Contribution ID: **61** Type: **Invited talk**

Low-background cryogenic design for large liquid xenon experiments

Wednesday, 20 May 2026 12:00 (30 minutes)

Searched for over half a century with detectors of increasing size and sensitivity, neutrinoless double beta (0νββ) decay offers a means to explore whether neutrinos are massive Majorana fermions and thus a portal between matter and antimatter. nEXO is a five-tonne liquid xenon time projection chamber (LXe TPC) to search for 0νββ decay of xenon-136 with a half-life sensitivity >10^28 years. With respect to its predecessor experiment, EXO-200, nEXO features new scintillation light and ionization charge detectors, and in LXe front-end readout electronics. Despite the uncertain future of nEXO, its cryogenic design includes novel solutions driven by the need by an unprecedentedly low radioactivity design, which can be applied to next-generation liquid xenon detectors of even larger size.
This talk will overview the nEXO design and provide details of the cryogenic and fluid handling and purification systems, highlighting the distinctive features of the LXe TPC technology within the global "tonne scale" program for 0νββ decay. The talk will also present the R&D in support of these novel cryogenic solutions ongoing at UMass Amherst.

Primary author: Dr POCAR, Andrea (University of Massachusetts Amherst)

Presenter: Dr POCAR, Andrea (University of Massachusetts Amherst)

Session Classification: Technology and R&D

Track Classification: Technology