CLEO/IQEC 2009 Postdeadline Papers

Agenda of Sessions

Session	Room	Time
CPDA–CLEO Postdeadline Session I	Room 314	8:00 p.m.–10:00 p.m.
CPDB–CLEO Postdeadline Session II	Room 315	8:00 p.m.–10:00 p.m.
IPDA–IQEC Postdeadline Session I	Room 316	8:00 p.m.–10:00 p.m.
IPDB–IQEC Postdeadline Session II	Room 317	8:00 p.m.–10:00 p.m.

CLEO Abstracts

CPDA • CLEO Postdeadline Session I

Room 314
8:00 p.m.–10:00 p.m.
Kaoru Minoshima; AIST, Japan, Presider

►CLEO 01: Laser Processing of Materials: Fundamentals and Applications

CPDA1 • 8:00 p.m.
Achieving Resolution Far beyond the Diffraction Limit with RAPID Photolithography, *Linjie Li, Rafael R. Gattass, Erez Gershgoren, John T. Fourkas; Univ. of Maryland, USA.* A novel photolithographic method with $\lambda/20$ fabrication resolution is introduced, in which one laser is used to initiate multiphoton absorption polymerization in a photoresist while a second, phase-shaped laser is used to deactivate the polymerization.

CPDA2 • 8:12 p.m.
Quantum-Rod Sensitized Four-Dimensional Optical Data Storage, *Xiangping Li, James W. M. Chon, Richard A. Evans, Min Gu; Ctr. for Micro-Photonics, Swinburne Univ. of Technology, Australia.* Quantum rods (QRs) are incorporated into polymers that are doped with azo dyes via an energy transfer process. The polarization-dependent refractive-index change allows four-dimensional optical data storage as well as other polarization-controlled photonic applications.

►CLEO 03: Semiconductor Lasers

CPDA3 • 8:24 p.m.
Ultralow-Noise Packaged 1.55-μm Semiconductor External-Cavity Laser with 0.37-W Output Power, *Paul W. Juodawlkis, William Loh, Frederick J. O'Donnell, Michaal A. Brattain, Jason J. Plant; MIT Lincoln Lab, USA.* We demonstrate a semiconductor external-cavity laser comprising a slab-coupled optical waveguide amplifier (SCOWA) and a fiber Bragg grating. The laser exhibits a Lorentzian linewidth of 1.75 kHz and a sidemode suppression ratio > 80 dB.

CPDA4 • 8:36 p.m.
Demonstration of Laser Operation at Room-Temperature of an Sb-Based Mid-Infrared Multi-Quantum-Well Structure Monolithically Grown on a Silicon Substrate, *Jean-Baptiste Rodriguez, Laurent Cerutti, Eric Tournié; Univ. Montpellier 2, CNRS, France.* We report on the fabrication and characterization of mid-infrared Sb-based lasers grown on silicon substrates. We demonstrate room-temperature operation with low threshold current densities (~1.5 kA/cm^2), and pulsed mode up to a duty-cycle of 10%.

►CLEO 08: Ultrafast Optics, Optoelectronics and Applications

CPDA5 • 8:48 p.m.
Magneto-Optical Kerr Effect Probed Using Ultrafast High-Order Harmonic EUV Light, *Chan La-O-Vorakiat[1], Mark Siemens[1], Justin Shaw[2], Hans Nembach[2], Stefan Matthias[3], Roman Adam[4], Claus M. Schneider[4], Martin Aeschlimann[3], Thomas Silva[2], Margaret Murnane[1], Henry Kapteyn[1]; [1]Dept. of Physics, JILA, Univ. of Colorado, USA, [2]Electromagnetics Div., NIST, USA, [3]Univ. of Kaiserslautern and Res. Ctr. OPTIMAS, Germany, [4]Forschungszentrum Jülich, Germany.* We use tabletop high harmonics to detect the EUV transverse magneto-optical Kerr effect from a permalloy sample. We measure large asymmetries, up to 6%, around the M absorption edges of Fe (54eV) and Ni (67eV).

►**CLEO 11: Fiber Amplifiers, Lasers and Devices**

CPDA6 • 9:00 p.m.
Rapidly Scanning Fourier Transform Spectrometer Based on a GHz Repetition Rate Yb-Fiber Laser Pair, *Ingmar Hartl, Axel Ruehl, Rajesh Thapa, Hugh A. McKay, Brian K. Thomas, Libin Fu, Liang Dong, Martin E. Fermann; IMRA America, Inc., USA.* We demonstrate a rapidly scanning all-fiber Fourier transform spectrometer based on a temporal scanning all-optical delay line constructed with two mode-locked 1-GHz Yb fiber lasers. An effective mirror scan rate of 7.5 km/s is achieved.

CPDA7 • 9:12 p.m.
Double Photonic Bandgap Hollow-Core Photonic Crystal Fiber, *Philip S. Light[1], François Couny[1], Ying Ying Wang[1], Natalie V. Wheeler[1], P. John Roberts[2], Fetah Benabid[1]; [1]Univ. of Bath, UK, [2]Danish Technical Univ., Denmark.* We report on the design, fabrication and characterization of hollow-core photonic crystal fiber with two robust bandgaps that bridge the benchmark laser wavelengths 1064 nm with 1550 nm, and 1064 nm with 780 nm.

►**CLEO 12: Lightwave Communications and Networks**

CPDA8 • 9:24 p.m.
28-Gb/s 16-QAM OFDM Radio-over-Fiber System within 7-GHz License-Free Band at 60 GHz Employing All-Optical Up-Conversion, *Chun-Ting Lin[1], Er-Zih Wong[1], Wen-Jr Jiang[1], Po-Tsung Shih[1], Jason (Jyehong) Chen[1], Sien Chi[1,2]; [1]Inst. of Electro-Optical Engineering, Natl. Chiao Tung Univ., Taiwan, [2]Yuan-Ze Univ., Taiwan.* A record 28-Gb/s 16-QAM OFDM system within 7-GHz license-free band at 60 GHz employing all-optical up-conversion with frequency quintupling is experimentally demonstrated. Negligible penalty is observed following 100-km SMF transmission without any dispersion compensation.

►**CLEO 14: Optical Metrology**

CPDA9 • 9:36 p.m.
Phase-Stabilized, 1.5-W Mid-Infrared Frequency Comb, *Florian Adler[1], Kevin C. Cossel[1], Michael J. Thorpe[1], Ingmar Hartl[2], Martin E. Fermann[2], Jun Ye[1]; [1]JILA, NIST, Univ. of Colorado, USA, [2]IMRA America, Inc., USA.* We present a mid-infrared frequency comb based on a synchronously-pumped, femtosecond optical parametric oscillator. The idler (signal) is continuously tunable from 2.8-4.8 μm (1.76-1.37 μm) with a maximum average output power of 1.50 W.

CPDA10 • 9:48 p.m.
Full Control of the Carrier-Envelope Phase of Raman-Generated Single-Cycle Waveforms, *Zhi-Ming Hsieh[1,2], Chien-Jen Lai[1], Han-Sung Chan[3], Sih-Ying Wu[1], Chao-Kuei Lee[4], Wei-Jan Chen[1], Ci-Ling Pan[3], Fu-Goul Yee[2], A. H. Kung[1,3]; [1]Inst. of Atomic and Molecular Sciences, Academia Sinica, Taiwan, [2]Natl. Taiwan Univ., Taiwan, [3]Natl. Chiao Tung Univ., Taiwan, [4]Natl. Sun-Tat-Sen Univ., Taiwan.* Precise control of the carrier-envelope phase of Raman generated ultrashort pulses is achieved by generating a Raman frequency comb using an infrared laser pulse and its second harmonic to drive the Raman coherence.

CPDB • CLEO Postdeadline Session II

Room 315
8:00 p.m.–10:00 p.m.
Timothy Carrig; Lockheed Martin Coherent Technologies, USA, Presider

►**CLEO 02: Solid-State, Liquid and Gas Lasers**

CPDB1 • 8:00 p.m.
Solid-State Conical Refraction Laser, *Amin Abdolvand[1], Keith G. Wilcox[1], Todor K. Kalkandjiev[2], Edik U. Rafailov[1]; [1]Univ. of Dundee, UK, [2]Conerefringent Optics SL, Spain.* We present ultra-efficient conical refraction Nd:KGW laser providing multi-watt output with excellent beam quality independent of resonator design and slope efficiency close to the theoretical maximum, offering the ultimate route for brightness-scaling in solid-state lasers.

CPDB2 • 8:12 p.m.
Eye-Safe Pr^{3+}:$RbPb_2Cl_5$ Laser at ~1.65 μm Resonantly-Pumped at 1547 nm, *Nikolay Ter- Gabrielyan, Tigran Sanamyan, Mark Dubinskii; US ARL, USA.* Resonantly-pumped laser action based on $^3F_3 \Rightarrow {}^3H_4$ transition of Pr^{3+} ion is reported for the first time. Pr^{3+}:$RbPb_2Cl_5$ laser demonstrated slope efficiency of over 21% at 1647 nm despite the marginal initial sample quality.

►**CLEO 04: Applications of Nonlinear Optics**

CPDB3 • 8:24 p.m.
Dispersion and Nonlinearity Compensation Using Spectral Phase Conjugation, *Onur Kuzucu, Yoshitomo Okawachi, Reza Salem, Mark A. Foster, Alexander L. Gaeta, Amy C. Turner-Foster, Michal Lipson; Cornell Univ., USA.* We demonstrate broadband spectral phase conjugation based on temporal imaging via four-wave mixing and show for the first time compensation of pulse distortions due to second and third-order dispersion and self-phase modulation.

CPDB4 • 8:36 p.m.
Relaxation-Oscillation-Free Continuous-Wave Optical Parametric Oscillator Pumped Internal to a Semiconductor Disk Laser, *David J. M. Stothard[1], John-Mark Hopkins[2], David Burns[2], Malcolm H. Dunn[1]; [1]Univ. of St. Andrews, UK, [2]Inst. of Photonics, Univ. of Strathclyde, UK.* We describe a continuous-wave optical parametric oscillator operated within a semiconductor disk laser, free of relaxation oscillations associated with neodymium-based systems. Parametric threshold occurred at 1.4W primary (diode) pump power and 8.5W yielded 205mW idler.

►**CLEO 05: Terahertz Technologies and Applications**

CPDB5 • 8:48 p.m.
Low Divergence, Single-Lobed, Surface Emission from THz Photonic-Crystal Quantum Cascade Lasers, *Yannick Chassagneux[1], Raffaele Colombelli[1], Wilfried Maineult[2], Stefano Barbieri[2], Suraj P. Khanna[3], Edmund H. Linfield[3], A. Giles Davies[3]; [1]Inst. d'Electronique Fondamentale, Univ. Paris-Sud, France, [2]Matériaux et Phénomènes Quantiques, Univ. Paris 7, France, [3]School of Electronic and Electrical Engineering, Univ. of Leeds, UK.* We demonstrate single-mode, single-lobed surface-emitting terahertz quantum cascade lasers employing photonic-crystal resonators. Single-lobed emission is obtained with carefully designed pi-shift, *Q*-factor optimization yields a maximum operating temperature of 151K and peak powers of ~7 mW.

►CLEO 06: Optical Materials, Fabrication and Characterization

CPDB6 • 9:00 p.m.
Ultra-Thin-Walled III-Arsenide Microtubes with Embedded QW Light Emitters: Room Temperature PL Characteristics, *Ik Su Chun, Kevin Bassett, Archana Challa, Xiuling Li; Univ. of Illinois at Urbana-Champaign, USA.* Arsenide-based III-V microtubes are formed by a strain-induced self-rolling process. We report room-temperature photoluminescence characteristics of such microtubes with embedded GaAs quantum-well structure that is only 38 nm in total wall thickness.

CPDB7 • 9:12 p.m.
Direct Band Gap Tensile-Strained Germanium, *Yijie Huo[1], Hai Lin[1], Yiwen Rong[1], Maria Makarova[1], Theodore I. Kamins[2], Jelena Vuckovic[1], James S. Harris[1]; [1]Stanford Univ., USA, [2]Hewlett-Packard Labs, USA.* We report up to 2.3% biaxial tensile-strained Ge layers grown on InGaAs/GaAs buffer layers. Low-temperature photoluminescence shows a dramatic intensity increase for >2% tensile strained Ge, confirming the existence of a direct band gap Ge.

►CLEO 16: Micro- and Nano-Photonics Devices

CPDB8 • 9:24 p.m.
CMOS-Compatible Multiple Wavelength Source, *Jacob S. Levy, Alexander Gondarenko, Mark A. Foster, Amy C. Turner-Foster, Alexander L. Gaeta, Michal Lipson; Cornell Univ., USA.* We demonstrate parametric oscillation in a complementary metal-oxide-semiconductor (CMOS) compatible silicon nitride ring resonator. We generate up to 40 wavelengths with a threshold power as low as 50 mW.

CPDB9 • 9:36 p.m.
Optomechanics of Phononic-Photonic Crystal Defect Cavities, *Matt Eichenfield, Jasper Chan, Ryan M. Camacho, Oskar J. Painter; Caltech, USA.* We provide an experimental realization of simultaneously localized and strongly coupled optical and mechanical modes in periodic nanostructures. The mechanical properties of localized phonons with Gigahertz frequencies and sub-picogram masses are studied via all-optical measurements.

CPDB10 • 9:48 p.m.
Adiabatic Resonant Microrings (ARMs) with Directly Integrated Thermal Microphotonics, *Michael R. Watts, William A. Zortman, Douglas C. Trotter, Gregory N. Nielson, David L. Luck, Ralph W. Young; Sandia Natl. Labs, USA.* A new class of microphotonic-resonators, Adiabatic Resonant Microrings (ARMs), is introduced. The ARM resonator geometry enables heater elements to be formed within the resonator, simultaneously enabling record low-power (4.4μW/GHz) and record high-speed (1μs) thermal tuning.

NOTES

IQEC Abstracts

IPDA • IQEC Postdeadline Session I

Room 316
8:00 p.m.–10:00 p.m.
Perry Rice; Miami Univ., USA, Presider

►IQEC 01: Quantum Optics of Atoms, Molecules and Solids

IPDA1 • 8:00 p.m.
High Fidelity Quantum Entanglement and Spin-Spin Dynamics Using Multiple Phonon Modes of Several Trapped Ions, *Kihwan Kim, Ming-Shien Chang, Simcha Korenblit, Kazi Rajibul Islam, Christopher Monroe; Joint Quantum Inst., Univ. of Maryland at College Park and NIST, USA.* We demonstrate quantum entanglement and global spin dynamics between a few trapped ions, using lasers that couple to all modes of transverse motion in a way that could be scaled to large numbers of spins.

IPDA2 • 8:12 p.m.
Atomic Nanofabrication of Periodic Structures, *Claire Allred, Jason Reeves, Christopher Corder, Harold Metcalf; Stony Brook Univ., USA.* Metastable helium has 20 eV of internal energy that destroys a resist assembled on a wafer. An optical standing wave was used to channel and focus the He* atoms into lines separated by half wavelength.

IPDA3 • 8:24 p.m.
Observation of an Optical Feshbach Resonance in ^{88}Sr, *Pascal G. Mickelson[1], Y. N. Martinez de Escobar[1], M. Yan[1], R. Chakraborty[2], T. C. Killian[1]; [1]Rice Univ., USA, [2]Harvard Univ., USA.* We have tuned the s-wave scattering length of ^{88}-Sr via an optical Feshbach resonance. Change in the rate of thermalization of atoms reveals a slight increase in the phase space density of the atom sample.

►IQEC 02: Quantum Science, Engineering and Technology

IPDA4 • 8:36 p.m.
A Single Photon Source Based on Diamond Nanowires, *Thomas M. Babinec[1], Birgit Hausmann[1,2], Mughees Khan[1], Philip Hemmer[3], Marko Loncar[1]; [1]Harvard Univ., USA, [2]Technische Univ. München, Germany, [3]Texas A&M Univ., USA.* We have demonstrated single photon emission from diamond nanowires waveguides with embedded nitrogen-vacancy color centers. Diamond nanostructures were fabricated with e-beam lithography and inductively coupled plasma reactive ion etching (ICP RIE) processes.

IPDA5 • 8:48 p.m.
Integrated Quantum Information Science with Photons, *Alberto Politi, Jonathan C. F. Matthews, Anthony Laing, Alberto Peruzzo, Pruet Kalasuwan, Mian Zhang, Xiao-Qi Zhou, Maria Rodas, Martin J. Cryan, John G. Rarity, Andre Stefanov, Siyuan Yu, Mark G. Thompson, Jeremy L. O'Brien; Univ. of Bristol, UK.* Quantum technologies based on photons will likely require integrated optics architectures for improved performance, miniaturization and scalability. We demonstrate high-fidelity silica-on-silicon integrated optical realizations of key quantum photonic circuits.

IPDA6 • 9:00 p.m.
Towards High Quality Photonic Polarization Entanglement Distribution at 1.3-μm Telecom Wavelength, *Tian Zhong[1], Xiaolong Hu[1], Franco N. C. Wong[1], Charles Herder[1], Faraz Najafi[1], Karl K. Berggren[1], Tony D. Roberts[2], Philip Battle[2]; [1]MIT, USA, [2]AdvR, Inc., USA.* Polarization-entangled photons at 1.3 μm from a fiber-coupled PPKTP waveguide are analyzed using a remotely located superconducting nanowire single-photon detector, yielding 97.5% quantum-interference visibility and 0.8 coincidence/s at 96 μW pump power.

IPDA7 • 9:12 p.m.
Ultra-Long Distance and Efficient Entanglement Distribution over 200 Kilometers, *James F. Dynes[1], Hiroki Takesue[2], Zhiliang Yuan[1], Andrew Sharpe[1], Ken-ichi Harada[2], Toshimori Honjo[2], Hidehiko Kamada[2], Osamu Tadanaga[3], Yoshiki Nishida[3], Masaki Asobe[3], Andrew J. Shields[1]; [1]Toshiba Res. Europe Ltd., UK, [2]NTT Basic Res. Labs, NTT Corp., Japan, [3]NTT Photonics Labs, NTT Corp., Japan.* Entanglement distribution over 200 kilometers of optical fiber is demonstrated with practical, low-cost, InGaAs avalanche photodiodes. High coincidence count rates are also observed indicating entangled based quantum key distribution is feasible over ultra-long distances.

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

IPDA8 • 9:24 p.m.
Probing Laser Disturbed Doubly Excited States with Isolated Attosecond Pulses, *Steve Gilbertson, Ximao Feng, Sabih Khan, Michael Chini, He Wang, Zenghu Chang; Kansas State Univ., USA.* Two-electron excitation and autoionization in helium atoms were studied experimentally using isolated attosecond pulses for the first time. The population of the resonance state was modified by intense near infrared laser pulses.

►IQEC 04: Optical Interactions with Condensed Matter and Ultrafast Phenomena

IPDA9 • 9:36 p.m.
Demonstration of an Optical Cryocooler, *Denis V. Seletskiy[1], Seth D. Melgaard[1], Stefano Bigotta[2], Alberto Di Lieto[2], Mauro Tonelli[2], Richard I. Epstein[1,3], Mansoor Sheik-Bahae[1]; [1]Univ. of New Mexico, USA, [2]Univ. di Pisa, Italy, [3]Los Alamos Natl. Lab, USA.* A temperature drop of 143 K with a cooling power of 110 mW is achieved by optical refrigeration in Yb:YLF crystal. Potential of cooling down to 100K is shown. This materializes the first all-solid-state cryocooler.

►IQEC 05: Nonlinear Optics and Novel Phenomena

IPDA10 • 9:48 p.m.
Pulse Compression and Slow-Light Enhanced Three-Photon Absorption in GaInP Photonic Crystal Waveguides, *Chad Husko[1,2], Sylvain Combrié[2], Quynh V. Tran[2], Fabrice Raineri[3,4], Chee Wei Wong[1], Alfredo De Rossi[2]; [1]Columbia Univ., USA, [2]Thales Res. and Technology, France, [3]Lab de Photonique et de Nanostructures (CNRS UPR 20), France, [4]Univ. D. Diderot, France.* We demonstrate first observations of slow-light enhanced three-photon absorption (ThPA) in photonic-crystal waveguides. The injected pulses demonstrate self-phase modulation (SPM) with scalings deviating from n_g^2 (SPM) and n_g^3 (ThPA). A thorough analysis suggests pulse compression leading to increased peak powers.

IPDB • IQEC Postdeadline Session II

Room 317
8:00 p.m.–10:00 p.m.
Presider to Be Announced

►IQEC 03: Fundamentals of Metamaterials, Periodic and Random Media

IPDB1 • 8:00 p.m.
Cloaking at Optical Frequencies Using Dielectrics, *Jensen Li[1], Jason Valentine[1], Thomas Zentgraf[1], Guy Bartal[1], Xiang Zhang[1,2]; [1]Univ. of California at Berkeley, USA, [2]Material Sciences Div., Lawrence Berkeley Natl. Lab, USA.* We experimentally demonstrate cloaking at optical frequencies. A dielectric carpet cloak is designed to hide object under a curved reflecting surface by mimicking the reflection from a flat surface, enabling broadband invisibility with low loss.

IPDB2 • 8:12 p.m.
Single Photon Gun: Radiative Decay Engineering with Metamaterials, *Zubin Jacob[1], Igor Smolyaninov[2], Evgenii Narimanov[1]; [1]Purdue Univ., USA, [2]Univ. of Maryland at College Park, USA.* We propose a new approach to single-photon sources based on metamaterials with hyperbolic dispersion. Highly directional emission and dramatic reduction in spontaneous-emission lifetime due to the singularity in density-of-states leads to an ideal photon gun.

IPDB3 • 8:24 p.m.
Demonstration of Cloaking at Optical Frequencies, *Lucas H. Gabrielli, Jaime Cardenas, Carl B. Poitras, Michal Lipson; Cornell Univ., USA.* We demonstrate a wideband invisibility cloak in the optical regime composed of nanometer scale non-resonant dielectric structures. The cloak conceals a deformation on a reflecting surface, under which an object can be hidden.

IPDB4 • 8:36 p.m.
Shaping Spontaneous Emission from a Single Quantum Dot into a Narrow Beam Pattern, *Lei Zhu, Muthiah Annamalai, Nikolai Stelmakh, Michael Vasilyev; Univ. of Texas at Arlington, USA.* We experimentally observe directional spontaneous emission with angular half-width of ~10 degrees from a single CdSe/ZnS quantum dot positioned in a slit nanoaperture surrounded by periodic corrugations.

IPDB5 • 8:48 p.m.
Plasmonic EIT at the Drude Damping Limit, *Na Liu[1], Lutz Langguth[1], Thomas Weiss[1], Jürgen Kästel[2], Michael Fleischhauer[2], Tilman Pfau[3], Harald Giessen[1]; [1]4th Physics Inst., Univ. of Stuttgart, Germany, [2]Fachbereich Physik and Res. Ctr. OPTIMAS, Technische Univ. Kaiserslautern, Germany, [3]5th Physics Inst., Univ. of Stuttgart, Germany.* We experimentally demonstrate a nanoplasmonic analog of electromagnetically induced transparency utilizing a stacked optical metamaterial. Specifically, we achieve a very narrow transparency window with high modulation depth due to nearly complete suppression of radiative losses.

►IQEC 05: Nonlinear Optics and Novel Phenomena

IPDB6 • 9:00 p.m.
Filamentation of Femtosecond Self-Bending Airy Beams, *Pavel Polynkin[1], Miroslav Kolesik[1], Jerome V. Moloney[1], Georgios A. Siviloglou[2], Demetrios N. Christodoulides[2]; [1]College of Optical Sciences, Univ. of Arizona, USA, [2]CREOL, College of Optics and Photonics, Univ. of Central Florida, USA.* We report experimental observation of laser filaments generated by intense, femtosecond, self-bending Airy beams in air and water. The generated curved filaments act as streak cameras for the forward-emitted broadband conical radiation.

IPDB7 • 9:12 p.m.
Phase-Conjugate Optical Coherence Tomography, *Julien Le Gouët, Dheera Venkatraman, Franco N. C. Wong, Jeffrey H. Shapiro; MIT, USA.* We demonstrate a new type of optical coherence tomography using only classical resources to achieve results that are typically associated with quantum-enhanced metrology: factor-of-two axial resolution enhancement and even-order dispersion cancellation.

IPDB8 • 9:24 p.m.
Two-Quantum Resonances Observed in Potassium Vapor by Two-Dimensional Fourier-Transform Spectroscopy, *Xingcan Dai[1], Alan D. Bristow[1], Denis Karaiskaj[1], Shaul Mukamel[2], Steven T. Cundiff[1]; [1]JILA, NIST, Univ. of Colorado, USA, [2]Univ. of California at Irvine, USA.* Unexpected two-quantum resonances are observed in potassium vapor using two-dimensional Fourier-transform spectroscopy. These transitions are an unambiguous indication of many-body interactions, which arise from the long-range interatomic coupling that is responsible for resonance self-broadening.

IPDB9 • 9:36 p.m.
Direct Observation of the Conical Intersection in cis-trans Photoisomerization of Rhodopsin, *Dario Polli[1], Cristian Manzoni[1], Daniele Brida[1], Giulio Cerullo[1], Piero Altoè[2], Gaia Tomasello[2], Giorgio Orlandi[2], Marco Garavelli[2], Oliver Weingart[3], Philipp Kukura[4], Katelyn Spillane[5], Richard A. Mathies[5]; [1]Politecnico di Milano, Italy, [2]Univ. di Bologna, Italy, [3]Univ. Duisburg-Essen, Germany, [4]ETH Zurich, Switzerland, [5]Univ. of California at Berkeley, USA.* High-time-resolution broadband pump-probe spectroscopy of rhodopsin reveals loss of reactant and appearance of photoproduct features within ≈ 100fs, which are signatures of a wavepacket moving through a conical intersection. Experiments are supported by molecular dynamics simulations.

►IQEC 06: Nano-Optics and Plasmonics

IPDB10 • 9:48 p.m.
A Plasmonic Switch Based on Molecular Machine-Au Nanodisk Complexes, *Yue Bing Zheng[1], Ying-Wei Yang[2], Lasse Jensen[1], Lei Fang[2], Bala Krishna Juluri[1], Amar H. Flood[3], Paul S. Weiss[1], J. Fraser Stoddart[2], Tony Jun Huang[1]; [1]Pennsylvania State Univ., USA, [2]Northwestern Univ., USA, [3]Indiana Univ., USA.* A plasmonic switch is demonstrated with rotaxane-derivatized Au nanodisks. The molecule-nanodisk complexes exhibit redox-controlled reversible plasmon-based switching, suggesting that nanoscale movement with surface-bound molecular machines can be used as the active components of plasmonic devices.