

PROCEEDINGS OF SPIE

***Radiation Detectors in Medicine,
Industry, and National Security XVIII***

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

**9–10 August 2017
San Diego, California, United States**

Sponsored and Published by
SPIE

Volume 10393

Proceedings of SPIE 0277-786X, V. 10393

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 *Radiation Detectors in Medicine, Industry, and National Security XVIII*, edited by Gary P. Grim, Lars R. Furenlid, H. Bradford Barber, Proceedings of SPIE Vol. 10393 (SPIE, Bellingham, WA, 2017) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510612433

ISBN: 9781510612440 (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 © 2017, 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/17/\$18.00.

Printed in the United States of America Vm7 i ffUb '5gg: WJUH gē bWzi bXYf`jW bgY Zca GD-9.

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

SPIE. DIGITAL LIBRARY

SPIDigitalLibrary.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>

SAFEGUARDS APPLICATIONS

10393 02	Threat detection of liquid explosives and precursors from their x-ray scattering pattern using energy dispersive detector technology [10393-1]
10393 03	Uranyl adsorption kinetics within silica gel: dependence on flow velocity and concentration [10393-2]
10393 04	Small unmanned aircraft system for remote contour mapping of a nuclear radiation field (Invited Paper) [10393-3]
10393 05	International Radiation Monitoring and Information System (IRMIS) [10393-4]

NOVEL DETECTOR CONCEPTS

10393 06	Development and deployment of the Collimated Directional Radiation Detection System (Invited Paper) [10393-5]
10393 07	Neutron detection with plastic scintillators coupled to solid state photomultiplier detectors [10393-6]
10393 08	High-resolution photon spectroscopy with a microwave-multiplexed 4-pixel transition edge sensor array [10393-7]

NOVEL DETECTOR APPLICATIONS

10393 0A	X-ray backscatter radiography with lower open fraction coded masks (Invited Paper) [10393-9]
10393 0C	New results from sub-3 MeV Compton spectrometer experiments (Invited Paper) [10393-11]
10393 0D	Modeling charge collection in x-ray imagers [10393-12]
10393 0E	A multi-purpose readout electronics for CdTe and CZT detectors for x-ray imaging applications [10393-13]

SIMULATIONS AND DATA ACQUISITION

10393 0F	3D-printed coded apertures for x-ray backscatter radiography (Invited Paper) [10393-14]
----------	--

10393 OH **Spectral correction algorithm for multispectral CdTe x-ray detectors** [10393-16]

DIGITAL RADIOGRAPHY AND CT

10393 OJ **Measurement of x-ray spectra using a recent YAP(Ce)-MPPC detector** [10393-18]

10393 OM **Scintillator performance considerations for dedicated breast computed tomography (Invited Paper)** [10393-21]

NOVEL DETECTOR APPLICATIONS

10393 OR **A framework for optimizing micro-CT in dual-modality micro-CT/XFCT small-animal imaging system** [10393-26]

10393 OS **A compact energy-independent CZT-based gamma camera (Invited Paper)** [10393-27]

10393 OU **Investigation of a high-sensitivity near-infrared-ray computed tomography scanner** [10393-29]

POSTER SESSION

10393 OX **The dual-channel ultraviolet/low light CMOS camera using image fusion technique** [10393-32]