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Neutron-Induced Partial γ-ray Cross-Section Measurements on Cu, Ge and Pb[1] E. KWAN, J.H. ESTERLINE, B. FALLIN, C.R. HOWELL, A. HUTCHESON, M.F. KIDD, A. TONCHEV, W. TORNOW, Duke Univ. & TUNL, H.J. KARWOWSKI, UNC-Chapel Hill & TUNL, J.H. KELLEY, NCSU & TUNL, D.M. MEI, Univ. of S. Dakota — In high-precision low-statistic measurements such as those carried out in deep underground low-background environments, naturally-occurring radiation can obscure the region of interest. For example, energetic neutrons produced from natural radioactivity or muon-induced reactions will interact with the experimental apparatus producing a continuous background. A survey of neutron-induced γ-ray transitions in ^{nat}Cu, enriched ^{76}Ge, and ^{nat}Pb from 150-4000 keV was carried out at TUNL using pulsed mono-energetic neutron beams, with an emphasis on the region around 2039 keV where the $0\nu\beta\beta$ decay peak of ^{76}Ge is expected to appear. Transitions at 2041, 2615, and 3062 keV in the shielding materials of Pb and Cu may either directly interfere with the ^{76}Ge $0\nu\beta\beta$ peak at 2039 keV or may produce nearby escape peaks. The rates at which these background peaks occur are needed to determine whether events due to $0\nu\beta\beta$ decay are observed and whether neutrinos are indeed their own anti-particles.

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Elaine Kwan
Duke Univ. & TUNL

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