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Martino Trassinelli
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Curriculum Vitæ

Nationality Italian and French

Current position Researcher at the Centre National de la Recherche Scientifique (CNRS, France) in the group "Clusters and Surfaces under Intense Excitation" at the Institut des NanoSciences de Paris

Scientific interests

- Structure of highly charged ions and exotic atoms for studies on quantum electrodynamics, strong and weak interactions.
- Highly charged ions interacting with atoms, surfaces and clusters.
- High-resolution X-ray spectroscopy based on Bragg diffraction.
- Bayesian statistics: applications to data analysis and theoretical condensed matter.
- Foundations and interpretations of quantum mechanics.
- Physics of breath-hold diving.

Professional career and experiences

Since 2024 **Chargé de recherche classe exceptionnelle**, *CNRS*, Institut des NanoSciences de Paris, Paris.

2007 – 2024 **Chargé de recherche classe normale**, *CNRS*, Institut des NanoSciences de Paris, Paris.

March 2021 **Visiting professor at the ExtreMe Matter Institute**, *GSI/FAIR*, Darmstadt, Germany.

Sept. 2017 **Habilitation à diriger des recherches (French habilitation)**, *Structure and dynamics of highly charged ions*, Université Pierre et Marie Curie, Paris, France.

April 2017 **Abilitazione Scientifica Nazionale (Italian habilitation)**, *Fisica Sperimentale delle Interazioni Fondamentali (Fascia II, SC 02/A1) and Fisica Sperimentale della Materia (Fascia II, SC 02/B1).*

2006 – 2007 **Post-doc**, *Accurate measurement of intra-shell transitions and Balmer lines in heliumlike uranium*, GSI Helmholtzzentrum and Alexander von Humboldt-Stiftung, Darmstadt, Germany.

2002 – 2005 **Ph.D. thesis**, *Quantum Electrodynamics Tests and X-rays Standards using Pionic Atoms and Highly Charged Ions*, Laboratoire Kastler Brossel, Paris, France.

Scientific production

Articles: 77 (14 letters, 2 *Nature*)
Book chapters: 5
Proceedings with referee: 52
Invited talks in conf. and seminars: 28
Oral contrib. to conf. and workshops: 53

Patents

April 2017 *Process for obtaining a giant magnetocaloric effect material by irradiation of ions*, French patent n. 1753170, US Patent App. 16/604,761

Codes

2024 – pres. `Bayesian average`: A robust weighted average and its uncertainty from a set of data points and their uncertainties based on Bayesian statistical methods. `github.com/martinit18/bayesian_average`

2014 – pres. `Nested_fit`: A versatile data analysis program based on Bayesian statistics for the evaluation of model probabilities and parameter posterior probability distributions. Written in Fortran with a Python library for post-analysis and plots. `github.com/martinit18/nested_fit`

2007 – 2018 `Minuit_fit`: A versatile χ^2 minimization program based on MINUIT CERN library with different choices of χ^2-statistics and profile functions. Written in Fortran.

Supervision of students and postdocs (S: supervision, CS: co-supervision)

Post-docs: 2 (2 S)
Ph.D. students: 6 (3 S, 3 CS)
Master students M2 and eq.: 9 (8 S, 1 CS)
Master students M1 and eq.: 5 (4 S. 1 CS)
3th year univ. students: 8 (4 S, 4 CS)
Engineering school students: 2 (1 S, 1 CS)

Teaching experience

2020 – pres. **Lecture and tutoring on *Bayesian statistics methods for data analysis* (4h/year)**, *Several Summer Schools: at ICFO (Barcelona), Lisbon Nova University (Portugal) and LNHB (Palaiseau, France).*

2016 – pres. **Lectures on *Atoms and Molecules in Strong Field* (part, 8h/year)**, *Research Master Light, Matter and Interactions*, Sorbonne Université, Paris, France.

2018 – 2024 **Lectures on *Theory of Classical Field* (part, 26h/year)**, *Research Master of Physics*, Sorbonne Université, Paris, France.

2006 **Lecture on *Exotic atoms* in the class Structure and Dynamics of Ions and Atoms (1h)**, *Research Master of Physics*, Goethe University Frankfurt, Germany.

2005 **Physics tutoring on *Thermodynamics* (36h of tutorial classes plus 40h of practical work)**, *University Pierre et Marie Curie, Paris, France*, 2nd year undergraduate class.

2003 **Physics tutoring on *Mechanics and Fluido-dynamics* (48h of tutorial classes plus 24h of practical work)**, *University Pierre et Marie Curie, Paris, France*, 1st year undergraduate class.

Positions in the administration of research

2013 – pres. Member of the international board of the Stored Particles Atomic Research Collab. (SPARC)

2011 – pres. Coordinator of the group *Photon and X-Ray Spectrometers* of SPARC

2023 – 2024 Member of the topical working group on "Fundamental Interactions and Symmetries", for the "NuPECC Long Range Plan 2024"

2018 – 2024 Nominated member of the scientific council of the Institut des NanoSciences de Paris

2013 – 2018 Elected member of the laboratory council of the Institut des NanoSciences de Paris

Expert and referee activity

2024 – pres. Referee for ERC Starting Grant and ERC Synergy projects

2023 – 2024 Referee for Interdisciplinary research proposals at GANIL accelerator facility (Caen, France)

2018 – pres. Member of 5 Ph.D. Thesis committees, (3 at Sorbonne Univ.; 1 at Univ. Paris-Saclay; 1 Univ. Nova Lisboa)

2013 – pres. Referee of 3 Ph.D. Thesis (Oulu University, TU Wien, Univ. Caen)

2019 Referee of Habilitation à diriger des recherches (French habilitation), Grenoble University

2014 – 2015 Member of the expert committee of Université Pierre et Marie Curie (atomic physics section)

2012 Member of the selection committee for an assistant professor position at the University Paris 13

2025 – pres. Guest editor of the special issue *HCI 2026* of *Nucl. Instrum. Meth. B* journal

2022 – 2023 Guest editor of the special issue *MaxEnt 2022* of *Entorpy* journal

2022 – 2023. Editor of the volume *MaxEnt 2022* of *Physical Sciences Forum* journal

Referee in the international journals: *Nature*, *Nature Rev. Meth. Primers*, *Phys. Rev. A*, *Nucl. Phys. A*, *New J. of Phys.*, *Nanoscale*, *Astrophys. J.*, *Quantum Sci. Technol.*, *AVS Quantum Sci.*, *Ann. Phys. (N.Y.)*, *Ann. Phys. (Berl.)*, *Found. Phys.*, *Entropy*, *Spectrosc. Lett.*, *X-Ray Spectrom.*, *Spectrochim. Acta A J. Phys.*, *Nucl. Instrum. Methods A and B*, etc.

Organization of seminars and conferences

2024 – pres. Co-chair of the international conference *STORI* 2027

2022 – pres. Member of the international advisory board of the international conference *MAXENT*

2019 – pres. Member of the international advisory board of the international conference *HCI*

2019 – pres. Member of *Les Atelier du LKB* seminar committee

2016 – 2024 Member of the seminar committee of the Institut des NanoSciences de Paris

2022 Co-chair of the international conference *MAXENT* 2022

2019 Member of the local organizing committee of the international conference *ICPEAC 2019*

2019 Member of the local organizing committee of the international symposium *ISIAC 2019*

2017 Member of the local organizing committee of the workshop *MPBT platform scientific day*

2017 Member of the local organizing committee of the workshop *SPARC 2017*

2017 Member of the international advisory board of the conference *Precision Physics, Quantum Electrodynamics and Fundamental Interactions 2017*

Awards and recognitions

2024 **CNRS Scientific Excellence award**, *(RIPEC C3)*.

2013 **CNRS Scientific Excellence award**, *(formal version of CNRS Prime d'Encadrement Doctoral et de Recherche)*.

2006 – 2007 **Postdoctoral Humboldt Research Fellowships**.

1999 – 2003 **Élève fonctionnaire stagiaire**, *École Normale Supérieure de Paris*.

Research projects

2022 – pres. Principal investigator of the project for GSI/FAIR 2023-4 *Towards testing three-loop effects of bound-state QED in heliumlike uranium* (proposal G-22-00068 and G-24-00275 accepted with A- rank)

2021 – pres. Principal investigator of the international ANR project *Dynamics of ion–magnetized surface interaction probed by integrated x-ray and ion spectroscopy (DIMAS)*, international ANR/FWF founding

2021 – pres. Principal investigator of the project *Quantum Nested Sampling*, in coll. with F. Finocchi (INSP)

2011 – pres. Member of the collaboration *FISIC (Fast Ion – Slow Ion Collisions)*, part of the EQUIPEX S3 until 2021, ANR Fit-FISIC between 2013-2018

2017 – 2024 Principal investigator of the project for FAIR phase-0 *High-resolution differential Measurements Between Two-and Three-Electron Uranium Ions for High-Precision Tests of Strong-Field QED* (proposal n. E125, accepted with A- rank)

2010 – 2024 Principal investigator of the project *Ion collision with giant magnetocaloric materials* within the ASUR team at the INSP

2018 – 2022 Participation to the ANR project *High-Performance Thermo-Magnetic Micro-Harvester*, ANR-18-CE05-0019, (PI: M. Lo Bue)

2019 – 2021 Principal investigator of the project *X-ray spectroscopy of He-like U and measurement of the bound-state beta decay of bare* ^{205}*Tl ions* in the program ENSAR2 No. 654002 *Transnational Access to GSI*, Horizon 2020 – EU Framework Programme for Research and Innovation –Integrated Activity, Germany

2013 – 2018 Participation to the international ANR project *Fit-FISIC: First steps Towards atomic physics of Fast Ion – Slow Ion Collision*, international ANR/DFG founding, ANR-13-IS04-0007, (PI: E. Lamour)

2016 – 2017 Principal investigator of the project *Detector development for atomic physics at FAIR* in the program ENSAR2 No. 654002 *Transnational Access to GSI*, Horizon 2020 – EU Framework Programme for Research and Innovation –Integrated Activity, Germany

2014 – 2015 Principal investigator of the project *Measurement of the bound-state beta decay of bare* ^{205}*Tl ions* in the program ENSAR No. 262010 *Transnational Access to GSI*, FP7 – Structuring the ERA - Integrated Activity, Germany

2006 – 2010 Participation to the ANR project *La Spectroscopie X: Métrologie et Sonde de l'Interaction avec les Ions de SIMPA*, ANR-06-BLAN-0223, France

2007 Principal investigator of the project *Test of Strong-Field-QED: High Resolution Detection Systems for Spectroscopy in Atomic Physics Experiments at GSI and FAIR and for Precision X-Ray Imaging*, non-recurring financing from the Helmholtz association for the promotion of young researchers, Germany