

# CURRICULUM VITAE

(UPDATED MAY 2022)

## LORENZO MARRUCCI

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## QUALIFICATIONS:

- 1993 Research Doctorate (PhD), Physics, UNINA, Italy  
1989 Laurea (Master’s degree), Physics, UNINA, Italy

## EMPLOYMENT HISTORY:

- 2013-present *Full Professor* of experimental physics of matter, Dept. Physics, UNINA, Italy  
2001-2012 *Associate Professor* of physics of matter, Dept. Physical Sciences, UNINA, Italy  
2008-2008 *Visiting Scientist* (July-October, 4 months), Liquid Crystal Institute, Kent State University, Ohio, USA  
1995-2001 *University Researcher* of physics of matter, Dept. Physical Sciences, UNINA, Italy  
1993-1994 *Postdoctoral research associate*, Dept. Physics, University of California at Berkeley, California, USA

## RESEARCH AND ACADEMIC LEADERSHIP (SELECTED):

- 2021-present *Rector’s Coordinator-Delegate for Research* in UNINA (equivalent to Vice-Rector for Research)  
2021-present *National Society of Science, Letters and Arts in Naples*, Academy of Mathematical and Physical Sciences, member  
2016-present *Principal Investigator* of European Research Council **ERC Advanced Grant** “Photonics of the spin-orbit optical phenomena (PHOSPhOR)” (ERC, H2020, 1.7 M€)  
2016-2019 *Vice Director* of the Department of Physics, UNINA (counting > 120 faculty members)  
2017 *Chair* of the “4<sup>th</sup> International Conference on the Optical Angular Momentum”, 18-22 September 2017, Anacapri (NA), Italy  
2013-2017 *Coordinator of Marie-Curie project* “Functional OXides Interfaces charge Dynamics under Ultrafast Electric Transients (FOXIDUET)” (Career Integration Grant, FP7, 100 k€)  
2013-2016 *National Coordinator (PI) of Relevant National Interest Project (PRIN)* “OXide Interfaces: emerging new properties, multifunctionality, and DEvices for electronics and energy (OXIDE)” (Italian Ministry of Instruction, University and Research, 900 k€)  
2010-2013 *European Coordinator (PI) of Future Emerging Technologies (FET – Open) project* “A toolbox for photon orbital angular momentum technology (PHORBITECH)” (FP7, 2.2 M€)  
2010-present *Head of the Structured Light And Matter research group (SLAM group)* of the Department of Physics, UNINA  
2005-2010 *Coordinator of the Physics Research Doctorate (PhD) School*, UNINA  
2005-2008 *Principal Investigator* of the National Research Council (CNR) grant “Fundamental issues in the physics of perovskites” (CNR, 250 k€)  
2003-2006 *National Coordinator (PI) of Fundamental Research Investment Fund (FIRB) Project* (Italian Ministry of Instruction, University and Research, 120 k€)  
2002-2005 *Coordinator* of one of the three *Research Divisions of Naples Research Center Coherentia* (National Institute for the Physics of Matter, INFM), now part of CNR institute SPIN

## SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS (IN UNINA):

- 2005-present 12 *Postdocs*, 3 current (Carlo Manzo, Ebrahim Karimi, Sergei Slussarenko, Vijay Kumar, Andrea Rubano, Filippo Cardano, Sen Mou, Raouf Barboza, Alessio D’Errico, Amin Babazadeh, Veronica Vicuña, Jinbing Hu)

- 2000-present 12 *PhD students*, 2 current (Gabriella Cerrone, Carlo Manzo, Andrea Rubano, Annunziata Savoia, Ebrahim Karimi, Filippo Cardano, Sen Mou, Adriana Pecoraro, Maria Maffei, Alessio D'Errico, Pegah Darvehi, Francesco Di Colandrea)
- 1998-present 23 *Master students*

#### **TEACHING ACTIVITIES (FOR UNINA):**

- 2019-present *Classical Electrodynamics*, Laurea Magistrale (MSc) in Physics
- Past activities: *General Physics I*, Laurea (BSc) in Industrial Engineering (2016-2020); *Electromagnetism and Optics*, Laurea (BSc) in Physics (2014-2019); *Foundations of Physics of Matter*, Laurea (BSc) in Materials Science and Engineering (2002-2015); *Photonics*, Laurea Magistrale (MSc) in Physics (2009-2014); *Relativity and Electromagnetic Fields*, Laurea (BSc) in Physics, (2009-2010); *Electromagnetism in Material Media*, Laurea Magistrale (MSc) in Physics (2006-2008); *Laboratory of Physics of Matter*, Diploma (BSc) in Materials Science and Engineering (2001-2002); *General Physics I*, Diploma (BSc) in Materials Science and Engineering (2000-2001); *Introduction to Nonlinear Optics*, PhD program in Physics (1995-1998)

#### **MEMBERSHIP OF EXTERNAL COMMITTEES AND BOARDS (SELECTED):**

- 2012-present *Scientific Advisory Committee* of the “International Conference on the Orbital Angular Momentum” (ICOAM), held every two years (11-17 members)
- 2014-2020 *Program Committee* of the Conference “Complex Light and Optical Forces”, held every year within SPIE Photonics West, San Francisco, USA (18 members)
- 2011-2019 *Scientific Advisory Board* of the “International Topical Meeting on Optics of Liquid Crystals (OLC)”, held every two years since 1986 (13 members)
- 2014 *Organizing Committee* of the “7<sup>th</sup> Italian Quantum Information Science Conference (IQIS2014)”, 15-19 September 2014, Salerno, Italy (4 members)
- 2007-2010 *Board of Directors* of *European Laboratory for Non-Linear Spectroscopy*, Florence, Italy (9 members, 5 Italians and 4 foreigners, including Prof. Theodor W. Hänsch, Nobel prize 2005)

#### **EDITORIAL AND SCIENTIFIC CONSULTING ACTIVITIES (SELECTED):**

- 1998-present *Reviewer for scientific journals* (including Nature, Science, Nature Physics, Nature Photonics, Nature Communications, Physical Review Letters, and >30 other titles)
- 2010-present *Reviewer for funding agencies* (European Research Council; Department of Energy, USA; Agence Nationale de la Recherche, France; Netherlands Org. for Scientific Research; Swiss National Science Foundation; Israel Science Foundation; Austrian Science Fund; Czech Science Foundation)
- 2010 *Reviewer for Cambridge University Press*

#### **INVITED COMMENTARIES IN SCIENTIFIC JOURNALS:**

1. F. Cardano and L. Marrucci, *Longitudinal fields and transverse rotations*, **Nature Photonics**, vol. 15, 72-74 (2021).
2. F. Cardano and L. Marrucci, *Spin-orbit photonics*, **Nature Photonics**, vol. 9, 776-778 (2015).
3. L. Marrucci, *Quantum optics: spin gives direction*, **Nature Physics**, vol. 11, 9-10 (2015).
4. L. Marrucci, *Spinning the Doppler effect*, **Science**, vol. 341, 464-465 (2013).

#### **TEN REPRESENTATIVE SCIENTIFIC PUBLICATIONS:**

1. A. D'Errico, F. Cardano, M. Maffei, A. Dauphin, R. Barboza, C. Esposito, B. Piccirillo, M. Lewenstein, P. Massignan, L. Marrucci, *Two-dimensional topological quantum walks in the momentum space of structured light*, **Optica** vol. 7, 108-114 (2020).
2. S. Slussarenko, A. Alberucci, C. P. Jisha, B. Piccirillo, E. Santamato, G. Assanto, L. Marrucci, *Guiding light via geometric phases*, **Nature Photonics** vol. 10, 571-575 (2016).
3. F. Cardano, M. Maffei, F. Massa, B. Piccirillo, C. de Lisio, G. De Filippis, V. Cataudella, E. Santamato, L. Marrucci, *Statistical moments of quantum-walk dynamics reveal topological quantum transitions*, **Nature Communications** vol. 7, 11439 (2016).

4. D. Naidoo, F. S. Roux, A. Dudley, I. Litvin, B. Piccirillo, L. Marrucci, A. Forbes, *Controlled generation of higher-order Poincaré sphere beams from a laser*, **Nature Photonics** vol. 10, 327-332 (2016).
5. F. Cardano, F. Massa, H. Qassim, E. Karimi, S. Slussarenko, D. Paparo, C. de Lisio, F. Sciarrino, E. Santamato, R. W. Boyd, L. Marrucci, *Quantum walks and wavepacket dynamics on a lattice with twisted photons*, **Science Advances**, vol. 1, e1500087 (2015).
6. T. Bauer, P. Banzer, E. Karimi, S. Orlov, A. Rubano, L. Marrucci, E. Santamato, R. W. Boyd, G. Leuchs, *Observation of optical polarization Möbius strips*, **Science**, vol. 347, 964-966 (2015).
7. C. Vitelli, N. Spagnolo, L. Aparo, F. Sciarrino, E. Santamato, L. Marrucci, *Joining the quantum state of two photons into one*, **Nature Photonics**, vol. 7, 521-526 (2013).
8. V. D'Ambrosio, E. Nagali, S. P. Walborn, L. Aolita, S. Slussarenko, L. Marrucci, F. Sciarrino, *Complete experimental toolbox for alignment-free quantum communication*, **Nature Communications**, vol. 3, 961 (2012).
9. E. Nagali, L. Sansoni, F. Sciarrino, F. De Martini, L. Marrucci, B. Piccirillo, E. Karimi, E. Santamato, *Optimal quantum cloning of orbital angular momentum photon qubits through Hong–Ou–Mandel coalescence*, **Nature Photonics**, vol. 3, 720-723 (2009).
10. L. Marrucci, C. Manzo, D. Paparo, *Optical spin-to-orbital angular momentum conversion in inhomogeneous anisotropic media*, **Phys. Rev. Lett.**, vol. 96, 163905 (2006).

#### **THREE REPRESENTATIVE PATENTS (OUT OF A TOTAL OF 5):**

1. F. Sciarrino, V. D'Ambrosio, N. Spagnolo, L. Del Re, L. Marrucci, S. Slussarenko, M. L. Aolita, S. P. Walborn, K. L. Chuan, Y. Li, *Ultra-sensitive photonic tiltmeter utilizing the orbital angular momentum of the light, and relevant angular measurement method*, EU no. 2811258.
2. E. Karimi, L. Marrucci, V. Grillo, E. Santamato, *Converter of orbital momentum into spin momentum for the polarization of particle beams*, US no. 8,552,398 B2, EU EP2605266 A2.
3. L. Marrucci, *Liquid crystal geometrical phase optical elements and a system for generating and rapidly switching helical modes of an electromagnetic wave, based on these optical elements*, US no. 8,264,623 B2 of 2012/9/11; EU EP2013647-A2.

#### **TEN REPRESENTATIVE INVITED PRESENTATIONS (OUT OF ABOUT 60 FROM LAST 10 YEARS):**

- 2019 Opening plenary speech at the 5<sup>th</sup> International Conference on Optical Angular Momentum (ICOAM), Ottawa, Canada
- 2018 International Max Planck Research School (IMPRS) Physics of Light, Gößweinstein, Germany
- 2016 Wilhelm and Else Heraeus Seminar on Nanophotonics and Complex Spatial Modes of Light, Bad Honnef, Germany
- 2015 XXXVIII Encontro Nacional de Física da Matéria Condensada (ENFMC) da Sociedade Brasileira de Física, Foz do Iguaçu, Brazil
- 2014 Keynote Speaker, 3<sup>rd</sup> Quantum Information Processing Communication and Control (QIPCC) Conference and School, South Africa
- 2014 International Conference on Photoalignment and Photopatterning in Soft Materials, Hong-Kong
- 2013 International Workshop on Singularities and Topological Structures of Light, ICTP Trieste, Italy
- 2013 International Workshop on Spin-Orbit Interactions for Light and Matter Waves, Max-Planck-Institut für Physik Komplexer Systeme, Dresden, Germany
- 2013 Symmetry, Bifurcation and Order Parameters, Cambridge Newton Institute, Cambridge, UK
- 2012 20 Years of Orbital Angular Momentum of Light, Leiden, Netherlands (symposium in the honor of J. P. Woerdman's 70 years)

#### **PUBLICATION AND CITATION TOTAL NUMBERS:**

- > 200 *total publications* in scientific journals and books
- 43 *publications in highly selective journals* (2 Science, 2 Nature Physics, 6 Nature Photonics, 9 Nature Communications, 3 Science Advances, 16 PRL, 5 Optica)
- > 10'500 *citations* in Web-of-Science (WoS); > 14'500 citations in Google Scholar
- *h-index* = 52 in WoS; *h-index* = 60 in Google Scholar