Beam Test Analysis Memo - Outline

Outline of the Beam Test Analysis Memo

Simulation

Geant4 package and simulations checks

- G3-G4 comparisons
- G4-EGSE comparisons
- CU geometry handling: standalone G4 CUTower simulation
- Low energy EM physics and discovery of LPM effect - improvement in TKR hits
- Hadronic physics lists
- Realistics TKR signal digitization algorithm

Geometry cross-checks

- TKR material audit
  - w thickness - corrected in BT and GR
  - missing mass in the tray boundaries and in the bottom tray - not corrected
- CAL material audit - implemented
- Realistic TKR tray geometry (honeycomb core, glue dots, strips)
- Effect of TKR alignment

Data integrity checks

Beamline checks and scan on extra material

- beam spot tuning and effect on data-MC agreement
- pressure scan on cerenkov, studies with extra layers of material before the CU and between TKR and CAL

CAL calibration

- pedestal drift from rate effect
- pedestal variations and correction with temperature
- light yeld correction with temperature
- LAC thresholds measurement and update in the simulation
- Cross-talks: FLE-FHE, inter-layer and effects on small-big diode intercalibration

TKR response

- no effects seen for high rates
- GTRC/FIFO registers settings
- Optimised split readout

Results

- data-MC agreement matrix
- projections of current discrepancies on background rejection

Tools and lessons learned (for internal collaboration use)

This should be a list of useful things we have developed which could help in minimizing the effort for a continuing analysis and a list of things to improve or avoid

- BtSystemTest
- use of pipeline II - how much effort?
- bad documentation of merit and svac tuples
- confusing naming for tkr hits variables (took a long time to realize that hits variables in merit are actually clusters variables and real hits in the svac)