Measurements of the 134Xe Neutron Capture Cross-Section Between 0.43 and 5.5 MeV

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In the study of rare event physics, such as neutrinoless double beta decay, it is important to understand potential background events. Neutron-induced events can take place even deep underground. Experiments that study the neutrinoless double beta decay of 136Xe use material enriched in 136Xe, but the material still contains a significant fraction of 134Xe. One neutron-induced event is neutron capture on 134Xe, which can emit gamma rays that have the potential to Compton scatter into the Q-value region of interest for 136Xe double beta decay. In this study, we investigate neutron capture on 134Xe by looking for gamma rays emitted from deexcitation from long-lived excited states of 135Xe and the subsequent decay to 135Cs. The xenon gas used was irradiated in the neutron beam at Triangle Universities Nuclear Laboratory, and the decays were counted in the low-background counting facility located in the Duke Physics building. We will report our results of the neutron capture cross section for incident neutron energies at 0.43, 0.8, 1.5, 2.0, 4.2, and 5.5 MeV. Additionally, the presentation will begin with a short description of how detectors work in physics research.