



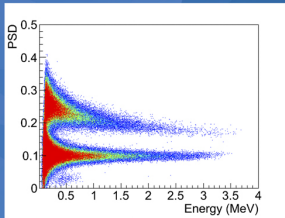
CAEN Sys

Systems & Spectroscopy Division

GAMMA AND FAST NEUTRON DETECTION SYSTEMS BASED ON COMBINED SCINTILLATORS FOR NUCLEAR SAFEGUARDS AND SECURITY APPLICATIONS

Gamma Neutron Counting

High-efficiency gamma/neutron organic detector
Pulse Shape Discrimination algorithm



** same Pulse Shape Discrimination (PSD) implemented in the IAEA Fast Neutron Collar Monitor (fresh fuel verification)



Extensive Test Campaign



NEUTRON SOURCES: PU-239 65-75% ENRICHED

distance (cm)	Shielding	Identification/trials
15 x standard	-	150/150
15 x standard	Poly 5 cm	14/15
15 x standard	Pb 5 cm	14/15
25 x standard	-	30/30

distance (cm)	Shielding	Identification/trials
15 x standard	-	9/9
15 x standard	Poly 5 cm	8/8
15 x standard	Pb 5 cm	6/8
20 x standard	-	8/8
25 x standard	-	12/15

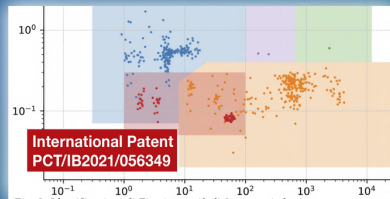
SNIPER G-N Special Nuclear Material & Severe Nuclear Threats Identifier

Remote measurement systems

1. Radiation detectors
2. Electronic for internal data processing
3. mini-computer for internal data logging
4. Battery powered (battery backup)
5. Wi-Fi connection for data visualization



Neutron Source Identification



Different conditions:
- Moderated
- Shielded
- Masked

Am/Be (red) area is discriminated through a 3rd parameter

International Patent PCT/IB2021/056349

1. WO2022013777 - SYSTEM AND METHOD FOR IDENTIFYING NUCLEAR THREATS

Publication Number: WO/2022/013777
 Publication Date: 05/18/2022
 International Application No.: PCT/IB2021/056349
 International Filing Date: 04/15/2021
 IPC Classifications: G01T 0107 (20060101), G01T 0108 (20060101), G01T 0110 (20060101)

Patent History
 Patent number: 11855477
 Type: Grant
 Filed: Jul 14, 2021
 Date of Patent: Dec 5, 2023
 Patent Publication Number: 20220074876
 Assignee: CAEN TECHNOLOGIES, INC. (New York, NY)
 Inventor: Massimo Morici (Madison, CT)
 Primary Examiner: David P. Porta
 Assistant Examiner: Casey Bryant
 Application Number: 17/975,743

Abstract
 A method and a device for the detection of radioactive sources, based on the simultaneous use of two or more radiation detectors of different types or configurations. The method involves the simultaneous use of two or more radiation detectors of different types or configurations. The device is a portable system for the detection of radioactive sources, based on the simultaneous use of two or more radiation detectors of different types or configurations. The system is used for the detection of radioactive sources in a controlled environment, such as a laboratory or a field site.

Exceeding the standards

Report
 17h 26m 30s

SNM: Cf-252, moderated, masked	: C.L: 80%
Industrial: Am-241	: C.L: 100%
Medical: Co-57	: C.L: 100%
Industrial, Medical: Co-60	: C.L: 100%
Industrial, Medical: Cs-137	: C.L: 100%
Industrial, Medical: Eu-152	: C.L: 100%
Industrial: Ba-140	: C.L: 70%
Medical: Na-22	: C.L: 100%

Portable and Scalable



- BACKPACK**
- Less than 8 kg
 - 38 x 30 x 14 cm
 - Battery: 8 hours (hot-swap)
 - Wireless connectivity



- RACK/MODULAR**
- Scalable number of detectors
 - Battery backup
 - Rack mountable
 - Deployment in reconciliation rooms



- Modular design with external detectors
- Large volume detectors for access monitoring

4 channel-Fast Neutron Data Acquisition System

