

Development of a Barium Tagging System for Enriched Xenon Observatory (EXO)

The next generation double beta decay experiments aim to probe the Majorana neutrino mass at or below 10 meV. To reach this sensitivity the detectors need to be ton or multi-ton scale and their radioactive backgrounds of the detectors also need to be further reduced. The Enriched Xenon Observatory (EXO) collaboration is developing a strategy for positively identifying the Ba-136 daughter nucleus of the double beta decay of Xe-136 using laser spectroscopy methods. A highly efficient barium identification could virtually eliminate radioactive backgrounds thus dramatically improving the sensitivity to neutrinoless double beta decay. In one scheme, the barium ion will be extracted out of liquid xenon and identified, after release, in an ion trap.

Other schemes such as direct detection in liquid or ion extraction from a high pressure gas detector are also under investigation. In this poster, progress of these R&D efforts will be presented.

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