Two towers preliminary report

TKR studies with one side readout for two towers configuration

Monica Brigida
Nico Giglietto
Outline

Some interesting TKR plots:

Compare distributions for selected events in 2Towers when the TKR is read out by left (135002057) or right (135002103) cables only. Baseline run (135002052) is used by reference.

- Hit multiplicity
- TOT
- DeltaTime

.....
### Two towers runs info (no cuts applied)

<table>
<thead>
<tr>
<th>Runs</th>
<th>Events</th>
<th>% 0 track</th>
<th>% 1 track</th>
<th>% 2 tracks</th>
<th>% More than 2 tracks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline run</td>
<td>293710</td>
<td>0.034</td>
<td>0.78</td>
<td>0.14</td>
<td>0.04</td>
</tr>
<tr>
<td>135002052</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“left” run</td>
<td>291861</td>
<td>0.034</td>
<td>0.78</td>
<td>0.14</td>
<td>0.04</td>
</tr>
<tr>
<td>135002057</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“right” run</td>
<td>292092</td>
<td>0.034</td>
<td>0.78</td>
<td>0.14</td>
<td>0.04</td>
</tr>
<tr>
<td>135002103</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ratio of events with different number of reconstructed TKR tracks
Number of reconstructed tracks for “right/left” runs and baseline run

All trigger types
No cuts applied
Events triggered by Tower 0 AND/OR Tower 4
Average number of hit strips per layer “right/left” runs and baseline run

All trigger types
No cuts applied
No event selection
(Tower 0 AND Tower 4)
Events selection

Events triggered by TKR in Tower0

Cut1 = GemTkrVector[0] == 1 && GemTkrVector[4] == 0 && GemCondWord == 2 (< 50% of events selected)

Cut2 = Cut1 + TkrNumTracks == 1 (40% of events selected)

To select MIPs we used the CalMIPRatio variable from merit root files

Cut3 = Cut2 + (CalMIPRatio < 1.3 && CalMIPRatio > 0.6) && CalNumHit[4] == 0 (10% of events selected)

Normal tracks selected

Cut4 = Cut3 + VtxZDir < -0.95 (3% of events selected)
Average number of hit strips per layer in **baseline** run vs Cuts applied
Average number of hit strips per layer: “right”, “left” runs and baseline run.

Normal tracks selected (Cut4 = Cut3 && VtxZDir < -0.95)
Average ToT (uncorrected) per layer

Baseline

Left/Right run

Average ToT per layer

Entries: 36
Mean: 17.38
RMS: 10.38
Delta Time between adjacent events (EvtTicks ... unit 50 ns)

Slope: $4 \times 10^{-6}$

about 80 Hz
The Hit Map before the cuts
How to select central and edge events

Vertical tracks selected

If TkrHitNum > 223 && TkrHitNum < 1077 -> central event
  If we have more than one hit strip into the layer, we take the average
  We verified the condition the first and the last layer crossed
Otherwise edge event

A1 = A2
... when the cuts are applied and "central" events selected for baseline run
... when the cuts are applied and "edge" events selected for baseline run.
To do

Analysis for “central” and “edge” events to be completed (Tkr plot for baseline and left/right readout runs)
MIPs selection studies .. to be continued
  i.e. Hits out of the tracks must be taken into account ...
ToTs studies vs cosθ and ϕ