Abstract Submitted
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Barium Tagging for nEXO DANIEL FUDENBERG, THOMAS BRUNNER, Stanford University, VICTOR VARENTSOV, Institute for Theoretical and Experimental Physics, Moscow, Russia & Facility for Antiproton and Ion Research in Europe (FAIR GmbH), RALPH DEVOE, Stanford University, JENS DILLING, TRIUMF, Vancouver, BC, Canada, GIORGIO GRATTA, Stanford University, NEXO COLLABORATION — nEXO is a next-generation experiment designed to search for $0\nu\beta\beta$-decay of Xe-136 in a liquid xenon time projection chamber. Positive observation of this decay would determine the neutrino to be a Majorana particle In order to greatly reduce background contributions to this search, the collaboration is developing several "barium tagging" techniques to recover and identify the decay daughter, Ba-136. "Tagging" may be available for a 2nd phase of nEXO and will push the sensitivity beyond the inverted neutrino-mass hierarchy. Tagging methods in testing for this phase include Ba-ion capture on a probe with identification by resonance ionization laser spectroscopy, and Ba capture in solid xenon on a cold probe with identification by fluorescence. In addition, Ba tagging for a gas-phase detector, appropriate for a later stage, is being tested. Here efficient ion extraction from heavy carrier gases is key. Detailed gas-dynamic and ion transport calculations have been performed to optimize for ion extraction. An apparatus to extract Ba ions from up to 10 bar xenon gas into vacuum using an RF-only funnel has been constructed and demonstrates extraction of ions from noble gases. We will present this system's status along with results of this R&D program.

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