

BB/HRS Analysis for d_2^n

LHRS Theta, H2 Update, MWDC Calibration

Matthew Posik

¹Temple University
Philadelphia, PA 19122

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Outline

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 - t_0 Plane Calibration
- 2 H2 Elastics
 - The LHRS Proton Cuts
 - Coin. BigBite Events
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2nd t_0 Plane Calibration/Residuals

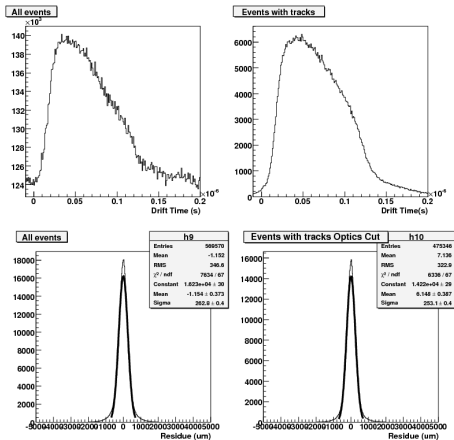


Figure: 4-pass t_0 's (top) and residuals (bottom) for MWDC X2 plane after 2nd calibration. Left is all hits, right is requiring a track.

BigBite MWDC 5-pass t_0 and Residuals

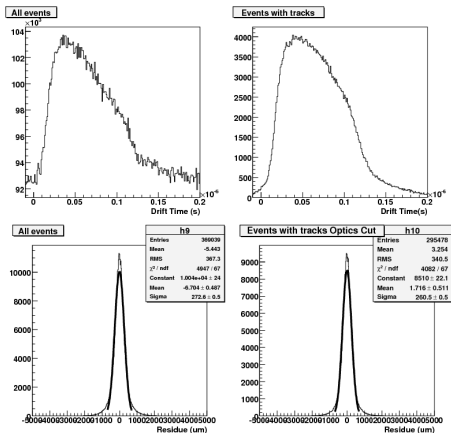


Figure: 5-pass t_0 's (top) and residuals (bottom) for MWDC X2 plane using 4-pass 2nd calibration. Left is all hits, right is requiring a track.

BigBite Residuals

Chamber 1 σ (μm)	u1	u1p	v1	v1p	x1	x1p
Before	665.5	665.3	678.8	661.7	577.5	575.1
After(1)	295.6	297.2	282.6	280.7	274.7	276.7
After(2)	283.7	285.4	272.0	270.8	261.2	263.7
5-Pass	290.7	296.1	280.4	279.6	269.9	271.4
Chamber 2 σ (μm)	u2	u2p	v2	v2p	x2	x2p
Before	717.3	708.2	705.4	715.8	602.9	606.9
After(1)	295.6	289.5	285.1	285.6	276.0	268.8
After(2)	284.5	278.1	272.9	273.7	262.8	255.3
5-Pass	296.3	287.9	279.9	282.1	272.6	263.6
Chamber 3 σ (μm)	u3	u3p	v3	v3p	x3	x3p
Before	606.7	617.6	613.5	622	480.8	488.8
After(1)	269.5	268.2	262.8	260.6	225.9	223.0
After(2)	253.7	252.2	246.9	244.6	210.6	207.9
5-Pass	259.1	259.1	249.4	247.7	214.4	211.3

LHRs Target Cuts

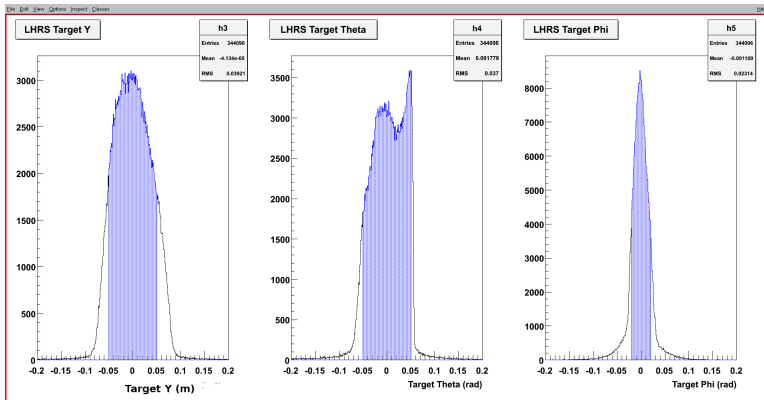


Figure: LHRs tg cuts. Y target (left), theta target (center) and phi target (right)

LHRs Momentum/Energy Cuts

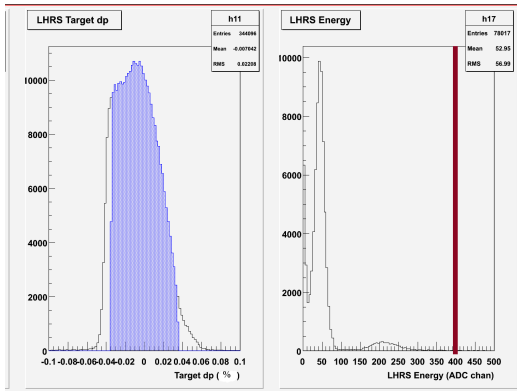


Figure: LHRs momentum cut (left) and LHRs pr1+pr2 cut (right)

Other LHRs Proton Cuts Used

- Other cuts used:

```
(DL.evtypebits&1<<5)==(1<<5)&&(DL.edtpl==0.0)
L.tr.n==1.0
(L.vdc.u1.nclust==1.0)&&(L.vdc.v1.nclust==1.0)
&&(L.vdc.u2.nclust==1.0)&&(L.vdc.v2.nclust==1.0)
L.cer.asum_c==0.0
abs(((evbbite_u3r-453.393)/6480.30)-14.75)<1.0
```

This leaves **89,480** proton events in the LHRs

BB Coin Cuts

- We add some BigBite cuts to electrons selected using the coin. protons of the LHRS.
- Additional BB cuts are:

```
abs(BB.tr.vz[Ndata.BB.tr.vz-1])<0.20)&&(Ndata.BB.tr.vz!=0)  
BB.tr.n==1
```

This leaves **82,217** coin. electrons in BigBite **92%** of LHRS protons

BB Čerenkov Multi-Hit TDCs

- BigBite Čerenkov detector used a multi-hit TDC so when cutting on TDC window, all hits need to be looked at.
- hits in all 20 TDCs were looped over and ORed together for the BigBite TDC cut.

BigBite Čerenkov Multi-Hit TDC

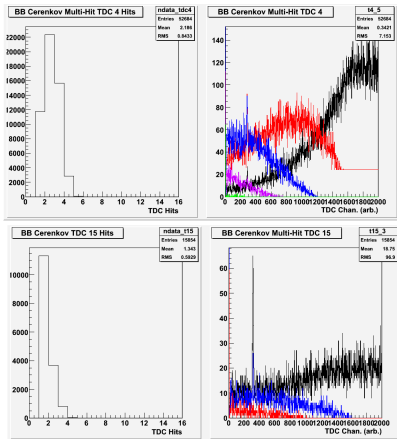


Figure: Shows TDC hits (left) and signals in each hit (right) for TDC 04 (top) and TDC 15 (bottom).

BB Čerenkov Multiu-Hit TDC Cut

- Applying all of the above cuts and now adding the BigBite TDC cut...

There are **64,477** coin electrons left in BigBite.

- We can now apply an ADC cut to the corresponding TDC
- This is done by **ADCxx AND TDCxx(all hits)**, where xx is the pmt number.

Using an ADC cut of **30 chan.** there are **44,928** events left

BB Čerenkov

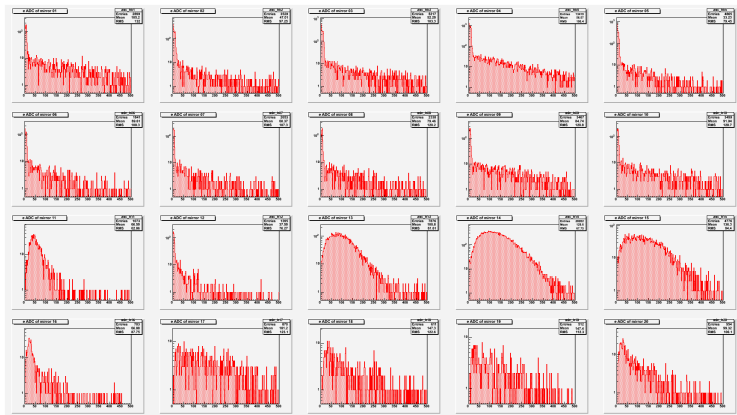


Figure: BigBite Čerenkov ADCs for H2 BB coin events.

BB Energy vs PreShower

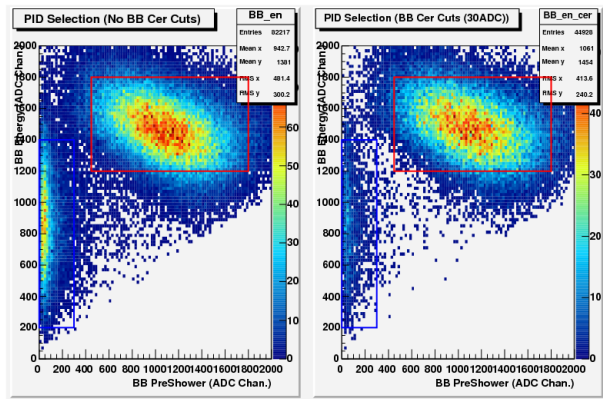


Figure: Shows Energy vs Preshower for H2 BB coin events.

Summary

- MWDC tracking residual resolution off from Transversity by $40\mu m$
- Will $40\mu m$ make a difference in DIS?
- Will look at PID of H2 events
- An efficiency for Čerenkov be obtained from ADC 13,14,15 ?

Summary

- Put together a \$1200 poster
- Particle Selection in BB for H2 runs
- Modify THaCherenkov class to include multi-hit TDCs