

Curriculum Vitae et Studiorum

Andrea MACCHI

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(Long, detailed version available at
http://www.df.unipi.it/~macchi/CV/CV_eu_macchi.pdf)

Personal data

Sex: Male **Date of birth:** September 5, 1970 **Citizenship:** Italian
Present position: research scientist of CNR/INO (National Institute of Optics, National Research Council), research unit “Adriano Gozzini”, Pisa, Italy.
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Short Summary A.M. received a M.Sc. degree (*Laurea*) in Physics from the University of Pisa in 1995 with honors (110/110 *cum laude*) and a Ph.D. degree in Physics from the Scuola Normale Superiore of Pisa in 1999 with honors (70/70 *cum laude*).

A.M. has been active in laser-matter interaction at very high intensities, beginning as an experimentalist (mostly working on X-ray emission from laser-produced plasmas) and later focusing on theory and simulation, still in close contact with experimental work. His research interest include laser-plasma acceleration of ions, high-field plasmonics, proton probing investigations, nonlinear dynamics in hot and relativistic plasmas, radiation friction in ultra-high laser fields, modeling and simulation methods.

A.M. is a staff research scientist with CNR/INO since 2010. Previously he was with CNR/INFM (2003-2009). He held a postdoctoral position at the Darmstadt University of Technology (1998-2000), and an International Fellowship at the Queen’s University of Belfast (2008). He participated to many collaborative European and Italian projects, also as principal investigator or local coordinator since 2005.

A.M. is the author or coauthor of about 90 publications on peer reviewed journals (with a H-index of 28 to date, ISI data) including a Review of Modern Physics and 15 Physical Review Letters, the single author of a textbook on Laser-Plasma Interactions (Springer, 2013) and the first author of a textbook of Problems in Classical Electromagnetism (Springer, 2017). He presented tens of seminars and talks (both invited and contributed) to international conferences and schools. He has been serving as a referee for more than 30 international journals and 9 funding and evaluation agencies of different countries.

A.M. collaborates since 2002 to teaching activities at the Physics Department of the University of Pisa for the undergraduate (B.Sc.), postgraduate (M.Sc.) and doctorate (Ph.D.) programs. He gives two lecture courses of Plasma Physics since 2009 and is Lecturer of Classical Electromagnetism since 2012. He has been the supervisor of 5 Ph.D., 15 M.Sc. and 17 B.Sc. students to date.

Degrees:

Habilitation as 1st level full Professor in Italian University (2013);

Ph.D. in **Physics** with honors (Scuola Normale Superiore, Pisa, 1999);

Master (*Laurea*) in **Physics** with honors (University of Pisa, 1995).

Past positions and main stays abroad:

01/02/2010–in progress: **Research staff scientist** of CNR/INO (the National Institute of Optics of the National Research Council).

01/05/2008–31/08/2008: **International Research Fellow** at School of Mathematics and Physics, Queen’s University of Belfast, UK.

01/08/2003–31/01/2010: **Research staff scientist** of INFN (the National Institute for the Physics of Matter).

01/06/2000–31/07/2003: **Postdoctoral Researcher** at the Department of Physics, Pisa University.

01/09/1998–31/05/2000: **Postdoctoral Researcher** at Theoretical Quantum Electronics, Darmstadt University of Technology.

Research projects coordination:

2014-2016 PRIN project “Laser-Driven Shock Waves”, sponsored by the Italian Ministry of University and Research (MIUR), as **local coordinator**.

2010-2014 FIRB “Futuro in Ricerca” project “Superintense Laser-Driven Ion Sources”, sponsored by the Italian Ministry of University and Research (MIUR), as **local coordinator**.

2012-2013 PRACE high performance computing project “Large Scale Acceleration of Ions by Laser”, as **principal investigator**.

2010-11 CNR-CNRS bilateral project “Surface Wave Induced Laser Absorption in Plasmas”, as **Italian partner unit coordinator**.

2010 ISCRA “Class A” Supercomputing Project “Towards Full-Scale Simulations of Laser-Plasma Interaction Experiments”, as **principal investigator**.

2008-09 CNR-RSTL project “Laser-driven pulsed sources of ions and neutrons”, as **principal investigator**.

2005-09 CNR/INFN-CINECA Supercomputing initiative, as **project manager** of annual projects.

Services:

Editorial Board, EPJ+ – European Physical Journal Plus (2018 –).

Scientific Advisory Committee, CILEX-APOLLON project, France (2013–2015).

Council of CNR/INO, elected member, 2010–2013.

Program committee (“beam plasma” section), 36th European Physical Society Conference in Plasma Physics, 2009.

Reviewer of research proposals for national agencies including: U.S. Department Of Energy (DOE), USA (2009); Italian Ministry of University, Education and Research (MIUR), Italy (2009 & 2011, 2017, 2018); Agence Nationale de la Recherche (ANR), France (2011 & 2015); Helmholtz Association, Germany (2013); Deutsche Forschungsgemeinschaft (German Research Foundation), Germany (2018); AVIESAN/ITMO Cancer & INCa, France (2019).

Evaluator for the National Agency for the eValuation of University and Research – ANVUR, Italy (2012 & 2016).

Referee for about 30 international journals, including Physical Review Letters, Physical Review (A, B, E, ST-AB, X), Nature Communications, New Journal of Physics, Applied Physics Letters, Journal of Physics (A, B, D), Medical Physics, Nuclear Fusion, Physics of Plasmas, Plasma Physics and Controlled Fusion, Scientific Reports.

Outstanding Referee of the American Physical Society (2014).

Teaching and supervisions:

2011: Guest **Lecturer** in the Master Program in Laser Physics and Technology, University of Salamanca, Spain.

2009–: **Lecturer** at the Department of Physics, University of Pisa: courses of *Physics 2* (introductory classical electrodynamics, undergraduate program in Physics), *Plasma Physics C* (2013–), *Low-Temperature Plasmas* and *Relativistic Plasmas* (graduate and Ph.D. programs in Physics)

2002–: **Teaching assistant** in the undergraduate program in Physics, University of Pisa: classes of Introductory Classical Electrodynamics

2002–: **Thesis supervisor** in the Physics programs (5 Ph.D., 15 M.Sc., 17 B.Sc. theses completed to date) at the University of Pisa.

Talks: About 50 between seminars and conference talks (18 invited). Full list: <http://www.df.unipi.it/~macchi/talks.html>. Five recent invited talks:

1. *Extreme high field plasmonics: electron acceleration and XUV harmonic generation from ultrashort surface plasmons*, 60th APS/DPP - Annual Meeting of the APS Division of Plasma Physics, Portland, Oregon, USA, November 05-09, 2018
2. *High Field Femtosecond Plasmonics for Laser-Driven Sources*, FISMAT17 - Italian National Conference on the Physics of Matter, Trieste, October 01-05, 2017.
3. *Basics of Laser-Plasma Interaction*, Advanced Summer School on “Laser-Driven Sources of High Energy Particles and Radiation”, Anacapri, Italy, July 9-16 2017.
4. *High Field Plasmonics and Laser-Plasma Acceleration*, Photonics Ireland 2015, Cork, Ireland, 2-4/09/2015
5. *Ion Acceleration*, LA3NET Advanced School on Laser Applications at Accelerators, Salamanca, Spain, 29/09-03/10/2014.

Books: (only as full author; several book chapters not included)

- *Problems in Classical Electromagnetism* (Springer, 2017), ISBN 978-3-319-63132-5 (hardcopy), 978-3-319-63133-2 (e-book). DOI: 10.1007/978-3-319-63133-2
- *A Superintense Laser-Plasma Interaction Primer* (Springer, 2013), ISBN 978-94-007-6124-7 (print), 978-94-007-6125-4 (e-book). DOI: 10.1007/978-94-007-6125-4
- *Problemi di Elettromagnetismo Classico* (Pisa University Press, 2012), ISBN 88-8492-414-6 [in Italian].

Peer reviewed publications: About 90 papers (both regular and invited) ; **H-index=28**, **HC-index=18**, **G-index=56**, and **~3300 total citations** to date (ISI-WoS data).

Complete lists and citation data available at:

<https://publons.com/researcher/2870221/andrea-macchi/> (publons/ISI-WoS),
<http://www.scopus.com/authid/detail.url?authorId=7006542747> (SCOPUS),
<http://scholar.google.it/citations?user=P5RtCW4AAAAJ> (Google Scholar).

Five most cited publications (ISI-WoS data with **self-citations¹** subtracted).

- 473** [Andrea Macchi](#), Marco Borghesi, Matteo Passoni, *Ion acceleration by superintense laser-plasma interaction*, Reviews of Modern Physics **85**, 751-793 (2013).
- 350** [A. Macchi](#), F. Cattani, T. V. Liseikina, F. Cornolti, *Laser acceleration of ion bunches at the front surface of overdense plasmas*, Physical Review Letters **94**, 165003 (2005).
- 202** [Andrea Macchi](#), Silvia Veghini, Francesco Pegoraro, *Light Sail Acceleration Reexamined*, Physical Review Letters **103**, 085003 (2009).
- 171** L. Romagnani, J. Fuchs, M. Borghesi, . . . [A. Macchi](#), . . . O. Willi, *Dynamics of electric fields driving laser acceleration of multi-MeV protons*, Physical Review Letters **95**, 195001 (2005).
- 147** S. Kar, K. F. Kakolee, B. Qiao, [A. Macchi](#), . . . M. Borghesi, *Ion acceleration in multispecies targets driven by intense laser radiation pressure*, Physical Review Letters **109**, 185006 (2012).

Six recent publications:

1. G. Cantono, L. Fedeli, A. Sgattoni, A. Denoeud, L. Chopineau, F. Reau, T. Ceccotti, [A. Macchi](#), *Extreme ultraviolet beam enhancement by relativistic surface plasmons*, Physical Review Letters **120**, 264803 (2018).
2. F. Pisani, L. Fedeli, [A. Macchi](#), *Few-cycle Surface Plasmon Polariton Generation by Rotating Wavefront Pulses*, ACS Photonics **5**, 1068 (2018).
3. C. Scullion, D. Doria, L. Romagnani, . . . [A. Macchi](#), . . . M. Borghesi, *Polarization dependence of bulk ion acceleration from ultrathin foils irradiated by high intensity, ultrashort laser pulses*, Physical Review Letters **119**, 054801 (2017).
4. S. Kar, H. Ahmed, R. Prasad, . . . , [A. Macchi](#), . . . M. Borghesi, *Guided post-acceleration of laser driven ions by a miniature modular structure*, Nature Communications **7**, 10792 (2016).
5. L. Fedeli, A. Sgattoni, G. Cantono, . . . , [A. Macchi](#), T. Ceccotti, *Electron acceleration by relativistic surface plasmons in laser-grating interaction*, Physical Review Letters **116**, 015001 (2016).
6. T. V. Liseykina, S. V. Popruzhenko, [A. Macchi](#), *Inverse Faraday Effect driven by Radiation Friction*, New Journal of Physics **18**, 072001 (2016).

¹Defined as citations from papers in which I am a coauthor