

SuperB TDR EMC

Outline

September 13, 2011

1. Overview (2pp)
 - (a) Three calorimeters and their technologies
 - (b) Background issues
 - (c) Simulation tools
2. Barrel Calorimeter (Kevin Flood) (20 pp)
 - (a) Requirements relevant to new environment
 - i. Radiation hardness
 - ii. Background rates (simulation studies)
 - (b) Description of BaBar barrel
 - i. Mechanical design
 - ii. Readout
 - iii. Calibration
 - (c) Performance of BaBar barrel
 - i. Energy and position resolution
 - ii. Gamma-gamma mass resolution
 - iii. Radiation damage, effect on resolution
 - iv. Changes in performance at SuperB
 - (d) Electronics changes (Valerio Bocci)
 - i. Rationale for changes
 - ii. Preamp design
 - iii. Shaping and digitization (synopsis, main discussion in electronics chapter?)
 - iv. Cabling (changes or not?)
 - (e) Transport, refurbishing, and installation (Kevin Flood)
 - i. De-installation at SLAC
 - ii. Electronics refurbish (Valerio Bocci)
 - A. Repair crystals with 0/1 working signals
 - B. Preamp replacement
 - C. ADC board replacement
 - iii. Calibration systems
 - A. Replace DT neutron generator
 - B. New plumbing from generator to detector (Corrado Gargiulo)
 - C. Repair and reconstitute light pulser system

- iv. Transport of barrel (Corrado Gargiulo)
 - v. Re-installation at Tor Vergata (Corrado Gargiulo)
- 3. Forward Calorimeter (Ric Faccini) (20pp)
 - (a) Requirements
 - i. Energy and angular resolution
 - ii. Radiation hardness
 - iii. Background rates
 - iv. Solid angle, transition to barrel
 - (b) Crystals (Ren-yuan Zhu) (a brief general discussion, then concentrate on the LYSO baseline)
 - i. Light output
 - ii. Radiation hardness
 - iii. Timing
 - iv. Uniformity
 - v. Manufacturing
 - A. Vendors, capacity
 - B. QA process, test stands
 - (c) Test beam results
 - i. Description of apparatus
 - ii. Electronics noise measurements
 - iii. Description of beam
 - iv. Description of data
 - v. Calibration, temperature correction
 - vi. Algorithms and Results
 - (d) Mechanical design (Corrado Gargiulo)
 - i. Crystal wrapping
 - ii. Mounting APDs
 - iii. Mechanical support
 - A. Prototype alveolar
 - B. Finite element analysis
 - iv. Services
 - A. Cabling
 - B. Cooling
 - C. Calibration system plumbing
 - v. Installation
 - (e) APD readout
 - (f) Electronics (Valerio Bocci)
 - i. Block diagram

- ii. Preamp design
 - iii. Shaper
 - iv. Digitization
 - v. Cables
 - (g) Calibration
 - i. Initial calibration with source
 - ii. 6 MeV calibration system
 - iii. Electronics calibration
 - iv. Temperature monitoring and correction
 - (h) Performance in simulations
 - i. Resolution studies
 - ii. Background studies
 - (i) Alternatives
 - i. Alternative I
 - A. Description
 - B. Performance, tests
 - C. Mechanical changes
 - D. Electronics changes
 - ii. (possibly not present) Alternative II
 - A. Description
 - B. Performance, tests
 - C. Mechanical changes
 - D. Electronics changes
 - iii. Comparison of alternatives with LYSO, including a brief discussion of discarded options
4. Backward Calorimeter (Gerald Eigen) (15 pp)
- (a) Requirements
 - i. Energy and angular resolution
 - ii. Radiation hardness
 - iii. Background rates
 - iv. Solid angle, transition to barrel
 - (b) Mechanical design
 - i. Calorimeter construction
 - ii. Support and services (Corrado Gargiulo)
 - (c) SiPM readout
 - (d) Electronics
 - (e) Calibration

- (f) Performance in simulations
 - (g) Discussion of task force conclusions
5. Trigger (This is to be discussed in the ETD chapter; we will have a brief discussion in the EMC chapter. Need to decide whether to merge into other EMC sections.) (2 pp)
 - (a) Calorimeter readout trigger
 - i. Normal mode
 - ii. Calibration
 - (b) Calorimeter trigger primitives
 6. ES&H (People protection is in a separate chapter; in the EMC chapter this mostly means detector protection) (2 pp)
 7. Cost and Schedule (Likely to move to be part of a special chapter) (?? pp)
 - (a) WBS structure
 - (b) Gantt chart
 - (c) Basis of estimates
 - (d) Cost and schedule risks