Detecting Fissionable Material in Cargo Containers via High-Energy Gamma Rays Emitted by Fission Products

Eric B. Norman, Lawrence Livermore National Laboratory, Livermore, CA 94551, USA

A method for detecting the presence of fissionable material concealed in intermodal cargo containers is being developed. It is based on interrogation with a pulsed beam of 7-MeV neutrons that produce fission. β-delayed high energy gamma rays emitted between beam pulses by fission products provide the detection signature. Fission product β-delayed gamma rays above 3 MeV are nearly 10 times more abundant than β-delayed neutrons and are easily distinguishable from natural radioactivity and from nearly all of the induced radioactivity in normal cargo. Detector backgrounds and potential interferences with the fission signature have been identified and quantified. Results from recent experiments and future development plans will be presented.