SHAPING TIME IN HEC

LARG Electronics Meeting 19.5.99

Contributions

- P.Strizenec: Noise reduction
- A.Kiryunin: MIP signals
- S.Chekulaev: Pions
- M.Kazarinov: Realisation and Data Base

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4th Longitudinal Segment in HEC Previous Arguments

One year ago it was decided to split the read-out of 16 gaps of the rear HEC wheel into two equal parts of 8 gaps each, HEC having 4 longitudinal segments.

Main arguments at that time:

- HV safety improved.
- Potential for improvement of
  - muon identification.
  - jet reconstruction and separation.
- Why not make use of the hardware what we have to invest in any case?

Cost increase: 70 KCHF

Long Shaping Time in 4th Longitudinal Segment in HEC Summary

- Small signals:
  - Improvement for MIP by factor twofor medium luminosities
  - Might expect improveent to S/N= 5
    for muons in eta range 1.7 to 2.5.
  - Potentially strong help in identification of muons in conjunction with muon chmbers.
- Jets:
  - No obvious improvements

- Realisation: Possible by redesign of patch panel and introduction of one special FEB per quarter.

- Total Cost: ~ 150 kCHF

4th Longitudinal Segment in HEC Implications

- The total # read-out channels remains unchanged: 24 * 4 * 32 = 3072 / side
- Each segment is independently supplied with HV.

  Total # HV lines: 4 * 4 * 32 = 512 / end-cap
- The calibration distribution scheme is revised. There will be 10 calibration generators for the front and 6 for the rear wheel.

  The total number of calibration lines does not change. 16 * 32 = 512 / end-cap
- The design of the preamp boards will be changed.

  As before there will be three types of boards.
- The # GaAs chips remains the same.

4th Longitudinal Segment in HEC Shaping and Trigger

- The peaking times will be adjusted in the preshaper insert in the FEB.
- The signals of segments 1-3 will be summed for the trigger.

  The 4th segment will not be summed having a longer shaping time than the other three.

TWO POSSIBLE ROUTES:

- Either: The peaking times will be adjusted to 50ns everywhere.
- Or: The shaping times will be adjusted to reach these peaking times (t_p ns):

eta range	Seg.1-3	Seg.4
< 2.5	50	100
>2.5	50	50

Long Shaping Time in 4th Longitudinal Segment in HEC Cost

- **No** extra cost for
  - GaAs chips
  - Preamp boards
  - Feedthroughs
  - Pigtails
  - Trigger summation
  - Calibration system

- **Additional** cost:
  - 8 FEBS (one per quarter and endcap) with associated RODs.
  - ~ 150 kCHF