Prof. Dr. PARMIGIANI FULVIO
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Italian
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• EDUCATION

1973: Doctor in Physics (Laurea)- Faculty of Science, Department of Physics, Università degli Studi di Milano, Milano, ITALY.

• CURRENT POSITIONS

2005 – Present: **Professor of Physics**
Department of Physics - Director- Università degli Studi di Trieste (I)
2013 – Present: **Visiting Professor, University of Cologne (D)**.
1997 – Present: **Research Associate Elettra Sincrotrone Trieste -Trieste (Italy).**

• PREVIOUS POSITIONS

1976-1984: Division of Quantum Optics- CISE -Milan-Italy.
1984-1985: Visiting Scientist- IBM Research Center, CA.,USA.
1986-1988: Head Surface Physics Section - CISE -Milan -Italy.
1989-1990: Visiting Scientist- IBM Almaden Research Center, CA., USA.
1991-1993: Senior Scientist at CISE - Milan -Italy.
1994-1997: Full professor of physics at the Polytechnic of Milan - Italy.
1997-2005: Full professor of physics Catholic University Brescia - Italy.

• MAJOR VISITING APPOINTMENTS

- 1977(Summer): Visiting researcher at the CERL (UK)
- 1987(Spring): Visiting scientist -Department of Chemistry, UC Berkeley (CA).
- 2001(Summer) Visiting scientist -Department of Physics, Stanford University (CA)
- 2002-2012: Summer visiting scientist - LBNL Berkeley, CA.
- 2001-2016: Affiliate LBNL - Berkeley, CA.

• MEMBERSHIPS

Fellow American Physical Society

- **FELLOWSHIPS AND AWARDS**

1973: Angelo Della Riccia Fellowship for the Laurea Thesis.
2012: Awarded of the 2012 "Zernike Chair Award" by the University of Groningen.
2013-present: Honorary Professor of the Faculty of Natural Science at the University of Groningen (NL).
2013-present: Appointed as Visiting professor at the International faculty of the University of Cologne (D).
2013: Fellow, American Physical Society.
2014: Awarded with the "Marco Polo Prize" by the Italian Embassy of Japan and the Kyoto Prefecture.

- **TEACHING**

-1994-1997: Polytechnic of Milan: classical mechanics; elettrodynamics .
-1997- 2005: Faculty of Science at the Catholic University: classical mechanics; elettrodynamics; atomic physics; solid state physics.
-2005-present: Faculty of Science at the Università degli Studi di Trieste: elettrodynamics; optics; quantum optics; radiation-matter interaction; spectroscopy.

- **SUPERVISION OF GRADUATE STUDENTS (2010-2015)**

10 PhD Students;
15 Master Students.

- **MAJOR CONTRIBUTION TO THE EARLY CAREER OF EXCELLENT RESEARCHERS (2005-2015)**

Post-Doc
Dr. Daniele Fausti - PhD University of Groningen (NL)- post-doc CFEL Hamburg Dr. Alberto Crepaldi –PhD EPFL Lausanne (CH); Dr. Federico Cilento – PhD University of Trieste; Dr. Marco Malvestuto – PhD University of Bologna; Dr. Martina Dell'Angela – PhD University of Trieste – CFEL Hamburg; Dr. Cephise Chaco - at present staff researcher at Artemis FAP STFC Rutherford Appleton Laboratory Harwell Oxford, Didcot (UK); Dr. Goran Zgrablic - at the present Assistant professor at the Polytechnic University of Pula (Croatia). Dr. Barbara Ressel - at the present Researcher at the University of Nova Gorica (Slovenia).

PhD
Dr. Alberto Simoncig - PhD Trieste, CFEL Hamburg, FERMI Sincrotrone Trieste. Dr. Emanuele Pedersoli: PhD. University of Milan- Post doc. LBNL (Berkeley), FERMI Sincrotrone Trieste. Dr. Emanuela Carleschi -PhD University of Trieste - Lecturer University of Johannesburg (S.A.); Dr. Giacomo Coslovich, PhD Trieste, LBNL (Berkeley) an and SLAC (Stanford). Dr. Novelli Fabio, PhD. University of Trieste, Swinburne University of Technology - Melbourne (Au); Dr. Valentina Capogrosso, PhD. -Politecnico Milano.

- **RESEARCH EXPEDITIONS (2000-2015)**

Free Electron Laser

Conceptual design and science cases of LUX (LBNL), FERMI@Elettra and NGLS (LBNL)-FEL photon beam transport-Photon beam diagnostics-FEL experimental end-stations. (See Italian free-electron laser, D. Pile, M.Svandrilk, F. Parmigiani, **NATURE PHOTONICS, 8**, 82-82, 2013 (interview)

Strongly electron-correlated materials, magnetism and HTSCs

Core level (XPS) and valence band (ARPES- RIXS) electronic structure-Magnetic properties (XMCD and XMLD)-Photo-induced phase transitions and non-equilibrium physics-Copper based high temperature superconductors-Phase transition in manganites and ruthenates.

Time-resolved optical and photoelectron spectroscopy

Super-continuum time resolved optical spectroscopy - Time resolved photoemission (linear and non-linear) - Time and spin resolved photoemission - Image potential states in metals and graphite. The research is devoted to elucidate the ultrafast processes in condensed and soft matter and their applications in technology. In particular, to study transient states and photo-induced phase transitions in superconductors (dynamics of quasi-particles, photon-boson interactions and the interplay between magnetism and superconductivity), magnetic materials (dynamics of the magnetic excitations) and electron correlations in hard- and soft-condensed matter (charge transfer and phonon assisted excitations).

• INSTITUTIONAL RESPONSIBILITIES

- 1986-1989 : Responsible of the surface physics laboratory of CISE Milan (I).
- 1998- 2013: Group leader of the beamline BACH - Elettra Trieste (I).
- 2000- 2005: Area leader of the electronic structure and magnetism group at Elettra.
- 2003- 2015: Head science program FERMI free electron laser facility.
- 2015-present - Director Department of Physics -University of Trieste.

• COMMISSIONS OF TRUST

- 2009: Technical Advisory Committee for the New Light Source (UK)
- 2009-2013: Member Scientific Advisory Committee of the SLS- PSI (CH)
- 2009: Scientific Advisory Committee Photon Factory–KEK Tsukuba, (J).
- 2012: UE56/1-BL (FEMTOSPEX, SGM) Review Panel BESSY II -Berlin (D).
- 2010-present: Chair of the Kai Siegbahn Elsevier award committee.
-2012-2015: Artemis FAP-STFC Rutherford Appleton Laboratory, Didcot (UK).
-2015-present: LCLS Review Panel -SLAC - Stanford

• LEADING OF MAJOR PROJECTS

2003-present: **Leading the science programs for the FERMI FEL**. The FERMI light source is a novel and advanced free electron laser based on the HGHG (High Gain Harmonic Generation) external coherent seeding. design for generating fully coherent EUV and soft X-ray pulses. Today FERMI is a unique FEL worldwide considered as the solely generating fully coherent EUV and soft X-ray radiation pulses. The experiments performed on FERMI are published in the major impact factor journals and they from gas phase and dilute system (mass selected clusters) to nano-magnetic materials and X-ray quantum optics. This project was founded from different National and International founding agencies for a budget over M€ 160

See: http://www.elettra.trieste.it/lightsources/FERMI.html.

Along with FERMI a new laboratory for non-equilibrium and time resolved studies and experiments (T-ReX) has been built under my direction and will be operating as a users facility in the FERMI experimental hall. With T-ReX are feasible experiments on time resolved optical spectroscopy and tire resolved ARPES in the sub ps time domain.

See: https://www.elettra.trieste.it/labs/t-rex.html

2003-2007: National Coordinator of a MIUR-FIRB on *Nano- and micro-spectroscopy by synchrotron radiation integrated with advanced STM/AFM systems to study man-made, atomic scale functional materials*.
2003-2005: National Coordinator PRIN Project founded by MIUR (Italian Ministry for Education-University and Research) - *X-ray Magnetic Circular Dichroism (XMCD) and Resonant Inelastic X-ray Scattering (RIXS) experiments on magnetic nano-structures at the BACH beamline on the Elettra storage ring*.
2006-2007: Local Coordinator PRIN Project founded by MIUR (Italian Ministry for Education-University and Research) - *Magnetic Dynamics in Artificial Ferromagnetic Nanostructures.*
2010-2012: National Coordinator PRIN Project founded by MIUR (Italian Ministry for Education-University and Research) - *Phononic Crystals and Evanescent wave spectroscopy in the fs-time domain for measuring the bio-molecular dynamic interactions among angiogenetic factors*. Protocol # 2008JWKYXB

- **MAJOR COLLABORATIONS**

2002-2005: **Accelerator and Fusion Research Division (AFRD) of the Lawrence Berkeley National Laboratory (LBNL)**. Important contribution to the conceptual design of an advanced coherent X-ray radiation source based on a "recirculating" LINAC. This new photon source was aimed at generating sub-picosecond coherent radiations from the EUV up to 10 keV (LUX project). **Particle Accelerator Conference, 2003. PAC 2003. Proceedings** (DOI: 10.1109/PAC.2003.1288874).
2010-2012: **BELLA project** in the frame of the Lasers, Optical Accelerator Systems Integrated Studies (LOASIS) –AFRD, **LBNL Berkeley**) for the construction of a 10-GeV laser-wakefield accelerator module that will provide powerful, intense electron beams with pulses as short as a femtosecond suitable for generating FEL radiation for research in materials science, life sciences, physics, and chemistry:
(http://www.slideserve.com/micheal/progress-with-laser-plasma-acceleration-and-prospects-of-lpa-hep-colliders).
2009-2013: **New Generation Light Source (LBNL**) - Contribution to the Science Case of the NGLS project.
http://www-als.lbl.gov/index.php/als-calendar/event/cWIwNWJrcWtnajRsYmNtb3FhYWVhaGFib3MgbGJsLmdvdl91aDI1ajdvcGZhMmhkczA0cWNnbmdpMHVxY0Bn/3.html?start=1298412000&end=1298415600.
2013-Present: Collaboration with the Physics Institute of Physics of the University of Cologne (D): http://www.ph2.uni-koeln.de/105.html.

➢ SCHOOLS AND MEETINGS 2010-2015 (SELECTED)

- **SCIENTIFIC MEETINGS (2010-2015) INVITED**

- AVS 2015 October 18-23, Novel Trends In Synchrotron and FEL-Based Analysis. San Jose (CA).
- International Conference M2S HTSC 2015 took place from Sunday, August 23 until Friday, August 28 in Geneva, Switzerland.
- E-MRS FALL Meeting, Symposium on Topological Materials, 22-25 Sept., 2014 -Warsaw (PL).
- Advanced Photon Source User Meeting, Workshop "X-rays in the Fourth Dimension" - 5-6 May 2012
- U.S. *Department of Energy* Accelerator and *Detector* Research and Development Program *Contractors' Meeting*, *Annapolis*, Maryland, August 21-23, *2011 (Invited plenary lecture)***.**
- Instructor of Synchrotron Radiation Instrumentation and Applications at the US Particle

Physics Accelerators School, Erice -Sicily (2011).
- Seventh International Symposium on Ultrafast Surface Dynamics-USD7 Croatia 22-26 August 2010 6) 6) 6- International Conference on Edge Topics in Correlated Materials, University of Paris-Sud and Collège de France, (2010).
- Instructor of Synchrotron Radiation Instrumentation and Applications at the US Particle Physics Accelerators School, 2010 - San Francisco, CA.

➢ EDITORIAL ACTIVITY AND PUBLICATIONS

2006-present - **Editor, Nuclear Instruments and Methods in Physics Research A** (Elsevier)
2012-present - **Editor for the Condensed Matter Section of Physics Reports** (Elesevier)
1992- G.F. Pacchioni, P.S. Bagus and **F. Parmigiani**, Eds. of "Cluster Models for Surface and Bulk Phenomena", (Plenum Press, New York, 1992) Serie B Physics vol. 283.
1994- P.S. Bagus, G.F. Pacchioni and **F. Parmigiani**, Eds. of " Core Level Spectroscopy for Magnetic Phenomena"(Plenum Press, New York, 1994) Serie B Physics vol. 345.
2011- **Year Book of Science and Technology, McGRAW-HILL**, 2011.
2016- **Guest Editor for Synchrotron Radiation News**, Special Issue on Seeded Free Electron Lasers.

- **HIGH IF PUBLICATIONS (2011-2015)**

1- Photon number statistics uncover the fluctuations in non-equilibrium lattice dynamics in **Nature. Communications 6**, Article number: 10249 (2015); doi:10.1038/ncomms10249
2- Ultrafast Optical Control of the Electronic Properties of Zr Te 5, **Physical Review Letters**, **115** (20), 207402
3 - *Momentum-Resolved Spin Dynamics od Bulk and Surface Excited States in the Topological* Bi_2Se_3*;* **Physical Review Letters, 114**, 097401 (2015).
1-*Witnessing the formation and relaxation of dressed quasiparticle in a strongly correlated electrons system*, **Nature. Communication. 5**, 5112 (2014).
4- *Ultrafast dynamics of massive Dirac Fermions in bilayer grapheme*, **Physical Review Letters**, **112**, 257401 (2014).
5- **PRL Viewpoint (**PRL 112, 257401(2014) on *Direct view of hot carriers dynamics in graphene*, **Physical Review Letters**, **111**, 027403 (2014).
6 - *Photo-enhanced antinodal conductivity in the pseudogap state of high-Tc cuprates*, **Nature. Communication**, **5**, 4353 (2014).
7- *Tunable Carrier Multiplication and Cooling in Graphene,* **Nano Letters 15**, 326-331 (2014).
8 - *Two stages seeded soft-X ray free electron laser*, **Nature Photonics**, **7**, 913 (2013).
9 - *Speed limit of the insulator-metal transition in magnetite*, **Nature Materials**, **12**, 882 (2013).
10 - *Competition between the pseudo gap and superconducting states in* $Bi_2Sr_2Ca_{1-x}Y_xCu_2O_{8+\delta}$ *superconductor by ultrafast broadband optical spectroscopy*, **Physical Review Letters, 110**, 107003 (2013).
11- *Highly coherent and stable pulses from the FERMI seeded FEL in the extreme ultraviolet*, **Nature Photonics**, **6**, 669 (2012).
12 - Disentangling the electronic and phononic glue in high Tc superconductors, **SCIENCE**, **335**, 1600 (2012).
13 - *Revealing the high-energy electronic excitations underlying the onset of high-temperature superconductivity in cuprates*, **Nature Communications, 2** 1354 (2011).

PUBLICATIONS FULL RECORD:
http://scholar.google.nl/citations?user=zGSSecUAAAAJ&hl=nl&oi=ao

- **REFERENCES**

Prof. Dr. Charles Shank - Former LBNL Director (Berkeley);
Prof. Dr. Andrea Cavalleri - MPI-CFEL Hamburg-University of Hamburg (D); Oxford University (UK).
Prof. Dr. Andrea Damascelli - University of British Columbia (Canada);
Prof. Dr. Norman Mannella - University of Tennessee (USA);
Prof. Dr. Claudio Pellegrini - UCLA (USA);
Prof. Dr. George Sawatzky - University of British Columbia (Canada);
Prof. Dr. Giorgio Margaritondo - École Polytechnique Fédérale de Lausanne (CH);
Prof. Dr. Majed Chergui - École Polytechnique Fédérale de Lausanne (CH);
Prof. Dr. Zhi-xun Shen - Stanford University (USA) and Chief Scientists SLAC;
Prof. Dr. Ingolf Lindau - SLAC and Stanford University (USA);
Prof. Dr. William A. Barletta – MIT (Cambridge, MA.) and USPAS director
Dr. Alexander Zholents - Accelerator Physicist -APS- Argonne Laboratory (USA)
Dr. William Fawley - FEL Physicist (SLAC, CA.);
Dr. Max Zolotorev – Laser and e-beam physicists LBNL (Berkeley, CA.);
Dr. Wim Leemans – AFRD-LBNL (Berkeley, CA.);
Prof. Dr. Dirk van der Marel - Universitè de Genevè (CH);
Prof. Dr. Paul H.M. van Loosdrecht - University of Cologne (D);
Dr. Hermann Duerr – LCLS (SLAC) Stanford University;
Prof. Dr. Maria Novella Piancastelli – Uppsala University (S);
Prof. Dr. Janos Hajdu - Uppsala University (S);
Prof. Dr. David Attwood – UC Berkeley, CA. (USA);
Prof. Dr. Charles Fadley – UC Davis, CA. (USA);
Prof. dr. Giuseppe Pezzotti - Kyoto Institute of Technology (J)

In 1973 he receives the degree of Doctor in Physics (Laurea) at the University of Milan. In 1976 he is with the quantum electronic division of CISE, Segrate (Milan) studying the optical and electronic properties of metal clusters. From 1984-1985 he is visiting scientist at the IBM Research Center of San José, CA., working on the electronic structure of supported metal clusters and metallic layers grown under non-equilibrium conditions. In the meantime he started an experimental activity on the physics of strongly correlated electron systems and HTSCs.
From 1989 to 1990, he returns, as visiting scientist, to the IBM Almaden Research Center, CA.(USA). In 1994 he obtains the full professorship in experimental physics at the Polytechnic of Milan and he works on the dynamics of non-equilibrium electron gas in metals. During the years 1997- 2004 he is professor of condensed matter at the faculty of Science of the Catholic university. From 2004 to present he is professor of condensed matter at the department of physics of the Università degli Studi of Trieste. In 1998 he is national coordinator of the INFM/PRA “Elphos” project to study the dynamics of electronic processes in condensed matter in the sub-ps domain and team-leader of the beamline BACH on the Elettra Synchrotron. In 1998, 2000, 2003, 2005 and 2008 he is national coordinator of the MIUR-PRIN projects on femtosecond time-resolved experiments. From 2001 to the present he is associate with the Lawrence Berkeley National Laboratory, CA., contributing to the science cases of LUX, BELLA and NGLS projects, respectively a X-ray FEL system based on a recirculating LINAC, a X-ray pulsed source based on laser-driven plasma acceleration and a 1 MHz superconducting LINAC for operating ten parallel seeded FELs. In 2003 he starts to coordinate the scientific case for the FERMI FEL at Elettra Sincrotrone Trieste, becoming head of the scientific program up to the present. At the present his major scientific interests are in the fields of non-equilibrium physics, photo-induced phase transitions and

spectroscopies of strongly electron correlated systems, magnetic materials and novel emerging materials.

In 2012 he is awarded with the Zernike Chair at the Zernike Institute of the University of Groningen (the Netherlands). From 2013 he is honorary professor at the Zernike Institute of the University of Groningen (the Netherlands). For the academic years 2013-2017 he is appointed visiting professor of Condensed Matter at the International Faculty of the University of Cologne (Germany). In 2013 he is appointed fellow of the American Physical Society.

He co-authored 240+ articles on the most prestigious journals of physics such as, Science, Nature Materials, Nature Photonics, Nature Communications, Nano-Letters, Scientific Reports, PRL, APL and PRB.

From 2006 he is editor of Nuclear Instruments and Methods In Physics Research (A) and from 2012 he is editor of Physics Letters Reports.