

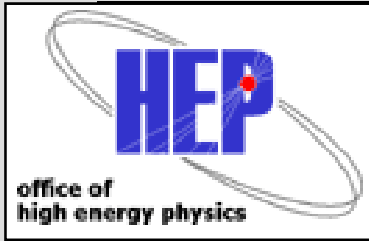
ILC Detector R&D  
at DOE  
High Energy Physics

SiD Workshop

Apr. 11, 2007

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DOE Office of High Energy Physics



## Some Free Advice\*



Is "SiD" really the name you want?

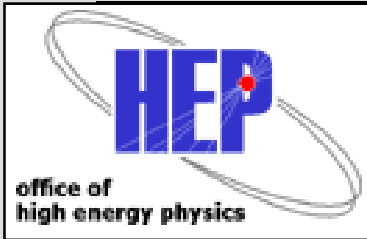
Consider the tyranny of the alphabet ...

CDF (and DØ); ALEPH (and DELPHI, L3, OPAL);  
BaBAR (and BELLE); ATLAS (and CMS)  
LCD/GLD (and SiD)!

Worth getting a better acronym?

CONSIDER? BACKSIDE? ASININE? ...

\* Worth what it costs



## ILC timeline

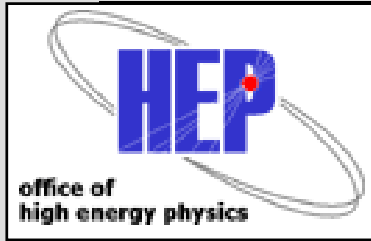


DOE Undersecretary for Science, Ray Orbach talked at HEPAP in February, and advocated that the US should examine the nature of its HEP program in the case that the ILC is stretched out relative to the GDE technically limited timeline.

### GDE timeline (RDR):

- Technical (Engineering) Design Report by 2010
- Start construction in 2012
- End construction in 2018 (7 year construction)

How do we interpret Dr. Orbach's comments?

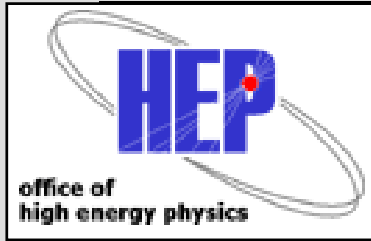


## ILC timeline\*

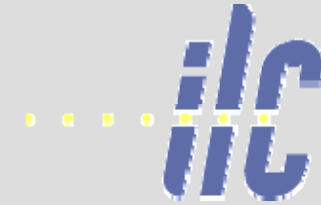


1. The GDE value estimate (\$6.7B \$FY07 + ~\$1.5B FY07 for explicit labor) is sufficiently high that it is not sensible to request a decision now to approve the project.
2. The value estimate will have to be translated into US methodology (contingencies, escalations, relevant overheads, detectors, US-specific costs relating to hosting, R&D ...). It is important to get a cost that does not change, includes all relevant pieces initially, and avoids scope changes. Don't rush to do the translation.

A valid translation requires (among other things), validation of the GDE estimate, assumptions on what the US is responsible for, and site selection.

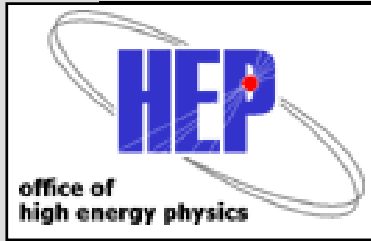


## ILC timeline\*



3. Putting the ILC R&D effort on a firm international footing is a very high priority now. Partners need to buy in for the EDR phase.
4. Experience with large international projects (e.g. ITER) show that negotiations relating to site, governance, cost-sharing etc. take time. (3 years for ITER from well defined EDR).
5. Seven year construction time for a very complex project is probably not realistic.
6. It is imperative to keep US HEP in general, and Fermilab as the potential site, healthy in the interval before the ILC. Planning this interim period with eye to possible delays is needed.

\* DG understanding



## ILC timeline comments\*

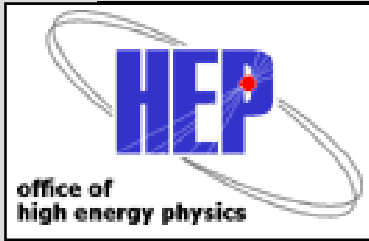


The ILC remains the highest priority for DOE HEP and is the top Office of Science priority for intermediate term facilities, based on its scientific potential. There is no retreat from the goal of realizing the ILC.

Confirmation of the physics case at LHC remains crucial.

The focus at this time should be on a vigorous, coordinated international R&D program.

More than the end date, the important milestone is the decision to proceed. If a decision were reached to build the ILC in the US, the US program would be healthy through the construction period (as was CERN during LHC construction).



# Detector R&D: A Bit of History

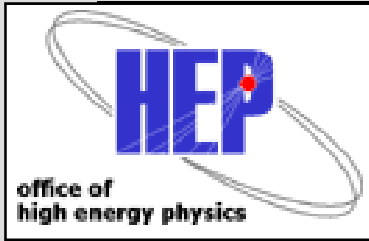


University ILC detector R&D program proposed in 2002 aimed at NSF (UCLC) and DOE (LCRD).

NSF and DOE merged this program into one jointly reviewed effort, through an umbrella grant to U. Oregon in 2005. ALCPG has recommended subcontracts via MoUs to 34 universities (+ 'small' labs) in the current year. FY2006 LCRD funding: (\$1048K DOE, \$300K NSF).

Start date for grants has typically been Sept. 1, 200x for FY200x (very late in fiscal year).

This year's awards will be the last in the current 3-year umbrella grant. Need discussion among ALCPG, U. Oregon and agencies to define the program in the next cycle.



## FY2007 Funding

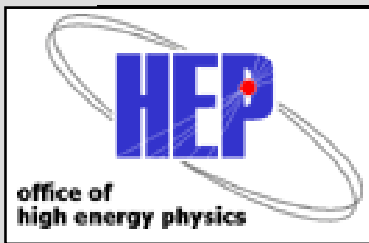


The continuing resolution delayed FY07 decisions. Final appropriations not bad for HEP, but ILC was limited to \$42M without identified support for detector R&D.

DOE plan: \$1800K for detector R&D to be split between supplemental proposals submitted in fall 2006 and continuation of the 'base' program.

NSF plan: Expect overall ILC support to be at least at FY2006 level. (In FY06, NSF awarded \$235K for accelerator R&D, \$300K for detectors, ~\$500K GDE support). Presently expect ~\$375K for detectors, with hope to improve this as budget becomes better defined.





# Detector R&D Review



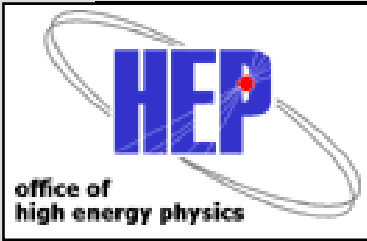
June 19, 20 at Argonne Lab. See url  
<http://physics.uoregon.edu/~lc/lcdrd/review-07/>

Charge: Evaluate achievements and future planning, and perspective on how these plans fit within world activities.

- ❖ Organization and oversight of the program
- ❖ Past R&D accomplishments
- ❖ Proposed activities FY2007 and beyond, with plan identifying goals, priorities, milestones and resource needs.
- ❖ Prioritization within approximate budget (DOE) guidance

Should address the coordination of university and laboratory R&D. (Lab physicist costs on general Research lines.)

Emphasis on generic R&D, but welcome advice on developing concepts is welcome.



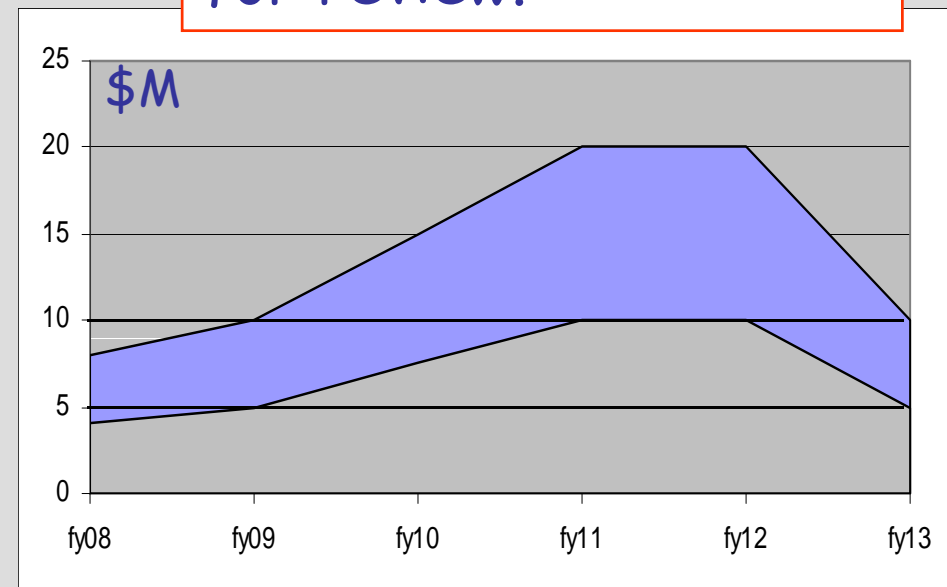
# Detector R&D Review



## Consultants:

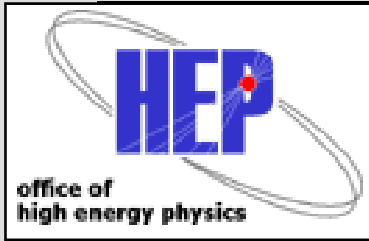
Tim Bolton (Kansas State)  
David Cassel (Cornell)  
Gary Feldman (Harvard)  
Meenakshi Narain (Brown)  
Regina Rameika (FNAL)  
Michael Rijssenbeek (Stony Brook)  
Bing Zhou (Michigan)

## DOE budget guidance for review.



Not all possible R&D topics likely affordable in US (also true for ILC accelerator), so critical evaluation of work in other regions is needed.

This guidance is only advisory - funding levels are always subject to change!



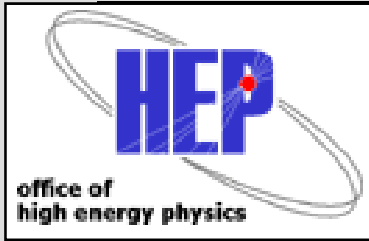
# Accelerator and Detector R&D Balance



DOE ILC budgets (from FY08 on) are expected to support both accelerator related activities and detector R&D.

There is no well-defined mechanism for determining the balance between ILC accelerator and detector R&D funding. ART/GDE is not presently constituted to give this advice. For FY2007, DOE got advice from LCSGA on this split:

LCSGA = M. Tigner (chair), J. Bagger, J. Brau, S. Dawson, J. Dorfan, G. Dugan, G. Gollin, M. Harrison, D. Karlen, H. Lynch, S. Mishra, P. Oddone, M. Oreglia, S. Ozaki, T. Raubenheimer, A. Shotter, H. Weerts



# Detector Concepts\*

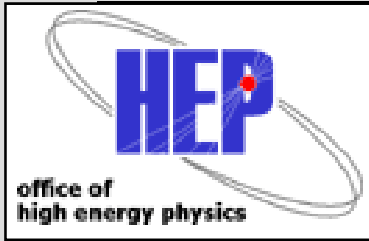


Although the main thrust of DOE/NSF funding at present is on generic detector R&D, we understand that over the next several years there will be a growing need to support R&D to define specific detectors.

Proposing and building collider detectors takes a comparable time to accelerator construction.

Typically, detector selection process and R&D funding are done by the host laboratory, with funding agency oversight. ILC, as an internationally managed machine, without a site or host lab, breaks new ground and needs new measures.

I continue to be worried that existing detector concepts break along largely regional lines.



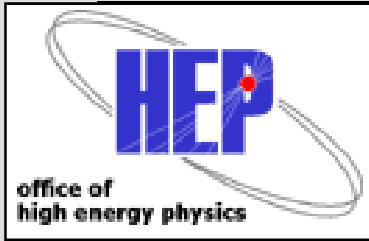
# Detector Concepts\*



As I understand the present WWS stance, the development and selection of ILC detectors would continue under WWS control with narrowing to 2 detectors by end 2008 - a laudable goal.

Will a free-standing WWS be effective to direct the detector effort as the concepts develop? WWS does not have the organizational structure, funding agency mandate or clear authority needed to manage funds or manage the proposals evaluation process.

The current evaluation of global R&D directions and priorities (e.g. Tracking in Beijing) is useful. The recommendation to create a Detector R&D Coordination Board is welcome.



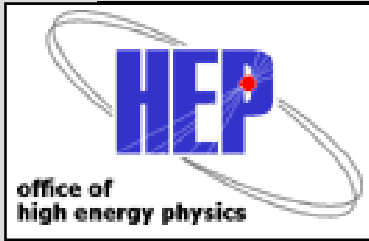
# Detector Concepts\*



Although itself a somewhat ad hoc organization, GDE has achieved stature as the interim ILC 'Laboratory'. It has the ear of funding agencies (through FALC) and can speak for the community to governments. Its reporting line through ILCSC gives structure.

I think it may be useful to bring the detector program under GDE/ILCSC, now that the RDR is complete. To do this would require significant additions to the GDE structure. The recent letter from ILCSC to WWS (to form an International Detector Advisory Group) is a useful start in this direction.

Downside would be relinquishing some community control over the experimental program. The benefit could be greater visibility for the detector effort within governments.



## Summary



- ❖ The ILC is still at the top of the priority list for DOE.
- ❖ FY2007 will bring modest increase for detector R&D.
- ❖ The June Review will be important for making the case that the US R&D program is well planned.
- ❖ We need to evolve the structure of the worldwide detector program.