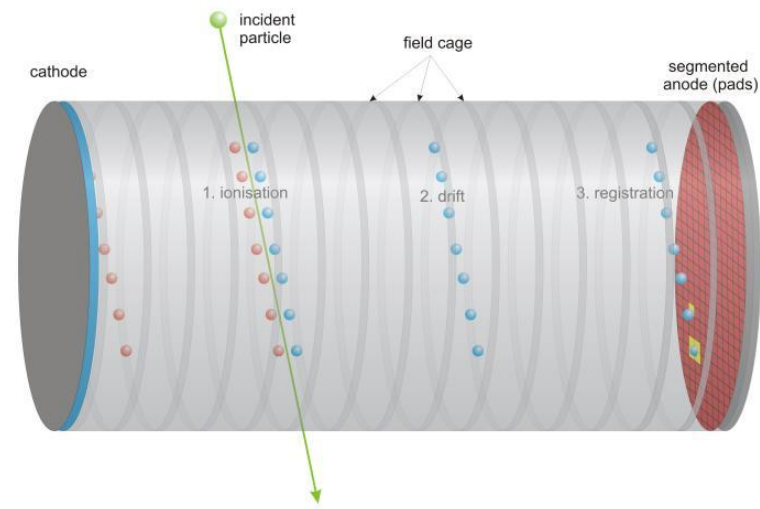
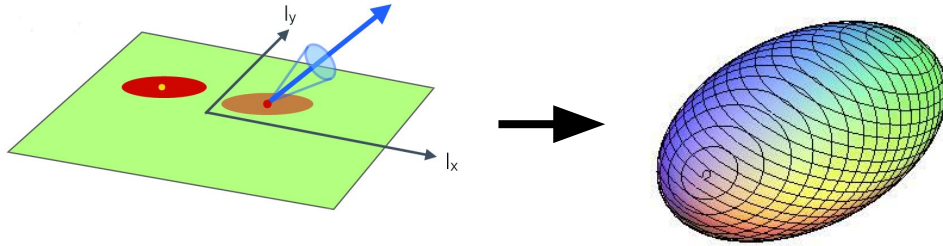


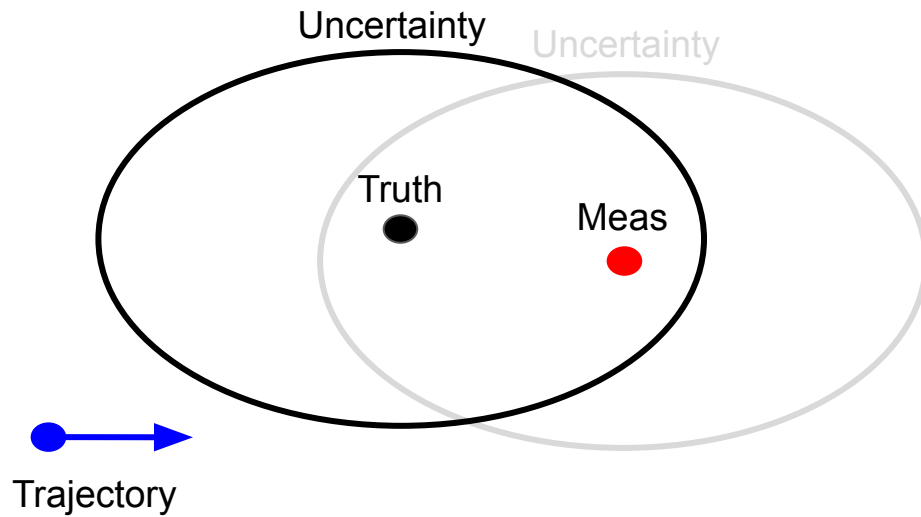
Problem

- Classical case:
 - Measurements only at surfaces
 - Propagation to surface, update and continue

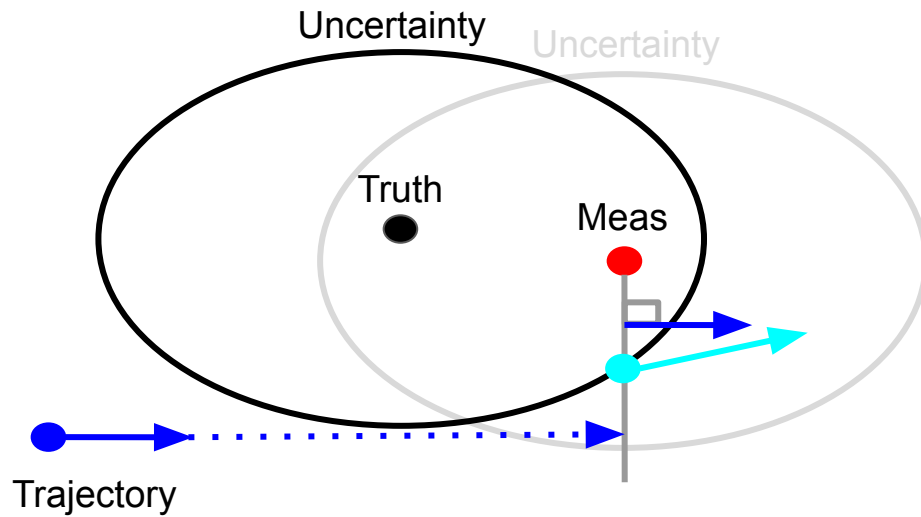


- Measurements located anywhere inside volume
 - Assumption: No prior information about location
 - At which point should the update occur?
 - Measurement itself is the only indicator
 - Shortest distance between trajectory and measurement
 - How does the filter formalism look like?
 - Similar to classical case
- More information → Formalism changes & results improve
- I will skip the math for today
 - Let's rather look at results and the branch composition

Problem



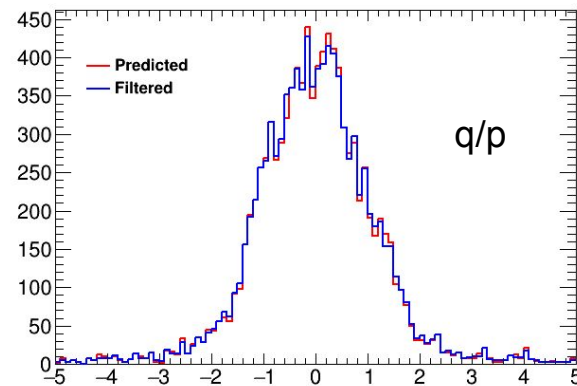
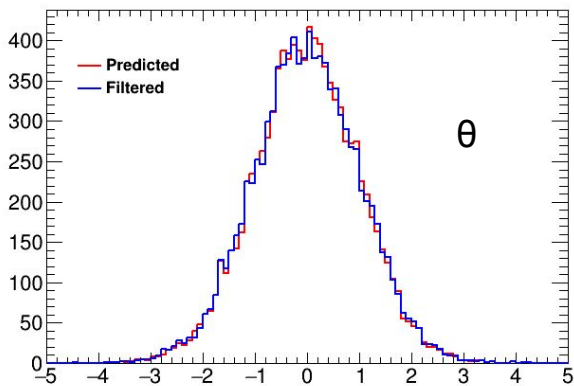
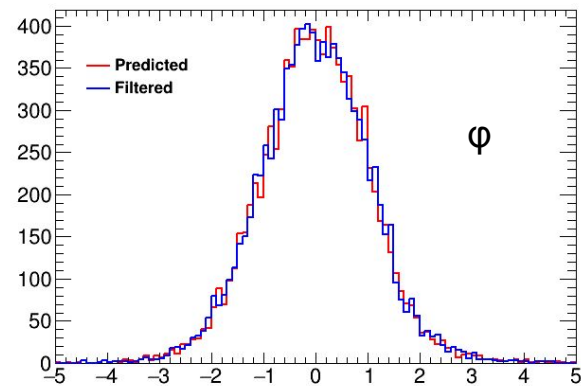
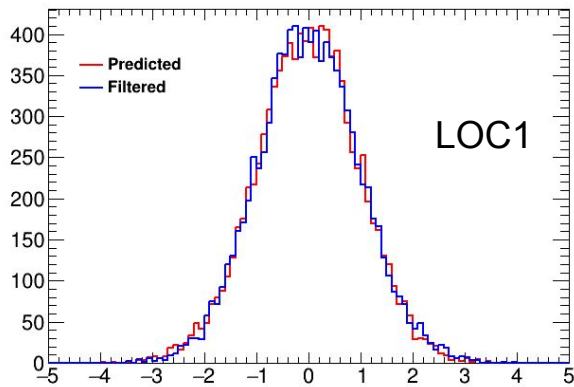
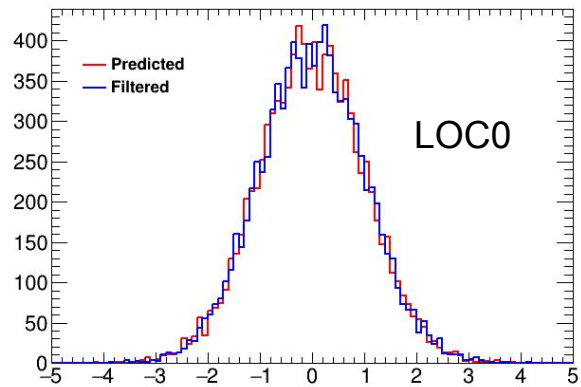
Problem



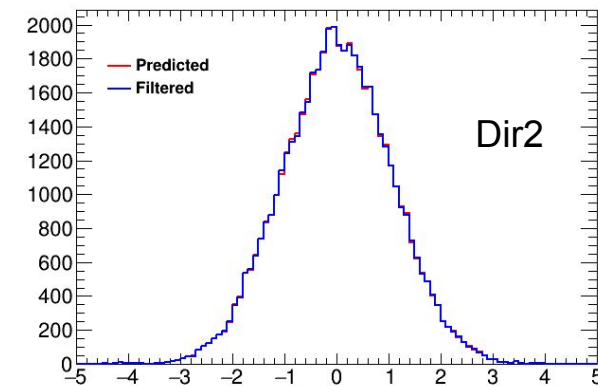
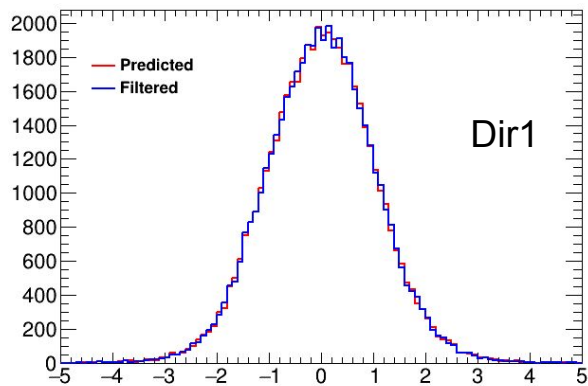
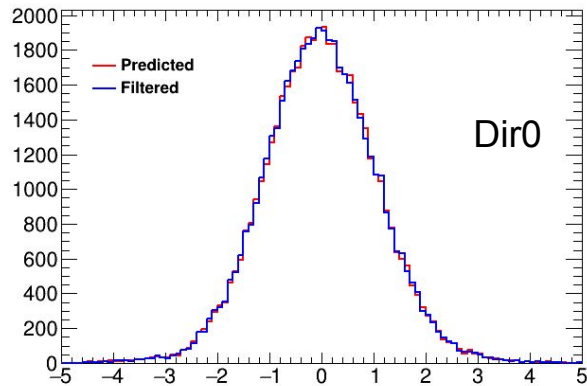
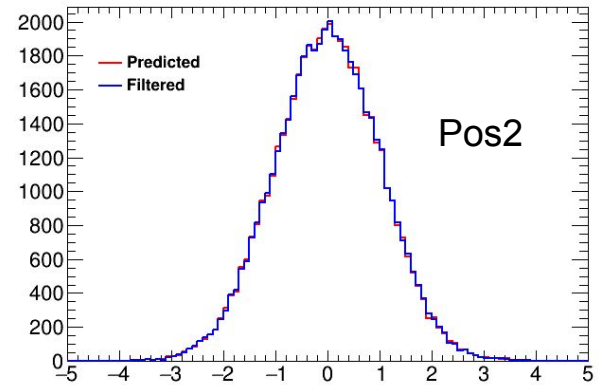
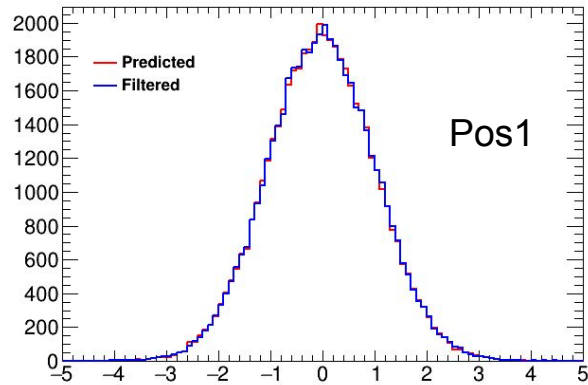
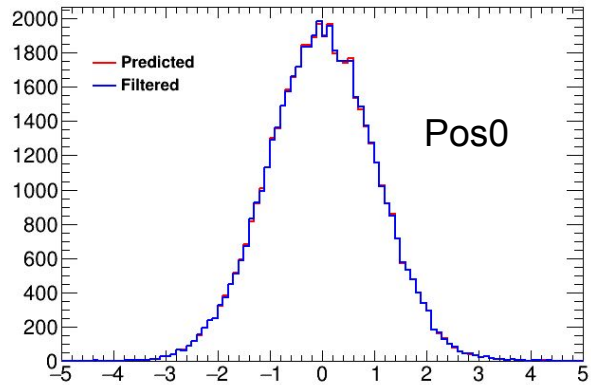
Setup

- **Detector**
 - [sPhenix](#) (Tracker + TPC)
 - Constant B-Field of (0, 0, 1.4) T
 - No material attached
- **Particle gun**
 - 10 GeV Muons
 - $\eta \in [-1,1]$
 - Full ϕ range
- **Simulation**
 - Hit smearing @ Tracker surface: (25, 100) μm
 - Hit smearing @ TPC volume: (175, 175, 750) μm
 - Hit creation @ TPC: Step size restricted to ≤ 10 mm, Hit created after each step
- Initial parameters of fit smeared by fixed values
- Smoothing performed by backward filtering
- Performed for tracker only & tracker + TPC

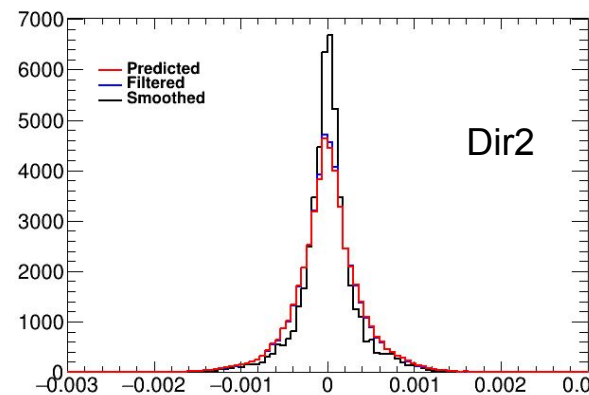
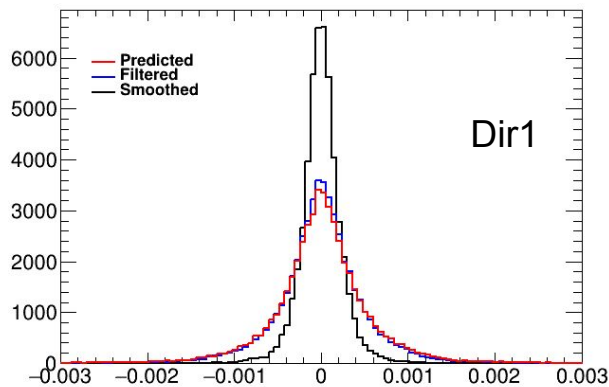
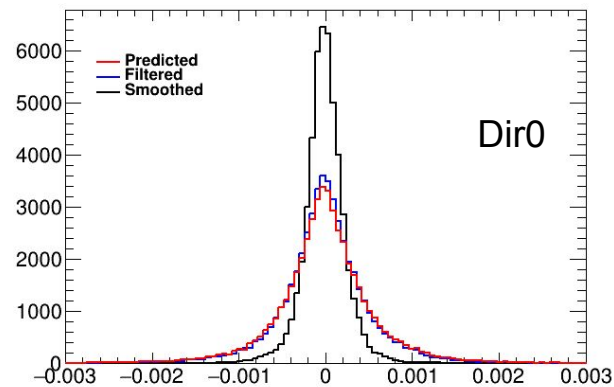
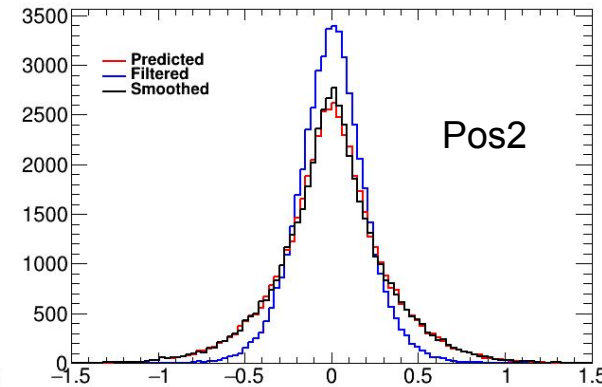
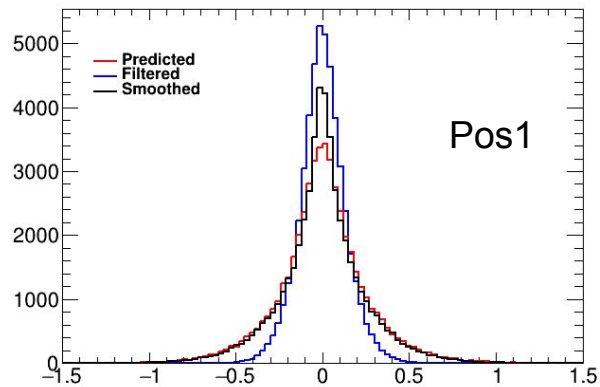
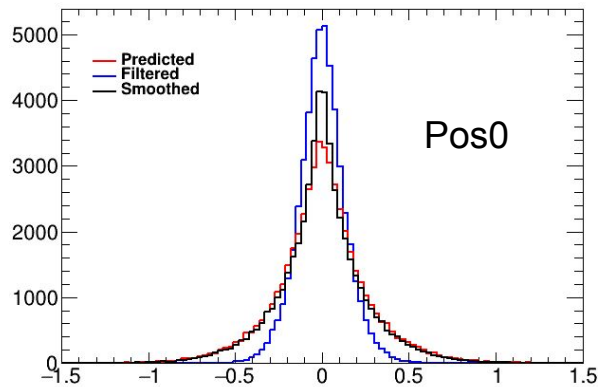
Pull distributions @ tracker



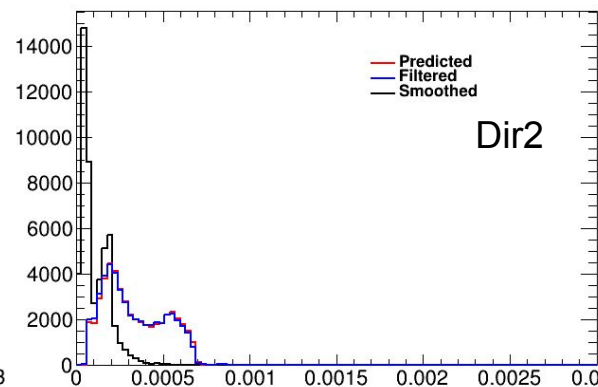
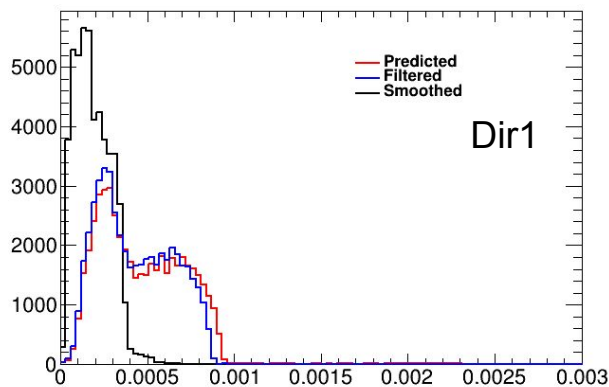
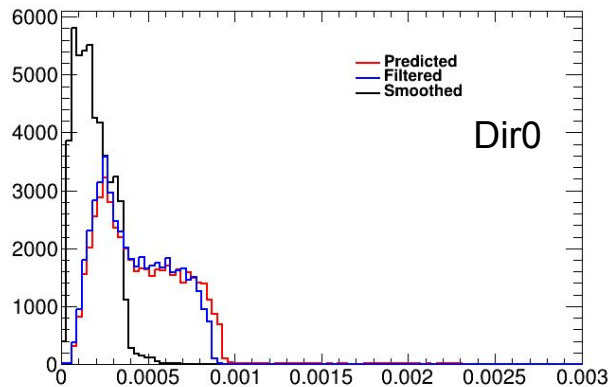
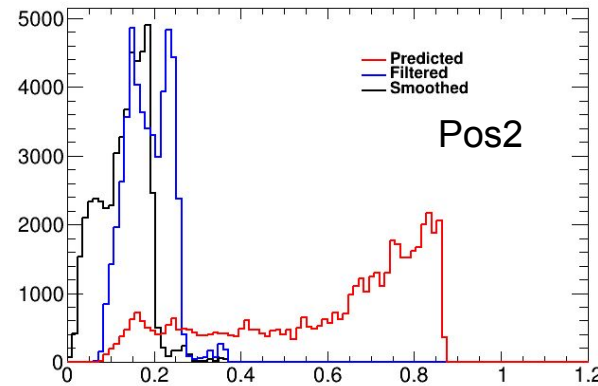
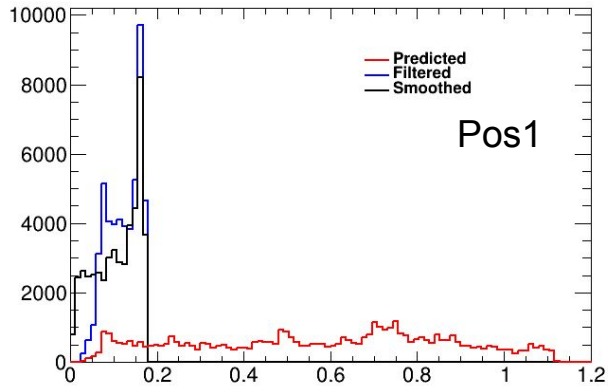
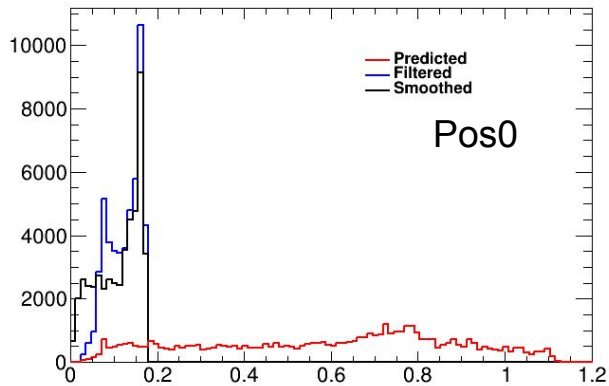
Pull distributions @ TPC



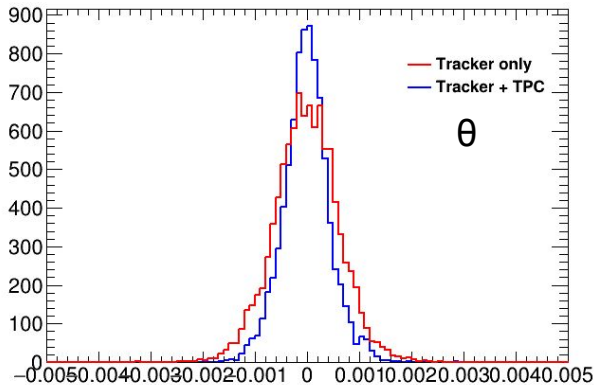
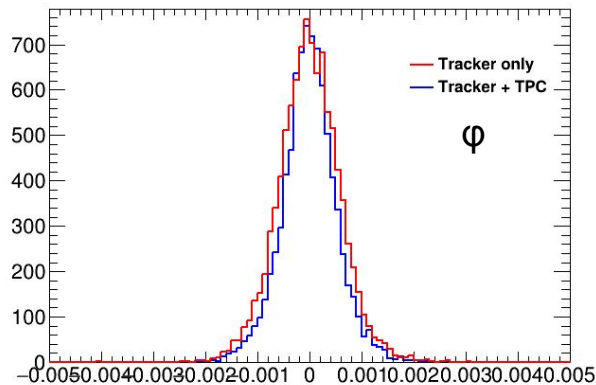
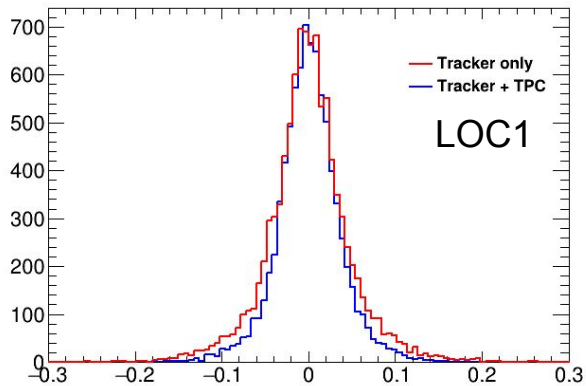
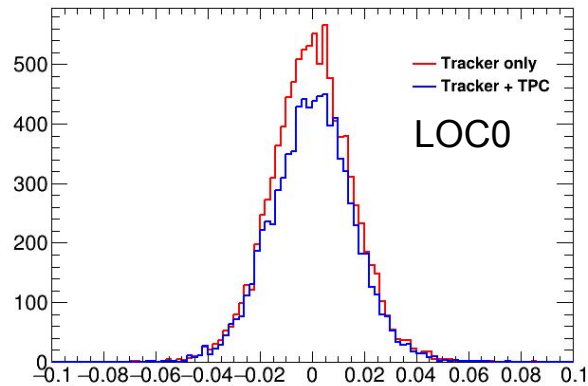
Residuals @ TPC



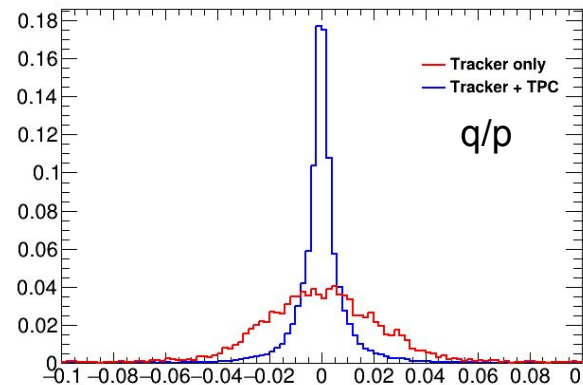
Errors @ TPC



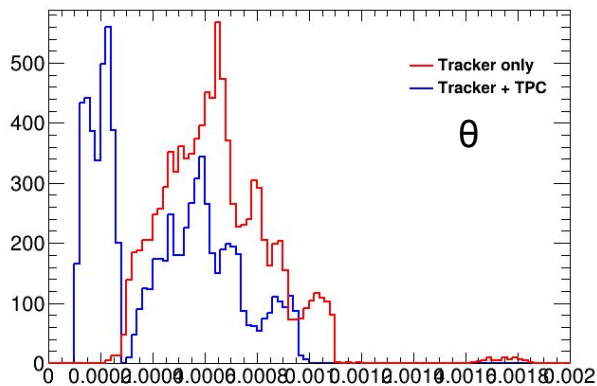
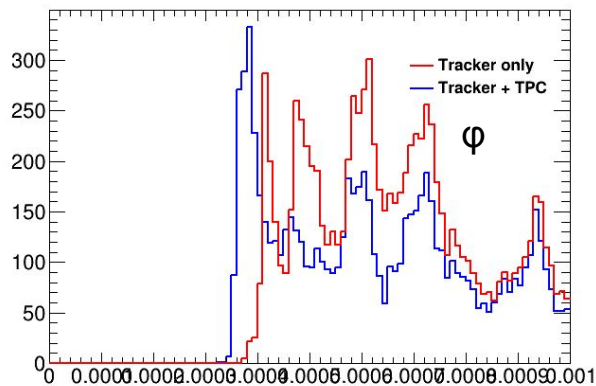
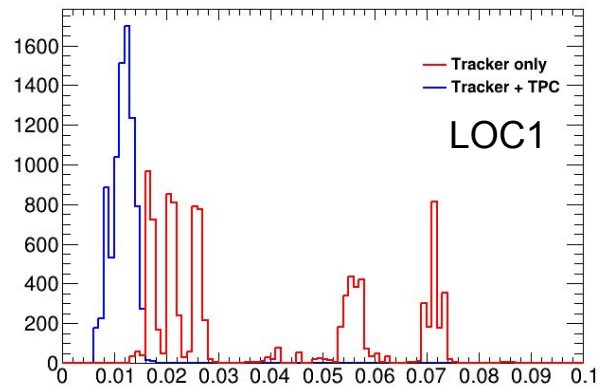
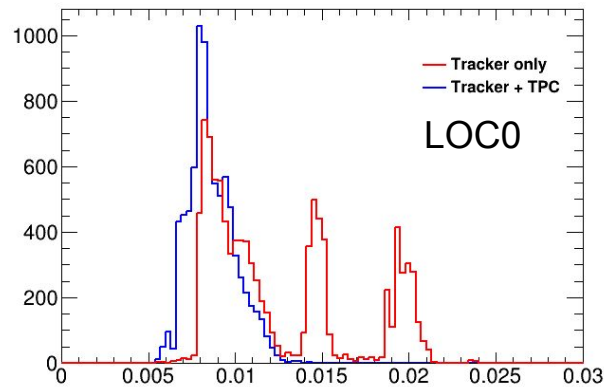
Smoothed residuals @ tracker



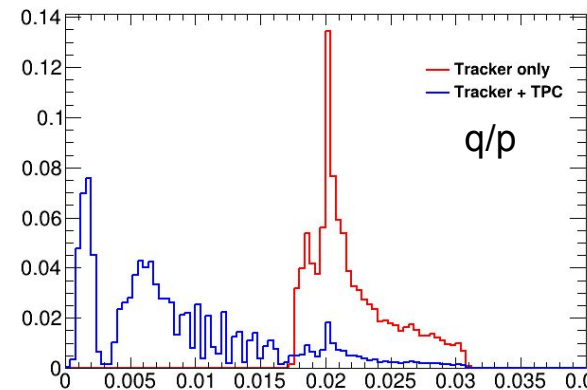
Normalized (Tracker+TPC)



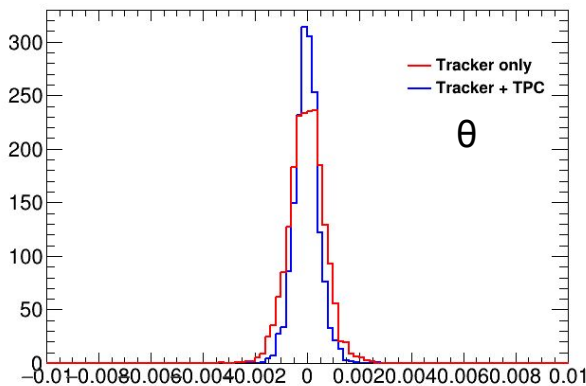
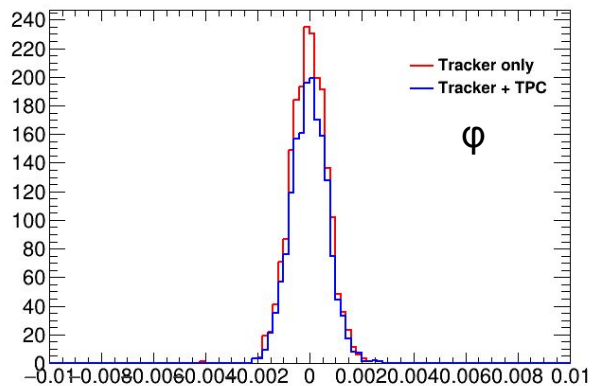
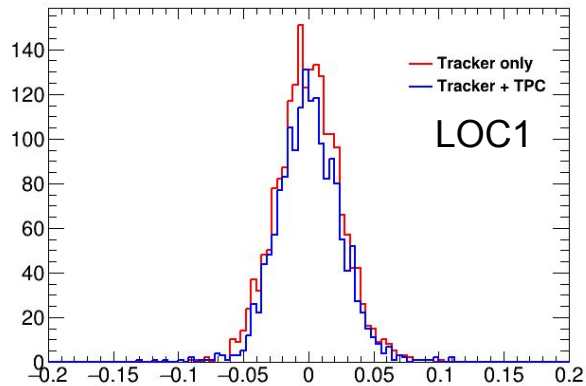
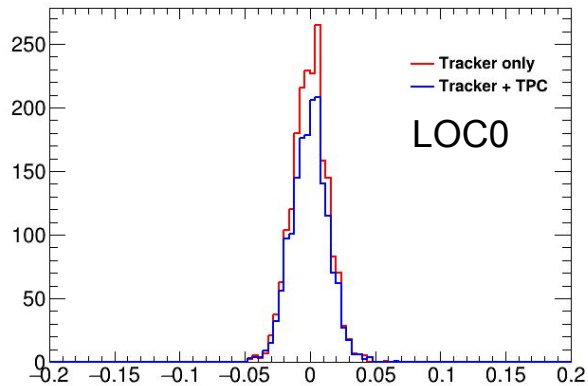
Smoothed errors @ tracker



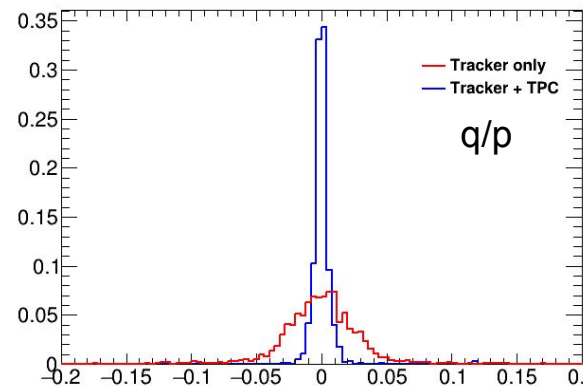
Normalized (Tracker+TPC)



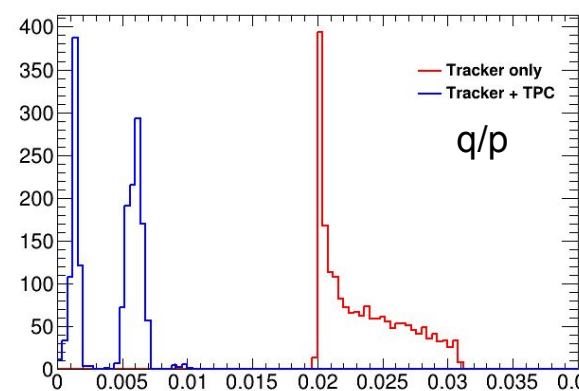
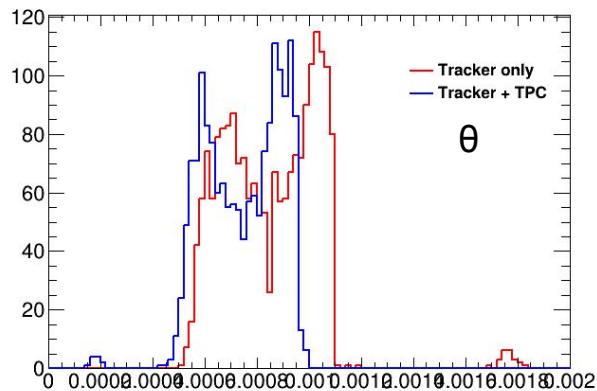
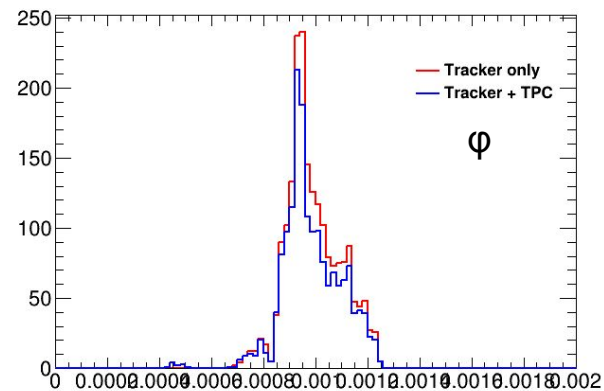
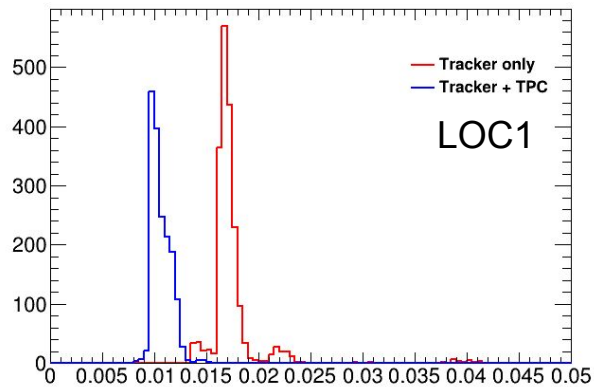
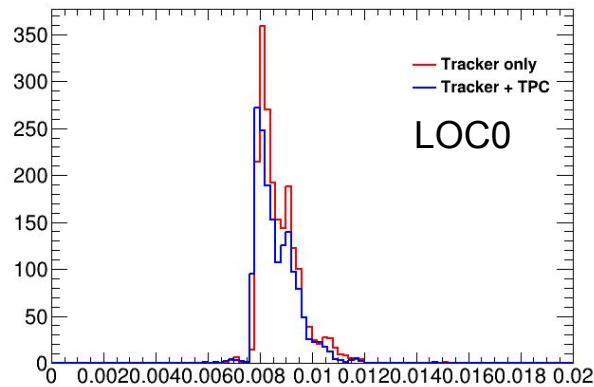
Smoothed residuals @ last surface



Normalized (Tracker+TPC)



Smoothed errors @ last surface



Branch content







Commits 239

Files changed 91



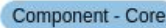
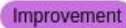




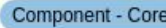
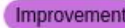


Commit comments 0

Showing 91 changed files with 8,004 additions and 2,291 deletions.

- Propagation

-  **Introduce propagation with all parametrisations** ●    
#86 opened on Apr 2 by FabianKlimpel 

- EDM

-  **Storage of GeometryObject in MultiTrajectory** ×    
#293 opened on Jun 30 by FabianKlimpel 
-  **Allow storage of FreeParameters in MultiTrajectory** ×    
#341 opened on Jul 20 by FabianKlimpel 
- SourceLink concept requires 7 lines of change to become applicable
- Should require a common constructor for proper smoothing

Branch content

Commits 239

Files changed 91

Commit comments 0

Showing **91 changed files** with **8,004 additions** and **2,291 deletions**.

- (C)KF
 - Require some refactoring (Functions templated unnecessarily)
 - Some additional functions required (Symmetrical to the current (C)KF)
 - GainMatrixUpdater needs a few lines of adaption (based on EDM)
- Geometry
 - Volume* → std::shared_ptr<Volume>
 - Ensure that it exists independently of TrackingGeometry
 - Based on EDM
 - Sensitive Volumes
 - Also affects hit creation / smearing

Branch content

Commits 239

Files changed 91

Commit comments 0

Showing 91 changed files with 8,004 additions and 2,291 deletions.

- I/O
 - Current examples rely on Digitization
 - Writers/Readers need to be adapted
 - Many line changes due to copy&paste
 - RootTrajectoryWriter needs some bug fixes
- Algorithms
 - Hit creation and smearing
 - Fitting algorithm (due to changes in the KF)
- No guarantee that these were all changes but at least the major ones