Summary Remarks

2005 INTERNATIONAL
LINEAR COLLIDER WORKSHOP

Stanford, California, USA 18-22 March, 2005

By Jonathan Dorfan

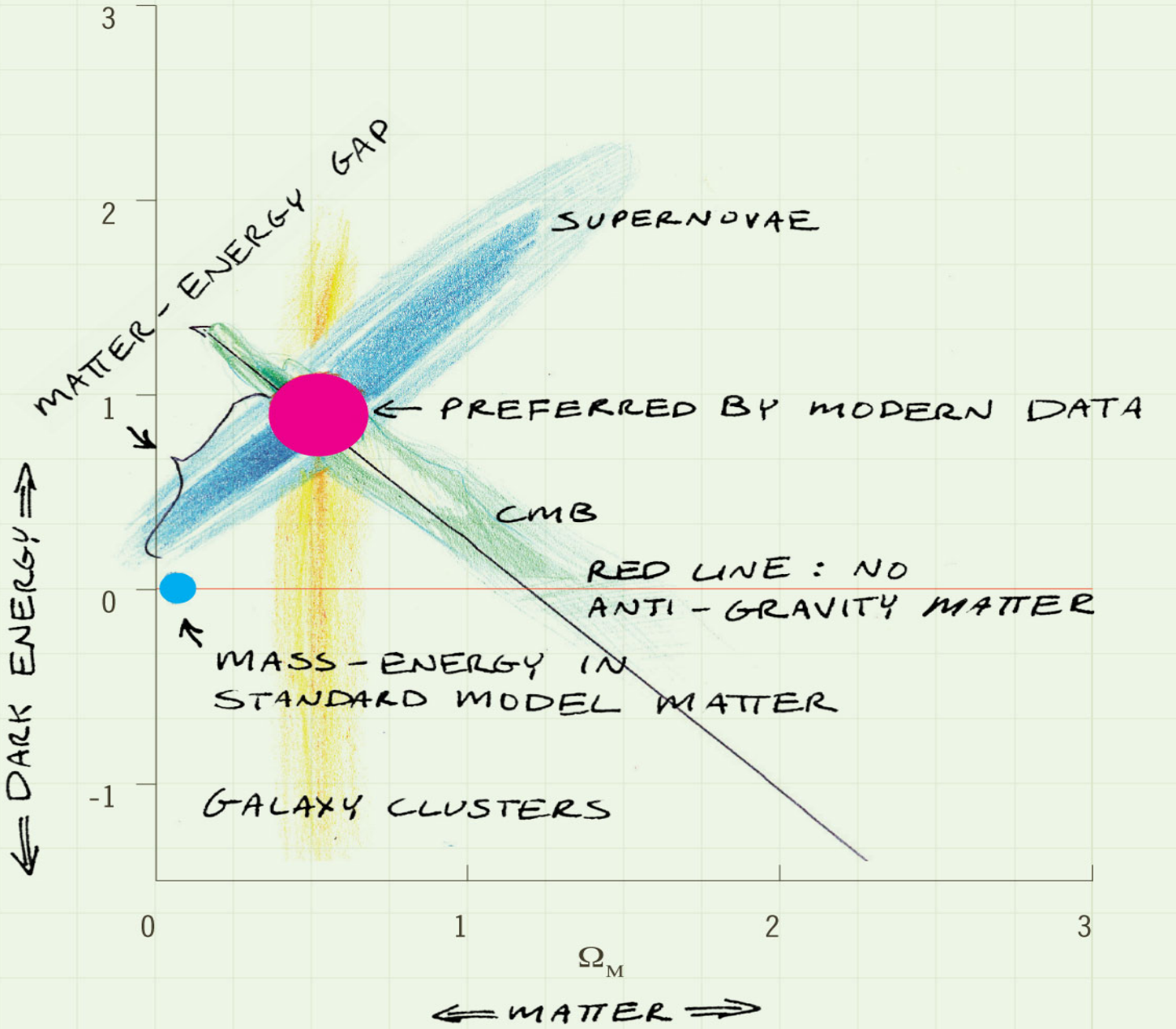
We Are Living In a Remarkable Time – We Stand at the Door to a A scientific Revolution

- **Discoveries of the past five years present us with an entirely new picture of our Universe – one for which we lack answers to leading questions:**
  - **What is the nature of the Universe and what is it made of?**
  - **What are matter, energy, space and time?**
  - **How did we get here and where are we going?**
- **While we have many remarkable theoretical models, we are without a comprehensive theoretical understanding of what we observe. Progress must come from experimental discoveries**
  - **Scientific Revolution in the Making**
  - **Have the tools now or in the near future to make the discoveries**

The data taken recently tell us that the total matter-energy content of the Universe must include invisible dark matter that holds the universe together and a mysterious dark energy that pushes the Universe apart

5% Visible Matter

95% Dark Energy and Dark Matter


3
2
1
0
-1
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1
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3
MATTER - ENERGY GAP
SUPERNOVAE
PREFERRED BY MODERN DATA
CMB
RED LINE : NO
ANTI - GRAVITY MATTER
MASS - ENERGY IN
STANDARD MODEL MATTER
GALAXY CLUSTERS
⇐ DARK ENERGY ⇒
Ω_M
⇐ MATTER ⇒

Borrowed From Joe Lykken ……

this is a special time in particle physics

- urgency: provocative discoveries lead to urgent questions
- connections: questions appear to be related in fundamental but mysterious ways -> big ideas are in play
- tools: we have the experimental tools, technologies and strategies needed to tackle these questions

conclusion:

we are seeing a scientific revolution in the making

Accelerator-Based Experiments Remain Crucial!

- **LHC turn-on is imminent – with its large energy reach, the LHC will pry open the discovery door and lay the foundation of our understanding**
- **But the terrain is vast and uncharted, and one energy-frontier probe alone will not suffice to unlock all the mysteries**
- **It will take additional tools to make the complementary discoveries needed to fully understand our Universe …… the ILC is one such partner, and it will be essential**
- **The HEP community has made enormous strides this past year, both in the machine and detector arenas, towards realizing a unified, international design for the ILC**

ILC Milestones

1988 Operation of the SLC begins

1994 ILC Tech Review Committee formed by R&D labs.

1995 ILC-TRC standardizes parameters and definitions.
Six technology options pursued world-wide

1999 ICFA endorses TeV Linear Collider

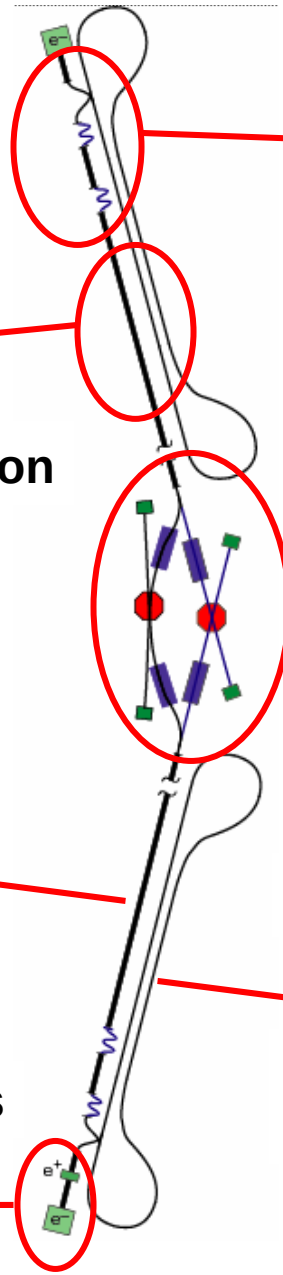
2002 ICFA establishes International Linear Collider Steering Committee.
ICFA commissions second ILC-TRC Report

2003 ILC-TRC concludes X-band and Superconducting technologies ok for ILC.
International Technology Recommendation Panel (ITRP) established

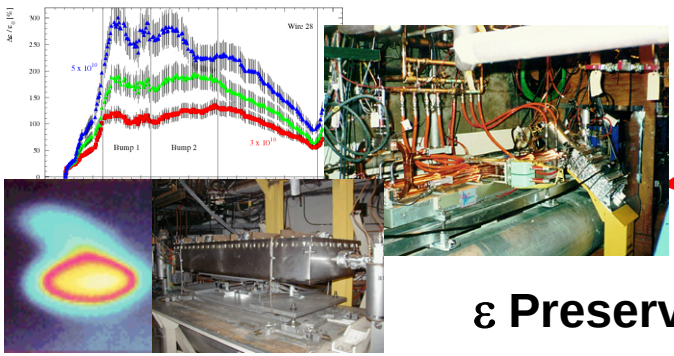
2004 ITRP recommends the cold technology for the ILC in August
First ILC workshop, October at KEK, second in Snowmass this Summer

2005 GDE has been launched with Barish as Director.
Detector Community's Decisions & Timeline Coordinated with Machine

Test Facilities at DESY, KEK, and SLAC



SLC, FFTB, ASSET, E-158

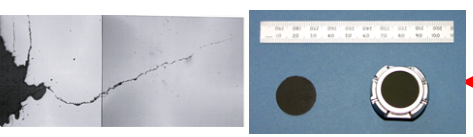


ε Preservation

Test Accelerator

Linac

SLC, E-158



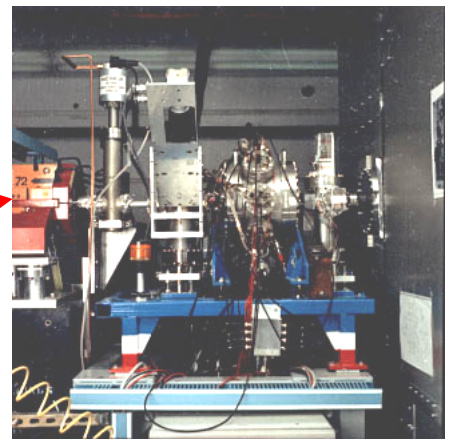
e+ / e- Sources

Bunch Compression

SLC and FEL's

SLC and FFTB

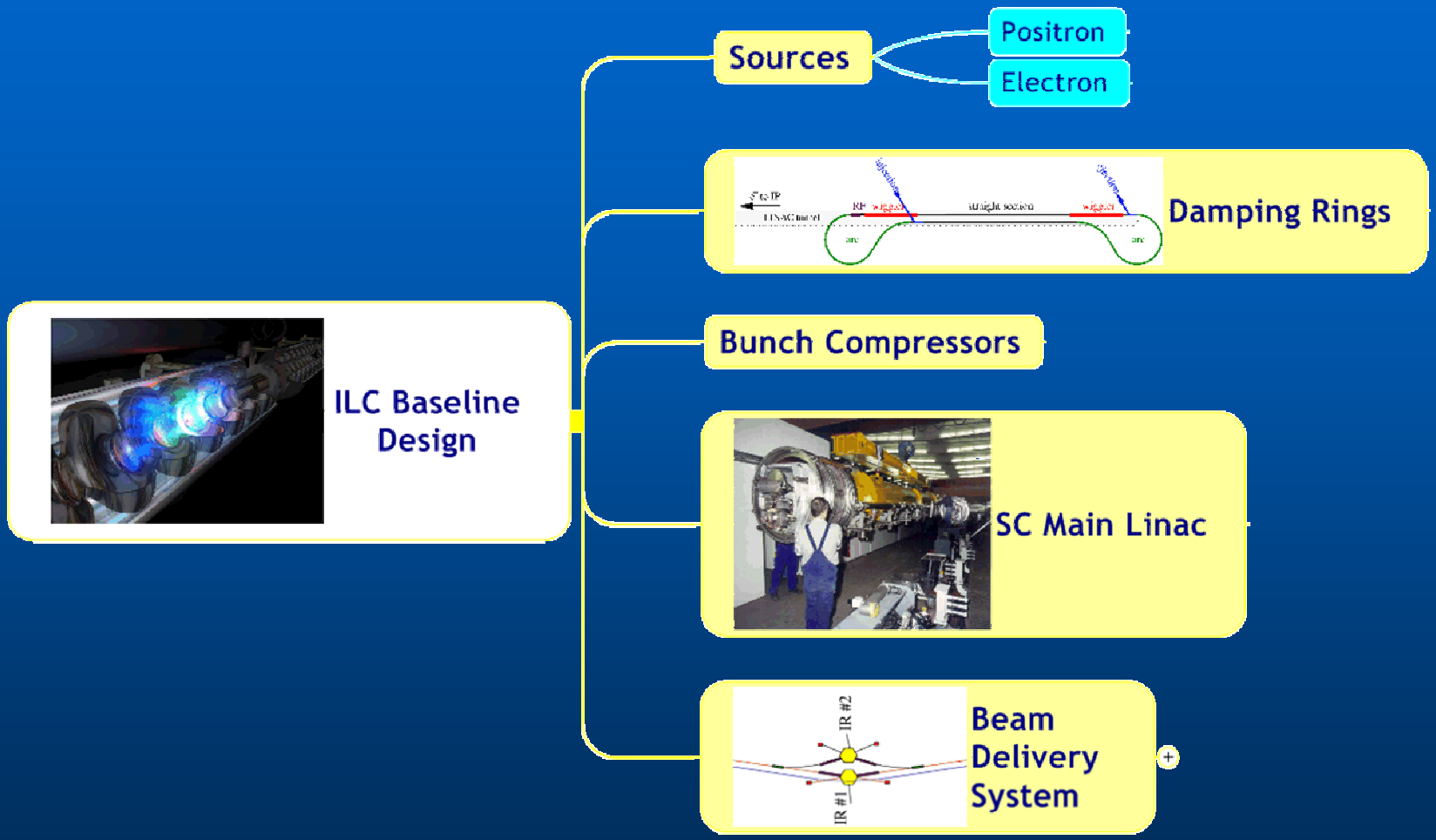
BDS & IR



ATF, 3rd Gen Light Sources, SLC

Damping Rings

Towards the ILC Baseline Design



Decisions to be Made!

LCWS History

(Organized by WWS)

1. **Saariselka, Finland** - September 9 - 14, 1991
2. **Hawaii, USA** - April 26 - 30, 1993
3. **Morioka, Japan** - September 8 - 12, 1995
4. **Sitges, Spain** - April 28 - May 5, 1999
5. **Fermilab, USA** - October 24-28, 2000
6. **Jeju Island, Korea** - August 26-30, 2002
7. **Paris, France** - April 19-23, 2004
8. **Stanford, USA** - March 17-23, 2005

International activities on LC physics/detector are intensifying :

Every 2yrs → Every 1.5 yrs → Every <1 yr

Detector Timeline by WWS

Timed to machine benchmarks

(2004) ITRP tech. recommendation	Set up 3 panels (detector R&D, MDI, and costing)
(2005) Accelerator CDR	~ spring 2006, “Detector outline documents” submitted to WWS by concept teams
(2007) Accelerator TDR	WWS receives a detector CDR from each concept team
(2008) LC site selection	Collaborations form and submit LOIs for proposal to the global lab
Site selection + 1yr	Global lab selects experiments.

Detector Concept Studies

- SiD
  - Silicon tracker, 5T field
  - SiW ECAL
  - 4 ‘coordinators’:

    J. Jaros, H. Weerts, H. Aihara, Y. Karyotakis

- “LDC”
  - TPC, 4T field
  - SiW ECAL (“medium” radius)
  - 6 ‘contact persons’:

    T. Behnke, H. Videau, D. Karlen, M. Battaglia + 2 from Asia being selected.

- “GLD”
  - TPC, 3T field
  - W/Scintillator ECAL (“large” radius)
  - 6 ‘contact persons’:

    H.B. Park, H. Yamamoto+ 4 from Americas/Europe being selected.

Keep Up The Pace!!

- **HEP Community is to be congratulated on the manner in which it has approached the challenge of the ILC by federating its international effort**
  - **Much remains to be done, both technically and in making the scientific case**
- **Funding Agencies are alert to our efforts and they are doing their part by actively supporting the R&D to realize a ILC design**
- **Keep up the momentum -- the scientific imperative is compelling**