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A study of medium energy neutrino interactions with the CAPTAIN detector.

At the baseline of LBNE, 1300 km, the neutrino energies in the first oscillation maximum range from 1.5 GeV to 5 GeV. Neutrino cross sections are poorly understood on any nuclear target in this energy regime. A detailed study of neutrino interactions in this energy regime is crucial to LBNE physics. The experiment simply will not work without it. Running the CAPTAIN liquid argon detector at Fermilab's NuMI beamline provides an important and unique opportunity to fulfill such request. This program expect to collect many complicated events from deep inelastic scattering and resonance production, which is in complementary to another liquid argon detector experiment - MicroBooNE - running at Fermilab's Booster Neutrino Beam in a lower energy regime.

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