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Measurement of Delayed Gamma-Ray and Neutron Emission from Bremsstrahlung-Induced Fission[1] ZEPHNE LARSEN, Brigham Young University, ALAN HUNT, Idaho State University, STUART JACKSON, DAVID HINSHELWOOD, Naval Research Lab — Recently, there has been an increased interest in applying nuclear physics principles for detection of smuggled nuclear material. One technique being investigated for the detection of fissile materials is called active detection. Active detection consists of irradiating an unknown sample with an intense source of photons to induce photofission in the sample. The radiation emitted by the fission fragments is measured and used to determine whether not the unknown substance is fissile material. Experiments were performed using the Mercury inductive voltage adder (located at the Naval Research Lab) which has been modified to attain a peak voltage of 8MV with 200 kA peak current in a 50-ns pulse. Delayed gamma rays and delayed neutrons were detected unambiguously from depleted uranium using bismuth-germanium-oxide and He-3 detectors, respectively, after irradiation by a single bremsstrahlung pulse from Mercury. The results of this experiment show promise of the detection technique's validity.

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