

MIGLIORE ERNESTO - CURRICULUM VITAE

Education

1994-1996: Grant for a Ph.D. in Physics, Università di Torino (IX cycle).

1993: Degree in Physics, Università di Torino (grade: 110/110 cum laude and honors).

Work Experience

Since January 2014: Abilitazione Scientifica Nazionale/Professore I fascia, S.C. 02/A1 (valid until 23.01.2023).

Since November 2010: Associate Professor (FIS/01) at Dipartimento di Fisica, Università di Torino.

2002-2010: Researcher (FIS/01) at Dipartimento di Fisica Sperimentale, Università di Torino.

2001-2002: Research grant at Dipartimento di Fisica Sperimentale, Università di Torino.

1999-2000: Fellowship in Particle Physics at the EP division of the European Organization for Nuclear Research (CERN).

1997-1998: Post-doctoral scholarship for experimental physicists from the Istituto Nazionale di Fisica Nucleare (call 6076/96).

Awards

2014: "Una Tantum - year 2012" (art.29 paragraph 19 of L240/2010) for permanent researchers for the term 2008/09-2010/11 from Università di Torino.

2017: "FABR" (art.1 paragraph 295 of L232/2016) for associate professors (€ 3 000) from MIUR.

Mentoring

- supervisor of 5 Ph.D. students;
- line manager of 4 research grants.

RESEARCH ACTIVITY

My main scientific interest is the experimental physics of elementary particles, specifically the tests of the Standard Model in experiments at particle accelerators. From 1993 to 2004 I participated in the DELPHI experiment at the LEP electron-positron collider at CERN in Geneva. Since 1998 I am a member of the CMS experiment at the LHC proton-proton collider, also at CERN, and since 2014 I am involved in the upgrade of the experiment for the high luminosity LHC (HL-LHC) operations foreseen for 2027. Since 2016 I am also participating in the NA62 fixed target experiment at the SPS accelerator at CERN for the measurement of the ultra-rare decay $K^+ \rightarrow \pi^+ \nu \bar{\nu}$.

My research activity has been carried out in collaboration with Istituto Nazionale di Fisica Nucleare (INFN).

1993-2004: member of the DELPHI Collaboration (about 500 authors).

Responsibilities and coordination appointments:

- 1994-1996: in charge of the on-line monitoring of the electromagnetic calorimeter (luminometer) STIC;
- 1995: representative of the DELPHI experiment at the "LEP2" workshop in the "Interaction Regions" group (ref. CERN Yellow Report CERN-96/01);

- 2000-2004: convener in DELPHI of the "4f physics" analysis group (10 FTE) for the investigation of the Standard Model four-fermion processes during the run of LEP at $\sqrt{s}=200$ GeV.

1998-present: member of the CMS Collaboration (about 2200 authors).

Responsibilities and coordination appointments:

- 1999-2000: author of the section of the Addendum to the Technical Design Report of the CMS Tracker defining the specifications of the silicon microstrip sensors (CERN/LHCC 2000-016);
- 2004-2005: manager in the INFN/Sezione di Torino for the production of 500 modules of the Tracker Inner Barrel (TIB) and of the Tracker Inner Discs (TID);
- 2006-2007: co-chairman of the session Experimental Aspects in the "Workshop on Monte Carlo, physics and simulation at LHC" promoted by the CSN4 of INFN (ref. "Frascati Physics Series" ISBN 978-88-86409-58-2);
- 2007-2008: in charge of the description of the Tracker Inner Discs detector in the simulation and reconstruction software of the CMS experiment;
- 2009-2010: coordinator of the working group in charge of the offline alignment procedures of the Tracker during the initial phase of data taking (15 FTE);
- 2009-2012: national co-coordinator of the physics activities of the INFN groups of the CMS Collaboration;
- since 2018: coordinator of the working group on Tracker simulation studies for the upgrade for the HL-LHC (10 FTE);
- since 2018: team leader of the CMS Tracker group in Torino (8 FTE) and member of the Tracker Institution Board; within the Inner Tracker upgrade, the Torino group is committed to developing and testing the front-end readout circuit, qualifying the modules, and assembling and testing the central part (barrel) of the detector.
- since 2020: coordinator of the task force on the performance of the sensors for the Inner Tracker for HL-LHC.

2014-16: participation in the MIUR/PRIN project H-TEAM ("H-TEAM: Trigger, Advanced Electronics and Innovative Methods for Precision Measurements in the Higgs sector at LHC" - prot. 2012Z23ERZ).

Responsibilities and coordination appointments:

- manager of the local INFN team "PRIN H-TEAM";
- manager of the local Research Unit (Torino) for the accounting of the project.

2016-present: member of the NA62 Collaboration (about 200 authors).

Responsibilities and coordination appointments:

- since 2017: deputy team leader of the Torino group;
- 2019: supervision of a post-doc student for implementing the official code for the reconstruction of the tracks in the GigaTracker beam spectrometer.

2018-today: participation in the project of the Department of Excellence 2018-2022 - PHYSICS

Responsibilities and coordination appointments:

- within the work package "Development of innovative sensors", in charge of the purchase of an X-ray diffractometer (specs: 60 kV, 3000 W) for the qualification of silicon detectors under a high flux of ionizing particles and the irradiation of integrated circuits with Total Ionizing Dose rate up to 30 kGy/h.

In my scientific career, I have become an expert in the development of silicon detectors for tracking charged particles in HEP experiments (CMS Tracker, NA62 GigaTracker, and CMS Tracker upgrade for the HL-LHC) in all respects: from designing the detector based on specific physics requirements to the R&D of sensors and readout electronics, from the construction of the detector to the studies of the performance with the data collected in the experiment, from the development of high-level observables (e.g., algorithms for determining the absolute scale of the momentum of the measured particles) to their use in physics analyses.

Currently, my research activity is focused on the upgrade of the CMS Tracker for HL-LHC. To resolve the 200 proton-proton interactions expected on average at each beam crossing, CMS will adopt for the region closest to the interaction point a hybrid pixel detector (Inner Tracker) in which sensor and readout electronics are manufactured independently. As part of this activity, I have carried on simulation studies for defining the specifications of the Inner Tracker (geometry of the pixel cells, parameters of the readout electronics, layout of the detector in terms of placement of the sensors and passive material). Within the activities funded by the grant PRIN H-TEAM, I have started, both locally and in the CMS Collaboration, a synergic activity between the designers of the front-end circuit (CERN/RD53 Collaboration) and the physicists involved in the simulation studies on the Inner Tracker. This synergy provided some key inputs for the choice of the front-end architecture made by CMS in May 2019.

Bibliometric Indexes on 07.06.2021 (source: ISI Web of Science)

ORCID: 0000-0002-2271-519

Total number of peer-reviewed publications (proceedings excluded): 1337.
Total number of citations, without self-citations: approximately 47 000 in 15 years (2007-2021).
h-index: 105 at 15 years (2007-2021): 104.

COMMISSIONS OF TRUST

- member of the "Register of Expert Peer Reviewers for Italian Scientific Evaluation" (REPRISE);
- reviewer of research products for the VQR 2011-2014 procedure;
- reviewer of projects for the MIUR FARE 2016 program (Gazz. Uff., serie generale, n. 299 23.12.2016);
- reviewer of a project of the Minerva-Weizmann-Program (2019) of the Max Planck Society <https://www.minerva.mpg.de/weizmann>;
- reviewer (11 projects) and rapporteur (3 projects) for the INFN Fellini Fellowship 2019 program, co-funded by the European Union (H2020-MSCA-COFUND GA No. 754496 - three-year fellowships with a gross amount of € 50 520/year);
- referee for Journal of Instrumentation (ISSN 1748-0221);
- referee for Physics Letters B (ISSN 0370-2693);
- referee for the proceedings of the conferences "10th International Conference on Large Scale Applications and Radiation Hardness of Semiconductor Detectors (RD11)" (Proceedings of Science vol. 143), and "International Workshop on Semiconductor Pixel Detectors for Particles and Imaging (PIXEL2016)" (JINST 12 C05011).

TENDER BOARDS MEMBERSHIP

- tender for the supply of an X-ray source, Università di Torino C.I.G n. 81319823D6 (supply amount: € 90 000);
- tender for the supply of an X-ray source, INFN Sezione di Pisa C.I.G. n. 8169364470 (supply amount: € 84 000).

SCIENTIFIC DISSEMINATION ACTIVITIES

Chairman of the local organizing committee for eleven editions (2005-2015) of the Masterclass in Particle Physics, a training and dissemination event aimed at high school students (about 100 students/year in Torino), carried out in collaboration with INFN and coordinated by the International Particle Physics Outreach Group (project funded by MIUR under law 6/2000, ref. PANN14T3_00336).

INSTITUTIONAL AND ORGANIZATIONAL ACTIVITIES AT UNIVERSITÀ DI TORINO

- 2012-2015: elected member of the Giunta of the Physics Department;
- since 2013: co-coordinator of the Nuclear and Subnuclear Physics curriculum of the Master's Degree in Physics;
- since 2014: member of the board for assigning of the scholarships (Art.11) for part-time collaborations of students enrolled in Physics (chairman of the Board in 2014, 2018, and 2019); scholarships awarded/year: 70;
- since 2015: member of the Commissione Monitoraggio e Riesame of the Corso di Studi in Fisica;
- chairman of two boards for the assigning MIUR/Università di Torino research grants;
- 2020: member of the board for admission to the Ph.D. program in Physics (XXXVI cycle).

