

Workshop on Xenon Detector $0\nu\beta\beta$ Searches: Steps Towards the Kilotonne Scale

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R&D for LAr + Xe + photosensitive dopants

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LArTPCs are the technology of choice for current and future neutrino experiments, including those expected to make eagerly awaited measurements of accelerator neutrino oscillations in the coming decade. This technology provides a large active volume and sensitivity to GeV signals like accelerator neutrinos all the way down to 10s of MeV, covering part of the supernova neutrino spectrum.

Expanding the reach of LArTPCs to below the 10 MeV range would substantially enhance the flagship analyses of experiments like DUNE, while potentially enabling the physics of solar neutrinos, dark matter searches, and neutrinoless double beta decay searches.

We outline the R&D pathway for photosensitive dopants, whose introduction into the LAr active medium, has the potential to substantially increase ionization yields of LAr detectors and enable the detection of low energy signals in large LArTPCs. This R&D program will demonstrate the feasibility and impacts of introducing doped LAr into current and future neutrino detectors at the kTon scale including the Xenon + photosensitive doping strategy.

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