

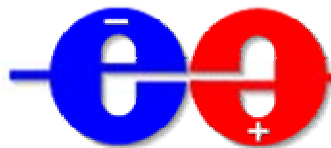
# Victoria Linear Collider Workshop



## Workshop Introduction

**I will try to summarize:**

- **How far we have come up to now**
- **Where we still need to go**
- **What should we focus on this week**
- **What will we need to accomplish in the coming year.....and beyond**



American Linear Collider  
Physics Group

, 2004



# International Linear Collider



- 1. Building the Physics Case**
- 2. Establishing the need for the Linear Collider in the LHC era**
- 3. Designing the Collider and moving toward construction**
- 4. International plan of support by the Governments**
- 5. Planning and doing the necessary R&D for the Detectors**
- 6. Continuing our Outreach**
- 7. Plans for future workshops**



# The Universe and the Linear Collider



- **The physical universe is a curious place**
  - ↪ **Symmetry in Leptons/Quarks**
    - ❖ broken  $\Rightarrow$  Very Heavy Top - why?
  - ↪ **Standard Model-like Electroweak couplings**
    - ❖ but unsatisfying Standard Model
  - ↪ **Evidence for light Higgs boson - can we find it?**
  - ↪ **Dark Matter - what is it?**
  - ↪ **Dark Energy - WHAT IS THIS??**
  - ↪ **Extra dimensions? - can we “see” them?**
  
- **We Need the Linear Collider to explore and reveal the underlying reasons for these effects**
  
- **Theory talks today: JoAnne Hewett – New ideas in EW SymBrk**  
**Uli Baur – Precision Calculations**      **Jonathan Feng – THE COSMOS**

## 1. Building the Physics Case



# History of Support for the Linear Collider



- **The Physics case for the Linear Collider has been clear for years now**
- **Motivated by this, a broad segment of the community has joined in support of the goal to realize the Linear Collider (selected)**
  - ↵ **ICFA Statement on Linear Colliders – 1999**
    - ❖ Recommends vigorous R&D to be ready in a few years  
[http://www.fnal.gov/directorate/icfa/icfa\\_LCstatement.html](http://www.fnal.gov/directorate/icfa/icfa_LCstatement.html)
  - ↵ **Snowmass Consensus Statement – 2001**
    - ❖ strongly recommends the expeditious construction of a Linear Collider as the next major international High Energy Physics project
  - ↵ **DOE/NSF Subpanel Report – 2002**
    - ❖ recommends that the highest priority of the U.S. program be a high-energy, high-luminosity, electron-positron linear collider
  - ↵ **“Understanding Matter, Energy, Space and Time: The Case for the  $e^+e^-$  Linear Collider” - 2003/4**
    - ❖ ~2700 signatories
  - ↵ **2004 – ACFA, ECFA, and HEPAP reaffirm their commitment to the Linear Collider**  
**J. Dorfan, ICFA Chair**

## 1. Building the Physics Case



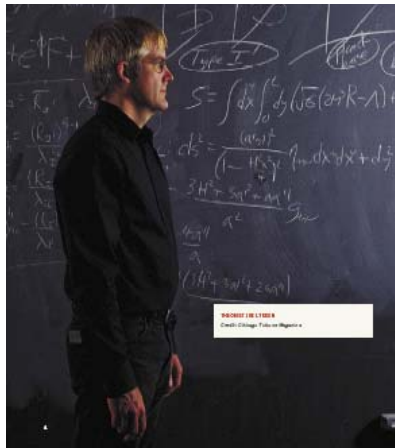
# Quantum Universe



## LEGEND: THE QUESTIONS

- 1 Are there undiscovered principles of nature :  
new symmetries, new physical laws?
- 2 How can we solve the mystery of dark energy?
- 3 Are there extra dimensions of space?
- 4 Do all the forces become one?
- 5 Why are there so many kinds of particles?
- 6 What is dark matter?  
How can we make it in the laboratory?
- 7 What are neutrinos telling us?
- 8 How did the universe come to be?
- 9 What happened to the antimatter?

		Tevatron	LHC	Linear Collider	NUMI / MINOS	ν Superbeams	BaBar	BTeV	JDEM	RHIC	Proton Decay
Undiscovered Principles?	1	×	×	×			×	×			
Dark Energy?	2		×	×					×		
Extra Dimensions?	3		×	×							
Unified Forces?	4			×							×
Why So Many Particles?	5	×					×	×			
Dark Matter?	6			×					×		
Neutrinos?	7				×	×					
Origin of Universe?	8		×							×	
Antimatter?	9					×	×	×			

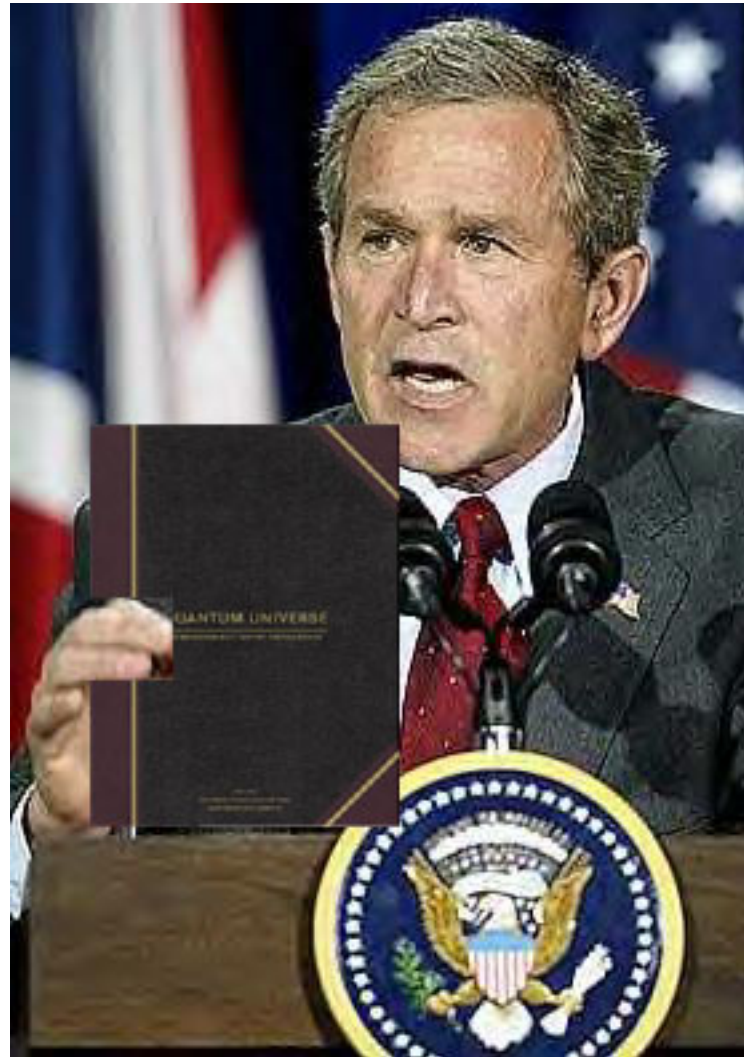


## 1. Building the Physics Case

J. Brau - ALCPG Workshop, Victoria - July 28, 2004



# Quantum Universe



## 1. Building the Physics Case



## National Academies Study: EPP 2010



At the dawn of the 21st century, elementary particle physics is poised to address some of the most basic questions in science. Obtaining the answers to these questions will require a global effort of great scale and complexity. The committee is charged to construct a plan for U.S. participation in this effort. In particular, the committee will

Identify, articulate, and prioritize the scientific questions and opportunities that define elementary-particle physics.

Recommend a 15-year implementation plan with realistic, ordered priorities to realize these opportunities.

### Committee Membership (provisional)

**Harold T. Shapiro**, Princeton University, *Chair*

**Sally Dawson**, Brookhaven National Laboratory, *Vice Chair*

**Jonathan Bagger**, Johns Hopkins University, *BPA Liaison*

Other committee members are being nominated and will be recommended for appointment; the full committee is expected to be identified by September 2004.

<http://www7.nationalacademies.org/bpa/EPP2010.html>

To send comments or suggestions to the committee, please send e-mail to [epp2010@nas.edu](mailto:epp2010@nas.edu).

### 1. Building the Physics Case



# The LHC/LC Study Group



- **The aim of the LHC / LC Study Group is to investigate how analyses at the LHC could profit from results obtained at a LC and vice versa.**
  - ↵ **Started in Spring, 2002, truly worldwide effort**
  - ↵ **Collaborative effort of Hadron Collider (HC) and Linear Collider (LC) communities**
  - ↵ **Study Group officially recognized by the International Linear Collider Steering Committee**
  - ↵ **About 190 working group members from ATLAS, CMS, LC Working Groups, theory + Tevatron contact person**
  - ↵ **Working Group coordination: R. Godbole, F. Paige, G. Weiglein**
  - ↵ **Web page: [www.ippp.dur.ac.uk/~georg/lhclc](http://www.ippp.dur.ac.uk/~georg/lhclc)**
  - ↵ **prepared a draft document for the Les Houches Workshop**
    - ❖ **Third Les Houches Workshop on Physics at TeV Scale Colliders: May 26 - June 6, 2003**
  - ↵ **Draft Report is posted on LHC/LC Web page**

**2. Establish the need for the LC in the LHC era**



# LHC and the Linear Collider



- **We have made the case for the Linear Collider during the LHC era, but it is not universally accepted – keep working on it.**
  - ↪ **There are those who say wait to see the results of the LHC**
  - ↪ **This is not an acceptable answer**
    - ❖ We know now the energy regime of the new physics from virtual effects at lower energy
    - ❖ The Linear Collider data will enhance the value of the LHC data
    - ❖ In many scenarios, the physics value of the Linear Collider significantly exceeds that of the LHC
    - ❖ The momentum and technical know-how cannot easily be re-established
  - ↪ **Try to make argument even stronger**
    - ❖ How would LHC program (upgrades, analysis, trigger, etc.) be changed by Linear Collider results?
- **Sally Dawson will speak today on LC-LHC Connections**

**2. Establish the need for the LC in the LHC era**



# Linear Collider Scope



**First step in moving to a final design for the Linear Collider was to establish the Physics Motivated Linear Collider Scope**

**3. Designing Collider / moving to construction**



# International Scope Document



## ↪ BASELINE MACHINE

- ❖  $E_{\text{CM}}$  of operation 200-500 GeV
- ❖ Luminosity and reliability for  $500 \text{ fb}^{-1}$  in 4 years
- ❖ Energy scan capability with  $<10\%$  downtime
- ❖ Beam energy precision and stability below about 0.1%
- ❖ Electron polarization of  $> 80\%$
- ❖ Two IRs with detectors
- ❖  $E_{\text{CM}}$  down to 90 GeV for calibration



Parameters for the Linear Collider

September 30, 2003

## ↪ UPGRADES

- ❖  $E_{\text{CM}}$  about 1 TeV
- ❖ Allow for  $\sim 1 \text{ ab}^{-1}$  in about 3-4 years

## ↪ OPTIONS

- ❖ Extend to  $1 \text{ ab}^{-1}$  at 500 GeV in  $\sim 2$  years
- ❖  $e^-e^-$ ,  $\gamma\gamma$ ,  $e^- \gamma$ , posi-pol
- ❖ Giga-Z, WW threshold

[http://www.fnal.gov/directorate/icfa/LC\\_parameters.pdf](http://www.fnal.gov/directorate/icfa/LC_parameters.pdf)

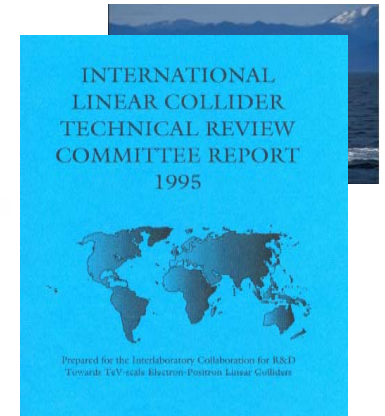
### 6.1 List of subcommittee members

Asia: Sachio Komamiya, Dongchul Son  
Europe : Rolf Heuer (chair), Francois Richard  
North America: Paul Grannis, Mark Oreglia

**3. Designing Collider / moving to construction**



# Steps To a Technology Selection



**1994 - A Technical Review Committee was created in 1994**

**1995 - report**

**2001 – ICFA requested a second report – new committee – same chair: G. Loew**

- **To assess the present technical status of the four LC designs at hand, and their potentials for meeting the advertised parameters at 500 GeV c.m.. Use common criteria, definitions, computer codes, etc., for the assessments**
- **To assess the potential of each design for reaching higher energies above 500 GeV c.m.**
- **To establish, for each design, the R&D work that remains to be done in the next few years**
- **To suggest future areas of collaboration**

**2004 – ITRP meets to review technologies and recommend a choice**

**3. Designing Collider / moving to construction**



## Accelerator Technology Selection (ITRP)



- **International Technology Recommendation Panel (ITRP), asked to recommend to ILCSC/ICFA the RF technology of the main linacs, has now held 5 intensive meetings**

**Jean-Eudes Augustin  
Jonathan Bagger  
Barry Barish (Chair)  
Giorgio Bellettini  
Paul Grannis  
Norbert Holtkamp  
George Kalmus  
Gyung-Soo Lee  
Akira Masaike  
Katsunobu Oide  
Volker Soergel  
Hirotaka Sugawara**

### Meetings

January 27-28, 2004 –

Rutherford Appleton Laboratory.

April 5-6, 2004 - DESY.

April 26-27, 2004 - SLAC.

May 25-26, 2004 – KEK

June 28-30, 2004 – Caltech

Aug 11-13, 2004 – Korea.

- **Appears to have a good chance for a recommendation in August**
  - ↳ **Barry will give us a report on Friday**

**3. Designing Collider / moving to construction**



## US Input to ITRP: The US Linear Collider Technology Options Study



- **The USLCSG accelerator subcommittee (chair: G. Dugan) took on the challenging task of providing for the world community a comparison of a US-based machine using either warm or cold technology.**
- **Two technology options were developed:**
  - ↪ **a warm option, based on the design of the NLC Collaboration,**
  - ↪ **and a cold option, similar to the TESLA design at DESY.**
- **Both options meet physics design requirements specified by USLCSG Scope document. (the similar ILC scope was not yet available)**
- **Both options were developed in concert, using, as much as possible, similar approaches in technical design for similar accelerator systems, and a common approach to cost and schedule estimation methodology, and to risk/reliability assessments.**
- **Highly detailed and technically rich report (475 pages).**  
**<http://www.slac.stanford.edu/xorg/accelops/>**

**3. Designing Collider / moving to construction**



## WWStudy Input to ITRP:



- **Physics Questions (30b, 30d)**

- ↗ **How do you make the case for determining the final energy choice for the LC prior to LHC results? What if LHC results indicate that a higher energy than design is required ?**
- ↗ **Considering that LC will start much later (although it can have concurrent operation period) than LHC, what physics capability does LC have which LHC does not share? Can this be realized at 500GeV or does it require much higher energy?**

**During the Paris LCWS “Colloque”, a task force prepared answers to these important questions, which were then submitted to the ITRP (<http://hep.uchicago.edu/~oreglia/Q30bd.pdf>)**

- **The Worldwide Study was invited to present at the June ITRP meeting at Caltech a discussion of the detector issues related to the technology choice**

**3. Designing Collider / moving to construction**



## WWStudy Input to ITRP:



### ○ June 28, Caltech

(coordinated by John Jaros, Francois Richard, Satoru Yamashita)

- |   |   |                         |
|---|---|-------------------------|
| ↗ | <b>Energy Spread Issues</b>                   | <b>Tim Barklow</b>      |
| ↗ | <b>Crossing Angle</b>                         | <b>Philip Bambade</b>   |
| ↗ | <b>Bunch Timing from the cold Perspective</b> | <b>Klaus Moenig</b>     |
| ↗ | <b>Bunch Timing from the warm Perspective</b> | <b>Hitoshi Yamamoto</b> |

Talks posted at:  
[http://www.ligo.caltech.edu/~donna/Documents\\_mt5.htm](http://www.ligo.caltech.edu/~donna/Documents_mt5.htm)

**Conclusion: There are detector challenges for either collider technology choice, non which should be factor in technology selection**

**Mike Woods will speak later today on impact of technology choice on LC physics and detectors**

**3. Designing Collider / moving to construction**



## Forming an International LC Design Group



- **ILCSC established a task force to recommend how best to establish an internationally federated design group**
  - ↪ **Will start the machine design as soon after the technology decision as possible.**
  - ↪ **First step in internationalizing the LC.**
  - ↪ **The goal is to have the structure of this design group agreed upon by ICFA and the funding agencies prior to finalizing the technology choice.**

### **Members of the task force are**

**Satoshi Ozaki (Chair), Jonathan Dorfan, Brian Foster, Won Namkung, Yoji Totsuka, Albrecht Wagner .**

**[http://www.fnal.gov/directorate/icfa/04-03-31\\_GDI\\_TF\\_Report.pdf](http://www.fnal.gov/directorate/icfa/04-03-31_GDI_TF_Report.pdf)**

**3. Designing Collider / moving to construction**



## Global Design Initiative



- **The Global Design Initiative proposed by the task force, will work to move quickly toward a TDR following the technology decision**

[http://www.fnal.gov/directorate/icfa/04-03-31\\_GDI\\_TF\\_Report.pdf](http://www.fnal.gov/directorate/icfa/04-03-31_GDI_TF_Report.pdf)

- **2004 International technology selection. Multi-laboratory MOU's to define and initiate the Global Design Effort.**
- **2005 Complete the accelerator CDR, including site requirements, and initial cost and schedule plan.**
- **2006 Initiate detailed engineering designs under the leadership of the Central Team.**
- **2007 A complete detailed accelerator TDR with the cost and schedule plan, establish the roles & responsibilities of regions, and begin the process for site proposals.**
- **2008 Site selection and approval of international roles & responsibilities by the governments.**

Jonathan Dorfan will speak later today on how this will be implemented

**3. Designing Collider / moving to construction**



# Organisation for Economic Co-operation and Development



- **OECD Global Science Forum analysis of particle physics (July 2002)**
  - ↪ agreed with the world-wide consensus on LC – concurrent operation with LHC
  - ↪ recommends continuation of consultations in preparation of the meeting of the OECD science ministers in 2004.

- **Meeting of the OECD Science Ministers**

- ↪ January 28-29, 2004



- Acknowledged the importance of ensuring access to large-scale research infrastructure and the importance of the long-term vitality of high-energy physics.
- Noted worldwide consensus of the scientific community for an electron-positron linear collider as the next accelerator-based facility to complement and expand on the discoveries of the LHC
- Agreed that the planning and implementation should be carried out on a global basis, and should involve consultations among scientists and representatives of science funding agencies from interested countries.
  
- Noted the need for strong international R&D collaboration and studies of the organisational, legal, financial, and administrative issues required to realise the next major accelerator facility, a next-generation electron-positron collider with a significant concurrent running with the LHC.

## 4. International Plan of support by the Govts



## Funding Agencies Meetings



- **July, 2003** “premeeting” of Agency folks (Europe and N.America) in London to enumerate the challenges and questions facing creation of agency based governance for an international project organization.
  - ↪ This meeting was an informal body to share views and opinions on prospects and issues in each of the states involved. The group discussed the status of current funding for a linear collider (LC) and their perceptions of the prospects for the future.
- **April, 2004** **Second meeting of “Agency folks” in London**
  - ↪ UK, Germany, France, Italy, US, Canada, Japan, CERN
  - ↪ Stressed importance of ITRP in 2004. Discussed three year R&D, followed by engineering design phase with completion of design in 2010. Earliest operation of linear collider 2015. Commissioning of a LC in 2015 could provide 5 years of concurrent running with the LHC. Timetable is consistent with the OECD Ministerial announcement of 29 – 30 January 2004.
  - ↪ **Minutes on the web: <http://www-jlc.kek.jp/licopo/documents/FALC/LC.april04.htm>**
- **Third meeting this week.**

### 4. International Plan of support by the Govts



## Two Detectors

- **International Scope Document specifies two operational detectors from the start**
- **Why two?**
  - ↪ **Competition**
  - ↪ **Cross-check**
  - ↪ **Efficiency**
  - ↪ **Insurance**
  - ↪ **Scientific opportunities**
- **What two?**
- **How do we get there?**

### 5. R&D for the Detectors



## Two Detectors

- **Several detector concepts have been or are under study**
  - ↗ **GLC Detector**
  - ↗ **TESLA TDR Detector**
  - ↗ **Silicon Detector**
  - ↗ **American Large Detector**
- **On Friday Harry Weerts will discuss the Detector Design Study of the Silicon Detector**
- **and Graham Wilson will explore the parameters and choices of a large detector, such as GLC, TESLA TDR, or American Large**
- **Global Organization of preparation for the Experimental Program**
  - ↗ **WWS organizing committee has drafted a proposal in preparation for the ILCSC in Beijing - we will discuss this in the plenary session on Friday**
    - ❖ **DRAFT circulated last week:**  
[http://blueox.uoregon.edu/~lc/wwstudy/ORG\\_GLOBAL\\_EXP\\_PROG\\_2.2.pdf](http://blueox.uoregon.edu/~lc/wwstudy/ORG_GLOBAL_EXP_PROG_2.2.pdf)
    - ❖ **WWS org. comm. met yesterday and is revising the draft proposal**

### 5. R&D for the Detectors



## Steps to Detector TDRs

- | <u>GDI Milestone</u>                    | <u>Steps toward Detector Realization</u>  |
|---|---|
| ○ ITRP Technology Recommendation (2004) | initiate global Detector R&D review, MDI task force, costing task force - early 2005  |
| ○ Accelerator CDR (2005)                | Preliminary costing of at least two whole-detector concepts (single joint document with performance estimates for each concept, plus reference to R&D done and that still required.) This document should be produced in time to be included in the Accelerator CDR process of the GDI. |
| ○ Accelerator TDR (2007)                | CDRs – WWS receives CDRs for experiments (these could be different set of concepts from, step above, as new ideas come with new people)   |
| ○ LC Site Selection (2008)              | Proposal – Collaborations form around the CDR detector concepts to prepare proposals (including performance, costs, and technical feasibility). The Global Lab will invite groups to produce TDRs.  |
| ○ Site Selection + 1 Year               | TDR – Global Lab receives TDRs from invited Proposals and selects experiments.  |

Caveat, these are my notes from yesterday;  
not yet the official version – will be presented Friday

### 5. R&D for the Detectors



# Detector Design Studies



- **Detector efforts must be inter-regional – we have a ways to go**
- **Silicon Detector Design Study**
  - ↪ **Design study meeting Saturday afternoon**
  - ↪ **Subsequent meetings planned at Durham ECFA Study (Sep 3) and at Taiwan ACFA Workshop (November)**
- **Large Detectors**
  - ❖ **TESLA TDR**
  - ❖ **GLC Very Large**
  - ❖ **American Large**
  - ↪ **Each of these originates as regional efforts.**
  - ↪ **Some difference in the choices**
    - ❖ **eg. GLC Very Large employs more cost effective calorimetry, allowing larger tracking volume.**
  - ↪ **Considering how to develop**

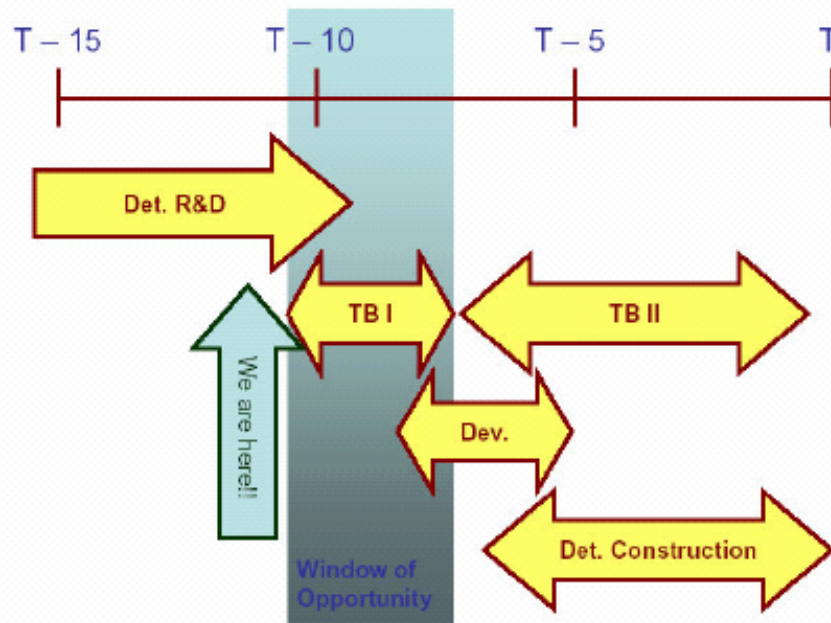
## 5. R&D for the Detectors



## Detector R&D is Critical



### LC Detector Time Scale



Graphically summarized  
by Jae Yu

**Late Thursday afternoon we will hold a special plenary session focussed on detector R&D issues: speakers: Brau, Jaros, Heuer**

Time	T=2015	Tasks
T ->10-11	Before 2005	Detector R&D
T - 10-11	2005-6	Test Beam I
T - 8-9	2006-7	•Detector Technology chosen. •Detector Development and design begins
T - 6	2009	Detector Construction begins Test Beam II (Calibration)
T	2015	LC and Detector ready

### 5. R&D for the Detectors



## R&D Support in US



- A single, combined proposal has been developed (led by UCLC and LCRD) in each of the past two years:

*A University Program of Accelerator and Detector Research  
for the Linear Collider*

LCRD submitted to DOE

UCLC submitted to NSF



### 5. R&D for the Detectors



A University Program of Accelerator and Detector Research for the Linear Collider

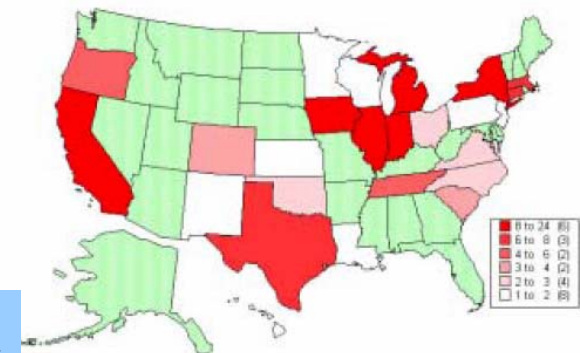


2002 Proposal	Proposed Budget	No. projects	2003 Proposal			
			\$ year 1	\$ year 2	\$ year 3	proposals
Accelerator Physics	\$1,003,783	33	\$1,126,162	\$1,575,474	\$1,554,058	29
Luminosity, Energy, Polarization	\$171,541	9	\$237,733	\$462,277	\$435,995	9
Vertex Detector	\$119,100	3	\$172,716	\$319,140	\$325,190	3
Tracking	\$395,662	11	\$596,660	\$915,936	\$932,386	11
Calorimetry	\$514,540	12	\$855,212	\$1,903,475	\$1,334,401	13
Muon system and Particle ID	\$148,899	3	\$194,188	\$224,444	\$230,991	3
<b>TOTAL</b>	<b>\$2,353,525</b>	<b>71</b>	<b>\$3,207,732</b>	<b>\$5,452,641</b>	<b>\$4,861,065</b>	<b>68</b>

[http://www.hep.uiuc.edu/LCRD/html\\_files/proposal.html](http://www.hep.uiuc.edu/LCRD/html_files/proposal.html)

[http://www.hep.uiuc.edu/LCRD/pdf\\_docs/LCRD\\_UCLC\\_Big\\_Doc/](http://www.hep.uiuc.edu/LCRD/pdf_docs/LCRD_UCLC_Big_Doc/)

participation, incl. labs



**USLCSG commissioned Detector R&D review panel**

**5. R&D for the Detectors**



\$ © \$

# DOE Grants

\$ © \$



**DOE responded to the proposals in FY03 and FY04 by funding 14 university LC detector R&D efforts in FY03 and 20 in FY04 based on the review by the USLCSG panel**

	<b>FY03</b>	<b>FY04</b>
↺ Lum/Energy/Pol	4	4 (1)
↺ Calorimetry	3	6 (2)
↺ Muons	2	3
↺ Particle ID	1	
↺ Tracking	2	5 (1)
↺ Vertex	2	2

» NOTE : Parenthesis refers to subset that are UCLC projects

**and 12 university LC accelerator R&D projects in FY03**

**4 supplements and 8 new grants**

**about \$500k for detector R&D and about \$400k for accelerator R&D in FY03  
and about \$700k for detector R&D and about \$400k for accelerator R&D in FY04**

## 5. R&D for the Detectors



# DOE FY05 Proposals



**DOE preparing to support projects again in FY05**

**Jim Reidy is here and will speak on Friday**

**Process is being discussed**

**Jim will give some details**

## 5. R&D for the Detectors



# NSF Proposals



**The UCLC received a planning grant for 150k\$ in FY03**

**Marv Goldberg is here and will speak on Friday**

## **5. R&D for the Detectors**



# Test Beams



- **The Detector R&D will require test beams**
- **The Working Groups have developed an understanding of the needs and the inventory of available beams for detector tests**
- **This is an issue of interest to the world-wide community**
- **Jae Yu and Gene Fisk have led a very active effort to develop the test beam plan in collaboration with European and Asian partners**
- **Continue discussions here this week**

## 5. R&D for the Detectors



## International R&D Coordination

- **International Detector R&D Committee** report summarizes the world-wide R&D effort
  - ↪ <http://blueox.uoregon.edu/~lc/randd.html>
  - ↪ report is dynamic through a set of web pages
  - ↪ WWS will be renewing this effort
- **International R&D Review meetings**
  - Vertex detection and intermediate tracking,  
North America (Arlington), January 8, 2003
  - Main Tracker and Muons,  
Europe (Amsterdam), March 31, 2003
  - Calorimetry and Forward Detectors,  
Europe (Montpellier), November, 2003
  - Vertex detection and intermediate tracking,  
Asia (Mumbai), December, 2003
  - Main Tracker and Muons,  
North America (SLAC), January, 2004

Discussing future review meetings now for Durham, Taipei, and beyond

### 5. R&D for the Detectors



# Outreach



- **Think about your elevator speech on the Linear Collider**
  - ↪ **See talks at Cornell and SLAC ALCPG meeting by Neil Calder and Judy Jackson**
- **Tell the story to politicians and public whenever possible**
- **Use the Quantum Universe**
- **Remember the Linear Collider is just a part of the needed investments in the physical sciences**

## 6. Continuing our Outreach



# Future Meetings of the ALCPG, and WWS



American Linear Collider  
Physics Group

- **This workshop is the sixth semi-annual workshop since Snowmass 2001**
  - ↖ **Chicago – Jan, 2002**
  - ↖ **Santa Cruz – Jun, 2002**
  - ↖ **Arlington – Jan, 2003**
  - ↖ **Cornell – Jul, 2003**
  - ↖ **SLAC – Jan, 2004**
  - ↖ **Victoria – Jul, 2004**
  
- **This frequency has help us to intensify our efforts**
  
- **Beyond Victoria:**
  - ↖ **The next LCWS (Worldwide Study) will be in the Americas in March, 2005**
  - ↖ **Do we need another ALCPG Workshop prior to March?**
    - ❖ Tentative sense is no, but there may be a need of smaller focussed meetings
  - ↖ **How often should we plan meetings in the future?**
    - ❖ 1/year as WWS Workshop go to 1/year

## 7. Future Workshops



# LCWS 2005



- **LCWS 2005 will be in the Americas in March, 2005**
- **Six proposals were submitted to host the meeting in the Americas**
  - ↳ **Arlington (UTA), Fermilab, Puebla (Mexico), San Francisco (LBNL), Stanford (SLAC), Vancouver (Triumpf)**
- **The proposals are under review,  
and a final selection will be made in August**

## 7. Future Workshops



## Monthly Electronic Continental Meetings



✉ committee: S. Dawson, G. Gollin, N. Graf, R. Patterson, S. Tkaczyk, J. Brau, M. Oreglia

<b>Dec. 13, 2002</b>	<b>Summary of the Ferimlab LHC/LC Workshop</b>	<b>Sally Dawson</b>
<b>Feb. 20, 2003</b>	<b>LC Affairs on the Intl Scene The LC and the Cosmos: Connections in Supersymmetry</b>	<b>Maury Tigner Jonathan Feng</b>
<b>Mar. 27, 2003</b>	<b>Challenges of Linear Collider Damping Rings</b>	<b>Andy Wolski</b>
<b>May 8, 2003</b>	<b>Matter and Energy, Space and Time: Particle Physics in the 21st Century</b>	<b>Jonathan Bagger</b>
<b>Jun. 5, 2003</b>	<b>SD, an Introduction</b>	<b>Martin Breidenbach</b>
<b>Nov. 6, 2003</b>	<b>Working Group on Connections to Astrophysics and Cosmology</b>	<b>J. Feng/M. Trodden</b>
<b>Apr. 18, 2004</b>	<b>The US Linear Collider Technology Options Study</b>	<b>Gerry Dugan</b>

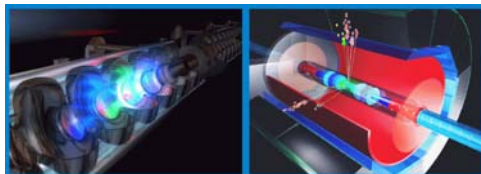
**Ideas are invited**

### **7. Future Workshops**

## Coordinating with European and Asian Partners

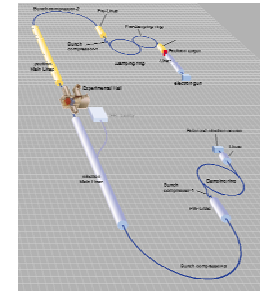
- **ECFA Study on Physics and Detectors for a Linear Electron-Positron Collider**

↳ **Durham, September 1-4, 2004**



- **ACFA Workshop series**

- **November 9-12, 2004 - 7th ACFA Workshop on Physics/Detector at the Linear Collider**
- **Taipei, Taiwan**



Many of us have been participating overseas  
20 or more from NA have been attending each  
of the past DESY/ ECFA WorkShops

We need to continue and strengthen this cooperation

### 7. Future Workshops



## Support is Building for the Linear Collider



***WORLD LEADERS ARE DISCUSSING  
IT AT EVERY OPPORTUNITY***





## Summary



- **The past two years have seen many important advances toward realizing the linear collider (incomplete list)**
  - ↗ **Regional Steering Groups Formed**
  - ↗ **International Steering Committee Formed**
  - ↗ **Scope Defined Internationally**
  - ↗ **Consensus Document Expressed Physics Goals and Drove Scope**
  - ↗ **TRC Evaluation of Technologies**
  - ↗ **ITRP Commissioned and Nearing Recommendation**
  - ↗ **Central Design Group Being Planned (GDI)**
  - ↗ **Office of Science designates LC as “top priority” mid-term project**
  - ↗ **OECD and Governmental Attention and Deliberation**
    - ❖ Very positive outcomes of discussions
- **Many of the necessary steps are being taken**
- **We must continue, coordinate, and intensify our R&D efforts to capitalize on the coming opportunities**



## Support is Building for the Linear Collider



***IT CAN UNITE THE LEAST LIKELY***

