

**Rosalba Saija**  
- CURRICULUM VITAE -

**PERSONAL INFORMATION**

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**Rosalba Saija**  
Date of birth: [REDACTED]  
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(Office) Department of Mathematics and Computer Science, Physics and Earth Science (MIFT) – University of Messina  
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**WORK EXPERIENCE AND TEACHING ACTIVITY**

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**August 2018 – Present**

Member of the *Abilitazione Scientifica Nazionale* Committee, SD 02/B2 – SSD FIS/03

**October 2018 – Present**

Coordinator of The Bachelor's and Master's degree course in Physics at the University of Messina

**March 2018 – Present**

Full Professor, scientific field *Physics of Matter*

- *Teaching Activity*  
Mathematical Methods in Physics (*Bachelor's Degree in Physics*)  
Modern Physics (*Bachelor's Degree in Physics*)  
Electromagnetic Scattering (*Master Degree in Physics*)  
Nano-optics (*PhD School in Physics*)

**2011**

Guest Editor JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER, Volume: 113 Issue: 18 Published: DEC 2012 ISSN: 0022-4073

**26-30 Sept 2011**

Chair of Organization Committee of XIII International Conference on “*Electromagnetic Light Scattering*” (Taormina, Messina)

**August 2011 – February 2018**

Associate Professor, scientific field *Physics of Matter*

**November 2011 - Present**

Associate Researcher at IPCF – CNR (Research National Council)

**April 2005**

Editor of Volume n.6 “*Light, Dust and Chemical Evolution*” (Journal of Physics: Conference Series)

**26-30 Settembre 2004**

Chair of Organization Committee of the International Workshop on “**Light, Dust and Chemical Evolution**” (Gerace, Reggio Calabria)

**25 March 2003**



Member of *Advisory and Program committee* of International Workshop ***Dust and molecules in the interstellar medium - Observations by microwave radio astronomical techniques*** (Messina, 25 marzo 2003)

**2003**

Co-author of “*Scattering from Model Nonspherical Particles. Theory and applications to Environmental Physics*” Monography, Springer-Verlag, Heidelberg,

**March 1983 - July 2011**

Senior researcher, scientific field *Physics of Matter*

## **EDUCATION AND TRAINING**

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**November 1988**

**March 1986**

**August/Sep 1984**

Visiting researcher at US Army Edgewood Chem. Biol. Center., Aberdeen PG, Maryland (USA)

**November 1980**

“Laurea” in Physics, University of Messina, supervisor Prof. Ferdinando Borghese.

## **FUNDED RESEARCH PROJECT**

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**From 2016**

Member of *Research & Mobility 2016 Project* (project code RES\_AND\_MOB\_2016\_-TORRISI), University of Messina.

**From 2014**

Local manager of *Materials, Physical and Nanosciences COST Action MP1403 (Nanoscale Quantum Optics)*

**2012-2015**

Member of *HIPPOCRATES Research Project* (PON02\_00355\_2964193)

**2002-2006**

Principal investigator of three-years project on “*The Optical Properties of Aerosols. (Biological aerosols)*”, Department of Environment dell’ U.S Army European Research Office. contract n. N622558-02-C-9040

**2003 – 2005**

Member of Scientific research program of relevant national interest (MIUR-COFIN) ‘*Effetti meccanici e biologici dell’interazione della radiazione con i grani del mezzo interstellare*’.

**2001- 2002**

Principal Investigator del one-year research project on “*Simulation of the Optical Properties of Atmospheric Aerosols in the Planetary Boundary Layer*”, Environmental Sciences Branch dell’ U.S Army European Research Office, Contract n. N68171-01-M-5907

**2000 – 2002**

Member of Scientific research program of relevant national interest (MIUR-COFIN) ‘*Cosmic Dust and Gas (Polvere e Gas nello Spazio: connessioni e evoluzione)*’.

**1998 - 1999**

Member of Scientific research program of relevant national interest (MIUR-COFIN) ‘*Dust and Molecules in astrophysical environment (Polvere e Molecole in ambiente astrofisico)*’.

**1984**

Principal Investigator of “*Optical Properties of aerosol particles*”, l’US Army European Research Office, contratto n. DAJA45-84-C-0005

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## RESEARCH ACTIVITY

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### Research sectors

The research activity is mainly focused on the study of extinction processes (scattering + absorption) of light by nano and micrometric particles. Its activity takes place on two parallel research fields: the first concerns the classical and quantum nano-optical sector, the second is the study of interstellar powders. In this context, over the years, she has:

- developed an analytical theory for the calculation of electromagnetic scattering from non-spherical particles.
- developed an efficient T-matrix method for the determination of scattering and extinction cross sections from random distributions of asymmetric nano particles.
- applied group theory techniques to the problem of scatterers with symmetry properties, realizing an efficient and robust code for the numerical calculation of electromagnetic scattering.
- detailed studies on the effect of non-sphericity, on the polarization properties, depolarization and aerosol radiative transport.
- developed an analytical theory and an efficient numerical code, for the calculation of electromagnetic scattering from non-spherical particles deposited on metallic and dielectric substrates.
- developed an analytical theory and an efficient numerical code for determining the force and the moment transferred from the radiation to the nano particles.
- developed an analytical theory and an efficient numerical code to study the phenomena of optical entrapment in optical tweezers.
- applied the theory to the interpretation of experimental data acquired in different experimental situations.

She is co-author of more than 100 publications published in international journals. She is co-author of the volume "Scattering from Model Nonspherical Particles. Theory and applications to Environmental Physics ", Springer-Verlag, Heidelberg, appeared as first edition in 2002 and second in 2007.

She is referee of some international scientific journals such as JQSRT, JOSA A, Applied Optics, JOP.

### Books and Articles (2014-2019)

1. *Light-matter Interaction Under Intense Field Conditions: Nonlinear Optical Properties of Metallic-dielectric Nanostructures*,  
Enza Fazio, Luisa D'Urso, Rosalba Saija, Saveria Santangelo, and Fortunato Neri  
*Current Nanomaterials* 2019, 4, 51-62
2. *Chiral optical tweezers for optically active particles in the T-matrix formalism*  
Patti F, Saija R., Denti P., Pellegrini G., Biagioni P., Iatì M.A., Maragò O.  
*Scientific Report* 9(1),29 (2019)
3. *Near-field imaging of surface plasmon vortex-modes around a single elliptical nanohole in a gold film*  
Claudia Triolo, Salvatore Savasta, Alessio Settineri, Sebastiano Trusso, Rosalba Saija, Nisha Rani Agarwal, Salvatore Patanè  
*Scientific Reports*, 9:5320 (2019)



4. *Optical tweezers and their applications*  
Polimeno, P., Magazzù, A., Iatì, M.A., (...), Volpe, G., Maragò, O.M.  
*Journal of Quantitative Spectroscopy and Radiative Transfer* 218, pp. 131-150 (2018)
5. *Electrospun Conjugated Polymer/Fullerene Hybrid Fibers: Photoactive Blends, Conductivity through Tunneling-AFM, Light Scattering, and Perspective for Their Use in Bulk-Heterojunction Organic Solar Cells*  
Zhenhua Yang, Maria Moffa, Ying Liu, Hongfei Li, Luana Persano, Andrea Camposeo, Rosalba Saija, Maria Antonia Iatì, Onofrio M. Maragò, Dario Pisignano, Chang-Yong Nam, Eyal Zussman, and Miriam Rafailovich  
*Journal of Physical Chemistry C*, 122, pp. 3058-3067 (2018)
6. *Optical trapping and optical force positioning of two-dimensional materials*  
M. G. Donato, E. Messina, A. Foti, T. J. Smart, P. H. Jones, M. A. Iatì, R. Saija, P. G. Gucciardi and O. M. Maragò  
*Journal of Physical Chemistry C*, 122, pp. 3058-3067 (2018)
7. *Biomimetic Amorphous Lasers through Light-Scattering Surfaces Assembled by Electrospun Fiber Templates*  
Maria Moffa, Andrea Camposeo, Vito Fasano, Barbara Fazio, Maria Antonia Iatì, Onofrio M. Maragò, Rosalba Saija, Heinz-Christoph Schroder, Werner E. G. Muller, and Dario Pisignano  
*Laser Photonics Rev.* 1-9 1700224 (2018)
8. *Ferdinando Borghese (26 May 1940–19 January 2017)*  
M.A. Iatì, R. Saija, O.M. Maragò, P. Denti  
*JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER* Volume: 201 Pages: 226-228 (2017)
9. *Spin-Momentum Locking in the Near Field of Metal Nanoparticles*  
C. Triolo, A. Cacciola, S. Patanè, R. Saija, S. Savasta, and F. Nori  
DOI: 10.1021/acsphotonics.7b00436, *ACS Photonics*, Published on Line, August 2017
10. *Spectral shift between the near-field and far-field optoplasmonic response in gold nanospheres, nanoshells, homo- and hetero-dimers*  
Cacciola, A.; Iatì, M. A.; Saija, R.; et al.  
*JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER* Volume: 195 Special Issue: SI Pages: 97-106 Published: JUL 2017
11. *Coherent backscattering of Raman light*  
Fazio, Barbara; Irrera, Alessia; Pirodda, Stefano; et al.  
*NATURE PHOTONICS* Volume: 11 Issue: 3 Pages: 170+ Published: MAR 2017
12. *Optical Trapping of Plasmonic Mesocapsules: Enhanced Optical Forces and SERS*  
By: Spadaro, D.; Iatì, M. A.; Perez-Pineiro, J.; et al.  
*JOURNAL OF PHYSICAL CHEMISTRY C* Volume: 121 Issue: 1 Pages: 691-700 Published: JAN 12 2017
13. *RANDOM OPTICAL MEDIA BASED ON HYBRID ORGANIC-INORGANIC NANOWIRES: MULTIPLE SCATTERING, FIELD LOCALIZATION AND LIGHT DIFFUSION*  
Persano, L.; Moffa, M.; Fasano, V.; et al.  
Edited by: Tabor, CE; Kajzar, F; Kaino, T; et al. Conference: Conference on Organic Photonic Materials and Devices XIX Location: San Francisco, CA Date: JAN 30-FEB 01, 2017 Sponsor(s): SPIE ORGANIC PHOTONIC MATERIALS AND DEVICES XIX Book Series: Proceedings of SPIE Volume: 10101 Article Number: UNSP 1010103 Published: 2017
14. *The activation of non-linear optical response in Ag@ZnO nanocolloids under an external highly intense electric field*  
Fazio, E.; D'Urso, L.; Santangelo, S.; et al.  
*NUOVO CIMENTO C-COLLOQUIA AND COMMUNICATIONS IN PHYSICS* Volume: 39 Art #: 307 (2017)
15. *Strongly enhanced light trapping in a two-dimensional silicon nanowire random fractal array*  
By: Fazio, Barbara; Artoni, Pietro; Iatì, Maria Antonia; et al.  
*LIGHT-SCIENCE & APPLICATIONS* Volume: 5 Article Number: e16062 Published: APR 2016

16. *Optical tweezers: a non-destructive tool for soft and biomaterial investigations*  
Magazzu, A.; Spadaro, D.; Donato, M. G.; et al.  
RENDICONTI LINCEI-SCIENZE FISICHE E NATURALI Volume: 26 Supplement: 2 Pages: 203-218 , 2015
17. *Plasmonic Absorption Enhancement of a Single Quantum Dot*  
Arena, S.; Cucinotta, F.; Di Stefano, O.; et al.  
PLASMONICS Volume: 10 Issue: 4 Pages: 955-962 Published: AUG 2015
18. *Modeling of Enhanced Electromagnetic Fields in Plasmonic Nanostructures*  
Maria Antonia Iati, Elefterios Lidorikis, and Rosalba Saija  
Handbook of Enhanced Spectroscopy, Chapter 3 , Edited by Pietro Giuseppe Gucciardi, Marc Lamy de la Chapelle, and Nathalie Lidgi-Guigu, Copyright 2016 Pan Stanford Publishing Pte. Ltd. ISBN 978-981-4613-32-3 (Hardcover), 978-981-4613-33-0 (eBook), September 15, 2015
19. *Subdiffraction Light Concentration by J-Aggregate Nanostructures*  
Cacciola, Adriano; Triolo, Claudia; Di Stefano, Omar; et al.  
ACS PHOTONICS Volume: 2 Issue: 7 Pages: 971-979 Published: JUL 2015
20. *Optical trapping of silver nanoplatelets*  
By: Messina, E.; Donato, M. G.; Zimbone, M.; et al.  
OPTICS EXPRESS Volume: 23 Issue: 7 Pages: 8720-8730 Published: APR 6 2015
21. *Near-Field Optical Detection of Plasmon Resonance from Gold Nanoparticles: Theoretical and Experimental Evidence*  
Triolo, Claudia; Cacciola, Adriano; Saija, Rosalba; et al.  
PLASMONICS Volume: 10 Issue: 1 Pages: 63-70 Published: FEB 2015
22. *Scaling of optical forces on Au-PEG core-shell nanoparticles*  
Spadaro, Donatella; Iati, Maria A.; Donato, Maria G.; et al.  
RSC ADVANCES Volume: 5 Issue: 113 Pages: 93139-93146 Published: 2015
23. *Superior plasmon absorption in iron-doped gold nanoparticles*  
By: Amendola, Vincenzo; Saija, Rosalba; Marago, Onofrio M.; et al.  
NANOSCALE Volume: 7 Issue: 19 Pages: 8782-8792 Published: 2015
24. *Ultrastrong Coupling of Plasmons and Excitons in a Nanoshell*  
Cacciola, O. Di Stefano, R. Stassi, R. Saija, and S. Savasta  
ACS NANO, Article ASAP DOI: 10.1021/nn504652w, Published on line October 22, 2014
25. *Polarization-dependent optomechanics mediated by chiral microresonators*  
Donato, M. G.; Hernandez, J.; Mazzulla, A.; et al.  
NATURE COMMUNICATIONS Volume: 5 Article Number: 3656 Published: APR 2014



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