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Radon Backgrounds in LZ

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LUX-ZEPLIN (LZ) is a next-generation two-phase xenon TPC detector operating at 4850 feet below ground with an active mass of 7 tonnes. The primary goal of LZ is to search for low-energy interactions from the dark matter halo in our galaxy —hypothesised to be in the form of Weakly Interacting Massive Particles (WIMPs). Operating for 1000 days and using a 5.6-tonne fiducial mass, LZ is projected to exclude at a 90% confidence level, spin-independent WIMP-nucleon cross-sections above 1.6x10-48 cm2 for a 40 GeV/c2 mass WIMP. Radon presents the largest contribution to the background model in achieving this sensitivity. In this talk, I will present the comprehensive radon screening programme in LZ that informs material selection and construction; contributions from various radon-related backgrounds, including emanation, plate-out and mis-reconstruction effects; and finally, the implications of radon levels in LZ for both the experiment's sensitivity and the spin-independent WIMP discovery potential of LZ.

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