CLEO

8:00 a.m. – 9:45 a.m.
CFA • Nd Lasers
Norman P. Barnes; NASA Langley Res. Ctr., USA, Presider

CFA1 • 8:00 a.m.
High Power CW and A-O Q-Switch Operation of 912 nm Nd:$GdVO_4$ Laser, *Jing Gao, Xin Yu, Jiangbo Peng, Wenping Zhang, Xudong Li, Junbua Yu, Yuezbu Wang; Harbin Inst. of Technology, China.* An efficient, compact 912 nm Nd:$GdVO_4$ laser is presented. The CW output power is up to 6.6 W. In the A-O Q-switched mode, minimum pulse width of 22 ns at 10 kHz is obtained.

CFA2 • 8:15 a.m.
Laser Properties of Composite Nd:$GdVO_4$ Single Crystal Grown by the Double Die EFG Method, *Makoto Matsukura[1], Osamu Nakamura[1], Shinya Watanabe[1], Akio Miyamoto[1], Yasunori Furukawa[1], Yoichi Sato[2], Takunori Taira[2], Tsuyoshi Suzudo[3], Hironobu Mifune[3]; [1]Oxide Corp., Japan, [2]Laser Res. Ctr. for Molecular Science, Japan, [3]Toboku R&D Ctr., Ricoh Co. Ltd., Japan.* Composite structures in $GdVO_4$ single crystals were directly grown by double die EFG method, which enables 3-mm core of Nd:$GdVO_4$ inside 5-mm clad of pure $GdVO_4$. Laser oscillation of our composite was successfully demonstrated.

8:00 a.m. – 9:45 a.m.
CFB • Laser Sources for Active Optical Sensing
Terrence Meyer; Innovative Scientific Solutions, Inc., USA, Presider

CFB1 • 8:00 a.m. Tutorial
Rare-Earth-Doped Fiber Lasers for Spectroscopic Trace-Gas Detection, *Dahv Kliner; Sandia Natl. Labs, USA.* Advantages and limitations of fiber-based laser systems for trace-gas detection will be reviewed. I will present example applications and instruments for in situ and remote detection at wavelengths from the mid-IR through the deep-UV.

8:00 a.m. – 9:45 a.m.
CFC • Imaging of Tissue and Cancer
Xingde Li; Univ. of Washington, USA, Presider

CFC1 • 8:00 a.m.
High-Speed Camera for Frequency Domain Imaging, *Abneesh Srivastava, David Watt, Gregory Faris; SRI Intl., USA.* We describe a high-speed camera system for performing frequency domain imaging with applications to photon migration imaging or fluorescence lifetime imaging. Field programmable gate arrays allow processing images up to 2 gigapixels per second.

CFC2 • 8:15 a.m.
Single-Scattering Optical Tomography, *Vadim A. Markel[1], John C. Schotland[2]; [1]Dept. of Radiology, Univ. of Pennsylvania, USA, [2]Dept. of Bioengineering, Univ. of Pennsylvania, USA.* We propose a novel tomographic method which utilizes visible or near-infrared light as a probe in the "mesoscopic" scattering regime when the tissue exhibits sufficiently strong scattering, yet the detected light is not diffuse.

8:00 a.m. – 9:45 a.m.
CFD • Stimulated NLO Processes
Jean-Claude Diels; Univ. of New Mexico, USA, Presider

CFD1 • 8:00 a.m.
Effect of Raman Susceptibility on Single-Pump Parametric Amplifiers, *Andy Hsieh, Stuart G. Murdoch, Stephane Coen, Rainer Leonhardt, John Harvey; Physics Dept., Univ. of Auckland, New Zealand.* The Raman susceptibility is shown to have a strong influence on the parametric gain of a single-pump parametric amplifier. A strong reduction in the parametric gain at 15.5 THz is observed due to this effect.

CFD2 • 8:15 a.m.
High Quality Millimeter Wave Carrier Generation via Stimulated Brillouin Scattering, *Markus Junker[1], Thomas Schneider[1], Kai-Uwe Lauterbach[1], Ronny Henker[1], Max J. Ammann[2], Andreas T. Scharzbacher[2]; [1]Deutscbe Telekom, Germany, [2]Dublin Inst. of Technology, Ireland.* A new and simple method for the generation and modulation of Millimeter waves is presented. Based on frequency upconversion via Stimulated Brillouin Scattering it is very flexible in its output frequency and modulation bandwidth.

JOINT

8:00 a.m. – 9:45 a.m.
JFA • Harmonic and X-Ray Generation in Plasmas
Zenghu Chang; Kansas State Univ., USA, Presider

JFA1 • 8:00 a.m.
High Brightness Injection-Seeded Table-Top Soft X-Ray Laser Using a Dense Plasma Amplifier, *Yong Wang, E. Granados, Miguel A. Larotonda, Mark Berrill, Bradley M. Luther, Dineshchandra Patel, Carmen S. Menoni, Jorge J. Rocca; NSF ERC for Extreme Ultraviolet Science and Technology, and Electrical and Computer Engineering Dept., Colorado State Univ., USA.* We demonstrated the generation of an extremely bright λ=32.6nm laser beam with high spatial coherence by saturated amplification of high harmonic seed pulses in a soft X-ray laser plasma amplifier created heating a titanium target.

JFA2 • 8:15 a.m. Invited
Attosecond Nonlinear Optics, *Y. Nabekawa[1], T. Shimizu[1], Katsumi Midorikawa[1], T. Okino[2], Y. Yamanouchi[2]; [1]RIKEN, Japan, [2]Dept. of Chemistry, School of Science, Univ. of Tokyo, Japan.* We report the direct observation of a train of attosecond pulses by mean of autocorrelation method using nonlinear two photon processes in atoms and molecules in the xuv region.

CLEO

8:00 a.m. – 9:45 a.m.
CFE • Hollow Waveguides
Mihaela Dinu; Bell Labs, Lucent Technologies, USA, Presider

CFE1 • 8:00 a.m.
Tunable Optofluidic Third Order DFB Dye Laser, *Morten Gersborg-Hansen, Anders Kristensen; Technical Univ. of Denmark, Denmark.* We present a low-threshold polymer-based nanofluidic dye laser. By employing a third order DFB laser resonator, we demonstrate a threshold fluence of ~7 μJ/mm^2 and a tunability of 45 nm using a single laser dye.

CFE2 • 8:15 a.m.
Use of Optical Tweezers to Fabricate Tunable Filters in Photonic Crystal Fibers, *Peter Domachuk, Hannah Perry, Fiorenzo Omenetto, Mark Cronin-Golomb; Tufts Univ., USA.* Tunable optical filters are fabricated in hollow core photonic crystal fibers by using optical tweezer beams directed transversely to the fiber to load and space silica microspheres in the fluid filled hollow core.

8:00 a.m. – 9:45 a.m.
CFF • Ultrafast Pulse Characterization I
Presider to Be Announced

CFF1 • 8:00 a.m.
Guided-Wave Temporal Imaging Based Ultrafast Recorders, *Corey V. Bennett[1], Bryan D. Moran[1], Carsten Langrock[2], Martin M. Fejer[2], Morten Ibsen[3]; [1]LLNL, USA, [2]Stanford Univ., USA, [3]Univ. of Southampton, UK.* Guided-wave parametric temporal imaging is demonstrated with 1.8 ps resolution and 1000:1 dynamic range. Waveforms are ~30.1X time magnified before recording single-shot on a streak camera, and on a real-time oscilloscope repeating at MHz rates.

CFF2 • 8:15 a.m.
Looped Time-Lens Compression for Generation of 3.5 nJ Femtosecond Pulses from a CW Laser, *James van Howe, Jennifer Lee, Chris Xu; Cornell Univ., USA.* We generate 516 fs pulses at 3.5 nJ energy from a continuous wave 1.55 μm source without mode-locking. Our system is compact, all-fiber, and allows continuous tuning of pulse width and center wavelength.

QELS

8:00 a.m. – 9:45 a.m.
QFA • Nonlinear Nano-Optics
Presider to Be Announced

QFA1 • 8:00 a.m. Invited
Nonlinear Nanoplasmonics, *Anatoly V. Zayats; Queen's Univ. of Belfast, UK.* Nonlinear optical properties associated with surface-plasmon excitations in metallic nanostructures hybridised with nonlinear molecules will be discussed. Nonlinear plasmonics provides a possibility to develop novel nonlinear metamaterials with enhanced functionalities and control light with light.

ROOM 337	ROOM 338	ROOM 339	ROOM 340	ROOM 341
QELS	CLEO			JOINT

8:00 a.m. – 9:45 a.m.
QFB • Spin Dynamics
John Sipe; Univ. of Toronto, Canada, Presider

QFB1 • 8:00 a.m.
Spatio-Temporal Resolution of Ballistic Spin Transport in Semiconductors, *Hui Zhao[1], Henry M. Van Driel[2], Arthur L. Smirl[1]; [1]Univ. of Iowa, USA, [2]Univ. of Toronto, Canada.* Ballistic pure spin currents, which are injected into GaAs quantum wells using quantum interference techniques, are spatially and temporally resolved for the first time, allowing the direct extraction of spin momentum relaxation times.

QFB2 • 8:15 a.m.
Optical Control of Electron Spin Precession in Semiconductor Quantum Wells, *Shannon O'Leary, Yumin Shen, Hailin Wang; Univ. of Oregon, USA.* We demonstrate a spin manipulation scheme that controls the amplitude as well as the phase of the quantum beats from electron spin coherence by exploiting the relative phase between relevant Larmor precessions of electron spins.

8:00 a.m. – 9:45 a.m.
CFG • Optical Trace Gas Detection
Dave Nelson; Aerodyne Res., USA, Presider

CFG1 • 8:00 a.m.
Sensitive Wavelength Modulation Spectroscopy of Ethane Using a Mid-Infrared Interband Cascade Laser, *Krishnan R. Parameswaran, Richard T. Wainner, David I. Rosen, David M. Sonnenfrob, Mark G. Allen; Physical Sciences Inc., USA.* Detection of ethane in breath will enable non-invasive monitoring of oxidative stress status. We present ethane absorption measurements using wavelength modulation spectroscopy and show that concentrations below 1 ppb can be detected with cavity enhancement.

CFG2 • 8:15 a.m.
Sensitive, Real-Time Interband Cascade Laser Based Sensor for Ethane Monitoring, *Yury A. Bakhirkin[1], Gerard Wysocki[1], Matthew P. Fraser[1], Rui Q. Yang[2], Frank K. Tittel[1]; [1]Rice Univ., USA, [2]JPL (NASA), USA.* A gas sensor based on a CW mid-infrared interband cascade laser and wavelength modulation spectroscopy capable of measuring ethane concentrations with a detection sensitivity of 0.15 ppbv/Hz$^{1/2}$ is reported.

8:00 a.m. – 9:45 a.m.
CFH • High-*Q* Microresonators and Devices I
Presider to Be Announced

CFH1 • 8:00 a.m. Invited
High-*Q* Photonic Crystal Cavities, *Susumu Noda; Kyoto Univ., Japan.* Recent progress of high-*Q* nanocavities is reviewed, where *Q*-factors more than 1.2 million have been successfully achieved while keeping small modal volume of ~1.1$(\lambda/n)^3$. New designs and applications of high-*Q* nanocavities are also discussed.

8:00 a.m. – 9:45 a.m.
CFI • High Power Fiber Lasers and Amplifiers
Jeff Nicholson; OFS Labs, USA, Presider

CFI1 • 8:00 a.m.
Bi-Doped Fiber Lasers: New Type of High-Power Radiation Sources, *Evgeny M. Dianov[1], Alexey V. Shubin[1], Mikhail A. Melkumov[1], Oleg I. Medvedkov[1], Igor A. Bufetov[2]; [1]Fiber Optics Res. Ctr. of the Russian Acad. of Sciences, Russian Federation, [2]Fiber Optics Res. Ctr., Russian Acad. of Sciences, Russian Federation.* CW lasing of a new type of lasers -Bi-doped fiber lasers- in a wavelength range of 1150÷1215 nm at high output power level (15W) and efficiency of 22% has been obtained for the first time.

CFI2 • 8:15 a.m.
High-Power Cascaded Raman Fiber Laser with 41-W Output Power at 1480-nm Band, *Yoshihiro Emori[1,2], Kanji Tanaka[2], Clifford Headley[1], Akira Fujisaki[2]; [1]OFS Labs, USA, [2]Furukawa Electric Co., Ltd., Japan.* A cascaded Raman laser with 41-W CW output at 1480-nm band was demonstrated by a 65-m silica-based highly nonlinear fiber as the Raman gain medium.

8:00 a.m. – 9:45 a.m.
JFB • Joint Symposium on THz Spectroscopy
Peter U. Jepsen; Technical Univ. of Denmark, Denmark, Presider

JFB1 • 8:00 a.m.
THz Phase-Transition Spectroscopy of Metals, *Kenneth J. Chau, Abdulhakem Elezzabi; Univ. of Alberta, Canada.* Terahertz (THz) time-domain spectroscopy is employed to study the solid-liquid phase transition of metallic Ga particle collections. This work is the first non-invasive THz spectroscopic investigation of melting phenomena in metallic media.

JFB2 • 8:15 a.m.
Electrical Conductivity Measurements of Warm Dense Matter with Time-Resolved Terahertz Spectroscopy, *Ki-Yong Kim, James H. Glownia, Balakishore Yellampalle, Antoinette J. Taylor, George Rodriguez; Los Alamos Natl. Lab, USA.* The quasi-DC electrical conductivity of warm dense matter is directly measured with terahertz-probe reflection spectroscopy. The measurements show a noticeable deviation from the Drude model in warm dense aluminum.

NOTES

CFA • Nd Lasers—Continued

CFA3 • 8:30 a.m.
High Order Wavefront Correction for High-Energy Nd:YLF Rod Amplifier by Phase Conjugate Plate, *Takasbi Sekine[1], Shinichi Matsuoka[1], Toshiyuki Kawashima[1], Hirofumi Kan[1], Junji Kawanaka[2], Koji Tsubakimoto[2], Masahiro Nakatsuka[2], Yasukazu Izawa[2]; [1]Hamamatsu Photonics K. K., Japan, [2]Inst. of Laser Engineering, Osaka Univ., Japan.* Wavefront correction until Zernike polynomial of degree three by phase conjugate plate has been demonstrated in a high energy Nd:YLF amplifier system. 108 amplification of 380 mJ has been achieved with a near-diffraction-limited beam quality.

CFA4 • 8:45 a.m.
Generation of Cylindrical Vector Beams from a Nd:YAG Laser Cavity including a c-cut YVO_4 Crystal, *Yuichi Kozawa, Kazubiro Yonezawa, Shunichi Sato; Inst. of Multidisciplinary Res. for Advanced Materials, Toboku Univ., Japan.* Cylindrical vector beams were generated from a Nd:YAG laser cavity including an undoped c-cut YVO_4 crystal. By simply adjusting the length of an asymmetric concentric cavity, the selection of radial or azimuthal polarization was possible.

CFB • Laser Sources for Active Optical Sensing—Continued

CFC • Imaging of Tissue and Cancer—Continued

CFC3 • 8:30 a.m.
Cellular Motion as Contrast Agent in Tumor Imaging, *Kwan Jeong, John J. Turek, David D. Nolte; Purdue Univ., USA.* We present the first three-dimensional time-course images of cytoskeletal anticancer drug effects on osteogenic tumor spheroids as a function of dose through motility imaging using dynamic speckle in digital holographic optical coherence imaging.

CFC4 • 8:45 a.m.
Near-Infrared Fluorescence Imaging for Colonic Cancer Diagnosis, *Zhiwei Huang, Xiaozhuo Shao, Wei Zheng, Colin Sheppard; Natl. Univ. of Singapore, Singapore.* A near-infrared (NIR) fluorescence imaging system was developed to acquire high contrast tissue NIR fluorescence images and to evaluate the efficacy of using the NIR imaging technique for cancer diagnosis in the colon.

CFD • Stimulated NLO Processes—Continued

CFD3 • 8:30 a.m.
Efficient Single Spatial Mode Stimulated Raman Scattering in a Hollow Core Photonic Band-Gap Fiber Filled with Ethanol, *Sylvie Lebrun, Philippe Delaye, Robert Frey, Gérald Roosen; Lab Charles Fabry de l'Inst. d'Optique, CNRS, Univ Paris-Sud, France.* Singlemode Raman generation in an ethanol filled photonic band gap fiber is demonstrated. Due to the limited fiber transmission band a high conversion efficiency towards the first Stokes is achieved even at high pump intensities.

CFD4 • 8:45 a.m.
Enhancement of Maximum Time Delay in One Fiber Segment Slow Light Systems Based on Stimulated Brillouin Scattering, *Ronny Henker[1], Thomas Schneider[1], Markus Junker[1], Kai-Uwe Lauterbach[1], Max James Ammann[2], Andreas Thomas Schwarzbacher[2]; [1]Deutsche Telekom Fachhochschule Leipzig, Germany, [2]Dublin Inst. of Technology, Ireland.* An effective method to enhance the time delay in SBS-based slow-light systems by decoupling the delay from the Brillouin gain is shown. A drastic improvement of the time delay in one fiber segment was achieved.

JFA • Harmonic and X-Ray Generation in Plasmas—Continued

JFA3 • 8:45 a.m.
Enhanced High Harmonic Generation in Xe, Kr and Ar Using a Capillary Discharge, *Tenio Popmintchev[1], Michael E. Grisham[2], David M. Gaudiosi[1], Brendan A. Reagan[2], Oren Cohen[1], Mark A. Berrill[2], Margaret M. Murnane[1], Henry C. Kapteyn[1], Jorge J. Rocca[2]; [1]JILA, Univ. of Colorado at Boulder and NIST, USA, [2]Dept. of Electrical and Computer Engineering, Colorado State Univ., USA.* We demonstrate a significant extension of the harmonic cutoff in xenon, krypton and argon ions using a capillary discharge, up to 160 eV, 170 eV and 275 eV respectively.

CFE • Hollow Waveguides—Continued

CFE3 • 8:30 a.m. Invited
Integrated Semiconductor Chips for EIT, *Holger Schmidt[1], Wenge Yang[1], Bin Wu[1], Donald B. Conkey[2], Rebecca Brenning[2], Aaron R. Hawkins[2]; [1]Univ. of California at Santa Cruz, USA, [2]Brigham Young Univ., USA.* We review fabrication and characterization of monolithically integrated rubidium vapor cells on a chip. Mode areas of 9μm^2 and optical densities in excess of 2 are demonstrated - ideal for EIT-based nonlinear optics.

CFF • Ultrafast Pulse Characterization I—Continued

CFF3 • 8:30 a.m.
Polarization-Insensitive Ultralow-Power Second-Harmonic Generation Frequency-Resolved Optical Gating, *Houxun Miao[1], Andrew M. Weiner[1], Carsten Langrock[2], Rostislav V. Roussev[2], Martin M. Fejer[2]; [1]Purdue Univ., USA, [2]Stanford Univ., USA.* We demonstrate polarization-insensitive ultralow-power second-harmonic generation (SHG) frequency-resolved optical gating (FROG) measurements with a fiber-pigtailed, aperiodically-poled lithium niobate (A-PPLN) waveguide by scrambling the polarization much faster than the measurement integration time.

CFF4 • 8:45 a.m.
Full Characterisation of Low Power Picosecond Pulses from a Gain-Switched Diode Laser Using Electro-Optic Modulation Based FROG, *Khu T. Vu, Andrew Malinouski, Michael A.F. Roelens, Morten Ibsen, Periklis Petropoulos, David J. Richardson; Univ. of Southampton, UK.* We use a linear FROG technique based on electro-optic modulation to fully characterise for the first time pulses from a 1.06 μm FP laser diode and design a grating to provide optimum pulse compression.

QFA • Nonlinear Nano-Optics—Continued

QFA2 • 8:30 a.m.
Second-Harmonic Generation Spectroscopy of Silicon Quantum Dots, *Vladimir O. Bessonov[1], Anton I. Maydykovsky[1], Oleg A. Aktsipetrov[1], Xinfan Huang[2], Kunji Chen[2]; [1]M.V. Lomonosov Moscow State Univ., Dept. of Physics, Russian Federation, [2]Dept. of Physics and Lab of Solid State Microstructures, Nanjing Univ., China.* The size effects in resonant nonlinear-optical response of silicon quantum dots are studied in the spectral interval of second-harmonic photon energies from 3.0 to 3.5 eV.

QFA3 • 8:45 a.m.
Linear and Nonlinear Optics of Light Harvesting Complexes: TCL- and Bloch Equations for Linear Spectra and Saturation Dynamics, *Marten Richter[1], Thomas Renger[2], Andreas Knorr[2]; [1]Inst. für Theoretische Physik, Technische Univ. Berlin, Germany, [2]Inst. für Chemie und Biochemie, Freie Univ. Berlin, Germany.* Bloch equations for the optical and electronic processes in light-harvesting-complexes, important nanostructures in photoprocesses, are presented. The theory includes Förster excitation transfer, electron-phonon coupling and arbitrary strong light fields leading to saturation phenomena.

QFB • Spin Dynamics—Continued

QFB3 • 8:30 a.m.
Effects of Disorder on Electron Spin Dynamics in GaAs Quantum Wells, *Zhigang Chen[1], Sam G. Carter[1], Rudolf Bratschitsch[1], Steven T. Cundiff[1], Philip Dawson[2]; [1]JILA, Univ. of Colorado and NIST, USA, [2]School of Physics and Astronomy, Univ. of Manchester, UK.* We measure electron spin dynamics in GaAs quantum wells with varying electron density. Electron Landé g factor is measured to characterize disorder potential. Electron spin coherence is lost from interplay between localization and dynamical scattering.

QFB4 • 8:45 a.m.
Investigation of Spin-Induced Pauli Blocking on Electron Dynamics in n-doped $In_{0.4}Ga_{0.6}As$/GaAs Quantum Dots, *Zong-kwei Wu[1], Hyunyong Choi[1], Theodore B. Norris[1], Xiaohua Su[1], Subhananda Chakrabarti[1,2], Pallab Bhattacharya[1]; [1]Univ. of Michigan, USA, [2]Univ. of Glasgow, UK.* A nanosecond-scale recovery component is observed in time-resolved differential transmission spectroscopy experiments on the electron relaxation in n-doped quantum dots. Polarization-dependent measurements show the recovery is not due to Pauli blocking driven by spin relaxation.

CFG • Optical Trace Gas Detection—Continued

CFG3 • 8:30 a.m.
Isotopic Ratio Measurements of Atmospheric Carbon Dioxide Using a 4.3 μm Pulsed Quantum Cascade Laser, *David Nelson[1], John B. McManus[1], Mark S. Zahniser[1], Bela Tuzson[2], Lukas Emmenegger[2]; [1]Aerodyne Res., Inc., USA, [2]EMPA, Air Pollution, Environmental Technology Lab, Switzerland.* We report CO_2 isotopic ratios (^{13}C, $18O$) measured in air using a pulsed quantum cascade laser at 2310 cm^{-1}. Performance is improved by analyzing the deviations between the sample spectra and simultaneously acquired reference spectra.

CFG4 • 8:45 a.m.
Methane Detection by Means of Quartz Enhanced Photoacoustic Spectroscopy in NIR, *Anatoliy A. Kosterev, Yury A. Bakhirkin, Frank K. Tittel; Rice Univ., USA.* Trace methane detection by means of quartz enhanced photoacoustic spectroscopy using a fiber-coupled DFB diode laser at 1651 nm will be reported. An autonomous sensor configuration will be described.

CFH • High-*Q* Microresonators and Devices I—Continued

CFH2 • 8:30 a.m.
Analytic Photonic Crystal Cavity Design, *Dirk R. Englund, Ilya Fushman, Jelena Vuckovic; Stanford, USA.* We describe an analytic method for designing photonic crystal structures and apply it to high-*Q* cavities. Starting from a photonic crystal Bloch mode, we derive a perturbative two-dimensional structure to confine a desired mode.

CFH3 • 8:45 a.m.
c-Er_2O_3 Microdisks on Silicon: Fabrication and Photoluminescence, *Christopher P. Michael[1], Thomas J. Johnson[1], Oskar Painter[1], Vijit A. Sabnis[2], Homan B. Yuen[2], Aleta Jamora[2], James Weldon[2], Scott Semans[2], Peter B. Atanackovic[2]; [1]Dept. of Applied Physics, Caltech, USA, [2]Translucent Inc., USA.* Microdisks are fabricated from c-Er_2O_3. Surface scattering presently limits the quality of whispering-gallery modes around the 980 nm and 1480 nm Er^{+3} pump bands. Photoluminescence is observed at 1550 nm while resonantly pumping cavity modes.

CFI • High Power Fiber Lasers and Amplifiers—Continued

CFI3 • 8:30 a.m.
Multi-mJ Energy, Multi-MW Peak-Power Photonic Crystal Fiber Amplifiers with Near-Diffraction-Limited Output, *Fabio Di Teodoro, Christopher D. Brooks; Aculight Corp., USA.* We report on large-core (up to 100um diameter) Yb-doped photonic crystal fiber amplifiers delivering ~1ns pulses of pulse energy/peak power up to 4.2mJ/4.5MW, in output beams of high spatial quality (M^2 < 1.3)

CFI4 • 8:45 a.m.
Strictly-All-Fiber 1070nm High Power Source in a Distributed Side-Coupled Pump Configuration, *Yaakov Glick, Yoav Sintov, Tomer Koplowitch, Yehuda Nafcha; Soreq NRC, Israel.* A high power source of 285W is presented with >50% optical efficiency, in an all-fiber configuration. Six 90W diode pumps are side-coupled via pump couplers along the Ytterbium doped fiber, in an even distribution.

JFB • Joint Symposium on THz Spectroscopy—Continued

JFB3 • 8:30 a.m.
Isotropic Photonic Magnetoresistance: A New Phenomenon at Terahertz Frequencies, *Corey A. Baron, Kenneth J. Chau, Abdulbakem Y. Elezzabi; Univ. of Alberta, Canada.* We demonstrate isotropic photonic magnetoresistive behaviour in the THz transmission through highly porous ferromagnetic particle collections. Experimental evidence suggests a morphological origin of the isotropic magnetic phenomenon.

JFB4 • 8:45 a.m.
Temperature Dependent and Magnetic Field Dependent Terahertz Spectroscopy of $In_{1-x}Mn_xAs$, *Jason Deibel[1], Junichiro Kono[1], Daniel Mittleman[1], Wenhui Fan[2], Prasbantb C. Upadhya[2], Amartya Sengupta[2], John Cunningham[2], Edmund H. Linfield[2], Giles Davies[2], Hiro Munekata[3]; [1]Rice Univ., USA, [2]Univ. of Leeds, UK, [3]Tokyo Inst. of Technology, Japan.* We report temperature and magnetic field dependent terahertz time domain spectroscopy measurements on InMnAs. The temperature dependent transmission is shown to vary with Mn content and applied magnetic field strength.

NOTES

CFA • Nd Lasers—Continued

CFA5 • 9:00 a.m.
Quasi CW Laser Diode Side Pumped Nd:YAG Slab Laser Passively Mode-Locked Using Multiple Quantum Well Saturable Absorbers, *Waldemar Zendzian[1], Jan K. Jabczynski[1], Jacek Kwiatkovski[1], Vaclav Kubecek[2], Helena Jelinkova[2], Andreas Stintz[3], Jean-Claude Diels[3]; [1]Inst. of Optoelectronics, Military Univ. of Technology, Poland, [2]Czech Technical Univ., Faculty of Nuclear Sciences and Physical Engineering, Czech Republic, [3]Univ. of New Mexico, Ctr. for High Technology Materials and Dept. of Physics and Astronomy, USA.* Operation of Nd:YAG slab laser side pumped by quasi-continuous laser diode passively mode locked using semiconductor saturable absorber is reported. Trains with energy up to 2 mJ and pulse duration of 65 ps were generated.

CFA6 • 9:15 a.m.
Development and Vacuum Life Test of a Diode-Pumped Cr:Nd:YAG Laser (Heritage Laser) for Space Applications, *Antonios Seas[1], Steve Li[1], Mark Stephen[1], Anne-Marie D. Novo-Gradac[1], Nasir Kashem[1], Aleksey Vasilyev[2], Elisavet Troupaki[2], Songsheng Chen[2], Alberto Rosanova[2]; [1]NASA, USA, [2]Science Systems and Applications Inc., USA.* The development and vacuum life-testing of a diode pumped Cr:Nd:YAG laser for space applications is presented. Furthermore results from long life-testing of 808-nm laser diode arrays in air and vacuum are discussed.

CFB • Laser Sources for Active Optical Sensing—Continued

CFB2 • 9:00 a.m.
Single-Frequency, Frequency-Doubled, Erbium-Doped, Fiber-Amplified Transmitter for Oxygen A-Band Spectroscopy, *Mark A. Stephen[1], Michael A. Krainak[1], Haris Riris[1], Graham Allan[2]; [1]NASA Goddard Space Flight Ctr., USA, [2]Sigma Space Corp., USA.* We developed a frequency-doubled, DFB-seeded EDFA. 8 Watts of frequency-doubled power was achieved in a single-frequency, wavelength tunable, power scalable laser transmitter used for spectroscopic remote sensing of the oxygen A-band.

CFB3 • 9:15 a.m.
Widely Tunable, High Power, Mode-Hop Free, CW External Cavity Quantum Cascade Laser at 8.4μm, *Gerard Wysocki[1], Robert F. Curl[1], Frank K. Tittel[1], Federico Capasso[2], Laurent Diehl[2], Mariano Troccoli[3], Gloria Höfler[4], Richard Maulini[5], Jérôme Faist[5]; [1]Rice Univ., USA, [2]Harvard Univ., USA, [3]Argos Tech LLC, USA, [4]Argos Tech, USA, [5]Univ. of Neuchâtel, Switzerland.* An external cavity quantum cascade laser (λ =8.4 μm) is reported. The laser operating at -30°C exhibits a single mode tuning range of 135 cm–1 providing up to 50 mW of CW laser radiation.

CFC • Imaging of Tissue and Cancer—Continued

CFC5 • 9:00 a.m.
Evaluation of a Multi-Wavelength Reflectance System for Determination of Tissue Optical Properties in the UVA-VIS, *Quanzeng Wang[1], Anant Agrawal[1], Stephanie Matchette[1], Nam Sun Wang[2], Joshua Pfefer[1]; [1]Food and Drug Administration, Ctr. for Devices and Radiological Health, USA, [2]Univ. of Maryland, USA.* Tissue optical properties at ultraviolet-A and visible wavelengths are needed to elucidate diagnostic device performance. We have developed a multi-wavelength fiberoptic reflectance system for optical property measurement and evaluated its performance using hemoglobin-based tissue phantoms.

CFC6 • 9:15 a.m.
Enzyme-Based Labeling of Tumor Boundaries, *Jeanne P. Hausbalter, Khalid Amin, Wan-Ru Chao, Kevin Kauweloa, Zisban Haroon, Gregory Faris; SRI Intl., USA.* We are developing a method for labeling tumor boundaries. An enzyme involved in wound healing covalently links a fluorescent-labeled substrate into the growing tumor boundary. We have performed in vitro assays to study this method.

CFD • Stimulated NLO Processes—Continued

CFD5 • 9:00 a.m.
Efficient Broadband Raman Generation in Crystals Driven by Dual-Frequency Femtosecond Laser Fields, *Miaochan Zhi, Xi Wang, Alexei V. Sokolov; Texas A&M Univ., USA.* We demonstrate efficient generation of discrete spatially-separated Stokes and anti-Stokes sidebands, ranging in wavelength from infrared, through visible, to ultraviolet spectral region, by crossing two- or three-color femtosecond laser beams in thin room-temperature Raman-active crystals.

CFD6 • 9:15 a.m.
Single-Shot Pulse Characterization with High Spatial Resolution using Localized Nonlinearities and Cerenkov Phase-Matching, *Stefan Holmgren, Carlota Canalias, Valdas Pasiskevicius; Royal Inst. of Technology, Sweden.* Cerenkov phase-matching of second-order nonlinearities localized in the regions of ferroelectric domain walls in $KTiOPO_4$ is used to realize a single-shot FROG arrangement for ultrashort pulse characterization, which can be used from visible to mid-infrared.

JFA • Harmonic and X-Ray Generation in Plasmas—Continued

JFA4 • 9:00 a.m.
Enhancement of Relativistic Harmonic Generation by an Optically-Preformed Periodic Plasma Waveguide, *Chih-Hao Pai[1], Cheng-Cheng Kuo[2], Ming-Wei Lin[2], Jyhpyng Wang[2,1], Szu-yuan Chen[2,3], Jiunn-Yuan Lin[4]; [1]Dept. of Physics, Natl. Taiwan Univ., Taiwan, [2]Inst. of Atomic and Molecular Sciences, Academia Sinica, Taiwan, [3]Dept. of Physics, Natl. Central Univ., Taiwan, [4]Dept. of Physics, Natl. Chung Cheng Univ., Taiwan.* Enhancement of relativistic third-harmonic generation by using a periodic plasma waveguide is achieved. Resonant dependence of harmonic intensity on plasma density modulation parameters is observed, which is a distinct characteristic of quasi-phase matching.

JFA5 • 9:15 a.m.
Two Mechanisms of High Harmonic Generation from Overdense Laser Plasmas—Relativistic and Non-Relativistic, *Robin S. Marjoribanks[1], C. Thaury[2], Fabien Quéré[2], Jean-Paul Geindre[3], Patrick Audebert[3], Pascal Monot[2], Philippe Martin[2]; [1]Univ. of Toronto, Canada, [2]Service des Photons, Atomes et Molécules (DSM/DRECAM), CEA, France, [3]LULI-CEA/CNRS/Ecole Polytechnique, France.* High harmonics from ultra-intense laser-matter interaction can be generated by both linear means and by relativistic means. In experiments up to a few 1019 Wcm^{-2}, we show the distinctions and means to control each.

CFE • Hollow Waveguides—Continued

CFE4 • 9:00 a.m.
Identification of the Band-Edge Cladding Modes of a Hollow-Core Photonic Crystal Fibre, *Francois Couny[1], Fetah Benabid[1], Peter John Roberts[2], Mathew T. Burnett[1], Stefan A. Maier[1]; [1]Physics Dept., Univ. of Bath, UK, [2]COM, Technical Univ. of Denmark, Denmark.* The cladding-modes adjacent the photonic bandgap of a hollow-core photonic crystal fiber are identified. The results show that the bandgap is due to three types of resonators: the glass-apex, the silica-strut, and the air hole.

CFE5 • 9:15 a.m.
Characterization of Index Changes in Silicone- and Nonsilicone-Based Hydrogel Polymers Induced by Femtosecond Micromachining, *Li Ding[1], Richard I. Blackwell[2], Jay F. Künzler[2], Wayne H. Knox[1]; [1]Univ. of Rochester, USA, [2]Bausch & Lomb, USA.* Diffraction gratings and optical waveguides are micro-machined inside hydrogel polymers containing up to 80% water using a 93 MHz Ti:Sapphire femtosecond laser with 27 fs pulses. Index changes as large as +0.06 are observed.

CFF • Ultrafast Pulse Characterization I—Continued

CFF5 • 9:00 a.m.
Sinusoidal Phase Modulation as a Gate for FROG, *Nicolas K. Fontaine, Ryan P. Scott, Jonathan P. Heritage, Brian H. Kolner, S. J. Ben Yoo; Dept. of Electrical and Computer Engineering, Univ. of California at Davis, USA.* A sinusoidal phase-modulation gate for cross-correlation frequency-resolved optical gating (PM-FROG) is demonstrated. This low-loss, linear gating technique can be used without separate gate characterization via a blind FROG algorithm with a simple intensity constraint.

CFF6 • 9:15 a.m.
Complex-Pulse Characterization Using a One Dimensional Scheme, *Balakisbore Yellampalle, Elbert E. M. Chia, Kiyong Kim, Richard D. Averitt, Antoinette J. Taylor; Los Alamos Natl. Lab, USA.* We show that complex pulses can be measured using autocorrelation, fundamental and second harmonic spectra (or with the first and second order interferometric autocorrelations). Our approach also differentiates pulses with indistinguishable autocorrelation and fundamental spectrum.

QFA • Nonlinear Nano-Optics—Continued

QFA4 • 9:00 a.m.
Pulsewidth Dependent Nonlinear Absorption in Au Films, *Nir Rotenberg[1], Alan D. Bristow[2], Markus Pfeiffer[3], Markus Betz[4], Henry M. van Driel[1]; [1]Dept. of Physics, Univ. of Toronto, Canada, [2]JILA, Univ. of Colorado at Boulder, USA, [3]Univ. Stuttgart, Physikalisches Inst., Germany, [4]Physik-Dept., Technische Univ. München, Germany.* Z-scans of 20 nm Au films at 630 nm show strong pulse-width dependence of nonlinear absorption that is characteristic of electron heating; effective beta increases > 100* as pulse width increases from 0.1-6 ps.

QFA5 • 9:15 a.m.
Near-Field Imaging of Second Harmonic Generation from Ellipsoidal Gold Nanoparticles, *Margherita Zavelani-Rossi[1], Michele Celebrano[1], Dario Polli[1], Paolo Biagioni[1], Marco Finazzi[1], Lamberto Duo'[1], Orazio Svelto[1], Giulio Cerullo[1], Massimiliano Labardi[2], Maria Allegrini[2], Johan Grand[3], Pierre-Michel Adam[3]; [1]Dept. di Fisica, Politecnico di Milano, Italy, [2]Dept. di Fisica, Univ. di Pisa, Italy, [3]LNIO, Univ. de Technologie de Troyes, France.* Second-harmonic generation by single gold nanofabricated particles is experimentally investigated by a non-linear near field scanning optical microscope. The nanoscale nonlinear response is found to strongly depend on surface plasmon resonances and on local morphology.

QFB • Spin Dynamics—Continued

QFB5 • 9:00 a.m. Invited

Ultrafast Enhancement of Ferromagnetism via Photoexcited Holes in GaMnAs, *Jigang Wang[1,2], I. Cotoros[1,2], K. M. Dani[1,2], D. S. Chemla[1,2], X. Liu[3], J. K. Furdyna[3]; [1]Lawrence Berkeley Natl. Lab, USA, [2]Univ. of California at Berkeley, USA, [3]Univ. of Notre Dame, USA.* We report on ultrafast photoenhanced ferromagnetism and para- to ferromagnetic phase transition, on a 100-ps time scale, due to a transient enhancement of Curie temperature via a population of photoexcited carriers in III-Mn-V semiconductor GaMnAs.

CFG • Optical Trace Gas Detection—Continued

CFG5 • 9:00 a.m.

Spectroscopic Study of Simulant for VX Nerve Agent in a Wide Frequency Range, *Renbo Song[1], Yujie J. Ding[1], Yuliya B. Zotova[2], Janet L. Jensen[3]; [1]Lehigh Univ., USA, [2]ArkLight, USA, [3]RDECOM Edgewood Chemical Biological Ctr., USA.* For the first time, we have identified eighteen new absorption peaks from Malathion which is used as a simulant for VX nerve agent in a spectral range from 15 to 6000 wave numbers.

CFG6 • 9:15 a.m.

Airborne Difference Frequency Spectrometer for Ultra Sensitive Formaldehyde Measurements, *Petter Weibring, Dirk Richter, James G. Walega, Alan Fried; Natl. Ctr. for Atmospheric Res., USA.* An airborne, difference-frequency generation mid-IR spectrometer for ultra sensitive measurements of formaldehyde at 3.5 µm is described. The system performance is assessed during three airborne field missions, yielding sensitivities of ~20 pptv (Absorbance ~7*10-7).

CFH • High-*Q* Microresonators and Devices I—Continued

CFH4 • 9:00 a.m.

Electro-Optically Tunable Microring Resonators Based on Single-Crystalline $LiNbO_3$ Thin Films, *Gorazd Poberaj, Andrea Guarino, Peter Gunter; ETH Zurich, Switzerland.* We present the first demonstration of electro-optically tunable microring wavelength filters in submicrometer-thick $LiNbO_3$ films fabricated by crystal ion slicing and wafer bonding techniques. A tunability of 0.14 GHz/V has been measured at 1550 nm.

CFH5 • 9:15 a.m.

Demonstration of High-*Q* Microdisk Resonators: Fabrication and Nonlinear Properties, *Tobias J. Kippenberg[1], Kerry Vahala[2]; [1]Max Planck Inst. of Quantum Optics, Germany, [2]Caltech, USA.* Fabrication of high-*Q* silica micro-disk resonators on silicon chip is reported with *Q*-factors exceeding 50 million. Applications to nonlinear optics and erbium microlasers presented.

CFI • High Power Fiber Lasers and Amplifiers—Continued

CFI5 • 9:00 a.m.

20W Single-Frequency Fiber Laser Operating at 1.93 µm, *Denis Gapontsev[1], Nicholai Platonov[1], Mikhail Meleshkevich[1], Oleg Misbechkin[1], Oleg Shkurikhin[1], Soren Agger[2], P. Varming[2], J. H. Povlsen[2]; [1]IPG Photonics, USA, [2]Koheras A/S, Denmark.* We have demonstrated a high power Tm-doped fiber laser system operating at 1.93µm. The DFB fiber laser with 20mW output power is amplified in a Tm-doped all-fiber amplifier system to the output power of 20W.

CFI6 • 9:15 a.m.

High Power Single-Ended Yb-Doped Fiber ASE Source, *Pu Wang, Jayanta K. Sahu, W. A. Clarkson; Optoelectronics Res. Ctr., UK.* High-power operation of fiber-based ASE sources is reported. Using single-stage and two-stage cladding-pumped ytterbium-doped fiber configurations we obtained 62W and 122W of broadband ASE output respectively. The prospects for further improvement in performance are considered.

JFB • Joint Symposium on THz Spectroscopy—Continued

JFB5 • 9:00 a.m.

Intrinsic Photoconductivity of P3HT Films Measured by Time-Resolved THz Spectroscopy, *Okan Esenturk[1], Joseph S. Melinger[2], Edwin J. Heilweil[3]; [1]Univ. of Maryland, USA, [2]U.S. NRL, USA, [3]NIST, USA.* Intrinsic photoconductivities of P3HT polymers were measured and compared by using optical pump-THz probe spectroscopy. The charge carrier mobility shows a clear dependence on the molecular weight and dispersion index of the polymers.

JFB6 • 9:15 a.m.

Broadband THz Time-Domain Spectroscopy of Single-Wall Carbon Nanotubes, *Hisaaki Nishimura[1], Nobutsugu Minami[2], Ryo Shimano[1]; [1]Dept. of Physics, Univ. of Tokyo, Japan, [2]Nanotechnology Inst., Natl. Inst. of Advanced Industrial Science and Technology (AIST), Japan.* Complex dielectric function of single-wall carbon nanotubes (SWNTs) is determined by terahertz time-domain spectroscopy from 0.2 to 20 THz. The real part exhibits extremely large value below 1THz, indicating the response of small gap SWNTs.

NOTES

CFA • Nd Lasers—Continued

CFA7 • 9:30 a.m.
Repetition-Rate-Stabilized High Power Passively Q-Switched Nd:YAG Microchip Laser, *Jianwu Ding, Allen Geiger; Akamai Physics, Inc., USA.* A compact diode-pumped passively Q-switched Nd:YAG microchip laser capable of 1-5kHz adjustable repetition-rate-stabilized pulses using an appropriate pump modulation technique was developed. It outputs linearly-polarized pulses with 3ns pulsewidth, 100μJ energy and <1% jitter.

CFB • Laser Sources for Active Optical Sensing—Continued

CFB4 • 9:30 a.m.
Broadly Tunable Single-Mode Quantum Cascade Laser Source, *Benjamin G. Lee[1], Ross Audet[1], Jim MacArthur[1], Mikhail Belkin[1], Laurent Diehl[1], Christian Pflügl[1], Federico Capasso[1], David Bour[2], Scott Corzine[2], J. Xbu[2], Gloria Hoefler[2]; [1]Harvard Univ., USA, [2]Agilent Labs, USA.* We construct a compact broadly tunable single mode quantum cascade laser source that can be used for mid-infrared spectroscopy. The source consists of an array of closely-spaced distributed feedback lasers and a CMOS controller.

CFC • Imaging of Tissue and Cancer—Continued

CFC7 • 9:30 a.m.
Inhomogeneity Localization in Scattering Media Based on an Optical Diffusion Model, *Guangzbi Cao, Charles A. Bouman, Kevin J. Webb; Purdue Univ., USA.* A fast approach for detecting and localizing an inhomogeneity in a tissue-like scattering medium is presented. The probability of detection and sensitivity describe the capability of such a measurement system, providing information for instrument design.

CFD • Stimulated NLO Processes—Continued

CFD7 • 9:30 a.m.
Beam Cleanup of a Pulsed Multimode Fiber Master-Oscillator Power-amplifier at 1.55 μm Using Stimulated Brillouin Scattering, *Bastien Steinbausser[1], Arnaud Brignon[1], Eric Lallier[1], Jean-Pierre Huignard[1], Patrick Georges[2]; [1]Thales Res. and Technology France, France, [2]Lab Charles Fabry de l'Inst. d'Optique, France.* We present a large core Er:Yb co-doped fiber amplifier followed by a beam quality recovery system. The multimode output (220μJ, M2~6) is converted in a good quality beam (M2=1.6, 110μJ) through SBS beam cleanup.

JFA • Harmonic and X-Ray Generation in Plasmas—Continued

JFA6 • 9:30 a.m.
Corrugated Plasma Waveguide: Slow Wave Structure for High Intensity Optical Pulses, *Brian Layer, Andrew York, Sanjay Varma, Yu-Hsin Chen, Howard Milchberg; Univ. of Maryland at College Park, USA.* Up to 4 cm long corrugated plasma waveguides are generated in clustered hydrogen, nitrogen, and argon gas jets. The corrugation period is as short as 70μm with relative modulation amplitudes up to ~20%.

CFE • Hollow Waveguides—Continued

CFE6 • 9:30 a.m.
Drawing-Induced Index Anisotropy in Single-Material Endlessly Single-Mode Microstructured Optical Fibers, *Benoit Sevigny[1], Mathieu Faucher[2], Nicolas Godbout[1], Suzanne Lacroix[1]; [1]Ecole Polytechnique de Montreal, Canada, [2]ITF Labs, Canada.* We report evidence of frozen-in viscoelastic strain and viscosity gradient arising from fiber drawing of pure silica endlessly single-mode holey optical fiber through phase retardation measurements. Tomographic reconstruction indicates non-uniform stress distribution during cooling.

CFF • Ultrafast Pulse Characterization I—Continued

CFF7 • 9:30 a.m.
Pulse Phase Reconstruction Using Optical Ultrafast Differentiation, *Fangxin Li, Yongwoo Park, José Azaña; Inst. Natl. de la Recherche Scientifique (INRS), Canada.* We introduce a simple, linear technique based on all-optical temporal differentiation for recovering the phase profile of optical waveforms from intensity measurements. We demonstrate characterization of low-power complex pulses in the sub-picosecond to nanosecond range.

QFA • Nonlinear Nano-Optics—Continued

QFA6 • 9:30 a.m.
Multipolar Interference in Second-Order Responses of Gold Nanoparticles, *Sami Kujala[1], Brian K. Canfield[1], Martti Kauranen[1], Yuri Svirko[2], Jari Turunen[2]; [1]Tampere Univ. of Technology, Finland, [2]Univ. of Joensuu, Finland.* We demonstrate experimentally that higher multipole radiation constitutes up to 20% of the total second-harmonic field amplitude emitted by an array of gold nanoparticles.

9:45 a.m. – 10:15 a.m. COFFEE BREAK, 300 LEVEL FOYER

ROOM 337	ROOM 338	ROOM 339	ROOM 340	ROOM 341
QELS	CLEO			JOINT

QFB • Spin Dynamics—Continued

QFB6 • 9:30 a.m.
Ultrafast Spin Dynamics in Manganese Doped GaN, *Nils Janssen[1], Tim Thomay[1], Markus Beyer[1], Alfred Leitenstorfer[1], Ulrich Rüdiger[1], Rudolf Bratschitsch[1], Tobias Graf[2], Mario Gjukic[2], Martin S. Brandt[2]; [1]Dept. of Physics and Ctr. for Applied Photonics, Univ. of Konstanz, Germany, [2]Walter Schottky Inst., Technische Univ. München, Germany.* We perform time-resolved Faraday rotation measurements on GaMnN. For the first time, we are able to deliberately excite and probe the "Mn^{2+} + hole" complex in this material.

CFG • Optical Trace Gas Detection—Continued

CFG7 • 9:30 a.m.
Petrochemical Gas Speciation Using a Rapid Widely-Tunable Mid-IR Laser Spectrometer, *Douglas J. Bamford, Scott J. Sharpe, Aaron Van Pelt, David J. Cook; Physical Sciences Inc., USA.* Species mole fractions in a mixture of hydrocarbons were measured with an accuracy of better than 2% using a fast-sweeping, widely-tunable spectrometer based on difference-frequency generation in periodically poled lithium niobate waveguides.

CFH • High-*Q* Microresonators and Devices I—Continued

CFH6 • 9:30 a.m.
Photonic Crystals (PC) in Diamond: Cavity *Q*-Mode Volume Influence on the Design, *Igal Bayn, Joseph Salzman; Technion, Israel.* We present a qualitative analysis of mode volume influence on a planar PC cavity *Q* in diamond. The results are supported by 3-D FDTD calculations on double heterostructures (DHs). The highest *Q*=135,000 is demonstrated.

CFI • High Power Fiber Lasers and Amplifiers—Continued

CFI7 • 9:30 a.m.
Mode Field Adaptation for High Power Fiber Lasers, *Mathieu Faucher, Yannick K. Lize; ITF Labs, Canada.* Low-loss all-fiber® mode field adapters for a variety of single and multimode fibers have been developed using a flexible fabrication technique. Combination of thermal-core-expansion and tapering characteristics ensures beam quality for fiber lasers and amplifiers.

JFB • Joint Symposium on THz Spectroscopy—Continued

JFB7 • 9:30 a.m.
Observation of Soft-Mode Hardening and Broadening in $SrTiO_3$ Thin Films by Broadband Terahertz Time-Domain Spectroscopy, *Ikufumi Katayama, Hiroshi Shimosato, Masaaki Ashida, Iwao Kawayama, Masayoshi Tonouchi, Tadashi Itoh; Osaka Univ., Japan.* Complex dielectric constants of $SrTiO_3$ thin films have been measured using the broadband terahertz time-domain spectroscopy. The broad detection-bandwidth of the photoconductive antenna enables us to clarify soft-mode dispersions as well as the TO_2 mode.

9:45 a.m. – 10:15 a.m. COFFEE BREAK, 300 LEVEL FOYER

NOTES

10:15 a.m. – 12:00 p.m.
CFJ • Yb Lasers

Daniel J. Ripin; MIT Lincoln Lab, USA, Presider

CFJ1 • 10:15 a.m.
On-Chip, Ultra-Low Threshold Yb Silica Laser, *Eric P. Ostby, Lan Yang, Kerry J. Vahala; Caltech, USA.* A novel Yb:SiO_2 fiber-coupled laser on a silicon chip was fabricated using a solution-gel process. We report a record-low pump threshold of 2 µW, and discuss the practical advantages of Yb microlasers.

CFJ2 • 10:30 a.m.
Compact Multi-Pass Ring Laser Using LHPG-Grown Yb:YAG Crystal Fiber, *Jui-Yun Yi[1], Kuang-Yao Huang[2], Chien-Chih Lai[1], Hsin Peng[2], Li-Hsuan Chen[2], Jian-Cheng Chen[2], Sheng-Lung Huang[1,3]; [1]Graduate Inst. of Electro-Optical Engineering, Natl. Taiwan Univ., Taiwan, [2]Inst. of Electro-Optical Engineering, Natl. Sun Yat-Sen Univ., Taiwan, [3]Dept. of Electrical Engineering, Natl. Taiwan Univ., Taiwan.* Yb:YAG crystal fiber was fabricated by laser-heated pedestal growth method for the first time. It was applied in a multi-pass ring laser with 54.7% slope efficiency, which is higher than 50.3% of using bulk Yb:YAG.

10:15 a.m. – 12:00 p.m.
CFK • Tapered Photonic Crystal Fibers

Benjamin J. Eggleton; Univ. of Sydney, Australia, Presider

CFK1 • 10:15 a.m.
Pulse Compression in Dispersion Decreasing Photonic Crystal Fiber, *J. C. Travers[1], B. A. Cumberland[1], A. B. Rulkov[1], S. V. Popov[1], J. R. Taylor[1], J. M. Stone[2], A. K. George[2], J. C. Knight[2]; [1]Femtosecond Optics Group, Dept. of Physics, Imperial College, UK, [2]Ctr. for Photonics and Photonic Materials, Dept. of Physics, Univ. of Bath, UK.* We report dispersion decreasing photonic-crystal-fibers for soliton compression at 1.06µm. Fibers 15-60m long with dispersion varying from 40-0ps.nm-1.km-1 were used to achieve compression ratios of over 15. Pulses of 655fs were compressed to 43fs solitons.

CFK2 • 10:30 a.m.
Up-Tapering of Optical Fibers Using a Conventional Flame Tapering Rig, *George Kakarantzas, Luis Prill-Sempere, Philip St.J Russell; Max-Planck Res. Group (IOIP), Univ. of Erlangen-Nuremberg, Germany.* We demonstrate the fabrication of low-loss up-tapers in SMF-28 using a conventional tapering rig. Waist diameters of 240 µm, uniform over several cm, have been produced. The technique also works for photonic crystal fibers.

10:15 a.m. – 12:00 p.m.
CFL • Optical Coherence Tomography

Xingde Li; Univ. of Washington, USA, Presider

CFL1 • 10:15 a.m.
Optical Coherence Tomography Phase Microscopy Using Buffered Fourier Domain Mode Locked (FDML) Lasers at up to 370,000 Lines per Second, *Desmond C. Adler[1], Robert Huber[2], James G. Fujimoto[1]; [1]MIT, USA, [2]Ludwig Maximilians Univ., Germany.* Buffered FDML lasers are applied for phase-sensitive sub-nanometer OCT phase microscopy and dynamic surface displacement measurements at speeds up to 370,000 axial lines per second. Excellent phase stability is demonstrated at high speeds.

CFL2 • 10:30 a.m.
High-Resolution OCT Balloon Catheter for Systematic Imaging of the Esophagus, *Henry L. Fu[1], Michael J. Cobb[1], Yuxin Leng[1], Daniel J. MacDonald[1], Joo Ha Hwang[2], Xingde Li[1]; [1]Dept. of Bioengineering, Univ. of Washington, USA, [2]Dept. of Medicine (GI division), Univ. of Washington,, USA.* An OCT balloon imaging catheter was developed using small compound rod lenses to achieve superb lateral resolution at a large working distance. The balloon catheter enables systematic assessment of human esophagus for Barrett's screening.

10:15 a.m. – 12:00 p.m.
CFM • Miscellaneous NLO

George Wong; Hong Kong Univ of Science & Technology, Hong Kong, Presider

CFM1 • 10:15 a.m.
First Experimental Demonstration of a SOA/DFB-LD Feedback Scheme Based All-Optical Flip-Flop, *Wouter D'Oosterlinck[1], Geert Morthier[1], Roel Baets[1], Jakob Buron[2], Filip Öhman[2]; [1]Dept. of Information Technology, Belgium, [2]COM•DTU Dept. of Communications, Optics & Materials, Denmark.* Dynamic optical flip-flop operation is observed using a DFB laser diode connected with a SOA. Switching times of 150ps for switch pulse energies of 6pJ and a repetition rate of 500MHz have been measured.

CFM2 • 10:30 a.m.
Room Temperature Semiconductor Source of Twin Photons, *Loic Lanco[1], Sara Ducci[1], Jean-Pierre Likforman[1], Xavier Marcadet[2], Jeroen Van Houwelingen[3], Hugo Zbinden[3], Giuseppe Leo[1], Vincent Berger[1]; [1]Lab Matériaux et Phénomènes Quantiques, France, [2]Alcatel-Thales III-V Lab, France, [3]Univ. de Genève, Switzerland.* We present an integrated source of twin photons in the telecom range based on the generation of parametric fluorescence in a semiconductor waveguide. Time-correlation and spectral measurements are performed on this new type of source.

10:15 a.m. – 12:00 p.m.
JFC • Atoms and Molecules in Strong Fields

Bernd Witzel; Univ. Laval, Canada, Presider

JFC1 • 10:15 a.m.
Photoelectron Angular Distributions from the Single Atom Response to a Relativistic Laser Field, *Anthony DiChiara, Isaac Ghebregziabiher, Rob Sauer, Barry C. Walker; Univ. of Delaware, USA.* Photoelectron angular distributions were measured for argon atoms at intensities up to 5 1018W/cm². It was found the isotropy increased with intensity and, at a fixed intensity, the lowest energy electrons exhibit the highest isotropy.

JFC2 • 10:30 a.m.
Intense Field Ionization of Methane, Butane, and Octane: Transition from Molecular to Atomic Response, *Sasi Palaniyappan, Rob Mitchell, Rob Sauer, Barry C. Walker; Univ. of Delaware, USA.* Ionization yields of C^{+n} (n<6) from the ionization of methane, butane, pentane, and octane are measured from 10^{13}W/cm² to 10^{16}W/cm², as one reaches 10^{16}W/cm² the molecular response becomes atomic-like.

10:15 a.m. – 11:00 a.m.
CFN • Quasi-Phase-Matched Materials/ Ferroelectrics

Sunao Kurimura; Natl. Inst. for Materials Science, Japan, Presider

CFN1 • 10:15 a.m. Invited
Ferroelectric Photonic Structures: Characterization and Device Demonstration, *A. H. Kung[1,2]; [1]Inst. of Atomic and Molecular Sciences, Academia Sinica, Taiwan, [2]Dept. of Photonics, Natl. Chiao-Tung Univ., Taiwan.* Novel optical devices made possible by advances in the development of ferroelectric photonic structures are described. The devices include a monolithic RGB light source, a tunable UV source, and devices created from 2-D photonic structures.

10:15 a.m. – 12:00 p.m.
CFO • Ultrashort Pulse Characterization II

Fiorenzo Omenetto; Los Alamos Natl. Lab, USA, Presider

CFO1 • 10:15 a.m.
Spatio-Temporal and Interferometric Characterisation of Sub-5-fs Pulses Obtained by Filamentation, *Annalisa Guandalini[1], Amelle Zair[1], Florian Schapper[1], Mirko Holler[1], Lukas Gallmann[1], Jens Biegert[1], Ursula Keller[1], Arnaud Couairon[2], Michel Franco[3], Andre Mysyrowicz[3]; [1]Physics Dept., ETH Zurich, Switzerland, [2]Ecole Polytechnique, CNRS, France, [3]Ecole Polytechnique, France.* We demonstrate new world-record pulse duration of only 4.9 fs with filamentation pulse compression, performed full spatio-temporal characterization and used an interferometric technique to experimentally determine the plasma concentration in the filament.

CFO2 • 10:30 a.m.
Spectral Shearing Interferometry with Spatially Chirped Beams, *Simon-Pierre Gorza, Piotr Wasylczyk, Ian A. Walmsley; Oxford Univ., UK.* We demonstrate a new SPIDER implementation relies on the two-dimensional interferogram between two spatially chirped pulse replicas. The device calibration and the spectral phase reconstruction for various shear values are performed from a single interferogram.

10:15 a.m. – 12:00 p.m.
QFC • Plasmons and Cavities

Anvar Zakhidov; Honeywell Intl. Inc, USA, Presider

QFC1 • 10:15 a.m.
Enhancement of Luminescence Efficiency Using Surface Plasmon Polaritons, *Greg Sun[1], Jacob B. Khurgin[2], Richard A. Soref[3]; [1]Univ. of Massachusetts at Boston, USA, [2]Johns Hopkins Univ., USA, [3]AFRL, USA.* Using GaN/Ag system, our rigorous theory shows that the enhancement of spontaneous emission from a light-emitting device via coupling with the surface plasmon polaritons pays off only for emitters that have low luminescence efficiency.

QFC2 • 10:30 a.m.
Nano-Optics for Chemical and Materials Characterization, *Michael R. Beversluis, Stephan J. Stranick; NIST, USA.* We have developed a hybrid microscope which combines structured-illumination techniques with Raman-spectroscopy to record 100 nm resolution images with chemically-specific contrast. We will show images of semiconductor nanostructures and discuss the technique's advantages and requirements.

QELS

CLEO

10:15 a.m. – 12:00 p.m. QFD • Dynamics of Dots, Wires and Tubes

Carlo Piermarocchi; Michigan State Univ., USA, Presider

QFD1 • 10:15 a.m.
Acoustic Phonon Damping of Rabi Oscillations in In(Ga)As Quantum Dots, *Thomas Müller, Thomas Moldaschl, Sebastian Golka, Gottfried Strasser, Karl Unterrainer; Inst. of Photonics and Ctr. for Micro- and Nanostructures, Austria*. Excitonic ground state Rabi oscillations in In(Ga)As quantum dots are studied via an ultrafast spectral hole burning technique. From comparison with frequency domain data we find that acoustic phonon-induced dephasing processes damp the oscillations.

QFD2 • 10:30 a.m.
Fast Intraband Capture and Relaxation in InAs/GaAs Self-Assembled Quantum Dots, *Evgeny A. Zibik[1], Stefan Menzel[1], Pantelis Aivaliotis[1], Ben A. Carpenter[1], John W. Cockburn[1], Maurice S. Skolnick[1], Luke R. Wilson[1], Thomas Grange[2], Robson Ferreira[2], Gerald Bastard[2], Dominik Stehr[3], Stephan Winnerl[3], Manfred Helm[3], Matthew J. Steer[4], Mark Hopkinson[4]; [1]Dept. of Physics and Astronomy, Univ. of Sheffield, UK, [2]Ecole Normale Supérieure, France, [3]Forschungszentrum Rossendorf, Germany, [4]EPSRC Natl. Ctr. for III-V Technologies, UK*. Electron capture and relaxation processes in n-type InAs/GaAs quantum dots were investigated using mid-infrared degenerated pump-probe spectroscopy. Fast (~4-10ps) intraband relaxation/capture times were measured even in the absence of electron-hole scattering.

10:15 a.m. – 11:15 a.m. CFP • PMD and Microwave Photonics

P. K. A. Wai; Hong Kong Polytechnic Univ., Hong Kong, Presider

CFP1 • 10:15 a.m.
High Speed, Broadband PMD Measurements via Efficient Spectral Polarimetry, *Li Xu, Shawn X. Wang, Andrew M. Weiner; ECE Purdue Univ., USA*. We experimentally demonstrate near-real-time broadband Polarization Mode Dispersion (PMD) measurements utilizing high speed spectral polarimetry. PMD was calculated and compared using three established methods.

CFP2 • 10:30 a.m.
Broadband All-Order Polarization Mode Dispersion Compensation by Characterization and Inversion of Jones Matrices on a Wavelength-by-Wavelength Basis, *Houxun Miao[1], Andrew M. Weiner[1], Leo Mirkin[2], Peter J. Miller[2]; [1]Purdue Univ., USA, [2]CRI Inc, USA*. We demonstrate full polarization mode dispersion (PMD) compensation of subpicosecond pulses passing through a PMD module with ~ 5.5 picoseconds mean differential group delay (DGD) by wavelength-by-wavelength characterization and inversion of Jones matrices.

10:15 a.m. – 12:00 p.m. CFQ • High-*Q* Microresonators and Devices II

Susumu Noda; Kyoto Univ., Japan, Presider

CFQ1 • 10:15 a.m. Invited
Photon Trapping, Delaying and Dynamic-Control Using Ultra-Small High-*Q* Photonic Crystal Cavities, *Takasumi Tanabe, Masaya Notomi, Eiichi Kuramochi, Akihiko Shinya, Hideaki Taniyama; NTT Basic Res. Labs, NTT Corp., Japan*. By employing ultra-small high-*Q* photonic crystal nanocavities, we demonstrated 1-ns photon trapping and 1.45-ns pulse delaying. The corresponding light speed is 5,800 km/s. We also demonstrated dynamic tuning of the *Q* within the photon lifetime.

10:15 a.m. – 12:00 p.m. CFR • Ultrashort Pulse Microfabrication and Ablation

Andreas Ostendorf; Laser Zentrum Hannover e.V., Germany, Presider

CFR1 • 10:15 a.m. Invited
Micro and Nanostereolithography for Production of Lab-on-a-Chip Devices, *Shoji Maruo[1,2]; [1]Yokohama Natl. Univ., Japan, [2]PRESTO, Japan Science and Technology Agency, Japan*. All optically controlled biochips have been developed by using two-photon microstereolithography. The biochip contains optically driven micromachines such as micropumps and micromanipulators. The versatile biochip offers advanced processes in chemical synthesis and cell analysis.

10:15 a.m. – 12:00 p.m. CFS • THz Spectroscopy

Richard D. Averitt; Los Alamos Natl. Lab, USA, Presider

CFS1 • 10:15 a.m. Invited
Terahertz Time-Domain Spectroscopy of Crystalline and Aqueous Systems, *Peter U. Jepsen[1], Uffe Møller[1], Finn Eichhorn[1], Hannes Merbold[2], Jacob R. Folkenberg[3], Stewart Clark[4]; [1]Technical Univ. of Denmark, Denmark, [2]Freiburg Univ., Germany, [3]Foss Analytical A/S, Denmark, [4]Univ. of Durham, UK*. We use ab-initio Density-Functional Perturbation Theory together with THz spectroscopy for precise prediction and assignment of vibrational modes in molecular crystals. We show that THz spectroscopy is useful for analysis of liquids and food products.

NOTES

CFJ • Yb Lasers—Continued

CFJ3 • 10:45 a.m.
Segmented Growth of Monoclinic Yb:KY(WO$_4$)$_2$/KY(WO$_4$)$_2$ and Its Laser Operation, *Simon Rivier[1], Valentin Petrov[1], Uwe Griebner[1], Andreas Gross[2], Sophie Vernay[2], Volker Wesemann[2], Daniel Rytz[2]; [1]Max-Born-Inst., Germany, [2]FEE GmbH, Germany.* Composite Yb:KY(WO$_4$)$_2$ grown on KY(WO$_4$)$_2$ substrates by segmented growth showed highly efficient continuous-wave laser operation with slope efficiencies as high as 80% and 375 mW output power was demonstrated.

CFJ4 • 11:00 a.m.
Tunable Laser Operation of Yb:NaY(WO$_4$)$_2$, *Xavier Mateos[1], Simon Rivier[1], Uwe Griebner[1], Valentin Petrov[1], Alberto García-Cortés[2], José M. Cano-Torres[2], María D. Serrano[2], Concepción Cascales[2], Carlos Zaldo[2]; [1]Max-Born-Inst., Germany, [2]Inst. de Ciencia de Materiales de Madrid, Consejo Superior de Investigaciones Cientificas, Spain.* CW laser operation of Yb^{3+} in a Czochralski-grown disordered NaY(WO$_4$)$_2$ crystal is demonstrated. The tunability extends from 1003.7 to 1073 nm. The maximum slope efficiency and output power are 74.6% and 463 mW, respectively.

CFK • Tapered Photonic Crystal Fibers—Continued

CFK3 • 10:45 a.m. Tutorial
Photonic Crystal Fiber Tapers and Devices, *Tim Birks; Univ. of Bath, UK.* Tapering (heat treatment after fabrication) can radically change the properties of photonic crystal fibres over centimetre lengths. Such transitions give useful fibre devices, including low-loss interfaces to dissimilar fibres, waveguides and other optical systems.

CFL • Optical Coherence Tomography—Continued

CFL3 • 10:45 a.m. Invited
Advances in Optical Coherence Tomography: Frequency Domain Technology and Applications, *Seok-Hyun (Andy) Yun; Harvard Medical School and Wellman Ctr., Massachusetts General Hospital, USA.* Frequency-domain optical coherence tomography, using rapidly-swept tunable lasers, offers dramatically-improved imaging speeds and opens up new applications such as comprehensive microscopy in living patients. This talk reviews these recent advances.

CFM • Miscellaneous NLO—Continued

CFM3 • 10:45 a.m.
3-D Integration of Continuum Generation and Carving on a Silicon Chip, *Prakash Koonath, Babram Jalali; Dept. of Electrical Engineering, Univ. of California at Los Angeles, USA.* An attempt at creating a multi-wavelength silicon light source is reported. Self phase modulation is used to broaden the spectrum of an off-chip seed pulse. The spectrum is filtered into discrete channels using vertically-coupled microresonators.

CFM4 • 11:00 a.m.
Generation of Continuous-Wave 17.6 THz Pulse Train, *Shin-ichi Zaitsu[1], Chihiro Eshima[1], Kazuki Ihara[1], Totaro Imasaka[1,2]; [1]Dept. of Applied Chemistry, Kyushu Univ., Japan, [2]Ctr. for Future Chemistry, Kyushu Univ., Japan.* We demonstrated that 17.6-THz pulse-like intensity modulation arising from the coherent superposition of multifrequency continuous-wave emissions generated from a hydrogen-filled high-finesse cavity through a cascade stimulated Raman scattering process.

JFC • Atoms and Molecules in Strong Fields—Continued

JFC3 • 10:45 a.m.
Single-Shot Time Resolved Measurement of Molecular Alignment in Laser-Irradiated Gases, *Sanjay R. Varma[1], Yu-hsin Chen[1], Howard M. Milchberg[1], Ilya Alexeev[2]; [1]Univ. of Maryland, USA, [2]Advanced Technologies and Applications, Inc., USA.* We present single-shot direct measurements of nonlinear refractive index temporal dynamics as effective way to determine instantaneous and non-instantaneous Raman contribution to n2 in molecular gases in the presence of high-intensity femtosecond laser pulses.

JFC4 • 11:00 a.m. Invited
High Field Physics with XUV Pulses from the Free Electron Laser in Hamburg: Atoms and Clusters, *Hubertus Wabnitz[1], Christoph Bostedt[2], Tim Laarmann[3], Ekaterina Eremina[2], Matthias Hoener[2], Heiko Thomas[2], Rubens de Castro[4], Joachim Schulz[5], Thomas Möller[2], Kai Tiedtke[1], Andrei A. Sorokin[6,7], Mathias Richter[7]; [1]Hasylab at DESY, Germany, [2]Technische Univ. Berlin, Germany, [3]Max-Born-Inst., Germany, [4]Brazilian Synchotron Source LNLS, Brazil, [5]MAX-lab, Sweden, [6]Ioffe Physico-Technical Inst., Russian Federation, [7]Physikalisch-Technischen Bundesanstalt (PTB), Germany.* Irradiation of clusters with intense VUV radiation pulses has shown unexpected high energy deposition and ionisation mechanisms different from the optical regime. The extension to shorter wavelengths (XUV) enables the direct ionisation of innershell electrons.

CFN • Quasi-Phase-Matched Materials/Ferroelectrics—Continued

CFN2 • 10:45 a.m.
High Power Continuous-Wave Green Light Generation by Quasi Phase Matching in MgSLT, *Sergey Tovstonog, Sunao Kurimura, Kenji Kitamura; Natl. Inst. for Materials Science (NIMS), Japan.* Single-pass second-harmonic generation of 7 W CW 542 nm radiation with 35.4% efficiency was achieved by QPM in Mg:SLT. The effects of laser linewidth on the SHG efficiency were investigated using a Yb-doped fiber laser.

CFN3 • 11:00 a.m.
E/O Tunable Second-Harmonic-Generation Gratings in Ion-Exfoliated Thin Films of Periodically Poled LiNbO$_3$, *Djordje Djukic[1], Guiem Cerda-Pons[1], Ryan M. Roth[1], Richard M. Osgood[1], Sasha Bakhru[2], Hassaram Bakhru[2]; [1]Columbia Univ., USA, [2]College of Nanoscale Science and Engineering, State Univ. of New York at Albany, USA.* We demonstrate for the first time that thin, single-crystal films fabricated by ion-exfoliation of a bulk PPLN crystal will reduce tuning voltage for electro-optically tunable harmonic generation in PPLN devices.

CFO • Ultrashort Pulse Characterization II—Continued

CFO3 • 10:45 a.m.
Directly Measuring the Spatio-Temporal Electric Field of Ultrashort Pulses in and near a Focus, *Pamela Bowlan, Pablo Gabolde, Rick Trebino; School of Physics, Georgia Tech, USA.* We present the first measurements of the spatio-temporal intensity and phase of an ultrashort pulse in and near a focus. Our method uses a variant of spectral interferometry (SEA TADPOLE) that we recently introduced.

CFO4 • 11:00 a.m.
Exact Solution for Sub-Cycle Pulsed Focused Vector Beams, *Qiang Lin[1,2], Jian Zheng[1], Wilhelm Becker[2]; [1]Zhejiang Univ., China, [2]Max-Born-Inst., Germany.* An accurate description of a sub-cycle pulsed beam is presented, which are exact solutions of Maxwell's equations, and applicable to a focused pulsed beam with a pulse duration down to and below one cycle.

QFC • Plasmons and Cavities—Continued

QFC3 • 10:45 a.m.
Effect of Surface Plasmon Polaritons on Optical Activity in Chiral Metal Nanogratings, *Kuniaki Konishi[1], Tomohiro Sugimoto[1], Konstantins Jefimovs[2], Yuri Svirko[3], Makoto Kuwata-Gonokami[1]; [1]Univ. of Tokyo, Japan, [2]Paul Scherrer Inst., Switzerland, [3]Univ. of Joensuu, Finland.* A relation between the optical activity and the coupling of SPP modes localized at the different interfaces of a chiral nanograting is obtained from the dependence of the polarization rotation on the angle of incidence.

QFC4 • 11:00 a.m.
Surface Plasmon Cavity Ring Down, *Eric R. Eliel, Nikolay V. Kuzmin, Gert W. 't Hooft; Leiden Univ., Netherlands.* We experimentally explore the dynamics of surface plasmons propagating along a smooth gold film as they bounce between two sub-wavelength slits. We observe ring-down features reminiscent of an optical beam in a Fabry-Perot resonator.

QFD • Dynamics of Dots, Wires and Tubes—Continued

QFD3 • 10:45 a.m.
Spin Relaxation in Charge Tunable InP Quantum Dots, *Yasuaki Masumoto, Bipul Pal, Shubei Oguchi, Michio Ikezawa; Inst. of Physics, Univ. of Tsukuba, Japan*. Optically pumped spins of doped electrons are partially preserved up to submillisecond and its dephasing time is 1.7ns. Spin relaxation in charge tunable InP quantum dots was extensively studied by dynamical and static optical orientation.

QFD4 • 11:00 a.m.
Excitonic and Semiconductor Bloch Equation Approaches to Carrier Dynamics in Semiconductors, *Dawei Wang, Marc M. Dignam; Queen's Univ., Canada*. We compare the ultrafast optical response of a nanoring using the semiconductor Bloch equations and our excitonic equations, where phase space filling is included. We demonstrate the potential advantages of the excitonic approach.

CFP • PMD and Microwave Photonics—Continued

CFP3 • 10:45 a.m.
Optical Control of Microwave Phase, *Marc Currie, Janet W. Lou, Igor Vurgaftman; NRL, USA*. The detected phase of a microwave signal modulated on an optical carrier can be modified by driving the photodetector into saturation. We demonstrate a phase change of ~60 degrees at 20 GHz.

CFP4 • 11:00 a.m.
Hybrid Optical Access Network Integrating Baseband and Radio Signals Transmitted on a Single Wavelength, *Chun-Ting Lin[1], Peng-Chun Peng[2], Jason (Jyebong) Chen[1], Cheng-Feng Peng[1], Wei-Ren Peng[1], Bi-Shiou Chiou[3], Sien Chi[1,4]; [1]Inst. of Electro-Optical Engineering, Natl. Chiao-Tung Univ., Taiwan, [2]Natl. Chi Nan Univ., Taiwan, [3]Dept. of Electronics Engineering and Inst. of Electronics, Natl. Chiao-Tung Univ., Taiwan, [4]Yuan Ze Univ., Taiwan*. We propose a hybrid optical access network integrating FTTH and RoF systems sharing a single distributed infrastructure. After transmission over 50km optical fiber, power penalties of baseband and RF signals are less than 0.2dB.

CFQ • High-*Q* Microresonators and Devices II—Continued

CFQ2 • 10:45 a.m.
Ultra Fast Nonlinear Optical Tuning of Photonic Crystal Cavities, *Ilya Fushman[1], Dirk Englund[1], Jelena Vuckovic[1], Edo Waks[2], Nick Stoltz[3], Pierre Petroff[3]; [1]Stanford Univ., USA, [2]Univ. of Maryland, USA, [3]Univ. of California at Santa Barbara, USA*. We demonstrate fast (up to 20 GHz), low power (5 microwatt) modulation of photonic crystal cavities in GaAs containing InAs quantum dots. Modulation is achieved via free carrier injection by an above-band picosecond laser pulse.

CFQ3 • 11:00 a.m.
Free UH-*Q* Microtoroids, New Tools for Designing Photonic Devices, *Mani Hossein-Zadeh, Kerry J. Vahala; Caltech, USA*. We describe techniques that enable fabrication of free UH-*Q* silica microtoroids. Preliminary results show that free resonators with *Q*s above 30 million can be fabricated and transferred to different platforms for integration with photonic devices.

CFR • Ultrashort Pulse Microfabrication and Ablation—Continued

CFR2 • 10:45 a.m.
Variable Pressure Hollow-Core Band-Gap Fiber Cell Produced Using Femtosecond Laser Micromachining, *Christopher J. Hensley, Daniel H. Broaddus, Chris B. Schaffer, Alexander L. Gaeta; Cornell Univ., USA*. We fabricate a high-transmission, variable-pressure gas fiber cell that can operate at low and high pressures. The cell is formed by using femtosecond pulses to drill micrometer-diameter radial capillaries through a hollow-core photonic bandgap fiber.

CFR3 • 11:00 a.m.
Heat Accumulation Effects in Femtosecond Laser Ablation of ITO Thin Films for DEP Trapping Devices, *M. Y. Xu, S. A. Hosseini, H. Zhang, S. M. Eaton, L. D. Lilge, P. R. Herman; Univ. of Toronto, Canada*. Heat accumulation effects, during high repetition rate (0.1 to 2.0 MHz) Yb fiber femtosecond laser ablation of transparent ITO films, are advantageous to pattern transparent microelectrodes for dielectrophoretic trapping of microspheres on a biochip.

CFS • THz Spectroscopy—Continued

CFS2 • 10:45 a.m.
Accurate Modeling of Inter- and Intramolecular Interactions in 1,4-Dihydroxynaphthalene in the 0.5-6 Terahertz Region, *Carlito S. Ponseca[1,2], Marilou Cadatal[1,2], Romeric Pobre[3], Reuben Quiroga[3], Hidetoshi Murakami[4], Shingo Ono[5], Nobuhiko Sarukura[4], Junichi Nishizawa[6], Ken Suto[6], Tetsuo Sasaki[6], Takenori Tanno[6], Keisuke Tominaga[7]; [1]Inst. for Molecular Science, Japan, [2]Graduate Univ. for Advanced Studies, Japan, [3]De La Salle Univ., Philippines, [4]Inst. of Laser Engineering, Osaka Univ., Japan, [5]Nagoya Inst. of Technology, Japan, [6]Semiconductor Res. Inst., Japan, [7]Molecular Photoscience Res. Ctr., Kobe Univ., Japan*. Semi-empirical calculations successfully predicted the terahertz (THz) absorption spectrum associated with intra- and intermolecular interactions in 1,4-dihydroxynaphthalene. Results are in excellent agreement with spectroscopy data in the 0.5-6 THz region using GaP wave THz source.

CFS3 • 11:00 a.m.
High Resolution Terahertz Spectroscopy of Organic Polycrystalline Thin Films Using a Parallel Metal Plate Waveguide, *Joseph S. Melinger[1], N. Laman[2], S. Sree Harsha[2], D. Grischkowsky[2]; [1]NRL, USA, [2]Oklahoma State Univ., USA*. A vibrational line narrowing effect is observed for organic polycrystalline films cast onto the surface of a parallel plate waveguide and results in a more informative THz absorption spectrum when compared to conventional THz spectroscopy.

NOTES

CFJ • Yb Lasers—Continued

CFJ5 • 11:15 a.m.
Composite Yb:YAG/Cr:YAG Ceramics Self-*Q*-Switched Laser, *Jun Dong[1], Akira Shirakawa[1], Ken-ichi Ueda[1], Hideki Yagi[2], Takagimi Yanagitani[2], Alexander A. Kaminskii[3]; [1]Inst. for Laser Science, Univ. Electro-Communications, Japan, [2]Konoshima Chemical Co. Ltd., Japan, [3]Inst. of Crystallography, Russian Acad. of Sciences, Russian Federation.* Composite Yb:YAG/Cr:YAG ceramics was fabricated successfully by using vacuum sintering technique and nanocrystalline technology. Self-*Q*-switched lasers with pulse energy of 125 μJ, and peak power of 105 kW have been demonstrated for the first time.

CFJ6 • 11:30 a.m.
Up-Conversion to the Conduction Band in Highly Doped Yb:YAG and Yb:Y_2O_3 and Its Effect on Thin-Disk Lasers, *Susanne T. Fredrich-Thornton[1,2], Jean-Francois Bisson[1], Dmitrii Kouznetsov[1], Ken-ichi Ueda[1], Klaus Petermann[2], Guenter Huber[2]; [1]Inst. of Laser Science, Japan, [2]Insitut fuer Laser-Physik, Germany.* The photoconductivity of high Yb-concentration YAG and Y_2O_3 samples has been measured, confirming the occurrence of up-conversion in these materials. High intensity pumping reveals a very broadband emission spectrum that exhibits avalanche behaviour.

CFK • Tapered Photonic Crystal Fibers—Continued

CFL • Optical Coherence Tomography—Continued

CFL4 • 11:15 a.m.
Real-Time Imaging of Biological Tissues Using High Resolution Line-Scanning Optical Coherence Microscopy, *Yu Chen, Shu-Wei Huang, Aaron D. Aguirre, James G. Fujimoto; MIT, USA.* A novel line-scanning optical coherence microscope with 2μm x 3μm resolution (transverse x axial), 250μm x 250μm field of view, and 90 dB sensitivity is presented for real time, cellular level imaging.

CFL5 • 11:30 a.m.
Novel S+C+L Broadband Source Based on Semiconductor Optical Amplifiers and Erbium-Doped Fiber for Optical Coherence Tomography, *David Beitel[1], Lionel Carrion[2], Ka-Lun Lee[3], Apurva Jain[1], Lawrence R. Chen[1], Romain Maciejko[2], Thas A. Nirmalathas[3]; [1]Dept. of Electrical and Computer Engineering, McGill Univ., Canada, [2]Dept. de Génie Physique, Ecole Polytechnique de Montreal, Canada, [3]Dept. of Electrical and Electronics Engineering, Univ. of Melbourne, Australia.* We have developed a novel, spectrally-flat S+C+L band source with > 120 nm bandwidth and 4 mW output power based on semiconductor optical amplifiers and an Erbium-doped fiber amplifier for optical coherence tomography imaging applications.

CFM • Miscellaneous NLO—Continued

CFM5 • 11:15 a.m. Invited
Energy Harvesting in Silicon Photonics, *Bahram Jalali, Sasan Fathpour, Kevin K. Tsia; Univ. of California at Los Angeles, USA.* Two-photon absorption is the central problem in silicon photonic devices. Two-photon photovoltaic effect can be used to harvest the lost optical power into useful electrical power.

JFC • Atoms and Molecules in Strong Fields—Continued

JFC5 • 11:30 a.m.
Dramatic Enhancement of High-Order Harmonic Generation in Mixed Gases, *Eiji J. Takahashi[1], Tsuneto Kanai[1], Yasuo Nabekawa[1], Katsumi Midorikawa[1], Kenichi L. Ishikawa[2,3]; [1]RIKEN, Japan, [2]Univ. of Tokyo, Japan, [3]PRESTO (Precursory Res. for Embryonic Science and Technology), Japan.* We demonstrate experimental evidence of the dramatic enhancement effect in a process of high-order harmonic generation. The harmonic yield generated from He atoms increased by a factor of 4000 with booster high-order harmonics from Xe.

CFN • Quasi-Phase-Matched Materials/Ferroelectrics—Continued

CFN4 • 11:15 a.m.
Broadly Tunable mW Level UV Light Generated by Intracavity SFG in a Compact High-*Q* PPMgSLT OPO, *Shih-Yu Tu[1], A. H. Kung[1,2], Sunao Kurimura[3], Kenji Kitamura[3], Takeshi Ikegami[4]; [1]Inst. of Atomic and Molecular Sciences, Academia Sinica, Taiwan, [2]Dept. of Photonics, Natl. Chiao-Tung Univ., Taiwan, [3]Natl. Inst. for Materials Science, Japan, [4]Natl. Inst. of Advanced Industrial Science and Technology, Japan.* A compact multi-kHz UV source tunable from 363nm to 378nm is realized by intracavity SFG in a PPMgSLT OPO. Phase-matched peaks at 334nm and 370nm are observed. A full tuning range of ~58nm is predicted.

CFN5 • 11:30 a.m.
Thin Film Pyrolectric Detector Coated with Multiwall Carbon Nanotubes: Absorptivity and Frequency Response, *John H. Lehman[1], Katherine E. Hurst[1], Antonije M. Radojevic[2], Anne C. Dillon[3], Richard M. Osgood[4]; [1]NIST, USA, [2]Charles Stark Draper Lab, USA, [3]Natl. Renewable Energy Labortatory, USA, [4]Columbia Univ., USA.* The spectral responsivity (600 nm to 1800 nm) of a pyroelectric detector fabricated from crystal ion slicing (CIS) is enhanced by a MWNT coating without substantial penalty to the low-frequency response (4 to 100 Hz).

CFO • Ultrashort Pulse Characterization II—Continued

CFO5 • 11:15 a.m.
Direct UV Pulse Shaping Applied to 3ps Square and Parabolic Pulses, *Thomas Oksenhendler[1], Nicolas Forget[1], David Garzella[2], Olivier Gobert[2], Richard Herzog[1], Philippe Hollander[2], Fabien Lepetit[2]; [1]Fastlite, France, [2]CEA SPAM, France.* Direct UV pulse shaping of square pulses and their measurements are experimentally demonstrated and discussed. We focus on single shot measurement and pulse shaping accuracy.

CFO6 • 11:30 a.m.
Shaped Ultrafast Laser Pulses in the Deep Ultraviolet, *Brett J. Pearson, Thomas C. Weinacht; Stony Brook Univ., USA.* We use an acousto-optic pulse shaper to programmably control the phase and amplitude of femtosecond laser pulses in the deep ultraviolet (260 nm). These pulses will be used in molecular coherent control experiments.

QFC • Plasmons and Cavities—Continued

QFC5 • 11:15 a.m.
Colloidal Quantum Dots in High-*Q* Pillar Microcavities, *Matthias Kahl[1], Tim Thomay[1], Verena Kohnle[1], Katja Beha[1], Joerg Merlein[1], Matthias Hagner[1], Andres Halm[1], Alfred Leitenstorfer[1], Rudolf Bratschitsch[1], Jan Ziegler[2], Thomas Nann[2], Yurij Fedutik[3], Mikhail Artemyev[3], Ulrike Woggon[3], Fabian Pérez-Willard[4]; [1]Univ. Konstanz, Germany, [2]Materialforschungsinstitut Freiburg, Germany, [3]Univ. Dortmund, Germany, [4]Lab fuer Elektronenmikroskopie, Univ. of Karlsrube, Germany.* We have fabricated high-*Q* pillar resonators with colloidal CdSe/ZnS quantum dots or rods as light emitters by focused ion beam milling. Cavities with elliptical cross section show higher *Q*-values compared to circular resonators.

QFC6 • 11:30 a.m.
Surface Plasmon Cavities for Solid-State Cavity Quantum Electrodynamics, *Yiyang Gong, Jelena Vuckovic; Stanford Univ., USA.* We propose a cavity based on surface plasmon modes confined by metallic distributed Bragg reflectors and analyze the interaction of the cavity mode with quantum dots (QD). The system exhibits strong Purcell enhancement.

QFD • Dynamics of Dots, Wires and Tubes—Continued

QFD5 • 11:15 a.m.
Chiral-Selective Excitation of Lattice Vibrations in Carbon Nanotubes Using Femtosecond Pulse Shaping , *Kiju Yee[1], Ji-Hee Kim[1], Yong-Sik Lim[2], Erik H. Haroz[3], Kang-Jeon Han[1], Junichiro Kono[3], Robert H. Hauge[3], Richard E. Smalley[3]; [1]Chungnanm Natl. Univ., Republic of Korea, [2]Konkuk Univ., Republic of Korea, [3]Rice Univ., USA.* Multiple pulse trains produced by femtosecond pulse shaping were used for chiral-selective excitation of coherent radial breading modes (RBM) in carbon nanotubes. Detection scheme and chirality-dependent phonon lifetimes are discussed.

QFD6 • 11:30 a.m.
Ultrafast Carrier Dynamics in Semiconductor Nanowires, *Robit P. Prasankumar[1], George T. Wang[2], Teresa Clement[3], Sukgeun G. Choi[1], Samuel T. Picraux[1,3], Antoinette J. Taylor[1]; [1]Los Alamos Natl. Lab, USA, [2]Sandia Natl. Labs, USA, [3]Arizona State Univ., USA.* Time-resolved measurements of carrier dynamics in Ge and GaN nanowires reveal that carrier relaxation in these systems is governed by surface states and defects. This has significant implications for nanowire-based devices in photonics and thermoelectrics.

CFQ • High-*Q* Microresonators and Devices II—Continued

CFQ4 • 11:15 a.m.
Demonstration of Silicon Microdisk Resonators Compatible with Active Integration: Ultra-high *Q* and Efficient Waveguide-Resonator Coupling, *Mohammad Soltani, Siva Yegnanarayanan, Ali Adibi; Georgia Tech, USA.* Silicon-on-insulator microdisk resonators with efficient planar-integrated input-output coupling are demonstrated. Two structures of fully-etched and partially-etched microdisk-on-substrate, compatible with active integration are fabricated and compared. Experimental quality factors about 2.5x106 and critical coupling are observed.

CFQ5 • 11:30 a.m.
Low Power Thermal Tuning of Second-Order Microring Resonators, *Reja Amatya, Charles W. Holzwarth, Fuwan Gan, Henry I. Smith, Franz Kärtner, Rajeev J. Ram, Milos A. Popovic; MIT, USA.* Efficient thermal tuning of 36pm/K and 60μW/GHz is shown for high-index-contrast silicon nitride second-order filters. Their compact size, large free-spectral range, low tuning power, and silicon compatibility make these resonators attractive for photonic integration.

CFR • Ultrashort Pulse Microfabrication and Ablation—Continued

CFR4 • 11:15 a.m.
Combining 5-D Microscopy with 3-D Femtosecond Laser Nanoprocessing, *Jianzhao Li, Peter R. Herman, Shane Eaton, Haibin Zhang, Amir H. Najadmalayeri, Abbas Hosseini; Univ. of Toronto, Canada.* An ultrafast-laser optical system is presented that combines nano-machining at high pulse energy (~1uJ) with five-dimensional (xyz, time, wavelength) optical microscopy at low energy (~1nJ) to enable on-the-fly and post-process optimization of femtosecond laser interactions.

CFR5 • 11:30 a.m.
Fabrication of a Multilayer Polymer Light-Emitting Diode by Resonant Infrared Laser Ablation, *Stephen L. Johnson[1], Christopher T. Bowie[1], Borislav Ivanov[1], Hee K. Park[2], Richard F. Haglund[1]; [1]Vanderbilt Univ., USA, [2]Appliflex LLC, USA.* Multi-layer polymer light-emitting diodes have been fabricated in vacuum by infrared laser ablation of conducting and light-emitting polymers. The spectral output of the devices resembles that of similar spin-coated devices, but shows some fluence dependence.

CFS • THz Spectroscopy—Continued

CFS4 • 11:15 a.m.
Narrow-Line THz Absorption Spectra of Deoxycytidine and D-Glucose Films in Parallel Plate Waveguides, *Norman Laman[1], Sree Harsha Srikantaiah[1], Daniel Grischkowsky[1], Joseph S. Melinger[2]; [1]Oklahoma State Univ., USA, [2]NRL, USA.* THz absorption spectra of planar polycrystalline films of Deoxycytidine and D-Glucose were measured at 295 K and 77 K via parallel plate waveguides. The observed linewidths are considerably narrower compared to conventional THz spectroscopy.

CFS5 • 11:30 a.m.
Dielectric Measurements for Powder-Shape Samples Using Terahertz Time-Domain Attenuated Total Reflection Technique, *Hiroyuki Yada, Masaya Nagai, Koichiro Tanaka; Dept. of Physics, Graduate School of Science, Kyoto Univ., Japan.* We have demonstrated that terahertz time-domain attenuated total reflection spectroscopy is a powerful tool of measuring the dielectric constants of various organic powder samples.

NOTES

CFJ • Yb Lasers—Continued

CFJ7 • 11:45 a.m.
High-Power Diode-Pumped Lasers Based on Yb:$YAl_3(BO_3)_4$ Crystals Cut along the Crystallographic Axes, *Junbai Liu[1], Xavier Mateos[1], Valentin Petrov[1], Huaijin Zhang[2], Jing Li[2], Jiyang Wang[2]; [1]Max-Born-Inst., Germany, [2]Shandong Univ., China.* Continuous-wave laser operation near 1 μm is studied at room temperature with c-cut and a-cut Yb: $YAl_3(BO_3)_4$ crystals end-pumped by a fiber-coupled diode-laser achieving an output power of 10.6 W and a slope efficiency of 72%.

CFK • Tapered Photonic Crystal Fibers—Continued

CFK4 • 11:45 a.m.
Analytical Relation between Effective Mode Field Area and Waveguide Dispersion in Microstructure Fibers, *Mathias Moenster[1], Günter Steinmeyer[1], Rumen Ilieu[2], Falk Lederer[2], Klaus Petermann[3]; [1]Max-Born-Inst., Germany, [2]Inst. für Festkörpertheorie und -optik, Germany, [3]Technische Univ. Berlin, Germany.* For non-radially symmetric fibers, we demonstrate the extended usefulness of a simple analytic relation connecting waveguide dispersion and mode-field radius, allowing for immediate estimation of soliton properties and supercontinuum generation efficiency in microstructure fibers.

CFL • Optical Coherence Tomography—Continued

CFL6 • 11:45 a.m.
Fiber-Broadened Passively Modelocked Er:Yb:Glass Laser for High-Resolution Optical Coherence Tomography, *Max C. Stumpf[1], Simon C. Zeller[1], Adrian Schlatter[1], Thomas Südmeyer[1], Ursula Keller[1], Toshiaki Okuno[2]; [1]ETH Zurich, Switzerland, [2]Optical Communications R&D Labs, Sumitomo Electric Industries Ltd., Japan, Japan.* We demonstrate a low coherence light source by directly launching the output of a femtosecond diode-pumped modelocked Er:Yb:glass laser into a highly-nonlinear fiber. The measured interferogram supports a depth resolution of 4 μm in air.

CFM • Miscellaneous NLO—Continued

CFM6 • 11:45 a.m.
Nanometric Three-Dimensional Sub-Surface Imaging of a Silicon Flip-Chip, *Euan Ramsay, Keith A. Serrels, Martin J. Thomson, Andrew J. Waddie, Richard J. Warburton, Mohammed R. Taghizadeh, Derryck T. Reid; School of Engineering and Physical Sciences, Heriot-Watt Univ., UK.* By implementing two-photon optical-beam-induced-current microscopy using a solid-immersion lens, imaging inside a silicon flip chip is reported with 166nm lateral resolution and an axial resolution capable of resolving features only 100nm deep.

JFC • Atoms and Molecules in Strong Fields—Continued

JFC6 • 11:45 a.m.
Two-Quantum-Path Interferences in High Order Harmonic Generation, *Amelle Zaïr[1], Mirko Holler[1], Annalisa Guandalini[1], Florian Schapper[1], Jens Biegert[1], Ursula Keller[1], Pascal Salières[2], Thierry Auguste[2], Eric Cormier[3], Adam Wyatt[4], Antoine Monmayrant[4], Ian A. Walmsley[4]; [1]IQE, Switzerland, [2]CEA, France, [3]CELIA, France, [4]Clarendon Lab, UK.* We have investigated intensity dependent high-harmonic generation, when short and long trajectories are both visible in the generated signal. We have measured a plateau-harmonic spectral broadening and yield modulations consistent with quantum-paths interferences calculations.

CFN • Quasi-Phase-Matched Materials/Ferroelectrics—Continued

CFN6 • 11:45 a.m.
Patterning Sub-Micrometer Domain in MgO:$LiNbO_3$ Ridge Waveguides by Focused Ion Beam for QPM Nonlinear Optical Devices, *Xijun Li[1], Atsusi Watanabe[1], Hideki Hatano[2], Kazuya Terabe[2], Kenji Kitamura[2]; [1]Corporate R&D Labs, Pioneer Corp., Japan, [2]Natl. Insitute for Materials Science, Japan.* Ferroelectric domain structure with pitch sizes of sub-micrometer has been fabricated by focused ion beam directly in MgO:$LiNO_3$ ridge waveguides. This result opens a new way to engineering domain in structures with an irregular surface.

CFO • Ultrashort Pulse Characterization II—Continued

CFO7 • 11:45 a.m.
Toward Programmable Ultrashort Pulse Characterization, *Nicolas Forget[1], Manuel Joffre[2], Sébastien Coudreau[1], Thomas Oksenbendler[1]; [1]Fastlite, France, [2]LOB, Ecole Polytechnique, CNRS, INSERM, France.* We demonstrate a programmable pulse characterization device based on an acousto-optic programmable dispersive filter. Both SH-FROG and SPIDER signals are obtained with a single optical setup. Experimental demonstration is provided on an amplified femtosecond system.

QFC • Plasmons and Cavities—Continued

QFC7 • 11:45 a.m.
Photon Emission Statistics and Coherence Properties of High-β Semiconductor Microcavity Lasers, *Sven M. Ulrich[1], Christopher Gies[2], Serkan Ates[1], Jan Wiersig[2], Stephan Reitzenstein[3], Carolin Hofmann[3], Andreas Löffler[3], Alfred Forchel[3], Frank Jahnke[2], Peter Michler[1]; [1]Univ. Stuttgart, Inst. für Strahlenphysik, Germany, [2]Univ. Bremen, Inst. für Theoretische Physik, Germany, [3]Univ. Würzburg, Technische Physik, Germany.* Complementary first- and second-order correlation experiments on high-β micropillar lasers are presented, which trace a smooth transition from spontaneous to stimulated emission. Our observations accord with refined theoretical calculations on semiconductor microlaser emission characteristics.

QELS

C L E O

QFD • Dynamics of Dots, Wires and Tubes—Continued

QFD7 • 11:45 a.m.
Time-Resolved Photoluminescence of GaN Nanowires of Different Crystallographic Orientations, *Alan Chin[1], Tai Ahn[2], Hongwei Li[3], Sreeram Vaddiraju[3], Chris Bardeen[2], Cun-Zheng Ning[4], Mahendra Sunkara[3]; [1]ELORET Corp., USA, [2]Univ. of California at Riverside, USA, [3]Univ. of Louisville, USA, [4]NASA Ames Res. Ctr., USA.* Our studies of time-integrated and time-resolved photoluminescence of a-axis and c-axis GaN nanowires demonstrate that the blue-shifted ultraviolet photoluminescence in a-axis GaN nanowires relative to c-axis GaN nanowires can be attributed to surface state emission.

CFQ • High-*Q* Microresonators and Devices II—Continued

CFQ6 • 11:45 a.m.
Highly Compact High-Order Micro-Ring Filters, *Sbijun Xiao, Maroof H. Khan, Hao Shen, Minghao Qi; Purdue Univ., USA.* We fabricate and characterize highly compact second-order and third-order silicon ring (radii ~ 2.5 um) filters with large free spectral ranges over 30 nm and high drop filtering contrast ratios over ~40 dB.

CFR • Ultrashort Pulse Microfabrication and Ablation—Continued

CFR6 • 11:45 a.m.
Effect of Pulse Shaping on Silicon Micromachining Monitored by Laser Induced Breakdown Spectroscopy and Surface Second Harmonic Generation, *Tissa C. Gunaratne, Xin Zhu, Vadim V. Lozovoy, Marcos Dantus; Michigan State Univ., USA.* Pulse shaping on silicon micromachining is explored using laser induced breakdown spectroscopy and surface second harmonic generation as diagnostics. The morphology of ablated holes for different shaped pulses will be discussed.

CFS • THz Spectroscopy—Continued

CFS6 • 11:45 a.m.
THz Vibrational Spectra of Hydrated and Dehydrated Samples by Time-Domain Spectroscopy, *Haruko Yoneyama[1], Masatsugu Yamashita[1], Shintaro Kasai[1,2], Kodo Kawase[1], Hiromasa Ito[1], Toshihiko Ouchi[1,2]; [1]RIKEN, Japan, [2]Canon Res. Ctr., Canon Inc., Japan.* We observed the vibrational modes of nucleoside related samples in hydrated and dehydrated states by terahertz (THz) time-domain spectroscopy. Several measured spectra indicated slight differences in the vibrational modes between hydrated and dehydrated samples.

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