PROCEEDINGS OF SPIE

Complex Light and Optical Forces XIX

David L. Andrews Enrique J. Galvez Halina Rubinsztein-Dunlop Editors

27–30 January 2025 San Francisco, California, United States

Sponsored and Published by SPIE

Volume 13393

Proceedings of SPIE 0277-786X, V. 13393

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 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 *Complex Light and Optical Forces XIX*, edited by David L. Andrews, Enrique J. Galvez, Halina Rubinsztein-Dunlop, Proc. of SPIE 13393, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510685345 ISBN: 9781510685352 (electronic)

Published by **SPIE** 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

v Conference Committee

OPTICAL FORCES I

13393 02 Optical trapping for charge detection and spinning [13393-2] Optical force dynamics on microscopic beads for different objective lenses using 13393 03 geometrical ray tracing [13393-3] **VECTOR MODES** 13393 04 Generation and characterization of complex vector modes with digital micromirror devices (Invited Paper) [13393-4] 13393 05 Experimental creation of programmable arbitrary spatiotemporal exotic beams [13393-6] **OPTICAL FORCES II** 13393 06 Light sheet optical tweezers as a force transducer for biological tissues [13393-8] **TOPOLOGICAL STRUCTURES** 13393 07 Multipole moment matching in OAM light-matter interaction [13393-15]

OPTICAL ANGULAR MOMENTUM

- 13393 08 Nonlinear up-conversion of spatiotemporal vortices into the EUV via high harmonic generation (Invited Paper) [13393-20]
- 13393 09 Near-field measure of optical chirality [13393-35]

QUANTUM EFFECTS AND INFORMATION

13393 0A Using optical-electronic neural network for demultiplexing OAM-coded signals [13393-30]

MODE CONSTRUCTIONS

13393 OB Harnessing optical aberrations for mode sorting [13393-36]

POSTER SESSION

13393 OC Free-space optical sensing using vector beam spectra [13393-45]