Update on CosmicTracker

T. Yang/FNAL
Jun 17, 2015

Introduction

- CosmicTracker was written in 2013 for the LongBo cosmic track reconstruction.
  - It was based on the ideas in Track3DReco, one of the first track reconstruction algorithms in larsoft, with improvements.
- It was later used in the ArgoNeuT CC-inclusive analysis.
- Pros: simple, works for both 2 planes and 3 planes.
- Cons: Does not work well for curved tracks, slow.

Updates

- Use ClusterCrawler as input (written by Bruce Baller, ported to DUNE by Gianluca Petrillo).

- Code restructured:

  - Cluster matching moved to ClusterMatchTQ

  - Trajectory reconstruction moved to CosmicTrackerAlg

  - Added track stitcher

Cluster Matching

- Match clusters in different views using time and charge information.
- The same code is now moved to an algorithm ClusterMatchTQ.

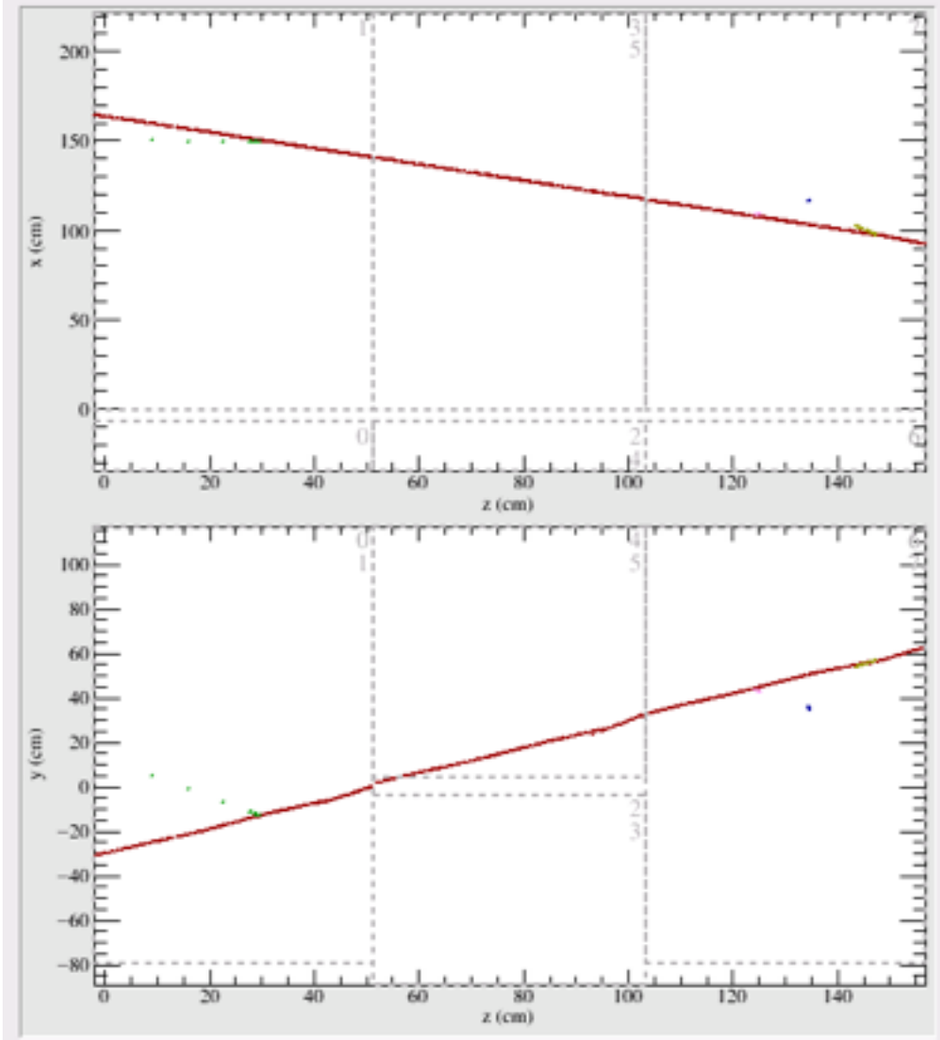
Trajectory reconstruction

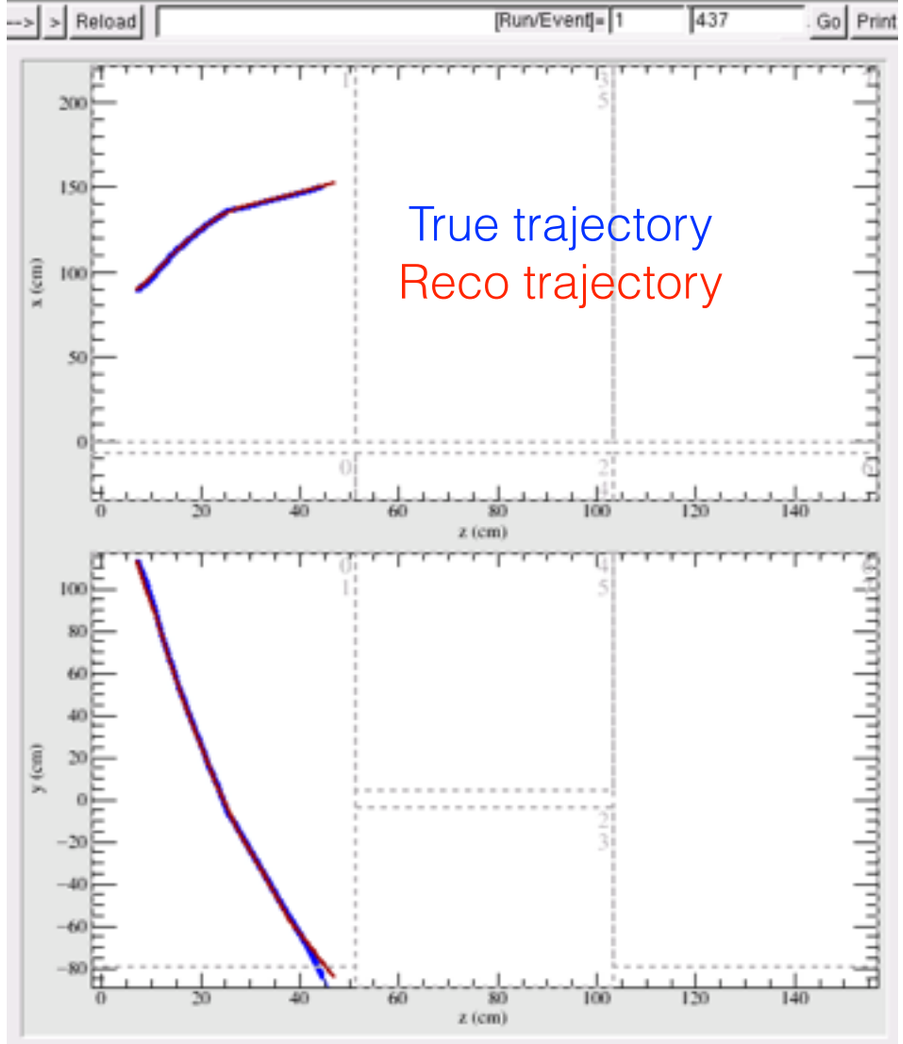
- Reconstruct start/end points, trajectory, directions
- This part of code is completely rewritten:
  - Code in CosmicTrackerAlg.
  - User TrackTrajectoryAlg/TrackLineFitAlg developed by Bruce Baller.
  - http://microboone-docdb.fnal.gov:8080/cgi-bin/ShowDocument?docid=3718

Track Stitching

- Wrote a simple track stitching algorithm in CosmicTracker_module.cc.

- If two tracks from two TPCs are collinear, stitch them.





Conclusions

- Various improvements to CosmicTracker
  - Use ClusterCrawler as input
  - Separate algorithms from module
  - Use new trajectory reconstruction
  - Add track stitcher
- Most of the updates use code written by Bruce Baller.
- Will talk to Brandon on future improvements of this track reconstruction.