

# Chiara Oppedisano

## PERSONAL INFORMATION

Date of birth            03/05/1973  
Nationality             Italian  
e-mail                    [chiara.oppedisano@to.infn.it](mailto:chiara.oppedisano@to.infn.it)

## WORK EXPERIENCE AND PRESENT POSITION

2005 – present: Staff researcher at “Istituto Nazionale di Fisica Nucleare (INFN)”  
Permanent position contract upon passing a national competitive exam in 2005.  
(On maternity leave from 6 September 2003 to 6 February 2004)

2004-2005: Teaching professor

Assignment of the tenure for the Applied Physics (FIS/07) course at the “Facoltà di Scienze Politiche” of the “Università degli Studi del Piemonte Orientale Amedeo Avogadro, Corso di Laurea Interfacoltà in Educazione Professionale”.

2003 - 2005: Post-doctoral researcher

Postdoc grant “Assegno di Ricerca” at Physics Department of Torino University.

Research program: “Monte Carlo simulations of heavy ion interactions at LHC energies with object-oriented techniques and distributed computing.” Scientific supervisors: professor E. Chiavassa (University of Torino) and professor M. Masera (University of Torino).  
(On maternity leave from 20 December 2003 to 20 May 2004)

2001 - 2003: Post-doctoral researcher

Postdoc grant “Assegno di Ricerca” at Physics Department of Torino University.

Research program: “Simulations of heavy ion interactions at LHC energies with object-oriented techniques and distributed computing.” Scientific supervisor: Professor M. Masera (University of Torino)

1998: Fixed-term researcher for “Istituto Nazionale di Fisica della Materia (INFN)” at the Physics Department of “Politecnico di Torino”, in collaboration with professor A. Tagliaferro

1991-1993: part-time collaboration with the Italian publisher “Einaudi”, Torino

I worked at the press office, and I was in charge of the daily press review preparation

## PUBLICATIONS

Co-author of more than 530 publications on peer-reviewed international journals.

An updated list of scientific publications can be found at the following link: [INSPIRE](#).

h-index (excluding self-citations): 76

ORCID id: [0000-0001-6194-4601](https://orcid.org/0000-0001-6194-4601)

Scopus id: [6603618381](https://scopus.com/authid/detail.uri?authorId=6603618381)

## EDUCATION AND ACADEMIC TITLES

- 2014: winner of the national selection for the eligibility as Staff Professor at the Italian University, (“*Abilitazione Scientifica Nazionale - Professore Universitario di Seconda Fascia nel Settore Concorsuale 02/A1 Fisica Sperimentale delle Interazioni Fondamentali*”) [[link](#)]
- 2001: Ph.D. in physics, Physics Department of Torino University  
Thesis: “Centrality measurement in the ALICE experiment with the Zero Degree Calorimeters”. Supervisors: professor M. Gallio (Torino University), dr. E. Scomparin (INFN). External referee: dr. A. Morsch (CERN)
- 1997: Physics academic degree with top marks (110/110 cum laude), Physics Department, Torino University.

## SCIENTIFIC ACTIVITY

- 2022 - present: convener of the Physics Working Group (PWG) “Monte Carlo generators and Minimum Bias physics”, appointed by the ALICE Collaboration Board, coordinating about 70 people
- 2019 - 2022: convener of the Physics Analysis Group (PAG) “Underlying Event” of the Physics Working Group “Monte Carlo generators and Minimum Bias physics”, appointed by the ALICE Collaboration Board, coordinating about 40 people
- 2016 - 2020: member of the ALICE Editorial Board, appointed by the ALICE Collaboration Board
- 2009 - 2022: member of the ALICE Computing Board
- 2013 - present: member of two working groups (Simulation Working Package and Reconstruction Working Package) in the framework of the ALICE Online and Offline Computing system upgrade project
- 2009 - 2022: responsible for the ALICE ZDC Detector Calibration & Data Quality Assurance
- 2011 - 2016: convener of the Physics Analysis Group (PAG) “Global Event Observables” (about 50 people) within the Physics Working Group “Light Flavour Spectra”, appointed by the ALICE Collaboration Board
- member of the Paper Committee of 7 papers of the ALICE Collaboration:
  - 1) “Neutron emission in ultraperipheral Pb-Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV” [<https://journals.aps.org/prc/abstract/10.1103/PhysRevC.107.064902>]
  - 2) “Study of very forward energy and its correlation with particle production at midrapidity in pp and p-Pb collisions at the LHC” [DOI: [https://link.springer.com/article/10.1007/JHEP08\(2022\)086](https://link.springer.com/article/10.1007/JHEP08(2022)086)]
  - 3) “Centrality determination of Pb-Pb collisions at  $\sqrt{s_{NN}} = 2.76$  TeV in the ALICE experiment” [DOI: [10.1103/PhysRevC.88.044909](https://doi.org/10.1103/PhysRevC.88.044909)]
  - 4) “Measurement of the cross section for electromagnetic dissociation with neutron emission in Pb-Pb collisions at  $\sqrt{s_{NN}} = 2.76$  TeV” [DOI: [10.1103/PhysRevLett.109.252302](https://doi.org/10.1103/PhysRevLett.109.252302)]
  - 5) “Centrality determination of pPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV in the ALICE experiment” [DOI: [10.1103/PhysRevC.91.064905](https://doi.org/10.1103/PhysRevC.91.064905)]

- 6) “Centrality dependence of the inclusive  $\psi(2s)$  production in p-Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV” [DOI: [10.1007/JHEP06\(2016\)050](https://doi.org/10.1007/JHEP06(2016)050)]
  - 7) “W and Z boson production in p-Pb collisions at p-Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV” [DOI: [10.1007/JHEP02\(2017\)077](https://doi.org/10.1007/JHEP02(2017)077)]
- member of the Internal Review Committee for 8 papers of the ALICE Collaboration:
    - 1) “Observation of abnormal suppression of  $f_0(980)$  production in p-Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV” [in preparation]
    - 2) “System-size dependence of the charged-particle pseudo rapidity density at  $\sqrt{s_{NN}} = 5.02$  TeV for pp, p-Pb and Pb-Pb collisions” [DOI: <https://www.sciencedirect.com/science/article/pii/S0370269323000643?via%3Dihub>]
    - 3) “ALICE luminosity determination for Pb–Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV” [<https://arxiv.org/abs/2204.10148>]
    - 4) “Energy dependence of  $\phi$  meson production at forward rapidity in pp collisions at the LHC” [DOI: <https://link.springer.com/article/10.1140/epjc/s10052-021-09545-3>]
    - 5) “Inclusive photon production at forward rapidities for proton-proton collisions at  $\sqrt{s}=0.9, 2.76$  and  $7$  TeV” [DOI: [10.1140/epjc/s10052-015-3356-2](https://doi.org/10.1140/epjc/s10052-015-3356-2)]
    - 6) “ $\phi$  meson production at forward rapidity in p-Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV and in pp collisions at  $\sqrt{s}= 2.76$  TeV” [DOI: [10.1016/j.physletb.2017.01.074](https://doi.org/10.1016/j.physletb.2017.01.074)]
    - 7) “ $\phi$  production at forward rapidity in Pb-Pb collisions at  $\sqrt{s_{NN}} = 2.76$  TeV” [DOI: [10.1140/epjc/s10052-018-6034-3](https://doi.org/10.1140/epjc/s10052-018-6034-3)]
    - 8) “Charged-particle pseudorapidity density at mid-rapidity in p-Pb collisions at  $\sqrt{s_{NN}} = 8.16$  TeV” [DOI: [10.1140/epjc/s10052-019-6801-9](https://doi.org/10.1140/epjc/s10052-019-6801-9)]

MANAGEMENT ROLE AND RESPONSIBILITIES
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#### ACTIVITY AS EVALUATOR AND REVIEWER

- appointed as expert evaluator for the Physics for Future (P4F) Marie Curie-Skłodowska postdoctoral programme, coordinated by the Institute of Physics of the Czech Academy of Sciences (FZU) in 2023. Evaluation of 5 projects.
- appointed by the Research Executive Agency of the European Commission as expert evaluator for the Marie Skłodowska-Curie Individual Fellowships Call (H2020-MSCA) and the Research and Innovation Staff Exchange (H2020-MSCA-RISE) in the framework of the Horizon 2020 funding program for the 2017, 2018, 2019, 2020 and 2021 calls. Evaluation of about 40 proposals.
- Appointed as expert evaluator for “la Caixa” Foundation in Doctoral Fellowship selection for the “2020 Doctoral INPhINIT” programme. Evaluation of 50 proposals.
- appointed by the Scientific Council of the Institute Pascal, Paris-Saclay University as external evaluator for the approval of thematic programs to be funded in 2018.
- appointed as reviewer in the evaluation of proposals in the framework of the funding project “*Futuro in Ricerca (FIRB)*” promoted by the “*Ministero dell’Istruzione, dell’Università e della Ricerca (MIUR)*” in 2013.

- appointed by the “National Research Foundation (NRF)” of South Africa as external evaluator of research projects in the framework of the “Competitive Programme for Rated Researchers” in 2013.
- collaboration in peer-review process of submitted papers with the following international journals “Nuclear Instrument and Methods in Physics Research, A”, “Advances in High Energy Physics”, “Nuclear Physics A”, “Journal of High Energy Physics”, “European Physical Journal C”.

### SCIENTIFIC COMMITTEES

- 2011-present: member of the Scientific Board of the INFN scientific school “*Giornate di Studio sui Rivelatori*” yearly organized in Cogne, Aosta, Italy.
- 2019-2021: member of the Torino INFN unit evaluation committee for the best experimental thesis award in memory of dr. Anna Piccotti
- 2017-2020: member of the Scientific Board and co-leader of the Working Package “Dissemination and outreach” in the project NEWS (NEw WindowS on the universe and technological advancements from trilateral EU-US-Japan collaboration), funded by the European Commission under the H2020-Stimulating innovation by means of cross-fertilization of knowledge funding programme  
Project ID: 734303. Web page: [http://cordis.europa.eu/project/rcn/210946\\_en.html](http://cordis.europa.eu/project/rcn/210946_en.html)
- 2018: member of the Local Organising Committee of the International Conference “Quark Matter 2018”, scientific convener for the sessions “Collective dynamics” and “Collectivity in small systems”
- 2014: member of the Scientific Committee of the session “*Frontiere dell’energia: Higgs, EW, QCD, ioni pesanti*” at the conference “*Incontri di Fisica delle Alte Energie (IFAE) 2014*”.

### MENTORING

- member of the “*Comité de suivi individuel*” of dr. S. Herrmann, University of Lyon (France).
- reviewer for the PhD thesis of dr. F. Ercolessi, Physics Department of Bologna University, 2023.
- member of the PhD dissertation defense committee of dr. Ahsan Mehmood Khan’s, Institute of Particle Physics, Central China Normal University (CCNU), 2022.
- external reviewer of the thesis and member of the examination board for the PhD degree of dr. N. Di Lalla, Physics Department of Pisa University, 2019.
- external reviewer for the master thesis of dr. K.J. Senosi, Cape Town University of South Africa, 2013.
- tutor or co-tutor, of 1 bachelor thesis, 3 master thesis and 2 PhD thesis.

## REPRESENTATIVE ROLES

- 2016 - 2023: elected for two mandates by my colleagues of the INFN Torino unit as representative of the staff researchers within the national INFN panel

## AWARDS

- 2013: best presentation prize at the INFN national workshop “Incontri di Fisica delle Alte Energie (IFAE) 2013”

## PRESENTATIONS AT CONFERENCES AND WORKSHOPS

1. “Studies on system-size dependence of particle production with ALICE”, contributed talk at the international conference “QCD@LHC”, Durham (UK), 4-8 September 2023.
2. “QGP physics results overview”, invited talk at the workshop “Fixed target experiments at LHC” within the STRONG-2020 project, Aussois (France), 5-7 January 2023
3. “Characterization of particle production through UE and very forward energy in hadronic collisions with ALICE at the LHC”, invited talk at the Sixth Biennial “Workshop on Discovery Physics at the LHC” (Kruger2022), 4-9 December 2022
4. “Shedding light on pp and p-Pb collisions through forward energy detection”, talk on personal invitation at the 13th International workshop on Multiple Partonic Interactions at the LHC, IFT UAM/CSIC Madrid, 14-18 November 2022
5. “Photons in heavy ion collisions: looking very forward”, talk on personal invitation at the EMMI workshop New Vistas in Photon Physics in Heavy-Ion Collisions, September 2022, Krakow, Poland
6. “INFN ScienzaPerTutti: 20 years of science for society”, parallel talk at the XLI International Conference on High Energy Physics (ICHEP), July 2022, Bologna, Italy
7. “QCD: experimental overview”, invited plenary, multi-experiment talk at the 10<sup>th</sup> Annual Large Hadron Collider Physics (LHCP2022) conference, May 2022, online
8. “Leading protons and neutrons in pA collisions at LHC energies”, invited plenary talk at the CFNS Ad-hoc Workshop: Target fragmentation and diffraction physics with novel processes: Ultraperipheral, electron-ion, and hadron collisions, February 2022, online
9. “Minimum Bias and Underlying Event studies at ALICE”, invited plenary talk at the 12th International Workshop on Multiple Partonic Interactions at LHC (MPI@LHC), October 2021, LIP, Lisbon
10. “Particle production at midrapidity in correlation with the very forward energy in pp and p-Pb collisions with the ALICE ZDC”, contributed talk in parallel session at the European Physical Society conference on High Energy Physics (HEP-EPS), July 2021, online
11. “Overview of recent ALICE results”, invited plenary talk at the 34 Workshop in Particle Physics “Les Rencontres de Physique de la Vallée d’Aoste”, March 2021, online
12. “Very forward energy emission as a function of particle production at midrapidity in pp and p-Pb collisions with the Zero Degree Calorimeter of ALICE”, parallel talk at the VI

- International conference on Initial Stages of high-energy nuclear collisions (IS2021), January 2021, Rehovot, Israel
13. "The Quark-Gluon Plasma: from the primordial universe to the LHC", invited seminar at the Institut für Kernphysik, June 2019, Münster, Germany
  14. "Soft probes in ALICE", parallel talk at the QCD session of the Sixth Annual Conference on Large Hadron Collider Physics (LHCP18), Bologna, Italia, June 2018
  15. "Results from ALICE", invited plenary talk at the International Conference "Miami 2017", Fort Lauderdale, USA, December 2017
  16. "Introduction to soft probes: an experimental overview", invited plenary multi-experiment talk at the workshop "*Secondo incontro sulla fisica con ioni pesanti a LHC*", Torino, Italy, October 2017
  17. "Electromagnetic dissociation of heavy ions at LHC energies", invited plenary multi-experiment talk at the Workshop "Challenges in photon-induced interactions", organized by the ExtreMe Matter Institut (EMMI), Krakow, Poland, September 2017
  18. "Forward nucleon emission in Pb-Pb, p-Pb and pp collisions with the ALICE ZDC", plenary talk at the 3<sup>rd</sup> Elba Workshop on Forward Physics @ LHC Energy, June 2016
  19. "Multi-parton interactions in p-Pb collisions at  $\sqrt{s} = 5.02$  TeV with ALICE", plenary talk at the 7<sup>th</sup> International Workshop on Multiple Partonic Interactions at the LHC, INCP, Trieste, Italia, November 2015
  20. "Centrality dependence of particle production in p-Pb collisions with ALICE at the LHC", talk at the International "Hard probes 2015" Conference, Montreal, Canada 29/6-3/7 2015
  21. "Scaling of particle production in pA collisions and centrality determination in p-Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV with ALICE", talk at the 3<sup>rd</sup> International Conference on New Frontier in Physics, August 2014, Kolymbari, Greece
  22. "p-Pb centrality in ALICE", talk at the Workshop on the determination of centrality in p-A collisions, CERN, February 2014, Geneve, Switzerland
  23. "p-Pb collisions: particle production and centrality determination in ALICE", talk at the Hard Probes 2013 International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions, Novembre 2013, Cape Town, South Africa
  24. "Heavy ion physics at LHC", invited multi-experiment talk at the national conference "*Incontri di Fisica delle Alte Energie (IFAE) 2013*", April 2013, Cittadella Universitaria di Monserrato, Cagliari, Italia
  25. "Charged particle production in Pb-Pb and p-Pb collisions at ALICE", invited plenary talk at the International Workshop on Discovery Physics at the LHC, Kruger 2012, December 2012, Kruger Gate, South Africa
  26. "Characterizing the medium with hard probes in ALICE", invited seminar at the "LNF-2012 Summer Institute on QCD, Heavy Flavours and Higgs physics", *Laboratori Nazionali di Frascati*, June 2012, Frascati, Italia
  27. "Centrality in p-A collisions with the ALICE ZDCs", invited talk at the "Workshop pA@LHC", CERN, June 2012, Geneve, Switzerland
  28. "Performances of the ALICE Zero Degree Calorimeters in Pb-Pb Collisions at LHC", talk at the conference "2011 IEEE Nuclear Science Symposium, Medical Imaging Conference", October 2011, Valencia, Spain

29. "Measurement of the electromagnetic dissociation cross section of Pb nuclei at  $\sqrt{s_{NN}} = 2.76$  TeV with the ALICE ZDC", talk at the International Conference Quark Matter 2011, May, Anancy, France
30. "The ALICE Zero Degree Calorimeters in pp physics", talk at the conference 12<sup>th</sup> Topical Seminar on Innovative Particle and Radiation Detectors (IPRD10), June 2010, Siena, Italia
31. "Physics performances of the ALICE Zero Degree Calorimeters in pp physics", talk at the Conference 11<sup>th</sup> Topical Seminar on Innovative Particle and Radiation Detectors (IPRD08), October 2008, Siena, Italia
32. "Centrality determination in p-A collisions", invited talk at the "3<sup>rd</sup> DIMUONnet Workshop on Heavy Flavors and Quarkonia production in Heavy Ion Collisions at the LHC", March 2006, Alessandria, Italia
33. "Centrality selection in p-A collisions at ALICE", talk at the "Workshop on Proton-Nucleus Collisions at the LHC", CERN, May 2005, Geneve, Switzerland
34. "New possibilities for the use of the Zero Degree Calorimeters of the ALICE experiment", plenary talk at the International Conference "XLIII International Winter Meeting on Nuclear Physics", March 2005, Bormio, Italia
35. "The NA60 experiment at the CERN SPS: first results and future perspectives", plenary talk at the "7<sup>th</sup> Conference on Strangeness in Quark Matter (SQM 2003)", March 2003, Atlantic Beach, North Carolina, USA
36. "*Determinazione della molteplicità adronica in funzione della centralità all'esperimento ALICE*", talk at the LXXXVIII Congresso Nazionale della Società Italiana di Fisica, October 2002, Alghero, Italia
37. "Hadron multiplicity versus centrality in ALICE", poster presented at the International Conference "Quark Matter 2002, XVI International Conference on Ultra-relativistic Nucleus-Nucleus Collisions", July 2002, Nantes, France
38. "An electromagnetic calorimeter prototype for the ALICE experiment", talk at the International Europhysics Conference on High Energy Physics", July 2001, Budapest, Hungary
39. "*Misura della sezione d'urto di dissociazione elettromagnetica e nucleare in urti Pb-Pb a 40 GeV/c per nucleone*", talk at the LXXXVI Congresso Nazionale della Società Italiana di Fisica, October 2000, Palermo, Italia

OUTREACH AND PUBLIC ENGAGEMENT
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- national responsible for INFN of the activities for the "*Salone del Libro*", the international book fair yearly held in Torino since 2022
- member of the Editorial Board of the national INFN project "*ScienzaPerTutti*" for public engagement and popularisation of science since 2017, appointed as national project leader since 2023 [<http://scienzapertutti.infn.it/>]
- member of the national outreach project "INFN-kids" dedicated to dissemination of science among children [<https://web.infn.it/infn-kids/>]
- scientific expert at the high school "*Liceo classico V. Alfieri*" for the design and realisation of the fair organised for the  $\pi$ -day since 2022

- organizer of Torino's international masterclass in particle physics for high school students, 2024 [\[link\]](#)
- co-curator of the public exhibition "Footprints revealed, scientists looking for the invisible", organised for the 2023 Science Fair in Genova.
- speaker at the initiative for public engagement "*Pillole di scienza*", at the book store "*Belleville*" in Bruino (Torino), October 2022
- invited expert at the national television (RAI) scientific show for kids "*La banda dei fuoriclasse*", 2021 [\[link\]](#)
- co-curator of the exhibition "Faces and challenges in physics", opened to the public at the "*Festival delle scienze*" in Rome, 22-28 November 2021. [\[link\]](#)
- organizer with dr. S. Di Francia (Department of Biological and Clinical Sciences, University of Turin) of the 2019 European Researcher's Night in Torino. Funds obtained by Compagnia di San Paolo, involvement of *Museo Egizio* and *Museo del Risorgimento*
- speaker at a public conference at the "*Festival della Scienza di Genova*" fair 2021 with dr. S. De Francia and dr. E. Pezzulli [\[link\]](#)
- organizer of experimental activities for kids at the scientific fair "*Festival dell'innovazione e della scienza 2021*" in Settimo Torinese, Torino [\[link\]](#)
- delivering a public lecture at the "*Festival dell'innovazione e della scienza 2021*", in Settimo Torinese with dr. S. Bagnasco and dr. G. Sestili [\[link\]](#)
- experimental laboratories for kids at the 2021 scientific fair "*Bergamoscienza*" [\[link\]](#)
- organizer and speaker at the events "*Ricercatori alla spina*" for the general public
- member of the committee for Outreach and Public Engagement Activities of the Torino INFN unit from 2016 to 2024
- invited seminar at the [CICAP](#) meeting "*Razionale alcolica*" held in Torino for the general public in 2029 [\[link\]](#)
- invited talk at the "Pint of Science" event in Torino for the general public in 2019 [\[link\]](#)
- lecturer at the International Masterclass on Particle Physics for high school students, delivering a seminar about experimental techniques in particle physics held in Torino, during 2021, 2019, 2018, 2017 and 2011 editions [\[link\]](#)
- outreach program for 5th-grade classes of the high school "*Liceo Classico Alfieri*", Torino "Atoms, nuclei and beyond...". Lessons and experimental activities in English language. Project (updated every year) carried on during years 2019, 2020, 2021, 2022.
- participation to the 2019 and 2018 "*Festival della Scienza*" in Genova as scientific guide at the stand designed for the general public by the INFN national project "*ScienzaPerTutti*"
- responsible for the stand and the activities of the European Night of the Researchers' for the Torino INFN unit and the Physics Department during years 2016 and 2017 and 2021
- lecturer at the training course "Physics and communication: Science and school", organized by INFN in Catania, 2017.
- responsible for the experimental activities for primary schools "Bambine e bambini all'università" ("Kids at the University"), promoted by the Torino municipality, 2017 [\[link\]](#).
- laboratories for primary schools in the framework of 3 projects I devised and designed for primary schools ("IC Rita Levi Montalcini" [\[link\]](#) [\[link\]](#), "IC Senigaglia" [\[link\]](#), "IC Mazzarello" in Torino [\[link\]](#)) in 2016 and 2017



- seminar about modern physics, standard model and detection techniques for students of the high schools “*Liceo Scientifico Copernico*”, “*Liceo Classico Alfieri*” and “*Liceo Scientifico Galileo Ferraris*”, Torino since 2016
- guide for the general public at the scientific exhibition “*L’invisibile meraviglia*”, organized by the INFN at the Regional Museum of Natural Science, Torino 2010

## TRAININGS

- 2020 and 2022: English courses at Wall Street English Institute, Torino
- 2019: training course “Machine learning”, organised by INFN in Camogli
- 2018: training course “Public engagement: the scientist on the stage”, organized by INFN at the Legnaro National Laboratories
- 2018: training course “Techniques and analysis tools for astrophysical sources X-ray polarimetry”, organized by INFN in Torino
- 2017: workshop “Communicating science: instructions”, organized by the Torino Planetarium
- 2016: training course “Physics and communication: Science and school”, organized by INFN at the Frascati National Laboratories
- 2016: training course “Physics and communication: Science and media”, organized by INFN in Bologna
- 2010: training course “VII Seminario Nazionale sul Software della Fisica Nucleare, Subnucleare ed Applicata”, organized by the INFN in Alghero
- 2009: course “Techniques of subnuclear physics applied to the diagnostics of cultural heritage”, formation training organized by INFN in Torino
- 2009: course “The ITER project: fusion and fission, status and perspectives on nuclear energetic sources”, training course organized by INFN in Torino
- 2001: training course “C++ for particle physicists”, organized by the CERN Training & Development group

## FUNDS & GRANTS

- 2013-2014: co-investigator in the project “Development of technologies for the optimization of LHC data access, with application to other scientific fields through the grid and cloud computing approach”, funded by the Italian Research Minister, in the framework of the national call “PRIN” 2010/2011.
- 2009-2011: co-investigator in the project “Study of strongly interacting matter”, funded by the European Commission in the framework of the call “FP7-INFRASTRUCTURES” (reference number 227431 HADRONPHYSICS2).
- 2001-2003: co-investigator in the project “Detection and Imaging of Antipersonnel Landmine by Neutron Backscattering (DIAMINE)”, funded by the European Commission in the framework of the call FP5-IST (reference number FP5 IST-2000-25237).

- 1998 and 2001: winner of a selection for a Ph.D. fellowship at the Physics Department of the Torino University.
- 1998: appointed as fixed-term researcher by “Istituto Nazionale di Fisica della Materia (INFM)” to work at the Physics Department of “Politecnico di Torino” on the project “Amorphous carbon thin films: physics and structural properties”, funded by the Sorin Biomedics. Scientific tutor: professor A. Tagliaferro, Politecnico di Torino.

TEACHING
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- 2003/04: assistant lecturer at the Physics Department of the Torino University, course “Interaction of radiation with the matter” held by professor E. Chiavassa for undergraduate students.
- 2002/03: assistant lecturer at the Physics Department of the Torino University, “Electricity and magnetism” and “Fluids, waves and thermodynamics” courses for graduate Physics students (50 hours)
- 2000/01: assistant lecturer at the Physics Department of the Torino University, “Mechanics” course for graduate Physics students (50 hours)
- 1999/00: assistant lecturer at the Physics Department of the Torino University, “Mechanics” course for graduate Physics students (50 hours)
- 1998/99: assistant lecturer at the Physics Department of the Politecnico di Torino, course “Solid state physics” held by professor A. Tagliaferro for Electronics and Nuclear Engineering graduate students

## SUMMARY

My research work was so far mainly focused on the experimental physics of ultra-relativistic heavy ion collisions for the study of strongly interacting matter.

I am a member of the **ALICE** (A Large Ion Collider Experiment) international collaboration since 1999. I have also been a member of the **NA60** experiment at the CERN Super Proton Synchrotron (SPS), devoted to the study of open charm and dimuon production in proton-proton and proton-nucleus collisions. In the framework of these experiments, I took care of the commissioning of the detectors that my research group was responsible for, of the detector characterization and commissioning. Then I dedicated my work to data reconstruction, calibration and data analysis. Finally, I presented results at international conferences on behalf of the two collaborations and I wrote scientific papers.

Since 2017 I am also collaborating to the **IXPE** (Imaging X-Ray Polarimetry Explorer) telescope, launched in 2021 to study the polarization of X-ray radiation emitted from astrophysical sources such as active galactic nuclei (AGN), microquasars, pulsars and pulsar wind nebulae, magnetars, accreting X-ray binaries, supernova remnants and black holes.

In the past I participated to research activities related to medical and humanitarian applications:

- development of a Computer Aided Detection (CAD) method for the identification of pulmonary nodules in lung Computed Tomography (CT) to support to radiologists in the identification of early-stage pathological objects (INFN project "**MAGIC5**")
- development of a portable detector for the detection and imaging of antipersonnel landmine by neutron backscattering, in the framework of the "**DIAMINE**" project funded by the European Commission (reference number FP5 IST-2000-25237)

In the following, I briefly highlight my personal contribution to these activities in more detail.

## ALICE

Since the beginning of my research work, I took care of the system of Zero Degree Calorimeters (ZDC) that the Torino group I work with is in charge of. I was responsible since 2000 of the online and offline software for simulation and reconstruction of the ZDC data within the ALICE offline framework, and I supervised the detector calibration and data Quality Assurance.

Since the beginning of the LHC experimental programme, I focused on data analysis. The main analyses I am either leading or involved into are:

- emission of nucleons in the very forward direction (close to beam rapidity) in proton-proton and proton-nucleus collisions. For this work I also worked in collaboration with professor Mark Strikman from the Penn University for data comparison with theoretical models. I presented preliminary results about this analysis at the following conference in 2021: Initial Stages, Les Rencontres de Physique de la Vallée d'Aoste, HEP-EPS, MPI@LHC (two of these talks were on invitation). The relative paper has recently been submitted by the ALICE Collaboration to the JHEP journal and available on [arXiv](#).
- centrality determination in proton-nucleus collisions at the LHC energies. I was in the Paper Committee of the ALICE paper about centrality in proton-nucleus [1] and nucleus-nucleus [2] collisions. I presented results about this topic at the following international conferences: "Hard Probes" in 2013, "3rd International Conference on New Frontier in Physics" in 2014, "Workshop on the determination of centrality in pA collisions at the LHC" in 2014, "Hard Probes" in 2015 and "7th International Workshop on Multiple Partonic Interactions at the LHC" in 2015.
- charged particle pseudorapidity distributions and centrality dependence of charged particle production in proton-proton and proton-nucleus collisions. I presented the first results about proton-nucleus collisions at the international conference "Workshop on Discovery Physics at the LHC" in 2012.
- production of dimuons, in particular  $\psi(2s)$  and Z, W bosons, in proton-nucleus collisions. I am in the Paper Committees of two related publications [3] [4].
- neutron emission in electromagnetic dissociation of lead nuclei in nucleus-nucleus collisions. This analysis led to the first measurement of the cross sections for single and mutual neutron emission at LHC energies, published in *Physics Review Letters* [5], I presented those results at the international conference "Quark matter" in 2011.

I am currently convener of the Physics Working Group (PWG) "Monte Carlo generators and Minimum Bias physics", coordinating 4 Physics Analysis Groups (PAG) and more than 70 persons. I have been convener of the Physics Analysis Group "Global Event Observables" within the Light Flavor Spectra Physics Working Group from 2011 to 2016 and of the Physics Analysis Group (PAG) "Underlying Event" within the "Monte Carlo generators and Minimum Bias Physics" from 2019 till 2022.

I am member of the ALICE Computing Board as the responsible for the ZDC since 2009, and of the working groups "Simulation Working Package" and "Reconstruction and Calibration Working Package" int the framework of the ALICE offline and offline code upgrade for LHC Run3. I was member of the ALICE Editorial Board from January 2016 to January 2020.

## **NA60**

I took care of developing the code for the ZDC data simulation, reconstruction and analysis. I analyzed the very first NA60 data, studying the charged particle multiplicity pseudorapidity distributions. The results confirmed, in an energy range that was not yet explored, the logarithmic growth with the square root of the center-of-mass energy. I presented those results at the international conference "Strangeness in Quark Matter" in 2003.

## **IXPE**

I worked at the simulations devoted to outline the observation plan for the telescope, with particular interests in magnetars and accreting stellar mass black holes. I am involved in the study through simulation of the residual modulation of the Gas Pixel Detectors (GPD).

## **TECHNOLOGICAL TRANSFER ACTIVITIES**

### **Development of an algorithm for the identification of pulmonary nodules**

During years 2010 and 2011 I collaborated with the research group coordinated by Dr. P. Cerello of INFN Torino in the framework of the INFN research project “Medical Application on a Grid Infrastructure Connection” (MAGIC5). The aim of the project was the development and test of an algorithm for the analysis of lung CTs to provide a Computer Aided Detection (CAD) for an automated identification of pulmonary nodules. The proposed method, the Channeler Ant Model (CAM), is an algorithm based on virtual ant colonies, conceived for the segmentation of complex structures with different shapes and intensity in a 3D environment. It exploits the natural capabilities of virtual ant colonies to modify the environment and communicate with each other by pheromone deposition. I contributed to the code development and to the validation process based on testing the algorithm on the different public databases available.

### **Development of RPCs to detect thermal neutrons for humanitarian mine-clearing operations**

In years 2001-2003 I participated in the European project Detection and Imaging of Anti-personnel Land-Mine by NEutron back-scattering (DIAMINE) project, funded in the framework of the European Commission call FP5-IST. It was primarily intended for mine-clearing operations in the Balkans and the main aim was to develop a portable detection system to localize mines exploiting the neutron back-scattering from the soil. Different detectors were proposed, I participated to the design, construction and experimental tests of a Resistive Plate Chamber (RPC), collaborating with CERN and testing the prototypes at the INFN Legnaro laboratories and at a nuclear reactor in Belgium.