

PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 9756

, "Front Matter: Volume 9756," Proc. SPIE 9756, Photonic and Phononic Properties of Engineered Nanostructures VI, 975601 (16 August 2016); doi: 10.1117/12.2240151

SPIE.

Event: SPIE OPTO, 2016, San Francisco, California, United States

PROCEEDINGS OF SPIE

Photonic and Phononic Properties of Engineered Nanostructures VI

**Ali Adibi
Shawn-Yu Lin
Axel Scherer**
Editors

**15–18 February 2016
San Francisco, California, United States**

Sponsored and Published by
SPIE

Volume 9756

Proceedings of SPIE 0277-786X, V. 9756

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

Photonic and Phononic Properties of Engineered Nanostructures VI, edited by Ali Adibi, Shawn-Yu Lin, Axel Scherer,
Proc. of SPIE Vol. 9756, 975601 · © 2016 SPIE · CCC code: 0277-786X/16/\$18 · doi: 10.1117/12.2240151

Proc. of SPIE Vol. 9756 975601-1

The papers 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. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIDigitalLibrary.org.

The papers 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 these proceedings:

Author(s), "Title of Paper," in *Photonic and Phononic Properties of Engineered Nanostructures VI*, edited by Ali Adibi, Shawn-Yu Lin, Axel Scherer, Proceedings of SPIE Vol. 9756 (SPIE, Bellingham, WA, 2016) Six-digit Article CID Number.

ISSN: 0277-786X
ISSN: 1996-756X (electronic)
ISBN: 9781628419917

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 © 2016, 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/16/\$18.00.

Printed in the United States of America.

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

**SPIE. DIGITAL
LIBRARY**

SPIDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a six-digit CID article numbering system structured as follows:

- 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.

Contents

v	<i>Authors</i>
vii	<i>Conference Committee</i>

PROPERTIES AND APPLICATIONS OF METASURFACES I

9756 09	Design and characterization of dielectric subwavelength focusing lens with polarization dependence [9756-7]
---------	--

PROPERTIES AND APPLICATIONS OF METASURFACES II

9756 0B	Controlling the emissivity with plasmonic nano-antennas [9756-9]
9756 0D	Modeling refractive metasurfaces in series as a single metasurface [9756-11]
9756 0E	Free-carrier contribution to all-optical switching in Mie-resonant hydrogenated amorphous silicon nanodisks [9756-12]

OPTOMECHANICAL STRUCTURES

9756 0N	Demonstration of hetero optomechanical crystal nanobeam cavities with high mechanical frequency [9756-21]
---------	--

NOVEL PHENOMENA AND APPLICATIONS IN ENGINEERED NANOSTRUCTURES

9756 0X	Time-harmonic optical chirality in inhomogeneous space [9756-30]
9756 0Y	Inverse design engineering of all-silicon polarization beam splitters [9756-31]

PLASMONIC NANOSTRUCTURES I

9756 0Z	Nanometers to centimeters: novel optical nano-antennas, with an eye to scaled production [9756-35]
9756 11	Optical harmonics generation in metal/dielectric heterostructures in the presence of Tamm plasmon-polaritons [9756-37]

PLASMONIC NANOSTRUCTURES II

- 9756 14 **Design of a plasmonic-organic hybrid slot waveguide integrated with a bowtie-antenna for terahertz wave detection** [9756-39]
- 9756 15 **Complex dielectric and geometry influences on plasmon excitation and energy transfer in nanocomposite systems** [9756-40]

PLASMONIC NANOSTRUCTURES III

- 9756 18 **Experimental investigation on the lensing and Talbot effects of finite-sized 2D periodic metallic nanoaperture arrays** [9756-43]
- 9756 19 **Polarization switchable two-color plasmonic nano-pixels for creating optical surfaces encoded with dual information states** [9756-44]
- 9756 1A **Nanoscale highly selective plasmonic multi-channel demultiplexer** [9756-45]

PHOTONIC CRYSTAL STRUCTURES I

- 9756 1J **Fiber-coupled photonic crystal nanocavity for reconfigurable formation of coupled cavity system** [9756-54]
- 9756 1L **Self-assembled photonic crystals for a chemical sensing** [9756-56]

MODELING AND SIMULATION OF NANOPHOTONIC STRUCTURES

- 9756 1R **Reconstruction of photonic crystal geometries using a reduced basis method for nonlinear outputs** [9756-62]
- 9756 1S **Metal-dielectric frequency-selective surface for high performance solar window coatings** [9756-63]
- 9756 1U **Analysis of dispersion relation in three-dimensional single gyroid** [9756-65]

POSTER SESSION

- 9756 1Y **Broadband meta-hologram composed of Z-shaped nano-antennas** [9756-70]
- 9756 21 **Directional switching of surface plasmon polaritons by VO₂-gold hybrid antennas** [9756-73]
- 9756 23 **Fabrication of two-dimensional visible wavelength nanoscale plasmonic structures using hydrogen silsesquioxane based resist** [9756-76]
- 9756 27 **Polarimetric techniques for determining morphology and optical features of high refractive index dielectric nanoparticle size** [9756-81]
- 9756 28 **Spectral response of dielectric nano-antennas in the far- and near-field regimes** [9756-82]

Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Afinogenov, B. I., 11
Alcaraz de la Osa, Rodrigo, 27
Ayoub, Ahmad B., 1A
Azzazi, Abdullilah, 1A
Bai, Guoren, 0N
Barreda, Ángela I., 27, 28
Barth, Carlo, 1R
Becker, Christiane, 1R
Bessonov, V. O., 11
Blake, Phillip, 15
Bouchon, Patrick, 0B
Bourdillon, C., 1L
Burger, Sven, 0X, 1R
Cadusch, Jasper J., 0Z
Chen, Chin-Ta, 14
Chen, Ray T., 14
Chung, Chi-Jui, 14
Clark, Alasdair W., 19
Coolen, L., 1L
Cooper, Jonathan M., 19
Cui, Kaiyu, 0N
Daney de Marcillac, W. 1L
Davis, Timothy J., 0Z
Dawson, Jeremy M., 23
DeJarnette, Drew, 15
Earl, Stuart K., 0Z
Fainman, Yeshaiahu, 09
Fedyanin, Andrey A., 0E, 11
Feng, Xue, 0N
Forcherio, Gregory T., 15
Frandsen, Lars H., 0Y
Gadde, Akshitha, 23
Gam Derouich, S., 1L
González, Francisco, 27, 28
Guneratne, Ananda Carl, 0D, 1S
Gutiérrez, Y., 28
Gutsche, Philipp, 0X
Haïdar, Riad, 0B
Hammerschmidt, Martin, 0X, 1R
Heydari, Esmail, 19
Huang, Yidong, 0N
Huang, Zhilei, 0N
Hung, Yu-Chueh, 1U
Jaeck, Julien, 0B
James, Timothy D., 0Z
Jheng, Pei-Lun, 1U
Kadiyala, Anand, 23
Kim, Joonsoo, 1Y
Kim, Sung W., 09
Kim, Sun-Je, 21
Lee, Byoung-ho, 1Y, 21
Lee, Kyookeun, 21
Lee, Seung-Yeol, 21
Lee, Yohan, 1Y
Li, Yongzhuo, 0N
Li, Zhibo, 19
Liu, Fang, 0N
Maître, A., 1L
Makhsiyani, Mathilde, 0B
Mangeney, C., 1L
Moreno, Fernando, 27, 28
Mulvaney, Paul, 0Z
Mun, Sang-Eun, 1Y
Ooka, Yuta, 1J
Pan, Zeyu, 14
Panchenko, Evgeniy, 0Z
Pang, Lin, 09
Pelouard, Jean-Luc, 0B
Pomplun, Jan, 1R
Popkova, A. A., 11
Poulikakos, Lisa V., 0X
Roberts, Ann, 0Z
Roper, D. Keith, 15
Saiz, José M., 27
Sanz, Juan M., 27
Schmidt, Frank, 0X, 1R
Schwob, C., 1L
Seeram, Manjo, 15
Shcherbakov, Maxim R., 0E
Shorokhov, Alexander S., 0E
Sigmund, Ole, 0Y
Smith, Kyle Z., 23
Subbaraman, Harish, 14
Swillam, Mohamed A., 1A
Tanabe, Takasumi, 1J
Temchenko, Marina, 1S
Tetsumoto, Tomohiro, 1J
Toor, Fatima, 0D, 1S
Vabishchevich, Polina P., 0E
Yu, Yiting, 18
Zappe, Hans, 18
Zhang, Wei, 0N
Zhang, Xiaoyun, 18
Zhang, Xingyu, 14

Conference Committee

Symposium Chairs

Jean-Emmanuel Broquin, IMEP-LAHC (France)
Shibin Jiang, AdValue Photonics, Inc. (United States)

Symposium Co-chairs

David L. Andrews, University of East Anglia (United Kingdom)
Alexei L. Glebov, OptiGrate Corporation (United States)

Program Track Chair

Ali Adibi, Georgia Institute of Technology (United States)

Conference Chairs

Ali Adibi, Georgia Institute of Technology (United States)
Shawn-Yu Lin, Rensselaer Polytechnic Institute (United States)
Axel Scherer, California Institute of Technology (United States)

Conference Program Committee

Andrea Alù, The University of Texas at Austin (United States)
William L. Barnes, University of Exeter (United Kingdom)
Ali Asghar Effekhar, Georgia Institute of Technology (United States)
Reginald K. Lee, California Institute of Technology (United States)
Marko Loncar, Harvard School of Engineering and Applied Sciences
(United States)
Susumu Noda, Kyoto University (Japan)
Masaya Notomi, NTT Basic Research Laboratories (Japan)
Ekmel Özbay, Bilkent University (Turkey)
Yong Xu, Virginia Polytechnic Institute and State University
(United States)
Eli Yablonovitch, University of California, Berkeley (United States)
Rashid Zia, Brown University (United States)

Session Chairs

- 1 Recent Advances in Engineered Nanostructures
Ali Adibi, Georgia Institute of Technology (United States)
- 2 Properties and Applications of Metasurfaces I
Tobias J. Kippenberg, Ecole Polytechnique Fédérale de Lausanne (Switzerland)
- 3 Properties and Applications of Metasurfaces II
Gennady B. Shvets, The University of Texas at Austin (United States)
- 4 Novel Nanophotonic Materials
Tingyi Gu, Princeton University (United States)
- 5 Optomechanical Structures
Volker J. Sorger, The George Washington University (United States)
- 6 Phononic Crystal Structures
Paul E. Barclay, University of Calgary (Canada)
- 7 Novel Phenomena and Applications in Engineered Nanostructures
Arka Majumdar, University of Washington (United States)
- 8 Plasmonic Nanostructures I
Stefan A. Maier, Imperial College London (United Kingdom)
- 9 Plasmonic Nanostructures II
Jennifer A. Dionne, Stanford University (United States)
- 10 Plasmonic Nanostructures III
Luca Dal Negro, Boston University (United States)
- 11 Photonic and Plasmonic Metamaterials
Ali Asghar Effekhar, Georgia Institute of Technology (United States)
- 12 Photonic Crystal Structures I
Shawn-Yu Lin, Rensselaer Polytechnic Institute (United States)
- 13 Photonic Crystal Structures II
Martin F. Schumann, Karlsruher Institut für Technologie (Germany)
- 14 Modeling and Simulation of Nanophotonic Structures
Ali Adibi, Georgia Institute of Technology (United States)