

# Eugenio Del Re (DelRe)

Associate Professor of Condensed Matter Physics (Full Professor Habilitation in Experimental Condensed Matter Physics – 02B1)  
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## E. DelRe's Nonlinear Optics Group at Sapienza

██████████, research fellow, ██████████, PhD Student, ██████████, research associate, ██████████, retired Full Professor of Physics, ██████████, group consultant

## Education

- 1995 Laurea Degree in Physics 110/110 magna cum laude from the University of Rome Sapienza discussing the experimental thesis "Single-photon state engineering for quantum optics" (Prof. ██████████).
- 1999 PhD in Physics discussing the experimental thesis "Nonlinear Optical Propagation in Ferroelectric and Near-Critical Paraelectric Photorefractive Crystals", in a joint PhD program between the University of L'Aquila and Princeton University (Prof. ██████████ - L'Aquila University, Prof. ██████████ - Princeton University).

## Academic and Professional

- 1995-1997 Officer of the Technical Corps, Physics Department, Italian Army
- 1997 Research Contract "Self-induced waveguides in photorefractive crystals" at the Fondazione di Ricerca "Ugo Bordoni" (Rome, Italy)
- 1998-2000 Permanent Research Scientist at the Fondazione di Ricerca "Ugo Bordoni", Nonlinear optics Laboratory (Rome, Italy) (Junior Scientist).
- 2000 Permanent Research Scientist at the Advanced Research Division, Pirelli Cavi e Sistemi Spa (Milan, Italy).
- 2001 Optical Engineer at Qplus Networks Inc. (Long Beach, California) and scientific consultant at Santel Networks Inc. (Newark, California).
- 2001-2003 Post-doctoral fellow at the Istituto Nazionale di Fisica della Materia, University of Rome La Sapienza (Rome, Italy)
- 2003-2005 Post-doctoral fellow at the Istituto Nazionale di Fisica della Materia, University of L'Aquila (L'Aquila, Italy)
- 2005-2011 Ricercatore Universitario (tenured Assistant Professor) in Experimental Physics at the Engineering Faculty of the University of L'Aquila (L'Aquila, Italy).
- 2011-2018 Ricercatore and Aggregate Professor in Experimental Physics at the Physics Department of La Sapienza University (Rome, Italy).
- 2013-present Habilitation for the role of Associate Professor in Experimental Condensed Matter Physics (02B1)
- 2017-present Habilitation for the role of Full Professor in Experimental Condensed Matter Physics (02B1)
- 2018-present Associate Professor in Condensed Matter Physics (02B1) at the Physics Department of La Sapienza University (Rome, Italy)

## Activity abroad and visiting positions

- 1996-1998 Visiting Student (18 months), Department of Electrical Engineering, Princeton University, New Jersey (USA, ██████████)
- 1997-2005 Visiting Researcher (4 months) at the Department of Applied Physics, Hebrew University of Jerusalem (Israel, ██████████)
- 1998-2001 Visiting Researcher (1 month) at the Haifa Institute of Technology -Technion, Haifa (Israel, Prof. ██████████)
- 2001 Optical R&D Engineer (4 months) at Qplus Networks Inc., Long Beach, California (USA)

2002	Optical R&D Engineer (2 months) at Santel Networks Inc., San Francisco, California (USA)
2015-2018	Visiting Professor of Thermodynamics (Summer Semester) at the John Cabot University (Rome, Italy)
2017-2019	Visiting Professor of Engineering Thermodynamics (Summer Semester) at CEA – Study Abroad (University of New Haven)

### Research projects as Principal Investigator or Unit Leader

2009-2011	Principal Investigator - "SMC - Smart Confocal Microscope" -FILAS - (Lazio Regional Government, 132 kEuro)
2010-2014	Principal Investigator - "Spatial soliton composites bridging PHOtorefractive and Cavity Optical Structures - PHOCOS"-FIRB MIUR "Futuro in Ricerca"- (MIUR, 589 kEuro)
2011-2013	Unit Leader - "Shock waves: theory and experiment " - PRIN 2009 (MIUR, 60 kEuro - Unit grant).
2014-2016	Unit Leader - "Extreme events in optics and hydrodynamics" PRIN 2012 (MIUR, 39 kEuro - Unit grant)
2016-2018	Principal Investigator - "Imaging through turbid systems" - (CERN, 32 KEuro)
2016-2017	Principal Investigator - "Optical Rogue Waves in Metastable Crystals - ROGUE" - Progetto di Ricerca di Ateneo Sapienza - (Sapienza University, 39 KEuro)
2018-2019	Principal Investigator (Scientific) - " TOPPP - Trasmissione Ottica Punto a Punto in Polarizzazione" - Progetto Integrato Lazio Innova "Aerospazio e Sicurezza" POR FESR 2014-2020 in collaboration with Crisel Srl (Lazio Regional Government, 240 kEuro total, 75 kEuro direct funding for E. DelRe's group)
2018-2019	Principal Investigator - "Giant Response in disordered Perovskites - (GRIP)" Progetto Grande di Ricerca di Ateneo Sapienza - (Sapienza University, 35KEuro)
2019-2020	Principal Investigator - "Self-aligning Achromatic Light Transducers - SALT" ATTRACT Project (H2020, European Union, 100 KEuro)
2020-2021	Principal Investigator - " Fractal-dimensional ferroelectric cluster percolation in super-crystals - FRACFER" - Progetto Piccolo di Ricerca di Ateneo Sapienza - (Sapienza University, 4 kEuro)
2021-2023	Principal Investigator - " Comunicazione laser dinamica nello spazio libero tramite droni" - Progetto Gruppi di Ricerca 2020 Lazio Innova (Lazio Regional Government, 150 kEuro total, 140 kEuro direct funding for E. DelRe's group)

### Research projects as Key Member

2001-2002	"Soliton-based electro-optical structures in near transition photorefractive crystals and bulk optical manipulation" - (██████████) PAIS (INFM) SES.
2002-2003	"Fenomeni spazio-temporali in ottica non lineare" - (P. ██████████) MIUR PRIN.
2003-2004	"Wavelength selective electro-optic beam manipulation through photorefractive solitons embedded in electro-holograms" - (██████████) PAIS (INFM) SEH.
2003-2005	"Interazioni lineari e non lineari tra sistemi di dimensionalità diversa" - (██████████) Progetto di Rilevante Interesse di Ateneo (██████████).
2003-2006	"Fenomeni spazio-temporali in propagazione" - (██████████) FIRB-INFM.
2006-2009	"Dispositivi ottici nanostrutturati in materia soffice" - (██████████) FIRB-internazionalizzazione Italia - Israele.
2011-2013	"Schemi innovativi per la microscopia TIRF e tecniche di autofocus dedicate ai sistemi TIRF" - FILAS SpA project with - Crisel Instruments Srl (██████████).
2012-2014	"Sistema Scanner 3D con luce strutturata per la rivelazione remota di deformazioni di superficie" - FILAS SpA project wuth - Crisel Instruments Srl (██████████)
2014-2015	"Anderson localization with classical and quantum photonics systems" Progetto di Ateneo Sapienza Awards (██████████).
2017-2018	"Complex nonlinear rogue waves and replica symmetry breaking" Progetto Medio di Ateneo Sapienza (██████████)
2018-2019	"Low-wavenumber femtosecond coherent Raman spectrometer" Italy-USA Project (Progetto Grande Rilevanza Italia-Stati Uniti) (██████████)
2019-2020	"Photonic Ising Machines" Progetto Medio di Ateneo Sapienza (██████████)

### Editorial Positions

- 2019-present Member of Editorial Board of "Optics" - ISSN: 2673-3269 - MDPI (Basel, Impact Factor not applicable - launched in 2019)
- 2020-present Editor of "Results in Physics" - ISSN: 2211-3797 - Elsevier (Amsterdam, Impact Factor 4.5)

### Chair and organizer

- 2011 Co-organizer and co-chair with Giovanna Tissoni of the Session "Universal soliton traits across different physical systems", 11 talks at the PIERS 2011 Conference (Marrakesh-Morocco, June 20-24, 2011)
- 2011 Chair of the Session Solitons I at the SPIE Conference on Optics and Optoelectronics 2011 in Prague (Prague - Cech. Republic, April 18-22, 2011)
- 2011 Co-organizer of the Erice Workshop Nonlinear Optics and Complexity in Photonic Crystal Fibers and Nanostructures, Ettore Majorana Foundation and Centre for Scientific Culture in Erice, Sicily (Italy), November 9-12, 2011.
- 2012 Member of Subcommittee 5: Nonlinear Optics and Novel Phenomena for the CLEO:2012 Conference held May 6-11, 2012 in San Jose, California.
- 2013 Member of Subcommittee - Fundamental Science - for the CLEO:2013 QELS Conference held June 9-14, 2013 in San Jose, California.
- 2014 Member of Subcommittee - Nonlinear Optics & Novel Phenomena - for the CLEO:2014 QELS Conference held in June 8-13, 2014 in San Jose, California.
- 2015 Member of the Organizing Committee of the 101st Congress of the Italian Physical Society (101-esimo Congresso della Società Italiana di Fisica - SIF 2015) held in September 21-25, 2015, in Rome, Italy.
- 2017 Co-organizer of the Summer School and Workshop "Data-driven methods for multi-scale physics and complex systems", July 24- August 4, 2017, in Rome, Italy.

### Present Research Activity

#### **Spatial nonlinear waves - Experimental**

Scale-free optics and subwavelength beam propagation in nanodisordered ferroelectrics; Klein-Gordon optics; anti-diffraction; spatial soliton propagation in photorefractive materials; rogue waves in photorefractive near-transition crystals.

#### **Complex solids - Experimental**

Relaxor ferroelectrics; non-ergodic ferroelectric phases; ageing; dipolar glasses; giant electro-optic response; spontaneous photonic crystals; ferroelectric super-crystals; second-harmonic-generation in ferroelectric super-crystals.

#### **Reprogrammable integrated electro-optic circuits - Experimental**

Soliton-based electro-optic waveguides in paraelectric crystals; funnel-wave guide circuits and arrays; volume integrated reprogrammable phase, intensity, and polarization modulators; reprogrammable electro-optic routers, splitters, and filters.

#### **Imaging and super-resolution - Experimental**

Miniaturized Bessel-beam electro-optic generators; structured illumination; super-resolved imaging.

#### **Quantum optics - Theoretical and experimental**

Foundations; entanglement; quantum algorithms; single-photons in random fibers.

#### **Statistical Mechanics - Theoretical and numerical**

Weak-ergodicity breaking, nano-scale fluctuations; Markovian processes.

### Spin-offs and Start-ups

- 2003-2009 Co-founder of Tel-Con Srl (Rome), research and development of innovative optical fiber communications based on polarization.

### Acknowledgements, prizes, and shortlists

- 1999 The papers B.Crosignani et al. Phys. Rev. Lett. 82, 1664 (1999); E. DelRe et al. Phys. Rev. Lett. 83, 1954 (1999), have been selected as Eccellenze of the Istituto Nazionale di Fisica della Materia.
- 2001-2008 The paper E. DelRe et al. Opt. Lett. 26, 908 (2001) has been included in Material Research Society Bulletin. Papers A. D'Ercole et al. Appl. Phys. Lett. 85, 2679 (2004); E. DelRe et al. Appl. Phys. Lett. 85, 5499 (2004); E. DelRe et al. Phys. Rev. E 71, 036610 (2005); C. Rizza et

- al. Phys. Rev. A 75, 063824 (2007); A. Ciattoni et al. Opt. Lett. 33, 2110 (2008) have been selected for the Virtual Journal of Ultrafast Science of the American Physical Society.
- 2002 **Shortlisted** (best 5 candidates) for the position of Assistant Professor at the Applied Physics Department - California Institute of Technology (Pasadena, USA), call of 2002 (Prof. Atwater)
- 2012 Eugenio Del Re, with Claudio Conti e Aharon J. Agranat, won the **Vigevani Research Prize 2012** (15 KUSD on behalf of the Associazione Italiana Amici dell'Università di Gerusalemme) for their research in propagation in disordered ferroelectrics.
- 2011 The paper **E. DelRe et al. Nat. Photon. 5, 39 (2011)** has been described in the News and Views of Nature Photonics in the paper A. Sukhorukov, Nat. Photon. 5, 4-5 (2011), has been described in a series of national and international websites, these including wired.it, fastweb.it, etc., and has been described in the Italian press (Il Tempo, Il Centro), and has been the subject of an interview on national radio, Moebius di Radio 24 - Il Sole 24 Ore, 2nd of April 2011.
- 2014 Eugenio DelRe has been awarded the **Teaching Excellence Award** by the University of Rome La Sapienza on the 19th of November 2014, a prize that recognized the top 5% university professors at the Campus as evaluated by the students.
- 2015 The paper **E. DelRe et al. Nature Photonics 9, 228-232 (2015)** has been described in the Italian press (Repubblica, il Corriere, Ansa, Agi, Le Scienze, etc.) and has been described in a News and Views of Nature Photonics paper H. Harutyunyan, Nat. Photon. 9, 213-214 (2015). The findings have been the subject of a national television program "Memex: Luce dei miei occhi" (Rai Cultura, 28th of December 2015).
- 2015 The results contained in the paper **S. Gentilini et al. Scientific Reports 5, 15816 (2015)** have been described in the Italian press and numerous popular websites (Corriere, Repubblica, il Giornale, Le Scienze, etc.).
- 2017 The results contained in the paper **G. Antonacci et al. Scientific Reports 7, 17 (2017)** have been described in the Italian press and numerous popular websites.
- 2017 The results contained in the paper **D. Pierangeli et al. Nature Communications 8, 1501 (2017)** has been described in the Italian press and popular science websites.
- 2018 The results contained in the paper **F. Di Mei et al. Nature Photonics 12, 734-738 (2018)** has been described in an Italian press release, described in a number of popular science websites, and been the subject of an interview on the Italian National Radio, Radio 24, in the program SmartCity24 (26/11/2018).
- 2019 The results contained in the paper **G. Marcucci et al. Nature Communications 10, 5090 (2019)** was described in several news websites.
- 2020 The results contained in the paper **L. Falsi et al. Communications Materials 1, 76 (2020)** was selected for the Web Cover Page of the journal and described in the Italian Press.
- 2021 The results contained in the paper **L. Falsi et al. Physical Review Letters 126, 037601 (2021)** was described in a Sapienza University press release.

### Departmental, Faculty, Campus, and National Appointments

- 2005-2008 Member of the ECAS Committee – “Education as a Complex Adaptive System” at the INVALSI - Istituto di Valutazione del Sistema Scolastico Italiano ([http://www.invalsi.it/invalsi/prog/ecas.php?page=ecas\\_it\\_05](http://www.invalsi.it/invalsi/prog/ecas.php?page=ecas_it_05))
- 2009-2011 Member of the PhD Board - Università degli Studi de L'Aquila, "INGEGNERIA ELETTRICA E DELL'INFORMAZIONE"
- 2013 Member of the PhD Board - Università degli Studi de L'Aquila, "INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE E DI ECONOMIA"
- 2012-2019 Member of the Departmental Space Task Force (Commissione Spazi), Physics Department, University of Rome La Sapienza
- 2013-2019 Member (Chair, 2018-2019) of the Departmental Publications Task Force (Commissione Pubblicazioni), Physics Department, University of Rome La Sapienza
- 2016-2018 Undergraduate Admissions Exams Delegate for Physics Students (Delegato OFA), Science Faculty, University of Rome La Sapienza
- 2015-present Group Leader of the Nonlinear Photonics Group at the Physics Department, University of Rome La Sapienza

2017	Chair of a National Selection Committee (Presidente di Commissione) for Permanent Technical Research Staff on behalf of the Italian National Research Council (CNR - Bando 367.87 DSFTM ISC CTER)
2017-2018	Research Quality and Outreach Board, member (Commissione per la qualità della Ricerca e della Terza Missione) - Physics Department, University of Rome La Sapienza
2018-present	Quality Control and Management Committee (Commissione di Gestione dell'Assicurazione Qualità) - Physics Department, University of Rome La Sapienza, member
2019	Examiner, committee for Salvatore Bruno Bruno, PhD in Physics, University of Rome Tor Vergata
2019	Examiner, committee for Stefania Sciara, International PhD in ICT, University of Palermo
2019-present	Member of the Selection Committee for international students - Physics Department, University of Rome La Sapienza
2020	Member of Selection Board for English Language Teaching - Physics Department, University of Rome La Sapienza
2020	Member of the PhD Examination Board for Condensed Matter Physics (XXXII cycle) - Physics Department, University of Rome La Sapienza
2020	Referee FISR2020-COVID-19 for the Italian Ministry of Research (MIUR)
2020-2021	Member of Departmental selection committee for new Faculty, Physics Department, University of Rome La Sapienza

### International Appointments

2009	Rapporteur for Future and Emerging Technologies (FET) projects of the EU, for a total of 58 project evaluations (2009).
2016	Examiner, committee for Noémi Wiersma, PhD in Physics, Université de Lorraine.
2019	Examiner, projects of the Austrian Science Fund.
2020	Referee, COVID-19 research projects, INRS Canada
2021	Examiner, promotion to Associate Professor, Prince Sattam bin Abdulaziz University (Saudi Arabia)

### Peer Review

Peer reviewer for all the major scientific journals that focus on photonics, these including Physical Review, Physical Review Letters, Nature Communications, Optics Letters.

### Membership

1996-2005	Istituto Nazionale di Fisica della Materia (INFN)
1999-present	Optical Society of America (OSA)
1998-2001	Gruppo Nazionale di Elettronica Quantistica e Plasmi (GNEQP)
2001-2003	Associazione Elettrotecnica ed Elettronica Italiana (AEI)
2005-2014	Consorzio Nazionale Interuniversitario di Struttura della Materia (CNISM)
2006-2009	Laboratorio di Ricerca SOFT dell'Istituto Nazionale di Fisica della Materia – Consiglio Nazionale della Ricerca (SOFT INFN-CNR)
2009-present	SIF – Società Italiana di Fisica
2010-2012	IPCF- Consiglio Nazionale delle Ricerche (Rome)
2012-present	ISC-Consiglio Nazionale delle Ricerche (Rome)

### Summer Schools

1999	"Bose-Einstein Condensation and Atom Cooling", International School of Physics E. Fermi, Varenna (student)
2001	"Quantum and Nonlinear Optics", Scuola di Specializzazione of the Istituto Nazionale di Fisica della Materia, Villa Gualino, Turin (Lecturer)
2009	XII International School on Complexity - Ettore Majorana Centre for Scientific Culture, Erice (Lecturer)

### Teaching - Undergraduate and graduate level

1998-2000	Instructor of "Fourier Optics and holography" at the School of Optoelectronics (CNR) of the Italian Army (Rome).
1999-2000	Instructor of "Principles of Lasers" at the Medical Physics School - University of Rome La Sapienza (Rome).
2001-2005	Instructor of "Optical Fiber Lab" for the training course "Data Communication" at Micron Technologies Italia (Avezzano)
2002-2004	Instructor of the course "Optoelectronics Laboratory" for Engineers at the University of L'Aquila.
2005-2008	Instructor of Fisica 1 (Mechanics and Thermodynamics) for Engineering, University of L'Aquila
2009-2011	Instructor of Fisica 2 (Electromagnetism) for Engineering, University of L'Aquila
2010-2011	Instructor of Optics for Physicists, University of L'Aquila
2011-2019	Instructor of Fisica 1 (Mechanics and Thermodynamics) for Aerospace Engineers, University of Rome La Sapienza
2012-present	Co-instructor of the Condensed Matter Laboratory Course for Physics, University of Rome La Sapienza (hosts 3-6 resident students in the group per year)
2013/2016/2018	Instructor of an Excellence Stage for Aerospace Engineering Students, University of Rome La Sapienza
2015-2018	Summer Semester Instructor of Thermodynamics for Engineers, John Cabot University, Rome
2017-present	Summer Semester Instructor of Thermodynamics for Engineers, CEA- University of New Haven, Rome
2017-present	Instructor of Optics and Laboratory for Physics Students (Bachelor Level), University of Rome La Sapienza
2020-present	Instructor of Physical Methods for Archeological Materials Science Students (Master Level), University of Rome La Sapienza (course still to be held)

## Students and Group Members

### Laurea Triennale (Bachelor level) Students

2009	██████████, Bachelor Degree Student in Physics defending the thesis "Strategie di Gioco Quantistiche", University of L'Aquila
2011	██████████, Bachelor Degree Student in Civil Engineering defending the thesis "Sensori di deformazione in fibra microstrutturata", University of L'Aquila
2011	██████████, Bachelor Degree Student in Chemical Engineering defending the thesis "Algoritmi quantistici nel bubble sorting", University of L'Aquila
2014	██████████, Bachelor Degree Student in Physics defending the thesis "Entanglement di singola particella utilizzando l'Hamiltoniana di Jaynes-Cummings", University of Rome La Sapienza
2015	██████████, Bachelor Degree Student in Aerospace Engineering defending the thesis "Diffraction limits to space optical links", University of Rome La Sapienza
2016	██████████, Bachelor Degree Student in Physics defending the thesis "Non Località Quantistica e Relatività: La Questione della Superluminalità", University of Rome La Sapienza
2016	██████████, Bachelor Degree Student in Physics defending the thesis " Non-località e realismo in Meccanica Quantistica", University of Rome La Sapienza
2017	██████████, Bachelor Degree Student in Physics defending the thesis "Equazione di Schroedinger Nonlineare e solitoni spaziali", University of Rome La Sapienza
2018	██████████, Bachelor Degree Student in Physics defending the thesis "Fasci di Bessel", University of Rome La Sapienza
2019	██████████, Bachelor Degree Student in Physics defending the thesis "Fasci di Airy", University of Rome La Sapienza
2019	██████████, Bachelor Degree Student in Physics defending the thesis "Universal linear optics quantum computing and resource limitations", University of Rome La Sapienza
2019	██████████, Bachelor Degree Student in Physics defending the thesis "Il Principio di Landauer", University of Rome La Sapienza
2020	██████████, Bachelor Degree Student in Physics defending the thesis "Optical Rogue Waves", University of Rome La Sapienza
2020	██████████, Bachelor Degree Student in Physics defending the thesis "Polarization vortices in ferroelectric phase transitions", University of Rome La Sapienza

- 2020 ██████████, Bachelor Degree Student in Physics defending the thesis "Rifrazione gigante a larga banda in super-cristalli ferroelettrici", University of Rome La Sapienza
- 2020 ██████████, Bachelor Degree Student in Physics defending the thesis "Propagation dynamics in optical waveguides", University of Rome La Sapienza
- 2020 ██████████, Bachelor Degree Student in Physics defending the thesis "Birifrangenza e propagazione in super-cristalli ferroelettrici", University of Rome La Sapienza
- 2020 ██████████, Bachelor Degree Student in Physics defending the thesis "Supercristalli ferroelettrici e rifrazione gigante", University of Rome La Sapienza
- 2020 ██████████, Bachelor Degree Student in Physics defending the thesis "Reti Neurali Ottiche", University of Rome La Sapienza
- 2021 ██████████, Bachelor Degree Student in Physics defending the thesis "Effetti da Dispersione del Ritardo di Gruppo in Spettroscopia Raman Stimolata Impulsiva risolta nel tempo mediante interferometro di Michelson", University of Rome La Sapienza
- 2021 ██████████, Bachelor Degree Student in Physics defending the thesis "Solitoni e loro ruolo nella formazione di onde Rogue", University of Rome La Sapienza
- 2021 ██████████, Bachelor Degree Student in Physics defending the thesis "Brownian Motors and rectification of thermal fluctuation", University of Rome La Sapienza

#### Laurea Magistrale (Master level) Students

- 1998 ██████████, Laurea Degree Student in Physics, defending the thesis "Solitoni Spaziali Fotorifrattivi", University of Rome La Sapienza
- 1999 ██████████, Laurea Degree Student in Electrical Engineering defending the thesis "Manipolazione ottica tramite solitoni spaziali fotorifrattivi", University of Roma Tre
- 2001 ██████████, Laurea Degree Student in Physics defending the thesis "Formazione di solitoni incoerenti e fenomeni non-stazionari", Università di Roma La Sapienza
- 2002 ██████████, Laurea Degree Student in Electrical Engineering defending the thesis "Elettro-olografia solitonica e manipolazione di segnali ottici", University of L'Aquila
- 2002 ██████████, Laurea Degree Student in Physics defending the thesis "Solitoni fotorifrattivi saturati e loro interazione ibrido-dimensionale", University of L'Aquila
- 2003 ██████████, Laurea Degree Student in Physics defending the thesis "Solitoni bidimensionali ed effetti di non-località spaziale", University of L'Aquila
- 2003 ██████████, Laurea Degree Student in Electrical Engineering defending the thesis "Solitoni spaziali fotorifrattivi e commutazione elettro-olografica integrata in fibra", University of L'Aquila
- 2004 ██████████, Laurea Degree Student in Physics defending the thesis "Nonlocalità spazio-temporale nella formazione dei solitoni spaziali", University of L'Aquila
- 2004 ██████████, Laurea Degree Student in Physics defending the thesis "Propagazione di solitoni spaziali fotorifrattivi in reticoli tridimensionali", University of L'Aquila
- 2005 ██████████, Laurea Degree Student in Electrical Engineering defending the thesis "Commutatori ottici rapidi basati su elettro-ogrammi solitonici miniaturizzati", University of L'Aquila
- 2008 ██████████, Laurea Degree Student in Physics defending the thesis "Sintesi di nonlineari ottiche tramite sequenze spazio-temporali", University of L'Aquila
- 2009 ██████████, Laurea Degree Student in Physics defending the thesis "Solitoni spaziali in cristalli non-ergodici", University of L'Aquila
- 2010 ██████████, Laurea Degree Student in Mathematical-Modelling Engineering defending the thesis "Fluttuazioni statistiche di oggetti partitori in microtubi", University of L'Aquila
- 2011 ██████████, Laurea Degree Student in Physics defending the thesis "Optica senza scala per fasci di luce a diverse lunghezze d'onda in cristalli ferroelettrici disordinati", University of Rome La Sapienza
- 2013 ██████████, Laurea Degree Studente in Physics defending the thesis "Solitoni Fotorifrattivi in Vetri Dipolari Complessi"
- 2014 ██████████, Laurea Degree Student in Physics defending the thesis "Optica senza scala in sistemi a dimensionalità ridotta", University of Rome La Sapienza

- 2015 [REDACTED], Laurea Degree Student in Physics defending the thesis "Solitoni spaziali in reticoli nonlineari", University of Rome La Sapienza
- 2015 [REDACTED], Laurea Degree Student in Physics defending the thesis "Ottica senza scala in ferroelettrici microstrutturati periodicamente", University of Rome La Sapienza
- 2016 [REDACTED], Laurea Degree Student in Physics defending the thesis "Incoherent nonlinear waves and rogue waves in photorefractive ferroelectrics", University of Rome La Sapienza
- 2016 [REDACTED], Laurea Degree Student in Physics defending the thesis "Nonlinear waves and electro-optics in a KLTN slab waveguide"
- 2017 [REDACTED], Laurea Degree Student in Physics defending the thesis "Scale-free optical propagation and imaging", University of Rome La Sapienza
- 2018 [REDACTED], Laurea Degree Student in Physics defending the thesis "Bessel-beam solitons", University of Rome La Sapienza
- 2019 [REDACTED], Laurea Degree Student in Physics defending the thesis "Ferroelectric cluster dynamics in biased supercrystals", University of Rome La Sapienza

#### PhD Students as coadvisor

- 2003-2006 [REDACTED], PhD Student in Physics defending the thesis "Dispositivi fotonici integrati basati sulla elettro-attivazione di solitoni spaziali fotorifrattivi", University of L'Aquila
- 2004-2007 [REDACTED], PhD Student in Electromagnetism defending the thesis "Polarization control through soliton electro-activation", University of Rome La Sapienza

#### PhD Students as advisor

- 2012-2015 [REDACTED], PhD Student in Physics defending the thesis "Scale-free optics", University of Rome La Sapienza
- 2013-2017 [REDACTED], PhD Student in Physics defending the thesis "Nonlinear Optical Waves in Disordered Ferroelectrics", University of Rome La Sapienza
- 2013-2017 [REDACTED], PhD Student in Electrical Engineering defending the thesis "Programming dynamic holograms for imaging through turbid media", University of L'Aquila
- 2014-2018 [REDACTED], PhD Student in Physics defending the thesis "Electro-optic photonic circuits from linear and nonlinear waves in nanodisordered photorefractive ferroelectrics", University of Rome La Sapienza
- 2015-2019 [REDACTED], PhD Student in Physics defending the thesis "Spontaneous photonic lattices and nonlinear waves in nanodisordered ferroelectrics", University of Rome La Sapienza
- 2018-present [REDACTED], PhD Student in Electromagnetism, University of Rome La Sapienza

#### Post-Docs

- 2011-2015 [REDACTED], Phys. Department, University of Rome La Sapienza
- 2013-2014 [REDACTED], Phys. Department, University of Rome La Sapienza
- 2016-2021 [REDACTED], Phys. Department, University of Rome La Sapienza
- 2017-2019 [REDACTED], Phys. Department, University of Rome La Sapienza

#### Research Associates

- 2021-2023 [REDACTED], Phys. Department, University of Rome La Sapienza

#### Research Fellows

- 2021-2023 [REDACTED], Phys. Department, University of Roma La Sapienza

#### Visiting Fellows and Professors

- 2018-2020 [REDACTED] Tianjin Normal University, China

### Present International Collaborations

#### Hebrew University of Jerusalem - Israel

Development of innovative crystals, waveguides, optoelectronic applications (Prof. [REDACTED])

#### Tianjin Normal University - China

Nonlinear optics (Prof. [REDACTED])

#### KTH Royal Institute of Technology - Sweden

Innovative nonlinear optics (Prof. [REDACTED])

### Scientific Production - Papers on international journals



- A1.** E.DelRe, B.Crosignani, M.Tamburrini, M.Segev, M.Mitchell, E.Refaeli, and A.Agranat  
One-dimensional steady-state photorefractive spatial solitons in centrosymmetric  
paraelectric KLTN  
Optics Letters 23, 421 (1998).
- A2.** E.DelRe, A.Ciattoni, B.Crosignani, and M.Tamburrini  
Approach to space-charge field description in photorefractive crystals  
Journal of the Optical Society of America B 15, 1469 (1998).
- A3.** E.DelRe, M.Tamburrini, M.Segev, E.Refaeli, and A.Agranat  
Two-dimensional photorefractive spatial solitons in centrosymmetric paraelectric  
potassium-lithium-tantalate-niobate  
Applied Physics Letters 73, 16 (1998).
- A4.** B.Crosignani, E.DelRe, P.DiPorto, and A.Degasperis  
Self-focusing and self-trapping in unbiased centrosymmetric photorefractive media  
Optics Letters 23, 912 (1998).
- A5.** E.DelRe, A.Ciattoni, B.Crosignani, and P.DiPorto  
Nonlinear optical propagation in near-transition centrosymmetric photorefractive crystals  
Journal of Nonlinear Optical Physics and Materials 8, 1-20 (1999).
- A6.** S.Lan, E.DelRe, Z.Chen, M.Shih, and M.Segev  
Directional coupler with soliton-induced waveguides  
Optics Letters 24, 475 (1999).
- A7.** B.Crosignani, A.Degasperis, E.DelRe, P.DiPorto and A.J. Agranat  
Nonlinear optical diffraction effects and solitons due to anisotropic charge-diffusion based  
self-interaction  
Physical Review Letters 82, 1664 (1999).
- A8.** E. DelRe, M. Tamburrini, M.Segev, R. Della Pergola, and A.J. Agranat  
Spontaneous self-trapping of optical beams in metastable paraelectric crystals  
Physical Review Letters 83, 1954 (1999).
- A9.** E.DelRe, B. Crosignani, and P. Di Porto  
Scheme for total quantum teleportation  
Physical Review Letters 84, 2989 (2000).
- A10.** E. DelRe, S. Trillo, and A.J. Agranat  
Collisions and inhomogeneous forces between solitons of different dimensionality  
Optics Letters 25, 560 (2000).
- A11.** E. DelRe, M. Tamburrini, and A.J. Agranat  
Soliton electro-optic effects in paraelectrics  
Optics Letters 25, 963 (2000).
- A12.** A. Ciattoni, A. Degasperis, and E. DelRe  
A one- and two-dimensional nonlinear pulse interaction  
Physical Review E 61, R4714 (2000).
- A13.** G. M. Tosi-Beleffi, M. Presi, E. DelRe, D. Boschi, C. Palma, and A.J. Agranat  
Stable oscillating nonlinear beams in square-wave-biased photorefractives  
Optics Letters 25, 1538 (2000).
- A14.** E. DelRe, A. Ciattoni, A.J. Agranat  
Anisotropic charge displacement supporting isolated photorefractive optical needles  
Optics Letters 26, 908 (2001).

- A15.** E. DelRe, B. Crosignani, and P. Di Porto  
Bell states, Bell operators, and total teleportation  
Zeitschrift fur Naturforschung A – Journal of Physical Sciences 56a, 128 (2001).
- A16.** A. Ciattoni, C. Conti, E. DelRe, P. Di Porto, B. Crosignani, and A. Yariv  
Polarization and energy dynamics in nonparaxial Kerr propagation  
Optics Letters 27, 734 (2002).
- A17.** E. DelRe and A. Agranat  
Dielectric nonlinearity in photorefractive screening solitons  
Physical Review A 65, 53814 (2002).
- A18.** E. DelRe, B. Crosignani, E. Palange, and A. J. Agranat  
Electro-optic beam manipulation through photorefractive needles  
Optics Letters 27, 2188 (2002).
- A19.** E. DelRe, A. D'Ercole, and A. J. Agranat  
Emergence of linear wave segments and predictable traits in saturated nonlinear media  
Optics Letters 28, 260 (2003).
- A20.** C. Dari-Salisburgo, E. DelRe, and E. Palange  
Molding and Stretched Evolution of Optical Solitons in Cumulative Nonlinearities  
Physical Review Letters 91, 263903 (2003).
- A21.** E. DelRe, E. Palange, and A. J. Agranat  
Fiber-launched ultra-tight photorefractive solitons integrating fast soliton-based beam manipulation circuitry  
Journal of Applied Physics 95, 3822 (2004)
- A22.** E. DelRe, G. De Masi, A. Ciattoni, and E. Palange  
Pairing space-charge field conditions with self-guiding for the attainment of circular-symmetry in photorefractive solitons  
Applied Physics Letters 85, 5499 (2004).
- A23.** A. D'Ercole, E. Palange, E. DelRe, A. Ciattoni, B. Crosignani, and A. J. Agranat  
Miniaturization and embedding of soliton-based electro-optically addressable photonic arrays  
Applied Physics Letters 85, 2679 (2004)
- A24.** E. DelRe, A. D'Ercole, and E. Palange  
Mechanisms supporting long propagation regimes of photorefractive solitons  
Physical Review E 71, 036610 (2005).
- A25.** E. DelRe, A. D'Ercole, E. Palange, A. J. Agranat  
Observation of soliton ridge states for the self-imprinting of fiber-slab couplers  
Applied Physics Letters 86, 191110 (2005)
- A26.** E. DelRe, A. Ciattoni, E. Palange  
Role of charge saturation in photorefractive dynamics of micron-sized beams and departure from soliton behavior  
Physical Review E 73, 017601 (2006)
- A27.** A. Ciattoni, C. Rizza, E. DelRe, E. Palange  
Counterpropagating spatial Kerr soliton in reflection gratings  
Optics Letters 31, 1507 (2006)
- A28.** A. Ciattoni, C. Rizza, E. DelRe, E. Palange

Photorefractive solitons embedded in gratings in centrosymmetric crystals  
Optics Letters 31, 1690 (2006)

**A29.** A. Pierangelo, E. DelRe, E. Palange, A. Ciattoni, Y. Garcia, A.J. Agranat  
Pinning-induced round solitons with symmetric nonlinear response for electroactivated optical circuitry  
Applied Physics Letters 89, 121123 (2006)

**A30.** C. Rizza, A. Ciattoni, E. DelRe, E. Palange  
Transverse and soliton instabilities due to counterpropagation through a reflection grating in Kerr media  
Optics Letters 31, 2900 (2006)

**A31.** E. DelRe and E. Palange  
Optical nonlinearity and existence conditions for quasi-steady-state photorefractive solitons  
Journal of the Optical Society of America B-Optical Physics 23, 2323 (2006)

**A32.** A. Ciattoni, C. Rizza, E. DelRe, E. Palange  
Counterpropagating spatial solitons in reflection gratings with a longitudinally modulated Kerr nonlinearity  
Physical Review Letters 98, 043901 (2007)

**A33.** C. Rizza, A. Ciattoni, E. DelRe, E. Palange  
Counterpropagating reflection grating dark solitons in Kerr media  
Physical Review A 75, 063824 (2007)

**A34.** E. DelRe, A. Pierangelo, E. Palange, A. Ciattoni, A.J. Agranat  
Beam shaping and effective guiding in the bulk of photorefractive crystals through linear beam dynamics  
Applied Physics Letters 91, 081105 (2007)

**A35.** A. Ciattoni, C. Rizza, E. DelRe, E. Palange  
Counterpropagating nondiffracting beams through reflection gratings  
Optics Express 15, 14163-14170 (2007)

**A36.** A. Pierangelo, E. DelRe, A. Ciattoni, G. Biagi, E. Palange, A. Agranat  
Separating polarization components through the electro-optic read-out of photorefractive solitons  
Optics Express 15, 14283-14288 (2007)

**A37.** A. Pierangelo, E. DelRe, A. Ciattoni, E. Palange, A. J. Agranat, and B. Crosignani  
Linear writing of waveguides in bulk photorefractive crystals through a two-step polarization sequence  
Journal of Optics A - Pure and Applied Optics 10, 064005 (2008)

**A38.** A. D'Ercole, A. Pierangelo, E. Palange, A. Ciattoni, A.J. Agranat, E. DelRe  
Photorefractive solitons of arbitrary and controllable linear polarization determined by the local bias field  
Optics Express 16, 12002-12007 (2008)

**A39.** A. Ciattoni, E. DelRe, A. Marini, C. Rizza  
Wiggling and bending-free micron-sized solitons in periodically biased photorefractives  
Optics Express 16, 10867-10872 (2008)

**A40.** C. Rizza, A. Ciattoni, E. DelRe  
Reflection solitons supported by competing nonlinear gratings  
Physical Review A 78, 013814 (2008)

- A41.** A. Ciattoni, E. DelRe, C. Rizza, A. Marini  
Miniaturized bending-free solitons by restoring symmetry in periodically biased photorefractives  
Optics Letters 33, 2110-2112 (2008)
- A42.** A. Ciattoni, A. Marini, C. Rizza, and E. DelRe  
Collision and fusion of counterpropagating micrometer-sized optical beams in periodically biased photorefractive crystals  
Optics Letters 34, 911-913 (2009)
- A43.** E. DelRe, P. Di Porto, and B. Crosignani  
Photorefractive Solitons and Their Underlying Nonlocal Physics.  
Progress in Optics 53, 153–200 (2009).
- A44.** A. Ciattoni, C. Rizza, E. DelRe and A. Marini  
Light-induced dielectric structures and enhanced self-focusing in critical photorefractive ferroelectrics  
Optics Letters 34, 3295-3297 (2009).
- A45.** A. Pierangelo, A. Ciattoni, E. Palange, A.J. Agranat, and E. DelRe  
Electro-activation and electro-morphing of photorefractive funnel waveguides  
Optics Express 17, 22659-22665 (2009)
- A46.** J. Parravicini, P. Minzioni, V. Degiorgio, and E. DelRe  
Observation of nonlinear Airy-like beam evolution in Lithium-Niobate  
Optics Letters 34, 3908-3910 (2009)
- A47.** E. DelRe and M. Segev  
Self-focusing and Solitons in Photorefractive Media  
Topics in Applied Physics 114, 547-572 (2009)
- A48.** C. Conti and E. DelRe  
Optical supercavitation in soft matter  
Physical Review Letters 105, 118301 (2010)
- A49.** E. DelRe, E. Spinozzi, A.J. Agranat, and C. Conti  
Scale-free optics and diffractionless waves in nanodisordered ferroelectrics  
Nature Photonics 5, 39-42 (2011)  
DOI: 10.1038/NPHOTON.2010.285
- A50.** E. DelRe, S. Di Sabatino, P. Di Porto, and B. Crosignani  
Built-in reduction of statistical fluctuations of partitioning objects in microtubules  
Physical Review E 84, 021112 (2011)
- A51.** C. Conti, A.J. Agranat, and E. DelRe  
Subwavelength optical spatial solitons and three-dimensional localization in disordered ferroelectrics: Toward metamaterials of nonlinear origin  
Physical Review A 84, 043809 (2011)
- A52.** J. Parravicini, F. Di Mei, C. Conti, A.J. Agranat, and E. DelRe  
Diffraction cancellation over multiple wavelengths in photorefractive dipolar glasses  
Optics Express 19, 24109-24114 (2011)
- A53.** V. Folli, E. DelRe, and C. Conti  
Beam Instabilities in the Scale Free Regime  
Physical Review Letters 108, 033901 (2012)

- A54.** E. DelRe, A. Pierangelo, J. Parravicini, S. Gentilini, and A. J. Agranat  
Funnel-based biomimetic volume optics  
Optics Express **20**, 16631-16638 (2012)
- A55.** J. Parravicini, A.J. Agranat, C. Conti, and E. DelRe  
Equalizing disordered ferroelectrics for diffraction cancellation  
Applied Physics Letters **101**, 111104 (2012)
- A56.** N. Ghofraniha, L. Santamaria Amato, V. Folli, S. Trillo, E. DelRe, and C. Conti  
Measurement of scaling laws for shock waves in thermal nonlocal media  
Optics Letters **37**, 2325-2327 (2012)
- A57.** J. Parravicini, C. Conti, A. J. Agranat, and E. DelRe  
Programming scale-free optics in disordered ferroelectrics  
Optics Letters **37**, 2355 (2012)
- A58.** J. Parravicini, C. Conti, A. J. Agranat, E. DelRe  
Rejuvenation in scale-free optics and enhanced diffraction cancellation life-time  
Optics Express **20**, 27382 (2012)
- A59.** S. Gentilini, N. Ghofraniha, E. DelRe, C. Conti  
Shock wave far-field in ordered and disordered nonlocal media  
Optics Express **20**, 27369 (2012)
- A.60.** N. Ghofraniha, S. Gentilini, V. Folli, E. DelRe, and C. Conti  
Shock waves in disordered media  
Physical Review Letters **109**, 243902 (2012)
- A61.** P. Di Porto, S. Di Sabatino, B. Crosignani, E. DelRe  
Power-Law Relaxation and Cumulative Information  
Journal of Statistical Physics **153**, 479-485 (2013)
- A62.** S. Gentilini, N. Ghofraniha, E. DelRe, and C. Conti  
Shock waves in thermal lensing  
Physical Review A **87**, 053811 (2013)
- A63.** S. Gentilini, N. Ghofraniha, E. DelRe, and C. Conti  
Shock waves in disordered media  
Optics and Photonics News **24** (12), 44 (2013)
- A.64.** J. Parravicini, D. Pierangeli, F. Di Mei, A. J. Agranat, C. Conti, and E. DelRe  
Aging solitons in photorefractive dipolar glasses  
Optics Express **21**, 30573-30579 (2013)
- A.65.** D. Pierangeli, J. Parravicini, F. Di Mei, GB. Parravicini, A. J. Agranat, E. DelRe  
Photorefractive light needles in glassy nanodisordered KNTN  
Optics Letters **39**, 1657-1660 (2014)
- A.66.** D. Pierangeli, F. Di Mei, J. Parravicini, GB. Parravicini, A. J. Agranat, C. Conti, and E. DelRe  
Observation of an intrinsic nonlinearity in the electro-optic response of freezing relaxors ferroelectrics  
Optical Materials Express **4**, 1487-1493 (2014)
- A67.** E. DelRe, S. Di Sabatino, P. Di Porto, and B. Crosignani  
Anomalous Fluctuations in the Motion of Partitioning Objects  
Journal of Statistical Physics **156**, 291-300 (2014)

- A.68.** P. Di Porto, B. Crosignani, and E. DelRe  
Intrinsic irreversibility of Markovian chains  
Physical Review E 89, 052118 (2014)
- A69.** J. Parravicini, M. Brambilla, L. Columbo, F. Prati, C. Rizza, G. Tissoni, A. J. Agranat, and E. DelRe  
Observation of electro-activated localized structures in broad area VCSELs  
Optics Express 22, 30225 (2014)
- A70.** F. Di Mei, J. Parravicini, D. Pierangeli, C. Conti, A. J. Agranat, and E. DelRe  
Anti-diffracting beams through the diffusive optical nonlinearity  
Optics Express 22, 31434 (2014)
- A71.** J. Parravicini, R. Martínez Lorente, F. Di Mei, D. Pierangeli, A. J. Agranat, and E. DelRe  
Volume integrated phase modulator based on funnel waveguides for reconfigurable miniaturized optical circuits  
Optics Letters 40, 1386-1389 (2015)
- A72.** E. DelRe, F. Di Mei, J. Parravicini, G. Parravicini, A. J. Agranat, and C. Conti  
Subwavelength anti-diffracting beams propagating over more than 1000 Rayleigh lengths  
Nature Photonics 9, 228-232 (2015) DOI: 10.1038/nphoton.2015.21
- A73.** J. Parravicini, F. Di Mei, D. Pierangeli, A. J. Agranat, and E. DelRe  
Miniaturized electro-optic infrared beam manipulator based on 3D photorefractive funnels  
Journal of Optics 17, 055501 (2015)
- A74.** S. Gentilini, E. DelRe, and C. Conti  
Non-paraxial dispersive shock-waves  
Optics Communications 355, 445-450 (2015)
- A75.** S. Gentilini, M. C. Braidotti, G. Marcucci, E. DelRe, and C. Conti  
Nonlinear Gamow vectors, shock waves, and irreversibility in optically nonlocal media  
Physical Review A 92, 023801 (2015)
- A.76.** D. Pierangeli, M. Flammini, F. Di Mei, J. Parravicini, C. E. M. de Oliveira, A. J. Agranat, and E. DelRe  
Continuous Solitons in a Lattice Nonlinearity  
Physical Review Letters 114, 203901 (2015)
- A77.** F. Di Mei, D. Pierangeli, J. Parravicini, C. Conti, A. J. Agranat, and E. DelRe  
Observation of diffraction cancellation for nonparaxial beams in the scale-free-optics regime  
Physical Review A 92, 013835 (2015)
- A.78.** D. Pierangeli, F. Di Mei, C. Conti, A. J. Agranat, and E. DelRe  
Spatial Rogue Waves in Photorefractive Ferroelectrics  
Physical Review Letters 115, 093901 (2015)
- A.79.** S. Gentilini, M. C. Baidotti, G. Marcucci, E. DelRe, and C. Conti  
Physical realization of the Glauber quantum oscillator  
Scientific Reports 5, 15816 (2015)
- A.80.** D. Pierangeli, M. Ferraro, F. Di Mei, G. Di Domenico, C. E. M. de Oliveira, A. J. Agranat, and E. DelRe  
Super-crystals in composite ferroelectrics  
Nature Communications 7, 10674 (2016)
- A.81.** F. Di Mei, P. Caramazza, D. Pierangeli, G. Di Domenico, H. Ilan, A. J. Agranat, P. Di Porto, and E. DelRe

Intrinsic Negative Mass from Nonlinearity  
Physical Review Letters 116, 153902 (2016)

**A.82.** J. Parravicini, E. DelRe, A. J. Agranat, and G. Parravicini  
Macroscopic response and directional disorder dynamics in chemically substituted ferroelectrics  
Physical Review B 93, 094203 (2016)

**A.83.** M. Leonetti, S. Karbasi, A. Mafi, E. DelRe, and Claudio Conti  
Secure information transport by transverse localization of light  
Scientific Reports 6, 29918 (2016)

**A.84.** D. Pierangeli, F. Di Mei, G. Di Domenico, A. J. Agranat, C. Conti, and E. DelRe  
Turbulent Transitions in Optical Wave Propagation  
Physical Review Letters 117, 183902 (2016)

**A.85.** D. Pierangeli, G. Musarra, F. Di Mei, G. Di Domenico, A. J. Agranat, C. Conti, and E. DelRe  
Enhancing optical extreme events through input wave disorder  
Physical Review A 94, 063833 (2016)

**A.86.** G. Antonacci, S. De Panfilis, G. Di Domenico, E. DelRe, and G. Ruocco  
Breaking the Contrast Limit in Single-Pass Fabry-Pérot Spectrometers  
Physical Review Applied 6, 054020 (2016)

**A.87.** M. Flammini, C. Bonsi, C. Ciano, Giliberti, E. Pontecorvo, P. Italia, E. DelRe, and M. Ortolani  
Confocal Terahertz Imaging of Ancient Manuscripts  
Journal of Infrared, Millimeter, and Terahertz Waves 38, 435-442 (2017)

**A.88.** G. Antonacci, G. Di Domenico, S. Silvestri, E. DelRe, and G. Ruocco  
Diffraction-free light droplets for axially-resolved volume imaging  
Scientific Reports 7, 17 (2017)

**A.89.** G. Di Domenico, J. Parravicini, G. Antonacci, S. Silvestri, A.J. Agranat, and E. DelRe  
Miniaturized photogenerated electro-optic axicon lens Gaussian-to-Bessel beam conversion  
Applied Optics 56, 2908-2911 (2017)

**A.90.** M. Ferraro, D. Pierangeli, M. Flammini, G. Di Domenico, L. Falsi, F. Di Mei, A. J. Agranat and E. DelRe  
Observation of polarization-maintaining light propagation in depoled compositionally disordered ferroelectrics  
Optics Letters 42, 3856-3859 (2017)

**A.91.** J. Parravicini, E. DelRe, A. J. Agranat, and G. Parravicini  
Liquid–solid directional composites and anisotropic dipolar phases of polar nanoregions in disordered perovskites  
Nanoscale 9, 9572 (2017)

**A.92.** D. Pierangeli, A. Tavani, F. Di Mei, A. J. Agranat, C. Conti, and E. DelRe  
Observation of replica symmetry breaking in disordered nonlinear wave propagation  
Nature Communications 8, 1501 (2017)

**A.93.** R. Martínez-Lorente, J. Parravicini, M. Brambilla, L. Columbo, F. Prati, C. Rizza, A. J. Agranat, and E. DelRe  
Scalable Electro-Optic Control of Localized Bistable Switching in Broad-Area VCSELs Using Reconfigurable Funnel Waveguides  
Physical Review Applied 7, 064004 (2017)

- A.94.** M. Flammini, E. Pontecorvo, V. Giliberti, C. Rizza, A. Ciattoni, M. Ortolani, and E. DelRe  
Evanescent-Wave Filtering in Images Using Remote Terahertz Structured Illumination  
Physical Review Applied 8, 054019 (2017)
- A.95.** G. Di Domenico, G. Ruocco, C. Colosi, E. DelRe, and G. Antonacci  
Cancellation of Bessel beam side lobes for high-contrast light sheet microscopy  
Scientific Reports 8,17178 (2018)
- A.96.** C. Ciano, M. Flammini, V. Giliberti, P. Calvani, E. DelRe, F. Talarico, M. Torre, M. Missori, and M. Ortolani  
Confocal Imaging at 0.3 THz With Depth Resolution of a Painted Wood Artwork for the Identification of Buried Thin Metal Foils  
IEEE Transactions on terahertz science and technology 8, 390-396 (2018)
- A.97.** D. Pierangeli, M. Flammini, L. Zhang, G. Marcucci, A.J. Agranat, P.G. Grinevich, P.M. Santini, C. Conti, and E. DelRe  
Observation of Fermi-Pasta-Ulam-Tsingou Recurrence and Its Exact Dynamics  
Physical Review X 8, 041017 (2018)
- A.98.** M. Flammini, G. Di Domenico, D. Pierangeli, F. Di Mei, A. J. Agranat, and E. DelRe  
Observation of Bessel-beam self-trapping  
Physical Review A 98, 033808 (2018)
- A.99.** F. Di Mei, L. Falsi, M. Flammini, D. Pierangeli, P. Di Porto, A. J. Agranat, and E. DelRe  
Giant broadband refraction in the visible in a ferroelectric perovskite  
Nature Photonics 12, 734-738 (2018)
- A.100.** F. Xin, M. Flammini, F. Di Mei, L. Falsi, D. Pierangeli, A. J. Agranat, and E. DelRe  
Using Bessel Beams to Induce Optical Waveguides  
Physical Review Applied 11, 024011 (2019)
- A.101.** G. Marcucci, D. Pierangeli, A. J. Agranat, R-K. Lee, E. DelRe and C. Conti  
Topological control of extreme waves  
Nature Communications 10, 5090 (2019)
- A.102.** F. Xin , M. Flammini, F. Di Mei, L. Falsi, D. Pierangeli, A. J. Agranat, and E. DelRe  
Observation of extreme nonreciprocal wave amplification from single soliton-soliton collisions  
Physical Review A 100, 043816 (2019)
- A.103.** J. Parravicini, L. Fornasari, E. DelRe, F. Marabelli, A. J. Agranat, and GB. Parravicini  
Evidence of double-loop hysteresis in disordered ferroelectric crystal  
Journal of Applied Physics 127, 184107 (2020)
- A.104.** F. Xin, F. Di Mei, L. Falsi, D. Pierangeli, A. J. Agranat, and E. DelRe  
Soliton Maxwell demons and long-tailed statistics in fluctuating optical fields  
Optics Letters 45, 648-651 (2020)
- A.105.** L. Falsi, L. Tartara, F. Di Mei, M. Flammini, J. Parravicini, D. Pierangeli, GB. Parravicini, F. Xin, P. DiPorto, A. J. Agranat, and E. DelRe  
Constraint-free wavelength conversion supported by giant optical refraction in a 3D perovskite supercrystal  
Communications Materials 1, 76 (2020)
- A. 106.** L. Lo Presti, J. Parravicini, R. Soave, G. Parravicini, M. Mauri, L. Loconte, F. Di Mei, L. Falsi, L. Tartara, S. Binetti, A. J. Agranat, and E. DelRe



Observation of an exotic lattice structure in the transparent  $\text{KTa}_{1-x}\text{Nb}_x\text{O}_3$  perovskite supercrystal  
Physical Review B 102, 214110 (2020)

**A.107.** L. Falsi, M. Aversa, F. Di Mei, D. Pierangeli, F. Xin, A. J. Agranat, and E. DelRe  
Direct Observation of Fractal-Dimensional Percolation in the 3D Cluster Dynamics of a Ferroelectric Supercrystal  
Physical Review Letters 126, 037601 (2021)

### Scientific Production - Article in Volumes

**AB1.** B. Crosignani, E. DelRe, and M. Tamburrini  
Novel optical phenomena in near-critical photorefractive crystals: diffusion-driven diffraction and spontaneous self-trapping  
"Unconventional Optical Elements for Information Storage, Processing and Communications", NATO Advanced Science Institute Series, sub-series 3, High Technology Volume 75, 127-135 (2000) (Kluwer Academic, 2000) Marom eds.

**AB2.** E. DelRe, B. Crosignani, P. Di Porto  
Photorefractive Spatial Solitons  
Book Chapter in "Spatial Solitons" edited by W. Torruellas and S. Trillo (Springer, New York, 2001) pages 61-86 ISBN 3540416536

**AB3.** E. DelRe, M. Segev, D. Christodoulides, B. Crosignani, and G. Salamo  
Photorefractive solitons  
Chapter 11 in "Photorefractive Materials and Their Applications 1", edited by P. Gunter and J.P. Huignard (Springer-Verlag, New York, 2006)  
Springer Series in Optical Sciences, Volume 113/2006 (DOI 10.1007/0-387-25192-8\_11)

**AB4.** E. DelRe and M. Segev  
Self-focusing and Solitons in Photorefractive Media  
Self-focusing, Past and Present: Fundamentals and Prospects, edited by R. W. Boyd, S. G. Lukishova, Y.R. Shen (Springer-Verlag, New York, 2009) ISBN 978-0-387-32147-9  
Topics in Applied Physics **114**, 547-572

**AB5.** B. Crosignani, E. DelRe, P. Di Porto  
Meccanica quantistica  
Voce della Enciclopedia Treccani Terzo Millennio (2010)

**AB6.** E. DelRe, A.J. Agranat, and C. Conti  
Scale-free optical propagation in out-of-equilibrium ferroelectric crystals  
Proceedings of SPIE-The International Society for Optical Engineering **8071**, 80710Q  
DOI: 10.1117/12.886954 (2011)

**AB7.** E. DelRe and C. Conti  
Scale-free optics  
Chapter 8 in "Nonlinear Photonics and Novel Optical Phenomena", Springer Series in Optical Sciences 170, 207-230 (2012)

**AB8.** D. Pierangeli, C. Conti, E. DelRe  
Rogue waves in photorefractive media  
Chapter 8 in "Nonlinear Guided Wave Optics: A Testbed for Extreme Waves", edited by S. Wabnitz (IOP Publishing, Bristol, 2017) DOI 10.1088/978-0-7503-1460-2

### Scientific Production - Articles in Proceedings

**AP1.** B. Crosignani, E. DelRe, P. Di Porto, M. Tamburrini, A. Degasperis, A. J. Agranat, M. Segev

Photorefractive diffusion-driven self-focusing and self-trapping in near-transition paraelectric crystals

Conference: 1998 IEEE Nonlinear Optics: Materials, Fundamentals and Applications, Princeville, HI (10-14 August 1998)

Proceedings of the 1998 IEEE Nonlinear Optics Topical Meeting, 411-413 (1998)

**AP2.** E. DelRe, M. Tamburrini, G. Egidi, M. Segev

Bright photorefractive spatial solitons in tilted BaTiO<sub>3</sub>

Conference: 1998 11th Annual Meeting IEEE Lasers and Electro-Optics Society, LEOS 1998, Orlando, FL (1-4 December 1998)

Proceedings of the 1998 11th Annual Meeting IEEE Lasers and Electro-Optics Society, LEOS, Volume 2, 138-139 (1998)

**AP3.** E. DelRe, S. Trillo, A. J. Agranat

Collision and inhomogeneous forces between solitons of different dimensionality

Conference: Quantum Electronics and Laser Science Conference (QELS 2000), San Francisco, CA (7-12 May 2000)

Trends in Optics and Photonics, QELS 2000 Technical Digest, 216-217 (2000)

**AP4.** G. M. Tosi-Beleffi, M. Presi, E. DelRe, D. Boschi, C. Palma, A. J. Agranat

Stable oscillating nonlinear beams in square-wave-biased-photorefractives

Conference: Conference on Lasers and Electro-Optics (CLEO), Baltimore MD (6-11 May 2001)

Conference on Lasers and Electro-Optics Technical Digest, 429-430 (2001)

**AP5.** E. DelRe, B. Crosignani, E. Palange, A. J. Agranat

Electro-optic switching through photorefractive needles

Conference: 2003 Conference on Lasers and Electro-Optics (CLEO), Baltimore, MD (1-6 June 2003)

OSA Trends in Optics and Photonics Series, Volume 88, 1429-1431 (2003)

**AP6.** A. D'Ercole, E. Palange, E. DelRe, A. Ciattoni, B. Crosignani, A. J. Agranat

Miniaturization and embedding of soliton-based electro-optically addressable photonic arrays

Conference: Conference on Lasers and Electro-Optics and 2006 Quantum Electronics and Laser Science Conference, CLEO/QELS 2006, Long Beach, CA (21-26 May 2006)

CLEO/QELS 2006 Proceedings, article number 4628164 (2006)

**AP7.** E. DelRe, A. Pierangelo, E. Palange, A. Ciattoni, Y. Garcia, A. J. Agranat

Linear writing of waveguides in bulk photorefractives

Conference: 2007 European Conference on Lasers and Electro-Optics and the International Quantum Electronics Conference, CLEO, Munich, Germany (17-22 June 2007)

CLEO/Europe 2007, article number 4386051 (2007)

**AP8.** J. Parravicini, P. Minzioni, V. Degiorgio, E. DelRe

Photovoltaic self-focusing in lithium niobate

Conference: European Conference on Lasers and Electro-Optics and the European Quantum Electronics Conference, CLEO/Europe - EQEC 2009, Munich, Germany (14-19 June 2009)

CLEO/Europe - EQEC 2009 Proceedings, article number 5194830 (2009)

**AP9.** E. DelRe, P. Di Porto, S. Di Sabatino, B. Crosignani

Reduced statistical fluctuations of the position of an object partitioning in two its environment

Conference: 2nd Law of Thermodynamics: Status and Challenges; San Diego, CA (14-15 June 2011)

American Institute of Physics Conference Proceedings Vol. 1411, 7-26 (2011)

**AP10.** C. Conti, E. DelRe

Optical supercavitation in soft-matter

Conference: 2011 Conference on Lasers and Electro-Optics Europe and 12th European Quantum Electronics Conference, CLEO EUROPE/EQEC 2011, Munich, Germany (22-26 May 2011)

CLEO EUROPE/EQEC 2011 Proceedings, article number 5943492 (2011)

**AP11.** E. DelRe, E. Spinozzi, A. J. Agranat, C. Conti

Scale-free optics and diffractionless waves in nano-disordered ferroelectrics

Conference: 2011 Conference on Lasers and Electro-Optics Europe and 12th European Quantum Electronics Conference, CLEO EUROPE/EQEC 2011, Munich, Germany (22-26 May 2011)

CLEO EUROPE/EQEC 2011 Proceedings, article number 5943475 (2011)

**AP12.** E. DelRe, E. Spinozzi, A. J. Agranat, C. Conti

Scale-free optics and diffractionless waves in nano-disordered ferroelectrics

Conference: 2011 Conference on Lasers and Electro-Optics: Laser Science to Photonic Applications, CLEO 2011, Baltimore, US (1-6 May 2011)

Quantum Electronics and Laser Science Conference, OSA Technical Digest, article number 5951327 – QMA4 (2011)

**AP13.** E. DelRe, A. J. Agranat, C. Conti

Scale-free optical propagation in out-of-equilibrium ferroelectric crystals

Conference: Nonlinear Optics and Applications V, Prague, Czech Republic (19-21 April 2011)

Proceedings of the SPIE – Volume 8071, article number 80710Q (2011) – Invited

**AP14.** M. C. Braidotti on behalf of S. Gentilini, G. Marcucci, E. DelRe, C. Conti

Nonlinear Gamow vectors in nonlocal optical propagation

Il Nuovo Cimento 39 C 281 (2016)

**AP15.** V. Giliberti, M. Flammini, C. Ciano, E. Pontecorvo, E. Del Re, and M. Ortolani

Super-resolved terahertz microscopy by knife-edge scan

Proceedings of the SPIE 10383, Terahertz Emitters, Receivers, and Applications VIII, 103830P (23 August 2017); doi: 10.1117/12.2273796

### Scientific Production - Invited talks

**I1.** E. DelRe, A. Ciattoni, C. Rizza, and A. Marini

Engineering effective soliton-supporting nonlinearities in micro-structured potassium-lithium-tantalate-niobate

Invited talk at the International Conference on Nonlinear Waves -Theory and Applications, (Beijing (China), June 09- 12, 2008)

**I2.** E. DelRe

Soliton electro-activation: miniaturizing and embedding electro-optic components in volume crystals

Invited oral presentation at the Discrete Optics Workshop (Tianjin (China), June 12-13, 2008)

**I3.** E. DelRe, E. Spinozzi, A. Marini, C. Conti, A. Ciattoni, A.J. Agranat

Complexity-driven optical spatial solitons in relaxor ferroelectrics

Invited talk in Complexity in Nonlinear Phenomena - XII School on Complexity (Erice, Italy, 3-7 October 2009)

**I4.** E. DelRe

Funnel waveguides

Invited talk at the First Ein-Gedi Workshop in Nonlinear Optics (Ein-Gedi, Israel, 20-23 December 2009)

**I5.** E. DelRe, E. Spinozzi, A. Marini, C. Conti, A. Ciattoni, A.J. Agranat

Optical Solitons in Complex Solids

Invited talk in the XCV Congresso Nazionale Società Italiana di Fisica (SIF) (Bari, Italy, 28/09/09- 02/10/09)

**I6.** E. DelRe, C. Conti, A.J. Agranat

Nonlinear optics in a dipolar glass

Invited oral presentation at the Second International TEDA Workshop on Nonlinear Optics and Novel Phenomena (Tianjin (China), June 30- July 2, 2010)

**I7.** E. DelRe, C. Conti, A.J. Agranat

Scale-free optics and diffractionless waves in nanodisordered ferroelectrics

Invited oral presentation at the SPIE Conference on Optics and Optoelectronics 2011 in Prague (Prague - Cech. Republic, April 18-22, 2011)

**I8.** E. DelRe, C. Conti, A.J. Agranat

Scale-free optics and super-imaging

Invited talk in the XCVII Congresso Nazionale Società Italiana di Fisica (SIF) (L'Aquila, Italy, 26-30 September 2011)

**I9.** E. DelRe, J. Parravicini, E. Spinozzi, C. Conti, F. Di Mei, V. Folli, A. J. Agranat

Scale-free optics

Invited talk at the Erice Workshop on Nonlinear Optics and Complexity in Photonic Crystal Fibers and Nanostructures (Erice, Italy, 9-12 November 2011)

**I10.** E. DelRe

Light with no spatial scale: diffraction cancellation, anti-diffraction, scale-free instability and subwavelength beam propagation in dipolar glasses

Invited talk at Nonlinear Photonics 2012 (Colorado Springs, 17-22 June, 2012)

**I11.** E. DelRe

Ultra-tight beams in nanodisordered ferroelectrics

Invited talk at Nonlinear Waves – Theory and Applications 2013 (Beijing, 12-15 June, 2013)

**I12.** E. DelRe

Exploring solitons in Glass-formers

Invited talk at International Conference on Applied Mathematics (Heraclion, 16-20 September 2013)

**I13.** E. DelRe

Observation of diffraction-free ultra-tight non-paraxial visible laser beams through nanodisordered ferroelectrics

Invited talk at the Israel-Italy workshop on Nanoscience and Nanotechnology (Jerusalem, 1-4 April 2013)

**I.14.** E. DelRe

Ultra-tight beams in nanodisordered ferroelectrics

Invited talk at Photonics North 2013 (Ottawa, 3-5 June 2013)

**I15.** E. DelRe

Photonics in glassy ferroelectrics

Invited talk at The Nonlinear Meeting (Edinburgh, 17-22 May 2014)

**I16.** E. DelRe

Nonlinear waves in disordered media

Invited talk at the Third International TEDA Workshop on Frontiers in Optics (Tianjin (China), 10-12 July, 2015)

**I17.** E. DelRe

Scale-symmetry in soliton solutions and a possible explanation of rogue waves  
Invited talk at WAVE2016\*- Workshop on Abnormal Wave Events (Nice, 15-17 June 2016)

**I.18.** E. DelRe

Spontaneous three-dimensional supercrystals in composite ferroelectrics  
Invited talk at Photorefractive Photonics 2017 (PR17 – Qingdao (China), 17-20 July 2017)

**I.19.** E. DelRe

Giant response in metastable ferroelectrics: from spatial rogue waves, optical turbulence, recurrences, to ideal imaging and achromatic white-light photonics  
European Research Council Advanced Workshop on "Spatiotemporal Multimode Complex Optical Systems" (Dubai, 16-19 October 2018)

**I.20.** E. DelRe

Linear and nonlinear effects in ferroelectric super-crystals: from broadband white-light giant refraction to wavelength-insensitive second-harmonic generation  
Invited talk at the Novel Concepts in Nonlinear Photonics workshop (Ein-Gedi, Israel, 10-15 February 2019)

**I.21.** E. Del Re

New optical phenomena in nano-disordered ferroelectrics  
Invited talk at the Workshop on Progress in Nonlinear Photonics (Helsinki, 23-25 April 2019)

**I.22.** E. DelRe

Giant broadband refraction and nonlinear optics in ferroelectric supercrystals  
Invited talk at Wavescotedazur - Nonlinear waves and turbulence in space plasmas, (Nice, 4-7 June 2019)

**I.23.** E. DelRe

Giant Refraction in Spontaneous 3D Super-Crystals in Nanodisordered Perovskites  
Invited talk at the Nonlinear metamaterials and photonics crystals workshop (Kfar Blum, Israel, 9-12 September 2019)

**I.24.** E. DelRe

Giant Refraction in Spontaneous 3D Super-Crystals in Nanodisordered Perovskites  
Invited talk at the Congresso Nazionale della Società Italiana di Fisica (SIF 2019) (L'Aquila, 23-27 September 2019)

**I.25.** E. DelRe

Exploration of nonlinear optics in disordered crystals  
Invited talk at the SPEED- Spectrometer for low-wavenumber coherent Raman detection First Workshop (SPEED - ENEA Casaccia, 17 December 2019)

## Scientific Production - Oral presentations

**O1.** E.DelRe, B.Crosignani, M.Tamburrini, M.Segev, M.Mitchell, E.Refaeli, A.Agranat  
One-dimensional photorefractive spatial solitons in paraelectric KLTN  
Oral presentation at CLEO 98 (San Francisco, 3-8 May 1998)

**O2.** B.Crosignani, E.DelRe, P.DiPorto, M.Tamburrini, A.Degasperis, A.Agranat, M.Segev  
Photorefractive diffusion-driven self-focusing and self-trapping in near-transition paraelectric crystals  
Oral presentation at Nonlinear Optics 98 (Kauai, 10-14 August 1998).

**O3.** E.DelRe, M.Tamburrini, G.Egidi, and M.Segev  
Bright photorefractive spatial solitons in tilted BaTiO<sub>3</sub>  
Oral presentation at LEOS 98 (Orlando, 3-4 December 1998).

- 04.** B. Crosignani, E. DelRe, M. Tamburrini  
Novel optical phenomena in near-critical photorefractive crystals  
Oral talk at the "Workshop on unconventional optical elements for storage, processing and communications" (Jerusalem-Israel, 19-21 October 1998).
- 05.** E. DelRe, M. Tamburrini, M. Segev, and A.J. Agranat  
Spontaneous optical solitons in metastable paraelectric crystals  
Oral presentation at CLEO/QELS99 (Baltimore, 23-28 May 1999).
- 06.** S.Lan, E.DelRe, Z.Chen, M.Shih, and M.Segev  
Directional coupler using soliton-induced waveguiding  
Oral presentation at CLEO/QELS99 (Baltimore, 23-28 May 1999).
- 07.** E. DelRe, S. Trillo, and M. Segev  
Observation of hybrid stripe-needle screening soliton interaction  
Oral presentation at NLGW99 (Djion-France, 1-3 September 1999).
- 08.** E. DelRe  
Reconfigurable bulk optical circuitry supported by photorefractive spatial solitons  
Oral presentation at Amalfi99 (Amalfi-Italy, October 1999).
- 09.** E. DelRe, S. Trillo, and A.J. Agranat  
Collisions and inhomogeneous forces between solitons of different dimensionality  
Oral presentation at CLEO/QELS2000 (San Francisco, 7-12 May 2000).
- 010.** E. DelRe and S. Trillo  
Propagazione e interazione fra guide d'onda scritte tramite solitoni spaziali ottici  
(Propagation and interaction between waveguides written through spatial optical solitons)  
Oral presentation XIII RiNEm (Como, 25-28 September 2000)
- 011.** G.M. Tosi-Beleffi, M.Presi, E.DelRe, D. Boschi, C. Palma, and A.J. Agranat  
Stable oscillating nonlinear beams in square-wave-biased photorefractives  
Oral presentation at CLEO/QELS2001 (Baltimore, 6-11 May 2001)
- 012.** E. DelRe, A. Ciattoni, and A.J. Agranat  
Anisotropic charge displacement supporting isolated photorefractive optical needles  
Oral presentation at NLGW'01 (Clearwater Florida, 25-28 March 2001)
- 013.** B.Crosignani, E. DelRe , P. Di Porto  
Soliton-based electro-optic beam manipulation in near-transition photorefractives  
Oral presentation at the INFMeeting02 (Bari-Italy, 24-28 June 2002).
- 014.** E.DelRe, B.Crosignani, E.Palange, and A.J.Agranat  
Electro-optic beam manipulation through photorefractive needles  
Oral Presentation at CLEO/QELS2003 (Baltimore, 1-6 June 2003)
- 015.** E.DelRe, B.Crosignani, E.Palange, and A.J.Agranat  
Electro-optic beam manipulation through photorefractive needles  
Oral presentation at the INFMeeting03 (Genova-Italy, 23-25 June 2003).
- 016.** B.Crosignani, P. Di Porto, A. Ciattoni, and E. DelRe  
Propagation invariant nonlinear optical waves characterized by subwavelength features  
Oral presentation at NOMA '03 (Cetraro, Italy, 8-13 June 2003)
- 017.** A. D'Ercole, E. Palange, E. DelRe, A. Ciattoni, B. Crosignani, A.J. Agranat  
Miniaturization and embedding of soliton-based electro-optically addressable photonic arrays  
Oral presentation at CLEO 2006 (Long Beach, 21-26 May 2006)

- O18.** E. DelRe, A. Pierangelo, E. Palange A. Ciattoni, Y. Garcia, and A. J. Agranat  
Linear writing of waveguides in bulk photorefractives  
Oral presentation at CLEO Europe 2007 (Munich, 17-22 June 2007)
- O19.** E. DelRe  
Solitonic light filaments in critical opacity - Optical solitons in ferroelectric phase-transitions  
Oral talk at the 2008 SIAM Conference on Nonlinear Waves and Coherent Structures (Rome, 21-24 July 2008)
- O20.** E. DelRe, E. Spinozzi, C. Conti, A. Ciattoni, A.J. Agranat  
Optical spatial solitons in glassy potassium-lithium-tantalate-niobate  
Oral presentation at the SPIE Europe 2009 Optics and Optoelectronics Conference (Prague, (Czech Republic) 19-23 April 2009)
- O21.** J. Parravicini, P. Minzioni, V. Degiorgio, E. DelRe  
Photovoltaic self-focusing in lithium niobate  
CLEO/Europe-EQEC 2009 (Munich, 14-19 June 2009)
- O22.** B. Crosignani, P. Di Porto, E. DelRe  
Adiabatic pistons as negentropy pumps  
Talk in Complexity in Nonlinear Phenomena - XII School on Complexity (Erice, Italy, 3-7 October 2009)
- O23.** E. DelRe and C. Conti  
Harnessing dielectric complexity for optics  
Oral presentation at the Second International Conference on Nonlinear Waves -Theory and Applications, (Beijing (China), June 26-29, 2010)
- O24.** E. DelRe, J. Parravicini, A.J. Agranat  
Electromorphing: A method to achieve fast electro-optic control of light beams through volume index of refraction patterns  
Oral presentation at PIERS 2011 in Marrakesh (Marrakesh (Morocco), June 20-24, 2011)
- O25.** E. DelRe. E. Spinozzi, A.J. Agranat, and C. Conti  
Scale-free optics and diffractionless waves in nano-disordered ferroelectrics  
Oral presentation at CLEO/QELS 2011 (Baltimore (US), 1-6 May 2011)
- O26.** E. DelRe. E. Spinozzi, A.J. Agranat, and C. Conti  
Scale-free Optics and Diffractionless Waves in Nano-disordered Ferroelectrics  
Oral presentation at CLEO/Europe-EQEC 2011 (Munich (Germany) 22-26 May 2011)
- O27.** C. Conti and E. DelRe  
Optical Supercavitation in Soft-matter  
Oral presentation at CLEO/Europe-EQEC 2011 (Munich (Germany) 22-26 May 2011)
- O28.** E. DelRe, P. Di Porto, S. Di Sabatino, and B. Crosignani  
Reduced statistical fluctuations for an object in a partitioned environment  
Oral presentation at the AAAS Second Law Symposium (San Diego (US), 12-16 June 2011)
- O29.** E. DelRe, A.J. Agranat, V. Folli, and C. Conti  
Scale-free propagation in out-of-equilibrium ferroelectric crystals  
Oral presentation at Medinano2011 (Rome (Italy), 23-26 October 2011)
- O30.** E. DelRe, J. Parravicini, G. Parravicini, A.J. Agranat, and C. Conti  
Wavelength-insensitive negative optical permittivity without nanofabrication in transparent nonlinear dipolar glasses  
Oral presentation to CLEO 2012 (San Jose (US), 17-22 May 2012)

- O31.** J. Parravicini, A. J. Agranat, C. Conti, and E. DelRe  
Kovacs and inverse Kovacs effect in the optical scale-free regime  
Oral presentation at Nonlinear Photonics 2012 (Colorado Springs 17-22 June 2012)
- O32.** E. DelRe, J. Parravicini, A. Pierangelo, S. Gentilini, A. J. Agranat  
Artificial retinal glial-like waveguides for biomimetic volume optics  
Oral presentation at CLEO EUROPE 2013 (Munich, 12-17 June 2013)
- O33.** D. Pierangeli, J. Parravicini, F. Di Mei, G. Parravicini, A. J. Agranat, and E. DelRe  
Photorefractive solitons in out-of-equilibrium disordered ferroelectrics  
Oral presentation at Nonlinear Photonics 2014 (Barcelona, 27-31 July 2014)
- O34.** F. Di Mei, D. Pierangeli, J. Parravicini, C. Conti, A. J. Agranat, and E. DelRe  
Non-paraxial non-diffracting beams in scale-free optics  
Oral presentation at CLEO Europe 2015 (Munich, 21 - 25 June 2015)
- O35.** D. Pierangeli, M. Flammini, F. Di Mei, J. Parravicini, C.E.M. de Oliveira, A.J. Agranat and E. DelRe  
Continuous solitons in a lattice nonlinearity  
Oral presentation at EQEC 2015 (Munich, 21 - 25 June 2015)
- O36.** D. Pierangeli, M. Ferraro, F. Di Mei, G. Di Domenico, C.E.M. de Oliveira, A.J. Agranat, and E. DelRe  
Spontaneous photonic super-crystals in composite ferroelectrics  
Oral presentation at CLEO 2016 (San Jose, California, 5-10 June 2016)
- O37.** E. DelRe  
THz technologies for analysis and diagnostics in cultural heritage  
NanoInnovation2017 (Rome, 26-29 September 2017)
- O38.** E. DelRe, G. Di Domenico, F. Di Mei, M. Flammini, D. Pierangeli, G.B. Parravicini, J. Parravicini, and A. J. Agranat  
Giant response and anomalous electrical and thermal conductivity in nanodisordered perovskite  $K_{1-x}Li_xTa_{1-y}Nb_yO_3$  crystals  
Physics and chemistry of emerging superconductors and thermoelectric materials (Rome, 13-15 September 2017)
- O.39.** M. Flammini, E. Pontecorvo, V. Giliberti, M. Ortolani, and E. DelRe  
Observation of evanescent-wave filtering in super-resolved THz images  
Oral presentation at CLEO Europe 2017 (Munich 25-29 June 2017)
- O.40.** M. Leonetti, S. Karbasi, A. Mafi, B. Abaie, E. DelRe, and G. Ruocco  
Transverse localization of light for single-mode and secure information transport  
Oral presentation at CLEO Europe 2017 (Munich 25-29 June 2017)
- O.41.** M. Flammini, G. Di Domenico, D. Pierangeli, F. Di Mei, A. J. Agranat, and E. DelRe  
Observation of a Bessel beam soliton  
Oral presentation at CLEO 2018 (San Jose 13-18 May 2018)
- O.42.** D. Pierangeli, M. Flammini, A. Tavani, F. Di Mei, A. J. Agranat, L. Zhang, C. Conti, and E. DelRe  
Spin-glass behavior in nonlinear optical waves  
Oral presentation at CLEO 2018 (San Jose 13-18 May 2018)
- O.43.** D. Pierangeli, M. Flammini, L. Zhang, G. Marcucci, A.J. Agranat, P.G. Grinevich, P.M. Santini, C. Conti, and E. DelRe  
Fermi-Pasta-Ulam-Tsingou recurrence in spatial optical dynamics



Oral presentation at the European Quantum Electronics Conference 2019 (Munich, 23-27 June 2019)

**O.44.** G. Marcucci, D. Pierangeli, A. J. Agranat, E. DelRe, and C. Conti

Topological Control of Optical Nonlinear Waves

Oral presentation at The European Conference on Lasers and Electro-Optics 2019 (Munich 23-27 June 2019)

**O.45.** L. Falsi, F. Di Mei, M. Flammini, D. Pierangeli, P. Di Porto, A.J. Agranat, and E. DelRe

Giant broadband refraction in the visible in a nanodisordered ferroelectric perovskite

Oral presentation at The European Conference on Lasers and Electro-Optics 2019 (Munich, 23-27 June 2019)

**O.46.** D. Pierangeli, M. Flammini, L. Zhang, G. Marcucci, A.J. Agranat, P.G. Grinevich, P.M.

Santini, C. Conti, and E. DelRe

Observation of Fermi-Pasta-Ulam-Tsingou recurrence in spatial optical dynamics

Oral presentation at Nonlinear Optics 2019 (Waikoloa Beach, Hawaii 15-19 July 2019)

**O.47.** G. Marcucci, D. Pierangeli, A. J. Agranat, R-K. Lee, E. DelRe, and C. Conti

Topological Control of Optical Extreme Waves

Oral presentation at Nonlinear Optics 2019 (Waikoloa Beach, Hawaii 15-19 July 2019)

### Scientific Production - Posters

**P1.** E. DelRe, B. Crosignani, M. Segev, and A. Agranat

Optical soliton-like phenomena in near transition paraelectric KLTN

Poster presentation at the INFMeeting 98 (Rimini, Italy, June 1998).

**P2.** A. Ciattoni, B. Crosignani, E. DelRe, and M. Tamburrini

Approach to two-wave-mixing in photorefractive materials

Poster presentation at the INFMeeting 98 (Rimini-Italy, June 1998).

**P3.** E. DelRe, A. Ciattoni, B. Crosignani, P. Di Porto

Diffusion-driven anisotropic self-interaction in near-transition paraelectrics

Poster presentation at the INFMeeting99 (Catania-Italy, June 1999).

**P4.** E. DelRe and A. Agranat

Dielectric nonlinearity in photorefractive screening solitons

Poster at NLGW'02 (Stresa, September 2002).

**P5.** G. De Masi, E. DelRe, E. Palange

Interplay between Nonlocality and Anisotropy in Photorefractive Needles

Poster presentation at the INFMeeting03 (Genova-Italy, June 2003).

**P.6** J. Parravicini, A. J. Agranat, C. Conti, E. Del Re

Scale-free optics in programmed dipolar glasses

Poster at NLO50 (Barcelona, 8-10 October 2012)

**P.7** J. Parravicini, A. J. Agranat, C. Conti, and E. DelRe

Scale-free optics in programmed dipolar glasses

Poster at FisMat 2013 - Italian National Conference on Condensed Matter Physics (Milan, 9-13 September 2013)

**P.8** F. Di Mei, D. Pierangeli, J. Parravicini, GB Parravicini, C. Conti, A. J. Agranat, E. DelRe

Intrinsic Nonlinearity in the Electro-Optic Response of Freezing Relaxors Ferroelectrics,

Poster at Nonlinear Photonics 2014 (Barcelona, 27-31 July 2014)

**P.9** E. DelRe and F. Di Mei

Lighting up a photonic network inside a living body

Poster at the ATTRACT TWD Symposium: Trends, Wishes and Dreams in Detection and Imaging Technologies 2016 (Barcelona, 30 June- 1 July 2016)

**P.10.** M. Ferraro, D. Pierangeli, M. Flammini, F. Di Mei, G. Di Domenico, A.J. Agranat, and E. DelRe  
Binary birefringence in ferroelectric super-crystals  
Poster presentation at CLEO Europe 2017 (Munich 25-29 June 2017)

**P.11.** F. Xin, M. Flammini, F. Di Mei, L. Falsi, D. Pierangeli, A. J. Agranat, and E. DelRe  
Using Bessel beams to induce programmable volume integrated optical circuitry  
Poster presentation at CLEO Europe 2019 (Munich 23-27 June 2019)

## Invited Seminars

- 2000 "Teleportation and Nonlinearity" - April 2000, Dip. Fisica Università di Roma "La Sapienza" (Roma)
- 2000 "Quantum Teleportation" - May 2000, Dip. di Fisica Università de L'Aquila (L'Aquila)
- 2002 "Unconventional nonlinearity in quantum information technology" - March 2002, Dep. of Applied Physics - California Institute of Technology (Pasadena, USA)
- 2002 "Quantum technology and nonlinear processes" -May 2002, IESS CNR (Rome)
- 2002 "Spontaneous solitons" - November 2002, Applied Physics Department -Hebrew University of Jerusalem (Jerusalem, Israel)
- 2005 "Entanglement: Einstein vs Bohr" – in "Fisica e Filosofia", September 2005, Aula Magna - Università dell'Aquila (L'Aquila)
- 2005 "Influsso del pensiero einsteiniano sull'unitarietà del sapere" - Fisica e Filosofia nella Scuola, December 2005 - Laboratori Nazionali del Gran Sasso (L'Aquila)
- 2008 " Effective nonlinearity in microstructured photorefractive ferroelectrics" - Febbraio 2008, Institute Nonlinéaire de Nice, 15/02/2008 (France)
- 2011 "Scale-free Optics and Super-Imaging" - June 2011, Dep. of Applied Physics - California Institute of Technology (Pasadena, USA)
- 2011 "Structured-illumination-microscopy: imaging sub-cellular features in vivo" - October 2011, Dipartimento di Fisica - Università di Roma La Sapienza (Roma)
- 2012 "Scale-free optics in out-of-equilibrium ferroelectric" - January 2012 - Dipartimento di Fisica - Università di Roma La Sapienza (Roma)
- 2012 "Light with no spatial scale: diffraction cancellation, anti-diffraction, scale-free instability and subwavelength beam propagation in dipolar glasses" -February 2012 - Max Planck Institute for the Physics of Light - Erlangen (Germany)
- 2012 "Boson-friend: a discussion on the discovery of the Higgs Boson" – September 2012 – John Cabot University – Rome (Italy)
- 2014 "Quantum Computing, Landauer's Principle, and Entanglement" - September 2014 - University of Tor Vergata - Rome (Italy)
- 2014 "Structured illumination microscopy and imaging with incoherent and coherent light" - May 2014 - CLNS-IIT - Rome (Italy)
- 2015 " Super-resolution and looking deep in a volume" - February 2015 - CERN Geneva (Switzerland)
- 2017 "Scale-free optics: Cancelling and inverting diffraction below the optical wavelength" – March 2017, Aula Conversi, Physics Department, University of Rome La Sapienza (Rome)
- 2017 "Scale-free optics: Cancelling and inverting diffraction below the optical wavelength" – March 2017, Brodje Institute, Hebrew University of Jerusalem (Israel)
- 2019 "Giant broadband visible refraction in ferroelectric super crystals" – December 2019, Brodje Institute, Hebrew University of Jerusalem (Israel)

## Talks for High Schools and the General Public

- 2004 "Fondamenti della Meccanica Quantistica" - Le Giornate della Scienza, March 2004, Liceo Scientifico "Manfredi Azzarita" (Rome)
- 2005 "Superare le tecnologie attuali: Teletrasporto, Crittografia e Computazione Quantistica" – Le Giornate della Scienza, Marzo 2005, Liceo Scientifico "Manfredi Azzarita" (Rome)

- 2005 "Macchine quantistiche e il superamento delle tecnologie attuali" – Le Giornate della Scienza, April 2005, Liceo Scientifico Tecnologico "Duca D'Aosta" (L'Aquila)
- 2006 "Galileo e la Fisica Contemporanea" - Le Giornate della Scienza, May 2006, Liceo Scientifico "Manfredi Azzarita" (Rome)
- 2007 "La simmetria nelle leggi fisiche dalla meccanica classica alla meccanica quantistica" - Le Giornate della Scienza, April 2007, Liceo Scientifico "Manfredi Azzarita" (Rome)
- NNazionale AIF (Associazione Nazionale Formatori), February 2010, Villa Valmarana Morosini (Altavilla Vicentina) e Centro Direzionale "Strinella 88" (L'Aquila)
- 2012 "Il Bosone di Higgs e la Conoscenza del Reale" – UPTER – Università Popolare di Roma, November 2012 – Villa Sarsina – Anzio (Rome)
- 2012-2014 "Scale-free optics and solitons", Master Class di Ottica – Piano Lauree Scientifiche Sapienza (Physics Dept. - La Sapienza, Rome)
- 2015-2016 "Superare le tecnologie attuali: teletrasporto, crittografia e computazione quantistica" - Salone dello Studente, 2015 and 2016 Edition - Nuova Fiera di Roma (Rome)
- 2016 "Grand Confirmations" - April 2016 - Chiesa Santa Maria degli Angeli - Rome (Italy)
- 2017 "Superare le tecnologie attuali: teletrasporto, crittografia e computazione quantistica", PLS initiative for High School Students - Physics Department, University of Rome La Sapienza
- 2019 "Fridays for the Future - In house Forum", Grassroots and the Guarini Institute, John Cabot University - November 2019 (Rome)

