

1. PERSONAL INFORMATION

Name: Alberto Crepaldi

2. EDUCATION

- **01/10/2008 – 31/01/2013** **PhD in Physics**, at the Institute of Physics of the École Polytechnique Fédérale de Lausanne (EPFL), Switzerland. Thesis title: “Strong spin-orbit coupling in low dimensional systems investigated by static and time-resolved ARPES”. Advisors: K. Kern and M. Grioni
- **01/10/2006 – 18/9/2008** **Laurea specialistica in Physics**, 110/110 *cum laude* at the Faculty of “Scienze Matematiche Fisiche e Naturali” of “Università degli studi di Trieste” (UNITS), Italy. Thesis title: “Time dependent dielectric function of photo-excited CuGeO₃”. Advisor: F. Parmigiani.
- **01/10/2003 – 28/09/2006** **Laurea triennale in Physics**, 110/110 *cum laude* at the Faculty of “Scienze Matematiche Fisiche e Naturali” of “Università degli studi di Trieste” (UNITS), Italy. Advisor: F. Parmigiani.

3. EMPLOYMENT HISTORY

- **01/09/2021 – present** **RTDB (Assistant Professor)**, Politecnico di Milano
- **01/12/2015 – 31/08/2021** **Scientist**, in the group of M. Grioni, at the Institute of Physics of the EPFL, Switzerland.
- **01/02/2013 – 30/11/2015** **Postdoctoral Fellow**, in the group of F. Parmigiani, at Elettra-Sincrotrone Trieste S. C. p. A., Basovizza-Trieste, Italy.

4. TEACHING EXPERIENCE

Since 2022 I am qualified with the Italian ASN “Abilitazione Scientifica Nazionale” II Fascia.

Since 2020, I am qualified by the French National Council of Universities as *Maître de Conférences* (MCF) in section 28, Materials and Condensed Matter.

- **2021 – present** **Politecnico di Milano** **“Fondamenti di Fisica Sperimentale”**
For the first year Bachelor students in Mechanical, Energetic and Aerospace Engineering.
Topics: mechanics, thermodynamics, and static electromagnetism.
Duties: lecturing the main course for mechanics, thermodynamics. Exercises for the entire course.
- **2016 – 2021** **EPFL** **General Physics 3 and General Physics 4**
For the second year Bachelor students in Engineering and Physics.
Topics: fluid dynamics, electromagnetism, waves, introduction to quantum mechanics and solid-state physics.
Duties: assistant lecturer in the main course and lecturer responsible for the exercise section.
- **2017 – 2019** **EPFL** **Solid State Physics X: experimental techniques**
Advanced course for PhD students.
Topics: photoelectron spectroscopies, from theory to experiment, with an introduction to ultrafast spectroscopies.
Duties: lecturer.
- **2019 – 2020** **EPFL** **Atoms and Radiation**
For the Master students in Physics.
Topics: nonlinear optics, mode-locked laser, spectrometers and interferometers, light-matter interaction, spectroscopy.
Duties: committee member for the oral exam.

- | • 2013 – 2015 | UNITS | Electrodynamics, Optics and Relativity |
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For the second year students in Physics.

Topics: electrodynamics, waves and optics, interference and diffraction, special relativity and relativistic formulation of electromagnetism.

Duties: lecturer of the exercise section, responsible for the exam preparation.

- **2008 – 2012** **EPFL** **General Physics 3 and General Physics 4**

For the second year Bachelor students in Engineering.

Topics: fluid dynamics, electromagnetism, waves, introduction to quantum mechanics and solid-state physics.

Duties: assistant in the exercise section.

5. SUPERVISION OF GRADUATE AND PHD STUDENTS

I have been co-supervisor of 2 Bachelor, 2 Master and 2 PhD students in the Physics Department at the UNITS and 1 PhD student at the Institute of Physics of the EPFL and 1 Master Student at Politecnico di Milano. Each thesis project has brought to at least one publication appeared in peer-reviewed journals.

- **Marta Zonno** (master student UNITS, 2013) thesis title: « Study of the dynamics of excited quasiparticles at the surface of bulk Rashba material ». Co-author in 1 paper.
- **Barbara Casarin** (master student UNITS, 2014) thesis title: « Scattering mechanisms in the optically excited state of topological insulators Sb_2Te_3 and Sb_2Te ». Co-author in 1 paper.
- **Michele Diego** (bachelor student UNITS, 2014) thesis title: « Out of equilibrium electronic properties of a polaronic semiconductor ». Co-author in 1 paper.
- **Luca Sbuelz** (bachelor student UNITS, 2014) thesis title: « Study of the electron dynamics in the surface state of the topological insulator Bi_2Te_3 ». Co-author in 1 paper.
- **Giulia Manzoni** (PhD Student UNITS, 2013-2016) thesis title: « A comprehensive ARPES study on the anomalous transport properties and topological character of ZrTe_5 ». Co-author in 10 papers.
- **Andrea Sterzi** (PhD student UNITS, 2013-2016) thesis title: « Time and Angle-Resolved Photoelectron Spectroscopy studies of novel topologically ordered materials ». Co-author in 11 papers.
- **Gianmarco Gatti** (PhD student EPFL, 2016-2020) thesis title: « Experimental studies of the equilibrium and out-of-equilibrium electronic structure of non-symmorphic topological materials ». Co-author in 8 papers
- **Andrea Fusinato** (master student, Politecnico di Milano, 2021-2022) thesis title “Femtosecond Electron and Lattice Dynamics in the quasi-1D Transition Metal Trichalcogenide ZrTe_3 ”.

6. SOCIETY MEMBERSHIPS, AWARDS AND HONORS

- **2023 – present** Member of the Editorial board of Journal of Electron Spectroscopy and Related Phenomena
- **2006 – 2008** **Luciano Fonda's Fellowship**, Università degli studi di Trieste, Italy.

7. COMMISSIONS OF TRUST

- **Scientific evaluator:** Department of Energy – DoE (US); Nanoscience Foundries and Fine Analysis – NFFA (EU); Stanford Synchrotron Radiation Lightsource – SSRL (US); European Research Council (ERC); French National Research Agency (ANR); Polish Funding Stream Support System (OSF).
- **Referee for scientific Journals:** Nature; Nature Materials; Science Advances; Communication Physics; Physical Review X; Physical Review Letters; Physical Review B; Physical Review Materials; ACS Nano; Europhysics Letter; Journal of Electron Spectroscopy and Related Phenomena.

8. FUNDING INFORMATION

My position did not allow me to appear as proposer or co-proposer, however I have contributed to writing the following projects:

- **Funded** **PRIN 2022** «Clarifying the Role of the Electronic Susceptibility in One-dimensional charge density wave materials»
- **2018 – 2021** « High resolution spectroscopy of strongly correlated electron system and artificial structures at surfaces »
Funded by the Swiss National Science Foundation (SNSF), grant value 720 000 CHF.
- **2015 – 2018** « High resolution spectroscopy of strongly correlated electron system and artificial structures at surfaces »
Funded by the Swiss National Science Foundation (SNSF), grant value 720 000 CHF.
- **2008 - 2012** Participant in «Nanostructures at surfaces and interfaces ».
Funded by Swiss National Science Foundation (SNSF), this project covered my PhD salary.

9. RESEARCH ACTIVITIES

Keywords:

- Angle Resolved Photoelectron Spectroscopy (ARPES);
- ultrafast spectroscopies;
- topological materials;
- chiral materials;
- 2D materials;
- electronic correlation;
- surface science.

Brief Description

My scientific background roots in the study of the electronic properties of novel topological phases of quantum matter. My contribution to this exciting field of research has a twofold nature. First, I have used high-resolution angle-resolved photoelectron spectroscopy (ARPES), also with spin resolution, to clarify the topological phase of novel compounds. Second, by developing two state-of-the-art experimental setups, I have contributed to establish time-resolved ARPES (tr-ARPES) as a powerful experimental tool to manipulate the electronic population in those topological materials. My activity has brought to the first direct investigation of the spin dynamics in a topological insulator, by combining tr-ARPES with spin resolution, and I have been the first to investigate the change in electron dynamics across a topological phase transition in a Weyl semimetal. Besides topological materials, in the past years I had the possibility to collaborate also on different themes, in particular studying the ultrafast response of 2D materials (graphene and black phosphorus) and strongly correlated electron systems (cuprates).

In my career, I led several scientific projects in a very independent way, as it is recognized by being first or corresponding author of more than 20 publications, and last author of two manuscripts published in Physical Review Letter. I have established and coordinated several collaborations with experts in complementary fields of research, with the aim to pursue a multidisciplinary approach to discover novel quantum materials. Our studies have laid solid foundations for collaborations with several theoretical groups, our results, in fact, challenge the development of *ab initio* methods for out-of-equilibrium electronic properties.

10. SUMMARY OF SCIENTIFIC ACHIEVEMENTS

Scopus is source of the following metrics and information (author ID:36131321400).

At July 2023, I am author of 46 manuscripts accepted in peer-reviewed journals.

Total Citations = 1491

Average Citation per Product = 32.4

Hirsh (H) index = 20