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Neutron Activation Background in the LUX-ZEPLIN Experiment

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The LUX-ZEPLIN (LZ) experiment is a dual-phase liquid-gas 10-tonne xenon time projection chamber (TPC) seeking to discover WIMP dark matter particles or set limits on their properties. The detector has been built at the SURF underground laboratory in South Dakota, USA, and first data set world leading limits on WIMP cross sections. To have the necessary sensitivity, the backgrounds in the detector have to be measured and understood. This includes background from radioactive isotopes of xenon created through neutron activation from either cosmic rays or calibration sources. The rate at which these backgrounds were produced in the LZ detector when exposed to various sources of neutrons has been measured and compared to expectations from simulations.

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