

The DARWIN R&Ds towards the XLZD detector

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Experiments using dual-phase liquid xenon time projection chambers (TPCs) are among the most sensitive in looking for weak interactive massive particle (WIMP) dark matter in the GeV to TeV energy range. Current generation of detectors use ~10 tonnes of liquid xenon to reach sensitivities of 10^{-47} cm². The ultimate goal of these experiments is to explore the allowed parameter space for nuclear recoils down to the neutrino fog, after which directionality is needed to discriminate WIMPs from coherent neutrino-nucleus scattering. To reach this goal we need ~60 tonnes of liquid xenon and thus a TPC of ~3 m height and width. The DARWIN program has the purpose to develop the required technology to overcome the challenges in building and operating a detector of these dimensions. In this talk I will show an overview of the challenges and the ongoing R&Ds carried out under the DARWIN flagship in view of a 60 tonnes dual-phase TPC envisioned by the XLZD (XENON-LZ-DARWIN) collaboration.

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