Minutes from the July 10, 2003 Meeting of the Linear Collider Subcommittee of the Fermilab Long Range Planning Group

Present: J. Butler, S. Holmes, R. Patterson,

Absent: M. Carena, R. Kephart, S. Nagaitsev, Y-K. Kim

Guests: J. Brau, E. Fisk, A. Kronfeld, M. Oreglia, E. Ramberg, S. Tkacyk,

Discussions of Detector R&D and Fermilab's Role

We were joined at this meeting by Jim Brau and Mark Oreglia, co-chairs of the American Linear Collider Physics Group (http://blueox.uoregon.edu/~jimbrau/LC/ALCPG/). Also participating in the discussion were Gene Fisk and Slawek Tkacyk, leaders of the Linear Collider group in the PPD, and Andreas Kronfeld, a member of the Fermilab "Linear Collider Octet".

Mark O. comments

The international situation:

- German government support for an international linear collider, but no offer of a German site.
- Asia has a formal planning exercise and sites.
- Emerging support within the U.S. government. Marburger and Orbach seem supportive.
- International Linear Collider Steering Committee formed and functioning.
- Process for international technology decision initiated by ILCSC.
- Timeline: 2007 is a good goal for identifying site and initiating site specific design.
- International scope document in preparation under auspices of ILCSC (based on U.S. and European documents).
- Role of CERN uncertain: participating in worldwide scope document, rumors may propose CLIC for initial LC incarnation.

Role of Fermilab: "Fermilab has to take a more active role. This is the point at which the lab can be left behind." How to fit in:

- Home base/support for LCRD program
- Devote increased (visible) effort to accelerator R&D. Opportunities exist with "the cap" gone, disfavor of cold R&D dissipating, and LCRD funds starting to flow.
- Start a seminar series
- Greater utilization of ICAR (who are waiting for the lab to step forward)

Jim B. comments

Jim spoke more specifically about what Fermilab could/should do, with an emphasis on detector R&D. "Fermilab is the dominant U.S. lab and has a responsibility to lead."

- Detector R&D: Must increase resources, visibility, and coordination role.
- Participation in specific R&D projects.
- (Should also increase accelerator R&D)
- Test beams: Fermilab has unique resources and must to respond to the need.

Next Steps:

- Fermilab detector & physics effort needs more visibility:
  - Higher on the org. chart
  - More people not in parenthesis
- Use the elevated visibility to:
  - Coordinate with ALCPG working groups
  - Coordinate with LCRD projects/groups
  - Coordinate with other labs
- LC seminars
- LC workshops
- Testbeams

Erik R./Testbeams

Erik Ramberg joined the meeting for a presentation on the status of test beams at Fermilab. With the CERN testbeam likely to cease operations in 2005 Fermilab represents the future of HEP testbeams. Fortunately Fermilab has recently competed a beamline complex in the meson area for support of testbeams and a few fixed target experiments. The complex is based on 120 GeV beams from the Main Injector and is designed to provide beam in parallel with collider operations. Operational modes/beam parameters are as follows:

- 120 GeV primary protons
  - Rates limited to 700 KHz
- Secondary beams
  - Momentum tunable over the range ~4 -> 80 GeV/c
  - Rates ~50 KHz
- Duty factor ~1 sec/minute
- Facilities and detectors
  - Cerenkov counters (2)
  - Si strip detectors
  - DAQ
- Status

  Commisioning is in progress.
  - Fast extracted beam delivered to Switchyard dump
  - Beam taken somewhat beyond Switchyard
  - Need to modify P2/P3 optics (beamlines upstream of switchyard)
    - Tevatron cannot be in store mode while doing this.
  - Main Injector QXR magnet needs installation to enable slow spill
  - Hope to initiate program soon.

  8 MOU's are in progress with several others in preparation. Erik said this does not reflect full subscription to the program.

More information is available at: http://www-ppd.fnal.gov/MTBF-w

Discussion

Joel suggested areas of support/participation:

Detector simulation

- Host software repository and provide support (NIU is interested in this)
- Participate in physics effort

Detector R&D

Test beam support

Models for support/participation:

- Leadership: Driven by core competencies and interest of the scientific staff (Si facility is an example)
- Participate but don't lead: Driven by level of enthusiasm.
- Follow: Technical support of outside groups but no direct scientific staff involvement.

Joel suggest that:

- Efforts should be visible.
- Effort should be developed proportional to the urgency of LC detector R&D needs.
- Level of effort and budget should be formalized.
- Priority issues need to be recognized => expectations/goals should be realizable.
- Goal should be pulling together a proposal/plan that meets the needs of the LC community and is compatible with Fermilab priorities. This probably means starting small.

Comments from the assembled:

Jim: $400K is going into detector R&D this year. This needs to double every year for the next 5-6 years.

Joel: This integrates to about $25M. What is basis for this? Not obvious that detector R&D cost is proportional to the cost of the machine. What are the detector costs?

Jim: $350M each. Assuming R&D =10%.

Gene: Need to establish a profile that makes sense for Fermilab. People need to scale with the expenditure. Maintaining annual doubling for five years is tough.

How do we build the Fermilab effort?

- Start w/ part timers
- Directorate has to actively encourage people.
- The right level is probably ~12 FTE (currently estimated at ~4)
- Suggest asking 5-10 people to work 50% on this as their service work.
- Magnify the effort by pairing young people with veterans.
- Small doesn't mean ineffectual.

Summary

As notes editor here is my attempt to make it sound like we had a coherent discussion. I believe the major point were:

- Fermilab has to a responsibility to increase both its effort and visibility on LC R&D (detector and accelerator)
  - More resources
  - More clout within the org chart

- Opportunities exist for
  Coordination/collaboration with the university, ALCPG, and LCRD efforts
  Providing a center for testbeams

- Need to prepare a plan for detector R&D consistent with LC needs and laboratory priorities and resources
  Requires active support from Directorate
  Expand/formally assign people and resources to the LC group
  Consider assigning more scientific staff to LC as their service fraction
  Emphasis on expanding effectively rather than precipitously

Next Meeting

July 31, 10:30-Noon, on the 7th floor cross-over.

Agenda:

1. Outreach and Local Alliances
2. Review of ongoing work plan.