

Abstract Submitted
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D-D Neutron Generator Calibrations and Hardware in the LUX-ZEPLIN Dark Matter Search Experiment WILL TAYLOR, Brown University, LUX-ZEPLIN COLLABORATION — The LUX-ZEPLIN (LZ) dark matter search experiment will be a two-phase liquid/gas xenon time projection chamber with 7 tonnes of active liquid xenon (LXe) located at the 4850 ft level of the Sanford Underground Research Facility in Lead, SD. LZ will utilize an in-situ, absolute calibration of nuclear recoils (NR) in LXe using mono-energetic 2.45 MeV neutrons produced by a D-D neutron generator. This technique was used in the LUX detector to measure the NR charge yield in LXe (Q_y) to 0.7 keV recoil energy and the NR light yield in LXe (L_y) to recoil energies of 1.1 keV - both of which were the lowest energy measurements achieved in the field. These absolute, ultra-low energy calibrations of the NR signal yields in LXe provide clear measurements of the detector response used for the WIMP search analysis. The improvements made for LZ will include shorter neutron pulse times, multiple neutron conduit configurations, and lower energy neutrons. The upgrades allow for even lower energy measurements of the nuclear recoil response in LXe and an independent measurement of L_y , as well as providing less uncertainty in energy reconstruction. In addition to discussing the physics of the neutron calibrations, I will describe the hardware systems used to implement them.

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