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Nuclear Recoil Calibrations in the LUX Detector Using Direct and Backscattered D-D Neutrons CASEY RHYNE, Brown University, LUX COLLABORATION — The LUX dark matter search experiment is a 350 kg two-phase liquid/gas xenon time projection chamber located at the 4850 ft level of the Sanford Underground Research Facility in Lead, SD. I will discuss the latest calibration of the nuclear recoil (NR) response in liquid xenon (LXe), performed in-situ in the LUX detector using mono-energetic 2.45 MeV neutrons produced via the Adelphi Technologies, Inc. DD108 D-D neutron generator. The calibration measured the NR charge yield in LXe (Q_y) to 0.7 keVnr recoil energy with an absolute determination of deposited energy and the NR light yield in LXe (L_y) to recoil energies of 1.1 keVnr, both of which improve upon all previous measurements. I will then focus in depth on the extension of this calibration using a new technique for generating a beam of sub-300 keV quasi-mono-energetic neutrons via the backscatter of 2.45 MeV neutrons off a deuterium-based reflector. Current simulations work optimizing the technique, its advantages, and its impact on future research will be discussed, including the extension of the NR Q_y calibration down to 0.14 keVnr, an independent NR L_y calibration, and an a priori estimate of the expected ^{8}B solar neutrino-nucleus coherent scattering signal in the upcoming LUX-ZEPLIN experiment.

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