PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 10678

, "Front Matter: Volume 10678," Proc. SPIE 10678, Optical Micro- and Nanometrology VII, 1067801 (26 July 2018); doi: 10.1117/12.2503291

SPIE.

Event: SPIE Photonics Europe, 2018, Strasbourg, France

PROCEEDINGS OF SPIE

Optical Micro- and Nanometrology VII

**Christophe Gorecki
Anand Krishna Asundi
Wolfgang Osten**
Editors

**25–26 April 2018
Strasbourg, France**

Sponsored by
SPIE

Cosponsored by
Strasbourg the Eurooptimist (France)
CNRS (France)
Investissements d'Avenir (France)
iCube (France)
Université de Strasbourg (France)

Cooperating Organisations
Photonics 21 (Germany)
EOS—European Optical Society (Germany)
Photonics Public Private Partnership (Belgium)
Comité National d'Optique et de Photonique (France)

Published by
SPIE

Volume 10678

Proceedings of SPIE 0277-786X, V. 10678

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

Optical Micro- and Nanometrology VII, edited by Christophe Gorecki, Anand Krishna Asundi,
Wolfgang Osten, Proc. of SPIE Vol. 10678, 1067801 · © 2018 SPIE
CCC code: 0277-786X/18/\$18 · doi: 10.1117/12.2503291

Proc. of SPIE Vol. 10678 1067801-1

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 Micro- and Nanometrology VII*, edited by Christophe Gorecki, Anand Krishna Asundi, Wolfgang Osten, Proceedings of SPIE Vol. 10678 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

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

ISBN: 9781510618824
ISBN: 9781510618831 (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 © 2018, 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/18/\$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 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

vii	<i>Authors</i>
ix	<i>Conference Committee</i>

SESSION 1 INTERFEROMETRY I

10678 02	Speckle Interferometry in harsh environments: design considerations and successful examples (Invited Paper) [10678-1]
10678 04	Focusing type grating interferometer [10678-3]
10678 05	Perturbation resistant RGB-interferometry with pulsed LED illumination (Best Student Paper Award) [10678-4]
10678 06	Laser heterodyne interferometer for simultaneous measurement of displacement, and roll-angle based on the acousto-optic modulators [10678-5]

SESSION 2 OPTICAL TOMOGRAPHY

10678 07	The SS-OCT endomicroscopy probe based on MOEMS Mirau micro-interferometer for early stomach cancer detection (Invited Paper) [10678-6]
10678 0A	The original application of hybrid lens in micromasurements for optical coherence tomography [10678-9]

SESSION 3 METROLOGY OF MICROOPTICS/MEMS

10678 0B	Assessing microlens quality based on 3D irradiance measurement at the focal spot area [10678-10]
10678 0C	About detecting steam condensation by means of polymer racetrack micro-resonators: highlighting the dynamics of such a soft matter process [10678-11]
10678 0E	Lithographic diffraction grating with a period failure [10678-14]

SESSION 4 HOLOGRAPHY

10678 0F	Holographic characterization and laser structuring of a microphone membrane [10678-16]

10678 OH   **Size measurements of an optical fiber by diffraction pattern analysis in Fraunhofer approximation [10678-18]**

SESSION 5   OPTICAL SCATTEROMETRY

10678 OJ   **Multimodal imaging Mueller polarimetric microscope to study polarimetric properties of spheroidal microparticles [10678-20]**

SESSION 6   MICRO- AND NANOTOPOGRAPHY

10678 OL   **Application of coherence scanning interferometry for local spectral characterization of transparent layers [10678-22]**

10678 OM   **Residual flatness error correction in three-dimensional imaging confocal microscopes [10678-23]**

10678 ON   **GPU-accelerated simulation of the superresolution capabilities of dielectric microspheres using the Differential Method [10678-24]**

10678 OO   **Determination of structural deviations in wire grid polarizers for DUV application wavelengths by transmission spectroscopy in the visible spectral range [10678-25]**

SESSION 7   INTERFEROMETRY II

10678 OQ   **Interferometric measuring systems of nanopositioning and nanomeasuring machines (Invited Paper) [10678-27]**

10678 OR   **Dispersion-controlled low-coherent interferometry for thin-film characterization [10678-28]**

10678 OS   **Ultrastable metrology laser at 633 nm using an optical frequency comb [10678-29]**

10678 OT   **Symmetrical double diffraction laser encoder [10678-30]**

10678 OV   **Two-step phase shifting in fringe projection: modeling and analysis [10678-32]**

SESSION 8   SPECIALIZED TECHNIQUES

10678 OW   **Mapping of the detecting units of the resonator-based multiplexed sensor [10678-33]**

10678 OX   **Numerical analysis of angle-selective one-dimensional periodic structure for building energy management [10678-34]**

10678 0Y   **Effects of non-ideal display properties in phase measuring deflectometry: A model-based investigation** [10678-35]

10678 0Z   **Ultra-small mechanical deformation sensor using a hybrid fiber optic-based triangular photonic crystal structure** [10678-36]

POSTER SESSION

10678 10   **Pump-probe digital holography for monitoring of long bulk nonlinear strain waves in solid waveguides** [10678-37]

10678 12   **Optical challenging feature inline measurement system based on photometric stereo and HON feature extractor** [10678-39]

10678 14   **Micro Glass Blowing platform for microfabrication of microoptical components** [10678-42]

10678 15   **Step-index optical fiber sizing with a rainbow technique** [10678-43]

10678 16   **Immersion white light scanning interferometry using elastic polymer path length compensation** [10678-44]

10678 18   **Deriving forces in a single beam gradient force optical tweezers using the angular spectrum method** [10678-13]

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.

Albertazzi, A., 02	Healy, John J., 18
Anstötz, Freddy, 16	Hennelly, Bryan M., 18
Artigas, Roger, 0M	Hsieh, Hung-Lin, 04, 0T
Bargiel, Sylwester, 07, 14	Huang, Junhui, 06
Barillon, Rémi, 16	Isoda, Kazutaka, 0X
Barrera, E. S., 02	Jacobs, P., 0F
Bartsch, Jonas, 0Y	Kalms, Michael, 0Y
Bêche, B., 0C	Köchert, Paul, 0S
Béguelin, Jeremy, 0B	Kroker, S., 0O
Beiu, Roxana-Mariana, 0Z	Lehmann, Peter, 05
Beiu, Valeriu, 0Z	Lhermite, H., 0C
Belashov, A. V., 10	Li, Dechun, 0V
Beltukov, Y. M., 10	Li, Q., 0C
Benedet, M., 02	Liang, An-Jie, 0T
Berges, M., 0C	Liao, Jia-Xian, 04
Bergmann, Ralf B., 0Y	Liu, Huiyu, 12
Bermudez, Carlos, 0M	Lu, Lei, 0V
Billard, Alain, 07	Lushnikov, D. S., 0E
Blumröder, Ulrike, 0S	Manske, Eberhard, 0S
Bodermann, B., 0O	Mao, Jiaqi, 0V
Boukellal, A., 0H	Martinez, Pol, 0M
Boumrrar, K., 0H	Matilla, Aitor, 0M
Cadevall, Cristina, 0M	Meng, Xiangfeng, 0V
Carrion, J. Vincente, 14	Mokdad, R., 0H
Cazin, V., 0C	Montgomery, Paul C., 0L, 16
Chen, Howard, 12	Moreno, Fernando, 0J
Chutani, Ravinder, 07	Mukhtar, Husneni, 16
Claveau, R., 0L	Nagata, Kohki, 0X
Cormerais, H., 0C	Nelsen, B., 0F, 0R
Dickmann, J., 0O	Noell, Wilfried, 0B
Dickmann, W., 0O	Nüß, Johann R., 0Y
Drozella, Johannes, 0N	Odinokov, S. B., 0E
Duma, Virgil-Florin, 0Z	Ossikovski, Razvigor, 0J
Ebisawa, Mizue, 0X	Osten, Wolfgang, 0N
Egorov, D. I., 0A	Ostendorf, Andreas, 0W
Fantini, A. V., 02	Otani, Yukitoshi, 0X
Felgner, André, 0M	Pape, Christian, 0V
Fernández, Andrea, 0J	Passilly, Nicolas, 07, 14
Flury, M., 0L	Pfeiffer, P., 0H
Frenner, Karsten, 0N	Preuß, M., 0R
Gao, Jianmin, 06	Prinzler, Martin H. U., 0Y
Garcia-Caurel, Enric, 0J	Qi, Jingya, 06
Garnier, L., 0C	Reithmeier, Eduard, 0V
Gaviot, E., 0C	Rojas Hurtado, C. B., 0O
Głomb, Grzegorz, 15	Rubin, Anne, 16
Gorecki, Christophe, 07, 14	Rudek, F., 0F
Hartmann, P., 0F, 0R	Saetchnikov, Anton, 0W
Hausotte, Tino, 0Q	Saetchnikov, Vladimir, 0W
He, Pei-Yun, 0T	Saiz, Jose Maria, 0J

Schake, Markus, 05
Scharf, Tordalf, 0B
Semenova, I. V., 10
Shishova, M. V., 0E
Siefke, T., 0O
Silva, F., 02
Song, Kechen, 12
Steinert, M., 0O
Struk, Przemyslaw, 07
Sun, Bo-Yen, 04
Świrniak, Grzegorz, 15
Symeonidis, Michail, 0B
Tanguy, Quentin A. A., 07
Taudt, Ch., 0F, 0R
Tcherniavskaia, Elina, 0W
Veiga, C. L., 02
Vié, V., 0C
Viotti, M. R., 02
Voelkel, Reinhard, 0B
Wang, Zhao, 06
Weichelt, T., 0O
Weiss, J., 0C
Willemann, D. P., 02
Xie, Huikai, 07
Yan, Yunhui, 12
Yang, Xiulun, 0V
Yin, Yongkai, 0V
Yoo, Thomas Sang Hyuk, 0J
Yu, Qin, 18
Zherdev, A. Y., 0E

Conference Committee

Symposium Chairs

Francis Berghmans, Vrije Universiteit Brussel (Belgium)
Thierry Georges, Oxxius SA (France)
Harald Giessen, Universität Stuttgart (Germany)
Paul C. Montgomery, Université de Strasbourg (France)

Conference Chairs

Christophe Gorecki, FEMTO-ST (France)
Anand Krishna Asundi, Nanyang Technological University (Singapore)
Wolfgang Osten, Institut für Technische Optik (Germany)

Conference Programme Committee

Jürgen W. Czarske, TU Dresden (Germany)
Peter J. de Groot, Zygo Corporation (United States)
Pietro Ferraro, Istituto Nazionale di Ottica (Italy)
Cosme Furlong, Worcester Polytechnic Institute (United States)
Yoshio Hayasaki, Utsunomiya University (Japan)
Michał Józwik, Warsaw University of Technology (Poland)
Peter H. Lehmann, Universität Kassel (Germany)
Paul C. Montgomery, Université de Strasbourg (France)
Andreas Ostendorf, Ruhr-Universität Bochum (Germany)
Yukitoshi Otani, Utsunomiya University (Japan)
Heidi Ottevaere, Vrije Universiteit Brussel (Belgium)
Nicolas Passilly, FEMTO-ST (France)
Christof Pruss, Universität Stuttgart (Germany)
Xiaocong Yuan, Nankai University (China)

Session Chairs

- 1 Interferometry I
Wolfgang Osten, Institut für Technische Optik (Germany)
- 2 Optical Tomography
Christophe Gorecki, FEMTO-ST (France)
- 3 Metrology of Microoptics/MEMS
Przemysław Struk, FEMTO-ST (France)
- 4 Holography
Rosmin Elsa Mohan, Nanyang Technological University (Singapore)

- 5   Optical Scatterometry
    Tino Hausotte, Friedrich-Alexander-Universität Erlangen-Nürnberg
    (Germany)
- 6   Micro- and Nanotopography
    Armando Albertazzi Gonçalves Jr., Universidade Federal de Santa
    Catarina (Brazil)
- 7   Interferometry II
    Jürgen W. Czarske, TU Dresden (Germany)
- 8   Specialized Techniques
    Christophe Gorecki, FEMTO-ST (France)