

LArIAT - Liquid Argon In A Testbeam

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The Liquid Argon Time Projection Chamber (LArTPC) represents one of the most advanced experimental technologies for physics at the Intensity Frontier due to its full 3D-imaging, excellent particle identification (PID) and precise calorimetric energy reconstruction. By deploying LArTPCs in a dedicated calibration test beam line at Fermilab, the LArIAT program aims to experimentally calibrate this technology in a controlled environment. For LArIAT phase-I, the physics measurements will focus on the analysis of electromagnetic shower reconstruction for electron-gamma separation, the determination of the muon sign in the absence of magnetic field via its capture on nuclei, the study of nuclear effects such as pion and kaon characteristic interaction modes and antiproton annihilation in LAr. Moreover, a new concept for LAr Scintillation Light Collection in neutrino detectors which will allow a uniform connection of the scintillation light wrt to the deposited energy has been developed to improve the calorimetric energy resolution. The LArIAT exploration of the LArTPC capabilities will serve the double purpose of improving this technology and providing physics results relevant to the neutrino oscillation physics and proton decay searches of the SBN and LBN programs.

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