

Abstract Submitted  
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**Distinguishing fissions of  $^{239}\text{Pu}$  and  $^{235}\text{U}$  with low-resolution detectors**<sup>1</sup> E. SWANBERG, E.B. NORMAN, S.G. PRUSSIN, H. SHUGART, UC Berkeley, E. BROWNE, LBNL — When  $^{239}\text{Pu}$  and  $^{235}\text{U}$  undergo thermal neutron-induced fission, both produce significant numbers of  $\beta$ -delayed gamma rays with energies in the several MeV range. Experiments using high energy-resolution germanium detectors<sup>2</sup> have shown that it is possible to distinguish the fission of  $^{239}\text{Pu}$  from that of  $^{235}\text{U}$ . Using differences in the temporal behavior and in the shapes of the gamma-ray energy spectra, we show that these two isotopes can also be differentiated using low-resolution plastic or liquid scintillators. It is likely this method could be extended to homeland security applications, such as screening of cargo containers for  $^{235}\text{U}$  and  $^{239}\text{Pu}$ , using a neutron source and such scintillators.

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<sup>2</sup>R. E. Marrs *et al.*, Nucl. Instr. & Meth. A (in press).

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