

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

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Sponsor: The Optical Society

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Program Committee

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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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THE PULSE OF THE INDUSTRY

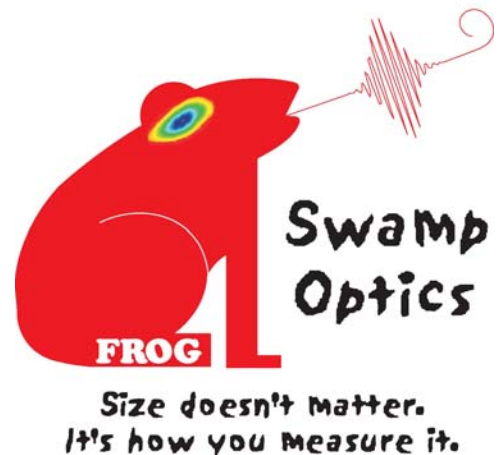
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Thank you to the following organizations that provided grant funding:

- ❖ 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 Nanophotonics Research and Applications (IPNRA) Session: Nonlinear Integrated Photonics

JTuA3, **Towards Sub-Wavelength Plasmonic Laser Devices**, Rupert F. Oulton¹, Volker J. Sorger¹, Thomas Zentgraf¹, Guy Bartal¹, Xiang Zhang^{1,2}; ¹Univ. of California at Berkeley, USA, ²Material 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 Monat¹, B. Corcoran¹, C. Grillet¹, M. Ebnali-Heidari¹, D. J. Moss¹, B. J. Eggleton¹, T. P. White², L. O'Faolain², T. F. Krauss²; ¹Univ. of Sydney, Australia, ²Univ. 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. Rini¹, Y. Zhu¹, S. Wall², R. Tobey², Y. Tomioka³, Y. Tokura³, A. Cavalleri^{2,4}, Robert W. Schoenlein¹; ¹Lawrence Berkeley Natl. Lab, USA, ²Univ. of Oxford, UK, ³AIST, Japan, ⁴Ctr. 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 Andersen¹; 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 Dot¹, Kamel Bencheikh², Benoît Boulanger¹, Ariel Levenson², Patricia Segonds¹, Corinne Félix¹; 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 Sibilìa, 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 Vilaseca¹, Vito Roppo¹, Jose F. Trull¹, Crina Cojocar¹, Kestutis Staliunas^{1,2}, D. Dumay³, Wieslaw Krolikowski³, Solomon S. Saltiel⁴, Dragomir N. Neshev³, Yuri S. Kivshar³; 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 Boitier¹, Antoine Godard¹, Claude Fabre², 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 CdSiP₂ Crystal Pumped at 1064 nm, Peter G. Schunemann¹, Kevin T. Zawilski¹, Thomas M. Pollak¹, Valentin Petrov²; ¹BAE Systems, Inc., USA, ²Max-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}; ¹Natl. Inst. for Materials Science, Japan, ²Waseda Univ., Japan

NThC2, High-Power External Cavity Enhancement for High Repetition Rate Coherent XUV Generation, Jens Rauschenberger^{1,2}, Ioachim Pupeza^{1,2}, Tino Eidam³, Fabian Röser³, Birgitta Bernhardt¹, Thomas Udem¹, Jens Limpert³, Alexander Apolonski², Theodor W. Hänsch^{1,2}, Andreas Tünnermann³, Ferenc Krausz^{1,2}; ¹Max-Planck-Inst. of Quantum Optics, Germany, ²Ludwig-Maximilians-Univ. München, Germany, ³Friedrich-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, <i>Palace Lounge</i>				
Monday, July 13					
7:00 a.m.–6:30 p.m.	Registration Open, <i>Palace Lounge</i>				
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, <i>Palace Lounge</i>				
10:00 a.m.–4:30 p.m.	Exhibits Open, <i>Palace Lounge</i>				
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, <i>Palace Lounge</i>				
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, <i>Palace Lounge</i>				
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, <i>Palace Lounge</i>				
10:00 a.m.–11:30 a.m.	JTUB • Joint Poster Session I, <i>Palace Lounge</i>				
10:00 a.m.–1:00 p.m.	Exhibits Open, <i>Palace Lounge</i>				
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, <i>Palace Lounge</i>				
5:00 p.m.–6:30 p.m.	Postdeadline Paper Sessions, <i>See Postdeadline Papers book for schedule and locations</i>				
7:00 p.m.–10:00 p.m.	Conference Luau, <i>Lagoon Green</i>				

	Tapa I	Tapa II	Tapa III	Honolulu I II
Wednesday, July 15				
7:30 a.m.-4:30 p.m.	Registration Open, <i>Palace Lounge</i>			
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, <i>Palace Lounge</i>			
10:00 a.m.-11:30 a.m.	JWA • Joint Poster Session II, <i>Palace Lounge</i>			
10:00 a.m.-2:30 p.m.	Exhibits Open, <i>Palace Lounge</i>			
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, <i>Palace Lounge</i>			
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, <i>Palace Lounge</i>			
8:00 a.m.-10:15 a.m.	NThA • Parametric Processes and Oscillators			
10:15 a.m.-10:45 a.m.	Coffee Break, <i>Palace Lounge</i>			
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, <i>Palace Lounge</i>			
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, <i>Palace Lounge</i>			
8:00 a.m.-10:15 a.m.	NFA • Self Focusing and Filaments			
10:15 a.m.-10:45 a.m.	Coffee Break, <i>Palace Lounge</i>			
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 Grodecka¹, Pawel Machnikowski², Jens Förstner¹; ¹Computational Nanophotonics Group, Theoretical Physics, Univ. of Paderborn, Germany, ²Inst. of Physics, Wrocław 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. Padilha¹, Scott Webster¹, David J. Hagan^{1,2}, Eric W. Van Stryland^{1,2}, Larissa Levina³, Vlad Sukhovatkin³, Edward H. Sargent³; ¹CREOL and FPCE, College of Optics and Photonics, Univ. of Central Florida, USA, ²Physics Dept., Univ. of Central Florida, USA, ³Edward 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. Politécnica 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}; ¹Univ. of Electro Communications, Japan, ²Intl. Cooperative Res. Project, JST, Japan, ³Dept. 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 Uchida¹, Harutoshi Tsuji¹, Naoya Fujita¹, Kensuke Fujii¹, Hayato Miyagawa¹, Noriaki Tsurumachi¹, Shun Koshihara¹, Hiroshi Itoh¹, Shunsuke Nakanishi¹, Tae Geun Kim²; ¹Kagawa Univ., Japan, ²Korea 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 Tai¹, Wen Hsiang Yu¹, Jao Shi Jang¹, Sheng Hsiung Chang²; ¹Dept. of Optics and Photonics, Natl. Central Univ., Taiwan, ²Inst. 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} cm²/W at wavelength =760nm.

NMA6 • 9:30 a.m.

Invited

Ultrafast Dynamics in Magnetoresistance Manganites: Vibrationally Driven Phase Transitions and X Ray Spectroscopy, M. Rini¹, Y. Zhu¹, S. Wall², R. Tobey², Y. Tomioka³, Y. Tokura³, A. Cavalleri^{2,4}, Robert W. Schoenlein¹; ¹Lawrence Berkeley Natl. Lab, USA, ²Univ. of Oxford, UK, ³AIST, Japan, ⁴Ctr. 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 Jeng¹, Yuan Yao Lin², Ray Ching Hong¹, Ray Kuang Lee²; ¹Dept. of Physics, Natl. Chung Hsing Univ., Taiwan, ²Inst. 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 filaments 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 Setzpfandt¹, Roland Schiek², Reinhard Geiss¹, Wolfgang Sohler³, Andreas Tünnerman^{1,4}, Thomas Pertsch¹; ¹Inst. of Applied Physics, Friedrich Schiller Univ. Jena, Germany, ²Univ. of Applied Sciences, Germany, ³Applied Physics, Univ. Paderborn, Germany, ⁴Fraunhofer 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. Svirko¹, Petr A. Obraztsov^{1,2}, Serge V. Garnov², Dmitry A. Lyashenko¹, Alexander N. Obraztsov^{1,3}; ¹Univ. of Joensuu, Finland, ²A.M. Prokhorov General Physics Inst., RAS, Russian Federation, ³Dept. 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 LiNbO₃ Membranes, *Reinhard Geiss¹, Holger Hartung¹, Rumen Iliew², Thomas Gischkat³, Frank Schrempel³, Frank Setzpfandt¹, Thomas Pertsch¹, Ernst Bernhard Kley¹, Falk Lederer², Werner Wesch³, Andreas Tünnermann^{1,4}; ¹Inst. of Applied Physics, Friedrich Schiller Univ. Jena, Germany, ²Inst. of Condensed Matter Theory and Solid State Optics, Friedrich Schiller Univ. Jena, Germany, ³Inst. of Solid State Physics, Friedrich Schiller Univ. Jena, Germany, ⁴Fraunhofer 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 KTiOPO₄. 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 Heine¹, Uwe Voelker¹, Klaus Betzler¹, Manfred Burianek², Manfred Muehlberg²; ¹Univ. of Osnabrueck, Germany, ²Univ. 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 plasmons, self focusing and slow light near a nonlinear cutoff.

NME3 • 2:45 p.m.

Second Order Nonlinear Optical Response of Gold, *Martti Kauranen¹, Fu Xiang Wang¹, Francisco J. Rodriguez¹, Willem M. Albers², Risto Ahorinta¹, John E. Sipe³; ¹Tampere Univ. of Technology, Finland, ²VTT Microtechnology and Sensors, Finland, ³Univ. 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 Fluorescence in Semiconductor Quantum Dots by Gold Nanoparticles, *Li Wang¹, Damian Ankuciwiez², Jiayu Chen¹, Ravi K. Jain¹; ¹Ctr. for High Technology Materials, Univ. of New Mexico, USA, ²Columbia Univ., USA*. Surface plasmon mediated 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. Alencar¹, Eduardo J. S. Fonseca¹, Cassio E. A. Santos¹, Sara F. A. Moraes², Marcos A. Gelesky², Mario R. Meneghetti², Jandir M. Hickmann¹; ¹Optics and Materials Group OPTMA, Inst. of Physics, Univ. Federal de Alagoas, Brazil, ²Inst. 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 Brand¹, Benoît Boulanger¹, Patricia Segonds¹, Yannick Petit^{1,2}, Corinne Félix¹, Bertrand Ménaert¹, Hideki Ishizuki³, Takunori Taira³; ¹Univ. Joseph Fourier, France, ²Univ. de Genève, Switzerland, ³Inst. 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 Andersen¹; ¹Technical Univ. of Denmark, Denmark, ²Max Planck Inst. for the Science of Light, Germany, ³Univ. 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 Benloch¹, Ferrán V. García Ferrer¹, Alejandro Romanelli², Eugenio Roldán¹, Germán J. de Valcárcel¹; ¹Univ. de València, Spain, ²Univ. 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 Wen¹, Eun Oh², Shengwang Du³; ¹Dept. of Physics, Univ. of Virginia, USA, ²Remote Sensing Div., NRL, USA, ³Dept. 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 wave 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 SiO₂ 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 Hernandez¹, Lazaro A. Padilha², Joel M. Hales¹, Daniel Owens¹, Jungbae Kim¹, Scott Webster², Seth R. Marder¹, Joseph W. Perry¹, David J. Hagan², Eric W. Van Stryland², Bernard Kippelen¹; ¹Georgia Tech, USA, ²Univ. 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. Oulton¹, Volker J. Sorger¹, Thomas Zentgraf, Guy Bartal¹, Xiang Zhang^{1,2}; ¹Univ. of California at Berkeley, USA, ²Material 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/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 Dot¹, Kamel Bencheikh², Benoît Boulanger¹, Ariel Levenson², Patricia Segonds¹, Corinne Félix¹; ¹Univ. Joseph Fourier, France, ²Lab 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. Jacobs¹, James D. Franson²; ¹Johns Hopkins Univ., USA, ²Univ. 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 As₂S₃ Chalcogenide Glass Waveguide, Mark Pelusi¹, Feng Luan¹, Trung Vo¹, Mike Lamont¹, Steven Madden², Douglas Bulla², Duk Yong Cho², Barry Luther Davies², Benjamin Eggleton¹; ¹Ctr. for Ultrahigh Bandwidth Devices for Optical Systems, School of Physics, Inst. for Photonic Optical Systems, Univ. of Sydney, Australia, ²Ctr. 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 As₂S₃ 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. Williams¹, Mingming Feng², J. Nathan Kutz¹, Kevin L. Silverman³, Richard P. Mirin³, Steven T. Cundiff¹; ¹Univ. of Washington, USA, ²JILA, NIST, Univ. of Colorado, USA, ³NIST, 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. Kiryanov¹, Sergey M. Klimontov^{1,2}, Anton N. Knigavko^{1,3}, Igor V. Mel'nikov^{1,3}; ¹Optolink Ltd., Russian Federation, ²A. M. Prokhorov General Physics Inst., RAS, Russian Federation, ³High Q Labs Inc., Canada*. We present a compact laser system made of a hybrid Q switched Nd³⁺:YAG/Cr⁴⁺: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 Yb³⁺ doped fiber without detrimental heating. Laser cooling with Yb³⁺ 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. Bochove¹, Michelle Hummel², Alejandro Aceves³; ¹Directed Energy Directorate, AFRL, USA, ²Mathematics and Computer Science Dept., Univ. of New Mexico, USA, ³Mathematics 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 Shimizu¹, Keiichi Edamatsu²; ¹JST, Japan, ²Tohoku 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 10¹¹ 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 Lin¹, Nai Hsiang Sun¹, Huei Min Yang¹, Shih Kun Liu²*; 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:GdVO₄ Lasers Pumped Directly into the Emitting Level, *Nicolae 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:GdVO₄ LiB₃O₅ 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 Brillouin 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 tunability 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 Zeng¹, Walter Hoyer², Jinjie Liu¹, Stephan W. Koch², Jerome Moloney¹; ¹Univ. of Arizona, USA, ²Philipps 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 C₆₀, *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 Lee¹, Lina Xu², Rick Trebino²; ¹Swamp Optics, USA, ²Georgia 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 Vilaseca¹, Vito Roppo¹, Jose F. Trull¹, Crina Cojocaru¹, Kestutis Staliunas^{1,2}, D. Dumay³, Wieslaw Krolikowski³, Solomon S. Saltiel^{3,4}, Dragomir N. Neshev³, Yuri S. Kivshar³; ¹Univ. Politecnica de Catalunya, Spain, ²ICREA, Spain, ³Australian Natl. Univ., Australia, ⁴Sofia 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 Weill¹, Omri Gat², Baruch Fischer¹; ¹Technion Israel Inst. of Technology, Israel, ²Hebrew 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 1 μ m 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 McMorrow¹, William Lotshaw², Joseph Melinger¹, Jonathan Pellish³; ¹NRL, USA, ²Aerospace Corp., USA, ³NASA 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 Webster¹, Susan A. Odum², Lazaro A. Padilha¹, Olga V. Przhonska^{1,3}, Davorin Peceli¹, Honghua Hu¹, Gero Nootz¹, Alexei D. Kachkovski⁴, Jonathan Matichak², Stephen Barlow², Harry L. Anderson⁵, Seth R. Marder², David J. Hagan¹, Eric W. Van Stryland¹; ¹CREOL and FPCE, College of Optics and Photonics, Univ. of Central Florida, USA, ²School of Chemistry and Biochemistry and Ctr. for Organic Photonics and Electronics, Georgia Tech, USA, ³Inst. of Physics, Natl. Acad. of Sciences, Ukraine, ⁴Inst. of Organic Chemistry, Natl. Acad. of Sciences, Ukraine, ⁵Dept. 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 \times 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-D, A-A and D-A, Honghua Hu¹, Lazaro A. Padilha¹, Scott Webster¹, Trenton Ensley¹, Davorin Peceli¹, Olga V. Przhonska^{1,2}, David J. Hagan^{1,3}, Eric W. Van Stryland^{1,3}, Mikhail V. Bondar², Yuriy L. Slominsky⁴, Alexei D. Kachkovski⁴, Andriy O. Gerasov⁴, Mykola P. Shandura⁴, Mykola P. Shandura⁴, Yuriy P. Kovtun⁴; ¹College of Optics and Photonics, CREOL and FPCE, Univ. of Central Florida, USA, ²Inst. of Physics, Natl. Acad. of Sciences, Ukraine, ³Dept. of Physics, Univ. of Central Florida, USA, ⁴Inst. of Organic Chemistry, Natl. Acad. of Sciences, Ukraine. We report the linear and nonlinear spectra of three series of cyanine dyes (donor-acceptor, acceptor-acceptor, and donor-donor) including effects of conjugation length and terminal groups. Two photon absorption up to 16,000 GM is observed in acceptor-acceptor structures.

JWA18

Temperature Dependent Nonlinear Absorption in InSb, Peter Olszak¹, Claudiu M. Cirloganu¹, Scott Webster¹, Lazaro A. Padilha¹, Shekhar Guha², Srinivasan Krishnamurthy³, David J. Hagan¹, Eric W. Van Stryland¹; ¹CREOL, Univ. of Central Florida, USA, ²AFRL, USA, ³SRI 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 Jolly¹, Samuel B. Owens Jr.¹, Gary M. Gray¹, Christopher M. Lawson¹, David P. Shelton²; ¹Univ. of Alabama at Birmingham, USA, ²Univ. 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 σ value of the Schiff base or azobenzene group.

JWA20

Excited State Absorption Cross Sections of a Phosphine Substituted Bithiophene, Timothy M. Pritchett¹, Jianwei Wang², Christopher M. Lawson², Qun Zhao², Gary M. Gray²; ¹ARL, USA, ²Univ. 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 Kawahara¹; ¹Tokyo Univ. of Agriculture and Technology, Japan, ²PRESTO, 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 Hayano¹, Hideki Takami¹, Shin Oya¹, Masayuki Hattori¹, Yoshihiko Saito¹, Makoto Watanabe¹, Yosuke Minowa¹, Sebastian Egner¹, Olivier Guyon¹, Meguru Ito¹, Vincent Garrel¹, Stephen Colley¹, Matthew Dinkins¹, Golota Taras¹, Tomio Kurakami¹, Yoshitake Nabeshima¹, Norihito Saito², Satoshi Wada², Takatoshi Shibuya³, Masanori Iye³*; ¹Subaru Telescope, Natl. Astronomical Observatory of Japan, USA, ²Solid State Laser for Astronomical Observation Res. Team, RIKEN, Japan, ³Natl. 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}*; ¹School of Materials Science, Japan Advanced Inst. of Science and Technology, Japan, ²Core Res. for Evolutional Science and Technology, JST, Japan, ³Ishikawa 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:LiNbO₃ Crystal, *Xiudong Sun, Suhua Luo, Hongxin Shi; Harbin Inst. of Technology, China.* Significant enhancement of nonvolatile photorefractive characteristics is achieved in LiNbO₃: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 sulfides) (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 Fernández¹, Lingxiao Zhu¹, Aart Verhoeff¹, Dmitrii Sidorov Biryukov¹, Audrius Pugzlys¹, Andrius Baltuska¹, Chi Hung Liu², Kai Hsiu Liao², Almantas Galvanauskas², Steve Kane³; ¹Technische Univ. Wien, Austria, ²Ctr. for Ultrafast Optical Science, Univ. of Michigan, USA, ³HORIBA 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. Burgess¹, Murray W. McCutcheon¹, Alejandro W. Rodriguez², Jorge Bravo Abad², Yanan Zhang¹, Steven G. Johnson³, Marko Loncar¹; ¹School of Engineering and Applied Sciences, Harvard Univ., USA, ²Dept. of Physics, MIT, USA, ³Dept. 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 Monat¹, B. Corcoran¹, C. Grillet¹, M. Ebnali Heidari¹, D. J. Moss¹, B. J. Eggleton¹, T. P. White², L. O Faolain², T. F. Krauss²; ¹Univ. of Sydney, Australia, ²Univ. 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.

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 Chu¹, Yan Wei Tzeng^{1,2}, Chen Han Huang^{1,3}, Yen Yin Lin⁴, Jian Ming Liu¹, Hsiang Chen Chui³, Hsiang Lin Liu², James M. Stone⁵, Jonathan C. Knight⁵; ¹Dept. of Physics, Natl. Taiwan Univ., Taiwan, ²Dept. of Physics, Natl. Taiwan Normal Univ., Taiwan, ³Inst. of Electro Optical Science and Engineering, Natl. Cheng Kung Univ., Taiwan, ⁴Inst. of Photonics Technologies, Dept. of Electrical Engineering, Natl. Tsing Hua Univ., Taiwan, ⁵Ctr. 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. Bale¹, Nathan Kutz²; ¹Photonics Res. Group, Aston Univ., UK, ²Dept. 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 Buduno lu, Coskun Ülgüdür, Kutun Gürel, Çağrı enel, 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 Chin¹, Miguel Gonzalez Herraes², Luc Thévenaz¹; ¹École Polytechnique Fédérale de Lausanne, Switzerland, ²Univ. 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 Moreno¹, Koen Clays^{1,2}, Mark G. Kuzyk²*; ¹Univ. of Leuven, Belgium, ²Washington 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 LiNbO₃ 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 LiNbO₃ 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 Yen¹, Ja Hon Lin², Kuei Chu Hsu³, Y. Lai¹*; ¹Dept. of Photonics and Inst. of Electro Optical Engineering, Natl. Chiao Tung Univ., Taiwan, ²Dept. of Electro Optical Engineering and Inst. of Electro Optical Engineering, Natl. Taipei Univ. of Technology, Taiwan, ³Graduate 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 Kono¹, Tomoyuki Oki^{1,2}, Takao Miyajima², Masaru Kuramoto², Hideki Watanabe², Masao Ikeda^{1,2}, Hiroyuki Yokoyama¹*; ¹New Industry Creation Hatchery Ctr., Tohoku Univ., Japan, ²Advanced 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, President*

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:LiNbO₃ Crystal and Generation of Squeezed States of Light at 860nm, Genta Masada^{1,2}, Mikiya Ueda¹, Tsuyoshi Suzudo³, Yasuhiro Sato³, Hideki Ishizuka⁴, Takunori Taira⁴, Akira Furusawa¹; ¹Dept. of Applied Physics and Quantum Phase Electronics Ctr., School of Engineering, Univ. of Tokyo, Japan, ²Tamagawa Univ. Res. Inst., Japan, ³Ricoh Co., Ltd., Japan, ⁴Inst. of Molecular Science, Japan. We achieved 128mW of oscillation threshold of an optical parametric oscillator with a periodically poled MgO:LiNbO₃ crystal and the squeezing level of $6.24 \pm 0.11\text{dB}$ 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 Boitier¹, Antoine Godard¹, Claude Fabre², Emmanuel Rosencher^{1,3}; ¹ONERA, France, ²Lab Kastler Brossel, Univ. Pierre et Marie Curie, France, ³Physics 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 Caillet¹, Aristide Lemaître², Isabelle Sagnes², Ivan Favero¹, Giuseppe Leo¹, Sara Ducci¹; ¹Univ. Paris Diderot, France, ²Lab 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 Zaskel¹, Dong Hoon Lee², Christoph Becher¹; ¹Univ. des Saarlandes, Germany, ²Korea 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 CdSiP₂ Crystal Pumped at 1064 nm, Peter G. Schunemann¹, Kevin T. Zawilski¹, Thomas M. Pollak¹, Valentin Petrov²; ¹BAE Systems, Inc., USA, ²Max 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 Minzioni¹, Paul Harper², Vincenzo Pusino¹, Lee Barker², Carsten Langrock³, Martin M. Fejer³, Juan Diego Ania Castanon⁴, Ilaria Cristiani¹, Vittorio Degiorgio¹; ¹CNISM and Univ. of Pavia, Italy, ²Aston Univ., UK, ³Stanford Univ., USA, ⁴Inst. 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 Keefe, 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}; ¹Natl. Inst. for Materials Science, Japan, ²Waseda 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 LiTaO₃ and LiNbO₃ 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 LiTaO₃ 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. Busacca¹, Salvatore Stivala¹, Luigi Oliveri², Stefano Riva Sanseverino¹, Gaetano Assanto³, Alessia Pasquazi⁴, Roberto Morandotti⁴; ¹DIEET, Univ. of Palermo, Italy, ²DIFTER, Univ. of Palermo, Italy, ³Univ. of Rome RomaTre, Italy, ⁴INRS 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 Pasquazi¹, Gaetano Assanto²; ¹Univ. du Québec, Canada, ²Univ. 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 solitons 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 Fallahi¹, Chris Hessenius¹, Yushi Kaneda¹, Jorg Hader^{1,2}, Jerome Moloney^{1,2}, Bernardette Kunert³, Wolfgang Stolz³, Stephan W. Koch³*; ¹Univ. of Arizona, USA, ²Nonlinear Control Strategies Inc., USA, ³Philipps 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}, Joachim Pupeza^{1,2}, Tino Eidam³, Fabian Röser³, Birgitta Bernhardt¹, Thomas Udem¹, Jens Limpert³, Alexander Apolonski², Theodor W. Hänsch^{1,2}, Andreas Tünnermann³, Ferenc Krausz^{1,2}*; ¹Max Planck Inst. of Quantum Optics, Germany, ²Ludwig Maximilians Univ. München, Germany, ³Friedrich 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 Popmintchev¹, Ming Chang Chen¹, Alon Bahabad¹, Michael Gerrity¹, Pavel Sidorenko², Oren Cohen², Sterling Backus³, Xiaoshi Zhang³, Greg Taft³, Ivan P. Christov⁴, Margaret M. Murnane¹, Henry C. Kapteyn¹*; ¹JILA, NIST, Univ. of Colorado, USA, ²Technion Israel Inst. of Technology, Israel, ³Kapteyn Murnane Labs Inc., USA, ⁴Sofia 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:CaF₂ Amplifier, *Giedrius Andriukaitis¹, Audrius Pugžlys¹, Andrius Baltuška¹, Liangbi Su², Jun Xu², Ruxin Li³, Wenn Jing Lai⁴, Poh Boon Phua⁴, Andrius Marcinkevicius⁵, Martin E. Fermann⁵, Linas Gini nas⁶, Romualdas Danielius⁶*; ¹Photonics Inst., Vienna Univ. of Technology, Austria, ²Key Lab of Transparent and Opto Functional Inorganic Materials, Shanghai Inst. of Ceramics, CAS, China, ³Shanghai Inst. of Optics and Fine Mechanics, CAS, China, ⁴Nanyang Technological Univ., Singapore, ⁵IMRA America Inc., USA, ⁶Light 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 Kono¹, Aya Sato¹*; ¹New Industry Creation Hatchery Ctr., Tohoku Univ., Japan, ²CREST, 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 Yokoyama¹, Tomoyuki Oki^{1,2}, Shunsuke Kono¹, Masao Ikeda^{1,2}*; ¹New Industry Creation Hatchery Ctr., Tohoku Univ., Japan, ²Advanced 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 Wu¹, Hua Cai¹, Yan Peng¹, Yuqi Tong¹, Arnaud Couairon², Heping Zeng¹; ¹East China Normal Univ., China, ²École 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. Mücke¹, Aart J. Verhoeff², Audrius Pugžlys¹, Andrius Baltuška¹, Skirmantas Ališauskas², Valerijus Smilgevičius², Jonas Pocius³, Linas Giniūnas³, Romualdas Danielius³, Nicolas Forget⁴; ¹Vienna Univ. of Technology, Austria, ²Vilnius Univ., Lithuania, ³Light Conversion Ltd., Lithuania, ⁴Fastlite, France. 1.55 μm pulses with up to 12.5 mJ energy are generated from a four stage KTP OPCA 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 Assanto⁴, Roberto Morandotti¹; ¹INRS Énergie, Matériaux et Télécommunications, Canada, ²Res. Ctr. SOFT INFM CNR, "Sapienza" Univ., Italy, ³Harvard Univ., USA, ⁴Univ. "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 Linzon¹, Boris A. Malomed³, Roberto Morandotti¹; ¹INRS Énergie et Matériaux, Univ. du Québec, Canada, ²Faculty of Physics, Warsaw Univ. of Technology, Poland, ³Faculty 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 Roy¹, James R. Gord¹, Robert P. Lucht³, Thomas B. Settersten⁴; ¹AFRL, USA, ²Dept. of Physics, Wright State Univ., USA, ³Purdue Univ., USA, ⁴Sandia 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. Richardson¹, Robert P. Lucht¹, Sukesh Roy², James R. Gord³; ¹Purdue Univ., USA, ²Spectral Energies, LLC, USA, ³AFRL, 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 French¹, Zun Huang¹, Hsueh Yuan Pao², Igor Jovanovic¹; ¹Purdue Univ., USA, ²Lawrence 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. Prasankumar¹, Zahyun Ku², Aaron V. Gin³, Prashanth C. Upadhyay¹, Steven R. J. Brueck², Antoinette J. Taylor¹; ¹Los Alamos Natl. Lab, USA, ²Univ. of New Mexico, USA, ³Sandia 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. Knox¹, Li Ding¹, Dharmendra Jani², Candido Pinto², Jeffrey Linhardt², Jay F. Künzler²; ¹Univ. of Rochester, USA, ²Bausch 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)

A

Abel, R. P.—NWB5
Aceves, Alejandro—JTUB19
Adachi, Jun—JMA1, **SWA1**
Adachi, Masafumi—JTUB7
Adams, Charles—**NWB5**, STUB3
Adams, John J.—NWC7
Adibi, Ali—IMC3, IMD2, IMG4,
ITUC2
Adler, Florian—**NThA3**
Agarwal, Anu—ITUA1, IWB4
Agashe, Shashank—IWA4
Agrawal, Arti—IMG2
Ahorinta, Risto—NME3
Aitchison, J. Stewart—IWD7
Aji, Abdellah—JTUB9
Alasaarela, Tapani—ITUE2, **JTuB4**
Albers, Willem M.—NME3
Albert, Felicie—NThC4
Albert, J.—IMD4
Alencar, Marcio A. R.—NME5, **SMA6**
Ali Khan, Irfan—NWE4
Ališauskas, Skirmantas—NFA3
Alkeskjold, Thomas Tanggaard—IWB7,
JTUB27
Alouini, Mehdi—SMB3
Ancukiewicz, Damien—IME5
Anders, Bjarklev—JTUB27
Andersen, Ulrik Lund—NTUA1
Anderson, Harry L.—JWA16
Anderson, Ryan—ITUA2
Anderson, Scott G.—NThC4
Ando, Ryoji—**IMB4**
Andreani, Lucio C.—JMA3
Andriukaitis, Giedrius—NThC5
Anetsberger, G.—ITUA4
Ania Castanon, Juan Diego—NThA5
Ankuciwiez, Damian—NME4
Antón, Miguel A.—JWA26, JWA29
Aoki, Kanna—**IMF**, **IWD1**
Apolonski, Alexander—NThC2
Arakawa, Yasuhiko—**IMF3**
Arcizet, O.—ITUA4
Arrieta Yañez, Francisco—JWA26, **JWA29**

Artoni, Maurizio—SWA5
Asano, Takashi—SWA6
Ashihara, Satoshi—**JWA21**
Ashley, Tim—**IMF1**
Assanto, Gaetano—NFA4, NThB6, NThB7
Asselberghs, Inge—**NWC4**
Atabaki, Amir H.—**IMC3**
Atkinson, P.—**IME4**
Azad, Abul K.—**NMC1**

B

Baba, Toshihiko—IMB3, **JMA1**, **STuC**,
SWA1
Babbitt, Wm. Randall—**JWB5**
Backus, Sterling—NThC3
Baets, Roel G.—**IME1**
Bahabad, Alon—NThC3
Bale, Brandon G.—**NWD4**
Balocchi, A.—**IWD4**
Baltuska, Andrius—NFA3, NThC5,
NWD1
Ban, Kengo—JTUA6
Barber, Zeb W.—**JWB5**
Barker, Lee—NThA5
Barkhouse, Aaron R.—**IWD2**
Barland, S.—**NMB4**
Barlow, Stephen—JWA16
Baroughi, Mahdi F.—ITUC3
Bartal, Guy—JTUA3
Barton, Jonathon S.—IWB2
Barty, Chris P. J.—NThC4
Bashkansky, Mark—**SMB1**
Bason, M. G.—**NWB5**
Bayat, Khadijeh—**ITuC3**
Beals, Mark—**IMC6**
Beausoleil, Ray G.—**IWD6**
Becher, Christoph—NThA1
Beggs, Daryl M.—ITUC4, JMA5
Behnia, Babak—IWA4
Bekal, Anish—**IMG5**
Belotti, Michele—**JMA3**
Belthangady, Chinmay—**JTuB25**, STUC1
Bencheikh, Kamel—NTUA4
Bennett, Anthony J.—**IME2**, **IME4**
Berger, Perrine—**SMB3**
Bergman, Keren—**NThA6**
Berkovitch, Nikolai—JWA4, **NME2**
Bernhardt, Birgitta—NThC2

Bertolotti, M.—NTUB3
Betts, S. M.—NThC4
Betzler, Klaus—**NMD5**
Beugnot, Jean Charles—**SMA3**
Bhagwat, Amar R.—**NWB4**
Bjarklev, Anders—IWB7
Blaaberg, Søren—IWA5
Blair, Steve—**JWB3**, **NMD**
Blumenthal, Daniel J.—**IMB1**, **IWB2**
Bochove, Erik J.—**IWC4**, **JTuB19**
Bock, P. J.—**IMD4**
Bogaerts, Wim—**IME1**
Boitier, Fabien—**NWE3**
Bondar, Mikhail V.—JWA17
Bondarenko, Olesya—JTUA1
Boriskina, Svetlana V.—ITUA6, **ITuD3**
Bortolozzo, Umberto—**SMB5**, STUB1
Boulanger, Benoît—**NMD6**, **NTUA4**, **NWE**
Bourderionnet, Jérôme—**SMB3**
Bowers, John—**IMC1**
Boyd, Robert W.—**NWB2**, **NWD**
Brand, Pierre—**NMD6**
Bravo Abad, Jorge—**NWD2**
Bretenaker, Fabien—**SMB3**
Briggs, Ronald D.—**IWB6**
Broadbent, C. J.—STUA2
Brueck, Steven R. J.—**NFB5**
Bryant, Garnett—STUC2
Buchhave, Preben—**JWA24**
Bucksbaum, Philip H.—**NMC3**
Buduno lu, Levent—**NWD5**
Bulla, Douglas—IWB5, JTUA4
Burgess, Ian B.—NFA4, **NWD2**
Burianek, Manfred—**NMD5**
Burykin, Nikolaj—**SMA7**
Busacca, Alessandro C.—**NThB6**
Buyanova, I. A.—**IWD4**

C

Caboche, E.—**NMB4**
Cada, Michael—JTUB11
Caetano, Dilson P.—**SMA6**
Cai, Hua—NFA1
Caillet, Xavier—**NWE6**
Calderon, Oscar G.—JWA26, JWA29
Camacho, Ryan M.—STUA2
Canalias, Carlota—**NMD4**
Canciamilla, Antonio—ITUC4, JMA2

Capmany, José—SMB6
 Carlie, Nathan—IWB4
 Carmon, Tal—**JTuA, NTuC5**
 Carr, C. W.—NWC7
 Carreño, Fernando—JWA26, JWA29
 Carter, Tony R.—IWB6
 Cavalleri, A.—NMA6
 Centini, M.—NTuB3
 Cerrina, Franco—**ITuA3**
 Chang, Hung chun—**IWC1, IWC2, IWC3**
 Chang, Sheng Hsiung—NMA5
 Chang, Yu Chia—IMD6, JTuB5
 Chang, Zi Chang—IME6, JWA1
 Chao, Shih—**IWC5**
 Chaudhuri, Sujeet K.—ITuC3
 Cheben, Pavel—IMB2, **IMD4, ITuE,**
 IWB3
 Chen, Chih Yao—JTuB2
 Chen, Hou Tong—NMC1
 Chen, Jiayu—**IME5, NME4**
 Chen, Jye Hong—JTuB28
 Chen, Ming Yun—IWC2
 Chen, Ming Chang—NThC3
 Chen, Weimin M.—**IWD4**
 Chen, Yaohui—JTuB27, **STuB5**
 Chen, Y. H.—NFA2
 Chi, Sien—JTuB28
 Chiang, An Chung—**NThB1**
 Chiang, Po Jui—IWC3
 Chin, Sanghoon—**JWB2, SMA3**
 Choi, Duk Yong—IWB5, JTuA4
 Christini, Doug—IWA4
 Christov, Ivan P.—NThC3
 Chu, Shi Wei—NWD3
 Chui, Hsiang Chen—NWD3
 Chung, Youngchul—IMC4
 Chuu, Chih Sung—JTuB25
 Cirloganu, Claudiu M.—JWA18
 Clays, Koen—NWC4, NWC5
 Clemmen, Stéphane—**IME1**
 Clifford, Jason P.—IWD2
 Cohen, Oren—NThC3
 Cojocar, Crina—NWA6
 Coldren, Larry A.—IMB1, IWA1, IWA2,
 IWA3
 Colley, Stephen—JWA22
 Columbo, L.—NMB4
 Cooke, David G.—NWA3
 Cooper, K.—IME4
 Corcho, Adan J.—SMA6
 Corcoran, B.—JWB1
 Corzine, Scott—IWA4
 Cossel, Kevin C.—NThA3
 Couairon, Arnaud—NFA1
 Creazzo, Tim—ITuC1
 Cristiani, Ilaria—NThA5
 Crognale, Claudio—**JWA10, JWA25**
 Cryan, Martin J.—IMF1
 Cundiff, Steven T.—JTuB14

D
 Dagli, Nadir—**IMC, IMD6, IWA6, JTuB5**
 Dahlquist, William—ITuA2
 Dai, Daoxin—IMC1
 Dai, Jianming—**NWA1**
 Dal Negro, Luca—ITuA6, ITuD3
 Dale, Elijah—SWA2
 Dalton, Larry—**NWC3**
 Danielius, Romualdas—NFA3, NThC5
 Dapkus, Paul D.—ITuB3
 Davidson, Nir—**STuA1, STuB2**
 Dawes, Andrew—**NWB**
 De La Rue, Richard M.—**IMG3, ITuC4,**
 IWD, JMA2, JMA3
 De Valcárcel, Germán J.—NTuA2
 Declair, Stefan—NTuC2
 Degiorgio, Vittorio—NThA5
 Delâge, André—IMB2, IMD4, IWB3
 Densmore, Adam—IMB2, IMD4, IWB3
 Dentai, Andrew—IWA4
 Di Falco, Andrea—**STuC6**
 Di Giansante, Antonella—JWA10, JWA25
 Dicaire, Isabelle—SMA3
 Diebold, Eric—ITuA5
 Diels, Jean Claude—SMB2
 Ding, Edwin—JTuB18
 Ding, Li—NFB7
 Dinkins, Matthew—JWA22
 Dogru, Selim—**IWA6**
 Dolfi, Daniel—SMB3
 Dolgaleva, Ksenia—**NWB2**
 Dong, Jack—ITuA2
 Dot, Audrey—NTuA4
 Dou, James—IWD7
 Du, Shengwang—JTuB25, NTuA3, **STuC1**
 Dubois, Charles—JTuB9
 Ducci, Sara—NWE6
 Dumay, D.—NWA6
 Durand, Magali—NWA2
 Dutta, Neilanjan—**IWD3**
 Dylov, Dmitry V.—NMB1
 Dyukova, Tatyana—SMA7

E
 Earnshaw, Mark—**IMA, IMB**
 Ebil, Ozgenc—IWD3
 Ebnali Heidari, M.—JWB1
 Edamatsu, Keiichi—JTuB20
 Eftekhar, Ali A.—IMC3
 Egami, Chikara—**JWA13**
 Eggleton, Benjamin—JTuA4, JWB1
 Egner, Sebastian—JWA22
 Eidam, Tino—NThC2
 Eisenstein, Gadi—**SMB4**
 Ellis, D. J. P.—IME4
 Emplit, Philippe—IME1, NMB5
 Ensley, Trenton—JWA17
 Evans, Peter—IWA4
 Eyal, Avishay—SMC2

F
 Fabre, Claude—NWE3
 Fainman, Yeshaiahu—**IME, JTuA1,**
 JTuB12
 Fallahi, Mahmoud—**NThC1**
 Fang, Alex—IMC1
 Farrell, Stephen—IMF6
 Fatemi, Fredrik—SMB1
 Favero, Ivan—NWE6
 Fejer, Martin M.—**NMC, NThA5, NTuB1**
 Félix, Corinne—NMD6, NTuA4
 Feng, Liang—JTuA1
 Feng, Mingming—JTuB14
 Feng, Michael Z.—**SMA1**
 Fermann, Martin E.—NThC5
 Fernández, Alma—**NWD1**
 Ferrari, Carlo—JMA2
 Ferrera, Marcello—ITuB4
 Feurer, Thomas—NWE5
 Fibich, Gadi—**NFA5**
 Firstenberg, Ofer—STuA1, **STuB2**
 Fischer, Baruch—**NWB7**
 Fisher, Matthew—IWA4
 Fisher, William M.—**NWB6**

Fleischer, Jason—JTUB13, **NMB1**
Florja czyk, M.—IMD4
Foaleng Mafang, Stella—SMA3
Fonseca, Eduardo J. S.—NME5
Forestiere, Carlo—ITuD3
Forget, Nicolas—NFA3
Förstner, Jens—NMA1, **NTuC2**
Foster, Mark A.—JTUA5
Franson, James D.—NTUA5
French, Douglas—**NFB4**
Fuentes Hernandez, Canek—**JTuA2**
Fujii, Kensuke—NMA4
Fujisawa, Akihiko—STUA5
Fujita, Naoya—NMA4
Fukuchi, Yutaka—**JTuB15**
Furusawa, Akira—**NTUA**, **NTuB2**, NWE2

G

Gaeta, Alexander L.—JTUA5, **NtuB**,
NWB4
Gai, Xin—IWB5
Galli, Matteo—JMA3
Galvanauskas, Almantas—NWD1
Ganta, Deepak—SWA2
García Ferrer, Ferrán V.—NTUA2
Garnov, Serge V.—NMD1
Garrel, Vincent—JWA22
Gat, Omri—NWB7
Gauguet, A.—NWB5
Gauthier, Daniel—**NFB**, NWB3, **SMC6**
Gauvreau, Bertrand—JTUB9
Gavish, Nir—NFA5
Geiss, Reinhard—NMB6, **NMD2**
Gelesky, Marcos A.—NME5
Genevet, P.—NMB4
Gerace, Dario—JMA3
Gerasov, Andriy O.—JWA17
Gerrity, Michael—NThC3
Gheorma, John—IWA4
Gibson, David J.—NThC4
Gil, L.—NMB4
Gin, Aaron V.—IWB6, NFB5
Gini nas, Linas—NFA3, NThC5
Ginzburg, Pavel—**JWA4**, **NME2**
Gischkat, Thomas—NMD2
Giudici, M.—NMB4
Glasgow, Scott A.—**SMA5**
Gnan, Marco—IMG3

Godard, Antoine—NThB8, NWE3
Gonzalez Herraiez, Miguel—JWB2, SMA3
Gopinath, Anand—**IMA**, **IMB**, ITuD7
Gopinath, Ashwin—**ITuA6**, ITuD3
Gord, James R.—NFB1, NFB2, SWA4
Gorshkov, Alexey V.—STUA4
Gorza, Simon Pierre—NMB5
Goulart Pailo, Christiane—NThA4
Govindan, Vishnupriya—**JWB3**
Grattan, K.T.V.—IMG2
Gray, Gary M.—JWA19, JWA20
Greenberg, Joel A.—**NWB3**
Grillet, C.—JWB1
Grodecka, Anna—**NMA1**
Gu, Chenji—NThA4
Gu, Xiaorong—NWE1
Guha, Shekhar—JWA18
Guizzetti, Giorgio—JMA3
Gulian, Armen—SMB1
Guo, Ning—JTUB9
Gürel, Kutun—NWD5
Guyon, Olivier—JWA22
Guzzon, Robert S.—IWA1, IWA2
Gwilliam, Russell—IMC2

H

Hachey, Simon—NTUA6
Hader, Jorg—NThC1
Hadley, G. Ronald—**IMG**, **ITuD1**
Haelterman, Marc—NMB5
Hagan, David J.—JTUA2, JWA16, JWA17,
JWA18, NMA2
Hahn, J.—STUA6
Hales, Joel M.—JTUA2
Hall, T. J.—IMD4
Ham, Byoung S.—**STuA6**, STuC5
Hamachi, Yohei—JMA1
Han, Sang Pil—**JTuB6**
Han, Young Tak—JTUB6
Han, Z. H.—IWC8
Hanashima, Kaori—JTUA6
Hänsch, Theodor W.—NThC2
Hao, Qiang—NWD7
Harada, Seiji—**IMG6**
Harmand, J. C.—IWD4
Harper, Paul—NThA5
Harris, Stephen E.—JTUB25, **JWB4**, NWE4
Hartemann, Frederic V.—NThC4
Hartung, Holger—NMD2
Haslam, Bryan—ITUA2
Hassani, Alireza—JWA5
Hattori, Masayuki—JWA22
Hawkins, Aaron R.—ITUE3, ITUE5, STUA3
Hayano, Yutaka—**JWA22**
Hayashi, Nobuhito—STUA5
Hayat, Alex—JWA4, NME2, **NWE7**
He, S.—IWC8
He, Zhusong—JWA27
Heard, Peter J.—IMF1
Heine, Urs—**NMD5**
Henker, Ronny—SMC3, SMC4
Hess, Ortwin—JMA4
Hessenius, Chris—NThC1
Heuer, Axel—JTUB21
Hibino, Yoshinori—**IMD3**
Hickmann, Jandir M.—NME5, SMA6
Ho, Daniel—IMF1
Ho, Seng Tiong—JWA12
Hoischen, Andreas—NTuC2
Holmes, Matthew R.—**ITuE5**
Hong, Ray Ching—NMB3
Honkanen, Seppo—ITUE2, JTUB4
Hooker, Simon M.—NThB3
Houard, Aurélien—NWA2
Howell, John C.—**STuA2**, **STuB**
Hoyer, Walter—NWB1
Hsu, Kung Shu—**IME6**
Hsu, Kuei Chu—NWD6
Hsu, Paul S.—SWA4
Hu, Honghua—JWA16, JWA17
Hu, Juejun—**ITuA1**, **IWB4**
Hu, Weisheng—ITUA2
Huang, Chen Han—NWD3
Huang, Y. C.—NThB1
Huang, Zun—NFB4
Hudson, A. J.—IME4
Hughes, Ifan G.—**STuB3**
Huignard, Jean Pierre—SMB5, STUB1
Hulbert, John—STUA3
Hummel, Michelle—JTUB19
Hung, Yung Jr.—IWA2, **IWD5**
Hurd, Katherine—STUA3
Hwang, Eui Hyun—ITUB3

I

Iguchi, Tatsuya—**IWC6**
 Ihlefeld, Jon F.—**IWB6**
 Ikeda, Kazuhiro—**JTuB12**
 Ikeda, Masao—**NThC7, NWD8**
 Ikuma, Yuichiro—**JTuB10**
 Ilday, F. Öemer—**NWD5**
 Iliew, Rumien—**NMD2**
 Imura, Ken—**JWA14**
 Ishida, Yuhki—**NWC2**
 Ishikawa, Hiroshi—**JTuA6**
 Ishikura, Norihiro—**JMA1, SWA1**
 Ishizawa, Shunsuke—**IME3**
 Ishizuki, Hideki—**NMD6, NThB5, NWE2**
 Ito, Meguru—**JWA22**
 Itoh, Hiroshi—**NMA4**
 Iwamoto, Satoshi—**IMF3**
 Iye, Masanori—**JWA22, NFB6**

J

Jacobs, Bryan C.—**NTuA5**
 Jain, Ravi K.—**IME5, NFB3, NME4**
 Jang, Ji Hyang—**JWA3**
 Jang, Jao Shi—**NMA5**
 Jani, Dharmendra—**NFB7**
 Janz, Siegfried—**IMB2, IMD4, IWB3**
 Jechow, Andreas—**JTuB21, NThB2**
 Jeng, Chien Chung—**NMB3**
 Jepsen, Peter—**NThC, NWA3**
 Jessop, Paul E.—**IMC2**
 Jia, Shu—**JTuB13**
 Jin, Jonghan—**NMC2**
 John, Sajeev—**NMD3**
 Johnson, Eric G.—**JTuB3**
 Johnson, Nigel P.—**JMA3**
 Johnson, Steven G.—**NWD2**
 Jovanovic, Igor—**NFB4**
 Joyner, Chuck—**IWA4**
 Jugessur, Aju S.—**IWD7**

K

Kabashin, Andrei—**JWA6**
 Kachkovski, Alexei D.—**JWA16, JWA17**
 Kakihara, Kuniaki—**IMD5, JWA7**
 Kaminski, Noam—**SMA2**
 Kampfrath, Tobias—**JMA5**
 Kane, Steve—**NWD1**
 Kaneda, Yushi—**NThC1**

Kapteyn, Henry C.—**NThC3**
 Karpowicz, Nicholas—**NWA4**
 Karvonen, Lasse—**ITuE2**
 Kasai, Katsuyuki—**JTuB22**
 Kash, Jeffrey—**IMA1**
 Kashyap, Raman—**JTuB17**
 Kato, Masaki—**IWA4**
 Kauranen, Martti—**NME3**
 Kawahara, Yusuke—**JWA21**
 Kawaji, Munenori—**JWA14**
 Kawashima, Hayato—**NFB8**
 Kejalakshmy, N.—**IMG2**
 Kelmelis, Eric—**IWD3**
 Kemme, Shanalyn A.—**IWB6**
 Khanna, Amit—**ITuE2**
 Khorshid Ahmad, Amin—**IMF5**
 Khurgin, Jacob B.—**NTuC3**
 Kikuchi, Akihiko—**IME3**
 Kim, Byungchae—**IMD6, JTuB5**
 Kim, Gunwoo—**IMC4**
 Kim, Jaeyoun—**ITuE4, ITuE6, JWA11**
 Kim, Jungbae—**JTuA2**
 Kim, Jun Whee—**JTuB8**
 Kim, Kyung Jo—**JTuB8**
 Kim, Kyong H.—**NWC6**
 Kim, Sang Hun—**ITuE7**
 Kim, Seungchul—**NMC2**
 Kim, Seunghyun—**ITuA2**
 Kim, Seung H.—**NWC6**
 Kim, Seung Woo—**NMC2**
 Kim, Suhyun—**IMC4**
 Kim, Tae Geun—**NMA4**
 Kim, Tae W.—**JTuA6**
 Kimerling, Lionel C.—**IMC6, ITuA1, IWB4**
 Kippelen, Bernard—**JTuA2**
 Kippenberg, T. J.—**ITuA4**
 Kiryanov, Alexander V.—**JTuB16**
 Kirk, Andrew G.—**IMF5**
 Kish, Fred—**IWA4**
 Kishino, Katsumi—**IME3**
 Kita, S.—**IMB3**
 Kitzerow, Heinz—**NTuC2**
 Kivshar, Yuri S.—**NWA6**
 Kley, Ernst Bernhard—**NMD2**
 Klimentov, Sergey M.—**JTuB16**
 Klimov, Victor I.—**NMA3**
 Knigavko, Anton N.—**JTuB16**
 Knight, Jonathan C.—**NWD3**

Knights, Andrew P.—**IMC2**
 Knox, Wayne H.—**NFB7**
 Kobayashi, Takayoshi—**NMB2**
 Kobori, Shingo—**IMG6**
 Koch, Stephan W.—**NThC1, NWB1**
 Koch, Tom—**ITuC, ITuE1**
 Kockaert, Pascal—**NMB5**
 Kokubun, Yasuo—**IWB1**
 Komatsu, Masaaki—**IMD5**
 Kondo, Takashi—**JTuA6**
 Kong, Fanmin—**IMG7, JWA2**
 Kono, Shunsuke—**NThC6, NThC7, NWD8**
 Korchemskaya, Elena—**SMA7**
 Koshiba, Masanori—**IMD5, JWA7**
 Koshiba, Shun—**NMA4**
 Kovtun, Yuriy P.—**JWA17**
 Krauss, Thomas F.—**ITuC4, JMA5, JWB1, STuC3, STuC6, SWA**
 Krausz, Ferenc—**NThC2**
 Krishnamachari, Uppili—**IWA1**
 Krishnamurthy, Srinivasan—**JWA18**
 Kristensen, Philip T.—**ITuD2**
 Krolkowski, Wieslaw—**NWA6**
 Ku, Zhyun—**NFB5**
 Kuang, Wan—**IME6**
 Kudo, Yusuke—**JTuB7**
 Kuipers, L. (Kobus)—**JMA5**
 Kuittinen, Markku—**JTuB4**
 Kunert, Bernardette—**NThC1**
 Künzler, Jay F.—**NFB7**
 Kuo, Paulina S.—**NWC**
 Kurakami, Tomio—**JWA22**
 Kuramochi, E.—**SWA3**
 Kuramoto, Masaru—**NWD8**
 Kurimura, Sunao—**NThB4**
 Kutz, J. Nathan—**JTuB14, JTuB18, NTuA6, NWD4**
 Kuzyk, Mark G.—**NWC5**

L

La Rocca, Giuseppe—**SWA5**
 Lægsgaard, Jesper—**IMG1**
 Lagarde, D.—**IWD4**
 Lai, Chih Hsien—**IWC1**
 Lai, Wenn Jing—**NThC5**
 Lai, Y.—**NWD6**
 Lambert, Damien—**IWA4**
 Lamont, Mike—**JTuA4**

Lamontagne, B.—IMD4
 Lan, Ruei Long—JTUB28
 Langrock, Carsten—NThA5, NTuB1
 Lapointe, Jean—IMB2, IMD4, IWB3
 Larciprete, M. C.—NTuB3
 Lassen, Mikael—NTuA1, NTuC
 Lawson, Christopher M.—JWA19, JWA20
 Lederer, Falk—NMD2
 Lee, Dong Hoon—NThA1
 Lee, Dongjoo—NWA5
 Lee, Ho—IMC4
 Lee, Jiwon—ITuE4
 Lee, Myungjun—STuB4
 Lee, Ray Kuang—JTUB2, NMB3
 Lee, Sylvanus—ITuD3
 Lee, San Liang—IWD5
 Lee, Seoung H.—NWC6
 Lee, Tsin Dong—JTUB2
 Lefebvre, Michel—NThB8
 Leijtens, Xaveer—ITUB2
 Lemaître, Aristide—NWE6
 Leo, François—NMB5
 Leo, Giuseppe—NWE6
 Lett, Paul—STuC2
 Leuchs, Gerd—NTuA1
 Levenson, Ariel—NTuA4
 Levina, Larissa—IWD2, NMA2
 Li, Hongyan—JWA23
 Li, Kang—IMG7, JWA2
 Li, Qing—IMG4, ITuC2
 Li, Ruxin—NThC5
 Li, Wenxue—NWD7
 Li, Yao—NWE1
 Li, Yuwei—NWB6
 Liao, Kai Hsiu—NWD1
 Liao, Zhi M.—NWC7
 Limpert, Jens—NThC2
 Lin, Chun Ting—JTUB28
 Lin, Ja Hon—NWD6
 Lin, Shih Chiang—JTUB23
 Lin, S. T.—NThB1
 Lin, Y. Y.—NThB1
 Lin, Yen Yin—NWD3
 Lin, Yizhu—IMG7
 Lin, YuanYao—JTUB2, NMB3
 Linhardt, Jeffrey—NFB7
 Linzon, Yoav—ITuB4, NFA6
 Lipson, Michal—ITuC5, JTUA5
 Liu, Chi Hung—NWD1
 Liu, Hsiang Lin—NWD3
 Liu, Jifeng—IMC6
 Liu, Jun—NMB2
 Liu, Jinjie—NWB1
 Liu, Jian Ming—NWD3
 Liu, Paul—IWA4
 Liu, Shih Kun—JTUB23
 Liu, Shuangqiang—JWA27
 Liu, Yifen—ITuE6
 Liu, Yu—JWA11
 Liu, Yu Chen—IME6, JWA1
 Liu, Yi—NWA2
 Lively, Erica—IMB1, IWB2
 Locharoenrat, Kitsakorn—JWA23
 Lodahl, Peter—ITuD2
 Logan, Dylan F.—IMC2
 Lomakin, Vitaliy—JTUA1
 Lon ar, Marko—IMF4, NWD2
 Londero, Pablo—NWB4
 Lopinski, Gregory—IWB3
 Lotshaw, William—JWA15
 Lu, Ling—ITuB3
 Lu, Xiaofei—NWA4
 Lu, Ya Yan—ITuD4, ITuD5, IWC7
 Luan, Feng—JTUA4
 Lucht, Robert P.—NFB1, NFB2
 Lunnemann, Per—STuC4
 Luo, Suhua—NWC1
 Luther Davies, Barry—IWB5, JTUA4
 Lyashenko, Dmitry A.—NMD1
 Lyubomirsky, Ilya—IWA4

M
 Ma, R.—IMB2
 Ma, Seong Min—STuC5
 Mašanovi , Milan L.—IMB1
 Machnikowski, Pawel—NMA1
 Madden, Steven—IWB5, JTUA4
 Maeda, Joji—JTUB15
 Maleki, Lute—NME, NTuC1
 Malkova, Natalia—STuC2
 Malomed, Boris A.—NFA6
 Manes, Ken—NWC7
 Marchena, Elton—ITuC1
 Marcinkevi ius, Andrius—NThC5
 Marder, Seth R.—JTUA2, JWA16
 Marie, Z.—IWD4
 Masada, Genta—NWE2
 Massar, Serge—IME1
 Matichak, Jonathan—JWA16
 Matsuda, Yasuhiro—NWC2
 Matsushita, Tomonori—JTUA6
 Mazur, Eric—ITUA5
 McCutcheon, Murray W.—NWD2
 McKinnon, R.—IMB2
 McMorrow, Dale—JWA15
 McNabb, Dennis P.—NThC4
 Md Zain, Ahmad R.—JMA3
 Measor, Philip—ITuE3, ITuE5
 Meier, Cedrik—NTuC2
 Meier, Torsten—NTuC2
 Mel nikov, Igor V.—JTUB16
 Melinger, Joseph—JWA15
 Melle, Sonia—JWA26, JWA29
 Melloni, Andrea—ITuA, ITuC4, IWB4,
 JMA2, STuC3
 Ménaert, Bertrand—NMD6
 Meneghetti, Mario R.—NME5
 Menzel, Ralf—JTUB21, NThB2
 Messerly, Mike J.—NThC4
 Michel, Jürgen—IMC6
 Migdall, Alan—STuC2
 Milchberg, Howard M.—NFA2, NWA
 Minowa, Yosuke—JWA22
 Minzioni, Paolo—NThA5
 Mirin, Richard P.—JTUB14
 Misawa, H.—IMB3
 Mischki, Trevor—IWB3
 Missey, Mark—IWA4
 Mitsunaga, Masaharu—STUA5
 Miyagawa, Hayato—NMA4
 Miyajima, Takao—NWD8
 Mizrahi, Amit—JTUA1
 Mizumoto, Tetsuya—ITuE7
 Mizutani, Goro—JWA23
 Mock, Adam—IMF2, ITuB3, ITuD6
 Moloney, Jerome—NThC1, NWB1
 Momeni, Babak—IMD2
 Monat, Christelle—JWB1
 Moraes, Sara F. A.—NME5
 Morandotti, Roberto—ITuB4, NFA4,
 NFA6, NThB6
 Morichetti, Francesco—ITuC4, IWB4,
 JMA2, SMB, STuC3
 Morimoto, Masashi—NWC2

Mørk, Jesper—ITuD2, IWA5, SMB6,
STuA, STuB5, STuC4
Moss, D. J.—JWB1
Mücke, Oliver D.—NFA3
Muehlberg, Manfred—NMD5
Murakami, Bungo—IWC6
Murnane, Margaret M.—NThC3
Murphy Jolly, Makeba B.—JWA19
Müstecaplioglu, Özgür—JWA28
Myneni, Krishna—SMB2
Myszyrowicz, André—NWA2

N

Nabeshima, Yoshitake—JWA22
Nagarajan, Radha—IWA4
Nakanishi, Shunsuke—NMA4
Nakano, Hisamatsu—IMB4, IMG6, IWC6
Nakano, Yoshiaki—ITuB1
Nash, Geoff R.—IMF1
Navarrete Benlloch, Carlos—NTuA2
Neifeld, Mark A.—JWB, STuB4
Nemova, Galina—JTuB17
Neshev, Dragomir N.—NWA6
Ness, Stan—ITuA2
Nevet, Amir—NWE7
Nezhad, Maziar P.—JTuA1
Nicholes, Steven C.—IMB1
Nicoll, Christine A.—IME2, IME4
Nilsson, Alan—IWA4
Nishijima, Y.—IMB3
Nishimura, Naoto—JWA13
Nishizawa, Yuji—ITuA5
Noda, Susumu—SWA6
Noh, Jong Wok—ITuA2
Nomura, Akifumi—IMB4
Nomura, Masahiro—IMF3
Nootz, Gero—JWA16, NMA2
Norberg, Erik J.—IWA1, IWA2
Nordin, Gregory P.—ITuA2
Notomi, Masaya—SWA3
Novikova, Irina—STuA4

O

O'Brien, John—IMF2, IMF6, ITuB3, ITuD6
O'Daniel, Jason—JTuB3
O'Faolain, Liam—ITuC4, JMA5, JWB1,
STuC6
O'Hara, John F.—NMC1

O'Keefe, Kevin—NThB3
Obara, Minoru—ITuA5
Obraztsov, Alexander N.—NMD1
Obraztsov, Petr A.—NMD1
Odom, Susan A.—JWA16
Odutola, Jamiu A.—SMB2
Oehlberg, Mark—STuA3
Oh, Eun—NTuA3
Oh, Min Cheol—JTUB8, JWA3
Ohkawa, Masashi—JTUB7
Ohta, Ikuma—JTUa6
Okawachi, Yoshitomo—JTUa5
Oki, Tomoyuki—NThC7, NWD8
Okuma, Junji—STuA5
Oliveri, Luigi—NThB6
Olszak, Peter—JWA18
Orenstein, Meir—JWA4, NME2, NWE7,

SMA2

Ota, Junya—JTUa6
Ota, Satoshi—JWA13
Oulton, Rupert F.—JTUa3
Owens Jr., Samuel B.—JWA19
Owens, Daniel—JTUa2
Oya, Shin—JWA22

P

Padilha, Lazaro A.—JTUa2, JWA16,
JWA17, JWA18, NMA2
Paek, Yong Soon—JTUB6
Pan, Haifeng—NWE1
Pan, Jin Shan—JTUB2
Pan, Yen Ting—IWD5
Panepucci, Roberto R.—JWA8
Pant, Ravi—STUB4
Pao, Hsueh Yuan—NFB4
Park, In Yong—NMC2
Park, Sang Ho—JTUB6
Park, Young Shin—NTUC4
Parker, John S.—IWA1, IWA2
Pasiskevicius, Valdas—NMD4
Pasquazi, Alessia—NThB6, NThB7

Patel, Raj B.—IME2
Patnaik, Anil K.—NFB1, SWA4
Pattanyus Abraham, Andras G.—IWD2
Pavel, Nicolaie—JTUB24
Pavinski, Don—IWA4
Peccianti, Marco—NFA4
Peceli, Davorin—JWA16, JWA17

Pedersen, Christian—JWA24
Pelc, Jason S.—NTuB1
Pellish, Jonathan—JWA15
Pelusi, Mark—JTUa4
Peng, Peng Chun—JTUB28
Peng, Yan—NFA1, NFA7
Perez Moreno, Javier—NWC5
Perry, Joseph W.—JTUa2
Pertsch, Thomas—NMB6, NMD2
Peters, David W.—ITuD1, IWB6
Petit, Laeticia—IWB4
Petit, Yannick—NMD6
Petrov, Valentin—NThA2, NThB
Phan Huy, Kien—IME1
Phillips, Brian S.—ITUE3
Phillips, Nathaniel B.—STuA4
Phua, Poh Boon—NThC5
Piegdon, Karoline—NTUC2
Pignolet, Alain—ITUB4
Pinto, Candido—NFB7
Pocius, Jonas—NFA3
Poitras, Daniel—IWB3
Pollak, Thomas M.—NThA2
Polyakov, Sergey V.—STUC2
Ponomarenko, Sergey A.—JTUB11
Popmintchev, Tenio—NThC3
Post, E.—IMB2, IMD4
Prade, Bernard—NWA2
Prasad, Amrita—IWB5
Prasankumar, Rohit P.—NFB5
Prather, Dennis—ITUC1, IWD3
Preußler, Stefan—SMC4
Pritchard, J. D.—NWB5
Pritchett, Timothy M.—JWA20
Przhonska, Olga V.—JWA16, JWA17
Pugžlys, Audrius—NFA3, NThC5, NWD1
Pugatch, R.—STuA1
Pugh, Jonathan R.—IMF1
Pun, E. Y. B.—IWC8, JTUB1
Pupeza, Ioachim—NThC2
Pusino, Vincenzo—NThA5

Q

Qasymeh, Montasir—JTUB11

R

Raburn, Maura—IWA
Rahman, B.M.A.—IMG2

Rahn, Jeff—IWA4
 Raitzsch, U.—NWB5
 Rajput, Monika—**JWA9**
 Rand, Stephen C.—**NWB6**
 Rarity, John G.—IMF1
 Rauschenberger, Jens—**NThC2**
 Rawal, Swati—JWA9
 Raybaut, Myriam—NThB8
 Razzari, Luca—ITuB4
 Reano, Ronald M.—**IMD1**
 Redding, Brandon F.—ITuC1
 Reffle, Mike—IWA4
 Reinhard, Björn M.—ITuA6
 Residori, Stefania—SMB5, **STuB1**
 Richardson, Daniel R.—NFB2
 Richardson, Kathleen—IWB4
 Rini, M.—NMA6
 Ritchie, David A.—**IME2, IME4**
 Riva Sanseverino, Stefano—NThB6
 Rivière, R.—ITuA4
 Roberts, Peter J.—IMG1
 Robinson, Tom A.—**NThB3**
 Rodriguez, Alejandro W.—NWD2
 Rodriguez, Francisco J.—NME3
 Roldán, Eugenio—NTuA2
 Romanelli, Alejandro—NTuA2
 Ron, Amiram—STuA1, STuB2
 Roppo, Vito—NWA6
 Rosa, Lorenzo—**JWA7**
 Rosenberger, Albert T.—**SWA2**
 Rosencher, Emmanuel—**NThB8, NWE3**
 Röser, Fabian—NThC2
 Roy, Sukesh—NFB1, NFB2, SWA4
 Rudenko, Mikhail—ITuE5
 Ruege, Alexander C.—**IMD1**
 Rutkowska, Katarzyna A.—**NFA6**
 Rutter, Natalia—STuC2

S

Safavi Naeini, Safieddin—ITuC3
 Sagnes, Isabelle—NWE6
 Saito, Norihito—JWA22
 Saito, Yuji—JMA1
 Saito, Yoshihiko—JWA22
 Saitoh, Kunimasa—**IMD5, JWA7**
 Sakai, Tetsuo—**ITuA5**
 Salem, Reza—**JTuA5**
 Sales, Salvador—SMB6

Saltiel, Solomon S.—NWA6
 Salvatore, Randal—IWA4
 Samarelli, Antonio—ITuC4, JMA2
 Samora, Sally—IWB6
 Sano, Haruyuki—JWA23
 Santos, Cassio E. A.—NME5
 Sargent, Edward H.—IWD2, NMA2
 Sarkissian, Raymond—**IMF6**
 Sasaki, Hirokazu—JMA1, SWA1
 Sato, Aya—NThC6
 Sato, Takashi—JTUB7
 Sato, Yasuhiro—NWE2
 Säynätjoki, Antti—**ITuE2, JTUB4**
 Scheuer, Jacob—JTUB26, SMC1, **SMC5**
 Schicker, Kathy—JTUB9
 Schiek, Roland—NMB6
 Schliesser, A.—ITuA4
 Schmid, Jens H.—IMB2, IMD4, **IWB3**
 Schmidt, Frank—**ITuD**
 Schmidt, Holger—ITuE3, ITuE5, STuA3
 Schneider, Rick—IWA4
 Schneider, Thomas—**SMC3, SMC4**
 Schoenlein, Robert W.—**NMA6**
 Schrempel, Frank—NMD2
 Schunemann, Peter G.—NThA2
 Scott, A.—**IMD4**
 Segonds, Patricia—NMD6, NTuA4
 Sekiguchi, Hiroto—IME3
 Semenov, Vladimir A.—NThC4
 enel, Çagri—NWD5
 Sennaroglu, Alphan—JWA28
 Sensarn, S.—**NWE4**
 Settersten, Thomas B.—NFB1
 Setzpfandt, Frank—**NMB6, NMD2**
 Shah Hosseini, Ehsan—**IMD2**
 Shahrar, Selim M.—**SMA4**
 Shandura, Mykola P.—JWA17, JWA17
 Shang, Tao—ITuE5
 Sharkawy, Ahmed—IWD3
 Sharping, Jay E.—**NFA, NThA4**
 Shelton, David P.—JWA19
 Shi, Hongxin—NWC1
 Shi, Lina—JWA6
 Shi, Shouyuan—ITuC1, IWD3
 Shibayama, Jun—IMB4
 Shibuya, Takatoshi—JWA22
 Shields, Andrew J.—IME2, IME4
 Shih, Chih T sung—IWC5

Shih, Min Hsiung—IME6, JWA1
 Shimizu, Ryosuke—**JTuB20**
 Shin, Heedeuk—NWB2
 Shin, JaeHyuk—IWA6
 Shin, Jang Uk—JTUB6
 Shoji, Ichiro—JWA14
 Shuker, Moshe—**SMA, STuA1, STuB2**
 Shverdin, Miroslav—**NThC4**
 Sibia, Concita—**NTuB3**
 Siddons, Paul—STuB3
 Siders, Craig W.—NThC4
 Sidorenko, Pavel—NThC3
 Sidorov Biryukov, Dmitrii—NWD1
 Silva, Wagner F.—SMA6
 Silverman, Kevin L.—JTUB14
 Simic, Aleksandar—JTUA1
 Sinclair, William—IWB3
 Sinha, Ravindra—JWA9
 Sipe, John E.—NME3
 Skorobogatiy, Maksim—**JTuB9, JWA5, JWA6**
 Slepkov, Aaron D.—NWB4
 Slominsky, Yuriy L.—JWA17
 Slutsky, Boris—JTUA1
 Smilgevi ius, Valerijus—NFA3
 Smit, Meint—**IMD, ITuB2**
 Smith, David D.—**SMB2**
 Smolski, Oleg V.—**JTuB3**
 Smolski, Viktor O.—JTUB3
 Sohler, Wolfgang—NMB6
 Solheim, B.—**IMD4**
 Soltani, Mohammad—**IMG4, ITuC2**
 Song, Dawei—**IWC7**
 Sorel, Marc—IMG3, ITuC4, JMA2, JMA3
 Sorger, Volker J.—JTUA3
 Sorin, Wayne V.—**JMA, SMA1**
 Spaeth, Mary—NWC7
 Spannagel, Augi—IWA4
 Srinivasan, Balaji—IMG5
 Staliunas, Kestutis—NWA6
 Starling, D.—STuA2
 Steiner, Michael—SMB1
 Stenberg, Petri—JTUB4
 Stepanchikov, Dmitrii—SMA7
 Stevenson, R. M.—IME4
 Stewart, James—IWA4
 Stivala, Salvatore—NThB6
 Stoeffler, Katherine—JTUB9

Stoian, Razvan I.—SWA2
Stolz, Wolfgang—NThC1
Stone, James M.—NWD3
Strain, Michael J.—IMG3
Strömqvist, Gustav—NMD4
Su, Liangbi—NThC5
Sugita, Atsushi—NWC2
Sukhovatkin, Vlad—NMA2
Sun, Chi Kuang—IWC1
Sun, Nai Hsiang—IWC3, JTuB23
Sun, Xiaochen—IMC6, ITuA1
Sun, Xiudong—NWC1
Suzudo, Tsuyoshi—NWE2
Suzuki, Jun ichi—NFB8
Svirko, Yuri P.—NMD1

T

Taft, Greg—NThC3
Tai, Chao Yi—NMA5
Taira, Takunori—NMA, NMD6, NThB5,
NWE2
Takahashi, Yasushi—SWA6
Takami, Hideki—JWA22
Tan, Dawn T. H.—JTuB12
Tanabe, T.—SWA3
Tanaka, Daiki—JTuB10
Tanaka, Shuhei—NFB8
Tanaka, Yoshinori—SWA6
Tanaka, Yuto—ITuA5
Taniyama, H.—SWA3
Tanvir, Huda—IMG2
Taras, Golota—JWA22
Tarhan, Devrim—JWA28
Tasaka, Shigeru—NWC2
Taylor, Antoinette J.—NFB5, NMC1
Tervonen, Ari—ITuE2
Themistos, C.—IMG2
Thévenaz, Luc—JWB2, SMA3, SMC2
Thorpe, Michael J.—NThA3
Tidemand Lichtenberg, Peter—JWA24
Tobey, R.—NMA6
Tokura, Y.—NMA6
Tolstikhin, Valery—ITuB
Tomes, Matthew—NTuC5
Tomioka, Y.—NMA6
Tong, Yuqi—NFA1
Torregiani, Matteo—ITuC4, IWB4, JMA2
Trebino, Rick—NWA5

Tredicce, J. R.—NMB4
Trotter, Douglas C.—IMC5
Trull, Jose F.—NWA6
Tsai, Corey—IWA4
Tsai, Shih Kuo—IME6
Tsakmakidis, Kosmas—JMA4
Tsang, K. C.—JTuB1
Tsuda, Hiroyuki—JTuB10
Tsuji, Harutoshi—NMA4
Tsurumachi, Noriaki—NMA4
Tu, C. W.—IWD4
Tucker, Rodney S.—SMA1
Tünnermann, Andreas—NMB6, NMD2,
NThC2
Tur, Moshe—SMC2
Turner Foster, Amy C.—JTuA5
Tzeng, Yan Wei—NWD3

U

Uchida, Yoshihisa—NMA4
Udem, Thomas—NThC2
Ueda, Mikiya—NWE2
Ülgüdür, Coskun—NWD5
Upadhyaya, Prashanth C.—NFB5
Upham, Jeremy—SWA6
Urbanski, Mark—NTuC2

V

Vachon, M.—IMB2
Van, Vien—IWC
Van Driel, Henry—NME6
Van Stryland, Eric W.—JTuA2, JWA16,
JWA17, JWA18, NMA2
Varma, S.—NFA2
Venkataraman, Vivek—NWB4
Verhoef, Aart J.—NFA3, NWD1
Vilaseca, Ramon—NMB, NWA6
Vo, Trung—JTuA4
Voelker, Uwe—NMD5
Vora, Kevin—ITuA5
Vu, Khu—IWB5
Vudya Setu, Praveen—STuA2

W

Wada, Satoshi—JWA22
Waldron, Philip—IWB3
Walker, David—SMB1
Wall, S.—NMA6

Walsh, Gary—ITuD3
Wang, Fu Xiang—NME3
Wang, Hailin—NThA, NTuC4, SMC
Wang, Jianwei—JWA20
Wang, Li—IME5, NFB3, NME4
Wang, Qian—JWA12
Wang, Rongping—IWB5
Wang, T. D.—NThB1
Wang, Xuan—JWA8
Wang, X. J.—IWD4
Wang, Yao Chen—IME6
Ware, Michael—SMA5
Watanabe, Hideki—NWD8
Watanabe, Makoto—JWA22
Watts, Michael R.—IMC5
Webster, Scott—JTuA2, JWA16, JWA17,
JWA18, NMA2

Wei, Lei—IWB7, JTuB27

Weill, Rafi—NWB7
Weiss, Ori—JTuB26
Welch, David—IWA4
Wen, Jianming—NTuA3, STuC1
Wendt, Joel R.—IWB6
Wesch, Werner—NMD2
White, Thomas P.—JMA5, JWB1
Wiatrek, Andrzej—SMC3, SMC4
Williams, Matthew O.—JTuB14
Willner, Alan E.—IWD6
Wu, Bin—STuA3
Wu, E.—NWE1
Wu, Fang Ming—JTuB28
Wu, Hao—JWA27
Wu, Jian—NFA1, NFA7
Wu, Jin Hui—SWA5
Wu, Meng Chyi—IME6, JWA1
Wu, Yumao—ITuD4

X

Xiao Li, Yinying—IWD6
Xie, Huan—ITuD5
Xie, Hao—JWA2
Xu, Dan Xia—IMB2, IMD4, IWB, IWB3
Xu, Hua—STuC5
Xu, Jun—NThC5
Xu, Lina—NWA5
Xue, Weiqi—JTuB27, SMB6

Y

Yaguchi, Tomohiko—JWA14
Yamada, Koshiro—JMA1
Yamaji, Masahiro—**NFB8**
Yamauchi, Junji—IMB4, IMG6, IWC6
Yan, Ming—NWE1
Yang, Huei Min—JTUB23
Yang, Xuan—NFA7
Yang, Yi Chun—IME6, JWA1
Yao, Peng—IWD3
Ye, Jun—NThA3
Yegnanarayanan, Siva—IMC3, IMG4,
ITUC2
Yen, Tzu Hsiang—**NWD6**
Yifat, Yuval—**SMC1**
Yilmaz, Yigit O.—JTUB3
Yin, Guang Yu—JTUB25, NWE4
Yokoyama, Hiroyuki—**NThC6, NThC7,**
NWD8
Yoo, Hyongsuk—**ITuD7**
Young, R. J.—IME4
Yu, Wen Hsiang—NMA5
Yuan, Ping—JWA27
Yuan, Shuai—NFA7
Yue, Yang—IWD6
Yum, Honam—SMA4

Z

Zadok, Avi—SMC2
Zäh, Florian—**NWE5**
Zaske, Sebastian—**NThA1**
Zawilski, Kevin T.—NThA2
Zayats, Anatoly V.—**NME1**
Zeng, Heping—NFA1, **NFA7**, NWD7,
NWE1
Zeng, Yong—**NWB1**
Zeng, Zei Wei—IWC5
Zentgraf, Thomas—JTUA3
Zhang, Lin—**IWD6**
Zhang, Qiang—NTUB1
Zhang, Xiang—JTUA3
Zhang, Xiaoshi—NThC3
Zhang, Xi Cheng—NWA1, NWA4
Zhang, Yinan—NWD2
Zhang, Yundong—**JWA27**
Zhao, F.—IWD4
Zhao, Qun—JWA20
Zhao, Yue—ITUE3

Zhu, Lingxiao—NWD1
Zhu, Y.—NMA6
Ziari, Mehrdad—IWA4
Zilka, Elad—SMC2
Zortman, William A.—**IMC5**

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. Altepeter¹, Matthew A. Hall¹, Milja Medic¹, Monika Patel¹, David A. Meyer², Prem Kumar¹; ¹Northwestern Univ., USA, ²Univ. 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 Glover¹, Marc Hertlein¹, Steve Southworth², Tom Allison³, Jeroen van Tilborg⁴, Elliot Kanter², Bertold Krässig², H. R. Varma², Bruce Rude¹, Robin Santra^{2,4}, Ali Belkacem¹, Linda Young²; ¹Lawrence Berkeley Natl. Lab, USA, ²Argonne Natl. Lab, USA, ³Univ. of California at Berkeley, USA, ⁴Univ. 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; INFN, 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 Photon Absorption Property of Metal Complexes Tethered with Azo Dyes, Ubaldo M. Neves¹, Leonardo De Boni¹, Cleber R. Mendonça¹, Zhihong Ye², Xiu R. Bu²; ¹Inst. de Física de São Carlos, Brazil, ²Clark 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 Kono¹, Takao Miyajima², Masaru Kuramoto², Masao Ikeda^{1,2}, Hiroyuki Yokoyama¹; ¹New Industry Creation Hatchery Ctr., Tohoku Univ., Japan, ²Advanced 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. Kuo¹, Konstantin L. Vodopyanov², Martin M. Fejer²; ¹NIST, USA, ²Stanford 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 Zadok¹, Sanghoon Chin², Elad Zilka³, Avishay Eyal³, Luc Thévenaz², Moshe Tur³; ¹Caltech, USA, ²Ecole Polytechnique Fédérale de Lausanne, Switzerland, ³Tel 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. Lee¹, Christian Grillet¹, Snjezana Tomljenovic Hanic¹, Dave Moss¹, Benjamin J. Eggleton¹, Xin Ga², Steve Madden², Duck Y. Choi², Douglas Bulla², Barry Luther Davies²; ¹CUDOS, School of Physics, Univ. of Sydney, Australia, ²CUDOS, 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 Kim¹, Jaeheon Shin¹, Chul Wook Lee¹, Eundeok Sim¹, Sang Pil Han¹, Yongsoon Baek¹, Dae Su Yee², Min Young Jeon³, Kyung Hyun Park¹; ¹Electronics and Telecommunications Res. Inst., Republic of Korea, ²Ctr. for Safety Measurement, KRISS, Republic of Korea, ³Chungnam 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 Wang¹, Swapnaji Chakravarty¹, Boem Suk Lee², Cheyun Lin², Jingdong Luo³, Alex K. Y. Jen³, Ray T. Chen²; ¹Omega Optics, Inc., USA, ²Microelectronics Res. Ctr., Univ. of Texas at Austin, USA, ³Dept. 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 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 Lu¹, Chunping Zhang¹, Jianguo Tian¹; ¹Nankai Univ., China, ²Columbia 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 Wofo; 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
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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. Hernandez¹, Corey V. Bennett¹, Bryan D. Moran¹, Alexander D. Drobshoff¹, Carsten Langrock², Derek Chang², Martin M. Fejer², Morten Ibsen³; ¹Lawrence Livermore Natl. Lab, USA, ²Stanford Univ., USA, ³Optoelectronics 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 Liu¹, Zhongping Chen¹, Khanh Kieu², Frank W. Wise²; ¹Univ. of California at Irvine, USA, ²Dept. 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

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

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