Intro & State of the ALCPG

Arnold's Linear Collider Physics & Detector Group

Stanford Linear Accelerator Center

A national laboratory funded by the Department of Energy

Jim Brau and Mark Oreglia

- Working group news
- ALCPG activities
- Funding and projects
- ALCPG: time for some changes

American Linear Collider Physics Group

This ALCPG Intro has a new thrust

- Most of you are familiar with ALCPG and LC activity
  - I provide updates rather than an introduction
- We are in a state of transition
  - ILC organization proceeding swiftly
  - Funding agencies supporting us now
  - Not unreasonable to consider 2015 target date
- So, we need to focus, re-energize, and set goals
  - We need more coordination between the WGs now
  - WG could also stand to update URLs, publish!
  - Finally time is ripe to set milestones towards TDR
  - Urgent need to work with the Europeans and Asians

The American LC Physics/Detector Working Groups

http://blueox.uoregon.edu/~lc/alcpg

Detector and Physics Simulations:

Vertex Detector:

Tracking:

Particle I.D.:

Calorimetry:

Muon Detector:

DAcq, Magnet, and Infrastructure:

Interaction Regions, Backgrounds:

IP Beam Instrumentation:

Cosmology WG

Testbeams

Higgs:

SUSY:

New Physics at the TeV Scale and Beyond:

Radiative Corrections (Loopverein):

Top Physics, QCD, and Two Photon:

Precision Electroweak:

gamma-gamma, e-gamma Options:

e-e-:

UCLC and LCRD

Joint proposals to NSF, DOE

Liaison to accel. R&D

Global Detector Network

LHC/LC Study Group

American Linear Collider Physics Group

American Linear Collider Physics Group

http:blueox.uoregon.edu/~lc/alcpg

Working Group Leaders

Co-chairs: Jim Brau and Mark Oreglia

Detector and Physics Simulations:
N. Graf/M. Peskin

Vertex Detector:
J. Brau /M Battaglia

Tracking:
B. Schumm/D. Karlen/K. Riles

Particle I.D.:
B. Wilson

Calorimetry:
R. Frey/A. Turcot/D. Chakraborty

Muon Detector:
G. Fisk / P. Karchin

DAcq, Magnet, and Infrastructure:
U. Mallik

Interaction Regions, Backgrounds:
T. Markiewicz/S. Hertzbach

IP Beam Instrumentation:
M. Woods /E. Torrence/D. Cinabro

Executive Committee
E. Blucher
D. Gerdes
L. Gibbons
D. Karlen
Y-K Kim
H. Murayama
J. Richman
R. VanKooten

Higgs:
M. Carena/H. Haber (R. Van Kooten)

SUSY:
U. Nauenberg/J. Feng /F. Paige

New Physics at the TeV Scale and Beyond:
J. Hewett/D. Strom/S. Tkaczyk

Radiative Corrections (Loopverein):
U. Baur/S. Dawson/D. Wackeroth

Top Physics, QCD, and Two Photon:
L. Orr/A. Juste

Precision Electroweak:
G. Wilson/B. Marciano

gamma-gamma, e-gamma Options:
J. Gronberg/M. Velasco

e-e-:
C. Heusch

Cosmology:
J. Feng, M. Trodden

Testbeams
G. Fisk, J. Yu

UCLC and LCRD
D. Amidei, D. Chakraborty,D. Cinabro, G. Dugan, D. Finley, G. Gollin, T. Himel, J. Jaros, U. Mallik, R. Patterson, J. Rogers, S. Tkaczyk

Liaison to accel. R&D
T. Himel, D. Finley, J. Rogers

Global Detector Network
M. Hildreth/R. Van Kooten

LHC/LC Study Group
- chaired by H. Schellman/F. Paige

New WG: Connections to Cosmology

- We felt there should be an ALCPG WG devoted to classifying the LC measurements within astrophysics and cosmology

- Goal: a white-paper in 1 year
  - Important for physics strategy
  - Important tool for funding agencies

- Initiators: Battaglia, Feng, Graf, Peskin, Trodden
  - … and many more active participants

Some Questions to Address:

- measuring the LSP in SUSY (mass, couplings etc.)
  - does this fit with the desired CDM?
- measuring other SUSY particles (e.g. the lightest scalar tau)
  - does this fit with the desired CDM? (E.g. are certain decay channels strong enough to give you the right amount of CDM?)
- measuring other parameters like the top quark mass, see what regions in constrained MSSM versions (mSUGRA, ...) are still allowed
- measuring the CDM very precisely.
  - What predictions are made within certain SUSY models?
  - About the LSP?
  - About the high-energy parameters?
- combination of CDM measurements with e.g. Higgs boson mass measurements
- implications for the allowed parameter space
- combination of CDM measurements with Higgs BR measurements, with electroweak precision observables, with b physics observables, ...

It wasn't difficult to get members

- Marco Battaglia <Marco.Battaglia@cern.ch>
- "Graf, Norman" <ngraf@SLAC.Stanford.EDU>
- Dhiman Chakraborty <dhiman@fnal.gov>
- Hitoshi Murayama <murayama@hitoshi.berkeley.edu>
- Sally Dawson <dawson@quark.phy.bnl.gov>
- Bhaskar Dutta <duttabh@uregina.ca>
- Uriel Nauenberg <uriel@pizero.colorado.edu>
- "Teruki Kamon" <kamon@physics.tamu.edu>
- "Michael E. Peskin" <mpeskin@SLAC.Stanford.EDU>
- Tim Tait <tait@fnal.gov>
- Stephane Willocq <willocq@physics.umass.edu>
- Mike Strauss <strauss@nhn.ou.edu>
- "Joanne L. Hewett" <hewett@SLAC.Stanford.EDU>
- "Jaros, John A." <john@SLAC.Stanford.EDU>
- Mark Oreglia <oreglia@hep.uchicago.edu>
- Court Bohn <clbohn@fnal.gov>
- Aaron Pierce <apierce@SLAC.Stanford.EDU>
- Jonathan Feng <jlf@feng.ps.uci.edu>
- Jonathan Bagger <bagger@jhu.edu>
- Konstantin Matchev <matchev@phys.ufl.edu>
- Sven Heinemeyer <heinemeyer@theorie.physik.uni-muenchen.de>
- nobuchika.okada@kek.jp (Nobuchika Okada)
- keisuke.fujii@kek.jp (Kaisuke Fujii)
- Jim Brau<jimbrau@faraday.uoregon.edu>

The LHC/LC Study Group

- Aim: investigate how analyses at the LHC could profit from results obtained at a LC and vice versa.
  - 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
  - Their white paper is crucial now! (was due 15 Dec!)
    - … and so is a good executive summary!
- Question: what is the post-paper role of this WG?
- Time to address their conclusions into our physics WGs

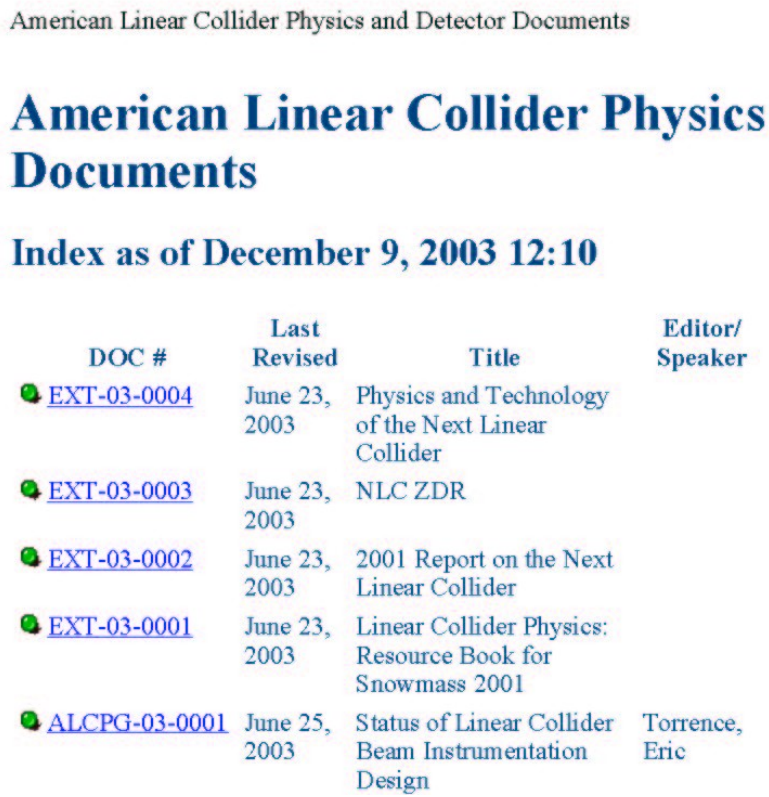
Physics WGs Must Reevaluate Precision

- The main thrust of the LHC/LC document centers on how accurate measurements by LC couple with LHC measurements to :
  - make indirect measurements of parameters
  - Select models
  - Show LHC where to look for higher states
- Assessment of LC measurement precision is crucial
  - We need to reassess which processes:
    - Are correctly assessed now
    - Need to be redone with better tools
    - Can exploit innovations in data analysis

ALCPG Documentation System

- We have now established a repository for ALCPG notes and other LC-related documentation.
- Database provides versioning support and searching capabilities.
- Full-featured web interface for insertion and retrieval.
- Customizable to allow for future extension.

- … now, we just need a few more entries!
  - Please start using it!!!



American Linear Collider Physics and Detector Documents

American Linear Collider Physics Documents

Index as of December 9, 2003 12:10

DOC #	Last Revised	Title	Editor/ Speaker
EXT-03-0004	June 23, 2003	Physics and Technology of the Next Linear Collider	
EXT-03-0003	June 23, 2003	NLC ZDR	
EXT-03-0002	June 23, 2003	2001 Report on the Next Linear Collider	
EXT-03-0001	June 23, 2003	Linear Collider Physics: Resource Book for Snowmass 2001	
ALCPG-03-0001	June 25, 2003	Status of Linear Collider Beam Instrumentation Design	Torrence, Eric

Major ALCPG Meetings/Workshops since Fall 2002

• LCDsoft	NIU	Nov 7-9
• γ collider	SLAC	Nov 21-22
• LHC/LC	Fermilab	Dec 12-13
• **ALCPG**	**UT-Arlington**	**Jan 9-11**
• LoopfestII	Brookhaven	May 14-16
• LC Sim	SLAC	May 19-22
• **ALCPG**	**Cornell**	**Jul 13-16**

- **And other WG meetings ($\gamma\gamma$, e^-e^-, …)**
  - **Please inform us of these local workshops**
- **Keep up the momentum in 2004!**

Monthly Electronic Continental Meetings

- We we have been conducting a series of Linear Collider Seminars to get the broader community involved and informed
  - http://blueox.uoregon.edu/~lc/alcpg/webcast/
  - committee: J. Brau, S. Dawson, G. Gollin, N. Graf, M. Oreglia, R. Patterson, S. Tkaczyk

December 13	Summary of the FNAL LHC/LC Workshop	Sally Dawson
February 20	LC Affairs on the Intl Scene;	Maury Tigner
	LC, SUSY and the Cosmos	J. Feng
March 27	Challenges of Linear Collider Damping Rings	Andy Wolski
May 8	Matter and Energy, Space and Time: Particle Physics in the 21st Century	Jonathan Bagger
June 5	SD, an Introduction	Martin Breidenbach
November 6	LC and the Cosmos:Connections to Cosmology	J. Feng, M. Trodden

We still need to reach a broader audience!

Future Meetings of the ALCPG

- July 28-31, 2004 in Victoria, B.C.
  - Main new foci:
    - Funding
    - Communicating to a broader community
    - Reorganizing the detector mission
    - More integration into the international studies
- Winter: not yet fixed
  - A couple of proposals in; please let us know ASAP if you want to volunteer to hold a workshop

Meetings, meetings, meetings

- How often to hold these regional meetings?
  - Europe and Asia want to cut back to 1/yr
  - Jim and I think ALCPG still needs 2/yr … for now
- How often to hold WorldWide meetings?
  - Yearly, if regional meeting cut back?
  - TRP recommentation by end of 2004 … perhaps by July
  - Should LCWS be <u>early</u> in 2005?
  - After this milestone, perhaps ALCPG meetings should go to 1/yr if LCWS becomes an annual event
- Should we hold an annual LC Physics School?
  - Ambleside was wonderful for bringing students on board
  - A more formal WS for our colleagues???
  - NB: No (zero, zilch, nada) LC plenary at APS/Riverside ☹

Detector Mini-workshops

- We have completed one cycle of the WorldWide detector systems 1-day workshops:
  - Vertex: Arlington, January 2003 (and Mumbai, December 2003)
  - Tracking: Amsterdam, March 2003
  - Calorimetry: Montpellier, November, 2003
- At this workshop we have the second Tracker workshop
  - The 2 leading tracker technologies both have critical issues requiring R&D
  - Need a roadmap for technology evaluation
- Time to set up milestones and plan for decisions

US LC Steering Group Info

- J. Dorfan, chair
- H. Lynch, executive secretary
- M. Tigner, M. Witherell … labs
- J. Brau, M. Oreglia … ALCPG
- G. Dugan, S. Holmes … accelerators
- J. Bagger, S. Dawson, J. Gates … theory
- D. Burke, J. Friedman, Y-K Kim, D. Marlow … expt
- Major tasks:
  - Organize the US (and American) efforts
  - Interface with ILCSC and US funding agencies
  - Initiate US participation in accelerator construction
- Activities summarized at: http://www.slac.stanford.edu/~hll/USLCSG/General/index.html

University Involvement & Funding

- Realizing the very large effort needed coordination, the community instituted two consortia for LC research and development:
  - University Consortium for a Linear Collider (NSF)
  - Linear Collider R&D group (DOE)
- Proposals were submitted a year ago at the level of $1M each in one combined proposal: *"A University Program of Accelerator and Detector Research for the Linear Collider"*
  - LCRD received approximately $900K
  - UCLC encountered glitches and was given $150K continuance
    - New proposal submitted…on fast track
    - separate detector and accelerator proposals
    - strengthened explanation of urgency for detector projects
    - NSF decision might be possible early in FY04

DOE Grants

DOE responded to the proposal in FY03 by funding 14 university LC detector R&D efforts

- Lum/Energy/Pol 4
- Calorimetry 3
- Muons 2
- Particle ID 1
- Tracking 2
- Vertex 2

and 12 university LC accelerator R&D projects

4 supplements and 8 new grants

about $500k for detectors and about $400k for accelerator

The FY04 Proposal

- www.lns.cornell.edu/public/LC/UCLC/ www.hep.uiuc.edu/LCRD/
- 68 requests, 48 universities, >300 physicists, $3.2M (FY04)

LCRD + UCLC	$ year 1	$ year 2	$ year 3	proposals
Accelerator Physics total	$1,126,162	$1,575,474	$1,554,058	29
Luminosity, Energy, Polarization total	$237,733	$462,277	$435,995	9
Vertex Detector total	$172,716	$319,140	$325,190	3
Tracking total	$596,660	$915,936	$932,386	11
Calorimetry total	$855,212	$1,903,475	$1,334,401	13
Muon system and Particle ID total	$194,188	$224,444	$230,991	3
Total	$3,182,671	$5,400,746	$4,813,021	68

Accelerator Projects

- **2. Accelerator Physics**
- 1. Beam Halo Monitor & Instrumented Collimators (LCRD; Lucien Cremaldi)..... 2.1
- 2. Beam Test Proposal of an Optical Diffraction Radiation Beam Size Monitor at the SLAC FFTB (LCRD; Yasuo Fukui)... 2.2
- 3. Design and Fabrication of a Radiation-Hard 500-MHz Digitizer Using Deep Submicron Technology (LCRD; K.K. Gan).... 2.3
- 4. RF Beam Position Monitors for Measuring Beam Position and Tilt (LCRD; Yury Kolomensky)...2.4
- 5. Non-intercepting electron beam size diagnosis using diffraction radiation from a slit (UCLC; Bibo Feng)
- 6. Single-shot, electro-optic measurement of a picosecond electron bunch length (UCLC;Bill Gabella)... 2.6
- 7. Fast Synchrotron Radiation Imaging System for Beam Size Monitoring (UCLC; Jim Alexander).. 2.7
- 8. Radiation damage studies of materials and electronic devices using hadrons (LCRD;David Pellett).. 2.9
- 9. BACKGAMMMON: A Scheme for Compton backscattered photoproduction at the Linear Collider (UCLC; S. Mtingwa)... 2.10
- 10. Ground Motion studies versus depth (LCRD; Mayda Velasco)... 2.11
- 11. Investigation of GAN Techniques in the Development and Operation of the TTF Data Acquisition System (UCLC; Don Hartill)..
- 12. Investigation of acoustic localization of rf cavity breakdown (LCRD; George Gollin).. 2.15
- 13. RF Cavity Diagnostics and Acoustic Emission Tests (LCRD; Lucien Cremaldi) . 2.17
- 14. Control of Beam Loss in High-Repetition Rate High-Power PPM Klystrons (LCRD;Mark Hess)... 2.18
- 15. Research in Superconducting Radiofrequency Systems (UCLC; H. Padamsee) ... 2.20
- 16. RF Breakdown Experiments at 34 Ghz (UCLC; J.L. Hirshfield)..
- 17. Investigation of Novel Schemes for Injection/Extraction Kickers (LCRD; George Gollin).... 2.22
- 18. Ring-tuned, permanent magnet-based Halbach quadrupole (LCRD; James Rosenzweig)..... 2.23
- 19. Investigation and prototyping of fast kicker options for the TESLA damping rings (UCLC; Gerry Dugan).. 2.25
- 20. Continuing Research and Development of Linac and Final Doublet Girder Movers (LCRD; David Warner) 2.26
- 21. Effects of Coherent Synchrotron Radiation in Linear Collider Systems (LCRD; James Ellison).. 2.27
- 22. Improved simulation codes and diagnostics for high-brightness electron beams (UCLC; Courtlandt L. Bohn)..... 2.29
- 23. Beam simulation: main beam transport in the linacs and beam delivery systems, beam halo modeling and transport, and implementation as a diagnostic tool for commissioning and operation (UCLC; Dave Rubin)... 2.30
- 24. Damping ring studies for the LC (UCLC; S. Mtingwa). 2.32
- 25. A Compact Wakefield Measurement Facility (LCRD; Young-Kee Kim) 2.33
- 26. Experimental, simulation, and design studies for linear collider damping rings (UCLC; Joe Rogers) 2.34
- 27. Undulator-Based Production of Polarized Positrons (LCRD; William Bugg) 2.37
- 28. Development of Polarized Photocathodes for the Linear Collider (LCRD; Richard Prepost) 2.40
- 29. Transverse phase-space measurements for a magnetic bunch compressor by using phase-space tomography technique (LCRD; Feng Zhou) 2.42

Polarization/Lumi/Vtx/Tracking

- **3. Luminosity, Energy, Polarization**
- 30. An Explicitly Radiation-Hard Fast Gas Cerenkov Calorimeter for Bunch-by-Bunch
- Luminosity Measurement at the Next Linear Collider (LCRD; John Hauptman)..... 3.1
- 31. R&D for luminosity monitor (LCRD; Yasar Onel).... 3.2
- 32. Extraction line energy spectrometer (LCRD; Eric Torrence)... 3.4
- 33. A Demonstration of the Electronic and Mechanical Stability of a BPM-Based Energy Spectrometer for an Electron-Positron Linear Collider (UCLC; Mike Hildreth)..... 3.5
- 34. Polarimetry at LC (LCRD; Yasar Onel) ... 3.6
- 35. Compton polarimeter backgrounds (LCRD; William Oliver) 3.7
- 36. Coherent and incoherent beamstrahlung at the LC (UCLC; Giovanni Bonvicini)... 3.8
- 37. Development of thin, fast, radiation hard, 3d-electrode array, silicon radiation sensors (LCRD; Sherwood Parker) . 3.9
- 38. Polarimeter with a Quartz Fiber Calorimeter (LCRD; Stefan Spanier). 3.10

- **4. Vertex Detector**
- 39. Pixel Vertex Detector R&D for Future High Energy Linear e+ e- Colliders (LCRD; Charlie Baltay) 4.1
- 40. Development and design of an LC ASIC for CCD readout and data reduction (UCLC; Patrick Skubic)..... 4.2
- 41. Study of the Mechanical Behavior of Thin silicon and the Development of hybrid silicon pixels for the LC (UCLC; Daniella Bortoletto).. 4.3

- **5. Tracking**
- 42. Development and Evaluation of Forward Tracking in the Linear Collider (LCRD; Michael Strauss).... 5.1
- 43. Development of a GEM based Forward Tracking Prototype for the NLC (LCRD; Lee Sawyer) ... 5.2
- 44. Straw Tube Wire Chambers for Forward Tracking in the Linear Collider Detector (UCLC; Keith Baker)..... 5.3
- 45. Fabrication, investigation and simulation of Gas Electron Multipliers for charged particle tracking (LCRD; Peter Fisher)..... 5.4
- 46. Studies of the Use of Scintillating Fibers for an Intermediate Tracker which Provides Precise Timing and Bunch Identification: Progress Report and Request For Funds (LCRD; Rick VanKooten) 5.5
- 47. Tracking Detector R&D at Cornell and Purdue Universities (UCLC; Dan Peterson)... 5.7
- 48. Tracking simulation studies and alignment system R&D (UCLC; Keith Riles)..... 5.8
- 49. Tracking Software Optimization for the Silicon Detector Option (LCRD; Milind Purohit) ...5.9
- 50. R& D Towards a Low - Mass Silicon Strip Central Tracker for the LC (LCRD; Bruce Schumm) 5.10
- 51. R&D towards a Silicon drift detector based main tracker for the NLC-SD option (UCLC; Rene Bellwied) ... 5.11
- 52. Negative Ion TPC as the NLC main tracker (UCLC; Giovanni Bonvicini) 5.12

Calorimetry/PID/Muon

- **6. Calorimetry**
- 53. Design and Prototyping of a Scintillator-based Digital Hadron Calorimeter (UCLC; Vishnu Zutshi) 6.1
- 54. Linear Collider Detector Development Proposal to Develop Scintillator-Fiber Readout Calorimetry with a Novel Geometrical Design that has Excellent Spacial Resolution (LCRD; Uriel Nauenberg) .. 6.2
- 55. Fast Response Tile Scintillation Development for Calorimetry and Tracking in NLC Detectors (UCLC; Mike Hildreth) 6.3
- 56. Energy Flow Studies with the Small Detector at the Linear Collider (LCRD; Usha Mallik).... 6.4
- 57. Development of a silicon-tungsten test module for an electromagnetic calorimeter (LCRD; Raymond Frey).
- 58. Digital Hadron Calorimetry for the Linear Collider using GEM based Technology (LCRD; Andy White) .. 6.6
- 59. Development of energy-flow algorithms, simulation, and other software for the LC detector (UCLC; Dhiman Chakraborty) 6.9
- 60. Investigation and Design Optimization of a Compact Sampling Electro-magnetic Calorimeter with High Spatial, Timing and Energy Resolution (UCLC; Graham Wilson).. 6.10
- 61. RPC Studies and Optimization of LC detector elements for physics analysis (UCLC;Mark Oreglia)..6.11
- 62. Micro-machined Vacuum Photodetectors (LCRD; Yasar Onel).. 6.12
- 63. Cherenkov compensated calorimetry (LCRD; Yasar Onel).
- 64. Study of Resistive Plate Chambers as Active Medium for the HCAL (LCRD; José Repond)..... 6.14
- 65. Proposal for Design Study of Active Mask for Future Linear Collider (LCRD; Teruki Kamon) ... 6.15

- **7. Muon System and Particle Identification**
- 66. Scintillator Based Muon System R&D 2004-2007 (LCRD; Paul Karchin) 7.2
- 67. Scintillator Based Muon System R&D (UCLC; Mitchell Wayne)..... 7.3
- 68. Demonstration of Geiger Mode Avalanche Photodiodes for Linear Collider Muon
- System Readout (LCRD; Robert Wilson).... 7.5

Test Beams

- The Detector R&D will require test beams
- The Working Groups are developing 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
- Gene Fisk and Jae Yu are pursuing negotiations with the US labs … possibly also CERN and KEK
- Real problem: test beams in 2005-6…when needed most

Detector Optimization

- Subsystem R&D is critical
  but detector integration is essential to the physics performance
- We organized a Detector Integration session at Cornell to consider integration and discuss options
  - SD (Silicon Detector) — Martin Breidenbach
  - TESLA Detector — Markus Schumacher
  - JLC Detector — Hitoshi Yamamoto
  - $\gamma\gamma$ Detector — David Asner

- This should be a major issue here at ALCPG-SLAC
  - It is time to get more serious about goals and milestones for detector performance and design
  - We hope a roadmap can be set here

The Next Steps

- Major victory: LC on the US roadmap
  - LC ranked at ***top*** of the mid-term priority projects
- Time to initiate more serious activity … funding
- LCWS in Paris will be another turning point for ILC

Mid-Term Priorities

Priority: 13
Linear Collider

= 1st mid-term project!

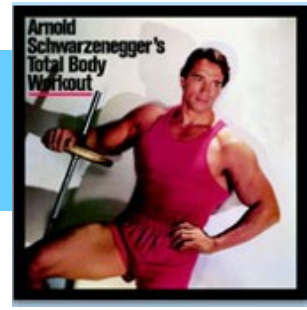
The Linear Collider is designed to extend the study of particle physics.

The Facility: The Linear Collider will allow physicists to make the world's most precise measurements of nature's most fundamental particles and forces at energies comparable to those of the Large Hadron Collider (LHC) now under construction in Switzerland.

Background: The Standard Model of particle physics, developed over the last 50 years and recognized as one of *the* great scientific achievements, has been tremendously effective in predicting the behavior of all the interactions of subatomic particles except those due to gravity, and in describing the varieties of particles that combine to make everyday matter. The next step—incorporating a theory of gravity and understanding why fundamental particles have mass—will require particle accelerators that function at the trillion-electron volt ("TeV") level.

- What can we do to be a major presence at the Paris meeting?
- WGs should devise strategy at this meeting

Time to pump up the effort



- The optimistic timeline for LC operation is 2015!!!
  - How can we get there from here?
    - 2006: fund design studies
    - 2009: begin construction
  - …for us, this means:
    - 2004-2006 is the R&D period
    - 2007: TDR
    - 2009: begin detector construction
- Time is passing…we've got to amalgamate the efforts

Focus the ALCPG Efforts

- Designs have focussed on TESLA, SD, LD, isolated subdetectors
  - How do we decide on 2 ILC TDR designs?
  - We need 2 base designs which can be evaluated w/ new tools
    - establish common benchmarks
    - Can we develop a roadmap proposal for Paris?
- The simulation tools are finally here;
  - Internationally, we need to agree on standards… by Paris!!!
  - 2004 must be the year of physics/detector optimization, regardless of the technology feasibility at this time
  - Employ new analysis techniques (e.g., energy flow) within the scenario of several detector configurations … and/or …

Jim & Mark's Charge

- So we need to set c…y…
  - Even though the…logies
  - We must look c…tectors with the (new) good simulation
  - The TESLA det…e … Obvious candidate
  - I think it is fair…e other most studied detector so far… detector configuration to…
- WG leaders: please… this detector roadmap
  - Set up some way…dies, milestones
    - Plan for dete…ranularity)
    - Set benchmark physics processes
    - Establish common simulation for detectors and beam