

Abstract Submitted  
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**Results from LArIAT Beamline and Proton Selection Studies.**

DEREK WALKER, Louisiana State University, LARIAT COLLABORATION — LArIAT (LArTPC In A Test beam) is an R&D LArTPC that seeks to measure how protons, pions, and other particles interact in liquid argon. One goal of this work is to improve the calibration of the Time of Flight (TOF) and momentum measurement systems to reduce the systematic uncertainties in the TOF and momentum scales. Calibrating the photomultiplier tubes (PMTs) of the TOF system reduced the systematic uncertainty in the TOF to 0.75ns. A second method, based on fitting the mass peaks of the particles, corroborates the TOF values found by fitting the PMTs directly. This second method also yields an estimate on the momentum calibration, finding that the momentum was measured  $(3.4 \pm 1.5)\%$  too high. It also found a data-driven constraint on the systematic uncertainty in the momentum of about 1.5%. Another goal is to find optimal selection cuts to identify proton interactions that produce charged pions. Cuts include selecting on the momentum and TOF of the particles to identify incoming protons and details on what secondary tracks are produced in order to identify when protons interact to produce pions. These cuts will be tested to see how they perform with respect to signal efficiency and background rejection.

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