

outline of ECal for LOI (based on Aihara talk)

From Ray Frey

- ECal requirements from physics
 - isolated electrons and photons; e.g. (radiative) Bhabhas; $Q \rightarrow Q'e\nu$
 - No requirement for excellent energy resolution, i.e. $0.17/\sqrt{E}$ is OK
 - Jets: photon (and π^0) reconstruction efficiency; charged tracking
 - tau's: id and reconstruction of $\rho\nu$ and $\pi\nu$ decay modes
 - charged track stubs (aid silicon tracker)
 - photon vertexing
- Description
 - Concept: compact, dense, highly segmented, integrated readout
 - Parameters, details, and drawings (4-5)
 - Baseline: pixels+KPiX; option for future: MAPS
- Performance
 - Energy resolution
 - Event displays to illustrate imaging calorimeter (jet/tau, γ vertex) ?
 - Interesting performance information from physics studies

ECal performance results (wish list)... again

- Energy resolution for isolated photons/electrons
 - This ~exists in DOD – needs to be checked, updated, improved (RF)
- Photon finding efficiency (in jets – need to define process)
 - This ~exists from PFA algorithms
 - But SiD has not yet implemented a good algorithm
 - What can we do for the LOI ?
- Radiative Bhabha measurement and/or Bhabha acollinearity ??
- Track finding seeded by Ecal (eg K0s) – in tracking section??
- Vertexing of photons (eg GM Susy) ??
- pi0 reconstruction efficiency
 - in jets (allows improvement of jet energy measurement)
 - in tau's – this is the key for tau decay mode reconstruction (bench #4)
 - This is untouched in SiD
 - Good benchmark for understanding impact of segmentation
- Benchmark #4: $\tau^+\tau^-$ at 500 GeV

LOI technology input: R&D now & post-LOI

Baseline:

- R&D needed to demonstrate readiness for “RDR” (2012)
 - Fabricate a functional test module with the real elements
 - KPiX-1024 bump-bonded to sensors
 - Test in a beam with good noise performance
 - Long flexcables
 - Mechanical prototype (including thermal demonstration)
- What could/should be done for LOI
 - Demonstrate good bump-bonding (KPiX prototypes)
 - Long flexcables proof of principle
 - Clear measure of acceptable KPiX noise performance

MAPS:

- Will provide list of milestones to demonstrate readiness to proceed post-2012

Other LOI items

- IDAG (1): “sensitivity to machine backgrounds as characterized in the MDI panel”
 - Takashi: help!
- IDAG(2): calibration and alignment schemes
 - Calibration was discussed at the WWS calorimeter review at DESY (June 2007)
 - Needs to be reviewed, discussed, etc for LOI
 - Alignment not expected to be a huge issue