Meeting focus: Discussion on the current status of Feedthrough (FT) needs from all parties, dedicated discussion on Laser system physics motivations and Photon system calibration FT needs.

Indico link:

Talk 1: Update on FT penetrations (Sowjanya Gollapinni)

In preparation for the Special Technical Board meeting on Sep. 29th, a summary of the status of Cryostat FT requests/needs is discussed in detail along with some concrete next steps. This included both Instrumentation and Calibration devices. Cryostat Instrumentation Consortium and Calibration Task Force (TF) is working together on this. The devices being considered included: Thermometers, Purity Monitors, Cameras, Radioactive source calibration devices, Field Calibration devices, Laser system (Talk 2), Photon Calibration system (Talk 3). Some comments during the talk:

- In the list of devices, we shouldn't forget about the possibility of Cosmic Ray Tagger (CRT). Ensuring we have space around the cryostat for CRT possibility is important. (Josh)
- On radioactive sources, reconstruction is a challenge, gammas won't make a track, will connect disconnected hits. Calorimetry is in general a challenge more so for these low energy gammas, and it is an ongoing process. (Josh, Juergen, others)
- On radioactive sources, what accommodations and considerations that DAQ needs to include in their design? (Josh)
- Thermal expansion over all APAs along the full length of the detector is not small and factor in losses to gamma rays, how do we account for this?
  - Gammas are diffused but the mean will be precise, we will get t0 from photon system and the ports are intentionally located half way in drift to mitigate with lower electron lifetimes. (Juergen)
- On Thermometers, it is important to note that temperature measurements are essential to validate the fluid flow model. For example, if the fluid doesn't mix well one would want to install heaters in which you want to monitor temperature again. These measurements form essential input to models, if the input to fluid flow models are wrong, it won't work. (Tim)
- We should think about spares for Purity Monitors and Thermometers. (Kendall)

Talk 2: Laser System Vs Cosmics: Current Arguments (Kendall Mahn)

This talk outlined specific motivations for laser relative to what will be feasible from other information such as Cosmics. The talk also included a proposal for the laser FTs along with a cartoon showing the specific FT locations. Laser is mainly motivated as a Stability monitor and a system for diagnosis. The closing of the talk called for holes in the arguments presented, criticism on any of the arguments presented.
Some comments during the talk:

- why cosmics are not suitable for global alignment?
  - To do this one has to stitch many many tracks and it becomes difficult.
- On the support structures, we have a model for how this will shrink but if it doesn't follow the model then we have a problem. Laser may not help with this all the way but will still be able to help. We have no other way to do this.

After the meeting, specific call back was made to receive more feedback on the presented arguments.

Talk 3: Photon system calibration FT needs (Ranjan Dharmapalan)

A photon calibration system for DUNE was proposed with a goal to monitor the photon detector gain and timing resolution along with monitoring stability and response as a function of time. The proposed system provides a quick reliable test of Photon system instead of waiting for cosmic muon coverage over the entire detector. The design of the proposed system mostly follows 35-ton design with needed extrapolation. A total of 10 FTs are requested above the two CPAs to route the fiber optic cables to the light diffusers that will sit on the CPA planes.

Some comments during the talk:

- It would be good to understand the FT width requirements for the 10 FTs requested. (Sowjanya)
  - A CF275 can hold upto 5 penetrations (from ProtoDUNE).
- Is there a limitation on the fiber length? (Sowjanya)
  - 20 meter fiber length should be okay, but we will learn more from ProtoDUNE. Different type of fiber is used for this not plastic, so cannot bend too much. It would be best to located them closer to the CPA. (Zelimir)
- How do you attach to the CPA? Do you ensure that it is grounded? How do you isolate it? (Juergen)
  - We connect the port directly to CPA probably sharing of ports is difficult. There is no electrical component in this. The fibers that will be used are highly resistive and insulating. This was indicated in the tests done by Glenn Horton-Smith from KSU. (Zelimir)
- In any case, it would be good to place the ports along the CPA planes for safety and not share the ports with other devices. (Juergen)