

BigBite Analysis

BB Optics

Matthew Posik

¹Temple University
Philadelphia, PA 19122

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Outline

- 1 BigBite Optics
 - Intorduction
 - Optics Summary
- 2 PreShower/Shower Sums
- 3 What's Next

Calibrations

- BigBite Optics Strategy:
 - No field run is used to find location of the wire chamber
 - Carbon foil targets are used to calibrate interaction vertex
 - Sieve Runs used to calibrate the angles
 - Elastic ^2H used to calibrate momentum
- Corrections were made by plotting vertex, momentum vs various tracking variables to remove dependencies
- Xin has taken care of the chamber, magnet and sieve positions, as well as the positive polarity optics

No Field Comparison: Interaction Vertex

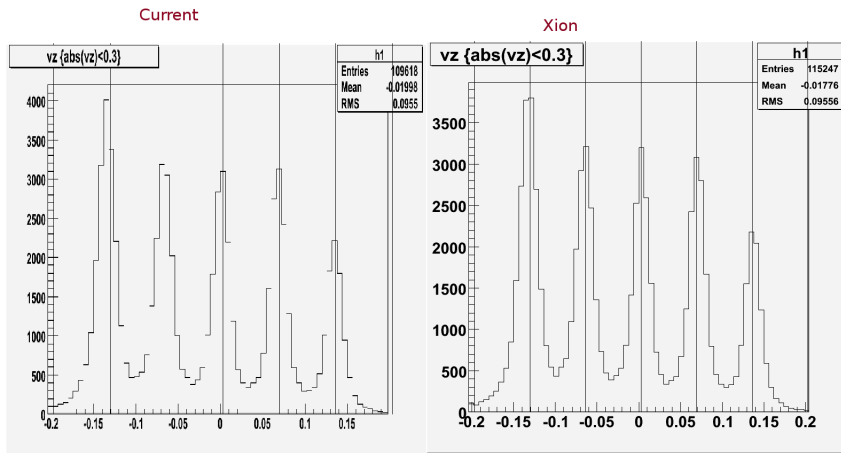
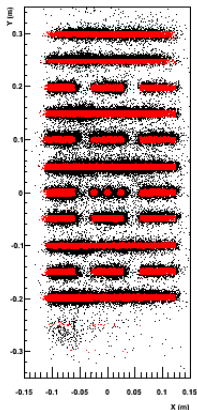


Figure: no magnetic field interaction vertex. Lines are carbon foil locations

No Field Comparison: Sieve

current



Xin

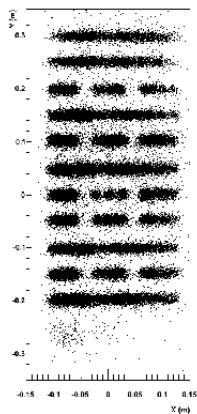


Figure: Sieve reconstruction for no field run.

Positive Interaction Vertex

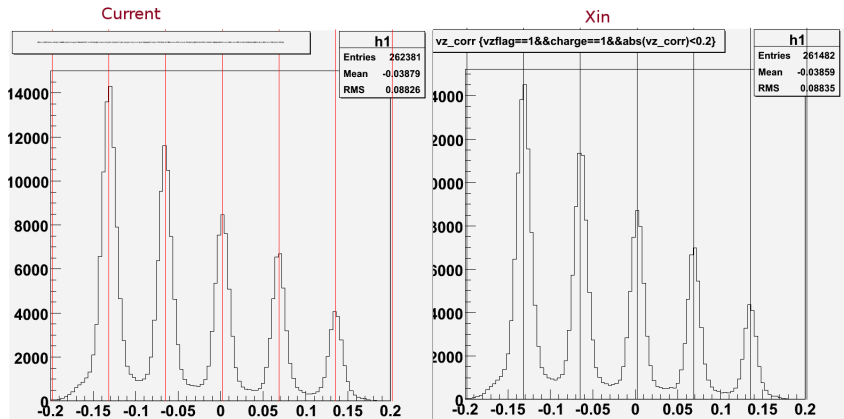
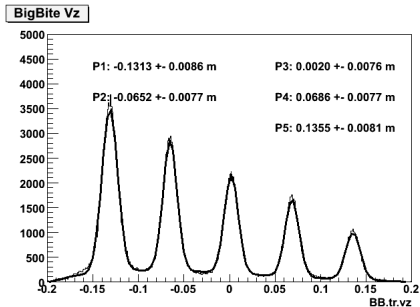


Figure: Positive interaction vertex. Lines are carbon foil location

Positive Fitted Interaction Vertex

Current



Xin

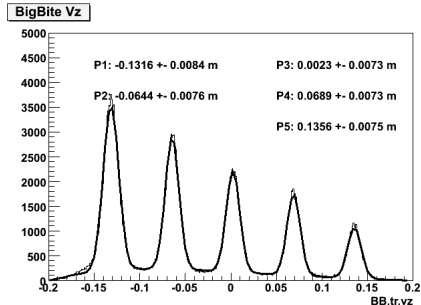


Figure: Positive interaction vertex. Currently an average resolution of about 0.79 cm compared to Xin's 0.76cm

Positive Sieve

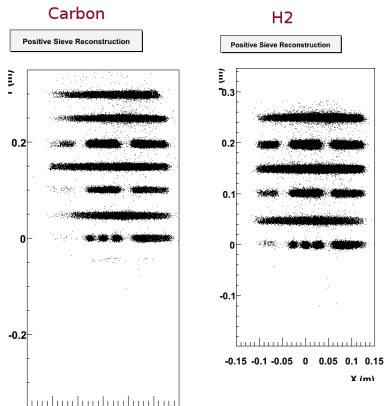


Figure: Positive sieve reconstruction. Left is using carbon target and right it using H2 target

Positive Resonance

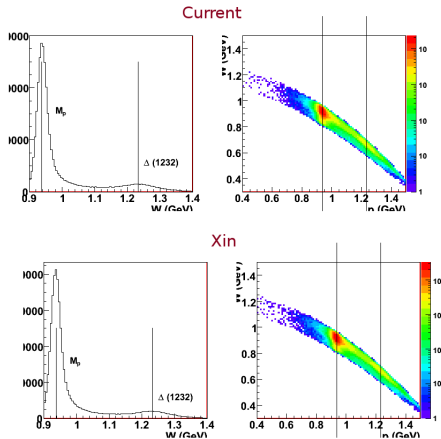


Figure: Positive resonance plots. Left plot invariant mass, right plot invariant mass vs momentum

Positive $\delta p/p$

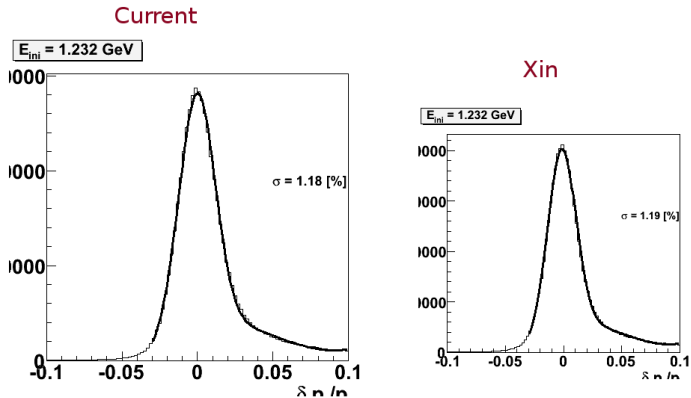


Figure: Positive momentum resolution $\delta p/p$. Current is 1.8% and Xin's is 1.9%

Current Negative Interaction Vertex

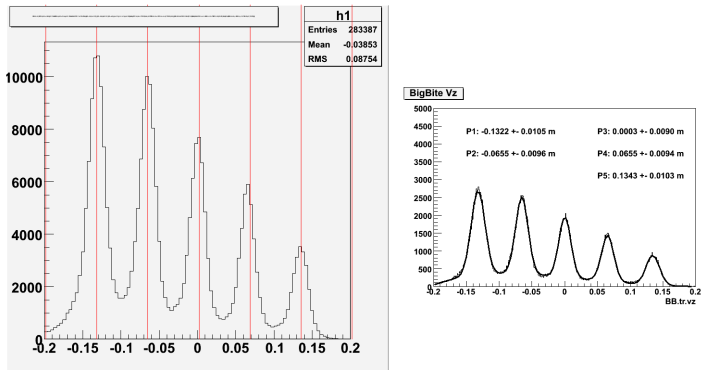


Figure: Negative interaction vertex. Average resolution for now is 0.98 cm

Current Negative Sieve

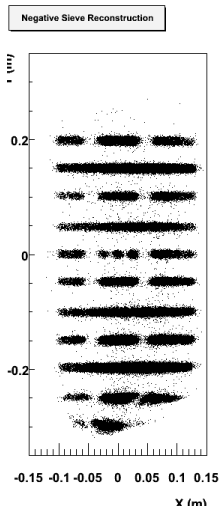


Figure: Negative Sieve reconstruction using Carbon target

Negative Resonance

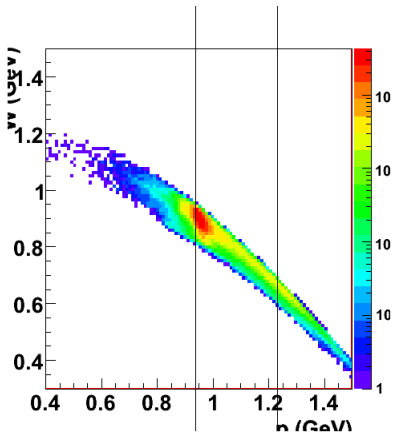
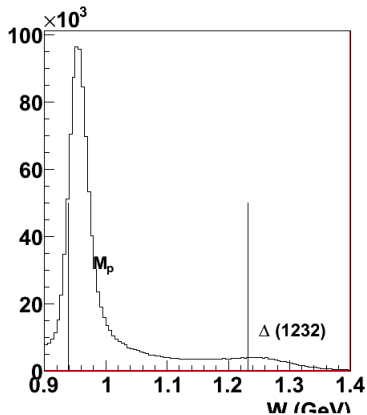


Figure: Negative resonance plots. Left plot invariant mass, right plot invariant mass vs momentum

Negative $\delta p/p$

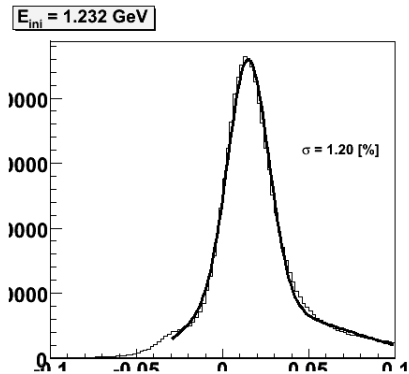


Figure: Negative momentum resolution $\delta p/p$.

Optics Summary

- Positive Optics look good:
- Negative vertex needs some more fine tuning to improve resolution
- Negative momentum also needs some calibration
- There is also a mistake with the db.BB.optics.dat file
 - There is a file db.BB.optics.dat outside the time stamp DIR that has the wrong sieve position, sieve angle, chamber position and chamber angle, they have transversity's location
 - Files in the time stamp DIRs are correct, correct and have d2n's locations (From Xin's positive optics calibration)

Optics Summary

- There seems to be a dead band in the reconstructed track x vs y , (maybe due to dead ps/sh signal?)
- Last week the preshower and total shower sums were checked (BB.ts.psum and BB.ts.sum)
- They looked ok, no obvious gain loss (plotted on next to slides)
- Took a look at the individual ADCs of the ps/sh, maybe one or two ADCs are dead and don't have an obvious affect on the ps/sh sums

PreShower Sums (from last meeting)

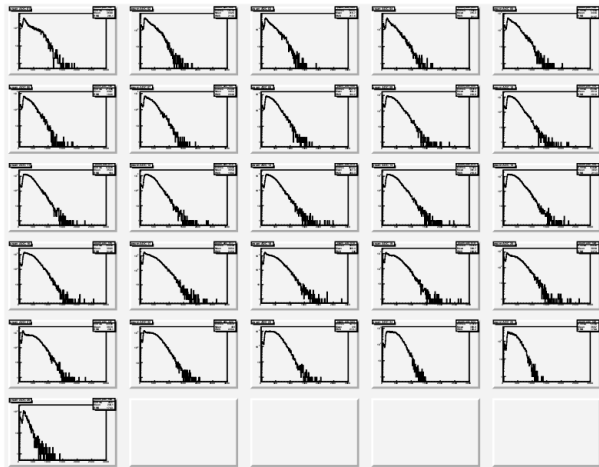


Figure: BB.ts.psum, pre-shower sums

Sums (from last meeting)

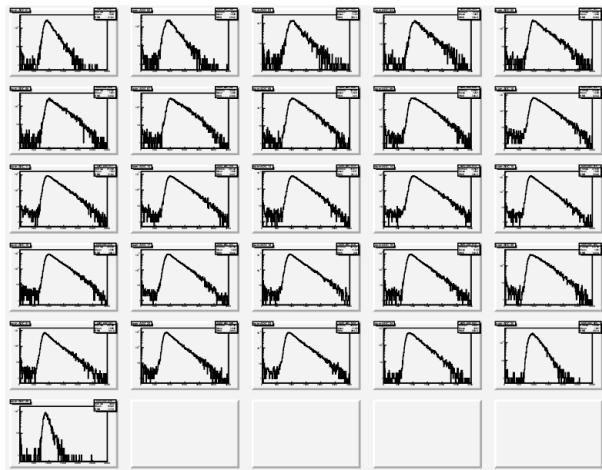


Figure: BB.ts.sum, total shower sums

PreShower ADCs

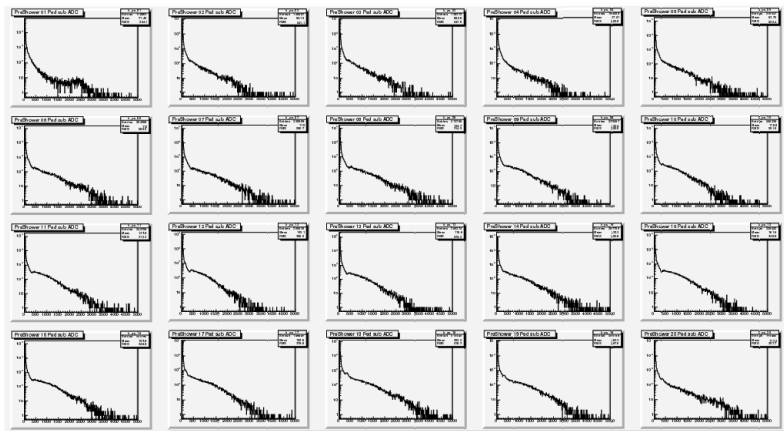


Figure: PreShower ADC signals 1-20

PreShower ADCs (Cont.)

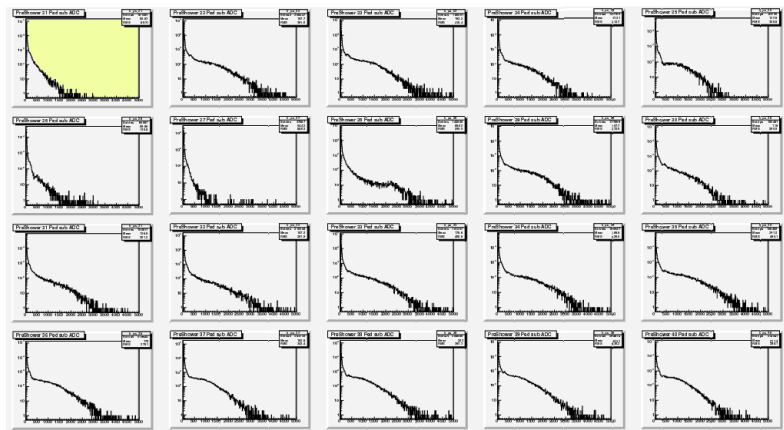


Figure: PreShower ADC signals 21-40

Preshower ADCs (Cont.)

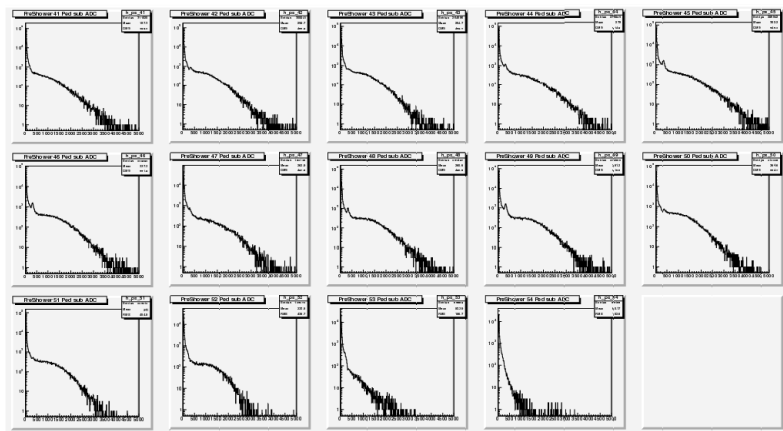


Figure: PreShower ADC signals 41-54

Optics Summary

- ADC 21 seems to be low (yellow block)
- The two below it are ADC 26 and 27 and are low because they are at the top of the BigBite detector and are near the edge of the acceptance

To Do:

- Calibrate negative BB optics
- Check Shower ADC signals