

Interface/integration discussions:

- TPC shifted by 200 mm relative to feedthroughs
 - Potentially major issue-- as we can't use the feedthroughs! Not a final decision, and discussions underway to recover the issue. Found another collision with the feedthroughs which is easy to resolve.
 - More specifically, can't use the middle row of 4 feedthroughs. The east set of 4 feedthrough collides with smaller brackets that can in principle be moved.
- Consider: Umbilical and powering for the neutron system and the laser system for ProtoDUNE-SP and also DUNE
- Follow up with shielding and grounding services.

ProtoDUNE-SP feedthrough/access

- Identified possible ports for laser and neutron access
- Secured some of the filler material for study and got information about where to get composition.

Physics case (LE program)

- Excellent talk from Erin about SN physics needs?
 - ADD? Solar neutrino case or not?
 - CONFIRM: how the case should be presented in the TDR and/or write a short dedicated note?
- Plan for Pulsed Neutron Source (PNS):
 - Prepare a full simulation
 - Indicate ability to resolve physics effects (noise, etc) and impact on energy scale/bias/detector threshold.
 - Need to show what can be done if the (corner) manholes are used. This seems to be the solution engineers prefer... (significant cost to any additional changes ~50-200k per port. Timescale for any changes is still ~3 mo. or less.)
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 - Is it really too far from the center? Or can the rate at the center be recovered by simply doing 2 runs at different rate settings? (this was the plan anyway, to reduce pile-up.)
 - Is the vicinity to the cryostat really a problem? The reflected neutrons are maybe not really in the anti-resonance window and will capture close, i.e., outside the field cage/TPC.
- DISCUSS: Plan for Radioactive Source (RS) - same as neutron?
- CONFIRM: Software coordination and sharing -- OK?

Laser case and design

- Physics case for laser:
 - Important to make an estimate of the precision with which the laser system can measure E field distortions.
 - It would be good to have the microBoone note ASAP,
 - But we should make our own estimate based on beam divergence, positioning accuracy, wire gap, etc... Aim to write a note.
 - Also, study the coverage achievable from outside FC (different distances..), knowing the FC gaps, and considering a given max angle (~45 deg). Simple study with root macro.
 - Try to quantify Efield precision needed to know recombination factor. Suggested to couple 2 protoDUNE studies: Michel electron search and HV variation: possibly measure recombination as a function of E in pDUNE?
- Design
 - On the top of the TPC, penetration of FC strongly preferred. Discussions with HV people indicate no show-stoppers there.
 - Pursue design of horizontally moving mirror to illuminate from end-walls. Extremities of long threaded rods can be in region with low potential, so it's possible to think of metallic parts for the transmission of movement from motors outside cryo. To avoid complications with cryo, can hold the system from the end-wall calib feedthroughs. System would then use 1 for periscope, 2 for holding things. One remains free for source.
 - Interface issues with PDS: study long-term effect on TPB or ARAPUCA. Also, effect on CPA kapton? Ettore suggests to check resistivity after some intense irradiation. Impact of laser on new ideas for reflectors (actually, TPB plates) on CPA also needs to be studied.
 - Found new laser, more powerful (160 mJ instead of 60 mJ), slightly more narrow (0.45 mrad instead of 0.5 mrad).
 - Discussion on electrical services: power supplies through interlock with PDS.

TDR preparation - SP design

- First draft due March 1st. -- *will collate ~existing materials sent, and try to identify items to update for next draft.*