CLEO/QELS 2008

Bringing Together the World's Foremost Optics and Photonics Leaders

Technical Conference: May 4-9, 2008

San Jose Convention Center, San Jose, California, USA

The Conference on Lasers and Electro-Optics (CLEO), the Quantum Electronics and Laser Science Conference (QELS) and the Conference on Photonic Applications, Systems and Technologies (*PhAST*) are truly the premier international events for optics and photonics. With nearly 5,500 attendees from 43 different countries at the 2008 conferences, they are the leading technical and business forums for those in the field. In addition, approximately two-thirds of paper submissions came from outside the U.S., and the exhibition—with more than 25 percent of participating companies coming from outside the U.S.—showcased the newest products from the global optics community.

CLEO/QELS and *PhAST* cover the entire field of optics and photonics—from the technologies of the future to today's applications. This year we had a vibrant conference and exhibition, including more than 350 participating companies, a record-breaking 2,342 paper submissions and 247 sessions. The conferences and exposition showcased the most exciting new developments in lasers and electro-optics.

Following such a strong year this year, the 2009 show will only get better, especially with the launch of PhotonXpo, providing the show floor with a brand new identity which reflects its true scope and emphasizes the commercial applications of today's leading technologies. We look forward to seeing you at the 2009 event from May 31 to June 5 in Baltimore, Maryland, USA.

Conference Program

CLEO/QELS features industry leaders in the fields of lasers, optical devices, optical fibers, photonics and innovative approaches in such fields as: laser spectroscopy, maser, nonlinear optics, optical detectors, optical modulators, optical pulses and quantum mechanics.

CLEO/QELS Abstracts

Monday, May 5, 2008

Agenda of Sessions and Key to Authors and Presiders

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CLEO 2: Solid-State Lasers
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CLEO 3: Semiconductor Lasers
A. Catrina Bryce, *Univ. of Glasgow, UK,* Chair
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Igor Vurgaftman, *NRL, USA*

CLEO 4: Applications of Nonlinear Optics
Vladimir Shkunov, *Raytheon Corp., USA,* Chair
Jean-Claude Diels, *Univ. of New Mexico, USA*
Jason Fleischer, *Princeton Univ., USA*
Peter Gunter, *Inst. of Quantum Electronics Nonlinear Optics Lab, Switzerland*
Bahram Jalali, *Univ. of California at Los Angeles, USA*
Narasimha S. Prasad, *Nasa Langley Res. Ctr., USA*
George Stegeman, *College of Optics and Photonics/CREOL, USA*
Takunori Taira, *Laser Res. Ctr. for Molecular Science, Japan*
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Majid Ebrahim-Zadeh, *ICFO-Inst. of Photonic Sciences, Spain*

CLEO 5: Terahertz Technologies and Applications
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CLEO 8: Ultrafast Optics, Optoelectronics & Applications
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CLEO 12: Lightwave Communications and Networks
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CLEO 16: Micro- & Nano-Photonics
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QELS 3: Fundamentals of Metamaterials, Periodic and Random Media
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QELS 4: Optical Interactions with Condensed Matter and Ultrafast Phenomena
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QELS 5: Nonlinear Optics and Novel Phenomena
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Koichi Yamakawa, *Japan Atomic Energy Agency, Japan*
Jonathan Zuegel, *Univ. of Rochester, USA*

Invited Speakers

CLEO Invited Speakers

CLEO 01: Laser Processing and Optical Instrumentation

CMF1, **Coherent Phonon Excitation and Manipulation in Bismuth Using Temporally Shaped Ultrafast Pulses,** *Alexander Q. Wu, Xianfan Xu, Andrew M. Weiner; Purdue Univ., USA.*

CMX1, **Laser Precision Engineering: From Microprocessing to Nanofabrication,** *Ming Hui Hong, Z. Q. Huang, Y. Lin, J. Yun, L. S. Tan, L. P. Shi, T. C. Chong; Data Storage Inst., Agency for Science, Technology and Res. and Dept. of Electrical and Computer Engineering, Natl. Univ. of Singapore, Singapore.*

CLEO 02: Solid-State Lasers

CTuKK3, **Dy^{3+} and Pr^{3+} Doped Crystals for Mid-IR Lasers,** *Andrey G. Okhrimchuk; Fiber Optics Res. Ctr., Russian Acad. of Sciences, Russian Federation.*

CFJ6, **Low Wavelength Emissions with Nd Doped Lasers,** *Marc Castaing[1,2], Emilie Herault[1], François Balembois[1], Patrick Georges[1]; [1]Lab Charles Fabry de l'Inst. d'Optique, Ctr. Natl. de la Recherche Scientifique, Univ. Paris-Sud, France, [2]Oxxius SA, France.*

CFW1, **Recent Advances in Cr^{2+} and Fe^{2+} Doped Mid-IR Laser Materials,** *Sergey B. Mirov; Univ. of Alabama at Birmingham, USA.*

CLEO 03: Semiconductor Lasers

CMI3, **GaN Photonic-Crystal Surface-Emitting Laser Operating at Blue-Violet Wavelengths,** Susumu Yoshimoto, Hideki Matsubara, Hirohisa Saito, Yue Jianglin, Yoshinori Tanaka, Susumu Noda; Kyoto Univ., Japan.

CMGG4, **Threshold Current Reduction and Electrical Modulation of Degree of Circular Polarization in InAs/GaAs Quantum Dot Spin-VCSELs,** Debashish Basu, Chung Chiang Wu, Dipankar Saha, Zetian Mi, Pallab Bhattacharya; Univ. of Michigan, USA.

CTuF4, **Short Wavelength Quantum Cascade Lasers Emitting around 3µm,** Roland Teissier, Jan Devenson, Olivier Cathabard, Alexei N. Baranov; Univ. Montpellier, France.

CTuJJ1, **Room Temperature Polariton Lasing and BEC in Semiconductor Microcavities,** *Jeremy J. Baumberg[1], S. Christopoulos[1], G. Baldassarri Höger von Högersthal[2], A. Grundy[2], P. G. Lagoudakis[2], A. Kavokin2, G. Christmann3, R. Butté3, E. Feltin3, J. F. Carlin3, N. Grandjean3, Dmitry Solnyshkov4, G. Malpuech4; 1Dept. of Physics, Univ. of Cambridge, UK, [2]Dept. of Physics and Astronomy, Univ. of Southampton, UK, [3]Ecole Polytechnique Fédérale de*

Lausanne, Inst. for Quantum Electronics and Photonics, Switzerland, [4]Lab des Sciences et Matériaux pour l'Electronique, et d'Automatique, Ctr. Natl. de la Recherche Scientifique, Univ. Blaise Pascal, France.

CThY1, **Lasers with Nanopatterned Active Regions,** *James J. Coleman; Univ. of Illinois, USA.*

CLEO 04: Applications of Nonlinear Optics

CTuO3, **Double Optical Gating of High Harmonic Generation,** *Hiroki Mashiko, Steve Gilbertson, Chengquan Li, Sabih Khan, Mahendra Shakya, Eric Moon, Zenghu Chang; Kansas State Univ., USA.*

CWC4, **Ultrafast Carrier Dynamics in Semiconductor Nanowires,** *Rohit P. Prasankumar[1], S. G. Choi[1], G. T. Wang[2], S. T. Picraux[1], A. J. Taylor[1]; [1]Los Alamos Natl. Lab, USA, [2]Sandia Natl. Labs, USA.*

CWK6, **Spatial Phase Shaping in Nonlinear Microscopy,** *Eric Olaf Potma; Univ. of California at Irvine, USA.*

CThX1, **All-Optical Quasi-Phase Matching Techniuqes in High-Harmonic Generation,** *Oren Cohen, Amy L. Lytle, Tenio Popmintchev, Henry Kapteyn, Margaret M. Murnane; JILA and Univ. of Colorado, USA.*

CFR2, **Nonlinear Optical Limits to Power in Fiber Amplifiers,** *A. V. Smith[1], G. R. Hadley[1], R. L. Farrow[1], B. T. Do[2]; [1]Sandia Natl. Labs, USA, [2]Ball Aerospace, USA.*

CLEO 05: Terahertz Technologies and Applications

CMFF1, **Terahertz Semiconductor Gain Medium: Static Properties and Dynamic Behavior,** *Juraj Darmo[1], J. Kröll[1], M. Martl[1], D. Dietze[1], S. Barbieri[2], C. Sirtori[2], K. Unterrainer[1]; [1]Photonics Inst., Vienna Univ. of Technology, Austria, [2]Materiaux at Phénemenes Quantiques Lab, Univ. Paris, Austria.*

CTuX1, **Terahertz Detectors and Emitters Based on Plasma Wave Oscillations in Nanometer Gate Length Transistors,** *Wojciech Knap[1,2]; [1]Tohoku Univ., Japan, [2]Ctr. Natl. de la Recherche Scientifique, Univ. Montpellier, France.*

CFV3, **Intense THz Supercontinuum Generation in Femtosecond Laser-Gas Interactions,** *Ki-Yong Kim, Antoinette J. Taylor, George Rodriguez; Los Alamos Natl. Lab, USA.*

CFZ1, **Terahertz-Field-Induced Carrier-Wave Rabi Oscillations in n-Type GaAs,** *Peter Gaal[1], Wilhelm Kuehn[1], Klaus Reimann[1], Michael Woerner[1], Thomas Elsaesser[1], Rudolf Hey[2]; [1]Max-Born-Inst. für Nichtlineare Optik und Kurzzeitspektroskopie, Germany, [2]Paul-Drude-Inst. für Festkörperelektronik, Germany.*

CFZ4, **High-Power THz Generation, THz Nonlinear Optics and THz Nonlinear Spectroscopy,** *János Hebling[1,2], Ka-Lo Yeh[1], Matthias C. Hoffmann[1], Keith A. Nelson[1]; [1]MIT, USA, [2]Dept. of Experimental Physics, Univ. of Pécs, Hungary.*

CLEO 06: Optical Materials, Fabrication and Characterization

CFN1, **Photonic Crystal Optofluidics for High Throughput Biosensing,** *Charles J. Choi, Brian T. Cunningham; Univ. of Illinois at Urbana-Champaign, USA.*

CFY3, **Templated Self-Assembly and Nano-Plasmonics of Nano-Void Surfaces,** *Bruno F. Soares[1], Robin M. Cole[1], Jeremy J. Baumberg[1], F. J. Garcia de Abajo[2], Sumeet Mahajan[3], Philip N. Bartlett[3]; [1]NanoPhotonics Ctr., Cambridge Univ., UK, [2]Inst. de Optica, CSIC, Spain, [3]School of Chemistry, Univ. of Southampton, UK.*

CThS3, **Single Quantum Dot Spectroscopy in a Cavity,** *Galina Khitrova; Univ. of Arizona, USA.*

CTuS5, **Electro-Optical Microring Resonators in Epitaxial Crystalline Organic and Ion Sliced Inorganic Materials,** *Peter Günter, Andrea Guarino, Gorazd Poberaj, Harry Figi, Daniele Rezzonico, Manuel Koechlin, Mojca Jazbinsek; Inst. of Quantum Electronics, Eidgenössische Technische Zurich, Switzerland.*

CWO1, **Fabrication of Tailored Photonic Crystals Using Multiphoton Lithography,** *Joseph Perry[1], Vincent W. Chen[1], Wenting Dong[1], Yadong Zhang[2], Kelly J. Perry[2]; [1]Georgia Tech, USA, [2]Focal Point Microsystems, USA.*

CLEO/QELS 07: CLEO/QELS Joint Subcommittee on High-Field Physics and High-Intensity Lasers

JWB4, **High Order Harmonic Generation in High Intensity Laser-Solid Interactions,** *Fabien Quéré[1], C. Thaury[1], H. George[1], J. P. Geindre[2], A. Lévy[1], T. Ceccotti[1], P. Monot[1], R. Marjoribanks[3], P. Audebert[2], Ph. Martin[1]; [1]Commissariat à l'Energie Atomique, DSM/DRECAM, CEN Saclay, France, [2]Lab pour l'Utilisation des Lasers Intenses, Ctr. Natl. de la Recherche Scientifique, Ecole Polytechnique, France, [3]Dept. of Physics and Inst. for Optical Sciences, Univ. of Toronto, Canada.*

JThB1, **The OMEGA EP High-Energy, Short-Pulse Laser System,** *Leon J. Waxer, Mark J. Guardalben, John H. Kelly, Brian E. Kruschwitz, Jie Qiao, I. A. Begishev, J. Bromage, C. Dorrer, J. L. Edwards, L. Folnsbee, S. D. Jacobs, R. Jungquist, T. J. Kessler, R. W. Kidder, S. J. Loucks, J. R. Marciante, D. N. Maywar, R. L. McCrory, D. D. Meyerhofer, S. F. B. Morse, A. V. Okishev, J. B. Oliver, G. Pien, J. Puth, A. L. Rigatti; Lab for Laser Energetics, Univ. of Rochester, USA.*

JFB6, **1 GeV Electron Beams from a Laser-Driven Channel-Guided Accelerator,** *Csaba Toth, K. Nakamura, A. Gonsalves, D. Panasenko, N. Matlis, C. G. R. Geddes, C. B. Schroeder, E. Esarey, W. P. Leemans; Lawrence Berkeley Natl. Lab, USA.*

JFF3, **Ultrafast Atomic and Molecular Dynamics with High-Order Harmonic Probes,** *Stephen R. Leone; Univ. of California at Berkeley, USA.*

CLEO 08: Ultrafast Optics, Optoelectronics and Applications

CMS4, ***In vivo* Cellular Level Imaging Using Nonlinear Optical Microendoscopy,** *Mark Schnitzer; Stanford Univ., USA.*

CTuA2, **Silicon-Chip-Based Single-Shot Ultrafast Optical Oscilloscope,** *Mark A. Foster, Reza Salem, David F. Geraghty, Amy C. Turner, Michal Lipson, Alexander L. Gaeta; Cornell Univ., USA.*

CTuK1, **Ultrafast Fiber Amplifier Systems: Status, Perspectives and Applications,** *Andreas Tünnermann[1,2], Jens Limpert[1,2], Stefan Nolte[1,2]; [1]Inst. of Applied Physics, Friedrich-Schiller-Univ. Jena, Germany, [2]Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany.*

CWA6, **Nanoscale Heat Transport Probed with Soft-X-Rays,** *Mark Siemens[1], Qing Li[2], Margaret Murnane[2], Henry Kapteyn[2], Ronggui Yang[2], Keith Nelson[3]; [1]JILA, USA, [2]Univ. of Colorado, USA, [3]MIT, USA.*

CThK1, **Visualizing Ultrafast Nonlinear Dynamics with X-FROG,** *Anatoly Efimov; Los Alamos Natl. Lab, USA.*

CFI4, **Attosecond-Resolution Timing Jitter Characterization of Free-Running Mode-Locked Lasers,** *Jungwon Kim, Jeff Chen, Jonathan Cox, Franz X. Käertner; MIT, USA.*

CLEO 09: Components, Integration, Interconnects and Signal Processing

CMG3, **Optical Signal Processing Using InP-Based Quantum-Dot Semiconductor Mode-Locked Lasers,** *Guang-Hua Duan; Alcatel Thales III-V Lab, France.*

CMP5, **Advances in Microwave Photonic Devices,** *Masayuki Izutsu; Natl. Inst. of Information and Communication Technology, Japan.*

CTuH5, **High-Speed Switching of a 1.55-µm Symmetric SEED,** *Gordon A. Keeler, Darwin K. Serkland, Alan Y. Hsu, Kent M. Geib, Mark E. Overberg, John F. Klem; Sandia Natl. Labs, USA.*

CTuBB2, **Large-Scale High-Index-Contrast Planar Lightwave Circuits,** *Brent Little, Sai Chu, Wei Chen, John Hryniewicz, Fred Johnson, Wenlu Chen, Dave Gill, Oliver King, Roy Davidson, Kevin Donovan, John Gibson; Infinera Corp., USA.*

CWF1, **Geiger-Mode Avalanche Photodiode Arrays for Near-Infrared Single-Photon Detection,** *Alex McIntosh; MIT Lincoln Lab, USA.*

CLEO 10: Medical and Biological Applications

CThG1, **Photoacoustic Tomography,** *Lihong V. Wang; Washington Univ. at St. Louis, USA.*

CThG2, **Quantitative Blood Flow Measurements with Multi-Exposure Speckle Contrast Imaging,** *Andrew K. Dunn, Ashwin B. Parthasarathy; Univ. of Texas at Austin, USA.*

CFE1, **High-Throughput *in vivo* Genetic and Drug Screening Using Femtosecond Laser Microsurgery and Microfluidics,** *Christopher B. Rohde, Fei Zeng, Coddy Gilleland, Ricardo Gonzalez-Rubio, Matthew Angel, Mehmet F. Yanik; MIT, USA.*

CFT1, **Dual-Color Superresolution Imaging Using Genetically Expressed Probes,** *Hari Shroff[1], Catherine G. Galbraith[2], James A. Galbraith[2], Helen White[1], Jennifer Gillette[2], Scott Olenych[3], Michael W. Davidson[3], Eric Betzig[1]; [1]Howard Hughes Medical Inst., USA, [2]NIH, USA, [3]Florida State Univ., USA.*

CLEO 11: Fiber and Guided-Wave Amplifiers, Lasers and Devices

CMB1, **Effectively Single-Mode Large Core Passive and Active Fibers with Chirally Coupled-Core Structures,** *Almantas Galvanauskas, M. Craig Swan, Chi-Hung Liu; Univ. of Michigan, USA.*

CMT1, **Fiber Networks for Ultrastable Frequency Standards and Timing Distribution,** *Seth M. Foreman; Stanford Univ., USA.*

CFL3, **Bi2O3-Based Fiber for Highly Nonlinear Applications,** *Naoki Sugimoto, Tatsuo Nagashima, Tomoharu Hasegawa, Seiki Ohara; Asahi Glass Co. Ltd., Japan.*

CLEO 12: Lightwave Communications and Networks

CWN1, **Optical OFDM,** *Arthur J. Lowery; Monash Univ., Australia.*

CThJJ4, **Intradyne Receivers Using FPGA Processing,** *Andreas Leven, Noriaki Kaneda, Young-Kai Chen; Bell Labs, Alcatel-Lucent, USA.*

CThR4, **Fiber-Wireless Networks and Radio-over-Fibre Techniques,** *Ken-ichi Kitayama[1], Toshiaki Kuri[2], J. J. Vegas Olmos[1], Hiroyuki Toda[3]; [1]Osaka Univ., Japan, [2]Natl. Inst. of Information and Communications Technology, Japan, [3]Doshisha Univ., Japan.*

CLEO 13: Active Optical Sensing

CMH3, **Frequency Combs and Hyperspectral Sources for Absorption Spectroscopy,** *Scott Sanders; Univ. of Wisconsin, USA.*

CMQ5, **Laser-Induced Breakdown Spectroscopy (LIBS) for Aerosol Analysis,** *David Hahn, Prasoon K. Diwakar, Philip B. Jackson; Univ. of Florida, USA.*

CLEO 14: Optical Metrology

CML3, **Fiber Length Stabilization System for Long-Baseline Phased-Array Radio Telescopes (ALMA),** *Mitsuru Musha[1], Ken'-ichi Nakagawa[1], Ken'-ichi Ueda[1], Masato Ishiguro[2], Akitoshi Ueda[2]; [1]Univ. of Electro-Communications, Japan, [2]Natl. Astronomical Observatory of Japan, Japan.*

CTuM1, **Going Optical: Clocks and Combs in Space,** *Ronald Holzwarth; Menlo Systems GmbH, Germany.*

CTuM4, **Full Stabilization of a Frequency Comb Generated in a Monolithic Microcavity,** *Pascal Del'Haye, Olivier Arcizet, Albert Schliesser, Tobias Wilken, Ronald Holzwarth, Tobias J. Kippenberg; Max-Planck-Inst. for Quantum Optics, Germany.*

CLEO 15: Organic and Inorganic LEDs for Solid State Lighting and Displays

CMAA3, **The Origin of Efficiency Droop in GaN-Based Light-Emitting Diodes and Its Solution,** *Jong Kyu Kim[1], Min-Ho Kim[2], Martin F. Schubert[1], Qi Dai[3], Tan Sakong[2], Sukho Yoon[2], Cheolsoo Sone[2], Yongjo Park[2], Joachim Piprek[4], E. Fred Schubert[1,3]; [1]Electrical, Computer and Systems Engineering Dept., Rensselaer Polytechnic Inst., USA, [2]Central R&D Inst., Samsung Electro-Mechanics, Republic of Korea, [3]Dept. of Physics, Applied Physics and Astronomy, Rensselaer Polytechnic Inst., USA, [4]NUSOD Inst. LLC, USA.*

CMKK1, **OLEDs on Fibers and AFM Cantilevers,** *Max Shtein[1], Brendan O'Connor[2], Yiying Zhao[1], Kevin P. Pipe[2]; [1]Dept. of Materials Science and Engineering, Univ. of Michigan, USA, [2]Dept. of Mechanical Engineering, Univ. of Michigan, USA.*

CLEO 16: Micro- and Nano-Photonic Devices

CTuJ1, **Carrier Dynamics and Slow Light in Semiconductor Nanostructures,** *Jesper Moerk, Filip Öhman, Mike van der Poel, Yaohui Chen, Weiqi Xue, Per L. Hansen, Kresten Yvind; Dept. of Communications, Optics and Materials, Technical Univ. of Denmark, Denmark.*

CTuT1, **Tunable Superluminal Pulse Propagation on a Silicon Chip,** *Sasikanth Manipatruni, Po Dong, Qianfan Xu, Michal Lipson; Cornell Univ., USA.*

CWP1, **Polarization Manipulation Devices Based on Silicon Photonic Wire Waveguides and Their Practical Application,** *Koji Yamada, Hiroshi Fukuda, Tai Tsuchizawa, Toshifumi Watanabe, Hiroyuki Shinojima, Hidetaka Nishi, Sei-ichi Itabashi; NTT Microsystem Integration Labs, Japan.*

CThLL1, **Plasmonics-Based Design: Combining Surface-Enhanced Raman and IR Spectroscopies into the Same Structure,** *Naomi J. Halas; Rice Univ., USA.*

CFH1, **Photonic Components for Short Range Optical Interconnects,** *Bert J. Offrein; IBM Res. GmbH, Switzerland.*

QELS Invited Speakers

QELS 01: Quantum Optics of Atoms, Molecules and Solids

QTuB1, **Deterministic Cavity QED with Single Atoms,** *Soo Y. Kim, Michael J. Gibbons, Kevin M. Fortier, Peyman Ahmadi, Michael S. Chapman; Georgia Tech, USA.*

QFM5, **Correlations in Two-Mode Cavity QED,** *David G. Norris[1], Jietai Jing[1], Rebecca Olson Knell[1], Luis A. Orozco[1], Arturo Fernandez[2], James P. Clemens[3], Perry R. Rice[3]; [1]Joint Quantum Inst., Dept. of Physics, Univ. of Maryland, USA, [2]Ctr. de Optica e Informacion Cuantica, Dept. de Fisica, Univ. de Concepcion, Chile, [3]Dept. of Physics, Miami Univ., USA.*

QELS 02: Single and Entangled Photons and Quantum Information

QME1, **Photonic Quantum Computing: Shor's Algorithm and the Road to Fault-Tolerance,** *B. P. Lanyon, T. J. Weinhold, N. K. Langford, M. Barbieri, M. P. de Almeida, A. Gilchrist, D. F. V. James, Andrew G. White; Univ. of Queensland, Australia.*

QWE4, **Experimental Demonstration of Continuous Variable Entanglement Distillation,** *Ruifang Dong[1], Mikael Lassen[1,2], Christoph Marquardt[1], Radim Filip[1,3], Ulrik L. Andersen[1,2], Gerd Leuchs[1]; [1]Inst. for Optics, Information and Photonics, Univ. Erlangen-Nürnberg, Germany, [2]Technical Univ. of Denmark, Denmark, [3]Palacky Univ., Czech Republic.*

QThK4, **Entanglement-Free, Heisenberg-Limited Phase Measurement,** *Brendon L. Higgins[1], Howard M. Wiseman[1], Geoff J. Pryde[1], Dominic W. Berry[2], Stephen D. Bartlett[3]; [1]Griffith Univ., Australia, [2]Macquarie Univ., Australia, [3]Univ. of Sydney, Australia.*

QFI4, **Fiber-Based Two-Photon Sources for Quantum Information,** *Alan Migdall[1,2], Jingyun Fan[1,2]; [1]NIST, USA, [2]Joint Quantum Inst., Univ. of Maryland, USA.*

QELS 03: Fundamentals of Metamaterials, Periodic and Random Media

QMA1, **Engineering Optical Space with Metamaterials,** *Vladimir M. Shalaev[1], A. V. Kildishev[1], V. P. Drachev[1], W. Cai1, H. K. Yuan[1], U. Chettiar[1], A. V. Boltasseva[2]; [1]Purdue Univ., USA, [2]Technical Univ. of Denmark, Denmark.*

QMD1, **Nanoplasmonics: Subwavelength Waveguides, Resonators and Antennas,** *Sergey I. Bozhevolnyi; Aalborg Univ., Denmark.*

QMG1, **Three-Dimensional Metamaterials at Optical Frequencies,** *Na Liu[1], Liwei Fu[1], Hongcang Guo[1], Stafan Kaiser[2], Heinz Schweizer[1], Harald Giessen[1]; [1]4th Physikalisches Inst., Univ. of Stuttgart, Germany, [2]1st Physikalisches Inst., Univ. of Stuttgart, Germany.*

QFA1, **InAs/InP Quantum Dot Photonic Crystal Microcavities–A Scalable Route to Single and Entangled Pair Sources,** *Robin L. Williams[1,2], S. Frédérick[1,2], M. E. Reimer[1,2], P. Poole[1], G. Aers[1], D. Dalacu[1], M. Korkusinski[1], J. Lefebvre[1], J. Lapointe[1], W. R. McKinnon[1], P.*

Hawrylak[1,2]; [1]Inst. for Microstructural Sciences, Natl. Res. Council, Canada, [2]Dept. of Physics, Univ. of Ottawa, Canada.

QFD1, **Random Lasers,** *Allard P. Mosk; Univ. of Twente, Netherlands.*

QELS 04: Optical Interactions with Condensed Matter and Ultrafast Phenomena

QWC1, **Observation of Non Resonant Coupling of Single Quantum Dots to Photonic Crystal Nanocavity Modes,** *Michael Kaniber, Arne Laucht, Andre Naumann, Felix Hofbauer, Jakob Angele, Max Bichler, Markus C. Amann, Jonathan Finley; Walter Schottky Inst., Germany.*

QThC3, **Time Resolved Photoemission of Bi2Sr2CaCu2O8+δ,** *Luca Perfetti, P. A. Loukakos, M. Lisowski, U. Bovensiepen, M. Wolf; Freie Univ. Berlin, Germany.*

QFC3, **Coherent Zero-State and π-State in an Array of Exciton-Polariton Condensates,** *C. W. Lai[1,2], N. Y. Kim[1], S. Utsunomiya[2,3], G. Roumpos[1], Yoshihisa Yamamoto[1,2,3]; [1]E. L. Ginzton Lab, Stanford Univ., USA, [2]Natl. Inst. of Informatics, Japan, [3]NTT Basic Res. Labs, Japan.*

QFF3, **Factoring Numbers with Interfering Random Waves,** *Sébastien Weber, Beatrice Chatel, Bertrand Girard; Lab Collisions, Agrégats, Réactivité, CNRS, France.*

QFJ5, **Imaging Spin Injection and Spin Transport in Semiconductors,** *Scott A. Crooker[1], Darryl L. Smith[2], Chris J. Palmstrom[3], Paul A. Crowell[4]; [1]Natl. High Magnetic Field Lab, USA, [2]Los Alamos Natl. Lab, USA, [3]Dept. of Chemical Eningeering and Materials Science, Univ. of Minnesota, USA, [4]School of Physics and Astronomy, Univ. of Minnesota, USA.*

QELS 05: Nonlinear Optics and Novel Phenomena

QMC1, **Broadband Cascaded Four-Wave Mixing in High-Q Silica Microspheres,** *Imad H. Agha, Yoshitomo Okawachi, Alexander L. Gaeta; School of Applied and Engineering Physics, Cornell Univ., USA.*

QTuC3, **Quasi Phase Matching with Quasi-Periodic Poling,** *Ady Arie; Tel-Aviv Univ., Israel.*

QTuL5, **Nonlinearity in Chalcogenide Glasses and Fibers, and Their Applications,** *J. S. Sanghera, L. B. Shaw, C. M. Florea, P. Pureza, V. Q. Nguyen, D. Gibson, F. Kung, I. D. Aggarwal; NRL, USA.*

QWD3, **Parametric Origin of Optical Magnetism,** *Samuel L. Oliveira[1], William M. Fisher[2], Stephen C. Rand[2]; [1]Univ. of Michigan, USA, [2]Div. of Applied Physics, Univ. of Michigan, USA.*

QELS 06: Nano-Optics and Plasmonics

QTuA1, **Recent Progress in Plasmonics,** *Mark L. Brongersma; Geballe Lab for Advanced Materials, USA.*

QTuG3, **The Strength of Surface Plasmons,** *Maurizio Righin[1], Giovanni Volpe[1], Dmitri Petrov[1,2], Romain Quidant[1,2]; [1]Inst. de Ciencies Fotoniques (ICFO), Spain, [2]Inst. Catalana de Recerca i Estudis Avançat (ICREA), Spain.*

QWA1, **Plasmonics: Chip-Based Component Devices and Metamaterials,** *Harry A. Atwater; Caltech, USA.*

QWF5, **Carrier Multiplication in Nanocrystal Quantum Dots and Solar Energy Conversion,** *Victor I. Klimov; Los Alamos Natl. Lab, USA.*

QThD5, **Optical Transitions in Monolayer and Bilayer Graphene,** *Feng Wang[1], Yuanbo Zhang[1], Chuanshan Tian[1], Caglar Girit[1,2], Alex Zettl[1,2], Y. Ron Shen[1,2]; [1]Univ. of California at Berkeley, USA, [2]Lawrence Berkeley Natl. Lab, USA.*

QFK3, **Near-Field Mapping of Infrared Optical Antennas,** *Robert L. Olmon[1], Andrew Jones[1], Peter Krenz[2], Glenn Boreman[2], Markus B. Raschke[1]; [1]Univ. of Washington, USA, [2]CREOL, Univ. of Central Florida, USA.*

CLEO/QELS 07: CLEO/QELS Joint Subcommittee on High-Field Physics and High-Intensity Lasers

JWB4, **High Order Harmonic Generation in High Intensity Laser-Solid Interactions,** *Fabien Quéré[1], C. Thaury[1], H. George[1], J. P. Geindre[2], A. Lévy[1], T. Ceccotti[1], P. Monot[1], R. Marjoribanks[3], P. Audebert[2], Ph. Martin[1]; [1]Commissariat à l'Energie Atomique, DSM/DRECAM, CEN Saclay, France, [2]Lab pour l'Utilisation des Lasers Intenses, Ctr. Natl. de la Recherche Scientifique, Ecole Polytechnique, France, [3]Dept. of Physics and Inst. for Optical Sciences, Univ. of Toronto, Canada.*

JThB1, **The OMEGA EP High-Energy, Short-Pulse Laser System,** *Leon J. Waxer, Mark J. Guardalben, John H. Kelly, Brian E. Kruschwitz, Jie Qiao, I. A. Begishev, J. Bromage, C. Dorrer, J. L. Edwards, L. Folnsbee, S. D. Jacobs, R. Jungquist, T. J. Kessler, R. W. Kidder, S. J. Loucks, J. R. Marciante, D. N. Maywar, R. L. McCrory, D. D. Meyerhofer, S. F. B. Morse, A. V. Okishev, J. B. Oliver, G. Pien, J. Puth, A. L. Rigatti; Lab for Laser Energetics, Univ. of Rochester, USA.*

JFB6, **1 GeV Electron Beams from a Laser-Driven Channel-Guided Accelerator,** *Csaba Toth, K. Nakamura, A. Gonsalves, D. Panasenko, N. Matlis, C. G. R. Geddes, C. B. Schroeder, E. Esarey, W. P. Leemans; Lawrence Berkeley Natl. Lab, USA.*

JFF3, **Ultrafast Atomic and Molecular Dynamics with High-Order Harmonic Probes,** *Stephen R. Leone; Univ. of California at Berkeley, USA.*

CLEO Tutorials

CLEO 01: Laser Processing and Optical Instrumentation

CMHH1, **Femtosecond and Nanosecond Laser-Induced Nanoeffects for Cell Surgery and Modifications of Glass ,** *Alfred Vogel[1], Norbert Linz[1], Sebastian Freidank[1], Joachim Noack[1], Günther Paltauf[2]; [1]Inst. of Biomedical Optics, Univ. of Lübeck, Germany, [2]Physics Inst., Karl-Franzens-Univ. Graz, Austria.*

CLEO 02: Solid-State Lasers

CThW1, **Fundamental Mechanisms and Advances in Crystaline Up-Conversion Lasers,** *Ernst Heumann; Univ. of Hamburg, Germany.*

CLEO 03: Semiconductor Lasers

CThHH1, **Quantum Dot Lasers Physics and Applications to High Power and High Efficiency,** *Dennis Deppe; CREOL, Univ. of Central Florida, USA.*

CLEO 04: Applications of Nonlinear Optics

CTuO2, **High Harmonic Generation and Extreme Nonlinear Optics,** *Christian Spielmann; Univ. Würzburg, Germany.*

CLEO 05: Terahertz Technologies and Applications

CMV1, **Terahertz Quantum Cascade Lasers: Design and Applications,** *Jérôme Faist; Univ. of Neuchatel, Switzerland.*

CLEO 06: Optical Materials, Fabrication and Characterization

CFG4, **Organic Photonics,** *Stephen Forrest; Dept. of Electrical Engineering and Computer Science, Univ. of Michigan, USA.*

CLEO/QELS 07: CLEO/QELS Joint Subcommittee on High-Field Physics and High-Intensity Lasers

JFD1, **The Physics of High-Order Harmonic Generation,** *Anne L'Huillier; Lund Univ., Sweden.*

CLEO 08: Ultrafast Optics, Optoelectronics and Applications

CThA4, **History of High-Intensity Interactions: Physics of the Power Scaling of the 2.9 Angstrom Xe(L) X-Ray Amplifier to the Multi-Petawatt Level,** *A. B. Borisov[1], P. Zhang[1], E. Racz[1,2], J. C. McCorkindale[1], S. F. Khan[1], S. Poopalasingam[1], J. Zhao[1], Charles K. Rhodes[1]; [1]Univ. of Illinois at Chicago, USA, [2]KFKI Res. Inst. for Particle and Nuclear Physics, EURATOM Association, Hungary.*

CLEO 09: Components, Integration, Interconnects and Signal Processing

CTuBB1, **InP-Based Photonic Integrated Circuits,** *Larry Coldren; Univ. of California at Santa Barbara, USA.*

CLEO 10: Medical and Biological Applications

CThQ1, **Optofluidics for Biosensing,** *Steve Quake; Stanford Univ., USA.*

CLEO 11: Fiber and Guided-Wave Amplifiers, Lasers and Devices

CWJ1, **Fiber-Optic Parametric Amplifiers–Properties, Applications and Challenges,** *Magnus Karlsson; Chalmers Univ. of Technology, Sweden.*

CLEO 12: Lightwave Communications and Networks

CTuLL1, **A Physical Layer Perspective on Current and Next-Generation Passive Optical Networks,** *Kenneth C. Reichmann, Patrick P. Iannone; AT&T Labs-Res., USA.*

CLEO 13: Active Optical Sensing

CTuI1, **Femtosecond Coherent Anti-Stokes Raman Scattering Measurement of Gas-Phase Species and Temperature,** *Robert P. Lucht[1], Paul J. Kinnius[1], Sukesh Roy[2], James R. Gord[3]; [1]Purdue Univ., USA, [2]Innovative Scientific Solutions Inc., USA, [3]AFRL, USA.*

CLEO 14: Optical Metrology

CMC1, **Metrology with Cold Atoms,** *Mark Kasevich; Stanford Univ., USA.*

CLEO 15: Organic and Inorganic LEDs for Solid State Lighting and Displays

CMR1, **OLEDs for Solid-State Lighting,** *Anil R. Duggal; GE Global Res., USA.*

CLEO 16: Micro- and Nano-Photonic Devices

CWH1, **Toward Photonic Crystal Optical Buffer,** *Toshihiko Baba[1,2]; [1]Yokohama Natl. Univ., Japan, [2]Core Res. for Evolutional Science and Technology, Japan Science and Technology Agency, Japan.*

QELS Tutorials

QELS 02: Single & Entagled Photons and Quantum Information

QMB3, **Entanglement, Decoherence and Quantum Information,** *Luiz Davidovich; Univ. Federal do Rio de Janeiro, Brazil.*

QELS 05: Nonlinear Optics and Novel Phenomena

QMF1, **Harnessing Attosecond Science for Visualizing the Nanoworld,** *Margaret M. Murnane[1], Jorge Rocca[2], John Miao[3], Ronggui Yang[1], Keith Nelson[4], Eric Anderson[5], Martin Aeschlimann[6], Carmen Menoni[2], Mario Marconi[2], Henry C. Kapteyn[1]; [1]JILA and Univ. of Colorado, USA, [2]Colorado State Univ., USA, [3]Univ. of California at Los Angeles, USA, [4]MIT, USA, [5]Ctr. for X-Ray Optics, USA, [6]Univ. of Kaiserlautern, Germany.*

CLEO/QELS 07: CLEO/QELS Joint Subcommittee on High-Field Physics and High-Intensity Lasers

JFD1, **The Physics of High-Order Harmonic Generation,** *Anne L'Huillier; Lund Univ., Sweden*

2008 Special Symposia

Theodore Maiman Tribute Symposium: Invention and Demonstration of the World's First Laser

Sunday, May 4, 2008, 3:00 p.m. - 6:00 p.m. (Reception to follow at 6:00 p.m.)

Organizers:
Michael Barnoski, *NanoPrecision Products, Inc., USA,* Chair
Anthony Siegman, *Stanford Univ., USA*
Konstantin Vodopyanov, *Stanford Univ., USA,* CLEO Program Chair

In May of 1960, at the Hughes Research Laboratories in Malibu, California, the world's first burst of light amplification by stimulated emission hit the laboratory wall. It was the result of the relentless, determined efforts of Theodore Maiman, the man who developed, demonstrated and patented the world's first laser.

This symposium, organized as a tribute to Dr. Maiman, is intended to describe the events leading to the first laser and the pervasive impact it has had on all aspects of modern society. In its 47 years of existence, the laser has affected an enormously broad array of human endeavors from medicine, Ted's passionate field of use, to consumer products like the laser pointer used in this symposium.

The OSA Foundation is sponsoring a reception following the symposium to announce the establishment of the Theodore Maiman Student Paper Award. This annual award recognizes the innovation and research excellence, in the areas of laser technology and electro-optics, of a student presenter at the Conference on Lasers and Electro-Optics (CLEO) and the Quantum Electronics and Laser Science Conference (QELS). This award is supported by HRL Laboratories, IEEE-LEOS and the APS Division of Laser Science. All symposium attendees are welcome to attend the reception.

Invited Speakers:
The Man behind the First Laser, *Kathleen Maiman*

The Road to Ted Maiman's Ruby Laser, *Jeff Hecht, Contributing Editor, Laser Focus World, and author Beam: The Race to Make the Laser, USA*

Some Thoughts on 48 Years of Lasing, *David Hanna, Univ. of Southampton, UK*

Laser Applications in Medicine, *Nicholas J. Razum, former Executive Director and Board of Directors, Western Inst. of Laser Treatment, USA*

Wavelength Selective Absorption and Bio-Stimulation Effects of Laser Radiation in Medicine, *Delwin McCarthy, DDS, Millennium Dental, USA*

Reversal of Solar Skin Damage and Aging with Lasers, *Gregory S. Keller, MD, FACS, Founder, Western Inst. for Laser Treatment, USA*

Joint CLEO/QELS Symposium on Hollow-Core Photonic-Crystal Fibers and Waveguides

Organizers:
Karl W. Koch; *Corning Inc., USA*
Michael G. Raymer; *Dept. of Physics and Oregon Ctr. for Optics, Univ. of Oregon, USA*

Hollow-core photonic crystal fibers (HCPCF) guide light through a hollow core surrounded by a photonic crystal structure. HCPCF filled with atomic or molecular gas renders measurable otherwise very weak spectral signatures. This symposium covers recent progress in the design, fabrication, and uses of HCPCF, with the intent to educate potential users to the opportunities and limitations of HCPCF, and to inform designers of HCPCF about potential applications. The symposium also covers non-fiber hollow-core waveguides, such as semiconductor anti-resonant reflecting optical waveguides (ARROW), which offer the promise of integrated devices. HCPCF have been used for gas–laser interactions including low-threshold stimulated Raman scattering, electromagnetically induced transparency, gas sensors, and frequency references. Of interest is the ability to design the dispersive properties or losses of the waveguides, for optimizing nonlinear-optical processes. HCPCF can support guided cold atoms and compact atom interferometers. Atoms confined inside HCPCF or ARROW are promising for nonlinear optical interactions at extremely low light levels, with possible applications in quantum information science.

Invited Speakers:
JFA1, **Frequency and Wavelength Standards Based on Gas Filled HC-PBFs,** *Jan C. Petersen, Jan Hald; Danish Fundamental Metrology Ltd., Denmark.*

JFC1, **Nonlinear Optics in Gas-Filled Photonic Band-Gap Fibers,** *Alexander Gaeta; Cornell Univ., USA.*

JFE1, **Quantum Coherent Effects with Hollow-Core Photonic Crystal Fibers,** *Fetah Benabid, P. S. Light, F. Couny; Univ. of Bath, UK.*

JFE3, **Optical Guiding of Atoms through a Hollow-Core Photonic Band-Gap Fiber,** *Randall J. Knize, T. Takekoshi; Laser and Optics Res. Ctr., Dept. of Physics, US Air Force Acad., USA.*

JFE4, **Raman Amplification of Continuous-Wave Laser Emission in Hydrogen-Filled Hollow-Core Photonic Crystal Fiber,** *Kazuki Ihara, Shin-ichi Zaitsu, Totaro Imasaka; Kyushu Univ., Japan.*

JFG3, **Control of Surface Modes in Low Loss Hollow-Core Photonic Bandgap Fibers,** *Rodrigo Amezcua Correa[1], Frederic Gerome[1], Sergio G. Leon-Saval[2], Neil G. R. Broderick[3], Tim A. Birks[1], Jonathan C. Knight[1]; [1]Ctr. for Photonics and Photonics Materials, Univ. of Bath, UK, [2]Optical Fibre Technology Ctr., Univ. of Sydney, Australia, [3]Optoelectronics Res. Ctr., Univerisity of Southampton, UK.*

JFG4, **Realization of Low Loss and Polarization Maintaining Hollow Core Photonic Crystal Fibers,** *Brian Mangan[1], Jens K. Lyngsø[1], Peter J. Roberts[2]; [1]Crystal Fibre A/S, Denmark, [2]Dept. of Communications, Optics and Materials, Technical Univ. of Denmark, Denmark.*

Joint CLEO/QELS Symposium on Nonlinear Microscopy and Spectroscopy in Biology

Organizers:
Jerome Mertz, *Boston Univ., USA*
Eric Potma, *Univ. of California at Irvine, USA*
Changhuei Yang, *Caltech, USA*

Nonlinear optical techniques have equipped researchers with new tools for examining biological samples. The use of ultrafast pulses in multi-dimensional spectroscopy and coherent Raman spectroscopy have provided a closer look at the ultrafast dynamics and structure/function relationships of biological compounds. In combination with tight focusing, ultrafast lasers have also generated new imaging contrast mechanisms, such as coherent anti-Stokes Raman scattering, two-phonon absorption, sum frequency generation, and stimulated emission depletion, for the study of microscopic architecture, dynamics and composition of biological systems. In this symposium, the fields of nonlinear spectroscopy and microscopy are combined to sketch a unifying picture of the significant impact of ultrafast technologies on biology.

Invited Speakers:
JWC1, **New Nonlinear Signatures in Spectroscopy and Imaging,** *Warren S. Warren, Martin Fischer, Dan Fu, Tong Ye, Ivan Piletic, Thomas Matthews; Duke Univ., USA.*

JWC2, **Coherent Anti-Stokes Raman Scattering Microscopy,** *Ji-Xin Cheng[1,2]; [1]Weldon School of Biomedical Engineering, Purdue Univ., USA, [2]Dept. of Chemistry, Purdue Univ., USA.*

JWE1, **Mid-IR Pulse Shaping for Enhanced 2-D IR Spectroscopy,** *Sang-Hee Shim, David B. Strasfeld, Yun L. Ling, Martin T. Zanni; Univ. of Wisconsin at Madison, USA.*

JWE2, **Femtosecond Broadband Stimulated Raman Spectroscopy,** *Richard A. Mathies; Univ. of California at Berkeley, USA.*

Joint CLEO/QELS Symposium on Novel Resonators

Organizers:
Markus Aspelmeyer, *Inst. for Quantum Optics and Quantum Information, Austrian Acad. of Sciences, Austria*
Hui Cao, *Dept. of Physics and Astronomy, Northwestern Univ., USA*

An impressive array of advances in resonators has recently been made. The fast growing body of knowledge spearheads new fields of science and future technological impact. Examples span from novel applications for lasers and light sources across many fields of optics over mechanical high-precision measurements to new quantum phenomena and architectures. This symposium will bring together researchers of various fields to exchange ideas and discuss novel approaches to resonators. Topics to be covered include high-Q resonators; manifestation of radiation pressure in resonators; unstable resonators, such as chaotic and random cavities; novel quantum resonators, including micro- and nano-mechanical resonators, electro- and opto-mechanical resonators; superconducting striplines; subwavelength-scale resonators; micro-and nanocavities; and various external cavities.

Invited Speakers:
JMA1, **Quantum Information with Superconducting Qubits and Cavities,** *Raymond W. Simmonds; NIST, USA.*

JMA2, **Superconducting Microwave Cavities as Quantum Nanomechanical Transducers,** *Gerard J. Milburn[1], M. J. Woolley[1], A. C. Doherty[1], K. C. Schwab[2]; [1]Univ. of Queensland, Australia, [2]Cornell Univ., USA.*

JMA3, **Coupling a Nanomechanical Resonator to a Cooper-Pair-Box Qubit,** *Matthew LaHaye[1], Junho Suh[1], Pierre Echternach[2], Keith Schwab[3], Michael Roukes[1]; [1]Kavli Nanoscience Inst., Caltech, USA, [2]Ctr. for Space Microelectronics Technology, JPL, USA, [3]Dept. of Physics, Cornell Univ., USA.*

JMB1, **Title to Be Announced,** *Robert J. Schoelkopf; Yale Univ., USA.*

JMD5, **Resolved Sideband Laser Cooling of a Micro-Mechanical Oscillator,** *Albert Schliesser, Rémi Rivière, Georg Anetsberger, Olivier Arcizet, Tobias Kippenberg; Max-Planck-Inst. of Quantum Optics, Germany.*

JMB2, **Novel Nanophotonic Resonators: Opportunities and Challenges,** *Evelyn Hu[1], Kevin Hennessy[1,2], Antonio Badolato[2], Chiou-Fu Wang[1], Pierre M. Petroff[1], Atac Imamoglu[2]; [1]Univ. of California at Santa Barbara, USA, [2]ETH, Switzerland.*

JMC1, **Silicon Micro-Resonators for On-Chip Optical Networks,** *Yurii A. Vlasov, Fengnian Xia, Solomon Assefa, William M. J. Green; IBM T.J. Watson Res. Ctr., USA.*

JMC4, **Vertical Integration of Ultrafast Semiconductor Lasers,** *B. Rudin, D. J. H. c. Maas, A.-r. Bellancourt, M. Golling, T. Südmeyer, Ursula Keller; Eidgenössische Technische Zurich, Switzerland.*

JMD3, **Cavity Opto-Mechanics,** *Kerry Vahala[1], Tobias Kippenberg[2]; [1]Caltech, USA, [2]Max Planck Inst. für Quantenoptik, Germany.*

CLEO Symposium on Integrated Optical Isolators and Magneto-Optical Phenomena

Organizers:
Paul Juodawlkis; *MIT Lincoln Lab, USA*
Yoshiaki Nakano; *Univ. of Tokyo, Japan*

Integrated optical isolators having small size, high isolation, and low loss are important to the realization of large-scale photonic integrated circuits containing optical emitters and gain elements. The goal of this symposium is to bring together researchers working on the development of these integrated isolators with researchers who are exploring fundamental aspects of non-reciprocal devices, magneto-optical phenomena, and waveguide polarization control. Topics to be included in this symposium include the physics of magneto-optics, magneto-optical material properties and growth, non-reciprocal waveguide device concepts and demonstrations, polarization manipulation in integrated photonics, and novel applications of integrated magneto-optics.

Invited Speakers:
CThC1, **Integrated Waveguide Optical Isolators: Principles and History,** *Tetsuya Mizumoto, Yuya Shoji; Tokyo Inst. of Technology, Japan.*

CThC4, **Low-Loss, InP-Based Integrated Optical Isolators,** *Wouter Van Parys[1], D. Van Thourhout[1], R. Baets[1], B. Dagens[2], J. Decobert[2], O. Le Gouezigou[2], D. Make[2], R. Vanheertum[3], L. Lagae[3]; [1] Dept. of Information Technology (INTEC), Ghent Univ.-IMEC, Belgium, [2]Alcatel Thales III-V Lab, France, [3]Interuniversitair Micro Electronica Centrum (IMEC), Belgium.*

CThM3, **Use of Polarization in InP-Based Integrated Optics,** *J. J. G.m. van der Tol, L. M. Augustin, A. A. M. Kok, U. Khalique, M. K. Smit; Eindhoven Univ. of Technology, Netherlands.*

CThM4, **Growth of Magneto-Optic Garnet Waveguides and Polarizers for Optical Isolators,**
Sang-Yeob Sung, Xiaoyuan Qui, Bethanie J. H. Stadler; Univ. of Minnesota, USA.

CLEO Symposium on Light Filaments and Light Propagation in Atmosphere

Organizers:
Ludger Wöste, *Freie Univ., Germany*
Patrick Rambo, *Sandia Natl. Labs, USA*

Topics include fundamental mechanisms of light filamentation such as optical self-trapping, self-focusing, multiphoton ionization, and additional wavelength generation mechanisms (Raman, continuum, four wave mixing, etc.); parametric dependencies of filamentation such as wavelength, pulsewidth, atmospheric constituency and pressure; and applications such as LIDAR, remote LIBS, remote THz generation, laser-triggered discharges, and directed energy transfer.

Invited Speakers:
CWE1, **What Is a Filament and Why Is It So Interesting?** *See Leang Chin; Laval Univ., Canada.*

CWE3, **Filamentation with Ultraviolet Pulses,** *Jean-Claude Diels, Alejandro Aceves, Xiaozhen Xu, Alexey Sukhinin, Oliver Chalus, Alain Bourdier; Univ. of New Mexico, USA.*

CWE4, **Filament Induced Electric Events in Thunderstorms,** *Jean-Pierre Wolf; GAP, Univ. of Genève, France.*

QELS Symposium on Quantum Light-Matter Interfaces

Organizers:
Julio Gea-Banacloche, *Univ. of Arkansas, USA*
Atac Imamoglu, *ETH Zurich, Switzerland*
Alex Kuzmich, *Georgia Tech, USA*

Recently, there have been remarkable advances in the ability to couple stationary (e.g., atomic) and flying (optical) qubits. Such interconversion is a prerequisite for the construction of quantum memories and more generally for the construction of quantum repeaters and networks, but could also prove central to the development of ―hybrid‖ quantum information technologies. In addition to memories and repeaters, these techniques promise improved sources of single photons, new schemes for quantum logic gates, and other exciting applications. In parallel, there has been rapid progress in the development of solid-state qubits, and new techniques will have to be

developed to interface these qubits with other systems (e.g., optical, atomic). This symposium will address new advances and new challenges in this area, bringing together leading researchers from various fields to talk with each other about the latest ideas for making different qubits talk with each other as well.

Invited Speakers:
QTuH1, **Trapped Ion Quantum Networks,** *Christopher Monroe[1,2], L.- M. Duan[1,2], D. Matsukevich[1,2], P. Maunz[1,2], D. L. Moehring[1,2], S. Olmschenk[1,2]; [1]Joint Quantum Inst., USA, [2]Dept. of Physics, Univ. of Maryland, USA.*

QTuK1, **Quantum Interface between Light and Matter: New Approaches and Applications,** *A. Akimov, M. Bajscy, D. Chang, E. Togan, J. Maze, A. S. Zibrov, Mikhail D. Lukin; Harvard Univ., USA.*

QTuK4, **Cavity QED with Single Atomic and Photonic Qubits,** *Gerhard Rempe; Max-Planck-Inst. for Quantum Optics, Germany.*

Plenary Session

The CLEO/QELS 2008 Plenary Sessions took place on Monday, May 5, 2008, and Wednesday, May 7, 2008.

The PowerPoint slides and audio of the plenary presentations will be posted below as they become available. You must have Microsoft PowerPoint or Adobe Reader to view these slides. To download the free PowerPoint view, visit the Microsoft website.

David Reitze *Professor of Physics* University of Florida, USA

The Laser Interferometer Gravitational-Wave Observatory: Probing the Dynamics of Space-Time with Attometer Precision

Audio Presentation

Date: Monday, May 5, 2008

Abstract: The detection of gravitational waves promises to open up a new astrophysical window on the universe. I'll discuss gravitational waves, what makes them so interesting and challenging to detect and how we will detect them using really big interferometers.

Biography: David Reitze received a B.A. in physics from Northwestern University in 1983 and a Ph.D. in physics from The University of Texas at Austin in 1990 working in the area of femtosecond spectroscopy. After positions at Bellcore and Lawrence Livermore National Laboratory working on the development of high intensity ultrafast lasers and pulse shaping techniques, he joined the University of Florida where he currently holds the rank of Professor of Physics. In 1996, he began working on the development of large-scale gravitational wave interferometers with the LIGO Project. He led the design effort for the Input Optics, one of the major subsystems of the LIGO interferometers. He is currently the Spokesperson of the LIGO Scientific Collaboration, overseeing a group of 600 scientists worldwide engaged in the search for gravitational waves. He is a Fellow of the American Physical Society and a member of the Science and Engineering Council of the Optical Society of America.

Albert Polman
Director
Center for Nanophotonics,
FOM-Institute AMOLF**,** Netherlands

Plasmonics: Optics at the Nanoscale

Audio Presentation

Date: Wednesday, May 7, 2008

Abstract: The generation, concentration and dispersion of surface plasmons in thin metal films, nanoresonators and metal particle arrays is to be presented. The unique dispersion and mode confinement characteristics of these structures enables control of light at the true nanoscale.

Biography: Albert Polman obtained his Ph.D. from the University of Utrecht, The Netherlands, in 1989. He was a post-doctoral researcher at AT&T Bell Laboratories until 1991 and then became group leader at the FOM-Institute for Atomic and Molecular Physics (AMOLF) in Amsterdam, The Netherlands. In 2003 he spent a sabbatical year at CALTECH. Since 2005 he also serves as director of AMOLF. Polman is associated with the University of Utrecht as a professor of nanophotonics. His research interests are energy transfer in photonic nanostructures, plasmonics, microcavities, rare earth ions, silicon nanostructures and photovoltaics. Polman specializes in studies at the interface between optical physics and materials science, and has regularly demonstrated transfer of knowledge to applied concepts.

Ian A. Walmsley
Hooke Professor of Experimental Physics
University of Oxford**,** UK

Meet the Fock States: The Photon Revisited

Date: Wednesday, May 7, 2008

Abstract: Debates about the character of the photon go back to the first years of quantum mechanics. Recent developments in quantum optics have enabled the generation of exotic nonclassical states of light that can provide a new perspective.

Biography: Ian Walmsley is the Hooke Professor of Experimental Physics at the University of Oxford, UK, where he is also Head of the Sub-Department of Atomic and Laser Physics. Prior to moving to the UK in 2001, Walmsley was on the faculty of the Institute of Optics at the University of Rochester.

His research efforts have been directed toward quantum phenomena on ultrafast timescales, including the generation of nonclassical radiation and matter and its characterization, manipulation of matter using closed loop methods and the development of methods for the measurement of ultrafast optical waveforms.

2008 Short Course Schedule

Short Course Chairs
James R. Leger, *Univ. of Minnesota, USA*
Keith Williams, *NRL, USA*

General Information

The CLEO/QELS Short Course program includes a range of topic areas at a variety of educational levels. The Short Course program offers experienced professionals skill-building training and insight into new fields, and offers students a small-class environment led by a widely recognized industry expert. Short Courses are an excellent opportunity to learn about new products, cutting-edge technology and vital information at the forefront of the laser science and electro-optics fields. In addition, Continuing Education Units (CEUs) are available.

Schedule by Topic Category

Laser Processing and Optical Instrumentation

NEW! SC317 Laser Tweezers: Moving Tiny Things with Light, *Kristian Helmerson; NIST, USA*

Solid-State Lasers

SC165 Laser Diode-Pumped Solid-State Lasers, *Larry Marshall; Arasor, USA*

Semiconductor Lasers

SC167 Fundamentals of Semiconductor Lasers: Edge-Emitters to Micro Cavity Devices, *Kent D. Choquette[1], Weng Chow[2]; [1]Univ. of Illinois, USA, [2]Sandia Natl. Labs, USA*

SC301 Quantum Cascade Lasers: From Band Structure Engineering to Commercialization, *Federico Capasso; Harvard Univ., USA*

NEW! SC319 Quantum Dot Laser Diodes, *Peter Blood; Cardiff Univ., UK*

Applications of Nonlinear Optics

SC149 Foundations of Nonlinear Optics, *Robert Fisher; RA Fisher Associates LLC, USA*

SC153 Quasi-Phasematching for Wavelength Conversion and All-Optical Nonlinear Processing, *Peter G. R. Smith; Univ. of Southampton, UK*

SC163 Practical OPOs, *Majid Ebrahim-Zadeh[1], Malcolm Dunn[2]; [1]Inst. de Ciencies Fotoniques, Spain, [2]Univ. of St. Andrews, UK*

Ultrafast Optics, Optoelectronics and Applications

SC155 Ultrashort Laser Pulse Measurement, *Rick Trebino; Georgia Tech, USA*

SC160 Microwave Photonics, *Keith Williams; NRL, USA*

SC164 THz Technology, *Alan Cheville; Oklahoma State Univ., USA*

Components, Integration, Interconnects and Signal Processing

SC154 Quantum Well Devices for Optics and Optoelectronics, *David A. B. Miller; Stanford Univ., USA*

SC198 Packaging of Optoelectronic Components, *Andreas Rose; Photonics Res. Corp., USA*

Medical and Biological Applications

SC182 Biomedical Optical Diagnostics and Sensing, *Thomas Huser; Univ. of California at Davis, USA*

SC191 Tissue Optics: Fundamentals and Applications to Biomedical Optical and Laser Diagnostics, *Valery V. Tuchin[1], Kirill V. Larin[2]; [1]Saratov State Univ., Russian Federation, [2]Univ. of Houston, USA*

SC272 Biological and Chemical Sensing for Homeland Security, *Stephen Lane[1,2], Thomas Huser[2]; [1]Lawrence Livermore Natl. Lab, USA, [2]Univ. of California at Davis, USA*

Fiber and Guided-Wave Amplifiers, Lasers and Devices

SC123 Erbium-Doped Fiber Amplifiers and Raman Fiber Amplifiers, *John Zyskind; JDSU, USA*

SC192 Fiber Optic Sensors: Principles and Applications, *Michel Digonnet; Stanford Univ., USA*

SC270 High Power Fiber Lasers and Amplifiers, *W. Andrew Clarkson; Optoelectronics Res. Ctr., Univ. of Southampton, UK*

NEW! SC318 Laser Beam Combining: Theory and Methods, *James R. Leger; Univ. of Minnesota, USA*

Lightwave Communications and Networks

SC147 Optical Fiber Communication Systems, *Alan Willner; Univ. of Southern California, USA*

Active Optical Sensing

SC200 Laser Remote Sensing, *Timothy Carrig, Philip Gatt; Lockheed Martin Coherent Technologies, USA*

Organic and Inorganic LEDs for Solid State Lighting and Displays

NEW! SC316 Organic Photonic Devices, *Marc Baldo, Vladmir Bulovic; MIT, USA*

Micro- and Nano-Photonic Devices

SC300 Silicon Photonics, *Bahram Jalali; Univ. of California at Los Angeles, USA*

Single and Entangled Photons and Quantum Information

SC189 Quantum Technologies, *Ian Walmsley; Univ. of Oxford, UK*

SC271 Quantum Information—Technologies and Applications, *Prem Kumar[1], Paul Toliver[2]; [1]Northwestern Univ., USA, [2]Telcordia Technologies, USA*

Fundamentals of Metamaterials, Periodic and Random Media

SC194 Photonic Crystal Fibers and Devices, *Benjamin J. Eggleton; Univ. of Sydney, Australia*

SC302 MetaMaterials, *Vladimir M. Shalaev; Purdue Univ., USA*

Nano-Optics and Plasmonics

SC166 Photonic Crystal Devices and Integrated Circuits, *Dennis Prather; Univ. of Delaware, USA*

SC221 Nano-Photonics: Physics and Techniques, *Axel Scherer; Caltech, USA*

CLEO/QELS Joint Subcommittee on High-Field Physics and High-Intensity Lasers

SC247 Ultrafast Optics: Nanoscale Microscopy, Metrology and Patterning Using Compact and Large Scale Soft X-Ray Sources, *David Attwood[1], Jorge J. Rocca[2], Margaret Murnane[3]; [1]Lawrence Berkeley Natl. Lab, USA, [2]Colorado State Univ., USA, [3]Univ. of Colorado at Boulder, USA*

Fundamental Optical Science and Technologies

SC136 Understanding Lasers and Critical Optical Components, *Shaoul Ezekiel; MIT, USA*

SC143 Introductory and Intermediate Topics in Polarized Light, *Robert Fisher; RA Fisher Associates LLC, USA*

SC157 Laser Beam Analysis, Propagation and Shaping Techniques, *James R. Leger; Univ. of Minnesota, USA*