SYMPOSIUM ED13

Novel Photonic, Electronic and Plasmonic Phenomena in Materials
April 18 - April 21, 2017

Symposium Organizers
Emiliano Cortes, Imperial College London
Suljo Linic, University of Michigan–Ann Arbor
Prineha Narang, California Institute of Technology
Marin Soljacic, Massachusetts Institute of Technology

Symposium Support
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Proceedings Statement
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* Invited Paper

SESSION ED13.1: Excited-State Plasmonics and Nanophotonics
Session Chairs: Hrvoje Buljan and Ravishankar Sundararaman
Tuesday Morning, April 18, 2017
PCC North, 100 Level, Room 132 B

10:30 AM *ED13.1.01
Excited States Phenomena in Organic Solids and Hybrid Interfaces with AB Initio Many-Body Perturbation Theory Jeffrey B. Neaton[1, 2]; [1]University of California, Berkeley, United States; [2]Lawrence Berkeley National Laboratory, United States.

11:00 AM *ED13.1.02
Design Rules for Coupling Catalytic Particles to Near Fields of Plasmonic Particles For Enhanced Catalysis in 3-D Reactor Volumes Phillip Christopher; University of California, Riverside, United States.

11:30 AM *ED13.1.03
After the Plasmon—Designing Materials to Exploit Non-Equilibrium Carriers Ravishankar Sundararaman; Rensselaer Polytechnic Institute, United States.

SESSION ED13.2: Atomic-Scale Nanophotonics and Plasmonics I
Session Chairs: Nader Engheta and Qiong Ma
Tuesday Afternoon, April 18, 2017
PCC North, 100 Level, Room 132 B

1:30 PM *ED13.2.01
Salient Features of Extreme Photonics Nader Engheta; University of Pennsylvania, United States.

2:00 PM ED13.2.02
Enabling and Controlling "Forbidden" Light-Matter Interactions in Polaritonic Media Nicholas Rivera; Massachusetts Institute of Technology, United States.

2:15 PM *ED13.2.03
Quantum and Nonlocal Electrodynamics in Plasmonic Nanoparticles N. Asger Mortensen; Technical University of Denmark, Denmark.

2:45 PM BREAK

3:15 PM *ED13.2.04
Scalable, Ultra-Resistant Structural Colors Based on Network Metamaterials Federico Capasso; Harvard University, United States.

3:45 PM *ED13.2.05
Optoelectronics of Graphene-Based Van der Waals Heterostructures Qiong Ma; Massachusetts Institute of Technology, United States.

4:15 PM ED13.2.06
Bianisotropy—A New Route towards Non-Reciprocal Optical Metasurfaces Mark Lawrence; Stanford University, United States.

4:30 PM ED13.2.07
Coherent Control of the Optical Absorption and Fluorescence Enhancement in a Plasmonic Lattice Coupled to a Luminescent Layer Giuseppe Pirruccio[1, 2]; [1]UNAM, Mexico; [2]FOM Institute AMOLF, Netherlands.

4:45 PM ED13.2.08
Extreme Optical Anisotropy Using 2D Heterostructures of Graphene and Hexagonal Boron Nitride Zachary Hall; Massachusetts Institute of Technology, United States.

SESSION ED13.3: Poster Session I: Novel Photonic, Electronic and Plasmonic Effects in Materials I
Tuesday Afternoon, April 18, 2017
8:00 PM - 10:00 PM
Sheraton, Third Level, Phoenix Ballroom

ED13.3.01
High Damage Threshold Ga_2O_3 Dielectric Laser Accelerator Huiyang Deng; Stanford University, United States.

ED13.3.02
Design and Optimization of Hybrid Structure for Fast and deep SPP Electric Modulation Chenlei Pang; Zhejiang University, China.

ED13.3.03
Theoretical Study on the Effects of Atomic Size Defects on Hot Electron Generation of Noble Metal Nanoparticle for Photocatalytic Reaction Tae Kyung Lee; Ulsan National Institute of Science and Technology, Korea (the Republic of).

ED13.3.04
New Organic Fluorescent Small Molecules for Detection of Sensitive Radioactive Nuclear Materials Henok A. Yemam; Colorado School of Mines, United States.

ED13.3.05
Second Harmonic Generation Assisted Nonlinear Response of Double Metal Plasmonic Interfaces for Photovoltaic Applications Mona Zolfaghari Borra; Middle East Technical University, Turkey.

ED13.3.06
Hydrogen-Plasma Induced Insulator-to-Metal Transition in $Ba_{0.5}Sr_{0.5}Tio_3$ Thin Films Ambrose Seo; University of Kentucky, United States.

ED13.3.07
Altering the Optical Properties of Graphene by B (N) or B/N Co-Doping Pooja Rani; Modi College, India.

ED13.3.08
Metamaterial for Enhanced Light Absorption in CZTS Solar Cells Omar A. Abdelraouf; The American University in Cairo, Egypt.

ED13.3.09
Directional and Frequency-Selective Thermal Emission in Midinfrared Ahmad Khayyat Jafari; Texas Tech University (TTU), United States.

ED13.3.10
SERS Molecular Sensing Using Regular Arrays of Plasmonic Nanostructures Fabricated by Nanosphere Lithography Juan-Carlos Cheang-Wong; Instituto de Física, Universidad Nacional Autónoma de México, Mexico.

ED13.3.11
Vacancy-Induced Phase Transitions in Non-Stoichiometric Nickel and Tungsten Oxides Vidhya Chakrapani; Rensselaer Polytechnic Institute, United States.

SESSION ED13.4: Quantum Plasmonics and Nanophotonics
Session Chair: Ognjen Ilic
Wednesday Morning, April 19, 2017
PCC North, 100 Level, Room 132 B

8:00 AM *ED13.4.01
Quantum Plasmonics Peter Nordlander; Rice University, United States.

8:30 AM ED13.4.02
Electronic Factors Governing the Electron-Phonon Coupling in Metal-Adsorbate Systems—An Ab Initio Study Priyank Kumar; ETH Zurich, Switzerland.

8:45 AM ED13.4.03
Power Conversion via Unidirectional Tunneling of Plasmonic Hot Electrons Matthew Sheldon; Texas A&M University, United States.

9:00 AM *ED13.4.04
Surface-Enhanced Raman Spectroscopy and Imaging with Molecularly Functionalized Noble Metal Nanoparticles—From Experimental Precision Plasmonics to iSERS Microscopy and Chemical Energy Conversion Sebastian Schluecker; University Duisburg-Essen, Germany.

9:30 AM BREAK

SESSION ED13.5: Topological Photonics and Symmetry
Session Chairs: Nader Engheta and Prineha Narang
Wednesday Morning, April 19, 2017
PCC North, 100 Level, Room 132 B

9:45 AM *ED13.5.01
Topological Photonics and Phononics in Non-Reciprocal Metasurfaces Andrea Alu; The University of Texas at Austin, United States.

10:15 AM *ED13.5.02
Topological One-Way Fiber of Second Chern Number Ling Lu; Institute of Physics, China.

10:45 AM ED13.5.03
Double Gyroid Photonic Crystal—Synthesis and Mid-Infrared Photonic Characterization Siying Peng; California Institute of Technology, United States.

11:00 AM ED13.5.04
Topologically Enabled Optical Nano Motors Ognjen Ilic[1, 2]; [1]California Institute of Technology, United States; [2]Massachusetts Institute of Technology, United States.

11:15 AM ED13.5.05
Searching for Topological Materials Su-Yang Xu; Massachusetts Institute of Technology, United States.

11:30 AM ED13.5.06
Tuning the Transition from Spontaneous Emission to Lasing by Gate Control of the Local Density of Optical States Yu-Jung Lu; California Institute of Technology, United States.

11:45 AM ED13.5.07
Hidden Anisotropy of Gold Nanorods Ji-Young Kim; University of Michigan, United States.

SESSION ED13.6: Quantum Photonics and Plasmonics
Session Chair: Prineha Narang
Wednesday Afternoon, April 19, 2017
PCC North, 100 Level, Room 132 B

1:30 PM *ED13.6.01
Quantum Nanophotonics Jelena Vuckovic; Stanford University, United States.

2:00 PM *ED13.6.02
Quantum Plasmonics, Polaritons and Strong Light-Matter Interactions with 2D Material Heterostructures Frank Koppens[1, 2]; [1]The Barcelona Institute of Science and Technology, Spain; [2]ICREA – Institució Catalana de Recerça i Estudis Avancats, Spain.

2:30 PM BREAK

SESSION ED13.7: Atomic-Scale Nanophotonics and Plasmonics II
Session Chairs: Andrea Alu and Frank Koppens
Wednesday Afternoon, April 19, 2017
PCC North, 100 Level, Room 132 B

3:30 PM *ED13.7.01
Atomic Color Centers in Wide-Bandgap Semiconductors—Applications as Quantum Memories, Sensors and Single Photon Sources Dirk R. Englund; Massachusetts Institute of Technology, United States.

4:00 PM ED13.7.02
Super-Planckian Energy Transfer via Hyperbolic Phonons in a van der Waals Stack Niels Hesp; ICFO—Institut de Ciències Fotòniques, The Barcelona Institute of Science and Technology, Spain.

4:15 PM ED13.7.03
Plasmonics—Transformed Quantum Emitters Using Non-Conventional Nanoscale Plasmonic Doped Oxides Ajay Singh; Los Alamos National Laboratory, United States.

4:30 PM *ED13.7.04
Driving Photonics to the Atomic Scale Javier Aizpurua; CSIC-UPV/EHU, Spain.

SESSION ED13.8: Poster Session II: Novel Photonic, Electronic and Plasmonic Effects in Materials
Wednesday Afternoon, April 19, 2017
8:00 PM - 10:00 PM
Sheraton, Third Level, Phoenix Ballroom

ED13.8.01
Nanoporous Silver Double-Layers by Convenient Electrochemical Method for SERS Applications Yawen Zhan; City University of Hong Kong, Hong Kong.

ED13.8.02
Deep Ultraviolet Photodetector Based on Wide Bandgap Semiconductor Gallium Oxides Zhenping Wu; Beijing University of Posts & Telecomm, China.

ED13.8.03
Electrohydrodynamic Jet-Printed ZTO TFT and Its Electrical Properties Woon-Seop Choi; Hoseo University, Korea (the Republic of).

ED13.8.04
Enhancement of Properties of Perovskite Solar Cell and LED by Surface Plasmon Resonance of Graphene Quantum Dots/Ag Nanowires Sungwon Hwang; Konkuk University, Korea (the Republic of).

ED13.8.05
ITO / Ag / AlN / Al_2O_3 Multilayer Transparent Conductive Electrodes for Ultraviolet Light-Emitting Diodes Byeong Ryong Lee; Korea University, Korea (the Republic of).

ED13.8.06
Electrodeposited, Transverse Nanowire Electroluminescent Junctions Shaopeng Qiao; University of California, Irvine, United States.

ED13.8.07
Electronic Structure and Optical Response of Atomically-Thin Sheets of Plasmonic Metals Tuan H. Nguyen; Massachusetts Institute of Technology, United States.

ED13.8.08
Plasmon-Induced Hot Electron Generation in Nanoparticle Dimers Francisco V. Ramirez; Carnegie Mellon University, United States.

ED13.8.09
Nanometer-Scale Metal Meshes across Device-Relevant Areas for Transparent Electrodes and Optical Metamaterials Anna M. Hiszpanski; Lawrence Livermore National Laboratory, United States.

ED13.8.10
Magnetotransport Properties of Mechanically Stable Graphene Foam Rizwan Ur Rehman Sagar[1, 2]; [1]Shenzhen University, China; [2]Shenzhen University, China.

SESSION ED13.9: Phonon-Polaritons and MIR-THz Photonics
Session Chairs: Harry Atwater, Dirk Englund and Frank Koppens
Thursday Morning, April 20, 2017
PCC North, 100 Level, Room 132 B

8:00 AM *ED13.9.01
Mid-IR to THz Polaritonics—Realizing Alternative Materials Joshua D. Caldwell; U.S. Naval Research Laboratory, United States.

8:30 AM ED13.9.02
Hyperbolic Phonon Polaritons in Hexagonal Boron Nitride Siyuan Dai; University of California, San Diego, United States.

8:45 AM ED13.9.03
Controlling Localized Surface Phonon Polariton Resonances in Indium Phosphide Antennas via Carrier Injection Chase T. Ellis; US Naval Research Laboratory, United States.

9:00 AM ED13.9.04
Field Effect Optoelectronic Modulation of Quantum-Confined Carriers in Black Phosphorus Michelle C. Sherrott; California Institute of Technology, United States.

9:15 AM ED13.9.05
Electrical Properties of Gated Bismuth Telluride Selenide Brandon D. Clark; Worcester Polytechnic Institute, United States.

9:30 AM ED13.9.06
Ultrasensitive Surface Enhanced Infrared Absorption Spectroscopy on Patternless, Uniform Field Enhancement Surfaces Gokhan Bakan; Bilkent University, Turkey.

9:45 AM BREAK

SESSION ED13.10: Tunable Plasmonic, Photonic and Electronic Effects I
Session Chairs: Joshua Caldwell and Siyuan Dai
Thursday Morning, April 20, 2017
PCC North, 100 Level, Room 132 B

10:15 AM *ED13.10.01
Photonic Design as a Probe of Nanoscale Energy Conversion Mechanisms Harry A. Atwater; California Institute of Technology, United States.

10:45 AM ED13.10.02
Multi-Refractive-Index Metamaterials Using Subwavelength Waveguide Arrays Zhaoning Yu; University of Wisconsin–Madison, United States.

11:00 AM ED13.10.03
Dynamic Plasmonic Tuning of Infrared Metasurface Mie Resonators Jon A. Schuller; University of California, Santa Barbara, United States.

11:15 AM *ED13.10.04
Transgressing Effective Medium Theories with Epsilon-Near-Zero Media Inigo Liberal; University of Pennsylvania, United States.

SESSION ED13.11: Tunable Plasmonic, Photonic and Electronic Effects II
Session Chair: Jon Schuller
Thursday Afternoon, April 20, 2017
PCC North, 100 Level, Room 132 B

1:30 PM ED13.11.01
Nanowire Light Emitting Devices and their Applications in Wide-Field Far-Field Sub-Diffraction Imaging Qing Yang; Zhejiang University, China.

1:45 PM ED13.11.02
Electron Energy-Loss Spectroscopy Calculation in Finite-Difference Time-Domain: EELS-FDTD Nicolas Large; The University of Texas at San Antonio, United States.

SESSION ED13.12: Magnetic and Chiral Light-Matter Interactions
Session Chairs: Prineha Narang and Ravishankar Sundararaman
Thursday Afternoon, April 20, 2017
PCC North, 100 Level, Room 132 B

2:00 PM *ED13.12.01
Enhancing Chiral Light-Matter Interactions with Achiral Nanostructures Jennifer A. Dionne; Stanford University, United States.

2:30 PM *ED13.12.02
Synthetic Magnetic Fields and Synthetic Dimensions in Photonic Lattices Hrvoje Buljan; University of Zagreb Faculty of Science, Croatia.

3:00 PM BREAK

3:30 PM ED13.12.03
Ab Initio Insights into Novel Magnetic Behavior in the $Mn_{1-x}Fe_xRu_2Sn$ Pseudo-Binary Heusler Elizabeth Decolvenaere; University of California, Santa Barbara, United States.

3:45 PM ED13.12.04
Exciton Bose-Einstein Condensation in Double Walled Carbon Nanotubes Igor Bondarev; North Carolina Central University, United States.

4:00 PM ED13.12.05
Magnetic Assembly of Nanocubes into Responsive Photonic Crystals Zhiwei Li; University of California, Riverside, United States.

4:15 PM ED13.12.06
Light-Driven Self-Organization of Mesoscale Optical Matter Zijie Yan; Clarkson University, United States.

SESSION ED13.13: Imaging—A Nanophotonics and Plasmonics Approach I
Session Chairs: Emiliano Cortes and Jennifer Dionne
Thursday Afternoon, April 20, 2017
PCC North, 100 Level, Room 132 B

4:15 PM *ED13.13.01
Tailoring, Visualizing and Exploiting Field Confinement in Plasmonic and Phononic Nanoantennas Stefan A. Maier; Imperial College London, United Kingdom.

4:45 PM ED13.13.02
Quantum Plasmonic Theory of Small Metallic Chains Jamie Fitzgerald; Imperial College London, United Kingdom.

SESSION ED13.14: Nonlinear and MIR-THz Photonics
Session Chairs: Dirk Englund and Katherine Fountaine
Friday Morning, April 21, 2017
PCC North, 100 Level, Room 132 B

8:00 AM *ED13.14.01
Enhancing Nonlinear Effects in Plasmonic Nanostructures Rupert F. Oulton; Imperial College London, United Kingdom.

8:30 AM ED13.14.02
Independent Infrared and Visible Electrochromism in Plasmonic Nb-Doped TiO_2 Nanocrystals Clayton J. Dahlman; University of Texas at Austin, United States.

8:45 AM ED13.14.03
Mid-Infrared Optics Using Low-Loss Materials with Refractive Index below Unity Alireza Shahsafi; University of Wisconsin–Madison, United States.

9:00 AM ED13.14.04
Efficient Calculation of the Plasmonic Response of Nested Nanoparticles of Arbitrary Shape Raul Esquivel-Sirvent; Universidad Nacional Autonoma de Mexico, Mexico.

9:15 AM ED13.14.05
Ultra-Low Loss Polaritons in Hexagonal Boron Nitride—A New Approach Alexander J. Giles; US Naval Research Laboratory, United States.

9:30 AM ED13.14.06
Active Tuning of Surface-Phonon Polariton Resonances in Silicon Carbide Adam Dunkelberger[1, 2]; [1]NRC Research Associateship Fellow, United States; [2]U.S. Naval Research Laboratory, United States.

9:45 AM BREAK

SESSION ED13.15: Tailoring Light-Matter Interactions
Session Chairs: Peter Bermel and Rupert Oulton
Friday Morning, April 21, 2017
PCC North, 100 Level, Room 132 B

10:15 AM ED13.15.01
Shape and Crystalline Anisotropy Convoluted Effect on Localized Surface Plasmon Resonance of Semiconductor Nanocrystals Ankit Agrawal; The University of Texas at Austin, United States.

10:30 AM *ED13.15.02
Nanophotonic Design of Semiconductor Nanopillar Arrays—Fundamentals and Applications Katherine T. Fountaine[1, 2]; [1]Northrop Grumman Aerospace Systems, United States; [2]California Institute of Technology, United States.

11:00 AM ED13.15.03
Photonically Enhanced Strain Sensors Based on a Hybrid Structure of Crumpled Graphene and Colloidal Photonic Crystals Peter M. Knapp; University of Illinois at Urbana-Champaign, United States.

11:15 AM ED13.15.04
Light Scattered by 'Hedgehog' Particles Joong Hwan Bahng[1, 2]; [1]University of Michigan, United States; [2]University of Michigan, United States.

11:30 AM ED13.15.05
Probing the Surface Plasmon Resonance Behavior of Refractory Nanomaterials using Electron Energy Loss Spectroscopy Andrew Herzing; National Institute of Standards and Technology, United States.

11:45 AM ED13.15.06
Detecting Surface Energy Correlation with Crystal Orientation in Native Oxides Grown on Si(100) and Si(111) Using Three Liquid Contact Angle Analysis (3LCAA) Ryan T. Van Haren; Arizona State University, United States.

SESSION ED13.16: Imaging—A Nanophotonics and Plasmonics Approach II
Session Chairs: Peter Bermel and Joshua Caldwell
Friday Afternoon, April 21, 2017
PCC North, 100 Level, Room 132 B

1:30 PM *ED13.16.01
Tip-Enhanced Raman Spectroscopy for Nanoscale Reaction and Characterization Bin Ren; Xiamen University, China.

2:00 PM ED13.16.02
Plasmonic Enhancement in Surface-Enhanced Raman Scattering is much Stronger than Commonly Accepted Niclas S. Mueller; Freie Universität Berlin - Department of Physics, Germany.

2:15 PM ED13.16.03
Near-Field Detection and Application of Optical Orbital Angular Momentum Modes in an Electron Microscope Jordan A. Hachtel; Oak Ridge National Laboratory, United States.

SESSION ED13.17: Light-Scattering and Imaging
Session Chairs: Emiliano Cortes and Bin Ren
Friday Afternoon, April 21, 2017
PCC North, 100 Level, Room 132 B

2:30 PM *ED13.17.01
Light Generation and Scattering in a Photonic Network of Sub-Wavelength Nanofibres Riccardo Sapienza; King's College London, United Kingdom.

3:00 PM BREAK

3:30 PM ED13.17.02
Highly Effective Light Trapping in 2D Absorbers Sidan Fu; Dartmouth College, United States.

3:45 PM *ED13.17.03
Angle-Selective Filters for Position-Sensitive Illumination and Shadowing Peter Bermel; Purdue University, United States.

4:15 PM ED13.17.04
Electron Dynamics and Charge Injection in Au Nanoparticle - TiO_2 Thin Films Daniel Ratchford; Naval Research Laboratory, United States.

4:30 PM ED13.17.05
All-Electrical Detection and Imaging of Propagating Graphene Plasmons Achim Woessner; ICFO - The Institute of Photonic Sciences, Spain.

4:45 PM ED13.17.06
Polarized Light Emission from Isotropic Colloidal Quantum Dots Coupled to a Plasmonic Cavity Kivanc Gungor; Bilkent University, Turkey.