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(G) Ion extraction tests for Ba ion tagging

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Searches for neutrinoless double beta decay conducted with Xe-136 can be improved by detecting the decay's daughter, the Ba-136 ion. This technique offers complete rejection of the residual radioactive background, but its practical implementation remains challenging. At Carleton University, Ba ion tagging R&D is being conducted using a cryogenic liquid xenon setup. As a proof-of-concept, untargeted ion extraction tests are being carried out in argon gas using radioactive ions captured and extracted using a thin capillary probe into an analysis chamber and then detected using a passivated implanted planar silicon detector. To better understand the experimental results, a Monte Carlo simulation of this process has been developed. This talk will present the design considerations, apparatus and procedures used, as well as discuss and compare the experimental results and simulations.

Keyword-1

ion extraction

Keyword-2

barium tagging

Keyword-3

neutrinoless double beta decay

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