PROCEEDINGS OF SPIE

Laser Beam Shaping XXIII

Angela Dudley Alexander V. Laskin Editors

21 August 2023 San Diego, California, United States

Sponsored and Published by SPIE

Volume 12667

Proceedings of SPIE 0277-786X, V. 12667

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

Laser Beam Shaping XXIII, edited by Angela Dudley, Alexander V. Laskin, Proc. of SPIE Vol. 12667, 1266701 · © 2023 SPIE 0277-786X · doi: 10.1117/12.3012413

Proc. of SPIE Vol. 12667 1266701-1

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 *Laser Beam Shaping XXIII*, edited by Angela Dudley, Alexander V. Laskin, Proc. of SPIE 12667, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X ISSN: 1996-756X (electronic)

ISBN: 9781510665484 ISBN: 9781510665491 (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.



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

VECTOR AND VORTEX BEAMS

12667 04 Optical vortex pulse generation with reflective achromatic phase converter [12667-23]

APPLICATIONS: OAM AND COMMS

- 12667 05 Design and analysis of SiN optical waveguide for 2D beam steering [12667-7]
- 12667 06 Demultiplexing OAM beams via Fourier optical convolutional neural network [12667-8]
- 12667 07 **Polarization sensitive security system** [12667-9]
- 12667 08 Development of a novel beam profiling prototype with laser self-mixing via the knife-edge approach [12667-11]

SLMS AND DMDS

12667 0A Stabilization of optical wireless power transmission system using spatial light modulator [12667-6]

APPLICATIONS: HIGH-POWER

- 12667 0B High-resolution large-area patterning of photonic structures using a multibeam direct write laser lithography technology [12667-12]
- 12667 OC Advanced diffuser-based grayscale lithography [12667-13]
- 12667 OE Determination of the biological variability of porcine explant tissue in retinal damage ex-vivo experiments with optical laser radiation [12667-15]

MONDAY POSTER SESSION

- 12667 OF A new integrated machine learning framework for advanced photoemission [12667-21]
- 12667 OG Analytical analysis of the quality factor of quartically aberrated Laguerre-Gauss beams [12667-22]

WEDNESDAY POSTER SESSION

12667 0H Characterization of collimation quality of Gaussian beams produced with engineered diffusers [12667-16]

DIGITAL POSTER SESSION

- 12667 01 Software and hardware implementation of the algorithm for 2-mirrors automatic laser beam alignment system [12667-17]
- 12667 0J Adaptive system with Zernike-based hill-climbing algorithm for super Gaussian and doughnut-like beam shaping [12667-18]
- 12667 0K Cartridge-type piezostack deformable mirror with reduced cross-section of control elements [12667-19]
- 12667 OL Wavefront control with high-spatial cartridge-type piezostack deformable mirror [12667-20]

Conference Committee

Program Track Chair

José Sasián, Wyant College of Optical Sciences (United States)

Conference Chairs

 Angela Dudley, University of the Witwatersrand, Johannesburg (South Africa)
 Alexander V. Laskin, AdlOptica Optical Systems GmbH (Germany)

Conference Program Committee

Fred M. Dickey, FMD Consulting LLC (United States)
Andrew Forbes, University of the Witwatersrand, Johannesburg (South Africa)
Patrick Gretzki, Pulsar Photonics GmbH (Germany)
Raul I. Hernandez-Aranda, Tecnológico de Monterrey (Mexico)
Alexis V. Kudryashov, Institute of Dynamics of Geospheres RAS (Russian Federation)
Todd E. Lizotte, BOLD Laser Automation (United States)
Dorilian Lopez-Mago, Tecnológico de Monterrey (Mexico)
Daryl Preece, Beckman Laser Institute and Medical Clinic (United States)
Gediminas Račiukaitis, Center for Physical Sciences and Technology (Lithuania)
Carmelo Rosales-Guzmán, Centro de Investigaciones en Óptica, A.C. (Mexico)

Mateusz Michal Szatkowski, Wroclaw University of Science and Technology (Poland)