PROCEEDINGS OF SPIE

Optics and Photonics for Advanced Dimensional Metrology III

Peter J. de Groot Felipe Guzman Pascal Picart Editors

9–11 April 2024 Strasbourg, France

Sponsored by SPIE

Cooperating Organisations
Photonics 21 (Germany)
EOS—European Optical Society

Published by SPIE

Volume 12997

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 *Optics and Photonics for Advanced Dimensional Metrology III*, edited by Peter J. de Groot, Felipe Guzman, Pascal Picart, Proc. of SPIE 12997, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510673120

ISBN: 9781510673137 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2024 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

Conference Committee vii SESSION 1 **NEW METHODS AND ADVANCED PHOTONICS** 12997 05 Image flow-cytometry meets virtual reality: a new scenario for label-free quantitative phase contrast microscopy and single cell analysis [12997-4] 12997 07 In-process detection of laser-generated ultrasound for controlling material laser processing [12997-6] 12997 08 Application of frequency-shifted feedback laser optical frequency combs for distance and refraction coefficient measurements [12997-7] **SESSION 2** INTERFEROMETRY AND HOLOGRAPHY 12997 0A Zoom system for coherent imaging with no moving lens groups [12997-9] 12997 OB In vivo investigation of anuran sound localization with achiral digital Fresnel holography [12997-10] **SESSION 3** INTERFEROMETRY FOR TOPOGRAPHY AND SHAPE 12997 OE Analysis and improvement of the lateral resolution of CSI instruments based on the universal Fourier optics (UFO) model (Invited Paper) [12997-13] 12997 OF Multispectral interferometry for characterizing nano-objects [12997-14] 12997 0G Refocus criterion in dual-wavelength digital holographic interferometry for accurate shape **measurement** [12997-15] 12997 OH Suppression of scanning nonlinearities through computational self-correction in optical profilometry [12997-16] **SESSION 4** INTERFEROMETRY FOR DISTANCES, WAVEFRONTS, AND FORM 12997 OI James C. Wyant [12997-17] 12997 OJ Multiplexing interferometers using range-resolved interferometry (Invited Paper) [12997-18]

12997 OL	Interferometer cosine error and uncertainty minimisation using an external cavity [12997-20]
SESSION 5	CONFOCAL, SPECKLE, AND SPECTRAL METROLOGY
12997 OM	Digital twins for 3D confocal microscopy [12997-21]
12997 ON	Universal Fourier optics model for virtual confocal microscopes [12997-22]
12997 00	Implementations of ESFS for fast topographic acquisition [12997-23]
12997 OP	Speckle pattern optimization in laser speckle photometry for non-destructive testing [12997-24]
12997 OQ	Inline inspection of coating thickness on polymers using infrared reflection-absorption spectroscopy [12997-25]
12997 OR	Advancements in metrology for advanced semiconductor packaging [12997-26]
SESSION 6	BIG SCIENCE: GRAVITY WAVES, TELESCOPES, UV OPTICS
12997 OS	The laser interferometer space antenna (LISA) (Invited Paper) [12997-27]
12997 OT	Achieving a cosmological reach: from advanced LIGO to the next generation of terrestrial gravitational wave detectors (Invited Paper) [12997-28]
12997 OU	Rigid body motion tracking in axial shift mapping for measuring astronomical x-ray mirror figure (Invited Paper) [12997-29]
SESSION 7	AI, MACHINE LEARNING, AND COMPUTATIONAL IMAGING
12997 OX	Evaluating autofocusing metrics in digital lensless holographic microscopy [12997-32]
12997 OY	Correlating machine vision and learning with robot handling in increasing productivity of airbags manufacturing [12997-33]
12997 OZ	Dynamic mode decomposition-based algorithm for phase-shifting interferometry in the presence of miscalibration and vibration [12997-34]
SESSION 8	DEFLECTOMETRY AND FRINGE PROJECTION
12997 10	Deep-learning-enabled temporally super-resolved multiplexed fringe projection profilometry: high-speed kHz 3D imaging with low-speed camera [12997-35]

12997 11	Gamma correction in simultaneously dual fringe projection moiré profilometry [12997-36]
12997 13	Phase measuring deflectometry with monoscopic active display registration [12997-38]
	POSTER SESSION
12997 16	Phase-shifting algorithm using a single interferogram and deep learning [12997-41]
12997 17	Influence of specimen positioning stage drift in tilted-wave interferometry for accurate form measurements for aspherical and freeform surfaces [12997-42]
12997 18	Interferometric method for characterizing optical retarders [12997-43]
12997 1A	Tilt-to-length coupling metrology in the LISA mission [12997-45]
12997 1B	Diffractio: an open-source library for diffraction and interference calculations [12997-46]
12997 1G	A digital holographic system for measuring bacterial growth in micro-fluidic chambers [12997-51]
12997 1H	Uncertainty on Brillouin frequency on bulk polymethyl methacrylate for acoustic waves velocities [12997-52]
12997 11	Differential confocal microscopy for stable scanning-microsphere assisted direct laser writing [12997-53]
12997 1K	Technological challenges in the measurement of photonic products with white light interferometry [12997-55]
12997 1L	OpenRRI: theory and application of open-source interferometry [12997-56]
12997 1M	A comparison of inspections using an on-machine tactile probe and in situ laser tracker in shop floor conditions [12997-57]
12997 1N	Towards online monitoring of water pollutants: an optofluidic chip for characterizing microplastics in water (Best Student Paper Award) [12997-58]
12997 1P	Fourier-Bessel series expansion-based fringe pattern denoising and inpainting [12997-63]
	DIGITAL POSTER SESSION
12997 1Q	Scatterometry of nano-particles on silicon wafer [12997-60]
12997 1R	Light scattering defects and measurement accuracy in cavity ring-down spectroscopy [12997-61]