

PROCEEDINGS OF SPIE

Optomechanical Engineering 2023

Keith B. Doyle
Brandon D. Chalifoux
Kenneth R. Castle
José M. Sasián
Editors

23 August 2023
San Diego, California, United States

Sponsored and Published by
SPIE

Volume 12669

Proceedings of SPIE 0277-786X, V. 12669

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 *Optomechanical Engineering 2023*, edited by Keith B. Doyle, Brandon D. Chalifoux, Kenneth R. Castle, José M. Sasián, Proc. of SPIE 12669, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510665521

ISBN: 9781510665538 (electronic)

Published by

SPIE

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

Telephone +1 360 676 3290 (Pacific Time)

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. 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

v *Conference Committee*

OPTICAL ALIGNMENT

- 12669 02 **Systematic method of optical alignment using aberrations** [12669-11]
- 12669 03 **Unusual astigmatism encountered in an optical assembly having a moderate field of view**
[12669-12]
- 12669 04 **Comparing novel and conventional methods for optical system alignment using deflectometry**
[12669-13]

OPTOMECHANICAL SYSTEMS, FABRICATION, ASSEMBLY, AND TESTING

- 12669 05 **Dual-axis mirror scanners fabricated with 3D printing** [12669-5]
- 12669 06 **Optomechanical design of the Europa Imaging System Wide Angle Camera (EIS WAC)**
[12669-6]
- 12669 07 **Investigation of ultrafast laser stress generation in fused silica, Corning Eagle XG glass, Corning ULE glass, and sapphire** [12669-8]

OPTICAL MOUNTS AND MECHANISMS

- 12669 08 **Faster optical alignment with adjustable, re-lockable, ruggedized, and kinematic (ARRK) mounting** [12669-1]
- 12669 09 **The UHV chamber window glass mounting design and analysis** [12669-2]
- 12669 0A **Polygon scanner for laser surface cleaning** [12669-3]
- 12669 0B **Optomechanical mounts for high stability in harsh environmental conditions** [12669-4]

OPTICAL TOLERANCING

- 12669 OC **Sensitivity comparison of a NURBS freeform telescope** [12669-15]
- 12669 OD **Simultaneous piston and tip-tilt measurement of segmented optics with cross-fringe phasing sensor** [12669-17]
- 12669 OE **Wavefront aberration detection of a structured laser beam using artificial intelligence and its application in alignment** [12669-18]
- 12669 OF **Athermal design strategy for compact aspheric lens design** [12669-27]
- 12669 OG **Optomechanical analysis of the alignment tolerance of threaded lens mounts** [12669-14]

POSTER SESSION

- 12669 OK **Lightweighting large optomechanical structures in astronomy instrumentation utilising generative design and additive manufacturing** [12669-21]
- 12669 OM **Thermal stability of ultrafast laser-generated stress in fused silica** [12669-23]
- 12669 ON **Design of layered sapphire composites with ablation-tunable coefficient of thermal expansion** [12669-24]