Test run ECal performance

Sho Uemura

SLAC

Sho Uemura

Test run ECal performance

▲ 王 ▶ 王 ∽ Q C June 5, 2013 1/9

Another ECal performance talk

- Not much progress since last collaboration meeting
- Today: works in progress, ugly stuff
- Lots of open topics

< 同 > < ∃ >

Hardware performance (recap)

• 442 crystals total:

- 39 crystals aren't in the data (no FADC, no bias, masked in DAQ)
- 13 crystals weren't wired to the trigger
- 5 crystals are noisy and are masked in software
- 385 working crystals
- Trigger turn-on exactly as specified



HPS-TestRun-v3 : EcalCalHits : Hit Count

Calibration: gains

- Calibrate gains by equalizing crystal E/p between data and MC
- Gains vary broadly between HV groups but are relatively uniform within groups



Image: A matrix

Data vs. MC

- Cluster position distributions still don't match between data and MC (right: all clusters, bottom: clusters above 400 MeV in upper right)
- Calibration problems?





Sho Uemura

Thresholds

- Trigger thresholds were high and uneven (200–1000 MeV), and depended on cluster size (more sensitive to single-crystal clusters)
- Crystal readout thresholds equally high and uneven (50–200 MeV); only read out 1 or 2 highest-energy crystals in a cluster



- B

Looking at energy resolution

- Readout thresholds mean E/p is larger at larger momentum
- RMS of E/p increases with momentum instead of falling as it should



Resolution in simulation

 Simulation assumes "ideal" ECal readout (energy deposition exactly proportional to pulse height), so energy resolution in simulation (top) is too good compared to data (bottom)



Call for help

- We have a couple of people with no calorimeter experience and many other HPS commitments
- Need experienced people to take over

< 6 b