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Neutron-induced Backgrounds in ^{134}Xe for Large-Scale Neutrinoless Double-Beta Decay Experiments[1] NINA MORIGUCHI, MARY KIDD, Tennessee Tech University, WERNER TORNOW, Duke University/TUNL — ^{136}Xe is used in large neutrinoless double-beta (0) decay experiments, such as KamLAND-Zen and EXO 200. Though highly purified, ^{136}Xe still contains a significant amount of ^{134}Xe. Recently, a new nuclear energy level was found in ^{134}Xe. If ^{134}Xe decays from this proposed excited state, it will emit a 2485.7 keV gamma ray. Because this energy lies near the region of interest of ^{136}Xe 0 decay experiments (Q value 2457.8 keV), it could make a significant contribution to the background. A purified gaseous sample of ^{134}Xe will be irradiated with neutrons of an incident energy of 4.0 MeV at Triangle Universities Nuclear Laboratory and monitored with high-purity germanium detectors. The spectra obtained from these detectors will be analyzed for the presence of the 2581 keV gamma ray. We will report on the status of this experiment. Future plans include expanding this measurement to higher initial neutron energies.

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