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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 ^{136}Xe . The current stage of the experiment, EXO-200, consists of an ultra-low background TPC filled with $\sim 175\text{kg}$ of xenon enriched to $\sim 80\%$ in the isotope ^{136}Xe . 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 ^{136}Xe , which is now the most precisely measured two-neutrino double beta decay half-life. In February 2014, with $99.8\text{ kg}\cdot\text{yr}$ of ^{136}Xe exposure and determined background rate of $(1.7\pm 0.2)\times 10^{-3}$ /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.

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