Performance of BBC in pp collisions

- Analysed pp runs from January.
- Modified the BbVertex to use all tubes to extract a t0 and Z vertex.
- Correlation to TPM1 tracks (Run 6473)

Analyzed 78K trigger 3 (FS) and 30K trigger 6(MRS)

The BB counter has low efficiency – The first figure shows the hits in left vs right. Note that the total number of events is ~ 16.8K out of a total of 106K i.e.. an efficiency of ~15%. Of these the majority has only one hit in left and right,

The overall resolution in time and z determination is though still pretty good.As can be seen in the correlation plot to TPM1 tracks.

The resolution is not nearly as good as in Au-Au but reasonable for checking average vertex distribution-quality of event sample where timing and vertex is derived by other methods.


BB Left mult vs Right mult

Z(BB) vs Z(TPM1 tracks)
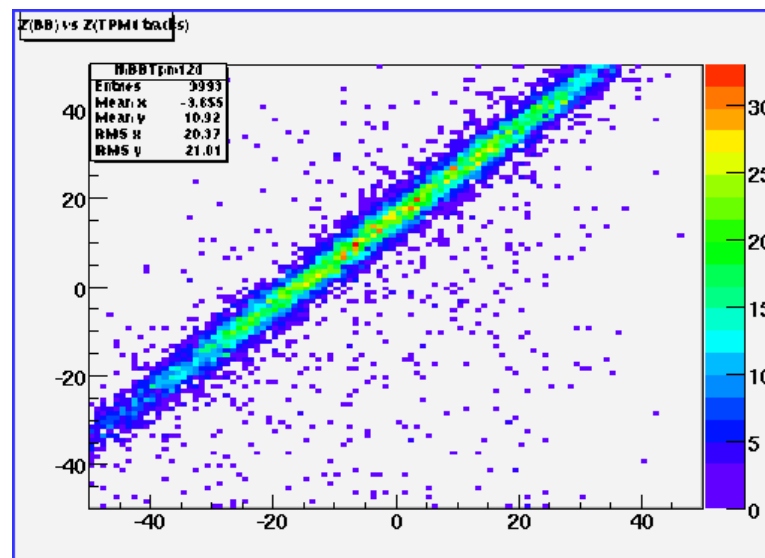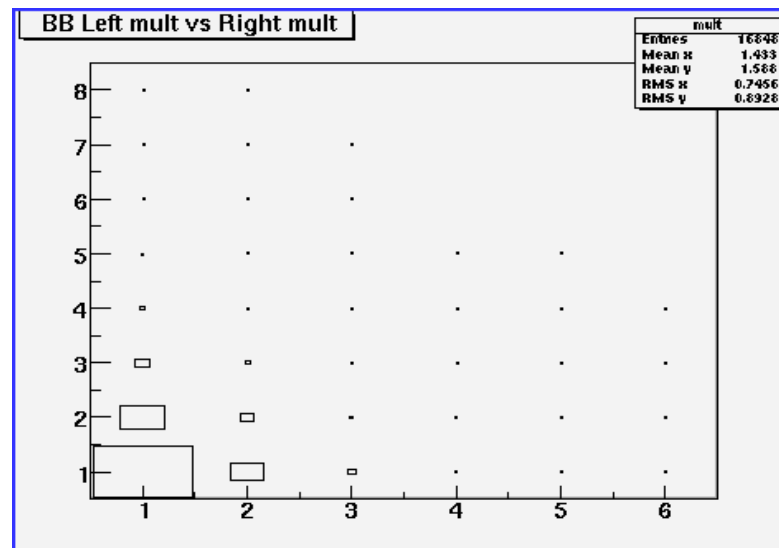
Vertex resolution

- Z(BB)-Z(TPM1) for N>=1 and n>2 hits respectively.

- The resolution is ~ 2.6 and 1.9 cm respectively; this is to be compared with the AuAu resolutions of ~ 0.8 cm.
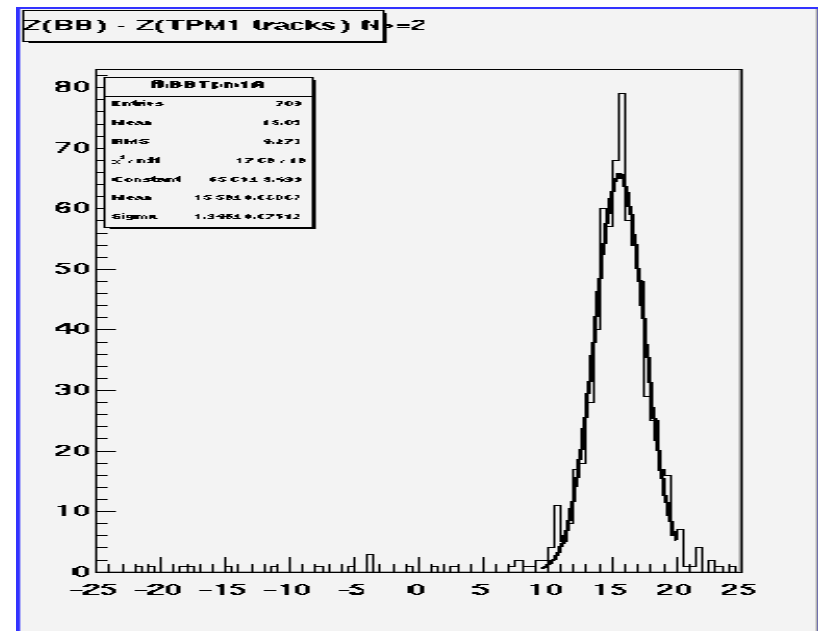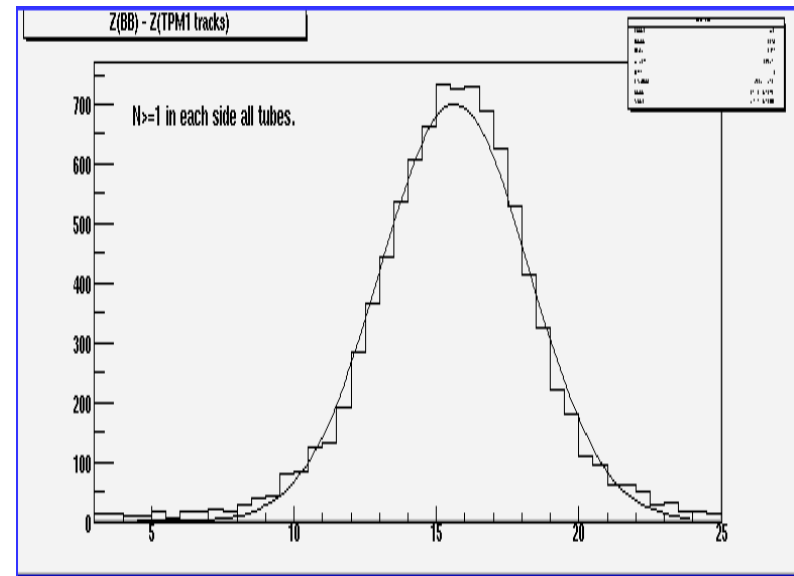
Timing relative to TD1

- Timing of Td1 slat 1, 2 relative to BB(t0) for N=2. For N=1the timing is poorer ~ 120 psec. The fits for N=2 gives ~ 90 psec.
- Since it is unclear if this is dominated by the BB or TD1 additional checks was made.
- The initial estimate for TD1 was to have ~40-50 psec resolution.
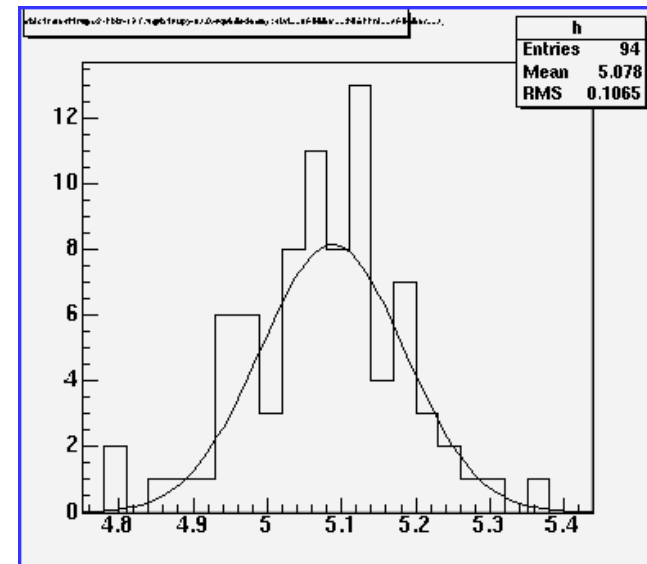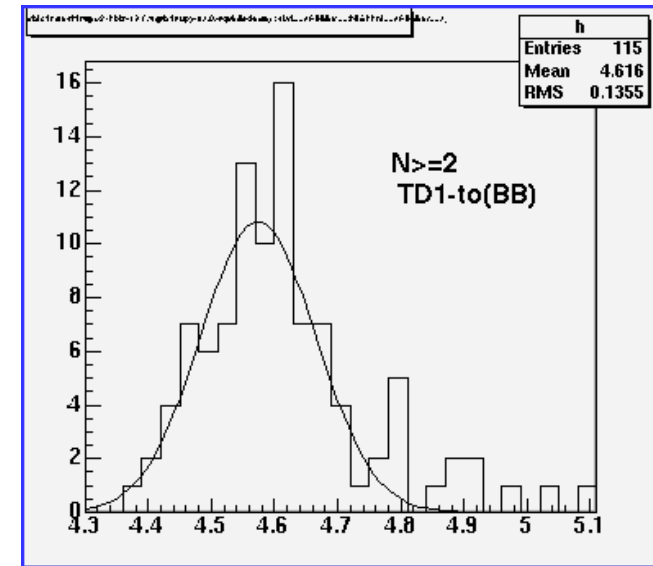
TD1 slewing correction.

- The response of TD1 was re-evaluated.
- Slewing correction are determined from basically looking at scatter plots of tdc-alpha/sqrt(e) and deciding visually on a best value (at least for now).
- Run 6473 (3 deg) –observe multiple hits in each slat.
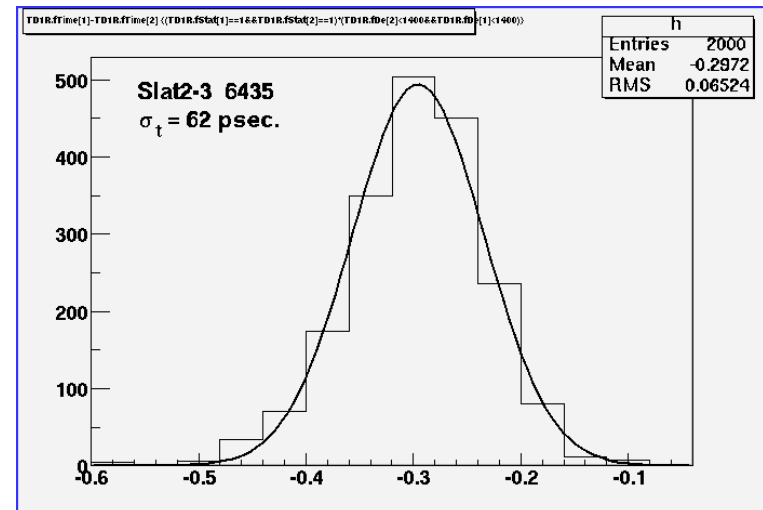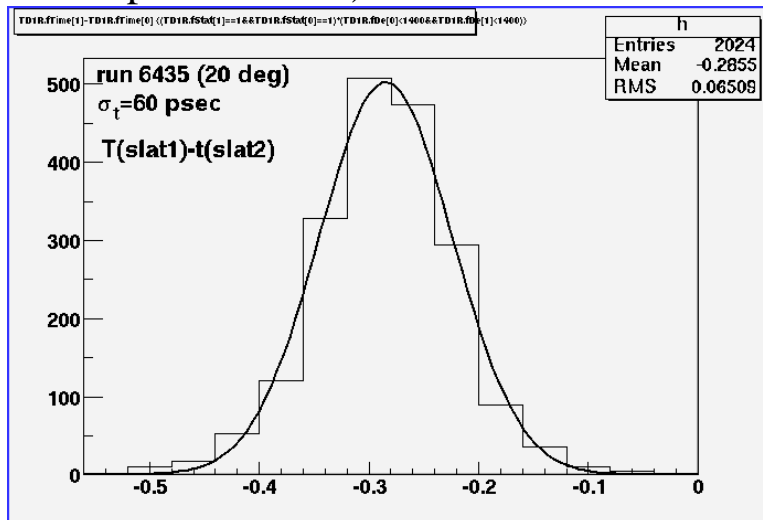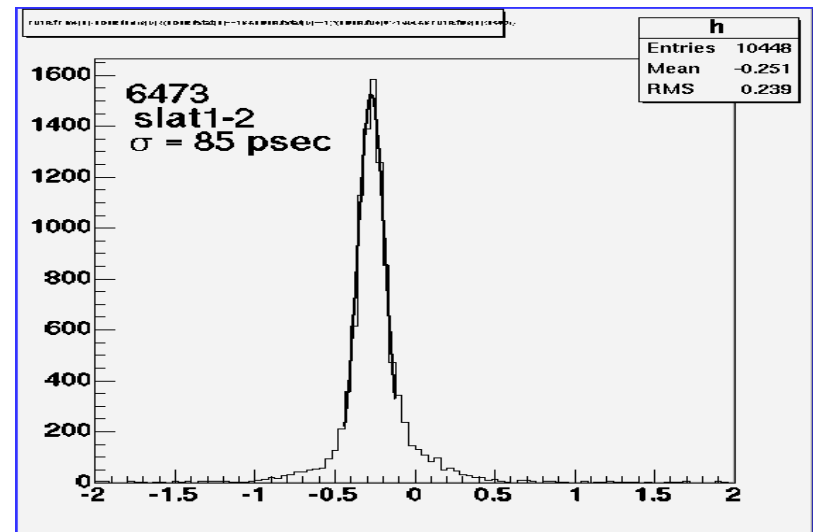- The overall slewing looks reasonable.

Technical note – uses Td1RdoModule with ntuple on and usebb on.

The constants used are different than those used so far in the rdo module and which Kris had used for his analysis.
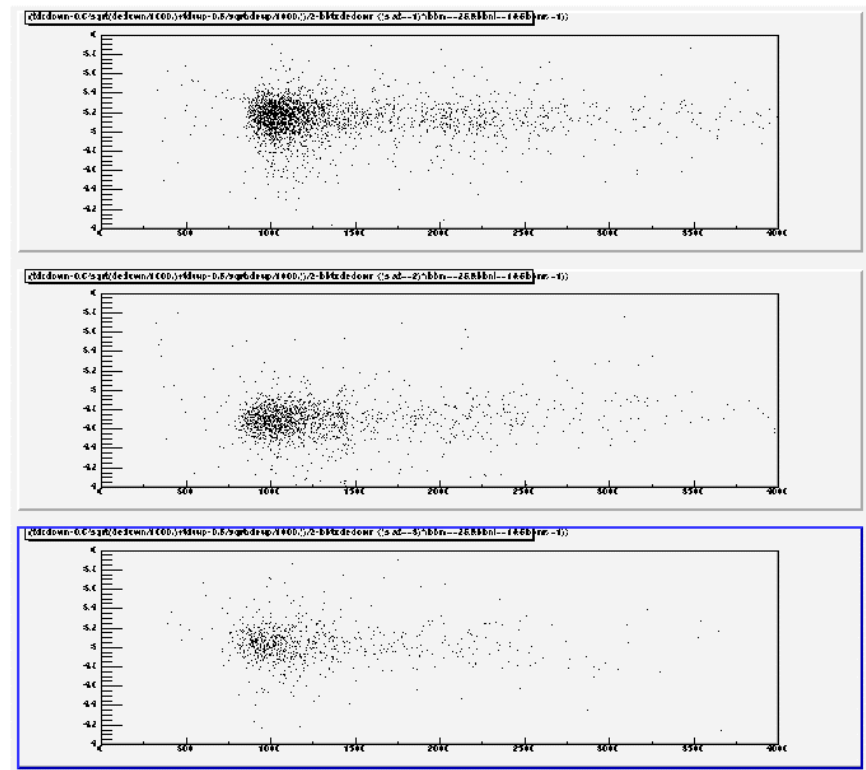
Results of slewing diff.

- Results does depend on angle setting –

- The first plot is for 3 deg requiring a slat1+2 difference time requiring single hit in both. The spectrum is dirty and the resolution 85 psec = 60 psec intrinsic.

- Taking run 6435 (20 deg) results are much nicer see two plots for slat1-2 and slat 2-3 (sigma= 60 psec. equivalent to ~44 psec. Per slat)

6473
slat1-2
σ = 85 psec

	h	
Entries		10448
Mean		-0.251
RMS		0.239

run 6435 (20 deg)
σ_t=60 psec
T(slat1)-t(slat2)

	h	
Entries		2024
Mean		-0.2855
RMS		0.06509

Slat2-3 6435
σ_t = 62 psec.

	h	
Entries		2000
Mean		-0.2972
RMS		0.06524

Summary

The TD1 performs as advertised under clean conditions. The performance may be slightly worse at 3 deg due to backgrounds. The signals are certainly not as clean as for 20 deg.

Its expected to work for d-Au in addition to the pp performance.

Software that has still has to be done –

- Slewing correction into DB

- Calibration modules for timing and slewing off sets. This not so much for the present pp analysis, but in anticipation of the upcoming dAu and pp running.

Software that was modified

- BbVertex and BbVertexModule to allow for sufficient diagnostics. See code for additional comments.