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nEXO : The next phase of EXO on searching Neutrinoless Double Beta Decay

The Enriched Xenon Observatory (EXO) is an experimental program searching for neutrino-less double beta decay using 136Xe. The current stage of the experiment, EXO-200, consists of an ultra-low background TPC filled with ~175kg of xenon enriched to ~80% in the isotope 136Xe. EXO-200 has been taking data since May 2011, and producing some of the most competitive results in the field. The collaboration first discovered, and recently reported an improved measurement of the two-neutrino double beta decay of 136Xe, which is now the most precisely measured two-neutrino double beta decay half-life. In February 2014, with 99.8 kg•yr of 136Xe exposure and determined background rate of (1.7±0.2)×10^{-3} /keV/kg/yr in the ±2 sigma region of interest around the endpoint, the collaboration obtained a 90% CL sensitivity of 1.9×10^25 yr on neutrinoless double beta decay half-life. Building on the success of EXO-200, the collaboration is actively performing feasibility studies and R&D for the next phase multi-ton scale experiment named nEXO. The current detector conceptual design, background estimation, as well as sensitivity and discovery potential for nEXO will be described.

Primary author: WEN, Liangjian (Institute of High Energy Physics, Beijing)

Presenter: WEN, Liangjian (Institute of High Energy Physics, Beijing)

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