Abstract Submitted
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Detecting Shielded Special Nuclear Materials Using Multi-Dimensional Neutron Source and Detector Geometries[1] JOHN SANTARIUS, MARCOS NAVARRO, MATTHEW MICHALAK, AARON FANCHER, GERALD KULCINSKI, RICHARD BONOMO, University of Wisconsin-Madison — A newly initiated research project will be described that investigates methods for detecting shielded special nuclear materials by combining multi-dimensional neutron sources, forward/adjoint calculations modeling neutron and gamma transport, and sparse data analysis of detector signals. The key tasks for this project are: (1) developing a radiation transport capability for use in optimizing adaptive-geometry, inertial-electrostatic confinement (IEC) neutron source/detector configurations for neutron pulses distributed in space and/or phased in time; (2) creating distributed-geometry, gas-target, IEC fusion neutron sources; (3) applying sparse data and noise reduction algorithms, such as principal component analysis (PCA) and wavelet transform analysis, to enhance detection fidelity; and (4) educating graduate and undergraduate students.

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