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Background model and science reach of the LUX-ZEPLIN (LZ) experiment

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LUX-ZEPLIN (LZ) is a direct dark matter experiment, primarily designed to search for WIMPs, currently being commissioned 1.5 km underground at the Sanford Underground Research Facility in Lead, South Dakota. It features a 2-phase xenon time projection chamber with an active mass of 7 tonnes, surrounded by an instrumented xenon "skin" and a liquid scintillator outer detector which are used as active vetoes. The entire setup is installed inside a tank of ultra-pure water to shield it from external radiation. An extensive screening and selection campaign for the materials used in the construction of the detector, together with an inline xenon purification system, further ensure an ultra low-background environment. This will allow LZ to reach an unprecedented sensitivity to the WIMP-nucleon spin-independent cross-section of 1.4×10^{-48} cm²2 for a 40 GeV/c² mass WIMP after a 1000 live day run, using an inner fiducial mass of 5.6 tonnes with minimal gamma-ray and neutron backgrounds. This is an improvement of more than one order of magnitude over the current best results. This talk will provide an overview of the background model of LZ and its implication on the scientific reach of the experiment, not only for direct WIMP search but also for other interesting physics topics.

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