# AOPC 2022: Infrared Devices and Infrared Technology; and Terahertz Technology and Applications

Haimei Gong Jin Lu Editors

18–19 December 2022 ONLINE, China

Sponsored by Chinese Society for Optical Engineering (CSOE) (China)

Technical Sponsor SPIE

Organized by Tianjin University (China) University of Electronic Science and Technology of China (China) Nanjing University of Science and Technology (China) Beijing Institute of Space Mechanics and Electricity (China) Science and Technology on Low-light-level Night Vision Laboratory (China) Science and Technology on Electro-Optical Information Security Control (China)

Published by SPIE

Volume 12555

Proceedings of SPIE 0277-786X, V. 12555

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

AOPC 2022: Infrared Devices and Infrared Technology; and Terahertz Technology and Applications, edited by Haimei Gong, Jin Lu, Proc. of SPIE Vol. 12555, 1255501 © 2023 SPIE · 0277-786X · doi: 10.1117/12.2670160 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 AOPC 2022: Infrared Devices and Infrared Technology; and Terahertz Technology and Applications, edited by Haimei Gong, Jin Lu, Proc. of SPIE 12555, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510662247 ISBN: 9781510662254 (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.



**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

#### TERAHERTZ TECHNOLOGY AND APPLICATIONS

- 12555 02 Terahertz non-destructive testing technique based on the thickness of the adhesive layer of aerospace ceramic glued structural parts estimation method [12555-1]
- 12555 03 Rapid THz Identification of coffee bean origin with ensemble learning [12555-2]
- 12555 04 Broadband THz Bessel beam generation based on axicon [12555-3]

#### INFRARED DEVICES AND INFRARED TECHNOLOGY

- 12555 05 **Research on rotary dual channel infrared tracking technology** [12555-4]
- 12555 06 **Research on technology of large-diameter high-precision fixed-point infrared radiation source under wide temperature** [12555-5]
- 12555 07 Pointing error modeling and analysis of an electro-optical reconnaissance system [12555-6]
- 12555 08 Fabrication of linear polarizer in 7-14um infrared region by metal-assisted chemical etching [12555-8]
- 12555 09 Design of focal plane circuit for space-borne 640×512 uncooled infrared camera [12555-9]
- 12555 0A Simulation analysis of space-based infrared remote sensing characteristics of hypersonic vehicles [12555-10]
- 12555 0B Temperature field of the skin irradiated by the xenon lamp [12555-11]
- 12555 0C Multi-angle infrared vehicle target recognition based on light-head R-CNN [12555-13]
- 12555 0D VOC gas leakage detection using infrared image and convolutional neural networks [12555-14]
- 12555 OF Intra-cavity QEPAS gas sensor based on fiber-ring laser for C<sub>2</sub>H<sub>2</sub> detection [12555-16]
- 12555 0G Verification of the method for measuring the thermal conductivity of solids with dual-wavelength infrared lasers: taking 304 stainless steel as an example [12555-17]

12555 OH	Design of TDI infrared imaging circuit system with large dynamic range [12555-18]
12555 01	Optimal design of rectangular mirror based on topology and size optimization [12555-20]
12555 OJ	Infrared photodetection based on monodisperse mercury telluride colloidal quantum dots [12555-22]
12555 OK	InAs/GaSb T2SL photodetector grown by MBE for gas imaging beyond infrared atmospheric window [12555-23]
12555 OL	Research of temperature distribution and radiation characteristics of integrated blackbody on high-temperature [12555-24]
12555 OM	Experimental study of the effect of laser parameters on active laser infrared radiation thermometry [12555-25]
12555 ON	Spectral radiation drift behavior of near-infrared laser by the complete hemispherical reflection method [12555-26]
12555 00	Research on characteristics of Raman amplifier based on TiO2-doped fiber [12555-27]
12555 OP	Infrared target tracking method based on hierarchical association and multi-feature fusion [12555-28]
12555 0Q	The study on dark current of InAs/GaSb superlattice longwave devices with unipolar graded barrier structure [12555-29]

### **Conference Committee**

Conference Chairs

Haimei Gong, The Shanghai Institute of Technical Physics of the Chinese Academy of Sciences (China)Jin Lu, Tianjin Jinhang Institute of Technical Physics (China)

Program Committee

Xue Li, Shanghai Institute of Technical Physics, Chinese Academy of Sciences (China)
Xin Tang, Beijing Institute of Technology (China)
Yueming Wang, Shanghai Institute of Technical Physics, Chinese Academy of Sciences (China)