

PROCEEDINGS OF SPIE

Optical Manufacturing and Testing XIV

**Daewook Kim
Heejoo Choi
Heidi Ottevaere
Rolf Rascher**
Editors

**22–24 August 2022
San Diego, California, United States**

Sponsored and Published by
SPIE

**Volume
12221**

Proceedings of SPIE 0277-786X, V. 12221

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 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 Manufacturing and Testing XIV*, edited by Daewook Kim, Heejoo Choi, Heidi Ottevaere, Rolf Rascher, Proc. of SPIE 12221, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510654266

ISBN: 9781510654273 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2022 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.

**SPIE. DIGITAL
LIBRARY**

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

vii *Conference Committee*

OPTICAL MANUFACTURING I

12221 03 **Prototyping, replication, and metrology of freeform optical micro-components (Invited Paper)**
[12221-1]

OPTICAL MANUFACTURING II

12221 07 **Strategies for improving ultrafast laser stress figuring range and resolution** [12221-5]

12221 08 **Differential phase measuring deflectometry for on-machine metrology of ultrafast laser stress figuring** [12221-6]

12221 09 **Solarization effects in optical glass from UV to blue** [12221-9]

12221 0A **Using ISO environmental standards in an ISO 10110 format drawing** [12221-11]

12221 0B **Novel micro-textured film offers promise in universal handling of optics** [12221-12]

NAUTILUS SPACE TELESCOPE I

12221 0C **Nautilus Space Observatory: a very large aperture space telescope constellation enabled by scalable optical manufacturing technologies (Invited Paper)** [12221-13]

12221 0D **Type 2 longitudinal chromatic aberration from a high-harmonic MODE lens and color corrector**
[12221-14]

12221 0E **Fabrication, assembly, and testing of a MODE lens color corrector** [12221-15]

12221 0F **Stray light analysis and testing of a MODE lens telescope** [12221-16]

NAUTILUS SPACE TELESCOPE II

- 12221 0G **Precision glass molding technology for the MODE lens telescope** [12221-17]
- 12221 0H **Autonomous closed-loop control for multi-segmented optic aligning and assembly** [12221-18]
- 12221 0I **Progress towards alignment of Multi-Order Diffractive Engineered (MODE) lens segments using the Kinematically-Engaged Yoke System (KEYS) for optical performance testing** [12221-19]
- 12221 0J **Initial testing of a MODE lens telescope** [12221-20]

OPTICAL TESTING I

- 12221 0K **Generalized surface reconstruction and fringe analysis through phase measuring deflectometry** [12221-24]
- 12221 0L **Conical null-screen design for evaluating a biconical surface using a smartphone-based corneal topographer** [12221-26]
- 12221 0M **Influence of lens and perspective distortion on optical surface metrology instrumentation** [12221-27]
- 12221 0N **Measurement of non-uniform AR-coated surfaces using an optical coordinate measurement machine with coating effect error compensation** [12221-38]

OPTICAL TESTING II

- 12221 0Q **Absolute distance measurement using polarization-based spectral-domain interferometer with dual reference path** [12221-22]
- 12221 0R **An interferometric method for simultaneous measurement of thickness, refractive index, and surface profile of a silicon wafer** [12221-23]
- 12221 0S **Picometer-range characterization of LAM dynamics with whole-field LDV** [12221-39]

OPTICAL TESTING III

- 12221 0T **Scanning Shack-Hartmann sensor for wavefront measurements on freeform optics** [12221-28]
- 12221 0U **Reconstruction of optical wavefronts with parallel registration algorithms** [12221-30]

- 12221 0V **Measurement of inner centration of an asphere with computer generated holograms compared to an optical profiler** [12221-52]
- 12221 0W **Quantifying the validity conditions of the Beckmann-Kirchhoff scattering model** [12221-31]

OPTICAL TESTING IV

- 12221 0Y **Evaluating SMR positioning with an autostigmatic microscope** [12221-33]
- 12221 10 **Absolute characterization of gravity sag for light-weighted optics** [12221-35]
- 12221 11 **Measurements of the critical parameters in high aspect ratio semiconductor microstructures such as deep trenches, deep holes, and through silicon vias** [12221-54]

POSTER SESSION

- 12221 12 **Parametric circular aperture segmentation formalism** [12221-8]
- 12221 13 **CTE effects of CVD silicon carbide cladding of a silicon carbide optic** [12221-10]
- 12221 17 **3D reconstruction of aerodynamic airfoils using computer stereo vision** [12221-45]
- 12221 19 **Improved quantitative testing of a nonsymmetric convex surface using a conical null screen** [12221-48]
- 12221 1A **Single-shot intraocular lens surface measurement with the GelSight topography system** [12221-49]
- 12221 1B **On-machine laser spot diagnostics by scanning linear image sensor for maskless lithography system** [12221-50]
- 12221 1C **Corneal topography using dynamic point shifting method in quadrangular OLED's prism** [12221-47]