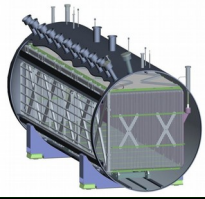


Workshop on Calibration and Reconstruction for LArTPC Detectors

December 10-11 @ Fermilab, Batavia, IL

Workshop Introduction

Michael Mooney
Colorado State University



Organization



- ◆ Organizers:
 - Michael Mooney (CSU)
 - Tingjun Yang (FNAL)
 - David Caratelli (FNAL)
- ◆ Two-day workshop
 - Monday: calibration
 - Tuesday: reconstruction
- ◆ **65+ registrants** – wow!
- ◆ Workshop supported by Fermilab Neutrino Physics Center (NPC) – thank you!
- ◆ Thanks to Etta Johnson and Connie Hillgard for helping with workshop logistics

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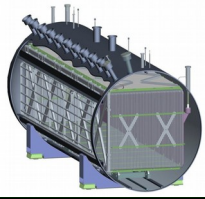


Organizing Committee

Michael Mooney (Colorado State)
Tingjun Yang (FNAL)
David Caratelli (FNAL)

A venue for the LArTPC neutrino community to exchange ideas and start developing a collaborative strategy working to meet stringent requirements on neutrino event reconstruction and detector calibrations.

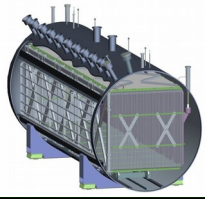
<https://indico.fnal.gov/event/18523/>  **Fermilab**



Goals/Scope



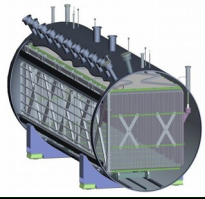
- ◆ Several LArTPC neutrino experiments in operation or will be operating within next decade
 - Personnel stretched very thin with both SBN and DUNE on the horizon
 - But **a lot of overlap** in needs and tools development!
 - We need to organize to ensure efficient information transfer across experiments, and sharing of tools where possible, so that SBN and DUNE are successful
- ◆ Many open questions for LArTPC calibration and reconstruction – just a couple:
 - Do we have a sufficient plan for obtaining detector physics measurements we need ahead of SBN/DUNE?
 - Pros/cons of different reconstruction paradigms? And can/should they be combined into one approach?



Logistics



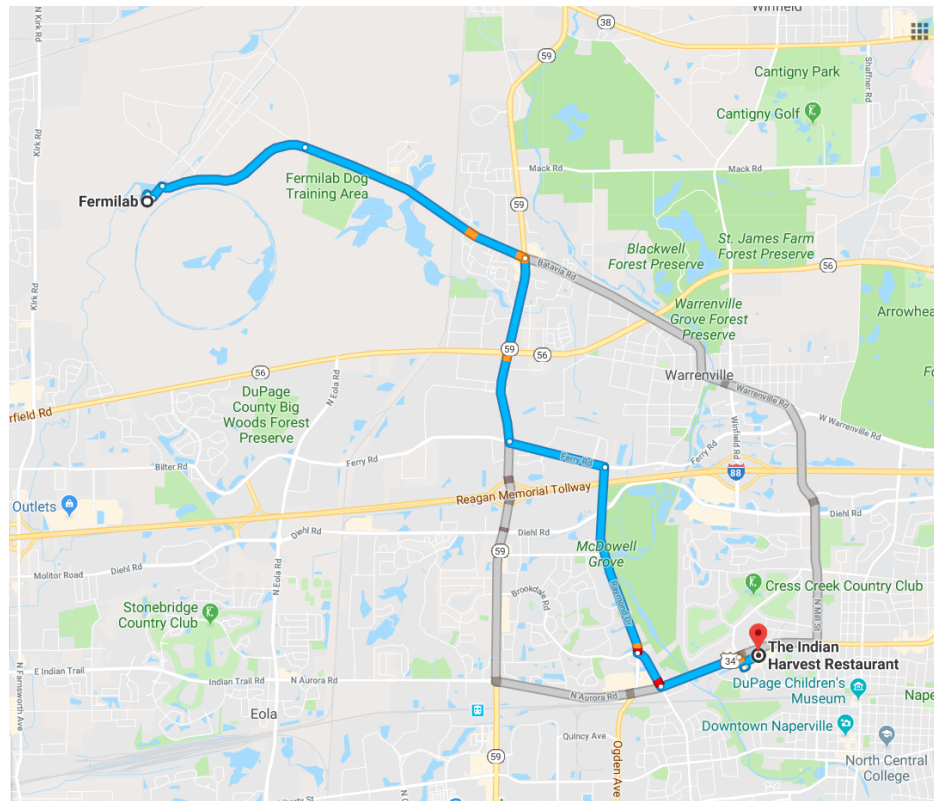
- ◆ Today: 9am–5:30pm @ WH1W (“One West”)
 - Focus is LArTPC calibrations
- ◆ Tomorrow: 9am–5:15pm @ WH8XO (“Hornet’s Nest”)
 - Focus is LArTPC reconstruction
- ◆ Registration fee is \$15 – please pay during next coffee break if you haven’t already
 - Fee will be reimbursed for speakers – see email David sent for more information (or ask one of the organizers)
- ◆ Plan to write **proceedings** for workshop – will be in touch about contributions in next couple of weeks
- ◆ Workshop dinner: tonight, 6:30pm, at Indian Harvest
 - David will poll directly before first coffee break to estimate attendance for reservation

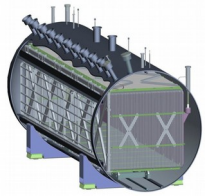


Dinner Details



- ◆ Address: 796 Royal St. George Dr. #101, Naperville, IL 60563
- ◆ About a 20-25 minute drive





Today's Agenda



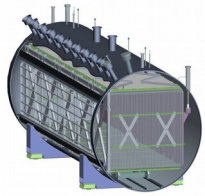
♦ **Early morning session: TPC Calibrations**

- Noise - Mike Mooney
- Front-end electronics - Brian Kirby
- ADC electronics - Wenqiang Gu
- Wire field response - Hanyu Wei

♦ **Late morning session: Photodetector Calibrations**

- Gain and quantum efficiency - Matt Toups
- Light yield and propagation effects - Diego Garcia-Gamez
- Energy reconstruction with light - Will Foreman

♦ **LUNCH (on your own): 11:50am-1pm**



Today's Agenda



◆ **Early afternoon session: Calibration Sources**

- π^0 mass reco. @ ICARUS – Alessandro Menegolli (remote)
- Stopping tracks – Jen Raaf
- Michel electrons – David Caratelli
- ^{39}Ar beta decays, deployed radiological sources – Hannah Rogers
- Pulsed neutron generator – Jingbo Wang
- UV laser system – Yifan Chen

◆ **Late afternoon session: High-Level Calibrations**

- Space charge effects – Mike Mooney
- Recombination – Bruce Baller
- Detector uniformity – Varuna Meddage
- TPC alignment – Tom Junk
- Neutrino energy reconstruction – Jianming Bian
- DUNE calibration needs – Kendall Mahn (remote)