

PROCEEDINGS OF SPIE

Infrared Technology and Applications XLVII

Bjørn F. Andresen
Gabor F. Fulop
Lucy Zheng
Masafumi Kimata
John Lester Miller
Editors

12–16 April 2021
Online Only, United States

Sponsored and Published by
SPIE

Volume 11741

Proceedings of SPIE 0277-786X, V. 11741

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

Infrared Technology and Applications XLVII, edited by Bjørn F. Andresen, Gabor F. Fulop,
Lucy Zheng, Masafumi Kimata, John Lester Miller, Proc. of SPIE Vol. 11741, 1174101
© 2021 SPIE · CCC code: 0277-786X/21/\$21 · doi: 10.1117/12.2598630

Proc. of SPIE Vol. 11741 1174101-1

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 *Infrared Technology and Applications XLVII*, edited by Bjørn F. Andresen, Gabor F. Fulop, Lucy Zheng, Masafumi Kimata, John Lester Miller, Proc. of SPIE 11741, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510643192

ISBN: 9781510643208 (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

NIR / SWIR

- 11741 08 **Performance of low noise InGaAs detector** [11741-1]
- 11741 0B **Thick Al_{0.85}Ga_{0.15}As_{0.56}Sb_{0.44} avalanche photodiodes on InP substrate** [11741-4]
- 11741 0D **Extended-short-wavelength infrared AlInAsSb and InPAsSb detectors on InAs** [11741-6]
- 11741 0E **Ultra low light CMOS image sensors** [11741-7]
- 11741 0F **Development of high-speed quantum dots/graphene infrared detectors for uncooled infrared imaging** [11741-8]

CRYOGENIC COOLING OF SENSING DEVICES

- 11741 0G **Affordable cryocoolers for commercial IR imaging** [11741-9]
- 11741 0H **High-availability cryocooling for infrared sensors** [11741-10]
- 11741 0I **Radiation hard cryocooler electronics for HMWIR sensors** [11741-11]
- 11741 0J **Applicable range and performance prediction model for Thales rotary coolers** [11741-12]

AI / MACHINE LEARNING ENABLING IMPROVED IR SYSTEM PERFORMANCE

- 11741 0L **Polarimetric thermal-to-visible heterogeneous face recognition using coupled independent component analysis (Invited Paper)** [11741-14]
- 11741 0M **Visual-based defect detection for product classification: a machine learning approach (Invited Paper)** [11741-15]

T2SL AND HOT

- 11741 0N **Type II superlattice detectors at SCD (Invited Paper)** [11741-16]
- 11741 0P **Dual-band response in Type-II superlattice infrared photodetectors with a modified pBp design** [11741-18]

- 11741 OR **Self-aligned etching of subwavelength longwave infrared type-II superlattice pixels** [11741-20]
- 11741 OS **Small pixel MWIR sensors for low SWaP applications** [11741-21]
- 11741 OU **High operating temperature T2SL digital focal plane arrays for earth remote sensing instruments (Invited Paper)** [11741-23]
- 11741 OV **Development status of T2SL infrared detector in JAXA (Invited Paper)** [11741-24]
- 11741 OW **HOT MWIR detector with 5 μm pitch** [11741-25]
- 11741 OX **Type-II superlattices for SWaP and high-resolution detectors at IRnova** [11741-26]
- 11741 OY **HOT InAs/InAsSb nBn detector development for SWaP detector** [11741-27]
- 11741 10 **Wafer-scale integration of antimonide-based MWIR FPAs (Invited Paper)** [11741-29]
- 11741 11 **Volume MBE production trends for GaSb-based IR photodetector structures (Invited Paper)** [11741-63]

ELEVATED SKIN TEMPERATURE (EST) AND UNCOOLED FPAS

- 11741 12 **80 \times 32 SOI diode-based uncooled IRFPAs for thermal detectors** [11741-30]
- 11741 13 **Image signal processor for bolometers IR detectors** [11741-31]
- 11741 14 **Accurate fever screening system with visible camera and thermograph** [11741-32]
- 11741 17 **Testing and performance standards for elevated skin temperature (EST) screening systems using infrared cameras (Invited Paper)** [11741-35]

HGCDTE

- 11741 1B **Persistence and dark current characterization on HgCdTe short wave infrared imagers for astronomy at CEA and Lynred** [11741-40]
- 11741 1C **High operating temperature n-on-p extrinsic MWIR HgCdTe photodiodes** [11741-41]
- 11741 1D **Optical functions integrated onto a mid-wave infrared detector** [11741-42]

ALTERNATIVE FPA MATERIALS

- 11741 1F **QWIP as solution for mobile VLWIR imaging systems** [11741-44]
- 11741 1G **Development of small-format graphene infrared array sensors** [11741-45]
- 11741 1H **Graphene nanoribbon photogating for graphene-based infrared photodetectors** [11741-46]
- 11741 1I **Enhanced photogating effect with turbostratic stacked graphene photodetectors for developing high-responsivity infrared sensors** [11741-47]

ADVANCED TECHNOLOGIES ENABLING HIGHER SYSTEM PERFORMANCE

- 11741 1K **High resolution gas mid-infrared spectroscopy using circular multi-reflection (CMR) cell** [11741-49]
- 11741 1L **Image fusion systems for surveillance applications: design options and constraints for a tri-band camera** [11741-50]
- 11741 1M **A low SWAP-C 10-micron pitch 3-megapixel full motion video MWIR imaging system** [11741-51]

POSTER SESSION

- 11741 1N **Flexible optoelectronic organic sensor for infrared detection** [11741-52]
- 11741 1O **Metal-insulator-metal based plasmonic structures incorporating nanoslit for infrared rectification** [11741-53]
- 11741 1S **Silicide-based photodetectors with localized surface plasmon resonance for mid-IR detection** [11741-57]
- 11741 1T **Molecular-dynamics modeling of hydrogen-bond vibrational modes** [11741-58]
- 11741 1U **Dark current improvement by an in-situ plasma treatment on type-II superlattice LWIR photodetectors** [11741-59]
- 11741 1V **Investigation of ICP dry etching of InAs/GaSb type-II superlattice LWIR photodetector** [11741-60]
- 11741 1X **Low noise AlInAsSb avalanche photodiodes on InP substrates for 1.55 μm infrared applications** [11741-62]

