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Cold electronics for the readout of the DUNE liquid Argon TPC

The DUNE experiment's goals of precision studies of neutrino oscillations, searches for proton decays, and observation of neutrinos from supernova explosions require low noise electronics for the readout of the time project chamber anodes immersed in liquid Argon.

This presentation discusses the design of the readout system for the first DUNE far detector module that uses wire based anode plane assemblies as the sensing element of the TPC, and in particular the chain of custom designed application specific integrated circuits that are used to amplify, digitize, and serialize the signals from the TPC wires. These ASICs are mounted on front-end motherboards that are installed on the APAs inside the cryostat, which is crucial in order to meet the noise specifications of DUNE. This presentation reviews the development of the ASICs and the FEMBs, measurements obtained from standalone prototypes, as well as performance measurements from small scale tests where the FEMBs are installed on APAs operated at cryogenic temperatures.

Primary experiment

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