GLAST *The Gamma Ray Large Area Space Telescope*

Diagnostic Data from

# TKR and CAL

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Martin Kocian

Introduction

- Diagnostic data is available from TKR and CAL.

- A bit in the diagnostic information is the OR over all trigger signals in one layer-end.

- Latching of the diagnostic data is controlled by 3 parameters:

  1. SHAPE in the CC delays trigger signal w.r.t. latching time.

  2. STRETCH in the CC (RC for TKR) gives the trigger signal a defined length.

  3. WINDOW_WIDTH in the GEM delays latching time w.r.t trigger signal.

- TACK delay and TREQ delay are irrelevant.

CAL Scan

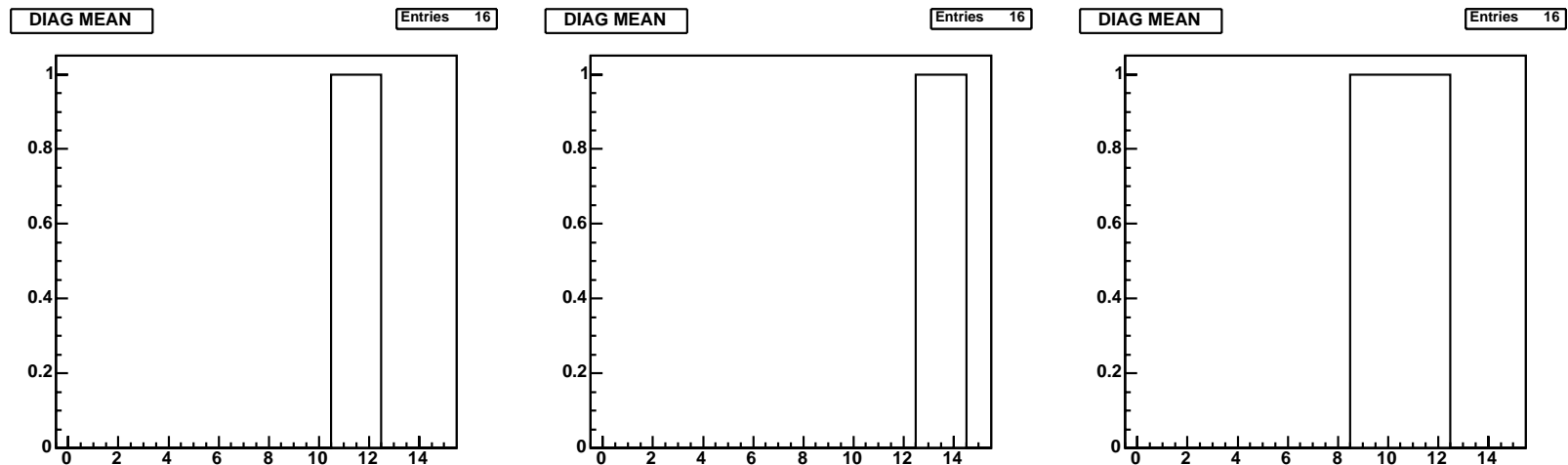To determine the correct settings, scans of the SHAPE parameter
were performed:
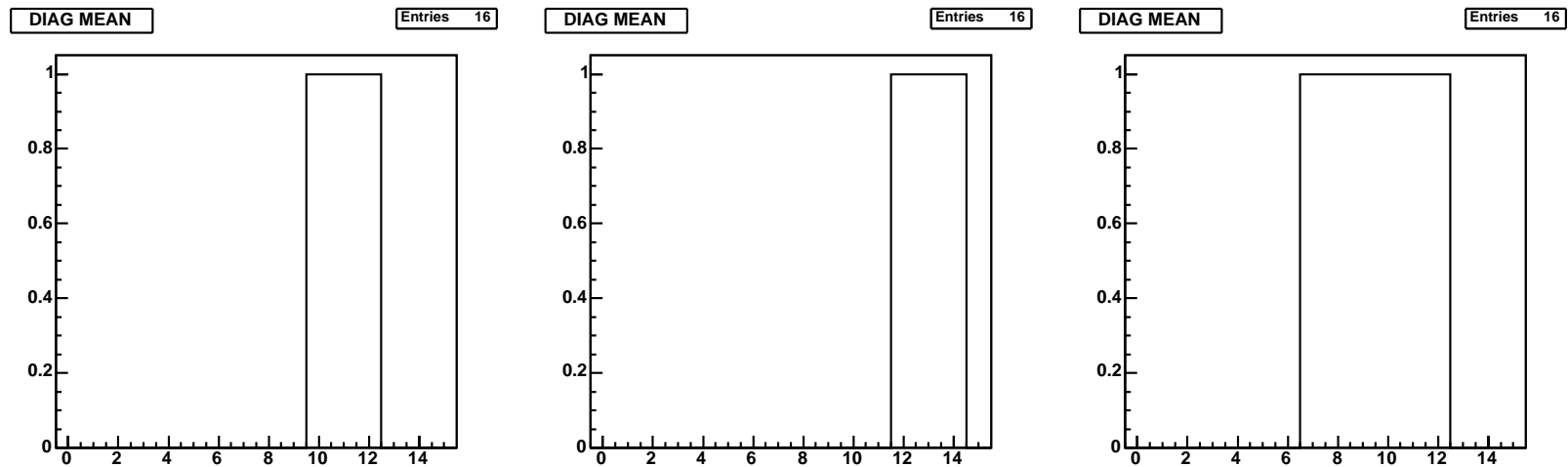
- LEFT: WINDOW_WIDTH=1, STRETCH=0, SHAPE=0-15

- CENTER: WINDOW_WIDTH=3, STRETCH=0,
  SHAPE=0-15

- RIGHT: WINDOW_WIDTH=1, STRETCH=3, SHAPE=0-15

In addition TREQ delay and TACK delay were varied $\rightarrow$ no effect

TKR Scan

Same procedure for the TKR:

- LEFT: WINDOW_WIDTH=1, STRETCH=1, SHAPE=0-15

- CENTER: WINDOW_WIDTH=3, STRETCH=1, SHAPE=0-15

- RIGHT: WINDOW_WIDTH=1, STRETCH=3, SHAPE=0-15

In addition TREQ delay and TACK delay were varied → no effect

Results

- Scans were performed on the mini tower/Dalek with charge injection

- The ldf files are available on request

- The result from the scans is the following prescription (as shown at IA meeting):
  - shape ≤ 11
  - CAL: shape ≥ 9 - stretch + window width
  - TKR: shape ≥ 11 - stretch + window width

- If these conditions are true diagnostic data from triggers occurring anywhere in the trigger window will be latched.
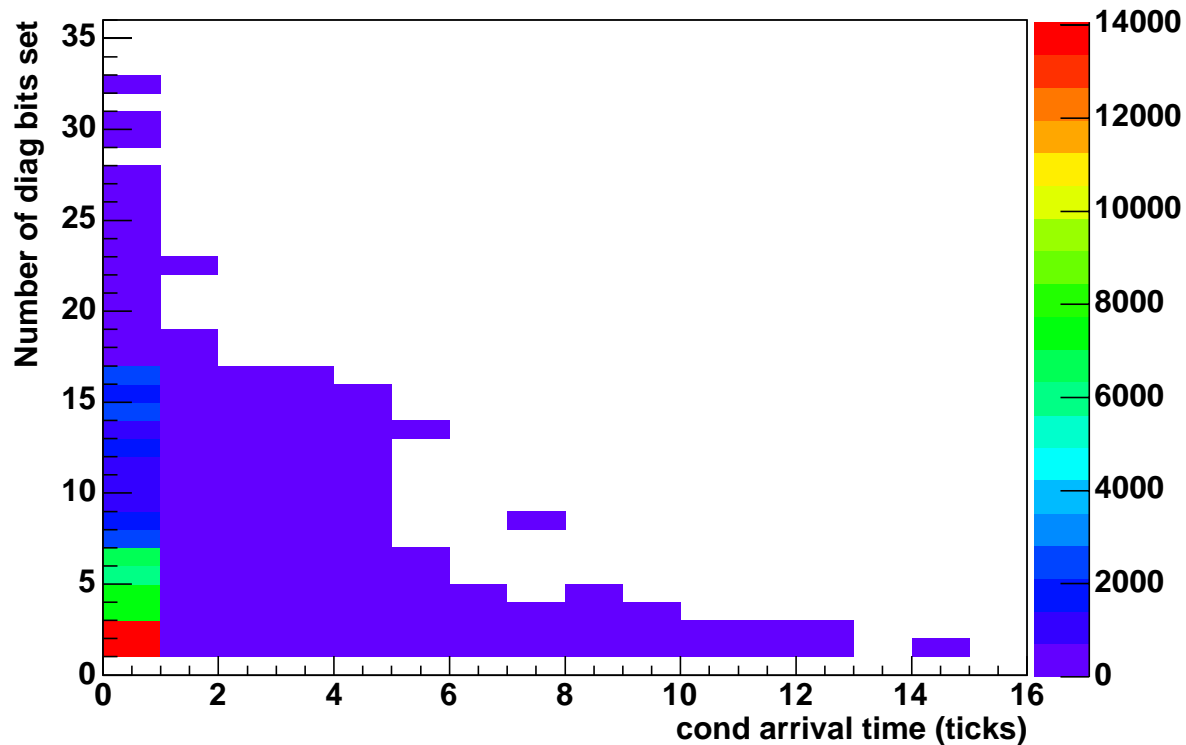
Verification on real data

As a verification take TRG efficiency run (win_width=15) and plot arrival time vs. number of diagnostic hits.

Calorimeter:

All entries have diagnostic hits.

Now do the same with the TKR.

nTKRTRG:GEM_condarrtimetkr {GEM_condarrtimetkr!=31}
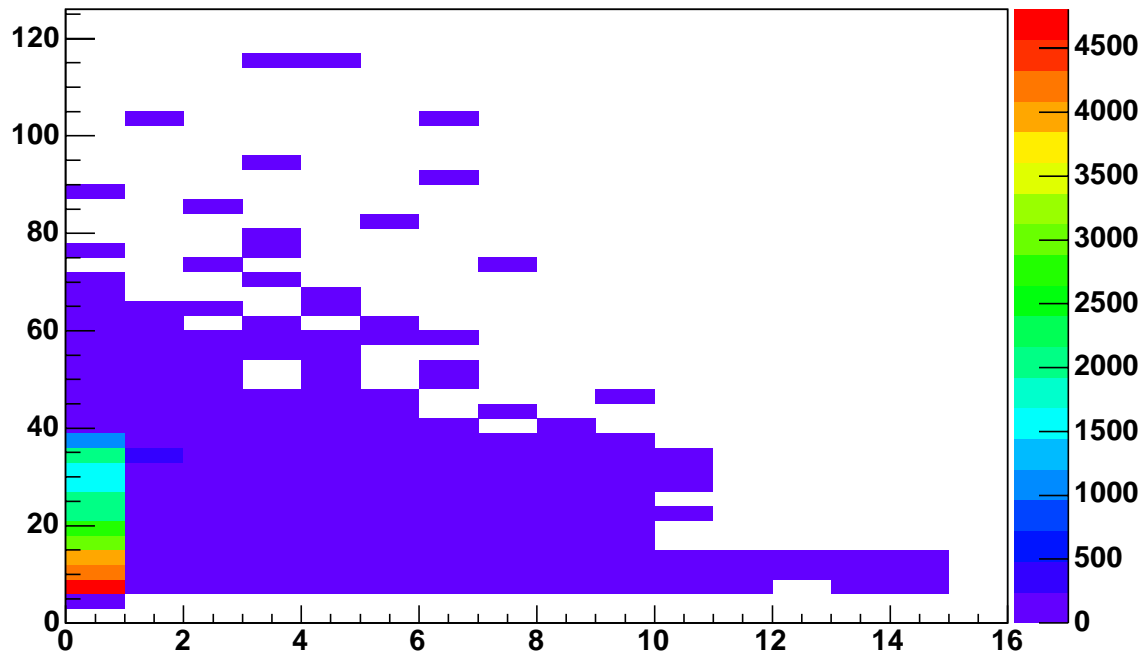
There should be no entries with less than 6 diagnostic hits. In this run there is 1 out of 36,000 events that has only 5 hits. This is due to the fact that the stretch was set to 0 which could result in a small stretch for a small signal. 99.997 % of the data have diagnostic information.

Conclusions

- With the new TKR stretch of 14 and a window width of 12, the shape parameter can be set to 9, 10, or 11 to latch the diagnostic data anywhere in the window. (Current setting: 9)

- Possible problem: The TKR requires a coincidence of 6 layers to open the window. Some layers fire early and will have to be latched even though they are outside the window. If the SHAPE parameter were set to 11 we would latch two ticks before the window opens. This may not be enough so the TKR stretch might have to be increased as well/instead.