

CURRICULUM VITAE - CARLO RIZZA

LANGUAGES

- Italian: Native Language.
- English: written and oral (advanced level).

My research background and expertise extend over the theoretical modeling of photonics devices based on novel physical mechanisms for achieving suitable functionalities. I am author of 58 articles (47 articles in international peer-reviewed journals, 11 conference papers and 17 as first author), of which 1 in *Light Science & Applications* (impact factor 14.098), 3 in *Physical Review Letters* (impact factor 8.462), 1 in *Laser & Photonics Review* (impact factor 8.008). My h-index is 12 with the total number of citations more than 450 (source: <http://www.scopus.com>). Current interest: photonics of 2D materials, epsilon-near-zero metamaterials, singular optics and spatial nonlocality in metamaterials. Systems investigated in the past: reconfigurable terahertz metamaterials, solitons propagating in Kerr media and in photorefractive media.

CITATION METRICS

	Scholar google	Scopus
Total articles in publication list	58	58
Sum of the times cited	584	453
h-index	14	12

CURRENT POSITION Postdoctoral Researcher at the Institute for superconductors, oxides and other innovative materials and devices, National Research Council (CNR-SPIN), L'Aquila, Italy

EDUCATION

Philosophiæ Doctor earned at University of L' Aquila, Thesis: optical propagation and solitons through reflection periodic media, Advisors: Prof. Bruno Crosignani (May 2008).

the 2St Laurea degree in Physics 110/110 cum laude earned at University of L'Aquila defending the thesis Teoña della propagazione dei solitoni fotorifrattivi in strutture periodiche, advisors: Prof. Paolo Di Porto and Prof. Bruno Crosignani (October 2004).

The 1st Laurea degree in Physics 110/110 cum laude earned at University of L' Aquila defending the thesis Moderni sviluppi sulla teleportazione e quantistica, advisor: Prof. Paolo Di Porto (October 2002).

High School Diploma received at "Liceo Scientifico Statale G. Galilei" (Modica, RG) (July 1999).

EMPLOYMENT

From December 2017, Postdoctoral Researcher at the Institute for superconductors, oxides and other innovative materials and devices, National Research Council (CNR-SPIN), L'Aquila, Italy

From April 2017 to November 2017, Postdoctoral Research Grant, "Studio della componente organica associata alla deposizione di film di ossido di zirconio con il metodo Oxilan di Chemetall mediante l'uso di metasuperfici funzionalizzate composte da nanoantenne di diversi metalli" awarded by University of L' Aquila.

From December 2016 to March 2017, Postdoctoral Research Grant "La dispersione spaziale in metamateriali periodici" awarded by University of Insubria.

From September 2016 to March 2017, Part-Time (30%) and Fixed-Term Researcher at the CNR-SPIN (V Aquila).

From May 2016 to July 2016 Postdoctoral Research Grant "Studio della chiralità elettromagnetica in metamateriali fotogenerati" University of L'Aquila

From May 2014 to April 2016 Postdoctoral Researcher (assegnò di ricerca) at the department of Science and High Technology, University of Insubria [Research Grant related to the project "Reconfigurable optically-induced metaatoms patterns in semiconductors" (INAS132194)].

From April 2011 to April 2014 Postdoctoral Researcher (assegnò di ricerca) at the department of Science and High Technology, University of Insubria (Research Grant related to the project "Futuro in Ricerca" FIRB- PHOCOS - RBF08E7VA).

From August 2008 to September 2010 Postdoctoral Researcher (assegnò di

ricerca) at the department of Electrical Engineering, University of L'Aquila.

From March 2008 to May 2008 Research grant at the CNR-INFM CRS SOFT (Rome) for developing a simulation program for micrometer-sized optical beams propagating in photorefractive media.

STAY ABROAD (AS

VISITING SCIENTIST)

From January 2011 to March 2011 Academic visitor at the School of Physics and Astronomy, University of St Andrews, Scotland (collaboration with A. Di Falco).

RESEARCH INITIATIVES -

Led as coordinator

PROJECTS

- o From November 2011 to May 2014 local coordinator of the project, "Futuro in Ricerca" FIRB- PHOCOS - RBFR,08E7VA at Dipartimento di Scienza e Alta Tecnologia, University of Insubria (589 kEuro total of which 236 kEuro of my direct responsibility).
- o (2014) Principal investigator of the project "Reconfigurable optically-induced meta-atoms patterns in semiconductors" (INAS132194) at the University of Insubria (22000 euro).
- o (2017) Principal investigator of Seed Project "Nuclear magnetic resonance based metamaterials" (4000 euro) [call launched by CNR-SPIN with the aim of supporting original frontier research projects by young].

Others

- o (2017) Participant to the project "Nanostructured materials as contrasting agents (NanoAgents)" CNR-SPIN (principal investigator Prof. Gianni Profeta).
- o (2016) Participant to the project "Large artificial optical nonlocality in Kapitza-like metamaterials" U.S. Army International Technology Center Atlantic for financial support (Grant No. W911NF-14-1-0315).
- (2014) Participation in the project PLS "Piano nazionale Lauree scientifiche" at the University of L'Aquila (Laboratorio di potenziamento nelle Scienze Fisiche, coordinators: Prof. A. Filippini, Prof. A. Continenza).

ADDITIONAL RESPONSIBILITY POSITIONS

PEER REVIEW

Referee for the most relevant international Journals in the field of Photonics: IEEE transactions on antennas and propagation, Photonics and Nanostructures - Fundamentals and Applications, Applied Physics A, Physics Letters A, Optics Communications, Optics Express, JOSA B, Physical Review A, Physical Review Letters, Sensors, Physical Review Applied.

CONFERENCES REVIEWER

Reviewer for the Metamaterials 2018 Congress.

MEMBER OF THE SCIENTIFIC COMMITTEE

Program committee member for the annual OPAL' 2018: The First International Conference on Optics, Photonics and Lasers, 9-11 May 2018 Barcelona, CASTELLDEFELS, Spain.

MEMBERSHIP

Member of the Italian Institute of Consiglio Nazionale delle Ricerche, CNR-SPIN (2010-2014).

Member of the SIF, Società italiana di fisica (2015).

AWARDS

- November 2005, Award received by "Provincia regionale di Ragusa" for outstanding graduate students living in Ragusa (Italy).

HABILITATIONS

- Habilitation as Associate Professor in theoretical condensed matter Physics (2017 - 2023).
- Habilitation as Associate Professor in experimental condensed matter Physics (2017 - 2023).
- High school physics and math teacher (classe di concorso A049, Italy 2013).
- Maitre de conferences (Lecturer equivalent), section: 30 Milieux dilués et optique (France 2012).

COLLABORATIVE EFFORTS

- International Collaborative efforts: the experimental group of Dr. Andrea Di Falco (heading the Synthetic Optics research group at the University of St. Andrews, Scotland), the theoretical group of Dr. Michael Scalora (a senior optical physicist for the US Army working at Weapons Sciences Directorate, Redstone Arsenal, Alabama), Dr. Giovanna Tissoni (Researcher at the Institut non lineaire de Nice, France), D Faccio's research group (Heriot-Watt University, Edinburgh, UK).
- National Collaborative efforts: the MRI group of Prof. Alecci (University of L'Aquila), the optics group of Prof. Elia Palange (associated Professor at the

University of L'Aquila), the experimental group of Dr. Eugenio Del Re (heading the nonlinear Optics research group at the University of Sapienza), Prof. Massimo Brambilla (associated Professor at the University of Bari, Italy) and his theoretical group, the Terahertz group of Prof. Gaetano Scamarcio (full-Professor at the University of Bari), the Electromagnetic Compatibility research group headed by Prof. Antonio Orlandi (full-Professor at the University of L'Aquila).

TEACHING EXPERIENCE

UNIVERSITY

- GENERAL PHYSICS I, Department of Industrial Engineering - University of L'Aquila, 2017/2018 (complements, 30 hours).
- e GENERAL PHYSICS II, Department of Industrial Engineering - University of L'Aquila, 2017/2018 (complements, 30 hours).
- e GENERAL PHYSICS I, Department of Industrial Engineering - University of L'Aquila, 2016/2017 (full course, 60 hours).
- NANOPHOTONICS Department of Industrial Engineering - University of L'Aquila (24 hours, complements, 2013/2014).
- Assistant during the PhD course (2004/2008): complements of Optics and Electromagnetism (courses of Prof. B. Crosignani, Department of Physics, University of L'Aquila).

HIGH SCHOOLS

- From January 23 to March 07, 2014, teaching lessons (classe di concorso A049, 10 hours) at Liceo Scientifico Statale "Andrea Bafile" L'Aquila.
- From October 18 to December 11 2010, teaching lessons (classe di concorso A059) at La scuola media D. Alighieri, L'Aquila, Italy.
- From July 05 to July 31 2010, teaching lessons (classe di concorso A038) at Istituto tecnico industriale statale "Amedeo Di Savoia duca d'Aosta" L'Aquila, Italy.

SUPERVISION OF

GRADUATE AND PHD

o Domenico Rago, Laurea degree in Physics (Bachelor + Master), "Nonlocal

STUDENTS

homogenization theory in Metamaterials: Effective electromagnetic spatial dispersion and artificial chirality¹ 2016 (advisor).

OUTREACH

e 2017, University of L'Aquila (L'Aquila), open-day, talk, title: "Giocando con la luce"ⁿ C. Rizza..

e 2014, Liceo Scientifico (L'Aquila), talk for High school, title: "Nanofotonica e Metamateriali"^l C. Rizza.

- Tour guide at the national laboratory of Gran Sasso INFN (2008).

ADDITIONAL COURSES

- 2009- Attending and achievement of the postgraduate diploma concerning the teaching of Physics (1500 hours) - FOR.COM.

INFORMATICS SKILLS

- Operating systems: Windows, DOS, Linux, Unix.
- General applications: MS Office, Open Office, Latex.
- Programming languages: Matlab, Fortran 77
- Scientific applications: Comsol Multiphysics (RF module, AC-DC module, PDE module), Mathematica.

CONFERENCES AND INVITED SEMINARS

CONFERENCES

- META2018 June 24 2018 (Marseille), "Optical chiral effects in ENZ ultrathin slabs" C. Rizza, A. Ciattoni, A. Marini, A. Di Falco, X. Li [Invited Talk].
- FISMAT2017 (Trieste), "Metamaterials with moderate-permittivity inclusions"^l, C. Rizza, A. Ciattoni, [Talk].
- Metamaterials 2017 , C. Rizza, L. Columbo, M. Brambilla, F. Prati and A. Ciattoni, "ID chirality in all-photodesigned THz metamaterials"11th International Congress on Engineered Material Platforms for Novel Wave Phenomena - Metamaterials 2017 Marseille, France, (2017), [Talk].

- Second International workshop on metamaterials-by*design (December 2016, Riva del Garda), "Multiscale homogenization theory for periodic metamaterials: artificial electromagnetic chirality and bianisotropy"^{tl}, C. Rizza [Poster].
- e FISMAT2015 (Palermo, September 2015), "Electromagnetic spatial dispersion in periodic metamaterials" C. Rizza, A. Ciattoni, [Talk].
- o 101 Congresso SIF (Roma, September 2015), "Electromagnetic spatial dispersion in periodic metamaterials"^{tl} C. Rizza, A. Ciattoni, [Talk].
- o **Metamaterials'2015**, Oxford 7-12 September 2015, "Multiscale theory for periodic metamaterials and impact of geometric chirality from 3D to 1D" C. Rizza, A. Ciattoni, [Poster].
- o Third Mediterranean Photonics Conference (May 7th-9th 2014), "Artificial electromagnetic chirality in multi-layered metamaterial structures" C.
- o **Metamaterials'2013** (16-19 September), "Kapitza Dielectric Metamaterials"^{tt} C. Rizza, Alessandro Ciattoni, [Poster].
- EOSAN'12 2012, 25 —28 September 2012, Aberdeen Exhibition and Conference Centre, Scotland, GB., "Generation and control of cavity solitons by means of photorefractive soliton electro-activation" C. Rizza, L. Columbo, F. Prati, M. Brambilla and G. Tissoni, EOS Annual Meeting (EOSAM 2012), [talk].
- **METAMATERIALS 2010 KARLSRUHE** "Beam transverse power flow reversing in extreme nonlinear metamaterials, C. Rizza, A. Ciattoni, E. Palange . [Poster] .
- o March 16-18, 2009 Darmstadt (Germany) "Frequency filtering of Terahertz electromagnetic beams by means of Split-Ring-Resonator planar circuits C. Rizza, P. Carelli, F. De Paulis, A. Orlandi, E. Palange, M. Ortolani Invited talk at the CST MEETING
- July 5-7, 2006 (Ancona) C. Rizza et al., "Spatial Kerr solitons propagating in reflection gratings, [talk and poster] at the "Italian Workshop on Optics and Photonics" (IWOP 2006), Politecnico delle Marche.

INVITED SEMINARS

- November 2015, University of L'Aquila (L'Aquila), "Metamateriali: materiali artificiali per il controllo estremo della radiazione elettromagnetica, C. Rizza.
- February 2013, INLN (Sophia Antipolis) , "Diffractionless propagation through Kapitza stratified media;
- November 2013, University of Bari, "Reconfigurable all-optically induced THz metamaterials.

OTHER CONFERENCES ABSTRACTS

- o Terahertz Science & Technology (TST 2018, Berlin) V. Giliberti, M. Flammini, E. Pontecorvo, C. Rizza, A. Ciattoni, E. DelRe, and M. Ortolani "Knifeedge scan for super-resolved terahertz microscopy" (2018).
- o Photonics West, Japan 2017, Quantum Sensing and Nano Electronics and Photonics conference, G. Scamarcio et al. "Merging scattering near-field microscopy and self-mixing interferometry in quantum cascade lasers" (Keynote Presentation)
- A. Ciattoni, C. Rizza and A. Marini, "Efficient vortex generation in subwavelength epsilon-near-zero slabs" Oral presentation at th ICOAM 2017 ^u (Capri, Italy, September 2017).
- o X. Li, M. Pietrzyk, D. Faccio, C. Rizza, A. Ciattoni and A. Di Falco, "Linear and nonlinear optical behavior of epsilon near zero metamaterials: opportunities and challenges" Oral presentation at the "Quantum Sensing and Nano Electronics and Photonics XIV conference" (San Francisco, January 2017).
- Photonics 'West, San Francisco, California (USA) L. Columbo, F. P. Mezzapesa, M. Brambilla, M. Dabbicco, M. S. Vitiello, C. Rizza, and G. Scamarcio: "Homogeneous anisotropic terahertz response by photo-designed subwavelength grating" (2015).
- F. De Paulis, C. Rizza, A. Ciattoni, E. Palange, A. Orlandi, "Dynamically Reconfigurable Metamaterials for Shielding and Absorption in the GHz Range" ¹ Proc. of Joint IEEE International Symposium on EMC and EMC Europe 2015, Dresden, Germany, 16-21 August 2015.

e International Symposium on Physics and Applications of Laser Dynamics IS PALD, Paris (FR) L. Columbo, C. Rizza, M. Brambilla, F. Prati: "Complete set of logic gates based on dissipative-conservative spatial solitons" ^{tl} (2013)

- A. Ciattoni, and C. Rizza, "Effective medium theory for Kapitza stratified media" Poster presentation at "Cleo Europe 2013" (Munich, Germany, May 2013).
- A. Ciattoni, C. Rizza, and E. Palange, "Active plasmonic devices based on -near-zero nonlinear metamaterials" Poster presentation at "Metamorphose Metamaterials 2011" ¹ (Barcelona, October 2011).
- A. Ciattoni, C. Rizza, and E. Palange, "Engineering the Kerr response through metamaterials: extreme electromagnetic nonlinear regime" Oral presentation at "Metamorphose Metamaterials 2010" (Karlsruhe, Germany, September 2010).
- A. Ciattoni, C. Rizza, and E. Palange, "Extreme nonlinear optical regime supported by metamaterials: beam transverse power flow reversing" , Poster presentation at "CLEO/QELS 2010" (San Jose, US California, May 2010).
- C. Rizza; A. Priante; D. Doddi; F. De Paulis; A. Orlandi; P. Carelli; E. Palange, "Metamaterials for effective, single transmission resonant curves in the 1-5 THz spectral region" 3rd International Congress on Advanced Electromagnetic Materials in Microwaves and Optics, London, UK, 2009.
- E. DelRe, A. Ciattoni, C. Rizza, and A. Marini, "Engineering effective solitonsupporting nonlinearities in micro-structured potassium-lithium-tantalataniobate, invited talk at the International Conference on Nonlinear Waves -Theory and Applications, (Beijing (China), June 09- 12, 2008).