

PROCEEDINGS OF SPIE

Optical Manipulation Conference

Takashige Omatsu
Ryuji Morita
Editors

19–21 April 2017
Yokohama, Japan

Sponsored and Published by
SPIE

Volume 10252

Proceedings of SPIE 0277-786X, V. 10252

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

Optical Manipulation Conference, edited by Takashige Omatsu, Ryuji Morita, Proc. of SPIE Vol.
10252, 1025201 · © 2017 SPIE · CCC code: 0277-786X/17/\$18 · doi: 10.1117/12.2279438

Proc. of SPIE Vol. 10252 1025201-1

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.

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 Conference*, edited by Takashige Omatsu, Ryuji Morita, Proceedings of SPIE Vol. 10252 (SPIE, Bellingham, WA, 2017) Seven-digit Article CID Number.

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

ISBN: 9781510610057
ISBN: 9781510610064 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445
SPIE.org

Copyright © 2017, Society of Photo-Optical Instrumentation Engineers.

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 copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online 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. The CCC fee code is 0277-786X/17/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

**SPIE. DIGITAL
LIBRARY**

SPIDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article 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 six-digit CID article numbering system structured as follows:

- The first four 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	<i>Authors</i>
ix	<i>Conference Committee</i>

OMC AND BISC JOINT SYMPOSIUM II

10252 03	Rhythmic motion of colloidal particles driven by optical force [10252-2]
10252 04	Thermo-plasmonic manipulation of living cyanobacteria on a gold nanostructure [10252-3]
10252 05	Novel compact photoacoustic imaging system to explore the applications in the medical imaging field [10252-51]

OPTICAL MANIPULATION I

10252 07	Optical manipulation of hot nanoparticles can mediate selected cell fusion (Invited Paper) [10252-5]
10252 08	Molecular dynamics in an optical trap of glutamate receptors labeled with quantum-dots on living neurons [10252-6]

OPTICAL MANIPULATION II

10252 09	Photonic entanglement processing with a single sub-wavelength structure (Invited Paper) [10252-7]
10252 0A	Single orbital angular momentum mode emission from vertical cavity surface emitting laser by optical feedback [10252-8]
10252 0B	Experimental generation of Bessel-Gauss coherence functions [10252-9]

OPTICAL MANIPULATION III

10252 0C	Light robotics: aiming towards all-optical nano-robotics (Invited Paper) [10252-10]
10252 0D	Tailored vectorial light fields: flower, spider web and hybrid structures [10252-11]
10252 0E	High average power ultraviolet picosecond optical vortex generation [10252-12]
10252 0F	Generation of intense ultrafast-rotating ring-shaped optical lattices with programmable control of rotational symmetry [10252-13]

10252 OG **Astigmatism inducing the degenerate effect in nearly hemispherical cavities: generation of three-dimensional structured light** [10252-14]

OPTICAL MANIPULATION IV

- 10252 OH **Observing laser ablation dynamics with sub-picosecond temporal resolution (Invited Paper)** [10252-15]
- 10252 OI **Plasmonic Au nano-needle fabricated by optical vortex laser illumination** [10252-16]
- 10252 OJ **Macroscopic assembly by optical control of zmol-level DNA hybridization** [10252-17]
- 10252 OK **Twisted polymeric microfiber formed by structured light illumination** [10252-18]
- 10252 OL **Plasmon active site for nanosized polymerization** [10252-19]
- 10252 OM **Circularly polarized lights twist azo-polymer to form helical surface relief** [10252-20]
- 10252 ON **Fabrication of semiconductor microspheres with laser ablation in superfluid helium** [10252-21]
- 10252 OO **Creating a crystalline silicon (111) needle by optical vortex illumination** [10252-22]

OPTICAL MANIPULATION V

- 10252 OQ **Optical binding of two microparticles levitated in vacuum** [10252-24]
- 10252 OR **Nano-ring arrays for sub-micron particle trapping** [10252-25]
- 10252 OS **Rotational dynamics and heating of trapped nanovaterite particles** [10252-26]
- 10252 OT **Optical binding of particles in the evanescent field of microfiber modes** [10252-27]

OPTICAL MANIPULATION VI

- 10252 OU **Optical tweezer manipulation for atom tetris (Invited Paper)** [10252-28]
- 10252 OV **Dynamics of optically levitated microparticles in vacuum placed in 2D and 3D optical potentials possessing orbital angular momentum** [10252-29]
- 10252 OW **Continuous rotation of a cholesteric liquid crystalline droplet by a circularly polarized optical tweezers** [10252-30]
- 10252 OX **Nanoparticle trapping and control in a hollow whispering gallery resonator** [10252-31]

OPTICAL MANIPULATION VII

- 10252 0Z **Near-field optical forces-assisted molecular nanoparticle deposition in the nanogap of plasmonic nanoantennas** [10252-33]
- 10252 10 **Analysis of a nano-particle rotation using a plasmonic trimer nano-structure** [10252-34]
- 10252 11 **Temperature measurement of the metal particle during laser-induced migration in the glass** [10252-35]
- 10252 12 **On-chip photonic tweezers for photonics, microfluidics, and biology** [10252-36]

OPTICAL MANIPULATION VIII

- 10252 13 **Optical manipulation by nonlinear response of nanoparticles (Invited Paper)** [10252-37]
- 10252 14 **Generation of chiral optical near-fields with non-chiral metallic nanostructures and linearly polarized light** [10252-38]
- 10252 15 **Enhancement of linear/nonlinear optical responses of molecular vibrations using metal nanoantennas** [10252-39]
- 10252 16 **Localized field control at the nano-scale** [10252-40]
- 10252 17 **Strong electric field enhancement in a gold/silica bow-tie nano-antenna** [10252-41]

POSTER SESSION

- 10252 18 **Tight focusing of radially polarized ultrashort light pulses: slow light and pulse compression** [10252-42]
- 10252 19 **Influence of dilution with organic solvents on emission spectra of CdSe/ZnS quantum dots** [10252-43]
- 10252 1A **Speckle and focusing of partially coherent beams through scattering medium** [10252-44]
- 10252 1B **Amplification of complex fields in Nd:YAG amplifiers** [10252-45]
- 10252 1C **Effect of polymer stabilization on floating-ring-electrode LC lens** [10252-46]
- 10252 1D **Dispersion compensation based on prism compressor** [10252-47]
- 10252 1E **Enhancement of electrocatalytic activity of octahedral Au@Pt core-shell nanoparticles by the surface plasmon excitation** [10252-48]
- 10252 1H **Property of magnetic trapping of superconducting sub-micron particles** [10252-52]

Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Ablez, Ablimit, 0O
Ahn, Jaewook, 0U
Alpmann, Christina, 0D
Arita, Yoshihiko, 0K, 0Q, 0S, 0V
Ashida, Masaaki, 0N, 1H
Ashihara, Satoshi, 15
Auñón, Juan M., 0V
Awaji, Y., 0A
Azarmi, Fardad, 17
Bahadori, Azra, 07
Banas, Andrew, 0C
Barada, Daisuke, 0M
Bendix, Poul M., 07
Buese, Alexander, 09
Chang, Chengcheng, 1B
Chen, Mingzhou, 0V
Chen, Xiaomei, 1D
Chen, Xudong, 1B
Chen, Y. F., 0G
Chen, Ziyang, 18, 1A
Chiba, Akira, 11
Cluzel, Benoît, 12
Craig, Derek, 0S
de Fornel, Frédérique, 12
Delamadeleine, Eric, 12
Denz, Cornelia, 0D
Dholakia, Kishan, 0K, 0Q, 0S, 0V
Fujita, Hanami, 0O
Fujiwara, Hideki, 16
Fukaminato, Tsuyoshi, 0Z
Glückstad, Jesper, 0C
Hadji, Emmanuel, 12
Han, Xue, 0R
Hashiyada, Shun, 14
Hayakawa, Toshiro, 05
Hidai, Hirofumi, 11
Hoshina, Masayuki, 13
Hosokawa, Chie, 08
Hsieh, Y. H., 0G
Hsu, Che-Ju, 1C
Huang, Chi-Yen, 1C
Huang, K. F., 0G
Iida, Takuya, 0J
Irisawa, Kaku, 05
Ishida, Shutaro, 0Z, 10, 16
Ishihara, Hajime, 13
Ishihara, Miya, 05
Ito, Syoji, 0J
Iwasa, Kohei, 0F
Izumisawa, Kai, 0I, 0O
Jager, Jean-Baptiste, 12
Ji, Xuanxuan, 1A
Juan, Mathieu, 09
Kakizawa, Kohei, 0F
Kameyama, Tatsuya, 1E
Khaleque, Abdul, 17
Kim, Hyosub, 0U
Kimura, Yasuyuki, 03, 0W
Kinan, Asuka, 19
Kishimoto, Tatsunori, 08
Kobayashi, Yohei, 0H
Kowa, Maya, 0E
Kudo, Tetsuhiro, 13
Kudoh, Suguru N., 08
Kumakura, Mitsutaka, 19, 1H
Kusa, Fumiya, 15
Lan, Tian, 1D
Lee, Junhyung, 0K
Lee, Woojun, 0U
Li, Xiaowei, 0L
Liang, H. C., 0G
Lin, Huichuan, 18
Liu, Hongying, 1D
Liu, Yi-Jun, 1C
Maezawa, Yasuyo, 08
Maimaiti, Aili, 0T
Masuda, Keigo, 0M
Matsusaka, Souta, 11
Matsushima, F., 1H
Mazilu, Michael, 0S, 0V
Minamimoto, Hiro, 0L
Minowa, Yosuke, 0N
Mironov, Evgeny G., 17
Miyamoto, Katsuhiko, 0E, 0I, 0K, 0M, 0O
Miyamoto, Yoko, 0B
Mizoguchi, Tadashi, 04
Molina-Terriza, Gabriel, 09
Morichika, Ikki, 15
Morita, Noboru, 11
Morita, Ryuji, 0A, 0F, 0I, 0O
Moriwaki, Y., 1H
Moriya, H., 0A
Moriyasu, Takeshi, 19
Murakoshi, Kei, 04, 0L
Naka, Shota, 04
Nakai, Tatsuya, 13
Nakamura, Yuri, 0I, 0O
Nakano, Shogo, 0M

Naoi, J., 1H
Narushima, Tetsuya, 14
Ni, Guoqiang, 1D
Nic Chormaic, Síle, 0R, 0T, 0X
Nishida, Keisuke, 0J
Nishimura, Yushi, 0J
Nishioka, Nobuyasu, 11
Oddershede, Lene B., 07
Oguni, Yuya, 0N
Okada, Kazuhiko, 0F
Okamoto, Hiromi, 14
Omatsu, Takashige, 0E, 0I, 0K, 0M, 0O
Orlita, Hiroaki, 16
Otte, Eileen, 0D
Palima, Darwin, 0C
Peyrade, David, 12
Picard, Emmanuel, 12
Pin, Christophe, 0Z
Pin, Christophe, 12
Pu, Haosen, 18
Pu, Jixiong, 18, 1A, 1B
Reddy, Salla Gangi, 0B
Renaut, Claude, 12
Richards, Joseph, 0S
Saito, Keita, 03
Sasaki, Keiji, 0Z, 10, 16
Sasaki, Yuta, 0E
Sato, Kentaro, 1E
Shibakawa, Jun, 0E
Shigematsu, K., 0A
Shoji, Tatsuya, 04
Singh, R. P., 0B
Skelton Spesyvtseva, Susan E., 0S
Spalding, Gabriel C., 0S
Su, K. W., 0G
Sudo, Kota, 10
Sugimoto, Tatsuyuki, 0I, 0O
Taguchi, Takahisa, 08
Takahashi, Genta, 0Z
Takahashi, Y., 1H
Takegami, Akinobu, 15
Tamiaki, Hitoshi, 04
Tamura, Mamoru, 0J
Tamura, Yuta, 0W
Tani, Shuntaro, 0H
Tardif, Manon, 12
Tischler, Nora, 09
Toda, Yasunori, 0A, 0F
Tokonami, Shiho, 0J
Torimoto, Tsukasa, 0I, 1E
Toyoshima, Shunsuke, 0K
Truong, Viet Giang, 0R, 0T
Tsuboi, Yasuyuki, 04
Tung, J. C., 0G
Vettenburg, Tom, 0V
Wada, Takatsugu, 05
Wakisaka, Yumi, 04
Wan, Lipeng, 1A
Ward, Jonathan M., 0X
Wright, Ewan M., 0Q, 0V
Yamaguchi, K., 1H
Yamaguchi, Koki, 0E
Yamane, Keisaku, 0A, 0F
Yang, Yong, 0X
Yasuda, Yuki, 16
Zhang, Jinjiang, 0L

Conference Committee

Symposium Chairs

Takashige Omatsu, Chiba University (Japan)
Toyohiko Yatagai, Utsunomiya University (Japan)
Osamu Matoba, Kobe University (Japan)

Conference Chair

Takashige Omatsu, Chiba University (Japan)

Conference Co-chairs

Hajime Ishihara, Osaka Prefecture University (Japan)
Keiji Sasaki, Hokkaido University (Japan)

Conference Program Committee

Ryuji Morita, Hokkaido University (Japan)
Yasuyuki Tsuboi, Osaka City University (Japan)
Masaaki Ashida, Osaka University (Japan)
Satoshi Ashihara, The University of Tokyo (Japan)
Yung-Fu Chen, National Chiao Tung University (Taiwan)
Kei Murakoshi, Hokkaido University (Japan)
Hiromi Okamoto, Institute for Molecular Science (Japan)
Seigo Ohno, Tohoku University (Japan)
Ichiro Shoji, Chuo University (Japan)
Síle Nic Chormaic, Okinawa Institute of Science and Technology
Graduate University (Japan)
Yasuhiro Sugawara, Osaka University (Japan)

Session Chairs

- 1 OMC and BISC Joint Symposium I
Takashige Omatsu, Chiba University (Japan)
- 2 OMC and BISC Joint Symposium II
Osamu Matoba, Kobe University (Japan)
- 3 Optical Manipulation I
Keiji Sasaki, Hokkaido University (Japan)
- 4 Optical Manipulation II
Satoshi Ashihara, The University of Tokyo (Japan)

- 5 Optical Manipulation III
Yoshihiko Arita, University of St. Andrews (United Kingdom)
- 6 Optical Manipulation IV
Kei Murakoshi, Hokkaido University (Japan)
- 7 Optical Manipulation V
Masaaki Ashida, Osaka University (Japan)
- 8 Optical Manipulation VI
Gabriel Molina-Terriza, Macquarie University (Australia)
- 9 Optical Manipulation VII
Alexander B. Stilgoe, The University of Queensland (Australia)
- 10 Optical Manipulation VIII
Hiroshi Okamoto, Institute for Molecular Science (Japan)