

PROCEEDINGS OF SPIE

AOPC 2024: Terahertz Technology and Applications

**Juncheng Cao
Hongqiang Wang
Yiming Zhu
Chao Zhang**
Editors

**23–26 July 2024
Beijing, China**

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

Technical Cosponsor
SPIE

Published by
SPIE

Volume 13495

Proceedings of SPIE 0277-786X, V. 13495

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

AOPC 2024: Terahertz Technology and Applications, edited by Juncheng Cao,
Hongqiang Wang, Yiming Zhu, Chao Zhang, Proc. of SPIE Vol. 13495,
1349501 · © 2024 SPIE · 0277-786X · doi: 10.1117/12.3058285

Proc. of SPIE Vol. 13495 1349501-1

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 *AOPC 2024: Terahertz Technology and Applications*, edited by Juncheng Cao, Hongqiang Wang, Yiming Zhu, Chao Zhang, Proc. of SPIE 13495, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510687790
ISBN: 9781510687806 (electronic)

Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time)
SPIE.org
Copyright © 2024 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*

TERAHERTZ TECHNOLOGY AND APPLICATIONS

- 13495 02 **Development of terahertz bunker coal level radar for dynamic monitoring** [13495-1]
- 13495 03 **Hazardous object detection method based on improved YOLOv8 for terahertz security inspection equipment** [13495-2]
- 13495 04 **Recognition method for space target components in terahertz radar images based on improved YOLOv5** [13495-4]
- 13495 05 **Study of a lacquer box by using THz reflection imaging** [13495-5]
- 13495 06 **Additive manufacturing of metamaterials in 6G communication based on ink-jet printing** [13495-6]
- 13495 07 **A THz-ISAR imaging and rotation parameter estimation method for non-uniformly rotating targets based on minimum entropy** [13495-7]
- 13495 08 **Design, fabrication, and measurement of 500-750 GHz silicon waveguide transitions based on gap waveguide** [13495-8]
- 13495 09 **Terahertz time domain spectral classification and identification of defects in multilayer composite materials based on ResNet101 network** [13495-11]
- 13495 0A **Research on frequency domain three-dimensional imaging algorithm of millimeter wave radar** [13495-12]
- 13495 0B **Terahertz near-field RCS analysis of complex aircraft targets** [13495-13]
- 13495 0C **Mid-infrared electro-optic modulation by phase-change materials driven by transparent MEMS microheaters** [13495-14]
- 13495 0D **A comprehensive least squares calibration method for sideband separation receivers** [13495-15]
- 13495 0E **Design and application of terahertz near field imaging quasi-optical path** [13495-16]
- 13495 0F **Research on phased array antenna technology based on metasurfaces with composite periodic structures** [13495-17]

- 13495 0G **Terahertz spectral material recognition in online postal packages based on generative adversarial networks** [13495-18]
- 13495 0H **Identification of astragalus origin based on terahertz spectroscopy and machine learning** [13495-24]
- 13495 0I **Electronically driven THz spatial light modulator working in transmission mode** [13495-27]

Conference Committee

Conference Chairs

Juncheng Cao, Shanghai Institute of Microsystem and Information
Technology, Chinese Academy of Sciences (China)
Hongqiang Wang, National University of Defense Technology (China)
Yiming Zhu, University of Shanghai for Science and Technology
(China)
Chao Zhang, University of Wollongong (Australia)

Program Committee

Min Hu, University of Electronic Science and Technology of China
(China)
Yan Peng, University of Shanghai for Science and Technology (China)
Chang Wang, Shanghai Institute of Microsystem and Information
Technology, Chinese Academy of Sciences (China)
Qi Yang, National University of Defense Technology (China)
Yifei Zhang, Shandong University (China)

