

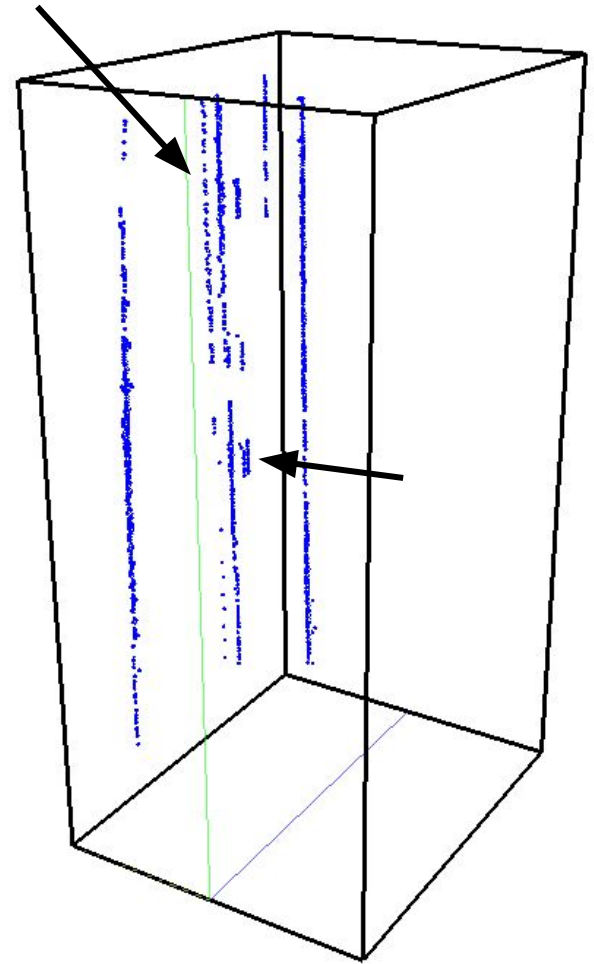
PixLAr Update

Hunter Sullivan

08/16/2018

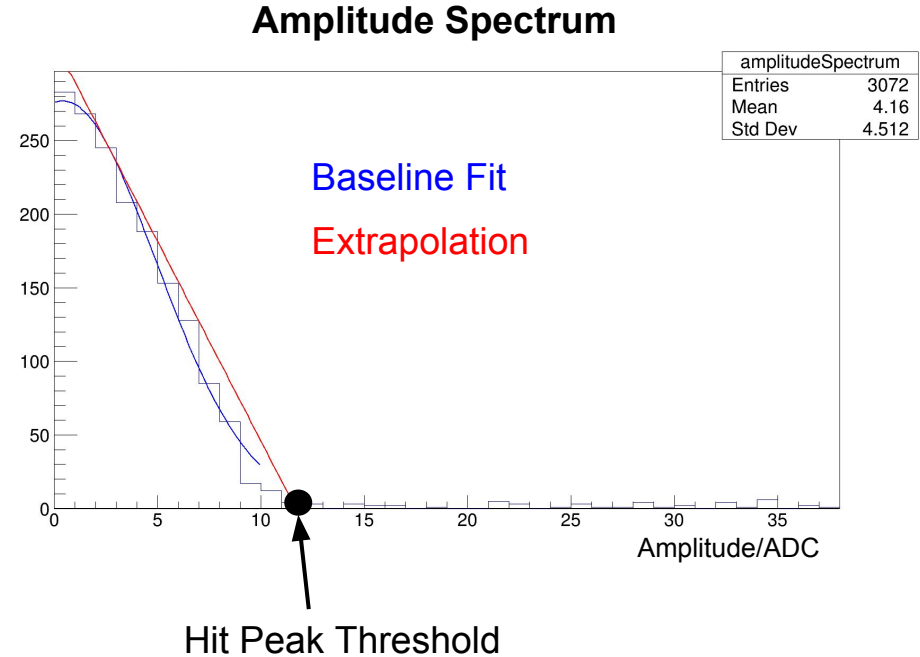
Reconstruction

- **Problems brought up last meeting resolved**
- **What tools do we have?**
 - Two clustering algorithms
 - PCA (with merging)
 - Two Hough transform algorithms (2D)
 - Offline event displays
- **What I've been working on**
 - Mitigating ambiguities and unwanted track features
 - Optimizing hit finding
 - Disambiguation
 - Cosmic tracks



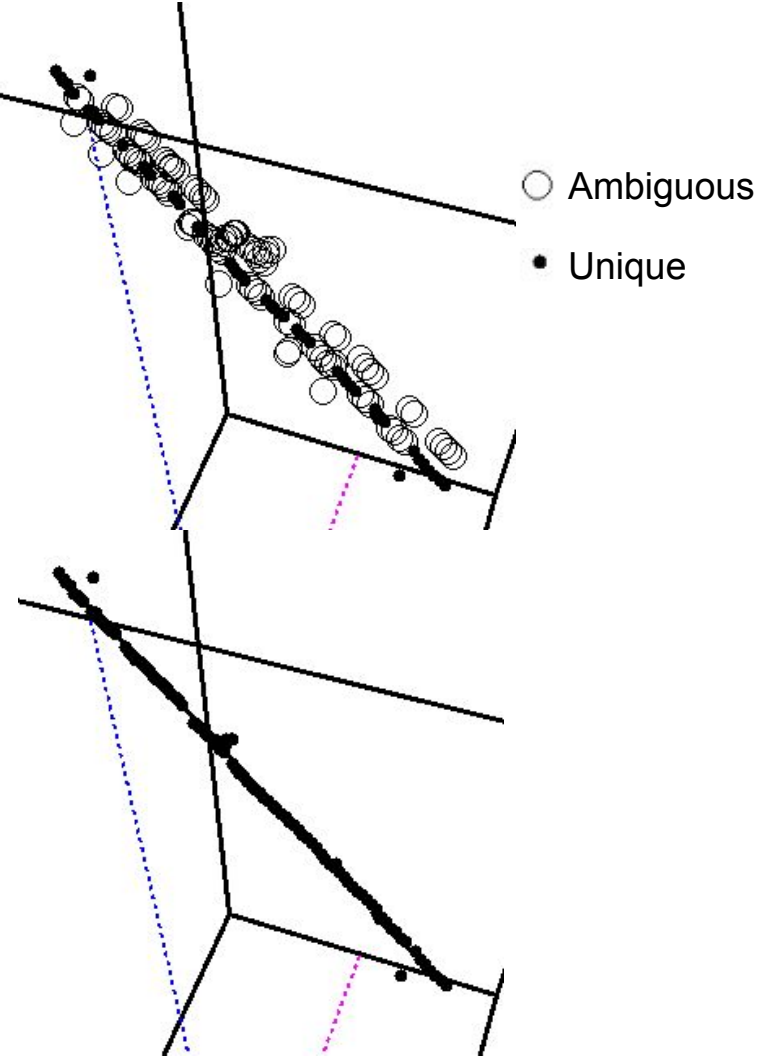
Hit Finding

- **Old parameters**
 - Absolute hit threshold
 - Relative to baseline
- **Disambiguation is only more difficult with noise hits**
 - Pixel and ROI width thresholds
 - Fit baseline with gaussian, extrapolate to x-axis
- **Does better in rejecting noise hits**

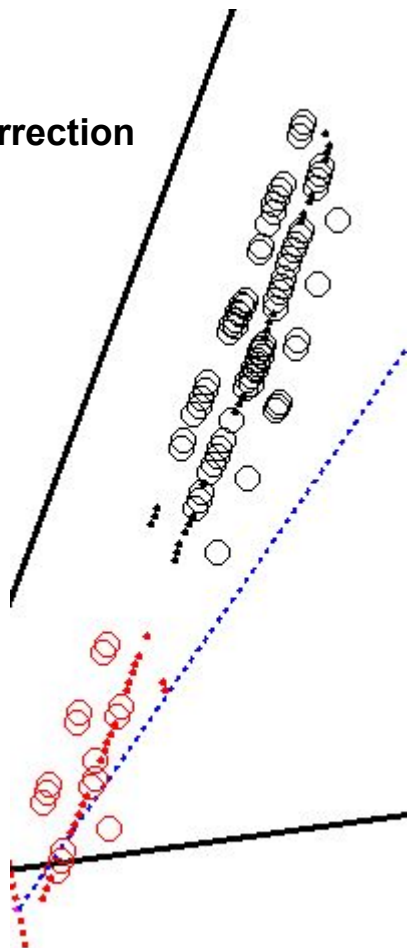


Cosmics and Disambiguation

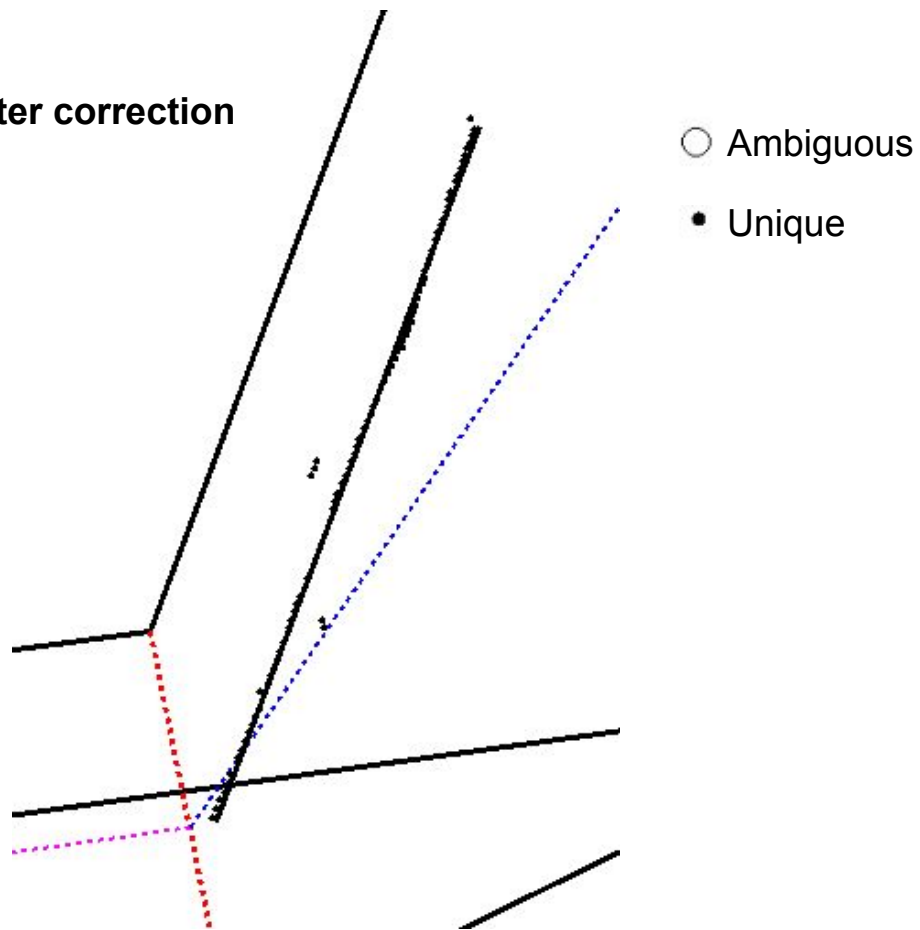
- **Developed a disambiguation algorithm to eliminate ghost tracks and correct for the ambiguities**
- **The idea**
 - Run PCA on unique hits in each cluster
 - Compare DOCAs for 3D hits with same pixel hit ID
 - Smallest is accepted and others are eliminated
 - Run PCA on all hits after correction
- **This does smear out delta rays**
 - Erik and I worked together to try and develop a good parameter set for deltas but no success
 - He's working on using the ambiguity information



Before correction



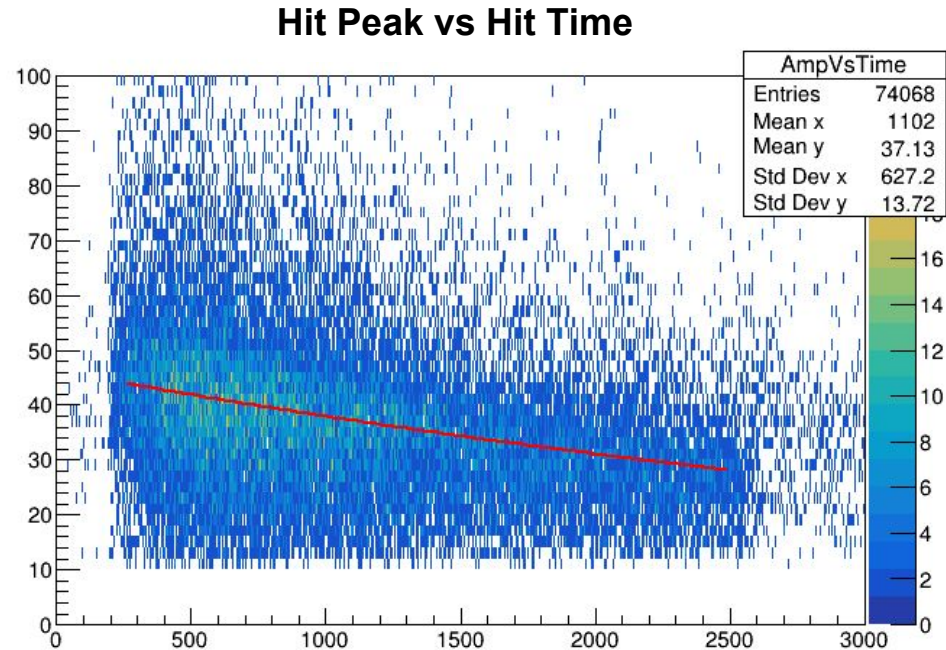
After correction



Cosmics

- **Lifetime measurement**
 - Having trouble submitting jobs to grid
 - Only have small data sets
 - With selection cuts, small sample sizes
- **Can obtain reasonable lifetimes**

Next: Lifetime measurements for the whole PixLAR run



$\tau \sim 650 \mu\text{s}$

Thanks!