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Barium Tagging for the NEXT Neutrinoless Double Beta Decay Program

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The NEXT collaboration is pursuing a phased program to search for neutrinoless double beta decay of ^{136}Xe using high pressure xenon gas time projection chambers. In addition to the capabilities of precise calorimetry and topological imaging, xenon gas detectors also offer a further opportunity: the plausible implementation of barium daughter ion tagging. In this talk I will present advances in the development of barium tagging in high pressure xenon gas, with a focus on R&D toward single ion manipulation and imaging. Topics to be covered include methods for concentrating ions to sensors via high pressure RF carpets, advances in single ion microscopy in high pressure gas, recent developments in chemical ion sensing technology, and proposed demonstrator detectors that aim to prove the technique with double beta decays, potentially unlocking new levels of sensitivity to the Majorana nature of the neutrino.

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