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The MicroBooNE continuous readout stream for detection of supernova neutrinos

Since the original detection of core-collapse supernova neutrinos in 1987, all large neutrino experiments seek to detect the neutrinos from the next nearby supernova. Among them, liquid argon time projection chambers (LArTPCs) offer a unique sensitivity to the electron neutrino flux. However, the low energy of the events (scale of MeVs), and the fact that all large (multi-tonne) LArTPCs operating at the moment are located near the surface, and therefore subject to an intense cosmic ray flux, makes triggering on the supernova neutrinos very challenging. Instead, MicroBooNE has pioneered a novel approach for detecting supernova neutrinos based on a continuous readout stream and a delayed trigger generated by other neutrino detectors (the Supernova Early Warning System, or SNEWS). MicroBooNE's data is stored temporarily for a few days, awaiting an SNEWS alert to be permanently saved. In order to cope with the large data rates produced by the continuous readout of the TPC and the PMT systems, FPGA-based zero-suppression algorithms have been developed. This talk will describe the continuous readout stream of MicroBooNE and discuss its applications.

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