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Deep Neural Network Signal Processing for Liquid Argon Time Projection Chamber HAIWANG YU, Brookhaven National Laboratory, DUNE COLLABORATION COLLABORATION — The Deep Underground Neutrino Experiment (DUNE) is a next-generation long-baseline experiment that aims to answer some of the key questions about neutrino physics. Liquid argon time projection chamber (LArTPC), the central part of DUNE far detectors, is an advancing neutrino detector technology featuring low energy threshold, high spacial resolution and detailed event topology reconstruction. In a single-phase LArTPC, the recorded data are several 2-dimensional projection images of charged-particle trajectories, which consists of waveforms (time) on different channels (wire) produced by an induced signal of ionization electrons. For such a detector, a critical step is the TPC signal processing that reconstructs the original ionization electrons from the recorded 2D images. For the first time, we introduced a deep neural network (DNN) in LArTPC signal processing. This method showed significant improvements over traditional ones with data from ProtoDUNE-SP, a 1:1 scale prototype of DUNE far detector module components. In this presentation, we will report details of the deep neural network LArTPC signal processing method and preliminary results.

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