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Extending DUNE Physics Reach in MeV-Scale with Innovative Charge and Light Collection Systems

Tuesday, 26 May 2020 11:54 (18 minutes)

One of the primary physics goals of the Deep Underground Neutrino Experiment (DUNE) is the detection of neutrinos produced in explosions of core-collapse supernovae. These neutrinos, with an energy range from a few to a few tens of MeV, are uniquely suited to characterize the detailed features of the supernovae and to search for non-standard interactions from neutrino mixing in extreme conditions.
To accurately extract all the information in the detectors from supernova neutrinos may require charge and light collection systems optimized to this energy regime. I will outline the requirements on detector resolution for distinguishing benchmark supernova neutrino fluxes from the most recent predictions and for measuring other physics processes occurring in supernova explosions. I will further discuss the proposed charge and light collection systems for the fourth module of the DUNE far detector, with the specific goal to extend the detector requirements for supernova neutrino detection.

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