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Investigation of neutron-induced backgrounds in isotopes of Molybdenum for $0\nu\beta\beta$ decay searches[1] M.F. KIDD, Tennessee Tech Univ, W. TORNOW, S. FINCH, TUNL/Duke University — Double-beta decay searches with bolometric crystals are extremely promising due to their excellent energy resolution, detection efficiency, and pulse-shape discrimination. Additionally, they can be constructed from a variety of materials, including many enriched double-beta decay candidates such as ^{100}Mo. With a Q-value of 3034.40 ± 0.17 keV, and a natural abundance of 9.82%, ^{100}Mo is an excellent candidate nucleus for the study $0\nu\beta\beta$ decay. One potential background for observing this transition is neutron inelastic scattering on isotopes of molybdenum. In ^{100}Mo, a nuclear level with energy 3039.4 ± 1.0 keV cascades to the ground state. Though none of these individual gamma rays emitted in this de-excitation lie in the region of interest, if they all interact within a single bolometric crystal, they will sum to a value within the ROI. Even with an enriched ^{100}Mo sample, other isotopes of molybdenum will be present. The isotopes ^{95}Mo and ^{97}Mo also have energy levels that lie within the ROI: 3037 keV and 3035 keV respectively. The decay schemes of these levels are unknown, so we can only search for decays to the ground state. We report our initial results in the investigation of ^{nat}Mo(n,nγ) with 4.5 MeV neutrons.

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M.F. Kidd
Tennessee Tech Univ

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