

PROCEEDINGS OF SPIE

Integrated Optics: Design, Devices, Systems and Applications VII

Pavel Cheben
Jiří Čtyroký
Iñigo Molina-Fernández
Editors

24–26 April 2023
Prague, Czech Republic

Sponsored by
SPIE

Cooperating Organisations
ELI Beamlines (Czech Republic)
HiLASE Centre (Czech Republic)
Laserlab Europe
AWE (United Kingdom)
STFC (United Kingdom)

Published by
SPIE

Volume 12575

Proceedings of SPIE 0277-786X, V. 12575

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 *Integrated Optics: Design, Devices, Systems and Applications VII*, edited by Pavel Cheben, Jiří Čtyroký, Iñigo Molina-Fernández, Proc. of SPIE 12575, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510662704

ISBN: 9781510662711 (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

v *Conference Committee*

PASSIVE AND ACTIVE WAVEGUIDE DEVICES

12575 02 **Recent progress in femtosecond pulsed ultralong fiber ring laser sources (Invited Paper)**
[12575-2]

INTERGRATED PHOTONIC SENSORS

12575 03 **Mid-infrared waveguides for broadband single-moded guidance** [12575-7]

12575 04 **Highly doped silicon plasmonic infrared nanoantennas for energy harvesting applications**
[12575-8]

INTEGRABLE LIGHT SOURCES

12575 05 **The ultra-bright and low-etendue light source for bioinstrumentation and scientific applications**
[12575-12]

12575 06 **Er³⁺ doped tellurite glass for whispering gallery mode microsphere laser production** [12575-13]

DIFFRACTIVE AND SUBWAVELENGTH-BASED DEVICES

12575 07 **Silicon-based surface gratings for efficient fiber-chip and free-space beam coupling (Invited Paper)** [12575-16]

12575 08 **Robust single-etch surface grating couplers for silicon nitride waveguide platform** [12575-18]

12575 09 **NIL master manufacturing for optical gratings** [12575-38]

OPTICAL WAVEGUIDE THEORY, MODELING, AND SIMULATIONS

- 12575 0A **Design optimization of silicon nitride-based micro-ring resonator systems in a CMOS mass production environment** [12575-20]
- 12575 0B **A silicon nitride MMI O-band power combiner based on slot waveguide structures** [12575-27]

INTEGRATED PHOTONICS FOR COMMUNICATIONS

- 12575 0C **Thermal insulation of silicon ring modulators in densely-packed photonic integrated circuits** [12575-22]
- 12575 0D **Tunable four-channel wavelength division (De) multiplexer based on cascaded long-period waveguide gratings** [12575-23]
- 12575 0E **Angled MMI optical switch** [12575-24]

POSTER SESSION

- 12575 0F **Active optic glass for broad-band amplification by erbium-bismuth activators** [12575-29]
- 12575 0G **Design of highly sensitive plasmonic nanoantenna mid-IR gas sensor** [12575-30]
- 12575 0H **Multi-functional optical design forIRST system using high-definition detector** [12575-31]
- 12575 0I **Spectral reflectance analysis of plant leaves during accelerated senescence in the VIS, NIR, MIR range** [12575-32]
- 12575 0J **Applying a Riesz-projection-based contour integral eigenvalue solver to compute resonance modes of a VCSEL** [12575-33]
- 12575 0K **Broadband plasmonic switching based on asymmetric metallic nanostructures on a VO₂ coated metallic film** [12575-34]
- 12575 0L **Mid-infrared localized surface plasmon resonances in silicon-dioxide nanoantennas for ozone detection** [12575-39]