

SiD Boulder Workshop Report

Ray Cowan

LQS Meeting

September 25, 2008



SiD Boulder Workshop

Sept. 17–19, 2008 at CU Boulder

About 60 people attended, a few from outside North America (UK and Japan)

Purpose

Organize effort to prepare SiD LOI by March 2009

Main topics

Update on ILC status worldwide

Perspectives on support

In the U.S. (DoE, NSF)

Outside the U.S. (France, Japan, U.K.)

Reports on progress and plans from all SiD subsystems

Discussion and planning of LOI tasks and writing

Documentation

Conference website: <http://ilc.colorado.edu/>

Presentations:

<http://ilcagenda.linearcollider.org/conferenceDisplay.py?confId=2784>



List of Main Talks

- [3D Pixel R&D Progress](#)
- [BeamCal Performance Simulation](#)
- [Benchmarking - Where do we need to go? What needs to be done to be ready for LOI](#)
- [Design of the Forward Region and the Effect of the Shape of the Beampipe on the Luminosity Measurement](#)
- [Discussion on LOI Issues](#)
- [Discussion on simulation requests and LOI plans](#)
- [Dual Read-Out Calorimetry](#)
- [Electronics](#)
- [Global Optimization](#)
- [H->mumu](#)
- [LOI PLANNING: Benchmarking](#)
- [LOI PLANNING: Electronics and DAQ](#)
- [LOI PLANNING: Engineering and Global Issues](#)
- [LOI PLANNING: The ECAL](#)
- [LOI PLANNING: The HCAL](#)
- [LOI PLANNING: The Muon Detector](#)
- [LOI PLANNING: The SiD Vertex Detector](#)
- [LOI PLANNING: The Very Forward Region](#)
- [LOI PLANNING: Tracking](#)
- [LOI requirements & IDAG](#)
- [LumiCal Optimization and Design](#)
- [Physics and Detector Support in Asia and Europe](#)
- [Plans for the LOI](#)
- [Progress in the ILC Program](#)
- [Report from the SLUO Meeting](#)
- [SiD Global Issues](#)
- [SiD Solenoid](#)
- [Status of PFA in SiD](#)
- [Status of SiD Engineering](#)
- [Status of Simulation Algorithms and Reconstruction](#)
- [Status of Simulation Algorithms and Reconstruction](#)
- [Status of the ECAL-SiW](#)
- [Status of the HCAL](#)
- [Status of the Vertex Detector, Engineering](#)
- [The View From the NSF](#)
- [Tracker Layout](#)
- [Tracking Simulation](#)
- [ttbar status](#)
- [Update on Virtual Segmentation](#)
- [ZH -> ccbar nunubar](#)



DoE View (1 of 4)



View from DC



- Overview – expect a continuing resolution for **at least** ~6 mo. Office funding will be at the \$689M level during this time (the amount before the supplement last summer). At this time we are looking at funding levels the same as last year with no new funding initiatives.
- We are cautiously optimistic that we will get the president's budget later which would allow us to establish a Detector R&D solicitation later this year. At the president's budget level, this could provide up to \$1M for generic detector R&D suitable for future colliders. Currently there is no money for this work at Universities.
- There is currently some laboratory support for generic detector system R&D at SLAC and Fermilab along with residual efforts at other labs but there is currently no additional funding for generic detector R&D at universities.
- I don't anticipate being able to fund detector collaborations to design detector systems for future lepton colliders unless or until we get a favorable federal budget.

9/15/2008

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ILC Update

Report by Barry Barish

There has been progress since last winter

However various international bodies seem to have little grasp of difficulties in the U.S. (and to a lesser extent the U.K.)

Moving ahead fast and unrealistically given funding realities outside Europe and Asia

Japan has significant support in Diet

60 members (out of approx 500) have formed formal group to promote/pursue the ILC

Japanese Diet (equivalent to U.S. Congress) has large fraction of members from scientific/technical community

Unlike U.S., where Congress is mostly businessmen and lawyers



DoE View (2 of 4)



P5 Report



Recommendation

"The panel recommends for the near future a broad accelerator R&D program for lepton colliders that includes continued R&D on ILC at roughly the proposed FY2009 level in support of the international effort. This will allow a significant role for the US in the ILC wherever it is built. The panel also recommends R&D for alternative accelerator technologies, to permit an informed choice when the lepton collider energy is established."

"The panel also recommends an R&D program for detector technologies to support a major US role in preparing for physics at a lepton collider."

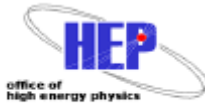
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DoE View (3 of 4)



Current Policy



The Office of High Energy Physics at DOE's current policy regarding the Linear Collider is:

- To support ILC accelerator R&D at a level which also allows the office to maintain strong programs at Fermilab and SLAC. The current level of planned ILC accelerator support for FY09 is \$29.5M.
- To support, in a minimal funding scenario, some generic Detector R&D at the national laboratories which might be useful for a linear collider. In a better funding scenario, I anticipate a solicitation for support for generic Detector R&D at Universities which also might be useful for a linear collider. We would coordinate with NSF to the extent possible.
- More broadly, provide continuing support for the University research program and the research program at other national laboratories with a HEP program, provide support for LHC, for dark matter and dark energy research (JDEM), and to support a neutrino program.

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DoE View (4 of 4)



Current Policy (cont.)



- In the long term, the view at DOE is that ILC accelerator technology must be determined first and that **major** funding for detailed ILC detectors is not needed until
 - the machine technology is determined, and
 - a decision has been reached to proceed with the construction of the accelerator.
- Until then we will support generic detector research which could be applicable to a lepton collider at a level consistent with available funding and other program priorities.

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NSF View (1 of 6)



View from Arlington



Marv Goldberg

FOG



NSF View (2 of 6)



EPP BUDGET PROCESS 9/17

1. We Remember: "Prediction is very difficult, especially if it's about the future."
- Niels Bohr



2.



Marv Goldberg



NSF View (3 of 6)



P5 Panel Advice



“The panel recommends for the near future a broad accelerator R&D program for lepton colliders that includes continued R&D on ILC at roughly the proposed FY2009 level in support of the international effort. This will allow a significant role for the US in the ILC wherever it is built. The panel also recommends R&D for alternative accelerator technologies, to permit an informed choice when the lepton collider energy is established.”

NSF EPP (with OHEP) is providing support for high priority lepton collider damping ring R&D—CESR TA

Marv Goldberg

“The panel also recommends an R&D program for **detector technologies** to support a **major US role in preparing for physics at a lepton collider.**”





NSF View (4 of 6)



Support For Detector Technologies



PREPARING FOR PHYSICS AT A LEPTON COLLIDER.

NSF EPP (**working with OHEP**) hopes to continue providing support for (**now generic**) lepton collider detector R&D (note that NSF initially supported R&D generically for detectors at hadron colliders,

We assume here that we will continue to **jointly review proposals with OHEP**, and agree on funding priorities. NSF will, as before, fund proposals through universities. *NO SOLICITATIONS at NSF*

We prefer, where appropriate, that support for lepton detector R&D follow the “LHC model.” This would suggest both **university and laboratory leadership and oversight**.

The scope of some proposals may include detector R&D for LHC upgrade as well as for a future linear collider R&D if these are synergistic..

NSF EPP now encourages **single Collaborative Proposals** for Future Lepton Detectors. This proposal type may be found in the NSF Grant Proposal Guide of Jan 08:

Marv Goldberg



NSF View (5 of 6)



SINGLE COLLABORATIVE PROPOSAL SUMMARY

See http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg

A Collaborative Proposal is one in which investigators from two or more organizations wish to collaborate on a unified research project. Collaborative proposals may be submitted to NSF as a **single focused proposal**, in which a single award is being requested (with subawards administered by the lead organization).

All collaborative proposals must clearly **describe the roles to be played by the other organizations, specify the managerial arrangements**, and explain the advantages of the multi-organizational effort within the project description.

A single investigator bears primary responsibility for the administration of the grant and discussions with NSF, and, at the discretion of the organizations involved, investigators from any of the participating organizations may be designated as co-PIs. By submission of the proposal, the organization has determined that **the proposed activity is administratively manageable**.

Marv Goldberg



NSF View (6 of 6)



Features of Collaborative Proposals

- More complete .
- Stronger management.
- More Accountability.
- Costs and Schedules should be better described and thus more easily reviewed.
- Will naturally lead to prioritized detector activities within the collaborations, and eliminate duplication.
- Allows for the shifting of funds among detector components when needed.
- Better match to end game.

*And Remember
"Broader Impacts"*

Marv Goldberg

NSF would establish a "Cooperative Agreement" as a requirement for funding, and this would describe in detail the interactions of the collaboration with EPP.



Questions to Answer



Concerns?

Some potential concerns...are there others?...which are important?

- SiD02 is defined. Is it right?
- Do we have the resources to generate all the MC data needed?
- When will we be ready to start reconstruction?
Do we have the resources to process all the data?
Are the PFA and tracking algorithms adequate?
What's missing?
- Do we have realistic conceptual designs for all subsystems?
- Are subsystem performance studies underway?
- Do we have enough physics analysts?
Can we cover the benchmarking exercises?

John Jaros

**Goal#3: Identify significant problems so
we can address them.**

Sept 17, 2008

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What's Next (short-term)?



What's coming Next?

SiD's short term plans support completing the LOI

- **SiD at LCWS08 November 16-20 Chicago**
Check up on data set generation
Review physics benchmarking
Assemble LOI rough draft
Recruit more LOI signatories
Can we meet Saturday, November 15?
- **Next SiD Workshop February/March?**
Review the final LOI draft
Prepare for Validation and Next Steps
Where is the Workshop? When?

John Jaros

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What's Next (long-term)?



What's Coming Next?

Long term plans parallel the GDE Schedule

- **Detector Design Phase I 2010**
LOI Validation with IDAG
Advance critical R&D
Continue optimization/update physics performance
Refine MDI plans
- **Detector Design Phase II 2012**
React to LHC Results
Complete needed R&D
Complete technical design
Confirm physics performance
Develop reliable cost estimate

John Jaros

Sept 17, 2008

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Workshop Summary

There's a lot activity ramping up to prepare the SiD LOI

First draft due in early January

Final version due to be given to the research director at the end of March

Detector concept is going through significant revisions

SiD01, SiD02, SiD03, ...?

Subsystems/engineers don't always agree on parameters of a given design

SiD02 was quoted with three HCAL thicknesses: 4.2, 4.5, and 4.8 λ_1

Many details to be worked out on cabling, mechanical support, etc.

LOI timescale is very tight

Given what's to be done

Millions of events per revision to be simulated, reconstructed, and studied

Cannot be finished by LOI deadline

LOI will likely contain "best guess" and list some options on technology choices

R&D studies will continue after LOI is submitted

There was a lot of talk about setting up a body (one person) to control the official "standard" description of each SiD variants

Response to LOIs promised in late 2009 or even later

Strong interest from collaborators for some sort of official response sooner

Needed for funding proposals