



## Minutes of the Fermilab UEC Meeting on February 24, 2012

### Attending:

Todd Adams, Mike Cooke, Dick Gustafson, Sergo Jindariani, Jonathan Lewis, Daniel Kaplan (remote), Ryan Patterson (remote), Greg Pawloski (remote), Brian Rebel, Nikos Varelas, Lisa Whitehead, Bob Zwaska

GSA officers: Chris Prokop, Alexander Radovic, Brian Tice

### Guests:

Steve Geer, Carol McGuire (remote), Jim Strait, Herman White

### **News from the Chair – Dan Kaplan**

Next meeting dates: 3/30, 4/27, 5/11, 6/14 (just after the Users Meeting). June 14 meeting conflicts with New Perspectives, but the GSA is amenable and will send one representative - morning meeting desirable so that people can leave after several-day stay.

Preparations for DC trip: A little over half the UEC and GSA will attend 3/21-23. UEC will visit along with USLUO and SLUO. Training session 3/10. Dan to Washington following week as well to attend 3/28-29 NUFO (National User Facilities Organization) event.

Ongoing effort to track Fermilab alumni outcomes running into difficulties: Fermilab thesis records incomplete, state of experiment records would require excessive spokesperson time. Changing tack to recruit collaborating-group PIs into the effort.

The UEC has historically made suggestions to Jeff Appel for the Fermilab PAC. Committee to send suggestions to Dan.

### **News from the Directorate – Jim Strait**

Jim summarized status of LBNE. These updates are fresh from briefings to DOE during preceding week. LBNE consists of new neutrino beam at Fermilab, 33-kton-fiducial liquid-argon detector at the Homestake Mine, and all required conventional facilities at both sites.

LBNE has three primary physics goals: First, neutrino oscillations and their relevance to the matter-antimatter asymmetry, possible new symmetries, and the unification of forces - sensitivity via CP violation and the matter hierarchy. Second, proton decay. Third, neutrinos from supernovae. Jim noted that neutrinos have historically been the source of many new, unexpected discoveries.

Greater sensitivity to CP violation and mass hierarchy if third mixing angle,  $\theta_{13}$ , not too small: for  $\sin^2(2 * \theta_{13}) > 0.01$  LBNE does well. Good sensitivity already expected

based on pre-Daya Bay results that  $\sin^2(2 * \theta_{13})$  likely larger than 0.01, with central value around 0.07. (Daya Bay result now strengthens the case.)

Unique capabilities of liquid-argon LBNE in proton decay because of ability to resolve slow particles, for example,  $p \rightarrow \nu + K^+$ . This mode has very low efficiency in water, in which Kaon is below Cherenkov threshold.

LBNE can also look deeply into galactic supernovae, detecting large numbers of neutrinos which are direct dynamical actors in the explosion.

LBNE currently has 338 collaborators, mostly from US institutions: 10 of 60 institutions are from 4 foreign countries; additional international collaboration being explored. Substantial project management teams - FNAL had pursued LAr and BNL H2O - integration of FNAL and BNL teams in progress.

Neutrino beam design has evolved substantially - now Main Injector extraction from MI-10, nearly pointing at Homestake, minimizing bends. To minimize underground construction, a small hill will be built to enclose primary beamline and target hall.

Detector options: a 200 kton (fiducial) water Cherenkov or 33 kton (fiducial) liquid-argon TPC in 2 16.5-kton modules. Substantial engineering done on both. Smaller near detector on Fermilab site will measure un-oscillated neutrino beam. Each technology has its own near-detector design.

LBNE Project working towards CD-1 milestone as defined by DOE. Has undergone myriad of "self-inflicted" reviews and workshops to ensure readiness.

Decision to build liquid-argon detector instead of water Cherenkov. Merits discussed, highlighting ability of liquid-argon TPC to identify electron-neutrinos and distinguish from various backgrounds. LAr also complementary to existing water Cherenkov detector (Super K), giving differing sensitivities to the various effects of neutrino oscillations, proton decay, and supernovae.

Updated schedule: project constrained fiscally over next few years, and technically in later years. \$10M in FY13 instead of expected \$35M inflicts a year of delay. Technical schedule drivers are LAr prototype, construction of cavity at Homestake, installation of detector components. With all constraints, estimate completion in FY23.

Q: Total budget limitations?

A: Think the plan conforms to existing, informal budget caps. Do not have a specific number from DOE. If that number is ultimately too small, ideas on how to stage project: descope in a way such that full experiment could be recovered via investment from other collaborators, savings of contingency, or future projects.

Q: Impact of red tape from Washington or other issues of planning process?

A: Project quite large, necessarily has very complicated process. Some items exacerbated by some rigidity in project process. On the whole, does not feel LBNE suffers from overly bureaucratic mindset.

Q: Message to take to Congress, particularly with regard to proposed FY13 cut?

A: The science is compelling, project could use support. His understanding of FY13 ding was that OMB did not think LBNE had well-formed plan. Hopes that issue now solved.

## **Subcommittee Reports:**

### **Users Meeting – Lisa Whitehead**

Subcommittee determining whom to invite for public lecture. Names passed to public lecture committee. Comment that audience will be predominantly the public, not users (believe filling auditorium not too difficult, even on a weeknight in June).

Substantial visiting-scholar funding available to support graduate-student travel to Users Meeting.

Tevatron Symposium 1 day before Users Meeting: 6 talks, dance performance, undergrad poster session, and reception.

### **GSA Report – Chris Prokop**

GSA requesting support for lunch forum on Intensity Frontier Science at April APS meeting. Forum would be directed towards grad students and postdocs, informing them about Intensity Frontier. Requested support a few thousand dollars from FRA/URA. Dan to contact Bruce Chrisman.

GSA considering expanding into GSA / Postdoc association. Issue: there is no organization at Fermilab for postdocs. Ample precedents at other labs for such an organization. UEC generally in favor and supportive.

### **Lewis-Burke Report – Carole McGuire**

FY13 president's budget request: HEP reduced 1.3% in total, but substantial additional concerns for Fermilab - substantial reduction in LBNE and zeroing of ILC. Pier in Washington this past week working with many people on budget, trying to restore funding that has been left out. We may have substantial traction on Capitol Hill. However, administration more focused on applied science, so uphill battle there.

Our DC visits next month an important part of process - timing is good. Important to make personal connections, especially with staffers.

Outlook: likely to have continuing resolution at least through the election. Must make case for our projects to continue in a CR. CR potentially advantageous compared to president's budget, but this is not guaranteed.

On LBNE, bias against new major facility start in present environment. However, not asking for commitment to build it, but to do preliminary planning and design - essentially the due diligence - an easier sell in this environment.

Can argue for reinvestment in our future program. Decided to turn off Tevatron and responsibly planned for transition to new projects. Now just executing that plan.

DOE initially proposed greater funding for Fermilab, LBNE, and perhaps ILC, but cut by OMB.

Q: Which comparisons to make?

A: Compare proposed to actual present-year funding.

Q: Zeroing of ILC - what connection to Project X?

A: Should not read too much into it - DOE putting off a very-long-term future project. Also, better not to have multiple large projects pending (LBNE + PrX). Can make point that development of SRF has many applications including future HEP accelerators and technologies (IARC).

Q: Accelerator-Driven Systems?

A: Small Modular Reactors dominant thing in Washington today, better off not pushing nuclear applications at all in present environment.

Q: Should seek small positive nuggets in the budget and emphasize those (e.g. university funding in FY13 budget)?

A: Really need to push for support for the field overall - university research viewed positively, need to have facilities with which to do it.

### **Short-Baseline Neutrino Focus Group at Fermilab – Steve Geer**

Steve convening focus group to plan for future short-baseline neutrino program at Fermilab in response to tensions among measurements by previous experiments. Goal: develop program that can definitively measure or falsify previous results. Group charged by Directorate with analyzing tensions, possibilities, and recommending optimal program.

Interim report early April to summarize present situation and expected impact of already-approved experiments, as well as some options. Final report at summer PAC meeting to compare options and recommend program.

Four subgroups:

- Tensions: analyze tensions in data.
- Options: collect and analyze options for future experiments.

- Cross-sections & fluxes: determine which ancillary data necessary for superior measurements.
- Facilities: analyze capabilities of world-wide proton and neutrino facilities.

Need substantial community input. Numerous presentations and white papers from previous workshops. Subgroups collecting information from experts. Open meeting March 21. Invitation extended to all interested members of community. Individuals can request to speak. Additionally, one-pagers solicited from community. March 21 meeting will substantially inform the interim and final reports.

Q: Enough protons at Fermilab to support short-baseline program?

A: Understanding availability of Fermilab complex is important part of study.

### **Subcommittee Reports cont'd:**

#### **Quality of Life – Mike Cooke**

Committee corresponding with Argonne on joint career fair. Argonne already set date for their fair, Fermilab likely to participate at some level. Need information: who interested in attending, what information useful to them? How much interest at Fermilab in supporting such an event (administrative support or funding)? Mike and Dan to investigate.

User off-site transportation: some exploration of Zipcar - will survey likely usage. There have been a number of passengers on the late taxis - will likely continue permanently.

#### **Outreach – Nikos Varelas**

Request sent to Fermilab community on collecting names of science editors. So far, 27 responses, not all complete. Next step: advertise through DPF newsletter.

University profiles moving ahead, none completed yet. There is a prize for the first.

Could Young-Kee write article for airline magazine?

#### **Govt. Relations – Brian Rebel**

Much work ongoing in preparation for DC Trip. Ordered 500 reprints of June, 2011 Physics Today article on applications of accelerators:  
[http://www.physicstoday.org/resource/1/phtoad/v64/i6/p46\\_s1](http://www.physicstoday.org/resource/1/phtoad/v64/i6/p46_s1)

Handouts: recent Symmetry issue, wavelength-shifter rulers, one-page brochure, and more.

Will conscript people to update trip wikis.

Meeting held with SLUO and USLUO to determine the "ask." Current version: "Please sustain funding for High Energy Physics as part of the science portfolio of the DOE Office of Science"

and the NSF to continue the process of innovation and discovery." Ample discussion on use of "sustain" versus "support" and how to reduce wordiness.

Next UEC meeting: March 30, 2012 in the afternoon

Scribe: Bob Zwaska