PROCEEDINGS OF SPIE

Metamaterials XII

Kevin F. MacDonald Isabelle Staude Anatoly V. Zayats Editors

6–10 April 2020 Online Only, France

Sponsored by SPIE

Cosponsored by
City of Strasbourg (France)
Eurometropole (France)
CNRS (France)
Région Grand Est (France)
iCube (France)
Université de Strasbourg (France)

Cooperating Organisations
Photonics 21 (Germany)
EOS—European Optical Society (Germany)
Photonics Public Private Partnership (Belgium)
Photonics France (France)

Published by SPIE

Volume 11344

Proceedings of SPIE 0277-786X, V. 11344

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

Metamaterials XII, edited by Kevin F. MacDonald, Isabelle Staude, Anatoly V. Zayats, Proc. of SPIE Vol. 11344, 1134401 · © 2020 SPIE · CCC code: 0277-786X/20/\$21 · doi: 10.1117/12.2571804

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 SPIEDigitalLibrary.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 *Metamaterials XII*, edited by Kevin F. MacDonald, Isabelle Staude, Anatoly V. Zayats, Proceedings of SPIE Vol. 11344 (SPIE, Bellingham, WA, 2020) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510634602

ISBN: 9781510634619 (electronic)

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 © 2020, 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 \$21.00 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/20/\$21.00.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

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



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 seven-digit CID article numbering system structured as follows:

- The first five 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

٧	Authors
∨ii	Conference Committee
	SENSING
11344 OB	Asymmetric hole array: tuning the optical circular dichroism for chiral molecules sensing [11344-10]
	DIELECTRIC METAMATERIALS
11344 12	AlGaN metasurface to increase the light-extraction efficiency of deep ultraviolet light-emitting diodes by perfect transmittance before critical angle [11344-38]
	METAMATERIALS MULTIPHYSICS
11344 17	Drag optical force due to a drift-current bias of graphene (Invited Paper) [11344-43]
11344 1C	Field enhancement in acousto-optic crystals with metamaterial inclusions [11344-48]
	2D MATERIALS AND METAMATERIALS
11344 1E	Topological valley plasmon transport in graphene bi-layer metasurfaces: applications to sensing nanodevices [11344-50]
	POSTER SESSION
11344 1L	Optimization by a genetic algorithm of pyramidal structures made of one, two or three stacks of metal/dielectric layers for a quasi-perfect broadband absorption of UV to near-infrared radiations [11344-55]
11344 1N	Highly efficient metamirror with circular dichroism and wavefront engineering [11344-57]
11344 1S	Light diffraction in photonic hypercrystals studied by finite-difference frequency-domain method [11344-62]
11344 1W	Lead halide perovskite-based active hyperbolic metamaterials in the visible region [11344-66]

11344 1X	Hot electron generation via internal surface photo-effect in structures with quantum well [11344-67]
11344 1Y	Silicon-on-insulator based high-index contrast gratings for resonant enhancement of second harmonic generation from two-dimensional material [11344-68]
11344 20	Design of silicon waveguides with all-dielectric metamaterial cladding by employing numerical simulations [11344-70]
11344 22	Transformation of refractive index spectra for titanium rough surfaces [11344-72]
11344 27	Pyramidal metamaterial-based absorbers for mode damping inside resonating structures [11344-80]

Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five 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.

A. S., Lal Krishna, 1Y Akram, Muhammad Rizwan, 1N Andreone, Antonello, 27 Ansari, Muhammad Afnan, 1N Bar-On, Ofer, 1W Basak, Supratim, 1W Belardini, A., 0B Bi, Hai, 1L Bryukhanov, Valery, 22 Cesca, T., OB Chikhi, Nassim, 27 Dandu, Medha, 1Y Debevc, Andraž, 20 Deka, Jayanta, 1Y Demin, Maksim, 22 Griesse-Nascimento, Sarah, 1L Hirayama, Hideki, 12 K. M., Jyothsna, 1Y Khaliq, Hafiz Saad, 1N Khankaev, Artemiy, 22 Khurgin, Jacob B., 1X Krč, Janez, 20 Lan, Zhihao, 1E Leahu, G., 0B Lobet, Michaël, 1L Lyatun, Ivan, 22 Majumdar, Kausik, 1Y Masullo, Maria Rosaria, 27 Mattei, G., 0B Mattiello, L., 0B Matveeva, Karina, 22 Mayer, Alexandre, 1L Mazur, Eric, 1L Mehmood, Muhammad Qasim, 1N Menon, Sruti, 1Y Murzina, Tatiana V., 1S Naeem, Taimoor, 1N Novikov, Vladimir B., 1S Pandolfi, F., OB Panoiu, Nicolae C., 1E Passarelli, Andrea, 27 Petronijevic, E., OB Petrov, Nikolai I., 1C Protsenko, Igor E., 1X Pustovoit, Vladislav I., 1C Raghunathan, Varun, 1Y

Riaz, Kashif, 1N Samusev, Ilia, 22 Scheuer, Jacob, 1W Scian, C., 0B Shaukat, Muzzamal I., 17 Shuklin, Fedor A., 1X Sibilia, C., 0B Silveirinha, Mário G., 17 Slezhkin, Vasily, 22 Smetanin, Igor V., 1X Tcibulnikova, Anna, 22 Topič, Marko, 20 Uskov, Alexander V., 1X Wang, Xiong, 1N Wang, Yupei, 1E You, Jian Wei, 1E Yun, Joosun, 12 Zhang, Dajun, 1N Zhang, Jin, 1N Zhu, Weiren, 1N Zubair, Muhammad, 1N

Conference Committee

Symposium Chairs

Francis Berghmans, Vrije Universiteit Brussel (Belgium)
Thierry Georges, Oxxius SA (France)
Paul C. Montgomery, Université de Strasbourg (France)
Lluis Torner, ICFO Barcelona (Spain)

Conference Chairs

Kevin F. MacDonald, University of Southampton (United Kingdom) **Isabelle Staude**, Friedrich-Schiller Universität Jena (Germany) **Anatoly V. Zayats**, King's College London (United Kingdom)

Conference Program Committee

Hatice Altug, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

Sergey I. Bozhevolnyi, University of Southern Denmark (Denmark) **Andrea Di Falco**, University of St. Andrews (United Kingdom)

Tal Ellenbogen, Tel Aviv University (Israel)

Jonathan A. Fan, Stanford University (United States)

Anthony Grbic, University of Michigan (United States)

Sébastien Guenneau, CNRS-Imperial Unite Mixte Internationale (United Kingdom)

Maria Kafesaki, Foundation for Research and Technology-Hellas (Greece)

Arseniy I. Kuznetsov, A*STAR - Institute of Materials Research and Engineering (Singapore)

Tao Li, Nanjing University (China)

Stefan Linden, Rheinische Friedrich-Wilhelms Universität Bonn (Germany)

Ferran Martín, Universidad Autònoma de Barcelona (Spain)

Alejandro Martínez, Universidad Politècnica de València (Spain)

Martin W. McCall, Imperial College London (United Kingdom)

Dorota A. Pawlak, Institute of Electronic Materials Technology (Poland)

Carsten Rockstuhl, Karlsruher Institut für Technologie (Germany) Mario Silveirinha

Philippe Tassin, Chalmers University of Technology (Sweden)

Sergei Tretyakov, Aalto University School of Science and Technology (Finland)

Din Ping Tsai, Research Center for Applied Sciences - Academia Sinica (Taiwan)

Jonathan A. Fan, Stanford University (United States)
Jason G. Valentine, Vanderbilt University (United States)