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In-Situ Laser Tagging of $^{136}Ba^{+}$Ions in a Liquid ^{136}Xe Detector KENDY HALL, CESAR BENITEZ, WILLIAM FAIRBANK, Colorado State University, ENRICHED XENON OBSERVATORY (EXO) COLLABORATION — Our group is working in partnership with the Enriched Xenon Observatory (EXO) collaboration to measure the effective Majorana mass of neutrinos with a sensitivity of 0.01eV in a ton size liquid ^{136}Xe detector. The only way to achieve such sensitivity is by neutrinoless double beta decay ($00\nu\beta$) with tagging of the $^{136}Ba^{+}$ daughter ion at the decay site. At CSU, we are developing a new fluorescence technique for in-situ laser tagging of a single $^{136}Ba^{+}$ ion in liquid Xe. Laser ablation is used to implant approximately 10^{8} Ba^{+} ions per pulse into a liquid xenon cell. In the past we have been troubled with inconsistencies in our fluorescence spectra, which may be due to impurities or unknown particles within our liquid Xe. To understand these problems, a liquid xenon recirculation system and purity monitor has been built. Purity levels of ppb can now be measure in our liquid xenon system. I will present possible emission spectra of Ba^{+} ions in liquid xenon and discuss how they correlate with the liquid xenon purity.

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