

Self-Assembled Plasmonic Nanoparticles for Organic Photovoltaics

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Symposium EM7 : Functional Plasmonics

Nov 28

Nov 29

Nov 30

Dec 01

Dec 02

2016-12-01 [+](#) [Show All Abstracts](#)

Symposium Organizers

Laura Na Liu, Max Planck Institute for Intelligent Systems

Prashant K. Jain, University of Illinois - Urbana Champaign

Yongmin Liu, Northeastern University

Yuebing Zheng, Univ of Texas-Austin

EM7.9: Functional Plasmonics for Physics, Chemistry, Biology and Materials Science I

Session Chairs

Ralf Jungmann

Thursday AM, December 01, 2016

Hynes, Level 3, Ballroom A

8:30 AM - *EM7.9.01

Actuation of Stimulus-Responsive Plasmonic Nanoparticles

[David Ginger](#)¹

¹ University of Washington Seattle United States

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9:00 AM - EM7.9.02

Single-Molecule Surface-Enhanced Raman Measurements in Individual Hot Spots

Nam Hoon Kim¹, [Wooseup Hwang](#)², Kangkyun Baek¹, Md. Rohman¹, Jeehong Kim², Gyeonwon Yun¹, Martin Moskovits⁴, Kimoon Kim^{1 2 3}

¹ Institute for Basic Science (IBS) Pohang Korea (the Republic of), ² Pohang University of Science and Technology Pohang Korea (the Republic of), ⁴ Department of Chemistry and Biochemistry University of California, Santa Barbara Santa Barbara United States, ³ Division of Advanced Materials Science Pohang University of Science and Technology Pohang Korea (the Republic of)

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9:15 AM - EM7.9.03

Measuring Viral Membrane Fluidity Based on the Scattered Light Polarization Fluctuations of Plasmonic Nanoparticle Labels

Amin Feizpour¹, Behnaz Eshaghi¹, Hisashi Akiyama¹, Suryaram Gummuluru¹, Bjoern Reinhard¹

¹ Boston University Boston United States

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9:30 AM - *EM7.9.04

Integration of Plasmonic Heating with Phase Transition for Novel Applications

Yunan Xia¹

¹ Georgia Institute of Technology Atlanta United States

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**10:00 AM -
BREAK**

10:30 AM - *EM7.9.05

Super-Resolution Microscopy with DNA Molecules

Ralf Jungmann^{1,2}

¹ Department of Physics and Center for Nanoscience Ludwig Maximilian University Munich Germany, ² Max Planck Institute of Biochemistry Munich Germany

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11:00 AM - EM7.9.06

Plasmonic Nanoparticle Networks Assembled from DNA Origami

Pengfei Wang^{2,1}, Kai Guo³, Yoonjo Hwang³, Kyungjin Park³, Seungwoo Lee³, Yonggang Ke^{2,1}

² Biomedical Engineering, School of Medicine Emory University Atlanta United States, ¹ Biomedical Engineering Georgia Institute and Technology Atlanta United States, ³ Sungkyunkwan University Suwon Korea (the Republic of)

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11:15 AM - EM7.9.07

Self-Assembled Plasmonic Nanoparticles for Organic Photovoltaics

Francesco Pastorelli¹¹ DTU Roskilde Denmark Hide Abstract

Introducing plasmonic resonant scatterers in photovoltaic devices is a promising way to increase energy conversion efficiencies by trapping incoming light in ultra-thin solar cells. Colloidal plasmonic oligomers are obtained following a cost-effective self-assembly strategy and incorporated in organic-based cells produced using spin-coating techniques in ambient air conditions. An interesting increase is observed of both external quantum efficiency (EQE) and short-circuit current for solar cells loaded with plasmonic oligomers compared with reference organic cells with and without isolated gold nanoparticles. Theoretical calculations demonstrate that the wavelength-dependent EQE enhancement is a resonant process due to the increased scattering efficiency in plasmonic antennas allowed by a chemically controlled 1 nm nanogap. This method opens the way towards roll-to-roll fabrication of efficient plasmonic ultra-thin photovoltaic devices.

The nano-gap antennas are linked at a controlled distance of a few nanometers by Dithiothreitol molecules. The spacing molecules ensure a minimum distance that plays a fundamental role in the formation of intensity hot spots in the nanogap as well as large and red-shifted scattering peaks. This OPV device, realized in ambient air condition, exhibited an efficiency 14% higher than the reference one showing a relevant enhancement in the red part of the EQE measurements.

Francesco Pastorelli, Sebastien Bidault, Jordi Martorell, Nicolas Bonod, DOI: 10.1002/adom.201300363

11:30 AM - *EM7.9.08

Reconstructing Hydrogen-Induced Phase Transitions in Individual Nanocrystals

Andrea Baldi¹, Tarun Narayan², Ai Leen Koh³, Robert Sinclair², Jennifer Dionne^{2,4}

¹ Dutch Institute for Fundamental Energy Research (DIFFER) Eindhoven Netherlands, ² Department of Materials Science and Engineering Stanford University Stanford United States, ³ Stanford Nano Shared Facilities Stanford University Stanford United States, ⁴ Stanford Institute for Materials and Energy Sciences SLAC National Accelerator Laboratory Stanford United States

 Show Abstract**EM7.10: Functional Plasmonics for Physics, Chemistry, Biology and Materials Science II****Session Chairs**

Maximilian Urban

Thursday PM, December 01, 2016
Hynes, Level 3, Ballroom A

1:30 PM - *EM7.10.01

Colloidal Nanocrystals Absorbing in the NIR—Synthesis, Transformations and Applications

Liberato Manna¹

¹ Inst Italiano di Tecnologia Genova Italy

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2:00 PM - EM7.10.02

Preferential Methane Production from Photocatalytic Carbon Dioxide Hydrogenation on Plasmonic Rhodium Photocatalysts

Xiao Zhang¹, Henry Everitt¹, Jie Liu¹

¹ Duke University Durham United States

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2:15 PM - *EM7.10.03

Programmable DNA Origami for Plasmonic Molecules, 2D Clusters and 2D Lattices

Pengfei Wang¹, Stavros Gaitanaros², Seungwoo Lee³, Mark Bathe², William Shih^{4 5 6},
Yonggang Ke¹

¹ Wallace H. Coulter Department of Biomedical Engineering Georgia Institute of Technology and Emory University Atlanta United States, ² Department of Biomedical Engineering Massachusetts Institute of Technology Cambridge United States, ³ SKKU Advanced Institute of Nanotechnology and School of Chemical Engineering Sungkyunkwan University Suwon Korea (the Republic of), ⁴ Wyss Institute for Biologically Inspired Engineering Harvard University Boston United States, ⁵ Department of Cancer Biology, Dana-Farber Cancer Institute Harvard Medical School, Harvard University Boston United States, ⁶ Department of Biological Chemistry and Molecular Pharmacology Harvard Medical School, Harvard University Boston United States

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2:45 PM - EM7.10.04

Self-Assembly for Active Plasmonic Devices

Farnaz Niroui¹, Mayuran Saravanapavanantham¹, Timothy Swager¹, Jeffrey Lang¹, Vladimir Bulovic¹

¹ Massachusetts Institute of Technology Cambridge United States

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3:00 PM -
BREAK

3:30 PM - *EM7.10.05

Tuning Localized Surface Plasmon Resonance in Metal Oxide Nanocrystals

Delia Milliron¹

¹ Department of Chemical Engineering The University of Texas at Austin Austin United States

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4:00 PM - *EM7.10.06

3D DNA Plasmonics

Maximilian Urban¹, Na Liu^{1 2}

¹ Max Planck Institute for Intelligent Systems Stuttgart Germany, ² Kirchhoff Institute for Physics University of Heidelberg Heidelberg Germany

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4:30 PM - EM7.10.07

Plasmonic Nanopores for Single Molecule Sensing

Francesca Nicoli², Daniel Verschueren², Maxim Belkin³, Aleksei Aksimentiev³, Cees Dekker², Magnus Jonsson^{1 2}

² Bionanoscience Delft University of Technology Delft Netherlands, ³ University of Illinois at Urbana-Champaign Urbana-Champaign United States, ¹ Laboratory of Organic Electronics Linköping University Norrköping Sweden

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EM7.11: Poster Session III: Functional Plasmonics

Session Chairs

Thursday PM, December 01, 2016

Hynes, Level 1, Hall B

8:00 PM - EM7.11.03

Scanning-Free Near Field Optical Microscopy with Tunable Plasmonic Graphene Gratings

Sandeep Inampudi¹, Jierong Cheng¹, Hossein Mosallaei¹

¹ Northeastern University Boston United States

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8:00 PM - EM7.11.08

Probing Charge Transfer Plasmons in Metallic Koch-Type Antennas across the Terahertz Domain

Arash Ahmadvand¹, Raju Sinha¹, Mustafa Karabiyik¹, Phani Kiran Vabbina¹, Burak Gerislioglu¹, Nezhir Pala¹

¹ Florida International University Miami United States

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8:00 PM - EM7.11.09

Formation of Metal Nanowire Array by Mechanical Deformation Using Anodic Porous Alumina Molds and Its Application to Plasmonic Devices

Toshiaki Kondo¹, Takashi Yanagishita¹, Hideki Masuda¹

¹ Tokyo Metropolitan University Hachioji Japan

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8:00 PM - EM7.11.07

Gold Nanostars with Tunable Plasmonic Properties for Identification, Localization, and Quantification of Biologically-Relevant Targets

Ted Tsoulos¹, Supriya Atta¹, Manjari Bhamidipati¹, Laura Fabris¹

¹ Rutgers University Piscataway United States

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8:00 PM - EM7.11.19

Designing Shape of Plasmonic Nanoparticle through Organothiols Molecule for Unprecedented Optical Property

Hye-Eun Lee¹, Hyo-Yong Ahn¹, Yoon Young Lee¹, Ki Tae Nam¹

¹ Materials Science and Engineering Seoul National University Seoul Korea (the Republic of)

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8:00 PM - EM7.11.21

Isolating the Plasmonic Properties of Non-Noble Copper Nanoparticles through Heterostructuring

Derrick Mott¹, Shinya Maenosono¹

¹ JAIST Nomi Japan

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8:00 PM - EM7.11.02

Broadband Light Absorption in Ultrathin Planar Metallic Films

Artur Davoyan^{2,3,1}, Giulia Tagliabue^{4,1}, Harry Atwater^{2,3,1}

² Resnick Sustainability institute Pasadena United States, ³ Kavli Nanoscience Institute Pasadena United States, ¹ California Institute of Technology Pasadena United States, ⁴ Joint Center for Artificial Photosynthesis Pasadena United States

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8:00 PM - EM7.11.01

Effects of Metal Film Thickness and Gain on the Coupling of Organic Semiconductor Emission to Surface Plasmon Polaritons

Ankur Dalsania¹, Jesse Kohl², Cindy Kumah³, Zeqing Shen¹, Christopher Petoukhoff², Catrice Carter², Deirdre O'Carroll^{1,2,4}

¹ Department of Chemistry and Chemical Biology Rutgers University Piscataway United States, ² Department of Materials Science and Engineering Rutgers University Piscataway United States, ³ Department of Chemical, Biochemical, and Environmental Engineering University of Maryland Baltimore United States, ⁴ Institute for Advanced Materials Devices and Nanotechnology Rutgers University Piscataway United States

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8:00 PM - EM7.11.04

Optoelectronic Properties of Polymer Semiconductor Films Integrated with Plasmon-Upconversion Coupling

Yu Jin Jang¹, Eunah Kim¹, Sunghyun Ahn², Kyungwha Chung¹, Jihyeon Kim¹, Heejun Kim¹, Huan Wang¹, Yoon Hee Jang^{1 3}, Jiseok Lee², Dong-Wook Kim¹, Dong Ha Kim¹

¹ EWHA Womans University SEOUL Korea (the Republic of), ² Ulsan National Institute of Science and Technology (UNIST) ULSAN Korea (the Republic of), ³ Korea Institute of Science and Technology (KIST) SEOUL Korea (the Republic of)

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8:00 PM - EM7.11.05

Symmetry Breaking, Facet Stability and Shape Control in Au Nanorod Growth

Joanne Etheridge¹, Wenming Tong¹, Michael Walsh¹, Hadas Katz-Boon¹, Alison Funston¹

¹ Monash Univ Clayton Australia

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8:00 PM - EM7.11.06

#xD; Plasmonic Induced Local Temperature Rise Measured by Upconversion Nanothermometry for Hyperthermia

Mengistie Debasu^{1,2}, Carlos Brites¹, Sangeetha Balabhadra¹, Helena Oliveira³, Joao Rocha², Luis Carlos¹

¹ Department of Physics and CICECO-Aveiro Institute of Materials University of Aveiro Aveiro Portugal, ² Departments of Chemistry and CICECO-Aveiro Institute of Materials University of Aveiro Aveiro Portugal, ³ Department of Biology and CESAM University of Aveiro Aveiro Portugal

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8:00 PM - EM7.11.24

Plasmon-Enhanced Whispering Gallery Mode Emission from Metal-Dielectric Core-Shell Resonator

Trong Ngo^{1,2,3}, Ching-Hang Chien^{1 2 3}, Yu-Da Chen^{1 2 3}, Yia-Chung Chang^{1 4}

¹ Research Center for Applied Sciences Academia Sinica Taipei Taiwan, ² Nano Science and Technology Program, TIGP Academia Sinica Taipei Taiwan, ³ Department of Engineering and System Science Academia Sinica Taipei Taiwan, ⁴ Department of Physics National Cheng Kung University Tainan Taiwan

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8:00 PM - EM7.11.15

Surface Plasmon Enhanced Molecular Beacons for Sensitive DNA Detection

Akash Kannegulla¹, Ye Liu¹, Li-Jing Cheng¹

¹ Oregon State University Corvallis United States

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8:00 PM - EM7.11.16

A Plasmonic Platform with Disordered Array of Metal Nanoparticles for Three-Order Enhanced Upconversion Luminescence and Highly-Sensitive Near-Infrared Photodetector

Seok Joon Kwon¹, Gi Yong Lee¹, Kinam Jung¹, Hyungduk Ko¹, Ho Seong Jang¹, Il Ki Han¹

¹ Korea Institute of Science and Technology Seoul Korea (the Republic of)

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8:00 PM - EM7.11.17

Microparticle Manipulation Using Thermoplasmonic Marangoni Flow

Kyoko Namura¹, Kaoru Nakajima¹, Motofumi Suzuki¹

¹ Kyoto University Kyoto Japan

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8:00 PM - EM7.11.18

Sensing Performance of Hybrid Magnetoplasmonic Nanohole Arrays

Antonio Garcia-Martin¹, Blanca Caballero¹, Juan Carlos Cuevas²

¹ Intitute of Microelectronics of Madrid CSIC Tres Cantos Spain, ² Departamento de Fisica Teorica de la Materia Condensada Universidad Autonoma de Madrid Cantoblanco - Madrid Spain

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8:00 PM - EM7.11.20

Plasmonic Activation of Platinum Clusters for Photocatalysis

Sarah Wieghold¹, Lea Nienhaus², Fabian Knoller¹, Florian Schweinberger¹, Joseph Lyding³, Ueli Heiz¹, Martin Gruebele³, Friedrich Esch¹

¹ Technische Universität München Garching Germany, ² Massachusetts Institute of Technology Cambridge United States, ³ University of Illinois Urbana United States

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8:00 PM - EM7.11.27

Directed-Assembled Moiré Plasmonic Metasurfaces for Multi-Functional Biomedical Application

Zilong Wu¹, Yuebing Zheng¹

¹ University of Texas at Austin Austin United States

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8:00 PM - EM7.11.28

Deep-UV Plasmonics Based on Metal Nanoparticles and Resonant Mode Coupling

Koichi Okamoto¹, Haruku Nishida¹, Daisuke Tanaka², Kouta Okura¹, Kazutaka Tateishi¹, Sou Ryuzaki¹, Pangpang Wang¹, Kaoru Tamada¹

¹ Kyushu University FUKUOKA Japan, ² NIT Oita College Oita Japan

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8:00 PM - EM7.11.29

Localized Surface Plasmon Resonances in Fully-Encapsulated Aluminium NanoVoids

Ye Zhu¹, Philip Nakashima¹, Alison Funston², Laure Bourgeois¹, Joanne Etheridge^{1,3}

¹ Materials Science and Engineering Monash University Clayton Australia, ² School of Chemistry Monash University Clayton Australia, ³ Monash Centre for Electron Microscopy Monash University Clayton Australia

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8:00 PM - EM7.11.30

Selective Excitation of Individual Multipolar Resonances in Single Core (Dielectric)-Satellite (Metal) Structures

Tian-Song Deng¹, U. Manna², J.H. Lee¹, J. Parker^{2,3}, N. Shepherd^{1,2}, Y. Weizmann¹, N. F. Scherer^{1,2}

¹ Department of Chemistry University of Chicago Chicago United States, ² James Franck Institute University of Chicago Chicago United States, ³ Department of Physics University of Chicago Chicago United States

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8:00 PM - EM7.11.31

CMOS-Compatible Zero-Index Metamaterial

Yang Li¹, Daryl Vulis¹, Orad Reshef¹, Philip Camayd-Munoz¹, Mei Yin¹, Shota Kita¹, Marko Loncar¹, Eric Mazur¹

¹ Harvard University Cambridge United States

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8:00 PM - EM7.11.32

Fabrication of Plasmonic Biomimic Substrates

Anatoliy Pinchuk¹

¹ University of Colorado at Colorado Springs Colorado Springs United States

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8:00 PM - EM7.11.25

Tunable Plasmonic Metamaterials through Geometric Tuning

Jeremy Reeves¹, Thomas Stark¹, Lawrence Barrett¹, Richard Lally¹, David Bishop¹

¹ Boston University Boston United States

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8:00 PM - EM7.11.23

Hybrid Plasmonic Cavity Design for THz Generation

Qiang Liu^{1,2}, Sacharia Albin³, Zhengbiao Ouyang^{1,2}, Suling Shen⁴

¹ College of Electronic Science and Technology of Shenzhen University Shenzhen China, ² THz Technical Research Center of Shenzhen University Shenzhen China, ³ Engineering Department, Norfolk State University Norfolk United States, ⁴ Department of Electronic Engineering, The Chinese University of Hong Kong Hong Kong Hong Kong

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8:00 PM - EM7.11.33

Angle-Dependant Broadband Reflectance of Direct Laser Fabricated Plasmonic Nanoparticle Templates on Silica of Varying Thickness

Jacob Spear¹, Dimitris Bellas², D Fairhurst¹, Nikolaos Kalfagiannis¹, Elefterios Lidorikis², D. Koutsogeorgis¹

¹ Nottingham Trent University Nottingham United Kingdom, ² Department of Materials Science and Engineering University of Ioannina Ioannina Greece

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8:00 PM - EM7.11.10

High Responsivity Infrared Graphene-Based Photodetector Assisted by Plasmonic Effect

Chen Zefeng¹

¹ CUHK Hong Kong China

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8:00 PM - EM7.11.11

Fabrication of Wafer-Scale Uniform Surface Enhanced Raman Scattering (SERS) Substrates for Quantitative Bio Sensing

Daejong Yang¹, Hyunjun Cho¹, Madelyn Wang¹, Kelly Woo¹, Sagar Vaidyanathan¹, Hyuck Choo¹

¹ California Institute of Technology Pasadena United States

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8:00 PM - EM7.11.12

From Weak to Ultrastrong Light-Matter Coupling in (6,5) Carbon Nanotubes and Plasmonic Crystals

Yuriy Zakharko¹, Arko Graf¹, Jana Zaumseil¹

¹ University of Heidelberg Heidelberg Germany

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8:00 PM - EM7.11.13

Silver Plasmonic Nanofluids for Solution Processed Solar Cells

Spyridon Kassavetis^{1,2}, Christos Kapnopoulos¹, Panos Patsalas¹, Elefterios Lidorikis², Stergios Logothetidis¹

¹ Physics Department Aristotle University of Thessaloniki Thessaloniki Greece, ² Materials Science and Engineering University of Ioannina Ioannina Greece

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8:00 PM - EM7.11.14

Focusing of THz Waves Using Silicon-Based Hyperbolic Metamaterials

Akash Kannegulla¹, Li-Jing Cheng¹

¹ Oregon State University Corvallis United States

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Engineered Core-Shell Nanostructures for Plasmon Enhanced Difference Frequency Generation in Terahertz Range

Raju Sinha¹, Arash Ahmadvand¹, Phani Kiran Vabbina¹, Mustafa Karabiyik¹, Burak Gerislioglu¹, Nezih Pala¹

¹ FIU Miami United States

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8:00 PM - EM7.11.26

Synthesis of Plasmonics Saturn-Like Particles

Mai Desouky¹, Hanbin Zheng¹, Serge Ravaine¹

¹ Chemistry University of Bordeaux Bordeaux France

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