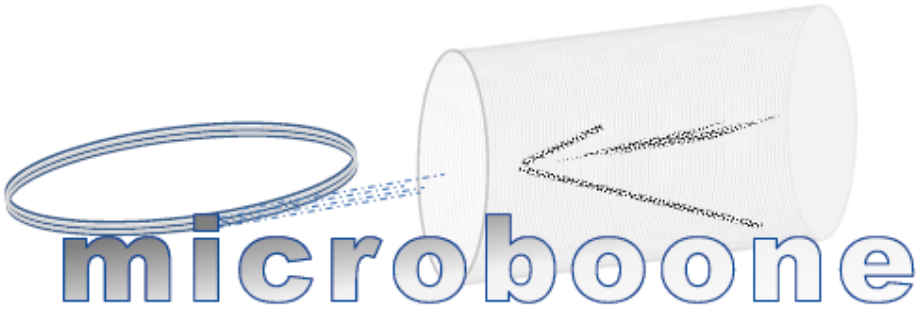
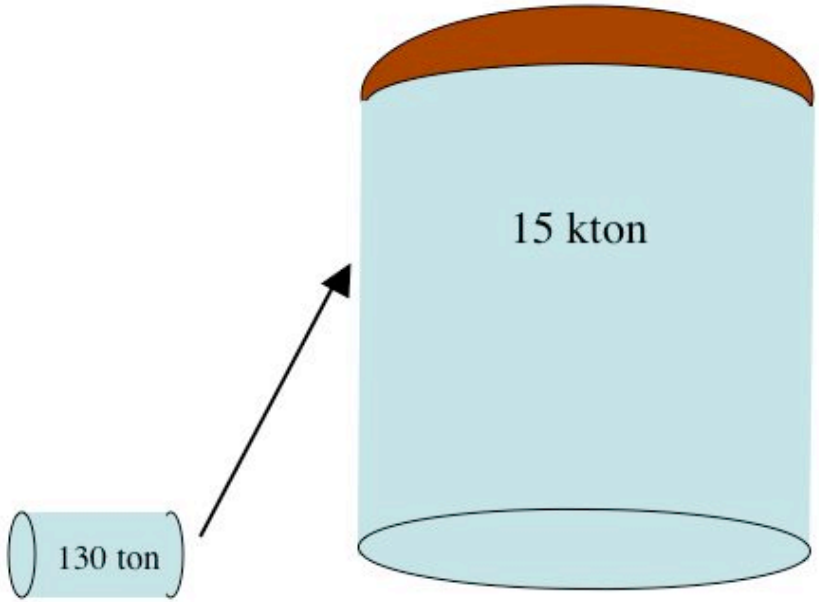


LArTF for Neutrino Detectors

Gina Rameika

August 2, 2011

LAr detector evolution – NuSAG 2006



Physics Development *using* ***existing*** *technology*
Record **complete neutrino interactions**: (ν_e & ν_μ)
Establish **Physics Collaboration**
Develop **Event Identification**,
Develop **Reconstruction**,
Develop **Analysis**,
Establish successful **Technology transfer**

Engineering Development:
Construction of Tank
Argon Purity
Mechanical Integrity of TPC
Readout S/N
Microphonics due to Argon Flow

Purity Monitor Development
Materials Tests
5 m Drift Demonstration
Long Wires Tests
Electronics Development

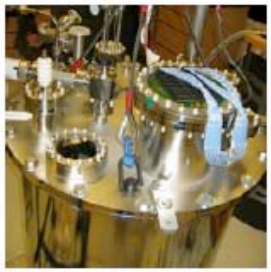
Liquid Argon Detector Evolution

Liquid-Argon Time Projection Chambers

Status of R&D Program in the US

The first TPCs in the United States:

Yale TPC



Location: Yale University
Active volume: 0.00002 kton
Year of first tracks: 2007

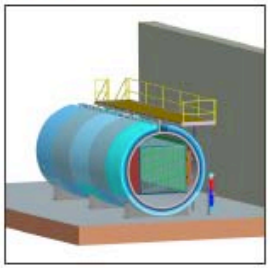
Bo

Location: Fermilab
Active volume: 0.00002 kton
Year of first tracks: 2008

ArgoNeuT

Location: Fermilab
Active volume: 0.0003 kton
Year of first tracks: 2008
First neutrinos: June 2009

MicroBooNE



Location: Fermilab
Active volume: 0.1 kton
Start of construction: 2010

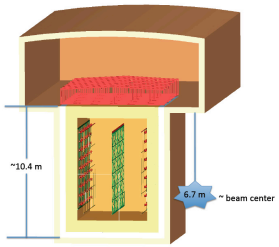
Test stands to improve liquid-argon technology:

Luke

Location: Fermilab
Purpose: materials test station
Operational: since 2008

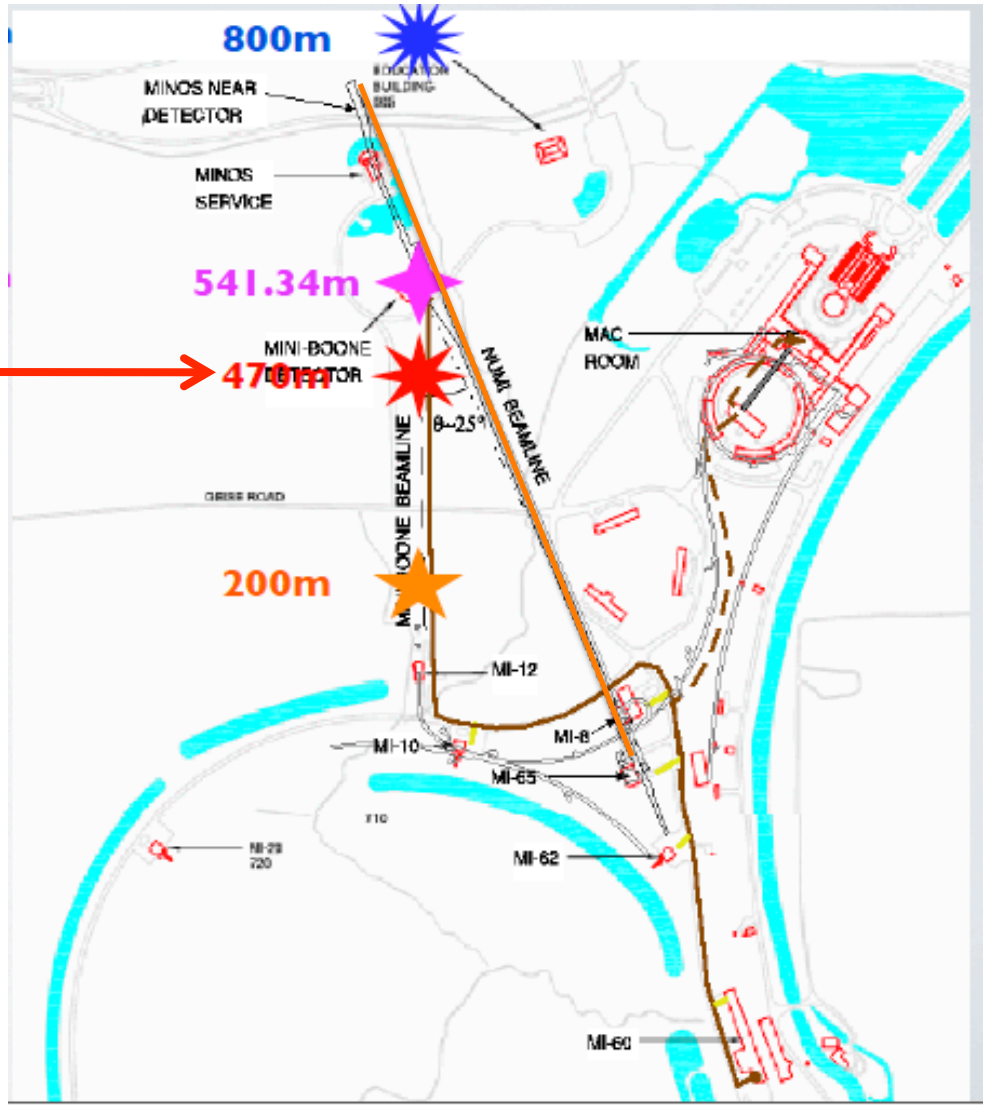
LAPD

Location: Fermilab
Purpose: LAr purity demo
Operational: 2010



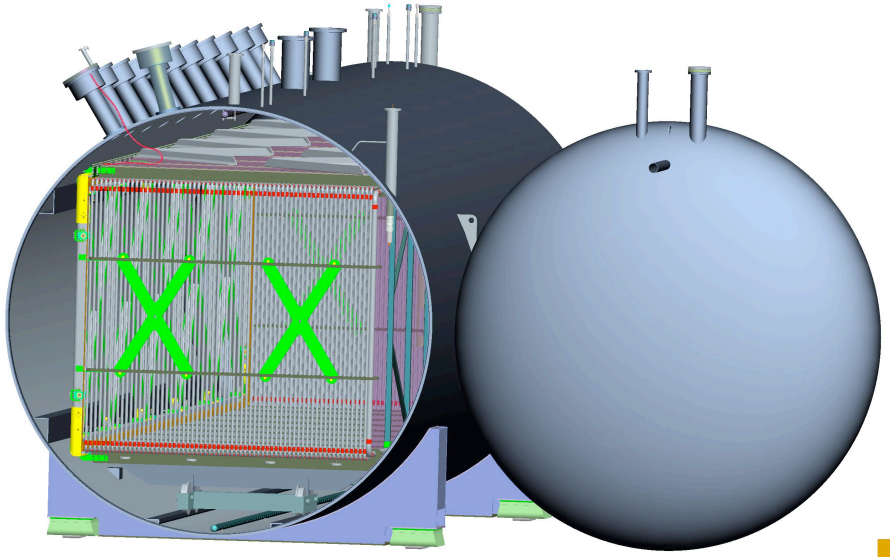
LAr1: Engineering prototype

Neutrino Area

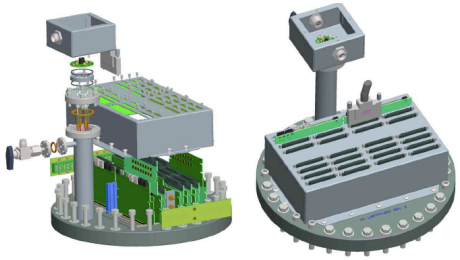


Multiple detectors exposed to Booster and NuMI beams

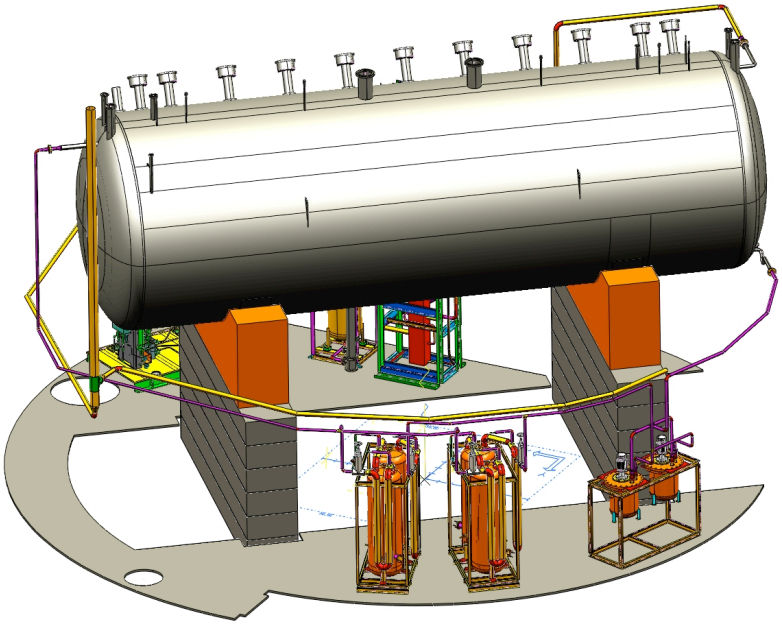
MicroBooNE

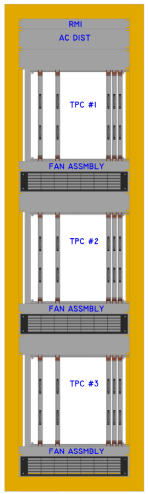


Cryostat containing a TPC and array of PMTs, electronics, cables..



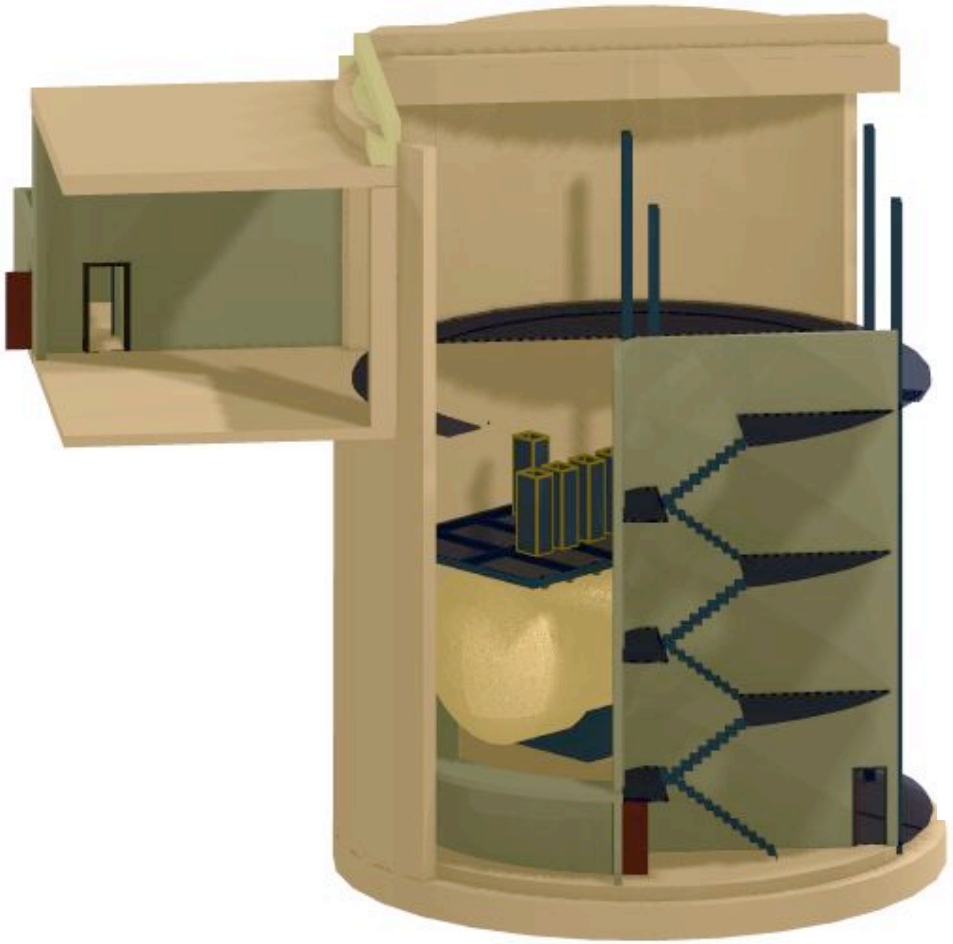
Cryostat installed in enclosure with equipment for cool down, filling and purification

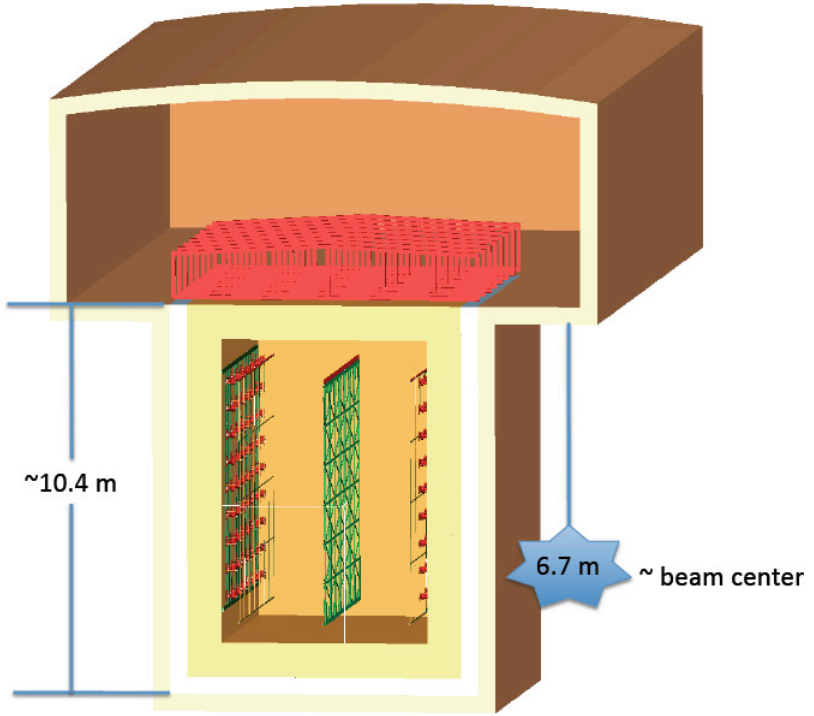




Readout racks and DAQ

LAr1 in the LArTF





Nov./Dec. 2011
Considered adopting this design for MicroBooNE;
Opted not to, due to cost and schedule considerations; follows naturally after MB