FEX Studies

Reinhard Eckmann
University of Texas at Austin
Pedestal: average energy of samples 9 to 18

Pedestal [GeV] Distribution is not Gaussian
Waveforms, run 26490

Selection: E>2MeV
+ no further criteria
- though on average pedestal seem to be ok
  scanning waveform pedestal seems to be often too low.
- assuming, that the pedestal is zero for all channel might not be justified.
Beam Data

Tue Apr 23 14:05:19 2002
Another method to determine a pedestal

Due to beam background a simple average pedestal is often a bad measure of the pedestal in the pulse time window.

Method:
- Search the lowest energy value in the 32 waveform samples
- If the sample energies of the neighboring samples are within 1 MeV, respectively 2 MeV for the next neighbors average them to determine the pedestal

Hope:
- Might be compared to average less sensitive to beam background.
Min Pedestal distribution, beam data

σ = 0.4 MeV

slightly better gaussian resolution, but not overwhelming!
Min Pedestal versus Channel (min ped>-0.01)

Profile Histogram (y-Scale differs from previous!)

Module *72 + Fiber *24 + Channel

Similar channel by channel scattering as average pedestal
Occupyance of channels with bad pedestal

Min Pedestal < -0.0126 GeV

Nent = 365367
Bad Pedestals are Predominantly in Channel Zero

- $\text{ped} = 0.012695312 \{t0>10&&cha==0\}$
- $h_{temp}$
  - $N_{ent} = 760623$
  - Mean = -0.00643
  - RMS = 0.006049

~ 50% of the entries
Dominantly same channel is readout twice per event, often all samples are zero, sometimes some samples have values.

A problem of waveform extraction only?
Cosmic Runs: No beam

Idea:
- extract average pulse shape w/o beam background especially at low energies

Some examples today:
- Selection: E>2MeV
+ bias to show by example:
  - pedestal seems to be more stable
  - some problems

Statistics limited, no quantitative studies yet.
Cosmics

Tue Apr 23 13:39:40 2002
Cosmics: Noise?
Cosmics: Noise?

Tue Apr 23 13:39:40 2002
Moment Time Distributions: $E>20$MeV

- 50 to 100 ns shifts
- a correction for this might improve the efficiency and/or rejection power of the timing cut
- tail to late times
Summary

- large variations of the pedestal in a considerable amount of channels, especially in the end cap.
- signs of noise in cosmics data
- feature in waveform readout lead to double readout of channel 0 for nearly(?) all fibers.
- systematic shifts in the moment time