

Development of a barium tagging technique for the future nEXO detector

Monday, August 19, 2024 4:25 PM (10 minutes)

The **nEXO** experiment aims to detect neutrinoless double beta decay ($0\nu\beta\beta$) in 5 tonnes of liquid xenon (LXe) inside a time projection chamber, isotopically enriched to 90% in the double-beta decaying isotope ^{136}Xe . One beneficial feature of LXe is the potential identification of the $0\nu\beta\beta$ decay daughter (^{136}Ba) providing the ultimate technology in background suppression. R&D efforts are undertaken by the collaboration to develop single Ba ion extraction from the detector volume and subsequent detection for deployment in future upgrades to the nEXO experiments.

As part of the Canadian barium tagging effort, various upgrades have been made to a laser ablation ion source, which has been developed by students over the last years, in an effort to develop a calibration system for an ion detection system for future barium tagging deployment. These upgrades include modifying its dark box and incorporating new optical and electronic instrumentation besides using a custom-built multi element target and a 349 nm UV laser for improving the performance and functionality of this ion detector. Moreover, simulations are being run to obtain precise voltages for the electrodes that will help us in guiding and bending ion trajectories into a quadrupole mass filter. This talk will focus on the hardware upgrades to the laser ablation ion source and the *SimIon* simulation work.

What area of study best describes your talk?

Physics

If you answered 'Other', please provide the study area.

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