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Background model fitting in the LUX-ZEPLIN experiment

Tuesday 19 July 2022 19:00 (1 hour)

LUX-ZEPLIN (LZ) is a dark matter direct detection experiment consisting of a dual-phase xenon time projection chamber with an active mass of 7 tonnes, which is surrounded by a xenon skin region and liquid scintillator to serve as active vetoes for gamma-ray and neutron backgrounds, respectively. With an extensive material assay effort, xenon purification campaign, and detector assembly under rigorous cleanliness protocols, LZ has attained an ultra-low background environment that enables a predicted spin-independent WIMP-nucleon cross section of 1.4x10ˆ-48 cmˆ2 at a WIMP mass of 40 GeV/cˆ2 after a livetime of 1000 days. To achieve this unprecedented sensitivity, it is essential to produce a well-constrained background model. This poster will highlight the procedure of background model fitting with in situ measurements, along with implications for simulations tuning and the required radioassay measurement precision for the next generation of dark matter experiments.

Author: AL MUSALHI, Aiham (University of Oxford)

Presenter: AL MUSALHI, Aiham (University of Oxford)

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