

LARIAT-II Update

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Preliminary Cost Estimate

NOTE: incomplete!

Costs verified by
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- 2000 channels (3mm pitch, 3m, 2 views)
- Copy μ Boone, based on official cost table, fully burdened costs
- Front end \$484k – cold electronics board/shaper/amp/ASIC, TPC cabling, feedthrough, intermediate amp, digitizer
- Readout ~~\$94.3k~~ \$58k – FPGA board couples to digitizer (need 32), 2 crates, 2 controllers, 2 XMIT modules, 6 PCIe optical links, trigger crate and electronics
- DAQ \$37.2k – computers
- TPC \$177k – assumes fixturing/machine reuse, design & fabrication only
 - “some assembly required” at FNAL
- Others? Need to keep this as **inexpensive as possible**. Significantly **less than \$1M**.

Other issues

- What will need some design work?
 - TPC and parts
 - Cold adapter board
 - Bias + LV system
 - Photosensing
- ATLAS feedthrough pin boards available?
 - Still needs clarification
- Sept 10 DOE FOA vs Field Work Proposal
 - We will go for Sept 10th for the detector parts
 - FWP seems more viable for cryo infrastructure

Proposal

- Budget is getting clearer, especially for large ticket items
- Proposal underway: (blue=1st pass done, orange=working)
 - Introduction and motivation
 - Project Objectives
 - Physics goals.
 - Beam and detector requirements.
 - Detector composition
 - project timeline
 - budget and justification
- Will need:
 - How do you slot in? What personnel are involved?
 - bios, C&P, prev results, facilities

Who does what - I

Major thrust: reduce development time and \$\$\$ by copying from MicroBooNE, making changes only where needed.

- Cold electronics fabrication – BNL
- Readout electronics fabrication – Nevis
- Readout adapter boards - ??
- Bias and low voltage system - ??
- Vertical slice setups – UCL + WM/??
 - Test readout and DAQ, adapt to our needs
- External PID and triggering integration – WM
 - readout of TOF, CER, VETO, PMTs → datastream
 - FPGA based coincidence, holdoff
- Run control – Chicago
- Reconstruction and performance studies – Yale + Manchester + ??
 - Already underway → supporting experimental design



Working to clarify the level of involvement of these groups

Who does what - II

Major thrust: reduce development time and \$\$\$ by copying from MicroBooNE, making changes only where needed.

- Cryosystems, Beam, Counters – FNAL
- TPC wires and planes – Yale & Syracuse
- TPC cage – Texas + ??s
- TPC cable production – BNL or ??s
- Photosensors – Indiana & L'Aquila??
 - More than one design possible. Will MicroBooNE PMTs fit?
- Slow controls, environmental monitoring – ??
 - PLC hardware comes w/ cryo. Software/integration needed.
- Detector data monitoring, online reconstruction, event display – ??,??,??
- DAQ integration @ FNAL – Chicago/UCL/WM/FNAL
- TPC assembly @ FNAL – FNAL/Yale/Syracuse/Texas
- Operations & Analysis – All

Next Steps

- Interested in a task? We must hurry.
 - Phonecall today or tomorrow
- 1p writeup early next week
- Budget as necessary.
 - M&S & tech labor OK.
 - No long term grad/postdoc funds.
- Mandatory Information (will point you to a link) – C&P, Facilities, Bio, Previous Activities, Program office contact.