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Projected WIMP sensitivity of the LUX-ZEPLIN dark matter experiment

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LUX-ZEPLIN (LZ) is a next generation dark matter direct detection experiment that will operate 4850 feet underground at the Sanford Underground Research Facility (SURF) in Lead, South Dakota, USA. Using a two-phase xenon detector with an active mass of 7 tonnes, LZ will search primarily for low-energy interactions with Weakly Interacting Massive Particles (WIMPs), which are hypothesized to make up the dark matter in our galactic halo. LZ builds upon the demonstrated response to keV nuclear recoils and the excellent self-shielding properties of liquid xenon and scales the TPC design beyond all existing experiments. In addition, an optically separated and instrumented xenon skin layer and a surrounding external liquid scintillator detector provide powerful rejection of gamma-rays and neutrons from internal sources. Materials screening and in-house purification of the liquid xenon then ensure that LZ meets the strict radioactivity constraints needed to achieve world leading WIMP search sensitivity. In this talk, I will describe the projected WIMP sensitivity of LZ, based on the latest background estimates and simulations of the detector. With construction well underway, LZ is on track for underground installation at SURF in 2019 and will start collecting data in 2020.

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