Nonlinear Optics (NLO)
Topical Meeting and Tabletop Exhibit

Technical Conference: July 12-17, 2009
Exhibition: July 13-15, 2009
Hilton Hawaiian Village Beach Resort & Spa
Honolulu, Hawaii, USA

PDP Submissions Deadline: June 17, 2009, 12:00 p.m. noon EDT (16.00 GMT)
Housing Deadline: June 9, 2009
Pre-Registration Deadline: June 18, 2009

Part of Advances in Optical Sciences::
OSA Optics & Photonics Congress

Featuring Three Collocated Topical Meetings:

Integrated Photonics and Nanophotonics Research and Application (IPNRA)
Nonlinear Optics (NLO)
Slow and Fast Light (SL)

2009 Meeting Chairs

General Chairs
Martin Fejer, *Stanford Univ., USA*
Alexander Gaeta, *Cornell Univ., USA*

Program Chairs
Daniel Gauthier, *Duke Univ., USA*
Takunori Taira, *Laser Res. Inst. for Molecular Science, Inst. for Molecular Science, Japan*

About NLO

Nonlinear optical phenomena are being studied and applied over a wide range of energies and powers, from single-photons to petawatts, and over broad spectral regimes, from THz to X-ray frequencies.

The purpose of this meeting is to provide an international forum for discussion of all aspects of nonlinear optics, including new phenomena, novel devices, advanced materials and applications.

Topics to Be Considered

- Fundamental studies and new concepts
- Quantum optics, computation and communication
- Solitons and nonlinear propagation
- Ultrafast phenomena and techniques
- Surface, interface and nanostructure nonlinearities
- Microcavity and microstructure phenomena
- High intensity and relativistic nonlinear optics
- Slow light
- Coherent control

- Novel lasers and frequency converters
- Nonlinear materials
- Atoms, molecules and condensates
- Semiconductors
- Nanostructures
- Organics
- Photonic bandgap structures
- Fibers and waveguides
- Photorefractives
- Applications
- Lasers and amplifiers
- Frequency converters
- Optical communications
- Photonic switching
- Ultrafast measurement
- Frequency combs and optical clocks
- THz generation, spectroscopy and imaging
- Materials processing
- Optical storage
- Pattern formation in nonlinear optical systems
- Single-photon nonlinear optics

About Nonlinear Optics

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Sponsor: The Optical Society

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Program Committee

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Alexander Gaeta, *Cornell Univ., USA*

Program Chairs

Daniel Gauthier, *Duke Univ., USA*
Takunori Taira, *Laser Res. Inst. for Molecular Science, Inst. for Molecular Science, Japan*

NLO Program Committee

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Exhibitors

NLO

Tabletop Exhibit:
July 13-15, 2009

Topical Meeting:
July 12-17, 2009

Nonlinear Optics 2009 Exhibit Space Reservation Contract

Exhibit Space Reservation Contract (PDF, 58KB)

Note: You need Adobe Acrobat to view the PDF files above. If you do not already have this software, you can download Adobe Acrobat for free at the Adobe Web site.

Tabletop exhibit space will be $1,090 for Corporate Members and $1,250 for non-members and will include:

- One complimentary registration list
- One complimentary technical registration and two exhibit personnel registrations
- One copy of the meeting's proceedings

If you have questions about exhibiting at this topical meeting, please contact our exhibit sales staff at 202.416.1428 202.416.1428 or exhibitsales@osa.org.

Sponsorship Opportunities at NLO 2009

Increase your company's visibility among qualified attendees with a sponsorship at the event.

Current NLO Sponsorship Opportunities Include:

- Coffee Break Sponsorships
- Reception Sponsorships
- Attendee Tote Bag Sponsorship
- Registration Material Inserts
- Advertising Signage Placements

Plus other customizable promotional opportunities

To find out more about one of the sponsorship opportunities listed above or to discuss a customized NLO promotional package or sponsorship, please contact Anne Jones at 202.416.1942 202.416.1942 or email exhibitsales@osa.org

Exhibitor Listings

ADVANCES in OPTICAL SCIENCES
2009 OSA OPTICS AND PHOTONICS CONGRESS

July 12-17, 2009
Honolulu, Hawaii
USA

Collated Meetings:

Integrated Photonics and Nanophotonics Research and Applications (IPNRA)

Nonlinear Optics (NLO)

Slow and Fast Light (SL)

Altos Photonics
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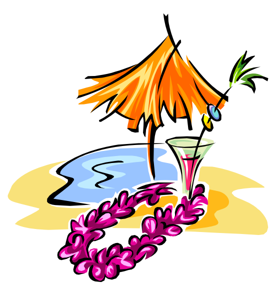

Thank you to the following organizations that provided grant funding:

- Air Force Office of Science Research (AFOSR)
- National Science Foundation (NSF)
- OSA Foundation

Special Events

Hawaiian Cultural Workshop for the OPC Summer Congress in Traditional & Modern Hula and Chants with Ka'iulani Visiko

Dates: Monday, July 13 and Tuesday, July 14, 2009
Time: 9:00–11:30 a.m.
Location: Hibiscus Suite, Kalia Executive Conference Center
There will be a 15 minute coffee break with Wayne “Kimo” Knox at 10:00 a.m.

On Tuesday, July 14, 2009, there will be an opportunity to perform what you learned in the workshop at the Conference Luau during Kimo and Ka'iulani's Cocktail Hour Concert.
Location: Rooftop of the Mid-Pacific Conference Center
****Note: Luau admission ticket required to participate. Additional tickets may be purchased at Registration until 6:30 p.m., Monday, July 13, 2009.****

For Ka'iulani's Workshop you'll need:

- Tank top or t-shirt
- Shorts or sarong
- Bare feet
- Notepad and pencil
- Much ALOHA and FUN!!

Open to members, family, and friends (Children 12 years old and under must have a parent present at all times).

For more information and any questions, visit www.GalleryKauai.com or contact Kimo and Ka'iulani by email, or call +1 585.313.1195 +1 585.313.1195 (cell).

Invited Speakers

Joint Nonlinear Optics (NLO)/Integrated Photonics and NanophotonicsResearch and Applications (IPNRA) Session: Nonlinear Integrated Photonics

JTuA3, **Towards Sub-Wavelength Plasmonic Laser Devices**, Rupert F. Oulton[1], Volker J. Sorger[1], Thomas Zentgraf[1], Guy Bartal[1], Xiang Zhang[1,2]; *[1]Univ. of California at Berkeley, USA, [2]Material Sciences Div., Lawrence Berkeley Natl. Lab, USA*

JTuA6, **Wavelength Conversion in Semiconductor Waveguiding Devices**, Takashi Kondo, Tomonori Matsushita, Junya Ota, Kaori Hanashima, Ikuma Ohta, Hiroshi Ishikawa, Kengo Ban, Tae Woong Kim; *Univ. of Tokyo, Japan*

Joint Nonlinear Optics (NLO)/Slow and Fast Light (SL) Session: Slow Light Applications in Nonlinear Optics

JWB1, **Slow Light Enhanced Nonlinear Effects in Silicon Photonic Crystal Waveguides**, Cristelle Monat[1], B. Corcoran[1], C. Grillet[1], M. Ebnali-Heidari[1], D. J. Moss[1], B. J. Eggleton[1], T. P. White[2], L. O'Faolain[2], T. F. Krauss[2]; *[1]Univ. of Sydney, Australia, [2]Univ. of St. Andrews, UK*

JWB4, **Modulation of Single Photons and Biphotons**, Steve Harris; *Stanford Univ., USA*

JWB5, **Broadband Optical Delay and Filtering in Spectrally Structured Materials**, Wm. Randall Babbitt, Zeb W. Barber; *Montana State Univ., USA*

Plenary Speakers

NMC1, **Active Terahertz Metamaterials**, Hou-Tong Chen, John F. O'Hara, Abul K. Azad, Antoinette J. Taylor; *Los Alamos Natl. Lab, USA*

NMC3, **Femtosecond, Intense Short Wavelength Laser-Molecule Interactions**, Philip H. Bucksbaum; *Stanford Univ., USA*

NTuB2, **Quantum Information Processing with Squeezed States of Light**, Akira Furusawa; *Univ. of Tokyo, Japan*

Invited Speakers

NMA3, **Optical Gain in the Auger-Recombination-Free Regime Using Strongly Confined Indirect Multiexcitons**, Victor I. Klimov; *Los Alamos Natl. Lab, USA*

NMA6, **Ultrafast Dynamics in Magnetoresistance Manganites: Vibrationally-Driven Phase Transitions and X-Ray Spectroscopy**, M. Rini[1], Y. Zhu[1], S. Wall[2], R. Tobey[2], Y. Tomioka[3], Y. Tokura[3], A. Cavalleri[2,4], Robert W. Schoenlein[1]; *[1]Lawrence Berkeley Natl. Lab, USA, [2]Univ. of Oxford, UK, [3]AIST, Japan, [4]Ctr. for Free Electron Laser Science, Germany*

NMB1, **Nonlinear Statistical Optics, Photonic Plasma, and Information Theory**, Dmitry V. Dylov, Jason Fleischer; *Princeton Univ., USA*

NMB4, **Physics and Properties of Cavity Soliton Lasers**, S. Barland, E. Caboche, L. Columbo, P. Genevet, L. Gil, M. Giudici, J. R. Tredicce; *Inst. Non Linéaire de Nice, France*

NMC2, **High Harmonic Generation by Surface Plasmon Resonance**, Seung-Woo Kim, Seungchul Kim, In-Yong Park, Jonghan Jin; *KAIST, Republic of Korea*

NMD3, **Photonic Band Gap Materials: Nonlinear Optics with Trapped Light**, Sajeev John; *Univ. of Toronto, Canada*

NMD4, **Counter-Propagating Nonlinear Interactions in Sub-Micrometer-Structured Ferroelectrics**, Valdas Pasiskevicius, Gustav Strömqvist, Carlota Canalias; *Royal Inst. of Technology, Sweden*

NME1, **Nonlinear Optics of Hybrid Plasmonic Nanostructures**, Anatoly V. Zayats; *Queen's Univ. Belfast, UK*

NME6, **Ultrafast Plasmonics Control**, Henry Van Driel; *Univ. of Toronto, Canada*

NTuA1, **Continuous Variable Entanglement of Orbital Angular Momentum States**, Mikael Lassen[1,2], Gerd Leuchs[2,3], Ulrik Lund Andersen[1]; *[1]Technical Univ. of Denmark, Denmark, [2]Max-Planck-Inst. for the Science of Light, Germany, [3]Univ. Erlangen-Nürnberg, Germany*

NTuA4, **Triple Photons Generation: Toward a New State of Light**, Audrey Dot[1], Kamel Bencheikh[2], Benoît Boulanger[1], Ariel Levenson[2], Patricia Segonds[1], Corinne Félix[1]; *[1]Univ. Joseph Fourier, France, [2]Lab de Photonique et de Nanostructures, CNRS, France*

NTuB3, **Nonlinear and Quantum Optics in One-Dimensional Photonic Structures**, Concita Sibilia, M. Centini, M. C. Larciprete, M. Bertolotti; *Univ. degli Studi di Roma La Sapienza, Italy*

NTuC1, **Nonlinear Optics with Crystalline Whispering Gallery Mode Resonators**, Lute Maleki; *OEwaves, Inc., USA*

NTuC4,**Resolved-Sideband Cooling of a Silica Optomechanical Microresonator in a Cryogenic Environment**, Hailin Wang, Young-Shin Park; *Univ. of Oregon, USA*

NTuC5, **Photonic MEMS Vibrating at X-Band Rates (11GHz)**, Tal Carmon, Matthew Tomes; *Univ. of Michigan, USA*

NWA3, **Dynamic Control of the Flow of Terahertz Light**, David G. Cooke, Peter Jepsen; *Technical Univ. of Denmark, Denmark*

NWA6, **Femtosecond Pulse Duration Measurements by Transverse Second Harmonic Generation in Random Nonlinear Media**, Ramon Vilaseca[1], Vito Roppo[1], Jose F. Trull[1], Crina Cojocaru[1], Kestutis Staliunas[1,2], D. Dumay[3], Wieslaw Krolikowski[3], Solomon S. Saltiel[4], Dragomir N. Neshev[3], Yuri S. Kivshar[3]; *[1]Univ. Politecnica de Catalunya, Spain, [2]ICREA, Spain, [3]Australian Natl. Univ., Australia, [4]Sofia Univ., Bulgaria*

NWB5, **Nonlinear Optics Using Rydberg Ensembles**, R. P. Abel, M. G. Bason, A. Gauguet, J. D. Pritchard, U. Raitzsch, Charles Adams; *Durham Univ., UK*

NWC3, **Integration of Extraordinary Nonlinear Optical Materials into Silicon Photonics, Plasmonics and Metamaterial Devices**, Larry Dalton; *Univ. of Washington, USA*

NWE3, **Photon Quantum Correlation Measurement by Two Photon Absorption in Semi-Conductors: Do Blackbody Photons Effectively Bunch?** Fabien Boitier[1], Antoine Godard[1], Claude Fabre[2], Emmanuel Rosencher[1,3]; *[1]ONERA, France, [2]Lab Kastler Brossel, Univ. Pierre et Marie Curie, France, [3]Physics Dept., Ecole Polytechnique, France*

NThA2, **Non-Critical Singly Resonant OPO Operation near 6.2 µm Based on a $CdSiP_2$ Crystal Pumped at 1064 nm**, Peter G. Schunemann[1], Kevin T. Zawilski[1], Thomas M. Pollak[1], Valentin Petrov[2]; *[1]BAE Systems, Inc., USA, [2]Max-Born-Inst., Germany*

NThA4, **Pulsed Fiber-Optical Parametric Oscillators in the near Infrared**, Jay E. Sharping, Christiane Goulart-Pailo, Chenji Gu; *Univ. of California at Merced, USA*

NThA6, **Silicon Nanophotonics for on-Chip High-Speed Parametric Optical Processing**, Keren Bergman; *Columbia Univ., USA*

NThB4, **Materials and Devices for Quasi-Phase-Matched Nonlinear Optics**, Sunao Kurimura[1,2]; *[1]Natl. Inst. for Materials Science, Japan, [2]Waseda Univ., Japan*

NThC2, **High-Power External Cavity Enhancement for High Repetition Rate Coherent XUV Generation**, Jens Rauschenberger[1,2], Ioachim Pupeza[1,2], Tino Eidam[3], Fabian Röser[3], Birgitta Bernhardt[1], Thomas Udem[1], Jens Limpert[3], Alexander Apolonski[2], Theodor W. Hänsch[1,2], Andreas Tünnermann[3], Ferenc Krausz[1,2]; *[1]Max-Planck-Inst. of Quantum Optics, Germany, [2]Ludwig-Maximilians-Univ. München, Germany, [3]Friedrich-Schiller-Univ. Jena, Germany*

NFA2, **High Power Laser Propagation in Atmospheric Quantum Wakes**, Howard M. Milchberg, S. Varma, Y.-H. Chen; *Univ. of Maryland at College Park, USA*

NFA5, **Self-Focusing of Very High-Power Pulses**, Gadi Fibich, Nir Gavish; *Tel Aviv Univ., Israel*

NFB6, **Astronomy with Laser Guide Star Adaptive Optics Systems**, Masanori Iye; *Natl. Astronomical Observatory, Japan*

	Tapa I	Tapa II	Tapa III	Honolulu I-II	Honolulu III
Sunday, July 12					
3:00 p.m.–6:00 p.m.	**Registration Open**, *Palace Lounge*				
Monday, July 13					
7:00 a.m.–6:30 p.m.	**Registration Open**, *Palace Lounge*				
8:00 a.m.–10:00 a.m.	NMA • Nonlinear Optics in Semiconductors, Glasses and Crystals	NMB • Spatial Effects			SMA • Fundamental Issues
8:00 a.m.–8:45 a.m.			IMA • IPNRA Plenary		
9:00 a.m.–10:00 a.m.			IMB • Highlights of IPNRA 2009 Contributed Papers		
10:00 a.m.–10:30 a.m.	**Coffee Break/Exhibits**, *Palace Lounge*				
10:00 a.m.–4:30 p.m.	**Exhibits Open**, *Palace Lounge*				
10:30 a.m.–12:30 p.m.	NMC • Nonlinear Optics Plenary I		IMC • Silicon Photonics and Hybrid Material Integrated Devices	IMD • Filter Technologies	SMB • Applications I
12:30 p.m.–2:00 p.m.	**Lunch** (on your own)				
2:00 p.m.–4:00 p.m.	NMD • Photonic Crystals and Periodic Nanomaterials	NME • Plasmonics	JMA • Joint IPNRA/SL Session: Slow Light Effects in Integrated Photonics Structures	IME • Nanophotonic Sources	
4:00 p.m.–4:30 p.m.	**Coffee Break/Exhibits**, *Palace Lounge*				
4:30 p.m.–6:30 p.m.			IMF • Q-Dot Emitters, PhC Lasers, Microcavities, Coupling	IMG • Modeling and Simulation	SMC • Fiber-Based Slow Light
Tuesday, July 14					
7:30 a.m.–6:30 p.m.	**Registration Open**, *Palace Lounge*				
8:00 a.m.–10:00 a.m.	NTuA • Entanglement, Squeezing and Quantum Memories	ITuA • Sensitive Nanophotonics	JTuA • Joint IPNRA/NLO Session: Nonlinear Integrated Photonics	STuA • Atomic Systems	
10:00 a.m.–10:30 a.m.	**Coffee Break/Exhibits**, *Palace Lounge*				
10:00 a.m.–11:30 a.m.	**JTuB • Joint Poster Session I**, *Palace Lounge*				
10:00 a.m.–1:00 p.m.	**Exhibits Open**, *Palace Lounge*				
11:30 a.m.–1:00 p.m.	NTuB • Nonlinear Optics Plenary II	ITuB • Photonic Devices and Integration I	ITuC • Silicon Nanophotonics	STuB • Applications II	
1:00 p.m.–2:30 p.m.	**Lunch (on your own)**				
2:30 p.m.–4:30 p.m.	NTuC • Nonlinear Optics in Microresonators	ITuD • Modeling and Simulation II	ITuE • Novel Waveguides and Photonic Sensors	STuC • Photonic Structures and Semiconductors	
4:30 p.m.–5:00 p.m.	**Coffee Break**, *Palace Lounge*				
5:00 p.m.–6:30 p.m.	**Postdeadline Paper Sessions**, *See Postdeadline Papers book for schedule and locations*				
7:00 p.m.–10:00 p.m.	**Conference Luau**, *Lagoon Green*				

	Tapa I	Tapa II	Tapa III	Honolulu I-II
Wednesday, July 15				
7:30 a.m.–4:30 p.m.	**Registration Open**, *Palace Lounge*			
8:00 a.m.–10:00 a.m.	**NWA • Terahertz and Ultrafast**	**NWB • Novel Effects in Atoms, Molecules and Metals**	**IWA • Photonic Devices and Integration II**	**SWA • Photonic Structures**
10:00 a.m.–10:30 a.m.	**Coffee Break/Exhibits**, *Palace Lounge*			
10:00 a.m.–11:30 a.m.	**JWA • Joint Poster Session II**, *Palace Lounge*			
10:00 a.m.–2:30 p.m.	**Exhibits Open**, *Palace Lounge*			
11:30 a.m.–1:30 p.m.	**NWC • Current Trends in Nonlinear Optical Materials**	**NWD • Advances in Frequency Conversion, High Energy Lasers, and Laser Dynamics**	**IWB • Resonator Circuits and their Applications**	**JWB • Joint NLO/SL Session: Slow Light Applications in Nonlinear Optics**
1:30 p.m.–2:30 p.m.	**Lunch** (on your own)			
2:30 p.m.–4:30 p.m.	**IWC • Modeling and Simulation III**	**IWD • 3-D Photonic Crystals, Novel Fabrication Techniques**		
7:30 p.m.–9:00 p.m.	**Registration Open**, *Palace Lounge*			
7:30 p.m.–9:30 p.m.	**NWE • Squeezing and Biphoton States**			
Thursday, July 16				
7:30 a.m.–1:00 p.m.	**Registration Open**, *Palace Lounge*			
8:00 a.m.–10:15 a.m.	**NThA • Parametric Processes and Oscillators**			
10:15 a.m.–10:45 a.m.	**Coffee Break**, *Palace Lounge*			
10:45 a.m.–1:00 p.m.	**NThB • Advances in Quasi-Phase-Matched Interactions**			
7:30 p.m.–9:00 p.m.	**Registration Open**, *Palace Lounge*			
7:30 p.m.–9:30 p.m.	**NThC • Generating E&M Radiation: Visible, UV, X-Ray and Gamma Rays**			
Friday, July 17				
7:30 a.m.–1:00 p.m.	**Registration Open**, *Palace Lounge*			
8:00 a.m.–10:15 a.m.	**NFA • Self Focusing and Filaments**			
10:15 a.m.–10:45 a.m.	**Coffee Break**, *Palace Lounge*			
10:45 a.m.–1:00 p.m.	**NFB • Applications of Nonlinear Optics**			

Key to Shading	
IPNRA Sessions	
NLO Sessions	No Shading
SL Sessions	
Joint Sessions	

Nonlinear Optics (NLO) Abstracts

•Sunday, July 12, 2009•

Palace Lounge
3:00 p.m.–6:00 p.m.
Registration Open

•Monday, July 13, 2009•

Palace Lounge
7:00 a.m.–6:30 p.m.
Registration Open

NMA • Nonlinear Optics in Semiconductors, Glasses and Crystals

Tapa I
8:00 a.m.–10:00 a.m.
Takunori Taira; Laser Res. Ctr. for Molecular Science, Inst. for Molecular Science, Japan, Presider

NMA1 • 8:00 a.m.
Indirect Dephasing Channel for Optically Controlled Spin in a Single Quantum Dot, *Anna Grodecka[1], Pawel Machnikowski[2], Jens Förstner[1]; [1]Computational Nanophotonics Group, Theoretical Physics, Univ. of Paderborn, Germany, [2]Inst. of Physics, Wroclaw Univ. of Technology, Poland.* We show that an optically driven carrier spin undergoes indirect dephasing even in the absence of spin-reservoir coupling and illustrate it for phonon-induced decoherence during optical spin rotation in a single quantum dot.

NMA2 • 8:15 a.m.
Evidence of Symmetry Breaking in Lead Salt Quantum Dots, *Gero Nootz[1,2], Lazaro A. Padilha[1], Scott Webster[1], David J. Hagan[1,2], Eric W. Van Stryland[1,2], Larissa Levina[3], Vlad Sukhovatkin[3], Edward H. Sargent[3]; [1]CREOL and FPCE, College of Optics and Photonics, Univ. of Central Florida, USA, [2]Physics Dept., Univ. of Central Florida, USA, [3]Edward S. Rogers Sr. Dept. of Electrical and Computer Engineering, Univ. of Toronto, Canada.* Experimentally observed two-photon transitions of lead-salt quantum dots, not predicted by k·p theory, are explained as symmetry forbidden one-photon transitions. Similarly features in the one-photon absorption spectra are explained as symmetry forbidden two-photon transitions.

NMA3 • 8:30 a.m. **Invited**
Optical Gain in the Auger-Recombination-Free Regime Using Strongly Confined Indirect Multiexcitons, *Victor I. Klimov; Los Alamos Natl. Lab, USA.* Semiconductor hetero-nanocrystals with a small CdSe core and a thick CdS shell show nearly complete suppression of Auger recombination, which allows for efficient optical gain with a very large bandwidth and record-low excitation thresholds.

NMB • Spatial Effects

Tapa II
8:00 a.m.–10:00 a.m.
Ramon Vilaseca; Univ. Politecnica de Catalunya, Spain, Presider

NMB1 • 8:00 a.m. **Invited**
Nonlinear Statistical Optics, Photonic Plasma, and Information Theory, *Dmitry V. Dylov, Jason Fleischer; Princeton Univ., USA.* We treat the nonlinear propagation of statistical light as a photonic plasma. Effective plasma frequencies and Debye lengths give characteristic scales, while coherent-incoherent coupling (signal-noise, or beam-plasma, interactions) gives a new type of dynamical stochastic resonance.

NMB2 • 8:30 a.m.
Broadband Two-Dimensional Multicolored Arrays Generation in a Sapphire Plate, *Takayoshi Kobayashi[1,2,3], Jun Liu[1,2]; [1]Univ. of Electro-Communications, Japan, [2]Intl. Cooperative Res. Project, JST, Japan, [3]Dept. of Electrophysics, Natl. Chiao Tung Univ., Taiwan.* Broadband two-dimensional multicolored array with nine periodic columns and more than ten rows was generated in a sapphire plate. The array structure was sensitive to the in-plane rotation of the sapphire plate.

NMA • Nonlinear Optics in Semiconductors, Glasses and Crystals (continued)

NMA4 • 9:00 a.m.
Population Dynamics of Excitons in GaAs/AlAs Coupled Quantum Well Systems Detected by Pump-Probe Spectroscopy, *Yoshihisa Uchida[1], Harutoshi Tsuji[1], Naoya Fujita[1], Kensuke Fujii[1], Hayato Miyagawa[1], Noriaki Tsurumachi[1], Shun Koshiba[1], Hiroshi Itoh[1], Shunsuke Nakanishi[1], Tae Geun Kim[2]; [1]Kagawa Univ., Japan, [2]Korea Univ., Republic of Korea.* We have studied population dynamics of excitons in GaAs/AlAs coupled quantum well systems and found that the anti-symmetric excitons reveal additional faster decay compared with the symmetric excitons in frequency resolved pump-probe spectroscopy.

NMA5 • 9:15 a.m.
The Investigation of the Nonlinear Refractive Index of Ho-Doped Gallium-Lanthanum-Sulfide Glass Based on Self-Diffraction Patterns, *Chao-Yi Tai[1], Wen-Hsiang Yu[1], Jao-Shi Jang[1], Sheng-Hsiung Chang[2]; [1]Dept. of Optics and Photonics, Natl. Central Univ., Taiwan, [2]Inst. of Atomic and Molecular Sciences, Academia Sinica, Taiwan.* The evolution of self-diffraction patterns under various incident powers in a Ho-doped GLS glass was observed. The corresponding nonlinear refractive index was precisely determined to be 7×10^{-13} cm^2/W at wavelength λ=760nm.

NMA6 • 9:30 a.m. Invited
Ultrafast Dynamics in Magnetoresistance Manganites: Vibrationally-Driven Phase Transitions and X-Ray Spectroscopy, *M. Rini[1], Y. Zhu[1], S. Wall[2], R. Tobey[2], Y. Tomioka[3], Y. Tokura[3], A. Cavalleri[2,4], Robert W. Schoenlein[1]; [1]Lawrence Berkeley Natl. Lab, USA, [2]Univ. of Oxford, UK, [3]AIST, Japan, [4]Ctr. for Free Electron Laser Science, Germany.* We report studies of ultrafast insulator-metal transitions in manganites by selective vibrational excitation of the Mn-O stretch and above-gap excitation. Time-resolved x-ray spectroscopy probes changes in O-2p and Mn-3-D electronic states near the Fermi level.

Palace Lounge
10:00 a.m.–10:30 a.m.
Coffee Break/Exhibits (Exhibits open 10:00 a.m.–4:30 p.m.)

NMB • Spatial Effects (continued)

NMB3 • 8:45 a.m.
Optical Pattern Transitions in Photorefractive Crystals, *Chien-Chung Jeng[1], YuanYao Lin[2], Ray-Ching Hong[1], Ray-Kuang Lee[2]; [1]Dept. of Physics, Natl. Chung Hsing Univ., Taiwan, [2]Inst. of Photonics Technologies, Natl. Tsing Hua Univ., Taiwan.* We show by experimental measurements there exists an intensity dependent pattern transition from optical modulation instability to transverse instability in nonlinear media which is explained by our model of periodic strip-filamens on cnoidal waves.

NMB4 • 9:00 a.m. Invited
Physics and Properties of Cavity Soliton Lasers, *S. Barland, E. Caboche, L. Columbo, P. Genevet, L. Gil, M. Giudici, J. R. Tredicce; Inst. Non Linéaire de Nice, France.* We show the appearance of cavity solitons in two mutually coupled broad area VCSEL's. We describe the physical processes at their origin and we discuss their properties. We compare experimental with theoretical results.

NMB5 • 9:30 a.m.
Experimental Observation of the 1-D Kerr-Type Cavity Soliton in a Passive Optical Fiber Resonator, *François Leo, Pascal Kockaert, Simon-Pierre Gorza, Philippe Emplit, Marc Haelterman; Univ. Libre de Bruxelles, Belgium.* The existence of 1-D Kerr-type cavity soliton is experimentally demonstrated in an optical fiber ring cavity. The solitons are generated through cross-phase modulation between the intracavity field and short external writing pulses.

NMB6 • 9:45 a.m.
Discrete Quadratic Solitons with Higher Order Modes in Lithium Niobate Waveguide Arrays, *Frank Setzpfandt[1], Roland Schiek[2], Reinhard Geiss[1], Wolfgang Sohler[3], Andreas Tünnerman[1,4], Thomas Pertsch[1]; [1]Inst. of Applied Physics, Friedrich-Schiller-Univ. Jena, Germany, [2]Univ. of Applied Sciences, Germany, [3]Applied Physics, Univ. Paderborn, Germany, [4]Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany.* We observed discrete quadratic solitons with higher order second harmonic modes in lithium niobate waveguide arrays. We also measured a cancellation of the nonlinearity due to the interaction of multiple second harmonic resonances.

NMC • Nonlinear Optics Plenary I

Tapa I
10:30 a.m.–12:30 p.m.
Martin M. Fejer; Stanford Univ., USA, Presider

NMC1 • 10:30 a.m. **Plenary**
Active Terahertz Metamaterials, *Hou-Tong Chen, John F. O'Hara, Abul K. Azad, Antoinette J. Taylor; Los Alamos Natl. Lab, USA.* We demonstrate THz metamaterials exhibiting either amplitude/phase control, via carrier injection or depletion in the active semiconductor substrate or frequency control, via photoexcitation of carriers into active semiconducting materials incorporated into the sub-wavelength metamaterial structure.

NMC2 • 11:15 a.m. **Invited**
High Harmonic Generation by Surface Plasmon Resonance, *Seung-Woo Kim, Seungchul Kim, In-Yong Park, Jonghan Jin; KAIST, Republic of Korea.* Surface plasmon resonance occurring within a gold bow-tie nanostructure enhances the electric field of a femtosecond laser with an amplification factor of more than 20 dB to produce extreme ultraviolet radiation by high harmonic generation.

NMC3 • 11:45 a.m. **Plenary**
Femtosecond, Intense Short Wavelength Laser-Molecule Interactions, *Philip H. Bucksbaum; Stanford Univ., USA.* Abstract not available.

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

NMD • Photonic Crystals and Periodic Nanomaterials

Tapa I
2:00 p.m.–4:00 p.m.
Steve Blair; Univ. of Utah, USA, Presider

NMD1 • 2:00 p.m.
Photon Drag in Graphitic Nanomaterials, *Yuri P. Svirko[1], Petr A. Obraztsov[1,2], Serge V. Garnov[2], Dmitry A. Lyashenko[1], Alexander N. Obraztsov[1,3]; [1]Univ. of Joensuu, Finland, [2]A.M. Prokhorov General Physics Inst., RAS, Russian Federation, [3]Dept. of Physics, Moscow State Univ., Russian Federation.* We demonstrate that irradiation of the sp2 nanocarbons with an intense nanosecond laser pulse gives rise to the photon drag current, which sign and amplitude depends on sample orientation with respect to the laser beam.

NMD2 • 2:15 p.m.
Radiation Losses of Photonic Crystal Waveguides in $LiNbO_3$ Membranes, *Reinhard Geiss[1], Holger Hartung[1], Rumen Iliew[2], Thomas Gischkat[3], Frank Schrempel[3], Frank Setzpfandt[1], Thomas Pertsch[1], Ernst-Bernhard Kley[1], Falk Lederer[2], Werner Wesch[3], Andreas Tünnermann[1,4]; [1]Inst. of Applied Physics, Friedrich-Schiller-Univ. Jena, Germany, [2]Inst. of Condensed Matter Theory and Solid State Optics, Friedrich-Schiller-Univ. Jena, Germany, [3]Inst. of Solid State Physics, Friedrich-Schiller-Univ. Jena, Germany, [4]Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany.* The impact of the air gap separating a photonic-crystal membrane from the underlying substrate on radiation losses is investigated. The proposed photonic-crystal geometry can be fabricated by means of ion-beam enhanced etching.

NME • Plasmonics

Tapa II
2:00 p.m.–4:00 p.m.
Lute Maleki; OEwaves, Inc., USA, Presider

NME1 • 2:00 p.m. **Invited**
Nonlinear Optics of Hybrid Plasmonic Nanostructures, *Anatoly V. Zayats; Queen's Univ. of Belfast, UK.* Nonlinear optical properties of various plasmonic nanophotonic components and metamaterials will be discussed and pathways to realise metamaterials and nanodevices with optically controlled properties will be demonstrated.

NMD • Photonic Crystals and Periodic Nanomaterials (continued)

NMD3 • 2:30 p.m. **Invited**

Photonic Band Gap Materials: Nonlinear Optics with Trapped Light, *Sajeev John; Univ. of Toronto, Canada.* I discuss quantum dot inversion, switching, and nonlinear optical Bloch-vector dynamics in the structured electromagnetic vacuum of a photonic band gap waveguide. This offers a theoretical foundation for on-chip multi-wavelength-channel optical transistor action.

NMD4 • 3:00 p.m. **Invited**

Counter-Propagating Nonlinear Interactions in Sub-Micrometer-Structured Ferroelectrics, *Valdas Pasiskevicius, Gustav Strömqvist, Carlota Canalias; Royal Inst. of Technology, Sweden.* We discuss spectral characteristics, tuning, noncollinear operation and temporal dynamics in mirrorless optical parametric oscillator with periodically poled $KTiOPO_4$. The crystal structuring technology on sub-micrometer scale will be presented.

NMD5 • 3:30 p.m.

Investigating the Domain-Size Dependent Ferroelectric Switching Behaviour with K-Space Spectroscopy, *Urs Heine[1], Uwe Voelker[1], Klaus Betzler[1], Manfred Burianek[2], Manfred Muehlberg[2]; [1]Univ. of Osnabrueck, Germany, [2]Univ. of Cologne, Germany.* K-space spectroscopy has emerged as a powerful tool for measuring ferroelectric domain structures. We report on the ferroelectric switching behaviour of calcium barium niobate, which has been investigated for the first time using this technique.

NME • Plasmonics (continued)

NME2 • 2:30 p.m.

Plasmonics Self-Focusing by Nonlocal Ponderomotive Nonlinearity in Metals, *Pavel Ginzburg, Alex Hayat, Nikolai Berkovitch, Meir Orenstein; Technion-Israel Inst. of Technology, Israel.* The inherent ponderomotive nonlinearity of electrons in metal depleting the electron density in high-field intensity region is harnessed to show nonlinear propagation of surface plamons, self-focusing and slow light near a nonlinear cutoff.

NME3 • 2:45 p.m.

Second-Order Nonlinear Optical Response of Gold, *Martti Kauranen[1], Fu Xiang Wang[1], Francisco J. Rodriguez[1], Willem M. Albers[2], Risto Ahorinta[1], John E. Sipe[3]; [1]Tampere Univ. of Technology, Finland, [2]VTT Microtechnology and Sensors, Finland, [3]Univ. of Toronto, Canada.* We use two-beam second-harmonic generation to separate the surface and bulk contributions to the nonlinearity of gold for different metal-dielectric interfaces. One of the surface parameters is shown to arise predominantly from the bulk response.

NME4 • 3:00 p.m.

Enhancement of Two-Photon Absorption-Induced Florescence in Semiconductor Quantum Dots by Gold Nanoparticles, *Li Wang[1], Damian Ankuciwiez[2], Jiayu Chen[1], Ravi K. Jain[1]; [1]Ctr. for High Technology Materials, Univ. of New Mexico, USA, [2]Columbia Univ., USA.* Surface plasmon meditated fluorescence is studied in semiconductor and metal nanoparticle composite structures. A 10x enhancement in two-photon absorption-induced fluorescence is observed when the spacing between CdSe/ZnS quantum dot and Au nanoparticle layers is 10nm.

NME5 • 3:15 p.m.

Tuning the Surface Plasmon Resonance of Colloidal Gold Nanoparticles and Controlling their Linear and Nonlinear Optical Responses, *Marcio A. R. Alencar[1], Eduardo J. S. Fonseca[1], Cassio E. A. Santos[1], Sara F. A. Moraes[2], Marcos A. Gelesky[2], Mario R. Meneghetti[2], Jandir M. Hickmann[1]; [1]Optics and Materials Group - OPTMA, Inst. of Physics, Univ. Federal de Alagoas, Brazil, [2]Inst. of Chemistry and Biotechnology, Univ. Federal de Alagoas, Brazil.* We report the use of myristic acid as a tuning agent for the surface plasmon resonance of highly stable colloids containing gold nanoparticles. The large nonlinear optical response of these systems was also investigated.

NME6 • 3:30 p.m. **Invited**

Ultrafast Plasmonics Control, *Henry Van Driel; Univ. of Toronto, Canada.* We review recent work on exploiting thermally based optical nonlinearities of gold to generate and switch surface plasmons on a picosecond time scale.

NMD • Photonic Crystals and Periodic Nanomaterials (continued)

NMD6 • 3:45 p.m.
Experimental Validation of Angular Quasi-Phase-Matching, *Pierre Brand[1], Benoît Boulanger[1], Patricia Segonds[1], Yannick Petit[1,2], Corinne Félix[1], Bertrand Ménaert[1], Hideki Ishizuki[3], Takunori Taira[3]; [1]Univ. Joseph Fourier, France, [2]Univ. de Genève, Switzerland, [3]Inst. for Molecular Science, Japan.* We validate the theory of angular quasi-phase-matching by performing second harmonic generation and difference frequency generation in a 3.9-mm-diameter sphere cut in a 5%MgO:PPLN crystal pumped with a tunable laser source.

Palace Lounge
4:00 p.m.–4:30 p.m.
Coffee Break/Exhibits

NOTES

•Tuesday, July 14, 2009•

Palace Lounge
7:30 a.m.–6:30 p.m.
Registration Open

NTuA • Entanglement, Squeezing and Quantum Memories

Tapa I
8:00 a.m.–10:00 a.m.
Akira Furusawa; Univ. of Tokyo, Japan, Presider

NTuA1 • 8:00 a.m. Invited
Continuous Variable Entanglement of Orbital Angular Momentum States, *Mikael Lassen[1,2], Gerd Leuchs[2,3], Ulrik Lund Andersen[1]; [1]Technical Univ. of Denmark, Denmark, [2]Max-Planck-Inst. for the Science of Light, Germany, [3]Univ. Erlangen-Nürnberg, Germany.* We report on the first experimental noise characterization of the first-order continuous variable orbital angular momentum states. Using a spatially non-degenerate optical parametric oscillator we produce quadrature entanglement between the two first-order Laguerre-Gauss modes.

NTuA2 • 8:30 a.m.
Squeezing Induced by Spontaneous Rotational Symmetry Breaking, *Carlos Navarrete-Benlloch[1], Ferrán V. García-Ferrer[1], Alejandro Romanelli[2], Eugenio Roldán[1], Germán J. de Valcárcel[1]; [1]Univ. de València, Spain, [2]Univ. de la República, Uruguay.* We deepen our previous study of non-critical and perfect squeezing generation through spontaneous rotational symmetry breaking by considering the influence of experimental (imperfect rotational symmetry) as well as theoretical limitations (going beyond the linearized treatment).

NTuA3 • 8:45 a.m.
Narrowband Triphoton W State Generation via Four-Wave Mixings, *Jianming Wen[1], Eun Oh[2], Shengwang Du[3]; [1]Dept. of Physics, Univ. of Virginia, USA, [2]Remote Sensing Div., NRL, USA, [3]Dept. of Physics, Hong Kong Univ. of Science and Technology, Hong Kong.* We propose to generate a narrowband triphoton W state entangled in time via two four-waving mixings in cold atomic gases. We examine two-photon and three-photon coincidences in two regimes and show interesting results.

JTuA • Joint IPNRA/NLO Session: Nonlinear Integrated Photonics

Tapa III
8:00 a.m.–10:00 a.m.
Tal Carmon; Univ. of Michigan, USA, Presider

JTuA1 • 8:00 a.m.
Room Temperature Operation of Subwavelength Metallo-Dielectric Lasers, *Maziar P. Nezhad, Aleksandar Simic, Olesya Bondarenko, Boris Slutsky, Amit Mizrahi, Liang Feng, Vitaliy Lomakin, Yeshaiahu Fainman; Univ. of California at San Diego, USA.* Lasing is demonstrated in optically pumped InGaAsP-SiO_2-aluminum structures, where both the resonator and the optical mode are subwavelength in all three dimensions. In the smallest case, a 550nm diameter InGaAsP disk exhibits lasing at 1390nm.

JTuA2 • 8:15 a.m.
The Nonlinear Optical Response of Transparent Metal-Dielectric Multilayer Structures, *Canek Fuentes-Hernandez[1], Lazaro A. Padilha[2], Joel M. Hales[1], Daniel Owens[1], Jungbae Kim[1], Scott Webster[2], Seth R. Marder[1], Joseph W. Perry[1], David J. Hagan[2], Eric W. Van Stryland[2], Bernard Kippelen[1]; [1]Georgia Tech, USA, [2]Univ. of Central Florida, USA.* We report on the nonlinear optical properties of metal-dielectric multilayer structures with peak transmittance of 75 %, spectral bandwidths up to 360 nm, and up to 20× larger nonlinear optical response than their component materials.

JTuA3 • 8:30 a.m. Invited
Towards Sub-Wavelength Plasmonic Laser Devices, *Rupert F. Oulton[1], Volker J. Sorger[1], Thomas Zentgraf[1], Guy Bartal[1], Xiang Zhang[1,2]; [1]Univ. of California at Berkeley, USA, [2]Material Sciences Div., Lawrence Berkeley Natl. Lab, USA.* We show that a hybrid of semiconductor nanowire and metallic surface modes produces an efficient laser device with lambda 2/100 mode area and discuss the broader impact of plasmon-based light sources and integrated optical components.

NTuA • Entanglement, Squeezing and Quantum Memories (continued)

NTuA4 • 9:00 a.m. **Invited**

Triple Photons Generation: Toward a New State of Light, *Audrey Dot[1], Kamel Bencheikh[2], Benoît Boulanger[1], Ariel Levenson[2], Patricia Segonds[1], Corinne Félix[1]; [1]Univ. Joseph Fourier, France, [2]Lab de Photonique et de Nanostructures, CNRS, France.* We implemented an experiment using a Nd:YAG laser and KTP crystals that allowed the generation and study of triple photons corresponding to the creation of three correlated photons from the splitting of a single photon.

NTuA5 • 9:30 a.m.

Optical Switches and Memories Using the Zeno Effect and Two-Photon Absorption, *Bryan C. Jacobs[1], James D. Franson[2]; [1]Johns Hopkins Univ., USA, [2]Univ. of Maryland, Baltimore County, USA.* Here we show that a classical version of the quantum Zeno effect can occur in a resonant system subject to nonlinear dissipation, and that this effect can be used to implement classical logic devices.

NTuA6 • 9:45 a.m.

Dynamics and Stability of Mode-Locking Using Phase-Sensitive Amplification, *Simon Hachey, J. Nathan Kutz; Univ. of Washington, USA.* It is demonstrated that phase-sensitive amplification in a laser cavity can be used to generate stable and robust mode-locked pulses. An average cavity model explicitly calculates the stability of the mode-locked pulses.

JTuA • Joint IPNRA/NLO Session: Nonlinear Integrated Photonics (continued)

JTuA4 • 9:00 a.m.

A Radio Frequency Spectrum Analyser with Terahertz Bandwidth Based on a Highly Nonlinear As_2S_3 Chalcogenide Glass Waveguide, *Mark Pelusi[1], Feng Luan[1], Trung Vo[1], Mike Lamont[1], Steven Madden[2], Douglas Bulla[2], Duk-Yong Choi[2], Barry Luther-Davies[2], Benjamin Eggleton[1]; [1]Ctr. for Ultrahigh Bandwidth Devices for Optical Systems, School of Physics, Inst. for Photonic Optical Systems, Univ. of Sydney, Australia, [2]Ctr. for Ultrahigh Bandwidth Devices for Optical Systems, Laser Physics Ctr., Res. School of Physics and Engineering, Australian Natl. Univ., Australia.* We demonstrate an all-optical RF spectrum analyser with >2.5THz bandwidth based on cross-phase modulation in a dispersion-engineered, nonlinear As_2S_3 rib waveguide.

JTuA5 • 9:15 a.m.

Ultrafast Optical Waveform Characterization and Generation Using a Four-Wave Mixing Time Lens on a Silicon Chip, *Reza Salem, Mark A. Foster, Yoshitomo Okawachi, Alexander L. Gaeta, Amy C. Turner-Foster, Michal Lipson; Cornell Univ., USA.* We demonstrate two temporal imaging systems using a four-wave-mixing-based time lens. High-speed performance monitoring using a temporal magnification system and high-speed NRZ packet generation using a temporal compression system are demonstrated.

JTuA6 • 9:30 a.m. **Invited**

Wavelength Conversion in Semiconductor Waveguiding Devices, *Takashi Kondo, Tomonori Matsushita, Junya Ota, Kaori Hanashima, Ikuma Ohta, Hiroshi Ishikawa, Kengo Ban, Tae Woong Kim; Univ. of Tokyo, Japan.* Wavelength conversion via quadratic optical nonlinearity in AlGaAs-based waveguiding devices will be presented. Efficient quasi-phase-matched nonlinear conversions are demonstrated in periodically inverted AlGaAs waveguides. A novel device utilizing birefringence in thin high-index-contrast waveguide is proposed.

Palace Lounge
10:00 a.m.–10:30 a.m.
Coffee Break/Exhibits (Exhibits open 10:00 a.m.–1:00 p.m.)

JTuB • Joint Poster Session I

Palace Lounge
10:00 a.m.–11:30 a.m.

JTuB13
Rayleigh-Taylor Instability in Nonlinear Optics, *Shu Jia, Jason W. Fleischer; Princeton Univ., USA.* We demonstrate, theoretically and experimentally, an all-optical Rayleigh-Taylor instability. Observations of the characteristic spatial period as a function of intensity difference, nonlinearity, and refractive index gradient show excellent agreement with analytical calculations from perturbation theory.

JTuB14
Intensity Dynamics in Semiconductor Laser Arrays, *Matthew O. Williams[1], Mingming Feng[2], J. Nathan Kutz[1], Kevin L. Silverman[3], Richard P. Mirin[3], Steven T. Cundiff[2]; [1]Univ. of Washington, USA, [2]JILA, NIST, Univ. of Colorado, USA, [3]NIST, USA.* The dynamics of a five-emitter semiconductor laser array is studied theoretically with steady-state, oscillatory, and chaotic behaviors achieved. This provides a design tool for achieving oscillations whose frequency is related to injection current.

JTuB15
Wavelength and Pulsewidth-Tunable Actively Mode-Locked Fiber Ring Laser Using a Short Length Bismuth-Based Highly Nonlinear Erbium-Doped Fiber, *Yutaka Fukuchi, Joji Maeda; Tokyo Univ. of Science, Japan.* We demonstrate a stable 10GHz actively mode-locked fiber laser employing a 151cm-long bismuth-oxide-based highly nonlinear erbium-doped fiber. The wavelength tuning range is 80nm covering the CL-band, and the pulsewidth is varied from 7.8ps to 23.0ps.

JTuB16
Specialty-Fiber Amplifier for a Microchip Laser: A ~1-mJ, 1-ns Output at a Multi-kHz Repetition Rate, *Alexander V. Kir'yanov[1], Sergey M. Klimentov[1,2], Anton N. Knigavko[1,3], Igor V. Mel'nikov[1,3]; [1]Optolink Ltd., Russian Federation, [2]A. M. Prokhorov General Physics Inst., RAS, Russian Federation, [3]High Q Labs Inc., Canada.* We present a compact laser system made of a hybrid Q-switched Nd^{3+}:YAG/Cr^{4+}:YAG microchip laser seeding an Yb-doped specialty-fiber amplifier with gain as high as 20-25 dB achieved for nanosecond single-mode pulses at 1-10-kHz repetition rate.

JTuB17
Athermal Raman Fiber Amplifier, *Galina Nemova, Raman Kashyap; École Polytechnique de Montréal, Canada.* We present a theoretical scheme for athermal Raman fiber amplifier. This approach allows Raman amplification in Yb^{3+}-doped fiber without detrimental heating. Laser cooling with Yb^{3+} ions compensates for the heat generated during laser action.

JTuB18
Stability Analysis of the Mode-Locking Dynamics in a Laser Cavity with a Passive Polarizer, *Edwin Ding, J. Nathan Kutz; Univ. of Washington, USA.* We present the first analytic theory of stability for mode-locking that explicitly accounts for the nonlinear polarization rotation in a birefringent, optical-fiber laser cavity mode-locked by a discrete, passive polarizer element.

JTuB19
Spatiotemporal Instability of Fiber Amplifier, *Erik J. Bochove[1], Michelle Hummel[2], Alejandro Aceves[3]; [1]Directed Energy Directorate, AFRL, USA, [2]Mathematics and Computer Science Dept., Univ. of New Mexico, USA, [3]Mathematics and Computer Science Dept., Southern Methodist Univ., USA.* Modulation instability is shown to arise from coupling between signal and pump fluctuations and its effect on phase stability is calculated. The results are relevant for phased fiber laser arrays.

JTuB20
Controlled Frequency Entanglement of Photons in Type-II Spontaneous Parametric Down-Conversion, *Ryosuke Shimizu[1], Keiichi Edamatsu[2]; [1]JST, Japan, [2]Tohoku Univ., Japan.* We report broadband entangled photon sources that have control capability of the frequency entanglement. Directly observing the frequency correlation between the constituent photons, we demonstrate the biphoton sources consisting of frequency-correlated or frequency-anticorrelated photons.

JTuB21
High Brightness, Tunable Diode Laser Based Continuous-Wave Biphoton Source for Two Photon Absorption at 976 nm, *Andreas Jechow, Axel Heuer, Ralf Menzel; Univ. of Potsdam, Germany.* A compact all solid state biphoton source based on a frequency doubled diode laser and a PPLN waveguide crystal is presented. More than 10^{11} photon pairs per second in one transversal mode could be generated.

JTuB22
Stabilization and Tuning of a cw Optical Parametric Oscillator with a Triply Resonant Compound Cavity, *Katsuyuki Kasai; NICT, Japan.* We developed a cw KTP (Type II) optical parametric oscillator with a triply resonant compound cavity. A continuous frequency tuning range of 800 MHz was achieved by using a two-frequency dithering stabilization technique.

JTuB23

Enhanced Cascade SHG+DFG Process by Using Power Management Technology and Time Delay, *Shih-Chiang Lin[1], Nai-Hsiang Sun[1], Huei-Min Yang[1], Shih-Kun Liu[2]; [1]I-Shou Univ., Taiwan, [2]Natl. Kaohsiung Univ. of Applied Sciences, Taiwan.* We propose a QPM waveguide incorporated with power management technology and time delay to achieve a maximum conversion efficiency by 232% compared with a normal QPM waveguide with 0.6 ps pulsewidth and 100 pJ energy.

JTuB24

High-Power Intracavity Frequency-Doubled Nd:$GdVO_4$ Lasers Pumped Directly into the Emitting Level, *Nicolaie Pavel; Natl. Inst. for Lasers, Plasma and Radiation Physics, Solid-State Quantum Electronics Lab, Romania.* The pump at 879 nm with diode lasers allowed realization of intracavity frequency-doubled Nd:$GdVO_4$-LiB_3O_5 green lasers with 5.1 W output power in an end-pumping scheme and 9.1 W output power in a multi-pass pumping geometry.

JTuB1–JTuB12 can be found in the Integrated Photonics and Nanophotonics Research and Applications (IPNRA) abstracts.
JTuB25–JTuB8 can be found in the Slow and Fast Light (SL) abstracts.

NOTES

NTuB • Nonlinear Optics Plenary II

Tapa I
11:30 a.m.–1:00 p.m.
Alexander Gaeta; Cornell Univ., USA, Presider

NTuB1 • 11:30 a.m.
Efficient Down-Conversion of Single Photons for Quantum Communication, *Jason S. Pelc, Carsten Langrock, Qiang Zhang, Martin M. Fejer; Stanford Univ., USA.* We propose and demonstrate a system by which light from a diamond NV-center single photon source may be efficiently down-converted to the telecommunications band using difference frequency generation in a PPLN waveguide.

NTuB2 • 11:45 a.m. **Plenary**
Quantum Information Processing with Squeezed States of Light, *Akira Furusawa; Univ. of Tokyo, Japan.* I will briefly review our research activities on creation of high-level and broadband squeezed states of light, quantum entanglement, and these application to quantum information processing (QIP).

NTuB3 • 12:30 p.m. **Invited**
Nonlinear and Quantum Optics in One-Dimensional Photonic Structures, *Concita Sibilia, M. Centini, M. C. Larciprete, M. Bertolotti; Univ. degli Studi di Roma La Sapienza, Italy.* An overview of nonlinear interactions in one-dimensional photonic band gap structures is presented. Theory and experiments of nonlinear quadratic interactions are discussed. Some quantum aspects of nonlinear propagation and noise reductions are also discussed.

1:00 p.m.–2:30 p.m.
Lunch (on your own)

NTuC • Nonlinear Optics in Microresonators

Tapa I
2:30 p.m.–4:30 p.m.
Mikael Lassen; Technical Univ. of Denmark, Denmark, Presider

NTuC1 • 2:30 p.m. **Invited**
Nonlinear Optics with Crystalline Whispering Gallery Mode Resonators, *Lute Maleki; OEwaves, Inc., USA.* Recent results with crystalline whispering gallery mode resonators will be discussed, including observation of Brillion scattering, Raman lasing, and four wave mixing in calcium fluoride resonators, and realization of a unique modulator with lithium tantalite.

NTuC2 • 3:00 p.m.
Coupling Dynamics of Quantum Dots in a Liquid-Crystal-Tunable Microdisk Resonator, *Jens Förstner, Cedrik Meier, Karoline Piegdon, Stefan Declair, Andreas Hoischen, Mark Urbanski, Torsten Meier, Heinz Kitzerow; Univ. of Paderborn, Germany.* We experimentally and theoretically investigate microdisk resonators with embedded quantum dots immersed in a liquid crystal in its nematic phase, showing the tunabililty of the photonic modes via external parameters like temperature or electric field.

NTuC3 • 3:15 p.m.
Microresonators for Optical Switching: Single versus Multiple Coupled, *Jacob B. Khurgin; Johns Hopkins Univ., USA.* We compare performance of single and multiple microresonators in optical switching schemes and show that depending on required speed and material parameters different schemes hold competitive advantages.

NTuC4 • 3:30 p.m. **Invited**
Resolved-Sideband Cooling of a Silica Optomechanical Microresonator in a Cryogenic Environment, *Hailin Wang, Young-Shin Park; Univ. of Oregon, USA.* Resolved-sideband cooling of a silica optomechanical microresonator is demonstrated in a cryogenic environment. Final phonon occupation as low as 37 is achieved when the resonator is precooled to 1.5 K.

NTuC5 • 4:00 p.m. **Invited**
Photonic MEMS Vibrating at X-Band Rates (11GHz), *Tal Carmon, Matthew Tomes; Univ. of Michigan, USA.* We report on an opto-mechanical resonator with vibration excited by compressive radiation pressure via stimulated Brillouin scattering (SBS).

4:30 p.m.–5:00 p.m., Coffee Break, *Palace Lounge*

5:00 p.m.–6:30 p.m., Postdeadline Paper Sessions, *See Postdeadline Papers book for schedule and locations*

7:00 p.m.–10:00 p.m., Conference Luau, *Lagoon Green*

•Wednesday, July 15, 2009•

Palace Lounge
7:30 a.m.–4:30 p.m.
Registration Open

NWA • Terahertz and Ultrafast

Tapa I
8:00 a.m.–10:00 a.m.
Howard Milchberg; Univ. of Maryland at College Park, USA, Presider

NWA1 • 8:00 a.m.
Demonstration of 17 Meter Standoff THz Wave Generation, *Jianming Dai, Xi-Cheng Zhang; Rensselaer Polytechnic Inst., USA.* We report standoff THz wave generation from femtosecond laser-induced plasma in ambient air through nonlinear optical processes similar to four-wave-mixing at a distance of about 17 meters by remotely focusing optical beams far way.

NWA2 • 8:15 a.m.
Terahertz Maker Fringe Observed in a Long Femtosecond Filament Generated by 2-Color Laser Field, *Yi Liu, Aurélien Houard, Magali Durand, Bernard Prade, André Mysyrowicz; Lab d'Optique Appliquée, École Polytechnique, France.* The terahertz radiation generated by a 2-color femtosecond laser in ionized air manifests a Maker fringe behavior, which reveals an intrinsic limitation of this scheme. The observations are explained by the formation of femtosecond filament.

NWA3 • 8:30 a.m. **Invited**
Dynamic Control of the Flow of Terahertz Light, *David G. Cooke, Peter Jepsen; Technical Univ. of Denmark, Denmark.* Guided propagation of THz light has been intensely developed recently. We describe our efforts towards dynamic, optical control of the flow of light in waveguide structures, enabling reconfigurable photonic components for the terahertz frequency range.

NWA4 • 9:00 a.m.
Broadband Terahertz Detection with Selected Gases, *Xiaofei Lu, Nicholas Karpowicz, X.-C. Zhang; Rensselaer Polytechnic Inst., USA.* We demonstrate a 240 times enhancement of broadband (0.1-10 THz) terahertz detection using hexane vapor in a gas cell. Analytical calculations and a figure of merit are introduced to characterize the sensitivity of gas sensors.

NWB • Novel Effects in Atoms, Molecules and Metals

Tapa II
8:00 a.m.–10:00 a.m.
Andrew Dawes; Duke Univ., USA, Presider

NWB1 • 8:00 a.m.
A Classical Study of Second-Harmonic Generation from Metallic Nanoparticles, *Yong Zeng[1], Walter Hoyer[2], Jinjie Liu[1], Stephan W. Koch[2], Jerome Moloney[1]; [1]Univ. of Arizona, USA, [2]Philipps Univ., Germany.* We developed a classical electrodynamics theory to study the optical nonlinearities of metallic nanoparticles. Through a detailed comparison between existing experiments and numerical simulations, we validated this theory as well as the associated numerical algorithm.

NWB2 • 8:15 a.m.
Strong, Fifth-Order, Nonlinear Optical Response Resulting from Local-Field-Induced Microscopic Cascading in C_{60}, *Robert W. Boyd, Ksenia Dolgaleva, Heedeuk Shin; Univ. of Rochester, USA.* We demonstrate theoretically and experimentally a previously overlooked contribution to the fifth-order susceptibility resulting from microscopic cascading. This contribution scales quadratically with the molecular number density and constitutes a potentially important means for enhancing nonlinearities.

NWB3 • 8:30 a.m.
Superradiance in an Ultracold Thermal Vapor, *Joel A. Greenberg, Daniel J. Gauthier; Duke Univ., USA.* We report on superradiant Rayleigh scattering in an anisotropic, cold thermal vapor. We identify threshold pump powers and atomic densities for entering the superradiant regime, and observe temporal correlations between light emitted in opposite directions.

NWB4 • 8:45 a.m.
Ultralow-Power Nonlinear Optics with Rb-Filled Photonic Band-Gap Fibers, *Vivek Venkataraman, Amar R. Bhagwat, Pablo Londero, Aaron D. Slepkov, Alexander L. Gaeta; School of Applied and Engineering Physics, Cornell Univ., USA.* Using light-induced atomic desorption, we generate an optically-dense Rb vapor on-demand inside a hollow-core photonic bandgap fiber for ultralow power nonlinear optical interactions. We demonstrate electromagnetically-induced-transparency, four-wave-mixing and efficient all-optical modulation in this system.

NWB5 • 9:00 a.m. **Invited**
Nonlinear Optics Using Rydberg Ensembles, *R. P. Abel, M. G. Bason, A. Gauguet, J. D. Pritchard, U. Raitzsch, Charles Adams; Durham Univ., UK.* Our work focuses on exploiting the strongly interacting character of Rydberg atoms for non-linear optics with the aim of realizing a robust quantum interface to control single photons.

NWA • Terahertz and Ultrafast (continued)

NWA5 • 9:15 a.m.
Measuring Complex and Visible Ultrashort Pulses, *Dongjoo Lee[1], Lina Xu[2], Rick Trebino[2]; [1]Swamp Optics, USA, [2]Georgia Tech, USA.* We show that frequency-resolved optical gating (FROG) can reliably measure extremely complex pulses and that a highly simplified version of it (GRENOUILLE) can easily measure visible pulses.

NWA6 • 9:30 a.m. **Invited**
Femtosecond Pulse Duration Measurements by Transverse Second Harmonic Generation in Random Nonlinear Media, *Ramon Vilaseca[1], Vito Roppo[1], Jose F. Trull[1], Crina Cojocaru[1], Kestutis Staliunas[1,2], D. Dumay[3], Wieslaw Krolikowski[3], Solomon S. Saltiel[3,4], Dragomir N. Neshev[3], Yuri S. Kivshar[3]; [1]Univ. Politecnica de Catalunya, Spain, [2]ICREA, Spain, [3]Australian Natl. Univ., Australia, [4]Sofia Univ., Bulgaria.* We study transverse non-collinear second harmonic generation in a nonlinear crystal with random ferroelectric domain structure and demonstrate that it provides a simple and robust method for characterizing femtosecond optical pulses.

NWB • Novel Effects in Atoms, Molecules and Metals (continued)

NWB6 • 9:30 a.m.
Dynamically-Enhanced, Coherent Optical Magnetization, *William M. Fisher, Yuwei Li, Stephen C. Rand; Univ. of Michigan, USA.* Optically-driven charge motion produces intense coherent magnetization in ultrafast experiments governed by a complex Mathieu equation. Magnetic dispersion and negative index behavior is predicted in unstructured, natural materials.

NWB7 • 9:45 a.m.
Light Condensation in Actively Mode-Locked Lasers , *Rafi Weill[1], Omri Gat[2], Baruch Fischer[1]; [1]Technion-Israel Inst. of Technology, Israel, [2]Hebrew Univ., Israel.* We present a new approach to active mode-locking (AML) that predicts, under certain conditions, pulse "condensation," analogous to BEC. In the condensate state, the first AML eigenmode is dominant over all other modes.

Palace Lounge
10:00 a.m.–10:30 a.m.
Coffee Break/Exhibits (Exhibits open 10:00 a.m.–2:30 p.m.)

NOTES

JWA • Joint Poster Session II

Palace Lounge
10:00 a.m.–11:30 a.m.

JWA14
New Fabrication Technique of Quasi-Phase-Matched Devices by Use of the Room-Temperature-Bonding, *Ken Imura, Munenori Kawaji, Tomohiko Yaguchi, Ichiro Shoji; Chuo Univ., Japan.* We propose a new versatile method for fabricating quasi-phase-matched devices: room-temperature plate-bonding technique. We have succeeded in bonding 12 plates of GaAs for 1μm-pumped OPO and 5 plates of GaP for THz generation.

JWA15
Single-Event Effects in Microelectronics Induced by Through-Wafer Sub-Bandgap Two-Photon Absorption, *Dale McMorrow[1], William Lotshaw[2], Joseph Melinger[1], Jonathan Pellish[3]; [1]NRL, USA, [2]Aerospace Corp., USA, [3]NASA Goddard Space Flight Ctr., USA.* Carrier generation based on nonlinear absorption in semiconductors is an important tool for the investigation of single-event effects (SEE) in microelectronic devices. Recent advances and the present status of two-photon-absorption induced SEE interrogations are described.

JWA16
Nonlinear Absorption Spectroscopy of a Bis(Porphyrin)-Substituted Squaraine, *Scott Webster[1], Susan A. Odom[2], Lazaro A. Padilha[1], Olga V. Przhonska[1,3], Davorin Peceli[1], Honghua Hu[1], Gero Nootz[1], Alexei D. Kachkovski[4], Jonathan Matichak[2], Stephen Barlow[2], Harry L. Anderson[5], Seth R. Marder[2], David J. Hagan[1], Eric W. Van Stryland[1]; [1]CREOL and FPCE, College of Optics and Photonics, Univ. of Central Florida, USA, [2]School of Chemistry and Biochemistry and Ctr. for Organic Photonics and Electronics, Georgia Tech, USA, [3]Inst. of Physics, Natl. Acad. of Sciences, Ukraine, [4]Inst. of Organic Chemistry, Natl. Acad. of Sciences, Ukraine, [5]Dept. of Chemistry, Chemistry Res. Lab, Univ. of Oxford, UK.* The nonlinear absorption mechanisms of a bis(porphyrin)-substituted squaraine have been studied with femtosecond, picosecond, and nanosecond pulsewidths. The two-photon absorption is ~10× larger than those of the constituents and is explained by intra-molecular charge transfer.

JWA17
Comparison of Linear and Nonlinear Absorption in Three Series of Similar Cyanine Dyes: D-π-D, A-π-A and D-π-A, *Honghua Hu[1], Lazaro A. Padilha[1], Scott Webster[1], Trenton Ensley[1], Davorin Peceli[1], Olga V. Przhonska[1,2], David J. Hagan[1,3], Eric W. Van Stryland[1,3], Mikhail V. Bondar[2], Yuriy L. Slominsky[4], Alexei D. Kachkovski[4], Andriy O. Gerasov[4], Mykola P. Shandura[4], Mykola P. Shandura[4], Yuriy P. Kovtun[4]; [1]College of Optics and Photonics, CREOL and FPCE, Univ. of Central Florida, USA, [2]Inst. of Physics, Natl. Acad. of Sciences, Ukraine, [3]Dept. of Physics, Univ. of Central Florida, USA, [4]Inst. of Organic Chemistry, Natl. Acad. of Sciences, Ukraine.* We report the linear and nonlinear spectra of three series of cyanine dyes (donor-π-acceptor, acceptor-π-acceptor, and donor-π-donor) including effects of conjugation length and terminal groups. Two-photon-absorption up to 16,000 GM is observed in acceptor-π-acceptor structures.

JWA18
Temperature Dependent Nonlinear Absorption in InSb, *Peter Olszak[1], Claudiu M. Cirloganu[1], Scott Webster[1], Lazaro A. Padilha[1], Shekhar Guha[2], Srinivasan Krishnamurthy[3], David J. Hagan[1], Eric W. Van Stryland[1]; [1]CREOL, Univ. of Central Florida, USA, [2]AFRL, USA, [3]SRI Intl., USA.* Temperature dependent two-photon and free-carrier absorption spectra of InSb are measured using femtosecond, picosecond, and nanosecond IR sources. Measurements over this substantial range of pulsewidths give results consistent with a recent theoretical model.

JWA19
Syntheses, Crystal Structure and Hyper Raleigh Scattering Measurements of Phosphite-Substituted Schiff Base Ligands, *Makeba B. Murphy-Jolly[1], Samuel B. Owens Jr.[1], Gary M. Gray[1], Christopher M. Lawson[1], David P. Shelton[2]; [1]Univ. of Alabama at Birmingham, USA, [2]Univ. of Nevada at Las Vegas, USA.* Stable chiral phosphites incorporating Schiff Bases or azobenzenes have been synthesized and characterized. HRS measurements indicate that the addition of the phosphite does not affect the β value of the Schiff base or azobenzene group.

JWA20
Excited-State Absorption Cross Sections of a Phosphine-Substituted Bithiophene, *Timothy M. Pritchett[1], Jianwei Wang[2], Christopher M. Lawson[2], Qun Zhao[2], Gary M. Gray[2]; [1]ARL, USA, [2]Univ. of Alabama at Birmingham, USA.* The two-photon and excited-state absorption cross sections of a derivative of 5,5′-bis (diphenylphosphino)-2,2′-bithiophene have been measured at 430-nm wavelength using open-aperture *Z* scans employing 27-ps and 5-ns pulses at multiple pulse energies.

JWA21
Spectral Broadening of Mid-Infrared Femtosecond Pulses in Semiconductor Materials, *Satoshi Ashihara[1,2], Yusuke Kawahara[1]; [1]Tokyo Univ. of Agriculture and Technology, Japan, [2]PRESTO, JST, Japan.* The pulses of 100-fs duration at 4800 nm were focused onto semiconductor materials of Si, Ge, and GaAs. Spectral broadening by a factor of >3 was observed with the input pulse energy of 3 micro-joule.

JWA22
A Laser Guide Star Adaptive Optics System of Subaru Telescope, *Yutaka Hayano[1], Hideki Takami[1], Shin Oya[1], Masayuki Hattori[1], Yoshihiko Saito[1], Makoto Watanabe[1], Yosuke Minowa[1], Sebastian Egner[1], Olivier Guyon[1], Meguru Ito[1], Vincent Garrel[1], Stephen Colley[1], Matthew Dinkins[1], Golota Taras[1], Tomio Kurakami[1], Yoshitake Nabeshima[1], Norihito Saito[2], Satoshi Wada[2], Takatoshi Shibuya[3], Masanori Iye[3]; [1]Subaru Telescope, Natl. Astronomical Observatory of Japan, USA, [2]Solid State Laser for Astronomical Observation Res. Team, RIKEN, Japan, [3]Natl. Astronomical Observatory of Japan, Japan.* Adaptive optics system with a laser guide star at Subaru Telescope is under commission. Characteristics of laser guide star, which is produced by all-solid state sum frequency laser at 589 nm, are presented.

JWA23
Construction of an Optical Sum Frequency Microscope with Confocal Optics, *Goro Mizutani[1,2], Kitsakorn Locharoenrat[1,2], Hongyan Li[1,2], Haruyuki Sano[1,2,3]; [1]School of Materials Science, Japan Advanced Inst. of Science and Technology, Japan, [2]Core Res. for Evolutional Science and Technology, JST, Japan, [3]Ishikawa Natl. College of Technology, Japan.* We have demonstrated confocal sum frequency (SF) microscopy. The SF intensity images were obtained when the incident beams were focused at different depths in the ZnS sample from 0 μm to 10 μm.

JWA24
Modeling Image Conversion in Sum-Frequency Generation, *Preben Buchhave, Peter Tidemand-Lichtenberg, Christian Pedersen; Technical Univ. of Denmark, Denmark.* We present a dynamic simulation of up-conversion of coherent images by sum-frequency generation. The method allows investigation of depletion of the interacting fields, diffraction and phase mismatch as well as imaging properties and filtering effects.

JWA25
All-Optical Demultiplexing of Femtosecond Pulses from an OTDM 500Gb/s Pattern Using Nonlinearities in SOAs, *Claudio Crognale, Antonella Di Giansante; TechnoLabs SpA, Italy.* This paper numerically investigates the potential performances of an all-optical interferometric SOA-based demultiplexer pump-probe scheme capable to extract a 250Gb/s channel from a 500Gb/s optical pattern without any pattern-dependence.

JWA1–JWA13 can be found in the Integrated Photonics and Nanophotonics Research and Applications (IPNRA) abstracts.
JWA26–JWA29 can be found in the Slow and Fast Light (SL) abstracts.

NOTES

NWC • Current Trends in Nonlinear Optical Materials

Tapa I
11:30 a.m.–1:30 p.m.
Paulina S. Kuo; NIST, USA, Presider

NWC1 • 11:30 a.m.
Novel Photorefractive Properties of $In:Fe:Cu:LiNbO_3$ Crystal, *Xiudong Sun, Suhua Luo, Hongxin Shi; Harbin Inst. of Technology, China.* Significant enhancement of nonvolatile photo-refractive characteristics is achieved in $LiNbO_3$:In:Fe:Cu crystal with high sensitivity, fast response and large refractive index change of 10^{-4}. Novel blue photorefractive properties were also studied using the two-wave coupling experiment.

NWC2 • 11:45 a.m.
Second Order Nonlinear Optical Activity of Non-Electrically Poled Amorphous Polymers, *Atsushi Sugita, Masashi Morimoto, Yuhki Ishida, Yasuhiro Matsuda, Shigeru Tasaka; Shizuoka Univ., Japan.* A new type of nonlinear optical polymers, poly (cyanophenylene sulfiedes) (PCPS) will be reported. The thin film of the PCPS on silver thin layer exhibited second order nonlinear optical activities even without conventional poling procedures.

NWD • Advances in Frequency Conversion, High Energy Lasers, and Laser Dynamics

Tapa II
11:30 a.m.–1:30 p.m.
Robert W. Boyd; Univ. of Rochester, USA, Presider

NWD1 • 11:30 a.m.
Broadly Tunable CEP Stable OPA Pumped by a Monolithic Ytterbium Fiber Amplifier, *Alma Fernández[1], Lingxiao Zhu[1], Aart Verhoef[1], Dmitrii Sidorov-Biryukov[1], Audrius Pugzlys[1], Andrius Baltuska[1], Chi-Hung Liu[2], Kai-Hsiu Liao[2], Almantas Galvanauskas[2], Steve Kane[3]; [1]Technische Univ. Wien, Austria, [2]Ctr. for Ultrafast Optical Science, Univ. of Michigan, USA, [3]HORIBA Jobin Yvon, Inc., USA.* We demonstrate an efficient broadband difference-frequency converter emitting carrier-envelope-offset-free seed pulses for chirped-pulse parametric amplification and pumped by a monolithic femtosecond Yb-doped-fiber amplifier that simultaneously provides passive optical synchronization for an OPCPA pump pulse source.

NWD2 • 11:45 a.m.
Efficient Difference Frequency Generation in Triply Resonant Nonlinear Cavities, *Ian B. Burgess[1], Murray W. McCutcheon[1], Alejandro W. Rodriguez[2], Jorge Bravo-Abad[2], Yinan Zhang[1], Steven G. Johnson[3], Marko Lončar[1]; [1]School of Engineering and Applied Sciences, Harvard Univ., USA, [2]Dept. of Physics, MIT, USA, [3]Dept. of Mathematics, MIT, USA.* We develop a theoretical framework for second-order nonlinear difference frequency generation in triply resonant wavelength-scale cavities, demonstrating stable CW conversion with quantum-limited efficiency. We propose a scheme for efficient THz generation based on this framework.

JWB • Joint NLO/SL Session: Slow Light Applications in Nonlinear Optics

Honolulu I-II
11:30 a.m.–1:30 p.m.
Mark Allen Neifeld; Univ. of Arizona, USA, Presider

JWB1 • 11:30 a.m. **Invited**
Slow Light Enhanced Nonlinear Effects in Silicon Photonic Crystal Waveguides, *Christelle Monat[1], B. Corcoran[1], C. Grillet[1], M. Ebnali-Heidari[1], D. J. Moss[1], B. J. Eggleton[1], T. P. White[2], L. O'Faolain[2], T. F. Krauss[2]; [1]Univ. of Sydney, Australia, [2]Univ. of St. Andrews, UK.* We experimentally investigate the slow light enhancement of nonlinear effects such as self-phase modulation, two-photon absorption and free carriers, through dispersion-engineered silicon photonic crystal waveguides. We also observe emission of visible light through third-harmonic generation.

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NWC • Current Trends in Nonlinear Optical Materials (continued)

NWC3 • 12:00 p.m. **Invited**

Integration of Extraordinary Nonlinear Optical Materials into Silicon Photonics, Plasmonics and Metamaterial Devices, *Larry Dalton; Univ. of Washington, USA.* Correlated quantum and statistical mechanical calculations have been employed to guide an exponential improvement of the electro-optic activity of organic materials, which have been integrated with silicon nanophotonic circuitry, plasmonic circuitry, and metamaterial device architectures.

NWC4 • 12:30 p.m.

***In situ* Switching of the Second-Order Nonlinear Optical Response at the Molecular Level,** *Inge Asselberghs, Koen Clays; Katholieke Univ. Leuven, Belgium.* We report on combined electrochemical and (non)linear optical experiments. The electrochemical experiments are conducted in solution and *in situ* monitored by hyper-Rayleigh-scattering. Also thin-films showed to be electrochemically-altered and *in situ* probed by second-harmonic generation.

NWD • Advances in Frequency Conversion, High Energy Lasers, and Laser Dynamics (continued)

NWD3 • 12:00 p.m.

50-MHz Single-Pass Optical Parametric Amplification Based on a Yb:Fiber Laser, *Shi-Wei Chu[1], Yan-Wei Tzeng[1,2], Chen-Han Huang[1,3], Yen-Yin Lin[4], Jian-Ming Liu[1], Hsiang-Chen Chui[3], Hsiang-Lin Liu[2], James M. Stone[5], Jonathan C. Knight[5]; [1]Dept. of Physics, Natl. Taiwan Univ., Taiwan, [2]Dept. of Physics, Natl. Taiwan Normal Univ., Taiwan, [3]Inst. of Electro-Optical Science and Engineering, Natl. Cheng Kung Univ., Taiwan, [4]Inst. of Photonics Technologies, Dept. of Electrical Engineering, Natl. Tsing Hua Univ., Taiwan, [5]Ctr. for Photonics and Photonic Materials, Univ. of Bath, UK.* A high-repetition-rate, doubly-resonant, 700-2000-nm continuously-tunable optical-parametric-amplifier with 50% conversion efficiency was demonstrated. The pump/seed were provided by second-harmonic-generation/supercontinuum from the same modelocked fiber laser. This low-pulse-energy, high-average-power source is useful for biomedical applications.

NWD4 • 12:15 p.m.

Spectral Filtering Highly-Chirped Pulses in All-Normal Dispersion Fiber Lasers, *Brandon G. Bale[1], Nathan Kutz[2]; [1]Photonics Res. Group, Aston Univ., UK, [2]Dept. of Applied Mathematics, Univ. of Washington, USA.* We present a theory for the generation of ultra-short, high-energy pulses in an all-normal dispersion laser cavity with spectral filtering. The theory gives a geometrical description of the intra-cavity dynamics for optimizing laser performance.

NWD5 • 12:30 p.m.

Observation of Noise Outburst in Mode-Locked Fiber Lasers, *Levent Budunoğlu, Coskun Ülgüdür, Kutan Gürel, Çagri Şenel, F. Öemer Ilday; Dept. of Physics, Bilkent Univ., Turkey.* Intensity noise is characterized over all known mode-locking regimes. We observe sudden outburst of noise beyond a threshold pulse energy. This appears to be the first evidence of coupling of nonlinear effects to laser noise.

JWB • Joint NLO/SL Session: Slow Light Applications in Nonlinear Optics (continued)

JWB2 • 12:00 p.m.

Complete Broadening Compensation in a Slow Light System Using a Non-Linear Regeneration Element, *Sanghoon Chin[1], Miguel Gonzalez-Herraez[2], Luc Thévenaz[1]; [1]École Polytechnique Fédéral de Lausanne, Switzerland, [2]Univ. of Alcalá de Henares, Spain.* We demonstrate experimentally a new configuration to realize zero-broadening slow light. The inevitable pulse broadening in the slow light medium was completely compensated by a nonlinear regeneration element. Experimental results show 1.3-bit delays without distortion.

JWB3 • 12:15 p.m.

Four-Wave Mixing in Slow Light Waveguides, *Vishnupriya Govindan, Steve Blair; Univ. of Utah, USA.* We study the effects of pulse distortion on four-wave mixing (FWM) for different slow-light architectures. REMZI has the highest FWM conversion. Distortion constraint limits the FWM conversion in CROW with higher number of stages.

JWB4 • 12:30 p.m. **Invited**

Modulation of Single Photons and Biphotons, *Steve Harris; Stanford Univ., USA.* We generate photons with sub-natural linewidths and temporal lengths that are sufficiently long that they may be easily modulated. Results include a new technique for measuring the temporal shape of biphotons.

NWC • Current Trends in Nonlinear Optical Materials

NWC5 • 12:45 p.m.
Sum-Rules: Applications to Nonlinear Optics at the Molecular Level, *Javier Perez-Moreno[1], Koen Clays[1,2], Mark G. Kuzyk[2]; [1]Univ. of Leuven, Belgium, [2]Washington State Univ., USA.* We use the Thomas Khun sum-rules to characterize the nonlinear efficiency of organic molecules, investigate new optimization strategies and interpret experimental results with the aim of simplifying the study of molecular nonlinear optics.

NWC6 • 1:00 p.m.
Low-Coherence Interferometry for Measuring Electro-Optic Coefficients of $LiNbO_3$ Crystals, *Seoung H. Lee, Seung H. Kim, Kyong H. Kim; Inha Univ., Republic of Korea.* A novel method based on white-light interferometry and phase analysis technique has been used to measure accurate unclamped electro-optic coefficients, r_{13} and r_{33} , of $LiNbO_3$ crystals over a wavelength range wider than 100 nm.

NWC7 • 1:15 p.m.
Using Absorption Distribution Model to Predict Optimal Laser Conditioning for DKDP Crystals, *Zhi M. Liao, Mary Spaeth, Ken Manes, John J. Adams, C. W. Carr; Lawrence Livermore Natl. Lab, USA.* A model based on thermal diffusion of nonlinear absorbing nano-precursor is used to calculate the optimal sequence of fluences necessary to condition DKDP crystal *in situ* using small-aperture damaging testing results.

NWD • Advances in Frequency Conversion, High Energy Lasers, and Laser Dynamics (continued)

NWD6 • 12:45 p.m.
Stable Q-Switched Modelocked Yb-Fiber Laser by AO Modulation and Nonlinear Fiber Loop, *Tzu-Hsiang Yen[1], Ja-Hon Lin[2], Kuei-Chu Hsu[3], Y. Lai[1]; [1]Dept. of Photonics and Inst. of Electro-Optical Engineering, Natl. Chiao Tung Univ., Taiwan, [2]Dept. of Electro-Optical Engineering and Inst. of Electro-Optical Engineering, Natl. Taipei Univ. of Technology, Taiwan, [3]Graduate Inst. of Electro-Optical Engineering, Chang Gung Univ., Taiwan.* The reliable Q-switched modelocking is demonstrated in an Yb-fiber laser by employing an acousto-optic modulator and a nonlinear-fiber-loop. Within the Q-switched envelope, the mode-locked pulses with 41 MHz repetition rate can be obviously seen.

NWD7 • 1:00 p.m.
High-Repetition-Rate High-Average-Power Yb-Doped Fiber Amplification System, *Wenxue Li, Qiang Hao, Heping Zeng; East China Normal Univ., China.* Efficient generation of 262-W average power of 5.4-ps pulses at 79.5-MHz repetition rate by use of two-stage ytterbium-doped fiber pre-amplifier and two-stage double-clad fiber power amplifier in cascade.

NWD8 • 1:15 p.m.
Remarkable Enhancement in the Self-Pulsating Action of a Weakly-Index-Guided AlGaAs Laser Diode by Nanosecond Electric-Pulse Excitation, *Shunsuke Kono[1], Tomoyuki Oki[1,2], Takao Miyajima[2], Masaru Kuramoto[2], Hideki Watanabe[2], Masao Ikeda[1,2], Hiroyuki Yokoyama[1]; [1]New Industry Creation Hatchery Ctr., Tohoku Univ., Japan, [2]Advanced Material Labs, Sony Corp., Japan.* Pulsation phenomena were enhanced in an AlGaAs self-pulsation laser diode under strong electric-pulse excitation. The peak power and pulse repetition increased, and the pulse duration decreased by a factor of 10 compared to DC-current operation.

JWB • Joint NLO/SL Session: Slow Light Applications in Nonlinear Optics (continued)

JWB5 • 1:00 p.m. **Invited**
Broadband Optical Delay and Filtering in Spectrally Structured Materials, *Wm. Randall Babbitt, Zeb W. Barber; Montana State Univ., USA.* Spectrally structured optical materials have the ability to process broadband signals, including performing true-time-delay and spectral filtering. This paper reviews the theory and experimental results of spatial spectral holographic true time delay and filtering.

1:30 p.m.–7:30 p.m.
Afternoon Free

Palace Lounge
7:30 p.m.–9:00 p.m.
Registration Open

NWE • Squeezing and Biphoton States

Tapa I
7:30 p.m.–9:30 p.m.
Benoît Boulanger; Inst. Neel, Joseph Fourier Univ., France, Presider

NWE1 • 7:30 p.m.
Infrared Single-Photon Frequency Upconversion Detection Pumped by Synchronous Fiber Lasers, *Xiaorong Gu, E. Wu, Yao Li, Ming Yan, Haifeng Pan, Heping Zeng; East China Normal Univ., China.* Infrared single photons at 1.55 μm from an Er-fiber laser were frequency up-converted to the visible region by a synchronized Yb-fiber laser pump beam in a PPLN crystal. The maximum conversion efficiency was reached 31.2%.

NWE2 • 7:45 p.m.
Characterization of Nonlinear Optical Properties of Periodically Poled MgO:LiNbO$_3$ Crystal and Generation of Squeezed States of Light at 860nm, *Genta Masada[1,2], Mikiya Ueda[1], Tsuyoshi Suzudo[3], Yasuhiro Sato[3], Hideki Ishizuka[4], Takunori Taira[4], Akira Furusawa[1]; [1]Dept. of Applied Physics and Quantum Phase Electronics Ctr., School of Engineering, Univ. of Tokyo, Japan, [2]Tamagawa Univ. Res. Inst., Japan, [3]Ricoh Co., Ltd., Japan, [4]Inst. of Molecular Science, Japan.* We achieved 128mW of oscillation threshold of an optical parametric oscillator with a periodically poled MgO:LiNbO$_3$ crystal and the squeezing level of -6.24 ±0.11dB at the pump power of 80mW.

NWE3 • 8:00 p.m. **Invited**
Photon Quantum Correlation Measurement by Two Photon Absorption in Semi-Conductors: Do Blackbody Photons Effectively Bunch? *Fabien Boitier[1], Antoine Godard[1], Claude Fabre[2], Emmanuel Rosencher[1,3]; [1]ONERA, France, [2]Lab Kastler Brossel, Univ. Pierre et Marie Curie, France, [3]Physics Dept., École Polytechnique, France.* We show that photon quantum correlations can be measured by two photon absorption in semiconductors. Hanbury-Brown Twiss experiments can thus be performed with genuine blackbodies with a time resolution in the femtosecond range.

NWE4 • 8:30 p.m.
Resonant Sum Frequency Generation with Biphotons, *S. Sensarn, Irfan Ali-Khan, G. Y. Yin, S. E. Harris; Stanford Univ., USA.* We improve the efficiency of sum frequency generation using entangled photons. By resonating the sum frequency field, we observe generated power which varies linearly with input power and is increased by a factor of 12.

NWE5 • 8:45 p.m.
Entangled-Photon Characterization and Quantum Imaging with Shaped Two-Photon States, *Florian Zäh, Thomas Feurer; Univ. of Bern, Switzerland.* We demonstrate pulse-shaper based characterization of entangled photon states, shaper-based quantum optical experiments and shaper-based quantum imaging.

NWE6 • 9:00 p.m.
A Semiconductor Ridge Micro Cavity Generating Counter-Propagating Twin Photons, *Xavier Caillet[1], Aristide Lemaître[2], Isabelle Sagnes[2], Ivan Favero[1], Giuseppe Leo[1], Sara Ducci[1]; [1]Univ. Paris Diderot, France, [2]Lab de Photonique et Nanostructures, CNRS, France.* We demonstrate twin photon emission in a AlGaAs ridge microcavity at room temperature. The pump beam resonance leads to an important efficiency enhancement of the nonlinear process generating counter-propagating twin photons at 1.55 micron.

NWE7 • 9:15 p.m.
Towards Semiconductor Two-Photon Gain: Electrically Induced Two-Photon Transparency in Quantum Wells, *Alex Hayat, Amir Nevet, Meir Orenstein; Dept. of Electrical Engineering, Technion-Israel Inst. of Technology, Israel.* We demonstrate experimentally a major step towards semiconductor based nonlinear two-photon gain and lasing—namely the two-photon transparency. The one-photon luminescence is progressively reduced by current injection down to the two-photon transparency point.

•Thursday, July 16, 2009•

Palace Lounge
7:30 a.m.–1:00 p.m.
Registration Open

NThA • Parametric Processes and Oscillators

Tapa I
8:00 a.m.–10:15 a.m.
Hailin Wang; Univ. of Oregon, USA, Presider

NThA1 • 8:00 a.m.
Green-Pumped CW Singly Resonant Optical Parametric Oscillator Based on MgO:PPLN with Frequency Stabilization, *Sebastian Zaske[1], Dong-Hoon Lee[2], Christoph Becher[1]; [1]Univ. des Saarlandes, Germany, [2]Korea Res. Inst. of Standards and Science, Republic of Korea.* We report on a cw-OPO based on MgO:PPLN, pumped at 532nm, featuring a threshold of 1.2W and 300mW of single-mode idler output power at 1406-1451nm. Signal frequency stabilization to a 133Cs hyperfine transition is demonstrated.

NThA2 • 8:15 a.m. **Invited**
Non-Critical Singly Resonant OPO Operation near 6.2 µm Based on a $CdSiP_2$ Crystal Pumped at 1064 nm, *Peter G. Schunemann[1], Kevin T. Zawilski[1], Thomas M. Pollak[1], Valentin Petrov[2]; [1]BAE Systems, Inc., USA, [2]Max-Born-Inst., Germany.* CdSiP2 is employed in a nanosecond, 90°-phase-matched singly resonant optical parametric oscillator pumped at 1064 nm, to produce idler pulses near 6.2 µm with an energy as high as 470 µJ at 10 Hz.

NThA3 • 8:45 a.m.
Phase-Stabilized, 1.5-W Mid-Infrared Femtosecond Optical Parametric Oscillator for Frequency Comb Spectroscopy, *Florian Adler, Kevin C. Cossel, Michael J. Thorpe, Jun Ye; JILA, NIST, Univ. of Colorado, USA* .We present a mid-infrared frequency comb based on a synchronously-pumped, femtosecond optical parametric oscillator. The idler (signal) is continuously tunable from 2.8-4.8 µm (1.76-1.37 µm) with a maximum average output power of 1.50 W.

NThA4 • 9:00 a.m. **Invited**
Pulsed Fiber-Optical Parametric Oscillators in the near Infrared, *Jay E. Sharping, Christiane Goulart-Pailo, Chenji Gu; Univ. of California at Merced, USA.* We review the progress in fiber optical parametric oscillators. Different implementations operating from 400 nm through 1650 nm in wavelength and with average powers of 100 mW have been reported and steady performance improvements continue.

NThA5 • 9:30 a.m.
Optical Phase Conjugation for Dispersion and Nonlinearity Compensation in a 1600km, 42 Gb/s Quasi-Lossless System, *Paolo Minzioni[1], Paul Harper[2], Vincenzo Pusino[1], Lee Barker[2], Carsten Langrock[3], Martin M. Fejer[3], Juan-Diego Ania-Castanon[4], Ilaria Cristiani[1], Vittorio Degiorgio[1]; [1]CNISM and Univ. of Pavia, Italy, [2]Aston Univ., UK, [3]Stanford Univ., USA, [4]Inst. de Óptica "Daza de Valdés", Spain.* We experimentally investigate a long-distance, high-bit-rate transmission system which combines optical-phase-conjugation with quasi-lossless amplification. Comparison with a conventional system configuration demonstrates the possibility of obtaining both dispersion compensation and improved nonlinear tolerance using proposed scheme.

NThA6 • 9:45 a.m. **Invited**
Silicon Nanophotonics for on-Chip High-Speed Parametric Optical Processing, *Keren Bergman; Columbia Univ., USA.* Utilizing all-optical parametric processing in a silicon photonic chip, we demonstrate wavelength conversion for 10 and 40-Gb/s NRZ as well as 160-Gb/s pulsed-RZ data signals, and demonstrate eight-way wavelength multicasting at 40-Gb/s NRZ data rates.

Palace Lounge
10:15 a.m.–10:45 a.m.
Coffee Break

NThB • Advances in Quasi-Phase-Matched Interactions

Tapa I
10:45 a.m.–1:00 p.m.
Valentin Petrov; Max-Born-Inst., Germany, Presider

NThB1 • 10:45 a.m.
A Compact and Wavelength-Tunable PPLN EO Q-Switch Laser with Intra-Cavity Optical Parametric Generation, *An-Chung Chiang, Y. Y. Lin, S. T. Lin, T. D. Wang, Y. C. Huang; Natl. Tsing Hua Univ., Taiwan.* We report a compact and tunable 1.55-μm-wavelength PPLN Q-switch laser with intra-cavity optical parametric generation, producing 8 ns, 5 μJ pulses at 10 kHz when pumped with a 10 W diode laser at 808 nm.

NThB2 • 11:00 a.m.
Highly Efficient Visible Light Generation at 488 nm Using High Brilliance Laser Diodes and Periodically Poled Materials, *Andreas Jechow, Ralf Menzel; Univ. of Potsdam, Germany.* SHG conversion efficiencies of up to 50% using PPLN waveguides in single pass and 30% using PPLN bulk crystals in a mini ring resonator could be achieved by frequency doubling high-brilliance laser diodes.

NThB3 • 11:15 a.m.
Chirped Pulse Trains for Quasi-Phase-Matching High Harmonic Generation, *Tom A. Robinson, Kevin O'Keeffe, Simon M. Hooker; Univ. of Oxford, UK.* A method for producing non-uniformly spaced (chirped) trains of ultrafast pulses is demonstrated, using an acousto-optic programmable dispersive filter (AOPDF). Programmable pulse trains of this type may find applications in quasi-phase matching of high-harmonic generation.

NThB4 • 11:30 a.m. **Invited**
Materials and Devices for Quasi-Phase-Matched Nonlinear Optics, *Sunao Kurimura[1,2]; [1]Natl. Inst. for Materials Science, Japan, [2]Waseda Univ., Japan.* Recent topics in QPM-NLO materials and devices are reviewed including thermally conductive Mg-doped stoichiometric lithium tantalate and a highly confined adhered-ridge waveguide. Novel materials and devices will extend the application field of NLO with unconventional power and efficiency.

NThB5 • 12:00 p.m.
Mg-Doped Congruent $LiTaO_3$ and $LiNbO_3$ for Highly Efficient and High Power/Energy QPM Optical-Parametric Systems, *Hideki Ishizuki, Takunori Taira; Laser Res. Ctr. for Molecular Science, Inst. for Molecular Science, Japan.* For highly efficient and high energy wavelength conversion, not only nonlinear optical coefficients but also transparent range and small absorption are important for nonlinear crystals. Mg-doped congruent $LiTaO_3$ was characterized for high energy QPM device.

NThB6 • 12:15 p.m.
Random Quasi-Phase-Matched Second Harmonic Generation in Periodically Poled Lithium Tantalate, *Alessandro C. Busacca[1], Salvatore Stivala[1], Luigi Oliveri[2], Stefano Riva Sanseverino[1], Gaetano Assanto[3], Alessia Pasquazi[4], Roberto Morandotti[4]; [1]DIEET, Univ. of Palermo, Italy, [2]DIFTER, Univ. of Palermo, Italy, [3]Univ. of Rome "RomaTre", Italy, [4]INRS-EMT, Univ. du Québec, Canada.* We experimentally observed and explained bulk second harmonic generation via random quasi-phase-matching, derived from a periodically poled lithium tantalate sample with a randomly patterned mark-to-space-ratio.

NThB7 • 12:30 p.m.
Quadratic Solitons in Degenerate Quasi-Phase Matched Noncollinear Geometry, *Alessia Pasquazi[1], Gaetano Assanto[2]; [1]Univ. du Québec, Canada, [2]Univ. "Roma Tre", Italy.* We investigate spatial solitons in a quasi-phase matched geometry involving two concurrent noncollinear quadratic processes. The system, formally equivalent to a transversely periodic quadratic medium, supports a class of simultons with a large stability domain.

NThB8 • 12:45 p.m.
Fresnel Phase Matching: A Universal Phase Matching Technique, *Myriam Raybaut, Antoine Godard, Michel Lefebvre, Emmanuel Rosencher; ONERA, France.* Fresnel phase matching is a universal phase matching technique for optical frequency conversion in thick isotropic materials. The potential and limits of this technique are presented, both experimentally and theoretically.

1:00 p.m.–7:30 p.m.
Afternoon Free

Palace Lounge
7:30 p.m.–9:00 p.m.
Registration Open

NThC • Generating E&M Radiation: Visible, UV, X-Ray and Gamma Rays

Tapa I
7:30 p.m.–9:30 p.m.
Peter Jepsen; Technical Univ. of Denmark, Denmark, Presider

NThC1 • 7:30 p.m.
High Power Visible Laser by Intracavity Frequency Doubling of InGaAs/GaAs Semiconductor Laser, *Mahmoud Fallahi[1], Chris Hessenius[1], Yushi Kaneda[1], Jorg Hader[1,2], Jerome Moloney[1,2], Bernardette Kunert[3], Wolfgang Stolz[3], Stephan W. Koch[3]; [1]Univ. of Arizona, USA, [2]Nonlinear Control Strategies Inc., USA, [3]Philipps-Univ. Marburg, Germany.* Fundamental operation and Intra-cavity frequency doubling of a highly strained InGaAs/GaAs vertical-external-cavity surface-emitting laser operating around 1175 nm is reported. Multi-watt tunable laser in the yellow-orange band is achieved. Over 10 nm tuning is demonstrated.

NThC2 • 7:45 p.m. **Invited**
High-Power External Cavity Enhancement for High Repetition Rate Coherent XUV Generation, *Jens Rauschenberger[1,2], Ioachim Pupeza[1,2], Tino Eidam[3], Fabian Röser[3], Birgitta Bernhardt[1], Thomas Udem[1], Jens Limpert[3], Alexander Apolonski[2], Theodor W. Hänsch[1,2], Andreas Tünnermann[3], Ferenc Krausz[1,2]; [1]Max-Planck-Inst. of Quantum Optics, Germany, [2]Ludwig-Maximilians-Univ. München, Germany, [3]Friedrich-Schiller-Univ. Jena, Germany.* We report on the cavity enhancement of a 78-MHz ytterbium-fiber laser to a record intra-cavity power of 14 kW. For the first time, pulse energies are comparable to CPA-systems, thus enabling efficient high harmonic generation.

NThC3 • 8:15 p.m.
Phase Matching of High Harmonic Generation in the Soft and Hard X-Ray Regions of the Spectrum, *Tenio Popmintchev[1], Ming-Chang Chen[1], Alon Bahabad[1], Michael Gerrity[1], Pavel Sidorenko[2], Oren Cohen[2], Sterling Backus[3], Xiaoshi Zhang[3], Greg Taft[3], Ivan P. Christov[4], Margaret M. Murnane[1], Henry C. Kapteyn[1]; [1]JILA, NIST, Univ. of Colorado, USA, [2]Technion-Israel Inst. of Technology, Israel, [3]Kapteyn-Murnane Labs Inc., USA, [4]Sofia Univ., Bulgaria.* We demonstrate through theory and experiment that scaling of perfect phase matching in high harmonic generation is surprisingly favorable as the wavelength of the driving laser is increased, enabling ultrafast, fully coherent, multi-keV x-ray sources.

NThC4 • 8:30 p.m.
Compact Laser Technology for Monoenergetic Gamma-Ray Compton Sources, *Miroslav Shverdin, Felicie Albert, Scott G. Anderson, S. M. Betts, David J. Gibson, Frederic V. Hartemann, Mike J. Messerly, Vladimir A. Semenov, Dennis P. McNabb, Craig W. Siders, Chris P. J. Barty; Lawrence Livermore Natl. Lab, USA.* We describe a novel laser system used in a Compton-scattering based monoenergetic gamma-ray source, commissioned at LLNL. This system consists of a UV laser for electron production and a high power CPA based scattering laser.

NThC5 • 8:45 p.m.
Multi-mJ kHz cw-Pumped Femtosecond Yb,Na:CaF_2 Amplifier, *Giedrius Andriukaitis[1], Audrius Pugžlys[1], Andrius Baltuška[1], Liangbi Su[2], Jun Xu[2], Ruxin Li[3], Wenn Jing Lai[4], Poh Boon Phua[4], Andrius Marcinkevičius[5], Martin E. Fermann[5], Linas Giniūnas[6], Romualdas Danielius[6]; [1]Photonics Inst., Vienna Univ. of Technology, Austria, [2]Key Lab of Transparent and Opto-Functional Inorganic Materials, Shanghai Inst. of Ceramics, CAS, China, [3]Shanghai Inst. of Optics and Fine Mechanics, CAS, China, [4]Nanyang Technological Univ., Singapore, [5]IMRA America Inc., USA, [6]Light Conversion Ltd., Lithuania.* We demonstrate a cw-diode-pumped close-loop-cooled Yb doped regenerative amplifier with the output energies scalable to multi-millijoule level due to gain-narrowing suppression by inhibiting ground-state absorption. Amplitude shaping of seed pulses allows achieving sub-200-fs pulse duration.

NThC6 • 9:00 p.m.
A 200-W Peak-Power Ultraviolet Picosecond Light Pulse Source Based on a Gain-Switched 1.55 Micrometer Laser Diode, *Hiroyuki Yokoyama[1,2], Shunsuke Kono[1], Aya Sato[1]; [1]New Industry Creation Hatchery Ctr., Tohoku Univ., Japan, [2]CREST, JST, Japan.* We generated sub-kilowatt peak-power and 6-ps duration 390-nm optical pulses via the fourth harmonic generation of amplified optical output from a gain-switched 1.55-micrometer laser diode. Power conversion efficiency from 1.55-micrometer to 390-nm light reached 12%.

NThC7 • 9:15 p.m.
Curious Gain-Switching Operation of GaInN Blue-Violet Laser Diodes Producing High-Peak-Power Picosecond Optical Pulses, *Hiroyuki Yokoyama[1], Tomoyuki Oki[1,2], Shunsuke Kono[1], Masao Ikeda[1,2]; [1]New Industry Creation Hatchery Ctr., Tohoku Univ., Japan, [2]Advanced Materials Labs, Sony Corp., Japan.* We found new kinds of phenomena in blue-violet GaInN laser diodes. In strong gain-switching operation, 10-W peak-power and 10-ps optical pulses were generated, and laser light injection into laser diodes further enhanced the peak power.

•Friday, July 17, 2009•

Palace Lounge
7:30 a.m.–1:00 p.m.
Registration Open

NFA • Self Focusing and Filaments

Tapa I
8:00 a.m.–10:15 a.m.
Jay E. Sharping; Univ. of California at Merced, USA, Presider

NFA1 • 8:00 a.m.
Rotational Quantum Wake of Pre-Aligned Molecules for Femtosecond Filamentation, *Jian Wu[1], Hua Cai[1], Yan Peng[1], Yuqi Tong[1], Arnaud Couairon[2], Heping Zeng[1]; [1]East China Normal Univ., China, [2]École Polytechnique, France.* We demonstrate that several features of femtosecond filamentation process, including self-guided filament length and the associate radiations of supercontinuum as well as shocked X-waves, can be controlled by the rotational quantum wake of pre-aligned molecules.

NFA2 • 8:15 a.m. **Invited**
High Power Laser Propagation in Atmospheric Quantum Wakes, *Howard M. Milchberg, S. Varma, Y.- H. Chen; Univ. of Maryland at College Park, USA.* The rotational quantum response of air molecules is shown to greatly enhance or completely extinguish the long ionization filament produced by nonlinear propagation of intense femtosecond pulses in air.

NFA3 • 8:45 a.m.
Toward Terawatt-Peak-Power Single-Cycle Infrared Fields, *Oliver D. Mücke[1], Aart J. Verhoef[1], Audrius Pugžlys[1], Andrius Baltuška[1], Skirmantas Ališauskas[2], Valerijus Smilgevičius[2], Jonas Pocius[3], Linas Giniūnas[3], Romualdas Danielius[3], Nicolas Forget[4]; [1]Vienna Univ. of Technology, Austria, [2]Vilnius Univ., Lithuania, [3]Light Conversion Ltd., Lithuania, [4]Fastlite, France.* 1.55-µm pulses with up to 12.5-mJ energy are generated from a four-stage KTP-OPCPA and recompressed to 79 fs. By focusing these pulses into a noble-gas cell, we demonstrate single 4-mJ supercontinuum filaments supporting 8-fs pulses.

NFA4 • 9:00 a.m.
Optical Bullet Bursts Generation in Nonlocal Media, *Marco Peccianti[1,2], Ian B. Burgess[1,3], Gaetano Assanto[4], Roberto Morandotti[1]; [1]INRS Énergie, Matériaux et Télécommunications, Canada, [2]Res. Ctr. SOFT INFM-CNR, "Sapienza" Univ., Italy, [3]Harvard Univ., USA, [4]Univ. "Roma Tre", Italy.* We present a novel approach to generate dense (3+1)D optical bullets trains, i.e. spatio-temporal self-trapped wave-packets, arising from the interplay between local and nonlocal nonlinearities, which can be generated under experimentally feasible conditions.

NFA5 • 9:15 a.m. **Invited**
Self-Focusing of Very High-Power Pulses, *Gadi Fibich, Nir Gavish; Tel Aviv Univ., Israel.* Self-focusing of very high-power pulses reveals new collapsing profiles, which are ring-type or shell-type, in contrast with the peak-type Townes profile. The initial self-focusing dynamics can be predicted using the Nonlinear Geometrical Optics (NGO) method.

NFA6 • 9:45 a.m.
Magneto-Optical Control of Nonlinear Collapse, *Katarzyna A. Rutkowska[1,2], Yoav Linzon[1], Boris A. Malomed[3], Roberto Morandotti[1]; [1]INRS-Énergie et Matériaux, Univ. du Québec, Canada, [2]Faculty of Physics, Warsaw Univ. of Technology, Poland, [3]Faculty of Engineering, Tel Aviv Univ., Israel.* Theoretical and experimental demonstration of light collapse control in nonlinear Kerr media is presented. An efficient management of the birefringence was achieved via the combined use of the Cotton-Mouton and Faraday effects in magneto-optical crystals.

NFA7 • 10:00 a.m.
Enhanced Third Harmonic Generation in Few-Cycle Femtosecond Filaments Modulated by Filament Non-Collinear Interaction, *Heping Zeng, Xuan Yang, Jian Wu, Yan Peng, Shuai Yuan; East China Normal Univ., China.* We demonstrate enhanced third harmonic generation of a few-cycle filament through its non-collinear interaction with a temporally synchronized femtosecond filament. An enhancement of 17 times in energy is achieved with a significant spectral broadening.

Palace Lounge
10:15 a.m.–10:45 a.m.
Coffee Break

NFB • Applications of Nonlinear Optics

Tapa I
10:45 a.m.–1:00 p.m.
Daniel Gauthier; Duke Univ., USA, Presider

NFB1 • 10:45 a.m.
Parametric Study of the Effects of Collisions on Electronic-Resonance-Enhanced Coherent Anti-Stokes Raman Scattering (ERE-CARS) of NO, *Anil K. Patnaik[1,2], Sukesh Roy[1], James R. Gord[1], Robert P. Lucht[3], Thomas B. Settersten[4]; [1]AFRL, USA, [2]Dept. of Physics, Wright State Univ., USA, [3]Purdue Univ., USA, [4]Sandia Natl. Labs, USA.* The effects of collisional-energy-transfer and dephasing rates on ERE-CARS in nitric oxide are investigated. A parametric study of the effects of collisions on the ERE-CARS signal demonstrates a reduced collisional dependence for saturating laser fields.

NFB2 • 11:00 a.m.
Single-Pulse Femtosecond Coherent Anti-Stokes Raman Scattering Temperature Measurements Using a Chirped-Pulse Probe Beam, *Daniel R. Richardson[1], Robert P. Lucht[1], Sukesh Roy[2], James R. Gord[3]; [1]Purdue Univ., USA, [2]Spectral Energies, LLC, USA, [3]AFRL, Wright-Patterson Air Force Base, USA.* Single-pulse, femtosecond coherent anti-Stokes Raman scattering (CARS) for 1-kHz gas-phase temperature measurements is discussed. A chirped-probe pulse is used to map the temperature-dependent Raman coherence decay into the spectrum of the femtosecond CARS signal.

NFB3 • 11:15 a.m.
Optimization of TPA-Induced Fluorescence from Ultrasmall (≤ 2 nm) Semiconductor Quantum Dots Used for Deep Tissue Imaging, *Li Wang, Ravi K. Jain; Ctr. for High Technology Materials, Univ. of New Mexico, USA.* We report optimizing the excitation wavelength for two-photon absorption-induced fluorescence in CdSe/ZnS ultrasmall semiconductor quantum dots, with a goal of maximizing their applicability to studying cell apoptosis in deep tissue imaging applications.

NFB4 • 11:30 a.m.
Imaging Resolution Improvement Using Transverse Phase Amplification, *Douglas French[1], Zun Huang[1], Hsueh-Yuan Pao[2], Igor Jovanovic[1]; [1]Purdue Univ., USA, [2]Lawrence Livermore Natl. Lab, USA.* Transverse phase amplification of spatially multimode beams can be achieved via phase-sensitive optical parametric amplification. Transverse phase amplification of the signal in the canonical imaging problem can improve imaging resolution beyond the Rayleigh limit.

NFB5 • 11:45 a.m.
Ultrafast Optical Wide Field Microscopy, *Rohit P. Prasankumar[1], Zahyun Ku[2], Aaron V. Gin[3], Prashanth C. Upadhya[1], Steven R. J. Brueck[2], Antoinette J. Taylor[1]; [1]Los Alamos Natl. Lab, USA, [2]Univ. of New Mexico, USA, [3]Sandia Natl. Labs, USA.* An ultrafast optical microscope capable of rapidly and sensitively acquiring wide field optical images with sub-100 femtosecond temporal resolution and micrometer spatial resolution is demonstrated for the first time.

NFB6 • 12:00 p.m. **Invited**
Astronomy with Laser Guide Star Adaptive Optics Systems, *Masanori Iye; Natl. Astronomical Observatory, Japan.* Adaptive optics with laser guide star is a promising technology to improve the imaging performance of astronomical telescopes to their diffraction limit. Examples of sciences and status of developments will be reviewed.

NFB7 • 12:30 p.m.
The Role of Nonlinear Absorption in Enhancement of Efficiency of Femtosecond Micromachining in Hydrogels, *Wayne H. Knox[1], Li Ding[1], Dharmendra Jani[2], Candido Pinto[2], Jeffrey Linhardt[2], Jay F. Künzler[2]; [1]Univ. of Rochester, USA, [2]Bausch and Lomb, USA.* Nonlinear absorption of femtosecond pulses in pure and doped hydrogel polymers has been measured, explaining the significantly faster machining speeds in doped hydrogels during the femtosecond laser micromachining that we have observed in doped samples.

NFB8 • 12:45 p.m.
Three-Dimensional Microfabrication by Single Pulse Femtosecond Laser through Binary Phase Hologram, *Masahiro Yamaji, Hayato Kawashima, Jun'ichi Suzuki, Shuhei Tanaka; New Glass Forum, Tsukuba Res. Consortium, Japan.* Multiple elements arrayed in 3-D spiral are microfabricated inside silica glass only by single femtosecond laser pulse controlled by computer generated hologram, even if it consists of elements of different aspect ratio.

Key to Authors and Presiders
(**Bold** denotes Presider or Presenting Author)

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Integrated Photonics and Nanophotonics Research and Applications (IPNRA)/ Nonlinear Optics (NLO)/Slow and Fast Light (SL) Postdeadline Paper Abstracts

•Monday, July 13, 2009•

NMD • Photonic Crystals and Periodic Nanomaterials

Tapa I
2:00 p.m.–4:00 p.m.
Steve Blair; Univ. of Utah, USA, Presider

PDNMD1 • 2:00 p.m.
Influence of Hole Sizes and Adhesion Layers on the Third-Harmonic Generation from Sub-Wavelength Apertures, *Xiaojin Jiao, Tingjun Xu, Steve Blair; Dept. of Electrical and Computer Engineering, Univ. of Utah, USA.* Third-harmonic generation from arrays of sub-wavelength apertures is measured. Strong angular dependence of THG is observed, which roughly corresponds to that of fundamental transmission. Influence of hole size and adhesion layers is also experimental studied.

•Tuesday, July 14, 2009•

NTuA • Entanglement, Squeezing and Quantum Memories

Tapa I
8:00 a.m.–10:00 a.m.
Akira Furusawa; Univ. of Tokyo, Japan, Presider

PDNTuA2 • 8:30 a.m.
Experimental Realization of a Multi-Player Quantum Game, *Joseph B. Altepeter[1], Matthew A. Hall[1], Milja Medic[1], Monika Patel[1], David A. Meyer[2], Prem Kumar[1]; [1]Northwestern Univ., USA, [2]Univ. of California at San Diego, USA.* We implement a multi-player quantum public-goods game using only bipartite entanglement and two-qubit logic. Within measurement error, the expectation per player follows predicted values as the number of players is increased.

PDPA • Nonlinear Optics Postdeadline Session I

Tapa I
5:00 p.m.–6:00 p.m.
Jens Rauschenberger; Max-Planck-Inst. of Quantum Optics, Germany, Presider

PDPA1 • 5:00 p.m.
40-Gbit/s Optical Data Exchange between WDM Channels Using Second-Order Nonlinearities in PPLN Waveguides, *Jian Wang, Scott Nuccio, Xiaoxia Wu, Omer Yilmaz, Lin Zhang, Irfan Fazal, Jeng-Yuan Yang, Yang Yue, Alan Willner; Univ. of Southern California, USA.* We demonstrate 40-Gbit/s optical data exchange between WDM channels based on second-order nonlinearities in a periodically-poled Lithium-niobate (PPLN) waveguide. Channel-selective data exchange of four WDM signals is shown, which introduces ~4 dB penalty.

PDPA2 • 5:15 p.m.
Experimental Verification of Two-Tone Amplification in Single Frequency Fiber Amplifiers, *Clint Zeringue, Iyad Dajani, Chunte Lu, Ahmed Lobad, Christopher Vergien; AFRL, USA.* We present experimental verification of a novel technique to suppress SBS in narrow linewidth fiber amplifiers. This technique relies on seeding with a combination of broad- and narrow-linewidth laser beams allowing favorable laser gain competition.

PDPA3 • 5:30 p.m.
Wavelength Conversion and 9-Fold Multicasting of a 21.4 Gbit/s DPSK Data Channel Using Supercontinuum Generation, *Omer F. Yilmaz, Scott Nuccio, Zahra Bakhtiari, Xiaoxia Wu, Jian Wang, Lin Zhang, Alan Willner; Univ. of Southern California, USA.* We demonstrate wavelength conversion and 9-fold multicasting of a 21.4-Gbit/s DPSK signal using supercontinuum generation. Multicasting is accomplished using a polarization based periodic filter for spectral slicing. Power penalties <3dB are achieved for all channels.

PDPA4 • 5:45 p.m.
X-Ray View of Dressed Atoms, *Ernest Glover[1], Marc Hertlein[1], Steve Southworth[2], Tom Allison[3], Jeroen van Tilborg[1], Elliot Kanter[2], Bertold Krässig[2], H. R. Varma[2], Bruce Rude[1], Robin Santra[2,4], Ali Belkacem[1], Linda Young[2]; [1]Lawrence Berkeley Natl. Lab, USA, [2]Argonne Natl. Lab, USA, [3]Univ. of California at Berkeley, USA, [4]Univ. of Chicago, USA.* We report, to our knowledge, the first dressed absorption spectrum at an X-ray probe wavelength. An ultrafast optical pulse induces transparency for X-rays, demonstrating a promising route to femtosecond X-ray pulse shaping and measurement.

PDPB • Nonlinear Optics Postdeadline Session II

Tapa II
5:00 p.m.–6:15 p.m.
Concita Sibilia; INFM, Dept. di Energetica, Univ. di Roma, Italy, Presider

PDPB1 • 5:00 p.m.
Synthesis and Characterization of Sol-Gel Based Nanostructured Cr(III)Doped ITO Films on Glass, *Prasanta K. Biswas, Susmita Kundu, Sunirmal Jana, Dipten Bhattacharya; Central Glass and Ceramic Res. Inst., India.* Sol-gel based Cr(III) doped quantum sized (2-10 nm) indium tin oxide films were deposited on glass and cured at different temperatures. Absorption and photoluminescence study shows a strong quantum confinement effect and exciton phonon interaction.

PDPB2 • 5:15 p.m.
Two Photo-Absorption Property of Metal Complexes Tethered with Azo Dyes, *Ubaldo M. Neves[1], Leonardo De Boni[1], Cleber R. Mendonça[1], Zhihong Ye[2], Xiu R. Bu[2]; [1]Inst. de Física de São Carlos, Brazil, [2]Clark Atlanta Univ., USA.* Schiff base compounds have been prepared possessing azo dye units. The two-photon absorption properties are evaluated, which reveals the additive property as a result of non-detrimental dipole-dipole interaction between dye chromophores.

PDPB3 • 5:30 p.m.
Two-Photon-Fluorescence Correlation Measurements of Picosecond Optical Pulses Generated from a 405-nm GaInN Laser Diode, *Shunsuke Kono[1], Takao Miyajima[2], Masaru Kuramoto[2], Masao Ikeda[1,2], Hiroyuki Yokoyama[1]; [1]New Industry Creation Hatchery Ctr., Tohoku Univ., Japan, [2]Advanced Material Labs, Sony Corp., Japan.* Intensity auto-correlation measurements using two-photon fluorescence from a GaN crystal were performed on picosecond optical pulses from a 405-nm GaInN laser diode excited by intense electric pulses. The estimated pulse duration was 10 ps.

PDPB4 • 5:45 p.m.
Polarization-Diverse Parametric Processes in Zincblende Crystals, *Paulina S. Kuo[1], Konstantin L. Vodopyanov[2], Martin M. Fejer[2]; [1]NIST, USA, [2]Stanford Univ., USA.* Quasi-phasematched, non-birefringent nonlinear materials, like orientation-patterned GaAs, allow efficient mixing of diverse polarization states. We investigate parametric processes in these materials, including the six coupled-wave equations that describe them and implications for all-optical signal processing.

PDPB5 • 6:00 p.m.
Vortex Spatiotemporal Optical Solitons in Nonlinear Optical Fibers, *Robabeh Talebzadeh; Azarbaijan Univ. of Tarbiat Moallem, Iran, Islamic Republic of.* We investigate possibility of forming spatiotemporal vortex solitons in inhomogeneous dispersive nonlinear-optical fibers using a graded-index kerr medium. We use a variational approach to solve NLS-equation and show they can be stabilized under certain conditions.

PDPC • Joint IPNRA/SL Postdeadline Session

Honolulu I-II
5:00 p.m.–6:15 p.m.
Liming Zhang; Bell Labs, Alcatel-Lucent, USA

PDPC1 • 5:00 p.m.
Polarization Dependent Pulse Distortion in Stimulated Brillouin Scattering Slow Light Systems, *Avi Zadok[1], Sanghoon Chin[2], Elad Zilka[3], Avishay Eyal[3], Luc Thévenaz[2], Moshe Tur[3]; [1]Caltech, USA, [2]Ecole Polytechnique Fédérale de Lausanne, Switzerland, [3]Tel Aviv Univ., Israel.* Stimulated Brillouin scattering slow light delay is shown to introduce an inherent polarization mode dispersion, which can dominate the broadening and distortion of signal pulses. The effect is demonstrated in both simulations and experiments.

PDPC2 • 5:15 p.m.
High-*Q* Photonic Crystal Chalcogenide Cavities by Photosensitive Post Processing, *Michael W. Lee[1], Christian Grillet[1], Snjezana Tomljenovic-Hanic[1], Dave Moss[1], Benjamin J. Eggleton[1], Xin Gai[2], Steve Madden[2], Duck Y. Choi[2], Douglas Bulla[2], Barry Luther-Davies[2]; [1]CUDOS, School of Physics, Univ. of Sydney, Australia, [2]CUDOS, Laser Physics Ctr., Australian Natl. Univ., Australia.* We present the first demonstration of a high-*Q* (~60000) photonic crystal (PhC) cavity formed post-fabrication by locally modifying the refractive index of a PhC made of a photosensitive chalcogenide glass.

PDPC3 • 5:30 p.m.
Monolithic Dual-Mode DFB Laser for Tunable Continuous-Wave THz Generation, *Namje Kim[1], Jaeheon Shin[1], Chul Wook Lee[1], Eundeok Sim[1], Sang-Pil Han[1], Yongsoon Baek[1], Dae-Su Yee[2], Min Young Jeon[3], Kyung Hyun Park[1]; [1]Electronics and Telecommunications Res. Inst., Republic of Korea, [2]Ctr. for Safety Measurement, KRISS, Republic of Korea, [3]Chungnam Natl. Univ., Republic of Korea.* We report a monolithic dual-mode DFB laser operating in the 1550-nm range as an optical beat source for tunable THz generation. The THz emission from InGaAs photomixers is continuously tuned from 0.17 to 0.49 THz.

PDPC4 • 5:45 p.m.
Nano-Photonic Electro-Optic Polymer Modulator Based on Photonic Band Gap Engineering, *Xiaolong Wang[1], Swapnajit Chakravarty[1], Boem Suk Lee[2], Cheyun Lin[2], Jingdong Luo[3], Alex K.Y Jen[3], Ray T. Chen[2]; [1]Omega Optics, Inc., USA, [2]Microelectronics Res. Ctr., Univ. of Texas at Austin, USA, [3]Dept. of Materials Science and Engineering, Univ. of Washington, USA.* A nano-photonic electro-optic polymer modulator based on shifting the band diagram of the photonic crystal waveguide is presented. Simulations results show that the device is as short as 20μm and consumes only 25fJ/bit energy.

PDPC5 • 6:00 p.m.
Low-Voltage, Vertical-Junction, Depletion-Mode, Silicon Mach-Zehnder Modulator with Complementary Outputs, *Michael Watts, William A. Zortman, Douglas C. Trotter, Ralph W. Young, Anthony L. Lentine; Sandia Natl. Labs, USA.* We demonstrate a new silicon depletion-mode vertical *p-n* junction phase-modulator implemented in a lumped-element Mach-Zehnder modulator configuration enabling an ultra-low $V_{\pi}L$ of ~1V·cm and 10Gb/s non-return-to-zero (NRZ) data transmission with wide-open complementary output eye diagrams.

•Wednesday, July 15, 2009•

JWA • Joint Poster Session II

Palace Lounge
10:00 a.m.–11:30 a.m.

PDJWA30
Slow Light in a Parametrically Amplifying Medium, *Nobuhito Hayashi, Akihiko Fujisawa, Masaharu Mitsunaga; Kumamoto Univ., Japan.* We theoretically study propagation behavior of probe (signal) and Stokes (idler) pulses under a strong coupling beam. The analyses predict that both pulses are parametrically amplified and delayed by about a pulsewidth.

PDJWA31
Laser Induced Absorption Spectra Properties of Ethyl Red Doped Film and Its Applications for Optical Switch Based Two Beams Mutual Modulation, *Zhaofeng Hao[1,2], Wenqiang Lu[1], Chunping Zhang[1], Jianguo Tian[1]; [1]Nankai Univ., China, [2]Columbia Univ., USA.* The absorption spectra of the samples were measured and the difference of nonlinear refractive index distribution curve was simulated using the Kramers-Kronig relation. Additionally, the transmission intensity mutual modulations of the two beams were studied.

PDJWA32

Fano Resonances in Saturable Waveguide Arrays, *Uta Naether, Daniel E. Rivas, Manuel A. Larenas, Mario I. Molina, Rodrigo A. Vicencio; Univ. de Chile, Chile.* We study the main properties of nonlinear localized modes in a waveguide array with an embedded nonlinear saturable impurity. We scatter a wave against the modes, discovering transmission suppression, which we connect to Fano resonances.

PDJWA33

Chaos and Pulses Packages in Current Modulated VCSELs, *J.H. Talla Mbé, Sifeu Takougang Kingni, Paul Woafo; Univ. of Yaoundé I, Cameroon.* We numerically study the dynamics of VCSELs based on the current-dependent gain model subjected to current modulation. Striking dynamics appears: pulses packages and chaotic behaviour.

PDJWA34

Coherent Control of Fluorescence Intensity with Shaped Femtosecond Pulses in Organic Molecules, *P. H. D. Ferreira, L. Misoguti, C. R. Mendonça; Inst. de Física de São Carlos, Brazil.* This paper presents a study of the coherent control of fluorescence intensity by two-photon absorption via genetic algorithm in Y-shaped molecules. Using a spatial light modulator, we were able to enhance the fluorescence intensity of two of these molecules.

•Friday, July 17, 2009•

NFA • Self Focusing and Filaments

Tapa I
8:00 a.m.–10:15 a.m.
Jay E. Sharping; Univ. of California at Merced, USA, Presider

PDNFA2 • 8:30 a.m.

745 fs Resolution Single-Shot Recording at 2.1 Tsample/s and 104 Mframes/s Using Temporal Imaging, *Vincent J. Hernandez[1], Corey V. Bennett[1], Bryan D. Moran[1], Alexander D. Drobshoff[1], Carsten Langrock[2], Derek Chang[2], Martin M. Fejer[2], Morten Ibsen[3]; [1]Lawrence Livermore Natl. Lab, USA, [2]Stanford Univ., USA, [3]Optoelectronics Res. Ctr., Univ. of Southampton, UK.* We demonstrate temporal imaging with -42.6x time magnification of 200 ps frames with subpicosecond resolution for waveforms containing 2.5 Gb/s modulated picosecond pulses. 852 GHz signal bandwidth is captured single-shot at 104 MHz frame rates.

NFB • Applications of Nonlinear Optics

Tapa I
10:45 a.m.–1:00 p.m.
Daniel Gauthier; Duke Univ., USA, Presider

PDNFB8 • 12:45 p.m.

Fiber Based Multiphoton Microscope Using a Fiber Femtosecond Laser and MEMS Scanning Probe, *Gangjun Liu[1], Zhongping Chen[1], Khanh Kieu[2], Frank W. Wise[2]; [1]Univ. of California at Irvine, USA, [2]Dept. of Applied Physics, Cornell Univ., USA.* We developed a fiber based MPM that integrates an all-normal-dispersion femtosecond fiber laser, double cladding photonic crystal fiber, and a MEMS scanning probe. SHG and two photon excited fluorescence images of biological sample were demonstrated.

NOTES

Key to Authors and Presiders

(**Bold** denotes Presider or Presenting Author)

Advances in Optical Sciences: OSA Optics & Photonics Congress
UPDATE SHEET

Withdrawals:

Integrated Photonics and Nanophotonics Research and Applications: IMG7, ITuD3, JWA2, JWA10
Nonlinear Optics: NMD1, NTuA2, JWA11, JWA25, NFA2
Slow and Fast Light: JWA28

Presentation Updates:

NFB8, **Three-Dimensional Microfabrication by Single Pulse Femtosecond Laser through Binary Phase Hologram,** *Masahiro Yamaji, Hayato Kawashima, Jun'ichi Suzuki, Shuhei Tanaka; New Glass Forum, Tsukuba Res. Consortium, Japan*, will be presented by Masahiro Yamaji at 8:15 a.m.–8:30 a.m. during session NFA, Self Focusing and Filaments.

Correction to Program:

The name of one of the authors of **IMF3**, **Single Quantum Dot Laser with Photonic Crystal Nanocavity**, is misspelled in the program book. The correct spelling is *Masahiro Nomura*.

An author was omitted from **IWD3**, **Fabrication of Large Area "Woodpile" Photonic Crystal Structures for Near IR**. The corrected author block is as follows: *Neilanjan Dutta[1], Peng Yao[1], Shouyuan Shi[1], Ahmed Sharkawy[2], Ozgenc Ebil[2], Eric Kelmelis[2], Dennis W. Prather[1], Elton Marchena[1]; [1]Univ. of Delaware, USA, [2]EM Photonics Inc., USA.*

Presider Updates:

Takunori Taira; Laser Res. Ctr. for Molecular Science, Inst. for Molecular Science, Japan will preside over session **NWA**, **Terahertz and Ultrafast**.

Michael E. Gehm; Univ. of Arizona, USA will preside over the joint Nonlinear Optics/Slow and Fast Light session **JWB**, **Slow Light Applications in Nonlinear Optics**.

Presenter Changes:

IMC1, **High Speed Modulation of Hybrid Silicon Evanescent Lasers**, will be presented by *Daoxin Dai; Univ. of California at Santa Barbara, USA.*

ITuE6, **Finite Thickness Metal-Insulator-Metal Structure for Waveguide Based Surface Plasmon Resonance Biosensing**, will be presented by *Jiwon Lee; Iowa State Univ., USA.*

NTuC2, **Coupling Dynamics of Quantum Dots in a Liquid-Crystal-Tunable Microdisk Resonator**, will be presented by *Cedrik Meier; Univ. of Paderborn, Germany.*

NWC3, **Integration of Extraordinary Nonlinear Optical Materials into Silicon Photonics, Plasmonics and Metamaterial Devices**, will be presented by *Philip A. Sullivan; Univ. of Washington, USA.*

NWD4, **Spectral Filtering Highly-Chirped Pulses in All-Normal Dispersion Fiber Lasers**, will be presented by *Nathan Kutz; Dept. of Applied Mathematics, Univ. of Washington, USA.*

NFA7, **Enhanced Third Harmonic Generation in Few-Cycle Femtosecond Filaments Modulated by Filament Non-Collinear Interaction**, will be presented by *Jian Wu; East China Normal Univ., China.*

NFB4, **Imaging Resolution Improvement Using Transverse Phase Amplification**, will be presented by *Igor Jovanovic; Purdue Univ., USA.*

POSTDEADLINE PRESENTATIONS: Please see the postdeadline papers book for times and locations of postdeadline paper presentations. Postdeadline papers will be presented throughout the week in various oral and poster sessions.

OSA thanks our corporate sponsor Swamp Optics. OSA also thanks the following organizations for providing grants: Air Force Office of Science Research (AFOSR), National Science Foundation (NSF), OSA Foundation.