

CAPTAIN Report – FY15 Q4

1. First Data from Mini-CAPTAIN Engineering Run

On August 3, 2015, the first laser data was obtained in the Mini-CAPTAIN time projection chamber using 400 kg of instrumented liquid argon. Figure 1 shows the ionization track from a high intensity UV laser pulse traversing the TPC. The detector was running with a one collection plane and one induction plane. The color on the plots represent the ADC value recorded on each wire by the electronics. Using this information, a track direction and energy of the event can be reconstructed.

2. FOA submission for CAPTAIN-MINERvA Program

In early September, an FOA was submitted outlining the CAPTAIN-MINERvA program. This effort combines the CAPTAIN detector, a 5 ton instrument liquid argon TPC, and the MINERvA detector at Fermilab. Specifically, CAPTAIN will run at Fermilab in the NuMI beamline to measure cross-sections and reaction topologies in the few-GeV neutrino energy regime in support of the DUNE program. This work has been supported by the Fermilab PAC. A thorough project plan and resource-loaded schedule was created at LANL in support of this effort.

3. Preparations for Neutron Run at LANSCE

Preparations are now being made to move Mini-CAPTAIN to the WNR facility at LANSCE to take data with neutrons incident on the detector. This neutron data will be vital to measure the response of liquid argon TPC's to high-energy neutrons. This work is crucial for understanding how to reconstruct few-GeV neutrino interactions in liquid argon detectors. At this time, the engineering run has ended and maintenance has begun on the detector. While the detector is open we will repair some electronics channels, install a purity monitor from the University of Minnesota, and install a photon detection system from the University of California-Davis. The week-long neutron beam run is scheduled to start at LANSCE in January 2016.

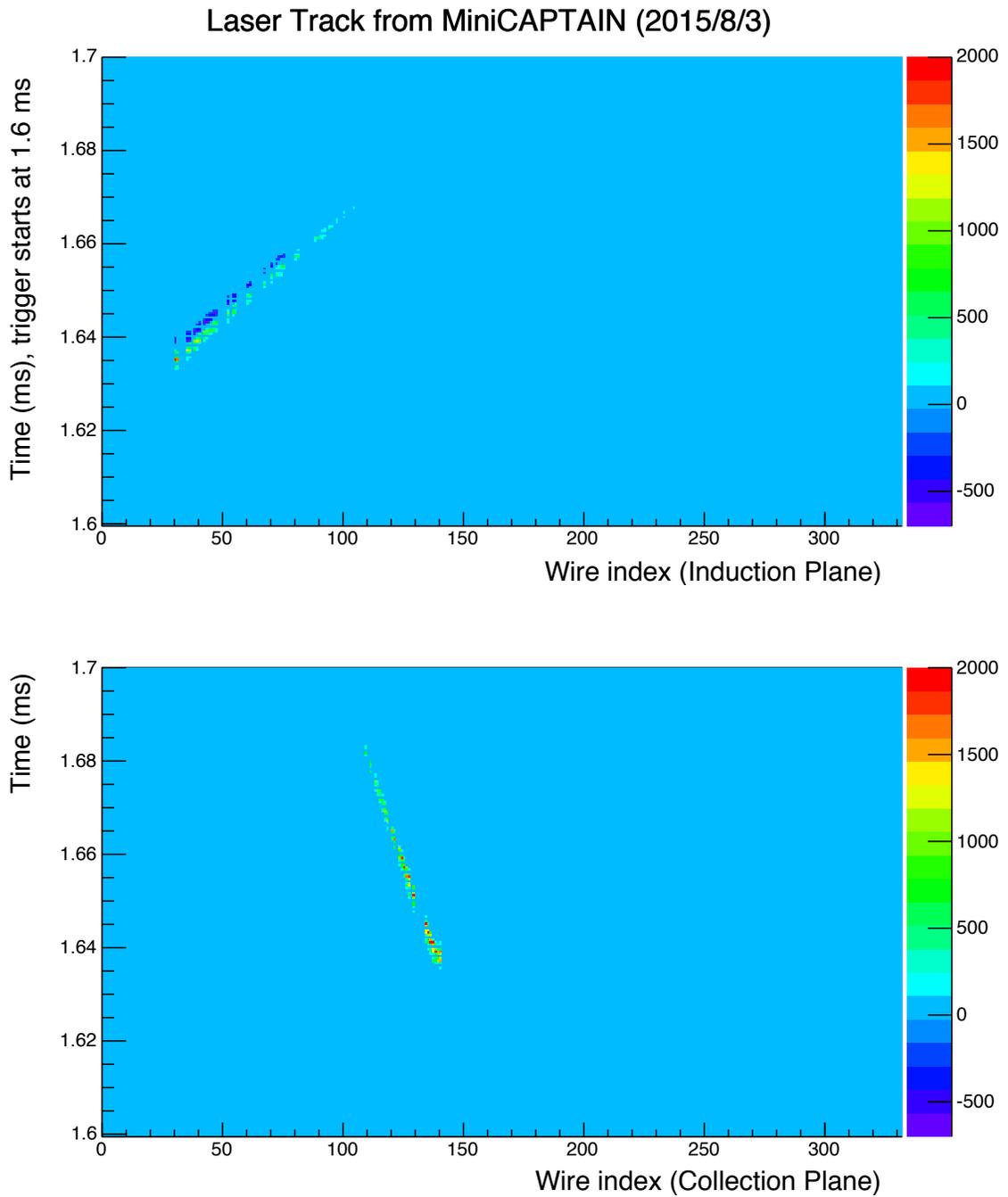


Figure 1: Ionization tracks from laser calibration system in Mini-CAPTAIN recorded on August 3, 2015.