

XLZD - Overview and Physics Potential

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The XLZD Collaboration is developing the next generation large low background xenon experiment with the aim to search for WIMP dark matter into the neutrino-fog. The proposed instrument also provides myriad scientific opportunities in neutrino physics; for instance the search for neutrinoless double beta decay and astrophysical neutrino phenomena. XLZD's design is a ≥ 60 -tonne active xenon dual-phase time projection chamber, pulling from the heritage of XENONnT and LUX-ZEPLIN experiments currently operating ~ 10 -tonne detectors using this technology, and the R&D performed by the DARWIN and nEXO collaborations. A 100-tonne detector with 1000 tonne-years exposure would be the definitive DM experiment, pushing the 3σ discovery potential down to $3 \times 10^{-49} \text{ cm}^2$ at $40 \text{ GeV}/c^2$, the systematic limit imposed by astrophysical neutrinos. Studies are presently ongoing to push XLZD's neutrinoless double beta decay sensitivity using natural xenon, with 9% ^{136}Xe , above 10^{28} year half-life. This talk will give an overview of XLZD, and cover its rich physics potential.

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