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(POS-21) Development of an In-Gas Laser Ablation source

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nEXO is a next generation detector to search for neutrinoless double-beta decay in Xe-136. This hypothetical decay violates lepton-number conservation, requiring the neutrino to be its own antiparticle and would imply the existence of physics beyond the Standard Model. As a potential upgrade to further improve nEXO's sensitivity, the Ba-tagging technique is being developed to eliminate nearly all background events. The Ba-tagging scheme being pursued by Canadian institutions involves an extraction of Ba-136 ions from candidate Xe-136 double-beta decay events within the detector in a gas phase, and an identification of Ba ions using laser and mass spectroscopy. To study and optimize the Ba-tagging extraction and identification process, a well-characterized in-gas ion source is needed. To this end, our group at McGill is developing an in-gas laser ablation source. Currently, ion production and transport efficiency in noble gas as a function of gas pressure is being studied. The setup, analysis, and future plans of the in-gas laser ablation source will be presented.

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