CV: Mario Pietro Carante, PhD

Personal Information

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I got my M.Sc. title in Physics in 2013 at the University of Pavia (110/110) with a computational thesis in the framework of the AEgIS experiment at CERN. I got my PhD in Applied Physics in 2017 at the University of Pavia, with Prof. Francesca Ballarini as Supervisor, and currently I have a post-doc research position. During the PhD I have been working on the development of a biophysical model, implemented as a Monte Carlo code, to simulate the effects of ionizing radiation on biological tissues. I applied the model in the framework of cancer hadrontherapy, focusing on the evaluation of the biological effectiveness of protons and carbon ions along therapeutic beams, and I contributed to make the model suitable for an interface with radiation transport codes; to this aim, a collaboration has just started with the FLUKA group. The research activity has been performed in collaboration with institutions like CNAO, CERN and ENEA and within different INFN experiments. I published 10 papers, delivered 6 conference presentations and took part in various didactic and educational activities. I received two travel awards, I was co-supervisor for a M.Sc. thesis in Physics and I was member of the Organizing and Local Committees of two conferences. A more detailed information on these issues can be found below.

Current position

Post-doc fellow (Supervisor: Francesca Ballarini) in Applied Physics at the University of Pavia, for research activities in the framework of the modelization of radiation-induced biological effects, with applications for cancer hadrontherapy.

Awards, honors and research projects

- **November 2016 - now**: Member of the INFN experiment MC-INFN
- **September 2016**: Travel Award by Società Italiana per le Ricerche sulle Radiazioni (SIRR) to present a contribution in “42nd Annual Meeting of the European Radiation Research Society (ERRS2016)”, Amsterdam, The Netherlands
- **May 2016**: Co-supervisor for the MSc thesis in Physics by Laura Pederzoli, Università degli Studi di Pavia, 2016
- **April 2016 – now**: Member of European Radiation Research Society (ERRS), 2016

- **September 2015**: Member of the Local Committee of the "VIII Young Researchers BNCT Meeting", Pavia, Italy
- **May 2015**: Travel Award by Società Italiana per le Ricerche sulle Radiazioni (SIRR) to present a contribution in "15th International Congress of Radiation Research", Kyoto, Japan
- **January 2015 – now**: member of the INFN experiment ETHICS (pre-clinical Experimental and THeoretical studies to Improve treatment and protection by Charged particleS)
- **November 2014:** Member of the Organizing Committee of "XVI Convegno Nazionale della Società Italiana per le Ricerche sulle Radiazioni", Pavia, Italy
- **November 2014 – Now**: Member of Società Italiana per le Ricerche sulle Radiazioni (SIRR)
- **November 2013 – December 2014**: Member of the INFN experiment NeTTuNo (NEuTron capTUre therapy of thoracic tumors with New fOrmulations)
- **November 2012 – February 2013:** business trips at CERN, Geneva, for data acquisition in the framework of the AEgIS experiment
- **September 2012 - April 2013:** stage at Istituto Nazionale di Fisica Nucleare (INFN)

Teaching and outreach activities

- Tutor for *Mechanics*, Bachelor course in Physics, University of Pavia (2016/17)
- Seminar and posters for "Notte Europea dei Ricercatori" 2016
- Oral presentation for "Incontri del Martedì": Francesca Ballarini and Mario Pietro Carante, *Radiazioni ionizzanti: effetti biologici e applicazioni biomediche*, December 2015
- *Famelab* educational presentations for high school students (2015 and 2016)
- Tutor for *Applied Physics*, Bachelor courses in "Professioni Sanitarie Tecniche" of the Faculty of Medicine, University of Pavia (2014/15 and 2015/16)
- Didactic seminars for *Fundamental of Physics*, Bachelor course in Natural Sciences, University of Pavia (2014/15, 2015/16 and 2016/17)

Conferences and meetings

- MC-INFN collaboration meeting, Roma, Italy, 7 April 2017 (with **oral presentation**)
- International symposium on ion therapy, Milano, Italy, 3-4 November 2016
- FLUKA collaboration meeting, CERN, Geneve, Switzerland, 17-18 October 2016 (with **oral presentation**)
- XVII Convegno Nazionale SIRR, Trento, Italy, 25-27 September 2016 (with **oral presentation**)

- 42nd Annual Meeting of the European Radiation Research Society (ERRS2016), Amsterdam, Netherlands, September 4-8 2016 (with **poster presentation**)

- 55th Annual Conference of the Particle Therapy Co-operative Group (Prague, Czech Republic, 22-28 May, 2016) (with **poster presentation**)

- 61th Annual Meeting of the Radiation Research Society (Weston, Florida, USA, 19-22 September 2015) (with **poster presentation**)

- 15th International Congress of Radiation Research (Kyoto, Japan, 25-29 May 2015) (with **poster presentation**)

- XVI National Convention of the Italian Society for radiation Research – SIRR (Pavia, 7-8 November 2014 (with **oral presentation**)

- Collaboration Meeting for the AEgIS experiment (CERN, Geneva, June 2013) (with **oral presentation**)

Education and training

16/02/2017 – PhD degree in Physics
- Athenaeum: University of Pavia
- Thesis title: *Biophysical modelling for cancer ion therapy*
- Supervisor: Francesca Ballarini
- Description: a biophysical model, implemented as a Monte Carlo code, was developed to simulate the effects of ionizing radiation on biological tissues. The model was applied in the framework of cancer hadrontherapy, focusing on the evaluation of the biological effectiveness of protons and carbon ions along therapeutic beams

12-13 May 2016 – Workshop: La Radiobiologia in INFN, Trento, Italy

29 April 2015 – *Seminar on Research Activities in Hadrontherapy*, CNAO, Pavia, Italy

1-4 October 2014 – *International School on Heavy Ions – III Course on Hadrons in Therapy and Space*, Erice, Italy

19-20 September 2014 – Workshop: *Hadrontherapy: a new frontier for cancer treatment*, CNAO, Pavia, Italy

17-18 December 2013 - Workshop: *Status and Future Perspectives of Charged Particle Therapy*, CNAO, Pavia, Italy

30/04/2013 – Master degree in Physics
- Athenaeum: University of Pavia
- Course: Nuclear and Subnuclear Physics
- Thesis title: *Neural Network Reconstruction Algorithms for Annihilation Events in an Antigravity Experiment*
- Supervisor: Alberto Rotondi; Cosupervisors: Andrea Fontana and Pablo Genova

- Description: within the Data Analysis Framework ROOT by CERN, based on C++, I developed a neural network able to reconstruct particle tracks with the aim of identifying the antihydrogen annihilation vertex in the AEgIS experiment, in order to make possible the first direct gravity measurement on neutral antimatter
- Grade: 110/110

25/02/2011 – Bachelor degree in Physics
- Athenaeum: University of Pavia
- Thesis title: *Terrestrial Gamma-ray Flashes*
- Supervisor: Patrizia Caraveo; Cosupervisor: Andrea de Luca
- Description: I gathered in a unique work most of the observations, studies and conclusions on Terrestrial Gamma-ray Flashes (TGFs), bursts of photons originating in the terrestrial atmosphere in association with thunderstorms
- Grade: 106/110

12/07/2007 – Scientific High School degree
- Institute: Liceo Scientifico Niccolò Copernico
- Grade: 100/100

Personal skills and competences

English Language
- Speaking: Good
- Writing: Advanced
- Certificates: First Certificate in English; Preliminary English Test (PET)

Computer skills
- Knowledge of the Office package and use of advanced Excel and Powerpoint functionalities
- Operative Systems: Linux –Ubuntu; Windows
- Programming languages: Python, C++, FORTRAN