NLGW

Nonlinear Guided Waves and Their Applications

Topical Meeting

6-9 September 2005
Dreikönigskirche
Dresden, Germany
About NLGW

This topical meeting brings together researchers working in all aspects of nonlinear optics in guided-wave and self-guided geometries. The development of new ideas and novel techniques in the areas of technology, phenomena, applications and theory are particularly emphasized. NLGW aims to:

- Provide a forum for the discussion of nonlinear waveguide and soliton phenomena from theoretical, material, and applications perspectives.
- Identify nonlinear effects in all-optical communications and signal processing and understand the opportunities and challenges that arise from them.
- Improve the interaction between phenomena and applications communities, particularly in the areas of optical communications, all-optical signal processing and frequency conversion.
- Encourage development of novel structures, materials and devices with enhanced nonlinear functionality.
- Address effects such as intrinsic localization in various nonlinear environments, including bulk media, waveguides, arrays, resonators and photonic crystals, and the novel phenomena based on them.
- Identify novel phenomena in configurations involving quadratic, cubic, photorefractive, reorientational and resonant nonlinearities.
- Highlight the similarities and differences between nonlinear effects in conservative and dissipative systems.
2005 NLGW Technical Program Committee

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Pere Colet, IMEDEA, Spain
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Yuri Kivshar, Australian Natl. Univ., Australia
Mustapha Tlidi, Univ. Libre de Bruxelles, Belgium
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Andrey Sukhorukov, Australian Natl. Univ., Australia
Stefan Trillo, Univ. di Ferrara, Italy

*Representative to OSA’s Science and Engineering Council
## 2005 NLGW Agenda of Sessions

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<td>TuA, Nanostructured Materials and 2nd Order Effects</td>
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<td>10:00 AM – 10:30 AM</td>
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<td>4:30 PM – 6:30 PM</td>
<td>TuD, Continuum Generation and Photonic Crystal Fibers</td>
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<td>8:30 AM – 10:00 AM</td>
<td>WA, Cavities and Dissipative Effects</td>
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<td>WB, Controlling the Properties of Light</td>
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<td>2:00 PM – 4:00 PM</td>
<td>WC, Self Similarity and Fiber Nonlinearities</td>
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<td>WD, Poster Session I</td>
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<td>6:00 PM – 8:00 PM</td>
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<td>8:30 AM – 10:00 AM</td>
<td>ThA, Imaging and Measurements</td>
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<td>ThB, Poster Session II</td>
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<td>2:00 PM – 4:00 PM</td>
<td>ThC, Nonlinear Optics in 2D Periodic Structures</td>
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<td>ThD, Nonlinear Spatial Structures</td>
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<td>8:30 AM – 10:00 AM</td>
<td>FA, Fabrication and Uses of Nonlinear Spatial Structures</td>
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<td>Coffee Break</td>
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<td>FB, Solitons and New Nonlinear Structures</td>
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2005 NLGW Abstracts

TuA • Nanostructured Materials and 2nd Order Effects

Festsaal
8:30 a.m.–10:00 a.m.
TuA • Nanostructured Materials and 2nd Order Effects
Presider, TBA

TuA1 • 8:30 a.m. ▶ Invited ◄
Optical Resonance in Nano-Structured Materials, Ildar R. Gabitov1, Joshua E. Soneson1, Andrei I. Maimistov2; 1Univ. of Arizona, USA, 2Moscow Engineering Physics Inst., Russian Federation. We examine resonant interactions of optical pulses with nanostructured materials in the case of the electric field interacting with plasmonic oscillations in metallic nanospheres and double resonance including the magnetic field interaction with nano-LC circuits.

TuA2 • 9:00 a.m.
Microcavity Photonic Crystal OPO, Rumen Iliev, Christoph Etrich, Ulf Peschel, Falk Lederer; IFTO, Friedrich-Schiller-Univ. Jena, Germany. We study the excitation of a defect mode in a quadratically nonlinear photonic crystal by a second harmonic wave. Both, a mean-field approach and finite-difference time-domain calculations predict spontaneous parametric down-conversion above a certain threshold.

TuA3 • 9:15 a.m.
Brillouin-Zone Spectroscopy of Nonlinear Photonic Lattices, Guy Bartal1, Oren Cohen1, Hrvoje Buljan1,2, Jason W. Fleischer1,3, Ofer Manela1, Mordechai Segen1; 1Technion, Israel Inst. of Technology, Israel, 2Univ. of Zagreb, Croatia, 3Princeton Univ., USA. We present a novel experimental technique for Brillouin-zone spectroscopy of photonic lattices with and without defects. Our technique facilitates mapping the borders of the extended Brillouin zones and the areas of normal and anomalous dispersion.

TuA4 • 9:30 a.m.
Phase-Resolved Nonlinear Propagation: Transition between Coherent Light-Matter Interaction Regimes, Tilman Höner zu Siederdissen1, Niels C. Nielsen1, Jürgen Kuhl1, Galina Khitrova2, Hyett M. Gibbs2, Stephan W. Koch2, Harald Giessen1,4; 1Max-Planck-Institut für Festkörperforschung, Germany, 2Optical Sciences Ctr., Univ. of Arizona, USA, 3Dept. of Physics and Material Sciences Ctr., Philipps-Univ. Marburg, Germany, 44th Physics Inst., Univ. of Stuttgart, Germany. We present phase-resolved pulse propagation measurements of the transition between several light-matter interaction regimes ranging from linear to highly nonlinear effects in a multiple-quantum-well Bragg structure.

TuA5 • 9:45 a.m.
Nondiffracting Beams in Periodic Media, Ofer Manela1, Mordechai Segen2, Demetrios N. Christodoulides2; 1Dept. of Physics and Solid-State Inst., Technion - Israel Inst. of Technology, Israel, 2School of Optics/CREOL, Univ. of Central Florida, USA. We present nondiffracting beams in 2-D periodic systems. We show that these beams may be associated with different bands in the transmission spectrum of the system and with different symmetry points of the Brillouin zone.

10:00 a.m.–10:30 a.m.
Coffee Break

TuB • Modulational Instability

Festsaal
10:30 a.m.–12:30 p.m.
TuB • Modulational Instability
Presider, TBA

TuB1 • 10:30 a.m.
Observation of a Stable Coherent Self-Trapped Vortex Light Beam in a Self-Focusing Medium, Shiuan-Yeh Chen, Tzu-Chun Lo, Ming-Feng Shih; Natl. Taiwan Univ., Taiwan Republic of China. We observe a stable coherent self-trapped vortex light beam in a noninstantaneous self-focusing medium. The stabilization, confirmed by numerical simulation, is achieved by adding small time-varying azimuthally-periodic modulation on the vortex light beam.

TuB2 • 10:45 a.m.
Experimental Observation of Modulational Instability in Self-Defocusing Nonlinear Waveguide Arrays, Christian Wirth, Milutin Stepic, Christian Rueter, Detlef Kip; Inst. of Physics and Physical Technologies, Clausthal Univ. of Technology, Germany. We observed both experimentally and numerically modulational instability and the consequent energy localization within the first band of a one-dimensional permanent nonlinear waveguide array fabricated in a photorefractive photovoltaic lithium niobate crystal.

TuB3 • 11:00 a.m.
Modulational Instability Due to an Irreversible, Nonlinear Process, Dirk Michaelis, Ulrich Streppel, Richard Konarschik, Andreas Bräuer; Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany. A new type of modulational instability for coherent as well as partially coherent light in systems with integrating nonlinearity caused by an irreversible process is investigated both, experimentally and theoretically.
TuB4 11:15 a.m.
High Resolution, High Contrast, High Focal Depth Nonlinear Beams, Paolo Polesana1, Daniele Facci1, Paolo Di Trapani1, Audrius Dubietis2, Ernestas Kucinskas2, Algis Piskarskas2; 1Univ. degli Studi dell’Insubria, Italy, 2Vilniaus Univ., Lithuania. We show nonlinear propagation of a nondiffracting Bessel pulse. In regime of multiphoton absorption, it creates a 4 cm long channel of 3-photon fluorescence, i.e. 80 times the equivalent Rayleigh range.

TuB5 11:30 a.m.
Subdiffractive Pulses in Photonic Crystals, Kestutis Staliasnas1, Carles Serrat2, Crina Cojocaru2, Jose Trull2, Ramon Herrero2; 1Univ. of Washington, USA, 2Univ. du Québec, Canada, 3Univ. of Arkansas, USA, 4Univ. of Glasgow, UK. We investigate propagation of light pulses in photonic crystals in the vicinity of the zero-diffraction point, and we find the family of nonspreading pulses, propagating without spreading in the vicinity of the zero-diffraction point.

TuB6 11:45 a.m.
Soliton Mobility in Nonlocal Nonlinear Media, Zhiyong Xu, Yaraslov Kartashov, Lluis Torner; Inst. de Ciencies Fotoniques, Spain. We address the impact of nonlocality in lattice solitons and soliton trains in Kerr-type nonlinear media. We show that the nonlocal nonlinear response can drastically enhance mobility of lattice solitons and stabilize complex multipole-mode solitons.

TuB7 12:00 p.m.
“Azimuthons”: Spatial Solitons with a Rotating Phase, Anton S. Desyatnikov, Andrey A. Sukhorukov, Yuri S. Kivshar; Australian Natl. Univ., Australia. We introduce the concept of “azimuthons” as self-trapped beams generated by azimuthal deformations of vortex solitons. We demonstrate that these modulated beams include the states with negative, positive, or zero rotation velocity.

TuB8 12:15 p.m.
Power-Dependent Walk-Off in Modulationally Unstable Nematic Liquid Crystals, Marco Peccianti, Gaetano Assanto; NooEL-Nonlinear Optics and OptoElectronics Lab, Italian Inst. for the Physics of Matter, Italy. We experimentally investigate nonlinear walk-off in nematic liquid crystals. In such anisotropic and nonlocal medium, transverse modulation instability results into power-controlled angular steering of a filament pattern.

12:30 p.m.–2:00 p.m.
Lunch Break

TuC 2:00 p.m.
Optical Routing by Sequential Incoherent Blocker Soliton-Control Beam Interactions in Kerr Waveguide Arrays, Joachim Meier1, George I. Stegeman2, Demetris Christodoulides3, Roberto Morandotti3, H. Yang4, Greg Salamo4, M. Sorel5; 1Univ. of Central Florida, USA, 2Univ. du Québec, Canada, 3Univ. of Arkansas, USA, 4Univ. of Glasgow, UK. Cascadable, digital all-optical routing by incoherent interactions between a highly confined soliton and two successive control beams of different wavelength was implemented in an AlGaAs waveguide array.

TuC 2:15 p.m.
Modulation Instability and Soliton Fission in Bragg Gratings, Joe T. Mok, Eduard Tsy, Ian C. M. Littler, C. Martijn de Sterke, Benjamin J. Eggleton; ARC Ctr. of Excellence for Ultrahigh-Bandwidth Devices for Optical Systems, Australia. A train of sub-60 ps pulses separated approximately by 200 ps is generated from a 0.6 ns Q-switched pulse in a fibre Bragg grating in transmission through the effects of modulation instability and soliton fission.

TuC 2:30 p.m.
Interaction of Novel 2D Gap Solitons with Defects, Alejandro B. Acero, Tomas Dohout; Univ. of New Mexico, USA. Existence of novel gap solitons in 2-D waveguides with Bragg grating in the propagation direction is shown and their trapping at localized defects modelled and explained via the principle of resonant energy transfer.

TuC 2:45 p.m.
Identification of Gap Soliton through Phase Measurement, Simon-Pierre Gorza1, Cyril Cambournac1, Philippe Emplit1, Marc Haeltterman1, Dirk Taillaert1, Bjorn Maes2, Roel Bect3; 1Optique et Acoustique, Univ. Libre de Bruxelles, Belgium, 2Dept. of Information Technology, Ghent Uni.-IMEC, Belgium. We fully characterize the stationary spatial gap soliton in periodic planar waveguide through the measurement of the transverse phase evolution across the soliton beam.

TuC 3:00 p.m.
Observation of the Discrete Talbot Effect, Robert Ivanov1, Daniel A. May-Arrioja1, Demetrios N. Christodoulides1, George I. Stegeman1, Yoohong Min2, Wolfgang Solder3; 1College of Optics and Photonics/CREOL&FPCE, Univ. of Central Florida, USA, 2Univ. of Paderborn, Germany. We report the first observation of the discrete Talbot effect in waveguide arrays. Recurrence for different input patterns was observed in good agreement with theory. The effect of nonlinearity on the Talbot dynamics was investigated.

TuC 3:15 p.m.
Waveguide Arrays for Passive Temporal Mode-Locking, J. Nathan Kutz, Joshua Proctor; Dept. of Applied Mathematics, Univ. of Washington, USA. A novel mode-locking technique is presented in which the intensity dependent spatial coupling dynamics of a waveguide array is used to achieve temporal (soliton) mode-locking in a passive optical fiber laser.
TuC7 • 3:30 p.m.
Two-Dimensional Complex Optically–Induced Nonlinear Photonic Lattices, Nina Sagemerten1, Jörg Imbrock1, Denis Träger1, Cornelia Denz1, Anton S. Desyatnikov1, Dragonin N. Neshev2, Alexander Dreischuh2, Wieslaw Krolikowski2, Yari S. Kieshan2, Robert Fischer2; 1Inst. für Angewandte Physik, WWU Muenster, Germany, 2Australian Natl. Univ., Australia. We generate different types of two-dimensional nonlinear photonic lattices in a photorefractive crystal by engineered periodic phase patterns, including novel triangular and vortex-like lattices, and study their linear guiding properties.

TuC8 • 3:45 p.m.
Observation of Light Confinement by Defects in Optically-Induced Photonic Lattices, Igor Makasyuk1, Zhigang Chen1, Jianke Yang2; 1San Francisco State Univ., USA, 2Univ. of Vermont, USA. Both one- and two-dimensional optically-induced photonic lattices with single-site negative defects are realized experimentally, in which light confinement as defect modes is clearly demonstrated. Our experimental results are in good agreement with theoretical predictions.

4:00 p.m.–4:30 p.m.
Coffee Break

TuD • Continuum Generation and Photonic Crystal Fibers

Festsaal
4:30 p.m.–6:30 p.m.
TuD • Continuum Generation and Photonic Crystal Fibers Keith Blow, Aston Univ., UK, Presider

TuD1 • 4:30 p.m. ► Invited ◄
Supercontinuum Generation and Superfocusing in Microstructure Fibers, Hollow Waveguides and Photonic Crystals, Joachim Herrmann, Anton Husakou; Max Born Inst., Germany. We present the theory of spectral broadening and short pulse generation due to nonlinear processes in microstructure fibers and hollow waveguides, and focusing of light below the diffraction limit by photonic crystals with negative refraction.

TuD2 • 5:00 p.m.
Experimental Observation of Polarization Modulation Instability in a Photonic Crystal Fiber, Kwan Leung G. Wong1, Robert J. Kruhlak1, Rainer Leonhardt1, John D. Harvey1, Nicolas Y. Joly1, Jonathan C. Knight1, William J. Wadsorth1, Philip St. J. Russell1; 1Univ. of Auckland, New Zealand, 2Univ. of Bath, UK. Polarization modulation instability in a birefringence photonic crystal fiber has been observed in the normal dispersion regime with a frequency shift of 64 THz between the generated frequencies and the pump frequency.

TuD3 • 5:15 p.m.
Single Mode Holey Fiber in GeGaSbS Chalcogenide Glass, Laurent Brilland1, Frederic Smektala1, Thierry Chartier1, Nicholas Traynor1, Achille Monteville1, Johan Troles1, Thanh Nam Nguyen1; 1PERFOS, France, 2Lab Verres et Céramiques, France, 3ENSSAT, France. We present recent results on the fabrication of a single mode Holey Fiber in GeGaSbS chalcogenide glass using the “Stack&Draw” technique. We measure a MFD of 8.3 µm and we estimate γ at 200 W⁻¹km⁻¹.

TuD4 • 5:30 p.m.
Dispersion-Management for Enhancing Supercontinuum Generation in Optical Fiber, J. Nathan Katz1, Claire Lynge2, Ben Eggleton2; 1Dept. of Applied Mathematics, Univ. of Washington, USA, 2Ctr. for Ultrahigh Bandwidth Devices for Optical Systems, Australia. Supercontinuum generation from a continuous wave field in a highly nonlinear fiber operating near the zero-dispersion point can be significantly enhanced with the aid of dispersion management.

TuD5 • 5:45 p.m.
All-Optical Switching in a Dual Core Photonic Crystal Fiber, A. Betlej1, S. Suntsov1, R. El-Ganainy1, D. N. Christodoulides1, George Stegeman1, J. Fini2, R. T. Bise3, D. J. DiGiovanni3; 1Univ. of Central Florida, USA, 2OFS Labs, USA. We demonstrate all-optical switching at 1550nm in a photonic crystal fiber consisting of two weakly coupled cores. At high powers, the output was dominated by continuum generation primarily towards shorter wavelengths.

TuD6 • 6:00 p.m.
Numerical Modeling of Continuous-Wave Supercontinuum Generation, Frédérique Vanholsbeeck1, Stéphane Coen1, Sonia Martin-Lopez2, Miguel Gonzalez-Herraez2,3; 1Univ. of Auckland, New Zealand, 2Consejo Superior de Investigaciones Científicas (CSIC), Spain, 3Univ. of Alcalá, Spain. Continuous-wave supercontinuum generation is studied numerically. We show that the random fluctuations of the partially coherent pump beam play a dominant role in the spectral broadening process and explain the smoothness of experimental spectra.

TuD7 • 6:15 p.m.
Interaction of a Soliton with a Continuous Wave in Photonic Crystal Fibers: Theory and Experiment, Dmitry Skryabin1, A. Yulin1, N. Joly1, J. Knight1, P. Russell1, A. Efimov2, F. Omenetto2, A. Taylor1; 1Univ. of Bath, UK, 2Los Alamos Natl. Lab, USA. We study interaction of a cw pump with an optical soliton in highly nonlinear photonic crystal fiber. We predict theoretically and confirm experimentally using XFROG measurements generation of new frequencies resulting from this interaction.
Wednesday, 7 September 2005

WA • Cavities and Dissipative Effects

Festsaal
8:30 a.m.–10:00 a.m.
WA • Cavities and Dissipative Effects
Robert Kuszelewicz, Lab de Photonique et Nanostructures, France, Presider

WA1 • 8:30 a.m. ▶ Invited ◀
Dissipative Spatial Soliton Phenomena in Active Semiconductor Optical Amplifiers, George Stegeman1, Erdem Ulltunir1, Demetri Christodoulides2, Falk Lederer1, Christoph H. Lange1; 1Univ. of Central Florida, USA, 2Friedrich-Schiller-Univ. Jena, Germany. We review our observations of multiple solitonic phenomena in electrically pumped semiconductor optical amplifiers (SOAs) including the generation of scalar solitons, their interactions, the possibility of incoherent vector solitons and modulational instability.

WA2 • 9:00 a.m.
Cavity Solitons in Driven VCSELs above Threshold: Theory and Experiment, Giovanna Tissoni1, Franco Prati1, Lorenzo Columbo1, Reza Kheradmand1,2, Luigi A. Lugliato1, Xavier Hachair3, Francesco Pedaci4, Emilie Caboche1, Stephane Barland1, Massimo Giudici5, Jorge Tredicce1, Igor Protosenko6, Massimo Brambilla7; 1Univ. di Roma “La Sapienza” - Dipartimento di Fisica, Italy, 2Boston College, USA, 3INFM, Dip. di Fisica e Matematica, Univ. dell’Insubria, Italy, 4Centro Ricerca Interateneo, Politecnico di Bari, Italy, 5Inst. Non-Linéaire de Nice, France, 6Synergy Group, Russia, 7Universita’ degli Studi di Bari, Italy. We experimentally demonstrate the existence and the control of cavity solitons in externally driven vertical-cavity semiconductor lasers above threshold. A model including material polarization dynamics is used to predict and confirm the experimental findings.

WA3 • 9:15 a.m.
Towards a Cavity Soliton Laser: Localized Emission States in Vertical-Cavity Surface-Emitting Lasers with Frequency-Selective Feedback, Thorsten Ackemann1, Malte Schulz-Ruhtenberg1, Markus Sondermann1, Karl F. Jentsch1, Xavier Hachair3, Massimo Giudici5, Jorge Tredicce1, Aleksandr V. Naumenko4, Natalia A. Loiko4, Roland Jaeger1; 1Inst. Non-Linéaire de Nice, France, 2Dept. of Physics, 3Univ. of Strathclyde, UK, 4Instituto de Optica, Spain, 5Inst. of Applied Physics, Univ. of British Columbia, Canada. We report on experimental investigations of self-sustained bistable localized emission states in vertical-cavity surface-emitting lasers with frequency-selective feedback without purely electrical pumping. Some insight is obtained already by a plane-wave theoretical model.

WA4 • 9:30 a.m.
Beam Propagation in a Cold Rb Atomic Sample, Guillaume Labetrie1, Thorsten Ackemann1, Bruce Klappauf2, Gian Luca Lippi1, Robin Kaiser1; 1Inst. Non-Linéaire de Nice, France, 2Dept. of Physics, Univ. of Strathclyde, UK, 3Univ. of British Columbia, Canada. Reshaping of a probe laser beam crossing a cold Rb sample is measured as a function of power, detuning and beam waist position. Three different, independent, and controllable sources of nonlinear interaction are identified.

WA5 • 9:45 a.m.
Composite Solitons Generated by Solid State Passively Mode-Locked Laser, Jose-Maria Soto-Crespo1, Nail Akhmediev2, Irina T. Sorokina3, Evgueni Sorokin3; 1Inst. de Optica, Spain, 2Optical Sciences Group, Australia, 3Technical Univ., Austria. We present the first experimental observation of composite solitons generated by the Cr:LiSGaF Kerr-lens passively mode-locked laser. These solitons are characterized by the multi-peak autocorrelation traces and double-peaked spectrum.

10:00 a.m.–10:30 a.m.
Coffee Break

WB • Controlling the Properties of Light

Festsaal
10:30 a.m.–12:30 p.m.
WB • Controlling the Properties of Light
Michael Cada, Technical Univ. of Nova Scotia, Canada, Presider

WB1 • 10:30 a.m. ▶ Invited ◀
Optically Tunable “Slow” Light in Waveguides, Alexander Gaeta1, Yoshitomo Okawachi2, Saikat Ghosh1, Jay E. Sharping1, Matthew S. Bigelow1, Aaron Schaefer1, Robert W. Boyd1, Zhaoming Zhu3, Daniel J. Gauthier3; 1Cornell Univ., USA, 2Inst. of Optics, Univ. of Rochester, USA, 3Duke Univ., USA. We demonstrate a technique for generating tunable all-optical delays as long as 20 ns in single-mode fibers at telecommunication wavelengths using stimulated Brillouin scattering. This process represents a step towards implementing slow-light in telecommunication systems.

WB2 • 11:00 a.m.
Group Velocity Control by Cascaded $\chi^{(2)}$ Interactions, Cristian Manzoni1, Marco Marangoni2, Giulio Cerullo1, Roberta Ramponi1, Fabio Baronio1, Costantino De Angelis2, Kenji Kitamura3; 1ICREA, Spain, 2Politecnico di Milano, Italy, 3Univ. degli Studi di Brescia, Italy. We experimentally demonstrate that the group velocity of ultrashort pulses can be controlled through $\chi^{(2)}$-cascaded interactions. This is achieved by propagating 35fs pulses around 1400nm in a 25-mm-long periodically poled stoichiometric lithium tantalate crystal.

WB3 • 11:15 a.m.
Cavity Solitons in Frequency Divide-by-Three Optical Parametric Oscillators, Kestutis Staliunas1, Stefano Longhi2, 1ICREA, Spain, 2Politecnico di Milano, Italy. We predict cavity solitons in frequency divide-by-three optical parametric oscillators in the presence of an additional degenerate parametric process between the signal and idler waves, and we investigate their stability properties.
High-Energy, Few-Cycle Pulses by Chirped-Pulse Cascaded

Jeroen Nijhof, Marconi, UK, Presider

Filters, in Chalcogenide Waveguides Integrated with Bragg Grating

We investigate temporal stability of stationary solutions for backward degenerate parametric mixing. We show that self-oscillating solutions can be obtained from suitable fundamental and second-harmonic continuous wave inputs under general phase-mismatched conditions.

FDTD Modeling of Conversion and Separatrix Crossing in Second Harmonic Generation, Michele Lauritani, Gaetano Bellanca, Stefano Trillo; Univ. of Ferrara, Italy. We investigate forward and backward second-harmonic-generation by means of FDTD method. We show that numerical dispersion of the method can strongly affect the generation process. Nevertheless FDTD captures complex dynamical phenomena such as separatrix crossing.

Nonlinear Pulse Propagation and All-Optical Regeneration in Chalcogenide Waveguides Integrated with Bragg Grating Filters, Vahid Tae‘eed, David J. Moss, Merdah Shokooh-Saremi, Ian Littler, Martin Rochette, Lihin Fu, Neil Baker, Barry Luther-Davies, Yilinan Ruai, Benjamin J. Eggleton; Univ. of Sydney, Australia, 1CUDOS, Australian Natl. Univ., Australia. We report all-optical regeneration in chalcogenide glass waveguides integrated with Bragg gratings, demonstrating nonlinear power transfer functions with 1ps to 2ps optical pulses.

10Gbit/s Transmission over Long Distance after All-Optical NRZ and RZ to CSRZ Format Conversion Using SLALOM, Mousaab M. Nahas, Mohamad H. A. Wahid, Robin A. Ibbotson, Keith J. Blow, Aston Univ., UK. We present a 10Gbit/s transmission performance over long distance after all-optical format conversion between NRZ and RZ to CSRZ format, using a semiconductor laser amplifier in a loop mirror (SLALOM).

12:30 p.m.–2:00 p.m.
Lunch Break

3:00 p.m.–4:00 p.m.

Jeroen Nijhof, Marconi, UK, Presider

High-Energy, Few-Cycle Pulses by Chirped-Pulse Cascaded Quadratic Compression, Jeffrey A. Moses, John Nees, Bixue Hau, Kyung-Han Hong, Gerard Mourou, Frank W. Wise; 1Cornell Univ., USA, 2Univ. of Michigan, USA. A new type of soliton-effect compression is proposed and demonstrated.

Requiring only a quadratic crystal and high-energy 100-fs source, near-single-cycle durations are predicted, despite significant group-velocity-mismatch. Initial experiments generate 4.5-cycle pulses and bandwidths >500 nm.

Entainment of Pulse Modulation Frequency in Fiber Lasers, Nail Akhmediev, Jose-María Soto-Crespo, Adrian Ankiewicz; 1Australian Natl. Univ., Australia, 2Inst. de Optica, Spain. We demonstrate that the period of soliton pulsations in a fiber laser can be entrained to the round-trip period. This entainment contains elements of chaotic dynamics which is quantified by estimating the Lyapunov exponent.

A Semi-Analytic Theory of the Self-Similar Laser Oscillator, Christian Jirauschek, F. Oemer Ilday, Franz X. Kaertner; MIT, USA. A semi-analytic theory for the similariton laser is developed using the variational approach. A new trial pulse shape, continuously adjustable inbetween pure Gaussian and pure parabolic, is introduced. Excellent agreement with numerical solutions is obtained.

Experimental Observation of Bound Dispersion-Managed Solitons, Martin Stratmann, Fedor M. Mitschke; Univ. of Rostock, Germany. We show numerically and experimentally the existence of bound states of bright and dark temporal solitons. These 'soliton molecules' exist only in dispersion-managed fiber.

Experimental Demonstration of Self-Similar Pulse Compression and Amplification, David Mechin, Sung-Hoon Im, Vladimir Kruglov, John Harvey; Dept. of Physics, Univ. of Auckland, New Zealand. Self-similar propagation of linearly chirped hyperbolic secant pulses in a decreasing dispersion fiber amplifier has been observed experimentally. The scheme takes advantage of an exact solution of the generalized nonlinear Schrödinger equation with distributed coefficients.

Testing and Extrapolating the Nonlinear Robustness of Modulation Formats, Alessandro Tonello, Stefan Wabnitz; Eranor Pincentini; J. Y. Guilloux, A. Bezard, T. Vargas, Juan Diego Ania Castanon, Sergei K. Turitsyn; Lab de Physique de l’Univ de Bourgogne, France, 2France Telecom R&D, France, 1Aston Univ., UK. The comparison of the robustness of modulation formats in fiber transmission systems facing nonlinear impairments and noise is carried out experimentally using a
test link. Special techniques may be necessary when extrapolating by numerical simulations.

WC8 • 3:45 p.m.
Experimental Observation of Incoherent Modulation Instability in Standard Optical Fibers, Alexandre Sauter1, S. Piloi1, G. Millo2, A. Picozzi2; 1Lab de Physique de l’Univ. de Bourgogne, France, 2Lab de Physique de la Matière Condensée, Univ. de Nice Sophia-Antipolis, France. In this work, we demonstrate theoretically and experimentally that a partially temporally incoherent light can exhibit modulational instability when propagating in an optical fiber with instantaneous nonlinear Kerr response.

WD3
From Maxwell’s Equations to Helmholtz Solitons, Pedro Chumorro-Posada1, Graham S. McDonald2; 1Depart. de Teoría de la Señal y Comunicaciones e Ingeniería Telemática, Univ. de Valladolid, Spain, 2Univ. of Salford, UK. We analyse the propagation properties of Helmholtz solitons numerically solving Maxwell’s equations. The results support previous Helmholtz work and permit to extend the analysis to new problems. We report the stability of sub-wavelength TE solitons.

WD4
Spatio-Temporal Reallocation and Evolution Patterns of Interacting Beams in Nonlinear Bi-Dispersive Media, Yannis Kominis1, Panagiotis Papagiannis2, Nikolaos Moshonas1, Sotiris Droulias1, Ilias Tsopelas1, Nikolaos Efremidis1, Kyriakos Hizanidis1,2, Demetrios Christodoulides1,2; 1Natl. Technical Univ. of Athens, Greece, 2School of Optics/CREOL, Univ. of Central Florida, USA. Beam interactions in nonlinear bi-dispersive media are studied and the spatio-temporal reallocation of beams is investigated, in order to transform an initial space separation of beams to a certain time separation.

WD5
The Dynamics of the Optical Parametric Oscillator Near Resonance Detuning, Braxton Osting, Sarah Hewitt, J. Nathan Kutz; Dept. of Applied Mathematics, Univ. of Washington, USA. A quintic, fourth-order evolution equation of the Swift-Hohenberg type is derived for an optical parametric oscillator near the resonance detuning limit which supports the formation of cavity solitons, plane waves, and periodic structures.

WD6
Steering Properties of the Bright Discrete Staggered Solitons in Photovoltaic Photorefractive Media, Aleksandra Malucko1, Ljupco Hadzievski2, Milutin Stepic2, Detlef Kip3; 1Faculty of Sciences and Mathematics, Serbia and Montenegro, 2Institute of Nuclear Sciences, Serbia and Montenegro, 3Inst. of Physics and Physical Technologies, Clausthal Univ. of Technology, Germany. The steering properties of on-site and inter-site stationary discrete bright staggered photovoltaic solitons are interpreted by the Peierls-Nabarro formalism. The free steering of twisted inter-site and on-site modes is absent.

WD7
Screening Solitons in Photorefractive Multiple Quantum Well Planar Waveguide, Andrzej Ziolkowski, Ewa Weinert-Raczk; Szczecin Univ. of Technology, Poland. The possibility of screening solitons generation in semi-insulating multiple quantum well planar waveguide is analysed. An approximate analytical solution is presented and confirmed by a numerical time-dependent solution to complete band transport model.

WD8
Transverse Response of Cavity Systems, Andrew J. Scroggie, Gian-Luca Oppo, John Jeffers, Graeme McCartney; Dept. of Physics, Univ. of Strathclyde, UK. We show that plane-mirror optical cavities (linear and nonlinear) can convert spatially-phase (amplitude) modulated input beams into amplitude (phase) modulated outputs. The effect occurs for only one sign of the effective cavity detuning.

WD9
Chaotic Bound State of Localized Structures in the Complex Ginzburg-Landau Equation, Turaev Dmitry1, Sergey Zelik2, Andrei G. Vladimirov2; 1Ben Gurion Univ., Israel, 2Inst. of Information Transmission Problems, Russian Acad. of Sciences, Russian Federation, 3Weierstrass Inst. for Applied Analysis and Stochastics, Germany. A new type of dynamic stable bound state of dissipative localized structures is found. It is characterized
by chaotic oscillations of distance between the localized structures, their phase difference, and the center of mass velocity.

**WD10**
**Mode Splitting in a Fiber Coupled-Resonator System**, Nick Lepeshkin1, Aaron Schaveinsberg1, George Gehring1, Robert W. Boyd1, David D. Smith2, Q-Han Park3, Deborah J. Jackson4; 1Inst. of Optics, USA, 2Dept. of Physics, Korea Univ., Republic of Korea, 3Quantum Computing Technologies Group, Jet Propulsion Lab, USA. We study mode splitting in a coupled fiber-ring resonator system. Cancellation of absorption on resonance is observed and explained in terms of destructive interference of the symmetric and anti-symmetric modes of the system.

**WD11**
**High Density InAlAs/GaAlAs Quantum Dots as an Efficient Enhanced Kerr Material for Transverse Non-linear Optics in Microcavities**, Jean-Michel Benoit, Aristide Lemaitre, Gilles Patriarche, Karine Meunier, Sylvain Barbay, Robert Kuszelewicz; Lab de Photonique et Nanostructures, France. InAlAs/GaAlAs quantum dots are studied using transmission electron microscopy, photoluminescence. These systems appear as promising materials for laser and non-linear optics in the visible/near infrared range, particularly as a focusing Kerr-like medium for pattern formation.

**WD12**
**Circulating Spatial Solitons**, Eyal Feigenbaum1, Meir Orenstein1, Jacob Scheuer2; 1Technion, Israel, 2Caltech, USA. To drive a spatial soliton into a circular motion, we employed interactions between the soliton and a curved nonlinear interface. The radial forces yielded an orbital soliton, when the interface nonlinearity exceeded a threshold value.

**WD13**
**Hyperbolic Patterns in Nonlinear Resonators**, Kestutis Staliunas1, Mustapha Tlidi2; 1ICREA, Spain, 2Uni. Libre de Bruxelles, Belgium. Nonlinear resonators with diffraction coefficients of opposite signs along two transverse directions support hyperbolic transverse patterns. These novel types of structures are described analytically by normal form analysis, and investigated numerically.

**WD14**
**Optical Pattern and Cavity Solitons in a Microcavity Based on Semiconductor Quantum Dots: Microscopic Model**, Sylvain Barbay1, Robert Kuszelewicz2, Ida Perrini2, Tommaso Maggipinto2, Massimo Brambilla2; 1Lab de Photonique et Nanostructures, France, 2Inst. Nazionale di Fisica della Materia, Italy. We develop an optical spatio-temporal model for quantum dots. Auger interactions are included as well as the inhomogeneous distribution of quantum dot sizes. Both focusing and defocusing nonlinear regimes are highlighted for cavity soliton applications.

**WD15**
**Spatio-Temporal Vortices and Vortex-Solitons**, Anatoly P. Sukhorukov, V. V. Yangirova, IV; Faculty of Physics, Lomonosov Moscow State Univ., Russian Federation. We first investigate spatio-temporal vortices propagating in linear and nonlinear media. Their features are described, and the methods of registration and generation are proposed. We present spatio-temporal vortex-soliton dynamics.

**WD16**
**Modulational Instability in Quadratic Media in a Quasi Self-Imaging Resonator**, Mark Saffman, Oo-Kaw Lim, Brian Boland; Univ. of Wisconsin at Madison, USA. We discuss the threshold for transverse modulational instability in a quasi self-imaging resonator with a quadratic nonlinearity. We show that a large reduction in the threshold can be obtained using a short diffraction length.

**WD17**
**Theoretical and Experimental Temporal Self-Focusing Studies in Photorefractive InP:Fe at Telecommunication Wavelengths**, Naima Khelfaoui1, Delphine Woltersberger1, Godefroy Kugel1, Nicolas Fressengeas1, Mathieu Chauvet1; 1LMOPS (Supelec), France, 2FEMTO-ST, France. We propose a theoretical and experimental analysis of the temporal self focusing phenomena in InP:Fe semiconductor for low irradiations of continuous laser beams at infrared wavelengths for optical telecommunication applications.

**WD18**
**Escape Angles for Out-of-Phase Nematicons**, Per Dalgaard Rasmussen1, Ole Bang1, Wieslaw Krolikowski2; 1Res. Ctr. COM, Technical Univ. of Denmark, Denmark, 2Laser Physics Ctr., Australian Natl. Univ., Australia. We study interaction between out-of-phase nematicons and predict analytically the critical degree of nonlocality that provides enough attraction for them to attract and collide. The results are verified by numerical simulations.

**WD19**
**Circular-Flow Modes in Nonlinear Multicore Couplers Equipped with Long-Period Gratings**, Noriaki Tsukada, Kensuke Fukushima; Hiroshima Inst. of Technology, Japan. We have numerically investigated spatiotemporal behaviors of circular flow modes induced in nonlinear fiber couplers that consist of phase-shifted N identical long-period fiber gratings by use of the discrete nonlinear Schrodinger equation.

**WD20**
**Discrete Solitary Waves in Nonlinear Nonlocal Media**, Andrea Fratalocchi, Gaetano Assanto; NooEL-Nonlinear Optics and OptoElectronics Lab, Italian Inst. for the Physics of Matter, Italy. We develop a theory of discrete spatial solitons in media with an arbitrary degree of nonlinear nonlocality and discuss the existence of a novel family of discrete localized waves.
WD21
Discrete Light Propagation and Nonlinear Interactions in Self-Defocusing Liquid Crystalline Waveguides, Andrea Fratalocchi1, Gaetano Assanto1, Kasia Brzdaśkiewicz2, Miroslaw Karpierz2; 1NooEL-Nonlinear Optics and Optoelectronics Lab, Italian Inst. for the Physics of Matter, Italy, 2Faculty of Physics, Warsaw Univ. of Technology, Poland. We investigate discrete light propagation and nonlinear interactions in a voltage-controlled array of channel waveguides in undoped nematic liquid crystals, exploiting their self-defocusing response.

WD22
Stabilization of Light Bullets in a Kerr Medium with Dispersion Management, Marek Trippenbach1, Michał Matuszewski1, Eryk Infeld1, Boris A. Malomed1; 1Univ. of Vermont, USA, 2San Francisco State Univ., USA. We demonstrate a possibility to stabilize spatiotemporal solitons in self focusing Kerr media by means of dispersion management in the longitudinal direction with the group velocity dispersion alternating between positive and negative values.

WD23
Pulse Compression Using Nonlinear Waveguide Arrays, Sotirios Droulias1, Ilias Tsopelas1, Nikolaos Moshonas1, Panagiotis Papagiannis1, Yannis Kominis1, Nikolaos Efremidis2, Kyriakos Hizanidis1, Joachim Meier3, Demetrios N. Christodoulides1; 1School of Electrical and Computer Engineering, Natl. Technical Univ. of Athens, Greece, 2College of Optics and Photonics, CREOL & FPCE, Univ. of Central Florida, USA. We demonstrate that high fidelity compression is possible when normally dispersive waveguide arrays are used together with gratings or other programmable phase filters. The performance of this scheme is assessed in AlGaAs array systems.

WD24
Defect Modes in One-Dimensional Optically-Induced Photonic Lattices, Francesco Fedele1, Jianke Yang1, Igor Makasyuk1, Zhigang Chen2; 1Univ. of Vermont, USA, 2San Francisco State Univ., USA. Defect modes in one-dimensional optically-induced photonic lattices are theoretically predicted and experimentally observed. Such defect modes are analogous to guided light in an air-hole in photonic crystal fibers.

WD25
Polychromatic Multigap Solitons in Nonlinear Photonic Lattices, Kristian Motzok1, Andréy A. Sukhorukov1, Yuri S. Kivshar1, Friedemann Kaiser1; 1Australian Natl. Univ., Australia, 2Technische Univ. Darmstadt, Germany. We predict simultaneous self-trapping of multiple frequency beams in spectral gaps of periodic lattices, and demonstrate strong sensitivity of localization and mobility of such polychromatic multigap solitons on their spectra due to lattice-enhanced dispersion.

WD26
Dissipative Solitons in Multi-Domain Semiconductor Laser Waveguides with Local Gain and Fast-Relaxing Absorption, Alexandre S. Shcherbakov, Mauro Sanchez Sanchez; Natl. Inst. for Astrophysics, Optics & Electronics, Mexico. We recognize steady states for dissipative solitons in multi-domain semiconductor laser waveguides shaped via resculpturing external optical pulses. Both dark and bright solitons are supported by waveguides with quasi-linear local gain and fast-relaxing saturable absorption.

WD27
Optically Induced Sculpturing of Three-Wave Coupled States in a Two-Mode Waveguide with a Square-Law Nonlinearity, Alexandre S. Shcherbakov1, Arturo Aguirre Lopez2; 1Natl. Inst. for Astrophysics, Optics & Electronics, Mexico, 2Mixteca Univ. of Technology, Mexico. Multi-pulse three-wave weakly-coupled states are shaped under action of a pulsed optical pump in a two-mode nonlinear waveguide. Analysis of the intensity and frequency distributions in their optical components and the experimental studies are presented.

WD28
Revealing Multi-Pulse Four-Wave Bragg Spatial Solitons Inperiodic Square-Law Nonlinear Crystal with Direct Transitions, Alexandre S. Shcherbakov1, Arturo Aguirre Lopez2; 1Natl. Inst. for Astrophysics, Optics & Electronics, Mexico, 2Mixteca Univ. of Technology, Mexico. Multi-pulse four-wave Bragg spatial solitons, originating with a two-phonon non-collinear light scattering, are uncovered in periodic crystals providing direct transitions between all light modes. Spatio-frequency distributions of their optical components are estimated and observed experimentally.

WD29
Subdiffractive Solitons in Bose-Einstein Condensates, Kestutis Staliunas1, Ramon Herrero2, German De Valcarcel3; 1ICREA, Spain, 2UPC, Spain, 3Univ. of Valencia, Spain. We predict the disappearance of diffraction (the increase of the mass) of Bose-Einstein condensates in counter-moving periodic potentials. We demonstrate subdiffractive solitons (stable droplets of the condensate) in the vicinity of this zero diffraction point.

WD30
Discrete Interband Mutual Focusing in Nonlinear Photonic Lattices, Christian R. Rosberg, Brendan Hanna, Dragomir N. Neshev, Andrey A. Sukhorukov, Wieslaw Krolikowski, Yuri S. Kivshar; Australian Natl. Univ., Australia. We study nonlinear coupling of mutually incoherent waves in a one-dimensional photonic lattice. We demonstrate experimentally mutual focusing and defocusing of beams associated with different Floquet-Bloch waves of the transmission spectrum.

WD31
Gap Random-Phase Lattice Solitons, Robert Pezer1, Hrvoje Buljan1, Jason Wolf Fleischer1, Guy Bartal1, Oren Cohen1, Morddelchi Segev2; 1Dept. of Physics, Univ. of Zagreb, Croatia, 2Electrical Engineering Dep., USA, 3Physics Dept. and Solid State Inst., Israel. We theoretically study the intensity structure, coherence properties, Floquet-Bloch and Fourier power spectra of gap random-phase lattice solitons in nonlinear photonic lattices with self-defocusing nonlinearity.
Steering Properties of Bright Discrete Staggered Solitons in Photovoltaic Photorefractive Media, Aleksandra Maluckov, Ljupco Hadzieszki, Milutin Stepic, Detlef Kip; Faculty of Sciences and Mathematics, Serbia and Montenegro, Vinca Inst. of Nuclear Sciences, Serbia and Montenegro, Clausthal Univ. of Technology, Germany. The steering properties of different types of discrete staggered solitons in self-defocusing photovoltaic photorefractive media are investigated and the exchange between trapping and steering of these modes is interpreted by the Peierls-Nabarro formalism.

Femtosecond Laser Writing of Surface Microstructures in Lithium Niobate, Daniela Grando, J. Yu, D. Ballarini, P. Galinetto; Univ. di Pavia, Italy. Femtosecond pulses from an amplified Ti:Sapphire laser were found to be a surgically precise manufacturing tool for the formation of microstructures in Lithium Niobate crystals. Surface gratings were formed with 10% first order diffraction efficiency.

Gap Soliton Internal Modes Beating and Optical Zoomeron, Boris Mantsyzov; Dept. of Physics, M. V. Lomonosov Moscow State Univ., Russian Federation. It is shown that a beating of internal modes of perturbed gap soliton of self-induced transparency causes energy exchange between linear modes and soliton. As a result, slow gap soliton demonstrates zoomeron-like oscillating dynamics.

Analytical Solution for Gap Soliton of Self-Induced Transparency in Structure with Cosine-Modulated Density of Resonant Atoms, Boris Mantsev, Evgeny V. Petrov; Physics Dept., M. V. Lomonosov Moscow State Univ., Russian Federation. We show analytically that a gap soliton of self-induced transparency can arise in cosine-modulated resonant structures, which are formed using holographic polymerization technique. The features of the solitons and their interactions are discussed.

Diffraction Management and Formation of Gap Solitons in Lithium Niobate Waveguide Arrays, Milutin Stepin, Feng Cht, Christian Rueter, Daniel Runde, Detlef Kip, Vladimir Shandarov, Ofer Manela, Mordechai Segev; Inst. of Physics and Physical Technologies, Clausthal Univ. of Technology, Germany, State Univ. of Control Systems and Radioelectronics, Russian Federation. We report on light propagation in one-dimensional photorefractive waveguide arrays in LiNbO3 exhibiting a saturable defocusing nonlinearity. Low-intensity discrete diffraction and high-intensity formation of gap solitons arising from the first band are demonstrated.

Gap Solitons in Photonic Crystal with Quadratic Nonlinearity and Diffraction, Maria V. Komissarova, Irina Yu. Polyakova, Anatoly P. Sukhorukov, Irina G. Zakharova; Faculty of Physics, Moscow State Univ., Russian Federation. Gap solitons excited by spatially limited wave beams in photonic crystals are studied numerically. In the cascade limit destructive diffraction influence is shown for zero-velocity solitons. Solitons with nonzero velocity are quasi-stable provided certain conditions.

Gap Soliton Gating, Dissociation, and Retrieval via Defect Mode Excitation in a Resonant Photonic Crystal, Igor V. Melnikov, J. S. Aitchison; Comtex Consulting Inc., Canada, A. M. Prokhorov General Physics Inst. RAS, Russian Federation, Dept. Electrical and Computer Engineering, Univ. of Toronto, Canada. The long-range interaction of gap solitons in a resonant photonic crystal is mediated by a defect that is shown to provide a selective reversible tool for optical storage/processing.

Experimental Observation of Discrete Modulation Instability in 1-D Nonlinear Waveguide Arrays, Mathieu Chvet, Guoyuan Fu, Gregory J. Salamo, Jason W. Fleischer, Mordechai Segev; Univ. of Arkansas, USA, Princeton Univ., USA, Physics Dept. and Solid State Inst., Technion, Israel. We report on the study of discrete modulation instability in a 1-D photonic lattice waveguide. Experimental results obtained both at the base and at the edge of the first Brillouin zone compare favorably with theory.

6:00 p.m.–8:00 p.m.
Conference Reception

Thursday, 8 September 2005
ThA2 • 8:45 a.m.
Near-Field Imaging of Short Pulse Dynamics in Nonlinear Planar Silica Waveguides, Yoav Linzon1, I. Ibsan1, D. Cheskis1, S. Bar-Ad2, R. Morandotti2, J. S. Aitchison3; 1School of Physics and Astronomy, Tel Aviv Univ., Israel, 2Univ. du Québec, Israel, 3Univ. of Toronto, Israel. Imaging by a simplified near-field scanning optical microscope and numerical simulations reveal the complex spatiotemporal and spectral dynamics during propagation of 60-fs pulses in nonlinear planar silica waveguides, in the anomalous dispersion regime.

ThA3 • 9:00 a.m.
Measurements of Large and Broadband Raman Gain Coefficients for a Number of Glass Families, Robert Stegeman1, Clara Rivero1, Kathleen Richardson1, Peter Delfs2, George Stegeman1, Thierry Cardinal1, Michel Couzi2, Philippe Thomas4, Jean-Claude Champarnaud-Mesjard4; 1Univ. of Central Florida, USA, 2Inst. de Chimie de la Matière Condensée de Bordeaux, France, 3Lab de Physico-Chimie Moleculaire, Univ. of Bordeaux 1, France, 4Science des Procédés Céramiques et Traitements de Surfaces, Faculté des Sciences et Techniques, France. Raman Gain coefficients have been measured for several different compositions of a variety of glass families in bulk samples. Coefficients up to 80 times and bandwidths three times that of fused silica will be reported.

ThA4 • 9:15 a.m.
Cutoff and Leakage Properties of Bi-Soliton and Its Existing Parameter Range, Yoshifumi Asao, Akihiro Maruta; Graduate School of Engineering, Japan. We study the cutoff and leakage properties of bi-soliton, which is a periodically stationary pair of adjacent pulses, and show then these properties limit its existent parameter range.

ThA5 • 9:30 a.m.
Bloch-Oscillations in Frequency Space, Ulf Peschel, Thomas Pertsch, Falk Lederer; Friedrich-Schiller-Univ. Jena, Germany. We show that based on the concept of Bloch-oscillations distortion free signal transfer between different frequency channels and spectral demultiplexing can be realized in a single mode fiber.

ThA6 • 9:45 a.m.
Instabilities of Four-Wave Mixing, S. Valentinii, G. Bellanca1, Stefano Trillo1, G. Millot1; 1Fondazione Ugo Bordoni, Italy, 2Univ. de Bourgogne, France. We predict that four-wave mixing driven by a dual frequency input undergoes different instability scenarios encompassing modulational instability or multiple shock formation in the anomalous and normal dispersion regime, respectively.

ThB1
Theoretical Description of a Self-Phase Modulation Based All-Optical Pulse Regenerator, Pontus Johansson1, Magnus Karlsson2; 1Dept. of Radio and Space Science, Chalmers Univ. of Technology, Sweden, 2Dept. of Microtechnology and Nanoscience, Photonics Lab, Chalmers Univ. of Technology, Sweden. A self-phase modulation based all-optical pulse regeneration system of the Mamshev type is investigated. Design guidelines are given and system trade-offs are described.

ThB2
Polarization-Mode Dispersion in Dispersion-Managed Soliton Transmission - Impact of Sectional Power Management, Satoshi Kawashima1, Kentarou Ishii1, Yutaka Fukushi1, Joji Maeda1; 1Dept. of Electrical Engineering, Faculty of Science and Technology, Tokyo Univ. of Science, Japan, 2Dept. of Electrical Engineering, Faculty of Engineering, Tokyo Univ. of Science, Japan. We numerically show that transmission power management in optical fiber links will effectively reduce PMD-induced pulse broadening in dispersion-managed soliton transmission.

ThB3
Theory of Multi-Frequency Mode-Locked Lasers, Edward Farnum, J. Nathan Kutz; Dept. of Applied Mathematics, Univ. of Washington, USA. A theoretical model based upon the master mode-locking equation is constructed to describe multi-frequency, pulsed mode-locking. The model results in mode-locking dynamics qualitatively observed in experimental multi-frequency laser operation.

ThB4
Semi-Analytical Q Parameter Estimate in Linear and Nonlinear Transmission Systems, Marc A. Eberhard, Keith J. Blow; Aston Univ., UK. We compare the Q parameter obtained from the semi-analytical model with scalar and vector models for two realistic transmission systems. First a linear system with a compensated dispersion map and second a soliton transmission system.

ThB5
Stimulated Emission of Linear Waves from Optical Solitons: Analytical Approach, Dmitry Skryabin, Alex Yulin; Univ. of Bath, UK. We present theory of emission of new spectral components by optical solitons probed by a dispersive wave. Our theory includes scalar and vector cases and allows explicit calculation of the amplitudes of the generated waves.

ThB6
Resonant π and 2π Solitons in Gas-Filled Hollow-Core PCFs, Fabio Bialcatalana1, Dmitry V. Skryabin2, Joep W. M. van Hulst, Keith J. Blow3; 1Tyndall Natl. Inst., 2Univ. of Bath, UK. A feasibility study of excitation of Raman Pi and 2Pi solitons in gas-filled hollow-core PCFs is given. We give realistic estimates for soliton durations and powers and investigate the role played by GVD and dephasing.
Effect of Distributed Loss of Waveguide on Amplitude Squeezing in the Second-Harmonic Generation, Joji Maeda, Yutaka Fukuchi; Tokyo Univ. of Science, Japan. Squeezing in the second-harmonic generation in dissipative waveguides is numerically studied. The effect of distributed loss on squeezing degradation is shown much smaller than that of the same amount of lumped loss at the output.
Rapoport, Larry Velasco; 1Univ. of Salford, UK, 2Natl. Taras Shevchenko Univ., Ukraine. Guided wave propagation in nonlinear layered gyrotropic media with embedded negatively refracting metamaterials is investigated. A general approach is taken that emphasizes gyroelectric and gyromagnetic materials nonreciprocal dispersion and an FDTD study of mode launching.

ThB20
Joined Resonances of Matter-Wave Solitons in Harmonic Traps, Bakhtiyor Baizakov; Dept. of Physics, Univ. of Salerno, Italy. Simultaneous resonances in oscillations of the center-of-mass position and width of matter-wave solitons, induced by periodic modulation of the strength of the harmonic trap are studied. Corresponding domains in the system’s parameter space are identified.

ThB21
Dynamical Stabilization of Matter-Wave Solitons in Bose-Einstein Condensates with Two and Three-Body Interactions, Fatkhulla Abdullaev; Physical-Technical Inst. of the Uzbek Acad. of Sciences, Uzbekistan. The existence of localized states in the Bose-Einstein condensate with two and three-body interactions in presence of nonlinearity management is shown. This result also obtained from Gross-Pitaevskii equation averaged over rapid modulations.

ThB22
Optical Image and Data Processing with Cavity Type-II Second Harmonic Generation, Adrian Jacobo, Pere Colet; Inst. Mediterraneo de Estudios Avanzados (IMEDEA) (CSIC-UIB), Spain. We study the possibilities of all-optical image and data processing using intracavity type II second-harmonic generation. We show AND and XOR operations when using two images. The use of cavities with spherical mirrors is discussed.

ThB23
Modeling Q-Switching in Actively Mode-Locked Lasers, Joshua Proctor, J. Nathan Kutz; Dept. of Applied Mathematics, Univ. of Washington, USA. We characterize the Q-switching behavior in an active mode-locked cavity as the nonlinear beating interaction of two unstable modes. The nonlinear beating generates a modulated pulse-train which is verified with numerical simulations.

ThB24
Spatial Solitons in an Optically Pumped Semiconductor Resonator, Yeregniya Larionova, Carl Otto Weiss; Physikalisch-Technische Bundesanstalt, Germany. Spatial solitons and structures in quantum well semiconductor microcavities are investigated with optical pumping. Dramatic reduction of light intensities supporting dark and bright solitons are found. Change of the nonlinearity sign at transparency is apparent.

ThB25
Dark Spatial Solitons in Semiconductor Microcavities, Yeregniya Larionova, Oleg Egorov, Carl Otto Weiss; Physikalisch-Technische Bundesanstalt, Germany, Inst. für Festkörpertheorie und Theoretische Optik, Friedrich-Schiller Univ., Germany. Properties of dark spatial solitons observed in reflection in a passive quantum well semiconductor resonator and comparison of theoretical calculations with experimental observations are discussed.

ThB26
Cavity Solitons in a VCSEL with Saturable Absorber, Giovanna Tissoni, Morten Bache, Franco Prati, Reza Kheradmand, Luigi A. Lugiato, Igor Protensko, Massimo Brambilla; 1INFM, Dipt. di Fisica e Matematica, Univ. dell’Insubria, Italy, 2Ctr. for Applied Physics and Astronomical Res., Univ. of Tabriz, Iran (Islamic Republic of), Lebedeo Physik Inst., Russian Scientific Ctr. of Applied Res., Russian Federation, 4INFM, Dipt. di Fisica Interateneo, Univ. e Politecnico di Bari, Italy. We predict the existence and control of cavity solitons in a VCSEL with saturable absorber. The absence of a holding beam implies that the background is the zero intensity field, originating a Cavity Soliton Laser.

ThB27
Cavity Solitons and Patterns in an Optically Pumped Semiconductor Amplifier with Coherent Injection, Sylvain Barbay, Yves Méneguet, Isabelle Sagnes, Robert Kuszelewicz; Lab de Photonique et de Nanostructures, France. We show the spontaneous formation of cavity solitons in a 120 microns diameter, specially designed and very uniform optically pumped semiconductor microcavity as well as patterns with local hexagonal symmetry.

ThB28
Transverse Solitons on a Dynamical Spiral Background, Florian Huneus, Elmar Schoebel, Thorsten Ackemann, Wolfram Lange; Univ. of Münster, Germany. We investigate the properties and the region of existence of high-amplitude dissipative solitons on a low-amplitude dynamical spiral background. The experimental system is a single-mirror scheme with sodium vapor as the nonlinear medium.

ThB29
Absolute Instability and Pattern Formation in Cold Atomic Vapors, Georg A. Muradyan, Yingxue Wang, William Williams, Mark Saffman; 1Yerevan State Univ., Armenia, 2Univ. of Wisconsin, USA. We calculate the threshold for transverse instability of counterpropagating beams in a cold atomic vapor. Redistribution of the atomic density lowers the threshold for instability for self-focusing, and raises it for self-defocusing.

ThB30
Polarization Properties and Length Scales of Patterns in Vertical-Cavity Surface-Emitting Lasers, Malte Schulz-Ruhtenberg, Thorsten Ackemann, Igor V. Babushkin, Natalia A. Loiko, Kai-Feng Huang; 1Inst. of Applied Physics, Univ. of Münster, Germany, 2Dept. of Physics, Univ. of Strathclyde, UK, 3Inst. of Physics, Acad. of Sciences of Belarus, Belarus, 4Dept. of Electrophysics, Natl. Chiao Tung Univ., Taiwan Republic of China.
We report on experimental investigations of the emission of vertical-cavity surface-emitting lasers with a large square aperture. Spatial-resolved polarization and length scales of transverse patterns are examined.

**ThB31**

**Quantum Fluctuations in Cavity Solitons**, Isabel Perez-Arjona1, German J. de Valcarcel2, Eugenio Roldan2; 1Univ. Politecnica de Valencia, Spain, 2Univ. de Valencia, Spain. Quantum fluctuations of degenerate optical parametric oscillators’ cavity solitons (CS) are studied. We show that CSs are sources of perfectly squeezed light that exhibit photon fluctuations below the shot-noise level as well.

2:00 p.m.–4:00 p.m.
Lunch Break

**ThC1 • Nonlinear Optics in 2D Periodic Structures**

2:00 p.m. ► Invited ◄

**Photonic Crystal Fibers for Nonlinear Fiber Optics**, Jonathan Knight, Feng Luan, Cristiano Cordeiro, Nicolas Joly, Philip St. John Russell; Univ. of Bath, UK. Photonic crystal fibers are formed from two-dimensionally patterned glass, which can trap light in a single guided mode in a specially-designed core. Their unusual properties make them a rich source of nonlinear optical effects.

2:30 p.m.

**Enhanced Nonlinear Beam Steering Near Band-Edges of Waveguide Arrays**, Yoav Lahini, Daniel Mandelik, Asaf Avidan, Yaron Silberberg; Weizmann Inst. of Science, Israel. We investigate experimentally nonlinear dynamics of light beams coupled near band edges of waveguide arrays. In this regime nonlinearity results in strong beam shifts, due to the high curvature of the diffraction curves.

2:45 p.m.

**Spectral Signatures of Soliton Collisions in Photonic Crystal Fibers**, Dmitry Skryabin, F. Luan, J. Knight, A. Yulin; Univ. of Bath, UK. Collisions of femtosecond solitons in photonic crystal fibers are investigated experimentally and numerically. Clear spectral signatures of the power exchange between the interacting pulses and of the resonant radiation resulting from the collision are reported.

3:00 p.m.

**Nonlinear Tamm States in Waveguide Lattices**, Sergiy Sutulov1, Konstantinos Makris1, Demetri Christodoulides1, George Stegeman1, Alain Hache2, Roberto Morandotti1, H. Yang1, Greg Salamo1, M. Soel2; 1Univ. of Central Florida, USA, 2Univ. of Moncton, Canada, 3Univ. du Quebec, Canada, 4Univ. of Arkansas, USA, 5Univ. of Glasgow, UK. We report the first experimental observation of nonlinear Tamm states in waveguide arrays. These self-trapped waves are located at the edge of an array and can only exist above a certain power threshold.

3:15 p.m.

**ThC5 • Tunable Refraction in Nonlinear Optically-Induced Photonic Lattices**, Christian R. Rosberg, Dragomir N. Neshev, Andrey A. Sukhorukov, Wieslaw Krolikowski, Yuri S. Kivshar; Australian Natl. Univ., Australia. We demonstrate tunable positive and negative refraction of Bloch waves in optically-induced photonic lattices. At high laser intensities, the beam broadening due to diffraction can be suppressed through nonlinear self-focusing while preserving the steering properties.

3:30 p.m.

**Observation of 2nd Band Vortex-Ring Soliton in 2-D Photonic Lattices**, Guy Bartal1, Ofer Manela1, Oren Cohen1, Jason W. Fleischer2, Mordechai Segev1; 1Technion, Israel Inst. of Technology, Israel, 2Princeton Univ., USA. We present the first observation of second-band vortex-ring solitons in 2-D photonic lattices, along with a theoretical study of their stability. This constitutes the first observation of a 2-D higher-band lattice soliton.

3:45 p.m.

**Reduced-Symmetry Two-Dimensional Solitons in Square Photonic Lattices**, Denis Traeger1, Robert Fischer2, Dragomir N. Neshev2, Andrey A. Sukhorukov2, Cornelina Derz1, Yuri S. Kivshar2, Wieslaw Krolikowski2; 1Westfalisches Wilhelms-Univ., Germany, 2Australian Natl. Univ., Australia, 3Laser Physics Ctr., CUDOS, Australia Natl. Univ., Australia. We describe soliton localization through combined effects of total internal and Bragg reflection along the principal directions of a square lattice, and study generation of these reduced-symmetry states experimentally through quasi-collapse of phase-engineered elliptic beams.

4:00 p.m.–4:30 p.m.
Coffee Break

**ThD1 • Optical Bloch Oscillations and Zener Tunneling in Two-Dimensional Photonic Lattices**, Henrike Trompeter1,2, Wieslaw Krolikowski2, Dragomir N. Neshev1, Anton S. Despatnikov3, Andrey A. Sukhorukov4, Yuri S. Kivshar5, Thomas Pertsch1, Ulf Peschel1, Falk Lederer1; 1Inst. of Condensed Matter Theory and Solid State Optics, Friedrich-Schiller Univ. Jena, Germany, 2Laser Physics Ctr. and CUDOS, Res. School of Physical Sciences and Engineering, Australian Natl. Univ., Australia, 3Nonlinear Physics Ctr. and CUDOS, Res. School of Physical Sciences and Engineering, Australian Natl. Univ., Australia. We study Bloch oscillations and Zener tunneling in a two-dimensional optically-induced
lattice with superimposed gradient of the refractive index. We observe simultaneous tunneling into three different points of the lattice bandgap spectrum.

**ThD2 • 4:45 p.m.**
Modulational Instability in an Optical Ring Cavity Filled with Right-Handed and Left-Handed Materials, Pascal Kockaert1, Philippe Tassin1, Guy Van der Sande2, Irina Veretennicoff3, Mustapha Tlidi2; 1Univ. Libre de Bruxelles, Belgium, 2Vrije Univ. Brussel, Belgium, 3Univ. of Central Florida, USA, 3Univ. La Sapienza and INFM, Italy.

We present the first observation of long-range interactions between solitons. Two beams launched in parallel, initially separated by 330µm, self-trap and attract one another, reducing their separation to 190µm over a propagation distance of 50mm.

**ThD3 • 5:00 p.m.**
Long-Range Interactions between Solitons in Nonlocal Nonlinear Media, Barak Alfassi1, Carmel Rotschild1, Oren Cohen1, Mordechai Segev1, Demetrios N. Christodoulides2; 1Technion Israel, Israel, 2School of Optics/CREOL, USA.

We present the equations of propagation in a Kerr nonlinear left-handed metamaterial and show that a cavity filled with right-handed and left-handed materials exhibits bistable behavior and spatial modulational instability.

**ThD4 • 5:15 p.m.**
Optical Quasi Crystals — Properties and Dynamics, Barak Freedman1, Guy Bartal1, Mordechai Segev1, Demetrios N. Christodoulides2, Jason W. Fleischer3; 1Technion, Israel, 2CREOL, Univ. of Central Florida, USA, 3Princeton Univ., USA.

We present the first observation of wave dynamics in 2-D Penrose-Tile quasi-periodic optical lattices, including experiments on linear “discrete” diffraction from various lattice sites, nonlinear (self-focusing) localization, and experiments on nonlinearly interacting quasi-periodic lattices.

**ThD5 • 5:30 p.m.**
Soliton Control in Modulated Optically-Induced Photonic Lattices, Ivan L. Garanovich, Andrey A. Sukhorukov, Yuri S. Kivshar; Nonlinear Physics Ctr. and CUDOS, Res. School of Physical Sciences and Engineering, Australian Natl. Univ., Australia.

We demonstrate that modulated lattices created by three interfering beams may allow for effective all-optical steering of spatial optical solitons, and also discuss novel effects such as soliton explosions due to resonant inter-band wave mixing.

**ThD6 • 5:45 p.m.**
Reversible Motion of Cavity Solitons on Modulated Backgrounds, Andrew J. Scroggie, Gian-Luca Oppo, John Jeffers, Graeme J. McCartney; Dept. of Physics, Univ. of Strathclyde, UK.

Cavity solitons can move up or down phase gradients, or even remain motionless regardless of background modulations. Abrupt changes in their direction of motion and final destination occur on increasing the background modulation wavenumber.

**ThD7 • 6:00 p.m.**
Information Transfer through Photorefractive Spatial Solitons in the Telecommunication Wavelength Range, Markus Tiemann, R. Sisodia, V. Petrov, J. Petter, T. Tschudi; TU Darmstadt, Germany.

Photorefractive spatial solitons are attractive elements as interconnectors for all-optical devices. According to our knowledge, we demonstrated for the first time the ability to transmit information through a soliton with the speed of 88.44 Tbits/s.

**ThD8 • 6:15 p.m.**
Soliton Transport in Quasi-Periodic Lattices, Andrey A. Sukhorukov; Australian Natl. Univ., Australia.

We demonstrate that nonlinear wave transport in quasi-periodic super-lattices, which profiles are described by multiple spatial frequencies, can be dramatically enhanced if mixed-frequency resonances are suppressed through aperiodic modulations defined by a simple analytical expression.
FA3 • 9:00 a.m.
Observation of a Discrete Family of Dissipative Solitons in the Presence of a Symmetry-Breaking Bifurcation, Matthias Pesch, Jens-Uwe Schurk, Thorsten Ackemann, Wulfhard Lange; Inst. für Angewandte Physik, Germany. The experimental observation of a discrete family of vector dissipative solitons in a single-mirror scheme based on sodium vapor is reported. Simulations provide further insight into the mechanisms leading to soliton formation.

FA4 • 9:15 a.m.
Experimental Observation of the Elliptically Polarized Fundamental Vector Soliton of Isotropic Kerr Media, Michaël Delqué1, Hervé Maillotte1, Thibault Sylvestre2, Cyril Cambournac2, Pascal Kockert3, Marc Hadjieber4; 1Dépt. d’Optique P. M. Duffieux, Inst. FEMTO-ST, France, 2Service d’Optique et d’Acoustique, Univ. Libre de Bruxelles, Belgium. We report the experimental observation of the elliptically polarized fundamental vector soliton of isotropic Kerr media and its unique polarization evolution. This was achieved in the spatial domain in a non birefringent CS2 planar waveguide.

FA5 • 9:30 a.m.
Nonlinear Waveguide Arrays by Femtosecond Laser Writing in Fused Silica, Alexander Szameit1, Dominik Blomer1, Jonas Burghoff1, Thomas Pertsch1, Stefan Nolte1, Andreas Tünnermann1, Ulf Peschel1, Falk Lederer1; 1Inst. für Angewandte Physik, Germany, 2Friedrich-Schiller-Univ., Germany. We report on the progress of optical waveguide arrays in fused silica produced by femtosecond laser writing with increased efficiency. We demonstrate discrete soliton formation in one-dimensional arrays and discrete diffraction in two-dimensional hexagonal lattices.

FA6 • 9:45 a.m.
Spatio-Temporal Dynamics of Ultrashort Laser Pulses in Materials with Anomalous Dispersion, Stefan Skupin1, Falk Lederer1, Luc Bergé1; 1IFTO, Germany, 2Dépt. de Physique Théorique et Appliquée, CEA/DAM Ile de France, France. The nonlinear dynamics of femtosecond optical pulses propagating in solid media with anomalous group-velocity dispersion (GVD) is investigated. 3-D collapsing pulses are shown to propagate by emitting quasi-periodically bursts of temporally-compressed light bullets.

10:00 a.m.–10:30 a.m.
Coffee Break

FB • Solitons and New Nonlinear Structures

Festsaal
10:30 a.m.–12:30 p.m.
FB • Solitons and New Nonlinear Structures
Pere Colet, IMDEA, Spain, Presider
demonstrate a much higher level of complexity than previously reported, and discuss the properties of asymmetric clusters of solitons.

**FB8 • 12:15 p.m.**  
*Excitability Mediated by Localized Structures*, Gomila Damia1, Manuel A. Matias2, Pere Colet2; 1Dept. of Physics, Univ. of Strathclyde, UK, 2IMEDEA (CSIC-UIB), Spain. We characterize a scenario where localized structures in nonlinear optical cavities display an oscillatory behavior which becomes unstable leading to an excitable regime. Excitability emerges from spatial dependence since the system locally is not excitable.

**Festsaal**  
12:30 p.m.–2:00 p.m.  
*Lunch Break*

**FC • Nonlinear Effects**

**FC1 • 2:00 p.m.**  
*Invited*  
*Nonlinear Light Propagation in Air*, Arnaud Couairon; Ctr. Natl. de Recherche Scientifique, France. Numerical simulations predict that femtosecond filamentation in low pressure gases efficiently generates single cycle pulses with 100 µJ energy. The coalescence of multiple filaments in suitable pressure gradients provides a scheme to increase this energy.

**FC2 • 2:30 p.m.**  
*Solitons in Nonlinear Media with Infinite Range of Nonlocality: First Observation of Coherent Elliptic Solitons and Bright Vortex-Ring Solitons*, Carmel Rotschild1, Ofer Manela1, Oren Cohen1, Tal Carmon2; 1Technion ISRAEL, Israel, 2Caltech, USA. We study solitons in highly-nonlocal nonlinear media for which far-away boundary conditions remotely control the evolution of the localized beam, and present the first experimental observation of coherent elliptic solitons and of vortex-ring solitons.

**FC3 • 2:45 p.m.**  
*Observation of Attraction Forces between Dark Solitons*, Alexander Dreischuh1,2, Dragomir N. Neshev1, Dan E. Petersen1, Ole Bang1, Wieslaw Krolikowski1; 1Dept. of Quantum Electronics, Bulgaria, 2Australian Natl. Univ., Australia. We address properties and enriched set of manipulations with solitons accessible in optical lattices that belong to different topological classes than periodic lattices. The particular examples of Bessel lattices and lattices with dislocations are considered.

**FC4 • 3:00 p.m.**  
*Observation of New Singular Solutions of the Nonlinear Schrödinger Equation*, Taylor D. Grou1, Alexander L. Gaeta1, Gadi Fibich1; 1Cornell Univ., USA, 2Tel Aviv Univ., Israel. We investigate theoretically and experimentally the collapse dynamics of non-Gaussian beams. Surprisingly, we find that the spatial profile evolves to a ring rather than to the Townes profile as the beam collapses.

**FC5 • 3:15 p.m.**  
*UV-Supercontinuum Generation and Femtosecond Filamentation in Air*, Stefan Skupin1, Falk Lederer1, Luc Bergê2, Guillaume Méjean3, Jérôme Kasparian3, Jin Yu4, Steffen Frey5, Estelle Salmon5, Roland Ackermann6, Jean-Pierre Wolf5; 1IFTO, Germany, 2Département de Physique Théorique et Appliquée, CEA/DAM l’Ile de France, France, 3Lab de Spectrométrie Ionique et Moléculaire, Univ. Claude Bernard, France. We report experimental and numerical results on supercontinuum generation at ultraviolet/visible wavelengths produced by the long-range propagation of infrared femtosecond laser pulses in air.

**FC6 • 3:30 p.m.**  
*Observation of Random Phase Gap Solitons in 2-D Photonic Lattices*, Guy Bartal1, Hrvoje Buljan2, Oren Cohen1, Jason Fleischer3, Mordechai Segev3; 1Technion, Israel Inst. of Technology, Israel, 2Univ. of Zagreb, Croatia, 3Princeton Univ., USA. We report the first experimental observation of gap random-phase lattice solitons. We observe their self-trapping conformed to the lattice periodicity in real space, as well as their multi-humped power spectrum in k-space.

**FC7 • 3:45 p.m.**  
*New Topologies for Solitons in Optical Lattices*, Yaroslav V. Kartashov, Lluis Torner; ICFO-Inst. de Ciencies Fotoniques, Spain. We address properties and enriched set of manipulations with solitons accessible in optical lattices that belong to different topological classes than periodic lattices. The particular examples of Bessel lattices and lattices with dislocations are considered.
-A-
Abdullaev, Fatkhulla – ThB21
Aceves, Alejandro B. – TuC3
Ackemann, Thorsten – WA3, WA4, ThB28, ThB30, FA3
Ackermann, Roland – FC5
Aguirre Lopez, Arturo – WD27, WD28
Alchison, J. S. – WD38, ThA2, ThB18
Akaike, Masami – ThB13
Akmediev, Nail – WA5, WC2, FB6
Alberucci, Alessandro – FA1
Alfassi, Barak – ThD3
Aña Castanon, Juan D. – WC7
Ankiewicz, Adrian – WC2
Argiolas, Nicola – ThB14
Asao, Yoshifumi – ThA4
Assanto, Gaetano – TuB8, WD1, WD20, WD21, FA1
Autizzi, Elena – ThB14
Avidan, Asaf – ThC2, FB5

-B-
Babushkin, Igor V. – ThB30
Bache, Morten – ThB26
Baets, Roel – TuC4, ThB15
Baizakov, Bakhtiyior – ThB20
Baker, Neil – WB6
Ballarini, D. – WC3
Bang, Ole – WD2, WD18, FC3
Bar-Ad, S. – ThA2
Barbay, Sylvain – WD11, WD14, ThB27
Barland, Stephane – WA2
Baronio, Fabio – WB2
Bartal, Guy – TuA3, WD31, ThC6, ThD4, FC6
Bazzan, Marco – ThB14
Bellanca, G. – ThA6
Bellanca, Gaetano – WB4, WB5
Benoit, Jean-Michel – WD11
Bergé, Luc – FA6, FC5
Betlej, A. – TuD5
Bezard, A. – WC7
Biancalana, Fabio – ThB6
Bienstman, Peter – ThB15
Bigelow, Matthew S. – WB1
Bise, R. T. – TuD5
Blomer, Dominik – FA5
Blow, Keith J. – TuD, WB7, ThB4, ThB7,
Boardman, Allan D. – ThB19
Boland, Brian – WD16
Boyd, Robert W. – WB1, WD10
Braimiotis, Christos – ThB8
Brambilla, Massimo – WA2, WD14, ThB26
Bräuer, Andreas – TuB3
Briedis, Dahlriani – WD2
Brillant, Laurent – TuD3
Broderick, Neil – TuC
Brdzakiewicz, Kasia – WD21
Buljan, Hrvoje – TuA3, WD31, FC6

-C-
Burghoff, Jonas – FA5
Burgoyne, Bryan – ThB11
Caboche, Emilie – WA2
Cada, Michael – WB
Cambournac, Cyril – TuD4, FA2, FA4
Capobianco, Antonio D. – ThB14
Cardinal, Thierry – ThA3
Carmon, Tal – FC2
Cerullo, Giulio – WB2
Chamorro-Posada, Pedro – WD3
Champarnaud-Mesnard, Jean-Claude – ThA3
Chartier, Thierry – TuD3
Chauvet, Mathieu – WD17, FA2
Chavet, Mathieu – WD39
Chen, Feng – WD36
Chen, Shuian-Yeh – TuB1
Chen, Zhigang – TuC8, WD24
Cheskis, D. – ThA2
Christodoulides, Demetrios N. – TuA5, TuC1, TuC5,
TuD5, WA1, WD4, WD23, ThC4, ThD3, ThD4
Coda, Virginie – FA2
Coen, Stéphane – TuD6
Cohen, Oren – TuA3, WD31, ThC6, ThD3, FC2, FC6
Cojocaru, Crina – ThB5
Colet, Pere – ThB22, FB, FB8
Columbo, Lorenzo – WA2
Conforti, Matteo – WB4
Cordeiro, Cristiano – ThC1
Coschignano, Gianluca – FA1
Couairon, Arnaud – FC1
Couzi, Michel – ThA3

-D-
Damia, Gomila – FB8
De Angelis, Costantino – WB2, WB4
De Luca, Antonio – WD1, FA1
de Sterke, C. M. – TuC2
de Valcarcel, German J. – ThB31
Delfyett, Peter – ThA3
Delqué, Michaël – FA4
Denz, Cornelia – TuC7, ThC7, FB4
Desyatnikov, Anton S. – TuB7, ThC7, ThD1
Di Trapani, Paolo – TuB4
DiGiovanni, D. J. – TuD5
Dmitry, Turave – WD9
Dohnal, Tomas – TuC3
Dreischuh, Alexander – TuC7, FC3
Drouillas, Sotiris – WD4, WD23
Dubietis, Audrius – TuB4

-E-
Eberhard, Marc A. – ThB4, ThB7, ThB8
Edmundson, Darran – WD2
Efimov, A. – TuD7
Efremidis, Nikolaos – WD4, WD23
Eggleton, Benjamin J. – TuC2, TuD4, WB6
Egorov, Oleg A. – ThB25, FB3
El-Ganainy, R. – TuD5
Emplit, Philippe – TuC4
Etrich, Christoph – TuA2

-F-
Faccio, Daniele – TuB4
Farinum, Edward – ThB3
Fazio, Eugenio – FA2
Fedele, Francesco – WD24
Fedorov, Sergey V. – FB2
Feigenbaum, Yael – WD12
Fibich, Gadi – FC4
Fini, J. – TuD5
Firth, William J. – FB7
Fischer, Robert – TuC7, ThC7
Fleischer, Jason W. – TuA3, WD31, WD39, ThC6, ThD4, FC6
Fratalocchi, Andrea – WD1, WD20, WD21
Freedman, Barak – ThD4
Fressengeas, Nicolas – WD17
Frey, Steffen – FC5
Fu, Guoyuan – WD39
Fu, Libin – WB6
Fukuchi, Yutaka – ThB2, ThB12, ThB13
Fukushima, Kensuke – WD19

-G-
Gabitov, Ildar R. – TuA1
Gaeta, Alexander – WB1, FC4
Galinetto, P. – WD33
Gao, Lu – ThB16
Garanovich, Ivan L. – ThD5
Gautier, Daniel J. – WB1
Gehring, George – WD10
Ghosh, Saikat – WB1
Gibbs, Hyatt M. – TuA4
Giessen, Harald – TuA4
Giudici, Massimo – WA2
Godbout, Nicolas – ThB11
Gomila, Damia – FB7
González-Herrera, Miguel – TuD6, WC3
Gorza, Simon-Pierre – TuC4, FA2
Grando, Daniela – WD33
Grow, Taylor D. – FC4
Guidici, Massimo – WA3
Guiloux, J. Y. – WC7
Güttich, Björn – FB4

-H-
Hachair, Xavier – WA2, WA3
Hache, Alain – ThC4
Hadžievski, Lipučo – WD6, WD32
Haêlerman, Marc – TuC4, FA2, FA4
Hanna, Brendan – WD30
Harvey, John D. – TuD2, WC6
Herrero, Ramon – TuB5, WD29
Herrmann, Joachim – TuD1
Hewitt, Sarah – WD5
Hizanidis, Kyriakos – WD4, WD23
Höner zu Siederdissen, Tilman – TuA4
Hong, Kyung-Han – WC1
Hou, Bixue – WC1
Huang, Kai-Feng – ThB30
Huneus, Florian – ThB28
Husakou, Anton – TuD1

-I-
Ibbotson, Robin A. – WB7
Il’din, F. Ömer – WC4
Iliew, Rumen – TuA2
Il’yas, I. – ThA2
Im, Sung-Hoon – WC6
Imbrock, Jörg – TuC7
Infeld, Eryk – WD22
Ishii, Kentarou – ThB2
Iwanow, Robert – TuC5

-J-
Jackson, Deborah J. – WD10
Jacobo, Adrian – ThB22
Jaeger, Roland – WA3
Jeffers, John – WD8, ThD6
Jentsch, Karl F. – WA3
Jirauschek, Christian – WC4
Johannisson, Pontus – ThB1
Joly, Nicolas Y. – TuD2, TuD7, ThC1

-K-
Kaertner, Franz X. – WC4
Kaiser, Friedemann – WD25
Kaiser, Robin – WA4
Karlfors, Magnus – ThB1
Karpierz, Miroslaw – WD21
Kartashov, Yaroslav V. – TuB6, FC7
Kasparian, Jerôme – FC5
Kawashima, Satoshi – ThB2
Khelfaoui, Naima – WD17
Kheradmand, Reza – WA2, ThB26
Khitrova, Galina – TuA4
King, Neil – ThB19
Kip, Detlef – TuB2, WD6, WD32, WD36
Kitamura, Kenji – WB2
Kivshar, Yuri S. – TuB7, ThC7, WD25, WD30, ThC5, ThC7, ThD1, ThD5
Klappauf, Bruce – WA4
Knight, Jonathan C. – TuD2, TuD7, ThC1, ThC3
Koch, Stephan W. – TuA4
Kockaert, Pascal – ThD2, FA4
Kojima, Keita – ThB13
Komninos, Yannis – WD4, WD23
Komissarova, Maria V. – WD37
Kowarschik, Richard – TuB3
Krolkowski, Wieslaw – ThC7, WD18, WD2, WD30, ThC5, ThC7, ThD1, FC3
Kruglov, Vladimir – WC6
Kruhlak, Robert J. – TuD2
Kucinskas, Ernestas – TuB4
Kugel, Godfrey – WD17
Kuhl, Jürgen – TuA4
Kuszelewicz, Robert – WA, WD11, WD14, ThB27
Kutz, J. Nathan – TuC6, TuD4, WD5, ThB3, ThB23
Kwan, Y. H. – ThB9

-L-
Labeyrie, Guillaume – WA4
Labruyere, A. – ThB9
Lacroix, Suzanne – ThB11
Lahini, Yoav – FB5, ThC2
Lange, Christoph H. – WA1
Lange, Wulfhard – ThB28, FA3
Lantz, Eric – ThB10
Larionova, Yevgeniya – ThB24, ThB25
Lauritano, Michele – WB5
Lederer, Falk – TuA2, WA1, ThA5, ThD1, FA5, FA6, FB3, FC5
Lemaître, Aristide – WD11
Leonhardt, Rainer – TuD2
Lepeshkin, Nick – WD10
Lim, Oo-Kaw – WD16
Linzon, Yoav – ThA2
Lippi, Gian Luca – WA4
Littler, Ian C. – TuC2, WB6
Lo, Tzu-Chun – TuB1
Lobanov, V. E. – ThB17
Locatelli, Andrea – WB4
Loiko, Natalia A. – WA3, ThB30
Longhi, Stefano – WB3
Luan, Feng – ThC1, ThC3
Lugjati, Luigi A. – WA2, ThB26
Luther-Davies, Barry – WB6
Lynga, Claire – TuD4

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Maeda, Joji – ThB2, ThB12
Maes, Bjorn – TuC4, ThB15
Maggiapinto, Tommaso – WD14
Maillotte, Hervé – ThB10, FA2, FA4
Mainistov, Andrei I. – TuA1
Makasyuk, Igor – TuC8, WD24
Makris, Konstantinos – ThC4
Malomed, Boris A. – WD22
Maluckov, Aleksandra – WD6, WD32
Mandelik, Daniel – TuC2, FB5
Manela, Ofer – TuA3, ThA5, WD36, ThC6, FC2
Mantsyzov, Boris I. – WD34, WD35
Manzoni, Cristian – WB2
Marangoni, Marco – WB2
Martin-Lopez, Sonia – TuD6
Maruta, Akihiro – ThA1, ThA4
Matias, Manuel A. – FB8
Matuszewski, Michal – WD22
May-Arrioja, Daniel A. – TuC5
Mazzoldi, Paolo – ThB14
McCartney, Graeme J. – WD8, ThD6
McDonald, Graham S. – WD3
McLeod, Robert – ThB16
Meier, Joachim – TuC1, WD23
Méjean, Guillaume – FC5
Meñíkov, Igor V. – WD38, ThB18
Ménesguen, Yves – ThB27
Merchant, Clark A. – ThB18
Meunier, Karine – WD11
Michaelis, Dirk – TuB3
Millot, G. – WC8, ThA6
Min, Yoohong – TuC5
Mitschke, Fedor M. – WC5
Mok, Joe T. – TuC2
Monteville, Achille – TuD3
Morandotti, Roberto – TuC1, ThA2, ThC4
Moses, Jeffrey A. – WC1
Moshonas, Nikolaos – WD4, WD23
Moss, David J. – WB6
Motzek, Kristian – WD25
Mourou, Gerard – WC1
Muhyaldin, Siham N. – ThB7
Muradyan, Gevorg A. – ThB29
Musso, Arnaud – ThB10

-N-
Nahas, Mousaab M. – WB7
Nakkeeran, K. – ThB9
Naumenko, Aleksandr V. – WA3
Nees, John – WC1
Neshev, Dragomir N. – TuC7, WD30, ThC5, ThC7, ThD1, FC3
Nguyen, Nam – TuD3
Nielsen, Nils C. – TuA4
Nijhof, Jeroen – WC
Nolte, Stefan – FA5

-O-
Oda, Shoichiro – ThA1
Okawachi, Yoshitomo – WB1
Omenetto, F. – TuD7
Oppo, Gian-Luca – WD8, ThD6
Orenstein, Meir – WD12
Osting, Braxton – WD5

-P-
Papagiannis, Panagiotis – WD4, WD23
Parini, Alberto – WB4
Park, Q-Han – WD10
Patriarche, Gilles – WD11
Peccianti, Marco – TuB8, WD1, FA1
Pedaci, Francesco – WA2
Perez-Arjona, Isabel – ThB31
Perrini, Ida – WD14
Pertsch, Thomas – ThA5, ThD1, FA5
Pesch, Matthias – FA3
Peschel, Ulf – TuA2, ThA5, ThD1, FA, FA5, FB3
Petersen, Dan E. – WD2, FC3
Petrov, Evgeny V. – WD35
Valcarcel, German D. – WD29
Valentini, S. – ThA6
Van der Sande, Guy – ThD2
Vanholsbeek, Frédérique – TuD6
Vargas, T. – WC7
Vedadi, Armand – ThB10
Velasco, Larry – ThB19
Veretennicoff, Irina – ThD2
Vladimirov, Andrei G. – WD9

Wabnitz, Stefan – ThD, WC7
Wadsworth, William J. – TuD2
Wagner, Kelvin H. – ThB16
Wahid, Mohamad H. – WB7
Wai, P. K. – ThB9
Wang, Yingxue – FB1, ThB29
Weinert-Raczka, Ewa – WD7
Weiss, Carl O. – ThB24, ThB25
Williams, William – ThB29
Wirth, Christian – TuB2
Wise, Frank W. – WC1
Wolf, Jean-Pierre – FC5
Wollersberger, Delphine – WD17
Wong, Kwan Leung G. – TuD2

Xu, Zhiyong – TuB6

Yang, H. – TuC1, ThC4
Yang, Jianke – TuC8, WD24
Yangirova, V. V. – WD15
Yu, Jin – FC5
Yu, J. – WD33
Yulin, Alex – TuD7, ThB5, ThC3

Zakharova, Irina G. – WD37
Zelik, Sergey – WD9
Zhu, Zhaoming – WB1
Zimmermann, Holger – FB4
Ziolkowski, Andrzej – WD7
Welcome to Dresden and the Nonlinear Guided Waves and Their Applications Topical Meeting. This promises to be a most informative and exciting meeting. We are pleased that you are here!

PROGRAM UPDATES

Updated Author Block
WD20
Discrete Solitary Waves in Nonlinear Nonlocal Media, Andrea Fratalocchi, Gaetano Assanto; NooEL-Nonlinear Optics and OptoElectronics Lab, Italian Inst. for the Physics of Matter, Italy

Program Updates
ThB19 – Withdrawn.

Presider Updates
TuA - Nanostructured Materials and 2nd Order Effects, Demetrios Christodoulides, Univ. of Central Florida, USA
TuB - Modulational Instability, Moti Segav, Technion Israel Inst. of Technology, Israel
ThC – Nonlinear Optics in 2D Periodic Structures, George Stegeman; Univ. of Central Florida, USA
FC - Nonlinear Effects, Roberto Morandotti, INRS-EMT, Canada

Title & Author Block Change
ThC3 - Families of Raman-Kerr Solitons in Hollow-Core Photonic Crystal Fibers, D. Skryabin, F. Biancalana, A. Yulin, Univ. Of Bath, UK

Remember to fill out a conference survey and return it to the registration desk.

The Organizers of NLGW 2005 gratefully acknowledge the support of:
Defense Advanced Research Projects Agency (DARPA)
U.S. Air Force Office of Scientific Research (AFOSR)
Friday, 9 September 2005

Postdeadline Paper Session
4:30 p.m. – 6:15 p.m.
Festsaal

PDP1 • 4:30 p.m.
Direct Observation of Fast Intensity Fluctuations of a Cascaded Raman Fiber Laser, Jochen Schroeder1, Frederique Vanholsbeeck1, Miguel Gonzalez-Herraez2, Stephane Coen3; 1Univ. of Auckland, New Zealand, 2Inst. de Fisica Aplicada, Spain. We show experimentally that Raman fiber lasers exhibit fast intensity fluctuations on a time scale of a few tens of picoseconds. Observations are performed with a forward-pump Raman amplifier with zero walk-off.

PDP2 • 4:45 p.m.
Coherent and Incoherent Inscription/Erasure of Cavity Solitons in an Optically-Pumped Vertical-Cavity Semiconductor Amplifier, Robert Kuszelewicz, Sylvain Barbay, Yves Méneguen, Isabelle Sagnes; Lab de Photonique et Nanostructures, France. We show pattern formation and demonstrate both coherent and incoherent inscriptions of cavity solitons in a broad-area, highly uniform optically pumped GaAlAs vertical-cavity semiconductor amplifier. Erasure is also demonstrated in the coherent case.

PDP3 • 5:00 p.m.
Bound Chains of Dark Dispersion-Managed Solitons, Martin Stratmann, Fedor M. Mitschke; Univ. of Rostock, Germany. Attractive interaction of dark dispersion-managed temporal solitons is observed numerically. We find chains of up to six bound dark DM solitons. Their binding mechanism is related to the undulating wings of dark DM solitons.

PDP4 • 5:15 p.m.
An Optical Ring Oscillator Using an Active Mach-Zehnder Interferometer, Ronnie Van Dommelen, Michael Cada; Dalhousie Univ., Canada. An all-optical self-starting oscillator was proposed, analyzed, built and tested, that uses an integrated interferometer with semiconductor optical amplifiers and a feedback loop. The nonlinearity of both the amplifiers and the interferometer are exploited.

PDP5 • 5:30 p.m.
Soliton-Like Differential Phase-Shift Keying Transmission Guided by In-Line Semiconductor Optical Amplifiers in 40 Gb/s Systems, Sonia Boscolo1, Sergei K. Turitsyn2, Ranjeet Bhamber1, Vladimir K. Mezentsev1, Vladimir S. Grigoryan3; 1Photonics Res. Group, School of Engineering and Applied Science, Aston Univ., UK, 3Ctr. for Photonic Communication and Computing, Northwestern Univ., USA. We propose a novel, soliton-like optical signal transmission scheme using differential phase-shift keying modulation format and cascaded in-line semiconductor optical amplifiers. The operational regime at 40 Gb/s/data rate is numerically demonstrated.

PDP6 • 5:45 p.m.
Stability of Nonlinear Bound States in the Presence of a Continuous Spectrum, Asaf Avidan, Y. Lahini, D. Mandelik, Y. Silberberg; Weizmann Inst. of Science, Israel. We study nonlinear relaxation of the excited state in a system with two bound states and a continuum. We simulate the process in a one dimensional waveguide array, and suggest a four wave mixing explanation.

PDP7 • 6:00 p.m.
Enhanced Third Order Nonlinear Effects in AlGaAs Nano-Wire Waveguides, Roberto Morandotti1, Robert Iwanow2, George I. Stegeman3, Demetri N. Christodoulides2, Daniel Modotto1, Andrea Locatelli2, Costantino De Angelis1, C. R. Stanely3, Marc Sorel4, Stewart Aitchison5; 1Inst. natl. de la recherché scientifique, Univ. du Québec, Canada, 2College of Optics and Photonics, Univ. of Central Florida, USA, 3Inst. Nazionale per la Fisica della Materia, Dipartimento di Elettronica per l’Automazione, Univ. di Brescia, Italy, 4Dept. of Electrical and Electronic Engineering, Univ. of Glasgow, UK, 5Dept. of Electrical and Computer Eng, Univ. of Toronto, Canada. We report the first observation of self-phase-modulation enhancement in 500 nm wide, AlGaAs Kerr nonlinear nano-waveguides.
2005 NLGW Postdeadline Key to Authors

Aitchison, Stewart – PDP7
Avidan, Asaf – PDP6
Barbay, Sylvain – PDP2
Bhamber, Ranjeet – PDP5
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Cada, Michael – PDP4
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Coen, Stephane – PDP1
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