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Probing MeV Scale Physics in LArTPCs with Radioactive Calibration Sources

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The Liquid Argon Time Projection chamber (LArTPC) is a unique technology well suited for large scale neutrino detectors. They allow for millimeter scale 3D precision particle tracking and calorimetry with good $\frac{dE}{dx}$ resolution, which provides excellent efficiency of particle identification and background rejection. While studies of detector response to high energy events have begun, there has been little to no direct demonstration of LArTPCs' capabilities in producing ground breaking physics with solar and supernovae low-energy neutrinos. We aim to facilitate the development of low-energy LArTPC capabilities by developing the first 1-10 MeV calibration subsystems for large LArTPCs. In this talk, I will introduce the properties of supernova neutrinos, discuss how they can be detected in LArTPCs, and overview the low-energy LArTPC calibration source conceptual designs we are developing.

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