FY08 ILC Beam Tests in End Station A

SLAC ILC R&D Meeting, December 17, 2007

BPM energy spectrometer (T-474/491)
Synch Stripe energy spectrometer (T-475)
Collimator design, wakefields (T-480)
Smith-Purcell bunch length diagnostics (T-487)
Linac BPM prototypes
EMI (electro-magnetic interference)

+ ILC Detector tests for SiD collaboration,
- T. Nelson et al., for testing KPiX readout chip that would be used with Tracker and Calorimetery systems. Beam test would possibly be with prototype ECAL Si Detectors, rather than CDF Si strips.
- A. White et al., for a GEM detector test

http://www-project.slac.stanford.edu/ilc/testfac/ESA/esa.html

ILC Beam Tests in End Station A

Run schedule currently proposed includes a 28.5 GeV run for ILC Accelerator program in late april – early may, and ILC detector tests with secondary beam in late may. A 2-week run is slotted for august for either primary beam (accelerator tests) or secondary beam (detector tests). Aiming to complete ILC Accelerator tests in ESA in april, but include contingency to run again in august.

SLAC Accelerator Schedule for FY2008			Seeman	17-Dec-07
	Turn on Date	Turn off date	Beam Energy (GeV)	Comments
SPEAR3	1-Oct	21-Dec	3.0	
SPEAR3	2-Jan	11-Aug	3.0	
LCLS Injector & Bunch Compressor	11-Dec	21-Dec	15.0	
LCLS Injector & Bunch Compressor	3-Jan	20-Apr	15.0	
LCLS Injector & Bunch Compressor	9-May	30-Sep	15.0	
Linac (e- to e+ target)	10-Dec	30-Sep	25.0	
PEP-II HER	10-Dec	30-Sep	9.0	
PEP-II LER	10-Dec	30-Sep	3.1	
ILC in ESA	21-Apr	8-May	28.5	
ILC in ESA	19-May	2-Jun	15.0	Parasitic to LCLS
ILC in ESA	4-Aug	18-Aug	15.0	Parasitic to LCLS
NLCTA	10-Nov	30-Sep	0.1	On duty cycle about 50%.

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FY08 Run Scheduling:

- Radiation shielding issues in BTH West (formerly FFTB West):
  - Shielding for light pipe is being re-worked; expect ready in March
  - “sky shine” for radiation from Aline running to workers in BTH West is being evaluated by rad physics

ESA Preparations for FY08 run(s):

- B108 controls racks for ESA magnets need upgrade to satisfy electrical safety; also water leaks in transductor chassis being repaired. In progress.
- Earthquaking braces needed for concrete blocks added at end of “bunker” in ESA (were added because of T475 detector beampipe restriction); calculations in progress by R. Arnold
- evaluating modifications to LCW distribution to beamline devices (magnets, collimators) to reduce vibrations

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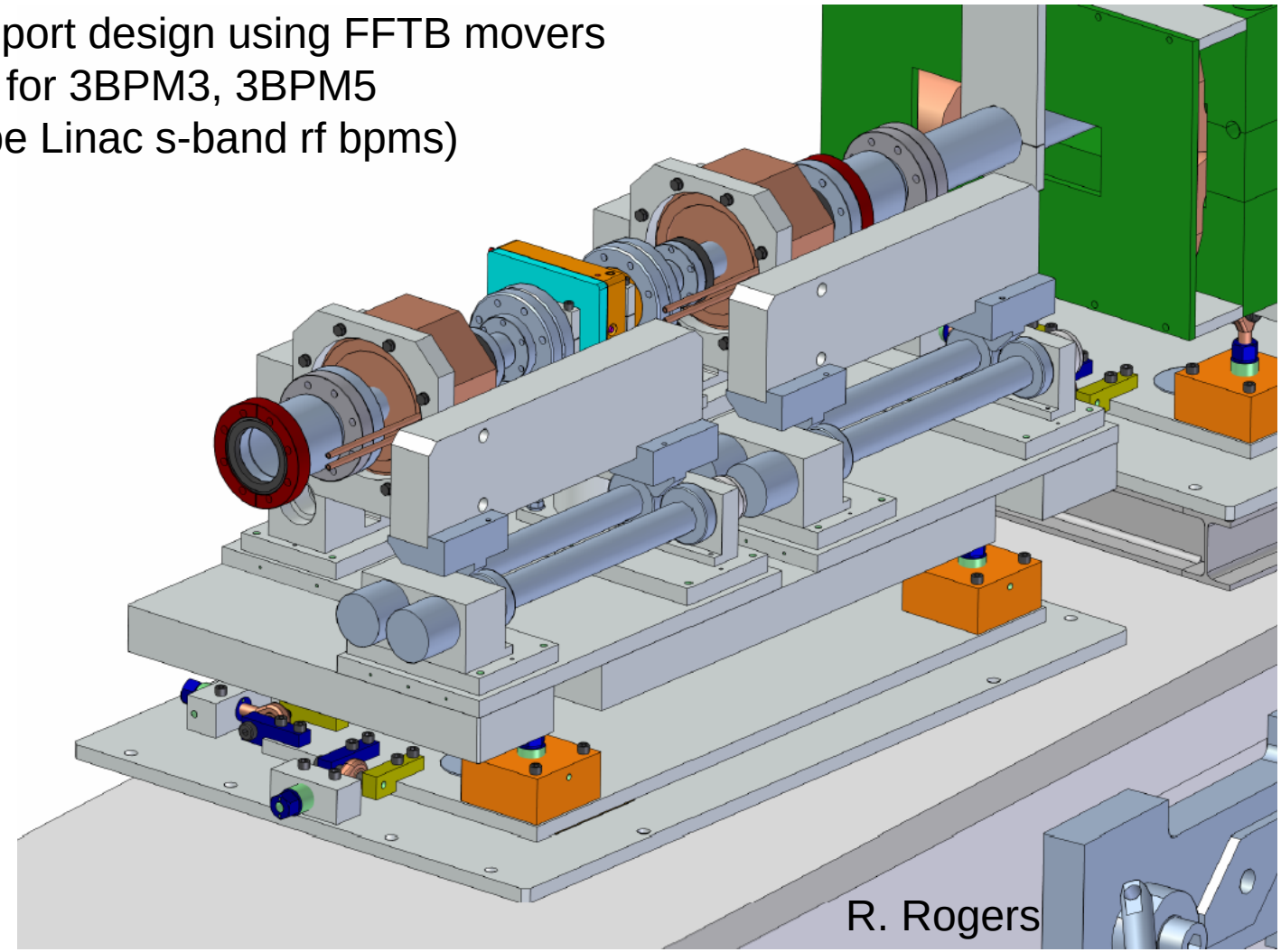
T474/T491 (incl. Linac prototype rf bpms) Work:

- **4 new NMR probes provided by DESY Zeuthen have arrived at SLAC**
- **1 new Hall probe system purchased by SLAC has arrived**
- UK group to replace 3BPM7, which had brazing problems that limited its performance
- UK/Berkeley groups to provide additional channels for calibration tone system
- Rerouting signal cables for upstream Aline bpms to go to relocated processors and digitizers in ESA rather than Counting House
- Notre Dame / SLAC to upgrade interferometer system to monitor "straightness" between BPM stations over 10 meters. Optics modeling in progress to finalize design. Plan to include a ccd camera to monitor stability of interferometer laser pointing.
- **NIM paper has been submitted on 2006 data**: BPMs 1-2, 3-5 and 9-11 in ESA, but not including spectrometer magnets and other 2007 upgrades (calibration tone system, Helmholtz coil calibration); Mark Slater is primary author. Bino Maiheu is starting a NIM paper on the 2007 data.
- New supports/movers for Linac rf BPMs 3,5; **FFTB movers have been removed from BSY for this; T2 stage is being removed from SLC FF to support both BPMs; Ron Rogers has designed support system for the BPMs using the FFTB movers and T2 stage – ready soon to give prints to Racine for fab/assembly.** Working with Doug McCormick on cableplant needed (LVDT module to be brought back from KEK).
- **Johnny Ng has produced a draft technote on vibration data analysis** with measurements from geophones,and interferometer; working on plan with C. Hast (in consultation with G. Bowden, D. Walz and others) to reduce vibrations from LCW distribution to magnets and collimators

New support design using FFTB movers
for 3BPM3, 3BPM5
(prototype Linac s-band rf bpms)



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T475 Work:

- Quartz fiber detector has been shipped back to U. Oregon to diagnose/fix signal ringing and crosstalk issues
- Evaluating an upgrade to utilize the visible SR light from the wiggler for beam setup + Evaluate for energy measurements; will include a monitor system with mirror (in vacuum) and imaging optics to a cmos camera; would have readout on local PC accessed via channel access on slac network. **Cmos camera has been purchased**.

T480 Work:

- Completing analysis on existing data; awaiting improved BPM calibration and resolution from T474 analysis; **M. Slater has joined this effort transferring from T474**
- uncertain if will fabricate new collimators or perform additional measurements on 15 existing collimators

T487 Work :

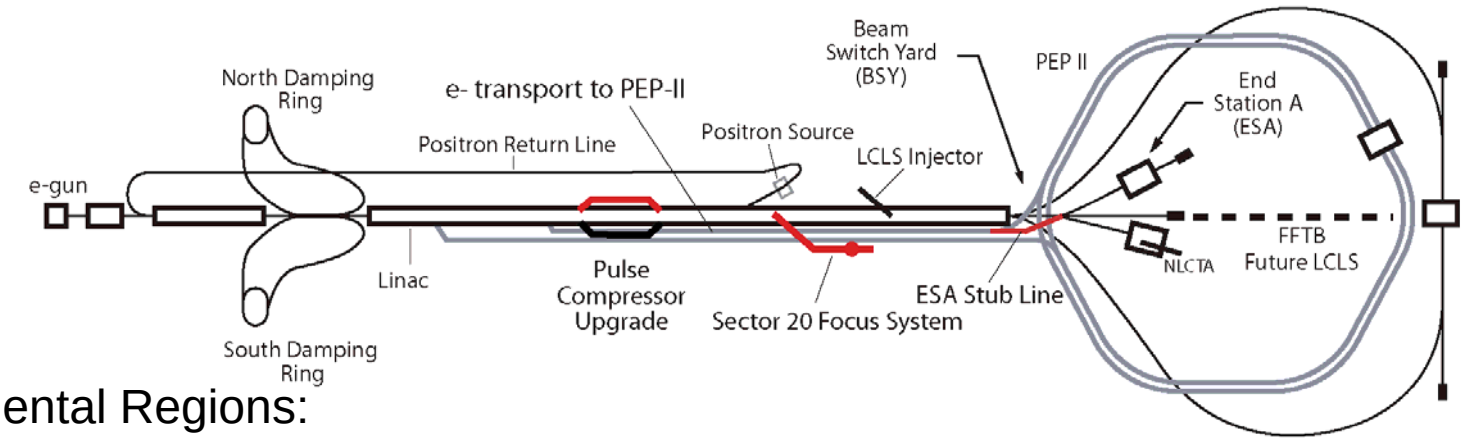
- Analysis of 2007 data in progress
- Plan to add polarization analysis of signal and to provide real-time analysis during data taking

EMI Studies:

- Nick Sinev plans to continue these studies; interest to test sensitivity of other electronics systems, in collaboration with other groups, to beam-induced EMI. Will test rf leakage from different connector feedthrus (bnc feedthru already tested) and rf cables.

Test Beams at SLAC beyond FY08

***F**acilities for **AC**celerator Science and **E**xperimental **T**est Beams at SLAC*
FACET proposal submitted to Dept. of Energy, Sept. 2007



2 Experimental Regions:

1. 24 GeV beam to new Sector 20 Experimental Region for advanced accelerator physics: plasma and dielectric wakefield acceleration + other experiments requiring high energy densities
2. General purpose test beam facility in ESA: primary beams for accelerator research, secondary beams for detector R&D, beam dump experiments for radiation physics studies. Initially limited to 12-GeV electron beam, with later upgrade to 24 GeV.

→ **review (tentatively) scheduled for Feb. 19-20**