PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 9969

, "Front Matter: Volume 9969," Proc. SPIE 9969, Radiation Detectors: Systems and Applications XVII, 996901 (23 November 2016); doi: 10.1117/12.2256422

Event: SPIE Optical Engineering + Applications, 2016, San Diego, California, United States

PROCEEDINGS OF SPIE

Radiation Detectors: Systems and Applications XVII

Gary P. Grim
H. Bradford Barber
Lars R. Furenlid
Editors

31 August – 1 September 2016
San Diego, California, United States

Sponsored and Published by
SPIE

Volume 9969

Proceedings of SPIE 0277-786X, V. 9969

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

Radiation Detectors: Systems and Applications XVII, edited by Gary P. Grim, H. Bradford Barber, Lars R. Furenlid,
Proc. of SPIE Vol. 9969, 996901 · © 2016 SPIE · CCC code: 0277-786X/16/\$18 · doi: 10.1117/12.2256422

Proc. of SPIE Vol. 9969 996901-1

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 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 *Radiation Detectors: Systems and Applications XVII*, edited by Gary P. Grim, H. Bradford Barber, Lars R. Furenlid, Proceedings of SPIE Vol. 9969 (SPIE, Bellingham, WA, 2016)
Six-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510603295

ISBN: 9781510603301 (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 © 2016, 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/16/\$18.00.

Printed in the United States of America.

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 six-digit CID article numbering system structured as follows:

- The first four 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	Authors
vii	Conference Committee

SESSION 1 RADIOGRAPHY

- 9969 03 **MCNP estimate of ZLS lens sensitivity in an x-ray field** [9969-2]
9969 04 **Flash radiography studies with microcolumnar CsI** [9969-3]

SESSION 2 DETECTORS AND ANALYSIS

- 9969 06 **Recent results from Compton spectrometer experiments (Invited Paper)** [9969-5]
9969 07 **Exploration of available feature detection and identification systems and their performance on radiographs** [9969-6]
9969 08 **An analysis of side readouts of monolithic scintillation crystals** [9969-7]
9969 09 **Hybrid object detection system for x-ray radiographs** [9969-8]
9969 0A **Developing imaging capabilities of multi-channel detectors comparable to traditional x-ray detector technology for industrial and security applications (Invited Paper)** [9969-9]
9969 0B **Transitioning glass-ceramic scintillators for diagnostic x-ray imaging from the laboratory to commercial scale** [9969-26]

SESSION 3 GAMMA AND NEUTRON DETECTORS

- 9969 0C **Design and manufacture of imaging time-of-propagation optics (Invited Paper)** [9969-10]
9969 0D **Improving the time response of a gamma/neutron liquid detector (Invited Paper)** [9969-12]
9969 0E **GAMBE: multipurpose sandwich detector for neutrons and photons** [9969-13]

SESSION 4 PET

- 9969 0G **A new mechanism of ionizing radiation detection for positron emission tomography: modulation of optical properties** [9969-15]
9969 0I **Investigation of a near-infrared-ray computed tomography scanner** [9969-17]

SESSION 5 DETECTOR SYSTEMS

- 9969 0J **Evaluation of a photon counting Medipix3RX CZT spectral x-ray detector (Invited Paper)**
[9969-18]
- 9969 0L **Spectral x-ray computed tomography scanner using a cadmium telluride detector**
[9969-21]

SESSION 6 APPLICATIONS

- 9969 0O **Design and characterization of a low profile NaI(Tl) gamma camera for dedicated molecular breast tomosynthesis (Invited Paper)** [9969-25]

POSTER SESSION

- 9969 0Q **Overhauser magnetometer sensor design for magnetic field observation** [9969-24]

Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Ahmed, A., 0E	Niestroy, Justin, 0O
Albrecht, Mike, 0C	Obst, Andrew W., 0D
Baker, Stuart A., 03, 04	Oda, Yasuyuki, 0I, 0L
Beckert, M. Brooke, 0B	Phillips, David H., 04
Bray, Iliana E., 07, 09	Polemi, Andrew M., 0O
Brown, Kristina K., 04	Powel, S., 0E
Buckles, Robert A., 0D	Rees, J., 0E
Burdin, S., 0E	Ritman, Erik L., 0J
Butler, Philip H., 0J	Rundberg, Robert S., 0D
Cao, Qiong, 0Q	Rundle, David S., 0J
Casse, G., 0E	Sato, Eiichi, 0I, 0L
Castaneda, Jesus J., 04	Satoi, Yuichi, 0I
Chen, Shudong, 0Q	Schwartz, Alan, 0C
Collins, Noelle M., 0A	Smalley, Duane, 04
Corredor, Andrew, 04	Smith, A., 0E
Daghighian, Henry M., 0G	Smith, Andrew S., 04
Devonshire, Madison L., 0A	Stolin, Alexander, 0O
DeYoung, Anemarie, 0D	Tao, Li, 0G
Elder, Eric, 0B	Thompson, Kyle R., 0A
Espy, Michelle A., 06	Tinsley, Jim, 0D
Fast, James, 0C	Tsurin, I., 0E
Frayser, Daniel K., 0D	van Zalinge, H., 0E
Furenlid, Lars R., 08	Vercnocke, Andrew J., 0J
Gallejo, Sabrina, 0B	Vita, Joshua A., 07, 09
Garza, Irene, 0D	Waltman, Tom B., 0D
Gehring, Amanda E., 06	Wantuch, Andrew C., 07, 09
Guo, Xin, 0Q	Watanabe, Manabu, 0I, 0L
Hagiwara, Osahiko, 0I, 0L	Webb, Timothy J., 06
Haines, Todd J., 06	Williams, Mark B., 0O
Holswade, Erica A., 0A	Wojcik, Randy, 0O
Howe, Russell A., 03	Yamaguchi, Satoshi, 0I, 0L
Ishii, Tomotaka, 0I	Yuan, Vincent W., 0D
Jaliparthi, Gangadhar, 0O	Zhang, Shuang, 0Q
Jimenez, Edward S., 07, 09, 0A	
Jorgensen, Steven M., 0J	
Kaufman, Morris I., 0D	
Kusachi, Shinya, 0I, 0L	
Levin, Craig S., 0G	
Li, Xin, 08	
Li, Zan, 0Q	
Lutz, Steve, 04	
Majewski, Stan, 0O	
Malone, Robert M., 03, 0D	
Matsukiyo, Hiroshi, 0I, 0L	
McCullough, Cynthia H., 0J	
Mitchell, Stephen E., 03	
Morgan, Dane V., 04	
Morgan, George L., 0D	
Nadler, Jason, 0B	

Conference Committee

Program Track Chairs

Ali M. Khounsary, Illinois Institute of Technology (United States)
Ralph B. James, Brookhaven National Laboratory (United States)

Conference Chairs

Gary P. Grim, Lawrence Livermore National Laboratory
(United States)
H. Bradford Barber, The University of Arizona (United States)
Lars R. Furenlid, The University of Arizona (United States)

Conference Program Committee

Stuart A. Baker, National Security Technologies, LLC (United States)
Patrick Feng, Sandia National Laboratories (United States)
Paul P. Guss, National Security Technologies, LLC (United States)
Khalid M. Hattar, Sandia National Laboratories (United States)
Ralph B. James, Brookhaven National Laboratory
(United States)
Edward Steven Jimenez Jr., Sandia National Laboratories
(United States)
Will E. Johns, Vanderbilt University (United States)
Michael J. King, Rapiscan Systems Laboratories (United States)
Edward A. McKigney, Los Alamos National Laboratory (United States)
Wondwosen Mengesha, Physical Optics Corporation (United States)
Frank E. Merrill, Los Alamos National Laboratory (United States)
Michael R. Squillante, Radiation Monitoring Devices, Inc.
(United States)

Session Chairs

- 1 Radiography
Gary P. Grim, Lawrence Livermore National Laboratory
(United States)
- 2 Detectors and Analysis
H. Bradford Barber, The University of Arizona (United States)
- 3 Gamma and Neutron Detectors
Edward S. Jimenez, Sandia National Laboratories (United States)
- 4 PET

Lars R. Furenlid, The University of Arizona (United States)

5 Detector Systems

H. Bradford Barber, The University of Arizona (United States)

6 Applications

Lars R. Furenlid, The University of Arizona (United States)