

Abstract Submitted
for the 4CS21 Meeting of
The American Physical Society

Recent Progress in Imaging of Barium Atoms in Solid Xenon¹

MARI TODD, DAVID FAIRBANK, JENNIFER STANLEY, WILLIAM FAIRBANK, Colorado State University, NEXO COLLABORATION — Interest in neutrinoless double beta decay searches has increased in recent decades to probe whether the neutrino is its own anti-particle or not. Recent searches in enriched liquid Xenon have occurred in the EXO-200 experiment, with plans to achieve greater sensitivity in a ton-scale detector in the nEXO experiment. In liquid ^{136}Xe , double beta decay leaves behind a daughter barium atom. If this daughter can be identified and tagged, the only remaining background in the detector will be $2\nu\beta\beta$ decay. To this end, images of single barium atoms in solid xenon in one matrix site have been achieved. [1]. Imaging of single Ba atoms in the other three matrix sites is more challenging due to greater photobleaching that limits the number of photons emitted by one atom. Recent evidence of fluorescence recovery from photobleaching upon annealing and reduced photobleaching at higher temperature show promise for improved single Ba atom imaging in these matrix sites. [1] Chambers et al. Nature

¹Research supported by NSF grants numbers 1649324 and 2011948.

Mari Todd
Colorado State University

Date submitted: 10 Sep 2021

Electronic form version 1.4