

Curriculum vitae of Simonetta Gentile

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Research Career

- 1974** Degree in Physics with full marks and honours at University of Rome, *La Sapienza*,
- 1978** Diploma Scuola di Perfezionamento in Physics (Nuclear Physics) with full marks and honours at University of Rome, *La Sapienza*,
- 1975-1980** Physics Department fellow, University of Rome, *La Sapienza*,
- 1981-1982** CERN fellow, particle physics experiment division, CERN (Geneva),
- 1981-1988** Researcher at University of Rome, *La Sapienza*,
- 1988-1992** Associate Professor, University of Calabria,
- 1991-1992** CERN visiting scientist, particle physics experiment division, CERN (Geneva),
- 1999-2000** CERN visiting scientist, particle physics experiment division, CERN (Geneva),
- 1992-2010** Associate Professor, University of Rome, *La Sapienza*,
- 2011-2021** Full Professor in Experimental Physics, University of Rome, *La Sapienza*.
- 2011-present** Scientific associate of National Institute of Nuclear Physics - INFN

Academic responsibilities

- since 1976** Scientific associate of National Institute of Nuclear Physics - INFN
- since 1980** Scientific associate of European Center of Nuclear Physics - CERN
- 2015-2016** Member of Sapienza Committee for large scientific infrastructure acquisition.
- 2016-2018** Rector's Delegate for Recognition and development of National and International Research Collaboration.
- 2015- 2016** Member of Sapienza Committee for large scientific infrastructure acquisition.

- 2016- 2018** Rector's Delegate for Recognition and development of National and International Research Collaboration.
- 2017-2020** President of Scientific Research Committee of University *La Sapienza*, , funding all research projects of all research fields.
- 2023-present** Member of Scientific Committee of *Fondazione Sapienza*.
- 2023-present** Member of National Selection Committee for the habilitation of Full Professors and Associate professor in experimental particle physics.
 - During all my carrier member of many selection committee for funding and selection of reseachers and professors.

Scientific responsibilities

- 1985-1992** Responsible of calorimetric trigger in L3 experiment
- 1999-2000** Physics Coordinator of L3 experiment held at CERN (1200 physicists and engineers),
- 1995,1997-2003** Member of talk committee and publication committee L3 experiment,
- 2002-2006** Chairperson of talk committee AMS experiment.
- 2006-2010** Responsible of Rome group for the R& D of detectors for future accelerators, in particularly ILC.

Other Scientific Achivements

- Invited speaker and chair of sessions in many international conferences,
- Member of the editorial board of the international scientific journal *Nuovo Cimento*,
- Supervisor of several undergraduate, graduate and PhD students involved in particle physics experiments,
- Organization of congress- The most recent "L'intelligenza artificiale all'incrocio dei saperi, Aspetti scientifici, etici e impatto sociale". University *La Sapienza*,22 February 2024.
- Author of more than *1500 publications* on international scientific journal,
- Hirsch index, *h-index=122* (source: Web of Science).

Research Activities

- **Charm particle search in neutrino interactions**

1974-1978. E247 experiment at Fermilab, to search charm particles produced in neutrino interactions using a hybrid technique of nuclear emulsion and electronic detectors. The first charm decay was detected.

- **Charm particle search in hadronic interactions**

1980-1987. EHS collaboration (experiments NA16, Na27) to study the production and decay of heavy flavours in πp and pp interactions using the SPS beam. These experiments used a hybrid technique: high resolution bubble chamber.

- **Electron-positron collision physics (LEP): L3 experiment**

1985-1992. *Hardware activity*: **Responsible** for the design, installation and running of **calorimetric trigger**.

1993-2000. *Data Analysis* Lepton τ production (cross section and asymmetry) from the Z decay. Co-author of a review paper entitled *Physics of Tau Lepton*, S. Gentile and M.Pohl, Phys. Rep. 274 (1996) 287. Study of characteristics of W bosons: mass, decay branching ratios and couplings, focusing on decay channel of $W \rightarrow \tau\nu$. At center-of-mass energy 208 GeV, my attention was directed to the $e^+e^- \rightarrow W^+W^-\gamma$ to investigate the anomalous quartic couplings.

1998-2000. I served as *L3 Physics Coordinator* in 1999/2000, as the LEP reached the highest center-of-mass energy 208 GeV.

- **Astroparticle: Alpha Magnetic Spectrometer installed on International Space Station (ISS)**

2001-2010. *Transition Radiation Detector*. I pushed for the participation of a group of scientific of my university and INFN to the Space experiment AMS. The collaboration, led by the Nobel Prize prof Samuel Ting of the Massachusetts Institute of Technology (MIT), was conceived for building an innovative cosmic rays spectrometer to be installed on ISS. The experiment provides a high statistics measurement of charged elementary particles in the Space, a sensitive search for cosmic antimatter (anti-helium) and dark matter. Today, the AMS results are considered a breakthrough in the Physics study of cosmic rays.

I collaborated with the MIT group on the design, construction and test of the Transition Radiation Detector, with specific responsibility to develop the electronic of the slow control of the gas system. This detector is designed to disentangle protons/antiprotons from positrons/electrons with a rejection factor, combined with the electromagnetic calorimeter better than 10^{-6} in an energy range from 1.5 GeV to 300 GeV. A tiny variation of gas density will correspond to a gain variation and consequently to a reduction of rejection factor. I designed and fixed the system parameters of the slow control electronics. The detector is still perfectly functioning and taking data, today on ISS.

- **Innovative particle detectors for future accelerators**

2006-2010 *Silicon Photomultiplier*: In 2006 I proposed a pionering R&D activity on calorimetric detectors for future accelerators. The idea was to reveal the light in the calorimeter by silicon photomultiplier (SiPM), sensitive to few photons. I performed the study and characterization in laboratory of these detectors that today are used in a wide area spread from Medical to the Space Physics and Astrophysics.

- **Proton-proton collision physics (LHC):ATLAS experiment**

1996-2001 *Hardware activity*: I collaborated to the construction of MDT for the barrel modules, responsibility of Rome group with other Universities.

2004-2012. *Analysis data preparation and Phenomenological studies*. In these years was interested to investigate the possible discovery of supersymmetric h

neutral Higgs boson (CP-pair) decaying in muon pair (Eur. Phys. J.C 229-245 (2007) and MSSM Higgs bosons decaying into SUSY cascade, as neutralino or chargino, with a final state of four leptons and missing transverse energy (ATL-PHYS-PUB-2009-079).

I performed phenomenological study on Z' decaying in supersymmetric particles, *Heavy Neutral Gauge Bosons at LHC in an Extended MSSM*, Nuclear Physics B866 (2013) 293-366.

2010-present Data Analysis: My attention was devoted to the study of the Higgs boson produced in association with top quarks at center of mass energy 7 - 8 and 13 TeV, in multilepton final states and hadronic tau decay in ATLAS. The results have been published in Phys. Rev. D 97 (2018) 072003 with an integrated luminosity 36.1 fb^{-1} and the publication with 140 b^{-1} is expected soon. Other my contribution are on measurements of total and differential production cross-sections of $t\bar{t}W$, which the publication is expected in the next months.