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Simulations of the Outer Detector for the XLZD Experiment

Wednesday 9 April 2025 11:30 (15 minutes)

The XENON-LUX-ZEPLIN-DARWIN (XLZD) Experiment will search for Weakly Interacting Massive Particles (WIMPs) using a 60-80T liquid xenon time projection chamber (LXe-TPC) and 1kT Outer Detector (OD) for suppression of neutron background which is indistinguishable from WIMPs signals. The optimisation of the OD in such a detector like XLZD is crucial and is examined in detail here using a Geant4 simulation 'XLZD Sandbox'. The simulation can flexibly modify the OD geometry and media (Gadolinium (Gd) loaded Water-based Liquid Scintillator, Gd-Liquid Scintillator, Gd-Water) for optimisation of the OD design, maximising neutron tagging efficiency and minimising background rate.

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