

In-gas laser ablation source (IGLAS) for nEXO's Ba-tagging group at McGill

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The nEXO collaboration is searching for neutrinoless double-beta decay ($0\nu\beta\beta$) events in a multi-ton Time Projection Chamber (TPC) filled with liquid Xenon-136 as it decays into Barium-136 ions. As an upgrade, the collaboration is also developing a barium tagging technique to extract Ba-136 from liquid xenon and identify it to eliminate all other background events. To further understand the production and extraction of barium ions in detector-like conditions, progress is being made towards the development of an in-gas laser ablation source (IGLAS). This setup focuses and guides a laser beam onto the surface of a barium sample inside a high pressure noble gas chamber. The laser ablates ions off from the sample surface, which are measured in the form of an ion current. The goal of the summer 2021 IGLAS project is to study ion current signals as a function of different parameters including, but not limited to, buffer gas, pressure, voltage applied to barium target and ion collector, and laser properties such as power and frequency rate. This presentation includes further details on the current status and development of the ablation source at McGill's Ba-tagging group.

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