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Discovering the origin of matter with liquid xenon neutrinoless double-beta decay detectors: nEXO and beyond

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Searches for neutrinoless double-beta decay ($0\nu\beta\beta$) offer unique sensitivity to physics beyond the Standard Model and could have implications for key fundamental questions like the origin of the matter-antimatter asymmetry in the universe. Large xenon-based detectors are a leading technology in this field. Among the next generation of $0\nu\beta\beta$ detectors, nEXO takes full advantage of the liquid xenon Time Projection Chamber technology by using a 5 ton detector to probe the ^{136}Xe $0\nu\beta\beta$ half-life with sensitivity > 10^{28} year. This talk will focus on discussing nEXO's design, sensitivity, and recent developments. I will conclude with some considerations about challenges, opportunities, and ongoing R&D to extend the liquid xenon technology ton-scale, with the goal to achieve ^{136}Xe $0\nu\beta\beta$ half-life sensitivities of 10^{30} year or longer.

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Submitted on behalf of a Collaboration?

Yes

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