Abstract Submitted
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Feasibility of 238U NRF Detection in Shipping Containers[1] BEN RYAN, UNC Chapel Hill — Sophisticated detection methods are required to efficiently screen the immense volume of containers imported into the United States for the presence of special nuclear materials. The likelihood of detection of characteristic nuclear resonance fluorescence (NRF) lines for the 238U isotope inside a shipping container is examined. Similarly to atoms, nuclei fluoresce when they are excited by incident photons of particular energies unique to each isotope. Detection of the resulting gamma transitions induced by a γ-source allows for nonintrusive interrogation of materials. The Geant4 Monte Carlo simulation toolkit was modified to support detection of NRF. Simulations of a number of typical cargo container geometries containing natural uranium irradiated by a realistic nearly monoenergetic tunable gamma source were developed. The existence of NRF lines in the resulting spectra of exterior detectors will be described.

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