



NLC News -

Vol. 2, No. 12 December 2001

Director's Corner

David L. Burke

This coming February, SLAC will host LC02, the 9th **International Workshop on Linear Colliders** (*). The 'LC' series of workshops began at SLAC in 1988 as construction of the SLC came to an end, and the first "linear collisions" were taking place. The workshop has since been hosted on a rotating basis in the U.S., Japan, Russia, and Europe:

1988	LC88	SLAC
1990	LC90	KEK
1991	LC91	Protvino
1992	LC92	Garmisch
1993	LC93	SLAC
1995	LC95	KEK
1997	LC97	Zvenigorod
1999	LC99	Frascati

These workshops are known for vigorous exchange of ideas and information, and forthright but collegial evaluation of design and technology. Many advances and new concepts now part of the NLC baseline originated in 'LC' working groups convened from the world's leading accelerator scientists and engineers. And many an expert has met a match in the open and challenging 'LC' environment. We will strive to maintain this richness as we welcome the global accelerator community to SLAC.

Another group that will be hard at work during LC02 is the International Linear Collider Technical Review Committee (ILC-TRC) chaired by Greg Loew of SLAC. This group was formed in 1994 to review and collect into a common language and format the parameters and design choices of the various linear collider R&D collaborations. It issued its first report in 1995, and until recently maintained updated information on its web site: <http://www.slac.stanford.edu/xorg/ilc-trc/ilc-trchome.html>. The TRC is now engaged in a major review with plans to release a new report in the Fall of 2002. This task, set into motion by a charge from the International Committee on Future Accelerators (ICFA), is widely seen as a first "fact-finding" step towards an international decision on technology and joint design of a TeV-class linear collider. The NLC is well represented on the TRC.

Seasons greetings, and the best for the New Year to you all.

[(*) LC02, February 4-8, 2002; <http://www-project.slac.stanford.edu/lc02/>].

7th International Study Group Meeting

Nan Phinney

The 7th International Study Group meeting (ISG7) was held at KEK from November 12-15, 2001. The spring ISG meeting was not held this year because of the Snowmass workshop in June so this was the first ISG meeting since last November. In the interim, a 500 GeV cms linear collider has received strong endorsement from all three regions of the world in statements issued by ACFA, ECFA and the HEPAP Subpanel. Both the NLC and JLC groups enthusiastically embraced the opportunity to reinvigorate their collaboration. In particular, there were many animated discussions exploring possible ways to share resources for future high-power rf testing. After the opening plenary session, the participants separated into two working groups on luminosity and energy. The luminosity group covered parameters, injection, damping rings and beam dynamics. The energy group covered all aspects of rf power creation, handling and consumption.

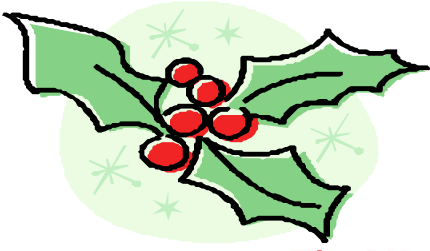
In the almost two years since the ISG Progress Report was published in the spring of 2000, the JLC and NLC groups had adopted slightly different approaches to the beam parameters and X-band rf configuration based on their assessment of R&D successes and challenges. An important topic for both working groups was to

understand and discuss these differences.

The 2000 ISG Report presented an operating plane of parameters and two options for higher luminosity. The luminosity group decided to merge these into a single design parameter set given in Table 1. The bunch train now consists of 192 bunches of $0.75 \cdot 10^{10}$ particles separated by 1.4 ns. Assuming a smaller emittance from the damping rings and slightly less emittance dilution through the linacs, the JLC/NLC has a design luminosity of $2\text{-}3 \cdot 10^{34}/\text{cm}^2/\text{s}$, depending on the repetition rate assumed for the U.S. or Japan. It is also possible to deliver the same luminosity with lower current, $0.65 \cdot 10^{10}$ per bunch, and a smaller IP beta function.

The NLC and JLC groups have worked closely together for years on the design and fabrication of the X-band structures, both on techniques for wakefield suppression and more recently on the high gradient damage problem. For the power generation and distribution, they have chosen different configurations, although both have solid-state IGBT-based modulators, 75 MW PPM klystrons and a Delay Line Distribution System (DLDS). Since either solution can lead to a successful implementation of the necessary power sources, the final choice will be based on R&D results and cost optimization. In the short term, development of both designs will allow physicists to continue to understand more fully the advantages and tradeoffs.

	Stage 1		Stage 2	
CMS Energy (GeV)	500		1000	
Site	US	Japan	US	Japan
Luminosity (10^{33})	20	25	30	25
Repetition Rate (Hz)	120	150	120	100
Bunch Charge (10^{10})	0.75		0.75	
Bunches/RF Pulse	192		192	
Bunch Separation (ns)	1.4		1.4	
Eff. Gradient (MV/m)	48.5		48.5	
Injected $\gamma\epsilon_x / \gamma\epsilon_y$ (10^{-8})	300 / 2		300 / 2	
$\gamma\epsilon_x$ at IP (10^{-8} m-rad)	360		360	
$\gamma\epsilon_y$ at IP (10^{-8} m-rad)	4		4	
β_x / β_y at IP (mm)	8 / 0.11		13 / 0.11	
σ_x / σ_y at IP (nm)	243 / 3.0		219 / 2.3	
θ_x / θ_y at IP (nm)	32 / 28		17 / 20	
σ_z at IP (um)	110		110	
Yave	0.14		0.29	
Pinch Enhancement	1.51		1.47	
Beamstrahlung δB (%)	5.4		8.9	
Photons per e+/e-	1.3		1.3	
Two Linac Length (km)	12.6		25.8	



*The NLC Project Team
wishes you and your families
a Happy Holiday Season
and
a New Year of Peace and Plenty*



Recent Linear Collider Publications
If you would like to have an NLC-related paper listed, please send information to amlarsen@slac.stanford.edu

I. Linear Collider Collaboration Notes
http://www-project.slac.stanford.edu/lc/ilc/TechNotes/LCCNotes/lcc_notes_index.htm
LCC-0076, "Transportation Lines for the NLC Damping Rings," Andrzej Wolski, November 2001.

LCC-0077, "Summary of LBNL/SLAC Design Work on NLC Magnets, November 2000 to October 2001" Jin-Young Jung, December 2001.

II. Other Reports
Czarapata, Paul, et al., "Status Report of the Inter-Laboratory Task Force on Remote Operation," SLAC-R-583, November 2001.

Calendar of Upcoming Events

Conferences of Interest

Physics and Detectors for the Linear Collider, University of Chicago Gleacher Center, Chicago, IL, Jan. 7-9, 2002, <http://LCworkshop.uchicago.edu>

LC02, 9th International Workshop on Linear Accelerators, CA, February 4 - 8, 2002, at SLAC. For information <http://www-project.slac.stanford.edu/lc02/> or IC02@slac.stanford.edu.

8th European Particle Accelerator Conference, June 3-7, 2002, Paris, France.

Corrigendum:

In last month's article by Maruyama and Clendenin, the units for pulse energy appeared as mJ. The correct unit is μJ .

