International Linear Collider
at Stanford Linear Accelerator Center

SLAC, the ILC, and the SMTF

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SLAC and the Technology Choice

When bad things happen …

- Denial
- Depression
- Awaking
- Recovery
- Strengthened by the experience. ← SLAC is moving on.

Moving On

This Talk

SLAC and the ILC

SLAC and the SMTF

Some DLB Observations and Conclusions

SLAC and the ILC

Strong team of accelerator physicists and engineers able to design, analyze the technical needs, and define the functional requirements for all systems and components.

- Beam Dynamics, Optics, Component and System Performance, Operations, Availability and Reliability, Conventional Facilities.

Experience with SLC, FFTB, ATF, and PEP-II.

Strong international relationships (KEK, DESY, CERN, BINP) built over many years of collaboration.

Domestic collaboration on NLC R&D (BNL, Fermilab, LBNL, LLNL, and U.S. universities).

SLAC and the ILC

The Main Linac

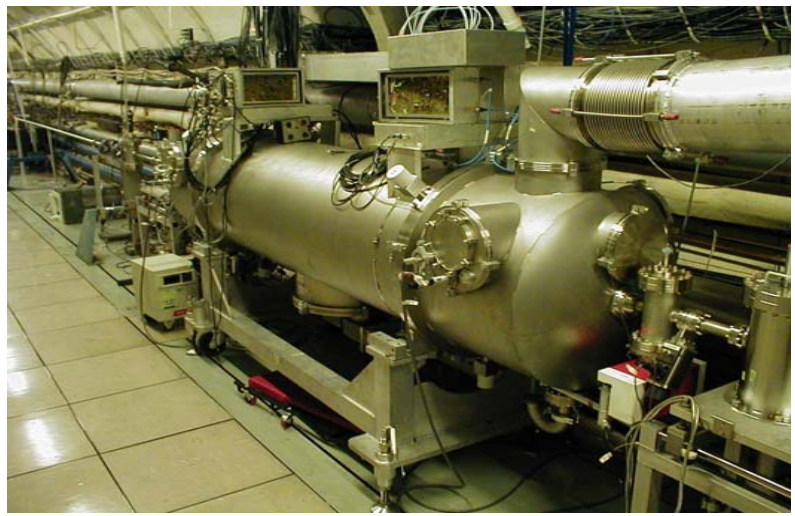
The RF system … modulator, klystron, distribution, LLRF and controls.

Participation in global engineering and design of next-generation ILC cryomodule.

- Cavity and magnet alignment and stability; beam operations and tuning. E.g. HOM measurements at TTF (M. Ross, N. Baboi).
- SLAC Cryogenics Group (J. Weisend, et al.)

Stanford Pico-Second IR-FEL Facility

Pairs of TESLA (ACCEL) cavities operating at 10 MV/m CW.



SLAC and the ILC

Sources and Injector Systems

- Electron polarization ≥ 85% (SLC and E-158).
- “Conventional” e+ source option (SLAC-LLNL).
- Polarized e+ demonstration (E-166: Cornell-DESY-SLAC-et al.).

Damping Rings

- Kicker development (SLAC-LLNL-Bechtel).
- ATF, ALS, and PEP-II experiments (KEK-LBNL-SLAC).
  - IBS, Fast Ion, and Electron Cloud.

Bunch Compressor

- Possible prototype at ATF.
- Two-stage option design.

SLAC and the ILC

Beam Delivery and IR

- SLC, SLD, and FFTB experience.
- Collimator wakefield measurements (Wake Test Facility).
- SLAC linac test beams (ESA).
  - IR and Extraction Line instrumentation.

Instrumentation, Control (Feedback), and Operations

- SLC, FFTB, and PEP-II experience.
- On-going ATF experimental program.
  - Nano-Beams Collaboration
  - Upgraded kicker to allow extraction of ILC bunch structure.

Conventional Systems

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SLAC and the SMTF

SLAC fully supports and will be a major player in the ILC part of the SMTF.

SLAC does not propose to establish facilities for cavity preparation or cryomodule assembly.

SLAC will participate in the global team that will develop the ILC cryomodule design.

SLAC is looking at a range of possible contributions to the SMTF … Design (certainly), RF sources (a natural), LLRF and controls.

→ Looking forward to discussions at this meeting.

This Talk

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SLAC and the SMTF

Some DLB Observations and Conclusions

Some Observations

The highest priority ILC R&D goal (world-wide) is completion and test of an ILC-spec cryomodule (35 MV/m with Lorentz compensation).

Critical world-wide need for a dedicated ILC Test Accelerator.

DESY and the VUV-FEL (TTF II)

- TESLA Collaboration Meeting at Orsay → Helen's Talk
- DLB Conclusions

DESY Actions (on ILC)

- Actions will mostly be specific to LINAC technology
- Goals:
  - Participation in the implementation / construction of one or more SRF Module Test Facilities (wherever they are built) for testing LC-type prototype cryomodules
  - This facility should support the rapid transition from the TTF Cryomodule (CM) → LC CM
  - Participation in large scale industrialisation in all three world regions (in Europe this process was begun with the TESLA TDR, and its continuation is now funded through the EU FEL Design Study and the XFEL project)
- TESLA collaboration can supply TTF-like CM with 35MV/m cavities with current infrastructure/manpower/expertise (some additional resources are needed)
  - in parallel / synergy with XFEL preparation
  - to be shipped to new LC test facility

(A. Wagner, TESLA Collaboration at Orsay)

Schedule Until 2007

Saturation in wavelength range 30-120 nm	July 2005
User operation (extended period)	
Operation with long bunch train	Dec. 2005
User operation (extended period)	
3rd Harmonic RF system and ACC6 installed	Feb. 2006
1 GeV beam energy	April 2006
Saturation 6 nm	June 2006
User operation (extended period)	
Seeding Option installed	Dec. 2006
Seeding demonstration	April 2007

(ACC6: TTF cryomodule with 35 MV/m cavities.)

(H. Weise, TESLA Collaboration at Orsay)

Cryomodule Status

modules	cavities	Cold mass + v-vessel	tuners	magnets	He-vessels	BPM	Main Couplers
Total Available now	30	1 type II 1 type III	17	2 TTF 1 TESLA	20 type III		40
6			piezos			?	
7	Old?	Sstruct	piezos		8 II	?	
8				XFEL Type ?	4		
9	2			XFEL-type ?	8		

(B. Petersen, TESLA Collaboration at Orsay)

TESLA Collaboration Role

- TESLA collaboration/DESY role:
  - A large part of XFEL preparatory work & R&D is directly applicable (transferable) to LC
    - industrialisation
    - cavity production
    - Klystrons & RF distribution
    - LLRF, tuners etc.
    - cryoplants
    - reliability
  - ~30% TTF-II beam time available for LC work
    Note: **100% of time** will provide invaluable experience for a future cold LC, especially the ~40% stable operation of FEL users
- Will integrate interested LC collaborators in this process

(A. Wagner, TESLA Collaboration at Orsay)

DLB Conclusions

European Message at Face Value

DESY committed to light-user community: VUV-FEL, XFEL, PETRA-3.

Synergy or conflict with ILC will require attention.

Focus is on engineering and production.

European ILC initiatives will come through EU programs.

A cryomodule from DESY for the SMTF at Fermilab is a couple years away.

Completion of a CDR by the GDE in 2006 with sufficient test and operation of a baseline ILC rf system and cryomodule will require careful planning and strong focus by the international community.