

PROCEEDINGS OF SPIE

Infrared Sensors, Devices, and Applications XIII

Priyalal Wijewarnasuriya
Arvind I. D'Souza
Ashok K. Sood
Editors

22–23 August 2023
San Diego, California, United States

Sponsored and Published by
SPIE

Volume 12687

Proceedings of SPIE 0277-786X, V. 12687

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 *Infrared Sensors, Devices, and Applications XIII*, edited by Priyalal Wijewarnasuriya, Arvind I. D'Souza, Ashok K. Sood, Proc. of SPIE 12687, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510665880

ISBN: 9781510665897 (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*

SESSION 1 INFRARED TECHNOLOGY OVERVIEW

- 12687 02 **Leonardo UK high performance shortwave APDs for astronomy (Invited Paper)** [12687-2]
- 12687 03 **Calibration system for mid-infrared superconducting nanowire single photon detectors**
[12687-4]
- 12687 04 **Advanced MWIR and LWIR band detection and imaging with nanostructured antireflection
coating technology (Invited Paper)** [12687-5]

SESSION 2 SPACE-BASED INFRARED TECHNOLOGY

- 12687 05 **PRIMA space telescope cryocooling system** [12687-6]
- 12687 06 **Current infra-red developments within Leonardo** [12687-7]

SESSION 3 III-V INFRARED MATERIALS AND DETECTORS

- 12687 07 **Growth of bulk 0.1 eV InAsSb on GaAs substrate with InAs-based intermediate buffer layer**
[12687-11]

SESSION 4 NOVEL DETECTOR CONCEPTS AND APPLICATIONS

- 12687 08 **Near-infrared imager based on high performance organic photodetector using a-IGZO as
electron transport layer** [12687-12]
- 12687 09 **Meta-surface lens and deep learning process toward practical LWIR imaging devices**
[12687-16]

SESSION 5 NOVEL IR DETECTORS AND MATERIALS

- 12687 0A **High-performance graphene-enhanced HgCdTe photodetectors for uncooled extended
infrared band sensing and imaging (Invited Paper)** [12687-18]

12687 0B **Development of voltage-tunable IR photodetector** [12687-22]

SESSION 6 MODELING OF ADVANCED INFRARED DEVICES

12687 0C **Modeling novel radiation hardened avalanche photodiode architectures** [12687-24]

12687 0D **Monte Carlo modeling of HgCdTe avalanche photodiodes** [12687-25]

12687 0E **Modeling the effects of graded and abrupt mole fraction profiles in pBn and nBn HgCdTe barrier detectors** [12687-26]

12687 0F **Quantum transport simulation of a mid-wave infrared Ga-based type-II superlattice for curved focal-plane arrays** [12687-27]

POSTER SESSION

12687 0G **Growth of 6.2 Å semiconductor topological materials on lattice engineered virtual substrates** [12687-9]

12687 0H **Multipolarized gold dipole nanoantennas for IR focal plane arrays: an infrared detection approach** [12687-29]

12687 0I **Characterization of a Shack-Hartmann type wavefront sensor for its use in an experimental aberrometer** [12687-32]

12687 0J **Analysis of optical properties and reduced strain estimation in InAs/InGaAsSb quantum dot heterostructure with the variation of growth rate** [12687-33]

12687 0K **Investigation of strain profile and band-alignment study in InAs/GaAsSb quantum dot heterostructure with varying Sb content** [12687-34]

DIGITAL POSTER SESSION

12687 0L **Optimized infrared light response speed <80 ms by applying an interface buffer layer to Schottky components** [12687-13]