LBNE NDS Quarterly Report – January 2015

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

The NuMI alcove 2 Cherenkov detector has been upgraded with a high-pressure window, high-strength CF tee (Figure 1), and an MKS psia gauge. In addition, a new ISEG HV supply with remote operation has been installed, cable trays were installed between the racks outside alcove 1 and alcove 2, and diamond detectors from CERN were installed into alcove 2 (Figure 2). Figure 3 shows that the diamond detectors are able to observe the microstructure of the NuMI beam by detecting the muons produced by incident proton interactions. Due to the fast timing response of the diamond detectors, the current plan is to use these instead of ionization detectors for determining the beam profile.

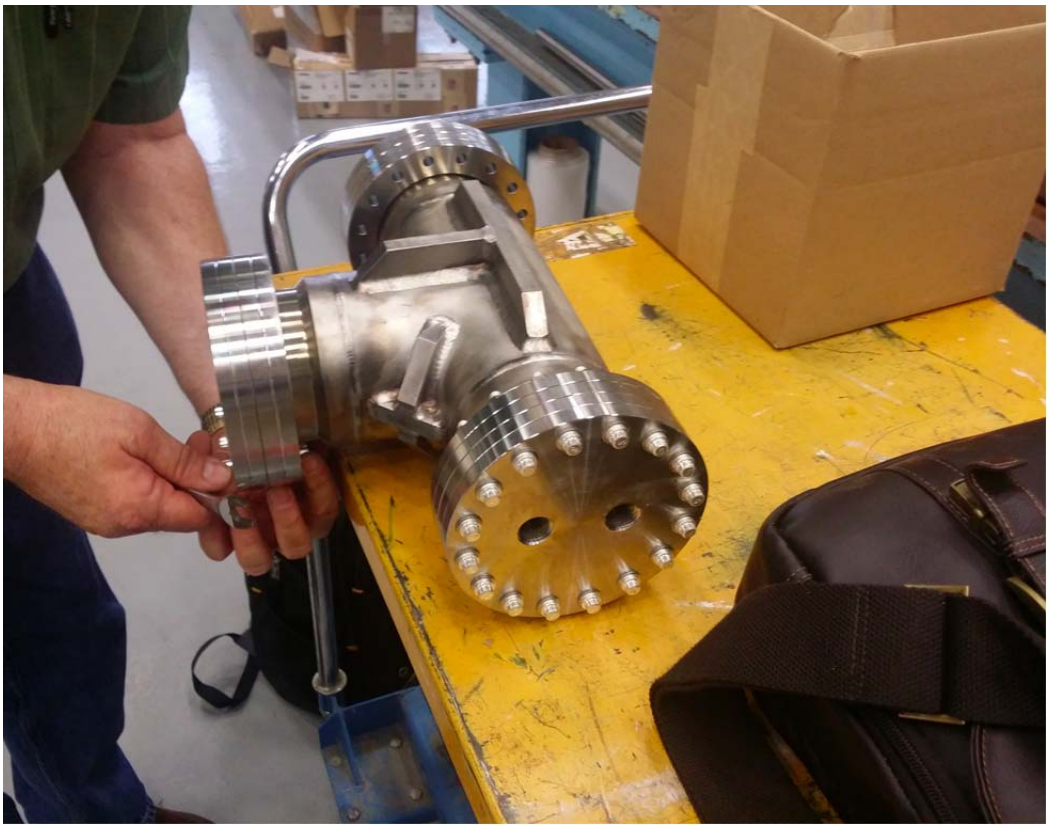

Figure 1: The new high-strength CF tee that was added to the Cherenkov detector located in NuMI alcove 2.

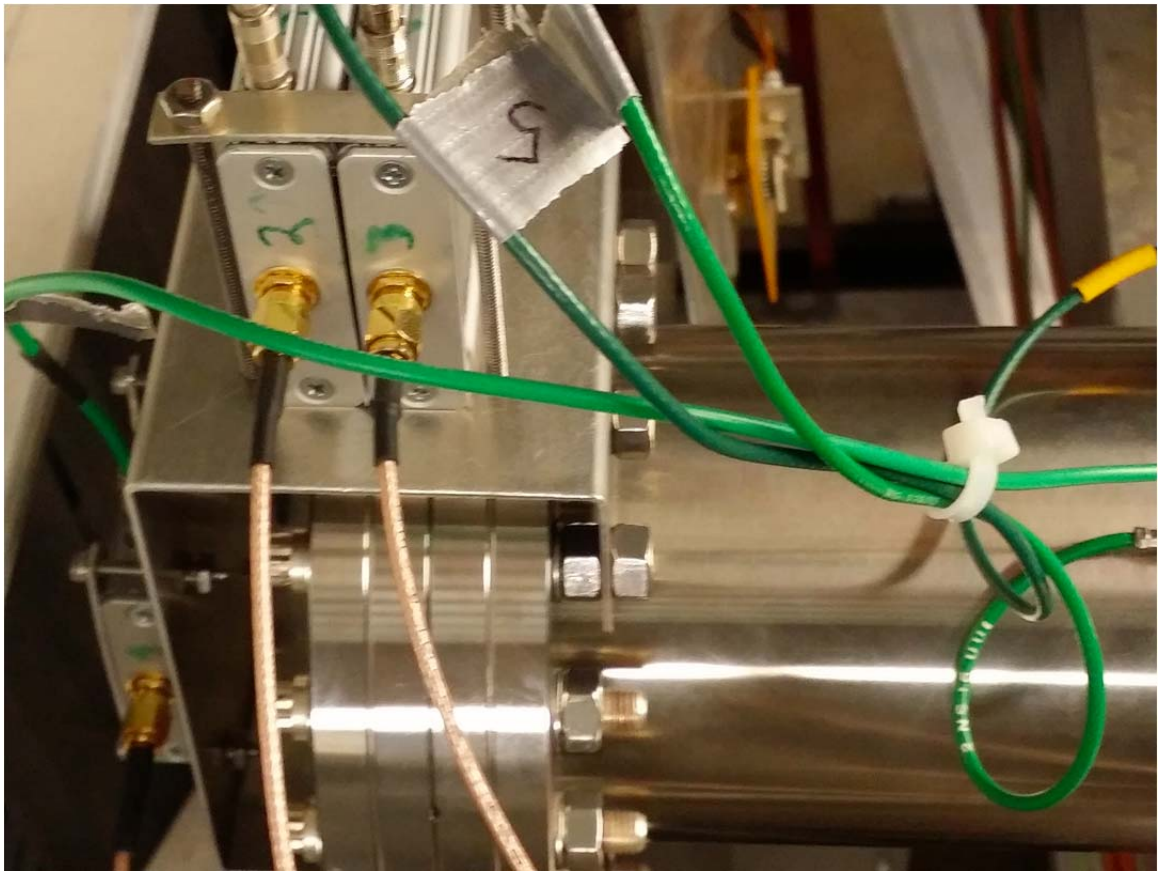

Figure 2: A photograph of the diamond detectors mounted above the Cherenkov detector.

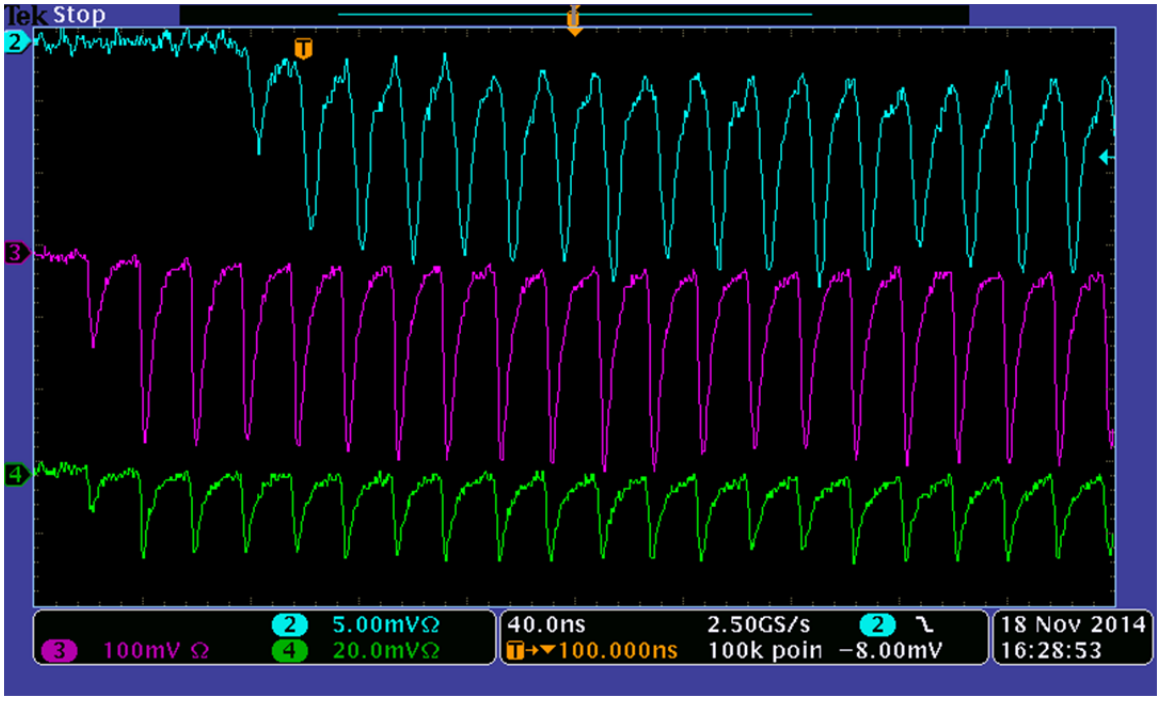

Figure 3: The microstructure of the NuMI beam as measured by the Cherenkov detector (top) and the two diamond detectors (bottom).

2. Near Neutrino Detector Progress (Christopher Mauger and Jan Boissevain)
Christopher Mauger and Jan Boissevain traveled to India in December to discuss the assignments and construction of the near neutrino detector (Figure 4). The Indian effort will receive funding from both DAE, which supports laboratories, and DST, which supports universities. The DAE PI will be from BARC, while the DST PI will be from Panjab University. At present, the assignments are the following: Magnet - BARC; MuID - VECC; ECal - IIT-G & Delhi University; STT – Panjab University; Detector & Environmental Electronics – BARC; Physics & Detector Simulations – US & India; Nuclear Targets – US.

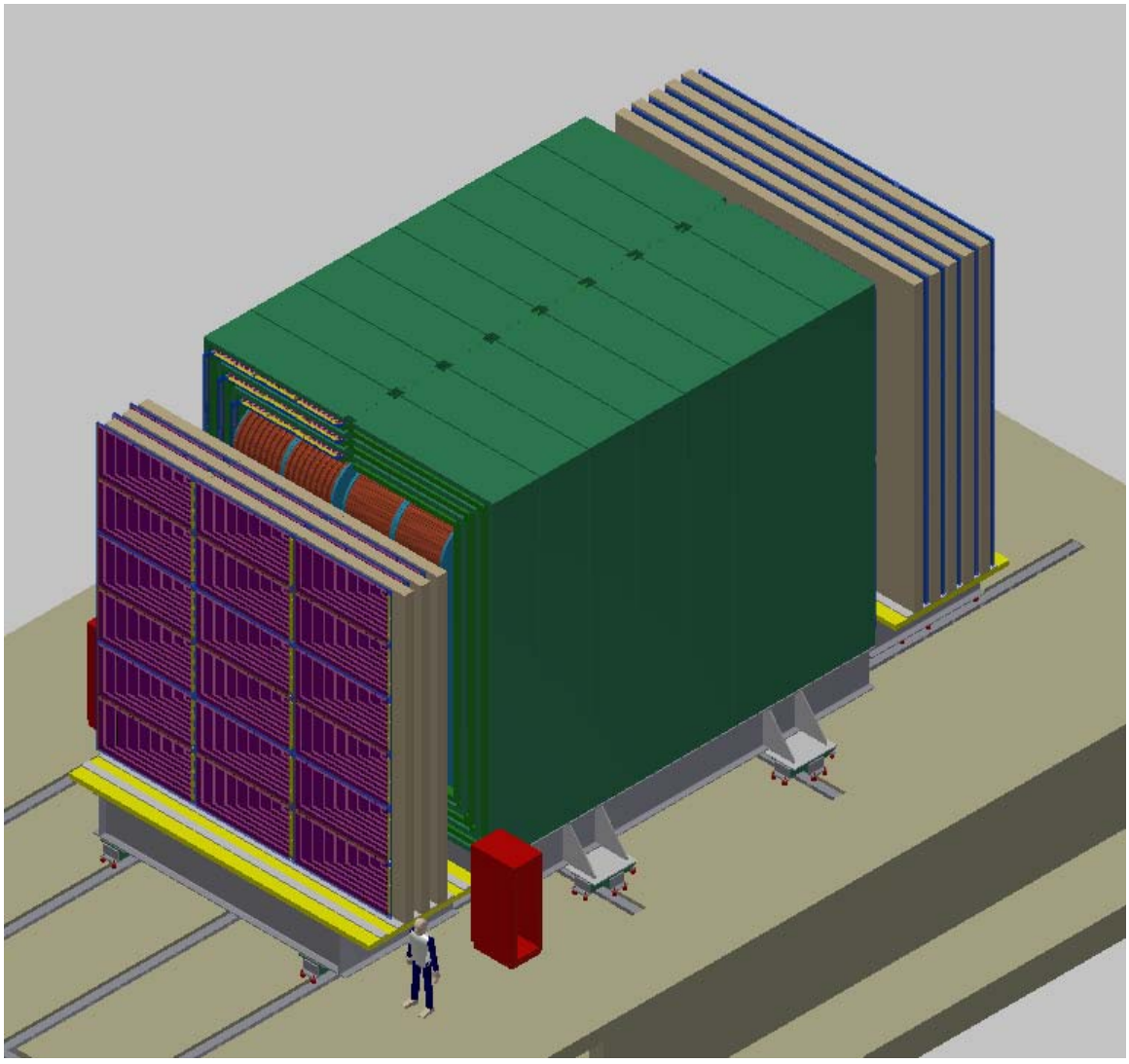

Figure 4: A schematic drawing of the near neutrino detector.

Design work continues on the different elements of the near neutrino detector. Figure 5 shows a detailed design of an XXYY straw-tube module with foil targets for measurement of transition radiation and particle identification. The total thickness is 76 mm, which allows for an 80 mm pitch for successive STT modules. Figure 6 shows the design of an RPC module with active area 1960 mm x 960 mm. Included

in the design are X-strip and Y-strip planes and Bakelite boards with HV electrode coating.

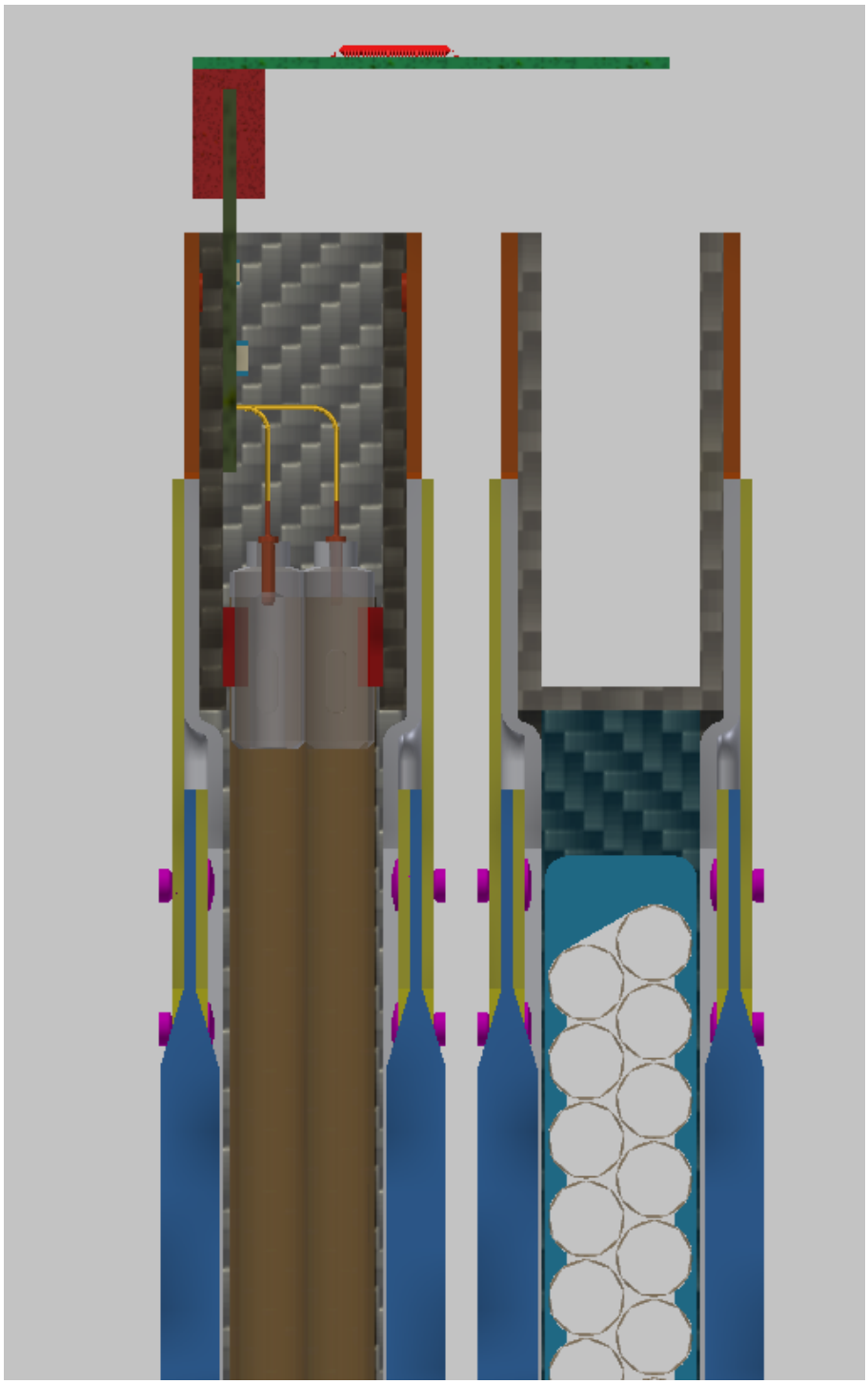

Figure 5: A detailed design of an XXYY straw-tube module with foil targets for measurement of transition radiation and particle identification.

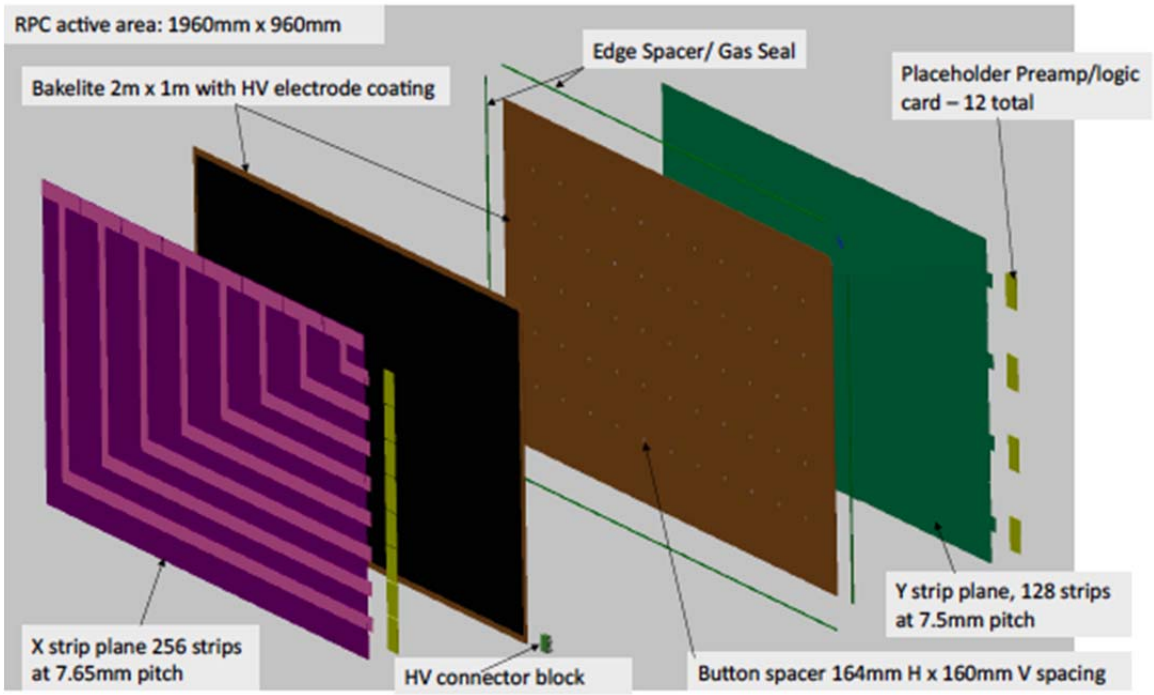

Figure 6: The design of an RPC module with active area 1960 mm x 960 mm.