

BigBite Analysis

Particle miss-id and 4pass BB Stability

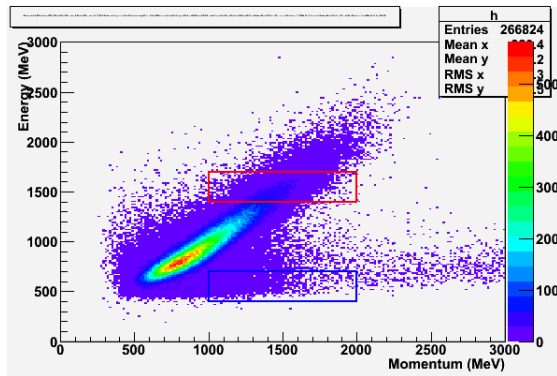
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- 1 Odd Particle
 - Particle Comparison
 - Shower Clusters
- 2 4pass BigBite Production Stability
 - Čerenkov TDCs
 - E/p
- 3 What's Next

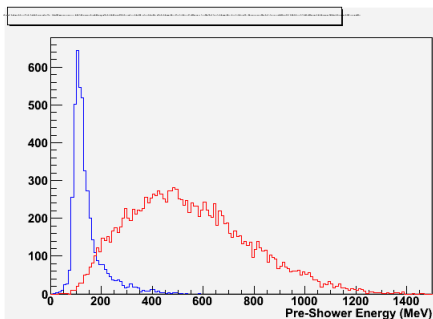
Define 2 Particle Types



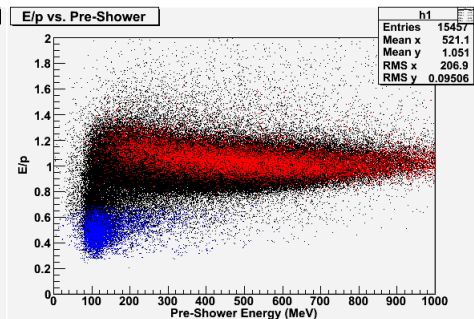
Two particle types to consider, red and blue

Pre-Shower and E/p vs Pre-Shower

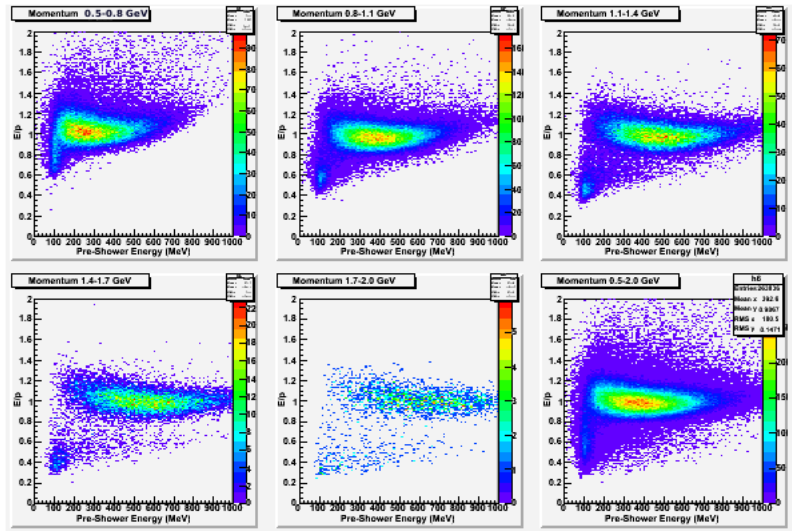
Pre-Shower



E/p vs Pre-Shower

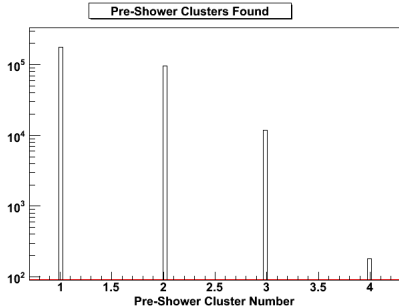
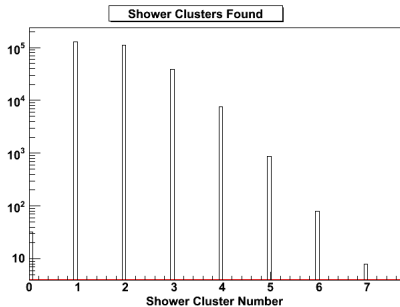


E/p vs Pre-Shower (Binned in Momentum)



Found Shower/Pre-Shower Clusters

Started looking at multiple clusters using Transversity shower class (d2n shower class does not save multiple clusters).



Shower Clusters

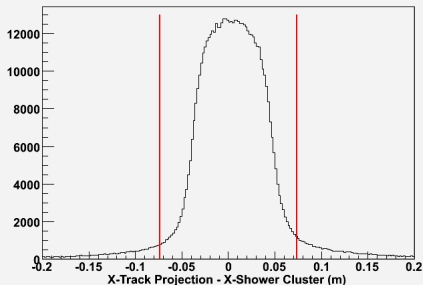
- 44% of events have 1 found shower cluster
- 38% of events have 2 found shower clusters
- 13% of events have 3 found shower clusters

Shower Clusters

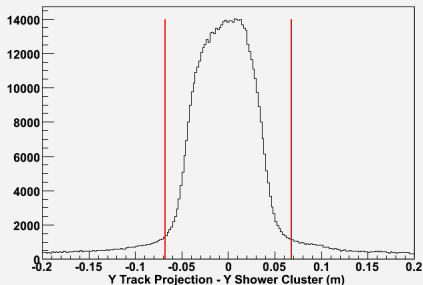
- In the Transversity shower class, there are 2 shower energy variables
- `BB.ts.sh.e[nclusters]` = Energy of each found cluster sorted from highest to lowest
- `BB.ts.sh_e[cluster matched to track]` = Energy of cluster that is closest to projected track
- Our d2n replay gives the scalar `BB.ts.sh.e` = the largest energy shower cluster found
- So for 1-track events ideally `BB.ts.sh.e[0] - BB.ts.sh_e[0] = 0`
- and `BB.ts.sh.e[0](transversity) = BB.ts.sh.e (d2n)`

Match Cluster to Track Cut

Shower Cluster X Matched to Track X



Shower Cluster Y Matched to Track Y



Transversivity Shower Cluster Comparison

Without cluster to track matching

- $BB.ts.sh.e[0] - BB.ts.sh_e[0] = 0 : 96.7\%$

With cluster to track matching

- $BB.ts.sh.e[0] - BB.ts.sh_e[0] = 0 : 99.2\%$

Odd Particle Summary

- Seems like most of particles off of $E = p$ line are from pion + background events
- Two particle types (background and electrons) have little separation at low momentum
- Two particle types separate as momentum increases
- Does not seem to be a cluster identified with wrong track

TDC Fits

Fit TDCs for each 4pass production run...

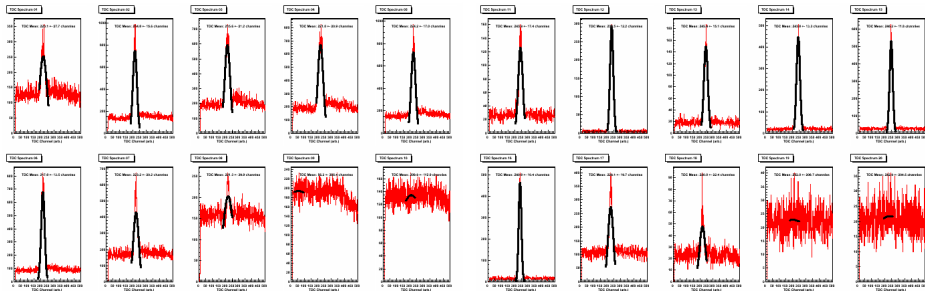
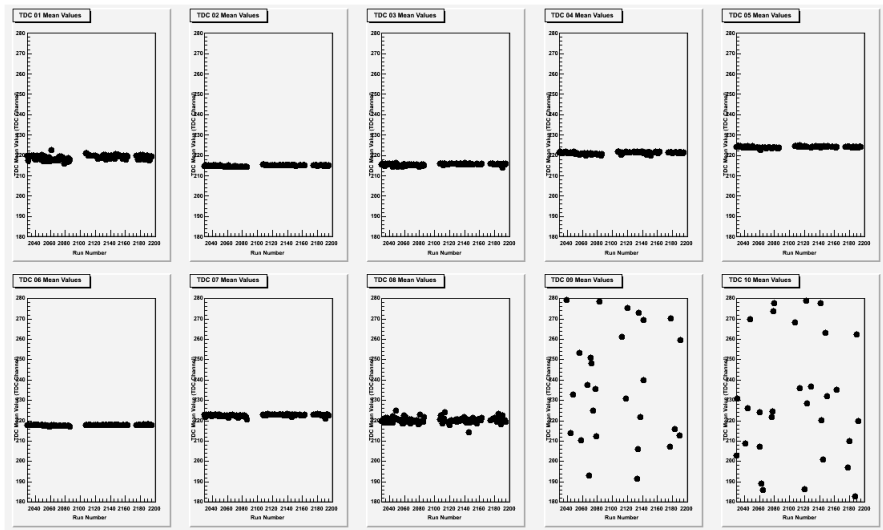


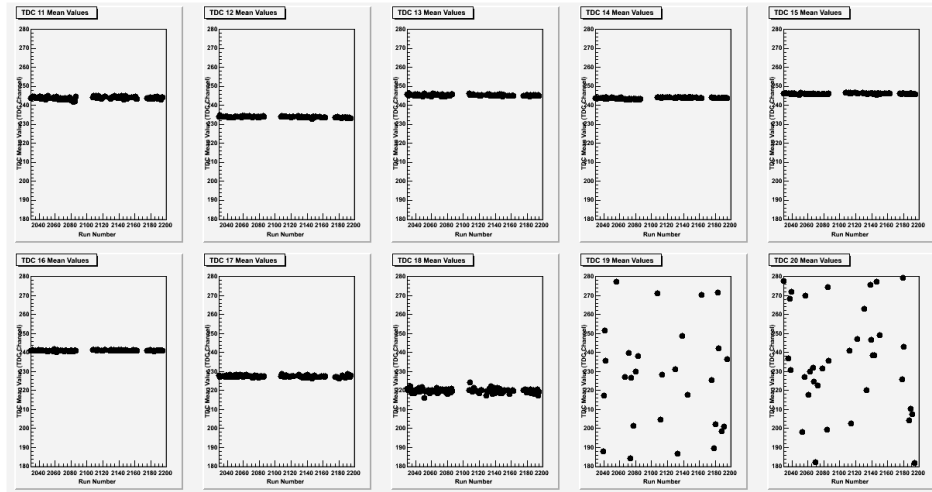
Figure: Beam-side TDC fits for 4pass ^3He run 2180.

Figure: RHRS-side TDC fits for 4pass ^3He run 2180.

Beam-Side Mean TDC values vs Run Number



RHRS-Side Mean TDC values vs Run Number



E/p Fits and Stability

Fit E/p for each 4pass production run...

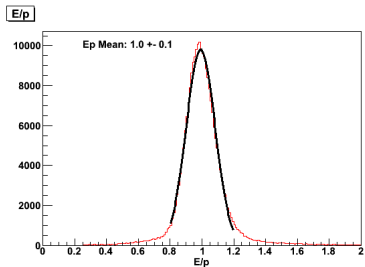
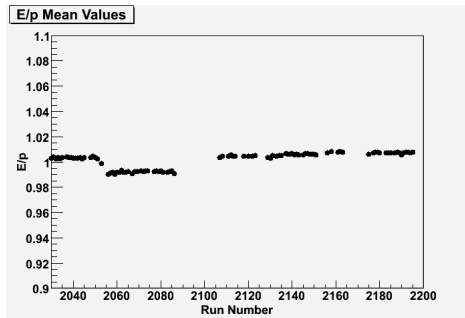


Figure: E/p fit for 4pass ^3He run 2061.

Stability of E/p vs Run Number...



For Next week

- See how to implement E/p correction to 4pass data
- Determine PID cuts (Bring in Čerenkov)