

Tracker Software Overview

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Since last CM...

- MC noise algorithm added (C. Heidt)
- Geometry / CDB advances
- Pattern Recognition improvements
- Merge into trunk
- Extensive documentation improvements
- MC – Reconstruction bridge
- Improved momentum residual study
- Spacepoint level pattern recognition efficiency study
- We now have users! (Celeste, Peter Lane, Step IV reduced current group)



Noise

- Simple noise algorithm now added to the MC code
- Uses it's own map, MapCppTrackerNoise
- Code review completed, most actions already done
- See Chris Heidt talk



Geometry / CDB

- Matters are advancing under C. Heidt
- Interface now working as a prototype (R. Bayes)
- Data in CDB taken from CMM and should be good
- Again, see C. Heidt talk for details



MC – Reconstruction Bridge

- Rule: *MC data should not appear in the Reconstruction side of the data structure*
- Q. How to compare results with MC truth?
- A. Create a bridge. Define a unique recon digit ID and store in the MC hit used to create that digit
- Using the digit IDs create a lookup table (implemented as C++ map) between MC hits and recon digits
- Implemented (SciFiLookup class), tested, already in use
- Still need to purge datastructure...



Documentation

Let's take a look...

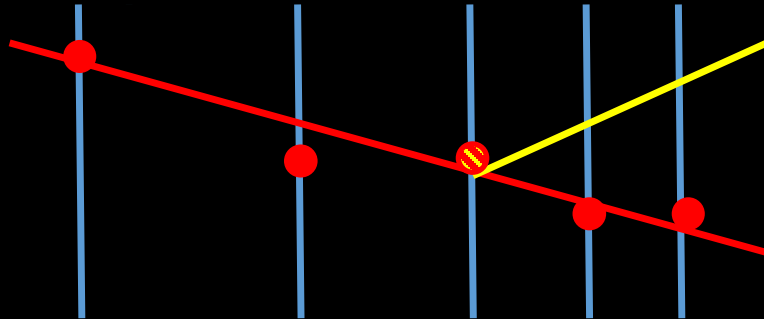


Pattern Recognition Performance

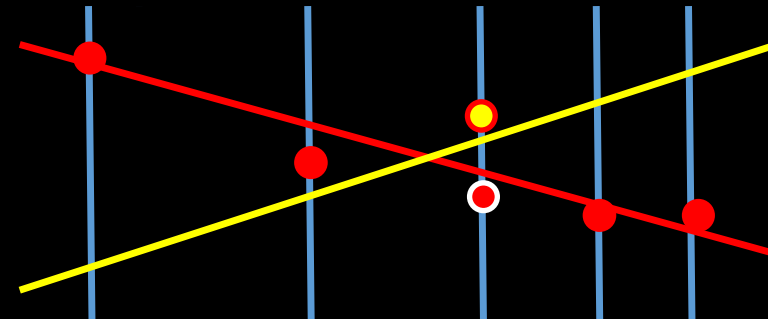
- Comparing with MC not so straight forward as previously thought
- New, more sophisticated algorithm based on the MC – Recon bridge used to extract MC truth associated with each spacepoint and track
- Accounts for a spacepoint having both a primary and secondary particle associated with it
- Results still contain outliers to be investigated, but result is much more rigorous



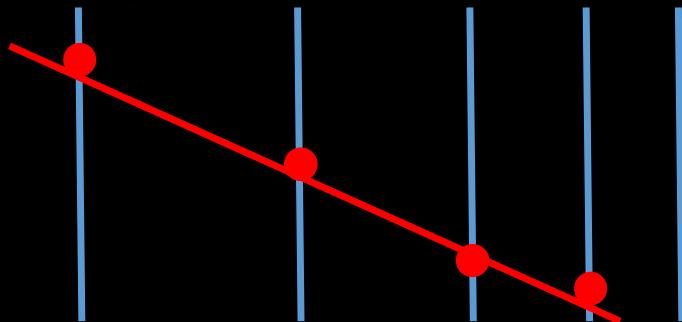
A subtle game...



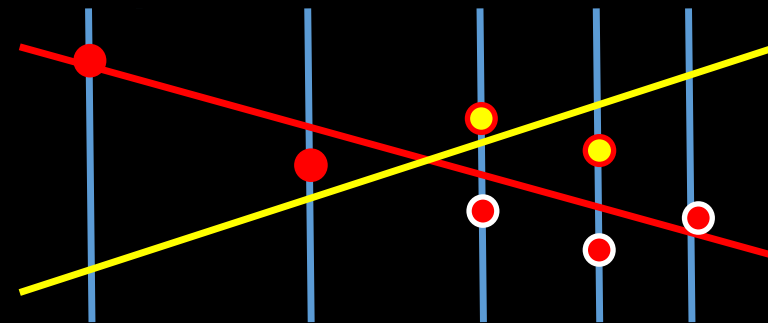
Knock on electron
All matched



2 primaries
1 missed
1 mismatched



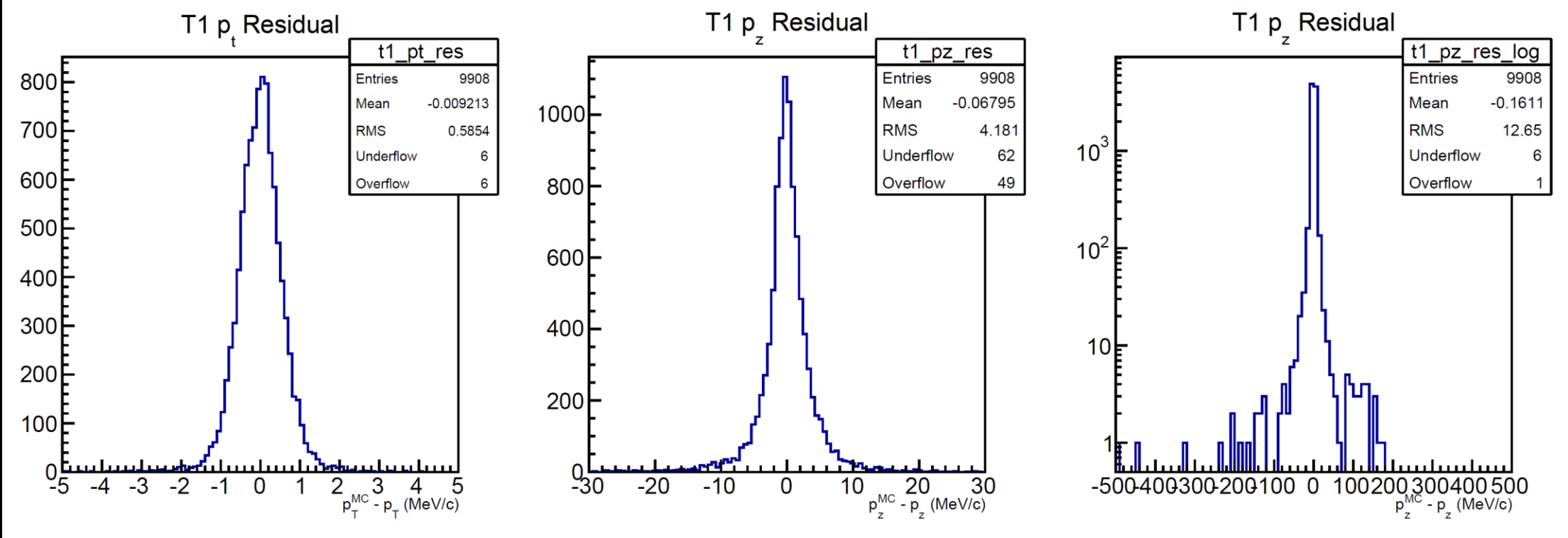
Partially contained
track
All matched



2 matched
2 mismatched
3 missed
Malformed track –
cannot associate
with MC

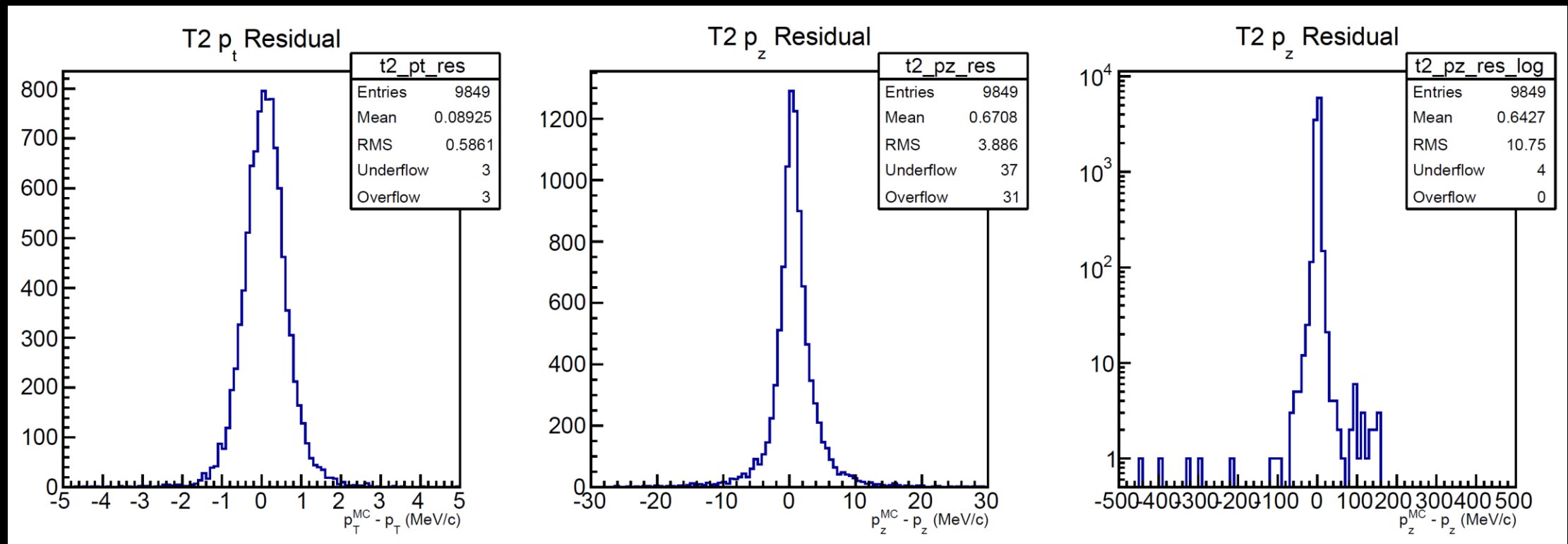


T1 Pat Rec Momentum Residuals



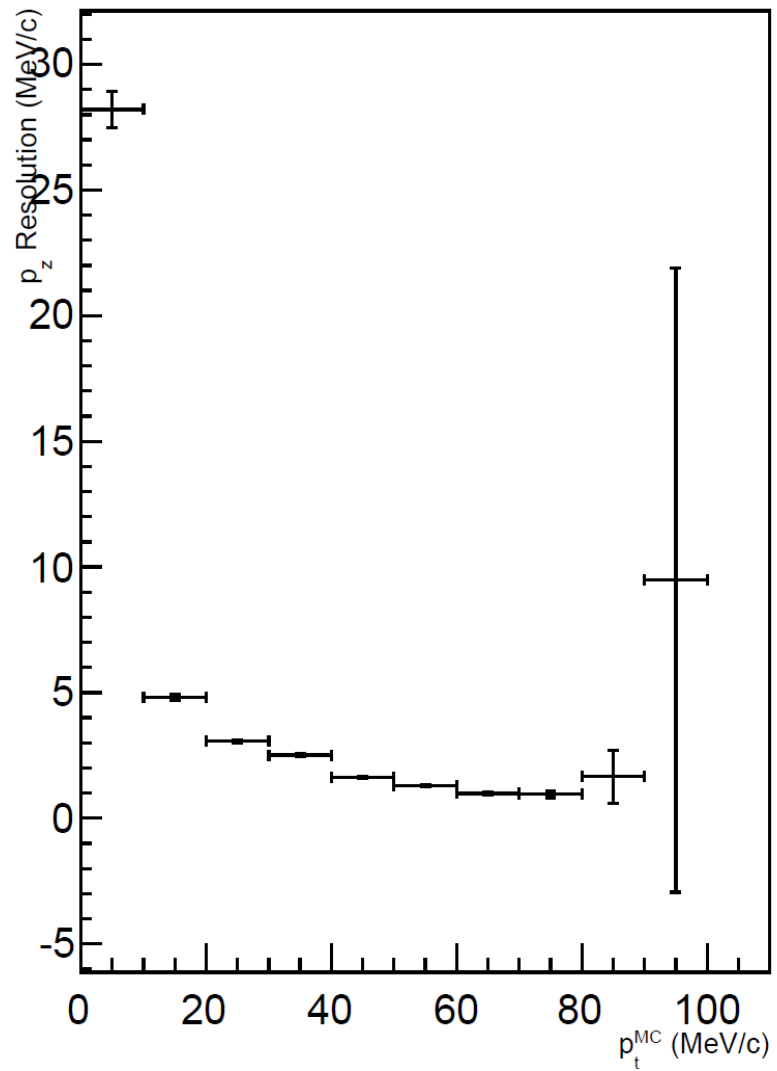


T1 Pat Rec Momentum Residuals

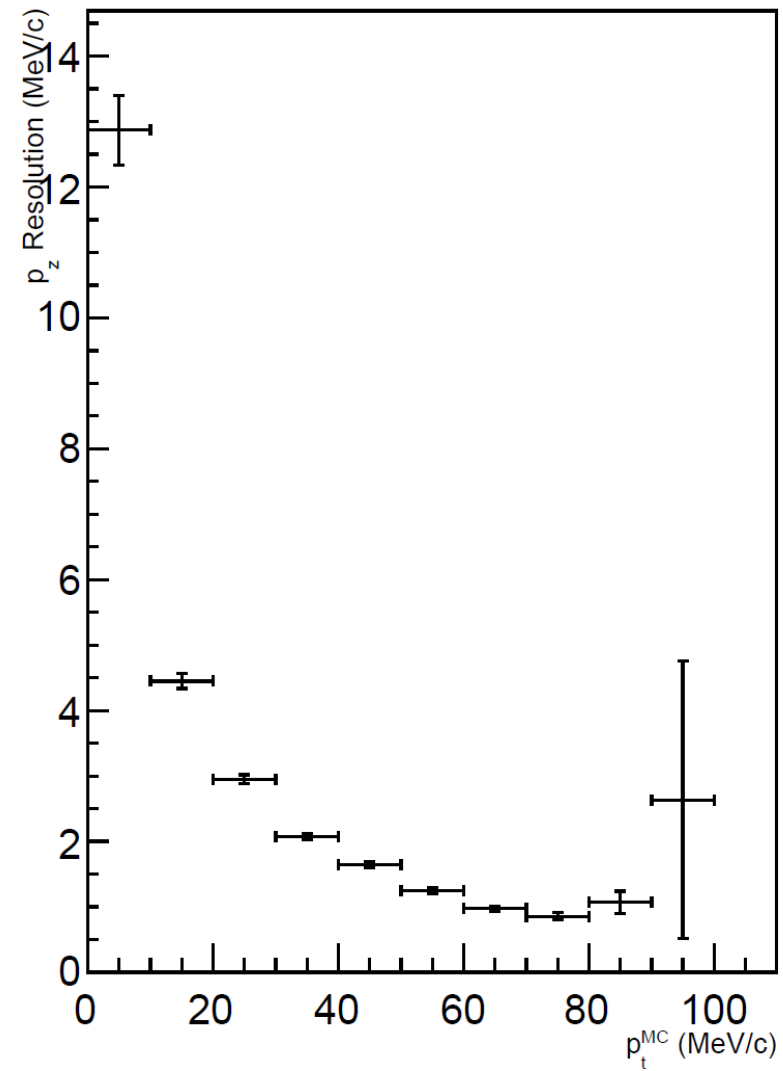




T1 p_z Resolution



T2 p_z Resolution





To Do

- Study performance with different beams (good student project...)
- More work on spacepoint efficiency study (ADD, C. Hunt)
- Final pass of digitisation and recon to spacepoints code (E. Santos)
- Implement more online plots (AD, M. Uchida)
- Investigate the Celeste effect (Celeste)
- Get code to access CDB geometry by default (R. Bayes, C. Heidt)
- Pick up common spacepoints at Pat Rec / Kalman stage (AD, E. Santos)
- Kalman to deal with both charges (E. Santos)
- Further documentation (All)
- Improved unit test coverage, more integration tests (AD, C. Heidt, E. Santos)
- Code profiling and speed up (C. Hunt)



Requests to MAUS

Necessities

- Trigger MC needed badly to test Pattern Recognition
- CDB interface
- New online plotting interface (ROOT?)
- Memory leaks removed

Would be nice if...

- Parallel running
- Remove requirement to pass JSON between modules (performance issue)

Questions

