

PROCEEDINGS OF SPIE

4th Optics Young Scientist Summit (OYSS 2020)

Chaoyang Lu
Yangjian Cai
Feng Chen
Zhaohui Li
Editors

4–7 December 2020
Ningbo, China

Organized by
Chinese Laser Press (China)
Youth Innovation Promotion Association

Published by
SPIE

Volume 11781

Proceedings of SPIE 0277-786X, V. 11781

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

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 *4th Optics Young Scientist Summit (OYSS 2020)*, edited by Chaoyang Lu, Yangjian Cai, Feng Chen, Zhaohui Li, Proceedings of SPIE Vol. 11781 (SPIE, Bellingham, WA, 2021) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510643963

ISBN: 9781510643970 (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 © 2021, 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/21/\$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.

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 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

4TH OPTICS YOUNG SCIENTIST SUMMIT (OYSS 2020)

- 11781 02 **Classification of pathogenic bacteria by Raman spectroscopy based on recurrent neural network** [11781-35]
- 11781 03 **A theoretical study towards water window attosecond light sources driven by a parametric waveform synthesizer** [11781-23]
- 11781 04 **Refractive index sensing properties of long-period fiber gratings at 2 μ m waveband** [11781-38]
- 11781 05 **Geometric analysis and new discoveries for phase-shifting algorithms based on the orthogonal resolution and resultant of forces** [11781-39]
- 11781 06 **A multi-field of view hyperspectral imaging system based on mid-wave infrared** [11781-47]
- 11781 07 **Automatic segmentation algorithm for dense steel structure point clouds** [11781-48]
- 11781 08 **Implementation of filtering method of active optical displacement sensor based on ZYNQ** [11781-52]
- 11781 09 **An infrared and visible image fusion method based on deep learning** [11781-53]
- 11781 0A **An experimental study on the characteristics of a bionic optical fiber** [11781-56]
- 11781 0B **Multi frame super resolution technology based on deep learning and compressed sensing** [11781-58]
- 11781 0C **High-accuracy and stable measurement of optical time delay based on an optical Hilbert transformer** [11781-61]
- 11781 0D **Auto-optimized compensation of pixel alignment in digital optical phase conjugation system** [11781-62]
- 11781 0E **Control of the dielectric constant of indium tin oxide film** [11781-67]
- 11781 0F **Enhanced time-resolved fluorescence imaging based on dual-gated for forensic document inspection** [11781-71]
- 11781 0G **Moiré imaging film with fluorescence enhancement effect** [11781-72]
- 11781 0H **ϕ -OTDR vibration detection based on dual-channel sensing of a two-mode fiber** [11781-74]
- 11781 0I **Research on optical microfiber pressure sensor applied in marine field** [11781-79]

- 11781 OJ **High-resolution and wideband optical vector analysis using fixed low-frequency detection** [11781-83]
- 11781 OK **Quantitative detection and analysis of two-dimensional modulation characteristics of vortex retarder based on PIE** [11781-84]
- 11781 OL **Deep-learning denoising convolutional neural network for photoacoustic microscopy** [11781-85]
- 11781 OM **Deep learning for fast image reconstruction of Fourier ptychographic microscopy with expanded frequency spectrum** [11781-86]
- 11781 ON **Influence of power ratio of the main amplifier to master oscillator on slope efficiency** [11781-88]
- 11781 OO **Airy-beam photoacoustic microscope imaging platform based on k-space pseudo-spectral method** [11781-91]
- 11781 OP **Construction of breast cancer photoacoustic imaging model based on COMSOL** [11781-93]
- 11781 OQ **Single-shot diagnostics for spatiotemporal laser-plasma evolution by the multi-dimensional encoding (MuDE) holography** [11781-103]
- 11781 OR **Development of key parameters metrology and calibration equipment for medical laser therapy apparatus** [11781-107]
- 11781 OS **Research on refractive index sensing performance of all-dielectric magnetic resonance metasurface** [11781-1]
- 11781 OT **Shack-Hartmann wavefront sensing with super-resolution photon-sieve array** [11781-2]
- 11781 OU **Simulation study on a new machining method of V-groove with double tools planing and ruling** [11781-7]
- 11781 OV **Preparation of colloidal submicrometre spheres with low-optical absorption via double laser-induced in liquid** [11781-8]
- 11781 OW **Preparation and photocatalytic performance of MoS₂ spheres by selective laser irradiation in liquid medium** [11781-12]
- 11781 OX **A comparative study of dry-etching nanophotonic devices on a LiNbO₃-on-insulator material platform** [11781-13]
- 11781 OY **Frequency domain super-resolution of staggered imaging system** [11781-14]
- 11781 OZ **InSb-based five-band terahertz metamaterial thermally tunable absorbers** [11781-17]
- 11781 10 **The effect of imaging distance on speckle correlography imaging** [11781-20]
- 11781 11 **Radial shear interferometer with twin non-confocal photon sieves** [11781-25]

- 11781 12 **A high-accuracy centroid estimation algorithm for star trackers based on micro-patch matching and filtering** [11781-29]
- 11781 13 **Propagation of a radially polarized Laguerre-Gaussian correlated Schell-model beam in atmospheric turbulence** [11781-30]
- 11781 14 **Chain-like cation for the fabrication of perovskite nanowires** [11781-33]
- 11781 15 **Estimation technique of global fringe contrast using in interferometers with adjustable contrast** [11781-36]
- 11781 16 **An accurate and convenient 3D profile measurement method based on phase shifting fringe projection** [11781-37]
- 11781 17 **An optical design of a MWIR spectral zoom system** [11781-40]
- 11781 18 **Method for estimating waveband of achromatic systems** [11781-42]
- 11781 19 **Real-time measurement of model attitude based on NDT and ICP** [11781-43]
- 11781 1A **Design and research of ultra-low loss terahertz photonic crystal fiber** [11781-46]
- 11781 1B **Frequency stabilization and absolute measurement of a near-infrared CW laser by optical frequency combs** [11781-50]
- 11781 1C **Backside-illuminated single photon avalanche diode with low dark count rate** [11781-51]
- 11781 1D **A photoacoustic temperature measurement method combined with quantitative absorption distribution** [11781-54]
- 11781 1E **Optimization of absorption layer in InGaAs/InP uni-traveling carrier photodiode** [11781-55]
- 11781 1F **Design of miniaturized high precision laser azimuth detection system** [11781-57]
- 11781 1G **Research on FPGA-based laser measuring instrument for surface flatness** [11781-59]
- 11781 1H **Research on target scattering characteristics based on Mueller matrix** [11781-69]
- 11781 1I **Linear off null working condition for total internal reflection imaging ellipsometry to detect subtle electron density change** [11781-70]
- 11781 1J **Imaging reconstruction through long-range scattering media by using deep learning** [11781-73]
- 11781 1K **Environmental adaptability design and measurement data classification analysis of thermopile sensors** [11781-78]
- 11781 1L **Measurement of 3D shape of cable sealing layer based on structured light binocular vision** [11781-80]

- 11781 1M **Research on high-speed transmission and display technology of optical dynamic scene** [11781-81]
- 11781 1N **Finite element simulation of the interaction between pulsed laser and mouse brain** [11781-87]
- 11781 1O **Research on spectrum analysis of photoacoustic signal based on COMSOL platform** [11781-92]
- 11781 1P **Three-dimensional spatiotemporal self-referenced characterization of ultrashort pulses using the coherent diffraction imaging technique** [11781-98]
- 11781 1Q **Design and sea trial of the ocean sensors integrated interface platform** [11781-3]
- 11781 1R **Research of development status of laser-assisted machining in situ** [11781-5]
- 11781 1S **Distinction of true or fake blood based on photoacoustic spectroscopy combined with artificial intelligence algorithms** [11781-15]
- 11781 1T **Focused field enhancement of terahertz metalens** [11781-16]
- 11781 1U **Design of LIDAR wide field of view receiver based on MEMS micro-mirror and high sensitivity APD** [11781-19]
- 11781 1V **High efficiency vector beam generation method based on a single LCSLM** [11781-21]
- 11781 1W **Optical fiber perimeter signal recognition based on fast dynamic time warping** [11781-22]
- 11781 1X **One-pot synthesized millimeter-sized perovskite single crystals for photodetectors** [11781-24]
- 11781 1Y **Research on angular vibration measurement system based on heterodyne interference** [11781-45]
- 11781 1Z **Communication reliability analysis of inter-satellite laser link based on transmission parameters** [11781-49]
- 11781 20 **Preliminary theoretical analysis of high-power Yb-doped fiber amplifiers tandem-pumped by short-wavelength fiber lasers** [11781-41]
- 11781 21 **Intelligent photothermal treatment method based on photoacoustic and photothermal probe assistance** [11781-60]
- 11781 22 **Quantum key pool construction and key distribution scheme in multi-domain QKD optical networks (QKD-ON)** [11781-63]
- 11781 23 **Development of simulation tool for the detection of terahertz signals based on microstructural photoconductive antenna** [11781-90]