

Abstract Submitted
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Barium Tagging for the Enriched Xenon Observatory (EXO) TIMOTHY WALTON, Colorado State University — The EXO experiment is designed to search for zero-neutrino double beta decay of the isotope Xe^{136} , in order to better understand the nature of neutrinos. Since the daughter of this decay is barium (Ba^{136}), detecting the presence of Ba^{136} at a decay site (called “barium tagging”) is the best way to reject backgrounds in the search for this decay. It is hopeful that barium tagging will be implemented in the next phase of EXO. One proposed barium tagging method is to trap the barium ion in a solid xenon matrix (by freezing the liquid xenon surrounding the decay), and move it to another location to do laser-induced fluorescence spectroscopy counting. Our group at CSU is researching the detection of single barium ions and atoms within a solid xenon matrix. A barium ion beam is used to implant the ions into freezing xenon, where laser spectroscopy is then performed. We demonstrate successful detection of very small numbers, and are nearing single-barium detection.

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