

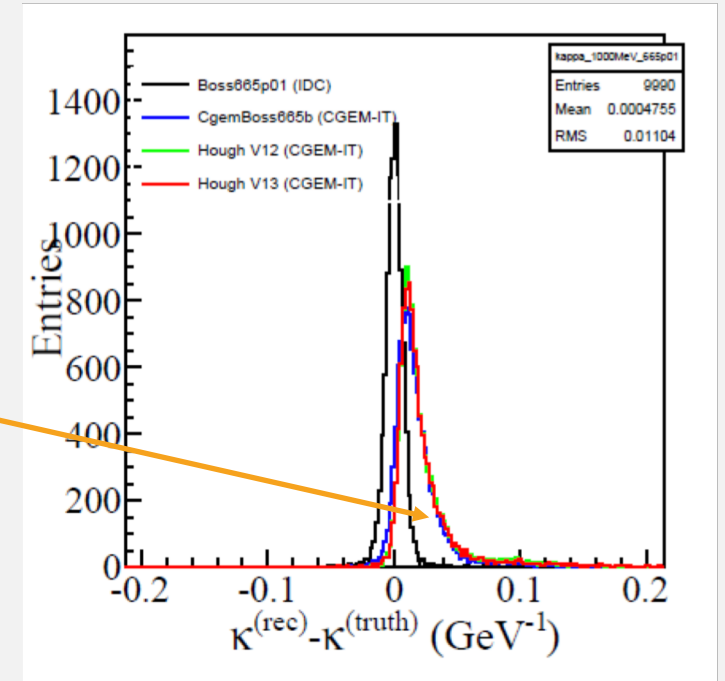
A NEW GLOBAL HELIX FITTING PACKAGE (CGEM+MDC)

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SOME ISSUES RELATED TO TRACK FINDING

- Kalman filter
 - failure rate high (half solved by Zhen)
- Global track fitting with the least square method for CGEM+MDC
 - Memory leakage => crash
 - Systematic shift from 0 in kappa (or p_T) residual distribution



- Current version is an extension of one for MDC (complicated, more time to debug)
- One possible solution: implement an independent and concise version of global track fitting for CGEM+MDC

A STANDARD PROCEDURE

$$\tilde{a} = a_0 + (A^T W A)^{-1} A^T W (\mathbf{M} - \mathbf{F}(a_0))$$

New trk parameters

Initial trk parameters

Jacobian matrix

Inverse of error matrix
of measurements

Measurements
(e.g. X,V, drift-distance)

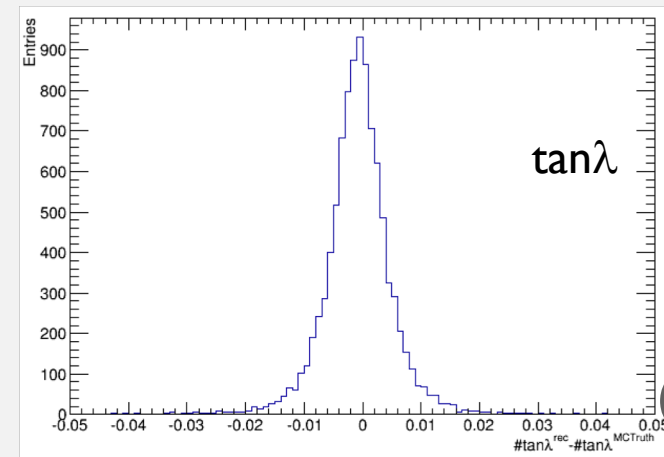
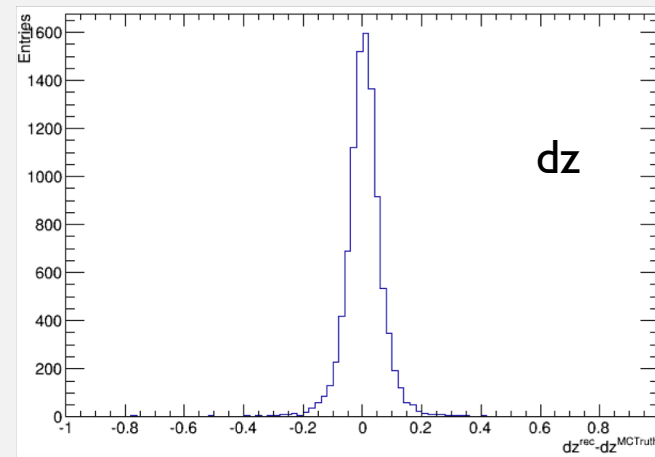
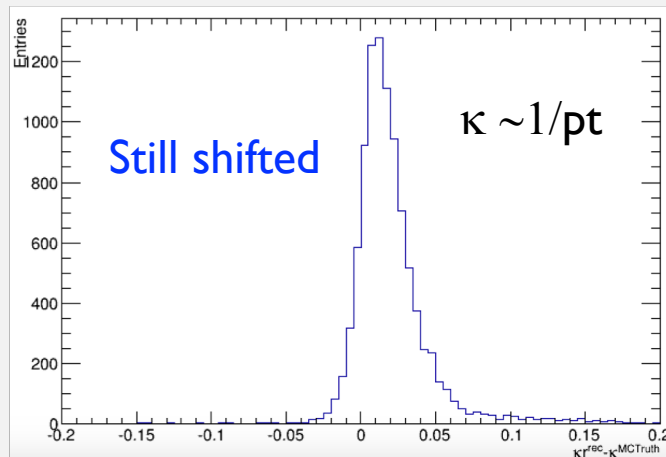
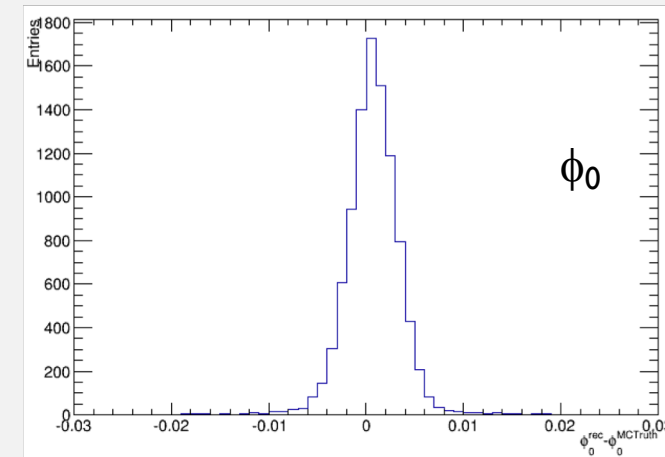
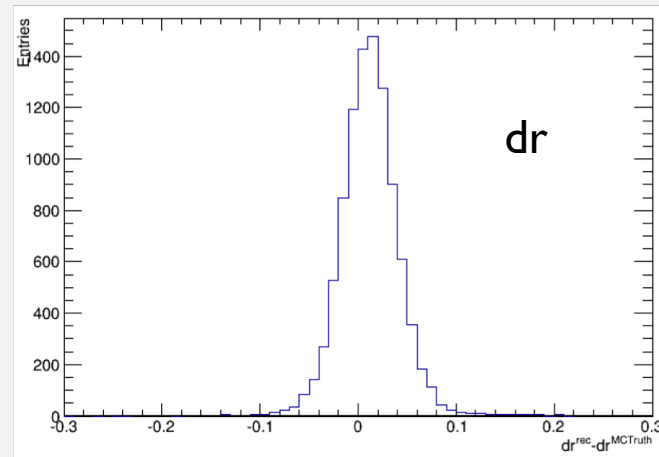
Predictions from a_0

Usually final track parameters obtained/converged after several iterations

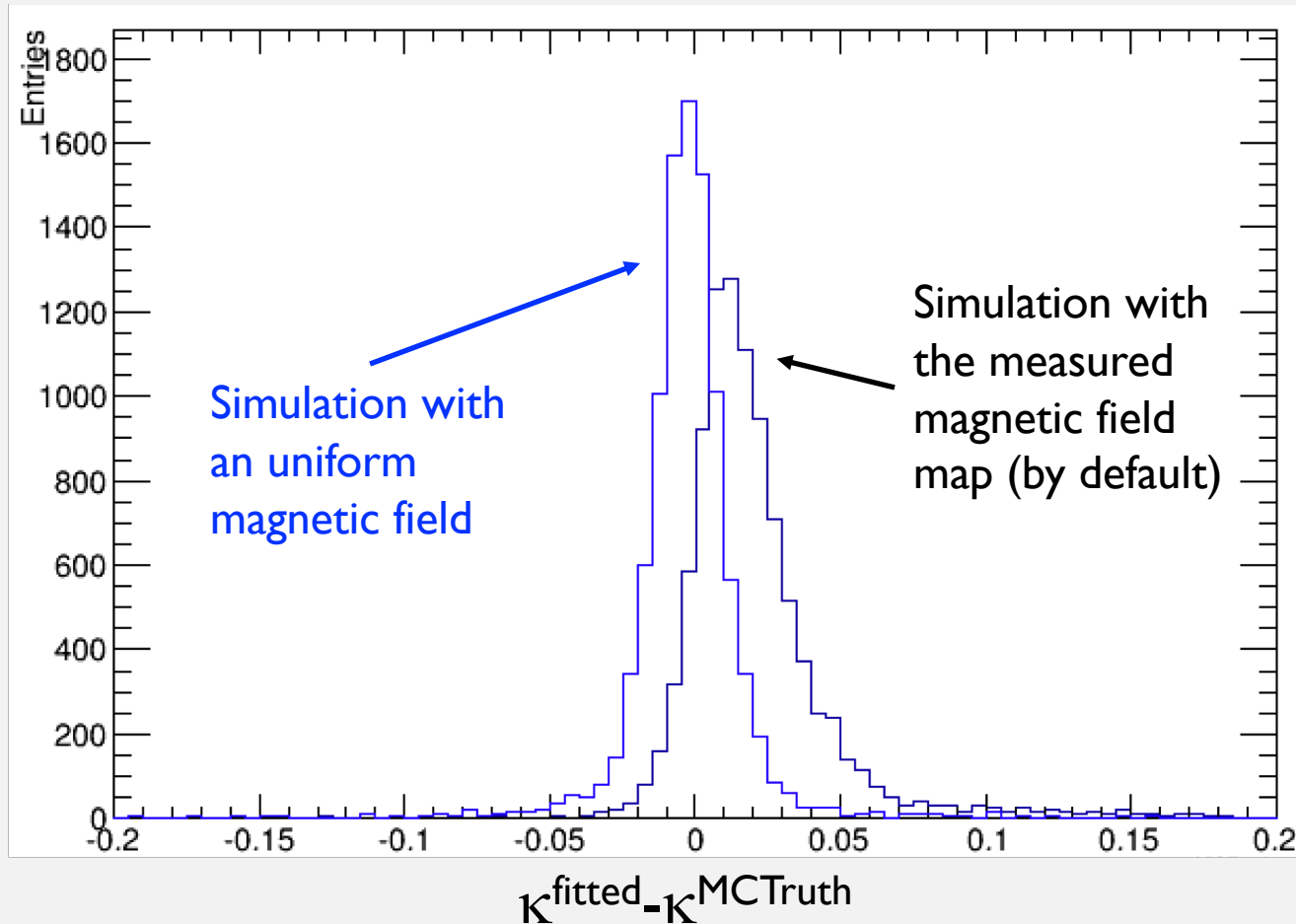
A preliminary version is implemented by Linghui and Liangliang

TEST WITH $p_t = 1 \text{ GeV } \mu^-$

- No track finding and all CGEM clusters and ODC hits are used in the track fitting
- 10000 events: no crash
- Residuals:



SHIFT IN KAPPA RESIDUAL DUE TO INHOMOGENEOUS MAGNETIC FIELD



In standard BOSS, a global track fitting (RungeKutta) considering the inhomogeneous magnetic field is used additionally

CONCLUSION

- Global track fitting with the least square method for CGEM+MDC
 - Memory leakage => crash
 - ✓ solved
 - Systematic shift from 0 in kappa (or p_T) residual distribution
 - ✓ understood