

Update on Cryostat Feed-through Needs

Slow Controls & Cryo. Inst. Consortium

- “Cryogenic Instrumentation” lives in the Slow Controls and Cryogenic Instrumentation Consortium.
 - Purity Monitors
 - Thermometers
 - Cameras (cold & Inspection)
 - Liquid Level Monitoring
 - Gas Analyzers
- The consortium has been working to define FT needs for items 1,2, and 3
- These items are relevant to the Calibration TF work since it affects the overall design of feedthroughs for calibration.

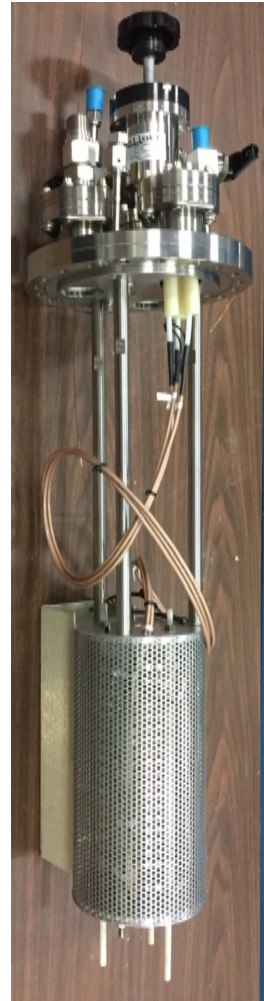
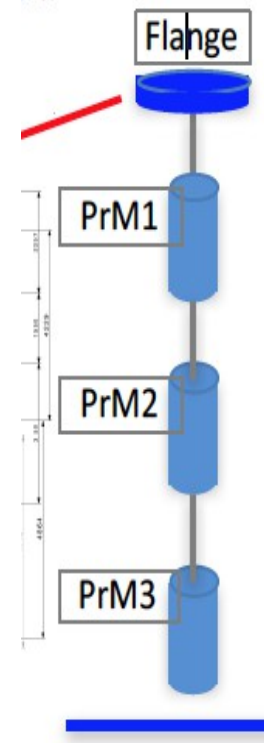
Slow Controls & Cryo. Inst. Consortium

- Last week, we had a talk on **Purity Monitor FT requirements**
- Tomorrow's consortium meeting:
 - **Thermometry FT requirements**
 - **Liquid argon fluid flow modeling in DUNE** (relevant to understand when determining locations of instrumentation devices)
- The goal is to specify:
 - No. of FT(s)
 - Location of FT(s)
 - Width of each FT
- We don't have any numbers yet, but we are getting there

Purity Monitors

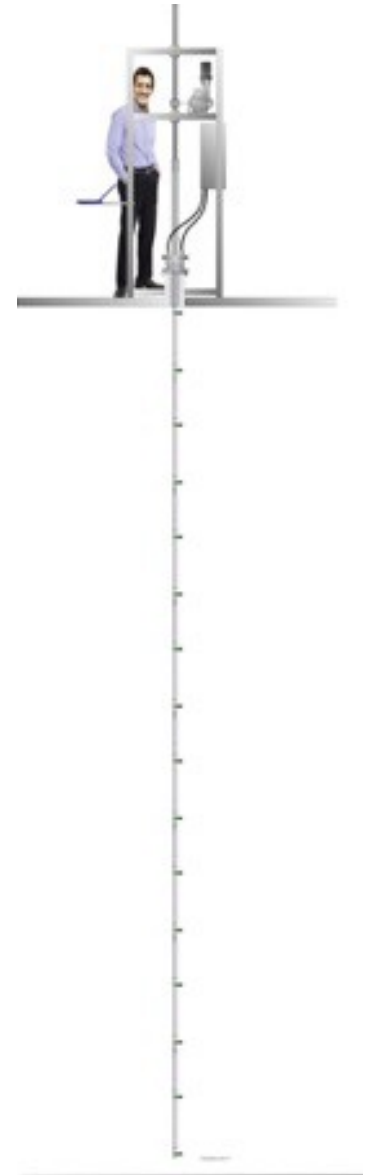
(based on Andrew/Jianming's talk)

- ProtoDUNE-SP PMs Can measure up to 10 ms lifetime
- Three purity monitors will hang from Flange vertically
- Same design can be extrapolated to DUNE
- Location of purity monitors:
 - vertical hanging vs horizontal placement will understanding fluid flow in the cryostat (tomorrow's fluid talk should help)
 - Also depends on the field gradient near the purity monitors. At least 500 mm clearance if they are close to the field cage; need simulations to ensure this. This defines the clearance around the PMs
- PMs are 4.75" in diameter. Add another 1" for HV cable/readout etc. So, 6" (152.4 mm for the device itself) – in principle 250 mm port size should work, can even be shared with other devices.
- Follow up studies will be discussed tomorrow to understand the possible locations of PMs (ideally at least two purity monitors at each corner of the cryostat will be good)



Thermometers

- ProtoDUNE-SP has two types of Thermometers, one of each
 - Static array of Thermometers (Valencia)
 - Dynamic T-Gradient Thermometers
 - Both cases: sensors are stringed vertically
- The dynamic T-Gradient thermometers can also be used for cross-calibration the sensors on the static array
- For DUNE, a similar or even a two sets of each of those types would be good.
- More on this will be discussed tomorrow at the slow controls consortium meeting



Work continuing on Laser

- Very productive discussion last week on Laser
- Need refinement in terms of main goals for LASER
- Laser can do a lot of things, we are currently making that list
 - Alignment
 - stability monitoring
 - E-field map
 - wire physical locations
 - HV system failures etc.
- The important question is again to what precision? (since a coarser understanding might be allowed by other systems)
- Also, some propagation of the impact of a given variable to physics is needed.
- Kendall and I are working on a document to put down arguments for laser and where it is most needed etc. along with FT requirement summary as the information evolves.