

# Rapid detection and localization of special nuclear materials

*Wednesday 27 October 2021 15:55 (20 minutes)*

## ABSTRACT

We have developed a method for sensitive detection and localization of special nuclear materials (SNM) within the context of an organic scintillator based radiation portal monitor (RPM) prototype system. The method uses fast time and energy correlations between gamma-rays and neutrons from spontaneous fission, and may be used as an additional detection modality, besides single gamma-ray and neutron counting. The newly developed neutron-gamma emission tomography (NGET) technique make possible fast and precise localization of small amounts of SNMs. This novel technique addresses global security threats from terrorism and the proliferation of nuclear weapons. It is demonstrated within the framework of an RPM prototype system, but it can be adapted to different detection geometries and applications, such as nuclear security, public safety, nuclear accident scenarios and radiological surveying in various contexts. Results on the RPM detection capabilities and localization accuracy in different shielding scenarios will be presented.

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**Session Classification:** Wednesday