

Synchronization and tagger alignment

Run 700000943

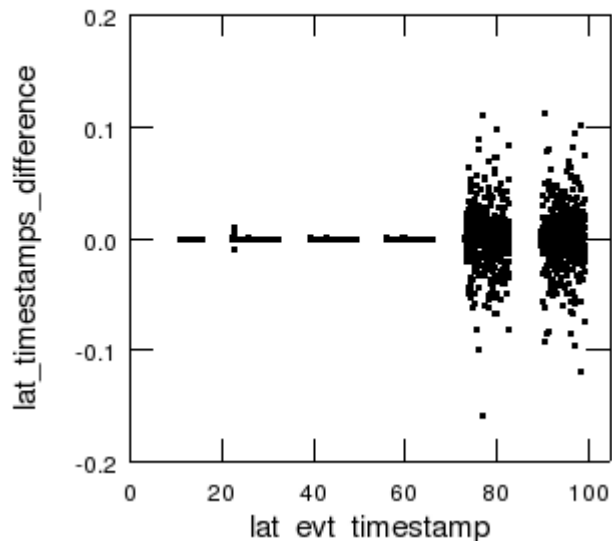
It is only a test run for checking the synchronization of the CU with the ancillary systems, so don't get too much excited about that:

- Beam energy: 5 GeV
- Trigger: S0 only (mainly pions)
- Rate: very high, presumably more than 30 kHz
- Number of events: ~10000, (roughly 30-40% of them do NOT have hits in the CU)
- Tagger configuration: only the first arm (modules 1 and 2) exposed to the beam.

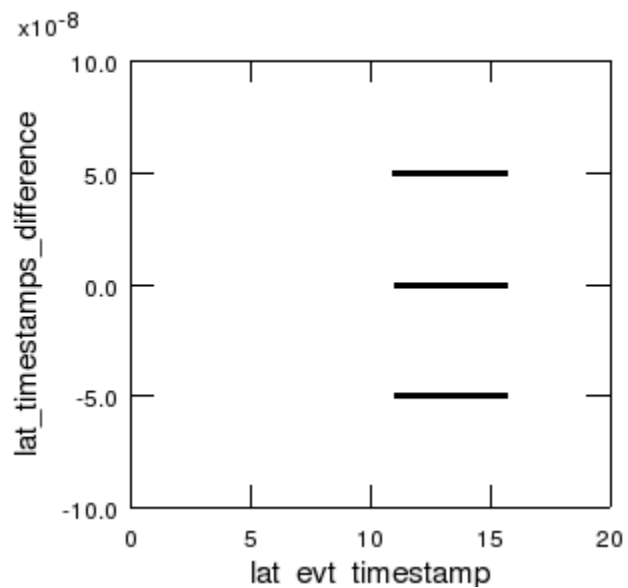
There are enough good events to make some interesting plots, though.

Synchronization

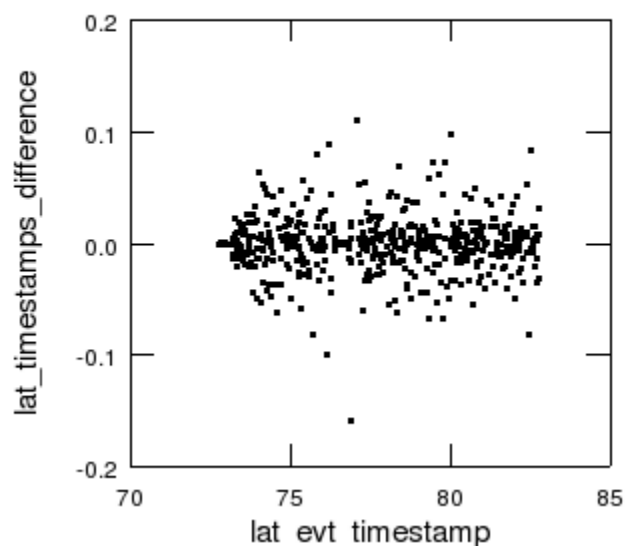
Both the CU and the ancillary system keep track of the delta time between consecutive events. A plot of the difference between those two delta times (vs. the absolute timestamp, for instance) allows to monitor the synchronization during the run. In fact, in this run, we have lost the synch at some point (but remember: this was only a test at a very high rate).



This is how the plot looks like while the two systems are synchronized (namely max 50 ns - 1 clock tick - time difference):

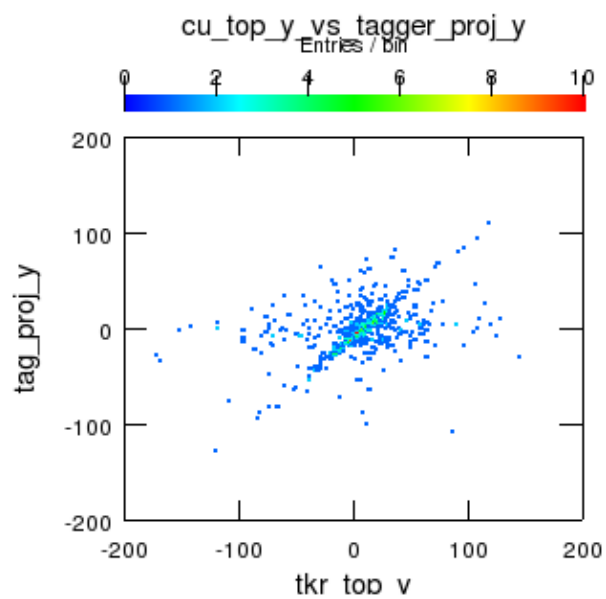
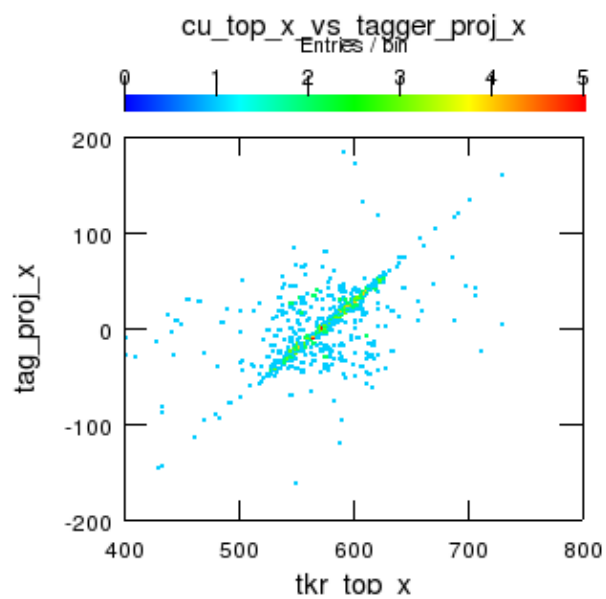


When the synch is lost the plot becomes a mess:

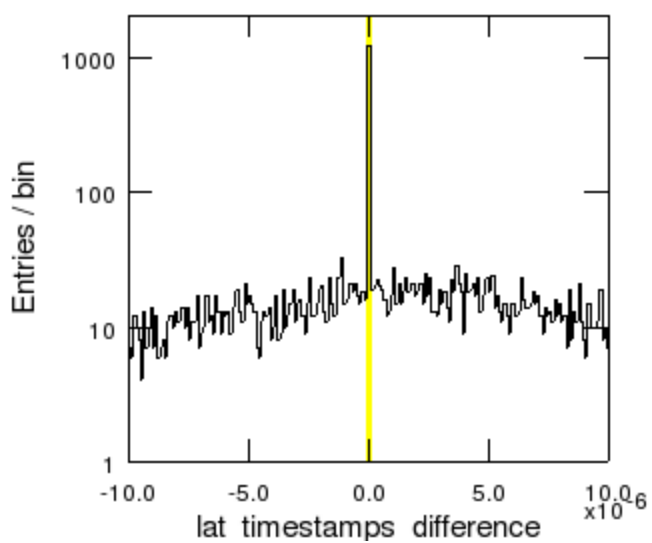
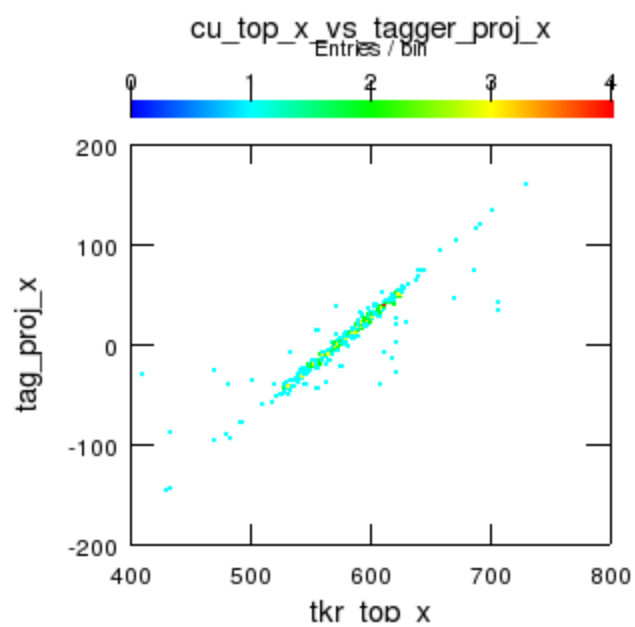


Tagger vs. CU: hit positions correlation

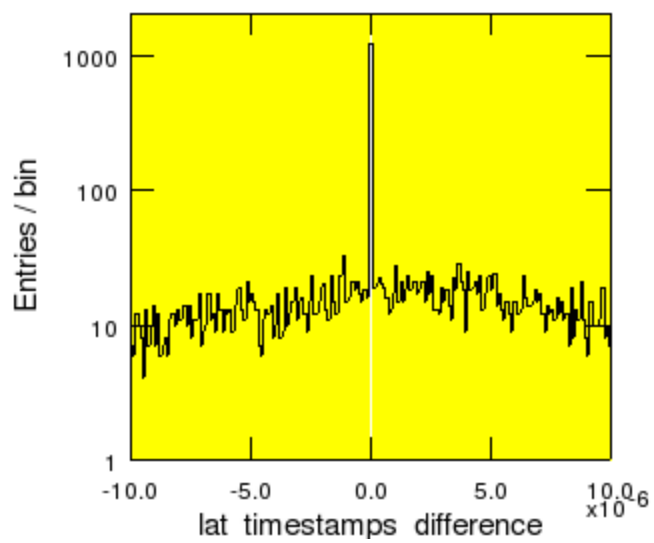
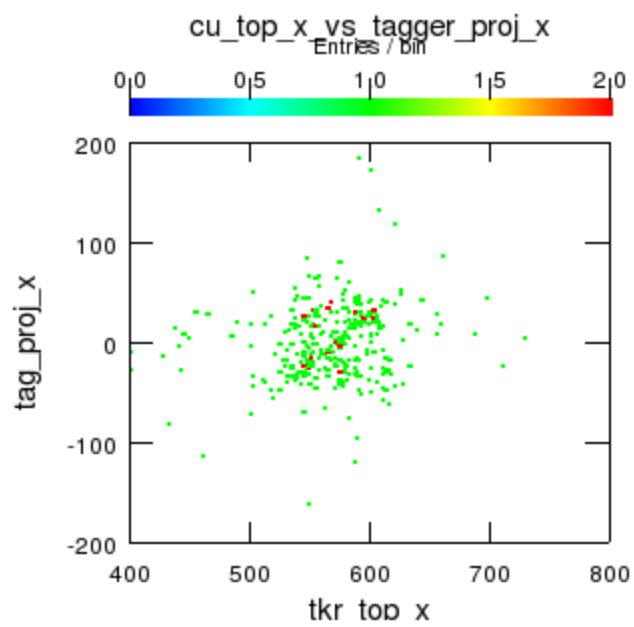
The following plot shows the correlation between the hit position on the top layer of the CU tracker against the track position in the tagger, projected onto the top layer of the TKR (both x and y views).



If we make a cut including only those events which are in synch, the correlation is much better (only the x view showed):

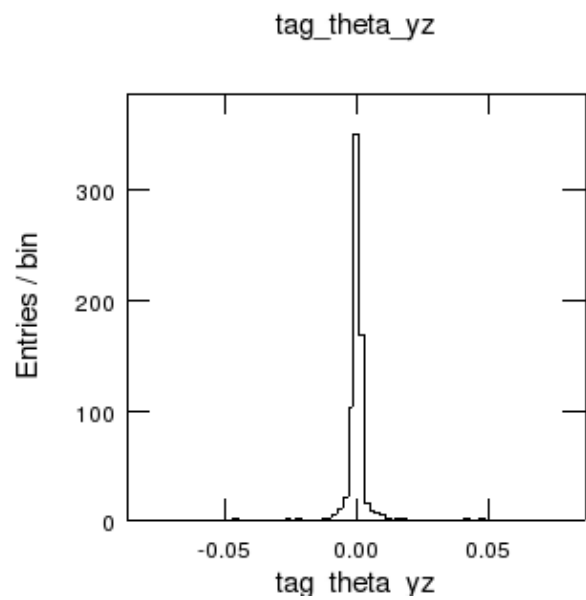
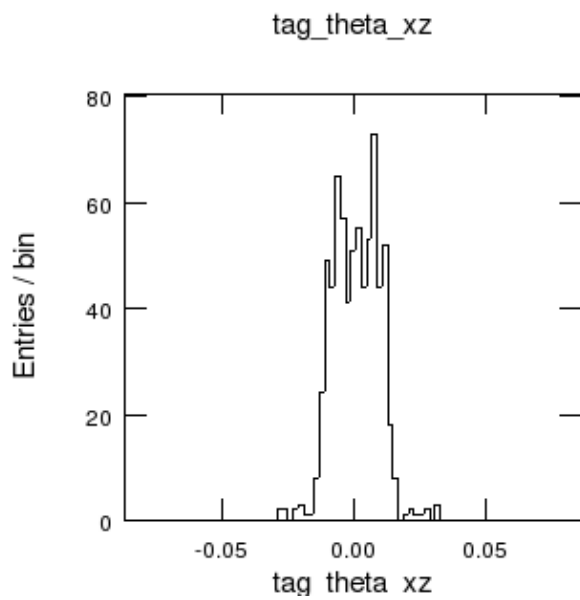
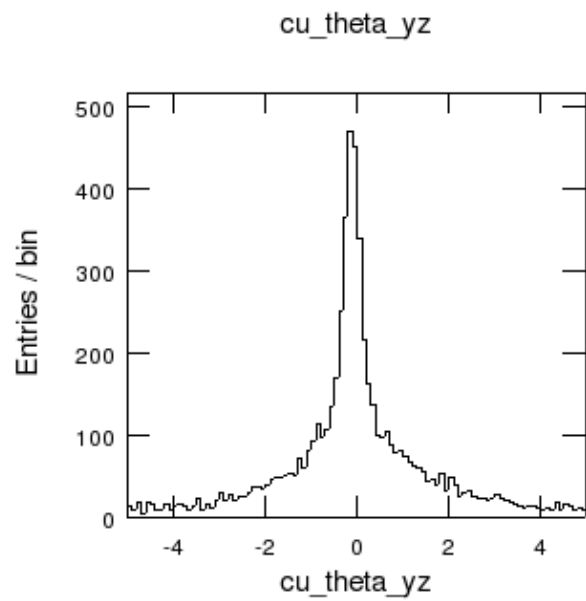
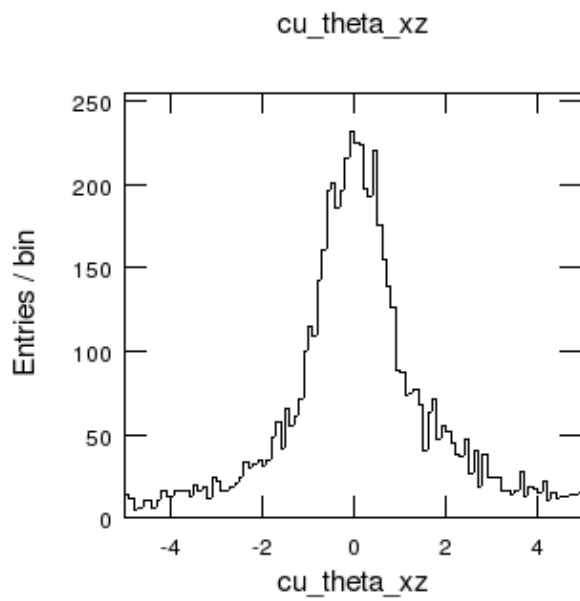


Then, if you're really brave, you can invert the cut:

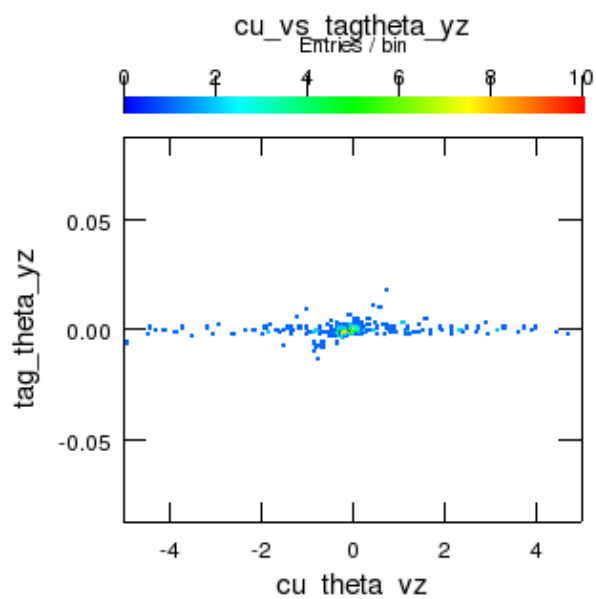
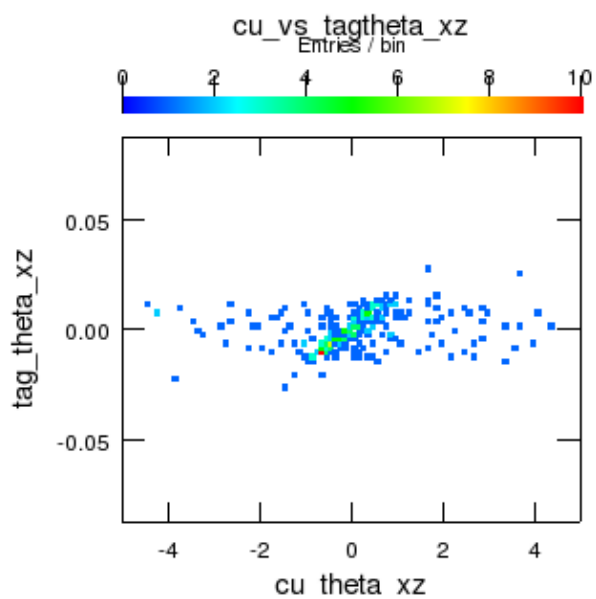


Tagger vs. CU: angular correlations

Here is the beam divergence, as seen by the tagger (again: first two chambers only) and the CU:



and here, again, the correlations (the long tails on the CU sides are due to the *reconstruction* algorithm, which is actually very stupid):



And, eventually, here is the PSF online (the RMS is .25 degrees, but that's just for fun):

