

Tracker Reconstruction Status

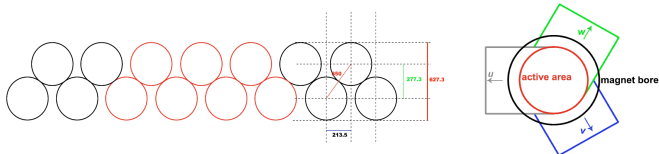
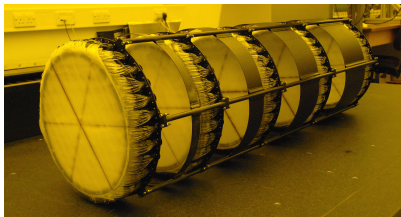
C Hunt

29th October 2015 - CM43



Track Reconstruction Overview

1. DAQ: NPE \rightarrow Data, Calibration
2. Digit Production and Bad Channel Handling
3. Clustering
4. Spacepoint Production
5. Pattern Recognition
6. Kalman Fitting



The Front Line

(The People You Email First!)

Font End Electronics - Ed Overton

- DAQ boards and digitisation
- DAQ Software
- Calibration & Mapping

Monte Carlo - Chris Heidt

- Reconstruction & Simulation Geometries
- Mapping & “Bad” Channel Identification

Track Reconstruction - Chris Hunt

- Digit, Cluster, Spacepoint Reconstruction
- Pattern Recognition (+ Adam Dobbs)
- Kalman Track Fit



Progress

Since the last CM. . .

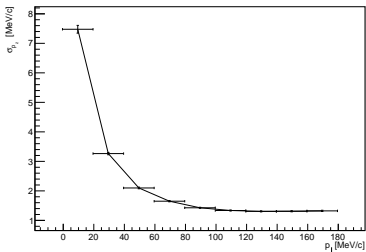
- Software has been used and abused by many people
- Tracker alignment is happening
- Global reconstruction is coming online
- Real data reconstruction is happening
- Useful scripts have been written and well tested - nearly ready for deployment
- Tracker resolutions covered in detail
- The list of known bugs has got considerably larger. . .

A quick look on the brighter side. . .

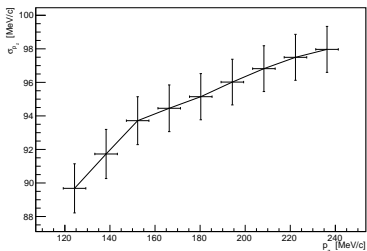
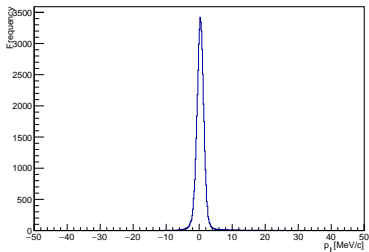


Helical Resolution Plots

p_z Resolution



p_t Resolution



Efficiency plots need improving.
But nearly there.

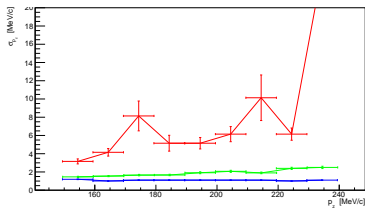
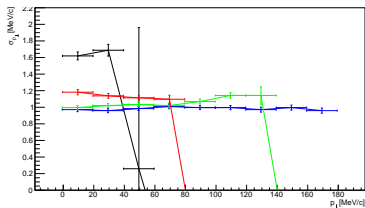
← (This is an underestimate!)



Helical Resolution Plots

Studies involving idealised, lower fields are ongoing.

These are PRELIMINARY



(1T 2T 3T 4T)

p_t is ok. Our measurable phase space is just reduced.
 p_z becomes poor, followed by catastrophic below 1T.

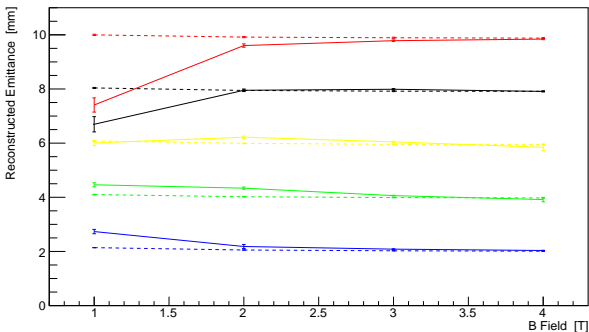
More studies are required.



Helical Resolution Plots

A quick check of the emittance reconstruction.

PRELIMINARY

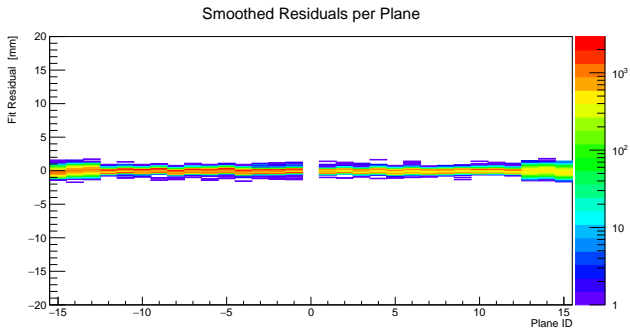


(10mm 8mm 6mm 4mm 2mm)

Some complex effects to disentangle, but the code to do the heavy lifting is all ready to go.



The Track Fit



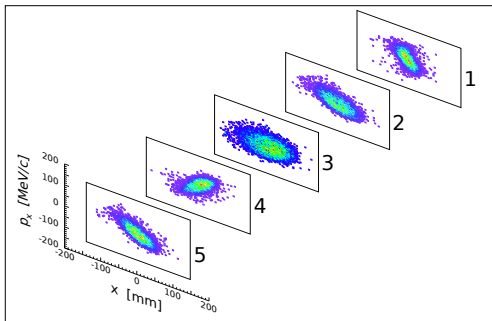
Residuals from fitted trackpoints to data. Pretty much bang on!

But this is with a p-value cut.

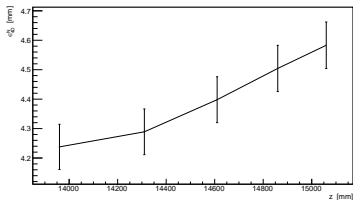
We throw out a lot of tracks that perhaps we shouldn't. . .



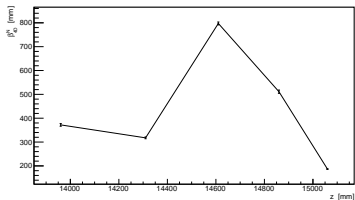
Helical Data



Reconstructed Normalised 4D Emittance



Reconstructed Normalised 4D Beta



It Works! We think...



Current Status

Installation & Calibration	Ready
Bad channel treatment	Ready
Digitisation	Ready
Clustering	Ready
Spacepoint Production	Ready
Pattern Recognition	Ready
PatRec Tracks	Tweaking
Kalman Track Fit	Tweaking
(PatRec++	Under Discussion)
Kalman++	Under Discussion

PatRec Tracks and Kalman Tracks are currently being used and tested - Very well tested!



Questions?

