, 1-19, doi:10.5194/esd-12-1-2021, 2021.

Alberti et al. Small-scale induced large-scale transitions in solar wind magnetic field, *The Astrophysical Journal Letters*, **914**, L6, doi:10.3847/2041-8213/ac0148, 2021.

Consolini et al. Sign-Singularity Analysis of Field-Aligned Currents in the Ionosphere, *Atmosphere*, **12**, 708, doi:10.3390/atmos12060708, 2021.

Consolini et al. Electric Field Multifractal Features in the High-Latitude Ionosphere: CSES-01 Observations, *Atmosphere*, **12**, 646, doi:10.3390/atmos12050646, 2021.

Alberti Book Review: Weather, Macroweather, and the Climate: Our Random Yet Predictable Atmosphere, *Frontiers in Climate*, **3**, 684637, doi:10.3389/fclim.2021.684637, 2021.

Faranda, Alberti et al. Interrupting vaccination policies can greatly spread SARS-CoV-2 and enhance mortality from COVID-19 disease: the AstraZeneca case for France and Italy, *Chaos*, **31**, 041105, doi:10.1063/5.0050887, 2021.

Alberti et al. Multiscale features of the near-Hermean environment as derived through the Hilbert-Huang Transform, *Frontiers in Physics*, **9**, 162, doi:10.3389/fphy.2021.668098, 2021.

Carbone et al. On the origin of high-frequency magnetic fluctuations in the interplanetary medium: a Brownian-like approach, *Frontiers in Physics*, **9**, 18, doi:10.3389/fphy.2021.613759, 2021.

Alberti, Consolini & De Michelis Complexity measures of geomagnetic indices in the last two solar cycles, *J. Atmos. Sol.-Terr. Phys.*, **217**, 105583, doi:10.1016/j.jastp.2021.105583, 2021.

Stumpo et al. Self-Organization through the Inner Heliosphere: Insights from Parker Solar Probe, *Atmosphere*, **12**, 321, doi: 10.3390/atmos12030321, 2021.

Mangano et al. BepiColombo Science Investigations During Cruise and Flybys at the Earth, Venus and Mercury, *Space Sci. Rev.*, **217**, 23, doi:10.1007/s11214-021-00797-9, 2021.

Milillo et al. Exospheric Na distributions along the Mercury orbit with the THEMIS telescope, *Icarus*, **355**, 114179, doi:10.1016/j.icarus.2020.114179, 2021.

2020

Consolini, Alberti & Carbone On Yaglom's Law for the Interplanetary Proton Density and Temperature Fluctuations in Solar Wind Turbulence, *Entropy*, **22**, 1419, doi:10.3390/e22121419, 2020.

Alberti et al. Multiscale measures of phase-space trajectories, *Chaos*, **30**, 123116, doi:10.1063/5.0008916, 2020.

Faranda & Alberti Modeling the second wave of COVID-19 infections in France and Italy via a stochastic SEIR model,

Chaos, **30**, 111101, doi:10.1063/5.0015943, 2020.

Alberti et al. On the Scaling Properties of Magnetic-field Fluctuations through the Inner Heliosphere,
The Astrophysical Journal, **902**, 84, doi:10.3847/1538-4357/abb3d2, 2020.

Consolini et al. Intermittency and Passive Scalar Nature of Electron Density Fluctuations in the High-Latitude Ionosphere at Swarm Altitude,
Geophys. Res. Lett., **47**, e2020GL089628, doi:10.1029/2020GL089628, 2020.

Carbone, Alberti et al. A model for the geomagnetic field reversal rate and constraints on the heat flux variations at the core-mantle boundary,
Scientific Reports, **10**, 13008, doi:10.1038/s41598-020-69916-w, 2020.

Alberti et al. Disentangling nonlinear geomagnetic variability during magnetic storms and quiescence by timescale dependent recurrence properties,
Journal Space Weather and Space Climate, **10**, 25, 10.1051/swsc/2020026, 2020.

Alberti & Faranda On the uncertainty of real-time predictions of epidemic growths: A COVID-19 case study for China and Italy,
Commun Nonlinear Sci Numer Simulat, **90**, 105372, 10.1016/j.cnsns.2020.105372, 2020.

Alberti, Consolini & Carbone The poor man's magnetohydrodynamic (PMMHD) equations,
J. Phys. Conf. Ser., **1548**, 012037, 2020.

Stumpo et al. Causal inference in space weather by an information theory approach,
J. Phys. Conf. Ser., **1548**, 012019, 2020.

Consolini et al. On the multifractal features of magnetic field fluctuations in the field-aligned current ionospheric polar regions: Swarm observations,
Journal of Geophysical Research, **125**, e2019JA027429, 10.1029/2019JA027429, 2020.

Carbone et al. Scale-Dependent Turbulent Dynamics and Phase-Space Behavior of the Stable Atmospheric Boundary Layer,
Atmosphere, **11**, 428, 2020.

Alberti et al. Linear versus nonlinear methods for detecting magnetospheric and ionospheric current systems patterns,
Earth and Space Science, **7**, 1-13, 10.1029/2019EA000559, 2020.

Vecchio et al. Effect of vegetation on the temperatures of Trappist-1 planets,
The Astrophysical Journal, **891**, 24, 2020.

Stumpo et al. Measuring Information Coupling between the Solar Wind and the Magnetosphere–Ionosphere System,
Entropy, **22**, 276, 2020.

2019

Alberti, Consolini & Carbone A discrete dynamical system: The poor man's magnetohydrodynamic (PMMHD) equations,
Chaos, **29**, 103107, 2019.

Laurenza, Alberti et al. Assessment of the particle radiation environment at L1 and near-Earth space,
Il Nuovo Cimento, **42 C**, 41, 2019.

Alberti, Laurenza & Cliver Forecasting solar proton events by using the ESPERTA model,
Il Nuovo Cimento, **42 C**, 40, 2019.

Vecchio et al. Solar activity cycles and grand minima occurrence,
Il Nuovo Cimento, **42 C**, 15, 2019.

Alberti et al. Multifractal and chaotic properties of solar wind at MHD and kinetic domains: an Empirical Mode Decomposition approach,
Entropy, **21**, 320, 2019.

Laurenza, Alberti et al. Estimation of the Particle Radiation Environment at the L1 Point and in Near-Earth Space,
The Astrophysical Journal, **873**, 112, 2019.

2018

Alberti et al. On fast and slow Earth's magnetospheric dynamics during geomagnetic storms: a stochastic Langevin approach,
Journal Space Weather and Space Climate, **8**, A56, 2018.

Alberti Multivariate Empirical Mode Decomposition analysis of Swarm data,
Il Nuovo Cimento (invited contribution), **41 C**, 113, 2018.

Consolini, Alberti & De Michelis On the Forecast Horizon of Magnetospheric Dynamics: A Scale-to-Scale Approach,
Journal of Geophysical Research, **123**, 9065-9077, 10.1029/2018JA025952, 2018.

Lotti et al. Soft proton flux on ATHENA focal plane and its impact on magnetic diverter design,
Experimental Astronomy, **45**, 411, 2018.

Alberti et al. On the stability of a climate model for an Earth-like planet with land-ocean coverage,
Journal of Physics Communications, **2**, 065018, 2018.

Carbone et al. Arbitrary-order Hilbert spectral analysis and intermittency in solar wind density fluctuations,
The Astrophysical Journal, **859**, 27, 2018.

Laurenza, Alberti & Cliver A Short-term ESPERTA-based Forecast Tool for Moderate-to-Extreme Solar Proton Events,
The Astrophysical Journal, **857**, 107, 2018.

2017

Piersanti, Alberti, et al. Comprehensive analysis of the Geoeffective Solar Event of June 21, 2015: Effects on the Magnetosphere, Plasmasphere and Ionosphere Systems,
Solar Physics, **292**, 169, https://doi.org/10.1007/s11207-017-1186-0, 2017.

Consolini, Alberti et al. A Hilbert-Huang transform approach to space plasma turbulence at kinetic scales,
Journal of Physics: Conference Series, **900**, 012003, 2017.

Piersanti et al. Does TEC react to a sudden impulse as a whole? The 2015 Saint Patrick's day Storm event,
Advances in Space Research, **60**, 1807-1816, http://dx.doi.org/10.1016/j.asr.2017.01.021, 2017.

Alberti et al. Comparative climates of TRAPPIST-1 planetary system: results from a simple climate-vegetation model,
The Astrophysical Journal, **844**, 19, 2017.

Alberti et al. Timescale separation in the solar wind-magnetosphere coupling during St. Patrick's Day storms in 2013 and 2015,
Journal of Geophysical Research, Special Issue on "Geospace system responses to the St. Patrick's Day storms in 2013 and 2015", **122**, 4266-4283, doi:10.1002/2016JA023175, 2017.

Alberti et al. Solar activity from 2006-2014 and short-term forecasts of solar proton events using the ESPERTA model,
The Astrophysical Journal, **838**, 59, 2017.

Vecchio et al. Connection between solar activity cycles and grand minima generation,
Astronomy & Astrophysics, **599**, A58, doi:https://doi.org/10.1051/0004-6361/201629758, 2017.

2016

Alberti et al. Identification of the different magnetic field contributions during a geomagnetic storm in magnetospheric and ground observations,
Annales Geophysicae, **34**, 1069-1084, doi:10.5194/angeo-34-1069-2016, 2016.

2015

Alberti et al. Spatial interactions in a modified Daisyworld model: Heat diffusivity and greenhouse effects,
Physical Review E, **92**, 052717, doi:http://dx.doi.org/10.1103/PhysRevE.92.052717, 2015.

2014

Alberti et al. Natural periodicities and Northern Hemisphere-Southern Hemisphere connection of fast temperature changes during the last glacial period: EPICA and NGRIP revisited, *Climate of the Past*, **10**, 1751-1762, 2014.

CONFERENCES & SCHOOLS

2021

13 - 15 September — Forty Years of Stochastic Resonance
Perugia, Italy

06 - 09 September — 11th Young Researcher Meeting
Trento, Italy

23 - 27 August — Dynamics Days 2021
Virtual

14 - 18 June — Parker One
Virtual

12 - 17 May — Applications of Statistical Methods and Machine Learning in the Space Sciences
Virtual

19 - 30 April — vEGU21: Gather Online
Virtual

12 February — Comparative equatorial Thermosphere-Ionosphere-Magnetosphere coupling
Virtual

03 - 05 February — Mercury Exploration Assessment Group (MExAG)
Virtual

2020

01 - 17 Dicember — AGU Fall Meeting 2020
Online everywhere

21 September - 09 October — Europlanet Science Congress 2020
Virtual meeting

04 - 08 May — Sharing Geoscience Online
Vienna (virtual), Austria

20 - 24 April — 20th Science Working Team Meeting BepiColombo
ESOC (virtual), Darmstadt, Germany

12 - 13 February — I Congresso Space Weather Italian Community (SWICo)
Italian Space Agency, Rome, Italy

03 - 07 February — XVI Congresso Nazionale di Scienze Planetarie
Centro Culturale San Gaetano, Padova, Italy

2019

03 - 04 December — Multi-spacecraft investigations of the inner heliosphere: Italian opportunities
Italian Space Agency, Rome, Italy

18 - 22 November — 16th European Space Weather Week
Palais des Congres, Liège, Belgium

28 - 31 October — Arcetri Workshop 2019 on Plasma Astrophysics
Department of Physics & Astronomy, University of Florence, Arcetri, Italy

07 - 11 October — Nonlinear and stochastic methods in climate and geophysical fluid dynamics
Institut Henri Poincaré, Paris, France

23 - 27 September — 105° Congresso Nazionale - Società Italiana di Fisica

	GSSI, L'Aquila, Italy
18 - 21 June	10th Young Researcher Meeting
	Rome, Italy
02 - 07 June	The Plasma Physics of the Magnetosphere
	Bra - Pollenzo, Italy
13 - 17 May	Living Planet Symposium 2019
	MiCo - Milano Congressi, Milan, Italy
07 - 12 April	European Geosciences Union General Assembly 2019
	Austria Center Vienna, Vienna, Austria
19 - 22 March	Mathematical models and methods in Earth and Space sciences
	Department of Mathematics, University of Rome Tor Vergata, Rome, Italy
05 - 08 February	Dynamical systems: from geometry to mechanics
	Department of Mathematics, University of Rome Tor Vergata, Rome, Italy

2018

22 - 26 October	Arcetri Workshop 2018 on Plasma Astrophysics
	Department of Physics & Astronomy, University of Florence, Arcetri, Italy
08 - 12 October	Swarm 8th Data Quality Workshop
	ESA/ESRIN, Frascati, Italy
17 - 21 September	104° Congresso Nazionale - Società Italiana di Fisica
	Università della Calabria, Rende (CS), Italy
08 - 13 April	European Geosciences Union General Assembly 2018
	Austria Center Vienna, Vienna, Austria
21 - 22 February	Convegno Nazionale IACA-Italia
	Istituto Nazionale di Geofisica e Vulcanologia, Roma, Italy

2017

23 - 27 October	Arcetri Workshop 2017 on Plasma Astrophysics
	Department of Physics & Astronomy, University of Florence, Arcetri, Italy
01 - 05 October	FisMat 2017
	ICTP-SISSA Miramare Campus - Trieste, Italy
18 - 22 September	Complexity and Turbulence in Space Plasmas
	International School on Space Science, GSSI - L'Aquila, Italy
11 - 15 September	103° Congresso Nazionale - Società Italiana di Fisica
	Università di Trento, Povo, Trento, Italy
23 - 28 April	European Geosciences Union General Assembly 2017
	Austria Center Vienna, Vienna, Austria

2016

17 - 20 October	Arcetri Workshop 2016 on Plasma Astrophysics
	Department of Physics & Astronomy, University of Florence, Arcetri, Italy
26 - 30 September	102° Congresso Nazionale - Società Italiana di Fisica
	Polo Multifunzionale di Psicologia Università degli Studi di Padova - Padova, Italy
06 - 10 June	Ground and space-based instruments for future research in Solar-Terrestrial physics
	International School on Space Science, GSSI - L'Aquila, Italy
30 May - 01 June	Meeting of the Italian Solar and Heliospheric Community (SOHE)
	Agenzia Spaziale Italiana, Via del Politecnico, Roma, Italy

17 - 22 April European Geosciences Union General Assembly 2016
Austria Center Vienna, Vienna, Austria

2015

13 - 18 December American Geophysical Union General Assembly 2015
Moscone Center, San Francisco, USA

21 - 26 September Heliospheric physical processes for understanding Solar-Terrestrial Relations
International School on Space Science, GSSI - L'Aquila, Italy

12 - 17 April European Geosciences Union General Assembly 2015
Austria Center Vienna, Vienna, Austria

2014

17 - 21 November 11th European Space Weather Week
Palais des Congres, Liège, Belgium

13 - 17 October 2nd TOSCA Training School on "Solar variability and Climate response"
International Centre for Theoretical Physics (ICTP) - Trieste, Italy

30 June - 11 July Summer School RECAS - Cloud Computing
University of Calabria - Dep. of Physics, 87036, Rende (CS), Italy

CONFERENCE PRESENTATIONS

2021

(Talk) *"Instantaneous scale-dependent properties of stochastic strange attractors"*, Forty Years of Stochastic Resonance, Perugia, 13-15 September 2021.

(Talk) *"The stochastic nature of the near-Sun solar wind turbulence"*, 11th Young Researcher Meeting (virtual), 06-09 September 2021.

(Talk) *"The chaotic structure of the near-Sun solar wind"*, Parker One (virtual), 14-18 June 2021.

(Invited talk) *"The "singular" behavior of the solar wind between PSP and BepiColombo orbits"*, Bepi-Colombo Cruise Science Study Group, 01 June 2021.

(Talk) *"Chaos in the solar wind"*, Applications of Statistical Methods and Machine Learning in the Space Sciences (virtual), 17-21 May 2021.

(Talk) *"On the multiscale fractal features of a low-order coupled ocean-atmosphere model in comparison with reanalysis data"*, vEGU21: Gather Online (virtual), 19-30 April 2021.

(Invited talk) *"On the uncertainty of real-time predictions of epidemic growths: A COVID-19 case study for China and Italy"*, vEGU21: Gather Online (virtual), 19-30 April 2021.

(Talk) *"Dynamical features of the near-Hermean environment under different solar wind conditions"*, vEGU21: Gather Online (virtual), 19-30 April 2021.

(Talk) *"Instantaneous multiscale properties of solar wind dynamical regimes and their attractors"*, vEGU21: Gather Online (virtual), 19-30 April 2021.

(Poster) *"Disentangling ionospheric structures from magnetospheric ones at low and mid latitudes"*, RAS Meeting "Comparative equatorial Thermosphere-Ionosphere-Magnetosphere coupling" (virtual), 12 February 2021.

(Poster) *"Multiscale Features of the Near-Hermean Environment as Derived by the Hilbert-Huang Transform"*, Mercury Exploration Assessment Group (MExAG) (virtual), 03 - 05 February 2021.

2020

(Poster) *"Multiscale Fractal Dimension Analysis of a Low-Order Coupled Ocean-Atmosphere Model based on Multivariate Empirical Mode Decomposition"*, AGU Fall Meeting 2020 (virtual), 01 - 17 December 2020.

(Talk) *"The Hilbert-Huang Transform (HHT) as a tool for characterizing dynamical features of Mercury's and Venus' magnetospheres"*, EPSC2020 (virtual), 21 September - 9 October 2020.

(Invited talk) *"Multiscale chaotic nature of the solar wind through the Heliosphere"*, BepiColombo Cruise Science Study Group, 25 August 2020.

(Talk) *"The Hilbert-Huang Transform (HHT) as a tool for characterizing dynamical features of Mercury's and Venus' magnetospheres"*, BepiColombo Young Scientist Study Group, 26 June 2020.

(Talk) *"Nonlinear decomposition of the Pleistocene climate record and the response to orbital forcing"*, MPE Webinars: Analysis and Modelling (`https://sites.google.com/view/mpe2020-webinars/home`), 10 July 2020.

(Display) *"Exospheric Na distributions along the Mercury orbit with the THEMIS telescope"*, Sharing Geoscience Online (virtual), Vienna, 4-8 May 2020.

(Display) *"Interplanetary effects on planetary environments: Earth, Venus, and Mercury"*, Sharing Geoscience Online (virtual), Vienna, 4-8 May 2020.

(Display) *"BepiColombo and Solar Orbiter coordinated observations: scientific cases and measurements opportunities"*, Sharing Geoscience Online (virtual), Vienna, 4-8 May 2020.

(Display) *"#SciComm via the European Geoscience Union Divisions' blogs: experiences from the editorial teams"*, Sharing Geoscience Online (virtual), Vienna, 4-8 May 2020.

(Display) *"Complex system perspectives of geospace electromagnetic environment research"*, Sharing Geoscience Online (virtual), Vienna, 4-8 May 2020.

(Display) *"Multiscale measures of phase-space trajectories"*, Sharing Geoscience Online (virtual), Vienna, 4-8 May 2020.

(Talk) *"Interplanetary effects on planetary environments: Earth, Venus, and Mercury"*, I Congresso Space Weather Italian Community (SWICo), Rome, 12-13 February 2020.

(Talk) *"Interplanetary effects on planetary environments: Earth, Venus, and Mercury"*, XVI Congresso Nazionale di Scienze Planetarie, Padova, 3-7 February 2020.

2019

(Talk) *"Characterizing Venus' environment during spacecraft flybys"*, Multi-spacecraft investigations of the inner heliosphere: Italian opportunities, Rome, 3-4 December 2019.

(Invited talk) *"On the dynamical properties of geomagnetic indices for Space Weather purposes"*, 16th European Space Weather Week, Liège, 18-22 November 2019.

(Poster) *"Detecting magnetospheric and ionospheric current systems patterns from Swarm observations"*, 16th European Space Weather Week, Liège, 18-22 November 2019.

(Invited talk) *"Chaos in the solar wind"*, Arcetri Workshop 2019 Plasma Astrophysics, 28-31 October 2019.

(Talk) *"Multifractal and Chaotic Properties of Solar Wind at MHD and Kinetic Domains"*, Società Italiana di Fisica, atticon11611 II-C-42, 2019.

(Talk) *"The poor man's magnetohydrodynamic (PMMHD) equations: a discrete dynamical system"*, 10th Young Researcher Meeting, Rome, 18-21 June 2019.

(Talk) *"On the chaotic/complex dynamics of the magnetosphere"*, The Plasma Physics of the Magnetosphere, Bra - Pollenzo, 2-7 June 2019.

(Poster) *"Linear vs. nonlinear methods for detecting magnetospheric and ionospheric current systems patterns"*, Living Planet Symposium 2019, Milan, 13-17 May 2019.

(Talk) *"The ESPERTA forecast tool for solar energetic proton events"*, Living Planet Symposium 2019, Milan, 13-17 May 2019.

Talk) *"The poor man's magnetohydrodynamic (PMMHD) equations: a discrete dynamical system"*, Geophysical Research Abstracts, Vol. 21, EGU2019-430, 2019.

2018

(Talk) *"Recurrence analysis of the magnetospheric dynamics"*, 15th European Space Weather Week, Leuven, 5-9 November 2018.

(Invited talk) *"Space plasmas as dynamical systems"*, Arcetri Workshop 2018 Plasma Astrophysics, 22-26 October 2018.

(Talk) *"Linear vs. nonlinear methods for detecting magnetospheric and ionospheric current systems patterns"*, Swarm 8th Data Quality Workshop, ESA/ESRIN, Frascati, 8-12 October 2018.

(Talk) *"Sulla natura multiscala della turbolenza nei plasmi spaziali"*, Società Italiana di Fisica, atticon11109 II-C-11, 2018.

(Talk) *"Exploring the middle Pleistocene transition"*, Geophysical Research Abstracts, Vol. 20, EGU2018-1613, 2018.

(Poster) *"Estimates of the energetic proton environment at L1 point"*, Geophysical Research Abstracts, Vol. 20, EGU2018-9090, 2018.

(Talk) *"Nonlinear analysis of the geomagnetic field of external origin"*, Convegno Nazionale IAGA-Italia, Roma, 21-22 February 2018.

2017

(Talk) *"Multi-scale analysis of space plasma turbulence by using Empirical Mode Decomposition"*, Arcetri Workshop 2017 Plasma Astrophysics, 23-27 October 2017.

(Talk) *"Looking at the solar wind plasma for Space Weather purposes"*, FisMat 2017, Trieste, 1-5 October 2017.

(Talk) *"Analisi non lineare delle variazioni del campo geomagnetico di origine esterna al pianeta"*, Società Italiana di Fisica, atticon10835 IV-C-31, 2017.

(Talk) *"To what extent can global warming events influence scaling properties of climatic fluctuations in glacial periods"*, Geophysical Research Abstracts, Vol. 19, EGU2017-12919, 2017.

2016

(Talk) *"How does the solar wind affect Earth's magnetosphere: from triggering to driving"*, Arcetri Workshop 2016 Plasma Astrophysics, 17-20 October 2016.

(Talk) *"A statistical study on the timescales involved into the solar wind-magnetosphere interaction during the March 17, 2015 storm"*, Società Italiana di Fisica, atticon9675 IV-C-11, 2016.

(Talk) *"The latitudinal distribution of the baseline geomagnetic field during the March 17, 2015 geomagnetic storm"*, Società Italiana di Fisica, atticon9668 IV-C-10, 2016.

(Poster) *"A statistical study on the timescales involved into the solar wind-magnetosphere interaction during the March 17, 2015 storm"*, Meeting of the Italian Solar and Heliospheric Community (SOHE), 2016.

(Poster) *"Characterization of X-ray and Type III radio bursts during solar cycle 24 for short-term warning of solar energetic particle events"*, Meeting of the Italian Solar and Heliospheric Community (SOHE), 2016.

(Poster) *"Paleoclimate changes: a stochastic resonance model based on ice-core data analysis"*, Geophysical Research Abstracts, Vol. 18, EGU2016-786, 2016.

(Invited talk) *"Natural periodicities and Northern Hemisphere-Southern Hemisphere connection of fast temperature changes during the last glacial period: EPICA and NGRIP revisited"*, Geophysical Research Abstracts, Vol. 18, EGU2016-4593, 2016.

(Talk) *"The latitudinal distribution of the baseline geomagnetic field during the March 17, 2015 geomagnetic storm"*, Geophysical Research Abstracts, Vol. 18, EGU2016-6396, 2016.

(Poster) *"The response of the ozone layer to the solar UV input: analysis of nonlinear trends"*, Geophysical Research Abstracts, Vol. 18, EGU2016-8381, 2016.

(Poster) *"A statistical study on the timescales involved into the solar wind-magnetosphere interaction during the March 17, 2015 storm"*, Geophysical Research Abstracts, Vol. 18, EGU2016-8421, 2016.

(Poster) *"Characterization of X-ray and Type III radio bursts during solar cycle 24 for short-term warning of solar energetic particle events"*, Geophysical Research Abstracts, Vol. 18, EGU2016-14599-1, 2016.

2015

(Poster) *"ULF waves: the main periodicities and their relationships with solar wind structures and magnetospheric electron flux"*, AGU Fall Meeting, San Francisco, 2015.

(Poster) *"The modulated baseline and anomalies of geomagnetic field during geomagnetic storms"*, AGU Fall Meeting, San Francisco, 2015.

(Poster) *"Detection of the different field contributions during geomagnetic storming time periods"*, European Space Weather Week 12, Oostend, November 2015.

(Poster) *"The modulated baseline and anomalies of geomagnetic field during geomagnetic storms"*, European Space Weather Week 12, Oostend, November 2015.

(Poster) *"A model upgrade for short-term warnings of solar energetic proton events"*, European Space Weather Week 12, Oostend, November 2015.

(Poster) *"Natural periodicities and Northern Hemisphere–Southern Hemisphere connection of fast temperature changes during the last glacial period: EPICA and NGRIP revisited"*, IUGG General Assembly, Praga, June 2015.

(Poster) *"The main periodicities of the geomagnetic Pc5 wave power and their relationship with solar wind speed, dynamic pressure and magnetospheric electron flux"*, IUGG General Assembly, Praga, June 2015.

(Poster) *"The modulated baseline and anomalies of geomagnetic field during geomagnetic storms"*, IUGG General Assembly, Praga, June 2015.

(Talk) *"Natural periodicities and Northern Hemisphere-Southern Hemisphere connection of fast temperature changes during the last glacial period: EPICA and NGRIP revisited"*, Geophysical Research Abstracts, Vol. 17, EGU2015-498, 2015.

(Poster) *"Pattern formation throught spatial interactions in a modified Daisyworld model"*, Geophysical Research Abstracts, Vol. 17, EGU2015-654, 2015.

(Poster) *"The main periodicities of the geomagnetic Pc5 wave power and their relationship with solar wind flow pressure and electron flux"*, Geophysical Research Abstracts, Vol. 17, EGU2015-2276, 2015.

2014

(Poster) *"The main periodicities of the geomagnetic Pc5 wave power and their relationship with solar wind and electron flux"*, European Space Weather Week, Liegi, November 2014.

LECTURING

2021

01 - 05 February — Dynamical systems approaches and chaos in Sun-Earth relations

Web school — Dynamical Systems and Machine Learning Approaches to Sun-Earth Relations

https://www.cifs-isss.org/Lecturers.aspx

SESSION/CONFERENCE ORGANIZATION

19 - 30 Apr 2021 — Convener of the Session SC4.5: "Nonlinear Processes in Geosciences: past methods and novel approaches" - vEGU21: Gather Online

19 - 30 Apr 2021 — Co-convener of the Session NP4.2: "Analysis of complex geoscientific time series: linear, nonlinear, and computer science perspectives" - vEGU21: Gather Online

19 - 30 Apr 2021 — Convener of the Session SC2.14: "Meet the EGU-Journal Editors" - vEGU21: Gather Online

04 - 08 May 2020 — Convener of the Session NET8: "Networking with the ECS of the NP division" - Sharing Geoscience Online

04 - 08 May 2020 — Convener of the Session NP4.1: "Complex geoscientific time series: linear, nonlinear, and computer science perspectives" - Sharing Geoscience Online

18 - 22 November 2019 — Convener of the Session 14: "Achievements in Magnetosphere - Ionosphere - Thermosphere coupling during geomagnetic storms and magnetospheric substorms" - 16th European Space Weather Week

07 - 12 April 2019 — Convener of the Session SC1.8/NP10.2: "Stochastic and chaotic approaches to geoscientific time series analysis" - EGU General Assembly 2019

08 - 13 April 2018 — Convener of the Session SC1.27/NP8.3: "Geophysical time series analysis" - EGU General Assembly 2018

30 May - 02 June 2016 — Member of the Local Organizing Committee of the "Fifth International Workshop on the Theory and Applications of the Vlasov equation - Vlasovia 2016"

REPRESENTATIVE

Apr 2019 - now — Early Career Scientists (ECS) representative for the Nonlinear Processes in Geosciences (NP) Division of the European Geosciences Union (EGU)

EDITORIAL ACTIVITIES

Sep 2020 - now — Guest Associate Editor of the journal *Frontiers in Physics*, Section: Space Physics
`https://www.frontiersin.org/journals/all/sections/space-physics#editorial-board`

May 2020 - now — Topic Editor of the journal *Entropy*
`https://www.mdpi.com/journal/entropy/topic_editors`

Sep 2019 - now — Topic Editor of the journal *Atmosphere*
`https://www.mdpi.com/journal/atmosphere/topic_editors`

Sep 2019 - now — Guest Editor of the Special Issue "New Achievements on Chaos, Turbulence and Complexity in Heliospheric Space Plasma Dynamics", *Entropy*, deadline for submissions: 01 September 2021
`https://www.mdpi.com/journal/entropy/special_issues/complexity_plasma_dynamics`

Jul 2019 - now — Lead Editor for the EGU Blog of the Nonlinear Processes in Geosciences (NP) Division of the European Geosciences Union (EGU)

INTERNATIONAL TEAMS

01 Dec 2020 - now — Member of the BepiColombo mission - Instrument: SERENA

01 Mar 2020 - now — Coordinator of the Working Group "Venus flybys science" within the BepiColombo-Solar Orbiter Italian Community

01 Mar 2020 - now — Member of the Working Group "Interplanetary medium science" within the BepiColombo-Solar Orbiter Italian Community

01 Jan 2020 - now — Member of the BepiColombo Hermean Environment Working Group

01 Jan 2020 - now — Member of the BepiColombo Young Scientists Working Group (BC YSWG)

01 Jan 2020 - now — Member of the BepiColombo Cruise Scientist Study Group (CSSG)

01 Sep 2019 - now — Member of PAGES (Past Global Changes) project

01 Dec 2017 - now — Associate Team Member of Advanced Telescope for High Energy Astrophysics (ATHENA)

01 Oct 2015 - Sep 2018 — Team Member of Turbulence Heating ObserveR (THOR), ESA Call for M4

SCIENTIFIC RESPONSIBILITIES

01 Feb 2021 - now — Associate scientist of the "Parker Solar Probe Theory Group"

01 Dec 2020 - now — Co-Investigator of the SERENA instrument on-board the BepiColombo mission

01 Nov 2019 - now — Young Scientist within the ISSI team "Complex Systems Perspectives Pertaining to the Research of the Near-Earth Electromagnetic Environment" (Team Leader: G. Balasis)

01 Nov 2019 - 30 Sep 2020 — Associate scientist of the "BepiColombo Coordinated Observations Working Group" under European Space Agency

01 Dec 2018 - 30 Nov 2019 — Associate scientist of the FP7 grant agreement n. 313038 "Solar system plasma Turbulence: Observations, inteRmittency and Multifractals (STORM)"

01 Dec 2017 - 30 Nov 2020 — Associate scientist of the European Union's Horizon 2020 Programme grant agreement n. 871158 "AHEAD2020 project"

01 Feb 2017 - 30 Nov 2017 — Associate scientist of the Italian PRIN 2012P2HRCR "The active Sun and its effects on Space Weather and Earth's Climate"

HONORS, AWARDS, AND GRANTS

10 Mar 2021 - now — Research Grant Proposal

	Co-Investigator for the proposal "Comprehensive spAce wEather Studies for the ASPIS prototype Realization (CAESAR)", under review for the Italian Space Agency (ASI) call "Studio per lo sviluppo del prototipo del centro dati scientifico ASPIS" (Coordinator: Dr. Monica Laurenza)
01 Jan 2021 - now	Fellow of the Royal Astronomical Society
12 Nov 2019	Eligible (2nd classified) for a tenure track full-time position at the Royal Meteorological Institute of Belgium (RMI) within the project "Modeling and forecasting the climate system from seasonal to decadal timescales over Europe using state of-the-art models and tools from non-linear sciences (SEAMLESS)" (Coordinator: Prof. S. Vannitsem).
12 Jul 2019	Winner of the selection procedure for a fixed-term researcher at the Department of Physics of the University of Calabria
Academic recruitment field	02/C1 - ASTRONOMY, ASTROPHYSICS, EARTH AND PLANETARY PHYSICS
Academic discipline	FIS/06 - PHYSICS OF THE EARTH AND OF THE CIRCUMTERRESTRIAL MEDIUM
Evaluation	EXCELLENT
	https://unical.portaleamministrazionetrasparente.it/moduli/downloadFile.php?file=oggetto_allegati/1919712133100__OGIUDIZI.pdf
01 Apr 2019	Research Grant Proposal
	Project "From the Sun to planetary environments and beyond", ASI - INAF Agreement N. 2018-16-HH.O (Coordinator: Dr. Anna Milillo), 2nd classified (eligible but not financed).
01 Jan - 31 Dec 2019	Research Grant
	Principal Investigator of the research grant financed by the Institute for Space Astrophysics and Planetology (IAPS) for the project "Dynamical systems approaches and chaos in the Sun-Earth system" within the call "Bando Nuove Idee IAPS 2019".
06 Oct 2018	International Award "Vincenzo Ferraro" 2018
	"for his interesting studies on the existence of a timescale separation between fast and slow dynamical processes in the Earth's magnetosphere"
	Società Italiana di Fisica & Associazione Onlus Vincenzo Ferraro presieduta dalla promotrice Signora Maddalena Ferraro
	https://www.sif.it/attivita/congresso/104/premiati
01 Jan - 31 Dec 2018	Research Grant
	Principal Investigator of the research grant financed by the Institute for Space Astrophysics and Planetology (IAPS) for the project "Machine learning approaches to Space Weather" within the call "Bando Giovani IAPS 2018".
11 Sep 2017	Migliori Comunicazioni 2017 (Società Italiana di Fisica)
	Sezione 4 - Geofisica e fisica dell'ambiente - Secondo premio
	https://www.sif.it/attivita/congresso/103/comunicazioni
	"Best Communications" - 2nd place - for the talk: "Analisi non lineare delle variazioni del campo geomagnetico di origine esterna al pianeta"
01 Jan - 31 Dec 2017	Complimentary Member of the European Geosciences Union (EGU) for the calendar year 2017 in response to EGU-related activities
13 - 17 Oct 2014	Grant
	Selected international graduate student for attending the 2nd TOSCA Training School on "Solar variability and Climate response"
01 Nov 2013 - 31 Oct 2016	Scholarship
(Cycle XXIX)	Dottorato di Ricerca in Scienze e Tecnologie Fisiche, Chimiche e dei Materiali

REVIEWER ACTIVITY

01 Feb 2020 - now	Reviewer Board member of the journal *Entropy*
	https://www.mdpi.com/journal/entropy/submission_reviewers
01 May 2019 - now	Reviewer Board member of the journal *Atmosphere*
	https://www.mdpi.com/journal/atmosphere/submission_reviewers

01 Jan 2015 - now Referee for *Monthly Notices of the Royal Astronomical Society*, *Chaos: An Interdisciplinary Journal of Nonlinear Science*, *Entropy*, *The Astrophysical Journal*, *Journal of Geophysical Research*, *Journal of Advances in Modeling Earth Systems*, *Atmosphere*, *Annals of Geophysics*, *Journal of Space Weather and Space Climate*, *Astronomy&Astrophysics*, *Frontiers in Physics*, *Nonlinear Processes in Geophysics*, *Earth, Planets and Space*, *Applied Sciences*, *Journal of Plasma Physics*, *Journal of Atmospheric and Solar Terrestrial Physics*

VISITING

16 -30 September 2018 Visiting researcher at Niels Bohr Institute, Centre for Ice and Climate, Copenhagen O, Denmark (Prof. P. D. Ditlevsen)

05 - 19 March 2017 Visiting researcher at Istituto di Astrofisica e Planetologia Spaziale, IAPS/INAF, Rome (Dr. G. Consolini)

06 - 20 March 2016 Visiting researcher at Istituto di Astrofisica e Planetologia Spaziale, IAPS/INAF, Rome (Dr. G. Consolini)

08 - 15 November 2015 Visiting researcher at Istituto di Astrofisica e Planetologia Spaziale, IAPS/INAF, Rome (Dr. G. Consolini)

11 - 31 May 2015 Visiting researcher at Istituto di Astrofisica e Planetologia Spaziale, IAPS/INAF, Rome (Dr. M. Laurenza)

COLLABORATIONS

- Prof. V. Carbone, University of Calabria, Rende (CS), Italy
- Dr. P. De Michelis, Istituto Nazionale di Geofisica e Vulcanologia (INGV), Rome, Italy
- Dr. E. W. Cliver, National Solar Observatory, Boulder, CO, USA
- Prof. P. D. Ditlevsen, University of Copenhagen, Niels Bohr Institute, Copenhagen O, Denmark
- Prof. R. V. Donner, Potsdam Institute for Climate Impact Research, Potsdam, Germany
- Prof. B. Dubrulle, SPEC, CEA, CNRS, Université Paris-Saclay, Gif-sur-Yvette, France
- Dr. D. Faranda, CNRS, Paris, France
- Prof. V. Lucarini, University of Reading, Reading, UK
- Prof. W.H. Matthaeus, University of Delaware, Newark, Delaware, USA
- Prof. S. Vannitsem, Royal Meteorological Institute of Belgium, Bruxelles, Belgium

THESIS SUPERVISION

Co-supervisor of 2 Master Degree thesis in Physics

— Giovanni Tripicchio, “Un modello climatico per lo studio di pianeti in rotazione sincrona”, Supervisors: Prof. V. Carbone, Dr. L. Primavera, Dr. T. Alberti, A.Y. 2016/2017

— Mattia Stefano, “Studio delle variazioni a lungo termine del clima terrestre e delle loro connessioni con l’attività solare”, Supervisors: Dr. F. Lepreti, Dr. T. Alberti, A.Y. 2015/2016

PRESS

13 Sep 2018 A press release has been dedicated to the “Vincenzo Ferraro” 2018 award `http://www.media.inaf.it/2018/09/13/premio-sif-tommaso-alberti/`

31 Jul 2018 “Siamo circondati da ... correnti!” (`https://www.primapagina.sif.it/article/805/siamo-circondati-da-correnti#.W2ANeRh9jCI`), a press release dedicated to the paper “Multivariate Empirical Mode Decomposition analysis of Swarm data”.

07 Jul 2017 A press release has been dedicated to the paper ”Comparative climates of TRAPPIST-1 planetary system: results from a simple climate-vegetation model” on Seeker.com, available at `https://www.seeker.com/space/planets/scientists-analyze-possible-vegetation-on-the-trappist-1-exoplanets`.

01 Nov 2015 The paper "Spatial interactions in a modified Daisyworld model: Heat diffusivity and greenhouse effects" was selected for the "Kaleidoscopes: November 2015" of the Physical Review E Journal https://journals.aps.org/pre/kaleidoscope/pre/92/5/052717)

OUTREACH

20 July 2020 Radio interview: About the beauty and pitfalls of nonlinear nature and the value of early-career networks

Many Body Physics, https://anchor.fm/manybodyphysics/episodes/About-the-beauty-and-pitfalls-of-nonlinear-nature-and-the-value-of-early-career-networks—Tommaso-Alberti-and-Beatrice-Ellerhoff-e14orn4

21 Mar 2017 La nuova glaciazione

"I've seen things...", Scienza e cinema fantastico, University of Calabria - Dep. of Physics, 87036, Rende (CS)

19 Jan 2017 Come funziona la Terra: dai cambiamenti climatici ai terremoti

Progetto Lauree Scientifiche, University of Calabria - Dep. of Physics, 87036, Rende (CS)

30 Sep 2016 Dal gelo al disgelo: l'importanza di capire il clima e i suoi cambiamenti

Researchers' Night, University of Calabria - Dep. of Physics, 87036, Rende (CS)

26 Sep 2014 How big is the Universe?

Researchers' Night, University of Calabria - Dep. of Physics, 87036, Rende (CS)

03 Apr 2014 The astrophysics at Unical: from the Sun to deep space

Day of environment and health, University of Calabria - Dep. of Physics, 87036, Rende (CS)

12 Nov 2014 Radio interview: I cambiamenti climatici

The sound of Science, Radio Ciroma 105.7 FM, Cosenza (CS)

20 July 2021 Radio interview: About-the-beauty-and-pitfalls-of-nonlinear-nature-and-the-value-of-early-career-networks

Many Body Physics, https://anchor.fm/manybodyphysics/episodes/

REFERENCES

Prof. Vincenzo Carbone (vincenzo.carbone@fis.unical.it)

Dr. Giuseppe Consolini (giuseppe.consolini@inaf.it)

Prof. Reik V. Donner (redonner@pik-potsdam.de)

I hereby authorize the processing of the personal data contained in this CV in compliance with the Italian Personal Data Protection Code (Legislative Decree no. 196 of 30 June 2003).

Federico Bianchini

fbianc@stanford.edu
https://fbianchini.github.io/

RESEARCH INTERESTS

Cosmology: phenomenology and data analysis; Cosmic microwave background; Large-scale structure; Gravitational Lensing; Sunyaev-Zel'dovich effect; Cross-correlations and connections with astrophysics; Cosmological test of fundamental physics; Statistical and computational methods for cosmology

CURRENT POSITION

12/2020-present **KIPAC Postdoctoral Fellow** Advisor: Zeeshan Ahmed
Kavli Institute of Cosmology and Astroparticle, Stanford University & SLAC National Accelerator Laboraty, USA

PREVIOUS POSITION

10/2016-10/2020 **Postdoctoral Fellow** Advisor: Christian L. Reichardt
School of Physics, University of Melbourne, Australia

EDUCATION

11/2012-9/2016 **Ph.D. in Astrophysics** Supervisor: Carlo Baccigalupi
Astrophysics Sector, SISSA/ISAS International School for Advanced Studies, Italy
10/2010-7/2012 **Master Degree in Astrophysics** Supervisor: Alessandro Melchiorri
Department of Physics, University of Rome "La Sapienza", Italy
10/2007-9/2012 **Bachelor Degree in Physics & Astrophysics** Supervisor: Alessandro Melchiorri
Department of Physics, University of Rome "La Sapienza", Italy

FELLOWSHIPS AND AWARDS

2020 **KIPAC Fellowship at Stanford University**
2020 **INFN Fellini Fellowship** (declined)
2018 **Betty Laby ECR Travel Bursary**
2015 **Erasmus Job Placement Fellowship**
2014 **International Astronomical Union Symposium 306 Travel Grant**
2012 **PhD Scholarship in Astrophysics curriculum, SISSA**

MENTORED STUDENTS

The University of Melbourne (co-supervised with Dr Christian Reichardt)

2020 – present	Eduardo Schiappucci (PhD candidate)
2018 – 2019	Mitchell Dylan De Zylva (MSc candidate)
2018 – 2018	Bryce Murphy (MSc candidate)
2016 – 2020	Anh Pham Thi Phuong (PhD candidate)

INSTITUTIONAL RESPONIBILITIES

2019 – 2020 Organizer of the Astrophysics seminar, University of Melbourne, School of Physics, Australia

PROFESSIONAL ACTIVITIES

- Member of the **SPT** collaboration 2016 – present
- Member of the **POLARBEAR** collaboration 2016 – present
- Member of the **Simons Observatory** collaboration 2016 – present
- Member of the **EUCLID** collaboration 2015 – 2016
- Member of the Astronomical Society of Australia (ASA) 2016 – present
- Member of the Italian National Institute for Nuclear Physics (INFN) 2012 – 2016
- Member of the Italian National Institute for Astrophysics (INAF) 2012 – 2016
- Referee for Nature Astronomy (2018 - present), Astronomy&Astrophysics (2020-present), Monthly Notices of Royal Astronomical Society (2015 - present), Journal of Cosmology and Astroparticle Physics (2020-present), Physical Review Letters (2020-present)

TECHNICAL SKILLS

- Computer languages: Python, C, Fortran (basics), IDL, scripting languages
- Scientific software: HEALPix, CAMB, CosmoMC, CLASS, emcee, PolSpice, scikit-learn, pandas
- Supercomputing: MPI, OpenMP; clusters used: NERSC (USA), Midway (USA), Spartan (Australia)

OUTREACH AND SERVICE

- Talks for year 10 students @ University of Melbourne 2018 - present
- Pint of Science @ Melbourne 2018 - present

REFERENCES

- Prof. Carlo Baccigalupi, SISSA/ISAS, email: bacci@sissa.it

- Prof. Christian Reichardt, University of Melbourne, email: christian.reichardt@unimelb.edu.au
- Prof. John Carlstrom, University of Chicago, email: jc@astro.uchicago.edu
- Dr. Zeeshan Ahmed, SLAC/Stanford University, email: zeesh@stanford.edu
- Prof. Alessandra Silvestri, Leiden University, email: silvestri@lorentz.leidenuniv.nl

PRESENTATIONS AT SCIENTIFIC CONFERENCES

Inv. = invited talk; * = Talk; Pos = Poster; Sem = seminar

Sem. Oct 2021, NCBJ Warsaw, Poland – '*Testing fundamental physics with the South Pole Telescope*'

Sem. Jan 2021, KIPAC Tea Talk, Stanford University, USA – '*Measuring the kinematic Sunyaev-Zel'dovich effect with SPT-3G and DES*'

Sem. May 2020, GCCL Zoom Seminar – '*Cosmological constraints from the SPTpol CMB lensing power spectrum*'

Sem. Aug 2019, UC Los Angeles, USA – '*Distortions in the Cosmic Microwave Background*'

Sem. Aug 2019, CCA, Flatiron Institute, USA – '*Distortions in the Cosmic Microwave Background*'

* July 2019, ASA2019, Brisbane, Australia – '*A new CMB lensing measurement from 500 square degrees of SPTpol data*'

Sem. April 2019, University of Sussex, UK – '*Distortions in the Cosmic Microwave Background*'

Sem. April 2019, SISSA/ISAS, Italy – '*Distortions in the Cosmic Microwave Background*'

Sem. April 2019, Padua Observatory, Italy – '*Distortions in the Cosmic Microwave Background*'

Inv. July 2018, LSS2LSS, Paris Orsay, France – '*Measuring peculiar velocities (and more) with the Cosmic Microwave Background*'

* July 2017, ASA2017, Canberra, Australia – '*A new CMB lensing measurement from 500 square degrees of SPTpol data*'

Sem. Apr 2017, University of Melbourne, Melbourne, Australia – '*Cross-correlations in the high-redshift sky: the Planck and Herschel case*'

Sem. Nov 2016, Swinburne University of Technology, Melbourne, Australia – '*Cross-correlations in the high-redshift sky: the Planck and Herschel case*'

Sem. Jan 2016, UC Irvine, US, - '*Investigating the Universe with Cosmic Microwave Background-Large Scale structure interactions*'

* Jan 2016, Statistical sampling and non-sampling methods in cosmology, Berkeley, US – '*Towards a tomographic analysis of Planck CMB lensing-Herschel cross-correlation*'

* Dec 2015, CMBXC Meeting Italia, Bologna, Italy – '*Methods and algorithms for CMB-LSS cross-correlations*'

* Sep 2015, Science with LSS and CMB cross-correlations, Merate, Italy – '*Towards a tomographic analysis of Planck CMB lensing-Herschel cross-correlation*'

* Jul 2015,14th Marcel Grossmann Meeting, Rome, Italy – '*Cross-correlations in the high-redshift sky: the Planck and Herschel case*'

Sem. Imperial Centre for Inference and Cosmology, Imperial College London, UK – '*Cross-correlations in the high-redshift sky: the Planck and Herschel case*'

* Euclid Consortium Meeting 2015, EPFL, Lausanne, Switzerland – '*Cross-correlations in the high-redshift sky: the Planck and Herschel case*'

Inv. Jun 2015, ASTRO@TS 2015, Trieste, Italy - – '*Cross-correlations in the high-redshift sky: the Planck and Herschel case*'

Sem. Instituut-Lorentz for theoretical physics, Leiden, Netherlands – '*Cross-correlations in the high-redshift sky: the Planck and Herschel case*'

Pos. Dec 2014, PLANCK2014, Ferrara, Italy – '*Cross-correlating Planck CMB Lensing with high-z sub-mm H-ATLAS galaxies*'

* Jun 2014, Cross-correlation in the high-redshift sky, London, UK - '*Cross-correlations in the high-redshift sky: the Planck and Herschel case*'

* May 2014, Statistical Challenges in 21st century cosmology, Lisbon, Portugal – '*Cross-correlations between cosmological and astrophysical data sets'*

LIST OF PUBLICATIONS

1000+ citations of published papers, h-index=17, according to Inspire

i) Publications as Lead Author or with Substantial Contribution

12. "*Searching for Anisotropic Cosmic Birefringence with Polarization Data from SPTpol***"**
F. Bianchini, W.L.K. Wu, … et al. [72 authors]
Phys. Rev. D 102, 083504 (2020)

11. "*Constraints on Cosmological Parameters from the 500 deg^2 SPTpol Lensing Power Spectrum***"**
F. Bianchini, W.L.K. Wu, … et al. [71 authors]
The Astrophysical Journal 888 (2020) 2

10. "*Cross-correlation of POLARBEAR CMB Polarization Lensing with High-z Sub-mm Herschel-ATLAS galaxies***"**
M. Aguilar Faúndez, …, **F. Bianchini**, … et al. [48 authors – I am the corresponding author]
The Astrophysical Journal 886 (2019) 1

9. "*Broadband spectral energy distributions of SDSS-selected quasars and of their host galaxies: intense activity at the onset of AGN feedback***"**
F. Bianchini, G. Fabbian, A.Lapi, J. Gonzalez-Nuevo, R. Gilli, C. Baccigalupi
The Astrophysical Journal 871 (2019) 136

8. "*Pancakes and fingers in the sky*"
F. Bianchini
Nature Astronomy 2 (2018) 942-943

7. **"***Imprints of gravitational lensing in the Planck cosmic microwave background data at the location of WISE×SCOS galaxies***"**
S. Raghunathan, **F. Bianchini**, C. L. Reichardt
Physical Review D 98 (2018) 4, 043506

6. **"***Constraining gravity at large scales with the 2MASS Photometric Redshift catalogue and Planck lensing*"
F. Bianchini & C. L. Reichardt
The Astrophysical Journal 862 (2018) 81

5. **"***Where is Population II?***"**
J. Mould, **F. Bianchin**i, D. Forbes, C. L. Reichardt
Publications of the Astronomical Society of Australia 35 (2018) e016

4. **"***Needlet estimation of cross-correlation between CMB lensing maps and LSS experiments***"**
F. Bianchini, A. Renzi, D. Marinucci
Journal of Cosmology and Astroparticle Physics 1611 (2016) 11, 050

3. **"***Toward a tomographic analysis of the cross-correlation between Planck CMB lensing and H-ATLAS galaxies***"**
F. Bianchini, A. Lapi, M. Calabrese, P. Bielewicz, J. Gonzalez-Nuevo, C. Baccigalupi, L. Danese, G. de Zotti, N. Bourne, A. Cooray, L. Dunne, S. Eales, E. Valiante
The Astrophysical Journal 825 (2016) 1, 24

2. **"***The kinetic Sunyeav-Zel'dovich effect in modified gravity***"**
F. Bianchini & A. Silvestri
Physical Review D 93 (2016) 06, 064026

1. **"***Cross-correlation between the CMB lensing potential measured by Planck and high-z sub-mm galaxies detected by the Herschel-ATLAS survey***"**
F. Bianchini, P. Bielewicz, A. Lapi, J. Gonzalez-Nuevo, C. Baccigalupi, G. de Zotti, L. Danese, N. Bourne, A. Cooray, L. Dunne, R. Ivison, S. Maddox, M. Negrello, E. Valiante, M.W.L. Smith, D. Scott, S. Eales, S. Dye
The Astrophysical Journal 802 (2015) 1, 64

ii) Collaborative papers with some contribution

32. *"The Design and Integrated Performance of SPT-3G***"**
J. Sobrin, ..., **F. Bianchini**, [123 authors]
Submitted to The Astrophysical Journal Supplement, Astro-ph: 2106.11202

31. *"Performance and characterization of the SPT-3G digital frequency-domain multiplexed readout system using an improved noise and crosstalk model***"**
J. Montgomery, ..., **F. Bianchini**, [121 authors]
Submitted to The Astrophysical Journal Supplement, Astro-ph: 2103.16017

30. *"Constraints on ΛCDM Extensions from the SPT-3G 2018 EEEE and TETE Power Spectra*"
L. Balkenhol, ..., **F. Bianchini**, [120 authors]
Submitted to Phys. Rev. D, Astro-ph:2103.13618

29. *"Detection of Galactic and Extragalactic Millimeter-Wavelength Transient Sources with SPT-3G*"
S. Guns, ..., **F. Bianchini**, [122 authors]
The Astrophysical Journal, 916 98 (2021)

28. *"Measurements of the E-Mode Polarization and Temperature-E-Mode Correlation of the CMB from SPT-3G 2018 Data*"
D. Dutcher, ..., **F. Bianchini**, [121 authors]
Phys. Rev. D 104, 022003 (2021)

27. *"Optimal CMB Lensing Reconstruction and Parameter Estimation with SPTpol Data*"
M. Millea, ..., **F. Bianchini**, [69 authors]
The Astrophysical Journal, in press (2021)

26. *"A Demonstration of Improved Constraints on Primordial Gravitational Waves with Delensing*"
P. A. R. Ade, Z. Ahmed, ..., **F. Bianchini**, [139 authors]
Phys. Rev. D 103, 022004 (2021)

25. "*CMB-S4: Forecasting Constraints on Primordial Gravitational Waves*"
Kevork Abazajian, Graeme E. Addison, ..., **F. Bianchini**, [230 authors]
Submitted to the Astrophysical Journal (2020)

24. "*A measurement of the CMB E-mode angular power spectrum at subdegree scales from 670 square degrees of POLARBEAR data*"
S. Adachi, …, **F. Bianchini**, … et al. [56 authors]
The Astrophysical Journal, 904 (2020), 65

23. "*Deployment of Polarbear-2A*"
D. Kaneko, …, **F. Bianchini**, … et al. [80 authors]
Journal of Low Temperature Physics 199 (2020) no.3-4, 1137-1147

22. "*An Improved Measurement of the Secondary Cosmic Microwave Background Anisotropies from the SPT-SZ + SPTpol Surveys*"
C. L. Reichardt, …, **F. Bianchini**, … et al. [77 authors]
The Astrophysical Journal, 908 (2021) 2

21. "*Measurement of the Cosmic Microwave Background Polarization Lensing Power Spectrum from Two Years of POLARBEAR Data*"
M. Aguilar Faúndez, …, **F. Bianchini**, … et al. [51 authors]

The Astrophysical Journal 893 (2020) 1, 85

20. **"***Measurements of B-mode Polarization of the Cosmic Microwave Background from 500 Square Degrees of SPTpol Data***"**
J.T. Sayre, …, **F. Bianchini**, … et al. [65 authors]
Submitted to The Astrophysical Journal, Astro-ph:1910.05748 (2019)

19. **"***The SPTpol Extended Cluster Survey***"**
L.E. Bleem, …, **F. Bianchini**, … et al. [138 authors]
The Astrophysical Journal Supplement Series, 247 (2020) 1, 25

18. **"***A Measurement of the Degree Scale CMB B-mode Angular Power Spectrum with POLARBEAR***"**
S. Adachi, …, **F. Bianchini**, … et al. [72 authors]
Submitted to The Astrophysical Journal, Astro-ph:1910.02608 (2019)

17. **"***Internal delensing of cosmic microwave background polarization B-modes with the POLARBEAR experiment***"**
S. Adachi, …, **F. Bianchini**, … et al. [53 authors]
Physical Review Letter 124 (2020) 13, 131301

16. **"***Galaxy Clusters Selected via the Sunyaev-Zel'dovich Effect in the SPTpol 100-Square-Degree Survey***"**
N. Huang, …, **F. Bianchini**, … et al. [76 authors]
The Astronomical Journal, 159 (2020) 3, 110

15. **"***Fractional Polarisation of Extragalactic Sources in the 500-square-degree SPTpol Survey***"**
N. Gupta, …, **F. Bianchini**, … et al. [80 authors]
Monthly Notices of Royal Astronomical Society, 490 (2019) no.4, 5712-5721

14. **"***A Detection of CMB-Cluster Lensing using Polarization Data from SPTpol***"**
S. Raghunathan, …, **F. Bianchini**, … et al. [129 authors]
Physical Review Letter 123 (2019) 18, 181301

13. **"***A Measurement of the Cosmic Microwave Background Lensing Potential and Power Spectrum from 500 deg^2 of SPTpol Temperature and Polarization Data***"**
W.L.K. Wu, …, **F. Bianchini**, … et al. [71 authors]
The Astrophysical Journal 884 (2019) 1, 70

12. **"***Constraining Radio Mode Feedback in Galaxy Clusters with the Cluster Radio AGN Properties to $z \sim 1$***"**
N. Gupta, …, **F. Bianchini**, … et al. [62 authors]
Monthly Notices of Royal Astronomical Society, 494 (2020) no.2, 1705-1723

11. **"***The POLARBEAR Fourier Transform Spectrometer Calibrator and Spectroscopic Characterization of the POLARBEAR Instrument***"**

F. Matsuda, …, **F. Bianchini**, … et al. [28 authors]
Rev.Sci.Instrum. 90 (2019) no.11, 115115

10. "*Evidence for the Cross-correlation between Cosmic Microwave Background Polarization Lensing from POLARBEAR and Cosmic Shear from Subaru Hyper Suprime-Cam***"**
T. Namikawa, …, **F. Bianchini**, … et al. [73 authors]
The Astrophysical Journal 882 (2019) 1, 62

9. "*QSOs acting as gravitational lenses: halo mass and projected mass density profile at z∼0.7***"**
L. Bonavera, J. González-Nuevo, S. L. Suárez Gómez, A. Lapi, **F. Bianchini**, M. Negrello, E. Díez Alonso, J. D. Santos, F. J. de Cos Juez
Journal of Cosmology and Astroparticle Physics 1708 (2017) 9, 21

8. "*The Simons Observatory: Science goals and forecasts*"
J. Aguirre, …, **F. Bianchini**, … et al. [249 authors]
Journal of Cosmology and Astroparticle Physics 1902 (2019) 056

7. "*Mass Calibration of Optically Selected DES clusters using a Measurement of CMB-Cluster Lensing with SPTpol Data***"**
S. Raghunathan, …, **F. Bianchini**, … et al. [131 authors]
The Astrophysical Journal 872 (2019) 2, 170

6. "*Dark Energy Survey Year 1 Results: tomographic cross-correlations between DES galaxies and CMB lensing from SPT+Planck***"**
Y. Omori, …, **F. Bianchini**, … et al. [137 authors]
Physical Review D 100 (2019) 4, 043501

5. "*Dark Energy Survey Year 1 Results: Joint Analysis of Galaxy Clustering, Galaxy Lensing, and CMB Lensing Two-point Functions***"**
T. Abbott, …, **F. Bianchini**, … et al. [164 authors]
Physical Review D 100 (2019) 2, 023541

4. "*Measurements of tropospheric ice clouds with a ground-based CMB polarization experiment, POLARBEAR***"**
S. Takakura, …, **F. Bianchini**, … et al. [48 authors]
The Astrophysical Journal 870 (2019) 102

3. "*The POLARBEAR-2 and Simons Array Focal Plane Fabrication Status***"**
B. Westbrook, …, **F. Bianchini**, … et al. [93 authors]
Journal of Low Temperature Physics, 193 (2018) 5-6, 758-770

2. "*Measuring galaxy cluster masses with CMB lensing using a Maximum Likelihood estimator: Statistical and systematic error budgets for future experiments***"**
S. Raghunathan, S. Patil, E. J. Baxter, **F. Bianchini**, L. E. Bleem, T. M. Crawford, G. P. Holder, A. Manzotti, C. L. Reichardt

Journal of Cosmology and Astroparticle Physics 1708 (2017) 08, 30

1. "*A Measurement of the Cosmic Microwave Background BB-Mode Polarization Power Spectrum at Sub-Degree Scales from 2 years of POLARBEAR Data*"
P.A.R. Ade, M. Aguilar, Y. Akiba, …, **F. Bianchini**, … et al. [81 authors]
The Astrophysical Journal 842 (2017) 2, 121

iii) Conference proceedings / White papers

6. "*Results of gravitational lensing and primordial gravitational waves from the POLARBEAR experiment***"**
Y. Chinone, …, **F. Bianchini**, … et al. [93 authors]
J.Phys.Conf.Ser. 1468 (2020) no.1, 012007

5. "*The Simons Observatory: Astro2020 Decadal Project Whitepaper***"**
M.H. Abitbol, …, **F. Bianchini**, … et al. [281 authors]
Bull. Am. Astron. Soc. 51 (2019) 147, Astro-ph:1907.08284

4. "*Dark Energy and Modified Gravity***"**
A. Slošar, …, **F. Bianchini**, … et al. [203 authors]
Astro-ph:1903.12016 (2019)

3. "*Electrical characterization and tuning of the integrated POLARBEAR-2a focal plane and readout***"**
C. Barron, …, **F. Bianchini**, … et al. [103 authors]
Proc.SPIE Int.Soc.Opt.Eng. 10708 (2018) 1070808

2. "*Cross-correlation between cosmological and astrophysical datasets: the Planck and Herschel case***"**
F. Bianchini, A. Lapi
SCCC21/IAU306 (2014)

1. "*H-ATLAS High-z Sources: An Optimal Sample for Cross-Correlation Analysis***"**
J. Gonzalez-Nuevo, A. Lapi**, F. Bianchini**,
49th Rencontres de Moriond: Cosmology, La Thuile, Italy, 22 - 29 Mar 2014, pp.121-126, (2014)

26 Ottobre 2021

CURRICULUM VITAE ET STUDIORUM di Sebastian Emanuel Lauro

POSIZIONE ATTUALE

01/03/2017 – 28/02/2022 Ricercatore a tempo determinato tipo A nel settore concorsuale 02/C1 S.S.D. FIS/06 presso l'Università di Roma Tre, Dipartimento di Matematica e Fisica.

ABILITAZIONE SCIENTIFICA NAZIONALE

Abilitato alla posizione di Professore di II Fascia nel SC 02/C1, SSD FIS/06 dal 02/09/2019.

CARRIERA UNIVERSITARIA E TITOLI DI STUDIO

01/10/2012 – 30/09/2016 Assegnista di ricerca ai sensi della L. 240/2010 presso l'Università di Roma Tre, sul tema: Misure elettromagnetiche ed inversione dati per l'esplorazione di Marte con il radar WISDOM.

01/10/2009 – 30/09/2012 Assegnista di ricerca ai sensi della L. 230/2005 presso l'Università di Roma Tre, sul tema: Ricostruzione delle proprietà elettromagnetiche e geometriche della stratigrafia sub-superficiale di Marte con tecniche di inversione tomografiche.

20/04/2009 – 20/07/2009 Contratto di collaborazione presso il Dipartimento di Fisica Università degli Studi Roma Tre per analisi dei dati radar acquisiti dallo strumento SHARAD.

2009 Dottorato di ricerca in Ingegneria Elettronica Biomedica, dell'Elettromagnetismo e delle Telecomunicazioni presso l'Università Roma Tre, nel corso del quale mi occupo della progettazione di componenti a microonde e a frequenze ottiche basati sull'impiego di materiali non convenzionali e studio le possibilità di impiego dei metamateriali. Discuto la tesi di Dottorato dal titolo: *Applicazioni ingegneristiche dei metamateriali per la realizzazione di componenti a microonde e a frequenze ottiche*.

2006 Abilitazione all'esercizio della professione di Ingegnere.

2005 Laurea in Ingegneria Elettronica, con votazione 110/110, con tesi di laurea dal titolo *Soluzioni Numeriche per l'Integrale di Helmholtz-Kirchhoff alle Alte Frequenze*, nella quale affronto l'applicazione di uno sviluppo asintotico all'interno di un codice agli elementi finiti di contorno per problemi di acustica interna.

ATTIVITÀ DI RICERCA

Il mio campo principale di ricerca riguarda l'analisi di segnali radar in ambito terrestre e planetario attraverso lo sviluppo di metodi di inversione elettromagnetici per lo studio del sottosuolo terrestre, della Luna, di Marte, di Venere e delle lune ghiacciate di Giove.
Lavoro anche sullo sviluppo e l'implementazione di tecniche di misure delle proprietà elettromagnetiche di materiali nel dominio del tempo e della frequenza e, in particolare modo, mi occupo della caratterizzazione in laboratorio e in situ di materiali quali ghiaccio, neve, permafrost, rocce, suoli e inquinanti, per lo studio della propagazione delle onde elettromagnetiche in mezzi naturali solidi, liquidi e granulari. Una parte della mia ricerca riguarda anche la caratterizzazione della performance della strumentazione geofisica e, in particolare, gli effetti di accoppiamento antenne-materiale e le caratteristiche radiative delle antenne radar.
Altro filone di ricerca riguarda lo studio degli effetti dei cambiamenti climatici sulla criosfera, attraverso l'analisi della propagazione e della caratterizzazione del segnale radar in ghiacci meteorici, marini e in depositi nevosi.
Tra i vari contributi scientifici, segnalo lo studio e il rilevamento di acqua liquida sotto la calotta polare sud di Marte, attraverso l'inversione dei dati radar raccolti dalla sonda MARSIS nella missione Mars Express.

PROGETTI DI RICERCA FINANZIATI

2019 Vincitore del finanziamento Europlanet Transnational Access (HORIZON 2020), per una Campagna di misure in Islanda con il progetto "Gpr Characterization Of Glacial Terrains As Analogue Of Mid-Latitude Regions Of Martian Surface In The Framework Of Exomars 2020" da svolgersi nel mese di giugno 2019.

PREMI E RICONOSCIMENTI PER L'ATTIVITÀ SCIENTIFICA

2020 premio AACS di Roma per il lavoro pubblicato su Nature Astronomy (Lauro et al., Multiple subglacial water bodies below the south pole of Mars unveiled by new MARSIS data).

2014 EAGE Ludger Mintrop Award. Il premio è stato conferito per la pubblicazione: C.Ferrara, V. Di Tullio, P.M.Barone, E.Mattei, S.E.Lauro, N. Proietti, D.Capitani and E.Pettinelli, Comparison of GPR and unilateral NMR for water content measurements in a laboratory scale experiment, Near Surface Geophysics, vol. 11, ISSN: 1569-4445 (2013).

2011 Ricevo il Meneghetti Award in Fisica. Il premio è stato conferito per l'articolo su rivista: "Radio wave techniques for non-destructive archaeological investigations", E. Pettinelli, P.M. Barone, E. Mattei, S.E. Lauro, Contemporary Physics 52 (2), 121-130 (2011).

2010 Vengo premiato in Award Session for Young Researchers at 13th International Conference on Ground Penetrating Radar (GPR 2010) organised by IBAM-CNR and University of Salento, 21st-25th June, Lecce, Italy.

PARTECIPAZIONE SCIENTIFICA A PROGETTI DI RICERCA INTERNAZIONALI E NAZIONALI

Sono team member in differenti progetti in ambito terrestre e planetario. In particolare:

Dal **2021** al **2022** sono membro del team scientifico del progetto SMVIA (Snow-mantle Modeling, Inversion and Validation using multi-frequency multi-mission InSAR in central Apennine) per la caratterizzazione elettromagnetica di misure di neve, Contratto ASI & DIET-SAPIENZA "SMIVIA" n.2021-9-U.0 - CUP F85F21001230005.
Dal **2020** al **2022** sono membro del team scientifico del progetto ISSI (International Space Science Institute, Berna, Svizzera), Searching for subglacial water on Mars with orbiting ground penetrating radars**,** per la modellizazione elettromagnetica e l'inversione dei dati.
Dal **2019** al **2022** ENVISION WP 2000 - Misure elettromagnetiche ad alta temperatura di rocce simulanti il sottosuolo di Venere – 24 mesi - Finanziamento ASI (2019-25-HH.0) .
Dal **2020** al **2022** DARA (Dipartimento per gli Affari Regionali e le Autonomie) Italian Government Measurements of physical properties and thickness of ice and snowpack in the central Apennines using GPR and TDR techniques (24 mesi).
Dal **2013** sono membro del team scientifico della missione RIME (Radar for Icy Moon Exploration) – a bordo di JUICE (Jupiter Icy Moon Explorer). Progetto finanziato da ASI (Accordo ASI/INAF 2013-056-RO Phase A/B1 WP 3300) focalizzando il mio lavoro sullo studio della propagazione di segnali radar all'interno della crosta ghiacciata di *Europa*;
Dal **2011** sono membro del team scientifico della missione ExoMars (Exobiology on Mars) (SCIENCE PHASE C2 / D finanziato da ASI I/060/10/0 - WP1300) per l'esperimento WISDOM (Water Ice and Subsurface Deposit Observation on Mars) fornendo il supporto scientifico per il progetto del GPR (Ground Penetrating Radar);
Dal **2009** ad oggi mi occupo di analisi radar dei dati di MARSIS (MARS EXPRESS - MEX Finanziamento ASI (I/010/05/0) – WP 1600), focalizzando la mia ricerca sull'inversione di dati radar per l'individuazione delle caratteristiche geologiche di Marte.
Dal **2009** mi occupo di analisi radar dei dati di SHARAD (Mars SHAllow RADar sounder), strumento che opera a bordo di MRO (Mars Reconnaisance Orbiter) - finanziato da ASI (contratto I/061/08/0 - WP 1330), focalizzando la mia ricerca sull'inversione di dati radar per l'individuazione delle caratteristiche geologiche di Marte.

COLLABORAZIONI CON ENTI DI RICERCA NAZIONALI E INTERNAZIONALI

Collaboro con gruppi di ricerca scientifici nazionali e internazionali. Nello specifico con:

LATMOS (Laboratoire ATmosphères, Milieux, Observations Spatiales, UMR 8190, France) – per la missione ExoMars;
IETR (Institut d'Electronique et de Télécommunications de Rennes, UMR CNRS 6164, France) – per la missione ExoMars;
IREA (Istituto per il Rilevamento Elettromagnetico dell'Ambiente, CNR, Italia) – per le missioni MRO e ExoMars;
DIET (Dipartimento di Ingegneria dell'Informazione, Elettronica e Telecomunicazioni, La Sapienza, Italia) – per la missione ExoMars e il progetto SMIVIA;
Sensors and Software inc, Canada – per l'interpretazione dei dati radar;
Il Dipartimento di Chimica "Ugo Schiff" (Università di Firenze, Italia) – per le analisi chimiche di campioni di ghiaccio;

RSLAB (Remote Sensing Laboratory, Università di Trento, Italia) – per le missioni JUICE e ENVISION;
IRA (Istituto di Radioastronomia, INAF, Italia) – per le missioni MRO e MEX;
IAPS (Instituto di Astrofisica and Planetologia, INAF, Italia) – per la missione MRO.
CEOS (Centre for Earth Observation Science) - Arctic System Science- Universita di Manitoba, Canada – per la misura delle proprietà elettriche del "sea-ice".
EURAC (Institute for Applied Remote Sensing, Bolzano,Italia) – per i) la caratterizzazione del suolo a supporto di studi idreogeologici in terreni alpini integrando tecniche elettromagnetiche (GPR e TDR) a tecnologie basate sullo scattering di neutroni (Cosmic-Ray Neutron Sensing); ii) la stima dello spessore del manto nevoso, del ghiacciaio e dello "snow water equivalent" tramite tecnica GPR e TDR e misure di densità.
NAOC (National Astronomical Observatories, Beijing, China) e University of Chinese Academy of Sciences (Beijing, China) – per l'analisi dei dati radar raccolti dalle missioni lunari Chang'e 3,4,5, e marziane RosPeR e MOSIR.
Planetary Geology Laboratory, Mineral Resources Research Division, Korea Institute of Geoscience , per l'analisi dei dati radar raccolti dalla missione della JAXA, KAGUYA.

Dept. of Space Studies Southwest Research Institute (SwRI), Boulder, Colorado, USA per le misure di ghiacci dopati con sali.

Institute of Applied Geosciences, School of Earth & Environment, University of Leeds, UK – nell'ambito dell'analisi dei dati di SHARAD.

CAMPAGNE DI MISURA RECENTI

2019 (Luglio) Misure GPR per il monitoraggio del ghiacciaio del Calderone (Abruzzo).
2018 (Luglio) Misure GPR per la caratterizzazione di faglie in roccia (Majella, Abruzzo), nell'ambito del progetto EC – funded ENOS (ENabling Onshore CO2 Storage in Europe - Horizon 2020).
2016 (Febbraio) SERF (Sea-ice Environmental Research Facility) Campaign 2016, CEOS University of Manitoba, Winnipeg, Canada - Measurement of sea ice physical properties using Multilevel Transmission Lines and Ground Penetrating Radar (GPR) http://www.asp-net.org/content/serf-2016-campaign#overlay-context=node/7
2016 (luglio) Misure GPR e TDR per la caratterizzazione elettromagnetica dei suoli e la calibrazione di una Cosmic-ray Neutron Probe (CRP) in collaborazione con EURAC – Bolzano, Remote Sensing Group.
2014 (aprile) Misure radar e TDR del manto nevoso e della struttura interna del ghiacciaio di Solda in collaborazione con EURAC – Bolzano, Remote Sensing Group.
2010 (ottobre) Misure Radar e TDR su terreni simulanti il suolo di Marte (Monte Etna) per lo sviluppo delle antenne di WISDOM (EXOMARS) in collaborazione con LATMOS, Paris, France.

REVISORE PER RIVISTE INTERNAZIONALI

IEEE Geoscience and Remote Sensing Letters; IEEE Transaction on Geoscience and Remote Sensing; IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing; Near Surface Geophysics; Journal of Applied Geophysics; Planetary and Space Science; IEEE Open Journal of Antennas and Propagation.

COMMISSIONI PER ASSEGNI DI RICERCA E BORSE DI STUDIO

2020 Membro della commissione per un assegno di ricerca su fondi Dara.
2020 Membro della commissione per una borsa di studio su fondi Envision.

ATTIVITA' DIDATTICA - DOTTORATO DI RICERCA

INSEGNAMENTI NEI CORSI DI DOTTORATO

2017- Oggi Titolare del corso Inversion Methods in Geophysics (2 CFU) per il Dottorato in Fisica presso il Dipartimento di Matematica e Fisica, Università degli Studi Roma TRE.

SUPERVISIONE O CO-SUPERVISORE DI TESI DI DOTTORATO

2020-2023 Co-Supervisore del lavoro di tesi di dottorato in Fisica XXXV CICLO di Jamaledin Baniamerian: Analysis of the ground penetrating radar data for the application to ground and planetary exploration.
2016-2017 Co-Supervisore del lavoro di tesi di dottorato sull'analisi dei dati radar raccolti dalla missione Chang'e3 degli studenti visitatori, Shuguo Xing e Chunyu Ding dell'University of Chinese Academy of Sciences (Beijing, China).
2014-2017 Co-Supervisore delle tesi di dottorato in Fisica XXVII CICLO di Barbara Cosciotti: Dielectric measurements of Europa's and Mars' ice shell: implication for radar exploration; e di Carlotta Ferrara: Ground Penetrating Radar early-time technique for soil electromagnetic parameters estimation.

INCARICHI DI RESPONSABILITÀ

2020- Oggi: docente responsabile del corso L'Agenda 2030 delle Nazioni unite per lo sviluppo sostenibile per il Dipartimento di Matematica e Fisica, Università degli Studi Roma TRE .

INSEGNAMENTI NEI CORSI DI LAUREA TRIENNALE E MAGISTRALE

2020-Oggi: docente del corso *L'Agenda 2030 delle Nazioni unite per lo sviluppo sostenibile* (3 CFU) per il corso di Laurea Triennale in Fisica presso il Dipartimento di Matematica e Fisica, Università degli Studi Roma TRE .
2019-Oggi: Titolare del corso *Elementi di Geofisica* (6 CFU) per il corso di Laurea Magistrale in Geologia del Territorio e delle Risorse, Università degli Studi Roma TRE.
2016-Oggi Titolare del corso *Laboratorio di Fisica Terrestre e dell'Ambiente* (6 CFU) per il corso di Laurea Triennale in Fisica presso il Dipartimento di Matematica e Fisica, Università degli Studi Roma TRE.

DIDATTICA INTEGRATIVA ED ESERCITAZIONI DI LABORATORIO

2013-2014 svolgimento delle esercitazioni del corso di *Fisica II* tenuto dal Professore Aldo Altamore presso il Dipartimento di Geologia, Università degli studi Roma TRE.
2013-2014 svolgimento dei *laboratori di Elettromagnetismo e Ottica* all'interno del Progetto Lauree Scientifiche (PLS), presso il Dipartimento di Fisica, Università degli studi Roma TRE.
2012-2014 svolgimento del corso di *Laboratorio di Fisica Terrestre e dell'ambiente*-Modulo Laboratorio, tenuto dalla Professoressa Elena Pettinelli, presso il Dipartimento di Fisica, Università degli studi Roma TRE.

2009-2010 svolgimento del corso di Laboratorio di Esperimentazioni di Fisica III tenuto dal Prof. De Vincenzi presso il Dipartimento di Fisica, Università degli studi Roma TRE
2006-2008 svolgimento del corso di in *Campi Elettromagnetici I, II e Bioelettromagnetismo*, Dipartimento di Ingegneria Elettronica, Università degli studi Roma Tre.

COMMISSIONI DI ESAME

Dal 2017 ad oggi membro della commissione della classe di laurea L30 e LM17.
Dal 2020 ad oggi membro della commissione d'esame per il corso di *Esperimentazioni di Fisica I*, presso il Dipartimento di Matematica e Fisica, Università degli studi Roma Tre.
Dal 2017 ad oggi membro della commissione d'esame per i corsi di *Fisica della Ionosfera e della Magnetosfera*, *Meccanica dei mezzi continui in fisica terrestre e dell'ambiente*, *Metodi sperimentali di geofisica*, presso il Dipartimento di Matematica e Fisica, Università degli studi Roma Tre.
2009-2016 membro della commissione d'esame per i corsi di *Laboratorio di Fisica Terrestre e dell'Ambiente* e *Metodologie Elettromagnetiche per la Geofisica*, *Fisica applicata alla terra e i pianeti*, presso il Dipartimento di Matematica e Fisica, Università degli studi Roma Tre.
2008 Esaminatore all'esame per il conseguimento dell'abilitazione alla professione di Ingegnere presso l'Università degli studi Roma Tre.

RELATORE E SUPERVISORE DI TESI DI LAUREA

2021 Relatore della tesi magistrale di Alessandro Brin *Electromagnetic characterization of meteorites for radar investigations of solar system bodies.*
2019 Relatore della tesi triennale di Alessandro Brin *Indagini geofisiche per l'esplorazione di laghi subglaciali.*
2018 Controrelatore della tesi triennale di Alessio Conclave *Caratterizzazione dinamica del sottosuolo tramite tecnica spettrale HVSR applicata su dati sismici passivi.*

2011-2014 Supervisore delle tesi di laurea di:
Francesco Gabbai: *Caratterizzazione dielettrica di un meteorite condritico finalizzata all'interpretazione di dati radar di missioni planetarie;*
Giorgio Taverna: *Dielectric estimation of the Martian surface by using the HF radar sounder*;
Davide Comite: *Studio numerico e sperimentale dello scattering in sistemi GPR;*
Alessio Pirotti: *Analisi di Geomateriali: Permittività elettrica e permeabilità magnetica*;
Valerio Marinelli: *Inversione di dati acquisiti con RADAR sottosuperficiale sul Polo Sud di Marte*;
Chiara Tomaino: *Analisi dei segnali GPR e stima della conducibilità in siti naturali che simulano il sottosuolo di Marte*;
Barbara Cosciotti: *Misure GPR e TDR integrate e finalizzate alla stima del contenuto d'acqua nel sottosuolo;*
Carlotta Ferrara: *Misure integrate NMR e GPR per la stima di umidità in materiali solidi*;
Vittorio Campanella: *Proprietà elettromagnetiche di campioni Lunari: implicazioni per future missioni con radar sottosuperficiali*;
Cinzia Zaccheo: *Misure elettromagnetiche ad alta frequenza in sito naturale che simula il sottosuolo marziano.*

SEMINARI SU INVITO

2019 – *Radar evidence of subglacial liquid water on Mars*, Institute of Applied Geosciences, School of Earth & Environment, University of Leeds, UK.
2019 – *Esplorare le calotte polari Marziane con MARSIS: la scoperta tutta italiana del lago marziano*, LXIII Congresso della Società Astronomica Italiana (SAIt), Accademia dei Lincei, Roma, 14-17/04/2019.
2019 – *Radar evidence of subglacial liquid water on Mars*, INAF – Osservatorio Astronomico di Padova.
2018 – *La scoperta dell'acqua liquida sotto la calotta polare Marziana*, Seminario di Fisica Terrestre e dell'Ambiente, Università di Roma Tre.

ORGANIZZAZIONE DI MEETING, CONVEGNI E WORKSHOP

2019 Workshop on SHARAD data analysis and processing, Institute of Applied Geosciences, School of Earth & Environment, University of Leeds, UK.
2019 Sessione Radar Sounding Investigations of Terrestrial and Planetary Ices, PIERS 2019, Roma, Giugno 2019.
2018 Sessione Metrology for Future Space Exploration: Instruments, Technology and Techniques. Special Session on Advanced remote sensing for exploration, 5th IEEE International Workshop on Metrology for AeroSpace in Rome, June 2018.

ATTIVITÀ DI COMUNICAZIONE DELLA SCIENZA, ORIENTAMENTO E TERZA MISSIONE

Gennaio 2019 Seminario al Liceo Scientifico Kennedy dal titolo Acqua liquida Marte.
Novembre 2018 Partecipazione alla Fiera dello Studente con il seminario: Acqua liquida su Marte: una scoperta tutta italiana.
Dal 2015 svolge attività di divulgazione scientifica presso il Dipartimento di Matematica e Fisica dell'Università Roma 3 all'interno degli eventi: "Notte europea della ricerca", "Occhi su Giove", "Occhi sulla Luna", "Occhi su Saturno, "Occhi su Marte".

Interviste
2018 – 2021 In relazione alla scoperta dell'acqua liquida sotto i ghiacci del polo sud di Marte pubblicata su Science e su Nature Astronomy e della ricerca sul lato oscuro della Luna pubblicata su Science Adavances ho rilasciato numerose interviste TV, Radio e scritte per emittenti e testate internazionali e nazionali, tra cui: CNN International, CCTV (China Central Station), EuroNews, Rai Tre TG Leonardo, Rai 1, Rai 3, Radio Rai 2, BBC radio 2, La Repubblica, Corriere della Sera, Messaggero, ANSA.

LINGUE STRANIERE

Buona conoscenza dell'inglese e del francese.

CAPACITÀ INFORMATICHE

LINUX, WINDOWS, MATLAB, Python, Mathematica, CST, HFSS, COMSOL Multiphysics.

ARTICOLI SU RIVISTE SCIENTIFICHE INTERNAZIONALI

Parametri bibliometrici (fonte scopus.com) al 22/10/2021: 611 citazioni, 13 h-index

1] Pettinelli, E., **Lauro, S. E.**, Mattei, E. *et al.* Stratigraphy versus artefacts in the Chang'e-4 low-frequency radar. *Nat Astron* **5,** 890–893 (2021). https://doi.org/10.1038/s41550-021-01432-x.

2] Cosciotti B., **Lauro S. E.**, Gabbai F., Mattei E., Di Paolo F., Pratesi G., Pettinelli E., Laboratory investigation into the dielectric properties of a L-chondrite (NWA 12857), Icarus, Volume 362, 2021, 114426, ISSN 0019-1035, https://doi.org/10.1016/j.icarus.2021.114426.

3] **Lauro S. E.**, Pettinelli E., Caprarelli G., Guallini L., Rossi A.P. Mattei E., Cosciotti B., Cicchetti A., Soldovieri F., Cartacci M., Noschese R., Pettinelli E., Multiple subglacial water bodies below the south pole of Mars unveiled by new MARSIS data. *Nat Astron* **5,** 63–70 (2021). https://doi.org/10.1038/s41550-020-1200-6.

4] Di Paolo F., Cosciotti B., **Lauro S. E.**, Mattei E., Pettinelli E., "A critical analysis on the uncertainty computation in GPR-retrieved dry snow parameters", Geophysics, vol. 85, p. H39-H49, ISSN: 0016-8033, doi: 10.1190/GEO2019-0683.1.

5] Li. C., Su Y., Pettinelli E., Xing S., Ding C., J. Liu, X. Ren, **Lauro S. E.**, Soldovieri F., Zeng X., Gao X., Chen W., Dai S., Liu D., Zhang G., Zuo W., Wen W., Zhang Z., Zhang X., Zhang H., "The Moon's farside subsurface structure unveiled by Chang'E-4 Lunar Penetrating Radar", Science Advances, vol. 6, ISSN: 2375-2548, doi: 10.1126/sciadv.aay6898.

6] Orosei R., Ding C., Fa W., Giannopoulos A., Herique A., Kofman W., **Lauro S. E.**, Li C., Pettinelli E., Su Y., Xing S., Xu Y. (2020). The global search for liquid water on mars from orbit: Current and future perspectives. Life, vol. 10, p. 1-15, ISSN: 2075-1729, doi: 10.3390/life10080120

7] **Lauro, S. E.**, Soldovieri, F., Orosei, R., Cicchetti, A., Cartacci, M., Mattei, E., Cosciotti B., Di Paolo F., Noschese R., Pettinelli, E. "Liquid Water Detection under the South Polar Layered Deposits of Mars-a Probabilistic Inversion Approach". Remote Sensing,vol. 11, ISSN: 2072-4292, doi: 10.3390/rs11202445.

8] Cosciotti, B., Balbi, A., Ceccarelli, A., Fagliarone, C., Mattei, E., **Lauro, S. E.**, Billi, D.. Survivability of Anhydrobiotic Cyanobacteria in Salty Ice: Implications for the Habitability of Icy Worlds. Life, 9(4), 86, 2019

9] Orosei R., **Lauro S. E.**, Pettinelli E., Cicchetti A., Coradini M., Cosciotti B., Di Paolo, F. Flamini, E.Mattei, E. Pajola, M. Soldovieri, F. Cartacci, M. Cassenti, F. Frigeri, A. Giuppi, S. Martufi, R. Masdea,A. Mitri, G. Nenna, C. Noschese, R. Restano, M. Seu (2018). Radar evidence of subglacial liquid water on Mars. *Science*, vol. 361, p. 490-493, ISSN: 0036-8075.

10] Li, Chunlai, Xing, Shuguo, **Lauro S. E.**, Su, Yan, Dai, Shun, Feng, Jianqing, Cosciotti, Barbara, Di Paolo, Federico, Mattei, Elisabetta, Xiao, Yuan, Ding, Chunyu, Pettinelli, Elena (2018). Pitfalls in GPR Data Interpretation: False Reflectors Detected in Lunar Radar Cross Sections by Chang'e-3. *IEEE Transactions on Geoscience and Remote Sensing*, p. 1-11, ISSN: 0196-2892, doi: 10.1109/TGRS.2017.2761881.

11] Guallini, Luca, Angelo Pio Rossi, François Forget, Lucia Marinangeli, **Lauro S. E.**, Elena Pettinelli, Roberto Seu, and Nicolas Thomas. Regional stratigraphy of the south polar layered deposits (Promethei Lingula, Mars):“Discontinuity-bounded” units in images and radargrams, *Icarus* (2017).

12] **Lauro S. E.**, Mattei, E., Cosciotti, B., Di Paolo, F., Arcone, S. A., Viccaro, M., & Pettinelli, E. EM signal penetration in a planetary soil simulant: Estimated attenuation rates using GPR and TDR in volcanic deposits on Mount Etna. *Journal of Geophysical Research: Planets*, 2017.

13] F. Di Paolo, **Lauro S. E.**, D. Castelletti, G. Mitri, F. Bovolo, B. Cosciotti, E. Mattei, R. Orosei, C. Notarnicola, L. Bruzzone, E. Pettinelli, Radar Signal Penetration and Horizons Detection on Europa Through Numerical Simulations, IEEE *Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 99, DOI 10.1109/JSTARS.2016.2544103, 2017.

14] **Lauro S. E.**, G. Gennarelli, E. Pettinelli, F. Soldovieri, F. Cantini, A. P. Rossi e R. Orosei, A strategy for an accurate estimation of the basal permittivity in the Martian North Polar Layered Deposits, *Geophysical Prospecting*, doi: 10.1111/1365-2478.12443, 2017.

15] E. Pettinelli, **Lauro S. E.**, B. Cosciotti, E. Mattei, F. Di Paolo, G. Vannaroni, Dielectric characterization of ice/$MgSO_4$ $11H_2O$ mixtures as Jovian icy moon crust anolgues, Earth and Planetary Science Letters, 439,11-17, 2016.

16] D. Comite, A. Galli, **Lauro S. E.**, E. Mattei, E. Pettinelli, Analysis of GPR Early-Time Signal Features for the Evaluation of Soil Permittivity Through Numerical and Experimental Surveys, JSTAR, 2016.

17] E. Pettinelli, B. Cosciotti, F. Di Paolo, **Lauro S. E.**, E. Mattei, R. Orosei, G. Vannaroni, Dielectric properties of Jovian satellite ice analogs for subsurface radar exploration: A review, Reviews of Geophysics, 2015.

18] E. Mattei, **Lauro S. E.**, G. Vannaroni, B. Cosciotti, F. Bella, E. Pettinelli, Dielectric measurements and radar attenuation estimation of ice/basalt sand mixtures as martian Polar Caps analogues. ICARUS, vol. 229, ISSN: 0019-1035, 2014.

19] E. Pettinelli, A Di Matteo, S. E. Beaubien, E. Mattei, **Lauro S. E.**, A. Galli, A controlled experiment to investigate the correlation between early-time signal attributes of ground-coupled radar and soil dielectric properties, Journal of Applied Geophysics 101, 68-76, 2014.

20] E. Mattei, **Lauro S. E.**, G. Vannaroni, E. Pettinelli, Coaxial-Cage Transmission Line for Electromagnetic Parameters Estimation, DOI 10.1109/TIM.2013.2266015, accettato su IEEE Transactions on Instrumentation and Measurement, 2013.

21] F. Soldovieri, I. Catapano, P. M. Barone, **Lauro S. E.**, Mattei E., E. Pettinelli, G. Valerio, D. Comite, A. Galli, Gpr Estimation of the Geometrical Features of Buried Metallic Targets in Testing Conditions. Piers B, ISSN: 1931-7360, 2013.

22] **Lauro S. E.**, Mattei E., Barone P.M., Pettinelli E., Vannaroni G., Valerio G., Galli A., Estimation of subsurface dielectric target depth for GPR planetary exploration: Laboratory measurements and modeling, Journal of Applied Geophysics, ISSN: 0926-9851, 2013.

23] C. Ferrara, V. Di Tullio, P. M. Barone, E.Mattei, **Lauro S. E.**, N. Proietti, D.Capitani and E.Pettinelli, Comparison of GPR and unilateral NMR for water content measurements in a laboratory scale experiment, Near Surface Geophysics, vol. 11, ISSN: 1569-4445, 2013

24] **Lauro S. E.**, E. Mattei, F. Soldovieri, E. Pettinelli, R. Orosei, G. Vannaroni, Dielectric constant estimation of the uppermost Basal Unit layer in the martian Boreales Scopuli region, Icarus, Volume 219, Issue 1, pages 458-467, 2012.

25] G. Valerio, Galli A., Barone P.M., **Lauro S. E.**, Mattei E., Pettinelli E., GPR Detectability of rocks in a Martian-like shallow subsoil: A numerical approach, Planetary and Space Science, Volume 62, Issue 1, p. 31-40, 2012.

26] E. Pettinelli, P. M. Barone, A. Di Matteo, E. Mattei E., **Lauro S. E.**, Mapping the undiscovered ruins of Pompeii (Neaples, Italy) using Ground Penetrating Radar, Archaeometry, Volume 54, Issue 1, 23 May 2012.

27] E. Pettinelli , P. M. Barone, A. Di Matteo, E. Mattei, **Lauro S. E.**, Radio wave techniques for non-destructive archaeological investigations, Contemporary Physics, Volume 52, Number 2, pp. 121-130(10), 2011.

28] P. M. Barone, T. Bellomo, E. Mattei, **Lauro S. E.**, and E. Pettinelli, Ground-penetrating Radar in the Regio III (Pompeii, Italy): Archaeological Evidence. Archaeological Prospection, 18: n/a. doi: 10.1002/arp.405, 2011.

29] **Lauro S. E.**, E. Mattei, E. Pettinelli, F. Soldovieri, R. Orosei, M. Cartacci, A. Cicchetti, R. Noschese, S. Giuppi, Permittivity estimation of layers beneath the northern polar layered deposits, Mars, Geophysical Research Letters, VOL. 37, L14201, 4 PP., 2010, doi:10.1029/2010GL043015.

30] **Lauro S. E.**, A. Toscano, and L. Vegni, Symmetrical Coupled Microstrip Lines With Epsilon Negative Metamaterial Loading, *IEEE Transactions on Magnetics*, vol. 45, n.3, pp. 1182-1185, marzo 2009.

31] **Lauro S. E.**, F. Bilotti, A. Toscano, L. Vegni, BEM analysis of electromagnetic components filled with unconventional materials, *COMPEL: The International Journal for Computation and Mathematics in Electrical and Electronic Engineering*, Vol. 27, pp. 1273-1285, 2008.

32] F. Bilotti, **Lauro S. E.**, A. Toscano and L. Vegni, Efficient Modeling of the Crosstalk between two Coupled Microstrip Lines over Non Conventional Materials Using an Hybrid Technique, *IEEE Transactions on Magnetics*, June 2008, Vol. 44, pages 1482-85.

33] **Lauro S. E.**, A. Toscano, L. Vegni, Enhanced Coupling Values in Coupled Microstrip Lines using Metamaterials, *The Radioengineering journal*, Volume 17, 2008.

34] **Lauro S. E.**, F. Bilotti, A. Toscano, L. Vegni, Accoppiatori direzionali ad elevati valori di accoppiamento tramite l'impiego di metamateriali, Quaderni della Società Italiana di Elettromagnetismo, Vol. LXIII - pagg. 168-177, Gennaio 2008.

CAPITOLI DI LIBRI

R. M. Di Maggio, P.M. Barone, E. Pettinelli, E. Mattei, S. E. Lauro, A. Banchelli, "Geologia Forense. Introduzione alle geoscienze applicate alle indagini giudiziarie", Dario Flaccovio editore, 2013.
Guallini L, AP Rossi, Lauro S. E., L Marinangeli, E Pettinelli, R Seu, "Unconformity-Bounded" Stratigraphic Units in the South Polar Layered Deposits (Promethei Lingula, Mars). In: STRATI 2013, Rocha, R., Pais, J., Kullberg, J.C., Finney, S. (Eds.), Springer, 2014.

CONFERENZE

1] D. E. Stillman, E. Pettinelli, K. M. Primm, G. Caprarelli, E. Mattei, **S. E. Lauro**, and B. Cosciotti. Perchlorate and chloride brines as the cause of the marsis bright basal reflections: laboratory measurements, Modern Brines 2021 (LPI Contrib. No. 2614).

2] **S. E. Lauro**, J. Baniamerian, E. Pettinelli, E. Mattei and B. Cosciotti A New Centroid Frequency-Based Algorithm to Estimate the Attenuation of Ground Penetrating Radar, Conference Proceedings, 82nd EAGE Annual Conference & Exhibition, Oct 2021, Volume 2021, p.1 – 5, https://doi.org/10.3997/2214-4609.202113118.

3] Di Paolo, F., Mattei, E., Cosciotti, B., **Lauro, S.**, and Pettinelli, E. (2021). Small-scale lava tube detection on the Moon using Ground Penetrating Radar (No. EPSC2021-211). Copernicus Meetings.

4] Martella, C. H., **Lauro, S. E.**, Mattei, E., Cosciotti, B., & Pettinelli, E. (2021, March). Reanalysis of the Active Seismic Experiments Performed on the Moon During Apollo 14 and 16 Missions. In Lunar and Planetary Science Conference (No. 2548, p. 1483).

5] Di Paolo, F., Ruggieri, A., Cosciotti, B., **Lauro, S. E.**, Mattei, E., Bruzzone, L., ... & Pettinelli, E. (2021, March). Radar Sounding of Ganymede and Callisto: Two-Way Attenuation and SNR Evaluation in Diverse Dielectric Scenarios. In Lunar and Planetary Science Conference (No. 2548, p. 1242).

6] **Lauro, S. E.**, Pettinelli, E., Caprarelli, G., Guallini, L., Rossi, A. P., Mattei, E., ... & Orosei, R. (2021, March). New Radar Evidence of Subglacial Liquid Water Below the Martian South Pole. In Lunar and Planetary Science Conference (No. 2548, p. 2061). (**Relatore**)

7] Di Paolo, F., **Lauro, S. E.**, Cosciotti, B., Mattei, E., & Pettinelli, E. (2020, November). Convective structure detection on Europa by ice-penetrating radar. In 18th International Conference on Ground Penetrating Radar (pp. 420-423). Society of Exploration Geophysicists.

8] Orosei, R., Caprarelli, G., Cartacci, M., Cicchetti, A., Cosciotti, B., Di Paolo, F., ... & Soldovieri, F. (2020, November). Radar detection of subglacial water under the south polar cap of Mars: Where are we now?. In 18th International Conference on Ground Penetrating Radar (pp. 436-439). Society of Exploration Geophysicists.

9] Di Paolo, F., **Lauro, S. E.**, Cosciotti, B., Mattei, E., & Pettinelli, E. (2020, September). Radar sounding of Ganymede: Attenuation and volume scattering losses estimation. In *European Planetary Science Congress* (pp. EPSC2020-291).

10] Pettinelli, E., Pecci, M., Marzano, F. S., Biscarini, M., Boccabella, P., Bruschi, F., ... & Tuccella, P. (2020). Monitoring the last Apennine glacier: recent in situ campaigns and modelling of Calderone glacial apparatus (No. EGU2020-22579). Copernicus Meetings.

11] Organizer of the Session : Radar Sounding Investigations of Terrestrial and Planetary Ices, in Piers 2019, Rome, 17-20June 2019.

12] Invited Talk on Esplorare le calotte polari Marziane con MARSIS: la scoperta tutta italiana del lago marziano, LXIII Congresso della Società Astronomica Italiana, Accademia dei Lincei, Roma, 14-17/04/2019. (**Relatore**)

13] Di Paolo, F., Cosciotti, B., **Lauro, S. E.**, Mattei, E., & Pettinelli, E. (2018, June). Dry snow permittivity evaluation from density: A critical review. In 2018 17th International Conference on Ground Penetrating Radar (GPR) (pp. 1-5). IEEE.

14] Organizer of the Special Track 1: Metrology for Future Space Exploration: Instruments, Technology and Techniques. Special Session on Advanced remote sensing for exploration, in 5th IEEE International Workshop on Metrology for AeroSpace in Rome, June 2018.

15] Cosciotti, B., Mattei, E., Pettinelli, E., Gabbai, F., Di Paolo, F., & **Lauro, S. E.** (2018, June). Dielectric Characterization of Ice/Na 2 SO 4· 10H 2 O Mixtures: Implications for Radar Investigations of Icy Satellites. In 2018 5th IEEE International Workshop on Metrology for AeroSpace (MetroAeroSpace) (pp. 363-367). IEEE.

16] Di Paolo, F., Orosei, R., **Lauro, S. E.**, Cosciotti, B., Mattei, E., & Pettinelli, E. (2018, June). Volume Scattering Losses Evaluation for Radar Sounding of Jovian Icy Moons. In 2018 5th IEEE International Workshop on Metrology for AeroSpace (MetroAeroSpace) (pp. 2422-2425). IEEE. (**Relatore**)

17] Mattei, Elisabetta, Di Paolo, Federico, Cosciotti, Barbara, **Lauro, Sebastian Emanuel**, Pettinelli, Elena, Beaubien, Stanley Eugene, Barber, David (2017). Young sea ice electric properties estimation under non-optimal conditions. In: 2017 9th International Workshop on Advanced Ground Penetrating Radar, IWAGPR 2017 - Proceedings. p. 1-4, Institute of Electrical and Electronics Engineers Inc., ISBN:9781509054848, gbr, 2017, doi: 10.1109/IWAGPR.2017.7996110.

18] Comite D., Galli A., **Lauro S.E.**, Mattei E., Pettinelli E. (2015). GPR early-time signal features for the evaluation of shallow-soil permittivity. In: 2015 9th European Conference on Antennas and Propagation, EuCAP 2015. Institute of Electrical and Electronics Engineers Inc., ISBN: 9788890701856, prt, 2015.17.

19] Comite D., Galli A., **Lauro S.E.**, Mattei E., Pettinelli E. (2015). Accurate analysis of GPR first-arrival signals for the evaluation of soil permittivity parameters. In: 2015 8th International Workshop on Advanced Ground Penetrating Radar, IWAGPR 2015. p. 1-3, Institute of Electrical and Electronics Engineers Inc., ISBN: 9781479964956, ita, 2015, doi: 10.1109/IWAGPR.2015.7292620.

20] Di Paolo F., Cosciotti B., **Lauro S.E.**, Mattei E., Callegari M., Carturan L., Seppi R., Zucca F., Pettinelli E., Combined GPR and TDR measurements for snow thickness and density estimation, 8th International Workshop on Advanced Ground Penetrating Radar IWAGPR2015.

21] Pettinelli E., Mattei E., Cosciotti B., Di Paolo F., **Lauro S.E.**, Laboratory and field ground penetrating radar measurements for buried weapons detection, 20th IMEKO TC4 Symposium on Measurements of Electrical Quantities: Research on Electrical and Electronic Measurement for the Economic Upturn, Together with 18th TC4 International Workshop on ADC and DCA Modeling and Testing, IWADC 2014.

22] **Lauro S.E.**, Mattei E., Cosciotti B., Di Paolo F., Pettinelli E., Coaxial-cage line for geomaterials electromagnetic characterization, 20th IMEKO TC4 Symposium on Measurement of Electrical Quantities: Research on Electrical and Electronic Measurement for the Economic Upturn, Together with 18th TC4 International Workshop on ADC and DCA Modeling and Testing, IWADC 2014. (**Relatore**)

23] Di Paolo F., Cosciotti B., **Lauro S.E.**, Mattei E., Pettinelli E., Vannaroni G., Thermal and electromagnetic models for radar sounding of the Galilean satellite icy crusts, 15th International Conference on Ground Penetrating Radar GPR2014.

24] Mattei E., **Lauro S.E.**, Colantuono L., Baliva A., Marinangeli L., Pettinelli E., Cosciotti B., Di Paolo F., Vannaroni G., Electromagnetic parameters measurements of clay soils for Mars radar sounding, 15th International Conference on Ground Penetrating Radar GPR2014.

25] Mattei, E., Colantuono, L., Baliva, A., Marinangeli, L., **Lauro, S. E.**, Pettinelli, E., and Vannaroni, G. Electromagnetic parameters measurements of clay soils for Mars radar sounding. In Ground Penetrating Radar (GPR), 2014 15th International Conference on (pp. 1046-1049). IEEE. (**Relatore**)

26] Comite, D., Galli, A., Ferrara, C., **Lauro, S. E.**, Mattei, E., Vannaroni, G., & Pettinelli, E. Numerical and experimental surveys on the GPR early-time signal features for the evaluation of shallow-soil permittivity. In Ground Penetrating Radar (GPR), 2014 15th International Conference on (pp. 131- 134). IEEE.

27] Ferrara C, Barone P M, Mattei E, Galli A, Comite D, **Lauro S E**, Vannaroni G, Pettinelli E (2013). An evaluation of the early-time GPR amplitude technique for electrical conductivity monitoring. In: Proceedings of the 2013 7th International Workshop on Advanced Ground Penetrating Radar, art. no. 6601549. Nantes, Francia, 2-5/7/2013.

28] PM Barone, E Mattei, C Proietti, E Pettinelli, C Ferrara, **S E Lauro**, M Viccaro, Ground-Penetrating Radar technique to investigate historic eruptions on the Mt. Etna volcano (Sicily, Italy), Advanced Ground Penetrating Radar (IWAGPR), 2013 7th International Workshop on, 2013/7/2.

29] Colantuono L., Baliva A., Mattei E., **Lauro, S.** Marinangeli, L.; Pettinelli, E.; Seu, R. "Dielectrical characterisation of clay soils for Mars radar investigations." EGU General Assembly Conference Abstracts. Vol. 15. 2013.

30] B. Cosciotti, M. De Santis, **S.E. Lauro**, E. Mattei, E. Pettinelli, G. Vannaroni "Dielectric Measurements of Saline Ices: Implication for Jovian Satellites Radar Exploration", EAGE/GRSG Remote Sensing Workshop & Exhibition, Parigi (Francia) 3 - 5 Setembre 2012.

31] A. Galli, D. Comite, G. Valerio, P. M. Barone, **S. E. Lauro**, E. Mattei, E. Pettinelli, G. Vannaroni "Theoretical and experimental investigations on the performance of Ground Penetrating Radars in challenging operational conditions" The European Radar Conference (EuRAD), Amsterdam, Paesi Bassi, 28/10-2/11/2012 - Proceedings (CD), 4 pp.

32] G. Valerio, F. Soldovieri, P. M. Barone, **S. E. Lauro**, E. Mattei, E. Pettinelli, D.Comite, A.Galli, Shape Reconstruction of Scatterers by Suitable Inverse Processing of GPR Data, VI European Conference on Antennas and Propagation, Prague, Czech Republic – 26-30 March 2012.

33] F. Soldovieri, D. Comite, A. Galli, G. Valerio, P. M. Barone, **S. E. Lauro**, E. Mattei, E. Pettinelli "Retrieval of shape characteristics for buried objects with GPR monitoring" European Geosciences Union General Assembly 2012, Vienna, Austria, 22-27/4/2012 (relazione su invito)- Abstracts (CD), 1 pp.

34] A. Galli, D. Comite, G. Valerio, P. M. Barone, **S. E. Lauro**, E. Mattei, E. Pettinelli, G. Vannaroni "Theoretical and experimental investigations on the performance of Ground Penetrating Radars in challenging operational conditions" The European Radar Conference (EuRAD), Amsterdam, Paesi Bassi, 28/10-2/11/2012 - Proceedings (CD), 4 pp.

35] L Guallini, **S. E. Lauro** , L Marinangeli, E Pettinelli, R Seu, SHARAD Analysis of Promethei Lingula (Mars): Evidences of Angular Unconformities and Possible, Lunar and Planetary Institute Science Conference, 2012/3.

36] M. De Santis, **S. E. Lauro**, E. Mattei, B. Cosciotti, E. Pettinelli, G. Vannaroni. Dielectric Measurements of Saline Ices: Implications for Jovian Satellites Radar Exploration. IWAGPR 2011, 6th International Workshop on Advanced Ground Penetrating Radar June 22-24, Aachen, Germany (2011).

37] C. Ferrara, P. M. Barone, **S. E. Lauro**, D. Capitani, V. Di Tullio, E. Mattei, N. Proietti, E. Pettinelli. Integrated GPR and Unilateral NMR Approach to Estimate Water Content in a Porous Material. IWAGPR 2011, 6th International Workshop on Advanced Ground Penetrating Radar June 22-24, Aachen, Germany (2011).

38] G. Valerio, P. M. Barone, **S. E. Lauro**, E. Mattei, E. Pettinelli, A. Galli "GPR reconstruction of the features of Martian subsoil in the frame of the Exomars mission" V EuCAP (European Conference on Antennas and Propagation), Roma, 11-15/4/2011 (relazione su invito)- Proceedings (CD), 3 pp.

39] G. Valerio, A. Galli, P. M. Barone, **S. E. Lauro**, E. Mattei, E. Pettinelli "Development of an efficient numerical set-up to predict the performance of Ground Penetrating Radar systems for on-site earth and planetary applications" XXX URSI General Assembly and Scientific Symposium of International Union of Radio Science, Istanbul, Turchia, 13-20/8/2011- Proceedings (CD), 4 pp.

40] G. Valerio, A. Galli, P. M. Barone, **S. E. Lauro**, E. Mattei, E. Pettinelli "GPR characterization of rocks buried in the Martian subsoil" XII International Conference on Ground Penetrating Radar, Lecce, 21-25/6/2010- Proceedings (CD), art. 5550180, 4 pp. – DOI: 10.1109/ICGPR.2010.5550180.

41] G. Valerio, A. Galli, P. M. Barone, **S. E. Lauro**, E. Mattei, E. Pettinelli "GPR investigation on buried rocks in Martian subsoil for 'WISDOM' project: numerical and measurement set-up results" IV EuCAP (European Conference on Antennas and Propagation), Barcellona, Spagna, 12-16/4/2010- Proceedings (CD), art. 5505439, 3 pp.

42] G. Valerio, A. Galli, P. M. Barone, **S. E. Lauro**, E. Mattei, E. Pettinelli "Characterization of scattering effects for GPR signals from rover on Martian soil: measured and simulated data" 2010 IEEE AP-S International Symposium on Antennas and Propagation and 2010 USNC/URSI National Radio Science Meeting, Toronto, Canada, 11-17/7/2010- Abstracts (CD), 1 pp.

43] **S. E. Lauro**, E. Mattei, E. Pettinelli, F. Soldovieri, R. Orosei, Permittivity Estimation of Layers Beneath the Northern Polar Layered Deposits, Mars, in EPSC Abstracts Vol. 5, EPSC2010-903, 2010 European Planetary Science Congress 2010 (Rome). (**Relatore**)

44] Barone P.M., **S. E. Lauro**, Mattei E., Pettinelli E., Non-destructive technique to investigate an archaeological structure: a GPR survey in the Domus Aurea (Rome, Italy), 2010, June: 13th International Conference on Ground Penetrating Radar (GPR 2010) organised by IBAM-CNR and University of Salento, 21st-25th June, Lecce, Italy.

45] **S. E. Lauro**, E. Mattei, E. Pettinelli, F. Soldovieri, R. Orosei. A simple inversion model for the estimation of subsurface features of Mars poles, 2010, June: 13th International Conference on Ground Penetrating Radar (GPR 2010) organised by IBAM-CNR and University of Salento, 21st-25th June, Lecce, Italy. (**Relatore**)

46] M. Balsi, S. Esposito, F. Frezza, P. Nocito, P.M. Barone, **S. E. Lauro**, E. Mattei, E. Pettinelli, C.Schettini, C. Twizere. GPR Measurements and FDTD Simulations for Landmine Detection 2010, June: 13th International Conference on Ground Penetrating Radar (GPR 2010) organised by IBAM-CNR and University of Salento, 21st-25th June, Lecce, Italy.

47] Pettinelli, E.; Barone, P.M.; Mattei, E.; **S. E. Lauro**; Valerio, G.; Galli, A.; Experimental measures to estimate the radar signal attenuation of WISDOM using simulate Martian soil, in Proceedings of the 9th National Congress of Planetology, Amalfi (SA – Italy) 2009, electronic version.

48] **S. E. Lauro**, A. Toscano, and L. Vegni, "Metamaterials for RFID," Proceedings of 4° Workshop on Metamaterials and Special Materials for TLC, Napoli, 18-20 Dicembre 2008. (**Relatore**)

49] A. Toscano, **S. E. Lauro**, L. Vegni, Design of nanofilters at optical frequencies, Metamaterials 2008, Pamplona, Spain, September 21-26, 2008. (**Relatore**)

50] **S. E. Lauro**, A. Toscano, L. Vegni, Problematiche di Compatibilità Elettromagnetica di Componenti Realizzati con Metamateriali, Riunione Nazionale di Elettromagnetismo, Lecce, 15-19 Settembre 2008. (**Relatore**)

51] **S. E. Lauro**, A. Toscano, and L. Vegni, Analisys of Absorbing Properties of Biisotropic, Birefringent Materials, XX Symposium Electromagnetic Phenomena in Nonlinear Circuits, 2 - 4 July, 2008, Lille, France. (**Relatore**)

52] A. Toscano, F. Bilotti, L. Vegni, **S. E. Lauro**, Design of nanofilters at optical frequencies, First Mediterranean Photonics Conference 2008, June 25th - 28th, Ischia, Italy.

53] **S. E. Lauro**, A. Toscano and L. Vegni, Multilayer Anisotropic Metamaterial Structure, Meta 08 NATO Advanced Research Workshop, 7-10 May, 2008, Marrakesh, Morocco. (**Relatore**)

54] **S. E. Lauro**, A. Toscano, and L. Vegni, Symmetrical Coupled microstrip lines with ENG metamaterial loading, 13TH IEEE CEFC 2008, 11-15 May 2008, Athens, Greece. (**Relatore**)

55] **S. E. Lauro**, A. Toscano, and L. Vegni, Analysis of Polarizing Properties of Birefringent Negative Indexed Materials at Optical Frequencies, MELECON'2008, The 14th IEEE Mediterranean Electrotechnical Conference, on pages 431-5, May 5-7, Ajaccio, France. (**Relatore**)

56] **S. E. Lauro**, A. Toscano, L. Vegni, Metamaterials slab for high-speed integrated circuits design, 11 Th International Symposium on Microwave and optical technology (ISMOT-2007), 17-21 December 2007, Rome, Italy. (**Relatore**)

57] F. Bilotti, **S. E. Lauro**, A. Toscano, L. Vegni, Design of ENG loaded coupled microstriplines with very high and very low coupling values, Metamaterials 2007, October 22-26, 2007, Rome, Italy. (**Relatore**)

58] **S. E. Lauro**, A. Toscano and L. Vegni, Enhanced Coupling Values in Coupled Microstriplines Using Metamaterials, International Conference on Electromagnetics and Communications, ICECom 2007, September 24-26, on pages 1-4, Dubrovnik, Croatia. (**Relatore**)

59] F. Bilotti, **S. E. Lauro**, A. Toscano and L. Vegni, Coupled Microstriplines with ENG Metamaterial loading: Physical concepts, Design formulas, and Numerical simulations, International Conference on Electromagnetics in Advanced Applications, ICEAA 2007, September 17-21, on pages 798-801, Torino, Italy. (**Relatore**)

60] F. Bilotti, **S. E. Lauro**, A. Toscano, and L. Vegni, Efficient Modeling of the Crosstalk between two Coupled Microstrip Lines over Non Conventional Materials Using an Hybrid Technique, COMPUMAG, 24-28 June 2007, Aachen, Germany. (**Relatore**)

61] **S. E. Lauro**, F. Bilotti, A.Toscano, and L. Vegni, Efficient reduction of the Cross-Talk between two coupled microstrip lines using metamaterials, EMC Workshop 12-14 June 2007, Paris, France. (**Relatore**)

62] A. Toscano, L. Vegni, F. Bilotti, **S. E. Lauro**, Metamaterials as Complex Dielectrics in the Design of a New Class of Integrated Circuits, SPIE Europe's International Congress on Optics & Optoelectronics (ICOO), 16-19 April 2007, Prague, Czech Republic.

63] F. Bilotti, **S. E. Lauro**, A. Toscano, and L. Vegni, Coupled microstrip lines with metamaterial loading: principle of operation, model and possible applications, Proc. of Nanometa 2007, the 1st European Topical Meeting on Nanophotonics and Metamaterials, 8-11 Jan., 2007, Seefeld, Austria. (**Relatore**)

64] A. Toscano, **S. E. Lauro**, F. Bilotti, L. Vegni, Applicazione del metodo agli elementi finiti per la riduzione della diafonia tra linee a microstriscia accoppiate, XVI Riunione Nazionale di Elettromagnetismo, 18-21 Settembre 2006, Genova, Italy. (**Relatore**)

65] **S. E. Lauro**, F. Bilotti, A.Toscano, and L. Vegni, Metamaterials as Complex Dielectrics in the Design of High-Speed Integrated Circuits, Proc. of the Third Workshop on Metamaterials and Special Materials for Electromagnetic Applications and TLC, p .61, March 30-31, 2006, Rome, Italy. (**Relatore**)

Roma, 22/10/2021

Autorizzo il trattamento e la comunicazione dei dati personali ai sensi del D. lgs. 196/03.

europass

Giuseppina Nigro

WORK EXPERIENCE

Post-doc Researcher
the Department of Physics at the University of Calabria (Italy) [1 Jul 2019 – Current]

Address: Rende (CS) (Italy)
Country: Italy

Fixed-term Assistant Professor
the Department of Physics at the University of Calabria (Italy) [Nov 2016 – Current]

Address: Cosenza
Country: Italy

Post-doc Researcher
the Department of Physics at the University of Calabria (Italy) [22 Nov 2015 – 22 Nov 2016]

Address: Cosenza

Researcher
the Department of Astronomy and Astrophysics, University of Chicago, Chicago IL (USA) [1 Nov 2014 – 31 Aug 2015]

Address: Chicago
Country: United States

Post-doc Researcher
the Department of Physics at the University of Calabria (Italy) [1 Nov 2011 – 31 Oct 2014]

Address: Cosenza (Italy)
Country: Italy

- Guest Scientist at The University of Chicago the Department of Astronomy and Astrophysics - USA - April 2014 - October 2014
- Guest Scientist at the AIP institute (Leibniz-Institut fur Astrophysik in Potsdam) - Germany
in January and February 2013
- Guest Scientist at the HZDR institute in Dresden - Germany - from October to December 2013

Post-doc Researcher
the Department of Physics at the University of Calabria (Italy) [1 May 2010 – 31 Oct 2011]

Address: Cosenza (Italy)
Country: Italy

Post-doc Researcher
the Department of Physics at the University of Calabria (Italy) [1 Jun 2006 – 28 Feb 2010]

Address: Cosenza (Italy)
Country: Italy

(considering the interruptions due to accepting post-doc contracts abroad)

Research Associate
US Naval Research Lab and George Mason University (Washington DC, USA) [1 May 2008 – 30 Apr 2009]

Address: Washington DC
Country: United States

Research Associate
US Naval Research Lab and George Mason University (Washington DC, USA) [1 Dec 2006 – 31 Jan 2008]

Address: Washington DC
Country: United States

Post-doc Researcher
the Department of Physics at the University of Calabria (Italy) [1 Nov 2005 – 31 Mar 2006]

Country: Italy

(incarico di Collaborazione Coordinata e Continuativa di cui all'art. 34 della L. n. 342/2000)

ASN - ABILITAZIONE SCIENTIFICA NAZIONALE

Italian ASN - Qualified as Associate Professor in the scientific field 02/C1 (Astronomy, Astrophysics and Physics of the Earth and Planets)
[29 Mar 2021 – Current]

FACULTY POSITION SHORTLISTED

Assistant Professor at Georgia State University - USA
[Feb 2017 – Feb 2017]

PROJECTS

PI for a research project -"Study on Magnetic Dynamo Effect"- POR CALABRIA FSE 2007/2013 GRANT: 64000 euro
[1 Nov 2011 – 31 Oct 2014]

PI for a research project on plasma instabilities accepted at CINECA, which won an award of many computational hours at SP6 supercomputer in CINECA-INAF agreement
[17 Jul 2009 – 31 Jul 2010]

White Paper - Voyage 2050:" A journey to the polar regions of a star: Exploring the solar poles and the heliosphere from high helio-latitude". Lead author: Louise Harra
[Mar 2019]

https://www.cosmos.esa.int/documents/1866264/3219248/HarraL_Voyage2050_solarpolarmission_aug2019.pdf/1ed01966-886d-e062-5e82-2e3b7e5ead1c?t=1565184639514

Seal of Excellence for the project proposal MELODY - MultiscalE soLar cOnvective DYnamo - following evaluation by an international panel of independent experts WAS SCORED AS A HIGH-QUALITY PROJECT PROPOSAL IN A HIGHLY COMPETITIVE EVALUATION PROCESS
[26 Mar 2021]

EDUCATION AND TRAINING

PhD in Physics
the Physics Department at the University of Calabria [15 Dec 2005]

Address: Cosenza (Italy)

PhD Thesis *"MHD Turbulence in Astrophysical Phenomena: Low Dimensional Models"*
Supervisor: Prof. Pierluigi Veltri

Master Degree in Physics (Laurea in Fisica vecchio ordinamento) with a mark of 110/110 cum laude.
Physics Department at the University of Calabria [7 Nov 2002]

Address: Italy, Cosenza
National classification: 110/110 cum laude

Title of Thesis:
" I Brillamenti Solari come Traccianti dell' Intermittenza della Turbolenza MHD: un modello a gusci spazialmente stratificato"
("Solar Flares as Intermittent Events of MHD Turbulence: a Stratified Shell Model").
Supervisor: prof. Pierluigi Veltri, prof. Francesco Malara

Python for Data Science Course - grade 100/100
The University of Chicago [Feb 2021 – Apr 2021]

Fellow at UCLA (USA): Participant at long-term program "Grand Challenge Problems in Computational Astrophysics"
University of California (UCLA), Institute for Pure & Applied Mathematics [Mar 2005 – Jun 2005]

Address: Los Angeles, CA

Programming Paradigm for GPU Devices
CINECA [15 Apr 2020 – 17 Apr 2020]

Address: Via Magnanelli 6/3 Casalecchio di Reno , Bologna, (Italy)

HPC numerical methods for Computational Fluid Dynamics (CFD) and Numerical Astrophysics
CINECA [2 Nov 2016 – 4 Nov 2016]

Address: Via Magnanelli 6/3 Casalecchio di Reno, Bologna, (Italy)

Structuring Your Scientific Paper
University of Chicago [24 Sep 2014 – 24 Sep 2014]

Address: 5801 South Ellis Avenue, Chicago, IL, (United States)

Mira Performance Boot Camp 2014
Argonne National Laboratory [20 May 2014 – 22 May 2014]

Address: 9700 S. Cass Avenue Lemont, IL 60439, Lemont, IL (United States)

Advance MPI Course
Department of Defence (USA) HPCMP (High Performance Computing Modernisation Program) [Sep 2008 – Sep 2008]

Address: 4555 Overlook Ave. SW , Washington DC, (United States)

XIII Scuola Estiva di calcolo parallelo
CINECA [5 Jul 2004 – 16 Jul 2004]

Address: Via Magnanelli 6/3 Casalecchio di Reno , Bologna, (Italy)

School leaving certificate - grade 60/60
Liceo Scientifico Enrico Fermi

Address: Cosenza (Italy)
National classification: grade 60/60

LANGUAGE SKILLS

Mother tongue(s): **Italian**

Other language(s):

English

LISTENING B2 **READING** B2 **WRITING** B2

SPOKEN PRODUCTION B2 **SPOKEN INTERACTION** B2

JOB-RELATED SKILLS

Scientific research - expertise:

My work and my experience are mostly concerned with astrophysical plasma theory and numerical simulations focused on magnetic dynamos, solar corona loop models, geodynamo, and magnetofluid turbulence. I investigate these subjects usually through Magnetohydrodynamic (MHD) numerical simulations.

Currently I am a post-doc researcher and fixed-term assistant professor at the Department of Physics at the University of Calabria in Italy (UNICAL), where I moved in November 2015 after my research position at the Department of Astronomy and Astrophysics at the University of Chicago (USA). At the University of Chicago, I worked with prof. Fausto Cattaneo on the generation of dynamo waves in linear and nonlinear regimes using and modifying a 3D-dimensional Cartesian pseudospectral parallel numerical code.

In 2011, I was awarded an Italian research grant for my proposal: ***Study on Magnetic Dynamo Effect***. The grant (64k euro) supported my research from 2011 to 2014. During these years, I spent long periods as a guest scientist in different international institutions, such as HZDR in Dresden and *Leibniz-Institut für Astrophysik* institute in Potsdam (Germany), and the Department of Astronomy & Astrophysics at the University of Chicago (USA). After this period, I was hired as a researcher at the Department of Astronomy and Astrophysics at the University of Chicago.

Prior to being awarded this grant, between 2009 and 2011, I was post-doc researcher at the University of Calabria where I studied magnetic dynamos and solar coronal loops using numerical and theoretical approaches.

During my post-doctoral position at the US Naval Research Lab, Space Science Division (Solar Theory Branch) between 2006 and 2009 in Washington DC (USA), I worked on the solar coronal heating problem. The aim of this research was to investigate plasma dynamics in a solar coronal loop, considering tearing-mode secondary instabilities numerically described by a 3D incompressible visco-resistive MHD numerical code. Furthermore, my Ph.D., obtained in 2005 at the University of Calabria, was dedicated to the development of a solar coronal loop model. In particular, my work has been based on building a model for MHD turbulence to describe plasma dynamics for a solar coronal loop, with the aim to reproduce the statistical properties of solar flares. I personally wrote the code to integrate this model, making the appropriate analysis of the numerical results. Moreover, in the last period of my Ph.D. I also developed a low dimensional model to describe magnetic polarity reversals like the one extrapolated by the paleomagnetic records of the Earth.

My main research topics:

- Solar Coronal Heating Problem: Coronal Loop Models
- Solar Magnetic Dynamo
- Plasma Physics Theory
- Turbulence in Magnetized Fluids
- Turbulent Shell Models
- Numerical Simulations

COMPUTER SKILLS

Numerical Analysis and Numerical Simulations

High level programming in Python, fortran 77, fortran 90/95, c++, IDL, Gnuplot

High Perform Parallel Computing (OpenMP, MPI)

User of Unix/Linux - Unix/Mac OS X systems

Good knowledge of LaTex software

DIGITAL SKILLS

Microsoft Word / Microsoft Excel / Microsoft Powerpoint / Google Drive / Google Docs / Zoom / Skype / Social Media / Microsoft Office / Facebook / LinkedIn / Power Point / Internet user / Written and Verbal skills / Analytical skills / Critical thinking / Research and analytical skills / Responsibility / WhatsApp / Gmail / Motivated / Creativity / Microsoft Teams / Research / Word

PUBLICATIONS

A journey of exploration to the polar regions of a star: probing the solar poles and the heliosphere from high helio-latitude

[2021]
https://link.springer.com/article/10.1007/s10686-021-09769-x

Experimental Astronomy. 31 July 2021

Louise Harra, Vincenzo Andretta, Thierry Appourchaux, Frédéric Baudin, Luis Bellot-Rubio, Aaron C. Birch, Patrick Boumier, Robert H. Cameron, Matts Carlsson, Thierry Corbard, Jackie Davies, Andrew Fazakerley, Silvano Fineschi, Wolfgang Finsterle, Laurent Gizon, Richard Harrison, Donald M. Hassler, John Leibacher, Paulett Liewer, Malcolm MacDonald, Milan Maksimovic, Neil Murphy, Giampiero Naletto, **Giuseppina Nigro**, Christopher Owen, Valentín Martínez-Pillet, Pierre Rochus, Marco Romoli, Takashi Sekii, Daniele Spadaro, Astrid Veronig, Werner Schmutz

Fractality of an MHD shell model for turbulent plasma driven by solar wind data: A review

[2021]
https://www.sciencedirect.com/science/article/pii/S1364682620303230

Journal of Atmospheric and Solar-Terrestrial Physics, Volume 214, 105524

Muñoz V., Domínguez M., **Nigro G.**, Riquelme M., Carbone V.

Plasma physics and astrophysics: retrospects, state-of-the art, and prospects

[2020]
https://link.springer.com/article/10.1007/s12210-020-00965-z

Rendiconti Lincei. Scienze Fisiche e Naturali, vol. 32, pages 25–44

Giuseppina Nigro, Francesco Pegoraro, Francesco Valentini

Study of the fractality in a magnetohydrodynamic shell model forced by solar wind fluctuations

[2020]
https://npg.copernicus.org/articles/27/175/2020/

Nonlinear Processes in Geophysics, vol. 27 (2), 175-185

Domínguez M., **Nigro G.**, Muñoz V., Carbone V., Riquelme M.

Turbulence in a Coronal Loop Excited by Photospheric Motions
[2020]
https://www.mdpi.com/2073-4433/11/4/409

Atmosphere, 11 (4), 409

Nigro G., Malara F., Vecchio A., Primavera L., Di Mare F., Carbone V., Veltri P.

Sign singularity of the local energy transfer in space plasma turbulence
[2019]
https://www.frontiersin.org/articles/10.3389/fphy.2019.00108/full

Frontiers in Physics, vol 7, pag. 108

Sorriso-Valvo L., De Vita G., Fraternale F., Gurchumelia A., Perri S., **Nigro G.**, ...;

Parametric Instability in Two-dimensional Alfvénic Turbulence
[2019]
https://iopscience.iop.org/article/10.3847/1538-4357/ab29f5/meta

The Astrophysical Journal, vol. 880 (2), pag. 156

Primavera L., Malara F., Servidio S., **Nigro G.**, Veltri. P.

Parametric Instability and Turbulent Cascades in Space Plasmas
[2019]
https://link.springer.com/chapter/10.1007/978-3-030-12547-9_17

Turbulent Cascades II, pages 159-168

Primavera L., Malara F., Servidio S, **Nigro G.**

Attracted by the fascinating magnetism of the Sun
[2019]
https://www.sif.it/riviste/sif/ncc/econtents/2019/042/01/article/1

IL NUOVO CIMENTO C, vol. 42, issue 1, article 2

G. Nigro

Electron Heating by Kinetic Alfvén Waves in Coronal Loop Turbulence
[2019]
https://iopscience.iop.org/article/10.3847/1538-4357/aaf168

The Astrophysical Journal, vol. 871, number 1, pag. 66

Malara F., **Nigro G.**, Valentini F., Sorriso-Valvo L.

Study on the Fractality of Magnetized Plasma using an MHD Shell Model driven by Solar Wind Data
[2018]
https://aip.scitation.org/doi/10.1063/1.5034129

Physics of Plasmas, vol 25, 092302

Dominguez M., **Nigro G.**, Munõz V., Carbone V.

Evolution of fractality in space plasmas of interest to geomagnetic activity

[2018]

https://npg.copernicus.org/articles/25/207/2018/

Nonlin. Processes Geophys., Review in Special Issue: Nonlinear Waves and Chaos, vol.25, 207-216

Munõz V., Dominguez M., Valdivia J.A., Good S., **Nigro G.**, Carbone V.

Study of Fractal Features of Geomagnetic Activity Through an MHD Shell Model

[2017]

https://aip.scitation.org/doi/10.1063/1.4993200

Physics of Plasmas, vol. 24, 072308

Dominguez M., **Nigro G.**, Munõz V., Carbone V.

What is a large-scale dynamo?

[2017]

https://academic.oup.com/mnrasl/article/464/1/L119/2282803

Monthly Notices of the Royal Astronomical Society Letters, vol. 464, L119-L123

Nigro G., Pongkitiwanichakul P., Cattaneo F., Tobias S.M.

A fast algorithm for a three-dimensional synthetic model of intermittent turbulence

[2016]

https://journals.aps.org/pre/abstract/10.1103/PhysRevE.94.053109

Physical Review E, vol. 94, 053109

Malara F., Di Mare F., **Nigro G.**, Sorriso-Valvo L.

Shear-Driven Dynamo Waves in Fully Nonlinear Regime

[2016]

https://iopscience.iop.org/article/10.3847/0004-637X/825/1/23

The Astrophysical Journal, vol. 825, issue 1, article id. 23, 8 pp

Pongkitiwanichakul P., **Nigro G.**, Cattaneo F., Tobias S.M.

Finite-time singularities and flow regularization in a hydromagnetic shell model at extreme magnetic Prandtl numbers

[2015]

https://iopscience.iop.org/article/10.1088/1367-2630/17/7/073038

New Journal of Physics, vol. 17, 073038

Nigro, G. and Carbone, V.

Heating Mechanisms for Intermittent Loops in Active Region Cores from AIA/SDOEUV Observations

[2014]

https://iopscience.iop.org/article/10.1088/0004-637X/795/1/48

The Astrophysical Journal, vol. 795, issue 1, id. 48, 12 pp.

Cadavid A. C.; Lawrence J. K.; Christian D. J.; Jess D. B.; **Nigro G.**

Cancellation properties in Hall-magnetohydrodynamics with strong guide magnetic field
[2013]
https://journals.aps.org/pre/abstract/10.1103/PhysRevE.88.063107

Physical Review E, vol. 88, issue 6, id. 063107

Martin L.N., De Vita G., Sorriso-Valvo L., Dmitruk P., **Nigro G.**, Primavera L., Carbone V.

Simplified model for an α 2-ω dynamo fed by dynamical evolution of the zonal shear
[2013]
https://academic.oup.com/mnras/article/433/3/2206/1226223

Monthly Notices of the Royal Astronomical Society, vol. 433, issue 3, pp. 2206-2214

A Shell Model for Large–Scale Turbulent Dynamo
[2013]
https://www.tandfonline.com/doi/abs/10.1080/03091929.2012.664141

Geophysical & Astrophysical Fluid Dynamics, vol. 107, issue 1-2, pp. 101-113

Giuseppina Nigro

Alfvén Waves: Coherent Phenomena in Coronal Loop sand Open-Field Regions
[2012]
https://link.springer.com/article/10.1007/s11214-010-9722-3

Space Science Reviews, vol. 172, issue 1-4, pp. 157-167

Malara F., **Nigro G.**, Veltri P., Onofri M.

A Study of the Dynamo Transition in a Self-consistent Nonlinear Dynamo Model
[2011]
https://iopscience.iop.org/article/10.1088/2041-8205/740/2/L37

The Astrophysical Journal Letters, vol. 740, L37 5pp

Giuseppina Nigro, Pierluigi Veltri

A Shell Model Turbulent Dynamo
[2011]
https://iopscience.iop.org/article/10.1088/0004-637X/735/2/73

The Astrophysical Journal, vol. 735, 73 6pp

Perrone D., **Nigro G.**, Veltri P.

Magnetic reversals in a modified shell model for magnetohydrodynamics turbulence
[2010]
https://journals.aps.org/pre/abstract/10.1103/PhysRevE.82.016313

Physical Review E, vol. 82, 016313

Giuseppina Nigro, Vincenzo Carbone

Fluctuating Energy Storage and Nonlinear Cascade in an Inhomogeneous Coronal Loop
[2010]
https://iopscience.iop.org/article/10.1088/0004-637X/720/1/306

The Astrophysical Journal, vol. 720, pp. 306-327

Malara F., **Nigro G**, Onofri M., Veltri P.

Explosive In stability and Coronal Heating

[2008]

https://iopscience.iop.org/article/10.1088/0004-637X/704/2/1059

The Astrophysical Journal, vol. 704, pp. 1059-1064

Dahlburg R. B., Liu J.-H., Klimchuk J. A., **Nigro G.**

Resonant Behavior and Fluctuating Energy Storage in Coronal Loops

[2008]

https://iopscience.iop.org/article/10.1086/590653

The Astrophysical Journal, vol. 685, issue 1, pp. 606-621

Nigro G., Malara F., Veltri P.

A statistical analysis of polarity reversals of the geomagnetic field

[2007]

https://www.sciencedirect.com/science/article/abs/pii/S0031920107001458?via=ihub

Physics of the Earth and Planetary Interiors, vol. 164, issue 3-4, pp. 197- 207

Sorriso-Valvo L., Stefani F., Carbone V., **Nigro G.**, Lepreti F., Vecchio A., Veltri P.

Modeling a Coronal Loop Heated by Magnetohydrodynamic Turbulence Nanoflares

[2005]

https://iopscience.iop.org/article/10.1086/444409

The Astrophysical Journal, vol. 633, issue 1, pp. 489-498

Reale F., **Nigro G.**, Malara F., Peres G., Veltri P.

Large-Amplitude Velocity Fluctuations in Coronal Loop: Flare Drivers?

[2005]

https://iopscience.iop.org/article/10.1086/449310

The Astrophysical Journal, vol. 629, issue 2, pp. L133-L136

Nigro G., Malara F., Veltri P.

Intermittency in MHD turbulence and coronal nanoflares modeling

[2005]

https://npg.copernicus.org/articles/12/245/2005/npg-12-245-2005.html

Nonlinear Processes in Geophysics, vol. 12, issue 2, pp. 245-255

Veltri P., **Nigro G.**, Malara F., Carbone V., Mangeney A.

Nanoflares and MHD Turbulence in Coronal Loops: A Hybrid Shell Model

[2004]

https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.92.194501

Physical Review Letters, vol. 92, 194501

Nigro G., Malara F., Carbone, V., Veltri P.

A Coronal Loop RMHD Shell Model for Turbulence generated Nanoflares

[2004]

https://aip.scitation.org/doi/abs/10.1063/1.1718459

AIP Conference Proceedings, vol. 703, 219 (2004)

Nigro G., Malara F., Carbone, V., Veltri P.

Self Organization in MagnetohydrodynamicTurbulence

[2009]

https://www.springer.com/gp/book/9780387758886

Encyclopedia of Complexity and Systems Science, vol. 19, pp. 8009-8028

Veltri P., Carbone V., Lepreti F., **Nigro G.**

Modeling magnetohydrodynamic turbulence by low-dimensional dynamical systems

[2008]

Anomalous Fluctuation Phenomena in Complex System: Plasma, Fluids and Fi- nancial Markets,pp.58-100

Carbone V., Lepreti F., **Nigro G.**, Sorriso-Valvo L., Vecchio A., Veltri P.

A shell model for turbulent dynamos

[2010]

http://articles.adsabs.harvard.edu/full/2011IAUS..274..159N

Proceedings of the International Astronomical Union, IAU Symposium, vol. 274, pp. 159-161

Nigro G., Perrone D., Veltri P.

Large-scale energy balance and MHD turbulence in solar coronal structures

[2010]

https://aip.scitation.org/doi/abs/10.1063/1.3395901

AIP Conference Proceedings, vol. 1216, 44

Malara F., **Nigro G.**, Onofri M., Veltri P.

Energy balance and cascade in MHD turbulence in the solar corona

[2009]

http://articles.adsabs.harvard.edu/full/2009IAUS..257..543M

Proceedings of the International Astronomical Union, IAU Symposium, vol. 257, pp. 543-553

Malara F., **Nigro G.**, Veltri P.

Large Amplitude Velocity Fluctuations as Precursor of Flares in Solar Coronal Loops

[2005]

http://articles.adsabs.harvard.edu/full/2005ESASP.592..515N

Proceedings of the Solar Wind 11/SOHO 16, "Connecting Sun and Heliosphere" Conference (ESA SP-592)

Nigro G., Malara F., Veltri P.

Velocity Fluctuations in Coronal Loops as Flare Drivers

[2005]

http://articles.adsabs.harvard.edu/full/2005ESASP.600E..92N

Proceedings of the 11th European Solar Physics Meeting

Nigro G., Malara F., Veltri P.

CONFERENCES AND SEMINARS

"Large-scale Dynamo vs Small-scale" at 4th Dynamo Thinkshop
[Universita degli studi di Roma Tor Vergata (Italy), 25 Nov 2019 – 26 Nov 2019]
Speaker

"Large-scale dynamo in the solution of the full induction equation" at Symposium Axel Brandenburg 60th Turbulence and Magnetic Fields - From the Early Universe to Late-type Stars
[Tuusula (Finland), 1 Apr 2019 – 5 Apr 2019]
Speaker
https://wiki.aalto.fi/display/AB6BS/Friday+5th+April

"The Large-scale Dynamo vs Small-scale Dynamo" at SOHE2016
[Agenzia Spaziale Italiana, Roma (Italia), 30 May 2016 – 1 Jun 2016]
Poster Presentation
http://sohe.roma2.infn.it/index.php/2016/05/monday-30th-may-1730-1830-poster-session/

"Attracted by the fascinating magnetism of the Sun" at SoHe3
[INAF Torino (Italy), 28 Oct 2018 – 31 Oct 2018]
Invited Speaker
http://sohe3.oato.inaf.it

"Small-scale Turbulence as Regenerating Source of the Stellar Magnetic Fields"
[Department of Physics and Astronomy, Georgia State University, Atlanta GA (USA), 17 Feb 2017 – 17 Feb 2017]
Invited Colloquium

"Shell Models for Astrophysical Phenomena Descriptions" at Nonlinear Waves and Chaos 9 Conference
[La Jolla, San Diego, California (USA), 4 Mar 2013 – 8 Mar 2013]
Invited Speaker

"Zonal Shear in a Solar Dynamo Model" at 2012 AGU Fall Meeting
[San Francisco, California (USA), 3 Dec 2012 – 7 Dec 2012]
Invited Speaker

"Self-consistent Nonlinear Dynamo Model" at Arcetri 2011 Workshop on Plasma Astrophysics
[Firenze (Italia), 17 Oct 2011 – 21 Oct 2011]
Speaker

"Study on the Dynamo Transition in a Self-consistent Nonlinear Dynamo model" at ST1.4 session, European Geosciences Union General Assembly 2011
[Vienna (Austria), 3 Apr 2011 – 8 Apr 2011]
Poster Presentation

"A Shell Model for Turbulent Magnetic Dynamo" at Radler Fest: Alpha Effect and Beyond
[Wenner-Gren Center, Nordita (Nordic Institute for Theoretical Physics) Stockholm (Svezia), 14 Feb 2011 – 18 Feb 2011]
Speaker

"A Shell Model for Turbulent Dynamos" at IAU Symposium no. 274: "Advances in Plasma Astrophysics"
[Giardini Naxos, Catania (Italy), Sep 2010 – Sep 2010]

Poster Presentation

"A Shell Model for Magnetic Dynamo" at Self-Organization in Turbulent Plasmas and Fluids Workshop
[Dresden (Germany), 3 May 2010 – 14 May 2010]

Speaker

"Onset and Nonlinear Development of Current Sheet Instabilities" at Solar Coronal Loops Workshp IV
[Astronomy and Space Science Department, University of Florence (Italy), 30 Jun 2010 – 3 Jul 2010]

Poster Presentation

"Reduced MHD Turbulence Model of a Coronal Loop" at America Astronomical Society 210th Meeting
[Honolulu, Hawaii (USA), Jun 2007 – Jun 2007]

Special Contribution for a new member of American Astronomical Society

"A Reduced MHD Shell Model for Turbulence in Coronal Loop" at SOHO 17 Conference
[Giardini Naxos, ME (Italy), May 2006 – May 2006]

Poster Presentation

"Velocity Fluctuations in Coronal Loops as Flare Drivers" at Europian SPM-11 Conference: "The dynamic Sun: Challenges for Theory and Observations"
[Leuven (Belgium), Sep 2005 – Sep 2005]

"Turbulent Model for Solar Flares and Astrophysical Dynamo" at Grand Challenge Problems in Computational Astrophysics Reunion Conference I
[IPAM, University of California, Los Angeles, CA (USA), 10 Dec 2006 – 15 Dec 2006]

Invited Speaker

"Velocity Fluctuations in Coronal Loops as Flare Drivers"
[Naval Research Laboratory, Washington DC (USA), 9 Jul 2006 – 11 Jul 2006]

Invited Colloquium

"MHD Turbulence, Coronal Heating, and Solar Wind Acceleration" at nternational Astrophysical Union Symposium 233: Solar Activity and its Magnetic Origin"
[Cairo (Egypt), 31 Mar 2006 – 3 Apr 2006]

Speaker

"Large Amplitude Velocity Fluctuations as Precursor of Nanoflares in Solar Coronal Loops" at Solar Wind 11- SOHO 16 meeting: "Connecting Sun and Heliosphere"
[Whistler (Canada), Jun 2005 – Jun 2005]

Poster Presentation

"Reduced MHD Shell Model for Turbulence in Coronal Loops"
[Jet Propulsion Laboratory-NASA, Pasadena, CA (USA), May 2005 – May 2005]

Invited Colloquium

"Large Amplitude Velocity Fluctuations as Precursor of Nanoflares in Solar Coronal Loops" at PCA Culminating Conference

[Lake Arrowhead, CA (USA), 5 Jun 2005 – 10 Jun 2005]

Invited Speaker

"Large Amplitude Velocity Fluctuations as Precursor of Nanoflares in Solar Coronal Loops" at "Solar Coronal Loops Workshop and Solar-B Discussion" International Conference

[Mondello, Palermo (Italy), 1 Sep 2004 – 3 Sep 2004]

Invited Speaker

"Turbulence Modeling in Coronal Loops" at the international Summer School "Analysis Techniques for Turbulent Plasma"

[Copanello, Catanzaro (Italy), Oct 2004 – Oct 2004]

Speaker

"A Reduced MHD Shell Model for Turbulence in Coronal Loop" at Scuola Nazionale di Fisica della Materia: "Sistemi di non Equilibrio: il Problema della Turbolenza nei Fluidi e nei Plasmi"

[Villa Gualino, Torino (Italy), Sep 2004 – Sep 2004]

Poster Presentation

"A Coronal Loop RMHD Shel lModel for Turbulence generated Nanoflares" at the international conference "Plasmas in the Laboratory and in the Universe: New Insights and New Challenge "

[Como (Italy), Apr 2004 – Apr 2004]

Poster Presentation

"RMHD Coronal Loop Model: Comparison with Velocity Observations" at IV Congresso Italiano di Fisica del Plasma

[Astronomy and Space Science Department, University of Florence (Italy), Jan 2004 – Jan 2004]

Speaker

"Nanoflares and MHD Turbulence in Coronal Loop: a Hybrid Shell Model" at Summer School "Basic Processes of Turbulent Plasmas"

[Chalkidiki (Greece), Sep 2003 – Sep 2003]

Speaker

ST1.4 session - Theory, simulations and observations of magnetic dynamos - EGU Assembly 2012

[Vienna (Austria), 22 Apr 2012 – 27 Apr 2012]

Convener

ST1.4 session - Theory, simulations and observations of magnetic dynamos - EGU Assembly 2011

[Vienna (Austria), 3 Apr 2011 – 8 Apr 2011]

Conviner

Plasma Physics and Astrophysics up to 2020 and Beyond - International workshop in honor of Pierluigi Veltri's 70th birthday'

[Università' della Calabria, Rende, Cosenza (Italy), 7 Oct 2019 – 8 Oct 2019]

SOC member

"Vlasovia 2016: Fifth International Workshop on the Theory and Applications of the Vlasov equation"

[Copanello, Catanzaro (Italy), 30 May 2016 – 2 Jun 2016]

LOC member

"Particle Acceleration and Transport: from the Sun to Extragalactic Sources"
[Università della Calabria, Rende, Cosenza (Italy), 12 Nov 2018 – 16 Nov 2018]

LOC member

ACADEMIC EXPERIENCES

Supervised Master Thesis: Dr. Francesca Di Mare
[2010 – 2010]

Teaching Assistant - Computational Physics (24 hours)
[2020 – 2021]

Department of Physics, University of Calabria: Bachelor course (second-year course)

Teaching - Fluid Mechanics (36 hours)
[2019 – 2020]

Department of Physics, University of Calabria: Bachelor course (second-year course)

Teaching Assistant - Computational Physics (24 hours)
[2019 – 2020]

Department of Physics, University of Calabria: Bachelor course (second-year course)

Teaching Assistant - Solar Physics (24 hours)
[2018 – 2019]

Department of Physics, University of Calabria: Master course (second-year course)

Teaching Assistant - Computational Physics (24 hours)
[2018 – 2019]

Department of Physics, University of Calabria: Bachelor course (second-year course)

Teaching Assistant - Physics (45 hours)
[2018 – 2019]

Department of Mechanical, Energy and Management Engineering, University of Calabria: Bachelor course (first-year course)

Teaching - Physics of the Interplanetary Space and Circumterrestrial Medium • (full course: 52 hours)
[2017 – 2018]

Department of Physics, University of Calabria: Master course (first-year course)

Teaching Assistant - Physics (45 hours)
[2017 – 2018]

Department of Mechanical, Energy and Management Engineering, University of Calabria: Bachelor course (first-year course)

Teaching Assistant - Fluid Mechanics (12 hours)
[2016 – 2017]

Department of Science of Materials Innovative and for Nanotechnology, University of Calabria: Bachelor course (second year)

Teaching Assistant - Mechanics and Thermodynamics (30 hours)
[2009 – 2010]

Faculty in Science of Physics and Mats, University of Calabria: Bachelor course (first year course)

Teaching Assistant - Electromagnetism

[2003 – 2004]

Faculty of Engineering, University of Calabria: Bachelor course (second years course)

ORGANISATIONAL SKILLS

Organisational skills

• POR-CALABRIA-FSE 2007/2013 GRANT (64K euro) for the research project on *"Study on Magnetic Dynamo Effect"*

• PI for a research project on plasma instabilities accepted at CINECA, which won an award of many computational hours at SP6 supercomputer in CINECA-INAF agreement (2009-2010).

• Scientific Organising Committee member of the International Conference Plasma Physics and Astrophysics up to 2020 and Beyond - International workshop in honor of Pierluigi Veltri's 70th birthday'

[Università' della Calabria, Rende, Cosenza (Italy), 7 Oct 2019 – 8 Oct 2019]

• Convener for ST1.4 session "Theory, simulations and observations of magnetic dynamos" at EGU (European Geosciences Union) meeting 2011- Vienna

• Convener for ST1.4 session "Theory, simulations and observations of magnetic dynamos" at EGU (European Geosciences Union) meeting 2012- Vienna

• Co-supervisor with prof. Francesco Malara, Master Thesis of Francesca Di Mare - University of Calabria (2010)

• Local Organising Committee member of the International Conference **"Vlasovia 2016: Fifth International Workshop on the Theory and Applications of the Vlasov equation"**

[Copanello, Catanzaro (Italy), 30 May 2016 – 2 Jun 2016]

• Local Organising Committee member of the International Conference **"Particle Acceleration and Transport: from the Sun to Extragalactic Sources"**

[Università della Calabria, Rende, Cosenza (Italy), 12 Nov 2018 – 16 Nov 2018]

EDITORIAL ACTIVITIES

Topic Editor for Atmosphere journal - MDPI

[Oct 2019 – Current]

Guest Editor of the Special Issue "Modeling Multiscale Dynamics by Statistical Mechanics in Heliophysics and Geophysics" in Atmosphere - MDPI

[Jan 2020 – Mar 2021]

https://www.mdpi.com/journal/atmosphere/special_issues/Statistical_Heliophysics_Geophysics

Review Editor for Frontiers in Space Physics - and Review Editor for Frontiers in Astronomy and Space Sciences

[Jul 2019 – Current]

Peer Reviewer for:

- The Astrophysical Journal
- Physics Review Letters
- Proceedings of the Royal Society A
- European Physical Journal Plus
- Advances in Space Research
- Atmosphere-MDPI
- Symmetry-MDPI