SORMA West 2016 Program (prepared May 22)

1A Opening Plenary I

Monday, May. 23 08:45-10:00 Krutch Auditorium
Session Chair: **John Valentine**, LBNL, United States

1A-1 (08:45, invited) Welcome and Opening Remarks
J. D. Valentine, *Lawrence Berkeley National Laboratory, USA*
1A-2 (09:15, invited) Glenn F. Knoll Memorial Lecture: Radiation Measurements - Concepts and Misconceptions
V. T. Jordanov, *labZY, USA*

1B Opening Plenary II

Monday, May. 23 10:30-12:00 Krutch Auditorium
Session Chair: **Stephen Derenzo**, LBNL, United States

1B-1 (10:30, invited) Radiation Detection Development and Procurement Opportunities at DOD
V. Novikov, *Joint Program Executive Office, USA*
1B-2 (10:50, invited) Advancing Technological Capabilities to Prevent Nuclear Terrorism
J. Rynes, *Domestic Nuclear Detection Office, USA*
1B-3 (11:20, invited) Technology Development and the Need for Realistic Testing under Realistic Conditions
T. Cassidy, *Sensor Concepts and Applications, Inc, USA*
1B-4 (11:40, invited) DNDO Transformational and Applied Research Awards
K. Cronk, *Domestic Nuclear Detection Office, USA*

1C Passive Detection in Wide-Area Search and Cluttered Environments Plenary

Monday, May. 23 13:30-15:30 Krutch Auditorium
Session Chair: **Ren Cooper,** LBNL, United States

1C-1 (13:30, invited) Towards Implementation of Large Scale Context-Sensitive Mobile Standoff Radiation Detection Systems
D. H. Chivers[1,2]
[1]*Berkeley Applied Analytics LLC, USA;* [2]*Lawrence Berkeley National Laboratory, USA*
1C-2 (14:00, invited) Development and Characterization of the Airborne Radiological Enhanced-sensor System
B. J. Quiter, *Lawrence Berkeley National Laboratory, USA*
1C-3 (14:30, invited) Radiation Awareness and Interdiction Network (RAIN) Advanced Technology Demonstration
M. Wrobel, *Domestic Nuclear Detection Office, USA*
1C-4 (15:00, invited) Passive Detection in Wide-Area Search and Cluttered Environments Path Forward
K. Cronk, *Domestic Nuclear Detection Office, USA*

1E Coffee & Poster Session 1E

Monday, May. 23 15:00-16:00 Grand Courtyard
Session Chair: **Didier Perrodin**, LBNL, United States

1E-1 Reliability Improvement for Compensated Counting Measurements
R. M. Coulon, T. Montagu, V. Schoepff, *CEA LIST, France*
1E-2 Spectral Analysis from Radiation Sensor Networks Using Principal Component Analysis
J. Zhao, C. J. Sullivan
University of Illinois at Urbana-Champaign, United States
1E-4 Advanced Radiation Detector for Unmanned Aerial Vehicle Operations (ARDUO)
L. E. Sinclair, R. Fortin, M. J. Coyle, R. A. Van Brabant
Natural Resources Canada, Canada
1E-5 Verification of Minimum Detectable Activity for Radiological Threat Source Search
H. E. Gardiner[1], M. Myjak[2], J. Baciak[1], R. Detwiler[2], J. Kulisek[2], C. Seifert[2]
[1]*University of Florida, USA;* [2]*Pacific Northwest National Lab, USA*
1E-6 Monte Carlo Modeling of a Neutron-Induced Gamma-Ray Sensor for Landmine Detection in Dry Soils
N. A. A. Elsheikh, *Al-Baha University, College of Science&Arts in Almikhwah, Saudi Arabia*; M. E. E. Ahmed, *Sudan Atomic Energy Commission, Sudan*; F. I. Habbani, *University of Khartoum, Faculty of Science, Sudan*
1E-7 Neutron/Gamma-Ray Interrogation System for Hidden SNMs in Cargo Containers
H. Ohgaki, *Insititute of Advanced Energy, Kyoto University, Japan*

On behalf of the JST R&D Program for Implementation of Anti-Crime and Anti-Terrorism Technologies for a Safe and Secure Society #066

1E-8 Genetic Algorithm Optimization of a Laser Beam-Profile as a Means to Maximize the Sensitivity of Air-Plasma Formation to the Presence of Radioactive Materials

J. Hah, M. D. Hammig, J. A. Nees

University of Michigan, USA

1E-9 Mobile Intelligent X-Ray Inspection System

A. Arodzero, S. Boucher, S. V. Kutsaev, *RadiaBeam Technologies, LLC, USA*; V. Ziskin, *Physical Science, Inc., USA*

1E-10 Self-Shielding Compensation for Moving Sources Detection

R. M. Coulon, J. N. Dumazert, *CEA LIST, France*

1E-11 Radioactive Source Localization by a Network of Non-Directional and Directional Detectors

K. Karafasoulis[1], G. Fragkos[2], I. Kaissas[3], A. Kyriakis[4], C. P. Lambropoulos[5], C. Papadimitropoulos[5], C. Potiriadis[3]

[1]Hellenic Army Academy, Greece; [2]Hellenic Army General Staff, Greece; [3]Greek Atomic Energy Commission, Greece; [4]Institute of Nuclear and Particle Physics, NCSR Demokritos, Greece; [5]Technological Educational Institute of Sterea Ellada, Greece

1E-12 A Field Deployable Imaging Neutron Detector (FIND) for SNM

J. S. Legere[1], P. F. Bloser[1], A. C. Madden[2], J. M. Ryan[1], M. L. McConnell[1]

[1]University of New Hampshire Space Science Center, USA; [2]Los Alamos National Laboratory, USA

1E-13 Portable Germanium Gamma-Ray Imaging System for National Security

J. G. Dreyer, M. T. Burks, *Lawrence Livermore National Laboratory, United States*; E. L. Hull, *PHDS Co., United States*

1E-14 Development of Eu:SrI scintillator array for gamma-ray imaging applications

H. Yamaguchi[1], K. Kamada[2,1], S. Kurosawa[1], Y. Shoji[1,2], J. Pejchal[3], Y. Yokota[1], Y. Ohashi[1], A. Yoshikawa[1,2]

[1]Tohoku University, Japan; [2]C&A Corporation, Japan; [3]Physics AS CR, Czech republic

1E-15 GEANT4 Analysis of a Thermal Neutron Real Time Imaging System

A. Datta, A. I. Hawari

North Carolina State University, USA

1E-16 Development of a Proto-Type Detector Using Novel Ce:GAGG Scintillator Arrays for High Resolution Radiation Imaging

M. Yoshino[1], K. Kamada[1], S. Kurosawa[1], Y. Shoji[1], Y. Yokota[1], A. Yoshikawa[1], K. Shimazoe[2], H. Takahashi[2]

[1]Tohoku University, Japan; [2]The University of Tokyo, Japan

1E-17 Electron Paramagnetic Resonance for Retrospective Dosimetry Applications

R. B. Hayes, *North Carolina State University, USA*

1E-18 Growth and Characterization of 1.5" Diameter Crystals of High Performance Scintillator $KCaI_3$:Eu for Use in X-Ray and Gamma-Ray Spectroscopy Applications

A. C. Lindsey, M. Zhuravleva, C. L. Melcher

The University of Tennessee, USA

1E-19 Machine Learning Method Applied in Readout System of Superheated Droplet Detector

Y. Liu, C. J. Sullivan, *University of Illinois at Urbana-Champaign, USA*; F. d'Errico, *Yale University, USA*

1E-20 Fresh Fuel Measurements with the Differential Die-Away Self-Interrogation Instrument

A. C. Trahan, A. P. Belian, M. T. Swinhoe, H. O. Menlove, *Los Alamos National Laboratory, USA*; M. Flaska, *Pennsylvania State University, USA*; S. A. Pozzi, *University of Michigan, USA*

1E-21 Feature Extraction and Isotope Identification on NaI Gamma-Ray Spectra

J. B. Stinnett, M. M. Watson, C. J. Sullivan, H. Xiong

University of Illinois at Urbana-Champaign, USA

1E-22 FemtoDAQ - a Two Channel Low-Cost Digitizer for Si-PM Based Detector Studies and Its Application for the HAWC Trigger Upgrade

W. Skulski, *SkuTek Instrumentation, USA*; A. Ruben, *W-IE-NE-R, Plein & Baus, Corp., USA*; S. BenZvi, *University of Rochester, USA*

1E-23 Development of a High-Efficiency, Fast-Neutron Detector with Excellent Gamma-Rejection Properties

C. O. McGahee, M. Flaska

Pennsylvania State University, USA

1E-24 Optical Properties and Geiger Mode Operation of $Al_{0.8}Ga_{0.2}As$ Avalanche Photodiode Elements

T. Kang[1], X. J. Chen[2], E. B. Johnson[2], J. C. Christian[2], I. Kwon[3], M. D. Hammig[1]

[1]University of Michigan, USA; [2]Radiation Monitoring Devices Inc, USA; [3]Stanford University, USA

1E-25 Time Interval Distributions from Time-Tagged Data

R. E. Wurtz, N. J. Snyderman, L. F. Nakae, G. F. Chapline, G. Guethlein

Lawrence Livermore National Laboratory, USA

1E-26 A Bootstrap Circuit to Enable Signal Multiplexing of SiPM-Based Scintillation Detectors Without Performance Degradation

I. Kwon, J. W. Cates, C. Levin, *Stanford University, USA*

1E-27 Working Gas Selection of the Boron Lined Honeycomb Neutron Detector to Be Used in Homeland Security

Z. Fang[1,2], Y. Yang[1,2], Y. Li[1,2]

[1]*Tsinghua University, China;* [2]*Key Laboratory of Particle & Radiation Imaging (Tsinghua University), Ministry of Education, China*

1E-28 Unusual behavior of the internal electric field in CdZnTe radiation detectors

G. Yang[1], V. Dedic[2], A. E. Bolotnikov[1], Y. Cui[1], G. S. Camarda[1], A. Hossain[1], U. N. Roy[1], R. Gul[1]
[1]*Brookhaven National Laboratory, USA;* [2]*Charles University, Czech Republic*

1E-29 A Feasibility Study of SmB6 as a Possible Candidate for an Alternative Neutron Detector Material

G. Kim, J. D. Kim, *Sejong University, Korea*; B. Kang, B. K. Cho, *GIST, Korea*

1E-3 Fast Neutron Background Characterization with the Radiological Multi-Sensor Analysis Platform (RadMAP)

J. R. Davis, *United States Military Academy, USA*; E. Brubaker, *Sandia National Laboratories, USA*; K. Vetter, *Lawrence Berkeley National Laboratory, USA*

1Fa Passive Detection in Wide-Area and Cluttered Environments

Monday, May. 23 16:00-17:30 Krutch Auditorium
Session Chairs: **Brian Quiter**, LBNL, United States **Klaus Ziock**, ORNL, United States

1Fa-1 (16:00) Low Cost System for the Interdiction of Radiological and Nuclear Threats

B. R. Cosofret, K. N. Shokhirev, T. Schmit, V. Ziskin, J. Wright, P. A. Mulhall, *Physical Sciences Inc., USA*; E. D. Johnson, D. W. Payne, D. M. Kavner, R. Moro, *Raytheon Integrated Defense Systems, USA*

1Fa-2 (16:15) Development of the Multi-Sensor Interdiction System Testbed (MIST) Advanced Technology Demonstration (ATD) for Detection and Tracking of Vehicle-Borne Radiation Sources

D. A. Cooper, R. J. Ledoux, S. E. Korbly, J. Costales, K. Kamieniecki, R. Niyazov, D. Hempstead, M. Gallagher, W. Franklin, N. D'Olympia, L. Janney, A. LaSpina, J. Stadtmiller, *Passport Systems, Inc., USA*; C. Monnier, R. Wronski, A. Ost, *Charles River Analytics, Inc., USA*

1Fa-3 (16:30) Multi-Agency Urban Search Experiment Detector and Algorithm Test Bed

A. D. Nicholson, D. E. Hornback, I. Garishvili, D. E. Archer, W. R. Ray, D. E. Peplow, M. W. Swinney, G. G. Davidson, *Oak Ridge National Laboratory, USA*; J. Peltz, *Department of Energy, USA*; L. K. McLean, *Remote Sensing Laboratory, USA*; B. J. Quiter, M. S. Bandstra, *Lawrence Berkeley National Laboratory, USA*

1Fa-4 (16:45) Large-Area, Low-Cost, High-Efficiency Neutron Detector for Vehicle-Mounted Operation

J. L. Lacy, C. S. Martin, A. Athanasiades, M. Regmi, G. J. Vasquez-Flores, S. Davenport, N. S. King, T. Lyons
Proportional Technologies Inc., USA

1Fa-5 (15:00) On Simple Computationally-Light Network Detection Methods for Radiation Sources

N. S. V. Rao, S. Sen, *Oak Ridge National Laboratory, USA*; R. R. Brooks, G. Cordone, *Clemson University, USA*; C. Q. Wu, M. L. Berry, K. M. Grieme, *New Jersey Institute of Technology, USA*

1Fa-6 (17:15) Effects of Complex Heterogeneous Cargo on Embedded Radioactive Objects

C. J. Divin, S. M. Glenn, H. E. Martz, M. A. Stoyer, S. G. Azevedo
Lawrence Livermore National Lab, USA

1Fb Enabling Technologies for National Security: Scintillation Detector Technology

Monday, May. 23 16:00-17:45 Garden Room
Session Chairs: **Alan Janos**, DNDO, United States **Christophe Dujardin**, U. Lyon, France

1Fb-1 (16:00) Study of $LaBr_3$ with Ce Doping and Sr Co-Doping by Subpicosecond Laser Experiments

S. Gridin, P. Li, B. Ucer, R. Williams, *Wake Forest University, USA*; K. Yang, P. Menge, *Saint-Gobain Crystals, USA*

1Fb-2 (16:15) Investigating Spectral Response from High Quality Sb:BiI3 Crystals

P. M. Johns, J. E. Baciak, J. C. Nino
University of Florida, United States

1Fb-3 (16:30) Improved Scintillator Performance with a Method of Enhanced Layered Coatings

D. Wakeford, S. Tornga, M. Hehlen
Los Alamos National Laboratory, USA

1Fb-4 (16:45) Ceramic Scintillators for High Energy Radiography

J. Glodo, Y. Wang, T. Gupta, R. Shawgo, C. Brecher, W. Rhodes, K. S. Shah
Radiation Monitoring Devices, Inc., United States

1Fb-5 (17:00) LAPPD™ Hermetic Packaging Using an Indium Solder Flat Seal

A. Elagin, E. Angelico, H. Frisch, E. Spieglan, *University of Chicago, USA*; R. Jarrett, *Indium Corporation, USA*

1Fb-6 (17:15) Sputter-Deposited Bi-Alkali Photocathodes – a Path Toward High Performance

H. B. Bhandari, *RMD, Inc., USA*
On behalf of the Photocathode Collaboration Group

1Fb-7 (17:30) Lithium Fluoride 7Li(p,n) Target Optimization for Scintillator Light Output Measurements

R. A. Weldon, J. Mattingly, *North Carolina State University, USA*; G. Rich, P. Barbeau, *Duke University, USA*

2A Active Interrogation and Shielded SNM Detection Plenary I

Tuesday, May. 24 08:30-10:00 Krutch Auditorium

Session Chairs: **John Mattingly**, NCSU, United States **Steven M. Glenn**, LLNL, United States

2A-1 (08:30, invited) An Overview of Radiography with Emphasis on Dual Energy for Cargo Inspection
H. E. Martz, Jr., S. M. Glenn, J. A. Smith, C. J. Divin
Lawrence Livermore National Laboratory, USA
2A-2 (09:00, invited) Test Results for Large-Scale Cargo Inspection Technologies
R. Bentley, *Sensor Concepts and Applications, Inc, USA*
2A-3 (09:30, invited) The Domestic Nuclear Detection Office's (DNDO) Shielded Nuclear Alarm Resolution (SNAR) Program Overview
N. Moon, *Domestic Nuclear Detection Office, USA*

2B Coffee & Poster Session 2B

Tuesday, May. 24 09:45-10:45 Grand Courtyard
Session Chair: TBD

2B-1 Compact, Low-Cost, SiPM-Based Portable Radiation Detectors
H. M. Park, J. H. Kim, K. S. Joo, *Myongji University, korea*
2B-2 The LLNL Ge-140 Handheld Spectrometer
L. E. Heffern, M. T. Burks, J. G. Dreyer
Lawrence Livermore National Laboratory, USA
2B-3 Bayesian Metropolis Techniques for Source Localization
J. M. Hite, K. L. Schmidt, R. Stefanescu, J. K. Mattingly, R. Smith
North Carolina State University, USA
2B-4 Imaging with Right/Left Discrimination Using near-Horizontal Cosmic-Ray Muons
W. Dreesen, J. A. Green, D. Schwellenbach, *National Security Technologies, LLC, USA*; N. Bonal, L. Preston, D. Dorsey, *Sandia National Laboratories, USA*
2B-5 Large-Scale Characterization of Gamma-Ray and Neutron Background Radiation in North America Using Vehicle-Based NaI(Tl) and ^{6}LiF/ZnS Scintillators
N. A. Hartmann, T. Achtzehn, S. A. Graham, V. T. Koslowsky, M. B. Smith
Bubble Technology Industries, Canada
2B-6 the identification of high Z materials with resonance of photoneutrons driven by low energy electron linac
Y. Yang[1,2], Y. Zhang[1,2], H. Chen[1,2], Y. Li[1,2], Y. Li[1,2]
[1]Tsinghua University, China; [2]Ministry of Education, China
2B-7 Recent Results Using the Cosmic Ray Inspection and Passive Tomography (CRIPT) System for SNM Imaging and Detection
S. Livingstone, V. Anghel, A. Erlandson, C. Jewett, O. Kamaev, M. Thompson
Canadian Nuclear Labs, Canada
2B-8 Direct Detection of Fission Neutrons: Fluorine-Based Threshold Activation Vs. Liquid Organic Scintillation Detectors
T. Gozani, *1050 Harriet St., USA*; M. J. King, *Rapiscan Laboratories, USA*
2B-9 Source Correlated Prompt Neutron Activation Analysis for Material Identification and Localization
B. E. Canion[1], S. McConchie[2], S. Landsberger[1]
[1]The University of Texas, USA; [2]Oak Ridge National Laboratory, USA
2B-10 The Study of the Gamma Ray Identifying Algorithm for a Miniaturized CsI(Tl) Scintillator Based Compact Radiation Sensor
H. Yoo, Y. Kim, M. Kim, C. Kim, G. Cho, *KAIST, South Korea*
2B-11 Flexible, High-Velocity Data Movement and Manipulation Systems for National Security Applications
R. Herbst, C. Kenney, G. Haller, S. Maldonaldo, M. Weaver
SLAC National Accelerator Laboratory, USA
2B-12 Development of Gamma-Ray/Neutron Dual-Particle Imager Using Rotational Modulation Collimator (RMC): Monte Carlo Simulation
H. S. Kim[1], H. Y. Choi[2], G. Lee[3], S.-J. Ye[1], G. Kim[2]
[1]Graduate School of Convergence Science and Technology, Seoul National University, Korea; [2]Sejong University, Korea; [3]Seoul National University of Science and Technology, Korea
2B-13 Source Location Reconstruction Using a Compact Neutron Scatter Camera Constructed from Pillars of Plastic Scintillator
K. Weinfurther, J. Mattingly, *North Carolina State University, USA*; E. Brubaker, J. Steele, M. Sweany, *Sandia National Laboratories, USA*
2B-14 Development of a Position-Sensitive Gamma-Ray Camera Using Ce:La-GPS Scintillator and an MPPC Array
S. Kurosawa[1], Y. Shoji[1,2], R. Murakami[1,2], T. Horiai[1], Y. Ohahsi[1], Y. Yokota[1], K. Kamada[1,2], A. Yoshikawa[1,2]
[1]Tohoku University, Japan; [2]C&A, Japan
2B-15 Microstructured Semiconductor Neutron Detector Arrays for Neutron Scattering Measurements

S. Bellinger[1], R. Taylor[2], L. Henson[1], D. McGregor[2]
[1]Radiation Detection Technologies, Inc., USA; [2]Kansas State University, USA

2B-16 Characterising Encapsulated Nuclear Waste Using Cosmic-Ray Muon Tomography
R. Al Jebali[1], A. Clarkson[1], D. Ireland[1], R. Kaiser[1], S. Lumsden[1], D. Mahon[1], D. Mountford[2], M. Ryan[2], G. Yang[1]
[1]University of Glasgow, UK; [2]National Nuclear Laboratory, UK

2B-17 Excimer-Based Large Area Neutron Detectors
M. A. Coplan[1], R. E. Vest[2], J. Ziegler[2], A. K. Thompson[2], C. M. Lavelle[3], C. W. Clark[1,2,4]
[1]University of Maryland, USA; [2]National Institute of Standards and Technology, USA; [3]The Johns Hopkins University Applied Physics Laboratory, USA; [4]Joint Quantum Institute, USA

2B-18 Optimization of Organic Liquid Scintillation Detectors in Radiation Portal Monitor Applications
M. G. Paff, S. D. Clarke, S. A. Pozzi
University of Michigan, USA

2B-19 Characterization of Materials Shielding Uranium and Plutonium
M. Streicher, S. Brown, D. Goodman, Y. Zhu, Z. He
University of Michigan, USA

2B-20 Strategies for Improving the Intrinsic Efficiency of CdTe/CdS Based Thin-Film Thermal Neutron Detectors
L. M. Smith[1], J. W. Murphy[1], S. Rozhdestvenskyy[1], I. Mejia[1], G. Kunnen[2], M. Quevedo-Lopez[1], D. Allee[2], B. Gnade[1]
[1]University of Texas at Dallas, United States; [2]Arizona State University, United States

2B-21 Performance of a LiF/ZnS-Based Neutron Multiplicity Counter
S. C. Stave[1], R. S. Behling[1], M. Bliss[1], C. Cowles[1], R. Kouzes[1], V. Kukharev[1], A. Lintereur[2], S. Robinson[1], E. Siciliano[1], P. Valdez[1]
[1]Pacific Northwest National Laboratory, USA; [2]University of Utah, USA

2B-22 NaI and NaI:Tl Picosecond Spectroscopy and Scintillation Modeling
K. B. Ucer, S. Gridin, P. Li, X. Lu, R. T. Williams, *Wake Forest University, United States*; M. R. Mayhugh, *Faceted Development, LLC, United States*; A. V. Gektin, *Institute for Scintillation Materials, Ukraine*; K. Yang, P. R. Menge, *Saint-Gobain Crystals, United States*; G. A. Bizarri, *Lawrence Berkeley National Laboratory, United States*

2B-23 Bromine Substitution in KSr_2I_5:Eu Scintillators
L. Stand, M. Zhuravleva, J. Johnson, E. Lukosi, C. L. Melcher
University of Tennessee, United States

2B-24 Online Trace-Level Quantification of Uranium in Environmental Waters
C. E. Duval, A. F. Seliman, T. A. DeVol, S. M. Husson
Clemson University, USA

2B-25 Development of Cesium Hafnium Chloride and Related Cubic Structure Materials for Gamma Ray Spectrometers
A. Burger, *Fisk University, USA*
On behalf of the Fisk University and LLNL collaboration

2B-26 Investigation of FPGA Based Real Time Adaptive Digital Pulse Shaping for High Count Rate Applications
S. Saxena, M. Liu, A. I. Hawari
North Carolina State University, USA

2B-27 Characteristics of an Indirect-Type Organic X-Ray Detector Fabricated with P3HT:ICBA Blending Materials
J. Kang, S. Kim, B. Kim, *Dankook University, South Korea*

2B-28 Characterization of Defects, Transport Properties and Detector Performance in $Pb_2P_2Se_6$
S. S. Kostina, M. P. Hanson, J. A. Peters, P. L. Wang, P. Chen, Z. Liu, M. G. Kanatzidis, B. W. Wessels
Northwestern University, US

2B-29 Thin-Film Large-Area Organic Detectors for Ionizing Radiation
C. Fuentes-Hernandez, T. M. Kahn, L. Diniz, J. C. Stooksbury, N. E. Hertel, B. Kippelen
Georgia Institute of Technology, USA

2C Active Interrogation and Shielded SNM Detection Plenary II

Tuesday, May. 24 10:45-12:15 Krutch Auditorium
Session Chairs: **Tsahi Gozani**, , United States **Douglas Wright**, LLNL, United States

2C-1 (10:45, invited) Non-Intrusive Imaging and Passive Primary Screening
K. Cronk, *Domestic Nuclear Detection Office, USA*

2C-2 (11:15, invited) Muon Tomography for Security Applications
C. A. Steer, S. Quillin, J. Burns
Atomic Weapons Establishment, UK

2C-3 (11:45, invited) DNDO Cargo/Rail Path Forward
N. Moon, *Domestic Nuclear Detection Office, USA*

2Ca Photofission-Based Detection of Shielded Special Nuclear Materials

Tuesday, May. 24 13:30-15:00 Krutch Auditorium

Session Chairs: **Namdoo Moon**, DNDO, United States **Harry Martz**, LLNL, United States

2Ca-1 (13:30) High-Power Superconducting Linacs for Active Cargo Scanning Applications
C. H. Boulware, T. L. Grimm, V. N. Starovoitova, J. L. Hollister
Niowave, Inc., USA
2Ca-2 (13:45) Impact of near-Monoenergetic Photon Sources on Nonproliferation Applications
B. A. Ludewigt, C. G. Geddes, J. D. Valentine
Lawrence Berkeley National Laboratory, USA
2Ca-3 (14:00) Monoenergetic Gamma Ray Radiography System for Detection of Shielded Nuclear Materials
T. D. MacDonald, A. Danagoulian, Z. S. Hartwig, R. C. Lanza, H. Y. Lee, B. E. O'Day, J. M. Rahon
Massachusetts Institute of Technology, USA
2Ca-4 (14:15) Dose Minimization for Detection of SNM and Contraband in Shipping Containers
C. M. Wilson, W. Bertozzi, N. D'Olympia, W. Franklin, S. E. Korbly, R. J. Ledoux
Passport Systems, Inc., USA
2Ca-5 (14:30) Standard Testing Requirements for Active Interrogation Systems
R. Kouzes, G. Warren, *Pacific Northwest National Laboratory, USA*; P. Chiaro, *Oak Ridge National Laboratory, USA*
2Ca-6 (14:45) Photon Active Search System
D. M. Wright, R. Casperson, J. Gronberg, L. Hiller, K. Kazkaz, F. Rebassoo, B. Rusnak, L. Snyder, J. Verbeke, *LLNL, USA*; A. Hunt, B. Satterwhite, *Idaho State University, USA*

2Cb Other Enabling Technologies for National Security

Tuesday, May. 24 13:30-15:00 Garden Room
Session Chairs: **Shawn Tornga**, LANL, United States **Marc A. Black**, Engility Corp.

2Cb-1 (13:30) First-Principles and Experimental Studies of the Optical Properties of Eu Doped Barium Mixed Halides: from Storage Phosphor to Bright Scintillator
A. Canning, M. Del Ben, B. Medasani, S. Chourou, I. V. Khodyuk, E. D. Bourret-Courchesne, G. A. Bizarri
Lawrence Berkeley National Laboratory, USA
2Cb-2 (13:45) Characterization of Large Volume CLYC Scintillators for Homeland Security Applications
L. Soundara-Pandian, J. Tower, P. O'Dougherty, J. Glodo, K. Shah
Radiation Monitoring Devices, Inc., USA
2Cb-3 (14:00) SrI2(Eu) Handheld Gamma Spectrometer Performance Evaluation Using Radionuclide Analysis Kit (RNAK)
P. R. Beck, N. J. Cherepy, B. M. Wihl, S. E. Fisher, S. L. Hunter, K. E. Nelson, B. S. Seilhan, S. A. Payne, S. E. Labov, Y. Yao, E. L. Swanberg, P. A. Thelin, *Lawrence Livermore National Laboratory, USA*; K. S. Shah, R. Hawrami, *Radiation Monitoring Devices, USA*; A. Burger, *Fisk University, USA*; L. A. Boatner, *Oak Ridge National Laboratory, USA*; M. Momayezi, *Bridgeport Instruments, USA*; K. T. Stevens, M. H. Randles, D. Solodovnikov, *Northrop Grumman Synoptics, USA*
2Cb-4 (14:15) DRiFT - an Extensible Toolkit for Detector Response Modeling in MCNP
C. R. Bates, M. T. Andrews, E. A. Mckigney, A. Sood, C. J. Solomon
Los Alamos National Laboratory, United States
2Cb-5 (14:30) Novel Detection Concepts for National Nuclear Security
C. Shenton-Taylor[1], E. Barritt[1], P. Bartlett[2], B. Darrer[2], O. Dorn[3], N. Gaspar[1], R. Guilizzoni[2], A. Langley[1], D. Leahy[3], K. Ley[1], C. Lloyd[1], A. Lohstroh[4], R. Marsh[1], S. Parsons[4], F. Renzoni[2], A. Richings[1], C. Steer[1], C. Thompson[1], R. Ward[1], J. Watson[1]
[1]AWE, Aldermaston, UK; [2]University College London, UK; [3]University of Manchester, UK; [4]University of Surrey, UK
2Cb-6 (14:45) Characterization of Fissile Assemblies Using Low Efficiency Detection Systems
G. F. Chapline, J. M. Verbeke
Lawrence Livermore National Laboratory, USA

2E Coffee & Poster Session 2E

Tuesday, May. 24 15:00-16:00 Grand Courtyard
Session Chair: **Ivan Khodyuk**, LBNL, United Strates

2E-1 Gadolinium and Terbium-Covered Bismuth-Loaded Plastic Scintillators for Thermal Neutron Detection
J. N. Dumazert[1], R. Coulon[1], M. Hamel[1], S. Normand[1], L. Méchin[2], G. H. Bertrand[1]
[1]CEA, France; [2]CNRS, France
2E-2 Urban Search of Radioactive Materials Enhanced by Mobile Sensor Networks and Geospatial Methods
M.-H. Jeong[1], C. J. Sullivan[2], S. Wang[1]
[1]University of Illinois, United States; [2]University o f Illinois, United States
2E-3 Development and Testing of a Novel Radioisotope Identification Algorithm for Vehicle-Borne Threats

L. E. Janney, D. A. Cooper, R. J. Ledoux, K. Kamieniecki, S. E. Korbly, N. D'Olympia, J. Costales, R. Niyazov, D. Hempstead, M. Gallagher
Passport Systems, Inc, U.S.A

2E-4 A Comparison of the Performance of Two Low-Cost Gamma-Ray Radioactive Isotope Identifiers
M. A. Foster, *Symetrica Security Ltd., UK*; D. Ramsden, M. Dallimore, ,

2E-5 Measurement of the Energy-Dependent Angular Response of the ARES Detector System and Application to Aerial Imaging
T. H. Joshi, J. Maltz, M. S. Bandstra, B. J. Quiter, *Lawrence Berkeley National Laboraoty, USA*; E. Wagner, T. Luke, R. Malchow, K. McCall, *Remote Sensing Laboraoty, USA*

2E-6 High-Output Portable Pulsed DD Neutron Generator for Active Interrogation Systems
M. D. Coventry, R. A. Stubbers, *Starfire Industries, 61820*

2E-7 Spectroscopic Neutron Transmission Measurements Using a $^{11}B(d,n?)^{12}C$ Source
J. Nattress[1], M. Mayer[2], A. Foster[2], A. Meddeb[1], Z. Ounaies[1], C. Trivelpiece[1], I. Jovanovic[2]
[1]University of Michigan, United States; [2]Pennsylvania State University, United States

2E-8 Pulse Shape Processing and Pile-up Rejection for High Energy Neutron Discrimination in Helium-4 Detectors
T. Zhu[1], Y. Liang[1], L. Rolison[1], J. M. Lewis[1], R. P. Kelley[1], C. Nguyen[1], S. Gokhale[1], H. Chung[2], S. Kiff[3], D. Murer[4], H. Ray[1], J. E. Baciak[1], A. Enqvist[1], K. A. Jordan[1]
[1]University of Florida, U.S.A.; [2]Korea Atomic Energy Research Institute, Korea; [3]Sandia National Laboratories, U.S.A.; [4]Arktis Radiation Detectors Ltd., Switzerland

2E-9 Point Kinetics Framework for Characterizing Prompt Neutron and Photon Signatures from Actively Interrogated Uranium
B. E. Canion[1], S. McConchie[2], S. Landsberger[1]
[1]The University of Texas, USA; [2]Oak Ridge National Laboratory, USA

2E-10 Boron Carbide Thin Films for Thermal Neutron Detection
M. D. Richardson, K. M. Lee, E. Lukosi
University of Tennessee-Knoxville, United States

2E-11 Fabrication and Characterization of a Fiber-Optic Gamma Imaging Probe
M. Kim[1], S. H. Shin[1], D. E. Lee[1], H. J. Kim[1], Y. B. Song[1], K. W. Jang[1], B. Lee[1], J. G. Kim[2], S. J. Jeon[2], W. J. Yoo[1]
[1]Konkuk University, Republic of Korea; [2]Korea Institute of Radiological & Medical Science, Republic of Korea

2E-12 Double Layered CdZnTe Compton Imager
Y.-H. Kim, T. Lee, W. Lee, *Korea University, South Korea*

2E-13 Incorporating Fission Chain Analysis Into Image Reconstruction for Tagged Neutron Interrogation
A. B. Nowack[1], J. P. Hayward[1,2], M. Tweardy[1], S. M. McConchie[2]
[1]University of Tennessee, Knoxville, USA; [2]Oak Ridge National Laboratories, USA

2E-14 A Low-Power Readout ASIC for High-Resolution Gamma Imaging with Solid-State Detectors
M. Clajus, D. Kuhn, S. Snyder, F. Walker, *NOVA R&D / Kromek USA, USA*; H. Malik, *Northrop Grumman Electronic Systems, USA*; D. Ward, *SemQuest, USA*

2E-15 TAWARA_RTM – the Detection System for Real Time Monitoring of Radioactive Contamination in Water Processed at Water Treatment Facilities
L. Swiderski, *National Centre for Nuclear Research (NCBJ), Poland*
On behalf of the TAWARA_RTM Collaboration

2E-16 Large Form-Factor, Gas-Based Detectors with Solid-State Light Readout
R. Chandra, U. Gendotti
Arktis Radiation Detectors Ltd, Switzerland

2E-17 Remote Detection of Uranium and Its Isotopes Through Femtosecond Filamentation Laser Ablation Molecular Isotopic Spectrometry
K. C. Hartig, I. Ghebregziabher, *The Pennsylvania State University, US*; I. Jovanovic, *University of Michigan, US*

2E-18 Application of Modern Autoradiography to Nuclear Forensic Analysis
T. Parsons-Moss[1], K. Knight[1], M. Fitzgerald[1,2], G. Stone[1], L. Caldeira[1]
[1]Lawrence Livermore National Laboratory, USA; [2]University of Nevada Las Vegas, Nevada

2E-19 Development of the Data Acquisition System for a ^{6}LiF/ZnS Neutron Multiplicity Counter
R. S. Behling[1], C. Cowles[1], R. Kouzes[1], A. Lintereur[2], S. Robinson[1], E. Siciliano[1], S. Stave[1], L. Wood[1]
[1]Pacific Northwest National Laboratory, USA; [2]University of Utah, USA

2E-20 Charge Collection and Light Emission in $LiInSe_2$
K. B. Ucer[1], S. Gridin[1], D. Onken[1], P. Li[1], R. T. Williams[1], E. Tupitsyn[2], P. Bhattacharya[2], E. Rowe[2], L. Matei[2], M. Groza[2], V. Buliga[2], B. Wiggins[3], A. Stowe[3], A. Burger[2]
[1]Wake Forest University, United States; [2]Fisk University, United States; [3]Y-12 National Security Complex, United States

2E-21 Nuclear Material Solution Assay by X-Ray Absorption and X-Ray Fluorescence
S. Park[1], S.-W. Kwak[1], J. Park[2], J.-K. Shin[1], U.-R. Park[1], H. Chung[1]
[1]Korea Institute of Nuclear Nonproliferation and Control, Republic of Korea; [2]ISPXRF Co., Ltd., Republic of Korea

2E-22 Rapid Uranium Isotopic Analysis Using Ultrafiltration and Alpha Spectroscopy
C. E. Duval, T. A. DeVol, S. M. Husson

Clemson University, USA

2E-23 From CsI:Tl to YAP:Ce – a Modeling Study of the Material Parameter Sensitivity of Proportionality
M. R. Mayhugh[1], X. Lu[2], S. Gridin[2], S. B. Donnald[3,4], C. L. Melcher[3], R. T. Williams[2]
[1]Faceted Development, LLC, USA; [2]Wake Forest University, USA; [3]The University of Tennessee, USA; [4]Agile Technologies, USA

2E-24 High Dynamic Range Photon Counting Imagers Using Nano-Engineered Microchannel Plates
C. D. Ertley, O. H. W. Siegmund, J. Hull, A. Tremsin, *UC Berkeley Space Sciences Laboratory, CA*; A. O'Mahony, C. Craven, M. Minot, M. Popecki, *Incom, Inc., MA*

2E-25 Non-Destructive Uranium Age Dating By High Resolution Gamma Spectrometry
L. Lakosi, *Centre for Energy Research, Hungarian Academy of Sciences, Hungary*; A. Kocsonya, T. C. Nguyen, ,

2E-26 Measurement of Fission Probabilities of Neutron-Induced, Angular-Momentum-Dependent Direct Reactions
J. D. Koglin[1,2], J. T. Burke[2], R. J. Casperson[2], I. Jovanovic[3]
[1]Pennsylvania State University, USA; [2]Lawrence Livermore National Laboratory, USA; [3]University of Michigan, USA

2E-27 Analyzing Beta-Gamma Spectra of Xe Isotopes Using the Method of "Successive 1D Fitting"
N. Deshmukh, A. Prinke, J. McIntyre, B. Miller
Pacific Northwest National Laboratory, USA

2E-28 Multiplicity Counting with a Water Neutron Detector
A. Asghari, *UC Berkeley, USA*; A. Bernstein, S. Dazeley, *Lawrence Livermore National Laboratory, USA*

2E-29 The Neutron Detector Using Radiation Integrated Circuits
M. D. Shah, C. M. Marianno, S. P. Khatri
Texas A&M University, USA

2Fa Neutron- and Muon-Based Detection of Shielded Special Nuclear Materials

Tuesday, May. 24 16:00-17:30 Krutch Auditorium
Session Chairs: **Christopher A. Steer**, AWE, United Kingdom **Kevin Cronk**, DNDO, United Stetes

2Fa-1 (16:00) High-Flux Neutron Generator Development for Active Interrogation of Special Nuclear Materials
R. Radel, *Phoenix Nuclear Labs, USA*

2Fa-2 (16:15) Large-Scale Trans-Stilbene Crystals for Fast Neutron Detection
N. Zaitseva, A. Glenn, L. Carman, A. Mabe, S. Payne
LLNL, USA

2Fa-3 (16:30) Neutron Spectroscopy by Thermalization Light Yield Measurement in a Composite Heterogeneous Scintillator
T. Shi[1], J. Nattress[2], M. Mayer[1], M. Lin[1], I. Jovanovic[1,2]
[1]Pennsylvania State University, USA; [2]University of Michigan, USA

2Fa-4 (16:45) Threshold Rejection Mode Active Interrogation of SNMs Using Continuous Beam DD Neutrons with Centrifugal and Acoustic Tensioned Metastable Fluid Detectors
B. C. Archambault[1], A. Hagen[2], K. Masuda[3], N. Yamakawa[4], R. P. Taleyarkhan[1,2]
[1]Sagamore Adams Laboratories, USA; [2]Purdue University, USA; [3]Kyoto University, Japan; [4]Pony Industry, Japan

2Fa-5 (17:00) SNM Detection Through Pulsed Epithermal-Neutron-Induced Fissions
T. Gozani, *1050 Harriet St., USA*; M. J. King, *Rapiscan Laboratories, USA*

2Fa-6 (17:15) Stream of Commerce Cargo Muon Scattering Signatures
S. M. Glenn, S. G. Azevedo, C. J. Divin, D. N. Fittinghoff, H. E. Martz, F. O. Rebassoo, T. M. Shokair, D. R. Slaughter, M. A. Stoyer, D. M. Wright
Lawrence Livermore National Laboratory, USA

2Fb Enabling Technologies for National Security: Algorithms

Tuesday, May. 24 16:00-17:30 Garden Room
Session Chairs: **Mark Wrobel**, DNDO, United States **Bogdan R. Cosofret**, PSI Corp., United States

2Fb-1 (16:00) Detection and Isotope Identification Capabilities of KSr2I5:Eu
E. Lukosi, M. Rust, C. Melcher
University of Tennessee, USA

2Fb-2 (16:15) Melinator – MEGAlib's Bayesian-Block Based Universal Energy Calibrator
A. Zoglauer, C. Kierans, S. E. Boggs, J.-L. Chiu, A. Lowell, C. Sleator
University of California at Berkeley, USA

2Fb-3 (16:30) Pulse Shape Discrimination Algorithms, Figures of Merit and Gamma Rejection for Liquid and Solid Scintillators
W. G. J. Langeveld, M. J. King, J. Kwong, *Rapiscan Laboratories, Inc., USA*; D. Wakeford, *Los Alamos National Laboratory, USA*

2Fb-4 (16:45) Development of a Nonsensitive Template for Arms-Control-Treaty-Verification Tasks
C. J. MacGahan[1,2], M. A. Kupinski[1], E. M. Brubaker[2], N. R. Hilton[2], P. A. Marleau[2]

[1]*University of Arizona, USA;* [2]*Sandia National Laboratories, CA*

2Fb-5 (17:00) Virtual 3D Scene Development for Radiological Urban Searches

S. S. Huh, V. Negut, B. Quiter

Lawrence Berkeley National Lab, USA

2Fb-6 (17:15) Prompt Neutron Coincidence Anisotropy in Highly Multiplying Assemblies of SNM

J. M. Mueller, J. Mattingly

North Carolina State University, USA

3A Advanced Capabilities Enabled by Gamma-Ray and Neutron Imaging Plenary

Wednesday, May. 25 08:30-10:00 Krutch Auditorium

Session Chairs: **Erik Brubaker**, SNL, United States **Zhong He**, U. Michigan, United States

3A-1 (08:30, invited) Gamma-Ray Imaging Concepts

K.-P. Ziock, *Oak Ridge National Laboratory, USA*

3A-2 (09:00, invited) Neutron Imaging Overview

P. Vanier, *Brookhaven National Laboratory, USA*

3A-3 (09:30, invited) Gamma-Ray and Neutron Imaging Path Forward

K. Hertz

Defense Nuclear Nonproliferation Research and Development, USA

3Ba Advanced Neutron Imaging

Wednesday, May. 25 10:30-12:00 Krutch Auditorium

Session Chairs: **Jason Hayward**, UTK, United States **Scott Kiff**, SNL, United States

3Ba-1 (10:30) Efficient, High Resolution Neutron Imaging by Ce-Doped GdI3

Z. Marton, S. R. Miller, S. Waterman, S. Scarborough, V. V. Nagarkar

Radiation Monitoring Devices, Inc., United States

3Ba-2 (10:45) Response of a New Pad-Based Neutron Detector Developed for Coded Aperture Thermal Neutron Imaging

I. Dioszegi, P. E. Vanier, *BNL, USA*

3Ba-3 (11:00) Thermal and Fast Neutron Coded-Aperture Imaging

M. Sweany, E. Brubaker, P. Marleau, *Sandia National Laboratories, USA*; M. Blackston, P. Hausladen, J. Newby, *Oak Ridge National Laboratory, USA*

3Ba-4 (11:15) Exploiting Fission Chain Reaction Dynamics to Image Multiplying Assemblies of Fissile Materials

P. Chapman, J. Linkous, J. Mattingly, *North Carolina State University, USA*; J. Newby, *Oak Ridge National Laboratory, USA*

3Ba-5 (11:30) Spectroscopic Neutron Radiography for a Cargo Scanning System

J. Rahon, A. Danagoulian, T. D. MacDonald, Z. S. Hartwig, R. Lanza

Massachusetts Institute of Technology, USA

3Ba-6 (11:45) Development and Characterization of a High Energy Neutron Time of Flight Imaging System

A. C. Madden, R. Schirato, A. Swift, D. Mayo, J. Hunter, T. Cutler, J. Goglio

Los Alamos National Laboratory, USA

3Bb Enabling Technologies for National Security: Gamma-Ray Detection

Wednesday, May. 25 10:30-12:00 Garden Room

Session Chairs: **Jarek Glodo**, RMD Inc., United States **Paul Barton**, LBNL, United States

3Bb-1 (10:30) Potential Pathway for Cost Reductions: Growth of High Performance Halide-Based Scintillators Using the Multi-Ampoule Bridgman Method

A. C. Lindsey, M. Zhuravleva, Y. Wu, C. L. Melcher

The University of Tennessee, USA

3Bb-2 (10:45) Fabrication and Evaluation of Orthogonal-Strip TlBr Gamma-Ray Detectors

K. Hitomi[1], N. Nagano[1], T. Onodera[2], T. Ito[1], S.-Y. Kim[1], K. Ishii[1]

[1]*Tohoku University, Japan;* [2]*Tohoku Institute of Technology, Japan*

3Bb-3 (11:00) Scintillation Non-Proportionality in Alkali Halide Crystals. Modifications with Doping and Temperature

A. Belsky[1], C. Dujardin[1], A. Gektin[2], S. Gridin[2,3], A. Vasil'ev[4]

[1]*Université Claude Bernard Lyon 1, France;* [2]*Institute for Scintillation Materials of the NAS of Ukraine, Ukraine;* [3]*Wake Forest University, USA;* [4]*Lomonosov Moscow State University, Russia*

3Bb-4 (11:15) Large Crystal Growth of High Performing $KSr_2I_5:Eu^{2+}$

L. M. Stand[1], M. Zhuravleva[1], J. Johnson[1], M. Loyd[1], S. Donnald[2], K. Vaigneur[2], E. Lukosi[1], C. L. Melcher[1]

[1]*University of Tennessee, United States;* [2]*Agile Technologies, United States*

3Bb-5 (11:30) Ternary and Quaternary Monoclinic Iodides as Scintillators for Radiation Detection
K. Biswas, C. M. Fang
Arkansas State University-Jonesboro, USA
3Bb-6 (11:45) Application of the EFG Method for Growth High-Brightness Scintillators
S. E. Swider[1], R. S. Feigelson[2], G. D. Calvert[2], M. R. Overholt[1], S. Lam[1], K. Becla[1], S. Motakef[1]
[1]CapeSym, Inc., USA; [2]Stanford Univerity, USA

4A Large Arrays of Low-Cost, Passive Detectors Plenary

Thursday, May. 26 08:30-10:30 Krutch Auditorium
Session Chairs: **Simon Labov**, LLNL, United States **Michael C. Wright**, ORNL, United States

4A-1 (08:30, invited) The Development of Networked Radiation Detection Systems
R. Vojtech, *Domestic Nuclear Detection Office, USA*
4A-2 (08:55, invited) Overview of the SIGMA Program
V. Tang, *DARPA, USA*
4A-3 (09:20, invited) Advanced Radiation Monitoring Device (ARMD) Advanced Technology Demonstration (ATD)
M. J. Harrison, *Argonne National Laboratory, USA*
4A-4 (09:45, invited) WIND: The Next-Generation Radiation Detection Backpack
S. Luke, *Domestic Nuclear Detection Office, USA*
4A-5 (10:05, invited) United Kingdom Home Office Efforts in Radiation Detection
K. Taylor, *Home Office, UK*

4B Coffee & Poster Session 4B

Thursday, May. 26 10:30-11:30 Grand Courtyard
Session Chair: **Tetiana Shalapska**, LBNL, United States

4B-1 Gadolinium-Core Based Polyvinyltoluene Plastic Scintillator Sphere for Neutron Detection and Counting
J. N. Dumazert[1], R. Coulon[1], F. Carrel[1], S. Normand[1], L. Méchin[2], M. Hamel[1]
[1]CEA, France; [2]CNRS, France
4B-2 Un-Imaged Gamma-Ray Detection with the Airborne Radiological Enhanced-Sensor System (ARES)
B. Seilhan, S. Labov, K. Nelson
Lawrence Livermore National Laboratory, United States
4B-3 Radiological Threat Detection by Canonical Correlation Analysis
E. Lei, K. Miller, P. Huggins, A. Dubrawski
Carnegie Mellon University, United States
4B-4 Recent Improvements in the Quality of Gamma-Ray Spectroscopy Using Plastic Scintillators
D. Ramsden, G. Pavlovski, D. Ayres, A. Price
Symetrica Security Ltd., United Kingdom
4B-5 Characterization of Deuterated-xylene Scintillator as Neutron Spectrometer
A. Di Fulvio, F. D. Becchetti, R. Raymond, R. O. Torres-Isea, S. D. Clarke, S. A. Pozzi
University of Michigan, United States
4B-6 Design and Expected Performance of an Explosives and Contraband Detection System Using Neutron Resonant Attenuation
M. Sweany, P. Marleau, *Sandia National Laboratories, USA*
4B-7 Low-Cost External Threshold Activation Detection (EXTAD)
M. J. King, *Rapiscan Laboratories, USA*; T. Gozani, *1050 Harriet St., USA*
4B-8 Optimization of Compact Moderator for Neutron Generator Based Inspection System
M. J. King, *Rapiscan Laboratories, USA*; A. M. Krites, B. E. Jurczyk, *Starfire Industries, USA*
4B-9 Exploration of Correlation Signatures from an API-DT Neutron Generator Interrogating Shielded Uranium
B. E. Canion[1], S. McConchie[2], S. Landsberger[1]
[1]The University of Texas, USA; [2]Oak Ridge National Laboratory, USA
4B-10 Compact, Low-Cost Personal Radiation Detector Based on Neutron and Gamma-Ray Sensitive Boron-Coated Straws, with Optional CsI(Tl) Crystal
J. L. Lacy, G. J. Vasquez-Florez, A. Athanasiades, C. S. Martin, V. Zavarzin, T. Lyons, M. Akopyan
Proportional Technologies Inc., USA
4B-11 Optimization of an Inner-Crystal Neutron-Scatter Camera: Monte Carlo Simulation
A. Jo, W. Lee, *Korea University, Korea*
4B-12 Prototype of a Multipurpose Gamma-Ray Imaging Detector Module with Enhanced Expandability
E. Min[1,2], Y.-J. Jung[2], H. Lee[2,1], J. Jang[2], K. M. Kim[3], K. Lee[2]
[1]Korea University, South Korea; [2]Korea Univeristy, South Korea; [3]Korea Institute of Radiological and Medical Sciences, South Korea
4B-13 SCoTSS Modular Survey Spectrometer and Compton Imager

A. M. L. MacLeod[1], L. E. Sinclair[2], P. R. B. Saull[1], P. L. Drouin[3], L. Erhardt[3], H. Jens[4], K. Bohdan[4], U. Rick[3], W. David[3]
[1]National Research Council, Canada; [2]Natural Resources Canada, Canada; [3]Defence Research and Development Canada, Canada; [4]Radiation Solutions Inc., Canada

4B-14 3D Image Reconstruction from Correlated Events of Gamma-Neutron Sources
M. Monterial[1,2], P. Marleau[1], J. E. M. Goldsmith[1], S. A. Pozzi[2]
[1]Sandia National Laboratories, USA; [2]University of Michigan, USA

4B-15 Investigation of the Internal Electric Field of CZT Detectors to Improve the Charge Collection
A. Hossain[1], V. Dedic[2], A. E. Bolotnikov[1], G. S. Camarda[1], Y. Cui[1], R. Gul[1], U. N. Roy[1], G. Yang[1], R. B. James[1]
[1]Brookhaven National Laboratory, USA; [2]Charles University, Czech Republic

4B-16 A Photoelectric Effect Eliminated Material Decomposition Method for Dual MeV Energy CT
T. Zhao, L. Li, Z. Chen, *Tsinghua University, China*

4B-17 Determining Material Properties with Cosmic-Ray Muon Track Analysis
D. Schwellenbach[1], A. Davis[2], C. Kruschwitz[1], J. A. Green[1], W. Dreesen[1]
[1]National Security Technologies, USA; [2]Univeristy of Wyoming, USA

4B-18 A New Large Area Wavelength Shifting Fiber Detector for Thermal Neutrons with Chip Based Readout of Multianode PMTs
R. Engels, U. Clemens, A. Erven, W. Erven, H. Gorke, J. Heggen, G. Kemmerling, H. Loevenich, J. Schelten, C. Wesolek
Forschungszentrum Juelich GmbH, Germany

4B-19 Improving Gamma-Ray Energy Resolution, Non-Proportionality, and Decay Time of NaI:Tl$^+$ with Co-Doping
K. Yang, P. R. Menge, *Saint-Gobain Crystals, United States*

4B-20 Transport and Rate Equation Modeling of Decay Time Components and Their Individual Proportionalities in CsI:Tl
X. Lu, S. Gridin, R. T. Williams, *Wake Forest University, United States*; M. R. Mayhugh, *Faceted Development LLC, United States*; A. V. Gektin, *Institute for Scintillation Materials, Ukraine*; A. Syntfeld-Kazuch, L. Swiderski, M. Moszynski, *National Centre for Nuclear Research, Poland*

4B-21 Solid-State Neutron Detectors Based on Hexagonal Boron Nitride Epilayers
A. Maity, T. C. Doan, J. Li, J. Lin, H. Jiang
Texas Tech University, United States

4B-22 Subpicosecond Laser Cutting of TlBr
D. R. Onken, K. B. Ucer, S. Gridin, R. T. Williams, *Wake Forest University, USA*; A. Datta, S. Motakef, *CapeSym, Inc., USA*

4B-23 Ultrastrong and Flexible Radiation Detectors Comprised of Semiconducting Nanoparticles Grafted upon Aramid Nanofibers
M. D. Hammig, T. Kang, M. Jeong, J. Lyu, B. Davis, N. A. Kotov
University of Michigan, USA

4B-24 Initial Background Evaluation of an Ultra-Low Background Liquid Scintillation Counter
J. L. Erchinger[1,2], J. L. Orrell[1], M. Douglas[1], C. E. Aalseth[1], B. E. Bernacki[1], E. S. Fuller[1], M. E. Keillor[1], C. M. Marianno[2], C. A. Mullen[1]
[1]Pacific Northwest National Laboratory, USA; [2]Texas A&M University, USA

4B-25 Composite Scintillators for Neutron Detection
A. Boyarintsev, A. Bobovnikov, N. Galunov, A. Gektin, N. Karavaeva, S. Kovalchuk, T. Nepokupnaya, Y. Onufriyev, V. Tarasov, S. Vasyukov, O. Zelenskaya
The Institute for Scintillation Materials of National Academy of Sciences of Ukraine, Ukraine

4B-26 Long-Term Store Effects on TlBr Detectors
S. O'Neal, W. Koehler, Z. He, *University of Michigan, USA*; H. Kim, L. Cirignano, K. Shah, *RMD, Inc, USA*

4B-27 First-Principles Study of High Light Yield Intrinsic Scintillator, Cesium Hafnium Chloride
K. Biswas, B. Kang, *Arkansas State University, USA*

4B-28 Characterization of Gamma-Ray and Neutron Radioactive Sources for DNDO Tests
M. A. Stoyer, S. M. Glenn, C. J. Divin, D. N. Fittinghoff, D. R. Slaughter, D. M. Wright, F. O. Rebassoo, H. E. Martz, S. G. Azevedo, T. M. Shokair, *LLNL, USA*; D. Strom, T. White, *PNNL, USA*; J. Spacco, D. Preston, B. Garzel, *Sensor Concepts and Applications (SCA), USA*

4B-29 Pillar-Structured Neutron Detector Based Multiplicity System
J. W. Murphy, Q. Shao, L. Voss, A. Conway, P. Kerr, G. Guethlein, R. Nikolic, *Lawrence Livermore National Laboratory, USA*; L. Fabris, *Oak Ridge National Laboratory, USA*

4Ca Large Arrays of Low-Cost, Passive Detectors

Thursday, May. 26 13:00-14:30 Krutch Auditorium
Session Chairs: **Clair Sullivan**, U. Illinois, United States **Kristin L. Hertz**, SNL, United States

4Ca-1 (13:00) Orthonormal Subspace Projection Matched Filters for Gamma Ray Detectors
K. E. Nelson, B. Seilhan, S. E. Labov
Lawrence Livermore National Laboratory, US

4Ca-2 (13:15) Parameter Inversion Techniques for Radiation Detection Problems
R. Stefanescu, K. Schmidt, J. Hite, R. Smith, J. Mattingly
North Carolina State University, North Carolina, US
4Ca-3 (13:30) Report on a Prototype Wearable Neutron Search Instrument Utilising Compact LiF/ZnS Detectors
M. A. Foster, *Symetrica Security Ltd., UK*; D. Ramsden, ,
4Ca-4 (13:45) TlBr Frisch Collar Devices for Radiation Pager Applications
H. Kim, P. Bennett, A. Churilov, Y. Ogorodnik, G. Ciampi, L. Cirignano, A. Gueorguiev, S. Kim, K. Shah
Radiation Monitoring Devices Inc., United States
4Ca-5 (14:00) The PRD Extension Module of the DMC3000 : a Low Power Personnel Radiation Detector with Radiation Exposure Monitoring.
A. Fallu-Labruyere, C. Micou, F. Schulcz, J. Fellinger
Mirion Technologies (MGPI) SA, France
4Ca-6 (14:15) Luminescence Techniques for Reconstructing Historical Radiological Source Information
R. B. Hayes, *North Carolina State University, USA*

4Cb Enabling Technologies for National Security: Neutron Detection

Thursday, May. 26 13:00-14:30 Garden Room
Session Chairs: **Richard Kouzes**, PNNL, United States **Hank Zhu**, DTRA, United States

4Cb-1 (13:00) Neutron Measurements with Extended Range 4He Detectors in High Gamma Environments
R. P. Kelley[1], T. Zhu[1], S. Gokhale[1], Y. Liang[1], H. Chung[2], S. Kiff[3], D. Murer[4], H. Ray[1], J. E. Baciak[1], A. Enqvist[1], K. A. Jordan[1]
[1]University of Florida, USA; [2]Korea Institute of Nuclear Nonproliferation and Control, Korea; [3]Sanda National Laboratories, USA; [4]Arktis Radiation Detectors Ltd., Switzerland
4Cb-2 (13:15) A Transportable High Efficiency Fast Neutron Spectrometer
C. Roecker[1], A. Bernstein[2], P. Marleau[3], K. Vetter[1,4]
[1]UC Berkeley, USA; [2]Lawrence Livermore National Laboratory, USA; [3]Sandia National Laboratories, USA; [4]Lawrence Berkeley National Laboratory, USA
4Cb-3 (13:30) Present Status of the Microstructured Semiconductor Neutron Detector (MSND)-Based Direct Helium-3 Replacement (HeRep)
T. R. Ochs[1], S. L. Bellinger[1], R. G. Fronk[1], L. C. Henson[2], D. E. Huddleston[1], J. K. Shultis[1], C. T. Smith[1], T. J. Sobering[1], D. S. McGregor[1]
[1]Kansas State University, 66506; [2]RDT, Inc., 66506
4Cb-4 (13:45) Neutron Detection Using Solid Organic Scintillators in Hand Held Instruments
A. Glenn, N. Zaitseva, A. Mabe, L. Carman
Lawrence Livermore National Laboratory, USA
4Cb-5 (14:00) Fission Neutron Detection Using 3-D CdZnTe Detectors
Z. He, M. Streicher, Y. Zhu
The University of Michigan, USA
4Cb-6 (14:15) Fast Neutron Spectroscopy with Tensioned Metastable Fluid Detectors
T. F. Grimes[1], R. P. Taleyarkhan[1,2]
[1]Purdue University, USA; [2]Sagamore Adams Laboratories, LLC, USA

4E Coffee & Poster Session 4E

Thursday, May. 26 14:30-15:30 Grand Courtyard
Session Chair: TBD

4E-1 Mapping Montebello Island Using a Portable Gamma-Ray Spectroscopy System
A. Flynn, D. Boardmen, A. Sarbutt, E. Young
ANSTO, Australia
4E-2 Mobile Radiation Sensor Networks for Source Detection in a Fluctuating Background Using Geo-Tagged Count Rate Data
Z. Liu, C. J. Sullivan
University of Illinois at Urbana-Champaign, United States
4E-3 Accurate Source Identification with Medium Resolution Detectors Using Advanced Spectroscopic Analysis Algorithms
K. N. Shokhirev, M. A. Costolo, B. R. Cosofret
Physical Science Inc., USA
4E-4 MUSE - Multi-Agency Urban Search Experiments
I. Garishvili, *BGS/ORNL, USA*; D. Hornback, D. Archer, A. Nicholson, D. Peplow, G. Davidson, M. Swinney, *ORNL, USA*; J. Peltz, *NNSA, USA*; L. McLean, *NTSEC, USA*; B. Quiter, M. S. Bandstra, *LBNL, USA*
4E-5 Conceptual Design for a Silicon Strip Cosmic-Ray Muon Detector for SNM

J. A. Green, W. Dreesen, D. Schwellenbach, D. Aberle, *NSTec, USA*; R. Lipton, M. Utes, P. Rubinov, W. E. Cooper, *Fermilab, USA*

4E-6 Buildup and Decay of Delayed Neutrons from Fission Induced by a $^{11}B(d,n?)^{12}C$ Source

M. Mayer[1], J. Nattress[2], A. Foster[1], A. Barhoumi Meddeb[1], Z. Ounaies[1], C. Trivelpiece[1], I. Jovanovic[2]

[1]Pennsylvania State University, USA; [2]University of Michigan, USA

4E-7 Conceptual Design of a Novel X-Ray Backscatter Inspection System with Enhanced Penetration and Material Discrimination

A. Arodzero, *RadiaBeam Technologies, LLC, USA*; V. Ziskin, *Physical Science, Inc., USA*

4E-8 Automated Manufacturing of Boron Coated Straws for Security and Neutron Science Applications

J. L. Lacy, C. S. Martin, S. Davenport, M. Regmi, G. J. Vasquez-Flores, M. Lacy, N. S. King, E. X. Zhang

Proportional Technologies, Inc., USA

4E-9 The 3DCZT Detector Developed at DTU Space

I. Kuvvetli, C. Budtz-Jørgensen

DTU Space National Space Institute, Technical University of Denmark, Denmark

4E-10 Image Reconstruction of Radioactive Sources with a SCoTSS Compton Gamma Imaging Device

R. Ueno[1], P.-L. Drouin[1], L. Erhardt[1], J. Hovgaard[2], B. Krupskyy[2], A. MacLeod[3], P. Saull[3], L. Sinclair[4], D. Waller[1]

[1]Defence Research and Development Canada, Canada; [2]Radiation Solutions Inc, Canada; [3]National Research Council Canada, Canada; [4]Natural Resources Canada, Canada

4E-11 Readout Electronics for a Single-Volume Neutron Scatter Camera

J. Steele, J. Brennan, E. Brubaker, G. Kaufman, M. Sweany, *Sandia National Laboratories, Livermore, USA*; J. Mattingly, K. Weinfurther, *North Carolina State University, USA*

4E-12 The Uniqueness of Neutron Images for Warhead Verification

R. R. Macdonald, R. S. Kemp, A. Danagoulian, J. Vavrek

MIT, USA

4E-13 Crystal Growth and Characterization of KCa0.8Sr0.2I3:Eu2+ Scintillators

Y. Wu, M. Zhuravleva, A. C. Lindsey, C. L. Melcher

University of Tennessee, USA

4E-14 Determining the Alpha-Ratio of Moderated Fissile Oxides

J. M. Verbeke, G. F. Chapline, L. Nakae

Lawrence Livermore National Laboratory, USA

4E-15 Imaging a Vertical Shaft from a Tunnel Using Muons

D. D. Schwellenbach[1], N. D. Bonal[2], D. J. Dorsey[2], L. Preston[2], J. A. Green[1], D. Smalley[1], W. Dreesen[1]

[1]National Security Technologies, USA; [2]Sandia National Laboratories, USA

4E-16 Automated Isotope Identification Algorithm Using Artificial Neural Networks

M. Kamuda, C. Sullivan

University of Illinois, United States

4E-17 Effects of Correlated and Uncorrelated Gamma-Rays on Fissile Mass Assay

C. C. Cowles[1,2], R. S. Behling[1], G. R. Imel[2], R. T. Kouzes[1], A. T. Lintereur[3], S. M. Robinson[1], E. R. Siciliano[1], S. C. Stave[1]

[1]Pacific Northwest National Laboratory, USA; [2]Idaho State University, USA; [3]University of Utah, USA

4E-18 Development and Operation of a Li6F:ZnS - Scintillating Plastic Capture Gated Detector

K. Wilhelm, M. Mayer, *Pennsylvania State University, USA*; J. Nattress, I. Jovanovic, *University of Michigan, USA*

4E-19 Study on Tolerance of TlBr Semiconductor Detectors to Gamma-Ray Irradiation

M. Matsumura, K. Watanabe, A. Yamazaki, A. Uritani, *Nagoya University, Japan*; N. Nagano, K. Hitomi, *Tohoku University, Japan*

4E-20 Calibrating the ProSPECTus System to Enable Rapid and Accurate Point-Source Activity Quantifications

T. F. Woodroof, J. Dormand, A. J. Boston, D. S. Judson, L. Harkness-Brennan, A. Patel, J. Bridge, J. Cooper

University of Liverpool, United Kingdom

4E-21 A Hybrid Enrichment Verification Array for Unattended UF6 Cylinder Assay: Module Characterization Studies

M. A. Zalavadia, L. E. Smith, B. S. McDonald, E. K. Mace, N. S. Deshmukh

Pacific Northwest National Laboratory, USA

4E-22 An Implicit Labeling Method for Fast Neutron/Gamma Discrimination

K. P. Lennox, A. M. Glenn, R. E. Wurtz

Lawrence Livermore National Laboratory, USA

4E-23 Water and Bromine Methanol Surface Treatments to Increase TlBr Gamma Detector Longevity

E. L. Swanberg, A. M. Conway, R. T. Graff, A. J. Nelson, L. F. Voss, S. A. Payne, *Lawrence Livermore National Laboratory, USA*; H. Kim, L. Cirignano, A. Churilov, K. Shah, *Radiation Monitoring Devices, INC, USA*

4E-24 Monte Carlo Simulations of the Zero Knowledge Warhead Verification Protocol

J. R. Vavrek, A. Danagoulian, E. Immerman, R. S. Kemp, R. C. Lanza, R. R. Macdonald, B. Osmanov

Massachusetts Institute of Technology, United States

4E-25 Rapid Fabrication and Characterization of Lithium Glass/Polyvinyl Toluene Composite Neutron Detectors with Multiple Glass Geometries

A. Foster[1], A. Barhoumi Meddeb[1], M. Mayer[1], C. Trivelpiece[1], J. Nattress[2], I. Jovanovic[2], Z. Ounaies[1]
[1]Pennsylvania State University, United States; [2]University of Michigan, United States

4E-26 Algorithms Enabling Coincidence Gamma Spectroscopy
A. M. Prinke, N. Deshmukh, B. W. Miller, B. D. Pierson, G. A. Warren, M. A. Zalavadia
Pacific Northwest National Laboratory, USA

4E-27 Scanning the Entire Aircraft
N. Birsan, M. Tudor, C. Sima, D.-P. Munteanu
MB Telecom Ltd, Romania

4E-28 Progress in the Optimization of Glass-Body Microchannel Plate Photodetectors Developed at Argonne National Laboratory
J. Wang, *Argonne National Laboratory, USA*

4E-29 Bismuth-Loaded Plastic Scintillator Portal Monitor
N. J. Cherepy, H. P. Martinez, P. R. Beck, R. D. Sanner, E. L. Swanberg, S. A. Payne, *Lawrence Livermore National Laboratory, USA*; C. R. Hurlbut, *Eljen Technology, USA*

4Fa Advanced Gamma-Ray Imaging

Thursday, May. 26 15:30-16:30 Krutch Auditorium
Session Chairs: **Erik Brubaker**, SNL, United States **Kai Vetter**, UC Berkeley, United States

4Fa-1 (15:30) Combined Compton and Pinhole Imaging of Distributed Plutonium-238 Holdup
T. J. Aucott, A. B. Brand, D. P. DiPrete, *Savannah River National Laboratory, US*; A. H. Couture, *Pajarito Scientific Corporation, US*

4Fa-2 (15:45) Search and Detection of Weak Gamma-Ray Sources Using the Apollo Handheld Gamma-Ray Imaging Spectrometer
F. Zhang, W. Kaye, W. Wang, J. Jaworski, C. G. Wahl, Y. A. Boucher, K. Moran, Z. He
H3D, Inc., USA

4Fa-3 (16:00) Special nuclear material characterization using energy spectra measured by a dual-particle imaging system
J. K. Polack, M. C. Hamel, T. L. Beames-Canivet, L. O. Supic, S. D. Clarke, S. A. Pozzi
University of Michigan, USA

4Fa-4 (16:15) 3D Directionality with a Pixelated Scintilator Gamma Spectrometer
E. L. Swanberg, B. M. Wihl, N. J. Cherepy, P. R. Beck, Z. M. Seeley, S. L. Hunter, S. E. Fisher, S. A. Payne, *Lawrence Livermore National Lab, USA*; J. Kindem, *Cokiya, Inc, USA*

4Fb System Development for Wide-Area Search

Thursday, May. 26 15:30-16:30 Garden Room
Session Chairs: **Ren Cooper**, LBNL, United States **Kevin Cronk**, DNDO, United States

4Fb-1 (15:30) 3-D Gamma-Ray Data Fusion from Handheld to Aerial Platforms
A. Haefner[1], R. Barnowski[2], R. Pavlovski[2], T. Joshi[1], V. Negut[1], P. Luke[1], M. Amman[1], D. Gunter[1], L. Mihailescu[1], K. Vetter[1,2]
[1]Lawrence Berkeley National Lab, USA; [2]UC Berkeley, USA

4Fb-2 (15:45) Development of a Dual Gamma/Neutron Spectrometer for Field Identification of Radioisotopes
D. M. Slaughter, *VP of Research, Photogenics, USA*
On behalf of the Photogenics Group and Collaborators

4Fb-3 (16:00) A Portable Directional Neutron Detector for Detection and Localization of Hidden Nuclear Materials
M. Regmi, G. Vazquez, A. Athanasiades, C. Martin, J. Lacy
Proportional Technologies Inc., USA

4Fb-4 (16:15) Boron-10 Nanoparticle Filled Micro-Structured Solid State Neutron Detector
R. Dahal, J.-W. Wu, A. Weltz, M. Koirala, M. M. Hella, J. J. J-Q. Lu, I. B. Bhat, Y. Danon
Rensselaer Polytechnic Institute, USA

4G Closing Plenary

Thursday, May. 26 16:30-17:00 Krutch Auditorium

4G-1 (16:30) Closing Remarks
J. D. Valentine, *Lawrence Berkeley National Laboratory, USA*