MIP Studies: Status Report

• Last time…
  – We presented preliminary work on selecting MIPs with TKR and CAL
  – Efficiency was 3% so we needed to do more work

• Before worrying about efficiency numbers…
  – we need to understand the event topologies for simple cases

• What is in this talk?
  – We will show how we are exploring the variables in the merit ntuple to understand to select MIPs
    – Try simple case first…
MIP Studies: Status Report

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Aug 13, 2004
Hit Distribution in Thin layers

What are these zeroes?

So we selected events with no hits in the thin layer to study what their topology is.

Cut in McZDir: $0 < \theta < 30^\circ$
From trigonometric calculation (ensure hits in every layer)

Most of them at 24 as expected
Most of the events appear to be reconstructed at the edge ("frame") of the two towers…

**Cut:** MC angle in Z $0 < \theta < 30^\circ$

- **TktrThinHits = 0**

**XY Reconstructed Position of track 1 requiring no hits in the thin W layers**
These “frame” events are events impinging in the lower part of the TKR (Back section) so the first hits show up at the “frame” of the towers.
What happens in the Layers with no W?

- No Hits on Thin
- No Hits on Thick
- No Hits on Blank

Two cases:
- A hits = 0
- B hits ≠ 0

Cuts: MC angle in Z $0 < \theta < 30^\circ$

TkrThinHits = 0
No Hits in the TKR: Case A

We don't have any hits on any layers as expected…

Cuts: MC angle in Z 0° < θ < 30°

TkrThinHits = 0
TkrThickHits = 0
TkrBlankHits = 0

We don’t have any hits on any layers as expected…

Now we try to figure out what these events mean

How can these events trigger without hit any layer?

let’s examine the CAL…
Case A: CAL Energy per layer

We have energy deposited in the CAL. It is here that we had a trigger!
Case A: conclusion

• There are tracks that trigger only in the CAL although the cut on direction. It is possible by tower geometry

• Case B will be examined next week

• But we have some questions…
  – Why is CalMipDiff zero for only CAL events?
    – Maybe this variable is only filled when there is a track found in the TKR
  – For these events Tkr1FirstLayer was 0:
    – Does that mean layer 0 or did not hit the TKR?
Summary

• We have understood events that
  – entered hit the tower at different entrance points
  – Left no hits in the front section of the TKR

• Next?
  – Study effects from reconstruction (instead of McZDir)
  – Study dependence on position within the tower