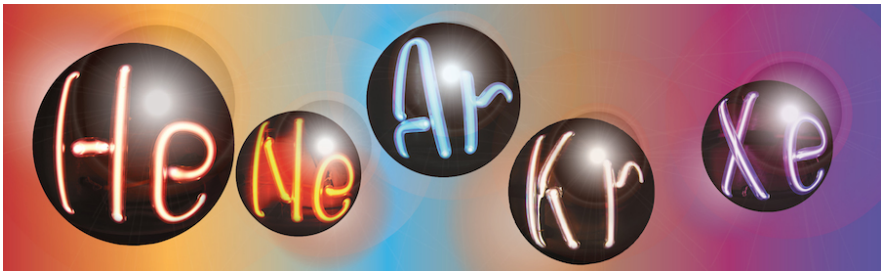

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Recent results and future plans of Xenoscope TPC

Despite compelling astrophysical evidence for dark matter, a definitive detection in a terrestrial experiment has yet to be made. Dual-phase liquid xenon time projection chambers have achieved world-leading sensitivities to interactions between dark matter particles and ordinary matter. Although current detectors operate with LXe target masses of about ten tonnes and at unprecedented low background levels, their searches have so-far returned null results.

The XLZD collaboration aims to fully exploit this technology by constructing a detector containing 60-80 tonnes of liquid xenon. Several technical challenges remain, one of which is being addressed by the large-scale vertical demonstrator - Xenoscope - at the University of Zürich. The facility contains 360 kg of LXe and was recently upgraded to accommodate a 2.6 m long dual-phase TPC. A primary objective of Xenoscope is to study long-distance electron drift in liquid xenon. Initial results demonstrate successful electron drift over distances exceeding 2 m using ionization electrons produced by atmospheric muons. Ongoing and future studies include refined measurements of light and charge transport in LXe, as well as investigations of a novel surface-coating approach for radon mitigation.

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