

Abstract Submitted
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Investigation of Energy Threshold and Neutron-Gamma Discrimination for the NEXT Array¹ STEVEN SHADRICK, MUSTAFA RAJABALI, Tennessee Technological University, ROBERT GRZYWACZ, KYLE SCHMITT, University of Tennessee, AARON ENGELHARDT, Tennessee Technological University — In present nuclear studies, limitations on determining γ -ray and neutron transitional energies are dependent on the quality and versatility of the detector arrangement. Of particular interest is the 0.1-10 MeV range. Many arrangements are bulky due to traditional photomultiplier tubes (PMTs) and typically have poor resolution at and below the 1 MeV range. The Nuclear dEtector with Tracking (NEXT) project is working to resolve these issues using silicon photomultipliers (SiPMs). SiPMs help to fulfill the increasingly apparent need for compact detectors for neutron detection while enabling measurements from 0.1-10 MeV with excellent resolution. Thin scintillator blocks of EJ-200 and EJ-299-33A plastic were used in conjunction with SiPMs to obtain energy spectra to verify energy threshold values. In addition, a separate project of scintillation light wavelength measurements were performed to determine the capability of EJ-299-33A to distinguish neutron from γ -ray hits. Methods of noise reduction in the spectrometer were implemented and documented. The analysis of energy measurements and wavelength measurements from the two projects will be presented. This research was funded by the Department of Energy and NNSA.

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