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Characterization of 100-400 keV nuclear recoils in xenon using a DT neutron source[1] TEAL PERSHING, Lawrence Livermore Natl Lab, DANIEL NAIM, University of California, Davis — In recent decades, xenon Time Projection Chambers (TPCs) have set world-leading limits on the parameter space for Weakly-Interacting Massive Particle (WIMP) dark matter interacting via elastic scattering channels. However, the absence of any WIMP signal in the low-energy nuclear recoil regime (¡100 keV) as predicted by canonical theories merits exploring new parameter space. One natural extension is to search for higher energy WIMP interaction signatures, such as those predicted by effective field theory models or inelastic scattering channels. For a successful search in this energy regime, nuclear recoils of hundreds of keV must be well-characterized. Unfortunately, current calibrations for xenon TPCs only reliably extend to around 100 keV nuclear recoils, and large uncertainties beyond this range hinder accurate characterization of higher energy recoils. This talk will present our effort to calibrate xenon's nuclear recoil response up to approximately 425 keV using the XeNeu dual-phase xenon TPC and 14.1 MeV neutrons from a Deuterium-Tritium generator. The current status of the construction and measurement, as well as the experimental setup's expected sensitivity based on simulations, will also be presented.

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