



Offline Computing

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Overview

- Current Release
- Production MC Processing
- MAUS: Global Reconstruction
- MAUS: Tracker Update
- MAUS: To Do
- Analysis
- Conclusion





Current Release

- Current release: MAUS-v3.0.0
- Download: <http://heplnv152.pp.rl.ac.uk/maus/>
- Global reconstruction - running as part of official offrec
 - See Melissa's talk (Monday morning)
- Tracker pattern recognition - MINUIT now default fitter
 - See Chris Hunt's talk (Monday afternoon)
- TOF last issues: low TOF2 efficiency, momentum discrepancy
 - See Scott's talk (Monday afternoon)
- Standard recon available at: <http://reco.mice.rl.ac.uk>





MC Batch Processing

- G4Beamline running again on GRID since March
- Full MAUS recon performed on raw MC
- Results produced as many small MAUS output ROOT files
- GRID job mangement used upgraded from WMS to DIRAC
- Since last CM: 19 new productions, 427 GB in 22,621 files
- Information about finished and running MC runs:
`http://micewww.pp.rl.ac.uk/projects/analysis/wiki/MCProduction`
- Requests for new runs to Dimitrije Maletic



Global Reconstruction

- Global recon now part official offline processing - **data available for analysis**
- Documentation in MAUS workbook and user guide
- Can look at US, DS and through tracks
- PIDs with log likelihoods and confidence levels provided
- Can look parent and orphan tracks (decays)
- Read out at virtual planes now possible
- Coming up:
 - PDF lookup via CDB in the next release
 - Track information as a function of z position
 - Include in event display



TOF Reconstruction

- Δt was found to depend on position
 - Led to inefficiency and TOF2 Δt offset
 - Fixed by new calibration (as of Tuesday this week)
- Still small discrepancies between data and MC and between TOF and tracker
- Scott trying to get a group together to track down these issues





Tracker

- Efficiency improved by switching to MINUIT
 - Model with low p_t singularity ditched
- Speed is sufficient
- Purity is reduced
 - p_z sometimes mis-reconstructed for $p_t < 10$ MeV/c tracks
- Mysterious excess of tracks reconstructed around $p_z = 50$ MeV/c
- May need to compensate for degradation of hardware



Efficiency (v3.0.0, Run 8681, real data)

<i>xy</i> Fit	<i>sz</i> Fit	Δ_{xy}	Δ_{sz}	TU 5pt	TU 4-5pt	TD 5pt	TD 4-5pt
LSQ	LSQ	5.0	150.0	0.9167	0.9880	0.8144	0.9807
MIN	MIN	10.0	65.0	0.9787	0.9879	0.9402	0.9721

Big improvement in MINUIT over LSQ!

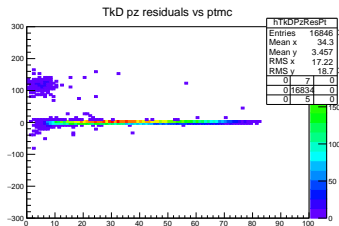
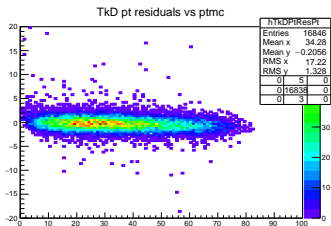
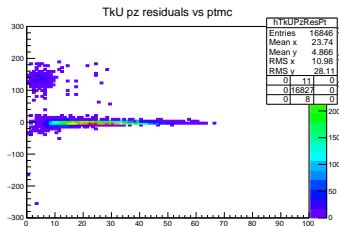
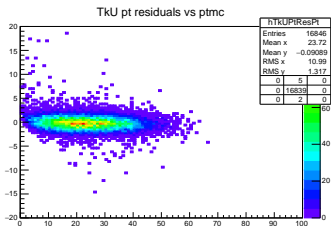
Figures for latest data:

<http://www.hep.ph.ic.ac.uk/~adobbs/Files/tracker-analysis/MAUS-v3.0.0/09700/>



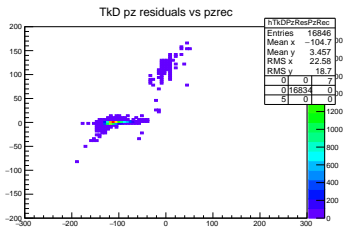
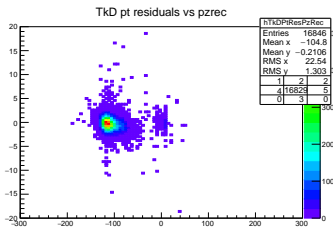
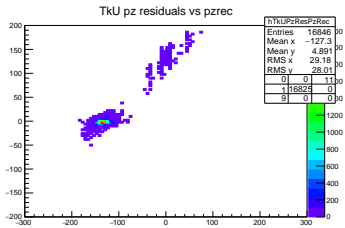
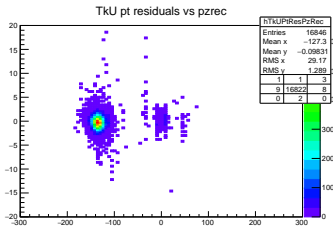
Pz low Pt PatRec mis-reconstruction

MC, run 08681, MAUS-v2.9.1 (MINUIT), Pattern Recognition tracks



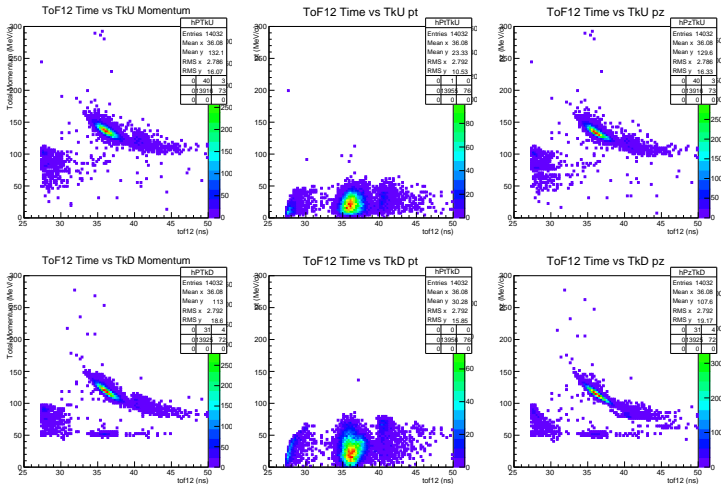
Pz low Pt PatRec mis-reconstruction

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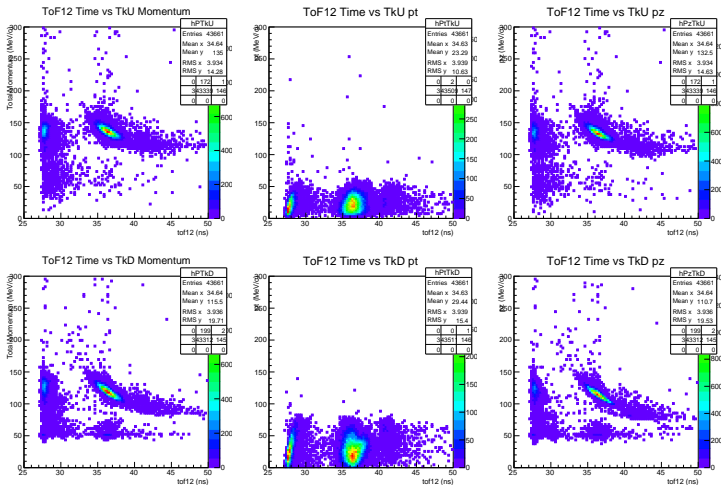
TkD Momentum mis-reconstruction?

MC, run 08681, MAUS-v2.9.1 (MINUIT), Kalman tracks, ref plane



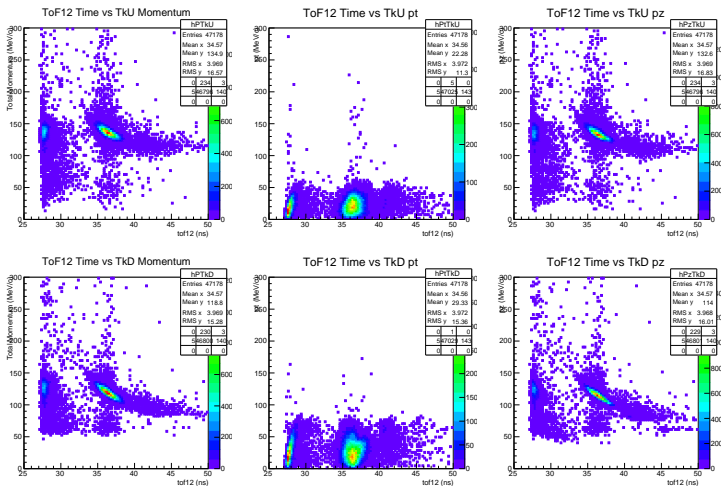
TkD Momentum mis-reconstruction?

Real Data, run 08681, MAUS-v3.0.0 (MINUIT), Kalman tracks, ref plane



TkD Momentum mis-reconstruction?

Real Data, run 08681, MAUS-v3.0.0 (LSQ), Kalman tracks, ref plane



To Do

- Solve tracker downstream mis-reconstruction
- Evaluate global reconstruction performance, enhance as needed
- Correct remaining TOF issues
- See if OutputCppRoot can perform faster
- Event viewer into online reconstruction



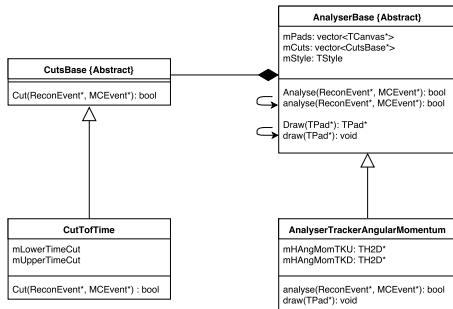
MICA

- Extensible framework for plotting MAUS output data
- Lots of analysers already in place
- C++ - fast
- cmake build system
- Available on github:

`git clone https://github.com/ajdobbs/mica.git`

- Sample output:

<http://www.hep.ph.ic.ac.uk/~adobbs/Files/tracker-analysis/>



Conclusion

- Batch production MC working well
- Global reconstruction now available in official data
- Few remaining tracker issues
- Few TOF issues
- Approaching conclusion of main development
- Paper on back burner due to data taking
- MAUS is providing reconstructed data, simulation and real, to collaborators for all the MICE detectors
- MAUS is providing live online data reconstruction and visualisation for shifters
- Download: <http://heplnv152.pp.rl.ac.uk/maus/>

