

Abstract Submitted
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Controlled Freezing of Liquid Xenon on a Cryogenic Probe for Single Daughter Atom Detection in EXO¹ CHRISTOPHER CHAMBERS, Colorado State University, EXO COLLABORATION — The EXO experiment is designed to search for zero-neutrino double beta decay of the isotope Xe¹³⁶, in order to better understand the nature of neutrinos. Since the daughter of this decay is barium (Ba¹³⁶), detecting the presence of Ba¹³⁶ at a decay site (called “barium tagging”) is the best way to reject backgrounds in the search for this decay. This would involve detecting a single barium ion from within a macroscopic volume of liquid xenon. One proposed barium tagging method is to trap the barium ion in frozen xenon at the end of a cold probe, and then detect the ion by its fluorescence in the solid xenon. Our group at CSU has begun testing designs for cold probes inside our liquid xenon cell. We demonstrate successful freezing of liquid xenon at the end of a probe, and I discuss improvements in the design, as well as trapping/detecting barium ions.

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