

Abstract Submitted
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EXO barium tagging R&D: identification in solid Xe¹ BRIAN MONG, Colorado State University, EXO COLLABORATION — To eliminate all backgrounds and reach the 10meV level of neutrino mass sensitivity, it is desired for the next generation EXO experiment to be able to identify the ¹³⁶Ba daughter nucleus in coincidence with candidate neutrinoless double beta decays. A few techniques involving laser-induced fluorescence of the Ba daughter are being developed to accomplish the detection. One technique involves freezing the Ba⁺ ion in a small amount of surrounding Xe on a cryogenic probe, and looking for the characteristic fluorescence of Ba⁺ or Ba in solid xenon. Progress on a technique where laser light is delivered by a fiber down the probe and fluorescence photons are collected back up the same fiber will be described. The current sensitivity is around 10⁴ Ba atoms on a sapphire window, and there is good reason to believe that this sensitivity could be improved by 10⁴ using a fiber. Indeed detection at the single molecule level has already been reached with a fiber probe.

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