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Data acquisition systems to detect accelerator and supernova neutrinos with MicroBooNE and SBND

MicroBooNE and SBND are liquid argon time projection chambers (LArTPC) with 85 ton and 112 ton of active mass, respectively, located along the Booster Neutrino Beamline at Fermilab. Both experiments use the accelerator signals in coincidence with the scintillation light produced when particles interact with the argon to trigger the readouts of the detectors. Furthermore, both experiments aim to detect neutrinos from a galactic core-collapse supernova (SN) and provide a platform for DAQ development to enable SN ν detection in the future DUNE experiment. Since 2017, MicroBooNE has operated a dedicated DAQ that reads out the detector continuously and uses the Supernova Early Warning System (SNEWS) alert as delayed trigger to overcome the trigger limitations due to its near-surface location. SBND will feature a similar system. The performance of this system has been validated with MicroBooNE Michel electron data of energies similar to those produced by SN ν.

Mini-abstract

MicroBooNE and SBND have a novel readout system to detect both accelerator and supernova neutrinos.

Experiment/Collaboration

MicroBooNE and SBND

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