## PROCEEDINGS OF SPIE

## 16th International Photonics and Optoelectronics Meetings (POEM 2025)

Xinliang Zhang William Shieh Perry Shum Peixiang Lu Jianji Dong Editors

15–17 May 2025 Wuhan, China

Organized by Huazhong University of Science and Technology (China)

Published by SPIE

**Volume 13695** 

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 16th International Photonics and Optoelectronics Meetings (POEM 2025), edited by Xinliang Zhang, William Shieh, Perry Ping Shum, Peixiang Lu, Jianji Dong, Proc. of SPIE 13695, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510693364

ISBN: 9781510693371 (electronic)

Published by

SPIF

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2025 Society of Photo-Optical Instrumentation Engineers (SPIE).

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 fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center 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.

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:** A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE 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

vii Conference Committee

## **OPTOELECTRONIC DEVICES AND INTEGRATION**

13695 02	Low-cost coherent optical communication system with error-feedback noise shaping and low-complexity adaptive equalizer [13695-4]
13695 03	Experimental demonstration of singularity-free modified constant modulus algorithm with polarization demultiplexing in Stokes space [13695-58]
13695 04	Wavelength division multiplexing on-chip parallel convolution processing core [13695-77]
13695 06	Non-Hermitian skin effect in a coupled microring resonator array [13695-20]
13695 07	A microwave photonic frequency down-converter with image rejection based on thin-film lithium niobate [13695-79]
13695 08	Clock synchronization via an X-band passive phase-stabilized microwave photonics link [13695-81]
13695 09	Generation of low-jitter optical pulses with reconfigurable repetition rates and pulse shape [13695-85]
13695 OA	Design of optical beamforming system based on optical all-pass filters [13695-32]
13695 OB	Optical transfer delay measurement of a 1064/532 nm laser link [13695-43]
13695 OC	Prediction of high-frequency dielectric response and optical properties of barium titanate electro-optic ferroelectric [13695-34]
13695 0D	Research on anti-interference characteristics of distributed fiber optic vibration sensing system based on OFDR [13695-16]
13695 OE	Coherent dual optical frequency combs generator using multistage electro-optic modulation [13695-65]
13695 OF	An optical parametric amplifier realized on a thin-film lithium niobate [13695-71]
13695 OG	Simulation of HgTe colloidal quantum dot infrared detectors based on nBn structure [13695-11]

13695 OH	Evanescent coupled slow-light photonic crystal grating antenna for solid-state LiDAR [13695-15]
13695 01	Dual passivation enables high-performance PbSe quantum dot short-wave infrared photodetectors [13695-18]
13695 OJ	Fully CMOS process compatible PZT-OI for microwave electro-optical device [13695-29]
13695 OK	Heterogeneously integrated Si/III-V laser with ultralow thermal resistance [13695-31]
13695 OL	Ultrafast polarization tracking method based on multidimensional modulation and optimization [13695-37]
13695 0M	A hardware-efficient OSNR monitor employing Higuchi fractal dimension on directly detected optical signals [13695-38]
13695 ON	HgTe colloidal quantum dot photodetectors using $SnO_2$ as an electron transport layer [13695-51]
13695 00	<b>1653-nm</b> distributed feedback laser with high-wavelength accuracy for methane detection [13695-54]
13695 OP	All-fiber dual-comb terahertz time-domain spectroscopy [13695-55]
13695 0Q	Acoustic sensing based on a dual-chirped-comb interferometric ranging system [13695-57]
13695 OR	Circular-polarization selective-absorbing photodetector based on double-layer metasurfaces [13695-59]
13695 OS	Nonlinearity compensation for ultralong-span OTN digital backpropagation based on distributed longitudinal power monitoring [13695-60]
13695 OT	Bismuth-doped heterogeneous multilayered fiber for O+E bands amplification [13695-86]
13695 OU	Arbitrary coupling photonics Ising machine based on MRRs array [13695-10]
13695 OV	Integrated sensing and communication with LFM-ASK waveform generation by P1 laser dynamics [13695-24]
13695 OW	Integrated Si <sub>3</sub> N <sub>4</sub> optical filter assisted by phase-shifted Bragg grating [13695-56]
13695 OX	Multitap complex Kalman filter for handling large PMD and fast RSOP [13695-3]
13695 OY	Distributed PMD measurement in mode-coupling situation based on polarization optical time-domain reflectometer [13695-23]
13695 OZ	A high-precision axial strain measurement sensor utilizing misaligned thin-core fiber

13695 10 Curvature and strain measurement sensors based on tapered dual-core photo fibers [13695-9]	onic crystal
Optical waveguide fabrication in tellurium dioxide single crystal by carbon ior [13695-26]	ns irradiation
13695 12 Visible and near-infrared waveguides formation in a chalcogenide glass via c implantation [13695-50]	carbon ions
LASER SCIENCE AND TECHNOLOGY	
13695 13 Lithium tantalate MZI filters assisted with Sb <sub>2</sub> Se <sub>3</sub> phase shifters [13695-6]	
13695 14 Investigation of a high-peak-power pulsed Tm:YAG laser [13695-40]	
Numerical analysis of laser cleaning in steel rail: effect of rust layer thickness [	[13695-52]
	H36 high-
13695 16 Investigation into high-peak-power nanosecond laser ablation for derusting El strength steel [13695-12]	
	minum alloy
strength steel [13695-12]  Research on high-energy nanosecond laser polishing technology for cast alur	minum alloy
strength steel [13695-12]  13695 17 Research on high-energy nanosecond laser polishing technology for cast alur wheels [13695-13]	,
strength steel [13695-12]  13695 17 Research on high-energy nanosecond laser polishing technology for cast alur wheels [13695-13]  BIOMEDICAL PHOTONICS  13695 18 Label-free detection of fibrotic focus in breast tumor microenvironment via mu	ultiphoton
strength steel [13695-12]  13695 17 Research on high-energy nanosecond laser polishing technology for cast alur wheels [13695-13]  BIOMEDICAL PHOTONICS  13695 18 Label-free detection of fibrotic focus in breast tumor microenvironment via mulimaging [13695-7]  Label-free visualization of microvessels in breast cancer based on multiphotor	ultiphoton n microscopy
strength steel [13695-12]  13695 17 Research on high-energy nanosecond laser polishing technology for cast alur wheels [13695-13]  BIOMEDICAL PHOTONICS  13695 18 Label-free detection of fibrotic focus in breast tumor microenvironment via mulimaging [13695-7]  13695 19 Label-free visualization of microvessels in breast cancer based on multiphotor [13695-19]  13695 1A Monitoring nasopharyngeal squamous metaplasia using multiphoton microsco	ultiphoton n microscopy opy
strength steel [13695-12]  Research on high-energy nanosecond laser polishing technology for cast alur wheels [13695-13]  BIOMEDICAL PHOTONICS  Label-free detection of fibrotic focus in breast tumor microenvironment via mulimaging [13695-7]  Label-free visualization of microvessels in breast cancer based on multiphotor [13695-19]  Monitoring nasopharyngeal squamous metaplasia using multiphoton microscocombined with spectroscopic imaging [13695-21]  Identifying the tumor margins of skin basal cell carcinoma using multiphoton in	ultiphoton  n microscopy  opy  microscopy
strength steel [13695-12]  13695 17 Research on high-energy nanosecond laser polishing technology for cast alunwheels [13695-13]  BIOMEDICAL PHOTONICS  13695 18 Label-free detection of fibrotic focus in breast tumor microenvironment via mulimaging [13695-7]  13695 19 Label-free visualization of microvessels in breast cancer based on multiphotor [13695-19]  13695 1A Monitoring nasopharyngeal squamous metaplasia using multiphoton microsecombined with spectroscopic imaging [13695-21]  13695 1B Identifying the tumor margins of skin basal cell carcinoma using multiphoton in [13695-25]  13695 1C Automated detection of tumor-associated collagen signatures in breast cancer	ultiphoton  n microscopy  opy  microscopy