

The CAPTAIN Program: Status and Plans

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The Cryogenic Apparatus for Precision Tests of Argon Interactions with Neutrinos (CAPTAIN) program makes measurements that are crucial for the future DUNE experiment. DUNE aims to study neutrino oscillation phenomena with high precision with long-baseline and atmospheric neutrinos, and the electron-neutrino spectrum from galactic core-collapse supernovae. CAPTAIN addresses challenges with both of these programs by making measurements of the liquid-argon time-projection chamber (LArTPC) response to medium-energy neutrons and by measuring the electron-neutrino on argon cross-section in an energy regime coincident with the neutrino spectrum expected from supernovae. CAPTAIN has deployed Mini-CAPTAIN, a 400-kg instrumented-mass LArTPC, in a neutron beamline at the Los Alamos Neutron Science Center that provides neutrons of energies up to 800 MeV. I report the status of the analysis of these measurements and their implications for DUNE's long-baseline neutrino oscillation program. Next, the 5-ton instrumented-mass CAPTAIN detector will be deployed in a stopped-pion neutrino source. This will constitute the first demonstration that LArTPC's can measure neutrinos in an energy regime relevant to supernova physics.

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