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New results from LUX

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Two phase xenon time projection chambers have a number of attractive characteristics for their use in rare event searches. This is the case for the Large Underground Xenon (LUX) experiment, resulting in interesting new results. TPCs have been traditionally used in dark matter searches for nuclear recoils, and LUX reported the most sensitive limits to date for spin-independent and spin-dependent WIMP-neutron interactions for masses above 4 GeV/c². Nevertheless, the low radioactivity background for electronic recoils of these devices makes them also highly attractive as a technology for use in searches that result in electron recoils. For example, LUX can probe for both axions coming from the Sun and axion-like particles (ALPs) moving within our Galaxy, arising from coupling to electrons via the so-called axio-electric effect. Although theoretically well motivated, axions have yet to be detected experimentally. We present the first results of the axion and ALP search with the LUX experiment. LUX data have also been used to set an upper limit on the half life of the two-neutrino double electron capture from the K-shell of ¹²⁴Xe. We present the analysis and some preliminary results for this search.

Experimental Collaboration

LUX

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