

Curriculum Vitæ

Prof. Mario Giordani

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Personal Details

Nationality: Italian

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Education

17.02.1997: Degree in Physics (110/110 *cum laude*), Università degli Studi di Trieste

20.02.2001: Ph.D. in Physics, Università degli Studi di Padova

Foreign Languages

- English (fluent)

Career

05.2001 – 10.2003: Postgraduate Researcher of the University of California, Davis (U.S.A.)
based at Fermi National Accelerator Laboratory (Batavia, Illinois – U.S.A.)

09.2003 – 09.2008 post-doctoral reasearch assistant at Università degli Studi di Udine

12.2008 – 11.2009: post-doctoral reasearch assistant at Università degli Studi di Udine

01.2010 – 07.2010: Scientific Consultant at the Abdus Salam International Centre for Theoretical Physics (Trieste)

06.2011 – 11.2016: Assistant Professor of Expertimental Physics at the Università degli Studi di Udine

12.2016 – Current: Associate Professor of Experimental Physics at the Università degli Studi di Udine

Professional Qualifications

- Level 3 authorised Radiation Protection Expert (RPE)
- RPE for the INFN Gruppo Collegato di Udine since 01.07.2017
- RPE for the Università degli Studi di Udine since 01.08.2017

Scientific Activity

- 1992: CERN Summer Student (tutor: Prof. L. Rolandi); development of a software for low-momentum track reconstruction for the Time Projection Chamber of the ALEPH experiment.
- 1995–1997: research activity within the DELPHI (CERN) Collaboration focused on the effect of Bose-Einstein correlations in high-multiplicity hadron production and modelization of the hadronization process (results collected in the thesis degree, Università degli Studi di Trieste, supervisor: Prof. P. Poropat)
- 1996–1997: study of medical applications of phase-contrast imaging (results presented at the discussion of the thesis degree, Università degli Studi di Trieste, supervisor: Prof. E. Castelli).
- 1997: collaboration with the Laboratoire de l'Accélérateur Linéaire (LAL), Orsay (Paris) for the development of a small Time Projection Chamber for the commissioning of the PEP-II accelerator at SLAC; participation to beam tests at CERN.
- 1998–2009: research activity within the CDF Collaboration (FNAL).
 - 1998–2001: search targeting a light, hadronically decaying Higgs boson at the beginning of Run II which led to the definition of a trigger strategy that, instead of relying on the performance of a new vertex detector (at that time still under commissioning), complemented calorimetric requests with the identification by means of low momentum leptons of the b-jets originating from the Higgs boson decay. The work has been collected in my Ph.D. dissertation entitled "A Run II Trigger Design for Higgs Boson Search at CDF" (supervisor: Prof. G. Busetto).
 - 2001–2009: activity in exotic physics, with particular reference to multi-lepton final states, that led to an improvement of the exclusion limits set on the chargino-neutralino supersymmetric production. The personal contribution focused on the $e\text{-}\mu$ channel and the revision of the trigger strategy.
 - 2002–2005: responsible of the dilepton triggers for exotic searches, for which I designed a substantial reconfiguration that led to an enhanced acceptance and better management of the collected data.
- 2006–Current: research activity within the ATLAS Collaboration (CERN).
 - 2006: preliminar studies on single quark top production in association with a W boson at LHC.

- 2006–2008: responsible of the online monitoring of the pixel detector. During my mandate I wrote the software decoding the data coming from the back-end electronics and producing a graphical representation of the main detector parameters. This software was validated during the cosmic runs and successfully used in the commissioning phase of the detector since mid 2008 and in the subsequent runs of data-taking.
- 2008–2017: local responsible for the development dedicated to radiation-tolerant pixel detectors to be used in the programme for upgrading and eventually replacing the inner tracker. Initially within the ATLAS 3D Collaboration, the activity focused on the construction of the IBL (Insertable B-Layer), a fourth instrumented layer installed in 2014 between the innermost part of the pixel detector and a new, narrower beam-pipe. It then continued as INFN RD_FASE2 with the development of the new inner tracker for the high-luminosity Phase-2 of LHC. The activity, in collaboration with Fondazione Bruno Kessler Trento, CERN and Institut Jožef Stefan (Ljubljana – Slovenia), aimed at optimizing the design of semiconductor sensors characterized by columnar electrodes (of which IBL represents the first application in high energy physics) by means of numerical simulations, experimental characterizations and beam tests.
- 2011–2014: activity aimed at searching for new physics evidence of the production of supersymmetric partners of the the top quark in events characterized by two leptons in the final state. My personal contribution was mainly related to the implementation of a data-driven method for estimating the hadronic backgrounds induced by the misidentification of leptons. This procedure was crucial for the success of the analysis and its subsequent developments; the same method was exploited beyond its original scope in analyses based on topologically similar events.
- 2013–2015: coordinator of the Data Quality Monitoring for the pixel detector, with the responsibility of signing off the data collected by the detector. I managed and developed the dedicated software, which required continuous iterations with the data acquisition, data preparation and offline software teams.
- 2014–2018: responsible and developer of the bytestream converter of the pixel detector, with the main task of integrating the IBL and updating the software in order to match the upgrades in the back-end electronics of the pixel detector. Due to the critical nature of the software, all modifications required extensive commissioning steps.
- 2015–2016: Deputy Project Leader of the pixel detector. As such, I took part in all decision-making processes concerning the operation and maintenance of the detector, coordinating an international collaboration of about 50 institutes. I was co-responsible of the approval of all published results and I took part in all performance studies of the detector.
- 2017–2021: national coordinator of the INFN project for the construction of the new, all-silicon inner tracker for the high-luminosity programme (ITk). The project involves eight institutes (about 50 collaborators) that are engaged on a variety of activities spanning from research and development to the construction and qualification of a complete end-cap pixel detector which, in terms of size and characteristics, is the largest instrument of this kind ever built in Italy. During my double mandate I led all

discussions with the funding agency (INFN) in order to define the project goal and budget (about 10M€) and to establish the role of the participating institutes.

- 2018–Current: local coordinator of the INFN FASE2_ATLAS ITk project dedicated to the quality control of about $\frac{1}{3}$ of the hybrid pixel modules that will equip the detector to be built in Italy.

Contributions to International Schools and Conferences

- “*The Search for the Higgs Boson at the Tevatron*”, invited talk, Planck02 – Fifth European Meeting – From the Planck Scale to the Electroweak Scale “Supersymmetry and Brane Worlds” (Kazimierz – Poland, 24–29.05.2002)
- “*Higgs and SUSY Searches at CDF*”, invited talk, RTN Workshop – “The 3rd generation as a probe for new physics” (Rome, 16–19.12.2002)
- “*Search for new particles or gauge bosons decaying into dileptons/dijets at the tevatron*”, invited talk, HEP 2003 – International Europhysics Conference on High-Energy Physics (Aachen – Germany, 16–19.07.2003)
- “*Beyond the Standard Model physics at the Tevatron*”, lecture at the 8th Hellenic School on Elementary Particle Physics (Corfu – Greece, 4–11.09.2005)
- “*Top Physics at LHC*”, invited talk, XIV International Workshop on Deep Inelastic Scattering (Tsukuba – Japan, 20–24.04.2006)
- “*Charge Asymmetry in Top Pairs at ATLAS*”, invited talk, 36th International Conference on High Energy Physics (Melbourne – Australia, 4–11.07.2012)
- “*Overview of the ATLAS Insertable B-Layer*”, invited tal, 36th International Conference on High Energy Physics (Melbourne – Australia, 4–11.07.2012)
- “*The Upgraded Pixel Detector of the ATLAS Experiment for Run-2 at the LHC*”, invited talk, 38th International Conference on High Energy Physics (Chicago – U.S.A., 3–10.08.2014)

Scientific Publications

Author or coauthor of 1300 scientific publications on peer-reviewed journals.

Refereeing Activity

- referee within the Young Researcher Programme “Rita Levi Montalcini” 2017 for the ERC sectore “PE – Physical Sciences and Engineering” (“PE2 2 Particle Physics” and “PE2 1 Fundamental interactions and fields”)
- referee within the Italian Programme for National Relevant Interest Projects (PRIN) 2017 for the ERC sector “PE – Physical Sciences and Engineering” (“PE2 2 Particle Physics” and “PE2 3 Nuclear Physics”)

- referee for the *Journal of Instrumentation* (JINST)

Didactical Activity

Teaching

Twenty-year experience in teaching classical mechanics, thermodynamics and electromagnetism at engineering courses.

Supervision

Supervisor of six theses in Mechanical and Electronic Engineering.

Administrative experience

Didactical committee: nominated member for the Management Engineering course (09.2017–09.2021)