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Status of the EXO double beta decay search

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The standard model has difficulty accommodating the tiny neutrino masses which are observed in nature, but light neutrinos arise naturally in many standard model extensions, including many grand unified theories. Many of these models also predict that neutrinos should be Majorana-type fermions, which would violate the conservation of lepton number. The EXO collaboration is carrying out a series of experiments to search for the golden signature of Majorana neutrinos: the double beta decay of the Xenon-136 nucleus. The construction and installation of the first experiment, known as EXO-200, is now complete, and first data is expected in the summer of 2010. This experiment is the largest double beta decay search ever performed, exceeding previous experiments by one order of magnitude in mass. The collaboration is also performing R&D to realize an ideal double beta decay search by positively identifying the daughter nucleus produced by the decay. We report here on the status of both of these efforts.

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