

PROCEEDINGS OF SPIE

***Plasmonics: Metallic Nanostructures
and Their Optical Properties VIII***

Mark I. Stockman
Editor

1–5 August 2010
San Diego, California, United States

Sponsored and Published by
SPIE

Volume 7757

Proceedings of SPIE, 0277-786X, v. 7757

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *Plasmonics: Metallic Nanostructures and Their Optical Properties VIII*, edited by Mark I. Stockman, Proceedings of SPIE Vol. 7757 (SPIE, Bellingham, WA, 2010) Article CID Number.

ISSN 0277-786X
ISBN 9780819482532

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445
SPIE.org

Copyright © 2010, Society of Photo-Optical Instrumentation Engineers

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/10/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

The logo for SPIE Digital Library features the word "SPIE" in a bold, sans-serif font above the words "Digital Library" in a smaller, lighter font. To the right of the text is a stylized graphic consisting of three vertical bars of increasing height, resembling a bar chart or a signal waveform.

SPIDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc.

The CID number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID number.

Contents

xi *Conference Committee*

CONTROL OF NANOLocalIZATION IN PLASMONICS

- 7757 OE **Straightforward control of light in a metallic trimer** [7757-13]
N. Bonod, A. Devilez, B. Stout, Institut Fresnel, Aix-Marseille Univ., CNRS, Ecole Centrale
Marseille, Domaine Univ. de Saint Jerome (France)
- 7757 OI **Cysteamine coated Ag and Au nanorods for improved surface enhanced Raman scattering
from dinitrotoluene and trinitrotoluene** [7757-10]
O. J. Glembocki, M. Gowda, U.S. Naval Research Lab. (United States); S. Geng, Univ. of
Maryland, College Park (United States); S. M. Prokes, N. Y. Garces, U.S. Naval Research Lab.
(United States); J. Cushen, The Univ. of Texas at Austin (United States); J. D. Caldwell, U.S.
Naval Research Lab. (United States)

LATEST PROGRESS IN SERS

- 7757 OJ **Structural and optical characterization of single nanoparticles and single molecule SERS
(Keynote Paper)** [7757-17]
S. L. Kleinman, J. M. Bingham, A.-I. Henry, K. L. Wustholz, R. P. Van Duyne, Northwestern Univ.
(United States)

SERS AND ENHANCED RADIATION

- 7757 OM **SERS microscopy: plasmonic nanoparticle probes and biomedical applications** [7757-21]
M. Gellner, M. Schütz, M. Salehi, Univ. Osnabrück (Germany); J. Packeisen, Medical Ctr.,
Rheiner Landstraße (Germany); P. Ströbel, A. Marx, Ruprecht-Karls-Univ. Heidelberg
(Germany); C. Schmuck, Univ. Duisburg-Essen (Germany); S. Schlücker, Univ. Osnabrück
(Germany)
- 7757 OQ **Surface-enhanced Raman scattering characterization of Ag nanorod arrays fabricated by
oblique angle deposition** [7757-22]
Y. Liu, Y. Zhao, The Univ. of Georgia (United States)

INVITED SESSION: SPASERS, NANOLASERS, AND GAIN IN NANOPLASMONICS

- 7757 OS **Electrically pumped gap-plasmon mode semiconductor core lasers (Keynote Paper)**
[7757-27]
M. T. Hill, Technische Univ. Eindhoven (Netherlands)

- 7757 0U **Semiconductor plasmon laser (Invited Paper)** [7757-29]
V. J. Sorger, R. F. Oulton, T. Zentgraf, Univ. of California, Berkeley (United States); R. Ma, Peking Univ. (China); C. Gladden, Univ. of California, Berkeley (United States); L. Dai, Peking Univ. (China); G. Bartal, Univ. of California, Berkeley (United States); X. Zhang, Univ. of California, Berkeley (United States) and Lawrence Berkeley National Lab. (United States)

APPLICATIONS OF PLASMONICS

- 7757 0W **Metallic superlens design using the long-range SPP mode cutoff technique** [7757-31]
G. Tremblay, Y. Sheng, Univ. Laval (Canada)
- 7757 0X **The studies of Schottky-diode based co-plane detector for surface plasmon resonance sensing** [7757-32]
C.-S. Liu, T.-Y. Wen, D.-S. Wang, C.-W. Lin, National Taiwan Univ. (Taiwan)

COMPLEX PLASMONIC SYSTEMS

- 7757 11 **Solitons, vortices, and guided waves in plasmonic metamaterials (Invited Paper)** [7757-35]
A. D. Boardman, P. Egan, R. C. Mitchell-Thomas, Y. G. Rapoport, Univ. of Salford (United Kingdom)

NANOANTENNAS I

- 7757 12 **Optical trapping and sensing with plasmonic dipole antennas (Invited Paper)** [7757-36]
W. Zhang, O. J. F. Martin, Ecole Polytechnique Fédérale de Lausanne (France)
- 7757 15 **Coupled, large-area gold nanowire arrays for nanorectenna energy conversion** [7757-39]
R. Osgood III, S. Giardini, J. Carlson, B. Kimball, M. Hoey, U.S. Army Natick Soldier Research, Development and Engineering Ctr. (United States); G. E. Fernandes, Z. Liu, J. H. Kim, J. Xu, Brown Univ. (United States); W. Buchwald, Air Force Research Lab. (United States)
- 7757 18 **Propagating plasmons on silver nanowires (Invited Paper)** [7757-133]
W. He, Beijing Institute of Technology (China); H. Wei, Z. Li, Y. Huang, Y. Fang, Beijing National Lab. for Condensed Matter Physics (China) and Institute of Physics (China); P. Li, Beijing Institute of Technology (China); H. Xu, Beijing National Lab. for Condensed Matter Physics (China), Institute of Physics (China), and Lund Univ. (Sweden)

POLARITONS, GAIN, AND RELATED TOPICS

- 7757 1A **Plasmonics for optical field localization and applications (Keynote Paper)** [7757-43]
L. Feng, Y. Fainman, Univ. of California, San Diego (United States)
- 7757 1B **Extremely low-loss slow-light modes in plasmonic dielectric hybrid systems** [7757-44]
A. Ishikawa, Univ. of California, Berkeley (United States) and RIKEN (Japan); R. F. Oulton, Univ. of California, Berkeley (United States); T. Zentgraf, Univ. of California, Berkeley (United States) and Univ. Stuttgart (Germany); X. Zhang, Univ. of California, Berkeley (United States) and Lawrence Berkeley National Lab. (United States)

ULTRAFAST AND STRONG FIELD PLASMONICS

- 7757 1D **High harmonic generation by guided surface plasmon polaritons (Keynote Paper)** [7757-46]
J. Choi, S. Kim, I.-Y. Park, S.-W. Kim, Korea Advanced Institute of Science and Technology (Korea, Republic of)
- 7757 1F **Probing ultrafast nano-localized plasmonic fields via XUV light generation** [7757-48]
S. L. Stebbings, Max-Planck-Institut für Quantenoptik (Germany); Y.-Y. Yang, Max-Planck-Institut für Quantenoptik (Germany), Technical Institute of Physics and Chemistry (China), and Graduate School of the Chinese Academy of Sciences (China); F. Süßmann, Max-Planck-Institut für Quantenoptik (Germany); R. Graf, A. Apolonskiy, Ludwig-Maximilians-Univ. München (Germany); A. Weber-Bargioni, Lawrence Berkeley National Lab. (United States); M. Durach, M. I. Stockman, Georgia State Univ. (United States); A. Scrinzi, Ludwig-Maximilians-Univ. München (Germany); F. Krausz, M. F. Kling, Max-Planck-Institut für Quantenoptik (Germany)

INFRARED AND TERAHERTZ PLASMONICS

- 7757 1H **Nanoconcentration of terahertz radiation in plasmonic waveguides** [7757-50]
A. Rusina, M. Durach, Georgia State Univ. (United States); K. A. Nelson, Massachusetts Institute of Technology (United States); M. I. Stockman, Georgia State Univ. (United States) and Max-Planck-Institut für Quantenoptik (Germany)
- 7757 1J **Electrically tunable surface plasmon for THz emission, detection, and other applications** [7757-52]
J. Khoury, B. Haji-Saeed, W. Buchwald, C. Woods, Air Force Research Lab. (United States)

NANOPLASMONIC CONFINEMENT AND RELATED SUBJECTS

- 7757 1R **Optical resonances and nanofocusing in triangular metal nano-grooves** [7757-60]
T. Søndergaard, Aalborg Univ. (Denmark); S. I. Bozhevolnyi, J. Beermann, S. M. Novikov, Univ. of Southern Denmark (Denmark); E. Devaux, T. W. Ebbesen, ISIS, CNRS, Univ. de Strasbourg (France); J. Rafaelsen, Aalborg Univ. (Denmark)
- 7757 1T **Plasmonic nanostructures: local versus nonlocal response** [7757-62]
G. Toscano, M. Wubs, S. Xiao, Technical Univ. of Denmark (Denmark); M. Yan, Technical Univ. of Denmark (Denmark) and Royal Institute of Technology (Sweden); Z. F. Öztürk, Technical Univ. of Denmark (Denmark) and Istanbul Technical Univ. (Turkey); A.-P. Jauho, Aalto Univ. School of Science and Technology (Finland) and Technical Univ. of Denmark (Denmark); N. A. Mortensen, Technical Univ. of Denmark (Denmark)
- 7757 1U **Cooperative effects in plasmonics: superfluorescence near metal nanostructures (Invited Paper)** [7757-63]
V. N. Pustovit, T. V. Shahbazyan, Jackson State Univ. (United States)

SURFACE ENHANCED PHOTOCHEMISTRY AND SPECTROSCOPY

- 7757 1W **Radiative engineering of nanoantenna arrays for ultrasensitive vibrational spectroscopy of proteins** [7757-65]
R. Adato, A. A. Yanik, Boston Univ. (United States); J. J. Amsden, D. L. Kaplan, F. G. Omenetto, Tufts Univ. (United States); M. K. Hong, S. Erramilli, H. Altug, Boston Univ. (United States)
- 7757 1X **Optical properties and surface-enhanced Raman scattering of quasi-3D gold plasmonic nanostructures** [7757-66]
J. Xu, Univ. of Washington (United States) and East China Univ. of Science and Technology (China); P. Guan, Univ. of Washington (United States); H. Gong, East China Univ. of Science and Technology (China); Q. Yu, Univ. of Washington (United States)

ENGINEERING PLASMONIC SPECTRA AND ENHANCEMENT I

- 7757 20 **Optical resonator in gap plasmon waveguide (Invited Paper)** [7757-69]
M. Haraguchi, H. Sokabe, T. Okuno, T. Okamoto, M. Fukui, Univ. of Tokushima (Japan)

ENGINEERING PLASMONIC SPECTRA AND ENHANCEMENT II

- 7757 21 **Controlling the optical spectra of gold nano-islands by changing the aspect ratio and the inter-islands distance: theory and experiment (Invited Paper)** [7757-70]
Y. M. Strel'niker, Y. Flegler, M. Rosenbluh, Bar-Ilan Univ. (Israel); D. J. Bergman, Tel Aviv Univ. (Israel)
- 7757 23 **Plasmo-photonic nanowire arrays for large-area surface-enhanced Raman scattering sensors** [7757-72]
J. D. Caldwell, O. J. Glembocki, R. W. Rendell, S. M. Prokes, J. P. Long, F. J. Bezares, U.S. Naval Research Lab. (United States)
- 7757 24 **Transparent electrode designs based on optimal nano-patterning of metallic films** [7757-73]
P. B. Catrysse, S. Fan, Stanford Univ. (United States)
- 7757 25 **Excitation of thin metallic disks and patch antennas by quantum emitters for single photon sources** [7757-74]
R. Esteban, Ctr. de Física de Materiales, CSIC-UPV/EHU and DIPC (Spain) and Lab. Charles Fabry, Institut d'Optique, CNRS, Univ. Paris-Sud (France); J.-J. Greffet, Lab. Charles Fabry, Institut d'Optique, CNRS, Univ. Paris-Sud (France)

POSTER SESSION

- 7757 28 **Non-linear processes in nanoparticle chains** [7757-78]
J. C. Juarez-Morales, J. Munoz-Lopez, P. Martinez-Vara, G. Martinez-Niconoff, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico)
- 7757 2C **Electrostatic plasmon resonances of metal nanoparticles in stratified geometries** [7757-83]
J. Jung, T. G. Pedersen, T. Søndergaard, K. Pedersen, Aalborg Univ. (Denmark)

- 7757 2D **A nanoimprinted plasmonic substrate for both local preconcentration and SERS detection** [7757-85]
D.-Z. Lin, T.-L. Chang, J.-Y. Chu, Industrial Technology Research Institute (Taiwan)
- 7757 2H **Singularity and Dirac dynamics in periodic plasmonic nanostructures** [7757-89]
S. H. Nam, A. J. Taylor, A. Efimov, Los Alamos National Lab. (United States)
- 7757 2I **Extinction and scattering of metallic nanoparticles in ordered and random arrays** [7757-90]
C. P. Burrows, W. L. Barnes, Univ. of Exeter (United Kingdom)
- 7757 2K **Transmission enhancement of bow-tie nano-aperture with double-layered structure** [7757-92]
D. Oh, S. Roh, B. Lee, Seoul National Univ. (Korea, Republic of)
- 7757 2M **Plasmon enhanced luminescence of Tb³⁺ doped Li₂O-LaF₃-Al₂O₃-SiO₂ glass containing Ag nanoparticles** [7757-94]
P. Piasecki, A. Piasecki, Z. Pan, A. Ueda, R. Aga, Jr., R. Mu, S. H. Morgan, Fisk Univ. (United States)
- 7757 2N **Numerical and experimental studies on plasmonic effects associated with a pair of subwavelength holes on metallic thin film** [7757-95]
Y. Oshikane, M. Nakano, H. Inoue, Osaka Univ. (Japan)
- 7757 2O **Two-photon luminescence microscopy of tunable gold nanostructures randomly distributed on templates of anodized aluminum** [7757-96]
P. Nielsen, J. Beermann, O. Albrektsen, S. Hassing, S. I. Bozhevolnyi, P. Morgen, Univ. of Southern Denmark (Denmark)
- 7757 2Q **A spectral surface plasmon resonance sensor based on transmission grating: architecture analysis dedicated to spectral sensors** [7757-99]
J. Hastanin, C. Lenaerts, K. Fleury-Frenette, S. Habraken, Univ. de Liège (Belgium)
- 7757 2R **Theory of spoof plasmons in real metals** [7757-100]
A. Rusina, M. Durach, M. I. Stockman, Georgia State Univ. (United States)
- 7757 2T **The calculations of electromagnetic fields around nanoparticles embedded in biological media** [7757-102]
V. D. Prytkova, V. V. Tuchin, Saratov State Univ. (Russian Federation)
- 7757 2W **Permittivity manipulation of metal-dielectric composite for improved SPR sensing** [7757-105]
H. Park, K. Lee, G. Kang, J. Lee, K. Kim, Yonsei Univ. (Korea, Republic of); S.-J. Chung, S.-H. Kim, Samsung Electronics Co., Ltd. (Korea, Republic of)
- 7757 2Z **Optical and morphological characterization of TiO₂ films doped with silver nanoparticles** [7757-108]
G. Valverde-Aguilar, J. A. García-Macedo, V. Rentería-Tapia, Univ. Nacional Autónoma de México (Mexico)
- 7757 34 **Mechanism of plasmon enhancement of PV efficiency for metallic nano-modified surface of semiconductor photo-cell** [7757-113]
W. Jacak, J. Krasnyj, J. Jacak, Wroclaw Univ. of Technology (Poland)

- 7757 35 **On-chip nanoplasmonic biosensors with actively controlled nanofluidic surface delivery** [7757-114]
A. A. Yanik, M. Huang, A. Artar, Boston Univ. (United States); T.-Y. Chang, Massachusetts Institute of Technology (United States); H. Altug, Boston Univ. (United States)
- 7757 36 **Utilizing higher order surface plasmon modes on wire gratings for metal enhanced fluorescence** [7757-115]
J. M. Steele, I. Gagnidze, Trinity Univ. (United States)
- 7757 38 **Closed form formulas and tunability of resonances in pairs of gold-dielectric nanoshells** [7757-119]
S. Campione, Univ. of California, Irvine (United States); A. Vallecchi, Univ. of California, Irvine (United States) and Univ. of Siena (Italy); F. Capolino, Univ. of California, Irvine (United States)
- 7757 3A **Surface plasmon-enhanced and quenched two-photon excited fluorescence** [7757-121]
C.-Y. Lin, C.-H. Lien, K.-C. Chiu, C.-Y. Chang, S.-H. Chang, T.-F. Guo, S.-J. Chen, National Cheng Kung Univ. (Taiwan)
- 7757 3C **Three-dimensional polymer microdevices with gold nanorods** [7757-123]
W.-S. Kuo, C.-H. Lien, K.-C. Cho, C.-Y. Chang, C.-Y. Lin, National Cheng Kung Univ. (Taiwan); P. J. Campagnola, Univ. of Connecticut Health Ctr. (United States); S.-J. Chen, National Cheng Kung Univ. (Taiwan)
- 7757 3D **Effects of structural parameters in metallic nano slit arrays** [7757-124]
X. Li, B. Alhasson, M. Matin, Univ. of Denver (United States)
- 7757 3E **Investigation of the effect of fabrication-related disorders in subwavelength metal-dielectric-metal plasmonic waveguides** [7757-125]
C. Min, G. Veronis, Louisiana State Univ. (United States)
- 7757 3F **Plasmonic coaxial Fabry-Pérot nanocavity color filter** [7757-127]
G. Y. Si, National Univ. of Singapore (Singapore); E. S. P. Leong, A*STAR Institute of Materials Research and Engineering (Singapore); A. J. Danner, National Univ. of Singapore (Singapore); J. H. Teng, A*STAR Institute of Materials Research and Engineering (Singapore)
- 7757 3G **Controlling the state of surface plasmon vortex by changing the topological charge and polarization state** [7757-128]
S.-Y. Lee, J. Park, Seoul National Univ. (Korea, Republic of); H. Kim, Korea Univ. (Korea, Republic of); S.-W. Cho, B. Lee, Seoul National Univ. (Korea, Republic of)
- 7757 3H **Near field imaging of a plasmon photonic crystal patterned on the facet of a quantum cascade laser** [7757-129]
D. Dey, R. M. Gelfand, J. Kohoutek, A. Bonakdar, H. Mohseni, Northwestern Univ. (United States)
- 7757 3J **Local plasmonic resonance based biosensor for investigating DNA hybridization using ellipsometry** [7757-131]
R. S. Moirangthem, Research Ctr. for Applied Sciences (Taiwan) and National Tsing Hua Univ. (Taiwan); Y.-C. Chang, P.-K. Wei, Research Ctr. for Applied Sciences (Taiwan)

- 7757 3K **SERS from ellipsoidal nanoparticles** [7757-134]
G. Mukhopadhyay, Indian Institute of Technology, Bombay (India); S. Puri, Indian Institute of Technology, Bombay (India) and Stanford Univ. (United States); P. Mukhopadhyay, Indian Institute of Technology, Bombay (India)
- 7757 3L **Temperature dependence of the near-field superlensing effect for single metal layers and stacked metal-dielectric films** [7757-135]
K. Elsayad, K. G. Heinze, Research Institute of Molecular Pathology (Austria)
- 7757 3M **Fast near-field imaging of spectrally broad sources using layered metallic structures** [7757-136]
K. Elsayad, Research Institute of Molecular Pathology (Austria); A. Urich, K. Unterrainer, Vienna Univ. of Technology (Austria); K. G. Heinze, Research Institute of Molecular Pathology (Austria)
- 7757 3O **Investigations of scattering and field enhancement effects in retardation-based plasmonic nanoantennas** [7757-138]
M. G. Nielsen, A. Pors, Univ. of Southern Denmark (Denmark); R. B. Nielsen, Technical Univ. of Denmark (Denmark); A. Boltasseva, Technical Univ. of Denmark (Denmark) and Purdue Univ. (United States); O. Albrektsen, M. Willatzen, S. I. Bozhevolnyi, Univ. of Southern Denmark (Denmark)
- 7757 3P **Exploring optimized configurations of plasmonic nanoparticles** [7757-139]
P. Pavaskar, J. Theiss, S. B. Cronin, The Univ. of Southern California (United States)
- 7757 3R **Nanoantenna couplers for metal-insulator-metal waveguide interconnects** [7757-141]
M. C. Onbasli, Massachusetts Institute of Technology (United States); A. K. Okyay, Bilkent Univ. (Turkey)

Author Index

Conference Committee

Symposium Chairs

David L. Andrews, University of East Anglia Norwich (United Kingdom)
James G. Grote, Air Force Research Laboratory (United States)

Conference Chair

Mark I. Stockman, Georgia State University (United States)

Program Committee

Martin Aeschlimann, Technische Universität Kaiserslautern (Germany)
David J. Bergman, Tel Aviv University (Israel)
Jochen Feldmann, Ludwig-Maximilians-Universität München
(Germany)
Harald W. Giessen, Universität Stuttgart (Germany)
Naomi J. Halas, Rice University (United States)
Martti Kauranen, Tampere University of Technology (Finland)
Satoshi Kawata, Osaka University (Japan)
Fritz Keilmann, Max-Planck-Institut für Quantenoptik (Germany)
Dai-Sik Kim, Seoul National University (Korea, Republic of)
Aaron Lewis, The Hebrew University of Jerusalem (Israel)
Olivier J. F. Martin, Ecole Polytechnique Fédérale de Lausanne
(Switzerland)
Peter J. Nordlander, Rice University (United States)
Lukas Novotny, University of Rochester (United States)
Motoichi Ohtsu, Japan Science and Technology Agency (Japan)
John B. Pendry, Imperial College London (United Kingdom)
Barry S. Perlman, Army Research Laboratory (United States)
Lewis J. Rothberg, University of Rochester (United States)
Vahid Sandoghdar, ETH Zürich (Switzerland)
George C. Schatz, Northwestern University (United States)
Tigran V. Shahbazyan, Jackson State University (United States)
Vladimir M. Shalaev, Purdue University (United States)
Gennady Shvets, The University of Texas at Austin (United States)
Din Ping Tsai, National Taiwan University (Taiwan)
Nikolay I. Zheludev, University of Southampton (United Kingdom)
Joseph Zyss, Ecole Normale Supérieure de Cachan (France)

Session Chairs

Special Invited Session: Latest Progress in Nanoplasmonics
Mark I. Stockman, Georgia State University (United States)

Nonlinear Nanoplasmonics
L. Kobus Kuipers, FOM Institute for Atomic and Molecular Physics
(Netherlands)

Material Properties in Plasmonics
Martti Kauranen, Tampere University of Technology (Finland)

Control of Nanolocalization in Plasmonics
Kurt Busch, Karlsruher Institut für Technologie (Germany)

Latest Progress in SERS
Meir Orenstein, Technion-Israel Institute of Technology (Israel)

SERS and Enhanced Radiation
Katrin Kneipp, Technical University of Denmark (Denmark)

Invited Session: Spasers, Nanolasers, and Gain in Nanoplasmonics
Meir Orenstein, Technion-Israel Institute of Technology (Israel)

Applications of Plasmonics
Niek F. van Hulst, ICFO—Instituto de Ciencias Fotónicas (Spain)

Complex Plasmonic Systems
Niek F. van Hulst, ICFO—Instituto de Ciencias Fotónicas (Spain)

Nanoantennas I
Cun-Zheng Ning, Arizona State University (United States)

Polaritons, Gain, and Related Topics
Allan D. Boardman, University of Salford (United Kingdom)

Ultrafast and Strong Field Plasmonics
Mark I. Stockman, Georgia State University (United States)

Infrared and Terahertz Plasmonics
Walter Pfeiffer, Universität Bielefeld (Germany)

Nanoantennas II
Dai-Sik Kim, Seoul National University (Korea, Republic of)

Surface Enhanced Photochemistry and Spectroscopy
Mark L. Brongersma, Stanford University (United States)

Engineering Plasmonic Spectra and Enhancement I
Matthias F. Kling, Max-Planck-Institut für Quantenoptik (Germany)

Engineering Plasmonic Spectra and Enhancement II
Tigran V. Shahbazyan, Jackson State University (United States)

