Status of $\gamma \rightarrow \rho$ p simulation study

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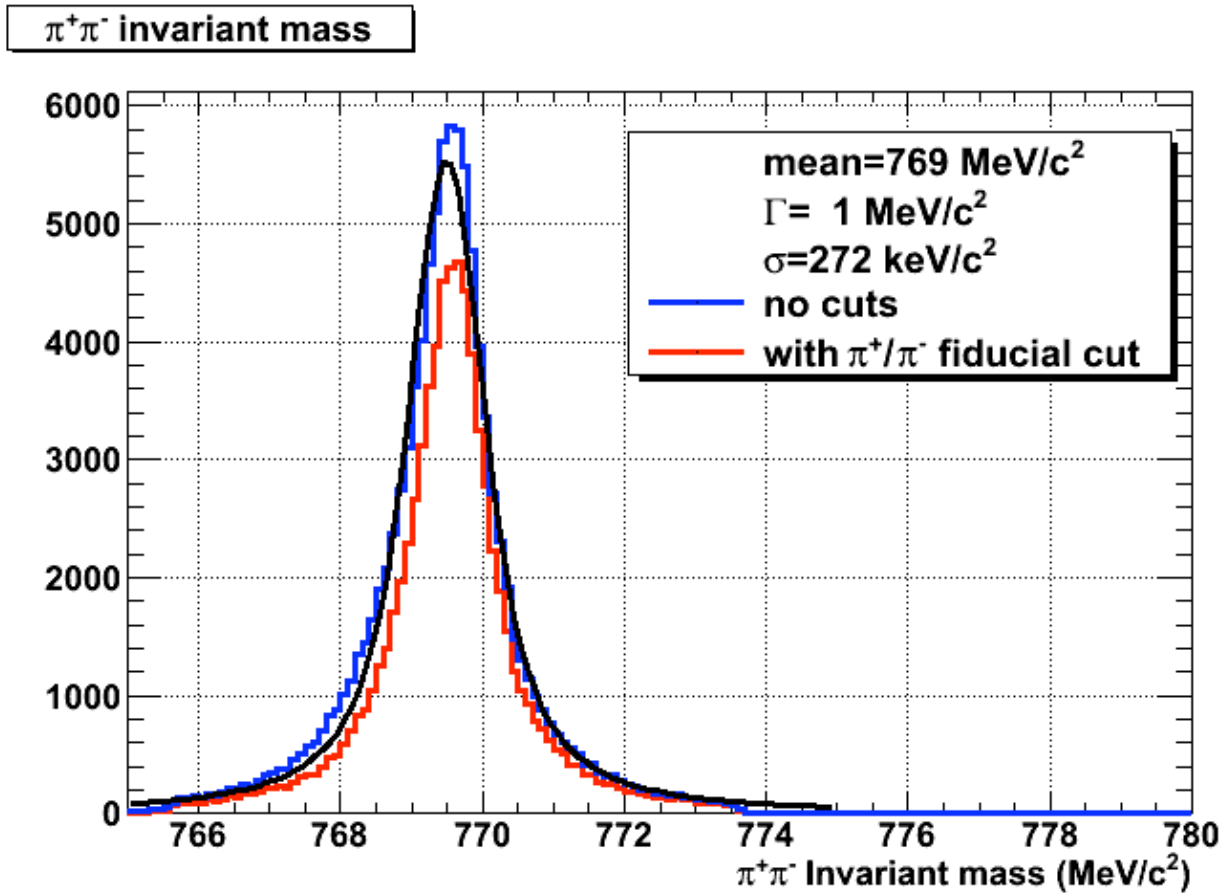
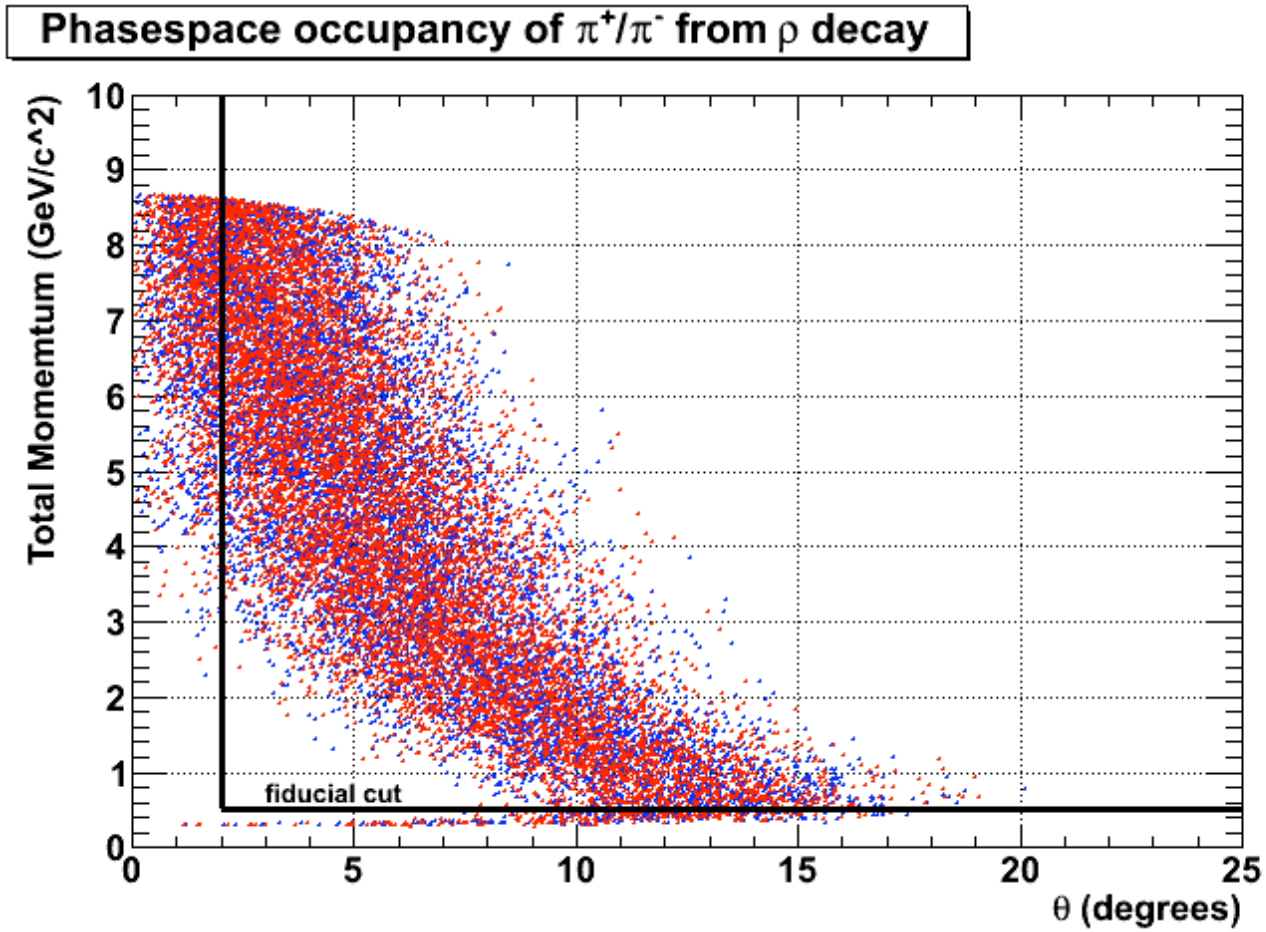
Thrown ρ mass distribution



Invariant mass from thrown pions with and without fiducial cut on pions.

Black curve is fit to "no cut" histogram

π+ π- momentum/angle distribution

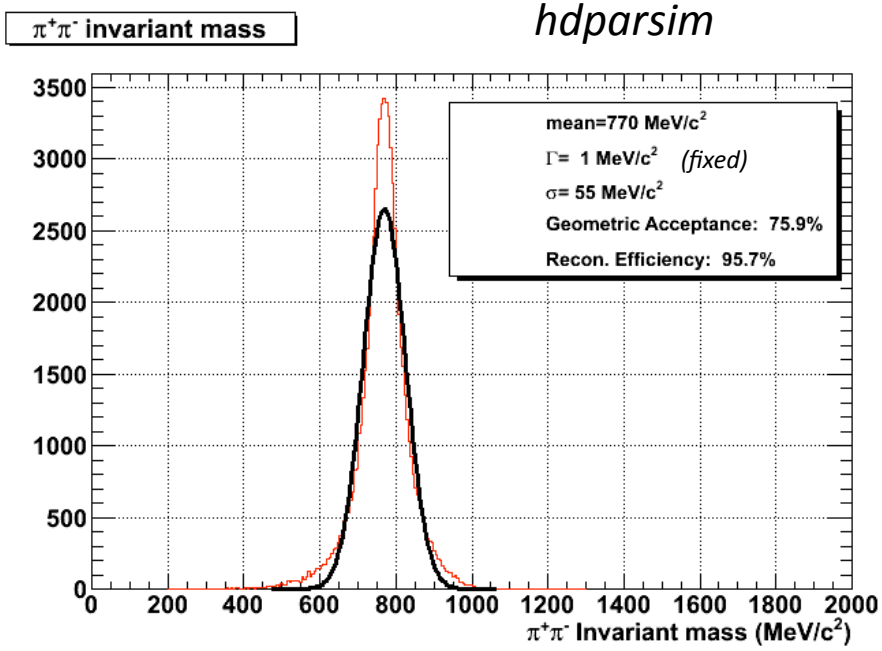


Phasespace occupied by pions from rho decays

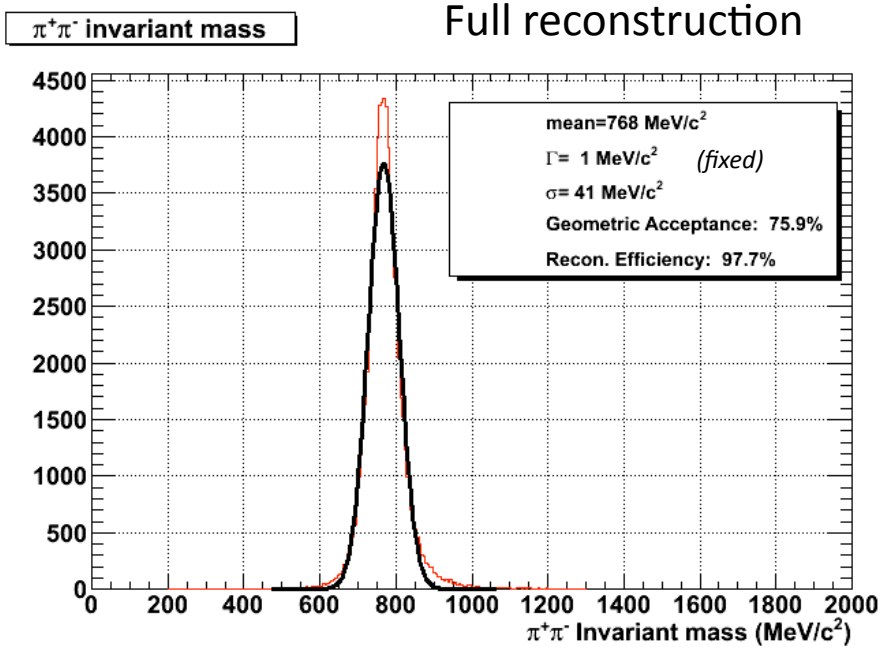
Red points are pi- and blue are pi+.

Semi-parameteric M.C. vs. full reconstruction

hdparsim



Full reconstruction

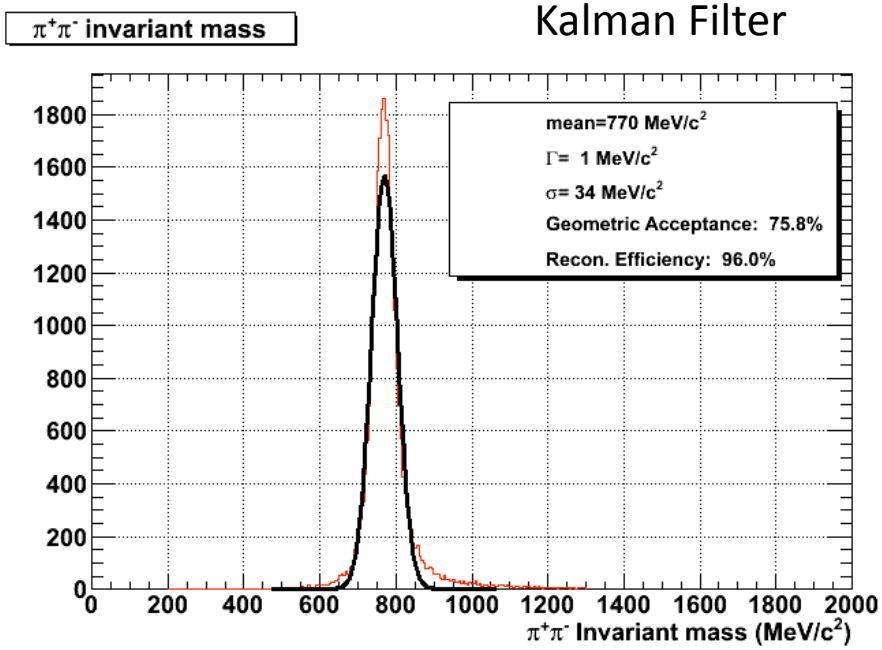


The two seem comparable, but the full reconstruction has improvements made since the *hdparsim* resolution and efficiency tables were created.

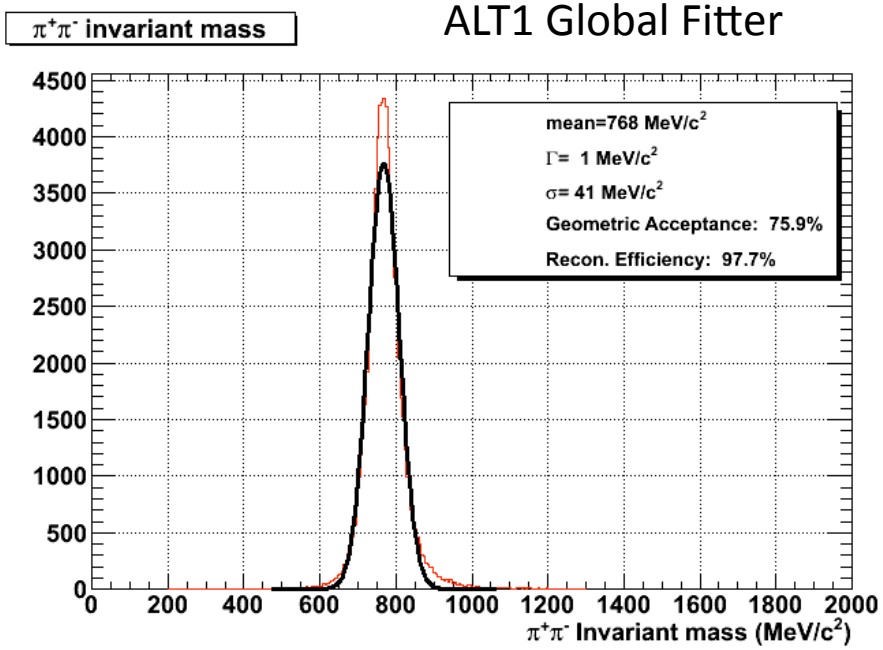
Efficiency and resolution

of reconstructed ρ

Kalman Filter



ALT1 Global Fitter



ALT1 fitter appears slightly more efficient while Kalman seems to give slightly better resolution.

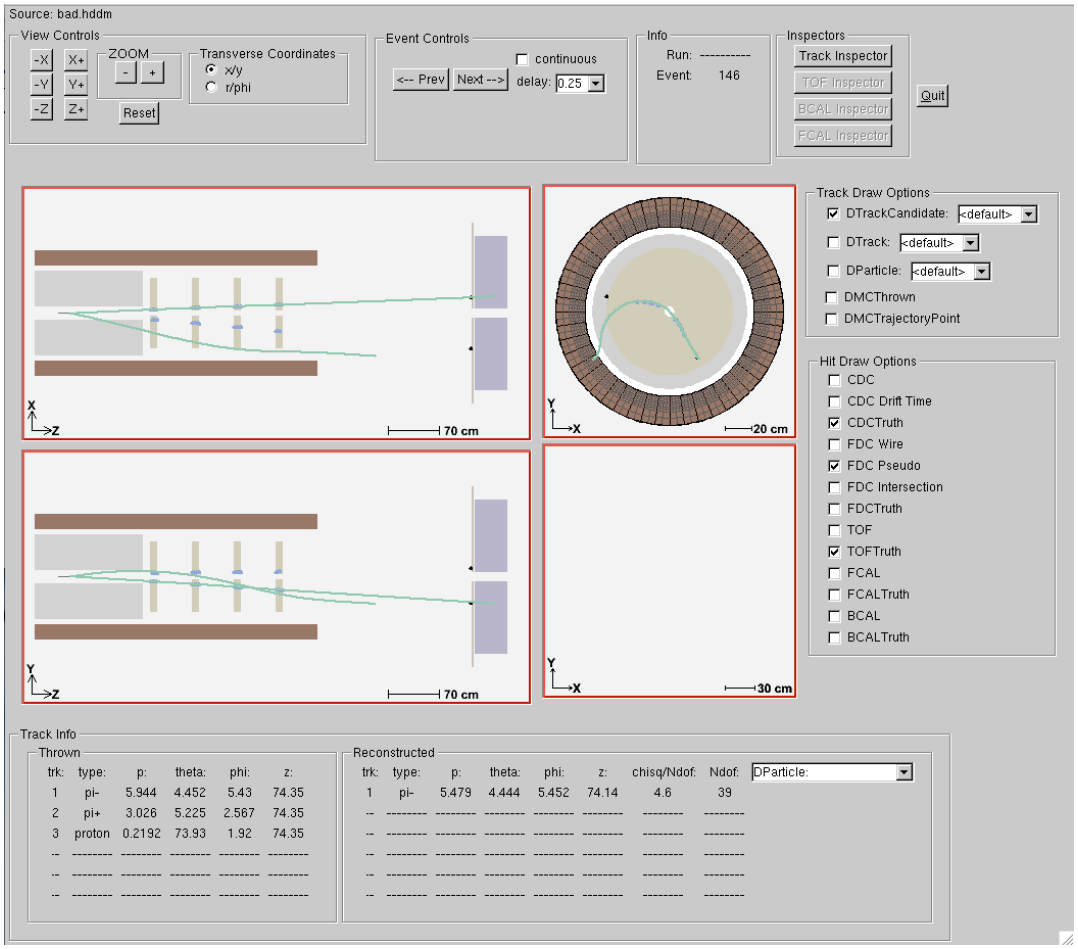
Failed events in two fitters

ALT1	Kalman
146	146
	199
268	268
	612
	764
834	834
842	842
847	
	902
954	954

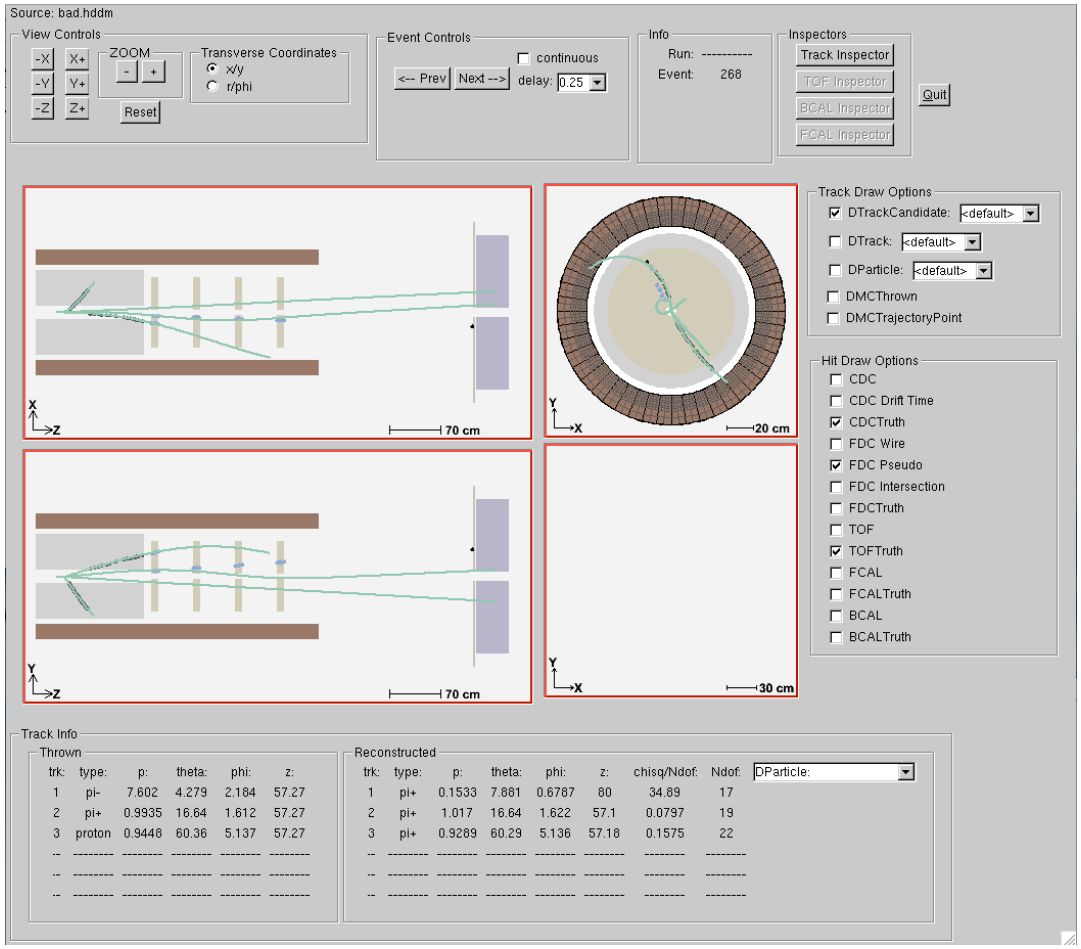
Event numbers of fiducial events where reconstruction failed from the first 1000 thrown events.

Many of the same event fail for both fitters.

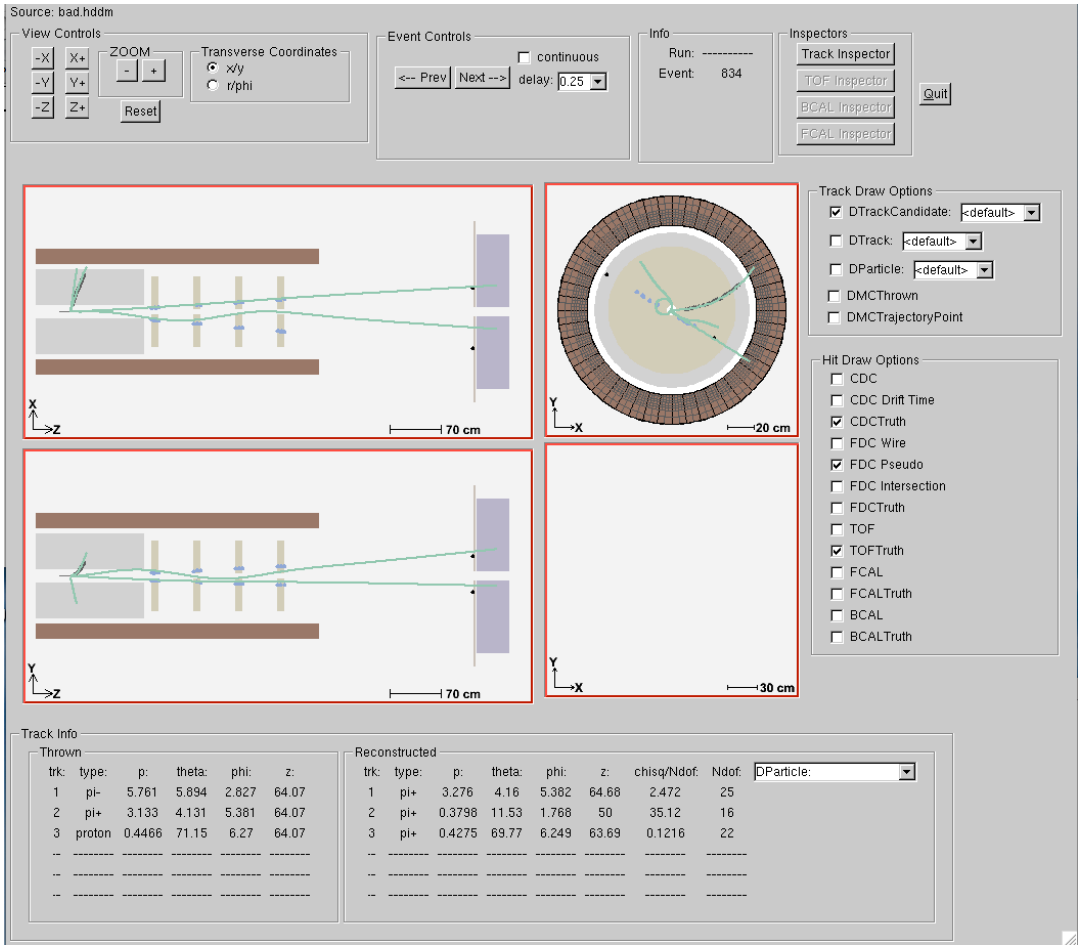
Failed event: 146



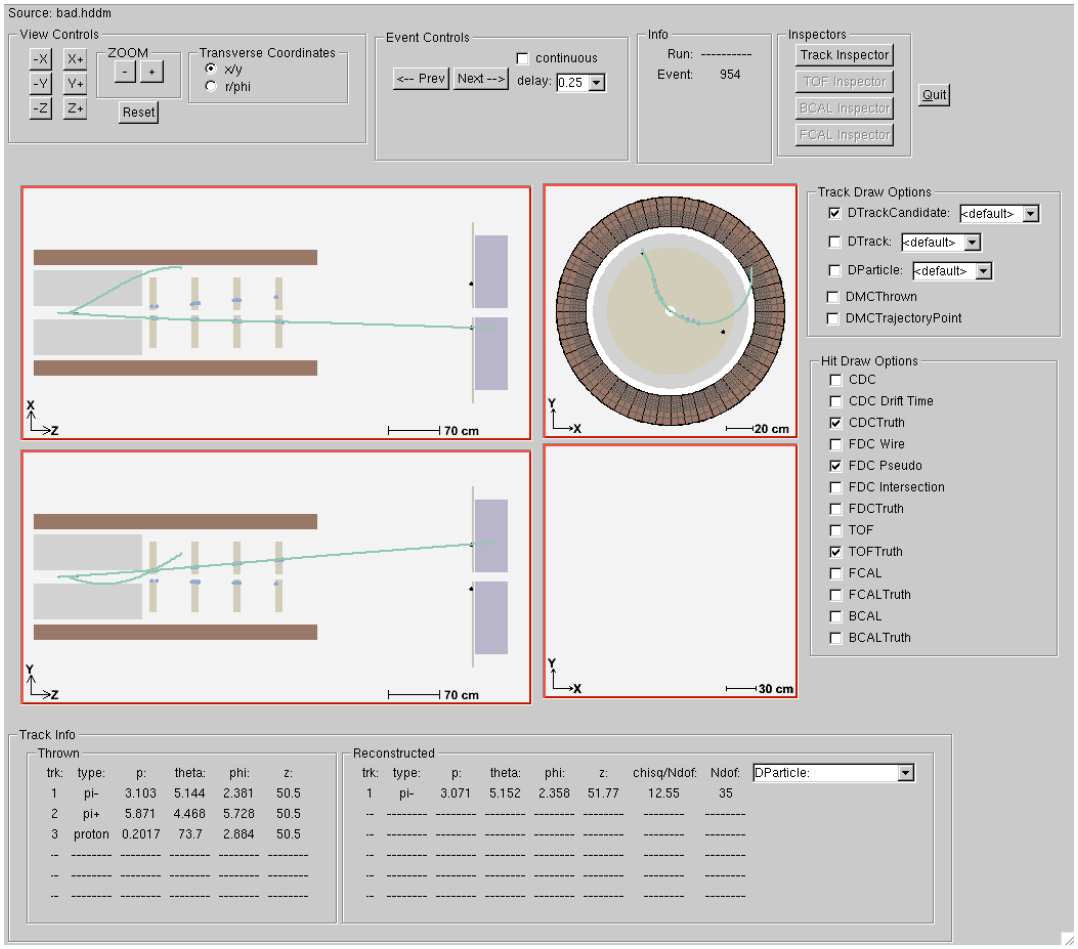
Failed event: 268



Failed event: 834



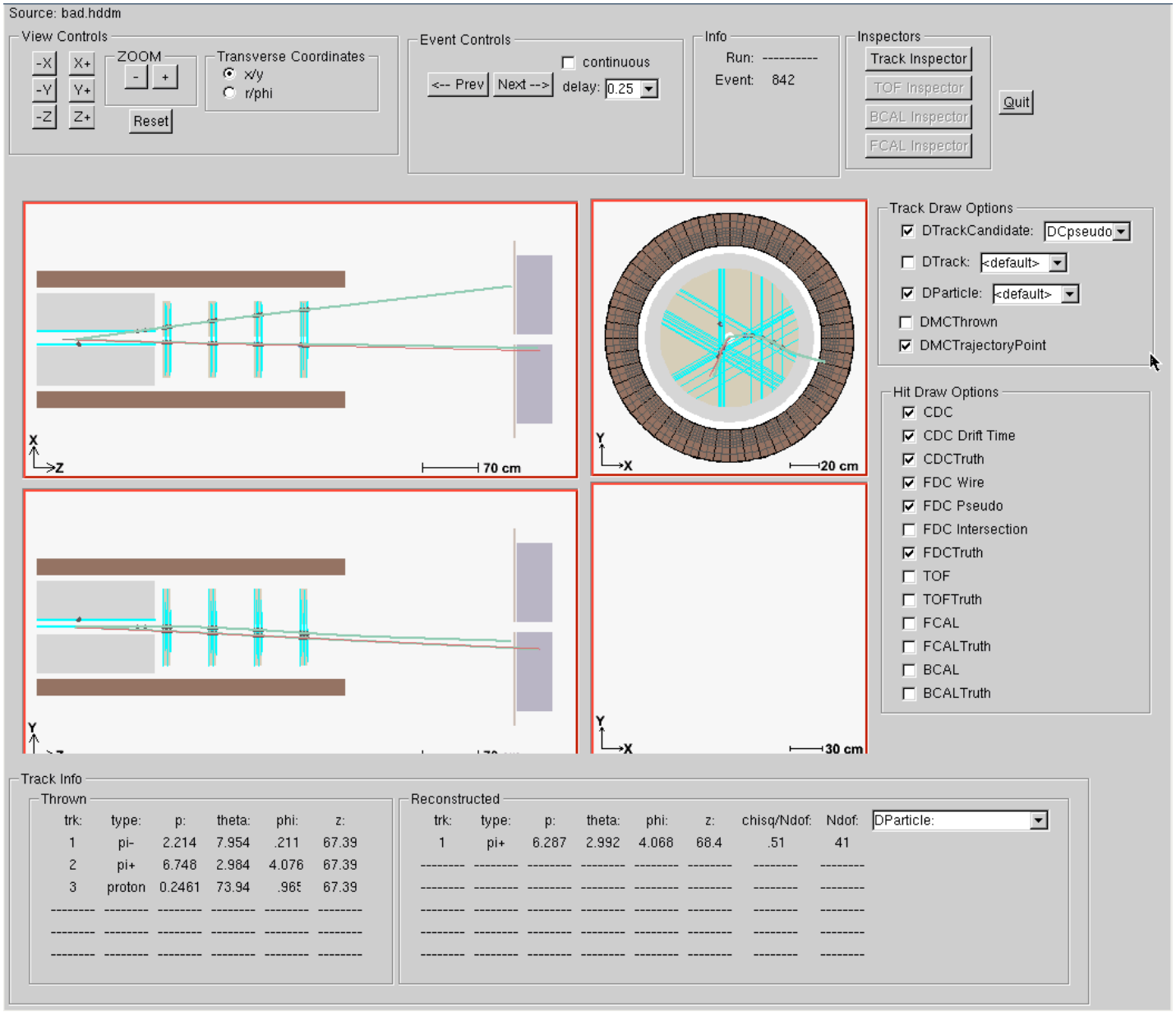
Failed event: 954



ALT1

Evnt: 847
ALT1 failed
Kalman succeeded

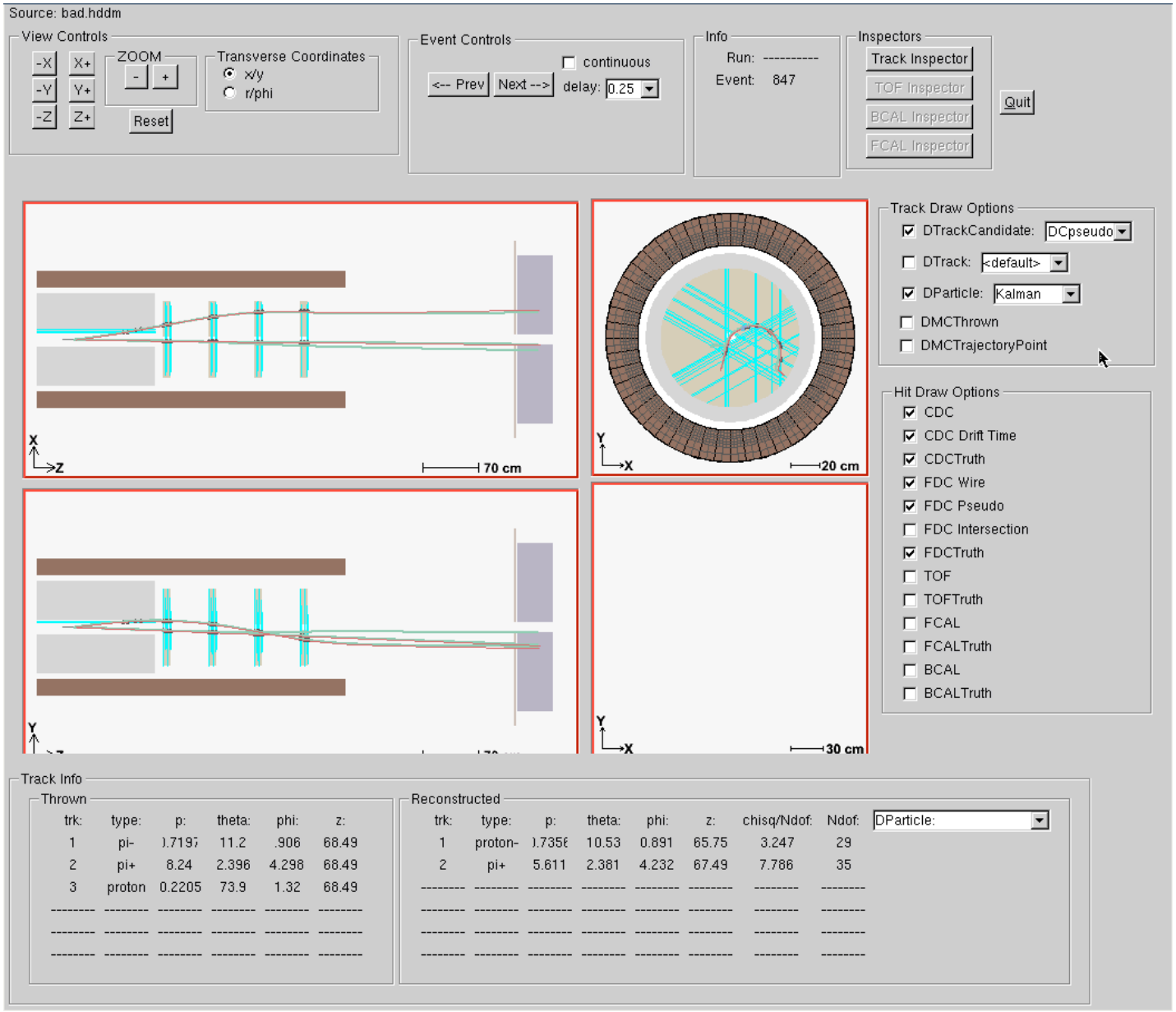
Apparently good candidate for both tracks



Kalman

Evnt: 847
ALT1 failed
Kalman succeeded

Apparently good candidate for both tracks



Summary

- Reconstruction efficiency for ρ is consistent with expectation from single track efficiencies
- ALT1 and Kalman filter appear give roughly the same performance in efficiency and resolution.
- Inefficiencies are mostly coming from poorly defined candidates
- Next steps:
  - Look at protons from same set of events
  - Turn on E.M. background