LBNC Close out

A. Bross

ND general meeting

12/9/2020

LBNC Meeting

- Held last week
- Charge (w/r ND)
  - The situation with respect to the IPR process and the approach to a Baseline review should be updated and clarified. The overview should include discussion of the development path for a second technology as well as the approach to the Near Detector including its Day-1 incarnation.
  - The revised version of the Conceptual Design Report for the Near Detector complex is anticipated. A description of both the documentation and the technical status should be heard. The LBNC will be presented with documentation describing the components and the strategy to be employed for a Day-1 Near Detector. A Charge for a separate LBNC review of this plan has been prepared by the Laboratory Director. At this juncture, the LBNC should hear as much of these plans as are permitted by the time available.

AGENDA

12/02/2020 (11)

08:00	**Executive Session Committee + Director** (30)		Private #	Private #
08:30	LBNF Status (20 + 10)	Chris Mossey	917 1735 3657	Click link above
09:00	DUNE Status (30 + 15) Inc approach to CD2	Ed Blucher	917 1735 3657	Click link above
09:45	Technical Coordination (15 +15)	Eric James	917 1735 3657	Click link above
10:15	Break (15)			
10:30	APA Single Phase (20 + 10)	Gina Rameika	917 1735 3657	Click link above
11:00	Vertical Drift (20 + 10)	Steve Kettell	917 1735 3657	Click link above
11:30	Near Detector (20 + 10)	Hiro Tanaka	917 1735 3657	Click link above
12:00	Computing (20 + 10)	Heidi Schellman	917 1735 3657	Click link above
12:30	**Executive Session** (30)		Private #	Private #
13:00	Adjourn **Offline:** Develop any Questions, Queries for DUNE			

12/03/2020 (10)

08:00	**Executive Session Committee (30)** Deliver Questions/Queries to DUNE		Private #	Private #
09:00	**Breakouts Listed Below (150)**			
09:00	**Vertical Drift Workshop + Plans** Answers to Committee Questions on VD - Steve Kettell (150)		917 1735 3657	Click link above Host will open breakout at 9:05am
09:00	**APA Single Phase Electronics, Installation** Cold Electronics – Marco Verzocchi (20+15) APAs – Christos Touramanis (20 + 15) Photon Detectors – Ettore Segreto (20 + 15) Installation – Jim Stewart (20 + 15)		917 1735 3657	Click link above Host will open breakout at 9:05am
09:00	**Near Detector Discussions** TMS – Tom LeCompte (25 + 20) Day-One ND Physics Performance – Chris Marshall (25 + 20) LAr ND Prototyping – Dan Dwyer (25 + 20)		917 1735 3657	Click link above Host will open breakout at 9:05am

Close Out slides

Findings

- Delivery of the revised ND CDR is imminent. LBNC expects that this could be the final version, and will review it as expeditiously as possible.
- Details of the Temporary Muon Spectrometer (TMS) were presented. It borrows significantly from the MINOS design. It will require 34 months to build once a decision is made to do so, at a base cost of ~$6M.
- The TMS measures momentum by range with a resolution of ~5%, but the design has not been optimized yet. This resolution is close to the requirement.
- TMS doesn't allow detailed studies of nu interactions in argon such as are possible with ND-GAr. The TMS will eventually need to be replaced by ND-GAr to achieve DUNE's ultimate CP sensitivity. TMS may also have pileup issues at full beam power, although it should operate fine at 1.2MW.
- We congratulate DUNE for recent advances in prototype tests of the ND-LAr design, including the first test results from the Module 0 prototype.
- Tests of the ArgoCube 2x2 prototype in the NuMI beamline have been pushed back to 2022, due to a combination of technical readiness and COVID. However, an extensive testing program using SingleCube and Module 0 is planned and will mitigate this to a large extent.
- DUNE is considered a new integrated design for ND-GAr's magnet vacuum vessel that would also provides pressure containment.

Close Out slides II

Comments

- The LBNC commends DUNE for making significant progress on defining the "Day 1 ND". The preliminary physics studies presented, which would need to be completed and documented in detail, indicate that this could be a viable detector option for the initial running period.
- LBNC's review of the Day 1 detector plan will require not only detector-level studies of TMS, ND-LAr, and SAND, but also "system-level" physics studies showing that the whole package, including the PRISM capacity, can achieve the needed sensitivity. Some of these physics studies go beyond what we see in the outline of the ND PDR.
- We acknowledge that an active R&D program is under way to optimize the design of the TMS further, and we are looking forward to see the results.
- We note that DUNE plans to decide on the inner tracking technology for SAND by April 30. This strikes us as uncomfortably late compared to the planned summer IPR.

Recommendations

- Produce documents describing the TMS technical design and physics studies of the capability of the Day 1 detector configuration in preparation of an LBNC review of the Day 1 detector strategy, by the end of January. This documentation should address how the Day 1 detectors will achieve 3 sigma sensitivity to CP violation in the initial stages of DUNE. These documents should address the charge of the Day 1 review.

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DISCUSSION