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Towards a supernova-like neutrino cross-section measurement with muDAR in SBND

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The extremely weak interaction of neutrinos makes them both challenging to study and excellent cosmological messengers as they can escape the most dense astrophysical objects. As a result, neutrinos can play a crucial role in answering some of the most important questions at both the smallest and largest scales of the universe. The next generation of accelerator-produced high-energy neutrino experiments, like the Deep Underground Neutrino Experiment (DUNE), will be sensitive to astrophysical neutrinos, providing a wealth of unique information about particle physics, as well as astrophysical objects.
However, many astrophysical neutrinos arrive with energies of a few tens of MeV –much lower than the typical accelerator energies. Very little is known about the interaction of these low-energy neutrinos and this key information is needed to fully interpret their measurements. The Short Baseline Near Detector (SBND) neutrino experiment plans to measure the probability of interaction of similar low-energy neutrinos coming from muons-decay-at-rest (⊠DAR), an intrinsic side product of the neutrino beam. In this poster, the progress towards detecting muon decaying at rest electron neutrinos is shown, focusing on the trigger requirements and light detection and timing capabilities of SBND.

Poster prize

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