DUNE Near Detector meeting— TIFR Discussion/CLOSE-OUT







Workshop Focus

• This workshop addressed the technical needs of the DUNE near detector complex. Of particular interest was the discussion of the collaborative effort that will be required in order to deliver the components of the multipurpose detector (MPD) system: the HPgTPC and its pressure vessel, the magnet system and the muon tagger/ID system.





SAND

 The discussion today was very focused on what needs to be done to move forward with SAND.

ACTION ITEMS

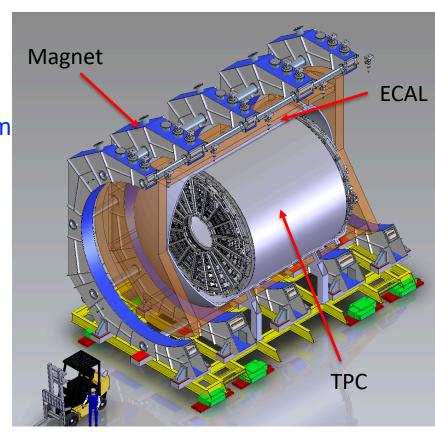
- Identify a specific topic and present and end-to-end analysis.
 - Nuclear effects and flux impact on and the oscillation analysis
 - Hydrogen x-section for example
- Present detailed physics comparison of the two SAND options





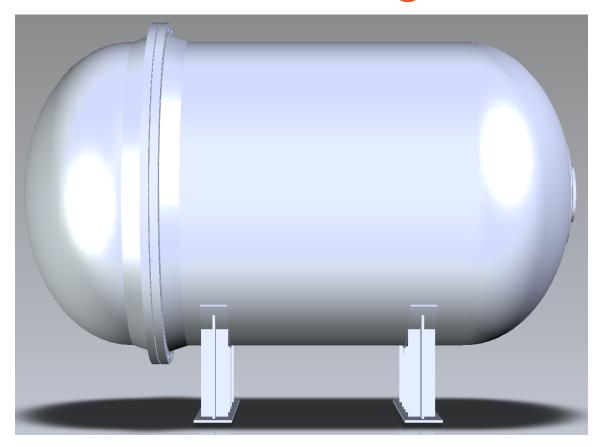
MPD

- Magnetized high-pressure (10 atm) gaseous argon TPC + ECAL + muon tagger
 - Copy of ALICE TPC (5m in diameter X 5m long active)
 - 0.5T field
- HPgTPC surrounded by highperformance ECAL
 - Calorimetric analysis for neutrals
 - Optimization study underway
- Muon tagger
 - Incorporated into return Fe





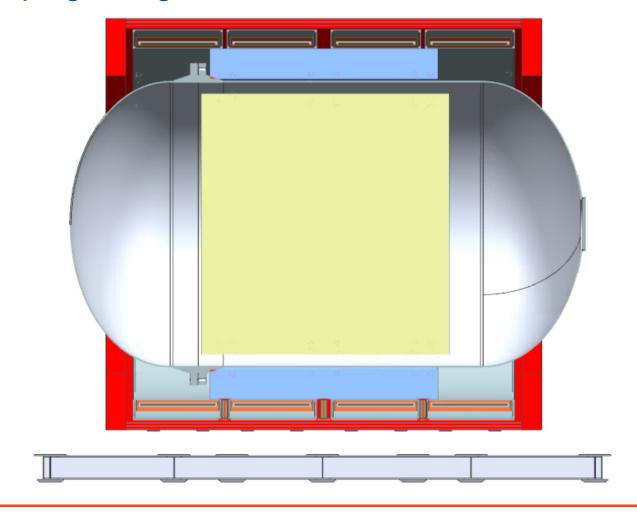
Pressure Vessel BARC design







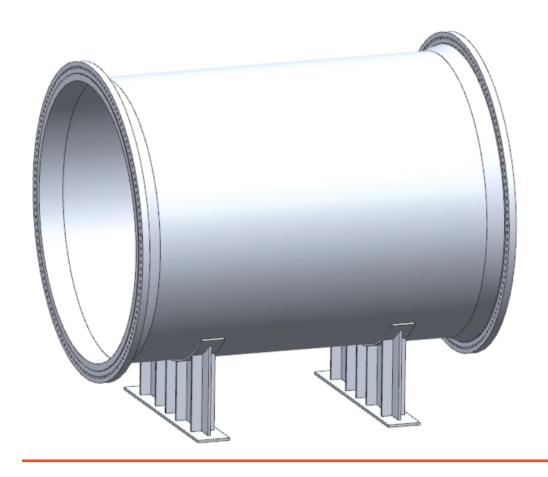
Developing Designs: Solenoid w/Partial return Yoke (SPY)





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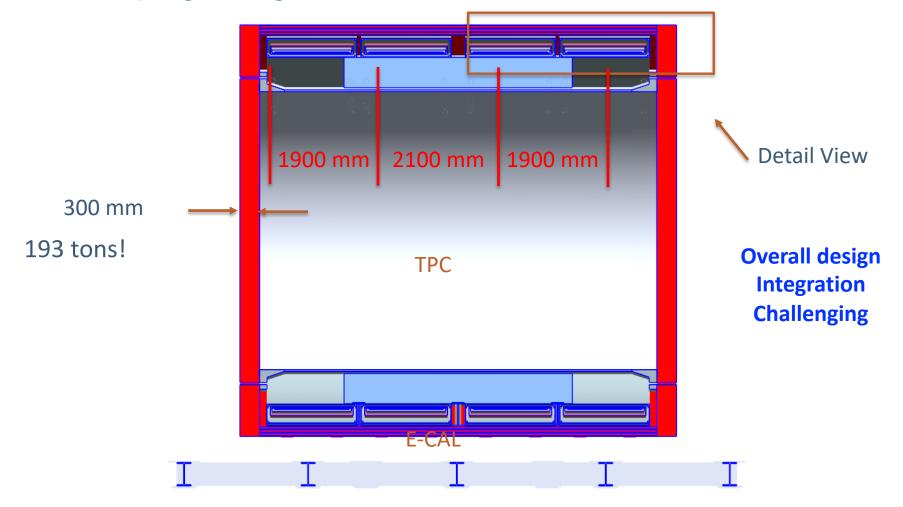
Proposed TPC vessel design



- Support legs need to be redesigned
- Available space between coils is very small
- Vessel to support E-Cal?

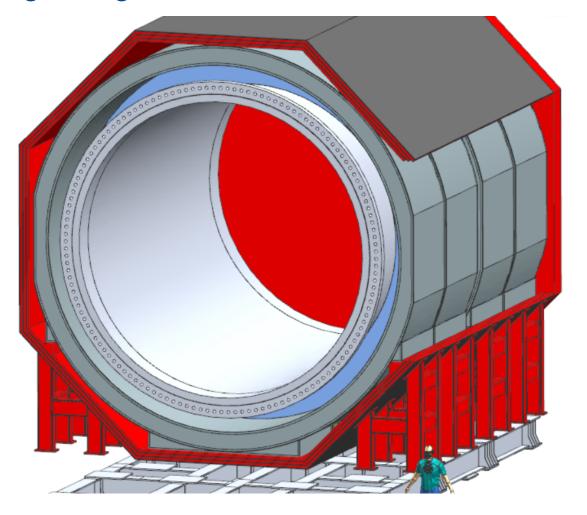


Developing Designs: Solenoid w/ Partial return Yoke (SPY)



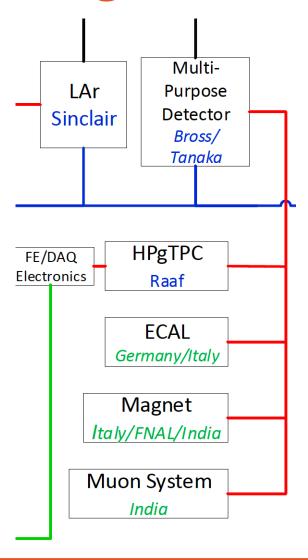


Developing Designs: Solenoid w/ Partial return Yoke (SPY)



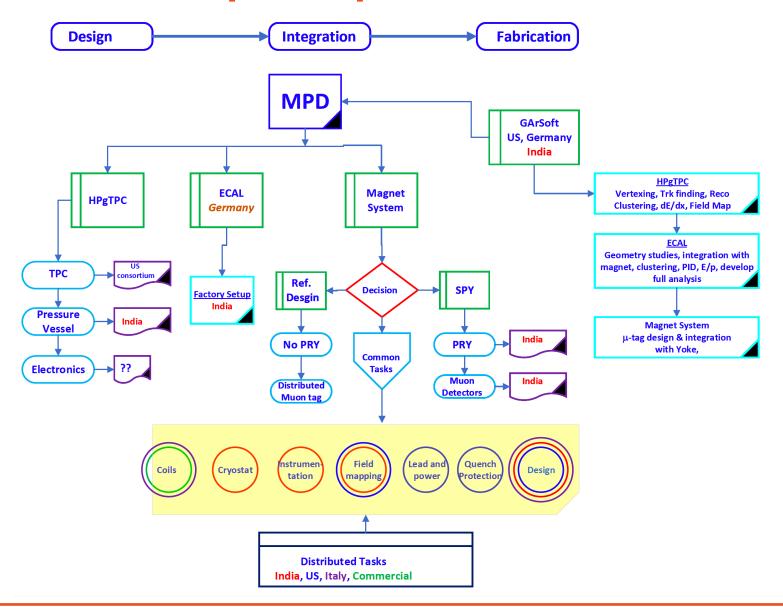


NDDG MPD Organization





MPD: Indian participation/contributions







Moving Forward





MPD: Indian participation

- BARC is already vigorously involved
 - Taking on the responsibility for the HPgTPC PV
 - Member of magnet system team
- Many opportunities (both hardware and software) for university groups
- Note: Many working meetings (Fermilab listserv)
 - ND general: dune-nd
 - MPD: dune-nd-magnet, dune-nd-gastpc
 - General ND engineering: dune-nd-engineering-integration,
 - ND Software: dune-nd-software, dune-nd-sw-integration
 - Physics: dune-physics





MPD: Indian participation II

- Hardware
 - μ-tagging system
 - ECAL module production
 - Magnet instrumentation
 - +++++
- In software and physics analysis there are many opportunities to make critical and important contributions
 - HPgTPC, ECAL, Magnet system (μ-tagger)
 - Plus many areas to contribute to the LBL general analysis group
- Support available for visitors to Fermilab
 - Intensity Frontier Fellowships
 - Student internships





Fermilab Intensity Frontier Fellowships

- Support for experimental or theoretical researchers wishing to pursue novel concepts with Fermilab scientific staff to enhance or strengthen the current program at Fermilab.
- Eligibility
 - Ph.D. in Experimental or Theoretical Particle or Nuclear Physics.
 - Successful candidates will be resident at Fermilab for 50 percent or more of the duration of the fellowship.
- Financial support: up to 50 percent of researcher's total current compensation, reimbursed to the researcher's home institution. Awards may include a travel budget to enable regular trips to remote experimental locations when appropriate, and to conferences to present work.
- See: https://www.fnal.gov/pub/forphysicists/fellowships/intensity_frontier/
- Groups should please contact the NDDG conveners with their areas of interest for participation on the MPD





THANK YOU



