Triple PSD with Polysiloxane-based Scintillators

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Abstract

Organic scintillators have been of increasing interest to the nuclear nonproliferation as a tool for treaty verification and safeguards due to their sensitivity to multiple species of ionizing radiation. Recent advances in producing boron-doped polysiloxane scintillators have shown that the addition of thermal neutron detection does not sacrifice neutron-gamma discrimination. Unsupervised machine learning methods are implemented for separating pulse contributions from fast neutrons, thermal neutrons, and gammas. Preliminary results from scintillator array measurements are included.