

LANL LDRD LAr TPC Project

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LANL LDRD Program

- Three-year projects, two major classes:
 - ER – exploratory research
 - single scientist (or part-time plus postdoc)
 - small M&S
 - DR – directed research
 - multiple scientists in multiple groups or divisions
 - larger M&S
- We succeeded in competing for a DR to enhance the physics reach of LBNE

Our DR Project

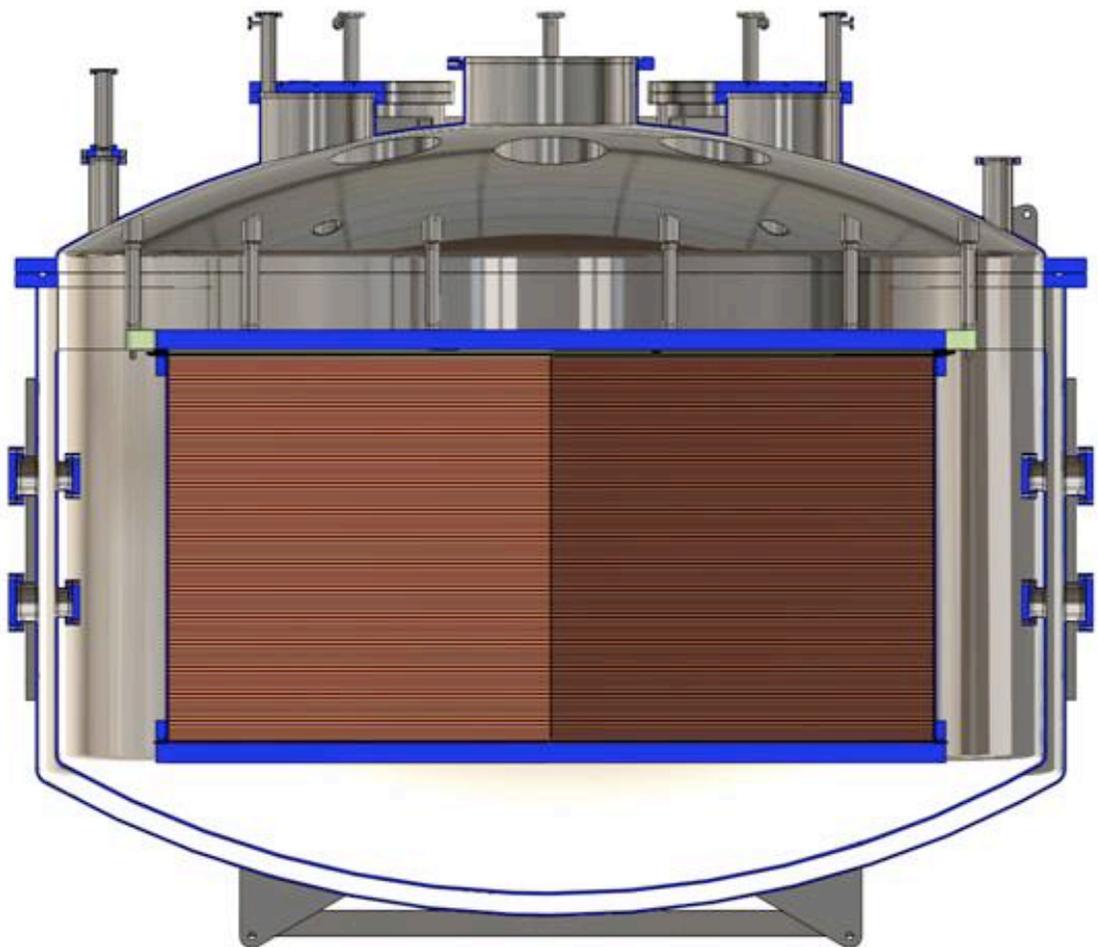
- Theory component (T-Division)
 - Beyond the Standard Model Physics
 - nucleon decay
 - supernova neutrinos
 - Nuclear Physics
 - cross-sections/final state interactions important for CP extraction
 - nucleon decay signatures
- Experimental component – redirected due to the LBNE far detector technology choice (Two P-division groups)
 - Build a moderate-scale liquid argon TPC
 - Operate it, develop calibration system, basic physics results (cosmic-ray and source running)
- Idea is the detector will have a useful life beyond the end of the LDRD period

LDRD Stretch Goals or Beyond the LDRD period goals

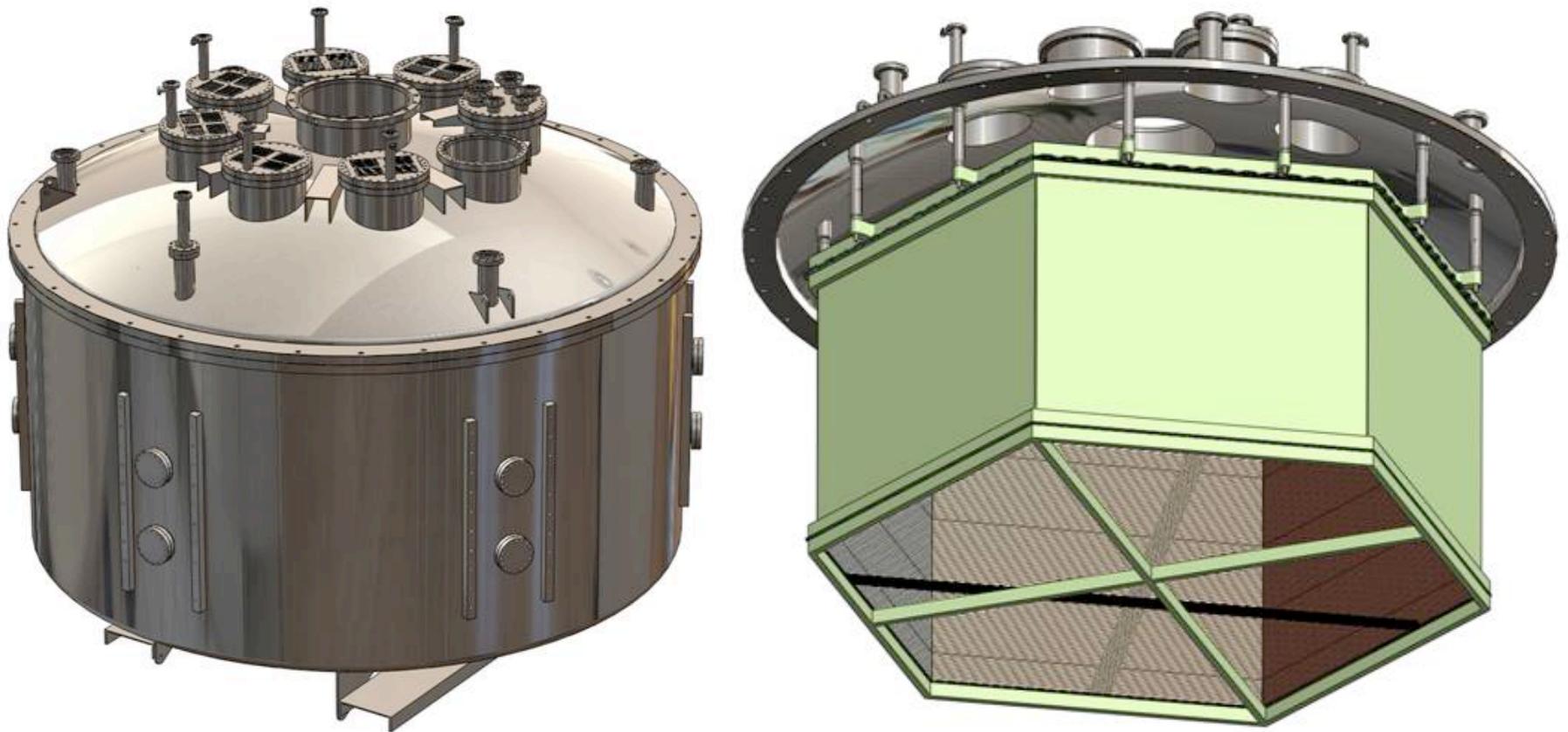
- High energy neutron beam running
 - LANL has a unique facility 600 MeV kinetic energy endpoint for neutrons
 - Just down the mesa from the commissioning sight
 - Important physics
 - cosmogenic backgrounds to supernova physics
 - neutrino energy reconstruction
 - potential surface running for LBNE (nobody wants this!)
- Neutrino beam running
 - Intermediate energy running in NUMI?
 - Low energy running at ORNL?
- Charged-particle beam running
- Cosmic-ray running

Cryostat and TPC

- UCLA-style design of the cryostat/TPC geometry – suggested by Hanguo Wang at the New Mexico Liquid Argon Meeting in July
- Largest TPC we will accommodate will be – hexagonal, with vertical drift with horizontal dimension between 2 and 3 meters, drift ~ 1m
- We need to order the cryostat ~now. Only go for 3 meters rather than 2 if physics arguments are strong
- Total instrumented mass between 4.3 and 10 tons – could go higher with increased drift length and a good reason!
- Timing: Cryostat and electronics delivery in late spring
- Commissioning begins in the summer of 2013
- LDRD ends September 2014



A few more pictures



Drawings by John Ramsey – LANL engineer

Questions or Discussion?

- Apologies for missing this important meeting
- I will be at the Community Planning Meeting and hope for conversations there
- Good luck for a successful workshop!
- Advertisement: New Mexico Liquid Argon TPC Workshop February 1 and 2, 2013 in Santa Fe – will include many planning discussions for commissioning and running this detector