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Low-energy neutrinos with DUNE, data reconstruction and analysis with DUNE's Prototypes and sensitivity to solar neutrinos

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The Deep Underground Neutrino Experiment (DUNE) is a next-generation long baseline neutrino experiment. By using Liquid Argon Time Projection Chamber (LArTPC) detectors to detect GeV-scale neutrinos produced by an accelerator, DUNE's main physics goals are to measure the CP-violating phase (δ_{CP}), determine the neutrino mass ordering and resolve the θ_{23} octant. Besides these observations at high energy, DUNE aims to explore the MeV energy range where solar neutrinos and supernovæ neutrinos can be observed. By observing neutrinos coming from the Sun, this experiment will be able to measure Δm^2_{21}, θ_{12} and θ_{13} and to study the thermal internal reactions of our star. DUNE might also be capable of detecting for the first time *hep* neutrinos thanks to the high cross-section of the Charge-Current channel on Argon. In the low-energy regime relevant for solar neutrinos detection, DUNE faces significant backgrounds arising from neutrons, radiogenic gamma rays and cosmogenic isotopes, which must be accurately modeled. After evaluating the backgrounds by means of simulation, signal and background topologies have been studied to develop efficient discrimination techniques, and a passive shielding has been proposed to reduce external backgrounds. To understand detector performance, DUNE has built two full-scale prototypes at CERN, *ProtoDUNE-HD* and *ProtoDUNE-VD*. The first data from *ProtoDUNE-HD* have been used to study the detector response to MeV-scale signals.

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