MicroBooNE Quarterly Report – May 2015

1. Event Reconstruction Progress (Wes Ketchum)

MicroBooNE is leading the effort on developing new algorithms to develop a fully-automated reconstruction chain. Figure 1 shows the reconstruction challenge in trying to reconstruct neutrino interactions in a sea of cosmic and neutron background.

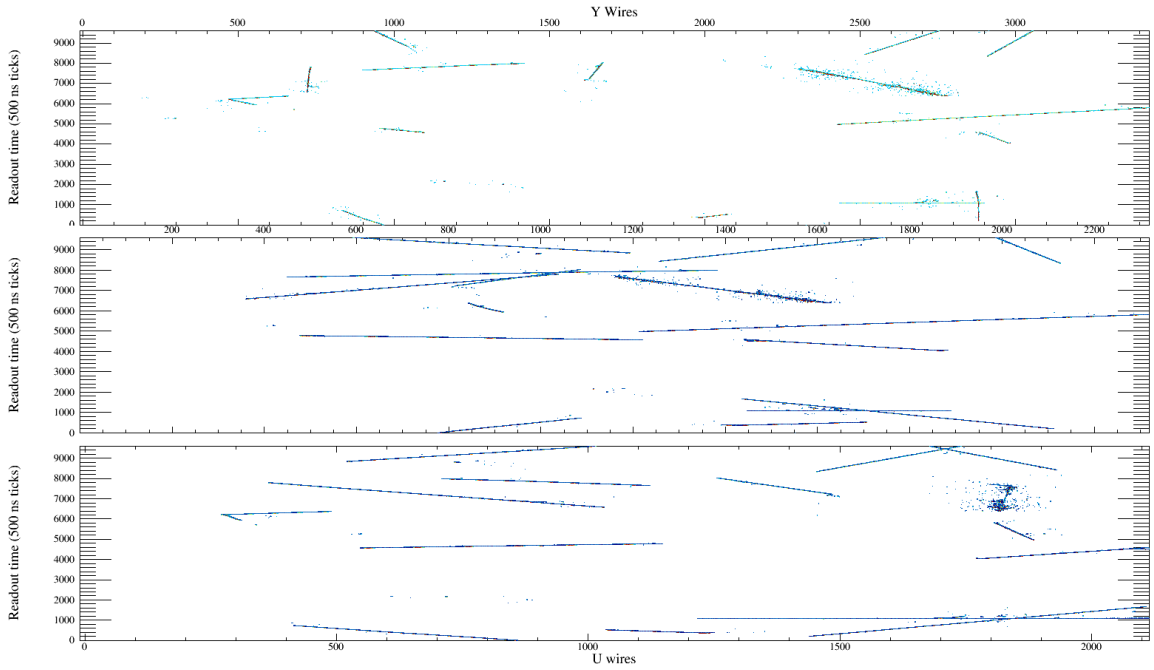
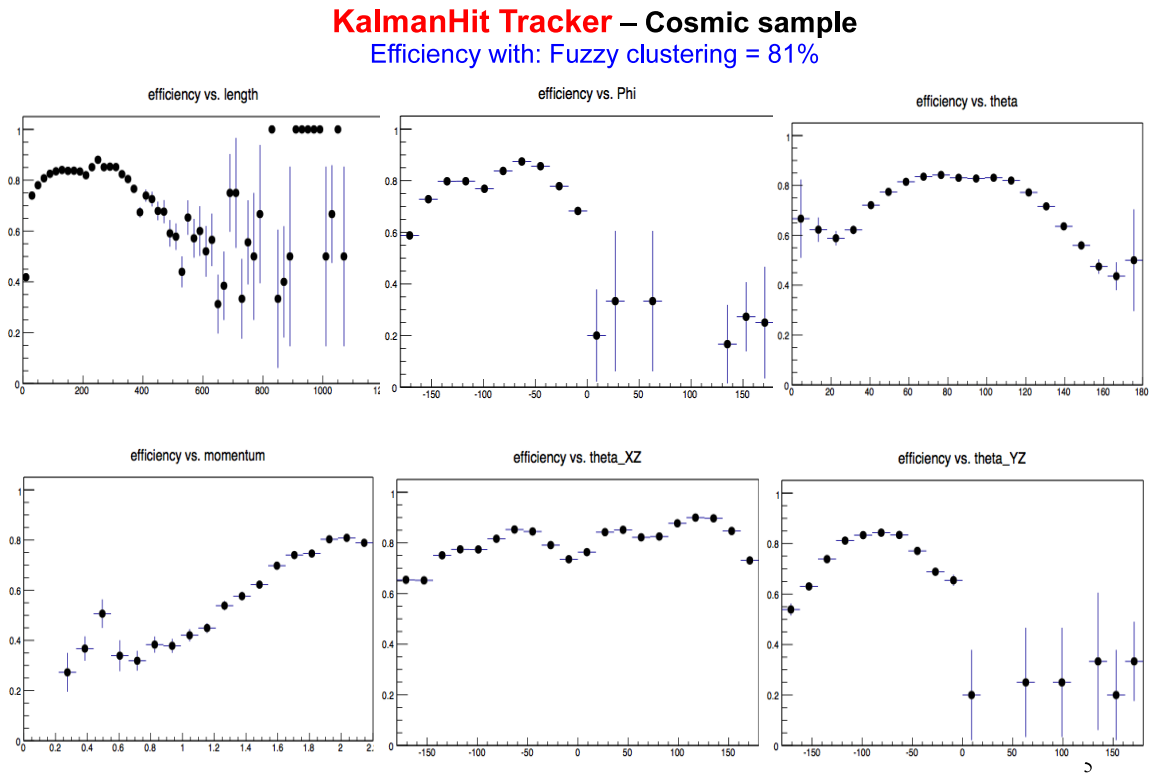


Figure 1: A simulated charged-current muon-neutrino interaction (left-most tracks) shown in 3 views: Y (top), V (middle), and U (bottom). The other tracks are from cosmic and neutron background.

Figure 2 shows the reconstruction efficiency obtained by the KalmanHit Tracker for cosmic muons as a function of length, Phi, theta, momentum, theta_XZ, & theta_YZ. The overall efficiency is 81%. Also, Figure 3 shows the neutral pion mass resolution using the 3D shower-finding package.



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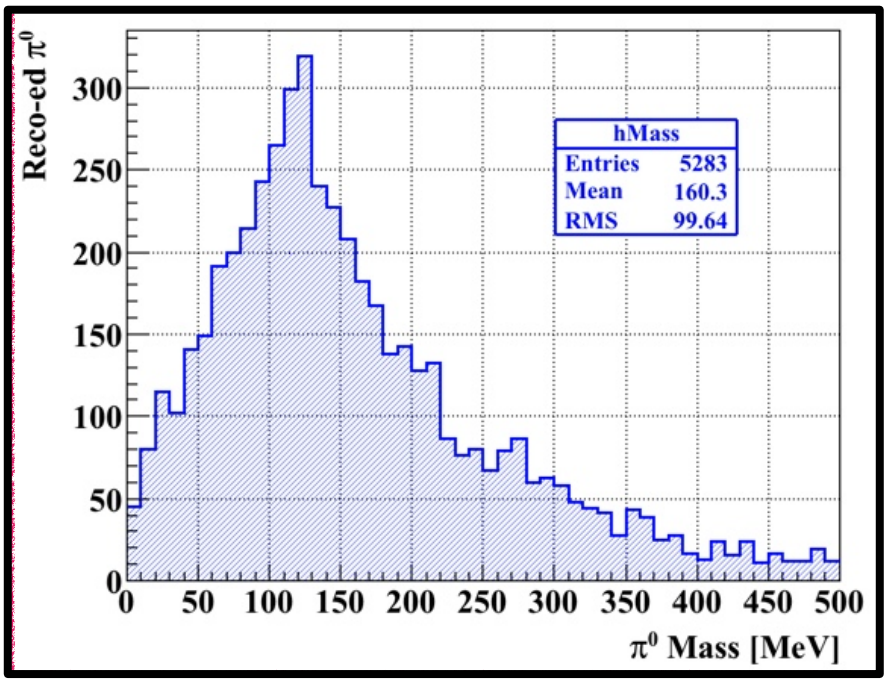

Figure 3: The neutral pion mass resolution using the 3D shower-finding package.

2. Electronics and DAQ Progress (Wes Ketchum)

Figure 4 shows the DAQ readout chain. Signals from the TPC wires go first to the cold electronics motherboards and then to the warm intermediate amplifiers and readout crates. The data are then sent to computers where the events are built. The average event sizes are approximately 20 MB, which corresponds to 200 MB/s for a 10 Hz trigger rate. The DAQ must handle information from a variety of sources, including TPC electronics, PMT electronics, Trigger electronics, GPS data, Laser calibration data, and auxiliary muon paddles. In addition, the DAQ needs to monitor data flow across 11 different systems and provide run control tools for both experts and non-experts. As seen in Figure 5, the new control room is now occupied and the DAQ team is preparing for MicroBooNE detector commissioning in the coming months.

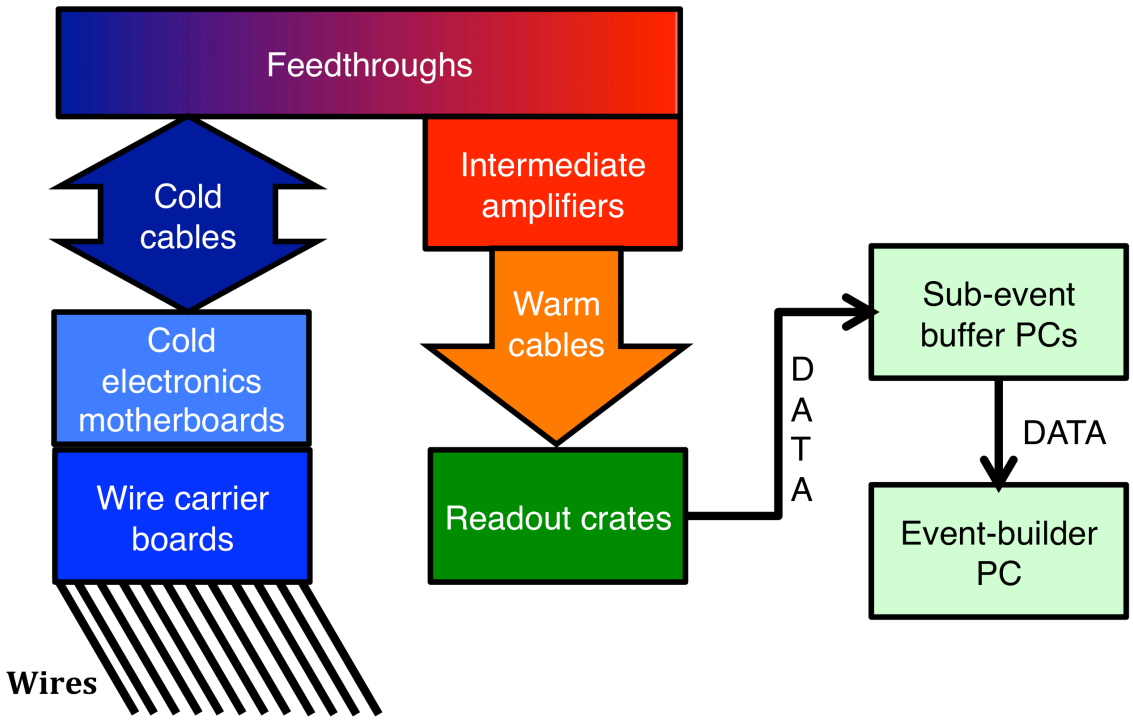

Figure 4: The DAQ readout chain.

Figure 5: A photograph of the new MicroBooNE control room.