



ARLINGTON LINEAR COLLIDER WORKSHOP

January 9 –11, 2002

Beam Instrumentation/Interaction Region Working Groups Agenda

4:00 - 6:00 Thursday January 9th

IP Beam Instrumentation Overview	E. Torrence	10'
TESLA Machine-Detector Interface	K. Buesser	20'
Lausanne beam energy mini-workshop	M. Hildreth	15'
Beamstrahlung detector	G. Bonvicini	15'
Fast Gas Cerenkov Calorimeter	E. Torrence (for O. Atramentov)	15'
Luminosity Spectrum	D. Miller	15'
Beam Instrumentation Working Group discussion	All	30'

8:30 - 10:30 Friday January 10th

Beam Diagnostics for test facilities of i) γ-γ, ii) polarized e^+ source	M. Woods	15'
Beam Delivery System Simulation and Detector Backgrounds	T. Maruyama	15'
Simulation of Quadrupole Synchrotron Radiation in the MatLiar Environment	S. Hertzbach	15'
Feedback on the NanoSecond Timescale - First Results from NLCTA	P. Burrows	15'
TRC Report on Machine-Detector Interface	T. Raubenheimer	20'
IR Working Group Discussion	All	40'



January 9 –11, 2002

Beam Instrumentation Working Group Report

D. Cinabro
Wayne State University

E. Torrence
University Of Oregon

M. Woods
SLAC

Working Group homepage: <http://www.slac.stanford.edu/~torrence/ipbi/>



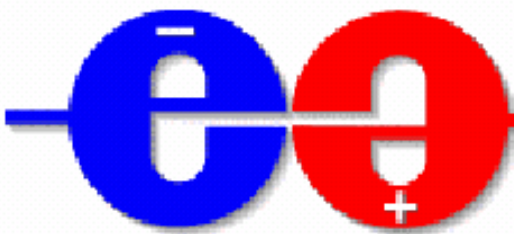
Beam Instrumentation (L, E, P)

Working Group Report

WG Scope \rightarrow Beam Instrumentation required for LC Physics

Principle Topics (L, E, P)

- Luminosity, luminosity spectrum (dL/dE)
- Energy scale and width
- Polarization



Beam Instrumentation (L, E, P)

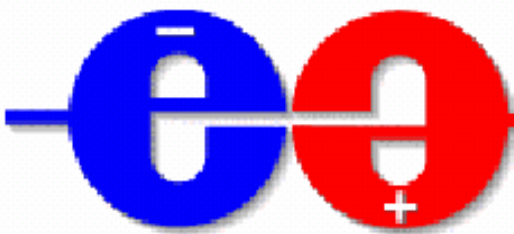
Working Group Report

“BI White Paper” in progress (complete this month; ongoing)

- Physics requirements for L, E, P measurements
 - Input needed from physics groups
 - Discussion at this meeting in Precision Electroweak and New Physics WGs
- ‘Strawman’ proposal for instrumentation

“Polarization” Paper to be written in next ~6-9 months

- Co-ordinated by Gudi Moortgat-Pick (POWER group)
- Joint effort by Japanese, American and European ‘editors’
- American ‘editors’: J. Sheppard, M. Woods,
U. Nauenberg, T. Rizzo, H. Steiner
- Physics impact of polarized electron and polarized positron beams
- Machine issues and polarimetry



Beam Instrumentation (L, E, P)

Working Group Report

Additional studies needed for dL/dE determination

- Talk by D. Miller plus much discussion at this meeting in IPBI, Precision EWeak and New Physics WGs

Correlations between L, E and their dependence on x, y, z, E of colliding particles

$L(x, y, z, E)$

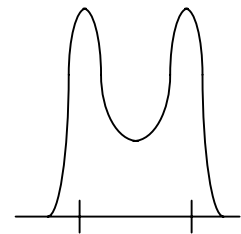
- offsets, beamstr., chromatic effects

$E(x, y, z)$

- dispersion, head-tail ‘horns of the devil’

Other: effects of disruption angles on acolinearity angle, final state beamstrahlung

acolinearity analysis may benefit from beam diagnostics



Energy Mini-workshop held in conjunction with Nanobeam 2002

- Talk by M. Hildreth at this meeting



Beam Instrumentation (*L,E,P*)

Working Group Report

R&D Proposals to DOE and NSF

\$170K requested in FY03

Luminosity

Fast Gas Cherenkov Calorimeter (Iowa St.)*

Luminosity Monitor (Iowa)

Large Angle Beamstrahlung Monitor (Wayne St.)*

3d Si Detector for Pair Monitor (Hawaii)

Energy

Extraction Line design for WISR D (U. Mass)

WISR D Detector design (Oregon)

rf BPM Spectrometer (Notre Dame)

Polarization

Quartz Fiber Calorimeter (Iowa)

Background Study (Tufts)

*talk presented at this meeting

NLC - The Next Linear Collider Project



**Beam Delivery &
Interaction Region
Highlights
Since Santa Cruz Meeting**

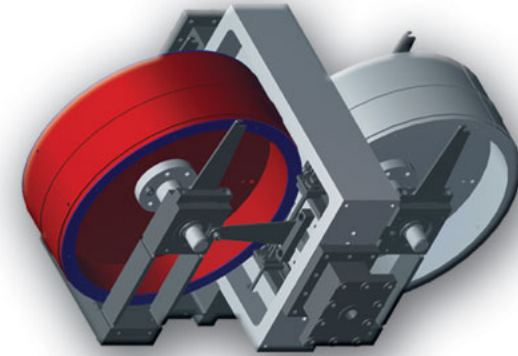
Tom Markiewicz/SLAC

11 January 2003

Arlington, Texas

Design Updates

Collimation Task Force Workshop at SLAC



- **“Collimation Task Force”** (T. Maruyama talk)
 - Review of spoiler/absorber aperture settings and recalculation of halo transmission, muon production, SR loads and apertures
 - CTF mini-workshop
 - Backup publication to TRC MDI chapter
- **Assembly of files of background events**
- **GEANT4 vs. GEANT3 tests (w/U.Tokyo) ongoing**
- **Tools for Background studies** (talk by S. Hertzbach)
 - ex. QSRAD, GuineaPig in MatLiar environment

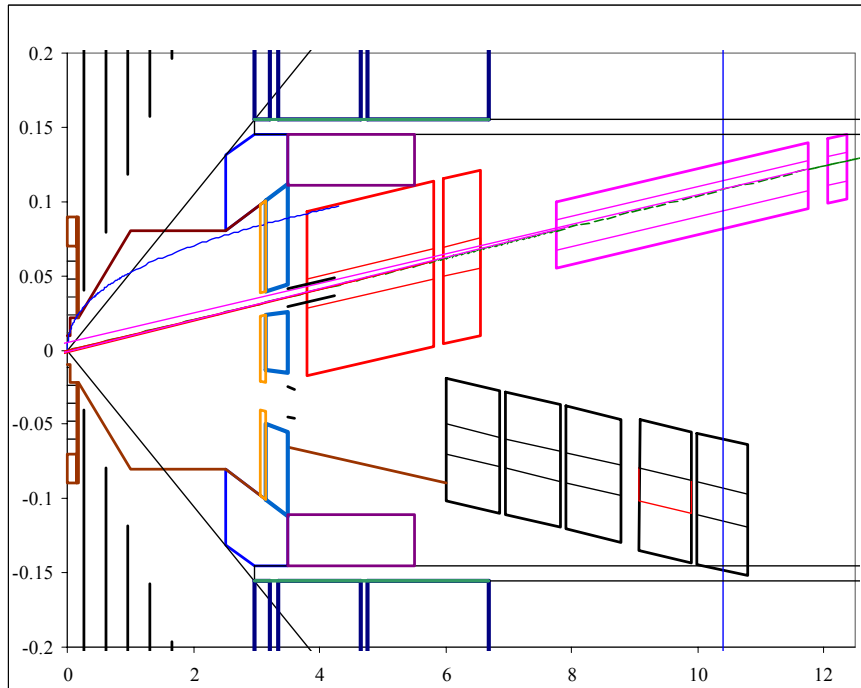
NLC Beam Delivery and Interaction Region Home

<p>Meetings BIG mtgs Local mtgs</p> <p>Configurations ZDR-Lehman(1996-99) "CD 0.4"-2000 NLC 2001 NLC 2002</p> <p>Issues Physics Backgrounds Engineering</p> <p>Links of Interest</p> <p>Programs Guinea Pig WBS Java GUI Track Err</p> <p>Electronic Documentation: Search Insert</p>	<p style="text-align: right;">NLC Background Files</p> <p>Incoherent e+e- Pairs</p> <ul style="list-style-type: none"> • Guinea Pig Program for Pair Generation • Files of disrupted beam, beamstrahlung photons, and other GP files e+e- pair files <p>Muon From Collimation System</p> <p>When tunnel filling spoilers are present:</p> <ul style="list-style-type: none"> • Muons from 250 GeV beams • Muons from 500 GeV beams <p>When tunnel filling spoilers are not present:</p> <ul style="list-style-type: none"> • Muons from 250 GeV beams • Muons from 500 GeV beams <p>Beam Gas</p> <p>1758 beam-gas rays which hit material inside the interaction region. Tom Markiewicz soon be better documented and moved to web accessible space</p>
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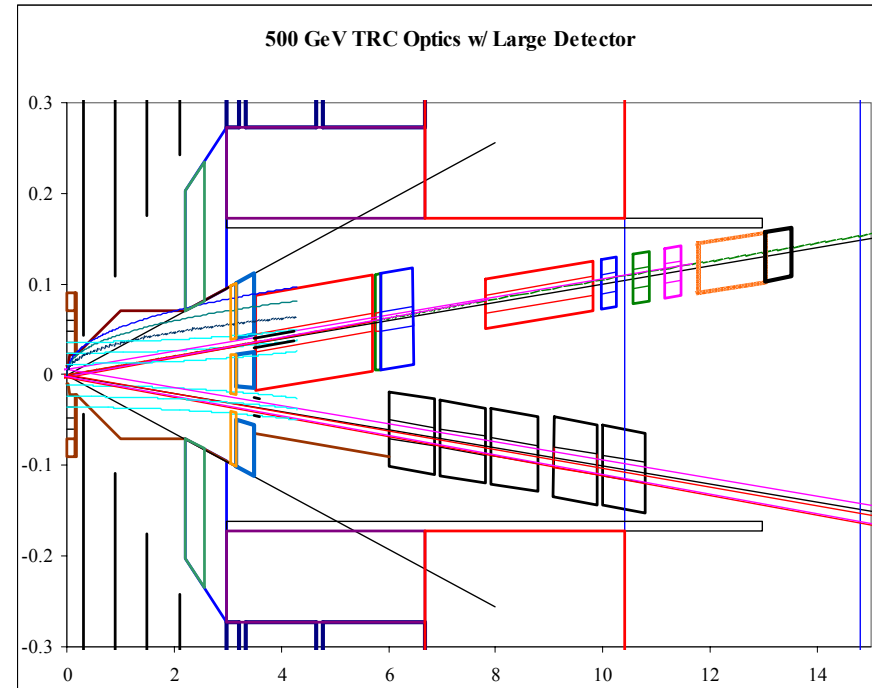
Design Updates

- **IR Design Modifications**
 - M1 & M2 masks moved from support tube to detector

OLD



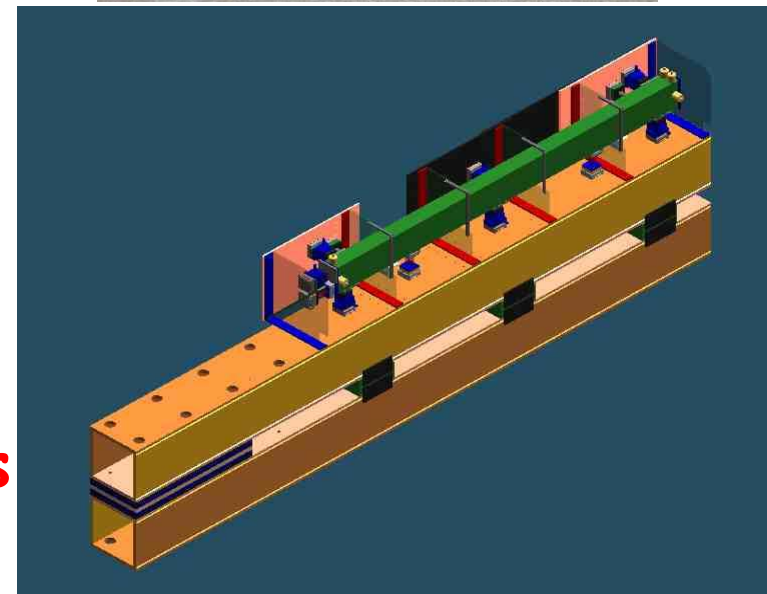
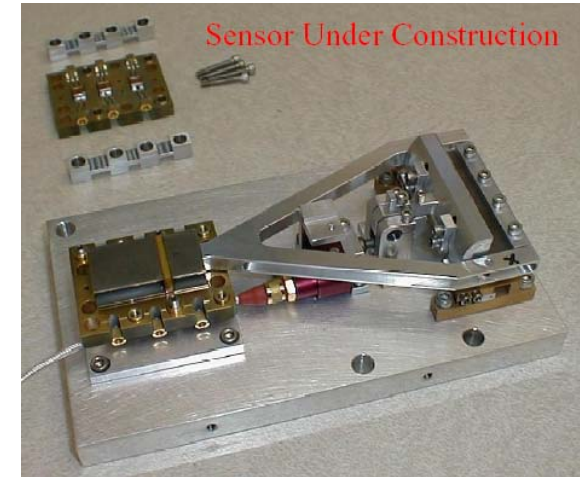
NEW





R&D Updates

- **Inertial Sensor Constructed & Under Test**
 - Design updates underway
 - Vacuum
 - Temperature Sensitivity
- **Prototype magnet girder**
 - Designed
 - parts purchased
 - fabrication underway
- **New team at BNL to begin SC magnet vibration measurements**

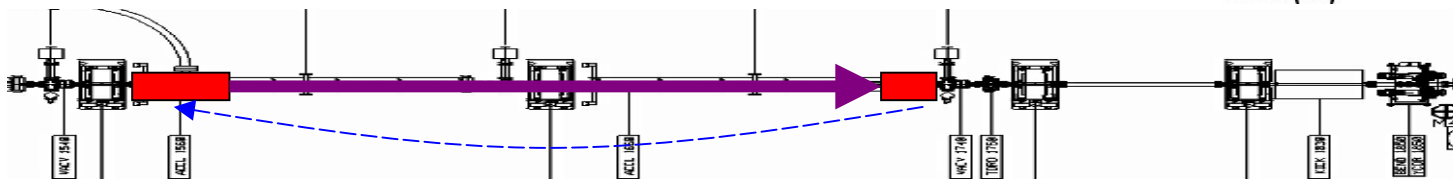
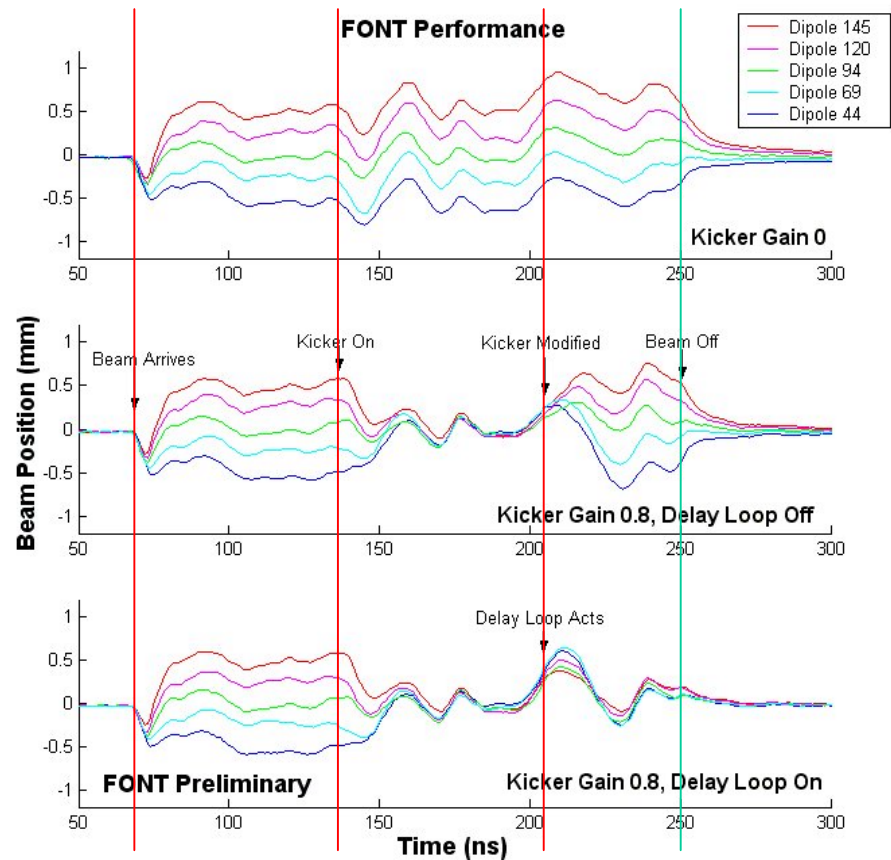


R&D Updates

- **First Results from "FONT" experiment promising** (P. Burrows talk)

- **Second round planned**

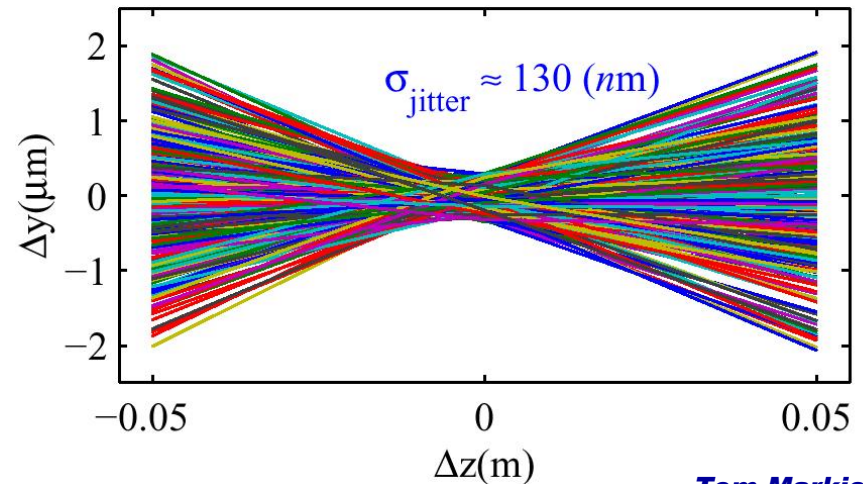
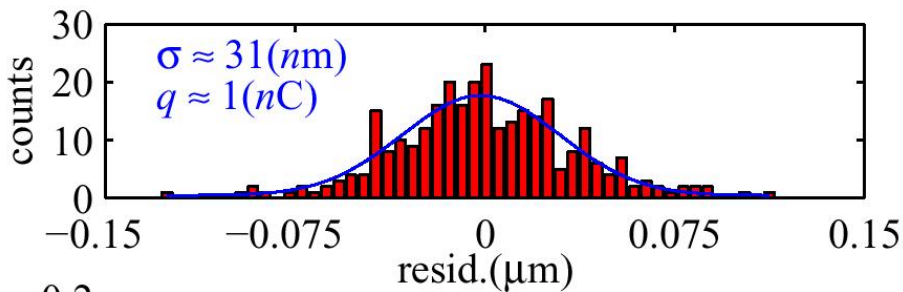
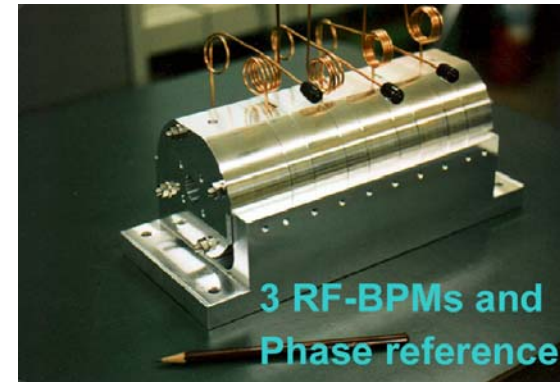
- Remove high-frequency 'static' structure in bunch position within train
- Reduce latency
- Witness BPMs
- FB in both x, y, x', y'
- Solid-state kicker amp



R&D Updates

Nanometer-resolution BPM program begun:

- Preliminary tests at ATF at KEK promising
- Fixtures/Engineering by LLNL team
- Further tests scheduled for Spring 2003
- Plan "FONT" style experiment in ATF
- Plan to use with single beam to demonstrate performance of vibration suppression system





TRC Report

on Machine-Detector Interface

Talk by T. Raubenheimer

Major Concerns (~R2)

- TESLA zero crossing angle
WG formed to address this (talk by K. Buesser)

Concerns (~R3)

- JLC/NLC stabilizing vibrations
R&D efforts on inertial sensors, prototype magnet girder,
nanometer BPMs
- TESLA reliance on beam-beam feedback