Intro & State of the ALCPG
Arnold’s Linear Collider Physics & Detector Group

Stanford
Linear
Accelerator
Center

Jim Brau and Mark Oreglia

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

American Linear Collider
Physics Group

Mark Oreglia, SLAC LCWS, 1/7/2004
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:

Testbeams

LHC/LC Study Group

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

Cosmology WG

Mark Oreglia, SLAC LCWS, 1/7/2004
**Working Group Leaders**

**Co-chairs:** Jim Brau and Mark Oreglia

<table>
<thead>
<tr>
<th>Executive Committee</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. Carena/H. Haber</td>
</tr>
<tr>
<td>(R. Van Kooten)</td>
</tr>
</tbody>
</table>

**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

**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

**Testbeams**
- G. Fisk, J. Yu

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

**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

**Global Detector Network**
- M. Hildreth/R. Van Kooten

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

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

Mark Oreglia, SLAC LCWS, 1/7/2004
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
  - 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
• 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!!!
<table>
<thead>
<tr>
<th>Meeting/Workshop</th>
<th>Location</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCDsoft</td>
<td>NIU</td>
<td>Nov 7-9</td>
</tr>
<tr>
<td>γ collider</td>
<td>SLAC</td>
<td>Nov 21-22</td>
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<tr>
<td>LHC/LC</td>
<td>Fermilab</td>
<td>Dec 12-13</td>
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<tr>
<td>ALCPPG</td>
<td>UT-Arlington</td>
<td>Jan 9-11</td>
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<tr>
<td>LoopfestII</td>
<td>Brookhaven</td>
<td>May 14-16</td>
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<tr>
<td>LC Sim</td>
<td>SLAC</td>
<td>May 19-22</td>
</tr>
<tr>
<td>ALCPPG</td>
<td>Cornell</td>
<td>Jul 13-16</td>
</tr>
</tbody>
</table>

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 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; LC, SUSY and the Cosmos  Maury Tigner, J. Feng
March 27      Challenges of Linear Collider Damping Rings  Andy Wolski
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 recommendation by end of 2004 ... perhaps by July
  - Should LCWS be **early** 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:
  - 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

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 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)

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

### 2. Accelerator Physics

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Code</th>
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<tbody>
<tr>
<td>1. Beam Halo Monitor &amp; Instrumented Collimators (LCRD; Lucien Cremaldi)</td>
<td>2.1</td>
</tr>
<tr>
<td>2. Beam Test Proposal of an Optical Diffraction Radiation Beam Size Monitor at the SLAC FFTB (LCRD; Yasuo Fukui)</td>
<td>2.2</td>
</tr>
<tr>
<td>3. Design and Fabrication of a Radiation-Hard 500-MHz Digitizer Using Deep Submicron Technology (LCRD; K.K. Gan)</td>
<td>2.3</td>
</tr>
<tr>
<td>4. RF Beam Position Monitors for Measuring Beam Position and Tilt (LCRD; Yury Kolomensky)</td>
<td>2.4</td>
</tr>
<tr>
<td>5. Non-intercepting electron beam size diagnosis using diffraction radiation from a slit (UCLC; Bibo Feng)</td>
<td>2.5</td>
</tr>
<tr>
<td>6. Single-shot, electro-optic measurement of a picosecond electron bunch length (UCLC; Bill Gabella)</td>
<td>2.6</td>
</tr>
<tr>
<td>7. Fast Synchrotron Radiation Imaging System for Beam Size Monitoring (UCLC; Jim Alexander)</td>
<td>2.7</td>
</tr>
<tr>
<td>8. Radiation damage studies of materials and electronic devices using hadrons (LCRD; David Pellett)</td>
<td>2.9</td>
</tr>
<tr>
<td>9. BACKGAMMON: A Scheme for Compton backscattered photoproduction at the Linear Collider (UCLC; S. Mtingwa)</td>
<td>2.10</td>
</tr>
<tr>
<td>10. Ground Motion studies versus depth (LCRD; Mayda Velasco)</td>
<td>2.11</td>
</tr>
<tr>
<td>11. Investigation of GAN Techniques in the Development and Operation of the TTF Data Acquisition System (UCLC; Don Hartill)</td>
<td>2.12</td>
</tr>
<tr>
<td>12. Investigation of acoustic localization of rf cavity breakdown (LCRD; George Gollin)</td>
<td>2.15</td>
</tr>
<tr>
<td>13. RF Cavity Diagnostics and Acoustic Emission Tests (LCRD; Lucien Cremaldi)</td>
<td>2.17</td>
</tr>
<tr>
<td>14. Control of Beam Loss in High-Repetition Rate High-Power PPM Klystrons (LCRD; Mark Hess)</td>
<td>2.18</td>
</tr>
<tr>
<td>15. Research in Superconducting Radiofrequency Systems (UCLC; H. Padamsee)</td>
<td>2.19</td>
</tr>
<tr>
<td>16. RF Breakdown Experiments at 34 Ghz (UCLC; J.L. Hirshfield)</td>
<td>2.20</td>
</tr>
<tr>
<td>17. Investigation of Novel Schemes for Injection/Extraction Kickers (LCRD; George Gollin)</td>
<td>2.22</td>
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<tr>
<td>18. Ring-tuned, permanent magnet-based Halbach quadrupole (LCRD; James Rosenzweig)</td>
<td>2.23</td>
</tr>
<tr>
<td>19. Investigation and prototyping of fast kicker options for the TESLA damping rings (UCLC; Gerry Dugan)</td>
<td>2.25</td>
</tr>
<tr>
<td>20. Continuing Research and Development of Linac and Final Doublet Girder Movers (LCRD; David Warner)</td>
<td>2.26</td>
</tr>
<tr>
<td>21. Effects of Coherent Synchrotron Radiation in Linear Collider Systems (LCRD; James Ellison)</td>
<td>2.27</td>
</tr>
<tr>
<td>22. Improved simulation codes and diagnostics for high-brightness electron beams (UCLC; Courtlandt L. Bohn)</td>
<td>2.29</td>
</tr>
<tr>
<td>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)</td>
<td>2.30</td>
</tr>
<tr>
<td>24. Damping ring studies for the LC (UCLC; S. Mtingwa)</td>
<td>2.32</td>
</tr>
<tr>
<td>25. A Compact Wakefield Measurement Facility (LCRD; Young-Kee Kim)</td>
<td>2.33</td>
</tr>
<tr>
<td>26. Experimental, simulation, and design studies for linear collider damping rings (UCLC; Joe Rogers)</td>
<td>2.34</td>
</tr>
<tr>
<td>27. Undulator-Based Production of Polarized Positrons (LCRD; William Bugg)</td>
<td>2.37</td>
</tr>
<tr>
<td>28. Development of Polarized Photocathodes for the Linear Collider (LCRD; Richard Prepost)</td>
<td>2.40</td>
</tr>
<tr>
<td>29. Transverse phase-space measurements for a magnetic bunch compressor by using phase-space tomography technique (LCRD; Feng Zhou)</td>
<td>2.42</td>
</tr>
</tbody>
</table>
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; Don 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 Purshottam)...... 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 Spatial 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 Electo-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

- 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 a focus for our detector study…
  - Even though there are alternative detector technologies
  - We must look carefully at 2 complete detectors with the (new) good simulation tools
  - The TESLA detector study is very mature … Obvious candidate
  - I think it is fair to say that the SiD is the other most studied detector so far … Other detector configuration to benchmark?

• WG leaders: please consider the following in this detector roadmap
  - Set up some way to accomplish these studies, milestones
    • Plan for detector optimization (e.g., granularity)
    • Set benchmark physics processes
    • Establish common simulation for detectors and beam