

PROCEEDINGS OF SPIE

# *Optical Manipulation and Structured Materials Conference*

Takashige Omatsu  
Kishan Dholakia  
Sile N. Chormaic  
*Editors*

17–21 April 2023  
Yokohama, Japan

*Published by*  
SPIE

**Volume 12606**

Proceedings of SPIE 0277-786X, V. 12606

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

Optical Manipulation and Structured Materials Conference, edited by Takashige Omatsu,  
Kishan Dholakia, Sile Nic Chormaic, Proc. of SPIE Vol. 12606, 1260601  
© 2023 SPIE · 0277-786X · doi: 10.1117/12.3011860

Proc. of SPIE Vol. 12606 1260601-1

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 [SPIDigitalLibrary.org](http://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 *Optical Manipulation and Structured Materials Conference*, edited by Takashige Omatsu, Kishan Dholakia, Sile N. Chormaic, Proc. of SPIE 12606, Seven-digit Article CID Number (DD/MM/YYYY): (DOI URL).

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

ISBN: 9781510663398  
ISBN: 9781510663404 (electronic)

Published by  
**SPIE**  
P.O. Box 10, Bellingham, Washington 98227-0010 USA  
Telephone +1 360 676 3290 (Pacific Time)  
[SPIE.org](http://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](http://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](http://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

xii *Conference Committee*

---

## OPTICAL MANIPULATION AND STRUCTURED MATERIALS CONFERENCE

---

- 12606 03 **Dynamics of quantized vortices in superfluid helium visualized with silicon nanoparticles** [12606-2]
- 12606 04 **Objective defocusing correction of collinear amplitude-modulated holographic data storage system based on deep learning** [12606-3]
- 12606 05 **Negative photoinduced birefringence in PQ/PMMA photopolymer materials** [12606-4]
- 12606 06 **Synthesis of as-prepared and sintered spinel ferrites containing cadmium, copper, and chromium exhibiting magnetism and photoluminescence** [12606-5]
- 12606 07 **Pixel crosstalk for phase retrieval based on deep learning** [12606-6]
- 12606 08 **Dual-channel polarization multiplexing based on linearly polarization holography** [12606-7]
- 12606 09 **Natural features, wettability, and optical diffraction patterns on an elastomeric replica of a superhydrophobic leaf derived via soft lithography** [12606-8]
- 12606 0A **Variable linear polarization of plane waves reconstructed via photorefractive volume holography** [12606-9]
- 12606 0C **Optical manipulation of resonant nanoparticles for thermal and rheological measurements** [12606-11]
- 12606 0D **Optical levitation using an LG<sub>01</sub> vortex beam** [12606-12]
- 12606 0E **Inverse design finds chiral nanogap antennas** [12606-13]
- 12606 0F **Formulation of optical force induced by superfluorescence** [12606-14]
- 12606 0G **Galaxy-shaped surface reliefs fabricated in an azo-polymer film with Laguerre-Gaussian beams** [12606-15]
- 12606 0H **Slipping liquid crystal rotator in viscous fluids** [12606-16]
- 12606 0I **Generalized spatial mode sorters for unscrambling light and imaging through multimode fibres** [12606-17]

- 12606 OK **One-dimensional radial Coulomb crystals in a quadrupole Paul trap** [12606-19]
- 12606 OL **Optomechanical detection of the transverse spin of light using anisotropic probe particles in an evanescent field and optical tweezers** [12606-20]
- 12606 OM **Emission properties of random lasers with scatterer distribution formed by optical trapping** [12606-21]
- 12606 ON **Localized surface plasmon resonance of gold nanoparticles modified Cu<sub>2</sub>O/ZnO nanorods array for hybrid glucose sensor electrode** [12606-22]
- 12606 OO **Extended optical binding with single and two focal laser beams** [12606-23]
- 12606 OP **Nanosopic visualization of chiro-optical field in photoinduced force microscopy** [12606-24]
- 12606 OQ **Direct generation of higher-order vector vortex modes at 640 nm from a Pr<sup>3+</sup>:YLF laser source** [12606-25]
- 12606 OR **How does optical vortex advance laser-induced forward transfer** [12606-26]
- 12606 OS **Null reconstruction in polarization holography** [12606-27]
- 12606 OT **Analysis by nonlocal response theory of tip-enhanced photoluminescence image of a single molecule** [12606-28]
- 12606 OU **Core-shell droplet formation of a temperature-responsive ionic liquid by a near-infrared focused laser beam** [12606-29]
- 12606 OV **High-definition direct print of perfect circle Au microdots by optical vortex induced forward transfer** [12606-30]
- 12606 OW **What will be done by optical manipulation of magnetically trapped superconducting micro-particles** [12606-31]
- 12606 OX **Deep learning-based super-resolution holographic data storage** [12606-32]
- 12606 OY **Luminescence-driven optomechanical system with micromechanical membranes** [12606-33]
- 12606 10 **Optical trapping and critical Casimir forces** [12606-35]
- 12606 12 **A simple model for laser-induced thermal convection in a microchannel** [12606-37]
- 12606 13 **Network-wide neuronal activity under optical trapping of synaptic vesicles in cultured neurons** [12606-38]
- 12606 14 **Spiral-structured crystal of ethylenediamine sulfate fabricated by optical trapping** [12606-39]
- 12606 15 **One-dimensional photonic crystals with mechanical defects fabricated by two-photon polymerization** [12606-40]

- 12606 16 **Generation of water vapor microbubbles on optical fiber tips** [12606-41]
- 12606 17 **Generation of optical skyrmion by using a spatial light modulator with a self-interferometer configuration** [12606-42]
- 12606 18 **Light-induced acceleration of antigen-antibody reaction for detecting attogram-level proteins** [12606-43]
- 12606 19 **Effect of interface in fiber-based optical condensation** [12606-44]
- 12606 1A **No reflection paradox at the boundary of hyperbolic medium** [12606-45]
- 12606 1B **Numerical simulation for a birefringent twister** [12606-46]
- 12606 1C **Single-chip optical vortex beam generation by using spiral-phase-plate-integrated photonic-crystal surface-emitting lasers** [12606-47]
- 12606 1D **Shaping of multimer plasmonic fields with fractional angular momentum** [12606-48]
- 12606 1E **Self-written microfiber waveguides with a first-order Bessel beam** [12606-49]
- 12606 1F **Hydrodynamics mediated interactions between live active rotors in dual optical tweezers** [12606-50]
- 12606 1G **Optical properties of color centers in nanodiamonds fabricated by detonation process** [12606-51]
- 12606 1H **Mechanisms of neuronal stimulation with a focused nanosecond optical vortex** [12606-52]
- 12606 1I **Modulation of optical force acting on small particles by using photochemical reaction and its application to control of optical transportation speed** [12606-53]
- 12606 1J **Multiple optical vortex beams generated by frequency-doubled Nd:YVO<sub>4</sub>/KGW Raman lasers at 588 nm** [12606-54]
- 12606 1K **Electron spin states on a higher-order Bloch sphere** [12606-55]
- 12606 1L **Meta-devices for optical varifocal, light-sheet, and abrupt autofocusing** [12606-56]
- 12606 1N **Characterisation of topological photons** [12606-58]



# Conference Committee

## *Conference Chairs*

**Takashige Omatsu**, Chiba University (Japan)  
**Kishan Dholakia**, University of St. Andrews (United Kingdom)  
**Sile Nic Chormaic**, Okinawa Institute of Science and Technology  
Graduate University (Japan)

## *Conference Program Committee*

**Masaaki Ashida**, Osaka University (Japan)  
**Satoshi Ashihara**, The University of Tokyo (Japan)  
**Yung-Fu Chen**, National Chiao Tung University (Taiwan)  
**Hajime Ishihara**, Osaka Prefecture University (Japan)  
**Yasuyuki Kimura**, Kyushu University (Japan)  
**Kyoko Kitamura**, Kyoto Institute of Technology (Japan)  
**Yuichi Kozawa**, Tohoku University (Japan)  
**Yoko Miyamoto**, The University of Electro-Communications (Japan)  
**Ryuji Morita**, Hokkaido University (Japan)  
**Kei Murakoshi**, Hokkaido University (Japan)  
**Kyoko Namura**, Kyoto University (Japan)  
**Kyunghwan Oh**, Yonsei University (Korea, Republic of)  
**Seigo Ohno**, Tohoku University (Japan)  
**Hiromi Okamoto**, Institute for Molecular Science (Japan)  
**Keiji Sasaki**, Hokkaido University (Japan)  
**Ichiro Shoji**, Chuo University (Japan)  
**Yasuhiro Sugawara**, Osaka University (Japan)  
**Xiaodi Tan**, Fujian Normal University (China)  
**Yasuyuki Tsuboi**, Osaka City University (Japan)  
**Nirmal K. Viswanathan**, University of Hyderabad (India)

