PERSONAL INFORMATION

Prof. Enrico Ronca

Dipartimento di Chimica, Biologia e Biotecnologie, Università degli Studi di Perugia,
Via Elce di Sotto, 8, 06123, Perugia, Italy

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https://eronca.wordpress.com

Sex Male | *Date of birth* 29/05/1987 | *Nationality* Italian

WORK EXPERIENCE

December 2022 - Current

Associate Professor and PI of the ERC-StG-2021 QED-Spin Project

Dipartimento di Chimica, Biologia e Biotecnologie, Università degli Studi di Perugia, Perugia.

- Research in theoretical and computational chemistry regarding the development of ab-initio methodologies for the study of molecules and materials strongly interacting with quantized fields in optical cavities.

November 2019 - Current

Visiting Researcher

Max-Planck Institute for the Structure and Dynamics of Matter (MPSD), Hamburg, Germany.

November 2019 – December 2022

Tenured Level III Researcher

Istituto per il Processi Chimico Fisici del CNR (IPCF-CNR), S.S. Pisa

September 2017 – November 2019

Postdoctoral Scientist

Max-Planck Institute for the Structure and Dynamics of Matter (MPSD), Hamburg, Germany.

- Research in theoretical and computational chemistry regarding the development of ab-initio methodologies for the study of molecules and materials strongly interacting with quantized fields in optical cavities. Advisor: Prof. Dr. Angel Rubio

July 2016 – August 2017

Postdoctoral Scholar

Division of Chemistry and Chemical Engineering, California Institute of Technology (CALTECH), Pasadena, CA, USA.

- Research in theoretical and computational chemistry regarding the development of ab-initio methodologies based on DMRG for the simulation of spectra of strongly correlated systems. Advisor: Prof. Dr. Garnet Kin-Lic Chan

February 2015 – June 2016

Postdoctoral Scholar

Chemistry Department, Princeton University, NJ, USA.

- Research in theoretical and computational chemistry regarding the development of ab-initio methodologies based on DMRG for the simulation of spectra of strongly correlated systems. Advisor: Prof. Dr. Garnet Kin-Lic Chan

November 2014 – January 2015

Postdoctoral Scientist

Institute of Molecular Sciences and Technologies of CNR (ISTM-CNR), Perugia, Italy.

- Research in theoretical and computational chemistry regarding the study of charge transfer processes in hybrid photovoltaic systems. Advisor: Prof. Dr. Filippo De Angelis

EDUCATION AND TRAINING

November 2011- November 2014

PhD in Chemical Sciences

Chemistry, Biology e Biotechnology Department, Università degli Studi di Perugia, Italy and Institute of Molecular Sciences and Technologies of CNR (ISTM-CNR), Perugia, Italy - Defended on **21/11/2014**.

- Theoretical and computational study of charge transfer processes in hybrid photovoltaic systems. Supervisor: Prof. Dr. Filippo De Angelis

October 2009 – July 2011

Master in Chemical Sciences

Chemistry, Biology e Biotechnology Department, Università degli Studi di Perugia, Perugia, Italy.

- Theoretical and computational study of charge transfer processes in water complexes. Supervisor: Prof. Francesco Tarantelli

September 2006 – July 2009

Bachelor in Chemistry

Chemistry Department, Università degli Studi di Perugia, Perugia, Italy.

- Theoretical and computational study of super-heavy elements complexes. Supervisor: Prof. Francesco Tarantelli.

FELLOWSHIPS AND AWARDS

2021 — ERC Starting Grant for the QED-Spin project.

2020- 2029 — National Scientific Qualification to be an Associate Professor in Physical Chemistry in Italy.

2020 — Second national position in Area 03 (Chemistry) of the Rita Levi Montalcini Program 2018.

2017- 2032 — National Scientific Qualification to be an Associate Professor in General and Inorganic Chemistry in Italy.

2011- 2014 — PhD Fellowship from the National Research Council (CNR) of Italy.

TEACHING ACTIVITIES

2021- Current — Tutor and Co-supervisor of the Master work of Matteo Castagnola and Sara Angelico, Scuola Normale Superiore and IPCF-CNR, Pisa, Italy.

2019- Current — Co-supervisor of the PhD work of Tor S. Haugland (NTNU - Norway, 2019-), Rosario R. Riso (NTNU - Norway, 2020-), Andrea Bianchi (SNS - Italy, 2021-), Alberto Barlini (SNS - Italy, 2021-) and Matteo Rinaldi (SNS - Italy, 2021-).

2020- 2021 — Co-supervisor of the Master work of Andrea Bianchi, Scuola Normale Superiore, Pisa, Italy.

2020 — Co-supervisor of the Master work of Rosario R. Riso and Laura Grazioli, Scuola Normale Superiore, Pisa, Italy.

2018- 2019 — Co-supervisor of the Master work of Tor S. Haugland, Norwegian University of Science and Technology, Trondheim, Norway.

2013 — Tutor for the course of General Chemistry, Department of Biological Sciences, Università degli Studi di Perugia, Italy.

ORGANIZATION OF WORKSHOPS

2021 Co-organizer of the "Ab-initio studies and novel effects of strong light-matter coupling in molecular, two-dimensional and solid-state systems" session at the APS March Meeting, USA, together with J. Flick (CCQ Flatiron).

INSTITUTIONAL RESPONSIBILITIES

2021 Reviewer for the applications for postdoctoral positions internal to H2020-MSCA-COFUND-2019 projects.

2020- 2021 Member of the committee for the selection of a postdoctoral position at the Institute for Chemical and Physical Processes of CNR (IPCF-CNR), Italy.

2020- 2021 Member of the Graduation Committee for the Master Degree in Chemistry at University of Pisa, Italy.

2020- Current Organizer of the Institute's Seminars at the Institute for Chemical and Physical Processes of CNR (IPCF-CNR), Italy.

REVIEWING ACTIVITIES

2015- Current Reviewer for several scientific peer-reviewed Journals (ACS Nano, Journal of Chemical Theory and Computation, The Journal of Physical Chemistry, The Journal of Physical Chemistry Letters, Physical Chemistry Chemical Physics, ChemPhysChem, International Journal of Quantum Chemistry, Chemical Physics Letters, Spectrochimica Acta A).

MEMBER OF SCIENTIFIC SOCIETIES

2015- Current Member of the Italian (SCI) and American (ACS) Chemical Societies.

SELECTED PRESENTATIONS

September 2021 "Shining light on the resonant mechanism of cavity-mediated chemical reactivity", ERC TAME Plasmon Closing Workshop, Università di Padova, Padova, Italy (**Invited**).

December 2020 "Changing ground state molecular properties in optical cavities: an ab-initio study", Appunti di Fisica, Università di Messina and IPCF-CNR, Messina, Italy (**Invited**).

February 2020 "Manipulating Properties of Molecules and Materials using Quantum Light in Optical Cavities", CNR Research Area, Pisa, Italy (**Invited**).

November 2019 "*Chemistry in cavity: an ab-initio study of vibrational strong coupling*", CUI: Advanced Imaging of Matter, Annual Meeting 2019, Hohwacht, Germany (**Contributed**)

November 2019 "Manipulating Properties of Molecules and Materials using Quantum Light in Optical Cavities", University of Trento, Trento, Italy (**Invited**).

September 2019 *"Manipulating and Controlling properties of molecules and materials using quantum light",* 12th European Conference on Computational Theoretical Chemistry, Perugia, Italy (**Contributed**)

January 2019 "Manipulating Properties of Matter with Quasiparticles of Light", CCQ-Columbia-Max Planck Center Kickoff Workshop, New York, USA (**Invited**).

March 2018 "Modeling Spectra of Strongly Correlated Realistic Systems and beyond", Scuola Normale Superiore, Pisa, Italy (**Invited**).

November 2017 "Modeling Spectra of Strongly Correlated Realistic Systems and beyond", Institute of Molecular Sciences and Technologies of the National Research Council (CNR) of Italy, Perugia, Italy (**Invited**).

April 2017 *"Density Matrix Renormalization Group based methods for the simulations of spectra of Strongly Correlated Systems in Quantum Chemistry",* Molecular Properties and Computational Spectroscopy – from Esoteric Effects to Novel Probing Tools, Pisa, Italy (**Contributed**).

January 2017 "Theoretical Methods for Excited State Properties in Extended Systems", Max Planck Institute for the Structure and Dynamics of Matter, Hamburg Germany (**Invited**).

PUBLICATIONS AND CITATIONS STATISTICS

Total number of publications: 30
Total Number of citations: 2118 (WoS) 2725 (Google Scholar)
5 Publications selected as Editor's Suggestions (1 - Nature Communications, 2 – Physical Review X, Physical Review B, Journal of Chemical Physics)
2 Publications selected as Highlights in the ADF software package website
4 publications with more than 100 citations
Most highly cited publication cited 766 times
Average number of citations per publication: 78
H-index: 23 (WoS) 25 (Google Scholar)

SELECTED PUBLICATIONS

- *Molecular orbital theory in cavity QED environment*, Rosario R. Riso, Tor S. Haugland, Enrico Ronca, Henrik Koch, Nature Commun., 13, 1368, **2022**.
- *Intermolecular interactions in optical cavities: an ab initio QED study*, T. S. Haugland, C. Schäfer, E. Ronca, A. Rubio, H. Koch, J. Chem. Phys., 154, 094113, **2021**.
- *Coupled Cluster Theory for Molecular Polaritons: Changing Ground and Excited* States, T. S. Haugland, E. Ronca, E. F. Kjønstad, A. Rubio, H. Koch, Phys. Rev. X, 10, 041043, **2020**.
- *Cavity Quantum-Electrodynamical Chern Insulator: Toward Light-Induced Quantized Anomalous Hall Effect in Graphene*, X. Wang, E. Ronca, M. A. Sentef, *Phys. Rev. B*, **99**, 235156, **2019**.
- *Cavity control of Excitons in two dimensional Materials:* S. Latini, E. Ronca*, U. De Giovannini, H. Hübener, A. Rubio, *Nano Lett.,* **19** (6), 3473-3479, **2019**.
- Time-step targeting time-dependent and dynamical density matrix renormalization group algorithms with ab initio Hamiltonians, E. Ronca∗, Z. Li, C. A. Jimenez-Hoyos, G. K.-L. Chan, J. Chem. Theory Comput., **13**, 5560–5571, **2017**.
- Density Relaxation in Time-Dependent Density Functional Theory: Combining Relaxed Density Natural Orbitals and Multireference Perturbation Theories for an Improved Description of Excited States, E. Ronca∗, C. Angeli, L. Belpassi, F. De Angelis, F. Tarantelli, M. Pastore, J. Chem. Theory Comput., **10**, 4014-4024, **2014**.
- A Quantitative View of Charge Transfer in the Hydrogen Bond: The Water Dimer Case, E. Ronca*, L. Belpassi, F. Tarantelli, ChemPhysChem, **15**, 2682-2687, **2014**.

- Charge-displacement analysis for excited states, E. Ronca∗, M. Pastore, L. Belpassi, F. De Angelis, C. Angeli, R. Cimiraglia, F. Tarantelli, J. Chem. Phys., **140**, 054110, **2014**.
- Influence of the dye molecular structure on the TiO2 conduction band in dye-sensitized solar cells: disentangling charge transfer and electrostatic effects, E. Ronca, M. Pastore, L. Belpassi, F. Tarantelli, F. De Angelis, Energy Environ. Sci., **6**, 183-193, **2013**.

PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s) English (C1)

Digital skills Proficient knowledge of the most commonly used operating systems (Linux, MAC Os, Windows), of the most used writing softwares (Microsoft Office, Latex) and of several programming languages (Fortran 90, Python, C++, etc.).