

CA package for MVD & STT tracking

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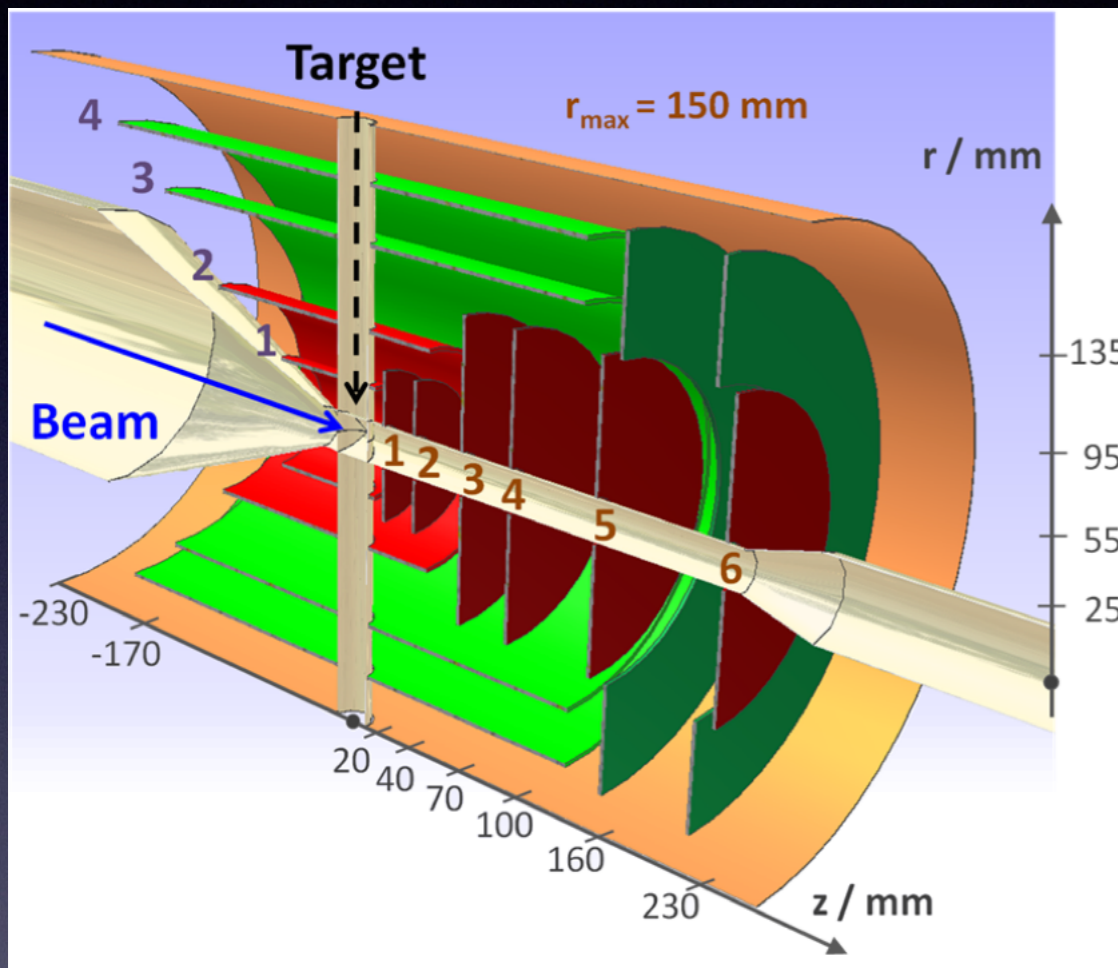


PANDA collaboration meeting
Bochum, 1 March 2016

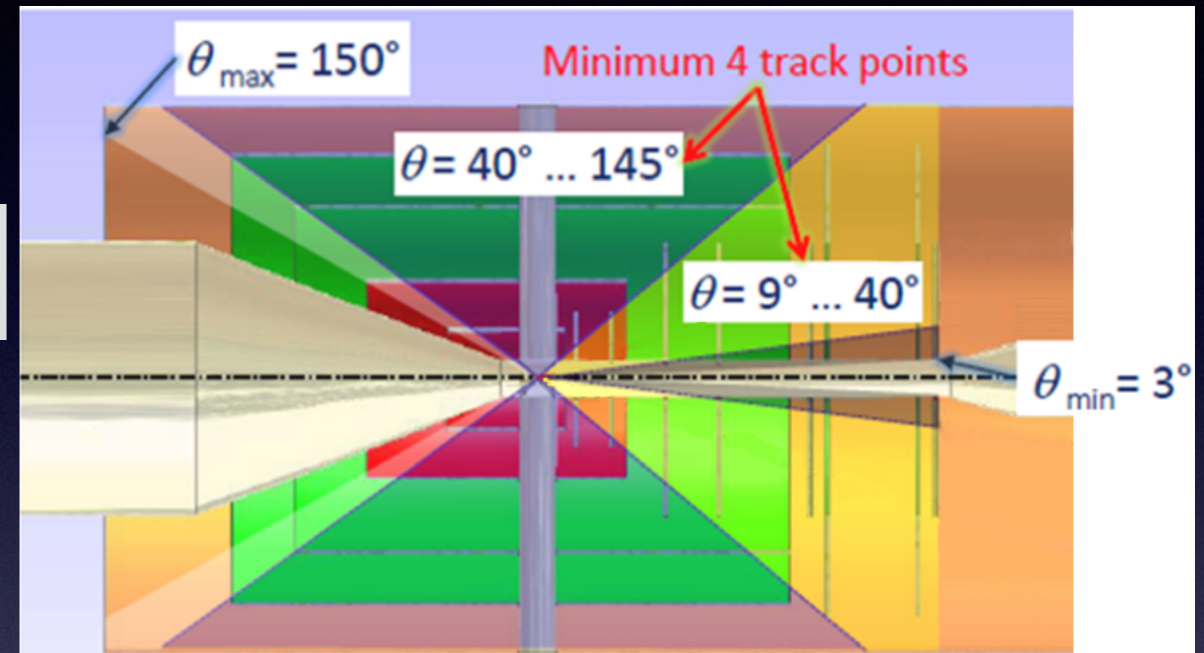
Outline

- Introduction
- Cellular Automaton tracking
- Current Status & Activity
- Forward & Barrel Tracking
- Outlook

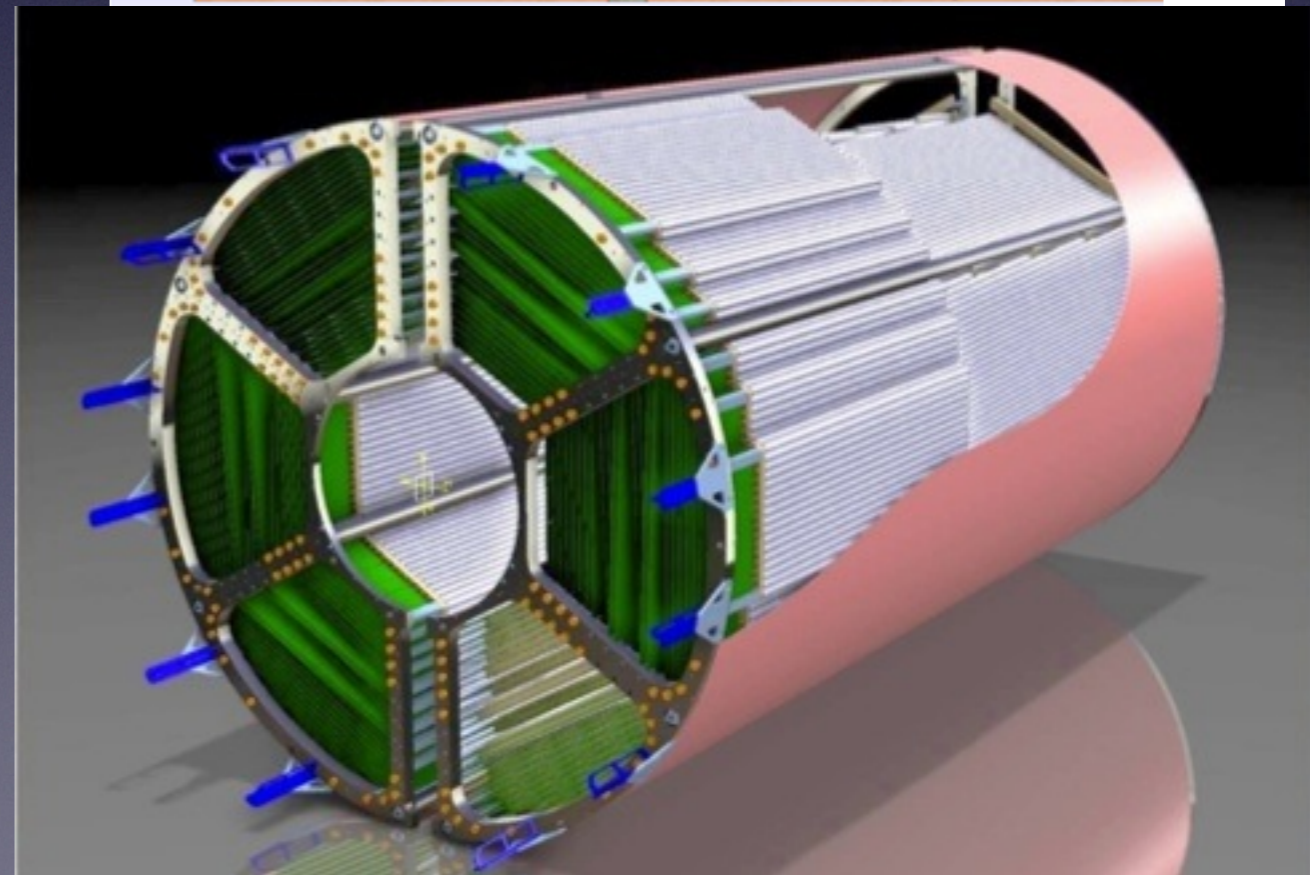
Introduction



MVD



STT



Cellular Automaton Tracking

- * Input/Initialisation

- * Tracklet construction

- * Parameters

- * Singlets

- * Doublets

- * Triplets

- * Kalman Filter

- * Extrapolation (Runge-Kutta 4th order method)

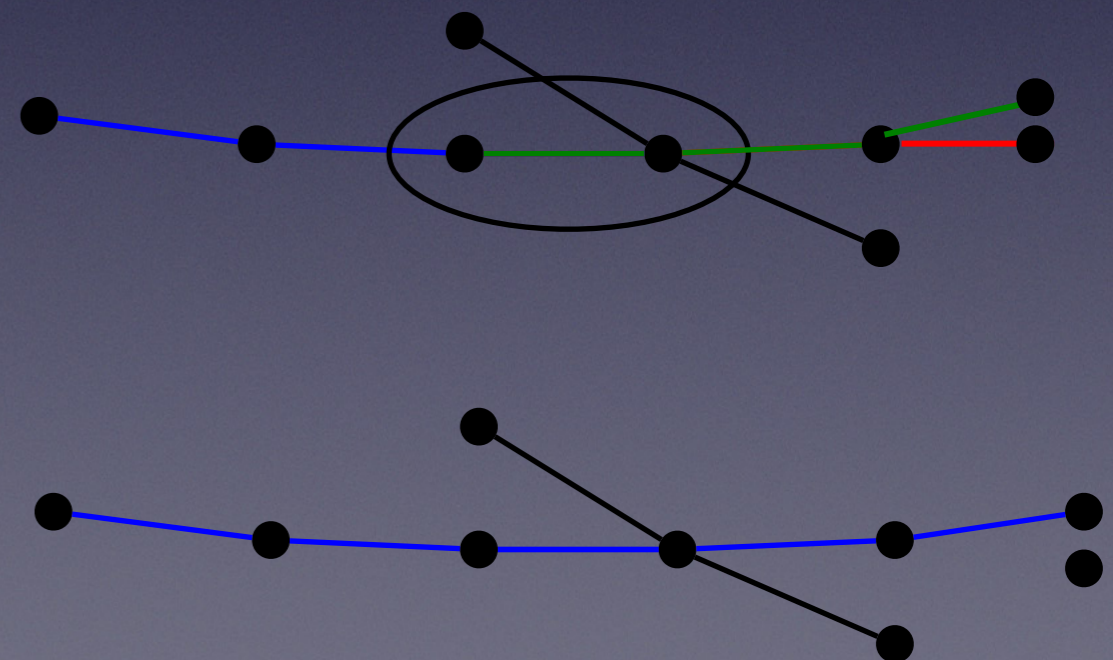
- * Update (using measurement information)

- * Evolution

- Neighbour Search

- Track Construction

- * Performance evaluation

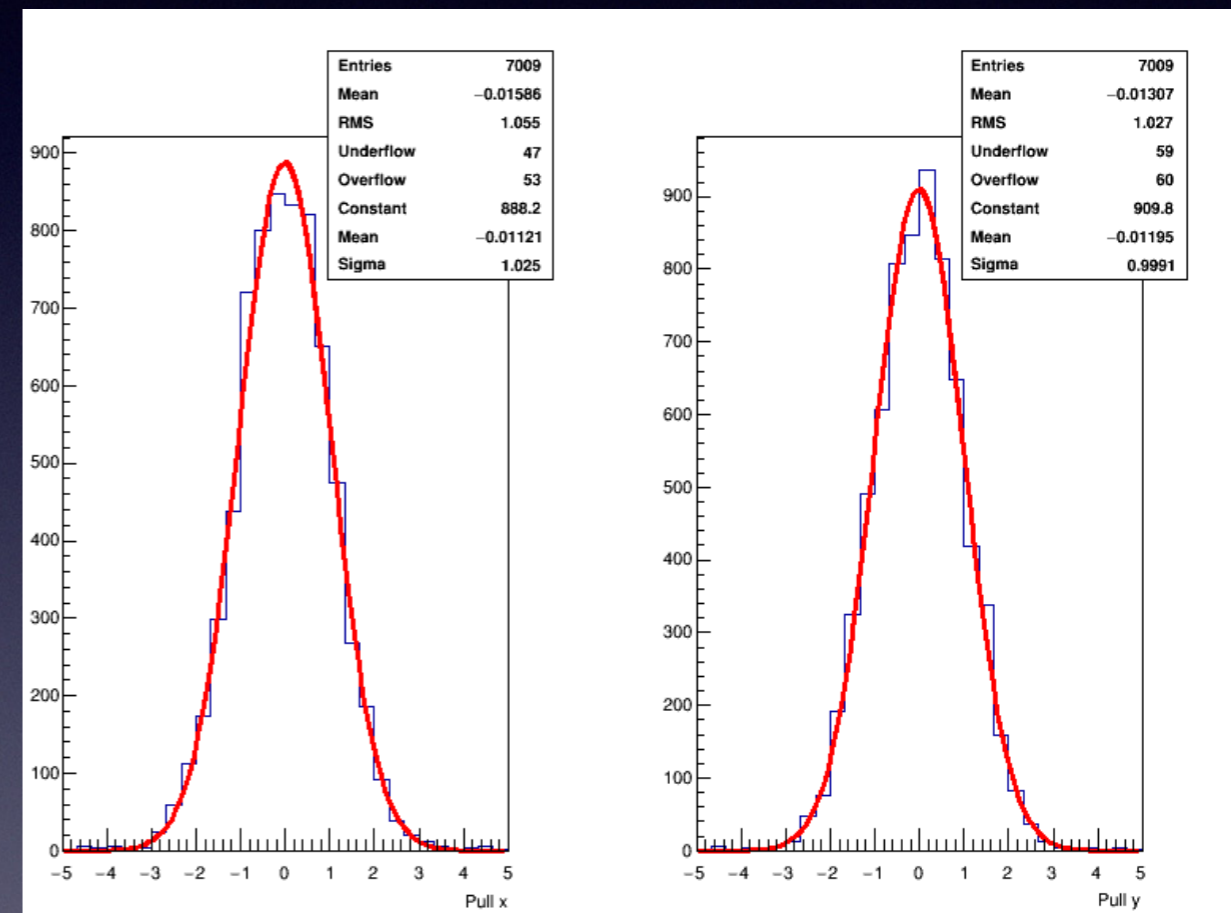
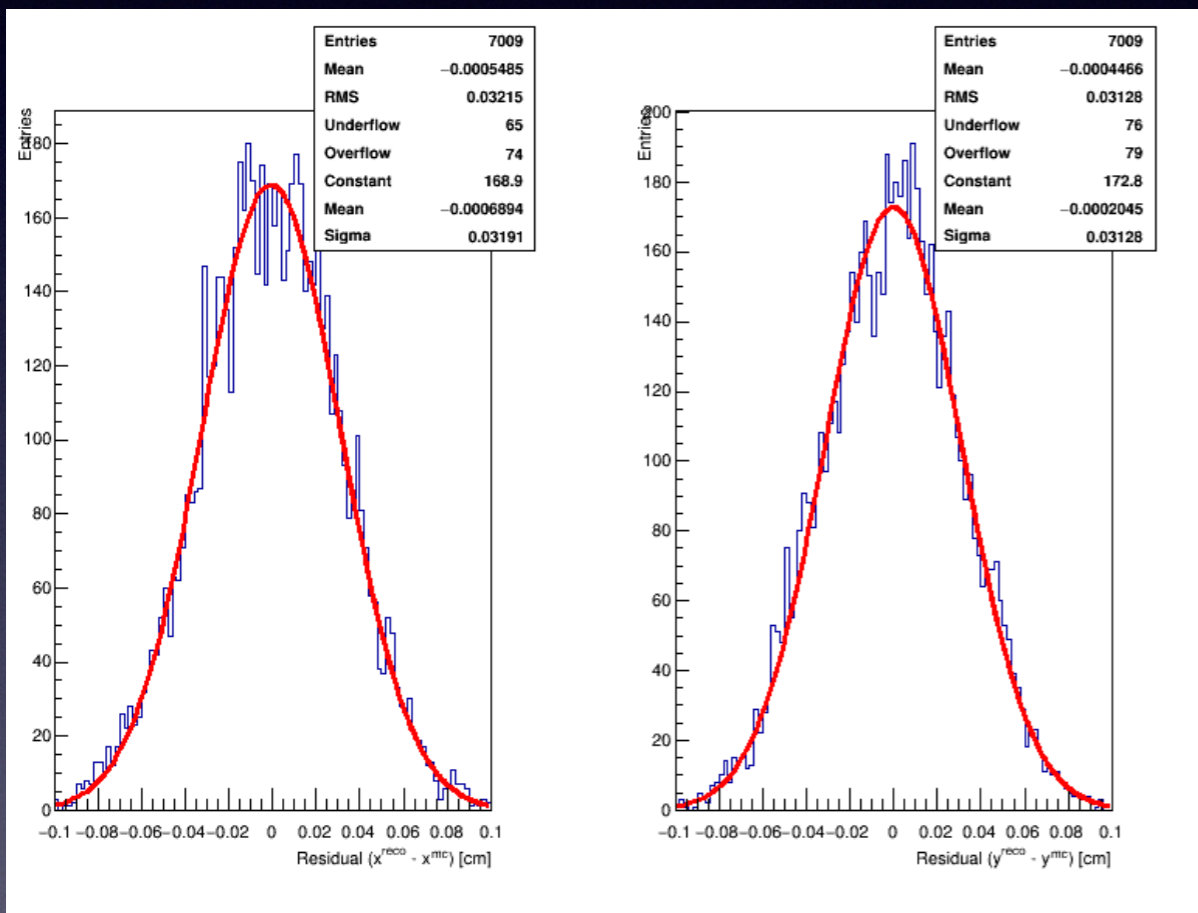


Current status & activity

Hits

Residuals

Pulls

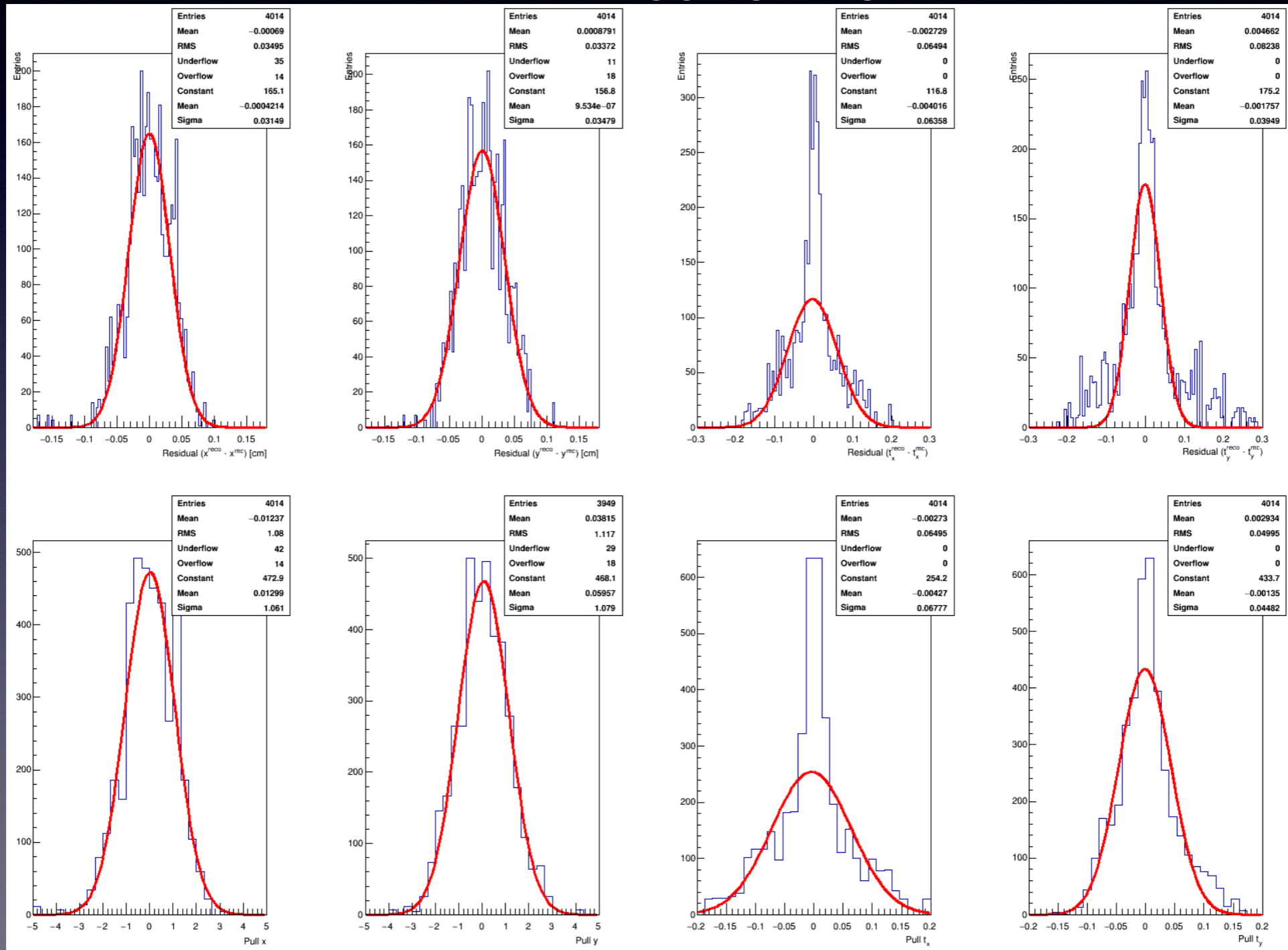


For debugging:

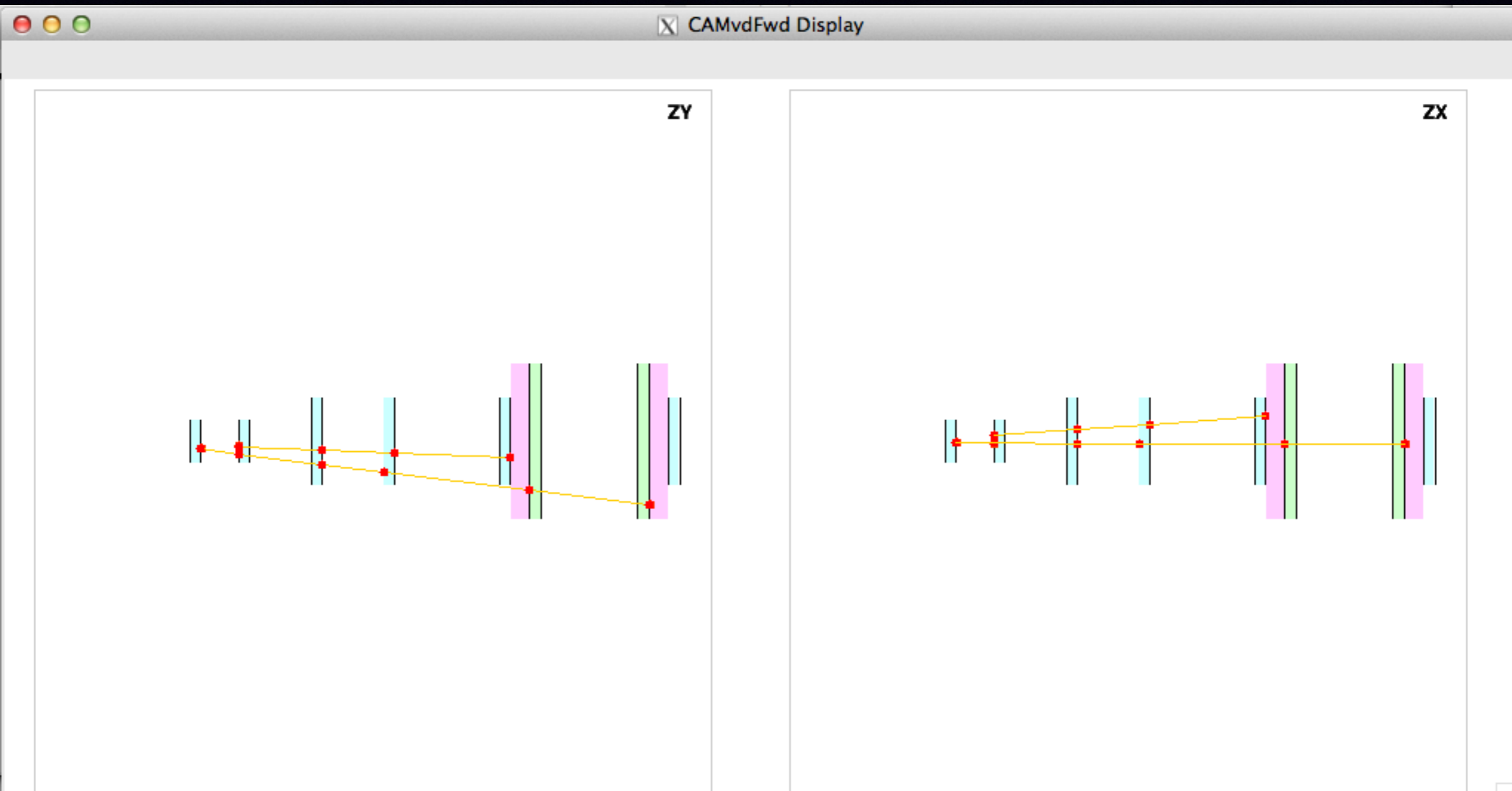
hits were simulated from a gaussian distribution with respect to mc-points

Fit quality

(reconstructed tracks with purity=100%)
in the debugging stage



Event Display Reconstructed Tracks



Efficiency

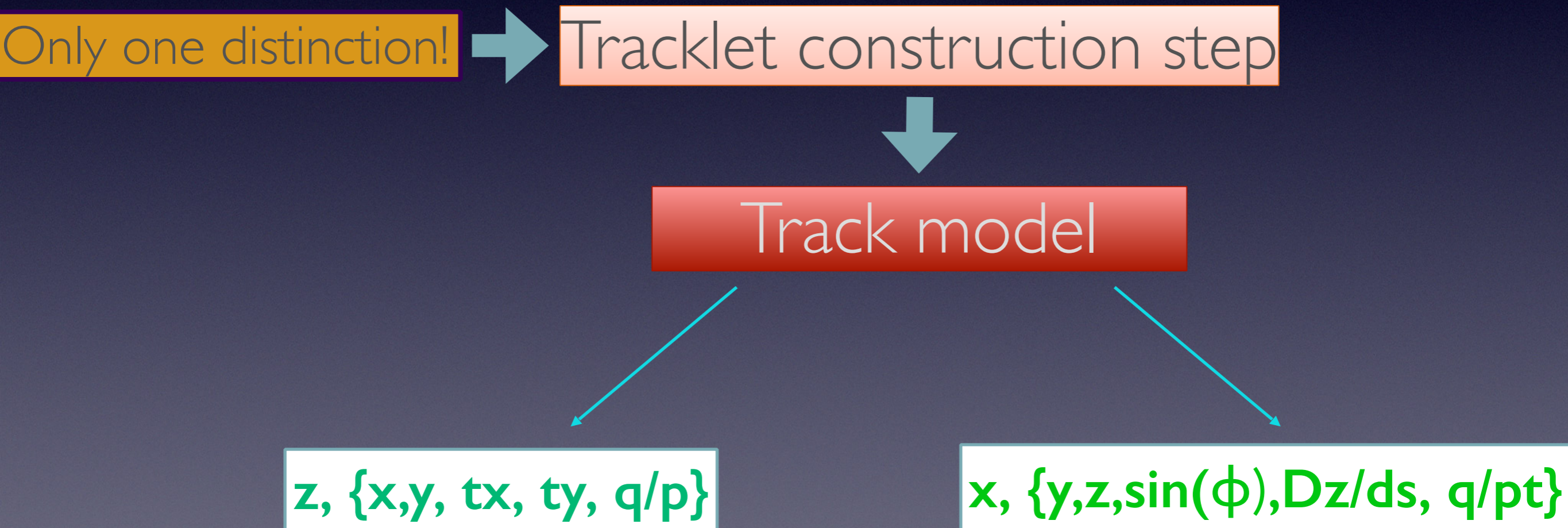
1000 events
purity=100%

Reconstructable track:
>= 3 consecutive MC points

	Efficiency,%	Ghost/ev	Clone/ev	Tracks/ev
triplets	100	12.5	9.5	1
track candidates	100	71.6	50.5	1
tracks	No selection yet because of KF debugging ...			

Forward & Barrel tracking

Forward & Barrel Tracking



Forward & Barrel Tracking

- Milestones

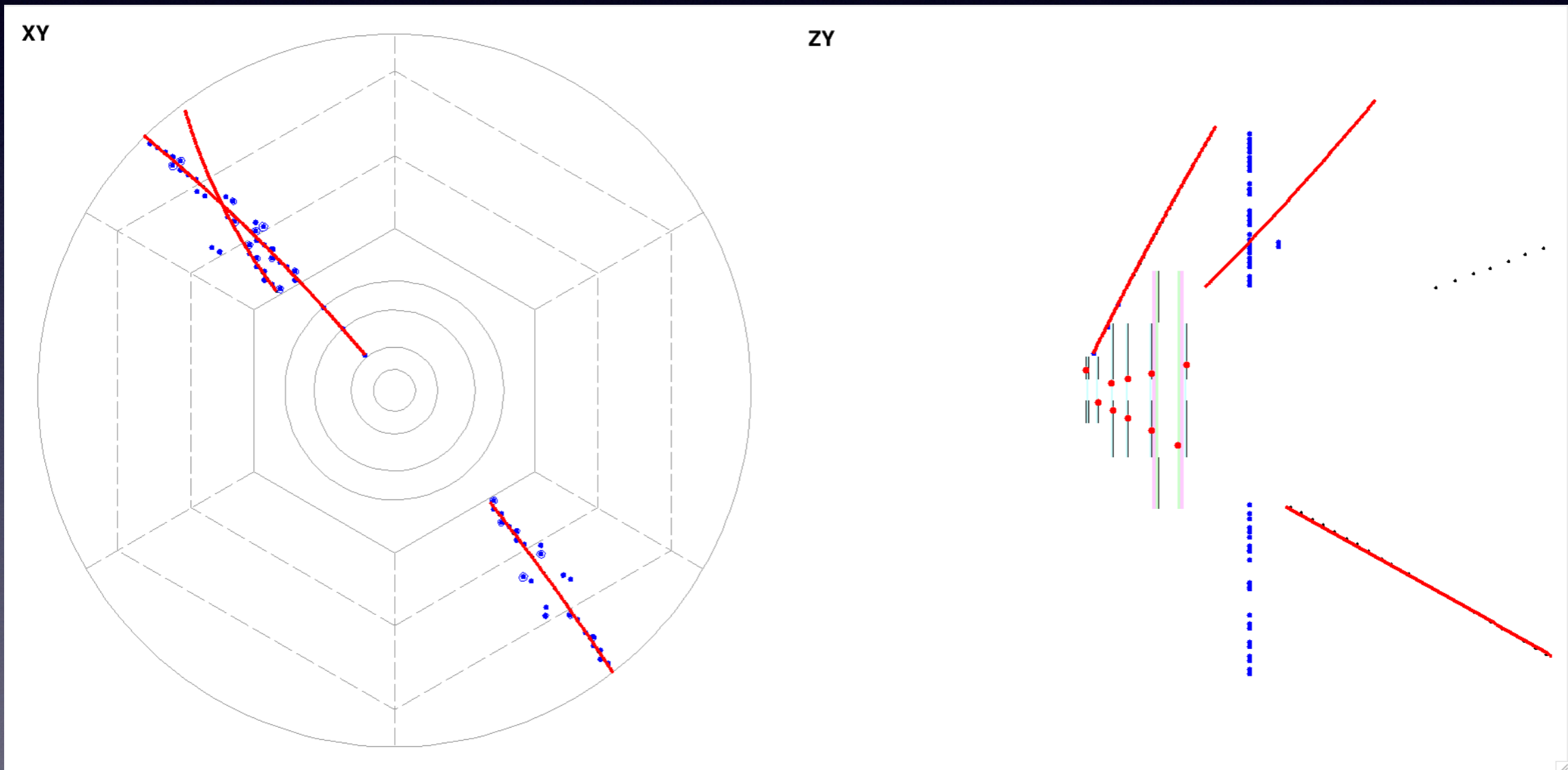
- Design:

- Final stages of reorganisation of the code-architecture.

- Abstraction:

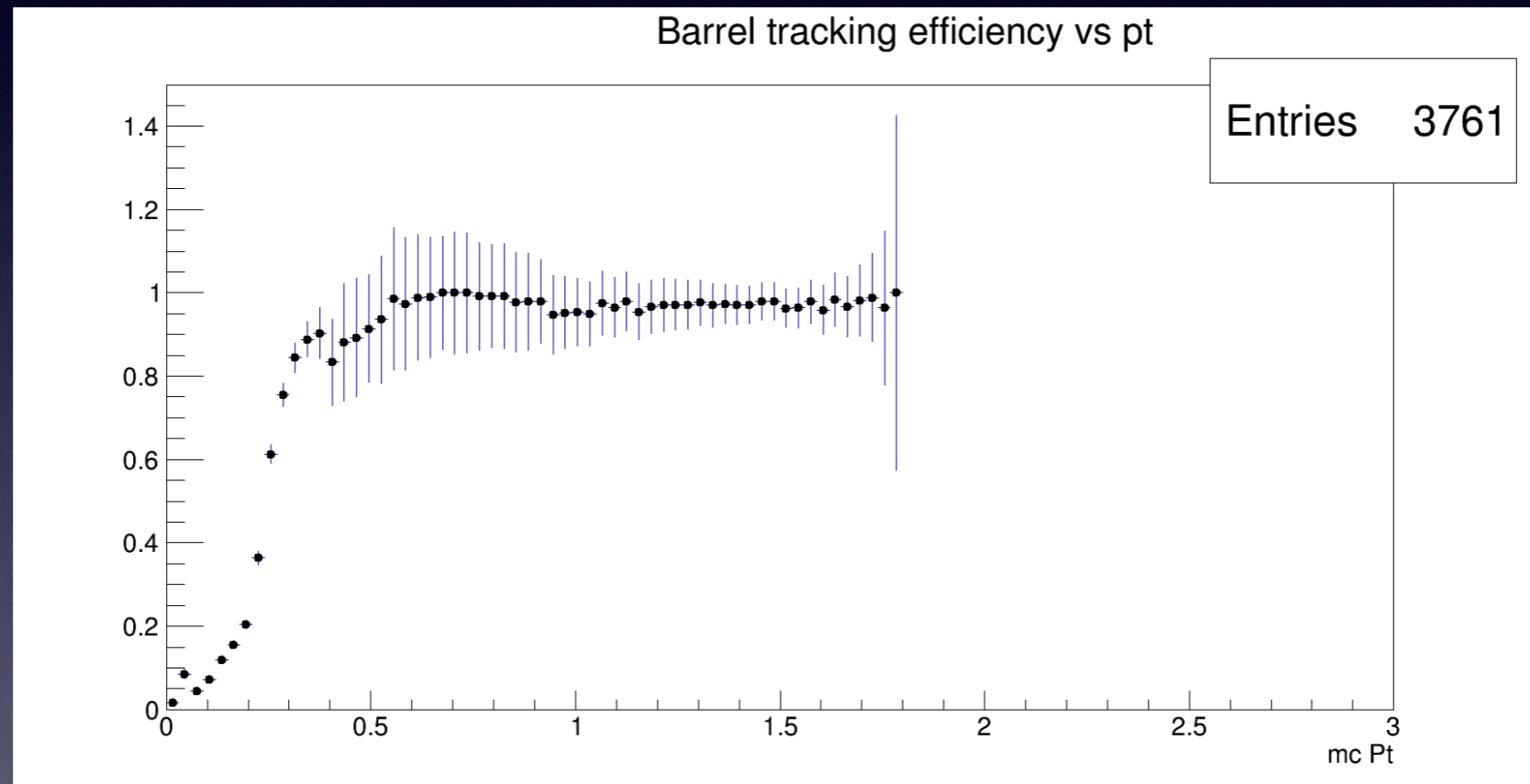
- Making the Barrel&Forward code absolutely identical, implementing only the KF-part so that it is suitable for both track-models.

Barrel MVD+STT event



Barrel part MVD+STT efficiency

primary MC tracks, ≥ 5 barrel hits, $Pt > .5$



Efficiency: $\sim 97.0\%$
Fake rate: 1.0%
Clone rate: 2.0%

Outlook

- Debug the Kalman Filter track fit in the magnetic field
- Track reconstruction efficiency in the forward part of MVD
- Code vectorisation for faster performance
- Combined forward MVD + barrel MVD + STT tracking