Nonlinear Optics and Its Applications VIII; and Quantum Optics III

Benjamin J. Eggleton
Alexander L. Gaeta
Neil G. R. Broderick
Alexander V. Sergienko
Arno Rauschenbeutel
Thomas Durt
Editors

14–16 April 2014
Brussels, Belgium

Sponsored by
SPIE

Cosponsored by
B-PHOT—Brussels Photonics Team (Belgium) • FWO—Fonds Wetenschappelijk Onderzoek (Belgium) • Brussels-Capital Region (Belgium) • Ville de Bruxelles (Belgium)

Cooperating Organisations
CBO-BCO (Belgium) • European Laser Institute • Photonics 21 (Germany) • EOS—European Optical Society (Germany)

Published by
SPIE

Volume 9136
Contents

xi Conference Committee  xv Quantum Optics Introduction

Part A Nonlinear Optics and its Applications

NONLINEAR QUANTUM OPTICS

9136 03 Domain-engineered PPLN for entangled photon generation and other quantum information applications (Invited Paper) [9136-2]
P. S. Kuo, National Institute of Standards and Technology (United States); J. S. Pelc, Hewlett-Packard Labs. (United States); O. Slattery, L. Ma, X. Tang, National Institute of Standards and Technology (United States)

9136 04 Efficient four-wave mixing by phase-mismatch switching (Best Student Paper Award) [9136-3]
Y. Lefevre, N. Vermeulen, H. Thienpont, Vrije Univ. Brussel (Belgium)

9136 06 Indirect transitions of a signal interacting with a moving refractive index front [9136-5]
M. Castellanos Muñoz, A. Yu. Petrov, Technische Univ. Hamburg-Harburg (Germany); L. O’Faolain, Univ. of St. Andrews (United Kingdom); J. Li, Sun Yat-Sen Univ. (China); T. F. Krauss, The Univ. of York (United Kingdom); M. Eich, Technische Univ. Hamburg-Harburg (Germany)

HIGH POWER EFFECTS

9136 08 Longitudinal mode-filling to cancel SBS in fully-fibered MOPAs dedicated to the production of high-energy nanosecond pulses [9136-7]
A. Jolly, ALPHANOV, Institut d’Optique d’Aquitaine (France) and CEA-CESTA (France); F. S. Gokhan, Hasan Kalyoncu Univ. (Turkey); R. Bello, P. Dupriez, ALPHANOV, Institut d’Optique d’Aquitaine (France)

9136 09 Laser-induced microwave generation with nonlinear optical crystals [9136-8]
F. A. Borghesani, Istituto Nazionale di Fisica Nucleare (Italy) and CNISM (Italy); C. Braggio, Univ. degli Studi di Padova (Italy) and Istituto Nazionale di Fisica Nucleare (Italy); G. Carugno, Istituto Nazionale di Fisica Nucleare (Italy); F. Della Valle, Univ. degli Studi di Trieste (Italy); G. Ruoso, Istituto Nazionale di Fisica Nucleare (Italy)
High-yield second-harmonic generation from mid-infrared to near-infrared regions in silicon-organic hybrid plasmonic waveguides [9136-12]
J. Zhang, Huazhong Univ. of Science and Technology (China) and Institut d’Electronique Fondamentale, Univ. Paris-Sud, CNRS (France); X. Zhang, Huazhong Univ. of Science and Technology (China); E. Cassan, Institut d’Electronique Fondamentale, Univ. Paris-Sud, CNRS (France)

All-optical generation of surface acoustic waves in a silica optical microwire [9136-13]
J.-C. Beugnot, Institut FEMTO-ST, CNRS-Univ. de Franche-Comté (France); S. Lebrun, G. Pauliat, Lab. Charles Fabry, Institut d’Optique, Univ. Paris-Sud, CNRS (France); H. Mailhotte, Institut FEMTO-ST, CNRS-Univ. de Franche-Comté (France); V. Laude, Lab. Charles Fabry, Institut d’Optique, Univ. Paris-Sud, CNRS (France); T. Sylvestre, Institut FEMTO-ST, CNRS-Univ. de Franche-Comté (France)

Opportunities for Raman wavelength conversion with silicon microdisks [9136-15]
I. Degli-Eredi, N. Vermeulen, H. Thienpont, Vrije Univ. Brussel (Belgium)

Spatio-temporal stability of 1D Kerr cavity solitons [9136-18]
L. Gelens, Vrije Univ. Brussel (Belgium) and Stanford Univ. School of Medicine (United States); P. Parra-Rivas, Vrije Univ. Brussel (Belgium) and Instituto de Fisica Interdisciplinar y Sistemas Complejos (Spain); F. Leo, Univ. Gent (Belgium) and IMEC (Belgium); D. Gomila, M. A. Matias, Instituto de Fisica Interdisciplinar y Sistemas Complejos (Spain); S. Coen, The Univ. of Auckland (New Zealand)

Strong nonlocal interaction stabilizes cavity solitons with a varying size plateau [9136-19]
C. Fernandez-Oto, M. Tlidi, Univ. Libre de Bruxelles (Belgium); D. Escaff, Univ. de Los Andes (Chile); M. Clerc, Univ. de Chile (Chile); P. Kockaert, Univ. Libre de Bruxelles (Belgium)

Controlling modulation instability using an incoherent low amplitude seed [9136-22]
T. Godin, D. M. Nguyen, S. Toenger, Y. Combes, B. Wetzel, T. Sylvestre, Institut FEMTO-ST, CNRS-Univ. de Franche-Comté (France); G. Genty, Tampere Univ. of Technology (Finland); F. Dias, Univ. College Dublin (Ireland); J. M. Dudley, Institut FEMTO-ST, CNRS-Univ. de Franche-Comté (France)

Tunable stimulated Brillouin scattering in hybrid polymer-chalcogenide tapered fibers [9136-23]
J.-C. Beugnot, Institut FEMTO-ST, CNRS, Univ. de Franche-Comté (France); R. Ahmad, M. Rochette, McGill Univ. (Canada); V. Laude, H. Mailiotte, T. Sylvestre, Institut FEMTO-ST, CNRS, Univ. de Franche-Comté (France)
Normal dispersion modulation instability in an As$_2$Se$_3$ chalcogenide hybrid microwire [9136-24]
T. Godin, Y. Combes, Institut FEMTO-ST, CNRS, Univ. de Franche-Comté (France); R. Ahmad, M. Rochette, McGill Univ. (Canada); T. Sylvestre, J. M. Dudley, Institut FEMTO-ST, CNRS, Univ. de Franche-Comté (France)

Temporal localized structures in a photonic crystal fiber resonator [9136-25]
L. Bahloul, L. Cherbi, H. Hariz, Univ. des Sciences et de la Technologie Houari Boumediene (Algeria)

APPLICATIONS OF NONLINEAR OPTICS

Airy beams propagation in optically induced photonic lattices [9136-27]
B. Bokić, Univ. of Belgrade (Serbia); F. Diebel, Westfälische Wilhelms-Univ. Münster (Germany); D. Timotijević, A. Piper, Univ. of Belgrade (Serbia); M. Boguslawski, Westfälische Wilhelms-Univ. Münster (Germany); D. Jović, Univ. of Belgrade (Serbia); C. Denz, Westfälische Wilhelms-Univ. Münster (Germany)

Parallel generation of fast random bits based on optoelectronic phase-chaos systems [9136-30]
R. M. Nguimdo, Vrije Univ. Brussel (Belgium); P. Colet, Consejo Superior de Investigaciones Científicas (Spain); J. Danckaert, Vrije Univ. Brussel (Belgium)

FIBRE LASERS I

High-power femtosecond fiber lasers based on self-similar pulse evolution (Invited Paper) [9136-31]
H. Liu, W. Renninger, Cornell Univ. (United States); B. Nie, M. Dantus, Michigan State Univ. (United States); F. Yu, J. Knight, Univ. of Bath (United Kingdom); A. Chong, Univ. of Dayton (United States); F. Wise, Cornell Univ. (United States)

Vector solitons in harmonic mode-locked erbium-doped fiber lasers [9136-32]
T. Habruseva, Aston Univ. (United Kingdom); M. Mkhitaryan, Moscow Institute of Physics and Technology (Russian Federation); C. Mou, A. Rozhin, S. K. Turitsyn, S. V. Sergeyev, Aston Univ. (United Kingdom)

Self-similar pulse-shape mode for femtosecond pulse propagation in medium with resonant nonlinearity [9136-34]
V. A. Trofimov, I. G. Zakharova, Lomonosov Moscow State Univ. (Russian Federation); S. Konar, Birla Institute of Technology (India)
Nonlinear energy deposition in water from fs-laser pulses: effect of the input chirp [9136-35]
C. Milián, Ctr. de Physique Theorique, CNRS, Ecole Polytechnique (France); A. Jarnac, Y. Brelet, Lab. d’Optique Appliquee, ENSTA ParisTech, Ecole Polytechnique, CNRS (France); V. Jukna, Ctr. de Physique Theorique, CNRS, Ecole Polytechnique (France); A. Houard, A. Mysyrowicz, Lab. d’Optique Appliquee, ENSTA ParisTech, Ecole Polytechnique, CNRS (France); A. Couairon, Ctr. de Physique Theorique, CNRS, Ecole Polytechnique (France)

Nonlinear mixing and mode correlations in a short Raman fiber laser [9136-37]
I. D. Vatnik, Institute of Automation and Electrometry (Russian Federation); O. A. Gorbunov, Institute of Automation and Electrometry (Russian Federation) and Novosibirsk State Univ. (Russian Federation); D. V. Churkin, Institute of Automation and Electrometry (Russian Federation), Novosibirsk State Univ. (Russian Federation), and Aston Univ. (United Kingdom)

Influence of the generated power, measurement bandwidth, and noise level on intensity statistics of a quasi-CW Raman fiber laser [9136-38]
O. A. Gorbunov, Institute of Automation and Electrometry (Russian Federation) and Novosibirsk State Univ. (Russian Federation); S. Sugavanam, Aston Univ. (United Kingdom); D. V. Churkin, Institute of Automation and Electrometry (Russian Federation), Novosibirsk State Univ. (Russian Federation), and Aston Univ. (United Kingdom)

Sensitive terahertz-wave detector using a quasi-phase-matched LiNbO3 at room temperature [9136-40]
K. Nawata, T. Notake, RIKEN Ctr. for Advanced Photonics (Japan); H. Ishizuki, Institute for Molecular Science (Japan); F. Qi, Y. Takida, S. Fan, S. Hayashi, RIKEN Ctr. for Advanced Photonics (Japan); T. Taira, Institute for Molecular Science (Japan); H. Minamide, RIKEN Ctr. for Advanced Photonics (Japan)

2.6 μm to 12 μm tunable ZGP parametric master oscillator power amplifier [9136-42]
T. Traub, Photonik-Zentrum Kaiserslautern e.V. (Germany); G. Anstett, Fraunhofer-Institut für Opttronik, Systemtechnik und Bildauswertung (Germany); G. Goeritz, GWU-Laser technik Vertriebsges.mbH (Germany); J. L’huillier, Photonik-Zentrum Kaiserslautern e.V. (Germany)

Field-enhanced nonlinear optical properties of organic nanofibers [9136-39]
O. Kostiučenko, J. Fiutowski, J. R. Brewer, H.-G. Rubahn, Univ. of Southern Denmark (Denmark)

Multi-modes of four-waves mixing at non-collinear interaction of laser beams in medium with cubic nonlinear response [9136-44]
V. A. Trofimov, I. E. Kuchik, N. V. Levitskiy, Lomonosov Moscow State Univ. (Russian Federation)
Control of soliton pattern through continuous external injection [9136-45]
A. Niang, F. Amrani, M. Salhi, H. Leblond, Univ. d’Angers (France); A. Komarov, Univ. d’Angers (France) and Institute of Automation and Electrometry (Russian Federation); F. Sanchez, Univ. d’Angers (France)

Instantaneous frequency measurement of microwave signals in optical range using “frequency-amplitude” conversion in the π-phase-shifted fiber-Bragg grating [9136-46]

Engaging new dimensions in nonlinear optical spectroscopy using auxiliary beams of light [9136-47]
J. S. Ford, D. S. Bradshaw, D. L. Andrews, Univ. of East Anglia (United Kingdom)

Nonlinear picosecond pulse transformation in large-core microstructured fibers [9136-50]
A. S. Pasishnik, S. I. Vavilov State Optical Institute (Russian Federation); S. O. Leonov, Bauman Moscow State Technical Univ. (Russian Federation)

Investigation of the separate optical nonlinear contributions of the core and cladding materials of silicon photonics slotted waveguides [9136-53]
W. Zhang, Institut d’Électronique Fondamentale, Univ. Paris-Sud, CNRS (France); S. Serna, Institut d’Électronique Fondamentale, Univ. Paris-Sud, CNRS (France) and Lab. Charles Fabry, Institut d’Optique (France); N. Dubreuil, Lab. Charles Fabry, Institut d’Optique (France); E. Cassan, Institut d’Électronique Fondamentale, Univ. Paris-Sud, CNRS (France)

Linear electro-optical scattering from ferroelectric nanocrystals [9136-54]
D. T. Trinh, Lab. de Photonique Quantique et Moléculaire, CNRS (France), Institut D’Alembert, Ecole Normale Supérieure de Cachan (France), and Hanoi National Univ. of Education (Viet Nam); V. Shynkar, J. Zyss, Lab. de Photonique Quantique et Moléculaire, CNRS (France) and Institut D’Alembert, Ecole Normale Supérieure de Cachan (France)

Effect factors of temperature measurements by femtosecond time-resolved CARS [9136-56]
Y. Zhao, S. Zhang, Z. Zhang, Z. Dong, D. Chen, Z. Zhang, Y. Xia, Harbin Institute of Technology (China)

Proposal of ultra-compact NAND/NOR/XNOR all-optical logic gates based on a nonlinear 3x1 multimode interference [9136-57]
M. Tajaldini, M. Z. Mat Jafri, Univ. Sains Malaysia (Malaysia)

Influence of photonic crystal fiber manufacturing inaccuracies on supercontinuum generation [9136-58]
M. Napierala, Z. Holdysinski, M. Szymanski, M. Murawski, Military Univ. of Technology (Poland) and InPhoTech Ltd. (Poland); P. Mergo, Univ. of Maria Curie-Skłodowska (Poland); P. Marc, L. R. Jaroszewicz, Military Univ. of Technology (Poland); T. Nasilowski, Military Univ. of Technology (Poland) and InPhoTech Ltd. (Poland)

Experimental demonstration of all optical XOR and XNOR gates for differential phase modulated data [9136-59]
R. Kakarla, D. Venkitesh, Indian Institute of Technology Madras (India)
Cross-absorption as a limit to heralded silicon photon pair sources
C. A. Husko, A. S. Clark, M. J. Collins, The Univ. of Sydney (Australia); A. De Rossi, S. Combré, G. Léhoucq, Thales Research and Technology (France); I. H. Rey, Univ. of St. Andrews (United Kingdom); T. F. Krauss, Univ. of St. Andrews (United Kingdom) and The Univ. of York (United Kingdom); C. Xiong, B. J. Eggleton, The Univ. of Sydney (Australia)

NLSE-based model of a random distributed feedback fiber laser
S. V. Smirnov, Novosibirsk State Univ. (Russian Federation) and Aston Univ. (United Kingdom); D. V. Churkin, Novosibirsk State Univ. (Russian Federation) and Aston Univ. (United Kingdom) and Institute of Automation and Electrometry (Russian Federation)

Multipolar nonlinear light-matter interactions with Gaussian vector beams
M. J. Huttunen, Tampere Univ. of Technology (Finland) and Aalto Univ. (Finland); J. Mäkitalo, G. Bautista, M. Kauranen, Tampere Univ. of Technology (Finland)

Delay-based reservoir computing using semiconductor ring lasers
R. M. Nguimdo, G. Verschaffelt, J. Danckaert, G. Van der Sande, Vrije Univ. Brussel (Belgium)

Spatial extreme events in a photorefractive single-feedback system
N. Marsal, V. Caullet, D. Woltersberger, M. Sciamanna, Supélec (France) and Lab. Matériaux Optiques, Photonique et Systèmes (France)

Modeling Kerr frequency combs using the Lugiato-Lefever equation: a characterization of the multistable landscape
P. Parra-Rivas, Vrije Univ. Brussel (Belgium) and Instituto de Física Interdisciplinar y Sistemas Complejos (Spain); D. Gomila, M. A. Matias, Instituto de Física Interdisciplinar y Sistemas Complejos (Spain); F. Leo, Univ. Gent (Belgium) and IMEC (Belgium); S. Coen, The Univ. of Auckland (New Zealand); L. Gelens, Vrije Univ. Brussel (Belgium) and Stanford Univ. School of Medicine (United States)

Synthetic diamond as a new material for on-chip nonlinear wavelength converters
N. Vermeulen, Vrije Univ. Brussel (Belgium); J. E. Sipe, Univ. of Toronto (Canada); L. G. Helt, Macquarie Univ. (Australia); H. Thienpont, Vrije Univ. Brussel (Belgium)

Self-action effects in semiconductor quantum dots
V. S. Dneprovskii, A. R. Kanev, M. V. Kozlova, A. M. Smirnov, Lomonosov Moscow State Univ. (Russian Federation)

Electrical nonlinear response of a photomixer for applications in ultrafast measurements
F. L. Constantin, Lab. PhLAM, CNRS (France)
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>9136 24</td>
<td>High performing SPS based on native NIR-emitting single colour centers in diamond (Invited Paper)</td>
<td>D. Gatto Monticone, Univ. degli Studi di Torino (Italy), Istituto Nazionale di Fisica Nucleare (Italy), and Consorzio Nazionale Interuniversitario per le Scienze Fisiche della Materia (Italy); P. Traina, Istituto Nazionale di Ricerca Metrologica (Italy); E. Moreva, Istituto Nazionale di Ricerca Metrologica (Italy) and Lomonosov Moscow State Univ. (Russian Federation); J. Forneris, Univ. degli Studi di Torino (Italy), Istituto Nazionale di Fisica Nucleare (Italy), and Consorzio Nazionale Interuniversitario per le Scienze Fisiche della Materia (Italy); M. Levi, Univ. degli Studi di Torino (Italy); G. Brida, I. P. Degiovanni, G. Amato, L. Boarino, Istituto Nazionale di Ricerca Metrologica (Italy); P. Olivero, Univ. degli Studi di Torino (Italy), Istituto Nazionale di Fisica Nucleare (Italy), and Consorzio Nazionale Interuniversitario per le Scienze Fisiche della Materia (Italy); M. Genovese, Istituto Nazionale di Ricerca Metrologica (Italy)</td>
</tr>
<tr>
<td>9136 27</td>
<td>Optimized QKD BB84 protocol using quantum dense coding and CNOT gates: feasibility based on probabilistic optical devices</td>
<td>A. Gueddana, M. Attia, R. Chatta, SUP’COM (Tunisia)</td>
</tr>
<tr>
<td>9136 28</td>
<td>The study of reducing the effect of detector saturation on ghost imaging</td>
<td>R. Q. He, Q. Chen, W. W. Zhang, J. Shu, Nanjing Univ. of Science and Technology (China)</td>
</tr>
<tr>
<td>9136 2B</td>
<td>Position-dependent photon operators in the quantization of the electromagnetic field in dielectrics at local thermal equilibrium</td>
<td>M. Partanen, T. Häyrynen, J. Oksanen, J. Tulkki, Aalto Univ. (Finland)</td>
</tr>
<tr>
<td>9136 2C</td>
<td>Optical four-wave mixing and generation of squeezed light in an optomechanical cavity driven by a bichromatic field</td>
<td>R. Garcés, G. J. de Valcárcel, Univ. de València (Spain)</td>
</tr>
<tr>
<td>9136 2D</td>
<td>Quantum information with optical photons in hybrid molecule-superconducting qubit system</td>
<td>S. Das, Niels Bohr Institute (Denmark); S. Faez, Leiden Institute of Physics (Netherlands); A. S. Sørensen, Niels Bohr Institute (Denmark)</td>
</tr>
<tr>
<td>9136 2E</td>
<td>Recovery of qubit coherence by noise-eater technique (Invited Paper)</td>
<td>M. Gavenda, L. Čelechovská, M. Dušek, R. Filip, Palacký Univ. Olomouc (Czech Republic)</td>
</tr>
<tr>
<td>9136 2G</td>
<td>Slow light in evanescently coupled optical cavities containing quantum dots (Best Student Paper Award)</td>
<td>E. Ergecen, Middle East Technical Univ. (Turkey)</td>
</tr>
</tbody>
</table>
Generation of correlated photon pairs in micro/nano-fibers [9136-93]
X. Li, L. Cui, C. Guo, Tianjin Univ. (China); Y. H. Li, Z. Y. Xu, L. J. Wang, Tsinghua Univ. (China); W. Fang, Zhejiang Univ. (China)

QUANTUM OPTICS IV: APPLICATIONS

Nanometric surface probing through ultra-cold atoms [9136-98]
M. Ali Khan, European Lab. for Non-Linear Spectroscopy (Italy) and Karlsruhe School of Optics (Germany); F. Schaefer, Kyoto Univ. (Japan); W. H. P. Pernice, Karlsruhe School of Optics (Germany); F. S. Cataliotti, European Lab. for Non-Linear Spectroscopy (Italy)

POSTER SESSION

Nearly deterministic loading of a single cesium atom in a magneto-optical trap and in a microscopic optical tweezer by feedback control [9136-100]
B. Liu, J.-M. Wang, W.-T. Diao, J.-Y. Wang, G. Jin, J. He, Shanxi Univ. (China)

Author Index
Conference Committee

Symposium Chairs

Francis Berghmans, Vrije Universiteit Brussel (Belgium)
Ronan Burgess, European Commission (Belgium)
Jürgen Popp, Institut für Photonische Technologien e.V. (Germany)
Peter Hartmann, SCHOTT AG (Germany)

Honorary Symposium Chair

Hugo Thienpont, Vrije Universiteit Brussel (Belgium)

Part A  Nonlinear Optics and its Applications

Conference Chairs

Benjamin J. Eggleton, The University of Sydney (Australia)
Alexander L. Gaeta, Cornell University (United States)
Neil G. R. Broderick, The University of Auckland (New Zealand)

Conference Programme Committee

Stephane Coen, The University of Auckland (New Zealand)
Arnaud Couairon, Ecole Polytechnique (France)
Richard M. De La Rue, University of Malaya (Malaysia) and University of Glasgow (United Kingdom)
Christophe Dorner, University of Rochester (United States)
Majid Ebrahimi-Zadeh, ICFO - Institut de Ciències Fotòniques (Spain)
Goëry Genty, Tampere University of Technology (Finland)
John D. Harvey, The University of Auckland (New Zealand)
Peter Horak, University of Southampton (United Kingdom)
Colin J. McKinzie, Alcatel-Lucent Bell Laboratories (United States)
Dragomir N. Neshev, The Australian National University (Australia)
Leif Katsuo Oxenløwe, Technical University of Denmark (Denmark)
Siddharth Ramachandran, Boston University (United States)
John E. Sipe, University of Toronto (Canada)

Session Chairs

Nonlinear Quantum Optics
Benjamin J. Eggleton, CUDOS (Australia)
High Power Effects  
**KaFai Mak**, Max-Planck-Institut für die Physik des Lichts (Germany)  

Nanophotonics  
**Alexander L. Gaeta**, Cornell University (United States)  

Cavity Solitons  
**Marc Hälterman**, Université Libre de Bruxelles (Belgium)  

Specialty Fibres  
**John M. Dudley**, Université de Franche-Comté (France)  

Applications of Nonlinear Optics  
**Miro Erkintalo**, Tampere University of Technology (Finland)  

Fibre Lasers I  
**Neil G. R. Broderick**, The University of Auckland (New Zealand)  

Fibre Lasers II  
**Frank W. Wise**, Cornell University (United States)  

Parametric Effects  
**Frank W. Wise**, Cornell University (United States)  

---  

**Part B**  
**Quantum Optics**  

**Conference Chairs**  
**Alexander V. Sergienko**, Boston University (United States)  
**Arno Rauschenbeutel**, Vienna Center for Quantum Science and Technology (Austria)  
**Thomas Durt**, Ecole Centrale Marseille (France)  

**Conference Programme Committee**  
**Alain Aspect**, Institut d’Optique Graduate School (France)  
**Victor Balykin**, Institute of Spectroscopy (Russian Federation)  
**Vladimir Buzek**, Slovak Academy of Sciences (Slovakia)  
**Berthold-Georg Englert**, National University of Singapore (Singapore)  
**Serge Massar**, Université Libre de Bruxelles (Belgium)  
**Gerard J. Milburn**, The University of Queensland (Australia)  
**Jeremy L. O’Brien**, University of Bristol (United Kingdom)  
**Paolo Tombesi**, Università degli Studi di Camerino (Italy)  
**Vlatko Vedral**, University of Oxford (United Kingdom)  
**Victor N. Zadkov**, Lomonosov Moscow State University (Russian Federation)
Anton Zeilinger, Universität Wien (Austria)

Session Chairs

Quantum Optics I
Thomas Durt, Ecole Centrale Marseille (France)

Quantum Optics II
Sara Ducci, Université Paris 7-Denis Diderot (France)

Quantum Optics III: Manipulation of Q States of Light
Paolo Traina, Istituto Nazionale di Ricerca Metrologica (Italy)

Quantum Optics IV: Applications
Thomas Durt, Ecole Centrale Marseille (France)
Introduction

This conference on Quantum Optics in the frame of the SPIE Photonics Europe 2014 was arranged for the third time in Brussels, Belgium. It was devoted to the recent scientific advances at the interface between quantum optics and atom optics. During the last decades, the studies of fundamental issues in quantum mechanics exploded from their originally confidential circle of specialists and became a major field of research that covers a large range of sub-disciplines, from nanotechnologies to quantum optics, including Bose-Einstein condensates, single photon sources, squeezed light, technologies for engineering quantum states and manipulating single atoms and ions, as well as quantum dots, etc. Although those researches are clearly foundationally oriented, they fit closely to experiments and already found amazingly successful applications in top-level metrology (spectroscopy, atomic clocks, measure of fundamental constants and so on) and quantum information (quantum cryptography and computing). The conference aimed at bringing a great opportunity to listen to some of the world renowned experts in these interconnected disciplines, as well as to discover new trends that result from the convergence of these fields. It offered an updated review of recent activities both in theoretical and experimental research. The conference programme and all manuscripts included in this volume cover the following topics:

- Nonclassical field states
- Quantum entanglement and EPR states
- Quantum states engineering and reconstruction
- Quantum memory for light, quantum interfaces, slow light, EIT
- Optomechanical devices
- Quantum communication and information processing
- Colour centers in diamond
- Quantum cryptography
- Nonlinear optics in graphene
- Quantum light in cavity
- Quantum key distribution

In conclusion, we thank all the conference participants and the authors of the submitted manuscripts for their contributions. Our special thanks also go the members of the program committee of this conference for their involvement into setting a good program.

Thomas Durt
Alexander V. Sergienko