

Noble Liquid Experiments for Neutrino and Dark Matter Interactions

Wednesday, May 18, 2022 9:00 AM (30 minutes)

Noble liquids are important target mediums for detecting neutrino interactions and searching for dark matter, thanks to their abundant scintillation and ionization yields, particle identification capabilities and availability in large quantities. Large 100-ton scale liquid argon (LAr) detectors were built and massive kiloton scale detectors are planned for detecting accelerator-produced neutrinos. Large liquid xenon (LXe) detectors with several tons of active target are currently collecting data to look for interactions of dark matter and solar neutrinos. The next generation 10-100 ton scale low background LXe and LAr detectors will have rich science opportunities for dark matter, astrophysical neutrinos and rare decay searches. Alternatively, smaller 100-kg scale noble liquid detectors with very low energy thresholds provide competitive sensitivities, compared to other target materials, for light dark matter and low energy neutrino detection. This talk will present the current status of the noble liquid experiments for dark matter and neutrino detection with the primary focus on the low background non-accelerator based experiments. We will discuss the science opportunities, recent results, challenges and novel ideas in building these experiments.

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