Accelerator Controls and Beam Instrumentation meeting, April 142004 AGENDA

- 1. cost comparison of camac vs vme BPM modules Mario Ortega
- 2. wire scanner control interfaces Dale Kotturi
- 3. Feedback behavior with/without latency Linda Hendrickson
- 4. otr radiation properties Steve Gierman
- 5. bunch length monitor properties Patrick Krejcik

BPM Comparison for LCLS – Mario Ortega

The cost comparison supplied below is derived from original work by Ron Johnson, SLAC, ESD. The comparison is between a Linac (Sectors 21-30) CAMAC based BPM module design and that of a VME BPM. Provisions common to both are omitted i.e. cables, calibration, installation for this estimate.

The following conditions apply to the CAMAC based design:

1)CAMAC Crates are present in Linac in quantity and

slot availability. No installation required.

1)Timing is available in said crates.

CAMAC BPM Processor Module (ED&I) Preliminary Design 53,676.00 Final Design 161,028.00 Construction and Test BPM Processor Module (M&S) Preliminary Design 15,000.00 Final Design 15,000.00 Construction 405,000.00 (135 modules, \$3k per module) TOTAL CAMAC BPM COST: \$685,488.00

35,784.00

The following conditions apply to the VME based BPM design:

1) All costs for production are relatively the same for both formats per R. Johnson

VME Crates are not present in Linac in any quantity.

Procurement and installation required.

A VME timing module and timing distribution has not yet been designed but is required. ED&I is costed in Injection.

VME BPM Processor Module (ED&I) Preliminary Design 53,676.00 Final Design 161,028.00 Construction and Test BPM Processor Module (M&S) Preliminary Design 15,000.00 Final Design 15,000.00 Construction 405,000.00 (135 modules, \$3k per module)

35,784.00

VME Crates, BPM Type (5-slot) w/ Controller & backplane 210,000.00 (30 Crates, \$7K per crate) includes IOC Timing Module 90,000.00 (30 modules, \$3k per module) 31 modules at \$1.5k or, 1 module plus fiber distribution

Distributed Timing Hdw. 390,000.00 (30 sectors, \$13k per sector) Consists of: Splitter to Main Drive Line (30 ea) Fiducial Output Module (30 ea) Fiducial RF Amplifier (30 ea) Timing System Heliax Cableplant (90 ea) TOTAL VME BPM COST: \$1,375,488.00





Linda Hendrickson

Bunch length monitor spectrum



Bunch length monitor spectrum



Wave propagation in an absorbing medium

$$E = E_0 e^{-\frac{2\mathbf{p}}{\mathbf{I}_0}kx} e^{i2\mathbf{p}\left(\frac{n}{\mathbf{I}_0}x - \mathbf{n}t\right)}$$



Optical constants

Titanium Aluminum

Fraction into solid cone

135 MeV





Photons per nanometer bandwidth 135 MeV



CCD Sensitivity



Photons per nanometer bandwidth



 Total number of photons, 400 to 950 nm
 0.0186

 0.0112