

Curriculum vitae STEFANIA BUFALINO

Present position: From 2018 I am Associate Professor (L. 240/10) at the Department of Applied Science and Technology (DISAT) of the Politecnico of Turin.

Publication Score

Co-author of about 450 publications, with h-index: 87 (Scopus),
More than 16 thousand citations (Scopus).

Curriculum studiorum

- 2007 Ph.D. in Physics at the Department of Experimental Physics, Turin.
- 2008-2010 Post-doc research fellow at the Department of Experimental Physics, Turin.
- 2010-2014 Post-doc research fellow at INFN, Turin. From July 2012 based at CERN with an Associate position at the CERN Physics department
- July 2014 - May 2015: Project Associate Position at CERN
- July 2012 - May 2015 I was based at CERN as a member of the CERN Physics Department
- June 2015 (for 6 months): Marie Curie Research Fellow at the Physics Department of the Turin University
- December 2015 (three years position): Researcher (art. 24 c.3-b L. 240/10) at the Department of Applied Science and Technology of the Politecnico of Turin

Recent responsibilities:

- October 2024-present: Coordinator of the Ph.D Course in Physics at the Politecnico of Torino.
- July 2023-present: Coordinator for the INFN Torino of the research groups belonging to the National Scientific Committee 3 of INFN
- Sep. 2020-present: convener of the ALICE 3 Timing Layers Working Group. The group, composed by ~30 members from 6 institutions, is dedicated to the R&D of silicon sensors with excellent timing resolution to build the ALICE 3 timing layers. ALICE 3 is a new experiment which has been proposed to run in 2030 at the LHC.
- 2017- 2019: convener of the Light Flavour Physics Working Group (PWG-LF) of the ALICE experiment at the LHC. The PWG-LF group is composed by ~120 members from 20 institutions.
- 2017-2019: member of the Physics Board of the ALICE experiment

Titles, awards and selected past responsibilities

- 2013-2017: Convener of the Physics Analysis Group “Nuclei and Exotica” of the ALICE experiment. The group is composed by ~50 members from 10 institutions and it is dedicated to the study of anti-nuclei, anti-hypernuclei and exotic baryon states.
- 2015-2016: Shift leader System Run Coordinator
- 2014 -2019: Deputy System Run Coordinator of the Silicon Drift Detector (SDD) of the ALICE Inner Tracking System (ITS).
- 2013 – 2015: System Run Coordinator of the ALICE ITS (~20 people to coordinate).

RESEARCH ACTIVITY

I have been working in the field of experimental nuclear and particle physics since my Ph.D.; specifically, my work focuses on data analysis and Monte-Carlo simulation and for a large fraction of my research work I have been very active in detectors commissioning and operations. I have been a member of three collaborations FINUDA, SKS AT J-PARC and ALICE at the LHC, where I reached leadership positions thus coordinating several international research groups dedicated to data analysis, detectors operation and R&D.

Presentation at conferences

I delivered more than 40 talks, and these include 11 invited contributions and 7 plenary invited talks.

Workshop/conferences organization

- Organizer of 4 international "EMMI Workshop on anti-matter, hyper-matter and exotica production at the LHC", supported by the ExtreMe Matter Institute (EMMI, Darmstadt, Germany) and held at CERN in 2015, in Turin in 2017, Wroclaw in 2019 and in Bologna in 2022.

- member of the Local Organizing Committee (LOC) of the 2018 European Nuclear Physics Conference (Bologna, Italy)
- member of the LOC of the 27th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions (2018 in Venice, Italy).

Activity as referee

Reviewer of the following international peer-reviewed journals:

- Nature Physics
- Advances in High Energy Physics
- Nuclear Physics A
- The European Physical Journal A
- The European Physical Journal Plus

Torino, 05/06/2025

Stefania Bufalino

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ORCID [0000-0001-7181-2071](https://orcid.org/0000-0001-7181-2071)

INSPIRES <https://inspirehep.net/author/profile/M.Taoso.1>

Main research interests Theoretical Astroparticle Physics, Cosmology, Physics Beyond the Standard Model, Dark Matter, Neutrinos.

Employment history

- 2017 - present **Senior staff researcher**, *Istituto Nazionale di Fisica Nucleare*, Sezione di Torino (Italy). In 2023 promoted to *Primo Ricercatore INFN* researcher (level 2).
- 2015 - 2017 **Postdoctoral researcher**, *Instituto de Física Teórica*, CSIC, Universidad Autónoma de Madrid (Spain).
- 2013 - 2015 **Postdoctoral researcher**, *Institut de Physique Théorique*, CEA-Saclay (France).
- 2011 - 2012 **Institute of Particle Physics Postdoctoral Research Fellow**, *University of British Columbia and TRIUMF laboratory*, Vancouver (Canada).
- 2009 - 2011 **Postdoctoral researcher**, *Instituto de Física Corpuscular*, IFIC-CSIC Valencia (Spain).

Education

- 2006 - 2009 **PhD in Theoretical Physics**, *University of Padova (Italy) and Université Paris Diderot (France)*, Thesis title: "Particle Dark Matter and Astrophysical constraints", Supervisors: Prof. Gianfranco Bertone, Prof. Antonio Masiero.
Enrolled in the "International Doctorate on AstroParticle Physics" (IDAPP) programme. Participation in the IDAPP training programme leads to a double doctoral degree according to the rules of the certification of Doctora Europaeus.
- 2000 - 2005 **Laurea Degree in Theoretical Physics**, *University of Padova (Italy)*, Thesis title: "The generation of the baryonic asymmetry in the Universe in the presence of a magnetic field", Supervisors: Prof. Sabino Matarrese, Prof. Antonio Riotto.

Scientific output and metrics as of May 2025

Total number of scientific papers: 68.

of which:

- 53 published on peer-reviewed journals + 1 under review
- 12 conference proceedings
- 2 reports of the astroparticle community

<https://inspirehep.net/authors/1055960?ui-citation-summary=true>

h-index: 38 (according to the Inspire database, citeable papers).

Total number of citations: >4500 (according to the Inspire database).

More than 60 talks and seminars, given at different conferences and institutions.

Research grants

- 2023 - 2026 **"Adressing systematic uncertainties in searches for dark matter"**, PRIN_2022F2843L, funded by MIUR. PI of the project: Alessandro Cuoco. .

- 2019 - 2023 **"The Dark Universe: A Synergic Multimessenger Approach"**, PRIN_2017X7X85K, funded by MIUR. PI of the project: Nicolao Fornengo. .
- 2018 - 2021 **"Looking into the dark – LINDARK"**, Individual grant. Project funded by INFN..

National and International Service

- 2023 - **Local coordinator** of the INFN Consortium for AstroParticle Theory (TAsP) research network present in Torino. <https://web.infn.it/CSN4/index.php/it/17-esperimenti/190-tasp-home>
- 2022 - **Representative** of the Torino group in the European Consortium for AstroParticle Theory present (EuCAPT) and member of the EuCAPT Symposium Task Force. <https://www.eucapt.org>
- 2021 - **Co-organiser of the Theory Colloquia** at the Physics Department of Torino. <http://colloquia.to.infn.it/>

Certificates and awards

- 2020 **National Scientific Qualification** from the Italian Ministry of University and Research to function as associate in Italian Universities in the area of "Theoretical physics of fundamental interactions". <https://asn18.cineca.it/pubblico/miur/esito-abilitato/02%252FA2/2/4>
- 2011 **Research Fellowship**. Institute of Particle Physics fellowship: to promote research in particle physics in Canada <https://particlephysics.ca/?lang=en>.

Evaluation activities

- PhD theses **Referee**; Candidate: , Universidad de La Laguna (Spain) 2024.
Referee; Candidate: , Universitat de València (Spain) 2024. **Referee**; Candidate: , Universitat de València (Spain) 2020.
Member of the jury; Candidate: Universitat de València (Spain) 2021. **Member of the jury**; Candidate: , Université Paris-Saclay (France) 2018.
- Master theses **Member of the jury**; Candidate: , Université de Franche-Comte (France) 2023.
- Scientific projects **Referee**; FONDECYT, Chile 2023.
Referee; French National Research Agency, **ANR**, France 2023.
- Member of the committee for a **faculty permanent position** (Maître de Conférences) at LAPTh Université Savoie Mont Blanc (France) 2021.
for the INFN *Molinari prize 2020 and 2021* for the best doctoral thesis in theoretical physics (University of Torino) 2021-2022.
for the INFN *Fubini prize 2018* for the best doctoral thesis in theoretical physics (national level) 2019.
- Referee for the following **journals**: Journal of High Energy Physics (JHEP), Physics Review D, Journal of Cosmology and Astroparticle Physics (JCAP), Physics Review Letters, Astronomy and Astrophysics Letters, Physics Letters B, European Physical Journal C, Advances in High Energy Physics, Monthly Notices of the Royal Astronomical Society, Galaxies.

Lectures

- University of Torino **PhD course on Dark Matter and early Universe cosmology**, yearly (course length: 20 hrs), 2019, 2021, 2023, 2024, 2025.

Conference and meetings organization

- May 2025 **"EuCAPT Symposium"**, Online, Member of the scientific organizing committee.
<https://indico.cern.ch/event/1515773/>
- June 2024 **"Axions in the sky!"**, Barolo, (Italy), Member of the local organizing committee.
<https://agenda.infn.it/event/39100/>
- May 2024 **"EuCAPT Symposium"**, CERN, Geneva (Switzerland), Member of the scientific organizing committee.
<https://indico.cern.ch/event/1335106/overview>
- Sept 2021 **Workshop "From Darklight to Dark Matter"**, Barolo (Italy), Member of the local organizing committee.
<https://agenda.infn.it/event/21257/>
- June 2021 **Workshop "Cortona Young: New Frontier in Theoretical Physics"**, Online, Member of the local organizing committee.
<https://www.ggi.infn.it/showevent.pl?id=404>
- May 2020 **Workshop "Cortona Young: New Frontier in Theoretical Physics"**, Online, Member of the local organizing committee.
<https://www.ggi.infn.it/showevent.pl?id=377>
- Nov 2016 **Workshop "Dark Matter from aeV to ZeV"**, Durham (UK), Member of the scientific organizing committee.
<https://conference.ippp.dur.ac.uk/event/555/>
- Sept 2014 **Workshop "Dark Matter numerical simulations"**, IPhT-Saclay, Paris (France), Member of the local organizing committee.
- Dec 2013 **Workshop "Amsterdam-Paris-Stockholm"**, IAP, Paris (December)France), Member of the local organizing committee.
<https://indico.cern.ch/event/270855/>
- Sept 2013 **Workshop "Dark Matter at accelerators"**, IPhT-Saclay (France), Member of the local organizing committee.

Seminars and Conference Talks

- 2 - 7 Dec 2024 *Let there be light (particles) Workshop*, Daejeon (Korea).
Invited speaker. <https://physics.iith.ac.in/ppc2024/>
- 14 Nov 2024 *Seminar at University of Pisa (Italy).*
- 14 - 18 Oct 2024 *PPC 2024*, Hyderabad (India).
<https://physics.iith.ac.in/ppc2024/>
- 8 - 14 Sept 2024 *Dark Side of the Universe*, Corfu (Greece).
<https://physics.ntua.gr/corfu2024/ds.html>
- 8 - 12 Jul 2024 *Identification of Dark Matter*, L'Aquila (Italy).
<https://www.idm2024.eu/>
- 28 Aug - 1 Sept 2023 *Topics in Astroparticle and Underground Physics*, Vienna (Austria).
<https://indico.cern.ch/event/1199289/>
- 03 March 2023 *Seminar at Helsinki Institute of Physics*, Finland.
<https://www.hip.fi/cosmoseminars/>
- 17-28 Oct 2022 *Beyond the Standard Models: Particle Physics Meets Cosmology*, Madrid, Spain.
Invited speaker. <https://indico.ift.uam-csic.es/event/12/>
- 8-12 Aug 2022 *TeVPA 2022*, Kingston, Canada.
<https://indico.cern.ch/event/1082486/>
- 26 May 2022 *Seminar at University of Pisa*, Italy.

- 10 Nov 2021 *Seminar at University of Padova, Italy.*
- 18-20 Oct 2021 *MULTIDARK Consolider Workshop, Huelva, Spain.*
<https://workshops.ift.uam-csic.es/multidark18>
- 23 Sept 2021 *Cosmology and dark matter in the era of multi-messenger astronomy, Torino, Italy. **Invited speaker.***
<https://agenda.infn.it/event/28019/>
- 30 Aug - 3 Sept 2021 *TAUP 2021, online conference.*
<https://congresos.adeituv.es/TAUP2021/>
- 12 - 23 Jul 2021 *ICRC 2021, online conference. **Invited rapporteur plenary speaker.***
<https://icrc2021.desy.de/>
- 28 Apr 2021 *UC Irvine, online talk.*
- 18 Oct 2019 *Seminar at IFUNAM, Mexico City, Mexico.*
- 9 - 13 Sept 2019 *TAUP 2019, Toyama, Japan.*
<http://taup2019.icrr.u-tokyo.ac.jp/>
- 8 - 10 April 2019 *IFAE 2019, Naples, Italy. **Invited speaker.***
<https://agenda.infn.it/event/17945/>
- 24 Jul 2018 *Seminar at IFIC, Valencia, Spain.*
- 25-29 Jun 2018 *Dark Side of the Universe, Annecy, France.*
<https://indico.in2p3.fr/event/14719/>
- 16 Feb 2018 *Seminar at IFIC, Valencia, Spain.*
- 24-26 May 2017 *MULTIDARK Consolider Workshop, UAM, Madrid, Spain.*
<https://workshops.ift.uam-csic.es/multidark14>
- 10-12 May 2017 *South American Dark Matter workshop, ICTP-SAIFR, San Paolo, Brazil. **Invited speaker.***
<https://www.ictp-saifr.org/sao-paulo-dark-matter-workshop/>
- 08 May 2017 *Seminar at ICTP San Paolo, Brazil.*
- 09 March 2017 *Seminar at University of Torino, Italy.*
- 30 Nov 2016 *Seminar at University of Padova, Italy*
- 21-25 Nov 2016 *Dark Matter from aeV to ZeV, Durham, UK.*
<https://conference.ippp.dur.ac.uk/event/555/>
- 10-16 Jul 2016 *PASCOS 2016, Quy-Nhon, Vietnam.*
<https://indico.cern.ch/event/452998/>
- 22-28 May 2016 *Frontier Objects in Astrophysics and Particle Physics, Sicily, Italy. **Invited plenary speaker.***
<http://www.lnf.infn.it/conference/vulcano2016/>
- 23-28 Nov 2015 *IBS-MULTIDARK Workshop, UAM Madrid, Spain.*
<https://workshops.ift.uam-csic.es/IBSmultidark>
- 15 Oct 2015 *Seminar at LPT Orsay, Paris, France.*
- 7-11 Sept 2015 *TAUP 2015, Torino, Italy.*
<http://taup2015.to.infn.it/>
- 16-20 Mar 2015 *Effective Theories and Dark Matter Workshop, Mainz, Germany.*
<https://indico.mitp.uni-mainz.de/event/25/>
- 4 March 2015 *Seminar at SISSA, Trieste, Italy.*
- 15-16 Jan 2015 *Rencontres de Physique des Particules, Paris, France.*
<https://indico.in2p3.fr/event/10699/>
- 11-13 Dec 2014 *GDR Terascale, Heidelberg, Germany. **Invited plenary speaker.***
<https://indico.in2p3.fr/event/10186/>

- 17-21 Nov 2014 *Dark Side of the Universe*, Cape Town, South Africa.
<http://www.acgc.uct.ac.za/dsu2014>
- 29 Sept-01 Oct 2014 *APS workshop*, Amsterdam, Netherlands.
<https://indico.cern.ch/event/331892/>
- 22-26 Sept 2014 *Physics Challenges in the face of LHC-14*, Madrid, Spain.
<https://workshops.ift.uam-csic.es/faceLHC14>
- 23-28 Jun 2014 *TeV/IDM 2014*, Amsterdam, Netherlands.
<https://indico.cern.ch/event/278032/>
- Apr 2014 *Seminar at LAPTh*, Annecy, France.
- 16-21 Sept 2013 *WIN 2013*, Natal, Brasil. **Invited speaker.**
<http://hep.if.usp.br/WIN13/>
- 12-31 May 2013 *Hunting for Dark Matter workshop*, Santa Barbara, USA. **Invited speaker.**
<https://www.kitp.ucsb.edu/activities/dmatter13>
- 25-27 March 2013 *APS workshop*, Stockholm, Sweden.
- Feb 2013 *Seminar at Institut d'Astrophysique de Paris*, Paris, France.
- Jan 2013 *Seminar at IPhT-Saclay*, Paris, France.
- 8-10 Oct 2012 *Physun 2012*, LNGS, Italy. **Invited speaker.**
<https://agenda.infn.it/event/5284/>
- 23-27 Jul 2012 *Identification of Dark Matter*, Chicago, USA. **Invited plenary speaker.**
<https://kicp-workshops.uchicago.edu/IDM2012/>
- 3-8 Jun 2012 *PASCOS 2012*, Merida, Mexico.
<https://indico.nucleares.unam.mx/event/621/>
- Nov 2011 *Seminar at TRIUMF Laboratory*, Vancouver, Canada.
- 5-9 Sept 2011 *TAUP 2011*, Munich, Germany.
<http://www.taup-conference.to.infn.it/taup2011.html>
- 11-14 Jul 2011 *FLASY 2011*, Valencia, Spain. **Invited speaker.**
<http://ific.uv.es/~flasy2011/>
- 4-6 Apr 2011 *MULTIDARK Workshop*, IFT UAM/CSIC Madrid, Spain.
www2.ift.uam-csic.es/iftworkshops/index.php?id=12
- 15-16 Nov 2010 *MULTIDARK Workshop*, CETA-CIEMAT, Trujillo, Spain.
www2.ift.uam-csic.es/iftworkshops/index.php?id=11
- 26-30 Jul 2010 *Identification of Dark Matter*, Montpellier, France.
<https://indico.in2p3.fr/event/1565/>
- 19-23 Jul 2010 *Pascos 2010*, Valencia, Spain.
- 28-30 Jun 2010 *MULTIDARK workshop*, Santander, Spain.
www2.ift.uam-csic.es/iftworkshops/index.php?id=10
- 1-5 Mar 2010 *Multi3 workshop*, Padova, Italy.
<https://userswww.pd.infn.it/~mdoro/Multi-cube/Homepage.html>
- 25-27 Jan 2010 *MULTIDARK workshop*, UAM Madrid, Spain.
www2.ift.uam-csic.es/iftworkshops/index.php?id=3
- Jun 2009 *Seminar at Observatory of Geneva*, Switzerland.
- May 2009 *Seminar at CERN TH-Division*, Geneva, Switzerland.
- March 2009 *Seminar at University of Padova*, Italy.
- March 2009 *Seminar at IFIC*, Valencia, Spain.
- 7-11 Sept 2009 *Cosmo 09*, CERN, Geneva, Switzerland.
<https://indico.cern.ch/event/46758/>

9-10 Jun 2008 *IDAPP meeting*, Paris, France.
 18-22 Aug 2008 *Identification of Dark Matter*, Stockholm, Sweden.
 3-4 May 2007 *IDAPP meeting*, Ferrara, Italy.
 27-31 Aug 2007 *TeV Particle Astrophysics*, Venice, Italy.
<https://www2.pd.infn.it/TeV/index.html>
 12-13 May 2006 *IDAPP meeting*, Ferrara, Italy.

Publications

The order of authors is alphabetical in most publications, as standard in my field of research.

- [1] M. Regis, M. Taoso and J. Terol Calvo, **Searching for axion-like particles with SPHEREx**, JCAP 05 (2025), 008, [[arXiv:2412.12286](#) [astro-ph.CO]].
- [2] J. Ruz, E. Todarello, J. K. Vogel, M. Taoso, *et al.* **NuSTAR as an Axion Helioscope**, Under review in PRL, [[arXiv:2407.03828](#) [astro-ph.CO]].
- [3] D. Barducci, E. Bertuzzo, M. Taoso, C. A. Ternes and C. Toni, **Illuminating the dark: mono- γ signals at NA62**, JHEP 10 (2024) 016, [[arXiv:2406.17599](#) [hep-ph]].
- [4] G. Ballesteros, J. Iguaz Juan, P. D. Serpico and M. Taoso, **Primordial black hole formation from self-resonant preheating?**, Phys.Rev.D 111 (2025) 8, 083521 [[arXiv:2406.09122](#) [astro-ph.CO]].
- [5] E. Todarello, M. Regis, M. Taoso, M. Giannotti, J. Ruz and J. K. Vogel, **The Sun as a target for axion dark matter detection**, Phys.Lett.B 854 (2024) 138752, [[arXiv:2312.13984](#) [hep-ph]].
- [6] E. Todarello, M. Regis, J. Reynoso-Cordova, M. Taoso, D. Vaz, J. Brinchmann, M. Steinmetz and S. L. Zoutendijk, **Robust bounds on ALP dark matter from dwarf spheroidal galaxies in the optical MUSE-Faint survey**, JCAP 05 (2024), 043, [[arXiv:2307.07403](#) [astro-ph.CO]].
- [7] E. Todarello, A. Scaffidi, M. Regis and M. Taoso, **Constraining Below-threshold Radio Source Counts With Machine Learning**, JCAP 01 (2024), 062, [[arXiv:2306.15720](#) [astro-ph.IM]].
- [8] G. Franciolini, A. Iovino, Junior., M. Taoso and A. Urbano, **One loop to rule them all: Perturbativity in the presence of ultra slow-roll dynamics**, Phys.Rev.D 109 (2024) 12, [[arXiv:2305.03491](#) [astro-ph.CO]].
- [9] A. Caputo, M. Negro, M. Regis and M. Taoso, **Dark Matter prospects with COSI: ALPs, PBHs and sub-GeV Dark Matter**, JCAP 02 (2023) 006, [[arXiv:2210.09310](#) [hep-ph]].
- [10] D. Barducci, E. Bertuzzo, C. Toni and M. Taoso, **Probing right-handed neutrinos dipole operators**, JHEP 03 (2023), 239, [[arXiv:2209.13469](#) [hep-ph]].
- [11] J. Reynoso-Cordova, M. Regis and M. Taoso, **Upper limits on the dark matter content in globular clusters**, JCAP 10 (2022) 038, [[arXiv:2203.13735](#) [astro-ph.GA]].
- [12] E. Bertuzzo, A. Scaffidi and M. Taoso, **Searching for inelastic dark matter with future LHC experiments**, JHEP 08 (2022) 100, [[arXiv:2201.12253](#) [hep-ph]].
- [13] F. Ricciardi, M. Taoso and A. Urbano, **Solving peak theory in the presence of local non-gaussianities**, JCAP 08 (2021) 060, [[arXiv:2102.04084](#) [astro-ph.CO]].
- [14] M. Taoso and A. Urbano, **Non-gaussianities for primordial black hole formation**, JCAP 08 (2021) 016, [[arXiv:2102.03610](#) [astro-ph.CO]].
- [15] A. Caputo, A. Vittino, N. Fornengo, M. Regis and M. Taoso, **Searching for axion-like particle decay in the near-infrared background: an updated analysis**, JCAP 05 (2021) 046, [[arXiv:2012.09179](#) [astro-ph.CO]].

- [16] E. Bertuzzo and [M. Taoso](#), **Probing light dark scalars with future experiments**, JHEP 03 (2021) 272, [[arXiv:2011.04735](#) [hep-ph]].
- [17] M. Regis and [M. Taoso](#) and MUSE Collaboration, **Searching for light in the darkness: Bounds on ALP dark matter with the optical MUSE-faint survey**, Phys.Lett.B 814 (2021) 136075, [[2009.01310](#) [astro-ph.CO]].
- [18] G. Ballesteros, J. Rey, [M. Taoso](#) and A. Urbano, **Stochastic inflationary dynamics beyond slow-roll and consequences for primordial black hole formation**, JCAP 08 (2020) 043, [[2006.14597](#) [astro-ph.CO]].
- [19] G. Ballesteros, J. Rey, [M. Taoso](#) and A. Urbano, **Primordial black holes as dark matter and gravitational waves from single-field polynomial inflation**, JCAP 07 (2020) 025, [[2001.08220](#) [astro-ph.CO]].
- [20] A. Caputo, M. Regis and [M. Taoso](#), **Searching for Sterile Neutrino with X-ray Intensity Mapping**, JCAP 03 (2020) 001, [[1911.09120](#) [astro-ph.CO]].
- [21] A. Caputo, M. Regis, [M. Taoso](#) and S.J. Witte, **Detecting the Stimulated Decay of Axions at RadioFrequencies**, JCAP 03 (2019) 027, [[1811.08436](#) [hep-ph]].
- [22] M. Cirelli, P. Panci, F. Sala, J. Silk, [M. Taoso](#), and HESS Collaboration, **Searches for gamma-ray lines and 'pure WIMP' spectra from Dark Matter annihilations in dwarf galaxies with H.E.S.S.**, JCAP 1811 (2018) 037, [[1810.00995](#) [astro-ph.HE]].
- [23] G. Ballesteros, P. D. Serpico and [M. Taoso](#), **On the merger rate of primordial black holes: effects of nearest neighbours distribution and clustering**, JCAP 10 (2018) 043, [[1807.02084](#) [astro-ph.CO]].
- [24] I. Baldes, M. Cirelli, P. Panci, K. Petraki, F. Sala and [M. Taoso](#), **Asymmetric dark matter: residual annihilations and self-interactions**, SciPost Phys. 4 (2018) 6, 041, [[1712.07489](#) [hep-ph]].
- [25] G. Ballesteros and [M. Taoso](#), **Primordial black hole dark matter from single field inflation**, Phys.Rev.D 97 (2018) 2, [[1709.05565](#) [hep-ph]].
- [26] D. Gaggero, D. Grasso, A. Marinelli, [M. Taoso](#) and A. Urbano, **Diffuse cosmic rays shining in the Galactic center: A novel interpretation of H.E.S.S. and Fermi-LAT γ -ray data**, Phys.Rev.Lett. 119 (2017) 3, 031101, [[1702.01124](#) [astro-ph.HE]].
- [27] M. Cirelli, P. Panci, K. Petraki, F. Sala and [M. Taoso](#), **Dark Matter's secret liaisons: phenomenology of a dark U(1) sector with bound states**, JCAP 05 (2017), 036, [[arXiv:1612.07295](#) [hep-ph]].
- [28] M. Cirelli and [M. Taoso](#), **Updated galactic radio constraints on Dark Matter**, JCAP 07 (2016), 041, [[arXiv:1604.06267](#) [hep-ph]].
- [29] E. Bertuzzo, P. A. N. Machado and [M. Taoso](#), **Diphoton excess in the 2HDM: Hastening towards instability and the nonperturbative regime**, Phys. Rev. D 94 (2016) no.11, 115006, [[arXiv:1601.07508](#) [hep-ph]].
- [30] D. Gaggero, [M. Taoso](#), A. Urbano, M. Valli and P. Ullio, **Towards a realistic astrophysical interpretation of the gamma-ray Galactic center excess**, JCAP 12 (2015), 056, [[arXiv:1507.06129](#) [astro-ph.HE]].
- [31] M. Cirelli, T. Hambye, P. Panci, F. Sala and [M. Taoso](#), **Gamma ray tests of Minimal Dark Matter**, JCAP 10 (2015), 026, [[arXiv:1507.05519](#) [hep-ph]].

- [32] J. Buch, M. Cirelli, G. Giesen and M. Taoso, **PPPC 4 DM secondary: A Poor Particle Physicist Cookbook for secondary radiation from Dark Matter**, JCAP 09 (2015), 037, [[arXiv:1505.01049](#) [hep-ph]].
- [33] M. Cirelli, F. Sala and M. Taoso, **Wino-like Minimal Dark Matter and future colliders**, JHEP 10 (2014), 033, [[arXiv:1407.7058](#) [hep-ph]].
- [34] M. Cirelli, D. Gaggero, G. Giesen, M. Taoso and A. Urbano, **Antiproton constraints on the GeV gamma-ray excess: a comprehensive analysis**, JCAP 12 (2014), 045, [[arXiv:1407.2173](#) [hep-ph]].
- [35] M. Lattanzi, R. A. Lineros and M. Taoso, **Connecting neutrino physics with dark matter**, New J. Phys. 16 (2014) no.12, 125012, [[arXiv:1406.0004](#) [hep-ph]].
- [36] N. Fornengo, R. A. Lineros, M. Regis and M. Taoso, **The isotropic radio background revisited**, JCAP 04 (2014), 008, [[arXiv:1402.2218](#) [astro-ph.CO]].
- [37] M. Cirelli, N. Fornengo, M. Taoso and A. Vittino, **Anti-helium from Dark Matter annihilations**, JHEP 08 (2014), 009 [[arXiv:1401.4017](#) [hep-ph]].
- [38] C. B. Jackson, G. Servant, G. Shaughnessy, T. M. P. Tait and M. Taoso, **Gamma Rays from Top-Mediated Dark Matter Annihilations**, JCAP 07 (2013), 006, [[arXiv:1303.4717](#) [hep-ph]].
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- [45] M. S. Boucenna, M. Hirsch, S. Morisi, E. Peinado, M. Taoso and J. W. F. Valle, **Phenomenology of Dark Matter from A_4 Flavor Symmetry**, JHEP 05 (2011), 037, [[arXiv:1101.2874](#) [hep-ph]].
- [46] M. Taoso, F. Iocco, G. Meynet, G. Bertone and P. Eggenberger, **Effect of low mass dark matter particles on the Sun**, Phys. Rev. D 82 (2010), 083509, [[arXiv:1005.5711](#) [astro-ph.CO]].
- [47] C. B. Jackson, G. Servant, G. Shaughnessy, T. M. P. Tait and M. Taoso, **Higgs in Space!**, JCAP 04 (2010), 004, [[arXiv:0912.0004](#) [hep-ph]].
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- [49] L. Bergström, G. Bertone, T. Bringmann, J. Edsjö and M. Taoso, **Gamma-ray and Radio Constraints of High Positron Rate Dark Matter Models Annihilating into New Light Particles**, Phys. Rev. D 79 (2009), 081303, [[arXiv:0812.3895](#) [astro-ph]].

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Scientific reports

- [55] J. L. Feng, et al. **The Forward Physics Facility at the High-Luminosity LHC**, J. Phys. G 50 (2023) no.3, 030501 [[arXiv:2203.05090](#) [hep-ex]].
- [56] T. Golling, et al. **Physics at a 100 TeV pp collider: beyond the Standard Model phenomena**, CERN Yellow Rep. (2017) 3, 441-634, [[arXiv:1606.00947](#) [hep-ph]].

Conference Proceedings

- [57] M. Taoso, **Probing right-handed neutrinos dipole operators**, PoS TAUP2023 (2024), 230.
- [58] J. Singal et al., **The Second Radio Synchrotron Background Workshop: Conference Summary and Report**, Publ. Astron. Soc. Pac. **135** (2023) no.1045, 036001, [[arXiv:2211.16547](#) [astro-ph.CO]].
- [59] M. Taoso, **News on Dark Matter from ICRC 2021**, Contribution to ICRC 2021, PoS ICRC2021 (2021), 047.
- [60] M. Taoso, **Probing light dark scalars with future laboratory experiments**, Contribution to TAUP 2021, J. Phys. Conf. Ser. **2156** (2021) no.1, 012054.
- [61] M. Taoso, **Detecting axion-like particles at radio frequencies**, Contribution to TAUP 2019, J. Phys. Conf. Ser. 1468 (2020) no.1, 012019.
- [62] M. Taoso, **A realistic model for cosmic-rays production and the galactic center GeV excess**, Contribution to Frontier Objects in Astrophysics and Particle Physics 2016, Frascati Phys. Ser. 64 (2017), 203-210.
- [63] M. Taoso, **Dark matter searches with radio observations**, Contribution to PASCOS 2012, J. Phys. Conf. Ser. 485 (2014), 012031.
- [64] M. Hirsch et al. **Proceedings, first workshop on Flavor Symmetries and consequences in Accelerators and Cosmology (FLASY2011): Valencia, Spain, July 11-14, 2011**, Contribution to FLASY 2011, [[arXiv:1201.5525](#) [hep-ph]].
- [65] M. Taoso, **Dark matter synchrotron emission and radio observations**, Contribution to TAUP 2011, J. Phys. Conf. Ser. 375 (2012), 012036.
- [66] M. Taoso, **Solar neutrinos constraints on light asymmetric dark matter**, Contribution to IDM 2010, PoS IDM2010 (2011), 038.

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- [68] M. Taoso, G. Bertone, G. Meynet and S. Ekstrom, **WIMPs annihilations in Pop III stars**, Contribution to IDM 2008, PoS IDM2008 (2008), 076.

Curriculum Vitæ of Daniele Trocino

Personal data

Full name Daniele Trocino

Employment history

May 2019–present	Staff researcher at Istituto Nazionale di Fisica Nucleare (INFN), Torino Division, Italy
Apr 2017–Apr 2019	Postdoctoral Researcher at Ghent University, Belgium
Feb 2011–Mar 2017	Postdoctoral Research Associate at Northeastern University, Boston, United States
Jan–Dec 2010	Scholarship from “Fondazione Angelo Della Riccia” (Florence, Italy) for a 12-month research project at CERN, Geneva, Switzerland

Education

Jan 2011	PhD in Physics, University of Turin, Italy
Sep 2007	Master’s Degree in Particle Physics <i>cum laude</i> , University of Turin
Jul 2005	Bachelor’s Degree in Physics <i>cum laude</i> , University of Turin

Research activity

I conduct my main research activity in the field of particle physics, in the Compact Muon Solenoid (CMS) experiment at CERN’s Large Hadron Collider (LHC) in Geneva, Switzerland, with particular focus on the following areas:

- searches for heavy sterile neutrinos (2017–present);
- trigger development and operations (2022–present);
- construction of the silicon detectors for the CMS Endcap Timing Layer (2020–present);
- muon detection and reconstruction (2008–present);
- invisible Higgs and dark matter searches (2012–2017);
- electroweak multiboson measurements (2011–2020);
- standard model (SM) Higgs searches (2008–2012).

Since 2023 I have worked on the development of imaging setups for medical and cultural heritage applications. In the context of the PITCH and Vi_Hi projects, I am building and commissioning a laboratory-based phase-contrast grating interferometer using a liquid-anode X-ray source, both for radiographic and tomographic analyses.

Leadership and coordination experience

Dec 2024–present	Local coordinator of the Torino CMS MIP Timing Detector (CMS MTD) group
Sep 2023–present	Co-convener (L2) of the HLT Field Operations Group within the CMS Trigger Studies Group (TSG-FOG)
Sep 2023–present	Deputy Principal Investigator, coordinator of the INFN research unit, and work package coordinator of the project PITCH – PRIN 2022 program (20225MM7KA)
Jan 2021–present	Responsible for the Torino assembly site of the CMS Endcap Timing Layer (ETL) modules
Sep 2020–Aug 2022	Co-convener (L3) of the muon reconstruction sub-group within the CMS Muon Physics Object Group (Muon POG)
Nov 2018–Aug 2020	Co-convener (L3) of the CMS Standard Model Physics–Multiboson sub-group
Jul 2019	Member of the Local Organizing Committee of the EPS–HEP Conference 2019, (Ghent, Belgium); co-coordinator of the EPS–HEP 2019 outreach program; editor of the EPS–HEP 2019 daily newsletter
Aug 2017–Aug 2023	Muon-Object Coordinator within the CMS Exotica Physics Analysis Group (EXO PAG)
Jan 2014–Dec 2015	Co-convener (L2) of the CMS Muon Physics Object Group (Muon POG)
Jan 2012–Dec 2013	Convener (L3) of the CMS Muon High-Level Trigger (HLT) group
Jan 2010–Dec 2013	Responsible for muon tracking and triggering using the CMS muon spectrometer alone (“standalone muons”)
Dec 2009–Dec 2010	Responsible for the operation of the Front-End Drivers (FEDs) of the CMS Drift Tubes (DT) detector

Grants and funding

Jan 2024–Dec 2026	Project “Virtual Histology (Vi.Hi)”, funded by INFN-CSN5 (“CSN5 Call”). Member of the research team
Sep 2023–Feb 2026	Project “Phase-contrast x-ray Imaging setup with a Talbot interferometer and a liquid anode source for Cultural Heritage applications (PITCH)”, funded by the Italian Ministry of University and Research (MUR), under the PRIN 2022 program (20225MM7KA). Deputy Principal Investigator, coordinator of the INFN research unit, and responsible for the work package in charge of the system design, construction, and commissioning

Awards and titles

Oct 2018	Habilitation as University Associate Professor in Experimental Physics of Fundamental Interactions (ASN, 02/A1 – FIS/01) by the Italian Ministry of University and Research (MUR)
Dec 2013	CMS Achievement Award, assigned by the CMS Collaboration at CERN

Institutional roles

May 2025–present	Member of the Scholarship Committee of INFN, Torino Division
Nov 2024–present	Member of the PhD Board of the Department of Physics, University of Torino, as INFN representative
May 2023–May 2025	Substitute member of the Research Fellowship and Scholarship Committee of INFN, Torino Division

Dissemination, outreach and social impact

Mar 2025	Co-organizer of the International Masterclass on CMS at the Department of Physics of the University of Torino (part of the IPPOG IMC Project): seminars and hands-on activities with highschool students, focused on experimental particle physics research. Torino, Italy
Dec 2024	“RadioLab” project: seminars and outreach activities with highschool students on radioactivity and radioprotection. IIS Corrado Gex, Aosta, Italy
May 2023–present	Outreach activities on INFN research topics at the Torino “International Book Fair” (“ <i>Salone Internazionale del Libro</i> ”), held every May in Torino, Italy
Jul 2019	Co-coordinator of the outreach program of the EPS–HEP 2019 Conference, Ghent, Belgium.

Seminars and lectures

14 Feb 2019	“Heavy Neutral Lepton searches at CMS”, invited seminar at Université Catholique de Louvain, Belgium
11 Jan 2017	“Dark matter and invisible Higgs searches in dilepton + MET channels at CMS”, invited seminar at Ghent University, Ghent, Belgium
4 Dec 2014	“Searches for dark matter at the LHC in mono-Z channels and in Higgs-portal models”, invited seminar at the <i>Brown Astrophysics Seminar Series</i> , Brown University, Providence, United States

Selected conference presentations

- 22 Oct 2024 “Searches in the long-lived particle and dark sectors”, plenary talk at the conference *Blois2024: 35th Rencontres de Blois on Particle Physics and Cosmology (Blois2022)*, Blois, France
- 7 Sep 2022 “Search for long-lived particles at ATLAS and CMS”, plenary talk at the conference *Interplay between Particle and Astroparticle physics (IPA2022)*, Vienna, Austria
- 8 Aug 2019 “Heavy Neutral Lepton searches at CMS and ATLAS”, invited plenary talk at the conference *15th Rencontres du Vietnam on 3 Neutrinos and Beyond*, Quy Nhon, Vietnam
- 9 Mar 2017 “Electroweak and QCD Physics at CMS”, plenary talk at the conference *La Thuile 2017*, 5–11 Mar 2017, La Thuile, Italy
- 9 Jan 2016 “Dark Matter Searches at CMS”, talk at the *6th International Workshop on High Energy Physics in the LHC Era (HEP 2016)*, 6–12 Jan 2016, Valparaíso, Chile
- 4 Jul 2014 “Searches for Invisible Decay Modes of the Higgs Boson with the CMS Detector”, talk at the *37th International Conference on High Energy Physics (ICHEP 2014)*, 2–9 Jul 2014, Valencia, Spain
- 17 Oct 2013 “The CMS High Level Trigger”, talk at the *20th International Conference on Computing in High Energy and Nuclear Physics (CHEP 2013)*, 14–18 Oct 2013, Amsterdam, The Netherlands
- 23 Apr 2013 “Production of Multiple Electroweak Bosons at CMS”, talk at the *XXI International Workshop on Deep-Inelastic Scattering and Related Subjects (DIS 2013)*, 22–26 Apr 2013, Marseilles, France
- 9 Aug 2011 “A Search For The Higgs Boson In $H \rightarrow ZZ \rightarrow 2\ell 2\nu$ Mode”, talk at the *2011 Meeting of the Division of Particles and Fields of the American Physical Society (APS-DPF 2011)*, 9–13 Aug 2011, Providence, United States
- 10 Mar 2010 “Strategy for an early observation of the $ZZ^{(*)}$ di-boson production in four-lepton final states”, plenary talk at the *XLV Rencontres de Moriond on Electroweak Interactions and Unified Theories (Moriond EW 2010)*, 6–13 Mar 2010, La Thuile, Italy
- 29 Sep 2008 “Search for the SM Higgs Boson in $H \rightarrow ZZ^{(*)}$ in 4 leptons at CMS”, talk at the *4th Conference on Physics at LHC (PLHC 2008)*, 29 Sep–4 Oct 2008, Split, Croatia

Professional training activities

- Sep 2023–present Organization of periodic training tutorials for CMS HLT experts and on-call shifters, CERN, Geneva, Switzerland
- Sep 2017 Instructor at the CMS Physics Object School, University of Bari, Italy

Teaching and mentoring experience

Nov 2024–present	Advisor of a postdoctoral researcher in the development of a phase-contrast X-ray interferometer in the context of the PITCH project
Feb 2023–Apr 2024	Advisor of a postdoctoral researcher in the construction of the CMS timing detector for the HL-LHC upgrade
2011–present	Supervision of former students of Northeastern University, Ghent University, and Torino University (co-supervisor of 8 PhD candidates and 3 Master’s Degree candidates); training of young reserchers in the CMS experiment in their physics analysis, software development, and detector work (muon and silicon detectors, muon reconstruction and trigger, data analysis)
2017–2019	Teaching assistant for the course “Subatomic Physics II” for the Master’s Degree in Physics at Ghent University, Department of Physics and Astronomy
2005–2006	Teaching assistant for the course “Laboratory of Electromagnetism, Optics, and Modern Physics” for the Bachelor’s Degree (<i>Laurea Triennale</i>) in Physics at the University of Torino, Department of Physics

Summary of publications (as of 11 June 2025)

I co-authored more than 1200 papers published on international peer-reviewed journals (courtesy of SCOPUS, www.scopus.com, and WEB OF SCIENCE, www.webofscience.com):

- citations: 61 356 (72 560 including self-citations)
- *h*-index: 123 (including self-citations)

A complete list of my publications can also be found at (courtesy of INSPIRE HEP):

<http://inspirehep.net/search?p=exactauthor%3AD.Trocino.1+collection%3APublished>

Selected publications

- [1] A. Hayrapetyan *et al.* [CMS Collaboration], “Search for long-lived heavy neutral leptons in proton-proton collision events with a lepton-jet pair associated with a secondary vertex at $\sqrt{s} = 13$ TeV,” *JHEP* **02** (2025), 036
[doi:10.1007/JHEP02\(2025\)036](https://doi.org/10.1007/JHEP02(2025)036), [arXiv:2407.10717](https://arxiv.org/abs/2407.10717) [hep-ex]
- [2] A. Tumasyan *et al.* [CMS Collaboration], “Search for long-lived heavy neutral leptons with displaced vertices in proton-proton collisions at $\sqrt{s} = 13$ TeV,” *JHEP* **07** (2022), 081
[doi:10.1007/JHEP07\(2022\)081](https://doi.org/10.1007/JHEP07(2022)081), [arXiv:2201.05578](https://arxiv.org/abs/2201.05578) [hep-ex]
- [3] A. M. Sirunyan *et al.* [CMS Collaboration], “Performance of the reconstruction and identification of high-momentum muons in proton-proton collisions at $\sqrt{s} = 13$ TeV,” *JINST* **15** (2020) no.02, P02027
[doi:10.1088/1748-0221/15/02/P02027](https://doi.org/10.1088/1748-0221/15/02/P02027), [arXiv:1912.03516](https://arxiv.org/abs/1912.03516) [physics.ins-det]
- [4] A. M. Sirunyan *et al.* [CMS Collaboration], “Search for new physics in events with a leptonically decaying Z boson and a large transverse momentum imbalance in proton-proton collisions at $\sqrt{s} = 13$ TeV,” *Eur. Phys. J. C* **78**, no. 4, 291 (2018)
[doi:10.1140/epjc/s10052-018-5740-1](https://doi.org/10.1140/epjc/s10052-018-5740-1), [arXiv:1711.00431](https://arxiv.org/abs/1711.00431) [hep-ex]
- [5] A. M. Sirunyan *et al.* [CMS Collaboration], “Search for dark matter and unparticles in events with a Z boson and missing transverse momentum in proton-proton collisions at $\sqrt{s} = 13$ TeV,” *JHEP* **1703**, 061 (2017), Erratum: [*JHEP* **1709**, 106 (2017); *JHEP* **1801**, 056 (2018)]
[doi:10.1007/JHEP03\(2017\)061](https://doi.org/10.1007/JHEP03(2017)061), [10.1007/JHEP09\(2017\)106](https://doi.org/10.1007/JHEP09(2017)106), [10.1007/JHEP01\(2018\)056](https://doi.org/10.1007/JHEP01(2018)056)
[arXiv:1701.02042](https://arxiv.org/abs/1701.02042) [hep-ex]
- [6] V. Khachatryan *et al.* [CMS Collaboration], “Searches for invisible decays of the Higgs boson in pp collisions at $\sqrt{s} = 7, 8$, and 13 TeV,” *JHEP* **1702**, 135 (2017)
[doi:10.1007/JHEP02\(2017\)135](https://doi.org/10.1007/JHEP02(2017)135), [arXiv:1610.09218](https://arxiv.org/abs/1610.09218) [hep-ex]
- [7] V. Khachatryan *et al.* [CMS Collaboration], “Measurements of the ZZ production cross sections in the $2\ell 2\nu$ channel in proton-proton collisions at $\sqrt{s} = 7$ and 8 TeV and combined constraints on triple gauge couplings,” *Eur. Phys. J. C* **75**, no. 10, 511 (2015)
[doi:10.1140/epjc/s10052-015-3706-0](https://doi.org/10.1140/epjc/s10052-015-3706-0), [arXiv:1503.05467](https://arxiv.org/abs/1503.05467) [hep-ex]
- [8] S. Chatrchyan *et al.* [CMS Collaboration], “Performance of CMS muon reconstruction in pp collision events at $\sqrt{s} = 7$ TeV,” *JINST* **7**, P10002 (2012)
[doi:10.1088/1748-0221/7/10/P10002](https://doi.org/10.1088/1748-0221/7/10/P10002), [arXiv:1206.4071](https://arxiv.org/abs/1206.4071) [physics.ins-det]
- [9] S. Chatrchyan *et al.* [CMS Collaboration], “Search for the standard model Higgs boson in the decay channel $H \rightarrow ZZ \rightarrow 4l$ in pp collisions at $\sqrt{s} = 7$ TeV,” *Phys. Rev. Lett.* **108** (2012) 111804. [doi:10.1103/PhysRevLett.108.111804](https://doi.org/10.1103/PhysRevLett.108.111804), [arXiv:1202.1997](https://arxiv.org/abs/1202.1997) [hep-ex]

PERSONAL INFORMATION

Raffaella Bonino

POSITION Associate Professor in Experimental Physics
Physics Department, University of Torino (UniTo)

WORK EXPERIENCE

30/04/2014 – 29/04/2017 **Fixed-term Researcher in Experimental Physics (RTD-B)**
Physics Department, UniTo

01/02/2014 – 29/04/2014 **Fixed-term Researcher in Astroparticle Physics**
Istituto Nazionale di Fisica Nucleare (INFN), Section of Turin

01/12/2011 – 31/01/2014 **Postdoctoral Fellowship**
Physics Department, UniTo

01/12/2007 – 30/11/2011 **Postdoctoral Fellowship**
Istituto Nazionale di Astrofisica (INAF)

EDUCATION

2004 – 2007 **PhD in Physics**
Physics Department, UniTo
▪ Thesis: "Study of the Ultra High Energy Cosmic Rays Arrival Directions"

2002 – 2004 **Master Degree in Astrophysics and Cosmic Rays Physics**
Physics Department, UniTo
▪ *Honors Graduate: Cum Laude - 110/110*
▪ Italian Physics Society (SIF) award for the best Master Thesis of the year

GRANTS

28/09/2023 – present PI of the project "SKYNET: Deep Learning for Astroparticle Physics", selected in the call "PRIN2022", funded by the European Union - Next Generation EU, MUR (budget: 252 961 €)

30/06/2021 – 31/12/2022 PI of the project: "X-ray Calibration Facility", selected in the call "Bando Ateneo / Compagnia San Paolo small / medium-size equipment 2020" (budget = 172 000 €)

2017 – 2020 PI of the project: "New techniques for the detection of space debris", selected with top score in the call "Progetto d'Ateneo / Compagnia San Paolo" (budget = 75 000 €)

2016 – 2021 Local PI of the project "Progetto Nazionale Lauree Scientifiche - Fisica" (budget = 100 000 €)

01/01/2015 – 31/12/2015 Responsible of the Dept. funds for the Experimental Astroparticle Physics group (budget = 10 000 €)

INSTITUTIONAL RESPONSIBILITIES

2025 – present Chair of the Orientation Committee of the School of Natural Sciences

2016 – present Local coordinator of the National Scientific Degrees Project (PLS)

2019 – present Member of the Scientific Committee of Centro Interdipartimentale per la Ricerca Didattica e l'Aggiornamento (CIRDA)

2018 – 2024 Member of the Research Committee, Physics Department, UniTo

2019 – 2025 Chair of the Orientation Committee, Physics Department, UniTo

2019 – 2020 Member of the Scientific Committee of the 2nd level Master in Mathematical and Physical Methods (MPM) for Space Sciences, UniTo

- 2017 – 2020 Member of the Board of Directors of Centro Interateneo di Interesse Regionale per la Formazione degli Insegnanti Secondari (CIFIS)
- 2016 – 2018 Member of the INFN Outreach Committee for the Astroparticle group

TEACHING ACTIVITY

- 2019 – present Professor of “*Detector and space equipment*”, 2nd level Master MPM for Space Sciences, UniTo
- 2015 – present Professor of “*Physics I Lab*”, Bachelor Degree in Physics, UniTo
- 2015 – present Professor of “*Physics II with lab*”, Bachelor Degree in Science and Technology of Materials, UniTo

RESEARCH ACTIVITY

Since the beginning of her scientific activity, Raffaella Bonino has worked in the field of **experimental Astroparticle Physics**, achieving an excellent expertise in data processing of both ground-based and space-based astroparticle experiments. Her publication records include **242 peer-reviewed articles** on high ranked scientific journals, with a **h-index of 69** and **25 786 citations** (Scopus – May 2025).

RB is / has been member of some of the major international astroparticle collaborations, as detailed below, thus strengthening her international network.

She has been member of the Pierre Auger Collaboration, as a PhD student before and as a post-doc fellow later. The Pierre Auger Observatory (PAO) is an experiment devoted to the study of **ultra-high energy cosmic rays**, i.e. with energies above 10^{18} eV. She has been the coordinator of the “Arrival directions and anisotropies” scientific group; a very active group, that has produced the most high-ranking publications of the collaboration.

Since 2014 she’s working for the NASA space mission Fermi-LAT, in the field of **high-energy gamma ray astrophysics**. Her activity is focused on the application of **Machine Learning Techniques to the selection of cosmic electron candidates** and to the computation of their energy spectrum. She’s been the coordinator of the Fermi “Cosmic Rays” and “Calibration and Analysis” scientific groups.

In 2017 she has also started to work on IXPE (Imaging X-Ray Polarimetry Explorer), a NASA space mission for **imaging and polarimetry measurements of x-ray photons**, launched in December 2021 and currently acquiring data.

In 2021 RB received a grant to set up a facility for the calibration of an X-ray polarimeter for the future space mission eXTP (to be launched in 2027). She is also contributing to the **optimization of the reconstruction algorithm** of the detected photoelectrons tracks, that is based on **Machine Learning techniques**.

RB has recently approached the study of **Space Debris** (SD), being the PI of a project selected with top score in the call “Progetto d’Ateneo/Compagnia San Paolo”. She’s thus set up a research team, by hiring 2 post-doc fellows and several grad students, to perform the **feasibility study of SD detection and tracking from the space**. Thanks to this project she has developed her capabilities in being a group leader, able to manage research grants and human resources. In the same context she’s collaborating with some private companies (e.g. Thales Alenia Space). As coordinator of scientific groups, she’s developed her capabilities in organising people and their activities, chairing meetings and ensuring rules and deadlines compliance. She’s also been PI of several scientific and educational projects, that further consolidated her skills in the management of economic resources and contracts.

According to law 679/2016 of the Regulation of the European Parliament of 27th April 2016, I hereby express my consent to process and use my data provided in this CV

Prof. Carlo Giovanni Maccaferri

Dipartimento di Fisica

Università degli Studi di Torino,

Via Pietro Giuria 1, Torino

CURRICULUM VITAE ACCADEMICO

Ottobre 2024.

— LINGUE : Italiano (nativo), Inglese (fluente), Francese (buono)

Posizione attuale

Dal 1/09/2017, Professore Associato di Fisica Teorica, Dipartimento di Fisica dell'Università degli studi di Torino.

Abilitazione Scientifica Nazionale per Professore di Prima Fascia Settore Concorsuale 02/A2

Posizioni Precedenti

- 7/06/2012— 31/08/2017 , Ricercatore (230/05) *Programma Rita Levi Montalcini* (Rientro dei Cervelli) al Dipartimento di Fisica dell'Università degli studi di Torino
- 1/11/2010— 6/06/2012 post-doc presso Institute of Physics of the Academy of Science of Czech Republic
- 1/09/2007 —31/10/2010, ULB+INFN post-doc presso ULB, Brussels, Service de Physique Théorique et Mathématique
- 1/09/2006 — 31/08/2007, Marie-Curie RTN post-doc presso VUB, Brussels, Theoretical Physics Department
- 1/11/2005 — 31/08/2006, post-doc presso ULB, Brussels, Service de Physique Mathématique des Interactions Fondamentales

Studi Post-Universitari

- 2001–2005 : PhD (Dottorato) presso SISSA/ISAS, Trieste, Elementary Particles sector,
Relatore : Prof. Lorianò Bonora

- PhD discusso il 4/10/2005, con Tesi dal titolo : “*D-branes, Rolling Tachyons and Vacuum String Field Theory*”

Studi Universitari

- Laurea in Fisica conseguita il 26/01/2001 Presso Università di Torino
110/110 cum Laude
- Tesi di Laurea “*Massive Type IIA Supergravity : Geometrical Construction*”,
Relatore : Prof. Riccardo D’Auria

Settore ERC di competenza

PE-2 Particles and Fields, Fisica Teorica delle Interazioni Fondamentali, Teoria delle Stringhe.

Seminari su invito a Conferenze

1. *Matrix Models and String Field Theory* , Benasque, Spain, May 2024 “**Integrating out in string field theory**”
2. *Matrix Models and String Field Theory* , Benasque, Spain, May 2023 “**Overview on classical solutions in string field theory**”
3. *Alessandro D’Adda Memorial Day*, Torino, Italy, 11 November 2022 “**From dual amplitudes to string field theory... and back**”
4. *String Field Theory 2022* , Prague, Czechia , September 2022 “**The classical cosmological constant of open-closed string field theory**”
5. *SFT@Cloud* , On-line event , September 2021 “**Closed string deformations in open string field theory**”
6. *Workshop on Fundamental Aspects of String Theory* , Sao Paolo, Brazil, June 2020 “**Classical solutions and background independence in OSFT**”
7. *Discussion Meeting on String Field Theory and String Phenomenology*, HRI, Allahabad, February 2018 “**Localization of effective actions in open superstring field theory**”
8. *SFT@HIT*, Holon, Tel Aviv, June 2017 “**Yang-Mills Potential from moduli space boundary**”,
9. *String Field Theory and Related aspects*, Sao Paolo, June 2016, “**D-branes moduli and Open String Field Theory**”

10. *Theories of Fundamental Interactions 2015*, Naples, November 2015, **“Defects in open string field theory”**
11. *Physics on the Riviera 2015*, Sestri Levante, September 2015 **“D-branes in open string field theory : classical solutions and topological defects”**
12. *String Field Theory and Related aspects*, Sichuan University, Chengdu, May 2015, **“Tachyon Vacuum on a separated brane-antibrane system”**
13. *The String Theory Universe*, Mainz, september 2014 **“String Field Theory Solution for Any Open String Background”**
14. *String Field Theory and Related aspects*, SISSA, Trieste July 2014, **“String Field Theory Solution for Generic Background Shifts”**
15. *IX Avogadro Meeting*, SISSA, Trieste, Italy, December 2013 **“Recent trends in string field theory”**
16. *Symmetry of the Universe and of the Fundamental Interactions*, Scuola Normale Superiore, 16-17 May 2013 **“ Charting the OSFT Landscape : Boundary State from Classical Solutions”**
17. *Vth International conference on String Field Theory and Related aspects*, Jerusalem, Israel, October 2012, **“ Boundary State from Ellwood Invariants”**
18. *XVIII European Workshop on String Theory*, Corfú, Greece, September 2012, **“ Boundary State from Open String Field Theory Invariants”**
19. *IVth International conference on String Field Theory and Related aspects*, Prague, Czech Republic, September 2011, **“ On Lumps from RG flows”**
20. *IIIrd International conference on String Field Theory and Related aspects*, Kyoto, Japan, October 2010, **“ A solution for relevant deformations in Open String Field Theory”**
21. *Problemi Attuali di Fisica Teorica*, Vietri, Italy, April 2010 **“ On lower dimensional D–branes in Open String Field Theory”**
22. *Current Trends in String Field Theory*, Pohang, South Korea, December 2009, **“The ghost sector in SFT : analysis and applications”**
23. *IInd International conference on String Field Theory and Related aspects*, Moscow, Russia, April 2009, **“On the ghost sector of Open String Field Theory”**
24. *IV Avogadro Meeting*, SISSA, Trieste, Italy, December 2008, **“Membranes Dynamics”**

25. *IIIrd RTN Workshop on Constituents, Fundamental Forces and Symmetries of the Universe*, Valencia, Spain, October 2007,
“New Vortices in Non-commutative Gauge Theory”
26. *Problemi Attuali di Fisica Teorica*, Vietri, Italy, April 2004
“D–Brane spectrum from Vacuum String Field Theory”
27. *Incontro del Gruppo IV, INFN*, Perugia, Italy, December 2003, and
Zagreb University, Croatia, February 2004
“Dressed Sliver Solutions in Vacuum String Field Theory”
28. *Convegno di Fisica Teorica*, Cortona, Italy, May 2003
“Properties of the Ghost product in Open String Field Theory”
29. *Problemi Attuali di Fisica Teorica*, Vietri, Italy, April 2003
“On Star Product in Open String Field Theory”

Lezioni su Invito

- Lectures on Superstring Theory at LACES 2020, Galileo Galilei Institute, Firenze, Italy 30/11-18/12/2020
- Lectures at International school on String Field Theory and Higher Spin Theory, Chengdu, 4-8/5/2015
- Lectures at International school on String Field Theory and Higher Spin Theory, Trieste, 21-26/7/2014
- *1st and 2nd Joint Paris–Bruxelles–Amsterdam PHD program*, Brussels, Belgium, October–November 2006 and October 2007
 - Topics in Superstring Theory
 - Introduction to String Field Theory
- *2nd Modave Summer School in Mathematical Physics*, Modave, Belgium, August 2006
 - Basics of Open String Field Theory

Seminari su invito presso Istituti

1. MIT Theory seminars, Cambridge, Boston, USA, November 2023 **“Open-closed duality in String Field Theory”**
2. INFN String webinars, February 2022 **“Integrating out in string field theory”**
3. Theory seminars, ETH Zurich, November 2021 **“Background Independence of open string field theory”**

4. Theory seminars, Pisa University, February 2016 “**D-branes moduli in open string field theory**’
5. Joint Seminars ULB-VUB-KUL-UMONS, Bruxelles March 2015 and String Theory Seminars at IFT, Lisbon “ **Open String Field Theory and D-Branes**”
6. *Rencontres Theoriciennes*, Ecole Normale, String Theory in Greater Paris, September 2014 “**String Field Theory Solution for Any Open String Background**”
7. *Torino University*, Italy, October 2011 “ **Relevant Deformations in Open String Field Theory**”
8. *ULB and Leuven, Bruxelles*, Belgium, March 2005,
“**Bubbling AdS and Vacuum String Field Theory : a correspondence**”
9. *ULB and Leuven, Bruxelles*, Belgium, June 2005,
“**Background Independence in VSFT : Chan Paton’s and Higgsing**”
10. *ULB and Leuven, Bruxelles*, Belgium, October 2004, and
Von Humboldt University, Berlin, Germany, November 2004
“**D–Branes and their decay in Vacuum String Field Theory** ”

Organizzazione

- Membro International Advisory Committee conferenza internazionale “String Field Theory 2022”, Praga, Repubblica Ceca, Settembre 2022
- Membro International Advisory Board conferenza internazionale “SFT@Cloud”, Evento On-line, Settembre 2021
- Organizzatore della conferenza internazionale “Workshop on Fundamental Aspects of String Theory”, ICTP-SAIFR Sao Paolo, Brasile, Giugno 2020
- Organizzatore Principale della conferenza internazionale “String Field Theory and String Perturbation Theory” . GGI Firenze, Maggio 2019.
- Organizzatore Principale del long-term workshop di 7 settimane “String Theory from a worldsheet perspective”, GGI Firenze, Primavera 2019.
- Organizzatore scuola di dottorato LACES, GGI Firenze 2018-2019-2020-2021-2022-2023. Trattasi di una delle scuole più riconosciute a livello mondiale nel settore.
- Organizzazione della conferenza internazionale “New Frontier in Theoretical Physics”, Cortona, 2018

- Organizzazione della conferenza internazionale “String Field Theory and Related Aspects”, SISSA, Trieste, Luglio 2014
- Organizzazione di Avogadro Meeting on Strings, Supergravity and Gauge Theories, negli anni 2009 (SISSA) e 2010-2011 (GGI, Florence)
- Organizzazione dei seminari per il gruppo di stringhe dell’Università di Torino (2012-2017)
- Organizzazione dei Theory Colloquia del Dipartimento di Fisica dell’Università di Torino (2015-2017)

Riconoscimenti

- Vincitore di un Grant Rita Levi Montalcini (2009)
- Selezionato per le audizioni finali del FIRB 2013, come Principal Investigator
- Revisore per Grant Proposals GACR, Czech Science Foundation (2021)
- Revisore per Grant Proposals “Rita Levi Montalcini” (2017)
- Revisore per Grant Proposals “Rita Levi Montalcini” (2018)
- Revisore per Grant Proposals of Croatian Science Foundation (HRZZ) 2013
- Revisore per Grant Proposals of Croatian Science Foundation (HRZZ) 2014
- Richiesta di revisione per Grant Proposal FIR 2014, Italian Ministry of Research (declinato)
- Revisore per Grant Proposal, Israel Science Foundation (ISF), 2017
- Referee per JHEP, NPB, PRD, EPJ-C, Symmetry, Theor.Math.Phys., IJMPA e altre riviste

Partecipazione in progetti nazionali ed internazionali

- Coordinatore locale iniziativa specifica INFN String Theory and Fundamental Interactions, STEFI a partire dal 2024.
- Principal Investigator “Programma per Giovani ricercatori Rita Levi Montalcini”, 2012
- Partecipante al PRIN 2020KR4KN2 “String Theory as a Bridge between gauge theories and quantum gravity.
- Partecipante al PRIN 2015MP2CX4 “Non-perturbative Aspects Of Gauge Theories And Strings”
- Partecipante all’iniziativa specifica” INFN String Theory and Fundamental Interactions, STEFI a partire dal 2015.
- Partecipante al progetto Grant della Compagnia di San Paolo “MAST : Modern Applications of String Theory” TO-Call3-2012-0088

Supervisione di studenti

- Advisor per progetto di PhD (, subject : Integrating out in Open-Closed String Field Theory, cominciato in ottobre 2022, in corso)
 - Advisor per progetto di PhD (, subject : Super String Field Theory, 2016-2019)
- Co-advisor per progetto di PhD (, subject : String Field Theory and D-branes moduli space, 2015-2016)
- Relatore di 10 Tesi Magistrali : 2017, 2019, 2021, 2021, 2022, 2022, A 2022, 2023, 2024, 2024.

Didattica

- Meccanica (AA 2012-2013),
- Metodi Matematici per la Fisica II (AA da 2012-2013 a presente)
- Fisica generale 1 con Laboratorio, presso Scienze dei Materiali, (da AA 2014-2015 a presente)
- Introduzione alla Teoria di Stringa, Laurea Magistrale in Fisica Teorica e Astrofisica (da AA 2019-2020 a presente)

Commissioni

- Presidente di commissione per discussione tesi di dottorato di presso il Dipartimento di Fisica Università di Torino (Luglio 2023),
- Membro commissione per il Trasferimento Tecnologico Dipartimento di Fisica Università di Torino (2021-2023)
- Membro commissione per assegnazione del Premio Molinari, per la miglior tesi magistrale del 2022 in Fisica Teorica,
- Membro di commissione in varie discussioni di tesi magistrali e triennali presso il Dipartimento di Fisica Università di Torino

Pubblicazioni

1. C. Maccaferri, “String Field Theory,” [arXiv :2308.00875 [hep-th]]. Review article submitted after invitation to *Oxford Research Encyclopedia of Physics*
2. C. Maccaferri, A. Ruffino and J. Vošmera, “Open-Closed String Field Theory in the Large N Limit,” [arXiv :2305.02844 [hep-th]]. *Accepted for publication*

in JHEP

3. C. Maccaferri, A. Ruffino and J. Vošmera, “The nilpotent structure of open-closed string field theory,” JHEP **08** (2023), 145 doi :10.1007/JHEP08(2023)145 [arXiv :2305.02843 [hep-th]].
4. C. Maccaferri and J. Vošmera, “The classical cosmological constant of open-closed string field theory,” JHEP **10** (2022), 173 doi :10.1007/JHEP10(2022)173 [arXiv :2208.00410 [hep-th]].
5. C. Maccaferri and J. Vošmera, “Closed string deformations in open string field theory. Part III. $\mathcal{N} = 2$ worldsheet localization,” JHEP **09** (2021), 049 doi :10.1007/JHEP09(2021)049 [arXiv :2103.04921 [hep-th]].
6. C. Maccaferri and J. Vošmera, “Closed string deformations in open string field theory. Part II. Superstring,” JHEP **09** (2021), 048 doi :10.1007/JHEP09(2021)048 [arXiv :2103.04920 [hep-th]].
7. C. Maccaferri and J. Vošmera, “Closed string deformations in open string field theory. Part I. Bosonic string,” JHEP **09** (2021), 047 doi :10.1007/JHEP09(2021)047 [arXiv :2103.04919 [hep-th]].
8. H. Erbin, C. Maccaferri, M. Schnabl and J. Vošmera, “Classical algebraic structures in string theory effective actions,” JHEP **11** (2020), 123 doi :10.1007/JHEP11(2020)123 [arXiv :2006.16270 [hep-th]].
9. H. Erbin, C. Maccaferri and J. Vošmera, “Localization of effective actions in Heterotic String Field Theory,” JHEP **02** (2020), 059 doi :10.1007/JHEP02(2020)059 [arXiv :1912.05463 [hep-th]].
10. T. Erler and C. Maccaferri, “String field theory solution for any open string background. Part II,” JHEP **01** (2020), 021 doi :10.1007/JHEP01(2020)021 [arXiv :1909.11675 [hep-th]].
11. C. Maccaferri and A. Merlano, “Localization of effective actions in open superstring field theory : small Hilbert space,” JHEP **06** (2019), 101 doi :10.1007/JHEP06(2019)101 [arXiv :1905.04958 [hep-th]].
12. T. Erler, C. Maccaferri and R. Noris, “Taming boundary condition changing operator anomalies with the tachyon vacuum,” JHEP **06** (2019), 027 doi :10.1007/JHEP06(2019)027 [arXiv :1901.08038 [hep-th]].
13. C. Maccaferri and A. Merlano, “Localization of effective actions in open superstring field theory,” JHEP **03** (2018), 112 doi :10.1007/JHEP03(2018)112 [arXiv :1801.07607 [hep-th]].

14. P. V. Larocca and C. Maccaferri, “BCFT and OSFT moduli : an exact perturbative comparison,” *Eur. Phys. J. C* **77** (2017) no.11, 806 doi :10.1140/epjc/s10052-017-5379-3 [arXiv :1702.06489 [hep-th]].
15. T. Kojita, C. Maccaferri, T. Masuda and M. Schnabl, “*Topological defects in open string field theory*,” arXiv :1612.01997 [hep-th].
16. P. A. Grassi and C. Maccaferri, “*Chern-Simons Theory on Supermanifolds*,” *JHEP* **1609** (2016) 170 doi :10.1007/JHEP09(2016)170 [arXiv :1606.06609 [hep-th]].
17. M. Kudrna and C. Maccaferri, “*BCFT moduli space in level truncation*,” *JHEP* **1604** (2016) 057 [arXiv :1601.04046 [hep-th]].
18. C. Maccaferri and M. Schnabl, “*Large BCFT moduli in open string field theory*,” *JHEP* **1508** (2015) 149 arXiv :1506.03723 [hep-th].
19. T. Erler and C. Maccaferri, “*String Field Theory Solution for Any Open String Background*,” *JHEP* **1410** (2014) 029 [arXiv :1406.3021 [hep-th]].
20. C. Maccaferri, “*A simple solution for marginal deformations in open string field theory*,” *JHEP* **1405** (2014) 004 [arXiv :1402.3546 [hep-th]].
21. M. Kudrna, C. Maccaferri and M. Schnabl, “*Boundary State from Ellwood Invariants*,” *JHEP* **1307** (2013) 033 [arXiv :1207.4785 [hep-th]].
22. T. Erler and C. Maccaferri, “*The Phantom Term in Open String Field Theory*,” *JHEP* **1206** (2012) 084 [arXiv :1201.5122 [hep-th]].
23. T. Erler and C. Maccaferri, “*Connecting Solutions in Open String Field Theory with Singular Gauge Transformations*,” *JHEP* **1204** (2012) 107 [arXiv :1201.5119 [hep-th]].
24. T. Erler, C. Maccaferri, “*Comments on Lumps from RG flows*,” *JHEP* **1111** (2011) 092 [arXiv :1105.6057 [hep-th]].
25. L. Bonora, C. Maccaferri and D. D. Tolla, “*Relevant Deformations in Open String Field Theory, a Simple Solution for Lumps*” *JHEP* **1111** (2011) 107 [arXiv :1009.4158 [hep-th]].
26. L. Bonora, C. Maccaferri and D. D. Tolla, “*Ghost story. III. Back to ghost number zero*,” *JHEP* **0911** (2009) 086 [arXiv :0908.0056 [hep-th]].
27. L. Bonora, C. Maccaferri, R. J. Scherer Santos and D. D. Tolla, “*Ghost story. II. The midpoint ghost vertex*,” *JHEP* **0911** (2009) 075 [arXiv :0908.0055 [hep-th]].
28. C. Krishnan, C. Maccaferri and H. Singh, “*M2-brane Flows and the Chern-Simons Level*,” *JHEP* **0905** (2009) 114 [arXiv :0902.0290 [hep-th]].

29. C. Krishnan and C. Maccaferri, “*Membranes on Calibrations*,” JHEP **0807** (2008) 005 [arXiv :0805.3125 [hep-th]].
30. L. Bonora, C. Maccaferri, R. J. Scherer Santos and D. D. Tolla, “*Ghost story. I. Wedge states in the oscillator formalism*,” JHEP **0709**(2007)061 arXiv :0706.1025 [hep-th].
31. N. Bouatta, J. Evslin and C. Maccaferri, “*Puffed Noncommutative Nonabelian Vortices*,” JHEP **0704** (2007) 037 [arXiv :hep-th/0702042].
32. L. Bonora, N. Bouatta and C. Maccaferri, “*Towards open-closed string duality : Closed strings as open string fields*,” arXiv :hep-th/0609182.
33. L. Bonora, C. Maccaferri, R. J. Scherer Santos and D. D. Tolla, “*Bubbling AdS and vacuum string field theory*,” Nucl. Phys. B **749** (2006) 338 arXiv :hep-th/0602015.
34. C. Maccaferri, “*Chan-Paton factors and higgsing from vacuum string field theory*,” JHEP **0509** (2005) 022 [arXiv :hep-th/0506213].
35. L. Bonora, C. Maccaferri, R. J. Scherer Santos and D. D. Tolla, “*Fundamental strings in SFT*”, Phys. Lett. B **619** (2005) 359 arXiv :hep-th/0501111.
36. C. Maccaferri, R. J. Scherer Santos and D. D. Tolla, “*Time-localized projectors in string field theory with E-field*”, Phys. Rev. D **71** (2005) 066007 arXiv :hep-th/0501011.
37. L. Bonora, C. Maccaferri, R. J. Santos, D. D. Tolla, “*Exact time-localized solutions in Vacuum String Field Theory*”, Nucl. Phys. B **715** (2005) 413 arXiv :hep-th/0409063.
38. L. Bonora, C. Maccaferri and P. Prester, “*The perturbative spectrum of the dressed sliver*”, Phys. Rev. D **71** (2005) 026003, arXiv :hep-th/0404154.
39. L. Bonora, C. Maccaferri and P. Prester, “*Dressed sliver solutions in vacuum string field theory*”, JHEP **0401** (2004) 038, arXiv :hep-th/0311198.
40. C. Maccaferri and D. Mamone, “*Star democracy in open string field theory*”, JHEP **0309** (2003) 049, arXiv :hep-th/0306252.
41. L. Bonora, C. Maccaferri, D. Mamone and M. Salizzoni, “*Topics in string field theory*”, arXiv :hep-th/0304270.
42. F. Bazzocchi, M. Cirafici, C. Maccaferri and S. Profumo, “*Matrix models of noncommutative (2d+1) lattice gauge theories*”, Int. J. Mod. Phys. A **19** (2004) 4287, arXiv :hep-th/0211060

Atti di convegno

1. C. Maccaferri, “*Boundary state from open string field theory invariants*,” PoS Corfu **2012** (2013) 100.
2. C. Maccaferri, “*A solution for relevant deformations in open string field theory*,” Prog. Theor. Phys. Suppl. **188** (2011) 83-93.
3. C. Krishnan and C. Maccaferri, “*Membranes, Strings and Integrability*,” Fortsch. Phys. **57** (2009) 632 [arXiv :0810.3825 [hep-th]].
4. C. Maccaferri, “*Basics of Open String Field Theory*”, Proceedings of the Second Modave Summer School in Mathematical Physics, International Solvay Institutes
5. L. Bonora, C. Maccaferri and P. Prester, “*The dressed sliver in VSFT*”, Proceedings of the 9th Adriatic Meeting, “Particle Physics and the Universe” Springer-Verlag, eds : J. Trampetic, J. Wess.
6. L. Bonora and C. Maccaferri, “*On star products in open string field theory*,” In *Kovras, O. (ed.) : Frontiers in field theory* 155-182

PERSONAL DETAILS

Family name, First name: **Piccolo, Federico**

Born at

Nationality:

Web site: http://www.solid.unito.it/RICERCATORI/index_ricercatori.html

• **Education**

20 January 2012 – **PhD in Materials and Nanosystems Science and Technology**

School of Doctorate in Science and High Technology, Physics Department, University of Torino, Italy

2008 – **Master Degree in Materials Science**

Physics Department, University of Torino, Italy

Final mark 110/110 cum laude

2006 – **Bachelor's Degree in Materials Science**

Chemistry Department, University of Torino, Italy

Final mark 110/110 cum laude

• **Current position**

2024 – today - **Associate Professor**

Physics Department, University of Torino, Italy

competition sector "02 / B1-Experimental Physics of Matter" (02/B1), scientific-didactic sector
disciplinary area of Condensed Matter Physics" (FIS/03)

2022 – National **scientific qualification as full professor**

competition sector "02 / D1-Applied Physics, Didactic and History of Physics"

2022 – National **scientific qualification as full professor**

competition sector "02 / B1-Experimental Physics of Matter"

• **Previous positions**

2017 – 2024 Fix Term Researcher (RTDA and RTDB)

Physics Department of the University of Torino, Italy

2016 – 2017 Research Fellow

Physics Department of the University of Torino, Italy

2014 – 2015 Research fellowship (supported by a Grant won by Federico Piccolo)

Turin Section of the Nation Institute of Nuclear Physics, Italy

2012 – 2013 Research Fellow

Physics Department of the University of Torino, Italy

Research activity

FP research activities are carried out at the Department of Physics of the University of Turin and the INFN section of Turin, with which he has been associated since 2009. He works within the Solid State Physics group, primarily focusing on applied physics for the **development of innovative devices for biosensing applications**.

Specifically, he oversees a research line focused on the development and application of biosensors using **artificial diamonds** for the study of neuronal networks for investigating degenerative diseases and assessing the effects of **ionizing radiation on single-cell secretory activity**. The highly **innovative** aspect of this last work lies in the novel approach to conducting **radiobiological experiments**, which focus on **measuring changes in cellular activity simultaneously with ionizing radiation exposure**.

Within the context of radiobiology, he is **studying the use of nanodiamonds both as radiosensitizers** for applications in radiotherapy and as **quantum sensors for detecting temperature and ROS variations in cellular systems**.

1. "A new diamond biosensor with integrated graphitic microchannels for detecting quantal exocytic events from chromaffin cells", F. Picollo, et al., **Advanced Material**, 25 (2013) 4696
2. "Effects of high-power laser irradiation on sub-superficial graphitic layers in single-crystal diamond", F. Picollo, et al, *Acta Materialia*, 103 (2016) 665
3. "Microelectrode arrays of diamond-insulated graphitic channels for real-time detection of exocytotic events from cultured chromaffin cells and slices of adrenal glands", F. Picollo, et al, **Analytical Chemistry** 88 (2016) 7493
4. "Micro graphite-patterned diamond sensors: Towards the simultaneous in vitro detection of molecular release and action potentials generation from excitable cells", G. Tomagra, ..., F. Picollo, **Carbon** 152 (2019) 424
5. "Triggering Neurotransmitters Secretion from Single Cells by X-ray Nanobeam Irradiation", F. Picollo et al, **Nano Letters** 20, 5 (2020) 3889
6. "Nanodiamond–Quantum Sensors Reveal Temperature Variation Associated to Hippocampal Neurons Firing" G. Petrini, ..., F. Picollo, et al, **Advanced Science**, 9(28) (2022) 2202014
7. "A comprehensive study of the effect of thermally induced surface terminations on nanodiamonds electrical properties" S. Sturari, ... F. Picollo, *Surfaces and Interfaces* 38 (2023) 102831
8. "Diamond-based sensors for in vitro cellular radiobiology: Simultaneous detection of cell exocytic activity and ionizing radiation" G. Tomagra, ..., F. Picollo, **Biosensors and Bioelectronics**, 220 (2023) 114876
9. "Creation, Control, and Modeling of NV Centers in Nanodiamonds" P. Aprà, ..., F. Picollo, **Advanced Functional Materials**, 34(39), (2024) 2404831
10. **APE - Amperometric PEak analysis**. A **freeware analysis code** written in MATLAB allows a fast and automated analysis of amperometric peak parameters from different chronoamperograms – http://www.solid.unito.it/Software/Software_index.html

International recognitions

2017 **Travel grant** for attending the "Microbeam Training Course at RARAF 2017", Nevis Laboratory of **Columbia University**.

National recognitions

2014-2015 **Grant for young researchers**, Turin Section of the Nation Institute of Nuclear Physics, Italy. First-ranked among participants at the national level.

Technology transfer

2019 BraYn **Startup Award**, for "Innovative diamond sensors" funded by 2I3T enterprise incubator on University of Torino

Outreach and communication

2012 **first best oral presentation**, XCVIII SIF Congress, Napoli, Italy,

2019 **Finalist** for the GiovedìScienza **National Science Communication Award**

Institutional responsibilities:

From 2024 member of the **board** of **Chemistry and Material Science Doctoral School**, University of Torino

From 2021 member of **Management board** of NIS **Interdepartmental Center**

From 2020 member of the **Orientation committee of the Physics degree**, University of Turin

2020 - 2023 member of the **"Giunta" of the Physics Department**, University of Turin

2020 - 2024 member of **board** of **T4C Doctoral School**

Editorial activities:

2023 associate **editor** *Frontiers in Carbon* (frontiers)

2023 **guest editor** of the Special Issue **"Diamond Technology for Biosensing and Quantum Sensing"**

From 2021 **topics board - Biosensors** (MDPI)

From 2020 scientific **editorial panel - EC Neurology** (ECNE)

International membership and commissions

2023 – ongoing: International Agency for Atomic Energy (**IAEA**) ("Sub-cellular imaging and irradiation using accelerator-based techniques"), **scientific collaboration n. F11024 – Italian Delegate**

2021: **Referee** for the evaluation of the **project of National Science Centre Poland**

2019: Member of the **European Panel for the evaluation of the CERIC-ERIC Partner Facility**

2013 – 2024: **CERN collaboration** RD42 ("Development of Diamond Tracking Detectors for High Luminosity Experiments at the LHC"):

2011 – 2015: International Agency for Atomic Energy (**IAEA**) ("Modelling and validation of ion beam induced damage in semiconductors"), **scientific collaboration n. 17028**

Invited talks

- **CAARI 2010**, Fort Worth, Texas (USA), 8 – 13/08/2010
- **NIS COLLOQUIUM** The interaction between **nano-objects** and neurons: from **biophysics** to **nanomedicine**, Turin, Italy, 30/11/2015
- **Round Table, IFD2015** - INFN Workshop on **Future Detectors**, Turin, Italy, 16 – 18/12/2015
- **BINGO NIS COLLOQUIUM** Recent advances in **biosensor technologies**, Turin, Italy, 22/11/2017
- **106° Congresso Nazionale SIF**, Web conference 14 – 18/09/2020
- **Applied Nuclear Physics conference**, Praga, Czech Republic, 12-17/09/2021
- **AARP - XlabF: Compact Solutions for Future Advanced X-ray Studies**, Frascati, Italy, 22/06/2022
- **2nd Global Summit on Nanotechnology and Materials Science**, Roma, Italy, 13-15/09/2023
- **Hasselt Diamond Conference 2025**, Hasselt, Belgium, 19-21/03/2025

BIBLIOMETRIC INDEXES

publications: 100
h-index (Scopus) 20
citations (Scopus) 1050

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