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Identification and Removal of Coincidence Backgrounds in the LUX-ZEPLIN experiment

Tuesday 19 July 2022 19:00 (1 hour)

LUX-ZEPLIN (LZ) is a dual-phase xenon time projection chamber (TPC) designed to achieve sensitivity to a WIMP-nucleon spin-independent cross section of $1.4 \times 10^{-48} \text{ cm}^2$ at a WIMP mass of $40 \text{ GeV}/c^2$ after a lifetime of 1000 live days. One of the key strengths of a dual-phase TPC is the use of both an electroluminescence and scintillation signal to discriminate signal from background, as well as to discriminate electron recoils from nuclear recoils. However, there is a non-negligible probability of an isolated electroluminescence and scintillation signal inside the LZ TPC being incorrectly identified as a scattering event. These accidental coincidence backgrounds are heavily dependent on detector geometry, are difficult to predict in advance of operation, and decrease the sensitivity of any dual-phase experiment. This poster details some sources of isolated signals within LZ, along with a number of methods of reducing these signals, which will be applied to the first science run of LZ data.

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