



ATF-2 Review

“GDE Closeout”

3-April-13



Major R&D Goals for Technical Design

SCRF

- **High Gradient R&D** - globally coordinated program to demonstrate gradient by 2010 with 50% yield; improve yield to 90% by TDR (end 2012)
- **Manufacturing:** plug compatible design; industrialization, etc.
- **Systems tests:** FLASH; plus NML (FNAL), STF2 (KEK) post-TDR

Test Facilities

- **ATF2** - Fast Kicker tests and Final Focus design/performance
EARTHQUAKE RECOVERY
- **CesrTA** - Electron Cloud tests to establish damping ring parameters/design and electron cloud mitigation strategy
- **FLASH** – Study performance using ILC-like beam and cryomodule (systems test)



R&D Test Facilities Deliverables

Test Facility	Deliverable	Date
<i>Optics and stabilisation demonstrations:</i>		
ATF	Generation of 1 pm-rad low emittance beam	2009
ATF-2	Demonstration of compact Final Focus optics (design demagnification, resulting in a nominal 35 nm beam size at focal point).	2010
	Demonstration of prototype SC and PM final doublet magnets	2012
	Stabilisation of 35 nm beam over various time scales.	2012
<i>Linac high-gradient operation and system demonstrations:</i>		
TTF/FLASH	Full 9 mA, 1 GeV, high-repetition rate operation	2009
STF & ILCTA-NML	Cavity-string test within one cryomodule (S1 and S1-global)	2010
	Cryomodule-string test with one RF Unit with beam (S2)	2012
<i>Electron cloud mitigation studies:</i>		
CESR-TA	Re-configuration (re-build) of CESR as low-emittance e-cloud test facility. First measurements of e-cloud build-up using instrumented sections in dipoles and drifts sections (large emittance).	2008
	Achieve lower emittance beams. Measurements of e-cloud build up in wiggler chambers.	2009
	Characterisation of e-cloud build-up and instability thresholds as a function of low vertical emittance (≤ 20 pm)	2010

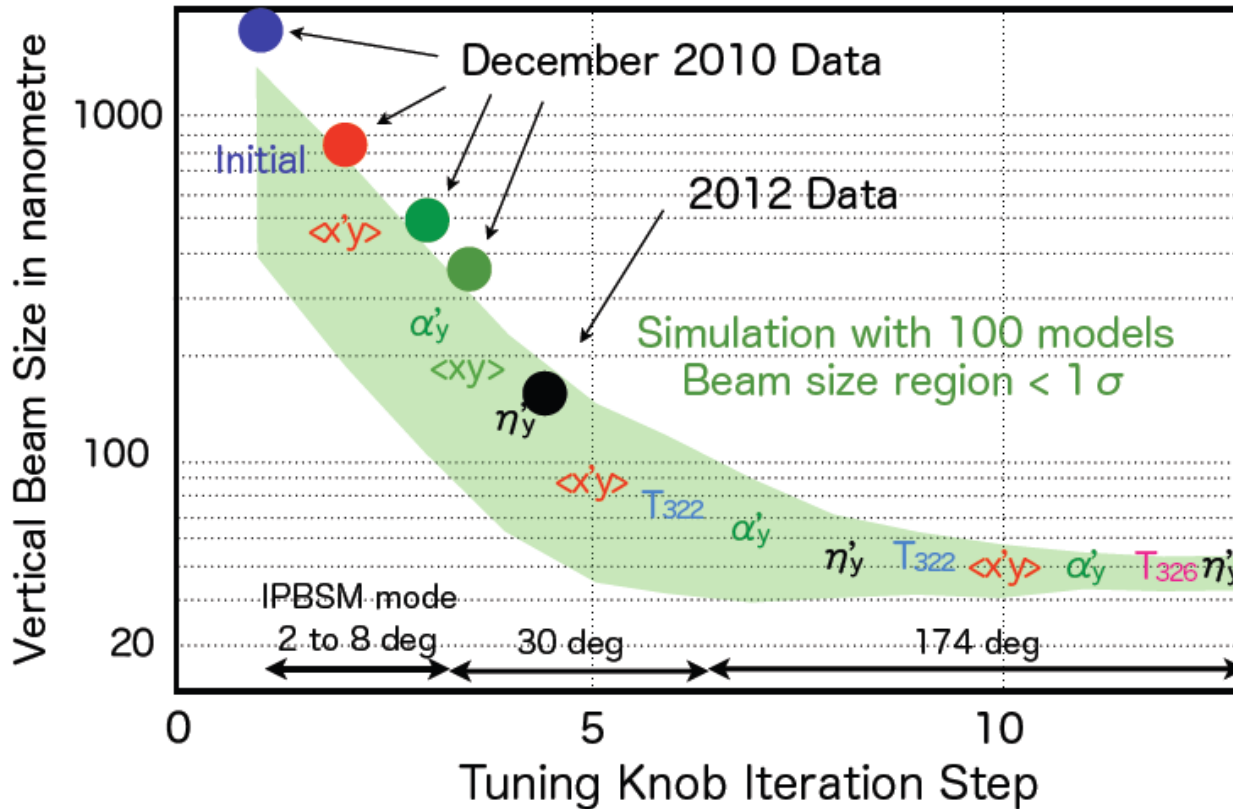


PAC Review -- Response to #2

The lack of progress towards the 37 nm ATF2 IP goal is a concern. Several issues have already been resolved, and the currently scheduled modifications should lead to significant progress towards the goal.

- This was slowed by the earthquake in Japan. Progress immediately following the technical review (see figure)
- We are instituting a technical review in May aimed at assessing technical status and proposing future goals and program needed for ILC.

ATF-2 earthquake recovery



- Vertical beam size (2012) = 167.9 plus-minus nm
- 1 sigma Monte Carlo
- Post-TDR continue to ILC goal of 37 nm + fast kicker
- Stabilization studies

ATF-2 achieves 72.8 nm

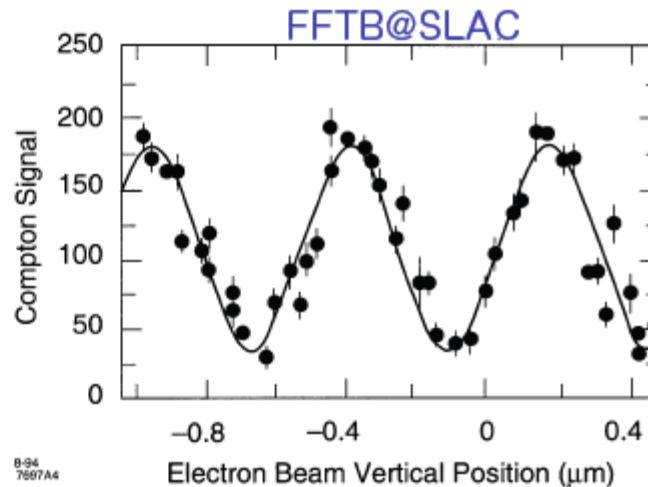
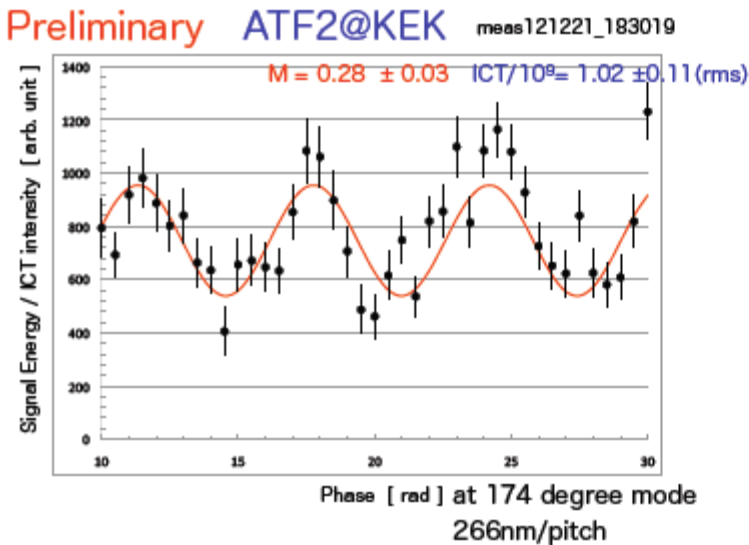


Figure 5.6: Laser-Compton beam size measurement performed in May of 1994. The measured size is 77 ± 7 nanometers.

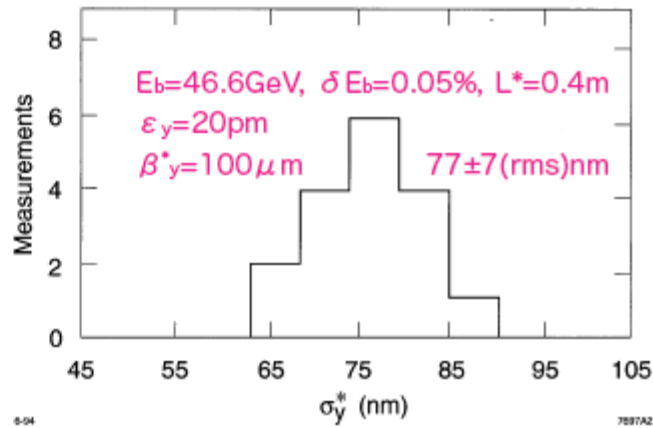
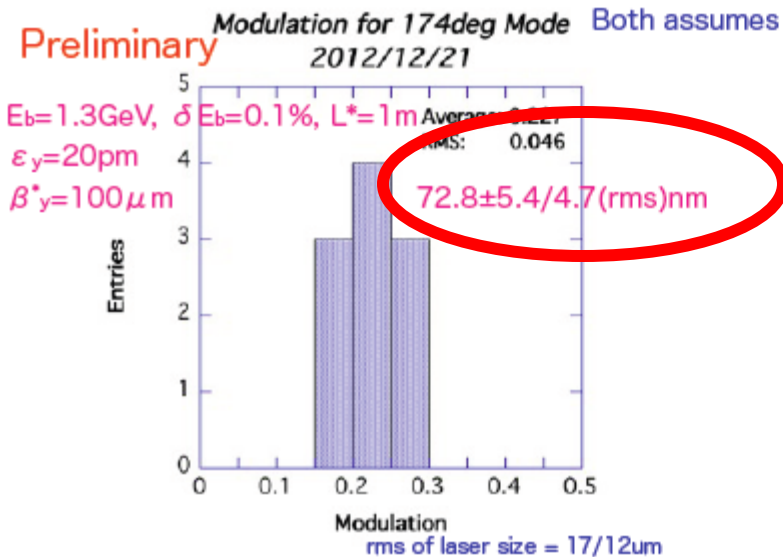


Figure 5.7: Histogram of measurements made during the last 3 hours of the May, 1994 FFTB run. Average size measured was 77 nm, with an RMS of 7 nm.
rms of laser size = 50 μm \rightarrow M reduction of 10%



ATF-2 Review and Plan

- Considering the present status of ATF-2 relative to GDE R&D goals, we want to review and assess the status of ATF-2 and plans
- What is required for ILC (37nm? and stability?). Are these goals achievable or what is needed to achieve them?
- What do we recommend more generally for ATF-2 future program.