

# **Hard X-Ray, Gamma-Ray, and Neutron Detector Physics**

## **Multiple-Coincidence Active Neutron Interrogation of Fissionable Materials**

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### **ABSTRACT**

Using a beam of tagged 14.1 MeV neutrons to probe for the presence of fissionable materials, we have measured n- $\gamma$ - $\gamma$  coincidences from depleted uranium (DU). The multiple coincidence rate is substantially above that measured from lead, tungsten, and iron. The presence of coincidences involving delayed gammas in the DU time spectra provides a signature for fissionable materials that is distinct from non-fissionable ones. In addition, the information from the tagged neutron involved in the coincidence gives the position of the fissionable material in all three dimensions. The result is an imaging probe for fissionable materials that is more compact and that produces much less radiation than other solutions.

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