CHARGE TO THE WORKSHOP

- Welcome to LCWS2004, continuing our successful series of workshops:
  - **Saariselka, Finland** - September 9 - 14, 1991
  - **Hawaii, USA** - April 26 - 30, 1993
  - **Morioka, Japan** - September 8 - 12, 1995
  - **Sitges, Spain** - April 28 - May 5, 1999
  - **Fermilab, USA** - October 24-28, 2000
  - **Jeju Island, Korea** - August 26-30, 2002
  - **Paris, France** - April 19-23, 2004

Worldwide Study of
the Physics and Detectors
for Future Linear
$e^+ e^-$ Colliders

NUMEROUS POSITIVE STEPS SINCE JEJU

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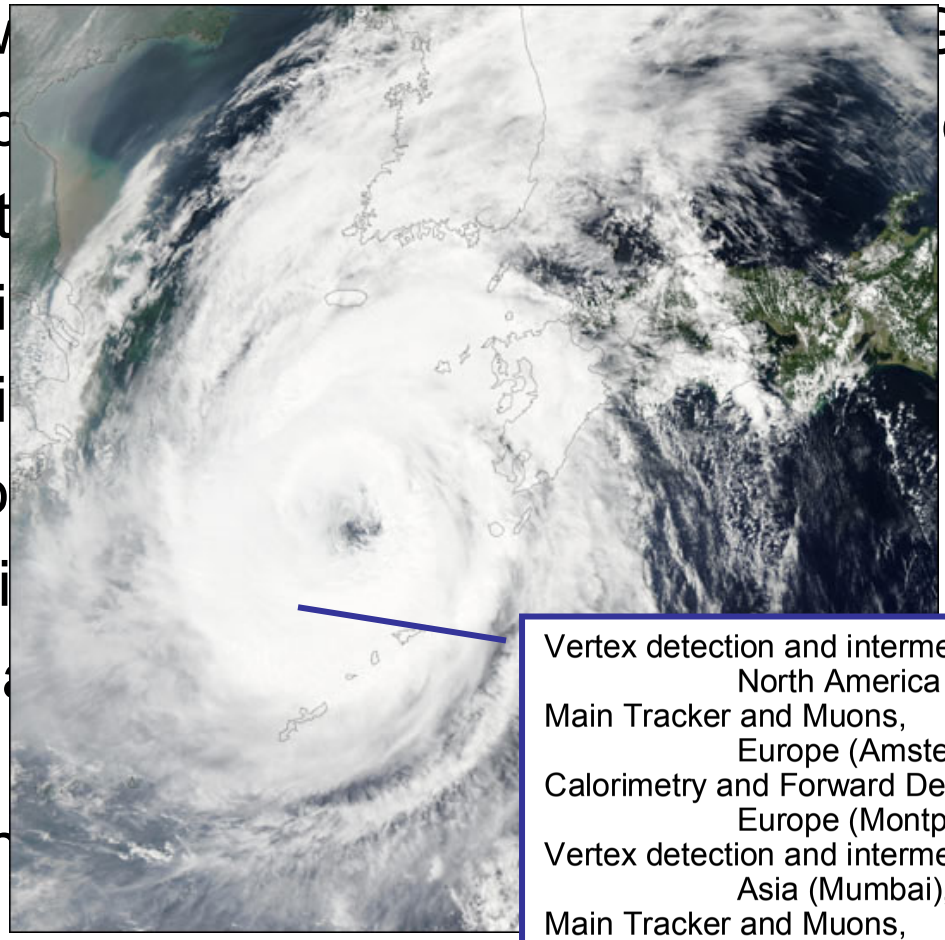


Vertex detection and intermediate tracking,
North America (Arlington), January 8, 2003
Main Tracker and Muons,
Europe (Amsterdam), March 31, 2003
Calorimetry and Forward Detectors,
Europe (Montpellier), November, 2003
Vertex detection and intermediate tracking,
Asia (Mumbai), December, 2003
Main Tracker and Muons,
North America (SLAC), January, 2004

NUMEROUS POSITIVE STEPS SINCE JEJU

- ILC-TRC completed technical review of accelerator concepts and R&D requirements - 2003
- Statement from Meeting of OECD Science Ministers - Jan 2004
  - Recognized next project is LC and concurrent running with LHC is needed
- ICFA/ILCSC launched the technology down-select (International Technology Recommendation Panel)
  - ITRP chair Barry Barish will speak Tuesday afternoon
- Global Design Initiative has been proposed by ILCSC Task Force – to carry to CDR, TDR and possibly beyond
  - ILCSC chair Maury Tigner will report today

STEADY PROGRESS IN REGIONS

- **Nov 2001**
  - German Science Council supported science goals of TESLA
  - urged project to develop international funding and cooperations

- **Feb-Sep 2003**
  - JLC renamed GLC
  - GLCTA project started
  - Roadmap report 'GLC project'

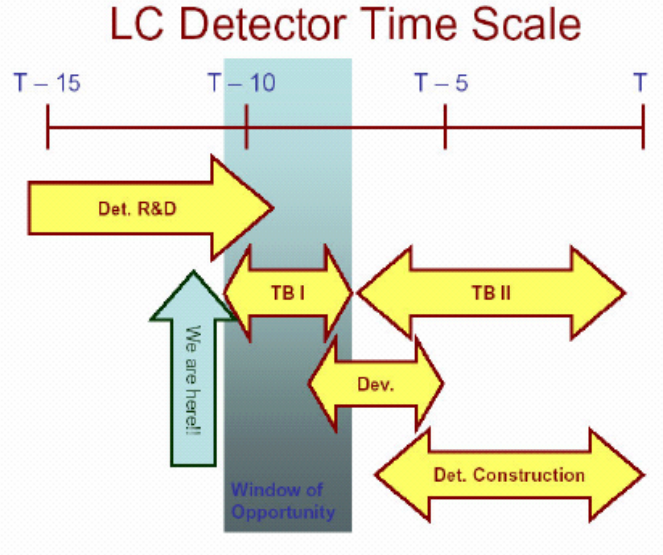
- **Nov 2003**
  - US DOE Office of Science Future Facilities Plan
  - LC is first priority mid-term new facility for all US Office of Science

OUR RESPONSIBILITIES

- Refine the physics case
- Develop the experimental plan and technologies
- Plan for moving toward experimental collaborations

OUR TIMELINE

- We are now passing through a precious period of time for creativity. (“Window of Opportunity”)
- It may <u>seem too early</u> for certain steps now, but before long it will <u>be too late</u>.



Graphically summarized by Jae Yu

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

INTERNATIONAL SCOPE DOCUMENT

- BASELINE MACHINE
  - E_{CM} of operation 200-500 GeV
  - Luminosity and reliability for 500 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_{CM} down to 90Gev for calibration
- UPGRADES
  - E_{CM} about 1 TeV
  - Allow for ~1 ab^{-1} in about 3-4 years
- OPTIONS
  - Extend to 1 ab^{-1} at 500 GeV in ~ 2 years
  - e^-e^-, $\gamma\gamma$, $e^-\gamma$, posi-pol
  - Giga-Z, WW threshold

Parameters for the Linear Collider

September 30, 2003

http://www.fnal.gov/directorate/icfa/LC_parameters.pdf

ITRP QUESTIONS

- The International Technology Recommendation Panel has posed two physics questions:
  - 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?
- Co-chairs propose that the World-wide study prepare answers this week to these questions to be given to ITRP at SLAC next week.
- Discuss this in organizing committee meeting today.
  - **Note – "Quantum Universe" released today to HEPAP expresses uniqueness of Linear Collider relative to LHC**

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?

ILCSC/ICFA REQUEST TO THE WORLD WIDE STUDY

At their February meetings, ILCSC and ICFA asked us to propose, in parallel with the Global Design Initiative for the LC machine, an *organisation* which will do three separate jobs:

1. Ensure that at least two different detector concepts are developed; by worldwide teams which will:
- prepare CDR(s) on concepts, by ~2006;
- the cores of the collaborations should have formed when funding is in place and bids are called for.

2. Encourage and coordinate inter-regional R&D on essential detector technologies, and give peer-reviewed recognition to nationally funded R&D programmes as part of the worldwide project.

3. Make sure that vital questions of machine-detector interface and beamline instrumentation are as fully supported as accelerator and detector R&D. This will involve close links with the GDI.

ILCSC/ICFA REQUEST TO THE WORLD WIDE STUDY (cont.)

The WWS Organising Committee* will meet this lunchtime for a first discussion of what to propose.

The suggestions will be reported and discussed in the Thursday afternoon plenary.

The OC will prepare a draft response to ILCSC/ICFA at their Friday lunchtime meeting.

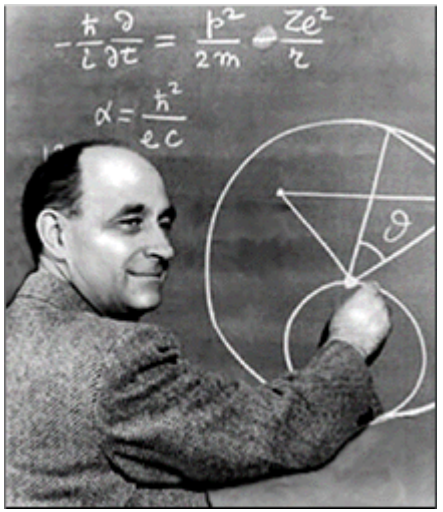
What do you think we should propose?

* ***Jim Brau, David Miller, Hitoshi Yamamoto; Paul Grannis, John Jaros, Dean Karlen, Mark Oreglia, Ritchie Patterson, Akiya Miyamoto, Atul Gurtu, JooSang Kang, ChangGen Yang, Wei-Shu Hou, Tiziano Camporesi, Michael Danilov, Rolf Heuer, Francois Richard, Ron Settles***

REVIEWS ON FRIDAY

- We have asked the review speakers on Friday to present talks which review the state of each topic, rather than the traditional review of what was presented at this particular workshop

- This program of talks should be an informative overview of the state of our efforts



PHYSICS STUDIES

- full draft LHC/LC Study Report is circulating
  - Congratulations and thank you to many contributors, and especially Georg Weiglein
- Connections to Cosmology
  - Working group launched this year in N. America
    - Led by J. Feng and M. Trodden
  - Here at LCWS2004 a task force has been charge to involve the physics groups in thinking and developing this topic;
    - Mark Trodden, Nobuchika Okada, Abdelhak Djouadi
  - please contribute to this important effort
  - Mark Trodden will speak on this topic at Wed afternoon colloquium:
    - *Why does Cosmology need results from a Linear Collider?*

PHYSICS STUDIES

- Other special colloquia this week
  - Tuesday afternoon

    The need for Precision Measurements

    Ed Witten

  - Thursday afternoon

    Energy Flow and Particle Flow

    Henri Videau

ACCELERATOR TECHNOLOGY THIS WEEK

- Progress on the Technologies
  - Today – reports on X-Band (Kubo/Markiewicz),
    Cold RF (Pagani), and CLIC (Delahaye)

- Technology Options
  - Today - Warm/cold comparison study in US (Dugan)
    - European thoughts on tech. options (Wagner)
  - Thursday afternoon – Plenary discussion

- ILCSC activities
  - Today – Maury Tigner, chair's report
  - Tue afternoon – Barry Barish, ITRP chair

OUTREACH

- Report by Phil Burrows on our activities in the regions
  - And how we can do better?

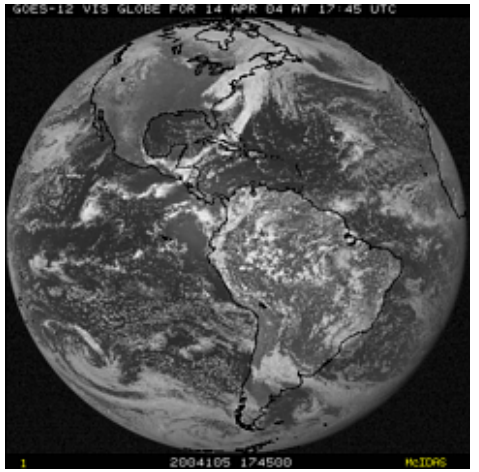
- Public release of the “consensus document” this week
  - Over 2600 signatories!

- Exhibition on Saturday at Palais de la Découverte on High Energy Physics Accelerators.

  - Welcome cocktail this evening at Palais de la Découverte

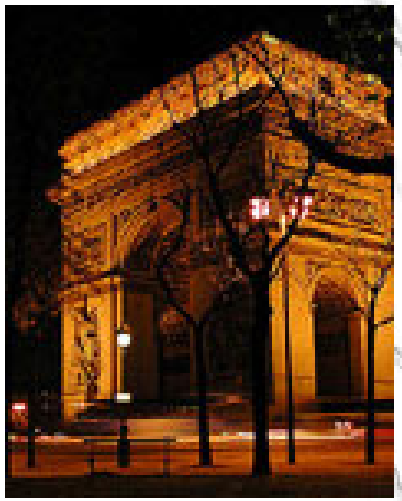
LCWS 2005

- It has been 19 months since LCWS2002 - August, 2002 on Jeju Island
- When should the next meeting occur?
  - Soon after the technology decision?
  - Late Spring 2005, or Fall 2005?
- The next meeting will be in North America
  - Fermilab and SLAC have each expressed strong interest in hosting
  - But date needs to be determined before we can move ahead with host selection



CONCLUSION

- We have a great adventure ahead, but it will only be realized by hard work, coordinated world-wide
- We are making good progress
- Keep it going



We are grateful to our hosts for inviting us to Paris in the Springtime