NLGW

Nonlinear Guided Waves and Their Applications

Topical Meeting

NEW DATES! March 28-31, 2004

Westin Harbour Castle
Toronto, Canada

Technical Program Committee

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About NLGW

March 28-31, 2004

This topical meeting brings together researchers working in all aspects of nonlinear optics in guided-wave and self-guided geometries. Participants will present papers covering topics that range from theory to experiments, from fundamentals to applications. The development of new ideas and novel techniques in the areas of materials, fabrication, devices, applications, and nonlinear theory are particularly emphasized. NLGW aims to:

- Provide a forum for the discussion of nonlinear waveguide and soliton phenomena from theoretical, material, device, 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 device and applications communities, particularly in the areas of optical communications, all-optical signal processing, and waveguide 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, waveguide arrays, resonators, and photonic crystals, and the novel phenomena based on them.
- Identify novel phenomena in configurations involving quadratic, cubic, photorefractive, and resonant nonlinearities.
- Highlight the similarities and differences between nonlinear effects in conservative and dissipative systems.

Meeting Topics

Category One: Nonlinear Fiber Effects and Temporal Solitons

- Basic nonlinear effects in fibers: Stimulated Raman Scattering (SRS), Stimulated Brillouin Scattering (SBS), four-wave mixing, nonlinear guided wave spectroscopy, two-photon absorption, and third-harmonic generation.
- Nonlinear pulse propagation: nonlinear pulse broadening, modulational instabilities, self-phase modulation, cross-phase modulation, pulse compression, and pulse train generation.

- Temporal solitons in fibers: generation of bright and dark solitons, application in transmission systems, polarization effects, stability of soliton trains, dispersion management, soliton-noise interaction, and solution control.
- Applications: optical communication systems, optical switching and processing, and fiber lasers and amplifiers.

Category Two: Spatial Solitons and Associated Propagation and Switching Effects

- Spatial optical solitons, self-trapping, and self-guiding effects: generation of bright and dark solitions via second order, third order, and photorefractive effects; longitudinal and transverse stability of solitary waves; modulation instability and spatio-temporal effects; and interaction of spatial solitions.
- Self-focusing and nonlinear guided modes in waveguides and at nonlinear interfaces, self-trapping effects in waveguide arrays, and discrete spatial solitons.
- Applications: beam steering, solitary waves as induced and steerable waveguides, soliton-based all-optical switching, and optical processing.
- New materials, including semiconductors, glasses, polymers, and organics for the observation of solitons.

Category Three: Nonlinear Periodic Structure, Cavities, and Feedback Systems

- Nonlinear effects in periodic structures: Bragg solitons, Bragg gratings in semiconductor waveguides, gap solitons, nonlinear effects in photonic crystals, and solitons in photonic crystals.
- Dissipative solitons: spatial solitons in optical cavities containing quadratic, cubic, saturable, or semiconductor materials, and spatial solitons in lasers with saturable absorbers. Vortex solitons, parametric domain wall solitons.
- Spatial pattern formation in nonlinear cavities and waveguides.
- Nonlinear modes and solitons in trapped Bose-Einstein condensates and optical lattices, nonlinear guided-wave atom-optics.

- Applications: optical switching, pattern storage, generation, and recognition as well as parametric devices.
- Fabrication of micro- and nanostructured materials, Bragg gratings, micro-ring resonators, and optimized nonlinear materials.

Category Four: Frequency Conversion and Switching

- Second-order nonlinear effects: three-waving mixing, second harmonic generation, difference frequency generation, sum frequency generation, optical rectification, parametric amplification (single-pass) and oscillation (resonator), and quasi-phase-matching.
- Cascaded nonlinearities; parametric amplification and cascaded processes; and pulse compression, scattering, reshaping, and temporal-soliton formation.
- Second-order nonlinear fiber effects: SHG and other frequency conversion effects, photorefractive effects, and self-organized fiber gratings.
- Novel χ^2 materials and new approaches to phase matching and all-optical switching.
- Applications: nonlinear effects in semiconductor optical amplifiers, wavelength conversion, novel all-optical switching elements, and integrated optical logic elements.

Publications

Conference Program

The *Conference Program* is now available on the web. Authors submitting papers, past meeting participants, and current committee members will automatically be notified by email when the *Conference Program* is available.

Technical Digest

The NLGW *Technical Digest* will contain the camera-ready summaries of papers presented during the meeting. At the meeting, each registrant will receive a copy of the *Technical Digest* on CD-ROM. Extra CD-ROM copies can be purchased at the meeting for a special price of US$ 45.

Agenda of Sessions

On This Page:

Also available is a PDF of the NLGW 2004 Abstracts and Agenda.

Sunday, March 28, 2004

Time	Event/Location
10:00 p.m. - 5:00 p.m.	**Registration** *North Concourse*

TOP

Monday, March 29, 2004

Time	Event/Location
6:00 a.m. – 8:00 a.m.	**Continental Breakfast** *Harbour Foyer*
7:00 a.m. – 6:00 p.m.	**Registration** *Lobby*
8:00 a.m. – 10:00 a.m.	**MA, Discrete Solitons I** *Harbour A*
10:00 a.m. – 10:30 a.m.	**Coffee Break & Exhibits** *Harbour B & C*
10:30 a.m.- 12:30 p.m.	**MB, Nonlinear Effects in Resonators** *Harbour A*
12:30 a.m. – 2:00 p.m.	**Lunch Break (On Your Own)**
2:00 p.m. – 4:00 p.m.	**MC, Poster Session I & Exhibits** *Harbour B & C*
3:00 p.m. – 3:30 p.m.	**Coffee Break** *Harbour B & C*

4:00 p.m. – 6:15 p.m.	**MD, Optical Amplifiers** *Harbour A*

▲TOP Tuesday, March 30, 2004

Time	Event/Location
6:00 a.m. – 8:00 a.m.	**Continental Breakfast** *Harbour Foyer*
7:00 a.m. – 6:00 p.m.	**Registration** *Lobby*
8:00 a.m. – 10:00 a.m.	**TuA, Switching and Materials** *Harbour A*
10:00 a.m. – 10:30 a.m.	**Coffee Break & Exhibits** *Harbour B & C*
10:30 a.m. – 12:30 p.m.	**TuB, Effects in Nonlinear Media** *Harbor A*
12:30 p.m. - 2:00 p.m.	**Lunch (On Your Own)**
2:00 p.m. – 4:00 p.m.	**TuC, Poster Session II & Exhibits** *Harbour B &C*
3:00 p.m. – 3:30 p.m.	**Coffee Break** *Coffee Break*
4:00 p.m. – 6:00 p.m.	**TuD, Spatial Solitons and Transverse Effects I** *Harbour A*
6:30 p.m. – 8:30 p.m.	**Conference Reception** *Regatta*

▲TOP Wednesday, March 31, 2004

Time	Event/Location
6:00 a.m. – 8:00 a.m.	**Continental Breakfast** *Harbour Foyer*
7:30 a.m. – 6:00 p.m.	**Registration** *Concourse*
8:00 a.m. – 10:00 a.m.	**WA, Spatial Solitons and Transverse Effects II**

	Harbour A
10:00 a.m. – 10:30 p.m.	**Coffee Break** *Harbour B & C*
10:30 a.m. – 12:30 a.m.	**WB, Discrete Solitons II** *Harbour A*
12:30 p.m. – 2:00 p.m.	**Lunch Break (On Your Own)**
2:00 p.m. – 4:00 p.m.	**WC, Nonlinear Effects in Photonic Crystal Fibres** *Harbour A*
4:00 p.m. – 4:30 p.m.	**Coffee Break** *Harbour B & C*
4:30 p.m. – 6:30 p.m.	**WD, Postdeadline Papers** *Harbour A*

Sunday, March 28, 2004

Lobby
10:00 a.m.–5:00 p.m.
Registration

Monday, March 29, 2004

Harbour Foyer
6:00 a.m.–8:00 a.m.
Continental Breakfast

Lobby
7:00 a.m.–6:00 p.m.
Registration

Harbour A
8:00 a.m.–10:00 a.m.
MA • Discrete Solitons I
Demetrios Christodoulides, School of Optics/CREOL, Univ. of Central Florida, USA, Presider

MA1 • 8:00 a.m.
Immobile gap-solitons in waveguide arrays, *Daniel Mandelik[1], Roberto Morandotti[2], Stewart Aitchison[3], Yaron Silberberg[1]; [1]Weizmann Inst. of Science, Israel, [2]Univ. du Quebec, Canada, [3]Univ. of Toronto, Canada.* Bright and dark spatial gap-solitons are demonstrated in waveguide arrays. These gap-solitons travel across the array at zero transverse velocity, in complete analogy with stationary (immobile) temporal gap-solitons, being excited in an 'idealized experiment'.

MA2 • 8:15 a.m.
Dynamic band-gap solitons in nonlinear optically-induced lattices, *Anton S. Desyatnikov[1], Andrey A. Sukhorukov[2], Elena A. Ostrovskaya[2], Yuri S. Kivshar[2], Cornelia Denz[1]; [1]Westfalische Wilhelms-Univ. Munster, Germany, [2]Australian Natl. Univ., Australia.* We describe optical solitons consisting of nonlinearly coupled periodic or quasi-periodic and localized components, and reveal a fundamental difference between moving solitons in self-focusing and self-defocusing media related to the effect of dynamic gap merging.

MA3 • 8:30 a.m.
Observation of vortex-ring "discrete" solitons in 2D photonic lattices, *Guy Bartal[1], Jason W. Fleischer[1], Oren Cohen[1], Ofer Manela[1], Mordechai Segev[1], Jared Hudock[2], Demetrios N. Christodoulides[2]; [1]Technion, Israel, [2]School of Optics/CREOL, Univ. of Central Florida, USA.* We present the experimental observation of both on-site and off-site vortex ring solitons of unity topological charge in a nonlinear photonic lattice, along with a theoretical study of their propagation dynamics and stability.

MA4 • 8:45 a.m.
Observation of discrete vortex solitons, *Dragomir N. Neshev[1], Tristram J. Alexander[1], Elena A. Ostrovskaya[1], Yuri S. Kivshar[1], Hector Martin[2], Zhigang Chen[2]; [1]Nonlinear Physics Group, RSPhysSE, Australian Natl. Univ., Australia, [2]Dept. of Physics and Astronomy, San Francisco State Univ., USA.* We observe experimentally the formation of discrete vortex solitons in two- dimensional optically-induced photonic lattices and describe numerically their excitation and propagation.

MA5 • 9:00 a.m.
Effects of disorder in a nonlinear fiber array, *Thomas Pertsch[1], Ulf Peschel[1], Jens Kobelke[2], Kay Schuster[2], Stefan Nolte[1], Andreas Tünnermann[1], Hartmut Bartelt[2], Falk Lederer[1]; [1]Friedrich-Schiller-Univ., Germany, [2]Inst. für Physikalische Hochtechnologie e.V., Germany.* We experimentally investigate the nonlinear field evolution in a disordered two-dimensional array of mutually interacting optical fibers.

The diffusive propagation of linear fields is nonlinearly modified resulting in power controlled localization and delocalization.

MA6 • 9:15 a.m.
Discrete nematicons, *Andrea Fratalocchi[1], Gaetano Assanto[1], Kasia A. Brzdąkiewicz[2], Miroslaw A. Karpierz[3]; [1]Italian Inst. for the Physics of Matter, Italy, [2]Warsaw Univ. of Technology, Poland, [3]Warsaw Univ. of Technology, Poland.* We investigate discrete propagation of light in a voltage-tunable liquid crystal array of waveguides. This geometry, in conjunction with a reorientational response, allows to study discrete optical phenomena and solitons in nematic liquid crystals.

MA7 • 9:30 a.m.
Multi-channel discrete quadratic solitons in periodically poled lithium niobatewaveguide arrays, *Robert Iwanow[1], George I. Stegeman[1], Roland Schiek[2], Thomas Pertsch[3], Falk Lederer[3], Yoohong Min[4], Wolfgang Sohler[4]; [1]School of Optics/CREOL, USA, [2]Univ. of Applied Sciences, Germany, [3]Friedrich-Schiller-Univ., Germany, [4]Univ. of Paderborn, Germany.* We report the first observation of quadratic discrete solitons localized in multiple neighboring channels of one-dimensional PPLN waveguide arrays. Measured field profiles for discrete diffraction and solitons versus wave-vector mismatch agree with theory.

MA8 • 9:45 a.m.
Two-dimensional optical discrete/lattice solitons, *Nikolaos K. Efremidis[1], Jared Hudock[1], Demetrios N. Christodoulides[1], Jason W. Fleischer[2], Oren Cohen2, Mordechai Segev[2]; [1]School of Optics/CREOL, USA, [2]Technion - Israel Inst. of Technology, Israel.* We study families of 2D lattice solitons, and show that they are possible when their power level exceeds a critical threshold. In addition, gap lattice solitons exist when the lattice possesses a complete 2D band-gap.

Harbour B and C
10:00 a.m.–10:30 a.m.
Coffee Break and Exhibits

Harbour A
10:30 a.m.–12:30 p.m.
MB • Nonlinear Effects in Resonators
William Firth, Strathclyde Univ., UK, Presider

MB1 • 10:30 a.m.
Experimental observation of transverse optical patterns in phase-coupled VCSEL arrays, *Maurizio Dabbicco, Leonardo Amato, Tommaso Maggipinto, Massimo Brambilla; INFM c/o Dept. di Fisica, Italy.* Pattern forming instabilities are observed in optically pumped, phase-coupled VCSEL arrays; global patterns with roll or hexagonal symmetry emerge in the field transverse profile. Simulations on tailored models qualitatively match the observations.

MB2 • 10:45 a.m.
Enhanced nonlinear optical response and all-optical switching in AlGaAs micro-ring resonators, *Robert W. Boyd, John E. Heebner, Nick Lepeshkin, Aaron Schweinsberg, Gary W. Wicks; Univ. of Rochester, USA.* We have constructed and characterized photonic devices based on optical micro-ring resonators. Light is guided by epitaxially grown layers and by air-clad sidewalls. We describe the phase transfer characteristics and all-optical switching in these devices.

MB3 • 11:00 a.m.
Characterization of cavity solitons in broad-area driven VCSELs below threshold, *Xavier Hachair[1], S. Barland[1], Luca Furfaro[1], Massimo Giudici[1], Salvador Balle[1], Jorge Tredicce[1], Massimo Brambilla[2], Tommaso Maggipinto[2], Ida M. Perrini[2], Giovanna Tissoni[3], Luigi A. Lugiato[3]; [1]Inst. Non Lineaire de Nice, France, [2]INFM, Dept. di Fisica Interateneo, Univ. e Poltecnico di Bari, Italy, [3]INFM, Dept. di Scienze, Univ. dell'Insubria, Italy.* We show the generation of several cavity solitons in driven broad-area vertical-

cavity semiconductor lasers below threshold. The switching process is analysed in details, and a theoretical interpretation is provided to confirm and steer experimental findings.

MB4 • 11:15 a.m.
Stationary conical waves in the presence of nonlinear absorption, *Miguel A. Porras[1], Alberto Parola[2], Audrius Dubietis[3], Paolo Di Trapani[2]; [1]Departamento de Fisica Aplicada, Spain, [2]INFM and Dept. of Physics, Italy, [3]Dept. of Quantum Electronics, Lithuania.* Owing to nonlinear losses, conical waves outclass solitons in describing spontaneuous localization driven by self-focusing. Stationary solutions of the nonlinear Schroedinger equation with nonlinear dissipation are found and compared with experiments. Applications are foressen.

MB5 • 11:30 a.m.
Localized states in vertical-cavity surface-emitting lasers with frequency-selective feedback, *Markus Sondermann[1], Francesco Marino[2], Karl F. Jentsch[1], Thorsten Ackemann[1], Roland Jaeger[3]; [1]Univ. of Muenster, Germany, [2]Inst.o Mediterráneo de Estudios Avanzados, Spain, [3]Ulm Photonics, Germany.* We report the experimental observation of bistable localized emission states in semiconductor devices without the need for a broad-area holding beam (vertical-cavity surface-emitting lasers with frequency-selective feedback operated close to threshold).

MB6 • 11:45 a.m.
Resonant trapping in a photo-induced gap in wave-number: experiment and theory, *Gaetan Van Simaeys[1], Stephane Coen[1], Marc Haelterman[1], Stefano Trillo[2]; [1]Universite Libre de Bruxelles, Belgium, [2]Univ. of Ferrara, Italy.* We investigate nonlinear propagation of two co-propagating modes linearly coupled by a photo-induced resonant traveling-wave grating. The observed grating-induced cancelation of modal group-delay is a signature of resonance solitons associated with a gap in wave-number.

MB7 • 12:00 p.m.
Grating mediated waveguiding and holographic solitons, *Barak Freedman[1], Oren Cohen[1], Jason W. Fleischer[1], Mordechai Segev[1], Demetrios N. Christodoulides[2]; [1]Technion, Israel, [2]School of optics – CREOL, Univ. of Central Florida, USA.* We demonstrate experimentally a new method of waveguiding, relying on Bragg diffractions from a bell/trough shaped 1D grating, and arising from cross-phase modulation. This system, when self-induced by the interacting waves, gives rise to "holographic-solitons."

MB8 • 12:15 p.m.
Frequency conversion in a nonlinear photonic quasi-crystal, *Radu T. Bratfalean, Neil G. Broderick, Katia Gallo, Anna C. Peacock; Optoelectronics Res. Ctr., UK.* We present the first results of 2nd harmonic generation in a two dimensional Penrose pattern in lithium niobate. These results show the flexibility and potential for novel devices in two dimensional poled structures.

12:30 a.m.–2:00 p.m.
Lunch Break (on your own)

Harbour B and C
2:00 p.m.–4:00 p.m.
MC • Poster Session I

MC1 • 2:00 p.m.
Stimulated Raman scattering in kilowatt ytterbium-doped double-clad fiber lasers, *Yong Wang, Chang-Qing Xu; Dept of Engineering Physics, McMaster Univ., Canada.* Stimulated Raman scattering (SRS) effect in kilowatt single-transverse-mode ytterbium-doped double-clad (YDDC) fiber lasers is numerically studied. Solutions to suppress the SRS in YDDC fiber lasers are presented and compared.

MC2 • 2:00 p.m.
Moving oscillating gap 2π pulses and their interaction, *Boris Mantsyzov; Dept. of Physics, Moscow State Univ., Russian Federation.* It is shown that gap soliton of self-induced transparency perturbed by

internal soliton mode can propagate within linear photonic band gap as oscillating soliton-like pulse. The interaction between pulses can be both elastic and inelastic.

MC3 • 2:00 p.m. Numerical implementation of the Manakov-PMD equation with precomputed M(ω) matrices, *Marc A. Eberhard, Christos Braimiotis; Aston Univ., UK.* The Manakov-PMD equation can be integrated with the same numerical efficiency as the coarse-step method by using precomputed M(ω) matrices, which entirely avoids the somewhat ad-hoc rescaling of coefficients necessary in the coarse-step method.

MC4 • 2:00 p.m.
Span length optimization of an SSMF/DCF based system with hybrid Raman/EDFA amplification, *Juan D. Ania-Castañón[1], Irina O. Nasieva[1], Sergei K. Turitsyn[1], Celine Borsier[2], Erwan Pincemin[2]; [1]Aston Univ., UK, [2]France Telecom R&D, France.* The impact of the span length on the optimal configuration of a transmission system with hybrid Raman/EDFA amplification is studied using the nonlinearity management theory. Optimal length is determined for an SSMF/DCF 40 Gb/s system.

MC5 • 2:00 p.m.
Squeezing of bistable solitons with cubic-quintic nonlinearity, *Ray-Kuang Lee[1], Yinchieh Lai[1], Boris Malomed[2]; [1]Natl. Chiao-Tung Univ., Taiwan Republic of China, [2]Departemant of Interdisciplinary Studies, Faculty of Engineering, Tel Aviv Univ., Israel.* The quantum fluctuations of bistable solitons described by the nonlinear cubic-quintic Schrodinger equation are studied. For the two bi-solitons with the same pulsewidth, their quantum fluctuations are different due to the effects of quintic nonlinearity.

MC6 • 2:00 p.m.
Direct scattering transform perturbation theory for dispersion-managed systems, *Yorgo Xudous, Pierre-André Bélanger; Univ. Laval, Canada.* We present a spectral formulation for quasi-periodic field propagation in nonlinear fibers managed through zero-average, piecewise-constant dispersion maps. The field is propagated exactly and the quasi-periodicity condition agrees with the DMNLS.

MC7 • 2:00 p.m.
Dispersion-managed solitons as the interference of chirped complex conjugate pulses, *Asshvin Gajadharsingh, Pierre-André Bélanger; Univ. Laval, Canada.* A particular feature of the dispersion-managed-soliton compared to the hyperbolic-secant soliton is the presence of side-lobes typical of interfering fields. Using a closed-form analytical expression of a zero-average DMS, we separate and study these fields.

MC8 • 2:00 p.m.
Collision-induced polarization scattering in dispersion managed fiber systems, *Antonio-Daniele Capobianco, Gianfranco Nalesso, Alessandro Tonello; INFM, Dept. di Ingegneria dell'Informazione, Italy.* We numerically study the depolarization caused by collisions of dispersion-managed vector solitons. Using a multiscale expansion of coupled Nonlinear Schroedinger equations we present an analytical model to describe the polarization dynamics of colliding solitons.

MC9 • 2:00 p.m.
Four-wave mixing instabilities in ultra-small core fibers, *Fabio Biancalana, Dmitry V. Skryabin, Philip St. J. Russell; Univ. of Bath, UK.* We have studied analytically and numerically the parametric instabilities in ultra-small core fibers in the two cases of scalar and polarized waves, finding new unstable regions and new physical behaviour in the far-detuned spectral regions.

MC10 • 2:00 p.m.
Nonlinear optical fiber loop mirror with feedback using high birefringence fiber in the loop, *Clark A. Merchant, Alan L. Steele; Carleton Univ., Canada.* The dynamics of a nonlinear optical fiber loop mirror with feedback using CW input and high birefringence fiber is examined. Results show dynamical behavior of the device can be controlled with different input polarization angles.

MC11 • 2:00 p.m.

Q parameter scaling in scalar and vector models with dominant signal-noise and noise-noise beating terms, *Marc A. Eberhard, Keith J. Blow; Aston Univ., UK.* The Q-parameter scales differently with the noise power for the signal-noise and the noise-noise beating terms in scalar and vector models. Some procedures for including noise in the scalar model largely under-estimate the Q-parameter.

MC12 • 2:00 p.m.
Dispersion map influence in 160 Gbit/s single channel transmission, *Benjamin Cuenot; France Telecom R&D, France.* Intrachannel non-linear effects are the source of degradation in 160 Gbit/s long-haul transmission. However, their impact can be reduced by an appropriate dispersion map and/or by using novel modulation schemes.

MC13 • 2:00 p.m.
Second-order distributed Raman amplification for quasi-lossless transmission, *Juan D. Ania-Castañón; Aston Univ., UK.* A novel distributed Raman amplification scheme for quasi-lossless transmission is presented. The scheme is able to keep signal power variations below 3 dB in a 100 km periodic cell and 0.36 dB in 60 km.

MC14 • 2:00 p.m.
Multiple solitons in systems governed by the Swift-Hohenberg equation, *Jose M. Soto-Crespo[1], Nail Akhmediev[2]; [1]Inst. de Optica C.S.I.C., Spain, [2]Optical Sciences Ctr., The Australian Natl. Univ., Australia.* The complex quintic Swift-Hohenberg equation is a model for describing pulse generation in mode-locked lasers with a complicated spectral response. We study several types of stationary and moving composite solitons of this equation.

MC15 • 2:00 p.m.
Chaos synchronization of a passive fibre resonator using the auxiliary system and applications to chaos masking, *Alan L. Steele[1], Stephen Lynch[2]; [1]Carleton Univ., Canada, [2]Manchester Metropolitan Univ., UK.* A passive nonlinear optical fibre circuit is proposed that exhibits chaos sychronization between a response and auxiliary receiver systems. This arrangement is also shown to facilitate chaos masking of an optical signal.

MC16 • 2:00 p.m.
Numerical model for a widely tunable self-similar oscillator, *Anna C. Peacock, Neil G. Broderick; Optoelectronics Res. Ctr., UK.* We propose a design for a widely-tunable oscillator operating over the wavelength range 1µm to 2µm. Numerical simulations show that the pulses evolve self-similarly in each stage of the oscillator maintaining a hyperbolic secant form.

MC17 • 2:00 p.m.
Pulse propagation in birefringent Kerr media: Stochastic coupled nonlinear Schrödinger equations, *Edouard Brainis, David Amans, Marc Haelterman, Philippe Emplit, Serge Massar; Univ. Libre de Bruxelles, Belgium.* Vacuum-fluctuations influence on pulses propagating through birefringent Kerr media is investigated using stochastic nonlinear Schrödinger equations. Computation tools are presented, and numerical results for vector modulation instabilities in the anomalous dispersion regime compared to experiments.

MC18 • 2:00 p.m.
Self-phase modulation instability in normal dispersion regime, *Bryan Burgoyne, Nicolas Godbout, Suzanne Lacroix; École Polytechnique de Montréal, Canada.* Modulation instabilities caused by self-phase modulation occur in normally dispersive waveguides, provided that the power, dispersion or nonlinearity varies along propagation. Propagation through two different segments with positive dispersion is shown to be unstable.

MC19 • 2:00 p.m.
Modulational instability in multimode parabolic-index optical fibers, *Stefano Longhi; Politecnico di Milano, Italy.* Pulse propagation in graded-index parabolic optical fibers shows a modulational instability

(MI) due to periodic spatial beam focusing. MI exists regardless of the sign of fiber dispersion and is a signature of strong space-time dynamics.

MC20 • 2:00 p.m.
Influence of the phase modulation of the pump wave in fiber optical parametric amplifiers, *Arnaud Mussot[1], A. Durécu-Legrand[2], E. Lantz[1], C. Simonneau[1], Dominique Bayart[2], Hervé Maillotte[1], Thibaut Sylvestre[1]; [1]Lab. d'Optique p.m. Duffieux, France, [2]Alcatel R&I, France.* We show analytically and numerically that phase modulation of the pump has a detrimental impact on the gain in fiber optical parametric amplifiers, which both depends on the modulator rise time and fiber dispersion slope.

MC21 • 2:00 p.m.
Nonlinearity management in hybrid amplification systems, *Juan D. Ania-Castañón[1], Irina O. Nasieva[1], Nayot Kurukitkoson[1], Sergei K. Turitsyn[1], Celine Borsier[2], Erwan Pincemin[2]; [1]Aston Univ., UK, [2]France Telecom R&D, France.* A theory of nonlinearity management in transmission lines with periodic dispersion compensation and hybrid Raman-EDFA amplification is developed. Different transmission/compensating fiber pairs performances are compared and the optimal amplification scheme determined for each case.

MC22 • 2:00 p.m.
Nonlinear switching and filtering dynamics in double-loop fiber Sagnac filter, *Jin U. Kang, Gang Chen, Jacob B. Khurgin; Johns Hopkins Univ., USA.* We investigated all-optical nonlinear switching and filtering dynamics of double-loop fiber Sagnac filter due to the nonlinear polarization rotation in the polarization maintaining (PM) fibers forming the Sagnac loops.

MC23 • 2:00 p.m.
Dipole solitons in two-dimensional photonic lattices, *Jianke Yang[1], Igor Makasyuk[2], Anna Bezryadina[2], Zhigang Chen[2]; [1]Univ. of Vermont, USA, [2]San Francisco State Univ., USA.* Dipole solitons in a two-dimensional photorefractive optical lattice are theoretically predicted and experimentally demonstrated. These solitons can be in-phase or out-of-phase in their two lobe components, and they are stabilized by the lattice-induced waveguide.

MC24 • 2:00 p.m.
Optical switching in nonlinear photonic crystals micro-resonators, *Dragan Vujic, Sajeev John; Univ. of Toronto, Canada.* We present numerical simulations of optical bistable switching in a 2d nonlinear photonic crystal containing a waveguide and micro-cavity resonator. We discuss all-optical switching properties with an instantaneous and noninstantaneous Kerr type of nonlinearity.

MC25 • 2:00 p.m.
Quantum mechanics in periodically curved optical waveguides, *Stefano Longhi, Davide Janner, Marco Marangoni, Paolo Laporta; Politecnico di Milano, Italy.* We show that beam propagation in periodically-bent waveguides shows similar features with electronic dynamics of atoms in high-intensity high-frequency laser fields, including dynamic wave function stabilization, wavepacket dichotomy and ionization quenching.

MC26 • 2:00 p.m.
Hybrid quadratic soliton in periodically poled crystals, *Anatoly P. Sukhorukov, Valery E. Lobanov; Faculty of Physics, Russian Federation.* We study numerically the process of third harmonic multistep cascading in quadratic photonic crystals and demonstrate hybrid soliton trapping. We analyze such soliton features by the averaging method and variational approach also.

MC27 • 2:00 p.m.
A simple approach for identifying discrete cavity solitons, *Oleg A. Egorov, Ulf Peschel, Falk Lederer; Inst. of Condensed Matter Theory and Optics, FSU, Germany.* We introduce an analytical approach which permits to identify domains of existence in parameter space of discrete cavity solitons. We demonstrate the performance of the approach for solitons in an array of quadratically nonlinear cavities.

MC28 • 2:00 p.m.

Collapse in Bose-Einstein condensates induced by fluctuations of the laser intensity, *Fatkhulla Abdullaev[1], Bakhtiyor Baizakov[1], Josselin Garnier[2]; [1]Physical-Technical Inst. of the Uzbekistan Academy of Sciences, Uzbekistan, [2]Universite Paul Sabatier, France.* The dynamics of an attractive BEC trapped by an optical trap is analyzed in the presence of fluctuations of the laser intensity. The condensate will eventually collapse for time is inversely proportional to noise intensity.

MC29 • 2:00 p.m.
About optical nonlinearity of waveguide photosensitive films, *Valentin I. Lymar; Dept. of Physics, Kharkov Natl. Univ., Ukraine.* A simple experiment to demonstrate laser intensity dependence of the photosensitive waveguide film refractive index is presented. Using diffraction measurements with spontaneous gratings we estimated roughly the effective value of the nonlinear index of refraction.

MC30 • 2:00 p.m.
Bright asymmetrical dissipative optical solitons in transversally multilayered semiconductor laser waveguides with saturable illocal gain and fast-relaxing absorption, *Alexandre S. Shcherbakov, Mauro Sanchez Sanchez; Natl. Inst. for Astrophysics, Optics & Electronics, Mexico.* The steady states for dissipative solitons shaped due to resculpturing external optical pulses are revealed in semiconductor laser waveguides. Bright asymmetrical optical solitons are supported by the waveguides with saturable illocal gain and fast-relaxing absorption.

MC31 • 2:00 p.m.
Effects of polarization-mode dispersion on dual-pump fiber-optic parametric amplifiers, *Fatih Yaman, Qiang Lin, Govind P. Agrawal; Inst. of Optics, USA.* We study the impact of residual random birefringence and the resulting polarization-mode dispersion and show that they limit the performance of dual-pump parametric amplifiers even when two pumps are chosen to be orthogonally polarized initially.

MC32 • 2:00 p.m.
Frequency-shifting with local nonlinearity management in non-uniformly poled quadratic nonlinear materials, *Kale Beckwitt, Fatih O. Ilday, Frank W. Wise; Cornell Univ., USA.* The frequency shifts resulting from cascaded processes with strong group-velocity mismatch can be controlled and enhanced by local nonlinearity management in quasi-phase matched structures. We demonstrate tailored, efficient frequency shifting of infrared pulses.

MC33 • 2:00 p.m.
Engineering the electromagnetic vacuum for controlling light with light in photonic crystals, *Rongzhou Wang, Sajeev John; Dept. of Physics, Univ. of Toronto, Canada.* A simple waveguide-defect architecture is designed to engineer the electromagnetic vacuum for controlling light with light. The process is based upon the atomic population inversion of two-level atoms (quantum dots) coherently pumped by a laser.

MC34 • 2:00 p.m.
Second-harmonic generation in waveguides induced by optical vortices, *Jose R. Salgueiro[1,2], Andreas Carlsson[1], Elena A. Ostrovskaya[1], Yuri S. Kivshar[1]; [1]The Australian Natl. Univ., Australia, [2]Universidade de Vigo, Spain.* We study the second-harmonic generation in the waveguides induced by optical vortex solitons in a defocusing Kerr medium, and demonstrate a substantial enhancement of the conversion efficiency when the proper conditions are achieved.

MC35 • 2:00 p.m.
Nonlinear transmission of sub-picosecond 1.5 µm pulses through single-mode silicon-on-insulator ridge waveguides, *Georg W. Rieger[1], Kuljit S. Virk[2], Jeff F. Young[1]; [1]Dept. of Physics and Astronomy, Canada, [2]Dept. of Physics, Canada.* Gratings are used to efficiently couple ~100 fs, 1.5 micron pulses into and out of single-mode silicon ridge waveguides of various lengths up to 600 microns. Nonlinear transmission spectra are reported and interpreted.

MC36 • 2:00 p.m.

Impact of randomly varying fiber dispersion on dual-pump fiber-optic parametric amplifiers, *Qiang Lin, Fatih Yaman, Govind P. Agrawal; Inst. of Optics, Univ. of Rochester, USA.* We study the impact of random variations in the zero-dispersion wavelength along the fiber length and show that they limit considerably the usable bandwidth of dual-pump fiber-optic parametric amplifiers.

MC37 • 2:00 p.m.
Controlled switching of discrete solitons in arrays of cubic and quadratic nonlinear optical waveguides, *Rodrigo Vicencio[1], Mario Molina[1], Yuri S. Kivshar[2]; [1]Dept. de Física, Facultad de Ciencias, Univ. de Chile, Chile, [2]Nonlinear Physics Group and Ctr. for Ultra-high bandwidth Devices for Optical Systems (CUDOS), Res. School of Physical Sciences and Engineering, The Australian Natl. Univ., Australia.* We suggest an effective method for controlling the multi-port switching of discrete solitons in arrays of nonlinear optical waveguides. We demonstrate the digitized switching of a narrow input beam in both cubic and quadratic arrays.

MC38 • 2:00 p.m.
Photon acceleration of X-rays in a waveguide, *José Tito Mendonça, Marta Fajardo, João M. Dias; Inst.o Superior Técnico, Portugal.* We consider photon acceleration of X-rays propagating in waveguides, due to relativistic ionization fronts produced inside the waveguide by intense laser pulses. This could lead to a continuous frequency shift in the X-ray domain.

MC39 • 2:00 p.m.
Bistability and chaos from a dual nonlinear optical loop mirror resonator, *Alan L. Steele; Carleton Univ., Canada.* A resonator composed of two nonlinear optical loop mirrors is investigated. The resonator exhibits bistability and instabilities, as well as the possibility of acting as an optical power limiter.

MC40 • 2:00 p.m.
Optimal duty cycle and asymmetric VSB filtering in a wavelength allocated DWDM CS-RZ transmission, *Ranjeet S. Bhamber, Sergei K. Turitsyn, Vladimir Mezentsev; Aston Univ., UK.* Impact of duty cycle on the optimisation of ultra-narrow VSB filtering in wavelength allocated CS-RZ Nx40Gbit/s DWDM transmission is investigated. A feasibility has been confirmed of over 600 km with 0.64 bit/s/Hz spectral efficiency.

MC41 • 2:00 p.m.
Impact of the fiber type and nonlinear management over the performance of a 16x40 Gb/s DWDM transmission system, *Erwan Pincemin[1], Didier Grot[1], Celine Borsier[1], Juan Diego Ania- Castañón[2], Sergei Turitsyn[2]; [1]France Telecom R&D, France, [2]Aston Univ., UK.* We examine impact of the fiber type and nonlinear management over the performance of a 16x40Gb/s DWDM NRZ transmission system. The line is constituted of 3x100km of G.652 or G.655 fiber with hybrid Raman-EDFA amplification.

MC42 • 2:00 p.m.
CW Raman pump broadening using modulational instability, *Tim J. Ellingham, Juan D. Ania-Castañón, O. Shtyrina, Michail P. Fedoruk, Sergei K. Turitsyn; Aston Univ., UK.* We examine theoretically and experimentally how the application of the modulation instability effect can be used to broaden CW Raman pump in order to achieve superior gain ripple performance in WDM transmission systems.

MC43 • 2:00 p.m.
Simulations and modeling of passive modelocking using a long period fiber grating, *J. Nathan Kutz, Karen Intrachat; Univ. of Washington, USA.* A modelocking technique is presented in which the intensity dependent, co-propagating, core and cladding mode-coupling dynamics of a long-period fiber grating is used to achieve modelocking in a passive optical fiber laser.

MC44 • 2:00 p.m.
2R and 3R optical regeneration in 40 Gbit/s WDM terrestrial networks, *Sonia Boscolo, Sergei K. Turitsyn, Vladimir K. Mezentsev; Photonics Res. Group, Aston Univ., UK.* We analyse a 2R regenerator using nonlinear-optical-loop-mirror and a 3R regenerator employing nonlinearly-enhanced amplitude

modulator in 40Gbit/s WDM networks based on standard fibre (SMF). Characterization of one- (600km of SMF) and two-step regeneration is presented.

MC45 • 2:00 p.m.
Analytical design of 160 Gbits/s densely dispersion-managed optical fiber transmission systems using Gaussian and raised cosine RZ ansätze, *A. Labruyère[1], P. Tchofo Dinda[1], A. B. Moubissi1, K. Nakkeeran[2], Y. H. Kwan[2], P. K. Wai[2]; [1]Lab. de Physique de l'Univ. de Bourgogne, France, [2]The Hong Kong Polytechnic Univ., Hong Kong Special Administrative Region of China.* We present an easy and efficient analytical method to design 160 Gbits/s densely dispersion-managed optical fiber transmission systems using Gaussian and raised cosine RZ ansätze.

MC46 • 2:00 p.m.
Dramatic pump depletion in a scalar modulation instability experiment, *Robert J. Kruhlak; Univ. of Auckland, New Zealand.* We report on a dramatic pump depletion in a modulation instability experiment on a photonic crystal fibre in the normal dispersion regime. Nonlinear Schrodinger simulations have been confirmed with experimental temporal profiles and pump-sideband crosscorrelations.

MC47 • 2:00 p.m.
Dark solitary waves in photorefractive multiple quantum well planar waveguide, *Andrzej Ziólkowski, Ewa Weinert-Raczka; Technical Univ. of Szczecin, Poland.* The possibility of dark solitary waves generation in a photorefractive slab waveguide based on a semi-insulating AlGaAs/GaAs MQW structure is analysed. The results based on transport equations and quadratic electro-optic effect are presented.

Harbour B and C
3:00 p.m.–3:30 p.m.
Coffee Break

Room: Harbour A
4:00 p.m.–6:15 p.m.
MD • Optical Amplifiers
Guy Millot, Univ. de Bourgogne, France, Presider

MD1 • 4:00 p.m.
"Cascade-Raman" soliton compression with 30-fs, Terawatt pulses, *Kale Beckwitt[1], Jeffrey A. Moses[1], Fatih O. Ilday[1], Frank W. Wise[1], John Nees[2], Erik Power[2], Keung H. Hong[2], Bixue Hou[2], Gerard Mourou[2]; [1]Cornell Univ., USA, [2]Univ. of Michigan, USA.* Theoretically, Raman-like soliton compression of mJ, 30-fs pulses is predicted. Initial experiments demonstrate 2 times compression of 1.3 TW/cm2 pulses under non-optimal conditions. The results agree closely with numerical simulations.

MD2 • 4:15 p.m.
Simultaneous achievement of polarization attraction and Raman amplification in optical fibers, *Stéphane Pitois, Alexandre Sauter, Guy Millot; Lab. de Physique, France.* We present a theoretical analysis and experimental demonstration of the combined effects of polarization attraction and Raman amplification in isotropic optical fibers. The polarization attraction is based on four-wave mixing interaction of counterpropagating waves.

MD3 • 4:30 p.m.
Cascaded Raman generation in optical fibers: Influence of chromatic dispersion and Rayleigh backscattering, *Frederique Vanholsbeeck[1], Stephane Coen[1], Philippe Emplit[1], Catherine Martinelli[2], Thibaut Sylvestre[3]; [1]Univ. Libre de Bruxelles, Belgium, [2]Alcatel Res. & Innovation, France, [3]Lab. d'Optique P. M. Duffieux, France.* We study experimentally and numerically how chromatic dispersion and Rayleigh backscattering influence cascaded Raman generation in optical fibers. We report higher Stokes orders at unexpected wavelengths and quenching of Rayleigh lasing lines by four-wave mixing.

MD4 • 4:45 p.m.

Multi-watt, continuous wave, continuum generation in dispersion shifted fiber by use of high power fiber source, *Pierre-Alain Champert, Vincent Couderc, Alain Barthélémy; Inst. de Recherche en Communication Optique et Microonde, UMR 6615 du CNRS, France.* A fully fiber integrated multiwatt broadband source is demonstrated using highly nonlinear dispersion shifted fibers pumped by a cw erbium fiber source. A broad 430 nm continuum at the -3dB level delivering 2.2W is obtained.

MD5 • 5:00 p.m.
Experimental properties of parabolic pulses generated via Raman amplification in standard optical fibers, *Christophe Finot[1], Stephane Pitois[1], Guy Millot[1], Cyril Billet[2], John Dudley[2]; [1]Lab. de Physique de l'Universite de Bourgogne, France, [2]Lab. d'Optique p.m. Duffieux de l'Universite de Franche Comte, France.* Parabolic pulses at 1550 nm have been generated in a standard telecommunications fiber using Raman amplification. The parabolic output pulse characteristics are studied as a function of input pulse energy and duration.

MD6 • 5:15 p.m.
Numerical modeling of four-wave mixing-assisted Raman fiber laser, *Frédérique Vanholsbeeck[1], Stéphane Coen[1], Philippe Emplit[1], Catherine Martinelli[2], Florence Leplingard[2], Sophie Borne[2], Dominique Bayart[2], Thibaut Sylvestre[3]; [1]Service d'optique et acoustique, Univ. Libre de Bruxelles, Belgium, [2]Alcatel R&I, France, [3]Lab. d'optique P.M. Duffieux, Univ. de Franche-Comte, France.* We present a new numerical model of cascaded Raman fiber lasers that takes into account four-wave mixing. New operating conditions are found when the laser dispersion is properly tuned, in good agreement with experimental results.

MD7 • 5:30 p.m.
Chaotic dissipative solitons as strange attractors, *Nail Akhmediev[1], Jose Maria Soto-Crespo[2], Adrian Ankiewicz[3]; [1]Optical Sciences Ctr., RSPhysSE, The Australian Natl. Univ., Australia, [2]Inst. de Optica, C.S.I.C., Spain, [3]Applied Photonics Group, RSPhysSE, The Australian Natl. Univ., Australia.* We study exploding solitons of the cubic-quintic Ginzburg-Landau (CGLE) equation and the regions of their existence. The soliton explodes intermittently, but it attracts the chaotic localized structures around it, thus acting as a 'strange attractor'.

MD8 • 5:45 p.m.
Self-similar evolution of parabolic pulses in a fiber laser, *Fatih Ö. Ilday, Joel R. Buckley, Frank W. Wise; Cornell Univ., USA.* A femtosecond fiber laser supporting self-similarly propagating parabolic pulses is demonstrated theoretically and experimentally. In addition to constituting another example of self-similarity, this new pulse shaping mechanism in principle allows scaling to unprecendented pulse energies.

MD9 • 6:00 p.m.
Period-doubling route to multiple-pulsing in femtosecond fiber lasers, *Fatih Ö. Ilday, Joel R. Buckley, Frank W. Wise; Cornell Univ., USA.* An analytical model, compatible with large changes, describes soliton mode-locking in fiber lasers. The predicted period-doubling route to multiple-pulsing is confirmed experimentally. The simple model explains the remarkable observation that chaos does not follow period-doubling.

Tuesday, March 30, 2004

Harbour Foyer
6:00 a.m.–8:00 a.m.
Continental Breakfast

Lobby
7:00 a.m.–6:00 p.m.
Registration

Harbour A
8:00 a.m.–10:00 a.m.

TuA • Switching and Materials
J. Stewart Aitchison, Univ. of Toronto, Canada, Presider

TuA1 • 8:00 a.m.
Low power transparent switching in quadratic nonlinear waveguide arrays, *Roland Schiek[1], Robert Iwanow[2], George I. Stegeman[2], Thomas Pertsch[3], Falk Lederer[3], Yoohong Min[4], Wolfgang Sohler[4]; [1]Univ. of Applied Sciences Regensburg, Germany, [2]CREOL/School of Optics, Univ. of Central Florida, USA, [3]Friedrich Schiller Univ., Germany, [4]Univ. of Paderborn, Germany.* Phase-insensitive all-optical switching and routing of low power optical signals without pulse break-up, based on parametric difference frequency generation in waveguide arrays, was experimentally investigated.

TuA2 • 8:15 a.m.
Ultra-fast reconfigurable spatial switching between a quadratic solitary wave and a weak signal, *P. Henri Pioger[1], Vincent Couderc[1], Alain Barthélémy[1], Fabio Baronio[2], Constantino De Angelis[2], Yoohong Min[3], Victor Quiring[3], Wolfgang Sohler[3]; [1]IRCOM, France, [2]INFM, Italy, [3]Angewandte Physik, Germany.* We present an ultra-fast reconfigurable switch based on the nonlinear interaction between a weak wave (the signal) and a solitary-wave (the control) at 1548nm. The non-collinear interaction gives birth to a third switched optical beam.

TuA3 • 8:30 a.m.
Parametric switching and frequency conversion in PPLN directional couplers, *Thomas Pertsch[1,2], Roland Schiek[3,1], Robert Iwanow[1], George Stegeman[1], Ulf Peschel[2], Falk Lederer[2], Yoohong Min[4], Werner Grundkötter[4], Wolfgang Sohler[4]; [1]School of Optics/CREOL, USA, [2]Friedrich-Schiller-Univ., Germany, [3]Univ. of Applied Sciences, Germany, [4]Univ. Paderborn, Germany.* Ultrafast all-optical switching is experimentally demonstrated based on quadratic parametric interaction in PPLN waveguide couplers. Transparent on/off switching and frequency conversion of milliwatt signals at 1550 nm is achieved with 2 W switching power.

TuA4 • 8:45 a.m.
Condensation in parametric wave interaction, *Antonio Picozzi[1], Marc Haelterman[2]; [1]Lab. de Physique de la Matière Condenseé, France, [2]Univ. Libre de Bruxelles, Belgium.* The parametric generation process driven from an incoherent pump exhibits a condensation phenomenon characterized by a sudden transition of coherence in which the incoherent pump and incoherent signal waves, spontaneously evolve towards highly coherent states.

TuA5 • 9:00 a.m.
Quasi-phase-matched second harmonic generation with picosecond pulses in GaAs/AlAs superlattice waveguides, *David C. Hutchings[1], Marc Sorel[1], Khalil Zeaiter[1], Aaron Zilkie[2], Bert Leesti[2], Amr Saher Helmy[2], Peter Smith[2], Stewart Aitchison[2]; [1]Univ. of Glasgow, UK, [2]Univ. of Toronto, Canada.* First-order, quasi-phase-matched second harmonic generation is demonstrated with picosecond pulses in a GaAs/AlAs superlattice waveguide where the modulation in the bulk-like second order susceptibility is realised by ion-implantation induced intermixing.

TuA6 • 9:15 a.m.
Nonlinear refractive index of As_2S_3 channel waveguides at 1.55 µm, *Jacques M. Laniel[1], Nicolas Hô[1], Réal Vallée[1], Alain Villeneuve[2]; [1]COPL, Univ. Laval, Canada, [2]ITF Optical Tech., Canada.* The nonlinear refractive index (n_2) of As_2S_3 channel waveguide has been measured at 1.55 µm. This measurement has been done in photodarkened and non photodarkened etched thin films.

TuA7 • 9:30 a.m.
Semiconductor superlattice waveguides: A universal testbed for nonlinear guided waves, *David C. Hutchings; Univ. of Glasgow, UK.* Sub-half-bandgap nonlinear refraction is considered for semiconductor superlattice waveguides, previously designed for quasi-phase-matched frequency conversion. A highly anisotropic dependence is obtained. Intermixing allows selective area definition of the nonlinear response.

TuA8 • 9:45 a.m.

Nonlinear modes and phase singularities of left-handed (Veselago) waveguides, *Allan D. Boardman, Peter Egan, Larry N. Velasco; Univ. of Salford, UK.* The nonlinear modes of complex open and closed waveguides containing left-handed, Veselago, materials are investigated. Critical parameters controlling the power flow are discovered. Complex guides containing vortices are investigated using a finite element method.

Harbour B and C
10:00 a.m.–10:30 a.m.
Coffee Break and Exhibits

Harbour A
10:30 a.m.–12:30 p.m.
TuB • Effects in Nonlinear Media
Neil Broderick, Univ. of Southampton, UK, Presider

TuB1 • 10:30:00 a.m.
Nonlinearly induced single mode behavior in multi-mode fibers, *Stefan Skupin[1], Ulf Peschel[1], Luc Berge[2], Falk Lederer[1]; [1]Friedrich-Schiller-Univ. Jena, Germany, [2]CEA/DAM Ile de France, France.* We derive an analytical stability criterion for weakly nonlinear modes of arbitrary waveguiding structures. By varying the strength of the guiding potential we can turn stable into unstable modes and vice versa.

TuB2 • 10:45:00 a.m.
Normal dispersion fibre-enhanced nonlinear optical loop mirror for 2R regeneration and phase margin improvement, *Sonia Boscolo, Sergei K. Turitsyn; Photonics Res. Group, Aston Univ., UK.* A novel all-optical regeneration technique using loop-mirror intensity-filtering and nonlinear broadening in normal-dispersion fibre is described. The device offers 2R-regeneration function and phase margin improvement. The technique is applied to 40Gbit/s return-to-zero optical data streams.

TuB3 • 11:00 a.m.
A novel quantization scheme by slicing supercontinuum spectrum for all-optical analog-to-digital conversion, *Sho-ichiro Oda, Shu-ichi Okamoto, Akihiro Maruta; Graduate School of Engineering, Osaka Univ., Japan.* We propose a novel quantization scheme for all-optical analog-to-digital conversion. The quantization is achieved by slicing the supercontinuum spectrum in which broadened spectral width depends on the peak power of the input pulse.

TuB4 • 11:15:00 a.m.
Experimental demonstration of fiber-optic lines with symmetric dispersion profiles for 160 Gbit/s terrestrial transmission systems, *Julien Fatome[1], Stephane Pitois[1], Patrice Tchofo Dinda[1], Guy Millot[1], Esther Le Rouzic[2], Benjamin Cuenot[2], Erwan Pincemin[2], Stephane Gosselin[2]; [1]Lab. de Physique, France, [2]France Telecom R&D, France.* We demonstrate both theoretically and experimentally that a fiber line with a symmetric dispersion swing can substantially improve the performance of classical 160 Gbit/s optical terrestrial transmission systems.

TuB5 • 11:30:00 a.m.
Theory of carrier-envelope phase slip for ultrashort dispersion managed solitons, *Boaz Ilan[1], Mark J. Ablowitz[1], Steven T. Cundiff[1,2]; [1]Univ. of Colorado at Boulder, USA, [2]JILA, Natl. Inst. of Standards and Tech., USA.* Phase dynamics of dispersion managed ultrashort-pulsed solitons is studied. The carrier-envelope phase slip induced by nonlinear dispersive effects is shown to saturate for strong dispersion maps.

TuB6 • 11:45:00 a.m.
Slow waves in linear and nonlinear photonic crystal waveguides: Figures of merit, *Jacob B. Khurgin, Jin U. Kang; Johns Hopkins Univ., USA.* Performance of the optical delay lines and nonlinear devices based on slow wave propagation in photonic crystal waveguides in the presence of higher order dispersion is analyzed and compared with other slow light schemes.

TuB7 • 12:00 p.m.

Transition radiation by matter-wave solitons in optical lattices, *Alexey V. Yulin, Dmitry V. Skryabin, Philip St.J. Russell; Physics Dept., Univ. of Bath, UK.* We demonstrate that matter-wave solitary pulses formed from Bose condensed atoms in optical lattices continuously radiate dispersive matter waves. This radiation exists universally for solitons moving through the lattice with arbitrary small but non-zero velocities.

TuB8 • 12:15 p.m.
Three-dimensional localized waves of the X-type in periodic media, *Claudio Conti[1], Stefano Trillo[2]; [1]Natl. Inst. for the Physics of Matter, Italy, [2]Univ. of Ferrara, Italy.* We show that X waves can play a fundamental role in the propagation of 3D wave-packets along periodic media. These results have relevance for both photonics crystals and Bose-Einstein condensation.

12:30 p.m.–2:00 p.m.
Lunch Break (on your own)

Harbour B and C
2:00 a.m.–4:00 p.m.
TuC • Poster Session II

TuC1 • 2:00 p.m.
Rotating and Fugitive Cavity Solitons in semiconductor microresonators, *Reza Kheradmand[1], Giovanna Tissoni[2], Luigi A. Lugiato[2], Massimo Brambilla[3]; [1]Ctr. for Applied Physics and Astronomical Res., Univ. of Tabriz, Iran (Islamic Republic of), [2]INFM, Dept. di Scienze, Univ. dell'Insubria, Italy, [3]INFM, Dept. di Fisica Interateneo, Univ. e Politecnico di Bari, Italy.* We describe different methods that exploit the intrinsic mobility of cavity solitons to realize periodic motion. Furthermore, under thermally-induced motion, they may perform a random walk in presence of a 2D phase profile (Fugitive Solitons).

TuC2 • 2:00 p.m.
Interacting solitons in multilayered Kerr slab waveguide: All-optical logic, *Jacob Scheuer[1], Meir Orenstein[2]; [1]Dept. of Applied Physics, Caltech, USA, [2]EE Dept., Technion, Israel.* Soliton interactions in inhomogeneous Kerr slab waveguide are exploited to realize efficient, cascadable and reversible all-optical logic operations. A complete set of logic gates: NOT, AND, OR and NOR was constructed and theoretically studied.

TuC3 • 2:00 p.m.
Cavity solitons in reverse gear, *Graeme McCartney, John Jeffers, Andrew Scroggie, Gian-Luca Oppo; Dept. of Physics, Univ. of Strathclyde, UK.* We study cavity solitons in optical parametric oscillators in the presence of a phase modulated pump. An abrupt change in their direction of motion and final destination occurs with increasing wavenumber of the phase modulation.

TuC4 • 2:00 p.m.
A nonlocal description of two-color parametric solitons, *Nikola I. Nikolov[1], Dragomir Neshev[2], Ole Bang[3], Wieslaw Z. Królikowski[4], John Wyller[5]; [1]Risø Natl. Lab., Tech. Univ. of Denmark, Denmark, [2]CUDOS and Nonlinear Physics Group, The Australian Natl. Univ., Australia, [3]Res. Ctr. COM, Tech. Univ. of Denmark, Denmark, [4]CUDOS and Laser Physics Ctr., The Australian Natl. Univ., Australia, [5]Dept. of Mathematical Sciences, Agricultural Univ. of Norway, Norway.* We show that two-color parametric solitons are equivalent to nonlocal solitons in terms of the profiles of stationary solutions. We confirm numerically how the dynamical properties of solitons might be different in the two systems.

TuC5 • 2:00 p.m.
Spatial bright-dark solitons in transversely magnetized coupled waveguides, *Allan D. Boardman, Ming Xie; Univ. of Salford, UK.* The manner in which the stability of magneto-optic spatial bright-dark soliton states in coupled waveguides can be exploited to give guaranteed isolator protection in monolithic integrated optical circuit applications is investigated.

TuC6 • 2:00 p.m.

Noise-immune universal computation using Manakov soliton collision cycles, *Darren Rand, Ken Steiglitz, Paul R. Prucnal; Princeton Univ., USA.* We show that bistable collision cycles of Manakov solitons are capable of universal, all-optical computation with state restoration. NAND gates and FANOUT are realized by soliton collisions in a homogeneous nonlinear medium.

TuC7 • 2:00 p.m.
Self-focusing and azimuthal instabilities in graded-index optical fibers, *Stefano Longhi, Davide Janner, Paolo Laporta; Politecnico di Milano, Italy.* A comprehensive analysis of self-focusing in parabolic-index optical fibers is given. As the fundamental nonlinear fiber mode turns out to be stable, higher-order nonlinear modes suffer from a transverse symmetry-breaking (azimuthal) instability at low thresholds.

TuC8 • 2:00 p.m.
Instabilities of counterpropagating spatial solitons, *Kristian Motzek[1], Friedemann Kaiser[1], Philip Jander[2], Anton S. Desyatnikov[2], Cornelia Denz[2], Milivoj R. Belic[3]; [1]Darmstadt Univ. of Technology, Germany, [2]Westfaelische Wilhelms-Univ., Germany, [3]Inst. of Physics, Yugoslavia.* We investigate the temporal stability of counterpropagating spatial solitons in saturable self-focusing media numerically and explain the results using a simplified linear model of soliton counterpropagation.

TuC9 • 2:00 p.m.
Observation of the optical components inherent in non-collinear four-wave coupled states, *Alexandre S. Shcherbakov, Arturo Aguirre Lopez; Natl. Inst. for Astrophysics, Optics & Electronics, Mexico.* Optical components of four-wave Bragg spatial solitons in the form of coupled states, originating with a two-phonon non-collinear scattering of light in uniaxial crystal, are uncovered. Their space-frequency distributions are investigated theoretically and observed experimentally.

TuC10 • 2:00 p.m.
Stability of vortex solitons in a 2D photorefractive optical lattice, *Jianke Yang; Univ. of Vermont, USA.* Stability of off-site vortex solitons in a photorefractive optical lattice is analyzed. We show that such solitons are linearly unstable in both the high and low intensity regimes, but are stable in the moderate-intensity regime.

TuC11 • 2:00 p.m.
Optical light bullets in a pure Kerr medium, *Gadi Fibich[1], Boaz Ilan[2]; [1]Tel Aviv Univ., Israel, [2]Univ. of Colorado at Boulder, USA.* The existence of optical bullets in planar waveguide Kerr media is predicted theoretically and verified numerically. These non-dissipative bullets are stabilized by small negative fourth-order dispersion and undergo elastic collisions.

TuC12 • 2:00 p.m.
Spatially-chaotic cavity soliton complexes, *William J. Firth, Damia Gomila, John M. McSloy, Andrew J. Scroggie; Dept. of Physics, Univ. of Strathclyde, UK.* We analyze cavity soliton complexes as patterns containing an arbitrary distribution of defects. Their co-existence and stability range is identified and analyzed for simple models, and interpreted as a spatial analogue of chaotic dynamics.

TuC13 • 2:00 p.m.
Ultrafast nonresonant third-order optical nonlinearities in ZnSe for photonic switching at telecom wavelengths, *Arkady A. Major[1], Fumiyo Yoshino[1], J. Stewart Aitchison[1], Peter W.E. Smith[1], Irina T. Sorokina[2], Evgeni Sorokin[2]; [1]Univ. of Toronto, Canada, [2]Technische Univ. Wien, Austria.* We report the steady-state and time-resolved z-scan measurements of the nonresonant third-order optical nonlinearities in ZnSe at telecom wavelengths. The measurements demonstrate that ZnSe could be successfully used for ultrafast all-optical switching at 1550 nm.

TuC14 • 2:00 p.m.
Stopping and bending light in 2D photonic structures, *Alejandro B. Aceves, Tomáš Dohnal; Dept. of Mathematics and Statistics, Univ. of New Mexico, USA.* We present results on the problem of optical pulses interacting with localized defects in 2D photonic structures, where the grating in the direction of propagation is in Bragg resonance with the electric field.

TuC15 • 2:00 p.m.
Polarized optical vortex solitons in inhomogeneous magnetic fields, *Allan D. Boardman, Larry N. Velasco, Peter Egan; Univ. of Salford, UK.* Polarized Faraday optical vortex solitons are simulated. The simulations are supported by variational analysis and linear stability theory. Novel features emerge that depend upon the polarization selected and the type of magnetic field inhomogeneity.

TuC16 • 2:00 p.m.
Dissipative magneto-optic solitons, *Allan D. Boardman[1], Larry Velasco[1], Peter Egan[1], Boris Malomed[2]; [1]Univ. of Salford, UK, [2]Tel Aviv Univ., Israel.* Dissipative magneto-optic spatial solitons are investigated using a cubic-quintic optical nonlinearity, coupled to a loss-gain balance, and a pumped optical cavity. It is shown how the magnetic field creates a highly desirable control option.

TuC17 • 2:00 p.m.
Spatial soliton collisions at arbitrary angles, *Pedro Chamorro-Posada[1], Graham S. McDonald[2]; [1]Universidad de Valladolid, Spain, [2]Univ. of Salford, UK.* The geometries of soliton collisions reveal symmetries that cannot be reproduced by previous descriptions based on the NLS equation. We present consistent results, based on the nonlinear Helmholtz equation, valid for arbitrary angles.

TuC18 • 2:00 p.m.
Spatial solitons in quasi-phase-matched quadratic media: An asymptotic approach, *Edward D. Farnum, J. Nathan Kutz; Univ. of Washington, USA.* Previous work in producing Kerr effects in quadratic materials focused on deriving averaged systems of cubic equations. Instead, we use an asymptotic approach which captures the fast behavior, and gives conditions for slow evolution.

TuC19 • 2:00 p.m.
Soliton self-reflection at a quadratically nonlinear interface, *Ladislav Jankovic[1], Hongki Kim[1], George I. Stegeman[1], Silvia Carrasco[2], Lluis Torner[2], Mordechai Katz[3]; [1]School of Optics/CREOL, USA, [2]Univ. Politecnica de Catalunya, Spain, [3]Electro-Optics Div., Soreq NRC, Israel.* The reflection of quadratic spatial solitons by a QPM engineered, quadratically nonlinear interface was observed for the first time. The reflection occurred at higher input intensities while for the low intensities the beam was transmitted.

TuC20 • 2:00 p.m.
Measurement of the self-consistent waveguide of an accessible soliton, *Xavier Hutsebaut[1], Cyril Cambournac[1], Marc Haelterman[1], Jeroen Beeckman[2], Kristiaan Neyts[2]; [1]Univ. Libre de Bruxelles, Belgium, [2]Universiteit Gent, Belgium.* Using phase-measurement interferometry we observe the self-induced waveguide of a nematicon. The measured high nonlocality of the reorientational nonlinearity of our nematic liquid crystal agrees with our (2+1)-D numerical simulation.

TuC21 • 2:00 p.m.
Extended filamentation of ultrashort pulses in the presence of anomalous group-velocity dispersion, *Kevin D. Moll, Luat Vuong, Yoshi Okawachi, Alexander L. Gaeta; Cornell Univ., USA.* We have investigated the self-guiding of ultrafast pulses in bulk media in the anomalous-dispersion regime and find that individual collapse events remain confined for significantly longer distances than pulses in the normal group-velocity dispersion regime.

TuC22 • 2:00 p.m.
Stripe composite solitons in two-dimensional nonlinear photonic lattices, *Dragomir N. Neshev[1], Yuri S. Kivshar[1], Hector Martin[2], Zhigang Chen[2]; [1]Nonlinear Physics Group, RSPhysSE, Australian Natl. Univ., Australia, [2]Dept. of Physics and Astronomy, San Francisco State Univ., USA.* We study experimentally the interaction of a quasi-one-dimensional soliton-stripe with a two-dimensional nonlinear photonic lattice. We observe a novel type of composite soliton created by strong coupling of mutually incoherent periodic and localized beam components.

TuC23 • 2:00 p.m.

Reflection of quadratic solitons at a PPLN/LiNbO3 interface, *Fabio Baronio[1], Constantino De Angelisi[1], P. Henri Pioger[2], Vincent Couderc[2], Alain Barthelemy[2]; [1]INFM, Italy, [2]IRCOM, France.* The dynamics of beams incident on a PPLN/$LiNbO_3$ interface is considered; in the whole device the linear refractive index is homogeneous. Linear beam transmission and soliton reflection at the phase-mismatched boundary are described.

TuC24 • 2:00 p.m.
Vectorial solitons and higher-order localized states in a single-mirror feedback system, *Matthias Pesch, Thorsten Ackemann, Edgar Große Westhoff, Wulfhard Lange; Inst. für Angewandte Physik, Germany.* The experimental observation of vector dissipative solitons in a single-mirror scheme based on sodium vapor is reported and compared to simulations. A second order soliton state is obtained.

TuC25 • 2:00 p.m.
Bloch oscillations and solitons in Discrete Ginzburg-Landau lattices, *Nikolaos K. Efremidis, Jared Hudock, Demetrios N. Christodoulides; School of Optics/CREOL, USA.* We demonstrate that Bloch oscillations and discrete solitons are possible in laser arrays described by Ginzburg-Landau lattices.

TuC26 • 2:00 p.m.
Numerical and experimental investigations of vector soliton bound-states in a Kerr planar waveguide, *Michael Delqué, Mathieu Chauvet, Hervé Maillotte, Thibaut Sylvestre; Lab. d'Optique P.M. Duffieux, France.* We investigate both numerically and experimentally the stability of a three-hump multimode vector soliton propagating in a Kerr planar waveguide. Strongly different output intensity patterns caused by symmetry-breaking instability are observed.

TuC27 • 2:00 p.m.
Stability of optical vortices with integer spin, *Lubomir Kovachev, Luben Ivanov, Dobri Simeonov, Todor Arabadzhiev; Bulgarian Academy of Sciences, Bulgaria.* The present work shows that vector version of 3D+1 Nonlinear Schredinger Equation (VNSE) admit exact vortex solutions. The numerical calculations shows that vortices are stable and propagate without any change of their shape.

TuC28 • 2:00 p.m.
Filamentation of femtosecond pulses in air: Turbulent short-scale cells versus long-range clusters, *Stefan Skupin[1], Luc Berge[2], Ulf Peschel[1], Falk Lederer[1]; [1]IFTO, Germany, [2]CEA/DAM, France.* The filamentation of ultrashort pulses in air is investigated. The evolution of these filaments can be approximated by a two-dimensional reduced model. Results from this model are confronted with 3D+1 space-and-time resolved numerical simulations.

TuC29 • 2:00 p.m.
Discrete dissipative solitons, *Ken-ichi Maruno[1], Adrian Ankiewicz[2], Nail Akhmediev[3]; [1]Graduate School of Mathematics, Kyushu Univ., Japan, [2]Applied Photonics Group, Res. School of Physical Sciences and Engineering, The Australian Natl. Univ., Australia, [3]Optical Sciences Ctr., Res. School of Physical Sciences and Engineering, The Australian Natl. Univ., Australia.* We study, analytically, the discrete complex cubic Ginzburg-Landau (dCCGL) equation.We have found a set of exact solutions which includes, periodic solutions in terms of elliptic Jacobi functions, and bright and dark soliton solutions.

TuC30 • 2:00 p.m.
Linear and cubic nonlinear properties of AlGaAs multimode waveguides, *Daniele Modotto[1], Costantino De Angelis[1], Marco A. Magaña-Cervantes[2], Richard M. De La Rue[2], Roberto Morandotti[3], Stefan Linden[4], Jessica P. Mondia[4], Henry M. Van Driel[4], J. Stewart Aitchison[4]; [1]Univ. di Brescia, Italy, [2]Univ. of Glasgow, UK, [3]Univ. du Québec, Canada, [4]Univ. of Toronto, Canada.* We report on the behavior of an AlGaAs multimode ridge waveguide when excited by a laser beam at different incident angles. We show that the output distribution varies with the input intensity.

TuC31 • 2:00 p.m.
Multiple filamentation induced by input-beam astigmatism, *Audrius Dubietis[1], Gintaras Tamosauskas[1], Fibich Gadi[2], Boaz Ilan[3]; [1]Vilnius Univ., Lithuania, [2]Tel Aviv Univ., Israel, [3]Univ. of Colorado, USA.* We

provide the first experimental evidence that multiple filamentation (MF) can be induced by input beam astigmatism. The MF pattern induced by astigmatism is reproducible shot to shot, and can dominate the effect of noise.

TuC32 • 2:00 p.m.
Modulational instabilities of partially incoherent light, *Dan Anderson, Lukasz Helczynski-Wolf, Mietek Lisak, Vladimir E. Semenov; Dept. of Electromagnetics, Sweden.* It is found that the consequences of the partial incoherence for the modulational (longitudinal and transversal) instability depend crucially on the form of the incoherence spectrum. Qualitatively different behavior may be observed for increasing incoherence.

TuC33 • 2:00 p.m.
Ising-Bloch transition in 2D degenerate wave mixing, *Yevgeniya Larionova[1], Ulf Peschel[2], Adolfo Esteban-Martin[3], Carl Otto Weiss[1]; [1]Physikalisch-Technische Bundesanstalt, Germany, [2]Inst. für Festkörpertheorie und Theoretische Optik, Germany, [3]Univ. de València, Spain.* We show experimentally and theoretically the existence of a 2D Ising-Bloch transition in the field generated by degenerate four wave mixing in a $BaTiO_3$-resonator.

TuC34 • 2:00 p.m.
Cavity solitons in driven VCSELs above threshold, *Giovanna Tissoni[1], Luigi A. Lugiato[1], Igor Protsenko[2], Reza Kheradmand[3], Massimo Brambilla[4]; [1]INFM, Dept. di Scienze, Univ. dell'Insubria, Italy, [2]Lebedev Physics Inst., Russia Ctr. for Applied Res., JINR, Russian Federation, [3]ICtr. for Applied Physics and Astronomical Res., Univ. of Tabriz, Iran (Islamic Republic of), [4]INFM, Dept. di Fisica Interateneo, Univ. e Politecnico di Bari, Italy.* We predict here the existence of cavity solitons in externally driven vertical-cavity semiconductor lasers above threshold. They are sitting on an unstable background, characterised by a Hopf instability.

TuC35 • 2:00 p.m.
Effective THz signal generation in one-dimensional photonic band gap structures arranged into THz superlattice, *Evgeny V. Petrov, Vladimir A. Bushuev, Boris I. Mantsyzov; Physics Dept., M.V.Lomonosov Moscow State Univ., Russian Federation.* Enhancement of THz signal generated in photonic band gap structures is studied. It is shown possibility of increasing generated THz signal intensity significantly due to arrangement of these structures into superlattice with THz spatial period.

TuC36 • 2:00 p.m.
Diffraction management and elliptic discrete solitons in two-dimensional waveguide arrays, *Jared Hudock, Nikolaos K. Efremidis, Demetrios N. Christodoulides; School of Optics/Creol, Univ. of Central Florida, USA.* We demonstrate that the linear and nonlinear dynamics of two-dimensional waveguide arrays are significantly more complex than their one-dimensional counterparts. Their diffraction behavior is anisotropic allowing the existence of discrete elliptic solitons in nonlinear arrays.

TuC37 • 2:00 p.m.
Incoherent control over coherent gap soliton in a one-dimensional resonant photonic crystal, *Igor V. Mel'nikov[1], J. Stewart Aitchison[1], Boris I. Mantsyzov[2]; [1]Dept. of Electrical and Computer Engineering, Univ. of Toronto, Canada, [2]Dept. of Gen. Physics, M. V. Lomonosov Moscow State Univ., Russian Federation.* We consider the stability of Bragg solitons in a resonant photonic crystal and show that slow gap solitons can be steered by means of incoherent pump of its small length.

TuC38 • 2:00 p.m.
Influence of inhomogeneities on wavelength selection of flower-like patterns in wide-aperture lasers, *Igor V. Babushkin[1], Natalia A. Loiko[1], Thorsten Ackemann[2]; [1]Inst. of Physics, Belarus, [2]Univ. of Muenster, Inst. fuer Angewandte Physik, Germany.* We show that the wavelength selection of flower-like patterns near the threshold of wide-aperture lasers (e.g. VCSELs) is governed not only by the detuning, but also by spatial inhomogeneities, e.g. of the pump profile.

TuC39 • 2:00 p.m.

Coupled circular arrays of optical amplifiers, *Kyriakos Hizanidis[1], Sotiris Droulias[1], Ilias Tsopelas[1], Nikos Efremidis[2], Demetrios Christodoulides[2]; [1]Natl. Technical Univ. of Athens, Greece, [2]School of Optics/CREOL, USA.* A circular array of optical amplifiers coupled with a central core is proposed. Nonlinear losses and energy tunneling within the array elements and the core are present fascilitating the existence of highly localized modes.

TuC40 • 2:00 p.m.
Pulse propagation and compression in nonlinear periodic structures with resonant saturable nonlinearities, *Tim K. L. Wong, Lukasz Brzozowski, Edward H. Sargent, J. Stewart Aitchison; Univ. of Toronto, Canada.* We develop a model to describe pulse propagation in nonlinear periodic structures consisting of resonant nonlinear materials with saturable absorption and refraction. We investigate the energy transmittance, reflectance and pulse compression.

TuC41 • 2:00 p.m.
Second-harmonic generation with ultrashort pump pulses in photonic bandgap structures, *Andrea Locatelli[1], Daniele Modotto[1], Costantino De Angelis[1], Filippo Maria Pigozzo[2], Antonio-Daniele Capobianco[1]; [1]Istituto Nazionale per la Fisica della Materia, Italy, [2]Univ. di Udine, Italy.* We numerically study the process of second-harmonic generation in one-dimensional photonic bandgap structures pumped by ultrashort pulses. Our analysis highlights reduced conversion efficiency and pulses distorsions, giving useful guidelines for the design.

TuC42 • 2:00 p.m.
Localized excitations of low dimensional Bose-Einstein condensates in optical lattices, *Fatkhulla Abdullaev[1], Mario Salerno[2]; [1]Physical-Technical Inst. of the Uzbekistan Academy of Sciences, Uzbekistan, [2]Universita di Salerno, Italy.* Existence of localized states of 1D NLS equation with quintic nonlinearity and optical lattices is investigated. Optical lattices prevent a collapse in attractive case and lead to existence of bright solitons for the repulsive case.

TuC43 • 2:00 p.m.
Lateral displacement of beams in transversely engineered Ti:PPLN waveguides, *Fabio Baronio[1], Constantino De Angelis[1], P. Henri Pioger[2], Vincent Couderc[2], Alain Barthelemy[2], Wolfang Sohler[3], Yoohong Min[3], Victor Quiring[3]; [1]INFM, Italy, [2]IRCOM, France, [3]Angewandte Physik, Germany.* The spatial dynamics of beams at the interface between two PPLN regions with different poling period is considered. We demonstrate numerically and experimentally intensity and phase-mismatch dependent spatial control of picosecond pulses at 1549nm.

TuC44 • 2:00 p.m.
Strongly localized discrete solitons in photonic crystals, *Rumen Iliew, Christoph Etrich, Ulf Peschel, Falk Lederer; IFTO, Germany.* Based on discrete soliton solutions of the tight-binding model in photonic crystals we prove their existence by a genuine numerical experiment using fully-vectorial finite-difference time-domain simulations. We identify cases where the tight binding model fails.

TuC45 • 2:00 p.m.
A novel photonic crystal flip-flop device, *Björn Maes, Peter Bienstman, Roel Baets; Ghent Univ. - IMEC, Belgium.* We numerically show memory operation of a novel photonic crystal structure. Its working principle is based on the interference feedback between two bistable Kerr nonlinear switches. Only positive input signals are required for flip-flop action.

TuC46 • 2:00 p.m.
Inhibition of pattern formation and novel localized structures using intracavity photonic crystals, *Damià Gomila, Roberta Zambrini, Gian-Luca Oppo; Dept. of Physics, Univ. of Strathclyde, UK.* Spatial structures are studied in a nonlinear cavity with a photonic crystal. Pattern formation is inhibited via the creation of a photonic band-gap. A novel mechanism of light localization due to defects is described.

TuC47 • 2:00 p.m.

Optical parametric oscillations in photonic crystal microcavities: 3D time-domain analysis, *Claudio Conti, Andrea Di Falco, Gaetano Assanto; Italian Inst. for the Physics of Matter, Italy.* We investigate optical parametric oscillations via four-wave mixing in photonic crystals. Using a vectorial 3D time-domain approach, including dispersion and nonlinearity, we demonstrate OPO's with inverted opals and photonic crystal membranes in isotropic media.

TuC48 • 2:00 p.m.
Discrete vortices: soliton clusters with a nontrivial phase, *Tristram J. Alexander, Andrey A. Sukhorukov, Yuri S. Kivshar; Australian Natl. Univ., Australia.* We derive the general conditions for the existence of symmetric and asymmetric (unconventional) lattice vortices in the form of coupled soliton bound states, and demonstrate novel types of dynamically robust rhomboid and triangular discrete vortices.

TuC49 • 2:00 p.m.
Noise-induced synchronization of transverse modes in wide-aperture lasers, *Giovanni A. Tapang, Francesco Papoff, Gian-Luca Oppo, William Firth; Dept. of Physics, Univ. of Strathclyde, UK.* Noise-induced synchronization in a multi-transverse mode laser with pump noise leads to a 52% improvement of the beam quality factor and is explained in terms of phase-locking of the active modes.

TuC50 • 2:00 p.m.
Diffractionless optical micro-circuitry in an inverse opal photonic band gap heterostructure, *Alongkarn Chutinan, Sajeev John; Dept. of Physics, Univ. of Toronto, Canada.* A design for photonic crystal all-optical micro-chips based on inverse opal photonic bandgap heterostructures is presented. Within the micro-circuit layer, we demonstrate single-mode waveguiding of light in air, throughout a bandwidth of >70nm near 1.55μm.

Harbour B and C
3:00 p.m.–3:30 p.m.
Coffee Break

Harbour A
4:00 p.m.–6:00 p.m.
TuD • Spatial Solitons and Transverse Effects I
John Dudley, Univ. de Franche Comte, France, Presider

TuD1 • 4:00 p.m.
Coherent interactions between dissipative spatial solitons, *Erdem A. Ultanir[1], Zhuo Chen[1], George I. Stegeman[1], Christoph H. Lange[2], Falk Lederer[2]; [1]Creol/School of Optics, USA, [2]Friedrich-Schiller-Univ. Jena, Germany.* We report the observation of interactions between two coherent dissipative spatial solitons in a periodically patterned semiconductor optical amplifier (PPSOA). The interactions are non-local and phase dependent and exhibit surprising features such as soliton birth.

TuD2 • 4:15 p.m.
Space-time dynamics of ultrashort light pulses in water, *Aidas Matijosius[1], Rimtautas Piskarskas[1], Audrius Dubietis[1], Jose Trull[2], Arunas Varanavicius[1], Algis Piskarskas[1], Paolo Di Trapani[3]; 1Deapartment of Quantum Electronics, Vilnius Univ., Lithuania, [2]Departament de Fisica i Enginyeria Nuclear, Univ. Politecnica de Catalunya, Spain, [3]Istituto Nazionale di Fisica della Materia and Dept. of Physics, Univ. of Insubria, Italy.* We experimentally study space-time transformation of 150-fs pulse, which undergoes self-focusing and filamentation in water by means of the nonlinear gating technique and provide full characterization of the resultant wave packet.

TuD3 • 4:30 p.m.
Modulational instability and spontaneous pattern formation with incoherent "white" light, *Tal Schwartz, Hrvoje Buljan, Tal Carmon, Mordechai Segev; Technion, Israel.* We present the first experimental evidence of modulational instability and spontaneous pattern formation with spatially and temporally incoherent “white” light emitted from an incandescent light bulb.

TuD4 • 4:45 p.m.
Two dimensional modulational instability in photorefractive media, *Mark Saffman[1], Glen McCarthy[2], Wieslaw Krolikowski[2]; [1]Univ. of Wisconsin, USA, [2]Laser Physics Ctr., Australia.* We investigate the modulational instability of beams in photorefractive media and present a linear approximation for the instability growth rate. We validate this approximation numerically and also experimentally in a strontium barium niobate crystal.

TuD5 • 5:00 p.m.
Partially incoherent optical vortices in self-focusing nonlinear media, *Chien-Chung Jeng[1], Ming-Feng Shih[1], Kristian Motzek[2], Yuri S. Kivshar[3]; [1]Natl. Taiwan Univ., Taiwan Republic of China, [2]Darmstadt Univ. of Technology, Germany, [3]Australian Natl. Univ., Australia.* We observe stable propagation of spatially localized single- and double-charge optical vortices of partially incoherent light in self-focusing nonlinear media. We confirm the vortex stabilization numerically and show similar stabilization mechanism for higher-order vortices.

TuD6 • 5:15 p.m.
Nonlocal modulation instability with partially incoherent light in nematic liquid crystals, *Gaetano Assanto, Emiliano Alberici, Marco Peccianti; Italian Inst. for the Physics of Matter, Italy.* In nonlinear optics, spatial transverse modulation instability depends on the coherence of the optical excitation. We report the experimental investigation of one-dimensional modulation instability in nematic liquid crystals using a partially incoherent beam.

TuD7 • 5:30 p.m.
Observation of elliptic incoherent spatial solitons, *Omer Katz[1], Tal Carmon[1], Tal Schwartz[1], Mordechai Segev[1], Demetrios N. Christodoulides[2]; [1]Technion - Israel Inst. of Technology, Israel, [2]CREOL - Univ. of Central Florida, USA.* We present the first experimental observation of spatially-incoherent elliptic solitons. We use partially-spatially-incoherent light with anisotropic correlation statistics, and observe elliptic solitons supported by the photorefractive screening nonlinearity.

TuD8 • 5:45 p.m.
Light filaments without self-guiding, *Audrius Dubietis[1], Eugenijus Gaizauskas[1], Ernestas Kucinskas[1], Gintaras Tamosauskas[1], Paolo Di Trapani[2]; [1]Dept. of Quantum Electronics, Vilnius Univ., Lithuania, [2]Istituto Nazionale di Fisica della Materia and Dept. of Physics, Univ. of Insubria, Italy.* Water light filaments appear from the spontaneous transformation of extended beams driven by the request of maximum stationarity and minimum losses in the presence and multi-photon absorption, without key role of plasma defocusing effects.

Regatta
6:30 p.m.–8:30 p.m.
Conference Reception

Wednesday, March 31, 2004

Harbour Foyer
6:00 a.m.–8:00 a.m.
Continental Breakfast

Concourse
7:30 a.m.–6:00 p.m.
Registration

Harbour A
8:00 a.m.–10:00 a.m.
WA • Spatial Solitons and Transverse Effects II
Gaetano Assanto, Italian Inst. for the Physics of Matter, Italy, Presider

WA1 • 8:00 a.m.
Spatial optical solitons in Reverse Proton Exchanged PPLN waveguides, *Giuseppe Leo[1], Antonio Amoroso[1], Lorenzo Colace[1], Gaetano Assanto[1], Rostislav V. Roussev[2], Marti Fejer[2]; 1Italian Inst. for the Physics of Matter, Italy, [2]Gintzon Laboratory, Stanford Univ., USA.* Low-threshold spatial optical solitons are observed for the first time in buried planar waveguides obtained by reverse-proton-exchanged periodically poled $LiNbO_3$.

WA2 • 8:15 a.m.
Quantum fluctuations and correlations of multimode vector solitons in Kerr media, *Eric Lantz[1], Thibaut Sylvestre[1], Herve Maillotte[1], Nicolas Treps[2], Claude Fabre[2]; [1]LOPMD, Univ. de Franche-Comté-CNRS, France, [2]Lab. Kastler-Brossel Univ. Pierre et Marie Curie, France.* We apply the Green's function method to show that multimode vector solitons experience strong squeezing on the optimal quadrature. This squeezing results from almost perfect anti-correlation between the fluctuations of the two incoherently-coupled circular polarisations.

WA3 • 8:30 a.m.
Incoherent solitons generated in instantaneous response nonlinear Kerr media, *Antonio Picozzi[1], Marc Haelterman[2], Stephane Pitois[3], Guy Millot[3]; [1]Lab. de Physique de la Matière Condensée, France, [2]Univ. Libre de Bruxelles, Belgium, [3]Univ. de Bourgogne, France.* We show theoretically and experimentally in an optical fiber system, that incoherent domain wall solitons can be generated spontaneously from incoherent light, despite of the instantaneous response of the fiber Kerr nonlinearity.

WA4 • 8:45 a.m.
Interactions between spatial screening solitons propagating in opposite directions, *Carmel Rotschild, Oren Cohen, Ofer Manela, Tal Carmon, Mordechai Segev; Technion ISRAEL, Israel.* We present the first experimental study on interactions between spatial solitons propagating in opposite directions. The collision experiments are carried out with photorefractive screening solitons. The results are generically different from collisions between co-propagating solitons.

WA5 • 9:00 a.m.
Temporal modulational instability of spatial solitons in second-harmonic generation, *Paolo Di Trapani[1], Gianluca Arrighi[1], Jin Yu[2], Gintaras Valiulis[3], Stefano Minardi[4]; [1]INFM and Dept. di Science CC. FF. MM. Universitá dell'Insubria, Italy, [2]INFM and Dept. di Elettronica, Universitá di Pavia, Italy, [3]Dept. of Quantum Electronics, Vilnius Univ., Lithuania, [4]ICFO - Inst. de Ciències Fotòniques, Spain.* Spatial solitons in second-harmonic generation show regular, high-frequency, temporal modulation 1.5-times above threshold. The result is interpreted as the first observation of their temporal modulational instability. Simulations indicate that instability is seeded by quantum noise.

WA6 • 9:15 a.m.
Control of multiple filamentation in air, *Gadi Fibich[1], Shmuel Eisenmann[2], Arie Zigler[2]; [1]Tel Aviv Univ., Israel, [2]Hebrew Univ., Israel.* We provide the first experimental evidence of control and suppression of the number of filaments for high intensity laser pulses in air by beam astigmatism.

WA7 • 9:30 a.m.
Impact of dimensionality on noise-seeded modulational instability, *Domenico Salerno[2,1], Ottavia Jedrkiewicz[1], Paolo Di Trapani[1], Jose Trull[3], Gintaras Valiulis[4]; [1]Univ. of Insubria, Italy, [2]Univ. of Milan, Italy, [3]Univ. Politecnica, Spain, [4]Univ. of Vilnius, Lithuania.* In second harmonic generation, the virtually infinite bandwidth of the spatio-temporal modulational instability leads to completely different scenarios for the wave-break when the input noise is monochromatic or when it carries a broad temporal spectrum.

WA8 • 9:45 a.m.
Experimental demonstration of Phase-Insensitive Qudratic Soliton Inverter for cascadable logic, *Balakishore Yellampalle, Lu Gao, Kelvin Wagner; Univ. of Colorado Boulder, USA.* Interaction between quadratic spatial solitons, generated using long time-chirped pulses, can be made almost phase insensitive. We experimentally showed such a phase-insensitive switching of a soliton. This device has the required properties for cascadable logic.

Harbour B and C
10:00 a.m.–10:30 p.m.
Coffee Break

Harbour A
10:30 a.m.–12:30 p.m.
WB • Discrete Solitons II
Paolo Di Trapani, Univ. Degli Studi Dell'Insubria, Italy, Presider

WB1 • 10:30 a.m.
First observation of discrete modulational instability in AlGaAs waveguide arrays, *Joachim Meier[1], George Ian Stegeman[1], Demetrious N. Christodoulides[1], Yaron Silberberg[2], Roberto Morandotti[3], Haeyeon Yang[4], Greg Salamo[4], Marc Sorel[5], Stewart Aitchison[6]; [1]CREOL/School of Optics, USA, [2]Dept. of Complex Systems, The Weizmann Inst. of Science, Israel, [3]Inst. national de la recherche scientifique, Universite du Quebec, Canada, [4]Physics Dept., Univ. of Arkansas, USA, [5]Dept. of Electrical and Electronic Engineering, Univ. of Glasgow, UK, [6]Dept. of Electrical and Computer Engineering, Univ. of Toronto, Canada.* The existence of modulational instability in the normal diffraction region and its absence in the anomalous regime was shown in a discrete nonlinear waveguide array. The gain versus input power and MI periodicity was measured.

WB2 • 10:45 a.m.
Quasi-stable propagation of short laser pulses in silica waveguide arrays in the anomalous dispersion regime, *Shimshon Barad[1], Dima Cheskis[1], Roberto Morandotti[2], J. Stewart Aitchison[3], Hagai Eisenberg[4], Yaron Silberberg[4], D. Ross[5]; [1]School of Physics and Astronomy, Tel Aviv Univ., Israel, [2]INRS-Énergie et Matériaux, Univ. du Québec, Canada, [3]Dept. of Electrical and Computer Engineering, Univ. of Toronto, Canada, [4]Dept. of Physics of Complex Systems, Weizmann Inst. of Science, Israel, [5]Dept. of Electronics and Electrical Engineering, Univ. of Glasgow, UK.* A sharp transition to strong spatial localization, observed (as function of laser power) for short pulses in waveguide arrays with anomalous dispersion, suggests a broad regime of quasi-stable propagation. Numerical simulations support this interpretation.

WB3 • 11:00 a.m.
Random-phase solitons in nonlinear periodic lattices, *Hrvoje Buljan[1], Oren Cohen[1], Jason W. Fleischer[1], Tal Schwartz[1], Mordechai Segev[1], Ziad H. Musslimani[2], Nikolaos K. Efremidis[2], Demetrios N. Christodoulides[2]; [1]TECHNION - Israel Inst. of Technology, Israel, [2]CREOL, Univ. of Central Florida, USA.* We present the first theoretical study and experimental demonstration of random-phase solitons (RPS) in nonlinear periodic lattices. For RPS to exist, their intensity profile and statistical (coherence) properties must conform to the lattice periodicity.

WB4 • 11:15 a.m.
Controlled generation and steering of spatial gap solitons in optically-induced lattices, *Dragomir N. Neshev[1], Andrey A. Sukhorukov[1], Yuri S. Kivshar[1], Brendan Hanna[2], Wieslaw Krolikowski[2]; [1]Nonlinear Physics Group, RSPhysSE, Australian Natl. Univ., Australia, [2]Laser Physics Ctr., RSPhysSE, Australian Natl. Univ., Australia.* We realize fully controlled generation of slow and immobile spatial gap solitons through two-beam mutual focusing in a periodic lattice. We also demonstrate the limitation of mutual beam focusing and enhanced mobility of gap solitons.

WB5 • 11:30 a.m.
Discrete solitons/soliton-trains in two-dimensional photonic lattices induced with partially-coherent light, *Zhigang Chen[1,2], Hector Martin[1], D.N. Christodoulides[3]; [1]San Francisco State Univ., USA, [2]TEDA Coll., Nankai Univ., China, [3]CREOL, Univ. of Central Florida, USA.* We demonstrate the formation of 2D discrete solitons/soliton-trains in a photonic-lattice induced with partially-coherent light, along with a clear transition from discrete-diffraction to discrete-soliton in the periodic lattice.

WB6 • 11:45 a.m.

Discrete cavity solitons, *Ulf Peschel, Oleg Egorov, Falk Lederer; Friedrich-Schiller-Univ. Jena, Germany.* Discrete cavity solitons are observed in arrays of coupled defects in photonic crystals or in other types of joint micro- or waveguide cavities. Various types of resting, oscillating and moving structures are found to coexist.

WB7 • 12:00 p.m.
Stable two-dimensional nonlinear periodic lattices, *Nina Sagemerten[1], Anton S. Desyatnikov[1,2], Cornelia Denz[1], Yaroslav V. Kartashov[3], Dragomir N. Neshev[2], Yuri S. Kivshar[2]; [1]Nichtlineare Photonik, Inst. fuer Angewandte Physik, Westfalische Wilhelms-Univ. Muenster, Germany, [2]Nonlinear Physics Group, RSPhysSE, Australian Natl. Univ., Australia, [3]CFO-Inst. de Ciencies Fotoniques and Dept. of Signal Theory and Communications, Univ. Politecnica de Catalunya, Spain.* We describe theoretically stable propagation of two-dimensional nonlinear periodic lattices in saturable self-focusing nonlinear media. Such stationary nonlinear periodic structures were observed experimentally for different lattice periods in the range of 30-100 micro m.

WB8 • 12:15 p.m.
Soliton control in waveguide arrays through Bloch-wave engineering, *Andrey A. Sukhorukov, Yuri S. Kivshar; Australian Natl. Univ., Australia.* We develop a concept of Bloch-wave engineering in waveguide arrays that allows for a control of the gap soliton mobility and multi-gap interactions, and propose a method of soliton switching based on Bloch-wave filtering.

12:30 p.m.–2:00 p.m.
Lunch Break (on your own)

Harbour A
2:00 p.m.–4:00 p.m.
WC • Nonlinear Effects in Photonic Crystal Fibres
Dmitry Skryabin, Dept. of Physics, Bath, UK, Presider

WC1 • 2:00 p.m.
Megawatt solitons in a gas-filled photonic-crystal fibers, *Dimitre G. Ouzounov[1], Faisal R. Ahmad[1], Alexander L. Gaeta1, Dirk Müller[2], Natesan Venkataraman[2], Michael T. Gallagher[2], Karl W. Koch[2]; [1]Cornell Univ., USA, [2]Corning Inc., USA.* We show that the dispersion of a hollow-core photonic band-gap fiber is anomalous throughout most of its transmission band. We generate Raman-shifted solitons in air and non-self-frequency shifted solitons in Xe with mewatt peak powers.

WC2 • 2:15 p.m.
Radiation and scattering of linear waves and solitons in photonic crystal fibers, *Dmitry V. Skryabin, Alexey V. Yulin, Fabio Biancalana, Feng Luan, Jonathan Knight, N. Joly, P. Russell; Dept. of Physics, UK.* We report theoretical and experimental results on several novel soliton related effects in ultra-small core photonic crystal fibers. Effects reported rely on peculiar dispersion characteristics, which are not attainable in telecom fibers.

WC3 • 2:30 p.m.
Suppression of vectorial modulation instability due to structural nonuniformity in photonic crystal fiber, *Bertrand Kibler, Cyril Billet, John M. Dudley; Universite de Franche-Comte, France.* Scalar and vectorial modulational instability processes in photonic crystal fibers are studied using both experiments and numerical simulations. Structural irregularities in the fiber hole distribution are shown to suppress polarization dependent vectorial modulational instability.

WC4 • 2:45 p.m.
Cob-web microstructured fibers optimized for supercontinuum generation with picosecond pulses, *Thorkild Sørensen[1], Ole Bang[1], Nikola I. Nikolov[2], Anders Bjarklev[1], Kristian G. Hougaard[1], Kim P. Hansen[3], Jens J. Rasmussen[2]; [1]Res. Ctr. COM, Technical Univ. of Denmark, Denmark, [2]Optics and Fluid Dynamics Dept., Risø Natl. Laboratory, Denmark, [3]Crystal Fibre A/S, Denmark.* Highly nonlinear cob-web microstructured fibers are engineered to have dispersion profiles for efficient direct degenerate four-wave

mixing and optimized supercontinuum generation with low-power picosecond pulses. This process is robust to fiber irregularities.

WC5 • 3:00 p.m.
Scalar modulation instability near zero GVD using a PCF, *John D. Harvey[1], Rainer Leonhardt[1], Gordon K.L. Wong[1], Heather S,J, Clark[1], Robert Kruhlak[1], Jonathan C. Knight[2], William J. Wadsworth[2], Philip St.J. Russell[2]; [1]Univ. of Auckland, New Zealand, [2]Univ. of Bath, UK.* Scalar modulation instability has been demonstrated in the normal dispersion regime using a PCF leading to efficient upconversion of a red pump to wavelengths throughout the visible.

WC6 • 3:15 p.m.
Intensity and polarization dependences of the supercontinuum generation in birefringent and highly nonlinear microstructured fibers, *Antoine Proulx[1], Jean-Michel Ménard[1], Nicolas Hô[1], Jacques M. Laniel[1], Réal Vallée[1], Claude Paré[2]; [1]COPL, Dept. de Physique, Canada, [2]INO, Canada.* We present experimental results highlighting the physical mechanism responsible for the initial spectral broadening of femtosecond Ti:Sapphire pulses in a highly birefringent and nonlinear microstructured fiber.

WC7 • 3:30 p.m.
Noise properties of phase-coherent supercontinua, *Nils Haverkamp, Harald R. Telle; Phys.-Tech. Bundesanstalt, Germany.* We investigated the complex modulation transfer for supercontinuum generation in microstructure fibers. Using 20 fs pulses, we found intensity transfer of 100 percent and intensity-to-phase transfer < 40 radians per percent of pump power variation.

WC8 • 3:45 p.m.
Dual-core air-clad fiber for supercontinuum polarization control, *Sergei Kobtsev[1], Sergei Kukarin[1], Nikolai Fateev[1], Vladimir Mezentsev[2], Sergei K. Turitsyn[2]; [1]Laser Systems Laboratory, Novosibirsk State Univ., Russian Federation, [2]Aston Univ., UK.* A dual-core tapered fibre is fabricated for generation of supercontinuum (SC) with polarization control. A modal analysis demonstrates a possibility to optimise design of a hybrid 3-in-1 device comprising taper, coupler and polarized SC generator.

Harbour B and C
4:00 p.m.–4:30 p.m.
Coffee Break

Harbour A
4:30 p.m. –6:30 p.m.
WD • Postdeadline Papers