DUNE NDS Quarterly Report – May 2015

1. Beamline Measurements Progress (Geoff Mills and Jan Boissevain)

Figure 1 shows a photograph of the NuMI Alcove 2 installation with the variable pressure, differential, gas Cherenkov counter and with CERN/CIVIDEC diamond ionization devices. The Cherenkov counter can run at argon gas pressures from 0-20 atmospheres to measure the muon flux as a function of energy from 1-120 GeV, while the diamond devices can measure the total muon flux.

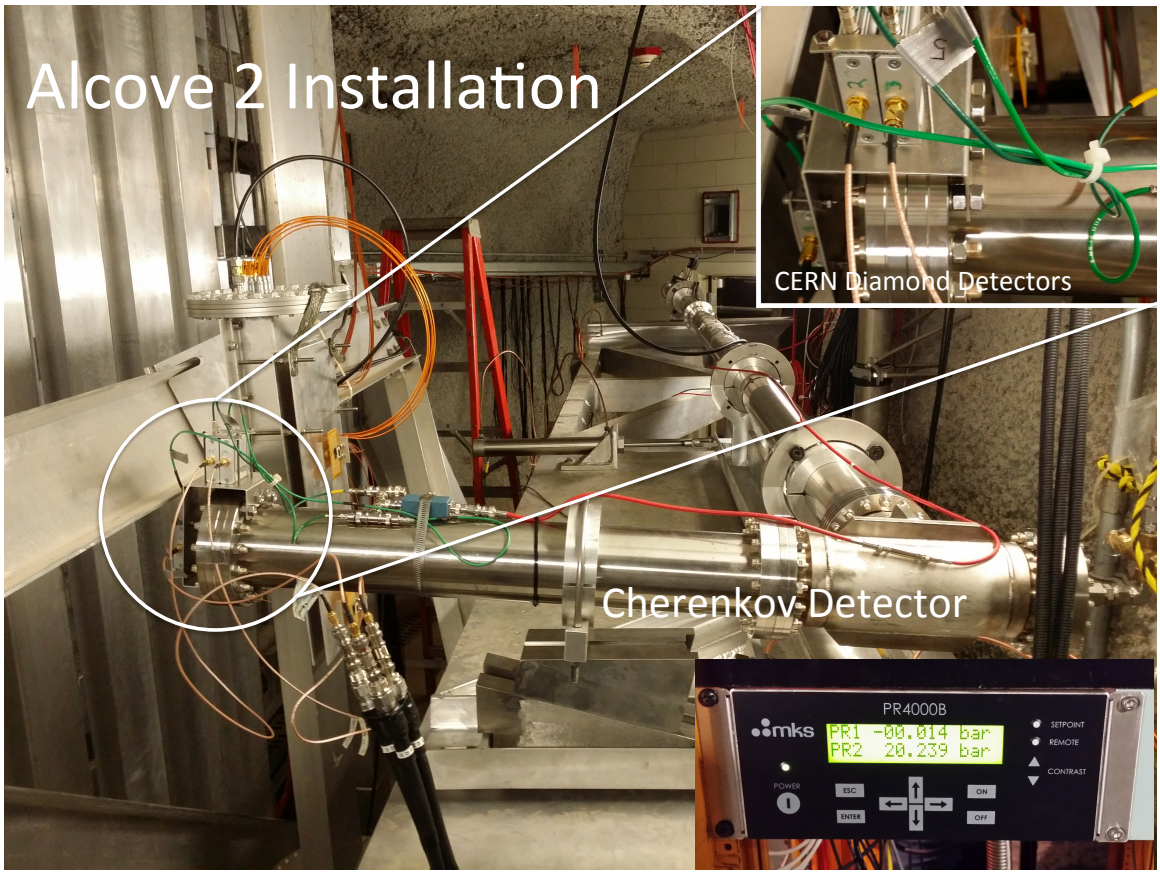

Figure 1: A photograph of the NuMI Alcove 2 installation.

Figure 2 shows the real-time online waveform displays of the NuMI beam microstructure, as measured by the Cherenkov detector and a CERN Diamond detector (top). Also shown are the microstructures of six Booster batches (bottom). Alcove 2 installation is complete and operational since February 2015. Alcove 1 installation is scheduled for the summer of 2015, and the detectors in both alcoves will be in operation through the NOvA running period.

Real-time Online Waveform Display

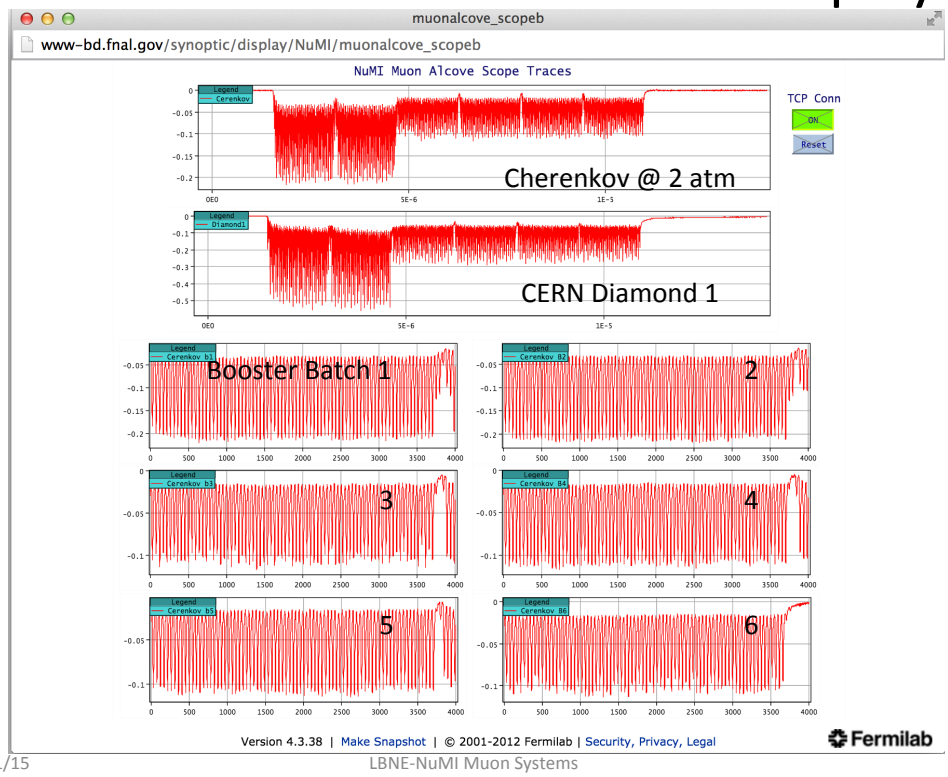

Figure 2: The microstructure of the NuMI beam as measured by the Cherenkov detector and a CERN Diamond detector (top). Also shown are the microstructures of six Booster batches (bottom).

2. Near Neutrino Detector Progress (Christopher Mauger, Bill Louis, & Jan Boissevain)

The dimensions of the DUNE near neutrino detector have been revised for the CD-1R review. As shown in Figure 3, the straw tube tracker (STT) will consist of 80 XXYY modules with overall dimension of 3.5 x 3.5 x 6.4 m^3. The total number of STT electronic channels will be 215,040. The ECAL will contain 26,112 scintillator bars of dimension 330 x 2.6 x 1 cm^3, corresponding to 52,224 electronic channels. The magnet volume will have inner dimensions of 4.5 x 4.5 x 8 m^3. Finally, the MuID will contain 432 RPC modules of dimension 1 x 2 m^2 and 165,888 electronic channels.

The total number of electronic channels will be 433,152.

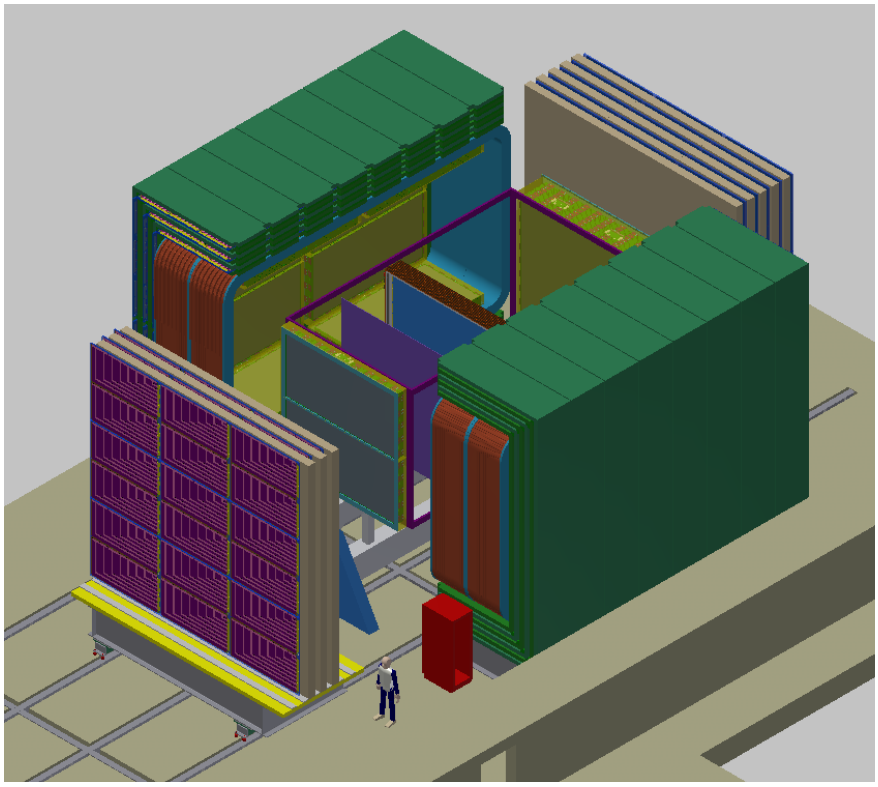

Figure 3: A schematic drawing of the DUNE near neutrino detector.

Design work continues on the assembly of the near neutrino detector in the near neutrino hall. Figure 4 shows a schematic drawing of the near detector in the neutrino hall with the CAPTAIN LAr TPC detector located upstream. The rails mounted on the floor allow the detectors to be moved on Hilman rollers.

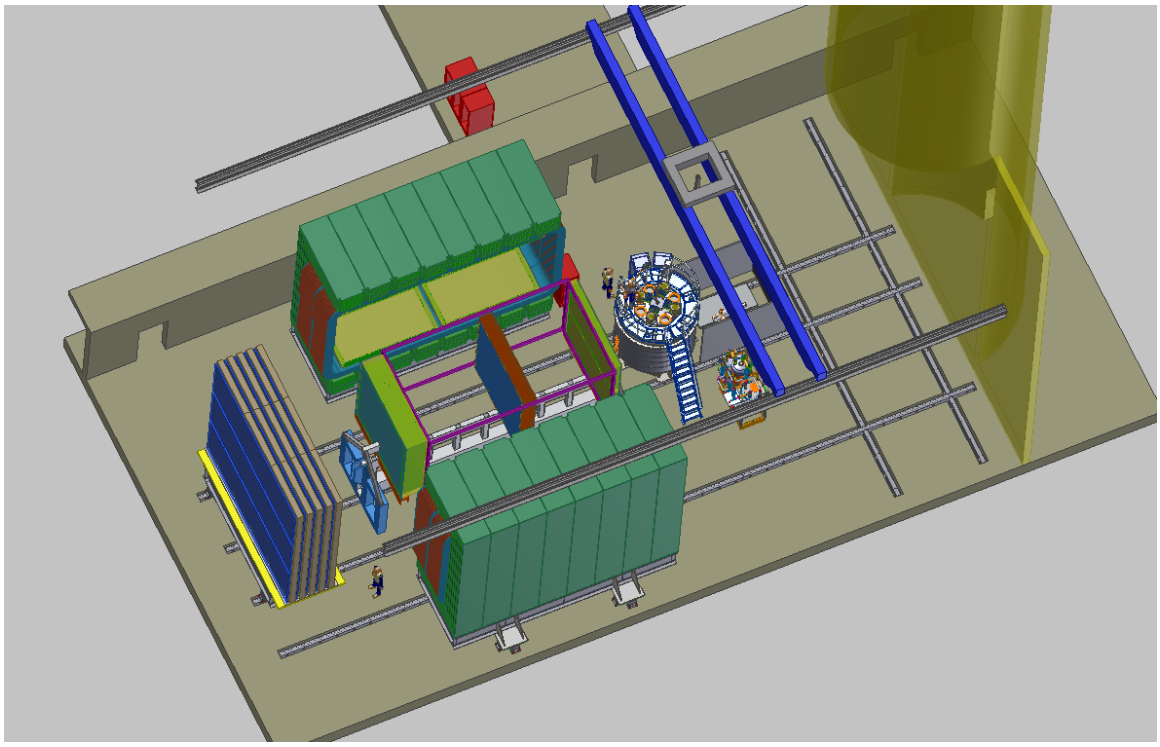

Figure 4: A schematic drawing of the near detector in the near neutrino hall with the CAPTAIN LAr TPC detector located upstream.