LANL MicroBooNE Quarterly Report – January 28, 2014

BNB hardware and commissioning (Richard Van de Water)

The Booster Neutrino Beam (BNB) is now running smoothly with new beam dual multiwires and the new fiber RWM system, but with the beam off-target and the horn off. The fiber RWM system with a new fast timing discriminator delivers the beam-crossing signal to the detector more reliably, which has improved the muon-neutrino event absolute bunch timing resolution from 1.8 ns to 1.5 ns, as shown in Fig. 1. This absolute bunch timing measurement can easily distinguish true neutrino events from cosmic-ray events and external neutrino interactions.
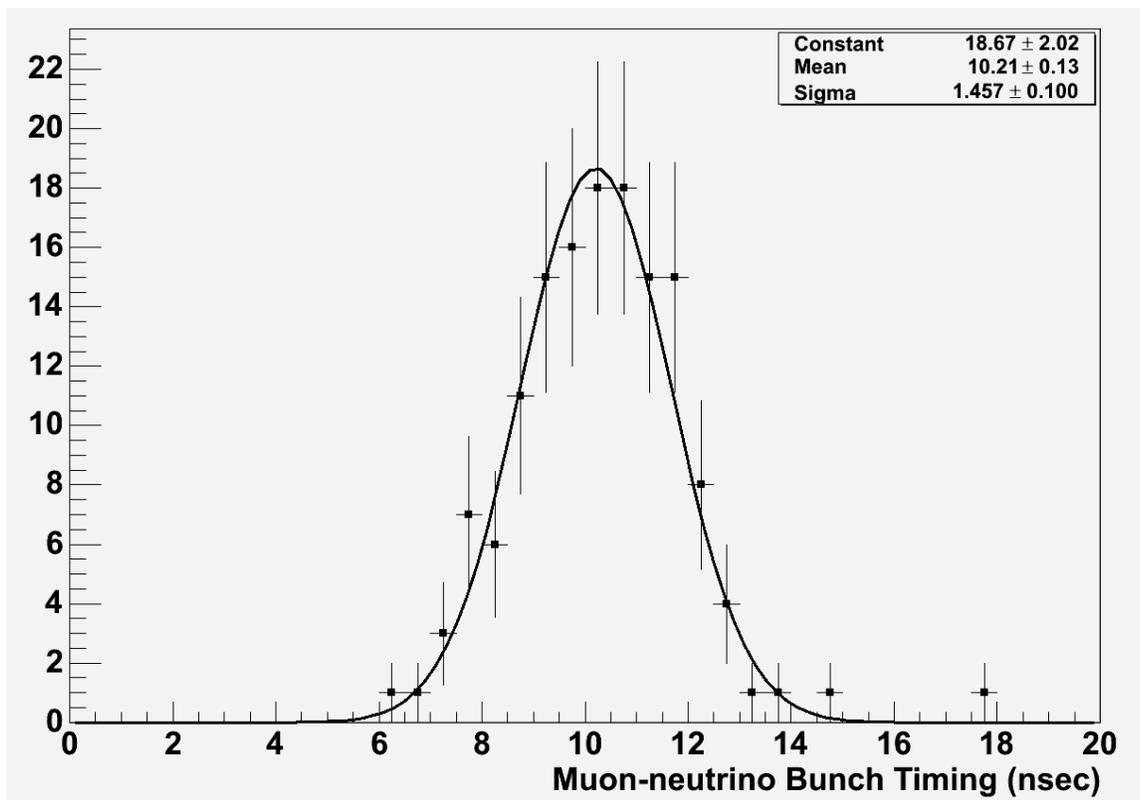

Constant	18.67 ± 2.02
Mean	10.21 ± 0.13
Sigma	1.457 ± 0.100

Figure 1: The muon-neutrino event absolute bunch timing distribution, which now has a resolution of 1.5 ns.

Beam Monitoring (Zarko Pavlovic)

The IRM has been installed at LArTF, which will output accelerator signals. The beam monitoring has three parts: monitoring the beam, monitoring the intensity frontier (IF) beam database, and monitoring the MicroBooNE beam DAQ. Figs. 2 and 3 show new Web pages associated with the BNB beam monitoring and the IF beam database monitoring.

BNB beam monitoring

Figure 2: New Web page associated with the BNB beam monitoring.
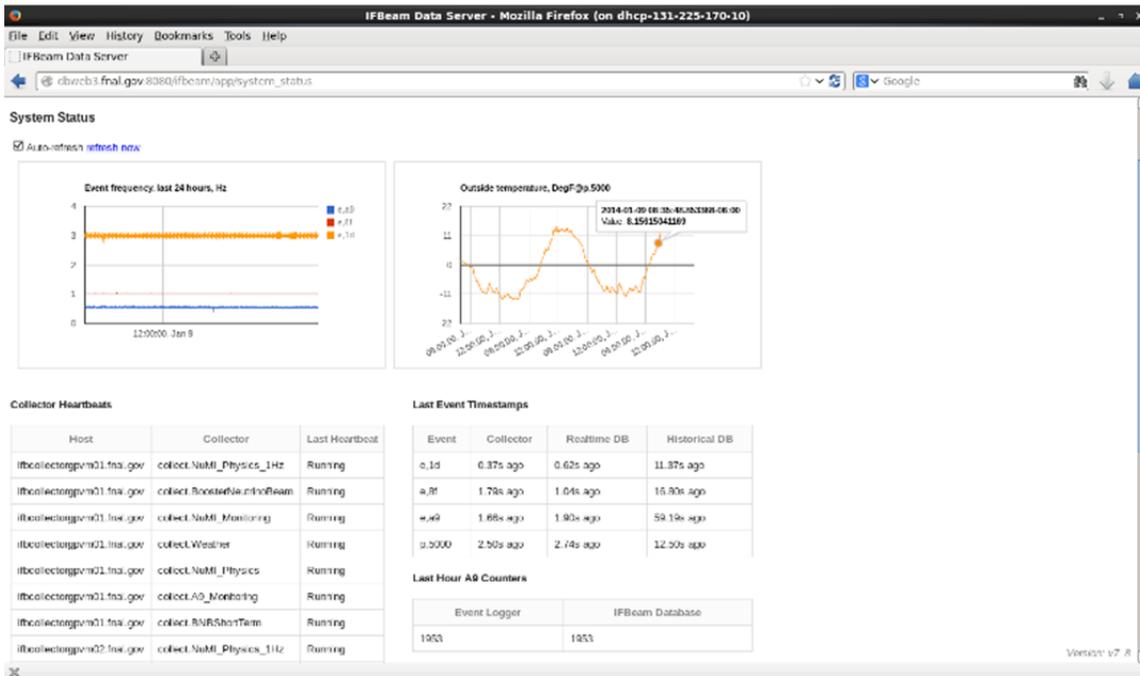
IF beam DB monitoring

Figure 3: New Web page associated with the IF beam database monitoring.

Electronics and DAQ (Wes Ketchum)

With the TPC system installed in the cryostat (see Fig. 4), post-insertion tests have verified the proper delivery of voltage from the cathode to the anode. No sparks or unexpected discharges were observed. The TPC-signal feed-throughs, the intermediate amplifiers on the outside of the cryostat, and the bias voltage to the wires have all been installed and tested. Also, a commissioning plan has been developed for the electronics and DAQ. The plan includes 1-2 weeks of air measurements to ensure that the electronics all work after they have been installed on the platform. This will be followed by 4 weeks of DAQ testing with the electronics off and 2-3 weeks of calibration and stability measurements and phototube trigger studies.

Figure 4: Photograph of the TPC being installed into the cryostat.

Event Reconstruction (Wes Ketchum)

As co-convener of the event reconstruction group, there has been much progress in the last quarter. Modules now exist in LArSoft for shower finding, vertex finding, and calorimetry, and isolated clusters and hits are now being used to project expected behavior near the vertex. Also, there have been improvements to vertex finding, including better matching across planes for reconstructing the 3D vertex. A full reconstruction chain is nearly ready. A MicroBooNE reconstruction workshop is being organized at Yale University from March 17-21 with the goal of getting developers together to work on steps needed for the first analyses.