

PROCEEDINGS OF SPIE

Optics for EUV, X-Ray, and Gamma-Ray Astronomy X

**Stephen L. O'Dell
Jessica A. Gaskin
Giovanni Pareschi**
Editors

**1–5 August 2021
San Diego, California, United States**

Sponsored and Published by
SPIE

Volume 11822

Proceedings of SPIE 0277-786X, V. 11822

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

Optics for EUV, X-Ray, and Gamma-Ray Astronomy X, edited by Stephen L. O'Dell,
Jessica A. Gaskin, Giovanni Pareschi, Proc. of SPIE Vol. 11822, 1182201 · ©
2021 SPIE · CCC code: 0277-786X/21/\$21 · doi: 10.1117/12.2606618

Proc. of SPIE Vol. 11822 1182201-1

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 *Optics for EUV, X-Ray, and Gamma-Ray Astronomy X*, edited by Stephen L. O'Dell, Jessica A. Gaskin, Giovanni Pareschi, Proc. of SPIE 11822, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510644823
ISBN: 9781510644830 (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.

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

ATMOSPHERIC CHERENKOV TELESCOPES

11822 02 **The ASTRI mini-array at the Teide Observatory** [11822-69]

ATHENA I: OVERVIEWS

11822 04 **ATHENA reference telescope design and recent mission level consolidation** [11822-31]

11822 05 **ATHENA x-ray optics development and accommodation** [11822-45]

11822 06 **Silicon pore optics x-ray mirror development for the Athena telescope** [11822-4]

ATHENA II: MIRROR MODULES

11822 09 **Environmental testing of the Athena telescope mirror modules** [11822-20]

ATHENA III: OPTICAL COATINGS

11822 0B **The effect of deposition process parameters on thin film coatings for the Athena X-ray optics** [11822-30]

11822 0C **Compatibility of iridium thin films with the silicon pore optics technology for Athena** [11822-34]

11822 0D **Impact of annealing on performance of X-ray mirror coatings for Athena** [11822-38]

ATHENA IV: PERFORMANCE MODELING

11822 0E **On the optical design of a large X-ray mirror based on silicon pore optics** [11822-19]

11822 0F **Effect of mirror curvature on the angular resolution of silicon pore optics** [11822-36]

11822 0H **Effect of particulate contamination on a silicon pore optic** [11822-11]

11822 0I **Open-source simulator for ATHENA X-ray telescope optics** [11822-32]

ATHENA V: OPTICS FACILITIES

- 11822 0J **Facility for alignment, assembly, and integration of the SPO mirror modules onto the ATHENA telescope** [11822-9]
- 11822 0K **The VERT-X calibration facility: development of the most critical parts** [11822-8]
- 11822 0M **Building the BEaTriX facility for the ATHENA mirror modules X-ray testing** [11822-16]
- 11822 0N **Manufacturing and testing of the X-ray collimating mirror for the BEaTriX facility** [11822-40]

X-RAY TELESCOPES

- 11822 0O **The Globe Orbiting Soft X-ray (GOSoX) polarimeter concept study** [11822-67]

PERFORMANCE SIMULATION & TESTING

- 11822 0Q **AstroX/McXtrace 2021: an update on simulation examples and features** [11822-37]
- 11822 0R **X-ray ray tracing with Zemax for the PANTER testing facility** [11822-65]

METROLOGY & ALIGNMENT

- 11822 0X **Lateral shift mapping metrology for X-ray telescope mirrors** [11822-25]

ADJUSTABLE X-RAY OPTICS

- 11822 11 **Fabrication of electroactive polymer actuators for adjustable X-ray optics** [11822-50]
- 11822 13 **Process development for adjustable X-ray mirrors** [11822-59]

DIFFRACTION GRATINGS

- 11822 15 **Manufacture and performance of blazed soft x-ray transmission gratings for Arcus and Lynx** [11822-56]

POSTER SESSION

- 11822 1D **LEXT: a lobster eye optic for Gamow** [11822-70]
- 11822 1E **Non-periodic multilayer coatings for solar applications: advantages and future perspectives**
[11822-66]
- 11822 1F **Design and characterization of a prototype proton response matrix for the XMM-Newton mission** [11822-12]
- 11822 1I **Progress on high-resolution thin full monolithic shells made of glass for Lynx** [11822-26]
- 11822 1J **A novel approach for fast and effective realization of high-resolution x-ray optics in metal**
[11822-27]

