

Postdeadline Presentations

PDPA • FiO Postdeadline Session A

Empire, Fairmount Hotel

18:30 – 20:30

Csaba Toth; Lawrence Berkeley National Laboratory, USA

PDPA1 • 18:30

Simultaneous Recording of Multiple Focal Planes for 3-D Microscopy using ultra-high Speed Adaptive Optics, C.B.

Arnold¹, M. Duocastella¹; ¹Mechanical and Aerospace Engineering, Princeton University, USA. An ultra-high speed adaptive element is used to provide simultaneous real-time imaging of multiple and selectable focal planes in a bulk specimen. This approach offers promising perspectives in relevant areas.

PDPA2 • 18:45

Deconvolved Phase Imaging for Diffraction Tomography, Y. Cotte¹, F.M. Toy¹, C. Depeursinge¹, D. Boss²; ¹Microvision and Microdiagnostics Group, Switzerland, ²Laboratory of Neuroenergetics and Cellular Dynamics, Switzerland. We present a new technique for coherent imaging based on digital holographic microscopy. For high-resolution tomography, the diffraction effect of the microscope objective is corrected by the system's complex point spread function.

PDPA3 • 19:00

Sparsity-Based Single-Shot Sub-Wavelength Coherent Diffractive Imaging, Yoav Shechtman¹, Alexander Szameit¹, Eliyahu Osherovich², Elad Bullkich¹, Hod Dana³, Snir Gazit¹, Shy Shoham³, Michael Zibulevsky², Irad Yaoneh², Ernst B. Kley⁴, Yonina C. Eldar⁵, Oren Cohen¹, Mordechai Segev¹; ¹Physics, Technion, Israel Institute of Technology, Israel, ²Computer Science, Technion, Israel Institute of Technology, Israel, ³Biomedical Engineering, Technion, Israel Institute of Technology, Israel, ⁴Institute of Applied Physics, Friedrich-Schiller-Universität Jena, Germany, ⁵Electrical Engineering, Technion, Israel Institute of Technology, Israel. We demonstrate theoretically and experimentally a method of performing single-shot sub-wavelength Coherent Diffractive Imaging (CDI): an algorithmic approach for reconstructing sparse sub-wavelength images from their far-field intensity measurements.

PDPA4 • 19:15

First Astronomical Spectra using an Integrated Photonic Spectrograph, Nick Cvetojevic^{1,2}, Nemanja Jovanovic^{2,4}, Chris Betters^{5,6}, Jon Lawrence^{2,4}, Simon Ellis⁴, Gordon Robertson^{5,6}, Michael Withford^{1,3}, Joss Bland-Hawthorn^{5,6}; ¹MQ Photonics Research Centre, Department of Physics and Astronomy, Macquarie University, Australia, ²Centre for Astronomy, Astrophysics and Astrophotonics, Macquarie university, Australia, ³Centre for Ultrahigh Bandwidth Devices for Optical Systems, Australia, ⁴Australian Astronomical Observatory, Australia, ⁵Sydney Institute for Astronomy, School of Physics, University of Sydney, Australia, ⁶Institute of Photonics and Optical Science, University of Sydney, Australia. We present results from the first ever successful, on-telescope test of a miniature integrated photonic spectrograph for astronomy, by obtaining a spectrum from a stellar source.

PDPA5 • 19:30

Compression of Attosecond Pulses with Multilayer Mirrors, Franck Delmotte¹, Charles Bourassin-Bouchet¹, Sébastien de Rossi¹, Evgueni Meltchakov¹, Zsolt Diveki², Elizabeth English², Thierry Ruchon², Pascal Salières², Bertrand Carré², Angelo Giglia³, Nicola Mahne³, Stefano Nannarone³; ¹Laboratoire Charles Fabry, Institut d'Optique, France, ²IRAMIS, Service des Photons, Atomes et Molécules, CEA-Saclay, France, ³IOM-CNR Laboratorio Tecnologia Avanzate e NanoScienza, Italy. We present the design, fabrication and characterization of non-periodic multilayer mirrors for the compression of attosecond pulses in the XUV domain. We demonstrate that time domain optimization allows pulse compression down to sub-50 as duration.

PDPA6 • 19:45

Plasma Waveguide Formation using Axicon Ignitor-Heater Scheme in High-Density Gas Clustered Target for Amplification of the Soft X-Ray Laser Radiation, *Michaela Kozlova^{1,2}, Stephane Sebban¹, Julien Gautier¹, Jaroslav Nejd²*; ¹FLEX, LOA ENSTA, France, ²Ultraintense lasers, IoP AV CS, Czech Republic. To boost energy output of the soft x-ray laser the waveguiding technique can be used. Hence we investigated plasma waveguide properties in the high-density gas clustered target.

PDPA7 • 20:00

Determination of Electron Diffusion Coefficients in Atomic and Molecular Gases using Femtosecond Pulses, *Amelie Jarnac¹, Magali Durand^{1,2}, Yi Liu¹, Bernard Prade¹, Aurelien Houard¹, Andre Mysyrowicz¹*; ¹Laboratoire d'Optique Appliquee, France, ²Onera, France. Life time measurement of a plasma grating formed at the intersection of two femtosecond filaments enables us to determine the plasma properties, such as the ambipolar diffusion coefficient and the recombination time, in different gases.

PDPA8 • 20:15

Sub-Wavelength Terahertz Spin-Flip Lase Based on a Magnetic Metal Point-Contact Array, *A.M. Kadigrobov¹*; ¹Department of Physics, Gothenburg University, Sweden. We suggest a terahertz laser in which stimulated emission of light occurs due to spin-flips of polarized electrons injected into a metallic point contact array. The optical gain can reach 10^6 cm^{-1} .

PDPB • FiO Postdeadline Session B

Crystal, Fairmount Hotel

18:30 – 20:30

David Reitze, University of Florida, USA

PDPB1 • 18:30

Record-length Transmission of Entangled Photons with Orbital Angular Momentum (Vortices), *Nenad Bozinovic¹, Siddharth Ramachandran¹, Misha Brodsky², Poul Kristensen³*; ¹ECE, Boston University, USA, ²AT&T, USA, ³OFS-Fitel, Denmark. We demonstrate, for the first time, transmission of entangled photons carrying orbital angular momentum, over km-lengths of a specially designed optical fiber, representing a thousand-fold improvement of transmission-distance over previous reports.

PDPB2 • 18:45

Influence of Atmospheric Turbulence on the Propagation of Quantum States of Light using Spatial Mode Encoding, *Brandon Rodenburg¹, Martin P. Lavery², Mehul Malik¹, Malcolm O'Sullivan¹, Mohammad Mirhosseini¹, Miles Padgett², Robert W. Boyd^{1,3}*; ¹Institute of Optics, University of Rochester, USA, ²School of Physics and Astronomy, University of Glasgow, UK, ³Physics, University of Ottawa, Canada. Turbulence effects on transverse modes of light with orbital angular momentum or linear momentum are studied theoretically and experimentally. These results have potentially important implications for free-space quantum communications systems.

PDPB3 • 19:00

Multi-Spatial-Mode Noiseless Optical Amplifier, *Alberto M. Marino¹, Neil Corzo-Trejo^{1,2}, Kevin M. Jones³, Paul Lett¹*; ¹Joint Quantum Institute, NIST and the University of Maryland, USA, ²Departamento de Física, CINVESTAV-IPN, Mexico, ³Department of Physics, Williams College, USA. We implement a noiseless optical amplifier through a phase-sensitive four-wave mixing process in rubidium vapor and show that it does not significantly degrade the signal-to-noise ratio. Preliminary results show its multi-spatial-mode nature.

PDPB4 • 19:15

All Atomic Generation and Manipulation of Squeezed Vacuum in Hot Rb Vapor, *T.S. Horrom¹, G. Romanov¹, I. Novikova¹, E.E. Mikhailov¹; ¹William and Mary, USA*. We demonstrate control over the noise spectrum of squeezed vacuum by passing it through Rb vapor under EIT conditions. This all-atomic EIT filtering of noise is applicable to gravitational wave interferometers and quantum memory systems.

PDPB5 • 19:30

Observation of low-contrast all-optical switching based on the Zeno effect, *Scott Hendrickson¹, Chad Weiler¹, Ryan Camacho², Peter Rakich², Ian Young², Michael Shaw², Todd Pittman³, James Franson³, Bryan Jacobs¹; ¹Applied Physics Laboratory, Johns Hopkins University, USA; ²Sandia National Laboratories, USA; ³University of Maryland, USA*. Low-contrast all-optical Zeno switching has been demonstrated in a Silicon Nitride microdisk resonator coupled to hot Rubidium vapor. The device is based on the suppression of cavity power buildup due to non-degenerate two-photon absorption.

PDPB6 • 19:45

Observation of Brillouin Cooling, *Gaurav Bahl¹, Matthew Tomes¹, Florian Marquardt^{2,3}, Tal Carmon¹; ¹Electrical Engineering and Computer Science, University of Michigan, USA, ²Institut für Theoretische Physik, Universität Erlangen-Nürnberg, Germany, ³Max Planck Institute for the Science of Light, Germany*. We experimentally demonstrate the energy-reversed counterpart to Brillouin lasers, resulting in the cooling of Brownian surface-acoustic-wave whispering-gallery resonances by light in a silica microsphere resonator.

PDPB7 • 20:00

Energy Transfer Enhancement by Localization of Light in a Sandwich-like Photonic Structure, *L. González-Urbina¹, J. Pérez-Moreno¹, K. Clays¹; ¹University of Leuven, Belgium*. Localization and slow light propagation enhance the efficiency of the energy transfer process between a donor-acceptor pair embedded in a polymer matrix and inserted in a double stack of Random hexagonal packed colloidal photonic crystals.

PDPB8 • 20:15

Coherent Storage and Retrieval of Broadband Optical Pulses, *¹E. Groves, ¹J.H. Eberly; ¹Physics and Astronomy, University of Rochester, USA*. We conduct a theoretical investigation of broadband optical pulse control in coherent three-level media. We produce an exact soliton solution, probe its utility with numerical solutions and generate animations to highlight interesting features.

PDPC • FiO Postdeadline Session C

Gold Room, Fairmont Hotel

18:30 – 20:30

Inuk Kang, Alcatel-Lucent Bell Labs, USA

PDPC1 • 18:30

Experimental Observation of Topological States and Adiabatic Pumping in 1D Photonic Quasicrystals, *Mor Verbin¹, Yaacov E. Kraus², Yoav Lahini¹, Zohar Ringel², Oded Zilberberg², Yaron Silberberg¹; ¹Complex Physics, Weizmann Institute of Science, Israel, ²Condensed Matter Physics, Weizmann Institute of Science, Israel*. In this work, we show that quasicrystals exhibit new types of topological phases that were previously attributed only to systems of higher dimension. We experimentally demonstrate such topological effects in 1D systems using photonic quasicrystals.

PDPC2 • 18:45

Sub 10 ps Carrier Response Times in Electroabsorption Modulators Using Quantum Well Offsetting, *Chris L. Daunt^{1,2}, Ciaran S. Cleary^{1,2}, Robert J. Manning^{1,2}, Frank H. Peters^{1,2}; ¹Department of Physics, University College Cork, Ireland; ²Integrated Photonics Group, Tyndall National Institute, Ireland*. We demonstrate sub 10 ps photo-carrier response times in an electroabsorption modulator having a custom epitaxy structure. The structure used quantum well offsetting and carbon doping to achieve a 2.5 ps response time, when biased at -4.5 V.

PDPC3 • 19:00

Strong Optomechanical Nonlinearity in Dual-Web Fibre, A. Butsch¹, M. Kang¹, T. Euser¹, P. Russell¹; ¹Max Planck Institute for the Science of Light, Germany. Nonlinear optomechanical refractive index changes $\sim 10^4$ larger than the Kerr effect are measured experimentally in a unique device consisting of two closely-spaced glass 'nanowebs' suspended inside a capillary fibre. FE modelling confirms the results.

PDPC4 • 19:15

Radially Polarized Beam Induced Plasmonic Hybrid Mode for Surface-enhanced Raman Spectroscopy, L. Du¹, ²X. Yuan; ¹Nanyang Technological University, Singapore, ²Nankai University, Tianjin, China. We applied radially polarized beam for propagating and localized surface plasmon co-enhanced Raman spectroscopy. Simulation and experimental works indicated that it can produce highly reproducible SERS substrate with impressive Raman enhancement.

PDPC5 • 19:30

Molding Optical Wavefronts Using Phase Discontinuities, Nanfang Yu¹, Patrice Genevet¹, Mikhail A. Kats¹, Francesco Aieta¹, Jean-Philippe Tetienne¹, Zeno Gaburro^{1,2}, Federico Capasso¹; ¹School of Engineering and Applied Sciences, Harvard University, USA, ²Dipartimento di Fisica, Università degli Studi di Trento, Italy. The phase response of plasmonic antennas is used to create designer interfaces, based on which we demonstrated generalized laws of reflection and refraction in the presence of phase discontinuities and created optical vortex beams.

PDPC6 • 19:45

Experimental Demonstration of Three-Dimensional Nanoscale Metamaterial Optical Cavities, Xiaodong Yang^{1,2}, Jie Yao¹, Junsuk Rho¹, Xiaobo Yin^{1,2}, Xiang Zhang^{1,2}; ¹University of California, Berkeley, USA, ²Lawrence Berkeley National Laboratory, USA. We demonstrate deep-subwavelength metamaterial optical cavities with anomalous scaling laws by incorporating indefinite metamaterials. Cavities with sizes down to $\lambda/12$ and high effective refractive index of 17.4 are realized.

PDPC7 • 20:00

Directionally Emitting Plasmon Lasers with Multiplexing and Electrical Modulation, Renmin Ma¹, Xiaobo Yin¹, Rupert Oulton¹, Volker J. Sorger¹, Xiang Zhang^{1,2}; ¹UC Berkeley, USA, ²Lawrence Berkeley National Laboratory, USA. We demonstrated the first directionally emitting deep sub-wavelength plasmon laser. The plasmon laser naturally integrates photonic and electronic functionality allowing both efficient electrical modulation and wavelength multiplexing.

PDPC8 • 20:15

Manipulation of Gold and Silver Nanoparticles via Photo-induced Magnetism, Navindra Singh², Neena Punnoose³, Benjamin Edelstein², Xiaojun Cheng¹, Matthew Moccarme¹, Luat T. Vuong¹; ¹Physics, CUNY Queens College, USA, ²Computer Science, Queens College, USA, ³Townsend Harris High School, USA. We experimentally demonstrate and theoretically model a photo-induced plasmon-assisted magnetic response in non-magnetic nano-particulate solutions that occurs using linear, circular, and unpolarized light.