

BigBite Analysis

MWDC 1-pass Residual Issue and Asymmetries Error Checks

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Outline

1 BigBite 1-Pass MWDC Issue

2 MWDC 1-Pass T2 Stability

- t_0 Stability
- Track Residual Stability

3 Asymmetry Error Check

4 Summary

5 What's Next

1-Pass MWDC Issue

- It was discovered that there was a MWDC issue when looking at the T2/T6 trigger events

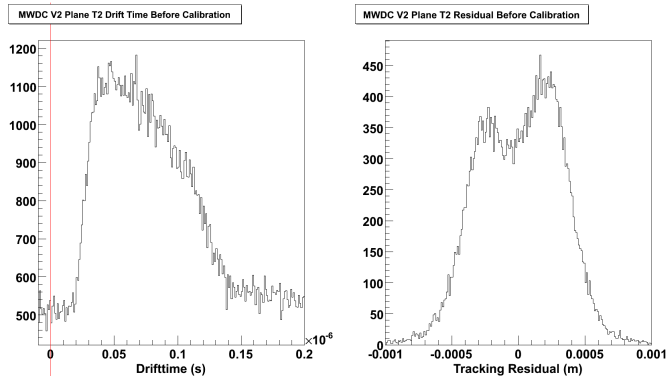


Figure: T2 trigger events for the v2 plane before calibration. Left plot shows drift time and right plot shows tracking residual

After A/D Card t0 Calibration

- Calibrated the t0 timing for each A/D card on each plane
- Recalibrated the drift time to drift distance and wire offsets...

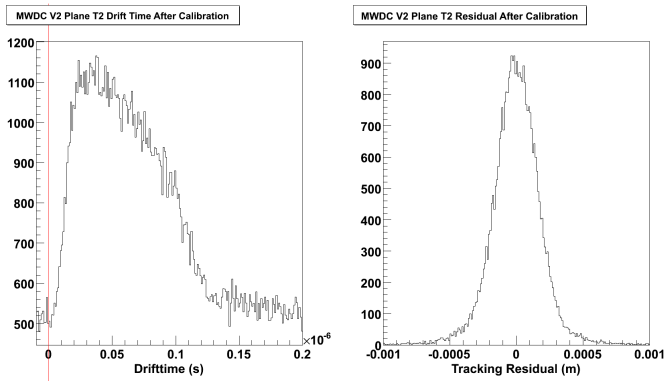
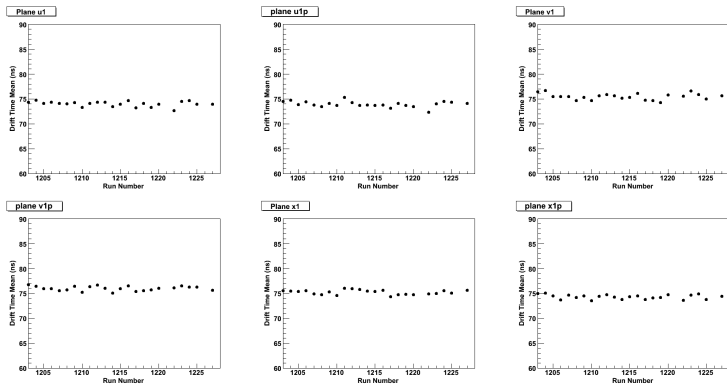
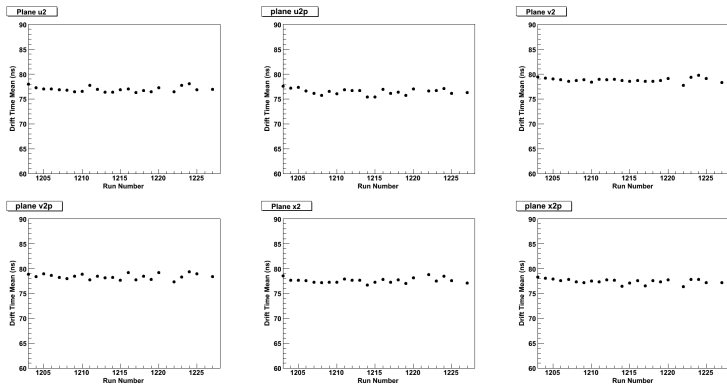
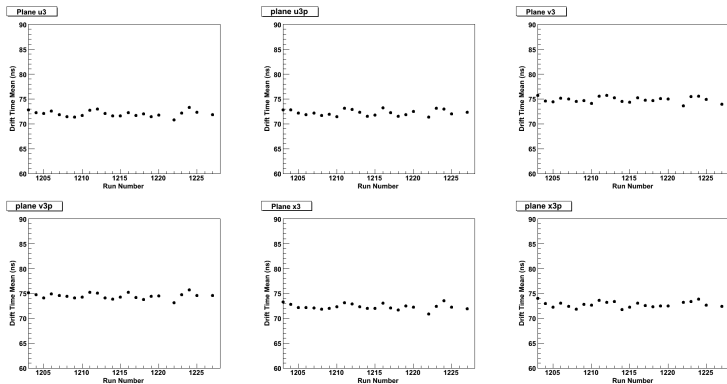


Figure: T2 trigger events for the v2 plane after calibration. Left plot shows drift time and right plot shows tracking residual.

Chamber-1 t_0 Figure: Chamber 1 drift time over all 1-pass ^3He runs.

Chamber-2 t_0 Figure: Chamber 2 drift time over all 1-pass ^3He runs.

Chamber-3 t_0 Figure: Chamber 3 drift time over all 1-pass ^3He runs.

Chamber-1 Residuals

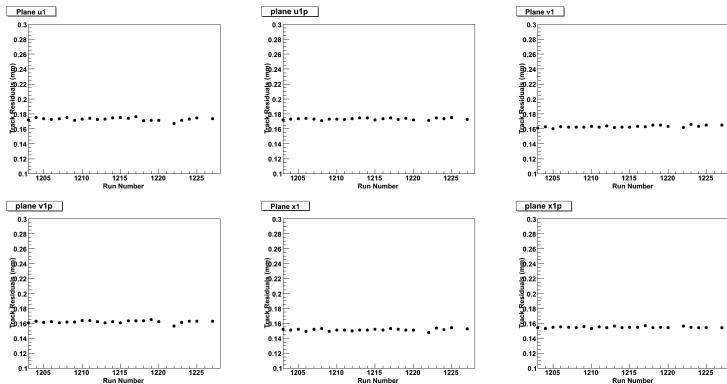


Figure: Chamber 3 track residuals over all 1-pass ^3He runs.

Chamber-2 Residuals

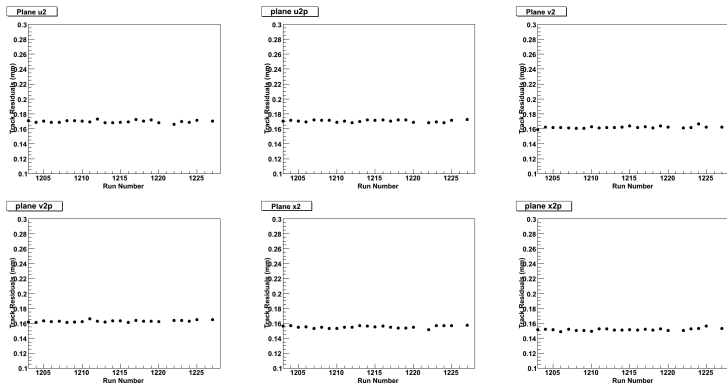


Figure: Chamber 2 track residuals over all 1-pass ^3He runs.

Chamber-3 Residuals

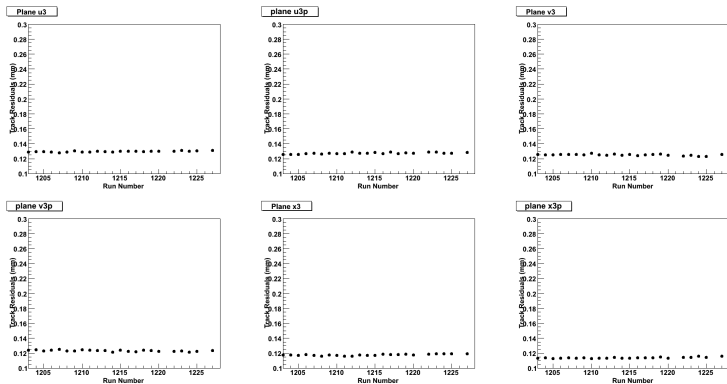


Figure: Chamber 3 track residuals over all 1-pass ^3He runs.

Asymmetry Error Check

- To check the error on the asymmetries I plot $\frac{1}{\sqrt{N}} - \sigma$
- $N = N_p + N_m$ where $N_p(N_m) =$ plus helicity(negative helicity)
- $\sigma = \sqrt{\frac{4N_p N_m}{(N_p + N_m)^3}}$
- σ was computed by

$$\sigma^2 = \left(\frac{\partial}{\partial(N_p, N_m)} \frac{N_m - N_p}{N_m + N_p} \right)^2 \sigma_{(N_p, N_m)}^2$$

- For small asymmetries $\sigma \sim \frac{1}{\sqrt{N}}$

Asymmetry Error Difference ($\frac{1}{N} - \sigma$)

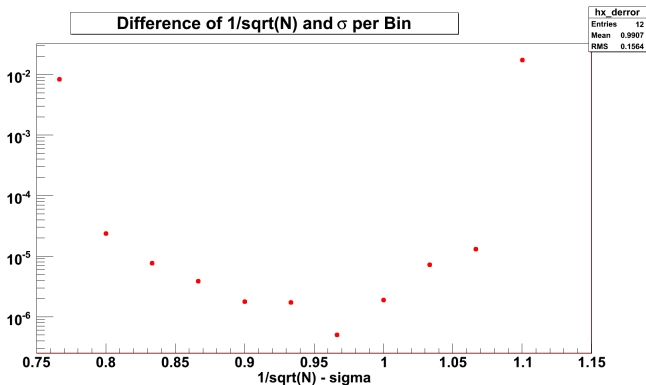


Figure: Asymmetry error difference for T2 events during 1-pass ^3He running.

Trigger Asymmetry Error Comparison

- Pre-scales during 1-pass ^3He running were $T1 = 20$, $T2 = 2$

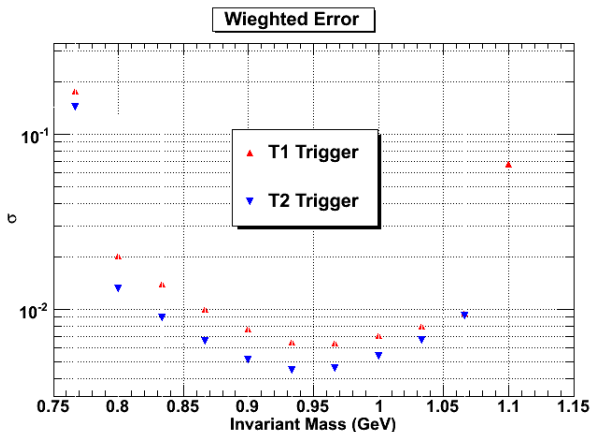


Figure: Asymmetry error comparison of the T1 and T2 triggers.

For Next week

- 1-pass ^3He MWDC issue fixed
- Have plots to now check errors on the asymmetries
- Current error calculation looks ok

For Next week

- Start towards getting g1 and g2 on 4pass data
 - Reproduce Diana's A1 and A2
 - Already computed 4-pass raw run by run asymmetries, need to get target/beam orientations now
- Look at "mis-aligned" electrons in ps vs sh in x-bins
- Do a MWDC check for our 4-pass runs
- Finish BB Čerenkov HV1 calibration