LArIAT (T-1034) Status

Sept. 22, 2014
All Experimenters’ Meeting
J. Raaf
LArIAT (Liquid Argon In A Testbeam)

Repurposed 550-liter ArgoNeuT LArTPC detector with modifications for operation in Fermilab charged particle test beam.

**Goals**
Characterize LArTPC performance in the range of energies relevant to upcoming MicroBooNE, SBN, and LBN experiments for neutrino physics and for proton decay searches.

- Experimentally measure $e^{-}\gamma$ separation
- Develop criteria for charge sign determination
- Optimize pion and kaon ID capabilities
- Characterize anti-proton stars in Ar
- Study energy resolution improvement by combining information from scintillation light and ionization charge signals
Recently refurbished MCenter beamline

Lots of hard work and time went in to getting this beamline back online and operating (better than before!)

Many thanks to Accelerator Division and FTBF
Present State: Commissioning Beam

- Cu Target
- Fe Collimator
- Multi-Wire Proportional Chambers
- Momentum-Selecting Dipole Magnets
- Final Collimator
- Beam Halo Scintillator
- Time-of-Flight Scintillators
Two DAQ systems:
- simple wire-chamber miniDAQ
- full LArIAT FPGA-based trigger & DAQ

Several trigger configs, $\pi^\pm$
(e.g., SC2 & WC3 & SC3 for simple DAQ)
- 8, 32, and 80 GeV
- $\pm20$, $\pm40$, $\pm50$, $\pm100A$ magnet current

Simple DAQ $\rightarrow$ big help in commissioning and testing full DAQ

Gained familiarity with all systems
- What to keep an eye on
- What “normal” looks like

Studies underway:
production rates
wire chamber timing & track reco
Preparing cryostat & TPC

Prep work for TPB-coated reflective foils

PMT & SiPM holder

Test fit in cryostat

Cryostat prep for active detectors installation

New anode sense wire planes

SiPM installation

• SiPM boards to be screwed onto edge of plastic PMT holder
Summary

• Collected invaluable beam data before shutdown. Studies underway
  – DAQ and trigger commissioning nearly complete
  – Beamline tuning is better than we hoped!
• Now preparing for full installation in MCenter
  – Cryostat & internal active detectors testing and prep work in progress now, plan for installation as soon as possible (planned first week of October)
  – Working on cryogenic system solutions (delayed delivery from vendor)