
Linear Collider Detector R&D Support

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SiD Workshop at SLAC

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The 2012 FOA and LCDRD

- LC Detector R&D has been supported by DOE over much of the past decade, at the labs and through the Universities.
- Most recently, DOE has supported the University Detector R&D project, including SiD R&D, which was administered by Jim Brau out of U Oregon.
- Funds for SiD R&D's third and final year were dispensed at the end of FY2011 at the level of ~\$0.9M, providing support through much of FY2012.

The 2012 FOA and LCDRD

- A DOE Collider Detector Funding Opportunity (FOA) was announced winter 2011, with proposals due in March.
- In response, the LCDRD Consortium was born. It solicited the HEP community for LC detector R&D, and attracted many of the projects which had been supported by SiD R&D.
- Proposals were solicited Winter/Spring 2011, resulting in the submission of a Field Work Proposal (FWP) from SLAC. PIs were Jim Brau, Marcel Demarteau, John Jaros, and Ron Lipton.

LCDRD Requested \$10M over 5 years

LCSIM

Chronopix
Vertex Sim

Laser Alignment
SiD Tracking

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GEM
Dual Readout CAL
DHCAL

SiW Ecal

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IOWA PFA
RPC Gas
E Spectrometers

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Project	Project No. (PN)	Institution	FY11	FY12	FY13	FY14	FY15	Total
Simulation	1.1	SLAC National Accelerator Laboratory	\$646,191	\$736,116	\$739,821	\$754,088	\$764,771	\$3,640,987
Simulation	1.1	Fermi National Accelerator Laboratory	\$150,821	\$155,345	\$160,006	\$164,806	\$169,750	\$800,727
Vertex	2.1	University of Oregon/Yale	\$0	\$184,664	\$194,667	\$224,650	\$224,633	\$828,614
Vertex	2.2	University of California at Santa Cruz	\$49,400	\$103,803	\$108,508	\$115,075	\$115,117	\$491,902
Tracking	3.1	University of Michigan	\$34,086	\$107,825	\$166,444	\$141,203	\$151,724	\$601,281
Tracking	3.2	University of California at Santa Cruz	\$24,107	\$125,046	\$128,006	\$132,001	\$134,969	\$544,127
Tracking	3.3	University of New Mexico	\$43,412	\$57,969	\$48,417	\$49,934	\$51,320	\$251,051
Calorimetry	4.1	University of Texas at Arlington	\$36,329	\$140,226	\$142,091	\$176,000	\$142,008	\$636,654
Calorimetry	4.2	University of Iowa-Dual Readout	\$100,923	\$88,934	\$90,385	\$92,645	\$95,776	\$468,664
Calorimetry	4.3	University of Iowa-DHCAL	\$41,750	\$144,787	\$144,564	\$151,893	\$76,058	\$559,051
Calorimetry	4.4	University of California Davis	\$0	\$72,049	\$51,873	\$0	\$0	\$123,923
Calorimetry	4.4	University of Oregon	\$0	\$62,430	\$46,925	\$0	\$0	\$109,355
Calorimetry	4.5	University of Iowa-PFA	\$36,715	\$173,075	\$179,604	\$175,354	\$180,614	\$745,362
Calorimetry	4.6	Princeton University	\$25,000	\$50,194	\$49,053	\$48,633	\$48,144	\$221,023
Beamline	5.1	Notre Dame University	\$0	\$32,750	\$28,041	\$28,383	\$28,736	\$117,909
Beamline	5.2	University of Oregon	\$27,685	\$23,324	\$20,682	\$21,302	\$21,941	\$114,935
TOTAL			\$1,216,417	\$2,258,536	\$2,299,085	\$2,275,966	\$2,205,560	\$10,255,564

LCDRD Proposal

- LCDRD was presented as a Consortium Proposal
- A Review Board established LCDRD priorities and provided governance. Brau, Jaros, Lipton, Para, Peterson, Weerts served on the Board.
- Pitch: Support the simulations and do the essential R&D to allow an objective comparison of the various lepton collider options (ILC, CLIC, MuC) in time for “Snowmass” (which at the time wasn’t yet scheduled).

LCDRD Proposal

- Highest priority was support for lcsim infrastructure, to be used for ILC, CLIC, and MC studies.
- Detector R&D was completely dominated by ILC detector work. The intent was to broaden the scope in the out years to include CLIC and even Muon Collider detector R&D as new projects became well-defined.
- The LCDRD Proposal included an overall narrative, summaries of the individual proposals, and copies of proposals themselves

Review of LCDRD

- DOE used external reviewers, and chose to review individual sub-proposals, not the overall consortium proposal.
- LCSIM, highly ranked, was urged last September to submit an independent FWP. It will be funded this September for \$300k for one year.
- Bad news for all other LCDRD proposals was unofficially circulated by the end of 2011. .

Review of LCDRD

- Several of us (Demarteau, MacFarlane, Brau, White, Grannis, Jaros) met with Jim Siegrist and Glen Crawford at DOE February 15, 2012, to ask about LCDRD status (proposal had been declined), request continued LC detector R&D support, and discuss strategy.
- Siegrist was sympathetic to keeping LC effort afloat. Suggested we work out next steps with DOE after seeing reviewer's comments .
- Reviewer's comments were delivered in late June. They were discussed with Glen Crawford on June 27, 2012. Most reviews were quite positive.
- Glen suggested we pursue a new, scaled-down, one year FWP. He also called our attention to a new detector FOA from DOE HEP.

LCDRD ...one more time

- **Solicitation**

We transmitted reviews to the original proponents, informed them about a new FOA they could individually apply to, and solicited their enrollment in LCDRD, Round II.

- **Sharpened and updated the LCDRD Pitch:**

Higgs + Japanese Interest + Snowmass \Rightarrow important to keep SiD and ILC physics and detector interests in the US alive and competitive. Need to be ready to participate if world-wide project is realized in the next few years.

- **Leaner and Meaner**

300k-500k deemed “appropriate”; one year proposal

Same PIs: Brau, Demarteau, Jaros, Lipton

SLAC FWP

Submission aimed for end of August

LCDRD II Projects

- **Vertex**
 - * Chronopix (UO and Yale)
 - * Pixel Sim (UCSC)
- **Silicon Detectors**
 - * SiD Microstrip Performance and Readout (UCSC)
 - * Beamcal sensors and radiation hardness (UCSC)
 - * Cables/connections for tracker modules (UNM)
- **Calorimetry**
 - * SiW Prototype Ecal (UO and UCD)
 - * DHCAL Support (U Iowa)
 - * GEM (UT Arlington)
 - * PFA (U Iowa)
- **Beamline**
 - * Energy Spectrometer (UO)

Status

- Gathering proposals and budgets this week (most are in)
- FWP Budget assembled this and next week
- SLAC internal Budget Review next week
- Hopefully, Director's approval and submission before September 1
- Fingers crossed

This year's proposal is a keep alive effort which we hope can grow into a substantial, multi-year proposal, if Linear Collider futures continue to improve and DOE takes note.