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and Performances of a Special Identifier of Nuclear Threats and SNM in Realistic Scenarios

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This paper presents the results of extensive tests conducted for more than 4 years, towards the realization of a portable backpack systems for the measurement and identification of radioactive material and at the same time determine in real time, without the support from experts, presence of SNM isotopes: U, Pu-239, PuWG, UWG, Am-Be, Am-Li, or their combination with masking sources and shielding. The performances of the device are exceeding the reference standards in sensitivity and furthermore for its capability SNM identification. The exclusive feature of this instrument is the capability to discriminate between fission sources (like Californium 252Cf) and alpha-n type sources (like Americium Beryllium Am-Be) from Plutonium and Uranium through an innovative dedicated parallelized algorithm. The neutron source detection has also been proved in a gamma ray field up to 100-300 $\mu\text{Sv/h}$.

This device, based on an organic liquid scintillator with excellent Pulse Shape Discrimination (PSD) proprieties for the simultaneous detection of gamma rays and neutrons, detects radioactive source as SNM, medical, industrial and Naturally Occurring Radioactive Material. An additional inorganic scintillator is also embedded, giving the capability of calculating Pu and U enrichment grade through characteristic gamma emission lines.

Promotional text

The system presented can perform the characterization of nuclear and other radioactive materials using a combined detection of fast neutrons and gamma radiation that can help to determine the origin and history of the materials under assay.

Primary authors: Mr MANGIAGALLI, Giacomo (CAEN S.p.A., Viareggio, Italy); Dr MORICHI, Massimo (CAEN S.p.A., Viareggio, Italy); Dr BONESSO, Isacco (University of Padua, Padua, Italy); Dr STEVANATO, Luca (University of Padua, Padua, Italy)

Co-author: Dr CORBO, Matteo (CAEN S.p.A., Viareggio, Italy)

Presenter: Mr MANGIAGALLI, Giacomo (CAEN S.p.A., Viareggio, Italy)

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