

PROCEEDINGS OF SPIE

Millimetre Wave and Terahertz Sensors and Technology XI

**Neil A. Salmon
Frank Gumbmann**
Editors

**10–11 September 2018
Berlin, Germany**

Sponsored by
SPIE

Cooperating Organisations
European Optical Society
Cranfield University (United Kingdom)

Published by
SPIE

Volume 10800

Proceedings of SPIE 0277-786X, V. 10800

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 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 *Millimetre Wave and Terahertz Sensors and Technology XI*, edited by Neil A. Salmon, Frank Gumbmann, Proceedings of SPIE Vol. 10800 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510621831

ISBN: 9781510621848 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time) Fax +1 360 647 1445

SPIE.org

Copyright © 2018, Society of Photo-Optical Instrumentation Engineers.

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 copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online 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. The CCC fee code is 0277-786X/18/\$18.00.

Printed in the United States of America Vm7 i ffUb '5gg: WJUH' q' bWZi bXYf' JW bg' Zc'a 'GD-9.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIE. DIGITAL LIBRARY

SPIEDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article 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	<i>Authors</i>
vii	<i>Conference Committee</i>
ix	<i>Introduction</i>

SESSION 1 APERTURE SYNTHESIS IMAGING SYSTEMS AND TECHNOLOGY

10800 03	Design of a low-cost cross-correlation system for aperture synthesis passive millimeter wave imager (Best Student Paper Award) [10800-2]
10800 04	Spatial resolutions and field-of-views in millimetre wave aperture synthesis security screening imagers [10800-3]

SESSION 2 IMAGE PROCESSING, PHENOMENOLOGY AND MEASUREMENT TECHNIQUES

10800 05	Stand-off sensing of material characteristics by polarimetric MMW radiometry (Invited Paper) [10800-4]
10800 06	Fusion of millimeter wave radar and RGB-depth sensors for assisted navigation of the visually impaired [10800-5]
10800 07	Experimental determination and simulations of the Huynen target parameters for full polarimetric millimetre wave concealed weapon recognition [10800-6]
10800 08	A new polarimetric passive radar calibrator for fully polarimetric measurement [10800-17]
10800 09	Identification of mixed substances using a random forest regressor to classify THz absorbance spectra [10800-7]
10800 0A	Non-destructive testing of graphene/epoxy composites using THz waves [10800-8]
10800 0B	About efficiency of THz image processing at using Poisson process for frames captured by THz passive camera [10800-9]

SESSION 3 EMERGENT ACTIVE AND PASSIVE IMAGERS AND SENSORS

- 10800 0C **TRay: active THz imaging autonomous biometric secured access control and tracking gate system (Invited Paper)** [10800-10]
- 10800 0D **Terahertz emission from InGaAs with increased indium content** [10800-11]
- 10800 0E **Understanding the detection mechanism of mm-wave radiation in glow discharge detectors** [10800-12]
- 10800 0F **Terahertz spectroscopy of immersion optical clearing agents: DMSO, PG, EG, PEG (Best Student Paper Award)** [10800-13]
- 10800 0G **Registration and spectral identification of THz images in reflected or transmitted light** [10800-14]
- 10800 0I **A 110-170 GHz transceiver in 130 nm SiGe BiCMOS technology for FMCW applications** [10800-16]
- 10800 0J **Impedance matching materials based on barium hexaferrites** [10800-18]

POSTER SESSION

- 10800 0K **Experimental results of using the impedance matching material to increase the bandwidth of antenna transmitter** [10800-19]