**Imperial College
London**

MAUS Status

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Overview

- Current Release
- Infrastructure
- Detector Overview
- Tracker Update
  - Trim coil performance analysis
- Global Reconstruction Update
- Future plans
- Conclusion

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Current Release

- Current release: MAUS-v2.6.0
- Highlights:
  - Global reconstruction TRef issue fixed
  - Tracker mappers refactored
  - Tracker Kalman integration tests
  - EpicsInterface, ParticleTrigger and TriggerEngine in datastructure
  - Logging and exceptions updated
  - Batch cluster running framework added
  - G4Beamline random number fix
  - Geometry corrections downloadable from CDB
- Known issues:
  - Tracker Kalman sometimes produces NaN
  - MC speed still slow

- Output API has not been correctly implemented (does not obey the standard interface `IModule`) - working to fix

- Reducers do not work with `OutputCppRoot`

- A data selection mapper is being worked on

- Some third party build scripts need updating

- Want to move to ROOT6 - next minor ROOT release should add GCC5 compatibility allowing the move

Detector Overview

- CKOV - functional
- TOF - Done
 - Except for the trigger MC
- Tracker
  - See later slides
- KL - Done
- EMR - Done

Tracker

- Efficiency, residuals, resolutions looking pretty good
- Helical pattern recognition parameters still to be optimised
- Low level MC needs validating
- Low momentum efficiency drop still to analysed
- No new Kalman champion
- Various analyses needed to support different lattice designs:
    - Reconstruction looks robust when trim fields are removed in Step IV
    - Efficiency looking good when using the no US solenoid descope lattice
- Paper nearly complete, latest draft at:
  https://github.com/mice-software/scifi-software-paper

Tracker Performance: US Trims vs. No Trims: Conditions

Trims
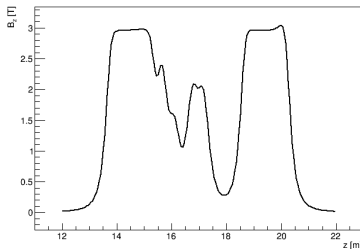
No Trims
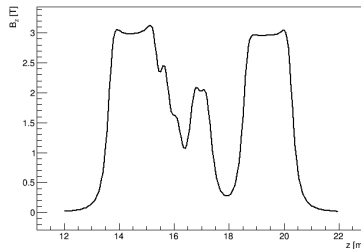
- Geometry based on run 8281

- Muon beam, 233 MeV/c

- Beam started just upstream of TOF1
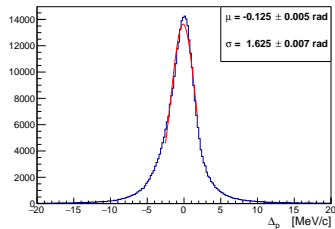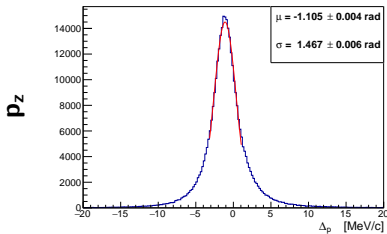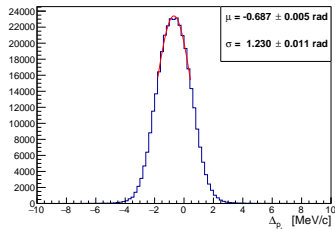
- 500,000 primaries

- Usual tracker analysis cuts

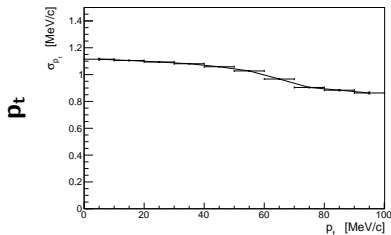## Tracker Performance: US Trims vs. No Trims: p residuals
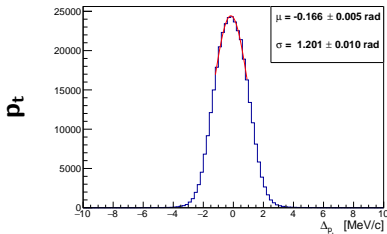
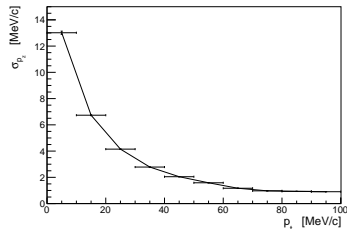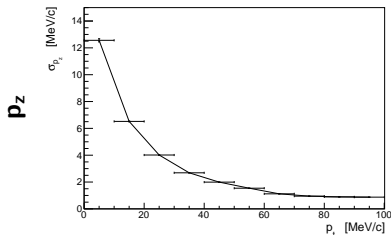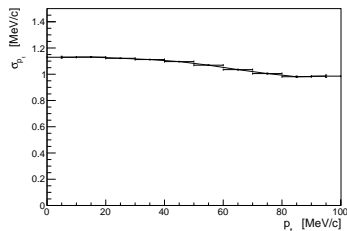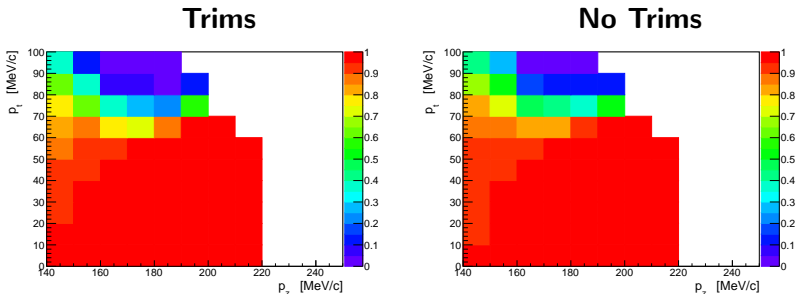## Tracker Performance: US Trims vs. No Trims: p resol

Tracker Performance: US Trims vs. No Trims: Efficiency

Efficiency 5 point tracks: Trims: **93.44%**, No Trims: **93.26%**
Efficiency 3 - 5 point tracks: Trims: **100.0%**, No Trims: **100.0%**

Global Reconstruction

- Global reconstruction code available in MAUS
- Development ongoing - not yet production quality, but close
- TrackMatching and PID working
- TRefArray storage issue fixed
- Some performance concerns when using Global as part of standard recon chain
- See J. Greis talk

Global Reconstruction Residuals
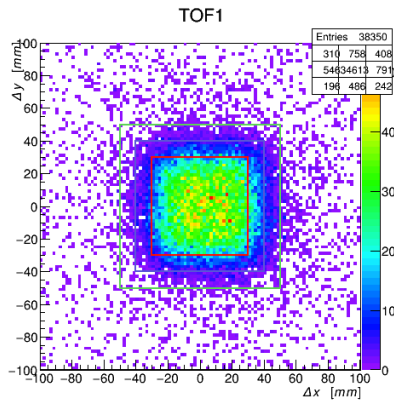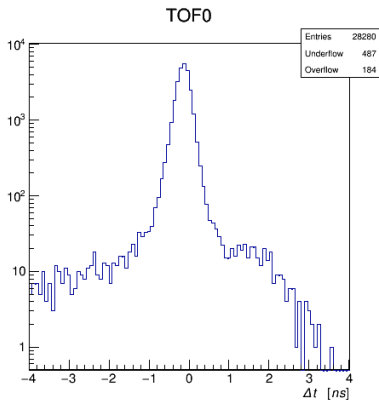
Future Plans

- Analyse tracker low momentum efficiency, fix if possible
- Verify low-level tracker MC
- Finish global reconstruction
- Event viewer into online reconstruction
- Data selection mapper
- Speed up MC
- Simulate the trigger
- Complete the Output API
- Upgrade to ROOT6
- Dreams: cmake build system, multi-threaded running, ...

Conclusion

- MAUS is providing reconstructed data, simulation and real, to collaborators for all the MICE detectors
- Many analyses now done using MAUS (see the other talks)
- MAUS is providing live online data reconstruction and visualisation for shifters
- Download: `http://heplnv152.pp.rl.ac.uk/maus/`