Contribution ID: **134** Type: **Talk**

The XLZD Experiment

Wednesday 26 March 2025 17:00 (15 minutes)

The XLZD Collaboration is developing an international experiment to search for WIMP dark matter down to the systematic limit imposed by astrophysical neutrinos. The experiment will be based on the heritage detector designs now operating at the 10-tonne scale implemented by the XENONnT and LUX-ZEPLIN collaborations, and further informed by work being carried out by the DARWIN R&D collaboration. These teams have used liquid xenon time projection chambers to probe WIMP parameter space to unprecedented levels. Building on these successes, we envision a new detector composed of at least 60-tonnes of active xenon surrounded by an outer detector to monitor and measure gamma and neutron backgrounds. XLZD will reach at least 200 tonne-years of exposure, and potentially up to 1000 tonne-years, allowing us to definitively explore the remaining WIMP parameter space. At this scale, XLZD will be able to competitively probe neutrinoless double-beta decay in xenon-136 and search for a broad range of new astrophysical neutrino phenomena.

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Session Classification: SESSION 13: Direct detection: Technical Development-1