

PROCEEDINGS OF SPIE

Active Photonic Platforms (APP) 2023

**Ganapathi S. Subramania
Stavroula Foteinopoulou**
Editors

**20–24 August 2023
San Diego, California, United States**

Sponsored and Published by
SPIE

Volume 12647

Proceedings of SPIE 0277-786X, V. 12647

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 *Active Photonic Platforms (APP) 2023*, edited by Ganapathi S. Subramania, Stavroula Foteinopoulou, Proc. of SPIE 12647, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510665088

ISBN: 9781510665095 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2023 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.

**SPIE. DIGITAL
LIBRARY**

SPIDigitalLibrary.org

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*

PHOTONICS AND OPTOELECTRONICS WITH 2D MATERIAL

12647 02 **Two-dimensional semiconductors for chiral directionality and electro-optic modulation in photonic systems** [12647-24]

PHOTONIC PLATFORMS FOR COMPUTING AND INFORMATION ENCODING

12647 03 **Deep spike heterostructure photonic neuro-transistors for effective neuromorphic computation and low energy consumption** [12647-35]

12647 04 **Programmable photonic chips and applications (Invited Paper)** [12647-37]

EXPLORING THE 4TH DIMENSION IN MATERIAL RESPONSES: EXPERIMENTS AND THEORY

12647 05 **Beyond physical limitations in electromagnetism and photonics through time-Floquet systems** [12647-39]

12647 06 **Space-time high-quality-factor metasurface for nonreciprocal wavefront manipulation** [12647-42]

PHOTONICS WITH PHASE-CHANGE MATERIALS I: ARCHITECTURE DESIGN AND THEORY

12647 07 **Switching between topological edge states using phase-change materials (Invited Paper)** [12647-45]

PHOTONICS WITH PHASE-CHANGE MATERIALS II: MATERIAL PROPERTIES AND DEVICES

12647 08 **Dispersion-engineered phase change material integrated silicon photonic modulators with controlled insertion losses** [12647-52]

NEW APPROACHES FOR THE DESIGN OF PHOTONIC PLATFORMS

12647 09 **Holographic scattering matrix for large scattering problems** [12647-56]

SYMMETRIES FOR EXTREME LIGHT CONTROL

- 12647 0A **Optical skyrmions (Keynote Paper)** [12647-57]
- 12647 0B **Symmetries and helicity in optical vortices (Keynote Paper)** [12647-58]

PT-SYMMETRIC, NON-HERMITIAN AND PSEUDO-HERMITIAN PHOTONIC SYSTEMS

- 12647 0C **Impact of waveguide imperfections on lasing near a stationary inflection point** [12647-62]
- 12647 0D **Photonic crystal defect mode with maximum chirality at exceptional point** [12647-63]

NOVEL NON-LINEAR PHOTONIC PHENOMENA AND SYSTEMS

- 12647 0E **Interband nonlinearity in aluminum-doped zinc oxide epsilon-near-zero metamaterial** [12647-71]
- 12647 0F **Dielectric metasurfaces for switchable nonlinear optics** [12647-74]
- 12647 0G **High-efficiency sum frequency generation from inverse designed metasurfaces** [12647-75]

NOVEL PLATFORMS FOR SENSORS

- 12647 0H **Plasmonic and interferometric optical fiber sensors for electrical system monitoring applications (Invited Paper)** [12647-78]
- 12647 0I **Mixed quantum-dot neuromorphic vision sensors for broad spectral perception** [12647-80]

ADVANCES IN FABRICATION FOR ACTIVE PHOTONICS

- 12647 0J **Enhancement of exciton-plasmon coupling via functional plasmonic metal oxide metastructures** [12647-85]

NOVEL PLATFORMS FOR ABSORPTION, PHOTODETECTORS, AND THERMAL EMISSION

- 12647 0K **Self-dual systems for backscattering cancellation (Invited Paper)** [12647-86]
- 12647 0L **Designing silicon-germanium photodetectors with numerical optimization: the tradeoffs and limits** [12647-90]

POSTER SESSION

12647 OM **Multilayer broadband switchable absorbers based on phase-change materials** [12647-106]