Accelerator Controls and Beam Instrumentation meeting, April 8 2004
AGENDA

Last time we met we discussed injector and linac profile monitor issues.
1.Dave Dowell explained the lambda/10 flatness spec for the YAG screen mirror
2. we still need an otr foil flatness spec (Dowell)
3.Zen Szalata showed a candidate digital video camera from Lumenera that EFD will buy for testing
4.Steve Gierman will calculate the expected photon flux as a function of e- energy for otr screens ***

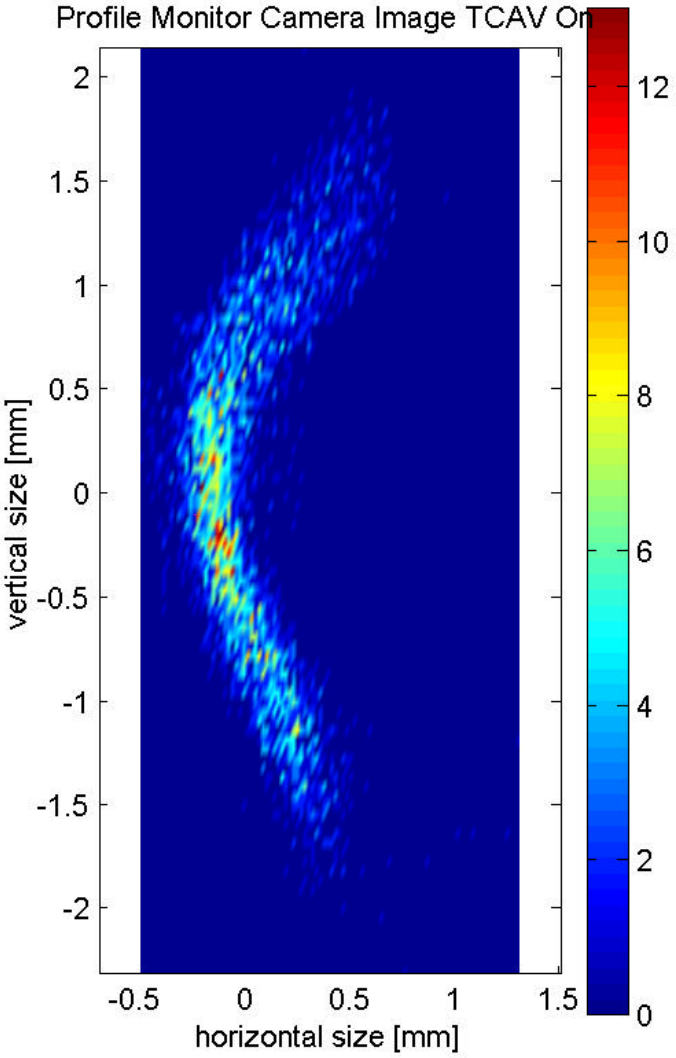
Ron Johnson reviewed what is still needed for BPM specifications

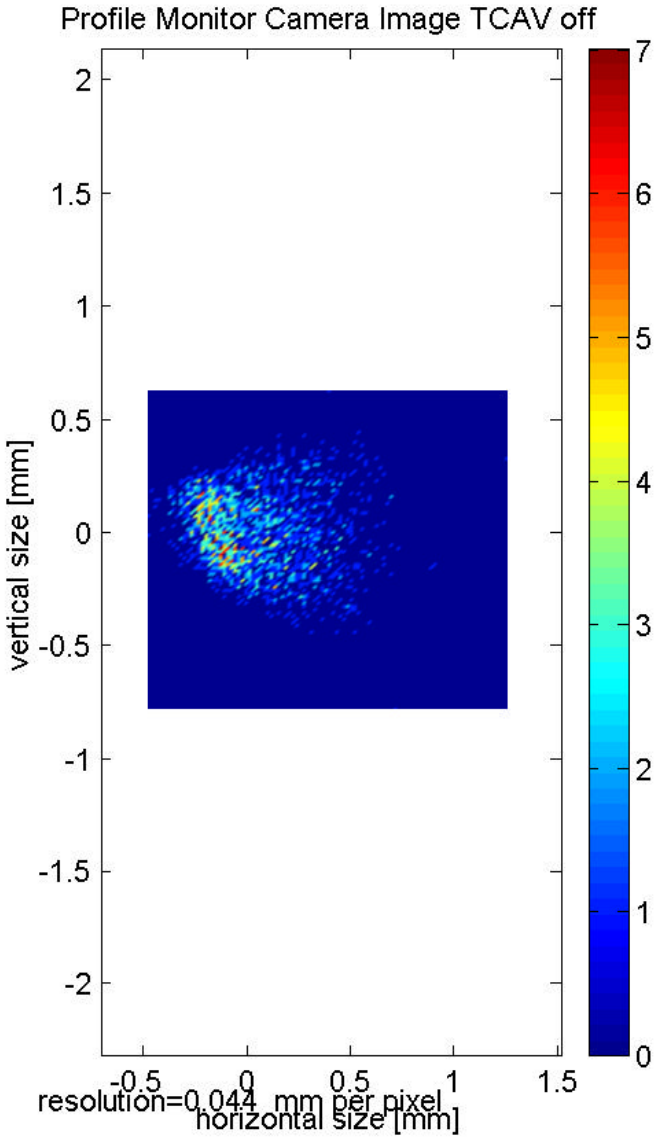
a. maximum cable length from BPM to module? - 150'

b. locations of BPM modules and crates in the linac - 3 per linac sector

Cost comparison of epics/vme bpm modules vs camac – next week Mario Ortega ***
This weeks agenda:
1. further discussion on the profile monitors
2. review of progress on feedback specifications
3. begin discussion of wire scanner issues

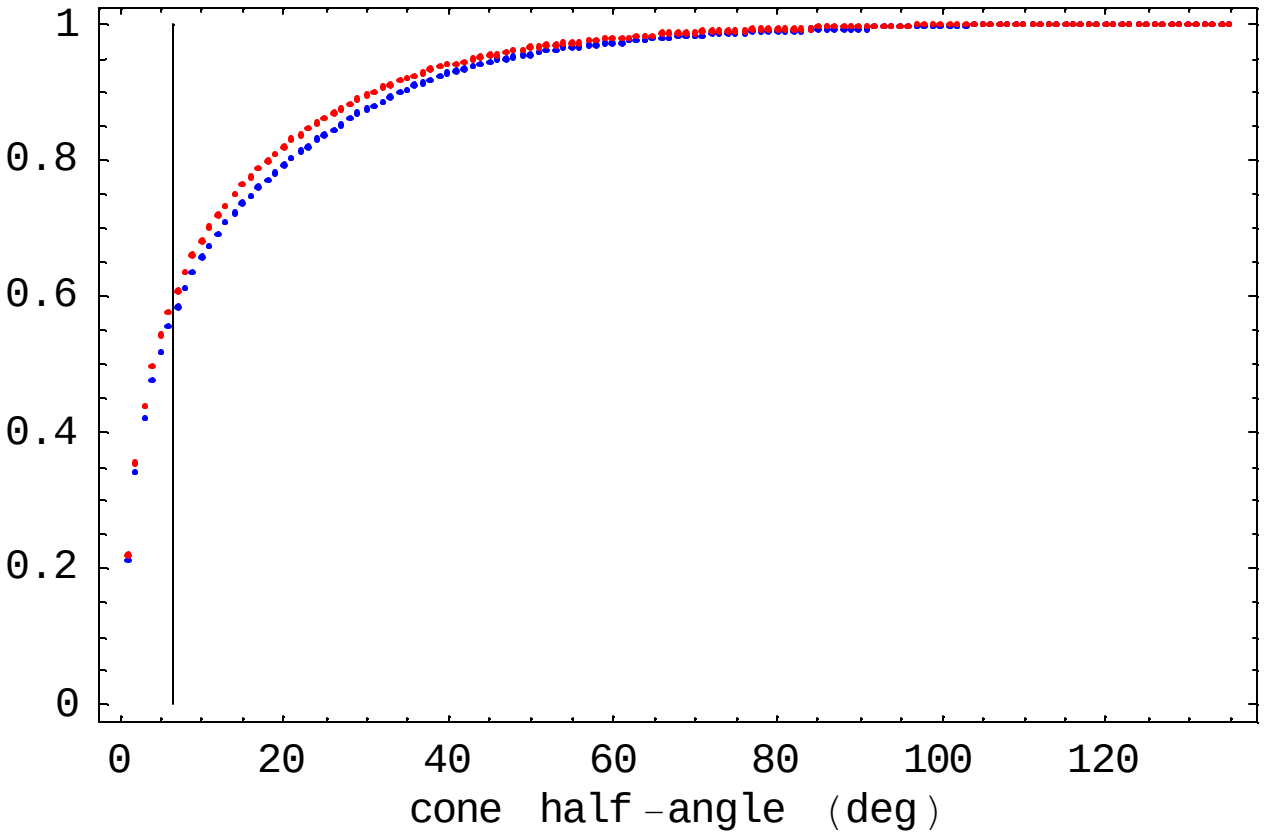
Injector spectrometer screen





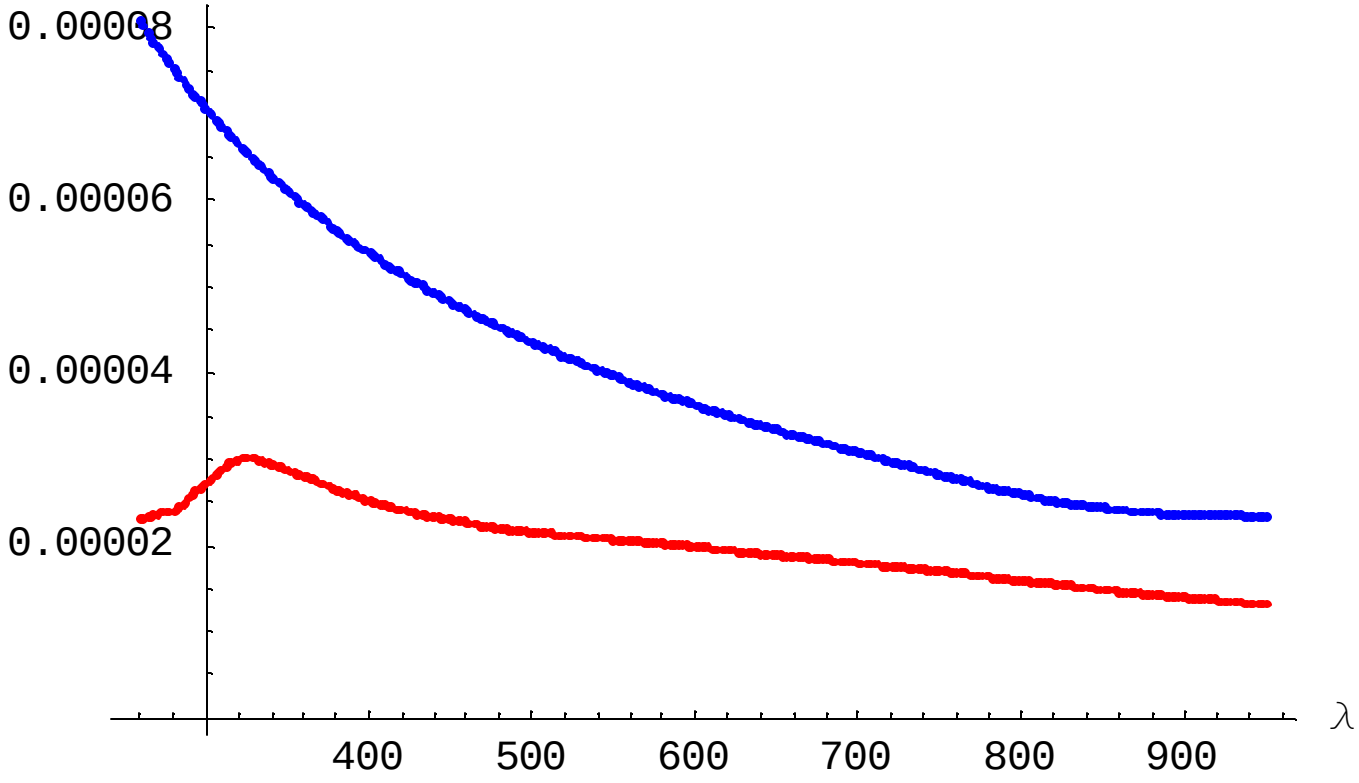
Patrick Krejcik

Fraction into solid cone



Steve Gierman

Photons per nanometer bandwidth



Steve Gierman

Feedback corrector discussion status

Inductance of a linac type4 xcor by CS was 50 mH (24 mH per coil)

SPEAR3 copper beam pipe has 3dB attenuation at ~20 Hz

Linac girder 9 xcors can be on stainless, but 700 girder has no room.

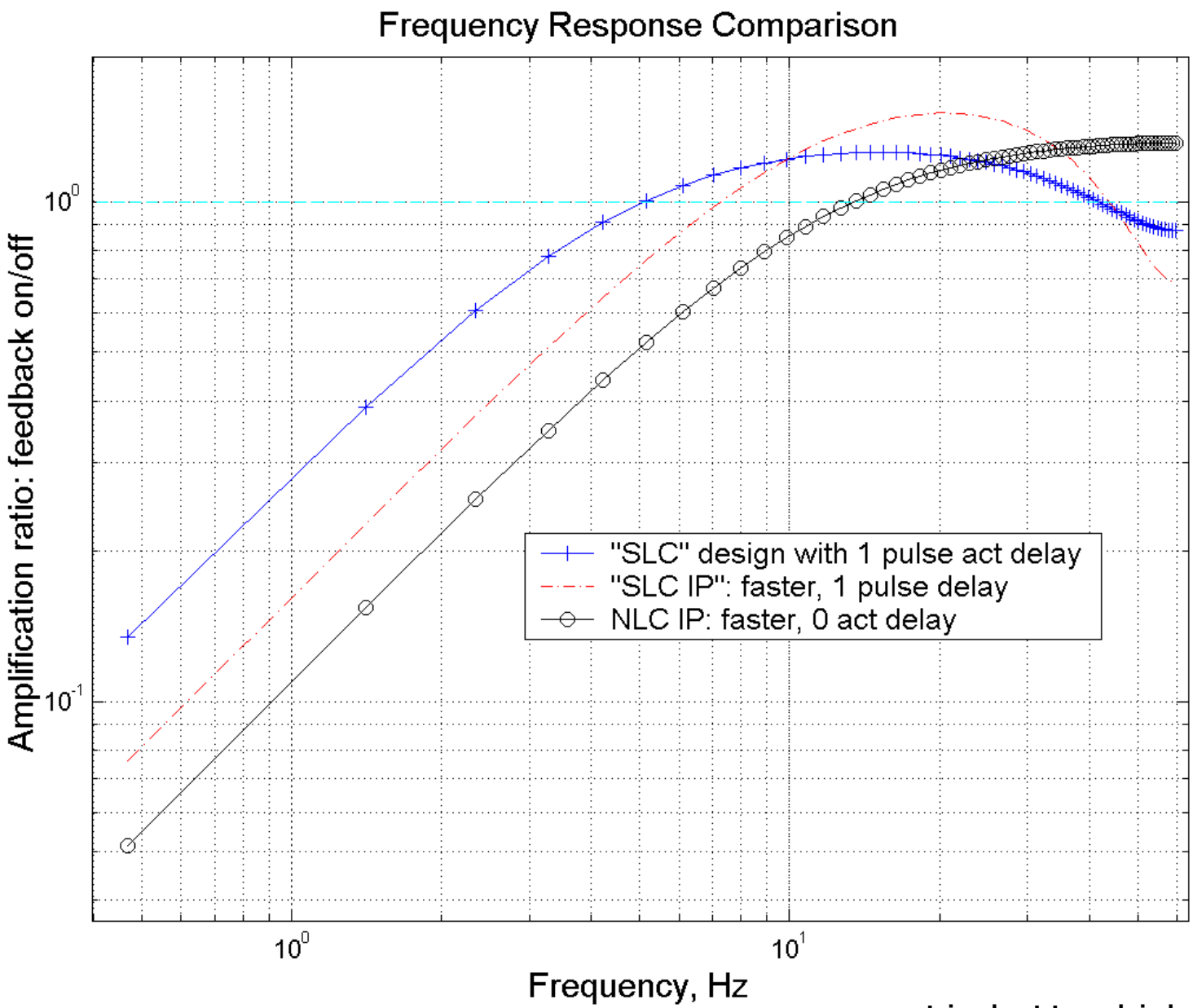
Test using MCOR12, accel structure, corrector, Hall probe on a scope:
Greg, Carl, Cherrill

.03% rms noise on mcor ps

Does a linac type4 xcor have hysteresis?

Will new mcors communicate via ethernet?

Do ALL new LCLS devices get controlled via vme? ESD needs better clarification



Linda Hendrickson

- Challenges facing LCLS wire scanner measurements:
- Notes from discussion meeting with Clive Field, Alan Fisher, Patrick Krejcik, Doug McCormick, Marc Ross

- 1. low charge of only 2-6 10^9 electrons
  2. small spots require small, low Z wires e.g. 20 um SiC wires
  3. low Z is necessary to minimize radiation to undulator, particularly for wires in the LTU
  4. there are few locations with bends, mainly straight ahead beam lines where wire scanners are located, so we can't detect straight ahead gammas.
  5. we will have low signal sensitivity issues similar to the present FFTB
  6. wire scanners located in the linac are also susceptible to dark current and LCLS may not have the option of lowering the local RF gradient as was done in SLC.
  7. the question is what are the best detectors and how to place them

- Recommendations:

  1. Use air as Cherenkov detector plus light periscope and big photomultiplier tube
  2. Use longer air path than for SLC operation to increase signal.
  3. Spoiler in front of air path consisting of 3/4" lead to maximize shower in the detector
  4. In the linac it was found that the radiation exits the beam pipe in a narrow zone approximately 2 quads downstream from the wire as it is over focused.
  5. The radiation should be detected symmetrically around beam pipe to avoid systematic asymmetry in the scan
  6. Use multiple detectors, including PLIC, for redundant readback
  7. Incorporate secondary emission detectors in the scanners which may work with the lower bunch charge compared to SLC
  8. evaluate proposal for a detector inside the beam pipe which is integrated with a protection collimator in order to intercept more of the radiation.

  Different lcls beam energies may require different detector positions!

- Testing:
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  1. tests in Li02 with low current and higher photomultiplier voltage raised to 1600 V from 11-1200 V to determine limits of sensitivity
  2. prototype a detector around the IP region of the FFTB beamline in combination with a low Z wire
  3. evaluate the SEM detector used inside the ESA beampipe built by Dieter Walz.

- Bench test wire scanner module with vme/epics controller
- Review wire scanner controls schematic for wire scanners – Dale.