### PROCEEDINGS OF SPIE

# 10th International Symposium on Advanced Optical Manufacturing and Testing Technologies

## Large Mirrors and Telescopes

Chang-Hui Rao
Christian Veillet
Xiaoliang Ma
Bin Fan
Fengchuan Liu
Manuel Collados Vera
Editors

14–17 June 2021 Chengdu, China

Organized by

IOE – Institute of Optics and Electronics, Chinese Academy of Sciences (China)

Sponsored by

COS – The Chinese Optical Society (China)

IOE – Institute of Optics and Electronics, Chinese Academy of Sciences (China)

Technical Cosponsor

SPIE

Supported by

Ministry of Science and Technology of China (China)

Chinese Academy of Sciences (China)

National Natural Science Foundation of China (China)

Published by

SPIE

**Volume 12070** 

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 10th International Symposium on Advanced Optical Manufacturing and Testing Technologies: Large Mirror and Telescopes, edited by Chang-Hui Rao, Christian Veillet, Xiaoliang Ma, Bin Fan, Fengchuan Liu, Manuel Collados Vera, Proc. of SPIE 12070, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510650152

ISBN: 9781510650169 (electronic)

Published by

SPIE

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

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2021 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

#### LARGE MIRROR AND TELESCOPES

12070 02	Assembly performance analysis of reflective optical systems based on digital twin [12070-12]
12070 03	Piston error detection technology for optical sparse aperture system via transfer learning [12070-7]
12070 04	Design and optimization of 1.2-m primary mirror supporting systems [12070-21]
12070 05	Design of off-axis compact optical system with large relative aperture and large field of view [12070-11]
12070 06	Target attitude estimation for motional Large Aperture Telescope (LAT) [12070-6]
12070 07	Zoom lens with large aperture and long focal length in the integration system of detection and recognition $[12070\text{-}24]$
12070 08	Controller design for the sub-axis of large aperture telescope base on fast observation target [12070-15]
12070 09	Large-range piston error detection technology based on dispersed fringe sensor [12070-19]
12070 0A	Optical system design for the 6.5m Southern Spectroscopic Survey Telescope and related multi-object fiber-fed spectrophotometer [12070-16]
12070 OB	Ground experiment of a 50 mm balloon-borne coronagraph for near space project [12070-28]
12070 OC	Study on assembly technology of primary and secondary mirror system based on truss structure [12070-2]
12070 0D	Plate scale variation detecting method for LINC-NIRVANA [12070-3]
12070 OE	At-wavelength optics characterization metrology at Shanghai Synchrotron Radiation Facility [12070-30]
12070 OF	Interference pattern with an analytical solution in modified Shack-Hartmann sensor [12070-4]
12070 OG	The research of $\Phi$ 1400mm SiC mirror for fabrication, test and alignment [12070-25]
12070 OH	Novel structure design of circle support component for a primary reflective mirror with large diameter [12070-17]
12070 OI	Aspheric surface polishing with orthogonal velocity polishing tool [12070-14]

12070 OJ	Study on the cooling method of deformable mirror under laser irradiation [12070-1]
12070 OK	Optimized thermal design of heat-stop of large ground-based solar telescope CLST [12070-31]
12070 OL	Control and optimization of the stray light in laser projectors [12070-125]
12070 OM	Review of loss measurement methods for high reflectivity mirrors [12070-73]
12070 ON	Strategies for operation safety protection of large solar telescope [12070-27]