

Integrated Photonics and Nanophotonics Research and Applications (IPNRA)

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 Applications (IPNRA)

[Nonlinear Optics \(NLO\)](#)

[Slow and Fast Light \(SL\)](#)

2009 Meeting Chairs

General Chairs

Mark Earnshaw, *Bell Labs, Alcatel-Lucent, USA*

Anand Gopinath, *Univ. of Minnesota, USA*

Program Chairs

Andrea Melloni, *Politecnico di Milano, Italy*

Liming Zhang, *Bell Labs, Alcatel-Lucent, USA*

About IPNRA

This year, the Integrated Photonics and Nanophotonics Research and Applications Topical Meeting will cover all aspects of research in integrated photonics and nanophotonics, featuring innovative science and engineering results. Topics include active and compound semiconductor devices; dielectric waveguides and waveguide devices; modeling and numerical simulation; integrated diffractive optics; microphotonics; and the generation, detection, and transport of optical fields on the "nanoscale." Application areas within the scope of this meeting include telecommunications, information technology, optical computing, optical storage, displays, environmental monitoring, biomedical science and instrumentation, and quantum information processing and communication. Nanophotonics is on a scale ranging from individual atoms, molecules or their clusters, to that of subwavelength effective media and photonic crystals.

Topics to be Considered

- **Silicon or Other Group IV Waveguide Photonics** Including SOI-based materials – active, light emitters or lasers isolation, amplifiers, passives, and complex circuits.
- **Active and Compound Semiconductor Devices:** Active III-V semiconductor devices; compound semiconductor modulators; filters; switches; wavelength converters; VCSELs; planar amplifiers; photonic integrated circuits and optoelectronic integrated circuits; compound semiconductor WDM components; novel III-V quantum optoelectronic devices; III-V materials and processing for photonics; reliability advances and issues; and emerging packaging technologies.
- **Dielectric and Polymer Waveguides and Waveguide Devices:** Integrated planar waveguides; polymer-based waveguide devices; active/passive integrated components; switches; variable optical attenuators; modulators; filters; integrated isolators and circulators; planar dispersion compensators; materials and fabrication technologies for photonic integrated circuits; characterization of linear and nonlinear optical waveguide devices; micro-machines and micro-optic components; parallel optical interconnects; reliability advances and issues; novel assembly and manufacturing techniques; and low-cost technology for polymer devices.
- **LiNbO₃ - and Other Metal-Oxide-Based Switches and Modulators:** Ultrahigh-speed; low- V_{π} ; devices; integrated scanners; and new fabrication methods.
- **Modeling, Numerical Simulation and Theory:** Optical-system modeling; numerical and semi-analytical methods for guided-wave optics; active, passive and nonlinear component modeling; WDM component design; advances in computational algorithms, physics and coupled models for integrated photonic circuits.
- **Microphotonics:** Simulation, modeling and experimental characterization of microcavity and other high confinement structures, waveguides, resonators, filters, add-drop integrated optical circuits, metallic and metallodielectric waveguides.
- **Inhomogeneous Materials (e.g., Composite Dielectrics, Semiconductors, Metals and Metallodielectrics):** Anisotropic; dispersive; efficient light extraction; nonlinear optical materials; and dynamically configurable.
- **Nano-Engineered Devices for Generation, Transport, and Detection of Light:** Resonators; light sources; quantum information; modulators; nano-MEMS; biophotonics; biological and chemical transducers and sensors; and efficient mode matching.
- **Nanofabrication Technology:** Lithography techniques; growth and deposition approaches; self-organized methods; and etching.
- **Characterization Tools on the Nanoscale**
- **Modeling and Simulation Tools**
- **Photonic Crystals, Waveguides, and Fibers**
- **Nanoscale Integration of Planar, Free-Space, and Mixed Subsystems**

About Integrated Photonics and Nanophotonics Research and Applications

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We would like to encourage submissions in the following areas:

- **Silicon or Other Group IV Waveguide Photonics** Including SOI-based materials – active, light emitters or lasers isolation, amplifiers, passives, and complex circuits.
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Pre-Registration Deadline: June 18, 2009

Future Meetings

Integrated Photonics Research, Silicon Photonics, and Applications
Technical Conference: June 6-10, 2010
Westin La Paloma
Tucson, AZ

Sponsor: [The Optical Society](#)

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Program Committee

General Chairs

Mark Earnshaw, *Bell Labs, Alcatel-Lucent, USA*
Anand Gopinath, *Univ. of Minnesota, USA*

Program Chairs

Andrea Melloni, *Politecnico di Milano, Italy*
Liming Zhang, *Bell Labs, Alcatel-Lucent, USA*

IPNRA Program Committee

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Pietro Bernasconi, *Bell Labs, Alcatel-Lucent, USA*
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Yasuo Shibata, *NTT Photonics Labs, Japan*
Mitsuru Takenaka, *Univ. of Tokyo, Japan*
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Hiroyuki Tsuda, *Keio Univ., Japan*
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Vien Van, *Univ. of Alberta Edmonton, Canada*
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Exhibitors

IPNRA

Tabletop Exhibit:
July 13-15, 2009

Topical Meeting:
July 12-17, 2009

IPNRA 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 IPNRA 2009

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

Current IPNRA 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 IPNRA 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

201 S. Wallace, Ste. B2C
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Altos Photonics offers pulsed solid-state lasers and tunable systems for research and industrial application, as well as related components and accessories. Laser components include UV and IR optics, non-linear crystals (BBO, KTP, ZGP, KYW, KGW, etc), optical mounts, USB-controlled stages, and laser safety glasses. Altos Photonics sells and services products from EKSPLA, EKSMA, Light Conversion & Standa. Since 1997, we have been partnering with outstanding researchers throughout the Americas to better understand and manipulate materials using photonics.



Optiwave Systems, Inc.

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THE PULSE OF THE INDUSTRY

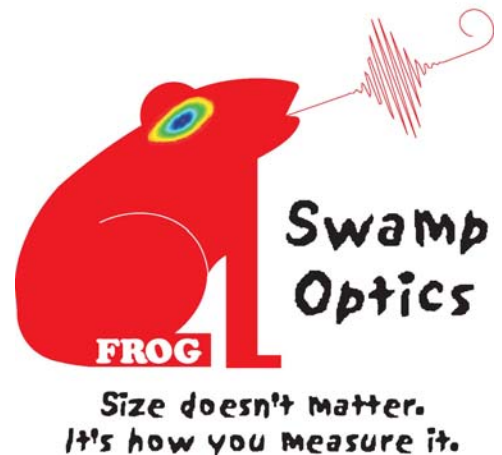
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Swamp Optics offers compact, convenient devices for measuring ultrashort laser pulses in real time and which yield the most complete measurements ever and include the beam spatial profile and spatio-temporal distortions. Awards include an R&D100 award and a Circle of Excellence award. Swamp Optics also offers custom devices for nearly every pulse-measurement problem, and we recently introduced a compact pulse compressor automatically free of distortions and very inexpensive.



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 Integrated Photonics and Nanophotonics Research and Applications (IPNRA)/Nonlinear Optics (NLO) Session: Nonlinear Integrated Photonics

JTuA3, **Towards Sub-Wavelength Plasmonic Laser Devices**, Rupert 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 Integrated Photonics and Nanophotonics Research and Applications (IPNRA)/Slow and Fast Light (SL) Session: Slow Light Effects in Integrated Photonics Structures

JMA1, **Dispersion-Controlled Slow Light in Photonic Crystal Waveguides**, Toshihiko Baba^{1,2}, Hirokazu Sasaki^{1,2}, Jun Adachi^{1,2}, Norihiro Ishikura¹, Yohei Hamachi^{1,2}, Koshiro Yamada¹, Yuji Saito^{1,2}; ¹Yokohama Natl. Univ., Japan, ²CREST, JST, Japan

JMA2, **Processing Light in Coupled Ring Resonators**, Francesco Morichetti^{1,2}, Carlo Ferrari¹, Antonio Canciamilla¹, Matteo Torregiani¹, Andrea Melloni¹, Antonio Samarelli³, Richard De La Rue³, Marc Sorel³; ¹POLICOM - DEI Politecnico di Milano, Italy, ²Fondazione Politecnico di Milano, Italy, ³Dept. of Electronics and Electrical Engineering, Univ. of Glasgow, UK

JMA5, **Ultra-Compact Switches and Modulators Based on Slow Light in Photonic Crystals**, Thomas F. Krauss¹, Daryl M. Beggs¹, Thomas P. White¹, Liam O'Faolain¹, Tobias Kampfrath², L. (Kobus) Kuipers²; ¹Univ. of St. Andrews, UK, ²FOM Inst. AMOLF, Netherlands

Plenary Speaker

IMA1, **Photonics in Supercomputing: The Road to Exascale**, Jeffrey Kash; *IBM Res., USA*

Active Waveguide Devices Invited Speakers

IMC1, **High Speed Modulation of Hybrid Silicon Evanescent Lasers**, Daoxin Dai, Alex Fang, John Bowers; *Univ. of California at Santa Barbara, USA*

IMC6, **Active Ge Based Devices for Silicon Photonics**, Jurgen Michel, Jifeng Liu, Xiaochen Sun, Mark Beals, Lionel C. Kimerling; *MIT, USA*

ITuB1, **Optical Flip-Flops and Isolators for Digital Photonic Integrated Circuits**, Yoshiaki Nakano; *Univ. of Tokyo, Japan*

IWA3, **Integrated Transmitters and Transceivers for High-End Applications in WDM Optical Networks**, Larry A. Coldren; *Univ. of California at Santa Barbara, USA*

IWA4, **InP PICs for Advanced Modulation Format Transmission**, Masaki Kato, Peter Evans, Scott Corzine, Matthew Fisher, John Gheorma, Andrew Dentai, Randal Salvatore, Ilya Lyubomirsky, Alan Nilsson, Jeff Rahn, Radha Nagarajan, Corey Tsai, Babak Behnia, James Stewart, Doug Christini, Mark Missey, Augi Spannagel, Damien Lambert, Shashank Agashe, Paul Liu, Don Pavinski, Mike Reffle, Rick Schneider, Mehrdad Ziari, Chuck Joyner, Fred Kish, David Welch; *Infinera, USA*

Passive Waveguide Devices Invited Speakers

IMD3, **Recent Progress on Planar Lightwave Circuits for High Bit-Rate Transmission**, Yoshinori Hibino; *NTT Photonics Labs, NTT Corp., Japan*

IMD4, **Recent Progress in Planar Waveguide Spectrometers**, Pavel Cheben¹, J. H. Schmid¹, M. Florjańczyk², P. J. Bock³, D.-X. Xu¹, S. Janz¹, A. Delâge¹, J. Lapointe¹, B. Lamontagne¹, E. Post¹, A. Densmore¹, J. Albert⁴, T. J. Hall³, B. Solheim², A. Scott^{2,5}; ¹*Natl. Res. Council Canada, Canada*, ²*York Univ., Canada*, ³*Univ. of Ottawa, Canada*, ⁴*Carleton Univ., Canada*, ⁵*COM DEV Ltd., Canada*

ITuB2, **Integration of Passive and Active Components in InP-Based PICs**, Meint Smit, Xaveer Leijten; *Technische Univ. Eindhoven, Netherlands*

ITuE1, **Low-Loss High Index Contrast SOI Waveguides: Expecting the Unexpected**, Tom Koch; *Lehigh Univ., USA*

IWB1, **Microring Resonator and Its Application to Hitless Wavelength Selective Switch Circuits**, Yasuo Kokubun; *Yokohama Natl. Univ., Japan*

Modeling, Numerical Simulation, and Theory Invited Speakers

IMG1, **Modeling of High-Power Pulse Compression and Soliton Formation in Hollow-Core Photonic Bandgap Fibers**, Jesper Lægsgaard, Peter J. Roberts; *Technical Univ. of Denmark, Denmark*

ITuD3, **Spectral Engineering of Deterministic Aperiodic Structures for Scattering, Localization and Enhancement of Optical Fields**, Svetlana V. Boriskina, Carlo Forestiere, Gary Walsh, Ashwin Gopinath, Sylvanus Lee, Luca Dal Negro; *Boston Univ., USA*

Nanophotonic Devices and Applications Invited Speakers

IME3, **Nanocolumn Light Emitters from Ultraviolet to Red and InGaN/GaN Nanocolumn Arrays**, Katsumi Kishino^{1,2}, Akihiko Kikuchi^{1,2}, Hiroto Sekiguchi^{1,2}, Shunsuke Ishizawa^{1,2}; ¹*Sophia Univ., Japan*, ²*CREST, JST, Japan*

IME4, **Entangled Photon Pair Sources Fabricated from InAs Quantum Dots**, David A. Ritchie¹, R. M. Stevenson², R. J. Young², A. J. Hudson^{1,2}, D. J. P. Ellis², A. J. Bennett², P. Atkinson¹, K. Cooper¹, C. A. Nicoll¹, A. J. Shields²; ¹*Univ. of Cambridge, UK*, ²*Toshiba Res. Europe Ltd., UK*

IMF3, **Single Quantum Dot Laser with Photonic Crystal Nanocavity**, Masahiro Nomura, Satoshi Iwamoto, Yasuhiko Arakawa; *Univ. of Tokyo, Japan*

IMF4, **High Quality Factor Photonic Crystal Nanobeam Cavities and Their Applications**, Marko Loncar; *Harvard Univ., USA*

ITuA3, **Nanotechnology from the Bottom up: Light-Directed Synthesis of DNA Molecules**, Franco Cerrina; *Boston Univ., USA*

ITuA4, **Cavity Optomechanics at the Micro- and Nanoscale**, G. Anetsberger¹, A. Schliesser¹, R. Rivière¹, O. Arcizet¹, T.J. Kippenberg^{1,2}; ¹*Max-Planck-Inst. für Quantenoptik, Germany*, ²*École Polytechnique Fédérale de Lausanne, Switzerland*

ITuC5, **Silicon Nanophotonics: The Optical Spice Rack**, Michal Lipson; *Cornell Univ., USA*

IWD1, **Coupling of Quantum Dots in 3-D Photonic Crystals**, Kanna Aoki; *Metamaterials Lab, RIKEN, 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	

Integrated Photonics and Nanophotonics Research and Applications (IPNRA) 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

IMA • IPNRA Plenary

Tapa III
8:00 a.m.–8:45 a.m.
Mark Earnshaw; Bell Labs, Alcatel-Lucent, USA, Presider
Anand Gopinath; Univ. of Minnesota at Minneapolis, USA, Presider

IMA1 • 8:00 a.m.

Plenary

Photonics in Supercomputing: The Road to Exascale, Jeffrey Kash; IBM Res., USA. Optical interconnects in present and future supercomputers are reviewed, emphasizing Exaflop performance circa 2020, which is 1000X today's Petaflop computers. Power, density and cost requirements become increasingly stringent, ultimately driving the need for on-chip optics.

IMB • Highlights of IPNRA 2009 Contributed Papers

Tapa III
9:00 a.m.–10:00 a.m.
Mark Earnshaw; Bell Labs, Alcatel-Lucent, USA, Presider
Anand Gopinath; Univ. of Minnesota at Minneapolis, USA, Presider

IMB1 • 9:00 a.m.

An 8x8 Monolithic Tunable Optical Router (MOTOR) Chip in InP, Steven C. Nicholes, Milan L. Mašanović, Erica Lively, Larry A. Coldren, Daniel J. Blumenthal; Univ. of California at Santa Barbara, USA. We demonstrate 10 Gbps error free operation through multiple ports of an InP monolithic tunable optical router consisting of eight input wavelength converters and an 8x8 passive arrayed-waveguide grating router.

IMB2 • 9:15 a.m.

Spiral Cavity Si Wire Resonators as Label-Free Biosensors, Dan-Xia Xu, A. Densmore, J. H. Schmid, R. Ma, M. Vachon, S. Janz, R. McKinnon, J. Lapointe, A. Delâge, E. Post, P. Cheben; Natl. Res. Council Canada, Canada. We demonstrate densely folded spiral cavity resonator with $Q > 20,000$ and an area of $30 \mu\text{m} \times 30 \mu\text{m}$. We show that extended cavity length increases Q and improves the fabrication robustness of resonators.

IMB3 • 9:30 a.m.

Label-Free Biosensing Utilizing Ultrasmall Photonic Crystal Nanolaser, S. Kita^{1,2}, Y. Nishijima³, H. Misawa³, T. Baba^{1,2}; ¹Yokohama Natl. Univ., Japan, ²CREST, JST, Japan, ³Hokkaido Univ., Japan. We demonstrate label-free biosensing using GaInAsP photonic crystal nanolaser with a nanoscale modal volume. We performed the real-time observation of specific binding of BSA protein from the lasing wavelength shift.

IMB4 • 9:45 a.m.

Analysis of a Plasmonic Microcavity Using the Frequency-Dependent LOD-FDTD Method, Jun Shibayama, Ryoji Ando, Akifumi Nomura, Junji Yamauchi, Hisamatsu Nakano; Hosei Univ., Japan. A simple frequency-dependent FDTD is developed with a trapezoidal recursive convolution technique and is applied to the analysis of plasmonic microcavities. Tunable properties of the resonance wavelength are obtained with varying an air core width.

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

IMC • Silicon Photonics and Hybrid Material Integrated Devices

Tapa III

10:30 a.m.–12:30 p.m.

Nadir Dagli; Univ. of California at Santa Barbara, USA, Presider

IMC1 • 10:30 a.m.

Invited

High Speed Modulation of Hybrid Silicon Evanescent Lasers, *Daixin Dai, Alex Fang, John Bowers; Univ. of California at Santa Barbara, USA.* High speed modulation results and analysis of hybrid silicon evanescent lasers is described. It should be possible to achieve a 3dB-bandwidth over 50 GHz and a data rate of 50 Gbit/s.

IMC2 • 11:00 a.m.

The Use of Deep-Level Dopants in Silicon-on-Insulator Optical Waveguide Modulators, *Dylan F. Logan¹, Paul E. Jessop¹, Andrew P. Knights¹, Russell Gwilliam²; ¹McMaster Univ., Canada, ²Surrey Ion Beam Ctr., Univ. of Surrey, UK.* The dependence of silicon's absorption coefficient at 1.55 μm on the charge state of deep levels is modeled and measured experimentally. Improved designs for *p-i-n* rib waveguide modulators based on this effect are presented.

IMC3 • 11:15 a.m.

Enhancing Thermal Reconfiguration Speed for Silicon Photonics Applications, *Amir H. Atabaki, Ali A. Eftekhar, Siva Yegnanarayanan, Ali Adibi; Georgia Tech, USA.* The reconfiguration speed of silicon photonic devices is enhanced by optimizing thin-film microheaters. We show theoretically and experimentally that narrower heaters, thinner buried oxide layers, and LPCVD SiN over-cladding can improve the reconfiguration speed.

IMC4 • 11:30 a.m.

Hybrid-Integrated Tunable Laser Using Polymer Microring-Resonator-Based Add-Drop Filter and Reflective SOA, *Ho Lee, Gunwoo Kim, Suhyun Kim, Youngchul Chung; Dept. of Electronics and Communications Engineering, Kwangwoon Univ., Republic of Korea.* We proposed a novel tunable laser hybrid-integrated with a polymer double-ring-resonator add-drop filter reflector. This tunable laser exhibited SMSR of 26dB, FWHM of 0.03nm, and tuning range of about 17nm.

IMD • Filter Technologies

Honolulu I-II

10:30 a.m.–12:30 p.m.

Meint Smit; Technische Univ. Delft, Netherlands, Presider

IMD1 • 10:30 a.m.

Multimode Waveguide-Cavity Integrated Optics for Sensors Based on Fringe Visibility Detection, *Alexander C. Ruege, Ronald M. Reano; Ohio State Univ., USA.* We demonstrate a sensor platform based on fringe visibility detection of the interaction of a two-mode waveguide coupled to a ring cavity. Glucose solution yields a fringe visibility change of 1.57 per weight percent.

IMD2 • 10:45 a.m.

Broadband Integrated Spectrometers in Silicon-Nitride for Spectral Analysis in Sensing Applications, *Babak Momeni, Ehsan Shah Hosseini, Ali Adibi; Georgia Tech, USA.* Silicon-nitride (SiN) spectrometers are proposed for efficient spectral analysis in integrated sensing systems. Planar SiN spectrometers are demonstrated in the visible wavelength range, and a cascaded implementation is proposed to extend the operation wavelength range.

IMD3 • 11:00 a.m.

Invited

Recent Progress on Planar Lightwave Circuits for High Bit-Rate Transmission, *Yoshinori Hibino; NTT Photonics Labs, NTT Corp., Japan.* Planar lightwave circuit (PLC) technology has been contributing greatly to the construction of high bit-rate and long distance optical transmission systems. This paper reviews recent advances on such PLC-based optical devices.

IMD4 • 11:30 a.m.

Invited

Recent Progress in Planar Waveguide Spectrometers, *Pavel Cheben¹, J. H. Schmid¹, M. Florjańczyk², P. J. Bock³, D.-X. Xu¹, S. Janz¹, A. Delâge¹, J. Lapointe¹, B. Lamontagne¹, E. Post¹, A. Densmore¹, J. Albert⁴, T. J. Hall³, B. Solheim², A. Scott^{2,5}; ¹Natl. Res. Council Canada, Canada, ²York Univ., Canada, ³Univ. of Ottawa, Canada, ⁴Carleton Univ., Canada, ⁵COM DEV Ltd., Canada.* We introduce several types of new waveguide spectrometers, namely a high-resolution 50-channel AWG spectrometer, a 40-channel broadband AWG spectrometer, a Si-wire sidewall grating multiplexer, and the first planar waveguide Fourier-transform spectrometer.

**IMC • Silicon Photonics and Hybrid Material Integrated Devices
(continued)**

IMC5 • 11:45 a.m.

Determination of Wafer and Process Induced Resonant Frequency Variation in Silicon Microdisk-Resonators, *William A. Zortman, Michael R. Watts, Douglas C. Trotter; Sandia Natl. Labs, USA*. By comparing the frequency deviations of the TE and TM modes of identically designed silicon microdisk-resonators across a wafer, we demonstrate that layer thickness non-uniformity is the dominant cause of fabrication-induced microdisk-resonator frequency deviation.

IMC6 • 12:00 p.m.

Invited

Active Ge Based Devices for Silicon Photonics, *Jurgen Michel; MIT, USA*. Some of the crucial building blocks for Si photonics are high performance photodetectors, modulators, and efficient light sources. High quality Ge epitaxial films on Si have opened new possibilities for high performance CMOS compatible devices.

IMD • Filter Technologies (continued)

IMD5 • 12:00 p.m.

Design of Ultra-Small Polarization Splitter Based on a Resonant Coupling between Silicon Wire and Slot Waveguides, *Masa-aki Komatsu, Kunimasa Saitoh, Kuniaki Kakiyama, Masanori Koshiba; Hokkaido Univ., Japan*. We propose an ultra-small polarization splitter based on a resonant tunneling phenomenon. Numerical simulations show that a 16- μm -long polarization splitter with extinction ratio better than -20 dB on the entire C-band is achievable.

IMD6 • 12:15 p.m.

Compact Add/Drop Filters Using Etched Beam Splitter and Total Internal Reflection Mirrors, *Byungchae Kim, Yu-Chia Chang, Nadir Dagli; Univ. of California at Santa Barbara, USA*. We present compact optical add-drop filters based on etched beam splitters and total internal reflection mirrors in weakly guiding GaAs/Al_{0.9}Ga_{0.1}As waveguides. Resonators with circumference of 70 μm have 11.5 nm FSR and 4.2 dB ER.

12:30 p.m.–2:00 p.m.

Lunch (on your own)

**JMA • Joint IPNRA/SL Session: Slow Light Effects in Integrated
Photonics Structures**

Tapa III

2:00 p.m.–4:00 p.m.

Wayne Sorin; Univ. of Melbourne, Australia, Presider

JMA1 • 2:00 p.m.

Invited

Dispersion-Controlled Slow Light in Photonic Crystal Waveguides, *Toshihiko Baba^{1,2}, Hirokazu Sasaki^{1,2}, Jun Adachi^{1,2}, Norihiro Ishikura¹, Yohei Hamachi^{1,2}, Koshiro Yamada¹, Yuji Saito^{1,2}; ¹Yokohama Natl. Univ., Japan, ²CREST, JST, Japan*. Photonic crystal slow light waveguides are demonstrated with a large delay-bandwidth product over 100, picosecond pulse transmission and tunable delay. The nonlinear enhancement based on the slow light pulse is also presented.

IME • Nanophotonic Sources

Honolulu I-II

2:00 p.m.–4:00 p.m.

Yeshiahu Fainman; Univ. of California at San Diego, USA, Presider

IME1 • 2:00 p.m.

Towards an Integrated Narrowband Source for Quantum Information: Photon Pair Generation in a Silicon Racetrack Resonator, *Stéphane Clemmen¹, Kien Phan Huy², Wim Bogaerts³, Roel G. Baets³, Philippe Emplit¹, Serge Massar¹; ¹Univ. Libre de Bruxelles, Belgium, ²Univ. de Franche-Comté, France, ³Ghent Univ. - IMEC, Belgium*. We present evidence of time correlated photon pairs generated by the four-wave mixing process in a silicon racetrack cavity. A coincidence measurement and an emission spectrum are presented and discussed.

JMA • Joint IPNRA/SL Session: Slow Light Effects in Integrated Photonics Structures (continued)

JMA2 • 2:30 p.m.

Invited

Processing Light in Coupled Ring Resonators, *Francesco Morichetti^{1,2}, Carlo Ferrari¹, Antonio Canciamilla¹, Matteo Torregiani¹, Andrea Melloni³, Antonio Samarelli³, Richard De La Rue³, Marc Sorel³*; ¹POLICOM - DEI Politecnico di Milano, Italy, ²Fondazione Politecnico di Milano, Italy, ³Dept. of Electronics and Electrical Engineering, Univ. of Glasgow, UK. The state-of-the-art of coupled resonator optical waveguides made of chains of ring resonators in glass and SOI platforms is reviewed. Issues concerning technology, design, limits and applications in the linear and nonlinear regime are discussed.

JMA3 • 3:00 p.m.

All Optical Switching in Silicon-on-Insulator Photonic Wire Nanocavities, *Michele Belotti¹, Matteo Galli¹, Dario Gerace¹, Lucio C. Andreani¹, Giorgio Guizzetti³, Ahmad R. Md Zain², Nigel P. Johnson², Marc Sorel², Richard M. De La Rue²*; ¹Univ. degli Studi di Pavia, Italy, ²Univ. of Glasgow, UK. All optical switching in a silicon-on-insulator wire with a 1-D photonic crystal nanocavity with ultra-high quality factor operating at telecom wavelengths is presented. Switching is performed with control pulse energy of only 20 fJ.

JMA4 • 3:15 p.m.

Recent Advances in “Trapped Rainbow” Techniques for Stopping Light, *Kosmas Tsakmakidis, Ortwin Hess*; *Advanced Technology Inst., Univ. of Surrey, UK*. We provide an overview of “trapped rainbow” techniques for stopping light. We show that guided modes with real propagation constant and complex frequency can be “trapped rainbow”-stopped even in the presence of waveguide losses.

JMA5 • 3:30 p.m.

Invited

Ultracompact Switches and Modulators Based on Slow Light in Photonic Crystals, *Thomas F. Krauss¹, Daryl M. Beggs¹, Thomas P. White¹, Liam O’Faolain¹, Tobias Kampfrath², L. (Kobus) Kuipers²*; ¹Univ. of St. Andrews, UK, ²FOM Inst. AMOLF, Netherlands. Photonic crystal slow light waveguides enable modulators with high speed and large bandwidth. Group indices of 30-40 are achieved with low loss and we demonstrate modulators of <100 μm length with switching times of 3ps.

IME • Nanophotonic Sources (continued)

IME2 • 2:15 p.m.

Interference of Photons from a Weak Laser and a Quantum Dot, *Anthony J. Bennett¹, Raj B. Patel^{1,2}, Christine A. Nicoll², David A. Ritchie², Andrew J. Shields¹*; ¹Toshiba Res. Europe Ltd., Cambridge Res. Lab, UK, ²Univ. of Cambridge, UK. We have measured correlations between photons emitted by a weak laser and a single quantum dot; sources with different statistics. A reduction at time zero is observed indicating photon interference, results are compared to theory.

IME3 • 2:30 p.m.

Invited

Nanocolumn Light Emitters from Ultraviolet to Red and InGaN/GaN Nanocolumn Arrays, *Katsumi Kishino^{1,2}, Akihiko Kikuchi^{1,2}, Hiroto Sekiguchi^{1,2}, Shunsuke Ishizawa^{1,2}*; ¹Sophia Univ., Japan, ²CREST, JST, Japan. InGaN-based nanocolumn LEDs from ultraviolet to red were fabricated through self-assembly of nanocolumns by rf-MBE. Uniform arrays of InGaN/GaN nanocolumns were grown demonstrating the controlled emission color from blue to red with changed nanocolumn diameter.

IME4 • 3:00 p.m.

Invited

Entangled Photon Pair Sources Fabricated from InAs Quantum Dots, *David A. Ritchie¹, R. M. Stevenson², R. J. Young², A. J. Hudson^{1,2}, D. J. P. Ellis², A. J. Bennett², P. Atkinson¹, K. Cooper¹, C. A. Nicoll¹, A. J. Shields²*; ¹Univ. of Cambridge, UK, ²Toshiba Res. Europe Ltd., UK. We have fabricated and optimized triggered sources of entangled photon pairs using self-assembled InAs quantum dots. After optimization, a fidelity to the ideal entangled state of over 90% has been achieved.

IME5 • 3:30 p.m.

Surface Plasmon Assisted Broadband Emission from Nanostructured Metal-Insulator-Metal Tunnel Junctions, *Jiayu Chen, Damien Ancukiewicz, Li Wang, Ravinder Jain*; *Univ. of New Mexico, USA*. Broadband emission from visible to near-IR and an upraised peak at high applied voltages is observed from Al-AlO_x-Au tunnel junctions. We argue that it results from an interaction with surface plasmons excited at metal-air interface.

JMA • Joint IPNRA/SL Session: Slow Light Effects in Integrated Photonics Structures (continued)

IME • Nanophotonic Sources (continued)

IME6 • 3:45 p.m.

Curvature Dependence of Lasing Wavelength in a Flexible InGaAsP Microdisk Cavity, Kung-Shu Hsu^{1,2}, Wan Kuang³, Yao-Chen Wang^{1,4}, Yi-Chun Yang¹, Shih-Kuo Tsai^{1,4}, Yu-Chen Liu^{1,4}, Zi-Chang Chang^{1,4}, Meng-Chyi Wu⁴, Min-Hsiung Shih^{1,2}; ¹Academia Sinica, Taiwan, ²Natl. Chiao Tung Univ., Taiwan, ³Dept. of Electrical and Computer Engineering, Boise State Univ., USA, ⁴Natl. Tsing Hua Univ., Taiwan. Compact InGaAsP microdisk cavities were fabricated on a flexible polydimethylsiloxane substrate. The lasing of the flexible microdisk was obtained with a low threshold. The curvature dependence of lasing wavelength was also characterized by bending cavity.

Palace Lounge

4:00 p.m.–4:30 p.m.

Coffee Break/Exhibits

IMF • Q-Dot Emitters, PhC Lasers, Microcavities, Coupling

IMG • Modeling and Simulation

Tapa III

4:30 p.m.–6:30 p.m.

Kanna Aoki; RIKEN, Japan, *Presider*

Honolulu I-II

4:30 p.m.–6:30 p.m.

G. Ronald Hadley; Rio Grande Photonics LLC, USA, *Presider*

IMF1 • 4:30 p.m.

Design and Fabrication Techniques for a Mid-Infrared Photonic Crystal Defect Cavity in Indium Antimonide, Jonathan R. Pugh¹, Daniel Ho¹, Peter J. Heard¹, Geoff R. Nash^{1,2}, Tim Ashley², John G. Rarity¹, Martin J. Cryan¹; ¹Univ. of Bristol, UK, ²QinetiQ, Malvern Technology Ctr., UK. Simulation results and fabrication details are presented for a two-dimensional Al_xGa_{1-x}In_{1-x-y}Sb photonic crystal membrane defect cavity. Peak emission is predicted at $\lambda=3.372\mu\text{m}$ with a Q factor of 26233 for an optimized membrane thickness of 1000nm.

IMG1 • 4:30 p.m.

Invited

Modeling of High-Power Pulse Compression and Soliton Formation in Hollow-Core Photonic Bandgap Fibers, Jesper Lægsgaard, Peter J. Roberts; Technical Univ. of Denmark, Denmark. We model the formation and self-frequency shift of solitons in a hollow-core photonic bandgap fiber. Extraction of clean femtosecond pulses by long-pass filtering in fibers with different air pressures is investigated.

IMF2 • 4:45 p.m.

Quality Factor Dependence on Vertical Slab Structure in Photonic Crystal Double Heterostructure Resonant Cavities, Adam Mock, John O'Brien; Univ. of Southern California, USA. The quality factor of photonic crystal heterostructure cavities with different vertical cladding geometries and photonic crystal hole etch depths is analyzed numerically. Symmetric cladding layers and deep etching are shown to improve the quality factor.

IMG2 • 5:00 p.m.

Characterisation of Terahertz Wave Confinement in Quantum Cascade Lasers, B. M. A. Rahman, Huda Tanvir, N. Kejalakshmy, A. Agrawal, C. Themistos, K. T. V. Grattan; City Univ. London, UK. Terahertz quantum cascade laser waveguides were characterized using the vector finite element method. Waveguides based on GaSb/AlGaSb multiple quantum well structures were simulated, for which detailed mode profiles, power confinement and loss factors are shown.

IMF3 • 5:00 p.m.

Invited

Single Quantum Dot Laser with Photonic Crystal Nanocavity, Masahiro Nomura, Satoshi Iwamoto, Yasuhiko Arakawa; Univ. of Tokyo, Japan. We demonstrate a single quantum dot laser using a photonic crystal nanocavity. A low quantum dot density ($\sim 0.4/\text{cavity}$) resulted in clear single quantum dot feature and distinct phase transition into lasing in photon correlation measurements.

**IMF • Q-Dot Emitters, PhC Lasers, Microcavities, Coupling
(continued)**

IMF4 • 5:30 p.m.

Invited

High Quality Factor Photonic Crystal Nanobeam Cavities and their Applications, Marko Loncar; *Harvard Univ., USA*. Wavelength-scale and high-Q photonic crystal resonators made in various materials (Si, Si₃N₄, III-Vs) will be discussed. Their application in novel single-photon sources, as well as for nonlinear wavelength conversion at single-photon level, will be presented.

IMF5 • 6:00 p.m.

Wavelength Conversion by Interband Transition in a Double Heterostructure Photonic Crystal Cavity, Amin Khorshidahmad, Andrew G. Kirk; *McGill Univ., Canada*. Intermodal transition by ultrafast tuning of a heterostructure photonic crystal cavity over a relative frequency range of 25% is numerically demonstrated. Mode selection is achieved by symmetry and the inherently wide spectral separation of resonances.

IMF6 • 6:15 p.m.

Investigation of a Tapered Fiber-Photonic Crystal Waveguide Coupler: Technology and Spectroscopy, Raymond Sarkissian, Stephen Farrell, John O'Brien; *Univ. of Southern California, USA*. A spectrometry technique based on a full four port modeling and measurement of a tapered fiber-photonic crystal waveguide coupler is proposed and technology implications of utilized fabrication techniques are investigated.

IMG • Modeling and Simulation (continued)

IMG3 • 5:15 p.m.

Post-Process Removal of Spurious Fabry-Pérot Oscillations in Measurements of Transmission Spectra, Michael J. Strain¹, Marco Gnan², Richard M. De La Rue¹, Marc Sorel¹; ¹*Univ. of Glasgow, UK*, ²*Univ. of Bologna, Italy*. A post-processing tool for suppression of unwanted Fabry-Pérot fringes in integrated optic device transmission measurements is presented. The method is shown to perform better than a shifting window averaging technique on various Bragg grating spectra.

IMG4 • 5:30 p.m.

Systematic Engineering of Waveguide-Resonator Coupling for Silicon Microring/Microdisk Resonators, Mohammad Soltani, Siva Yegnanarayanan, Qing Li, Ali Adibi; *Georgia Tech, USA*. Systematic engineering of waveguide-resonator coupling for optimum phase-matching and fieldoverlap is proposed. Adding a thin silicon pedestal layer underneath the resonator dramatically improves the coupling. Critical coupling to resonators with different Qs (10,000-3,000,000) are demonstrated.

IMG5 • 5:45 p.m.

Efficient Modeling of Erbium-Doped Waveguide Amplifiers Using Adaptive Multi-Step Iterative Methods, Anish Bekal, Balaji Srinivasan; *Indian Inst. of Technology Madras, India*. We discuss the use of predictor-corrector adaptive Adam-Bashforth method using Generalized Lagrange polynomial for modeling the population dynamics in compact erbium-doped waveguide amplifiers. This results in considerable reduction of computation time compared to conventional methods.

IMG6 • 6:00 p.m.

Modified Finite-Difference Formula for the Analysis of a Step-Index Waveguide with a Tilted Interface, Junji Yamauchi¹, Seiji Harada¹, Shingo Kobori², Hisamatsu Nakano¹; ¹*Hosei Univ., Japan*, ²*Advanced Technology R&D Ctr., Mitsubishi Electric Corp., Japan*. A 3-point finite-difference formula is derived for the analysis of a step-index waveguide with a tilted interface. The formula is suitable for the use of the alternating-direction implicit method.

IMG7 • 6:15 p.m.

Numerical Study on the Improvement of Light Extraction Efficiency by Silver Film with Periodic Air Slit Array, Yizhu Lin, Fanmin Kong, Kang Li; *School of Information Science and Engineering, Shandong Univ., China*. Owing to reflection, light extraction efficiency remains low for luminous devices by spontaneous emission; through FDTD simulation, we found silver film with periodic air slit array could contribute to the improvement and proposed a configuration.

• Tuesday, July 14, 2009 •

Palace Lounge

7:30 a.m.–6:30 p.m.

Registration Open

ITuA • Sensitive Nanophotonics

Tapa II

8:00 a.m.–10:00 a.m.

Andrea Melloni; Politecnico di Milano, Italy, *Presider*

ITuA1 • 8:00 a.m.

Design Guidelines for Optical Resonator Biochemical Sensors, Juejun Hu, Xiaochen Sun, Anu Agarwal, Lionel C. Kimerling; MIT, USA. Analogous to the widely accepted photodetector figure-of-merit (FOM), detectivity D^* , we introduce a new sensor system FOM, the time-normalized sensitivity S^* , to enable quantitative, cross-technology-platform comparison between resonator sensors with distinctive architectures and interrogation configurations.

ITuA2 • 8:15 a.m.

Progress toward Microcantilever Array Sensors Enabled by In-Plane Photonic Readout, Gregory P. Nordin, Seunghyun Kim, Jong Wok Noh, Weisheng Hu, Ryan Anderson, Stan Ness, Bryan Haslam, William Dahlquist, Jack Dong; Brigham Young Univ., USA. We report the design, fabrication and characterization of differential waveguide splitters for transduction of microcantilever deflection for sensor applications. Our approach is scalable to permit hundreds to several thousand microcantilevers on a single chip.

ITuA3 • 8:30 a.m.

Invited

Nanotechnology from the Bottom up: Light-Directed Synthesis of DNA Molecules, Franco Cerrina; Boston Univ., USA. Maskless photolithography and light-protected phosphoramidite precursors are used to generate large libraries of DNA oligonucleotides. We discuss merits and challenges of using these “oligos” as building blocks for the “bottom-up” synthesis of complex DNA structures.

ITuA4 • 9:00 a.m.

Invited

Cavity Optomechanics at the Micro- and Nanoscale, G. Anetsberger¹, A. Schliesser¹, R. Rivière¹, O. Arcizet¹, T. J. Kippenberg^{1,2}; ¹Max-Planck-Institut für Quantenoptik, Germany, ²École Polytechnique Fédérale de Lausanne, Switzerland. Using resolved-sideband laser cooling, a micromechanical oscillator is cooled to an average occupation of 63 quanta, and simultaneously measured close to the limit imposed by the Heisenberg uncertainty principle. Extending cavity optomechanics to the nanoscale is demonstrated using a nanomechanical oscillator dispersively coupled to an optical microresonator.

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 Owen¹, 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 Zentgraf¹, 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 $\lambda^2/100$ mode area and discuss the broader impact of plasmon-based light sources and integrated optical components.

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 Choi², 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.

ITuA • Sensitive Nanophotonics (continued)

ITuA5 • 9:30 a.m.

Optical Near-Field Distribution around Nano Hemi-Shell Periodic Structure for SERS Applications, *Tetsuo Sakai¹, Eric Diebold², Yuji Nishizawa¹, Yuto Tanaka¹, Kevin Vora², Eric Mazur², Minoru Obara¹; ¹Keio Univ., Japan, ²Harvard Univ., USA*. Raman spectroscopy is done to investigate the optical properties of 2-D nano-hemi-shell arrays consisting of small polystyrene particles coated with gold. The field distribution around nano-structures using femtosecond laser pulse irradiation is experimentally measured.

ITuA6 • 9:45 a.m.

Design and Nanofabrication of Deterministic Aperiodic Substrates for Surface-Enhanced Raman Scattering (SERS), *Ashwin Gopinath, Svetlana V. Boriskina, Björn M. Reinhard, Luca Dal Negro; Boston Univ., USA*. In this work we theoretically and experimentally study morphology dependent SERS enhancement in periodic and aperiodic metal nanoparticle arrays. This work demonstrates SERS enhancement factors $\sim 10^7$ using engineered, reproducible, deterministic-aperiodic arrays of Au nano-triangles.

Palace Lounge

10:00 a.m.–10:30 a.m.

Coffee Break/Exhibits

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

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.

JTuB • Joint Poster Session I

Palace Lounge

10:00 a.m.–11:30 a.m.

JTuB1

Eu³⁺ Doped Polymers for Optical Amplification, K. C. Tsang, E. Y. B. Pun; *City Univ. of Hong Kong, Hong Kong*. Eu³⁺ doped NOA polymers have been synthesized and characterized optically. Optical amplification at 612nm wavelength has been demonstrated, and a signal enhancement of ~18.3dB has been measured for a 5mm long device.

JTuB2

Interference Enhanced Directional Lasing through Surface Micro-Structures, YuanYao Lin¹, Chih-Yao Chen¹, Jin-Shan Pan², Tsin-Dong Lee^{3,4}, Ray-Kuang Lee¹; ¹Natl. Tsing Hua Univ., Taiwan, ²TrueLight Corp., Taiwan, ³Natl. Yunlin Univ. of Science and Technology, Taiwan, ⁴Industrial Technology Res. Inst., Taiwan. We demonstrate that surface-assisted micro-structures can tailor the modes and resulting emission from a dynamic localized VCSEL at room temperature. The coherent superposition of whispering gallery and dynamic localized modes are observed and reported.

JTuB3

Surface-Emitting QDs Laser with a Monolithically Integrated Grating Outcoupler, Oleg V. Smolski¹, Viktor O. Smolski¹, Yigit O. Yilmaz¹, Eric G. Johnson¹, Jason O'Daniel²; ¹Univ. of North Carolina at Charlotte, USA, ²CREOL, Univ. of Central Florida, USA. Grating coupled surface emitting laser diodes were designed and fabricated from a 1270nm InAs QDs epi. The integrated outcoupler's characteristics were compared with the grating simulation data. The advanced emitter's performance enhanced the device applications.

JTuB4

Filling of Slot Waveguides with Versatile Material Systems Using Atomic Layer Deposition, Tapani Alasaarela^{1,2}, Antti Säynätjoki¹, Petri Stenberg³, Markku Kuittinen³, Seppo Honkanen¹; ¹Helsinki Univ. of Technology, Finland, ²Beneq Oy, Finland, ³Dept. of Physics and Mathematics, Univ. of Joensuu, Finland. We introduce Atomic Layer Deposition (ALD) for versatile filling of slot waveguides. We demonstrate filling of test structures with combination of TiO₂ and Al₂O₃ layers and calculate the properties of dual-material filled slot waveguides.

JTuB5

Compact Etched Beam Splitters in Weakly Guiding GaAs/AlGaAs Waveguides, Byungchae Kim, Yu-Chia Chang, Nadir Dagli; *Univ. of California at Santa Barbara, USA*. Compact etched beam splitters in weakly guiding waveguides are designed, fabricated and characterized. 2-D FDTD calculations and experimental trends agree for varying incidence angle and gap dimension. Measurements indicate 10-30% power transmission over submicron area.

JTuB6

A Reflective Mirror with Spherical Lens Arrays for Multi-Channel Optical Interconnectors, Sang-Pil Han, Young-Tak Han, Sang-Ho Park, Jang-Uk Shin, Yong-Soon Paek; *ETRI, Republic of Korea*. We present a reflective mirror with spherical lens arrays (RMS) for multi-channel optical interconnectors. The coupling loss from a 9/125µm SMF to a 62.5/125µm MMF of the RMS samples is measured to be about 0.22dB.

JTuB7

Sensitivity Dependences of Silicon-Based Guided-Wave Optical Flow Sensors, Masashi Ohkawa, Yusuke Kudo, Masafumi Adachi, Takashi Sato; *Niigata Univ., Japan*. Sensitivity dependences of a silicon-based guided-wave optical flow sensor were examined experimentally. The flow sensor has a diaphragm with a small hole, and its operation is based on Bernoulli's theorem and the elasto-optic effect.

JTuB8

Plastic Optical Pressure Sensors Using a Flexible Polymer Waveguide, Jun-Whee Kim, Kyung-Jo Kim, Min-Cheol Oh; *Pusan Natl. Univ., Republic of Korea*. Optical pressure sensors based on the radiation coupling between a channel waveguide and a flexible polymer waveguide are proposed. From the fabricated sensor device, significant optical power modulation was observed depending on the contact pressure.

JTuB9

Colorful Photonic Band Gap Fiber-Based Textiles for Illumination and Sensing Applications, Bertrand Gauvreau¹, Ning Guo¹, Kathy Schicker², Katherine Stoeffler¹, Abdellah Aji³, Charles Dubois¹, Maksim Skorobogatyi¹; ¹École Polytechnique de Montréal, Canada, ²Univ. of the Arts London, UK, ³Industrial Materials Inst., Canada. Polymer Bragg fiber-enabled, color changing photonic textiles for illumination and sensing applications are demonstrated. Such textiles show intrinsic and uniform lateral light extraction and evolutive visuals using both passive and active color control.

JTuB10

Polarization Independent, Low Loss, Low Crosstalk Si Wire Waveguide Crossing, *Daiki Tanaka, Yuichiro Ikuma, Hiroyuki Tsuda; Keio Univ., Japan.* Polarization independent Si wire waveguide crossing with the offset structure is proposed. For both TE and TM modes, this crossing has low transmission loss and low crosstalk.

JTuB11

Electrically Biased Birefringent Silicon Waveguides, *Montasir Qasymeh, Sergey A. Ponomarenko, Michael Cada; Dalhousie Univ., Canada.* We show that the polarization evolution and the shape of ultrashort pulses, propagating in birefringent silicon waveguide, can be dually efficiently controlled by a static electric field, applied across the waveguide, and the input intensity.

JTuB12

On-Chip Group Velocity Dispersion Compensation Using Coupled Chirped Vertical Gratings, *Dawn T. H. Tan, Kazuhiro Ikeda, Yeshaiah Fainman; Univ. of California at San Diego, USA.* Coupled chirped vertical gratings are proposed for on-chip group velocity dispersion compensation. The device is studied using finite-difference time domain simulations and fabricated. The device circumvents the need for directional couplers to redirect compensated data.

JTuB13–JTuB24 can be found in the Nonlinear Optics (NLO) abstracts.

JTuB25–JTuB28 can be found in the Slow and Fast Light (SL) abstracts.

ITuB • Photonic Devices and Integration I

Tapa II

11:30 a.m.–1:00 p.m.

Valery Tolstikhin; OneChip Photonics Inc., Canada, Presider

ITuB1 • 11:30 a.m.

Invited

Optical Flip-Flops and Isolators for Digital Photonic Integrated Circuits, *Yoshiaki Nakano; Univ. of Tokyo, Japan.* For better handling of optical labels and payloads in photonic networks, digital photonic integrated circuits (PICs) are demanded. This paper reviews research on semiconductor all-optical flip-flops and waveguide optical isolators as building blocks for future large-scale PICs.

ITuB2 • 12:00 p.m.

Invited

Integration of Passive and Active Components in InP-Based PICs, *Meint Smit, Xaveer Leijtens; Technische Univ. Eindhoven, Netherlands.* Application specific photonic ICs (ASPICs) can be realized by integrating a small set of basic active and passive building blocks. In this presentation we will focus on the passive building blocks that are required.

ITuC • Silicon Nanophotonics

Tapa III

11:30 a.m.–1:00 p.m.

Tom Koch; Lehigh Univ., USA, Presider

ITuC1 • 11:30 a.m.

Concentric Microdisk Design for a Two-Stage Silicon Laser, *Brandon F. Redding, Tim Creazzo, Elton Marchena, Shouyuan Shi, Dennis Prather; Univ. of Delaware, USA.* We propose an electrically pumped two-stage laser based on concentric Si-nc and Er:SiO₂ microdisks. We present simulations of the pump and lasing modes and experimentally demonstrate excitation of the pump mode in the proposed device.

ITuC2 • 11:45 a.m.

Implementation of Single and Coupled Resonator Filters Using Ultimate Miniaturized Silicon Microdisk Resonators, *Mohammad Soltani, Qing Li, Siva Yegnanarayanan, Ali Adibi; Georgia Tech, USA.* Resonator-based filters using silicon microdisks scaled to ultimate miniaturization (radius~1.5-2 micron) close to radiation limit are demonstrated. High-Q (~150,000) and single-mode operation in each microdisk enables low insertion-loss and large free-spectral-range filters.

ITuC3 • 12:00 p.m.

SOI Based Photonic Crystal Polarization Converter for Terahertz Frequency Applications, *Khadijeh Bayat¹, Sujeet K. Chaudhuri¹, Safieddin Safavi-Naeini², Mahdi F. Baroughi²; ¹Univ. of Waterloo, Canada, ²South Dakota State Univ., USA.* Photonic crystal slab waveguide polarization converter was designed and simulated using 3-D-FDTD method. Polarization conversion efficiency higher than 90% was achieved within the frequency band of 584-605 GHz. The structure was fabricated on SOI wafer.

ITuB • Photonic Devices and Integration I (continued)

ITuB3 • 12:30 p.m.

High Peak Power Efficient Edge-Emitting Photonic Crystal Nanocavity Lasers, *Ling Lu, Adam Mock, Eui Hyun Hwang, John O'Brien, Paul Daniel Dapkus; Univ. of Southern California, USA.* Record room temperature single-mode edge-emitted peak power was collected from L3 and finite-waveguide photonic crystal nanocavity quantum well membrane lasers. Peak power levels of 230 and 540 μ W were collected from L3 and finite-waveguide edge-emitters, respectively.

ITuB4 • 12:45 p.m.

Polarization Proximity Effect in Isolator Crystal Pairs, *Yoav Linzon, Marcello Ferrera, Luca Razzari, Alain Pignolet, Roberto Morandotti; INRS-Énergie et Matériaux, Univ. du Québec, Canada.* We experimentally studied the polarization dynamics of near infrared light transmitted through magneto-optic YIG isolator crystal pairs using modified balanced detection and observed a proximity effect where the saturation field is significantly reduced.

1:00 p.m.–2:30 p.m.

Lunch (on your own)

ITuD • Modeling and Simulation II

Tapa II

2:30 p.m.–4:30 p.m.

Frank Schmidt; Zuse Inst. Berlin, Germany, President

ITuD1 • 2:30 p.m.

Complex Jacobi Iteration for 3-D Helmholtz Analysis of Metallic Structures, *G. Ronald Hadley¹, David W. Peters²; ¹Rio Grande Photonics, LLC, USA, ²Sandia Natl. Labs, USA.* The complex Jacobi iterative method was recently developed for Helmholtz analysis of normal dielectrics. Here we update the derivation to allow metallic structures and apply the method to analyze mid-IR transmission through a frequency-selective surface.

ITuC • Silicon Nanophotonics (continued)

ITuC4 • 12:15 p.m.

Backscattering in Slow Light Waveguides, *Francesco Morichetti^{1,2}, Antonio Canciamilla¹, Matteo Torregiani¹, Andrea Melloni³, Liam O'Faolain³, Daryl M. Beggs³, Thomas F. Krauss³, Antonio Samarelli⁴, Marc Sorel⁴, Richard M. De La Rue⁴; ¹POLICOM - DEI Politecnico di Milano, Italy, ²Fondazione Politecnico di Milano, Italy, ³School of Physics and Astronomy, Univ. of St. Andrews, UK, ⁴Dept. of Electronics and Electrical Engineering, Univ. of Glasgow, UK.* Backscattering and its dependence on group index is experimentally studied in ring-resonators and photonic crystals. Independently of the structure, the behavior of optical devices can be dramatically modified as backscattered power increases with group index.

ITuC5 • 12:30 p.m.

Invited

Silicon Nanophotonics: The Optical Spice Rack, *Michal Lipson; Cornell Univ., USA.* Silicon is evolving as a versatile photonic platform with multiple functionalities that can be seamlessly integrated. We have recently demonstrated the ability to guide and switch multiple wavelength sources at GHz bandwidths, in optomechanical as well as opto-fluidics devices.

ITuE • Novel Waveguides and Photonic Sensors

Tapa III

2:30 p.m.–4:30 p.m.

Pavel Cheben; Natl. Res. Council Canada, Canada, President

ITuE1 • 2:30 p.m.

Invited

Low-Loss High Index Contrast SOI Waveguides: Expecting the Unexpected, *Tom Koch; Lehigh Univ., USA.* This talk reviews experimental and analytical work in our quest for low-loss, high-index-contrast silicon-on-insulator (SOI) waveguides, yielding a number of intriguing effects that range from bizarre polarization characteristics to remarkable fundamental quantum electrodynamic phenomena.

ITuD • Modeling and Simulation II (continued)

ITuD2 • 2:45 p.m.

Fast, Accurate and Stable Scattering Calculation Method with Application to Finite Sized Photonic Crystal Waveguides, *Philip T. Kristensen, Peter Lodahl, Jesper Mørk; DTU Fotonik, Dept. of Photonics Engineering, Technical Univ. of Denmark, Denmark.* We present a multipole solution to the Lippmann-Schwinger equation for electromagnetic scattering in inhomogeneous geometries. The method is illustrated by calculating the Green's function for a finite sized two-dimensional photonic crystal waveguide.

ITuD3 • 3:00 p.m.

Invited

Spectral Engineering of Deterministic Aperiodic Structures for Scattering, Localization and Enhancement of Optical Fields, *Svetlana V. Boriskina, Carlo Forestiere, Gary Walsh, Ashwin Gopinath, Sylvanus Lee, Luca Dal Negro; Boston Univ., USA.* We present the results of the analysis and optimization of deterministic aperiodic structures which can be used for a variety of applications including lasers, label-free biosensing, enhanced light emitters, and substrates for surface-enhanced Raman scattering.

ITuD4 • 3:30 p.m.

Analyzing Diffraction Gratings by Neumann-to-Dirichlet Maps and Boundary Integral Equations, *Yumao Wu^{1,2}, Ya Yan Lu²; ¹Univ. of Science and Technology of China, China, ²City Univ. of Hong Kong, Hong Kong.* A new method for analyzing diffraction gratings is developed based on integral equations and Neumann-to-Dirichlet maps. The method shares the advantages of existing integral equation methods, but avoids the quasi-periodic Green's function.

ITuD5 • 3:45 p.m.

Modeling Two-Dimensional Anisotropic Photonic Crystals by Dirichlet-to-Neumann Maps, *Huan Xie^{1,2}, Ya Yan Lu²; ¹Univ. of Science and Technology of China, China, ²City Univ. of Hong Kong, Hong Kong.* For 2-D photonic crystals involving anisotropic media and circular cylinders, we derive analytic solutions in the unit cells, construct the Dirichlet-to-Neumann (DtN) maps and calculate band structures with new eigenvalue problem formulations involving smaller matrices.

ITuE • Novel Waveguides and Photonic Sensors (continued)

ITuE2 • 3:00 p.m.

Advantages of Angled Sidewalls in Slot Waveguides, *Antti Säynätjoki, Tapani Alasaarela, Amit Khanna, Lasse Karvonen, Ari Tervonen, Seppo Honkanen; Helsinki Univ. of Technology, Finland.* Advantages of angled sidewalls in slot waveguides are discussed. Enhanced vertical optical confinement in such waveguides is shown. Filling of an angled-sidewall slot structure with conformal growth by atomic layer deposition is discussed and demonstrated.

ITuE3 • 3:15 p.m.

Selectively Patterned Notch Filter Waveguides for Optofluidic Biosensors, *Philip Measor¹, Brian S. Phillips², Yue Zhao², Aaron R. Hawkins², Holger Schmidt¹; ¹Univ. of California at Santa Cruz, USA, ²Brigham Young Univ., USA.* An integrated filter utilizing liftoff-based selective patterning is designed, fabricated, and demonstrated. The waveguide acts as a notch filter in the collection path of an optofluidic device and exhibits $\Delta\lambda \sim 1.4\text{nm}$ and $\sim 22\text{dB}$ rejection over 18mm.

ITuE4 • 3:30 p.m.

The Design and Analysis of (MASH)-ARROW for Liquid Core Optical Waveguiding, *Jiwon Lee, Jaeyoun Kim; Iowa State Univ., USA.* A Multi- and Single- layer Hybridized Anti-Resonant Reflection Optical Waveguide (MASH)-ARROW, is proposed to introduce a novel mechanism for 2-D planar liquid core waveguiding and analyzed with finite element method for optofluidic sensing applications.

ITuE5 • 3:45 p.m.

Nanopore Fabrication in Hollow Integrated Waveguides, *Matthew R. Holmes¹, Mikhail Rudenko², Philip Measor², Tao Shang¹, Holger Schmidt², Aaron R. Hawkins¹; ¹Brigham Young Univ., USA, ²Univ. of California at Santa Cruz, USA.* We demonstrate the fabrication of micropores/nanopores in hollow antiresonant reflecting optical waveguides (ARROWs) through a combination of reactive ion etching and focused ion beam etching. Optical loss measurements indicate insignificant change in the waveguide loss.

ITuD • Modeling and Simulation II (continued)

ITuD6 • 4:00 p.m.

Photonic Crystal Laser Threshold Analysis Using 3-D FDTD with a Material Gain Model, *Adam Mock, John O'Brien; Univ. of Southern California, USA*. A derivation of threshold modal gain based on energy conservation and applicable to photonic crystal microcavities is presented. This result is investigated using 3-D FDTD simulations which include a spatially varying and dispersive gain model.

ITuD7 • 4:15 p.m.

Analysis of Open Dielectric Waveguides Using Pseudoinverse Penalty Method, *Hyoungsuk Yoo, Anand Gopinath; Univ. of Minnesota, USA*. The vector finite-element method in the interior and the boundary integral equation of the exterior domain are investigated to analyze open dielectric waveguides. The simultaneous solutions of propagating modes are obtained by the pseudoinverse method.

ITuE • Novel Waveguides and Photonic Sensors (continued)

ITuE6 • 4:00 p.m.

Finite Thickness Metal-Insulator-Metal Structure for Waveguide Based Surface Plasmon Resonance Biosensing, *Yifen Liu, Jaeyoun Kim; Iowa State Univ., USA*. We designed an asymmetric, finite thickness metal-insulator-metal (f-MIM) structure supporting surface plasmon-polariton (SPP) modes with high effective index. Combining f-MIM modes and polymer waveguide modes leads to a sensing scheme ideally suited for liquid-phase analytes.

ITuE7 • 4:15 p.m.

Single Trench GaInAsP Waveguide Mode Converter, *Sang-Hun Kim, Tetsuya Mizumoto; Tokyo Inst. of Technology, Japan*. A TE-TM mode converter is fabricated in a single trench GaInAsP waveguide by a single-masking and etching process. A mode conversion efficiency of 76% is obtained in a 210- μm long trench section.

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*

NOTES

• **Wednesday, July 15, 2009** •

Palace Lounge

7:30 a.m.–4:30 p.m.

Registration Open

IWA • Photonic Devices and Integration II

Tapa III

8:00 a.m.–10:00 a.m.

Maura Raburn; Infinera Corp., USA, Presider

IWA1 • 8:00 a.m.

InGaAsP/InP Based Flattened Ring Resonators with Etched Beam Splitters, Erik J. Norberg, John S. Parker, Uppili Krishnamachari, Robert S. Guzzon, Larry A. Coldren; *Univ. of California at Santa Barbara, USA*. A novel flattened ring resonator design utilizing Etched Beam Splitters (EBS) in InGaAsP/InP is proposed and demonstrated. A multiple-thickness hard mask that compensates for RIE-lag realizes waveguides and EBS in a single etch step.

IWA2 • 8:15 a.m.

Single Port Optical Switching in Integrated Ring Resonators, John S. Parker, Yung-Jr. Hung, Erik J. Norberg, Robert S. Guzzon, Larry A. Coldren; *Univ. of California at Santa Barbara, USA*. We have experimentally investigated single-port injection-triggered switching in a new class of semiconductor ring lasers with integrated gain, phase and passive waveguide sections as a building-block for all-optical signal processing such as high-speed analog-to-digital conversion.

IWA3 • 8:30 a.m.

Invited

Integrated Transmitters and Transceivers for High-End Applications in WDM Optical Networks, Larry A. Coldren; *Univ. of California at Santa Barbara, USA*. Integration platforms initially developed for widely-tunable lasers have recently been extended to single-chip transmitters and transceivers by incorporating optical amplifier-photodiode receivers with these transmitters. Results from these and other InP-based photonic ICs will be presented.

IWA4 • 9:00 a.m.

Invited

InP PICs for Advanced Modulation Format Transmission, Masaki Kato, Peter Evans, Scott Corzine, Matthew Fisher, John Gheorma, Andrew Dentai, Randal Salvatore, Ilya Lyubomirsky, Alan Nilsson, Jeff Rahn, Radha Nagarajan, Corey Tsai, Babak Behnia, James Stewart, Doug Christini, Mark Missey, Augi Spannagel, Damien Lambert, Shashank Agashe, Paul Liu, Don Pavinski, Mike Reffle, Rick Schneider, Mehrdad Ziari, Chuck Joyner, Fred Kish, David Welch; *Infinera Corp., USA*. InP photonic integrated circuits (PICs) for advanced modulation format transmission, which enable high spectral efficiency, reduced complexity, high reliability, and low power consumption, will be reviewed.

IWA5 • 9:30 a.m.

Conversion of Phase-Modulated Signals to Amplitude-Modulated Signals in SOAs Due to Mirror Reflections, Søren Blaaberg, Jesper Mørk; *Technical Univ. of Denmark, Denmark*. We present theoretical results that show conversion of phase modulated signals to amplitude modulated signals in an SOA. Large-signal and small-signal calculations show significant conversion responses caused by even minute reflections at the end mirrors.

IWA6 • 9:45 a.m.

Wide Bandwidth Design of Ultra-Low Voltage Substrate-Removed Electro-Optic Mach-Zehnder Intensity Modulators, Selim Dogru, JaeHyuk Shin, Nadir Dagli; *Univ. of California at Santa Barbara, USA*. Wide bandwidth design of recently demonstrated 0.3 V V_{π} substrate removed electro-optic modulators is described. 30 GHz bandwidth with V_{π} substantially lower than 1 V should be possible.

Palace Lounge

10:00 a.m.–10:30 a.m.

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

JWA • Joint Poster Session II

Palace Lounge

10:00 a.m.–11:30 a.m.

JWA1

Room Temperature Continuous-Wave Operation of Two-Dimensional Photonic Crystal Nanolaser on a Sapphire Substrate, Yu-Chen Liu^{1,2}, Yi-Chun Yang¹, Zi-Chang Chang^{1,2}, Meng-Chyi Wu², Min-Hsiung Shih^{1,3}; ¹Academia Sinica, Taiwan, ²Natl. Tsing Hua Univ., Taiwan, ³Natl. Chiao Tung Univ., Taiwan. An ultrasmall photonic crystal defect laser had been fabricated on a sapphire substrate. The room temperature continuous-wave (CW) lasing near 1550 nm had been achieved with a low threshold.

JWA2

Near-Field Property of the Plasmonic Optical Antennas, Hao Xie, Fanmin Kong, Kang Li; Shandong Univ., China. The electric field of nanoparticle optical antenna is studied by three-dimensional electromagnetic calculation. Huge electric field enhancement is excited at the gap and found to be dependent on gap size, length and radius.

JWA3

Out-Coupling Enhancement of OLEDs Using Organic Diffraction Gratings Placed on Top of ITO Electrode, Ji-Hyang Jang, Min-Cheol Oh; Pusan Natl. Univ., Republic of Korea. By incorporating diffraction grating structure in the middle of the OLED layers, the luminance efficiency is improved by 73%. The grating fabricated on the ITO is highly compatible with the conventional OLED fabrication process.

JWA4

Nonlinear Surface Plasmons in "Semiconductor THz Photonic Circuits" Using Ponderomotive Forces, Pavel Ginzburg, Alex Hayat, Nikolai Berkovitch, Meir Orenstein; Technion-Israel Inst. of Technology, Israel. Nonlinear propagation of THz surface plasmons on semiconductors, stemming from ponderomotive forces, may serve as important ingredient in active integrated THz photonics. High-power THz modes exhibit high order nonlinearity, "slow light," nonlinear cutoff, reduced wavelength.

JWA5

Surface Plasmon Resonance-Like Integrated Sensor at Terahertz Frequencies for Gaseous Analytes, Alireza Hassani, Maksim Skorobogatiy; École Polytechnique de Montréal, Canada. Plasmon-like excitation at the interface between highly porous fiber covered with a ferroelectric layer and gaseous analyte is demonstrated theoretically in terahertz regime. $1.3e-4$ RIU sensitivity to changes in the gaseous analyte refractive index is predicted.

JWA6

Spectral, Amplitude and Phase Sensitivity of a Plasmonic Gas Sensor in a Metallic Photonic Crystal Slab Geometry, Lina Shi, Andrei Kabashin, Maksim Skorobogatiy; École Polytechnique de Montréal, Canada. Using FDTD we investigate amplitude and phase reflective properties of a metallic photonic crystal gas sensor comprising a two-dimensional array of gold disks placed onto a thin gold film resting on a dielectric substrate.

JWA7

Effect of Rod Inaccuracy on Genetic-Algorithm-Designed C-Band Photonic-Crystal Waveguide Interleavers, Lorenzo Rosa, Kunimasa Saitoh, Kuniaki Kakiyama, Masanori Koshihara; Hokkaido Univ., Japan. We investigate the effect of construction inaccuracies on C-band photonic-crystal waveguide (PCW) interleavers with flattened pass-band, designed through the employment of single- and multi-objective genetic algorithm (GA) approaches.

JWA8

Multiplexed FBG Interrogation System on a Silicon Chip, Xuan Wang, Roberto R. Panepucci; Florida Intl. Univ., USA. We demonstrated a novel system based on integrated silicon thermo-optic tunable filter(s) for interrogating multiplexed FBG sensor array. The system is compact, low cost and with high resolution when multiplexed.

JWA9

All-Angle Negative Refraction for Blue Light with Nanophotonic Device Application, Monika Rajput, Ravindra Sinha, Swati Rawal; Delhi College of Engineering, Univ. of Delhi, India. All-angle negative refraction (AANR) for blue light is achieved in a new design of metallo-dielectric photonic crystal (MDPC) with its strong potential of nanophotonic device application in nano-technology and nano-optics.

JWA10

Modeling Femtosecond Phase Deviations by Nonlinear Gain Dynamics in Semiconductor Optical Amplifiers, Claudio Crognale, Antonella Di Giansante; TechnoLabs S.p.A., Italy. Extreme phase features of 100fs pump and probe optical pulses in a SOA have been numerically investigated taking into account the different impacts of the ultrafast nonlinear gain dynamics on the fields phase modulation.

JWA11

Optic Switching in Nonlinear Metal-Insulator-Metal Plasmonic Bragg Reflectors, Yu Liu, Jaeyoun Kim; Dept. of Electrical and Computer Engineering, Iowa State Univ., USA. We present several nonlinear $\lambda/4$ -shifted metal-insulator-metal Bragg reflectors. Optic switching and optical bistability in the proposed structures is investigated by Finite Difference Time Domain simulation. Our results show a feasible way for constructing optical switches.

JWA12

Optimizer Based on Parallel Computational Intelligence with Parallel FDTD and Application for Nanophotonic Design, Qian Wang¹, Seng Tiong Ho^{1,2}; ¹Data Storage Inst., Agency for Science, Technology and Res., Singapore, ²Northwestern Univ., USA. Powerful and efficient optimizer is developed, which incorporates parallel particle swarm optimization with parallel FDTD. It reduces the optimization time significantly as comparing to conventional approaches. This optimizer is introduced and demonstrated for nanophotonic design.

JWA13

Jitter-Free Nanospheres Optical Disk Storage with Buffer Ring, Chikara Egami, Naoto Nishimura, Satoshi Ota; Shizuoka Univ., Japan. An optical disk storage composed of nanospheres with buffer rings is proposed for high density recording without jitter. Nonlinear organic dyes were doped in the nanospheres as recordable bits. A new process has been devised.

JWA14–JWA25 can be found in the Nonlinear Optics (NLO) abstracts.

JWA26–JWA29 can be found in the Slow and Fast Light (SL) abstracts.

IWB • Resonator Circuits and their Applications

Tapu III

11:30 a.m.–1:30 p.m.

Dan-Xia Xu; Natl. Res. Council Canada, Canada, Presider

IWB1 • 11:30 a.m.

Invited

Microring Resonator and its Application to Hitless Wavelength Selective Switch Circuits, Yasuo Kokubun; Yokohama Natl. Univ., Japan. The recent progress in the microring resonator filters using high index contrast (HIC) optical waveguides is reviewed and its application to the hitless wavelength selective switch achieved by the author's group is mainly described.

IWB2 • 12:00 p.m.

Novel Fabrication of Sub-Wavelength High Aspect Ratio Metal/Dielectric Gratings on InP Semiconductor Platforms, Erica Lively, Jonathon S. Barton, Daniel J. Blumenthal; Univ. of California at Santa Barbara, USA. We demonstrate the first reported fabrication of metal gratings using inverse dielectric patterning with greater than 3:1 aspect ratio. The fabrication method, grating pitch measurements, and potential to realize theoretically predicted devices are discussed.

IWB3 • 12:15 p.m.

Silicon Photonic Guided Mode Resonance Filter for Evanescent Field Molecular Sensing, Jens H. Schmid, William Sinclair, Siegfried Janz, Jean Lapointe, Daniel Poitras, Trevor Mischki, Gregory Lopinski, Philip Waldron, Pavel Cheben, André Delâge, Adam Densmore, Dan-Xia Xu; Natl. Res. Council Canada, Canada. We present experimental and theoretical results of label-free molecular sensing with the TM mode of a 0.22 μm thick silicon slab waveguide used in a guided mode resonance configuration.

IWB4 • 12:30 p.m.

Cavity-Enhanced Photosensitivity in Chalcogenide Glass, Juejun Hu¹, Anu Agarwal¹, Lionel C. Kimerling¹, Matteo Torregiani², Francesco Morichetti², Andrea Melloni², Nathan Carlie³, Laetitia Petit³, Kathleen Richardson³; ¹MIT, USA, ²Politecnico di Milano, Italy, ³Clemson Univ., USA. Cavity-enhanced photosensitivity of As₂S₃ chalcogenide glass films is measured using planar micro-disk resonators. We observed infrared index trimming by 1550 nm wavelength light, cavity instability and confirmed the absence of two photon absorption.

IWB5 • 12:45 p.m.

Ge_{11.5}As₂₄Se_{64.5} Glass: A New Material for the Fabrication of Highly Nonlinear ($\gamma \approx 33,000\text{W}^{-1}\text{km}^{-1}$) Dispersion Engineered Waveguides, Barry Luther-Davies, Amrita Prasad, Xin Gai, Khu Vu, Steven Madden, Duk-Yong Choi, Douglas Bulla, Rongping Wang; Ctr. for Ultrahigh Bandwidth Devices for Optical Systems, Australian Natl. Univ., Australia. We report the properties of a Ge_{11.5}As₂₄Se_{64.5} chalcogenide glass and demonstrate that dispersion-engineered rib waveguides can be fabricated in this material with nonlinear parameters $>30,000\text{W}^{-1}\text{km}^{-1}$: the highest value yet reported for a glass planar waveguide.

IWB6 • 1:00 p.m.

Active Guided-Mode Resonant Subwavelength Gratings, David W. Peters¹, Aaron V. Gin¹, Shanalyn A. Kemme¹, Jon F. Ihlefeld¹, Ronald D. Briggs¹, Joel R. Wendt¹, Tony R. Carter², Sally Samora²; ¹Sandia Natl. Labs, USA, ²Sandia Staffing Alliance, USA. We design and fabricate guided-mode resonant subwavelength gratings using an active layer of barium titanate. Loss mechanisms in the metal and in the guiding layer are investigated. Modeling and experimental results are shown.

IWB7 • 1:15 p.m.

Liquid Crystal Photonic Bandgap Fiber Based Compact Electrically Tunable Long Period Grating Device, Lei Wei¹, Thomas Tanggaard Alkeskjold², Anders Bjarklev¹; ¹DTU Fotonik, Dept. of Photonics Engineering, Technical Univ. of Denmark, Denmark, ²Crystal Fibre A/S, Denmark, Denmark. We demonstrate a compact electrically tunable long period grating device based on a photonic crystal fiber infiltrated with a nematic liquid crystal. The spectral loss dips are tuned electrically and show strong polarization dependence.

1:30 p.m.–2:30 p.m.

Lunch (on your own)

IWC • Modeling and Simulation III

Tapa I

2:30 p.m.–4:30 p.m.

Vien Van; Univ. of Alberta, Canada, *Presider*

IWC1 • 2:30 p.m.

Analysis of THz Antiresonant Reflecting Tube Waveguides, Chih-Hsien Lai^{1,2}, Chi-Kuang Sun¹, Hung-chun Chang¹; ¹Natl. Taiwan Univ., Taiwan, ²Hwa Hsia Inst. of Technology, Taiwan. Modal patterns, modal indices, and attenuation constants of the air-core THz tube waveguides are numerically investigated. Analysis of results confirms that guiding mechanism of the leaky core modes is that of the antiresonant reflecting guiding.

IWC2 • 2:45 p.m.

A Full-Vectorial Finite-Difference Eigenmode Solver for Anisotropic Optical Waveguides with Arbitrary Permittivity Tensor, Ming-Yun Chen, Hung-chun Chang; Natl. Taiwan Univ., Taiwan. A finite-difference frequency-domain (FDFD) method based full-vectorial eigenmode solver is developed for analyzing anisotropic optical waveguides with arbitrary permittivity tensor. Guided modes on liquid-crystal-filled optical waveguides with different liquid-crystal molecular orientations are solved and discussed.

IWC3 • 3:00 p.m.

The Effect of Choosing PML Reflection-Coefficient Value on Numerical Accuracy in the Pseudospectral Leaky Waveguide Mode Solver, Po-Jui Chiang¹, Nai-Hsiang Sun², Hung-chun Chang³; ¹Natl. Kaohsiung Univ. of Applied Sciences, Taiwan, ²I-Shou Univ., Taiwan, ³Natl. Taiwan Univ., Taiwan. It is shown that suitable choice of the reflection-coefficient value of uniaxial perfectly matched layers is essential for achieving high-accuracy analysis of leaky waveguide modes using the full-vectorial multidomain pseudospectral mode solver.

IWD • 3-D Photonic Crystals, Novel Fabrication Techniques

Tapa II

2:30 p.m.–4:30 p.m.

Richard De La Rue; Univ. of Glasgow, UK, *Presider*

IWD1 • 2:30 p.m.

Invited

Coupling of Quantum Dots in 3-D Photonic Crystals, Kanna Aoki; Metamaterials Lab, RIKEN, Japan. Coupling of electrons and photons in a three dimensionally confined system was experimentally demonstrated with quantum dots embedded in a point defect cavity of a three dimensional photonic crystal.

IWD2 • 3:00 p.m.

Engineering Quantum Dot Surfaces in Solution-Processed Optoelectronics: Chemical Optimization of Photodetector and Photovoltaic Device Performance, Aaron R. Barkhouse, Jason P. Clifford, Andras G. Pattantyus-Abraham, Larissa Levina, Edward H. Sargent; Univ. of Toronto, Canada. We report that spin-cast colloidal quantum dot devices depend sensitively on exquisite control over surface passivation. We use these findings to quadruple infrared photovoltaic efficiency and build the first megahertz-frequency solution-cast photodiode.

IWC • Modeling and Simulation III (continued)

IWC4 • 3:15 p.m.

Effect of Nonlinear Phase on the Passive Phase Locking of an Array of Fiber Lasers of Random Lengths, Erik J. Bochove; AFRL, Kirtland Air Force Base, USA. We find support for the idea that the nonlinear phase shift can force the spontaneous locking of the output of an array of fiber lasers or regenerative amplifiers with random length differences.

IWC5 • 3:30 p.m.

Temperature Stability of a CMOS-Compatible Single-Arm Microring Optical Filter with MOS Cross-Section, Chih T'sung Shih, Zei Wei Zeng, Shihuh Chao; Natl. Tsing Hua Univ., Taiwan. We introduce the numerical analysis of the temperature stability of a single-arm microring that has a MOS rib-waveguide cross-section with 25.5 μm outer radius. The temperature coefficient of the resonant wavelength was found to be 0.088nm/ $^{\circ}\text{C}$.

IWC6 • 3:45 p.m.

Analysis of Enhanced Transmission through an Annular Slit Surrounded by Periodic Grooves, Junji Yamauchi, Bungo Murakami, Tatsuya Iguchi, Hisamatsu Nakano; Hosei Univ., Japan. The body-of-revolution finite-difference time-domain method is employed to analyze the transmission through an annular slit surrounded by periodic grooves in a silver film. A Bragg reflector is added at the outermost circumference.

IWC7 • 4:00 p.m.

Chebyshev Collocation Dirichlet-to-Neumann Map Method for Diffraction Gratings, Dawei Song^{1,2}, Ya Yan Lu²; ¹Univ. of Science and Technology of China, China, ²City Univ. of Hong Kong, Hong Kong. An efficient method for diffraction gratings is developed based on Dirichlet-to-Neumann (DtN) maps. A Chebyshev collocation method is used with a compact fourth order finite difference scheme to calculate DtN map efficiently.

IWC8 • 4:15 p.m.

Plasmonic Waveguide Resonators Based on Hexagonal Structures, Z. H. Han^{1,2}, E. Y. B. Pun¹, S. He^{2,3}; ¹City Univ. of Hong Kong, Hong Kong, ²Zhejiang Univ., China, ³Royal Inst. of Technology, Sweden. Hexagonal plasmonic waveguide resonators have been proposed and studied using finite difference time domain method. Numerical simulations show that these resonators exhibit unique subwavelength characteristics and added flexibilities compared to rectangular plasmonic resonators.

Palace Lounge

7:30 p.m.–9:00 p.m.

Registration Open

IWD • 3-D Photonic Crystals, Novel Fabrication Techniques (continued)

IWD3 • 3:15 p.m.

Fabrication of Large Area "Woodpile" Photonic Crystal Structures for Near IR, Neilanjan Dutta¹, Peng Yao¹, Shouyan Shi¹, Ahmed Sharkawy², Ozgenc Ebil², Eric Kelmelis², Dennis W. Prather¹; ¹Univ. of Delaware, USA, ²EM Photonics Inc., USA. We have fabricated large area 3-D polymer photonic crystals by modifying planar lithography to achieve exposure confinement and multiple resist application. This fabrication process allows arbitrary defect introduction and is suitable for batch fabrication.

IWD4 • 3:30 p.m.

Efficient Spin Filter Based on Non-Magnetic Semiconductor GaNAs, X. J. Wang¹, I. A. Buyanova¹, F. Zhao², D. Lagarde², A. Balocchi², Z. Marie², C. W. Tu³, J. C. Harmand⁴, Weimin M. Chen¹; ¹Linköping Univ., Sweden, ²Univ. de Toulouse, France, ³Univ. of California at La Jolla, USA, ⁴Lab de Photonique et Nanostructures, France. We provide experimental demonstration of a novel defect-engineered, efficient and switchable spin filter from GaNAs to generate, amplify and detect electron spin polarization at room temperature without a magnetic material or external magnetic fields.

IWD5 • 3:45 p.m.

Holographic Realization of Two-Dimensional Photonic Crystal Structures on Silicon Substrates, Yung-Jr. Hung, San-Liang Lee, Yen-Ting Pan; Dept. of Electronic Engineering, Natl. Taiwan Univ. of Science and Technology, Taiwan. We successfully realize submicron-scale photonic crystals on silicon substrates with good quality by laser holography technique. The use of antireflection layers is crucial for realizing submicron photonic crystals with good uniformity over a large area.

IWD6 • 4:00 p.m.

Slot Waveguides with a Flattened Near-Zero Dispersion and a Small Effective Mode Area, Lin Zhang¹, Yang Yue¹, Yinying Xiao-Li¹, Ray G. Beausoleil², Alan E. Willner¹; ¹Dept. of Electrical Engineering, Univ. of Southern California, USA, ²HP Labs, USA. We propose a dispersion-flattened silicon slot waveguide for on-chip nonlinear applications, which exhibits a flat near-zero dispersion within ± 150 ps/nm/km over a 244-nm wavelength bandwidth. Its effective mode area is as small as 0.04 μm^2 .

IWD7 • 4:15 p.m.

Tailoring the Filter Response of 2-D Photonic Crystal Microcavity Filters Embedded in Ridge Waveguides, Aju S. Jugessur, James Dou, J. Stewart Aitchison; ECTI, Faculty of Applied Science and Engineering, Univ. of Toronto, Canada. 2-D photonic crystal microcavity filters have been fabricated using electron-beam lithography and reactive ion etching. The size and shape variation of the holes in such devices provide effective techniques to tailor the filter response.

Key to Authors and Presidents
(**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
Borisкина, 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**
Budunoğlu, 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, Shiuh—**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
 Cojocarua, 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
 Eftekhari, 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**
Florjańczyk, 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
Gaṭ, 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
Giniūnas, 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-Herraez, 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, Rumen—**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**
 Kahihara, 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**
 Khorshidahmad, 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**
 Kir'yakov, 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, Masa-aki—**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**
 Krolikowski, Wieslaw—**NWA6**
 Ku, Zahun—**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
 Lončar, 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
 Mašanović, 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
 Marcinkevičius, 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
 Misse, 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**

Pattantus-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**
 Şenel, Çağrı—**NWD5**
 Sennaroglu, Alphan—**JWA28**
 Sensarn, S.—**NWE4**
 Settersten, Thomas B.—**NFB1**
 Setzpfandt, Frank—**NMB6, NMD2**
 Shah Hosseini, Ehsan—**IMD2**
 Shahriar, 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**
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Integrated Photonics and Nanophotonics Research and Applications (IPNRA)/ Nonlinear Optics (NLO)/Slow and Fast Light (SL) Postdeadline Paper Abstracts

• Monday, July 13, 2009 •

NMD • Photonic Crystals and Periodic Nanomaterials

Tapa I

2:00 p.m.–4:00 p.m.

Steve Blair; Univ. of Utah, USA, *Presider*

PDNMD1 • 2:00 p.m.

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

• Tuesday, July 14, 2009 •

NTuA • Entanglement, Squeezing and Quantum Memories

Tapa I

8:00 a.m.–10:00 a.m.

Akira Furusawa; Univ. of Tokyo, Japan, *Presider*

PDNTuA2 • 8:30 a.m.

Experimental Realization of a Multi-Player Quantum Game, Joseph B. 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 Tilborg¹, 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 Sibilgia; 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 Photo-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 Gai², 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, Yongsoo 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, Swapnajit 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 20 μ m and consumes only 25fJ/bit energy.

PDPC5 • 6:00 p.m.

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

• Wednesday, July 15, 2009 •

JWA • Joint Poster Session II

Palace Lounge

10:00 a.m.–11:30 a.m.

PDJWA30

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

PDJWA31

Laser Induced Absorption Spectra Properties of Ethyl Red Doped Film and Its Applications for Optical Switch Based Two Beams Mutual Modulation, Zhaofeng Hao^{1,2}, Wenqiang 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

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

Key to Authors and Presiders

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

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Allison, Tom—PDPA4
Altepetter, Joseph B.—PDNTuA2

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Baek, Yongsoon—PDPC3
Bakhtiari, Zahra—PDPA3
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Xu, Tingjun—PDNMD1

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Yang, Jeng-Yuan—PDPA1
Ye, Zhihong—PDPB2
Yee, Dae-Su—PDPC3
Yilmaz, Omer F.—PDPA1, **PDPA3**
Yokoyama, Hiroyuki—PDPB3
Young, Linda—PDPA4
Young, Ralph W.—PDPC5
Yue, Yang—PDPA1

Z

Zadok, Avi—PDPC1
Zeringue, Clint—PDPA2
Zhang, Chunping—**PDJWA31**
Zhang, Liming—**PDPC**
Zhang, Lin—**PDPA1**, PDPA3
Zilka, Elad—PDPC1
Zortman, William A.—PDPC5

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

Withdrawals:

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

Presentation Updates:

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

Correction to Program:

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

An author was omitted from **IWD3, Fabrication of Large Area "Woodpile" Photonic Crystal Structures for Near IR**. The corrected author block is as follows: *Neilanjan Dutta¹, Peng Yao¹, Shouyuan Shi¹, Ahmed Sharkawy², Ozgenc Ebil², Eric Kelmelis², Dennis W. Prather¹, Elton Marchena¹; ¹Univ. of Delaware, USA, ²EM Photonics Inc., USA.*

Presider Updates:

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

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

Presenter Changes:

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

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

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

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

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

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

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

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

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