PROCEEDINGS OF SPIE

9th International Symposium on Advanced Optical Manufacturing and Testing Technologies

Micro- and Nano-Optics, Catenary Optics, and Subwavelength Electromagnetics

Mingbo Pu Xiong Li Bin Fan Min Gu Reinhart Poprawe Xiangang Luo Editors

26–29 June 2018 Chengdu, China

Organized by Institute of Optics and Electronics, Chinese Academy of Sciences (China)

Sponsored by COS—The Chinese Optical Society (China) IOE—Institute of Optics and Electronics, Chinese Academy of Sciences (China)

Published by SPIE

Volume 10840

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 9th International Symposium on Advanced Optical Manufacturing and Testing Technologies: Micro- and Nano-Optics, Catenary Optics, and Subwavelength Electromagnetics, edited by Mingbo Pu, Xiong Li, Bin Fan, Min Gu, Reinhart Poprawe, Xiangang Luo, Proceedings of SPIE Vol. 10840 (SPIE, Bellingham, WA, 2019) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510623224

ISBN: 9781510623231 (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 SPIF.org

Copyright © 2019, 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/19/\$18.00.

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

∨ii	Authors

ix Symposium Committees

xi AOMATT 2018 Sponsors

MICRO- AND NANO-OPTICS, CATENARY OPTICS, AND SUBWAVELENGTH ELECTROMAGNETICS

10840 02	Fano resonance based on a subwavelength semi-annular-rectangular cavity resonator [10840-1]
10840 03	Non-paraxial diffraction of tiny pinhole illuminated by partially coherent light [10840-2]
10840 04	Design for dynamic wavefront manipulation based on phase change materials [10840-3]
10840 05	An all-dielectric metasurface with asymmetric wavefronts for oppositely propagating circularly polarized light [10840-5]
10840 06	Composite Ag-Ni metal mesh based transparent conductive film for electromagnetic interference shielding application [10840-6]
10840 07	Sensing characteristics of the gold-silver alloy waveguided metallic photonic crystals [10840-7]
10840 08	Optical responsivity of mechanical resonators based on suspended membranes of graphene and transition metal dichalcogenides [10840-8]
10840 09	Realization of Moiré imaging by flat micro lens array [10840-9]
10840 0A	Practical superoscillation element design for far field non-scanning superresolution imaging [10840-10]
10840 OB	Trade-offs between stress control and blister avoidance in MEMS devices [10840-14]
10840 OC	Tunable multi-modes resonator based on MIM plasmonic waveguides with circular cavity and rectangular baffle [10840-15]
10840 OD	High sensitivity plasmonic sensor using hybrid structure of graphene stripe combined with gold gap-ring [10840-17]

10840 OE	Dual-band coherent perfect absorption based on graphene patterned metasurface with tunable absorption frequency and absorptivity [10840-19]
10840 0G	Thermal blooming effect of pulse vortex laser beam propagating through the atmosphere [10840-21]
10840 OH	Theoretical study of strained black phosphorus photodetector integrated with silicon waveguide [10840-22]
10840 OI	A wide-angle and polarization-insensitive tunable metamaterial absorber based on graphene $\left[10840\text{-}24\right]$
10840 OJ	Study on wavelength division multiplexing with chirped volume Bragg gratings [10840-25]
10840 OK	SP resonance angle and Q-factor of metals in ultraviolet band [10840-27]
10840 OM	Extraordinary optical transmission of the double square ring metal nanocomposite structures [10840-29]
10840 ON	Performance improvement in inverted organic solar cells by incorporating core-shell $SiO_2@Au$ plasmonic structures [10840-32]
10840 00	Manipulation on thermal radiation spectrum and its polarization with laser manufactured periodic surface patterns [10840-33]
10840 OP	The spectroscopic and molecular constants studies of the ground and first excited states of O_2 molecule by CCSD(T) and MRCI methods [10840-36]
10840 OQ	A new long-range single nanotube hybrid plasmonic waveguide [10840-37]
10840 OR	A terahertz metamaterial analog of electromagnetically induced transparency and its application in loss detection [10840-39]
10840 OS	Slow light in a slot photonic crystal waveguide with asymmetric dielectric rods [10840-40]
10840 OT	Enhance the absorption of organic-inorganic perovskite film by nano-surface engineering [10840-41]
10840 OU	Study of the linewidth measurement with scanning electron microscope based on laser interference principle [10840-54]
10840 0V	Design of a miniature grating displacement sensor with large range [10840-58]
10840 OW	Downstream light intensification induced by Gaussian mitigation pits using micro-milling on rear KDP surface [10840-61]
10840 0X	Design and fabrication of a new tungsten-diamond transmission target for micro-computed tomography [10840-66]
10840 OY	Fresnel zone plate method for measuring lens transmission wavefront power spectral density [10840-89]

10840 OZ	Measurement of optical intercept of micro lens arrays [10840-93]
10840 10	The research of single point diamond turning Fresnel lens technology [10840-201]
10840 11	Analysis error of machining radial Fresnel lens on roller mold [10840-203]
10840 12	Dynamic fractal digital lithography for the fabrication of microlens array [10840-204]
10840 13	Fabrication of micro-pyramid structured optical element based on SPDT [10840-205]
10840 14	Simulation and experimental study on the precision glass molding for microstructures on optical glass based on relaxation effect [10840-214]
10840 15	Research and design of functional microstructures with directional transport for bionic microfluidics [10840-226]
10840 16	Research and development of light field microscope for measuring 3D microstructures [10840-229]
10840 17	Optimization design and performance test of optical antenna for laser communication [10840-242]
10840 18	Athermal design of refractive/diffractive hybrid infrared optical system with large relative aperture [10840-244]
10840 19	Design and fabrication of CGH for 820mm diameter tertiary mirror surface figure testing without center hole $[10840\text{-}249]$
10840 1A	Design of wide-spectrum directed multispectral imaging system with visible light [10840-254]
10840 1B	Research on two test methods of polarizer extinction ratio [10840-361]
10840 1C	Nano-grating structure optimal design of bio-inspired polarized light compass [10840-703]
10840 1D	Study on long period fiber grating sensor based on deep-grooved process [10840-733]
10840 1E	A multilayer structure with high Vis-absorption based on ultrathin NiCr film [10840-747]
10840 1F	A multi-band terahertz metamaterial absorber with novel structure [10840-787]
10840 1G	Research on micro displacement measurement technology based on chromatic confocal method [10840-904]