

Neutrinoless Double Beta Decay Search with EXO-200

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The Enriched Xenon Observatory (EXO) is an experimental program designed to search for the neutrino-less double beta decay of Xe-136. The current phase of the experiment, EXO-200, uses 200 kg of liquid xenon with 80% enrichment in Xe-136, and also serves as a prototype for a future 1-10 ton scale EXO experiment. The detector has been taking low background physics data with enriched xenon at Waste Isolation Pilot Plant (WIPP) in New Mexico since early May 2011. After reporting the first observation of two-neutrino double beta decay of Xe-136 in fall 2011, the collaboration has completed several detector upgrades and fine tuned detector performance for the search of neutrinoless double beta decay. In our first search result with an exposure of 32.5 kg-yr, no signal is observed with a background of $1.5 \text{ E-3 Ct/ kg/yr/keV}$ in the 1 sigma region of interest. This sets a lower limit on the half-life of the neutrinoless double-beta decay in Xe-136, $T_{1/2} > 1.6\text{E}25 \text{ yr}$ (90% CL), corresponding to effective Majorana masses of less than 140-380 meV, depending on the matrix element calculation.