

PERSONAL INFORMATION

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EDUCATION AND ACADEMIC QUALIFICATIONS

2024: Italian National Scientific Habilitation for Full Professorship in Experimental Physics
2004: PhD in Physics, University (U.) of Torino (IT)
2001: Postgraduate School in Astroparticle Physics, U. of Torino (IT)
2000: Master Degree in Physics (summa cum laude), U. of Torino (IT)

CURRENT POSITION

Since 01/07/2020: Associate Professor at the Department of Physics, University of Torino; Scientific Disciplinary Sector: Experimental Physics of Fundamental Interactions

PAST POSITIONS

2011-2020: Staff Researcher at the Department of Physics, U. of Torino
2015: Scientific Associate at CERN
2005-2011: Post-doctoral researcher at INFN (National Institute for Nuclear Physics)
2001: Postgraduate Fellow at INFN - Torino

A) INSTITUTIONAL RESPONSIBILITIES AT UNIVERSITY OF TORINO

Since 2021 Head of the Public Engagement Committee of the Physics Department, University of Torino. The Commission is composed of 16 members, appointed by the Department Council, and has a two-year budget of €50k.

Since 2023 Member of the working group for the Physics Department Quality Assurance (AVA3 national accreditation process). The working group is appointed by the Department Council

Since 2018 Member of the working group responsible for defining the Physics Department's Three-Year Plan (2019-2021, 2022-2024, 2025-2027). The working group is appointed by the Department Council upon the proposal of the Director of the Department

2018-2020 Elected Member of the Council of the School of Natural Sciences, University of Torino

2018-2020 Elected Member of the Executive Board of the Physics Department, University of Torino

2013-2019 Head of the Orientation Committee, Department of Physics, University of Torino

2013-2019 Member of the Orientation and Job Placement Committee, School of Natural Sciences, University of Torino

B) RESEARCH ACTIVITY

Participation and Responsibilities in International and National Collaborations

AMBER (CERN):

Since 2021 Member of the Collaboration Board

Since 2021 Member of the AMBER Collaboration's Publication Committee
(Chair since November 2023)

2021-2024 Deputy Coordinator of the "Pbar cross-section" physics group

Since 2021 Member of the International Collaboration

COMPASS (CERN):

2019-2022 Italian National Responsible of the COMPASS Experiment at INFN

Since 2015 Member of the Collaboration Board

2015-2019 Deputy Coordinator of the "Drell-Yan" physics group

2015 Run Coordinator for the experiment

Since 2005 Member of the International Collaboration

EIC (BNL, NY, USA):

Since 2024 Member of the ePIC Collaboration's Publication Committee

Since 2023 Member of the International ePIC Collaboration

Since 2016 Member of the Institutional Board of the Electron-Ion Collider
User Group (EICUG)

2020-2022 Chair of the Conference and Talks Committee of EICUG

2018-2019 INFN-Torino group leader

RD51 (CERN):

2011-2022 Member of the International Collaboration

DRD1 (CERN):

Since 2023 Member of the International Collaboration

Auger (Pierre Auger International Observatory, Malargue, Argentina):

2000-2004 Member of the International Collaboration

A description of main research activities can be found in [section E](#)

PUBLICATIONS AND TALKS

Co-author of 163 publications (Source: Scopus - 6717 citations, H-index: 41)

A complete list of of publications can be found in the document [Publication List attached to the application](#)

Over 20 talks at international and national conferences and workshops

A complete list of talks given at international conferences and workshops can be found in the [Appendix A](#)

PUBLICATIONS (PROPOSALS)

Member of the Drafting Committee of 2 Experiment proposals and Letters of Intent:

[1] COMPASS++/AMBER: Proposal for Measurements at the M2 beam line of the CERN SPS Phase-1: 2022-2024, CERN-SPSC-2019-022 ; SPSC-P-360

[2] COMPASS-II Proposal, COMPASS Collaboration (F. Gautheron et al.), 125 pp., SPSC-P-340, CERN-SPSC-2010-014, May 17, 2010

Co-author of the EIC Yellow Report:

[3] *Requirements and Detector Concepts for the Electron-Ion Collider: EIC Yellow Report*. NUCLEAR PHYSICS. A, vol. 1026, p. 1-902, ISSN: 0375-9474, doi:10.1016/j.nuclphysa.2022.122447

RESEARCH PROJECTS AND FUNDING

2023-2024: Principal Investigator of the eRD109 project, funded by the U.S. Department of Energy (DOE), related to the ALCOR ASIC development for the ePIC dRICH detector [60 k\$]

2019-2023 Participant, H2020 - Call: H2020-INFRAIA-2016-2017 - STRONG2020 - TMD-next [360 k€]. Coordinator of Work Package 1.1 (Analysis of Drell-Yan@COMPASS) [38 k€]

2019-2021 Principal Investigator of "Nucleons in 3D" (University of Torino, Local Research Funds) [14 k€]

2018-2020 Co-proponent of "A new Dark Matter Hunting" Project (Funded by Fondazione CRT) [24 k€]

2012-2015 Participant, University of Torino - Call 3 - Strategic Research Grants (12-CSP-C03-066): "The structure of the nucleon: The 3-Dimensional Partonic Structure Of Protons And Neutrons (3-D nucleon)" [233 k€]

CONFERENCE ORGANIZATION AND SCIENTIFIC ADVISORY COMMITTEES

2024 Member of the Local Organizing Committee for the "Physics at AMBER International Workshop" (PAW'24), Geneva, Switzerland

2024 Member of the Scientific Advisory Committee for the International Workshop "XSCRC2024: Cross sections for Cosmic Rays@CERN", CERN

2022 Convener for the parallel session "3D structure of the nucleon: TMDs" and organizer of the corresponding session at "24th International Spin Symposium" (SPIN2021), Matsue, Japan

2021 Convener for the working group "WG6: Future Experiments" and organizer of the corresponding session at "XXIX International Workshop on Deep Inelastic Scattering and Related Subjects" (DIS2022), Santiago de Compostela, Spain

2020 Member of the International Advisory Committee for "IWHSS20" - XVII International Workshop on Hadron Structure and Spectroscopy, Trieste, Italy

2019 Convener of parallel sessions: EIC User Group Meeting, Paris, France

2019 Member of the International Advisory Committee for "IWHSS19" - XVI International Workshop on Hadron Structure and Spectroscopy, Aveiro, Portugal

2018 Member of the Local Organizing Committee for "DIS2019", XXVII International Workshop on Deep Inelastic Scattering and Related Subjects, Torino, Italy

2017 Member of the International Advisory Committee and Local Organizing Committee for "IWHSS17" - XIV International Workshop on Hadron Structure and Spectroscopy, Cortona, Italy

2015, 2017 Member of the Organizing Committee for "NPQCD" - Italian Workshop on Hadron Physics and Non-Perturbative QCD, Cortona (2015) and Pollenzo (2017)

2008 Member of the Local Organizing Committee for "IWHSS08" - VII International Workshop on Hadron Structure and Spectroscopy, Torino, Italy

C) TEACHING AND MENTORING ACTIVITY

Since A.Y. 2024/2025 Lecturer for the course "Physics III," Bachelor's Degree in Physics, U. of Torino

Since A.Y. 2022/2023 Lecturer for the course Elementary Particles II," Master's Degree in Physics, U. of Torino

Since A.Y. 2012/2013 Lecturer for the course Physics Laboratory II, Bachelor's Degree in Physics, U. of Torino

Since 2013 Supervisor of 4 Ph.D students, 15 master students, 20 bachelor students in Physics, U. of Torino

Member of the Defense Committee and external reviewer of 13 PhD theses in Physics (University of Ferrara, Torino, Trento, Trieste, Polytechnic of Torino, University of Lisbon)

D) OUTREACH ACTIVITY

Below is a description of the main activities and coordination roles within the Third Mission, excluding the institutional responsibilities listed in [section A\)](#)

Since 2021 Creator and Coordinator of the project "Migrant Science - Stories of Science and Migration," winner of the 2021 and 2024 Calls for Public Engagement Projects of the University of Torino [96k€]

<https://scienzamigrante.unito.it/>

Since 2020 Co-author of the project "Physics with...Scientilla," organized by the Department of Physics in collaboration with INFN, presented at various national science festivals

https://www.df.unito.it/do/home.pl/View?doc=/pubeng/Fisica_con_Scientilla.html

2020-2022 Member of the Permanent Laboratory for Public Engagement (PELab) of the University of Torino

Since 2016 Member of the Coordination Committee for the Third Mission (CC3M) of the INFN Torino, promoting and coordinating scientific culture dissemination initiatives in collaboration with the national CC3M

Since 2016 Coordinator for Torino of the international science outreach festival "Pint of Science".

2016-2024 Local Coordinator of the national INFN CC3M RadioLab project for INFN Torino

2014-2019 Coordinator for the Physics Department of the Outreach Project "Bambine e Bambini. Un giorno all'Università," organised by the City of Torino and Agorà Scienza

2006-2016 Creator and curator of a Project for Schools in Torino about Science Communication ("Communicating Science": Scientific Journalism - Print and Web; Science on Radio; Science in Exhibitions), organized and delivered in dozens of secondary school classes over the years

OTHER

Participation in numerous public engagement activities in over ten editions of the European Researchers' Night, in Science Festivals (*Genoa Science Festival, Innovation and Science Festival in Settimo Torinese*), in Scientific Exhibitions ("*Physics on Wheels: A Traveling Laboratory*", "*Infinite Curiosity*", "*Lise Who?*"), and in schools. Ambassador for the European Researchers' Night 2020 in Torino.

Presenter of 15 talks in public engagement events and outreach conferences

E) DESCRIPTION OF THE RESEARCH ACTIVITY

Below is a description of the main research activities, excluding the primary coordination and leadership roles, which are listed in section B) of this Curriculum Vitae.

AMBER at CERN (2021 - now)

The AMBER physics program includes three main research lines: the measurement of antiproton (\bar{p}) production cross-sections with a proton beam, the measurement of the average proton radius, and the measurement of the pion and kaon PDFs.

My primary research activity within AMBER has been so far focused on the measurement of antiproton production cross-sections. I was a member of the drafting committee for the *Letter of Intent* (2018) and later for the *Proposal* of the AMBER Physics Program.

Following a test run in October 2022, which I coordinated, AMBER collected data in 2023 for the measurement of the \bar{p} cross-section on helium target, and in 2024 on hydrogen and deuterium targets. Data analysis is currently underway, and I was the supervisor of the first completed PhD thesis (Davide Giordano) within the Collaboration on this measurement, as well as of several undergraduate and master's theses. I co-authored the proposal submitted to the SPSC in September 2023 for the extension of AMBER's physics program to include \bar{p} cross-section measurements on hydrogen and deuterium targets, which was approved for the 2024 Run.

COMPASS at CERN (2005 - now)

As part of the diverse physics program of the COMPASS experiment at CERN, my research activity is primarily focused on studying the spin structure of the nucleon. This is achieved through the measurement of *Transverse Momentum Dependent parton distributions* (TMD PDFs) and the transversely polarized parton distribution, the "transversity" PDF, in SIDIS and Drell-Yan (DY) processes. Additionally, I work on the development of particle detectors, mainly in the areas of photodetection systems and front-end electronics.

Below is a list of my main activities within the COMPASS Collaboration:

- Responsible for the development, production, testing, and commissioning of the front-end electronics for the central photodetection system of the COMPASS RICH, based on multi-anode photomultipliers.
- Responsible for the characterization and testing of the new CMAD ASIC, developed by the INFN Torino section.
- Responsible for the development and testing of front-end electronics prototype boards based on CMAD chips for the Multi-Wire Proportional Chambers (MWPCs) of the COMPASS experiment.
- Study, via Monte Carlo simulations, and implementation of the new large angle muon trigger system (LAS trigger) in the COMPASS spectrometer, consisting of two large-area scintillator hodoscopes.
- Study, via Monte Carlo simulations, of the Drell-Yan process at COMPASS using a negative pion beam on a polarized NH_3 target.
- Data analysis of the DY process for the measurement of TMDs.
- Member of the drafting committee for the second phase of the experiment, "COMPASS-II Proposal" (SPSC-P-340, CERN-SPSC-2010-014, May 17, 2010).

RD51 at CERN (2011-2022) and DRD1 at CERN (2023 - now)

The RD51 Collaboration, which included approximately 450 authors from 75 universities and research institutes across 25 countries, had as its main objective the advanced technological development and application of Micropattern Gas Detectors (MPGDs). Within the RD51 Collaboration, my work primarily focused on the study and characterization of Thick-GEM detectors for large-area photodetectors, as well as the development and testing of a first 30x30 cm prototype of a MicroMegas detector for large-area tracking applications.

The new DRD1 initiative, which has replaced RD51, is dedicated to the technological development of gas detectors, including MPGD, RPC, TPC, and

large-scale drift chambers, multiwire chambers, and straw tubes. Within DRD1, I am involved in the development of a large-area MicroMegas (MM) prototype. This development is synergistic with the project to equip three large-area MM detectors for the AMBER experiment at CERN, specifically for the Drell-Yan physics program after Long Shutdown 3 (LS3).

EIC at BNL (2018-now)

The ePIC International Collaboration was formally established in 2023 for the construction of the detector of the same name at the first interaction point of the EIC (BNL, NY, USA). The ePIC Collaboration includes the participation of hundreds of scientists from 171 research institutes and universities across 24 countries worldwide. It was officially formed through the merger of two previous proto-collaborations, ECCE and ATHENA.

Since 2018, under the INFN EIC-NET initiative and later within ePIC, I have been working on the design of front-end electronics based on the ALCOR ASIC for the SiPM-based photodetection system of the dRICH (Dual Ring Imaging Cherenkov) detector. This project, carried out in collaboration with an international consortium, focuses on optimizing the ALCOR chip—developed by the electronics laboratory of the INFN Torino section—for application in the dRICH of ePIC at the EIC.

The ALCOR chip is now the candidate ASIC for the readout of silicon photomultipliers (SiPMs) in the dRICH of the ePIC experiment at EIC, where over 300,000 channels are expected to be installed. The chip has reached version 2.1, which is currently in the testing phase. Versions 1 and 2.0 have been extensively tested and used for SiPM readout in laboratory measurements and test beams at CERN in Geneva. The design of ALCOR v3.0 is currently in progress.

I am also among the authors of the EIC Yellow Report, the document that outlines the scientific objectives and the corresponding detector design specifications necessary for implementing the scientific program at EIC.

Pierre Auger Experiment - Pierre Auger International Observatory, Malargue, Argentina (2000-2004)

The Pierre Auger Observatory is the world's largest cosmic ray observatory, dedicated to studying ultra-high-energy cosmic rays with the goal of precisely measuring their energy spectrum and uncovering their composition and origin. It was the first experiment to simultaneously use two different types of detectors—fluorescence detectors and Cherenkov detectors—while covering an unprecedented ground detection area (over 3,000 km² equipped with Cherenkov detectors and monitored by four fluorescence "eyes").

I actively participated in various phases of the experiment, including long periods of work at the Observatory in Argentina, from its initial development and installation to its operation and data analysis. My focus was particularly on the fluorescence detector and its calibration system for measuring the energy of extensive air showers, which is based on a LIDAR system.

My main research activities included:

- Analysis of the mass composition of ultra-high-energy cosmic rays through the measurement of the so-called "elongation rate" of extensive air showers.
- Co-responsibility for the characterization, testing, and commissioning of the front-end electronics of the Fluorescence Detector.
- Co-responsibility for the development and deployment of the first LIDAR telescope for atmospheric monitoring installed at the Pierre Auger Observatory site.
- Member of the software development group for the Auger experiment's data analysis.

APPENDIX A) INTERNATIONAL CONFERENCES (CONTRIBUTIONS EXCLUDING POSTERS)

- [1] "Future meson structure studies with AMBER", **invited talk in parallel session**, "16th International Conference on Meson-Nucleon Physics and the Structure of the Nucleon" (MENU2023), Mainz, Germania, 15-20 October 2023
- [2] "Drell-Yan physics at COMPASS and AMBER", **invited talk**, "3rd Sardinian Workshop on Spin", Baia di Nora, Pula (Cagliari), 05 - 07 June 2023
- [3] "Future Experiments: Summary Talk of WG6", **plenary session**, "XXIX International Workshop on Deep-Inelastic Scattering and Related Subjects" (DIS2022), Santiago de Compostela, Spagna, 02 - 07 May 2022
<https://indico.cern.ch/event/1072533/contributions/4813643/>
- [4] "Drell-Yan physics at COMPASS", **invited talk**, "13th European Research Conference on Electromagnetic Interactions with Nucleons and Nuclei" (EINN2019), Paphos (Cipro), 27 October - 02 November 2019
- [5] "The Compass detector potential for cosmic rays physics", **invited talk**, 2nd International Workshop "Cross sections for Cosmic Rays @ CERN" (XSCRC2017), CERN, 29 - 31 March 2019
- [6] "Spin asymmetries in quarkonium production", **invited talk**, Quarkonia As Tools - Centre Paul Langevin, Aussois (Francia), 13-19 January 2019.
- [7] "Opportunity to contribute in the search of Dark Matter", **invited talk**, Mini Workshop for a QCD Facility at the SPS after 2021, CERN, 20 June 2018
- [8] "Measurement of transverse-spin-dependent azimuthal asymmetries in Drell-Yan process at COMPASS ", **talk in parallel session**, XXVI International Workshop on Deep Inelastic Scattering and Related Subjects, Kobe (Japan), 16-20 April 2018
- [9] "Transverse spin effects in Drell-Yan processes", **invited talk**, Transversity 2017 - 6th International Workshop on Transverse Polarization Phenomena in Hard Scattering, Frascati (IT), 11-15 December 2017

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- [10] "The Compass detector potentials for cosmic rays physics", **invited talk**, XSCRC2017:Cross sections for Cosmic Rays@CERN, CERN, 29-31Marzo 2019
- [11] "COMPASS Drell-Yan", **invited talk**, Workshop "Parton transverse momentum distributions at large x: a window into parton dynamics in nucleon structure within QCD", ECT* Trento (IT), 11-15 April 2016
- [12] "Opportunity to contribute in the search of dark matter", **invited talk**, COMPASS beyond 2020 Workshop, CERN, 21-22 March 2016
- [13] "Future measurement of DY at COMPASS", **invited talk**, Transversity2014 - 4th International Workshop on Transverse Polarization Phenomena in Hard Scattering, Cagliari (IT), 09-13 June 2014
- [14] "Future TMD DY measurements at COMPASS-II", **invited talk**, CLAS12 3rd European Workshop, Glasgow (Scotland, UK), 20-22 June 2013
- [15] "Polarized Drell-Yan measurements at COMPASS II", talk in parallel session, DIS2013 - 21th International Workshop on Deep-Inelastic Scattering and Related Subjects, Marsiglia (FR), 22-26 April 2013
- [16] "COMPASS future", **plenary talk**, Spin2012 - 20th International Spin Physics Symposium, Dubna (Russia), 17-23 September 2012
- [17] "COMPASS Drell-Yan Proposal", Polarized DY Physics Workshop, Santa Fe (USA), 31 October 2010
- [18] "Spin physics in DY processes: past, recent and future experiments" invited talk, IWHSS08 - VII International Workshop on Hadron Structure and Spectroscopy, Torino (IT), March 2008
- [19] "Fast Photon-Detection for COMPASS RICH-1", talk, 0th ICATPP International Conference on Astroparticle, Particle, Space Physics, Detectors and Medical Physics Applications, Como (IT), 08-12 October 2007
- [20] "The Atmospheric Monitoring with LIDAR for the Pierre Auger Observatory", poster, International Conference "Thinking, Observing and Mining the Universe", Sorrento (IT), 22-27 September 2004

[21] "The atmospheric monitoring for the Pierre Auger Observatory", Talk awarded as "best young physicist's contribution, Frontier Science 2004 - Physics and Astrophysics in Space, Frascati (IT), 14-19 June 2004