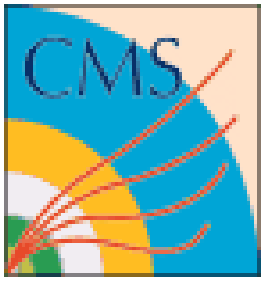
Millepede Alignment CosMin Approach

Jula Draeger
University of Hamburg

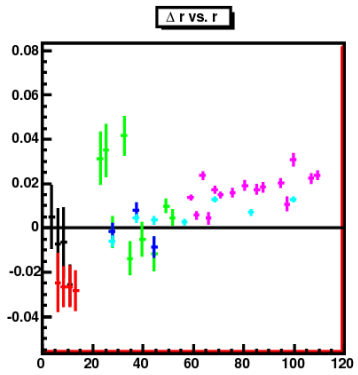


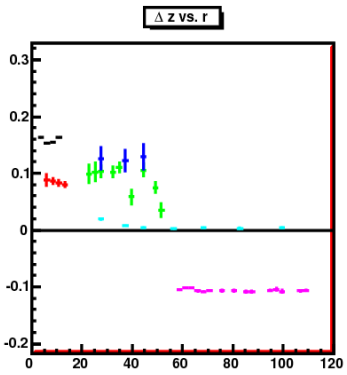
Twist – weak mode or bias?

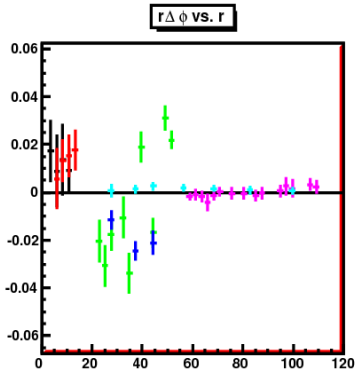
- Reminder:
  - ICHEP geometries (MP and HIP) show small twist in barrel
  - CosMintIOV propagates twist to endcaps (higher statistics allow movement of all modules in forward direction)
- Tests:
  - Start geometry for CosMintIOv = CosMinICHEP
  - Overcorrect twist in CosMinICHEP → introduce 'anti twist'
  - Realign back using CosMint strategy
  - Endposition same as CosMintIOV → more likely a bias in data
  - Endposition different as CosMintIOV but stable → more likely weak mode
  - Endposition not stable (twist of x micron every iteration) → more likely bias within algorithm

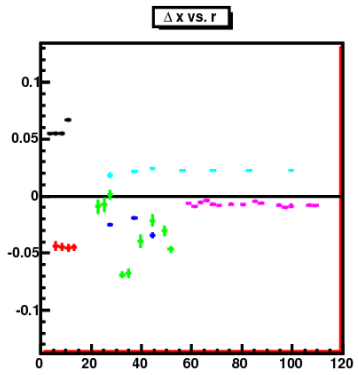
Twist – weak mode or bias? Starting geometry (I)

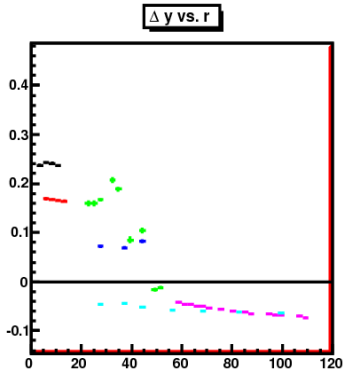
CosMinICHEP vs IDEAL (CT):

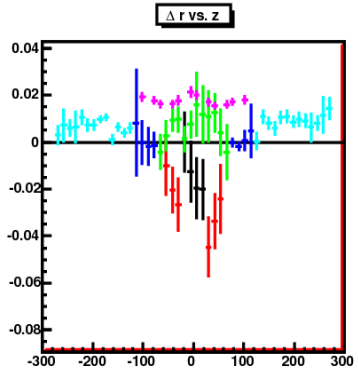


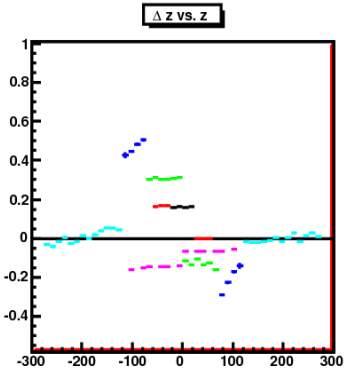


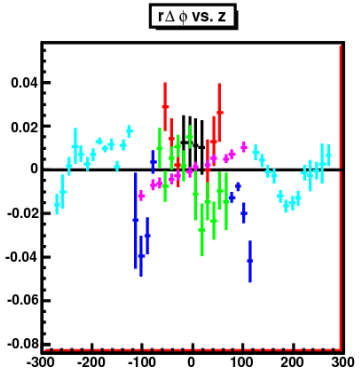


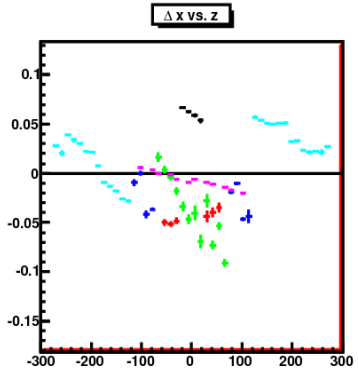


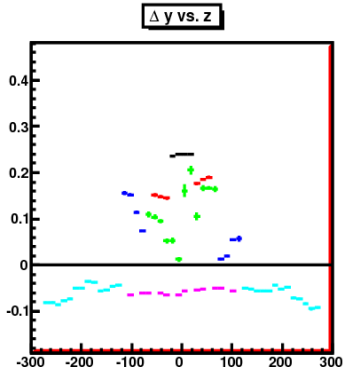


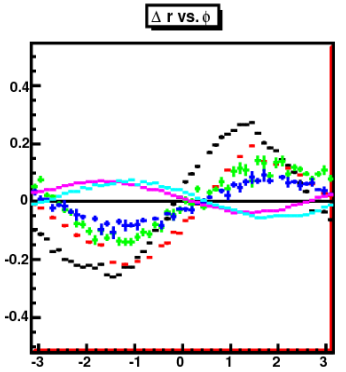


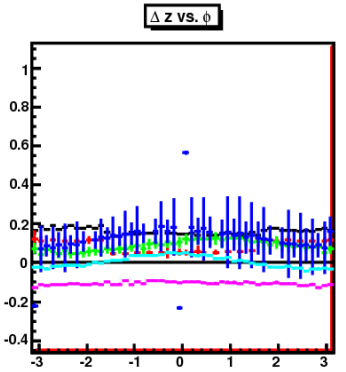


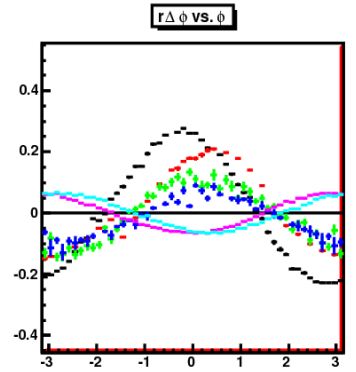


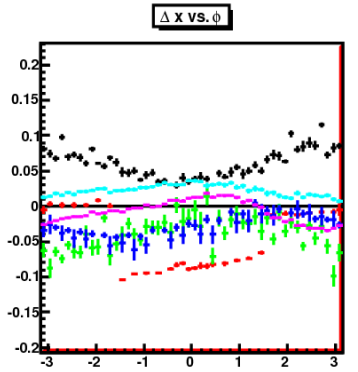


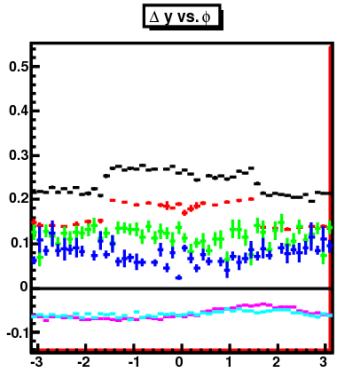




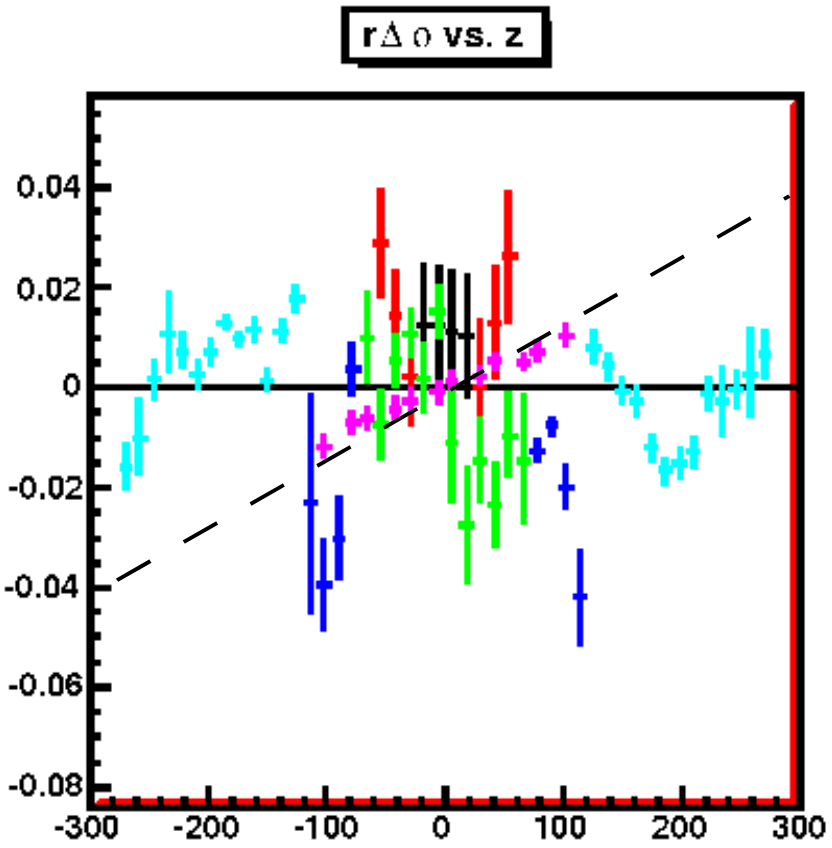






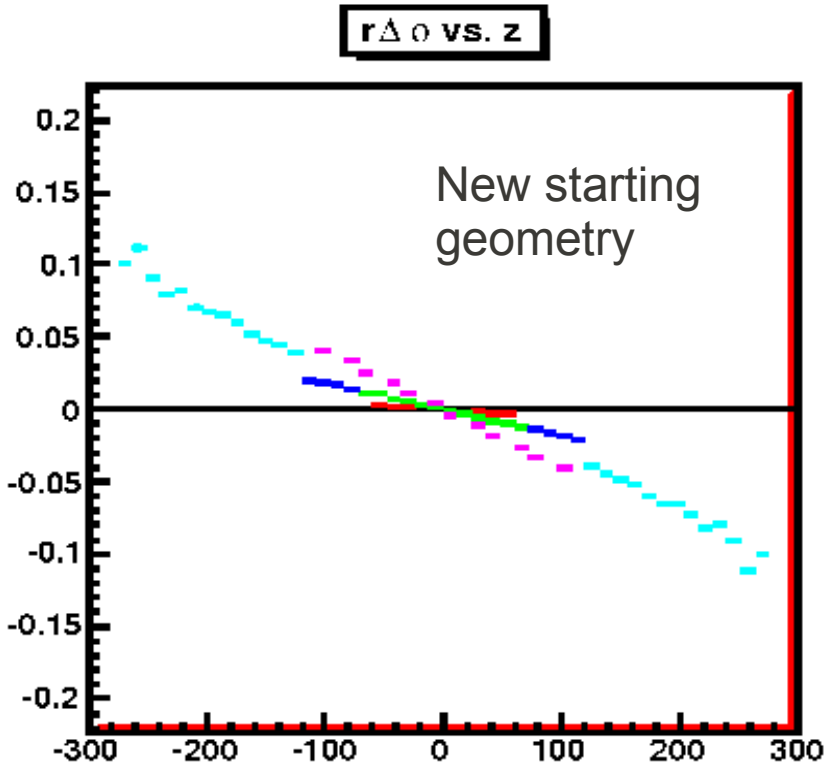


Twist – weak mode or bias? Starting geometry (I)

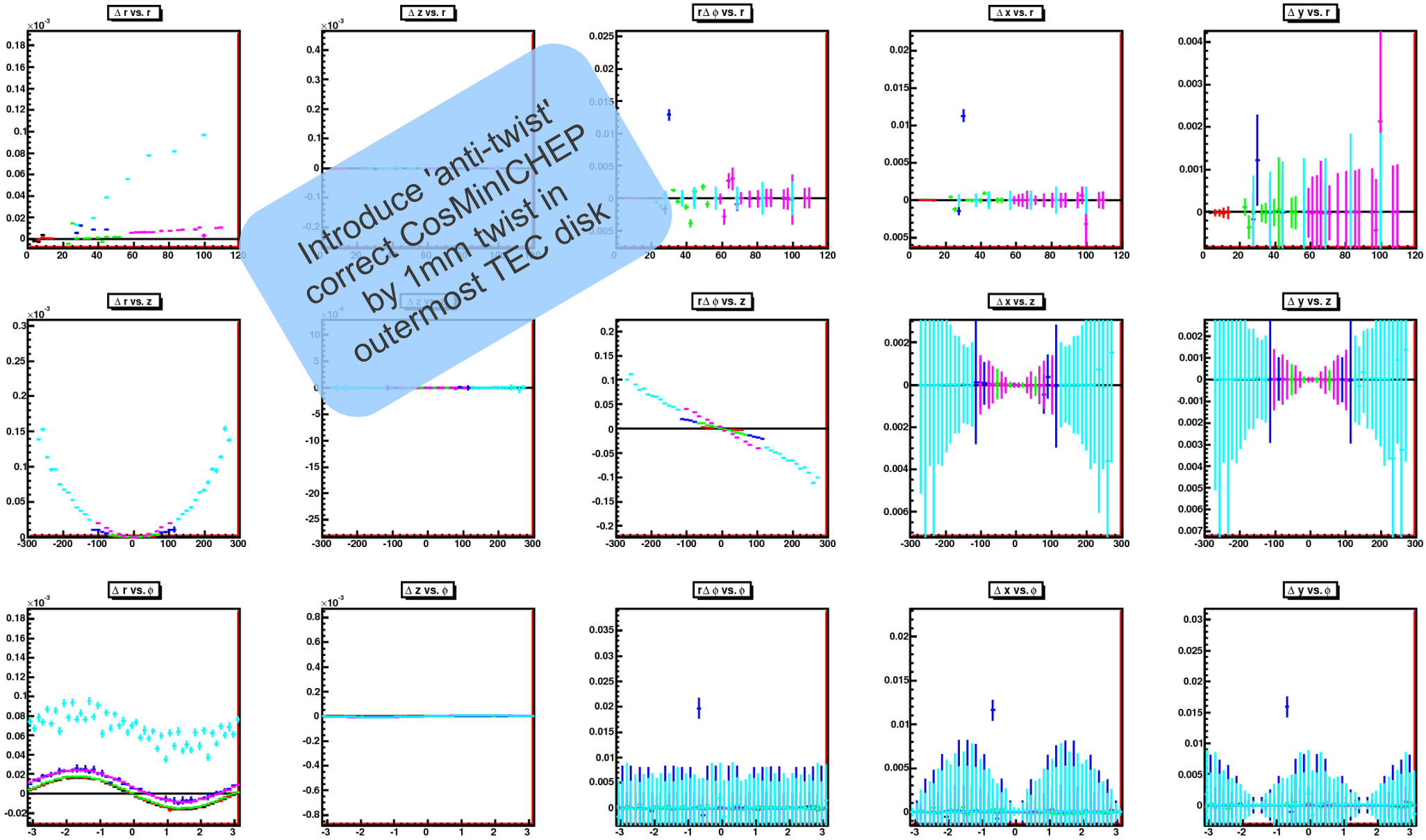


Use twist of TOB

- Dimension of twist = 0.5mm
- Correct for 1mm → overcorrection of about the same scale

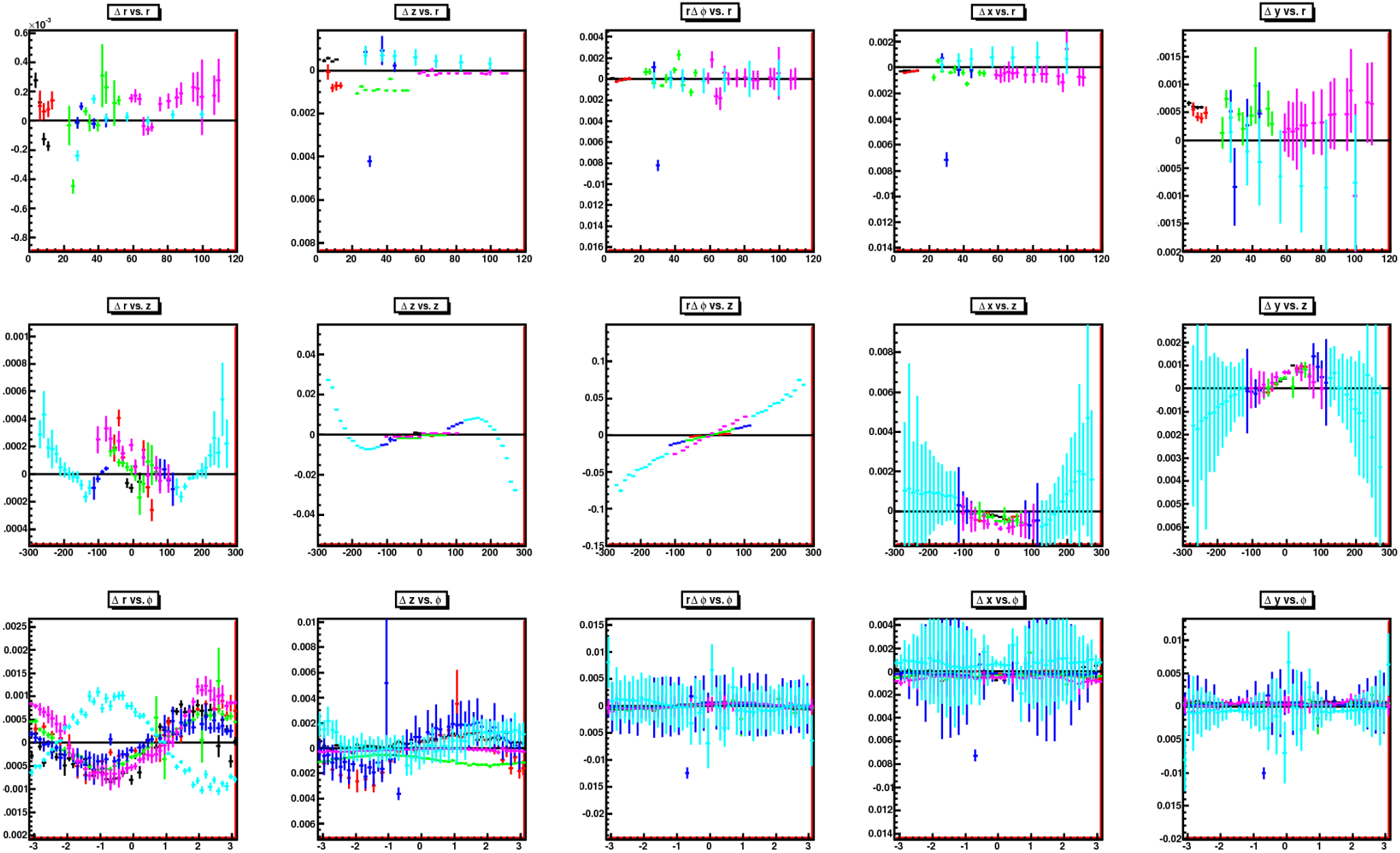


Twist – weak mode or bias? Starting geometry (II)

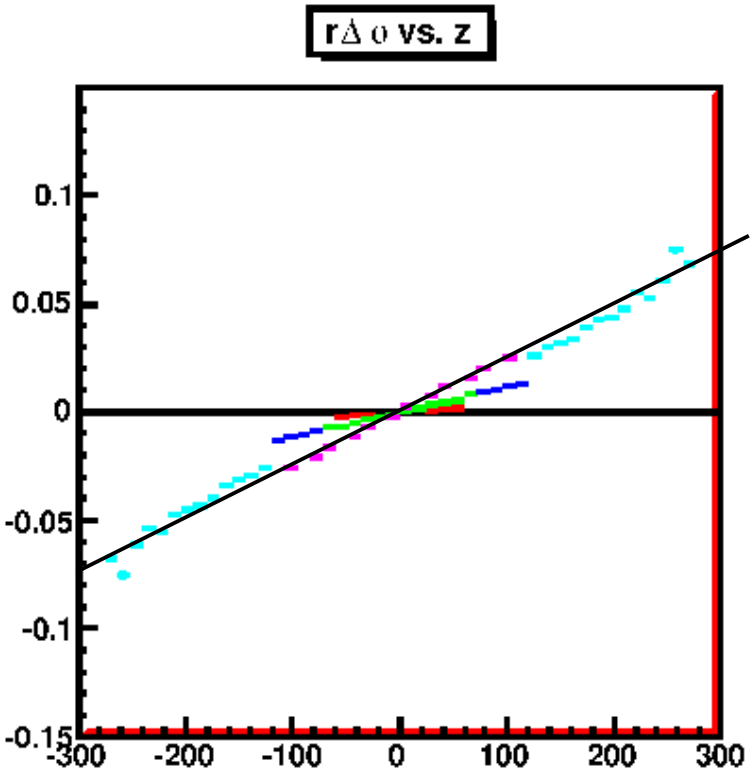


CosMint alignment from anti-twisted geometry (I)

CosMintIOV from Twist overcorrected geometry vs starting geometry:

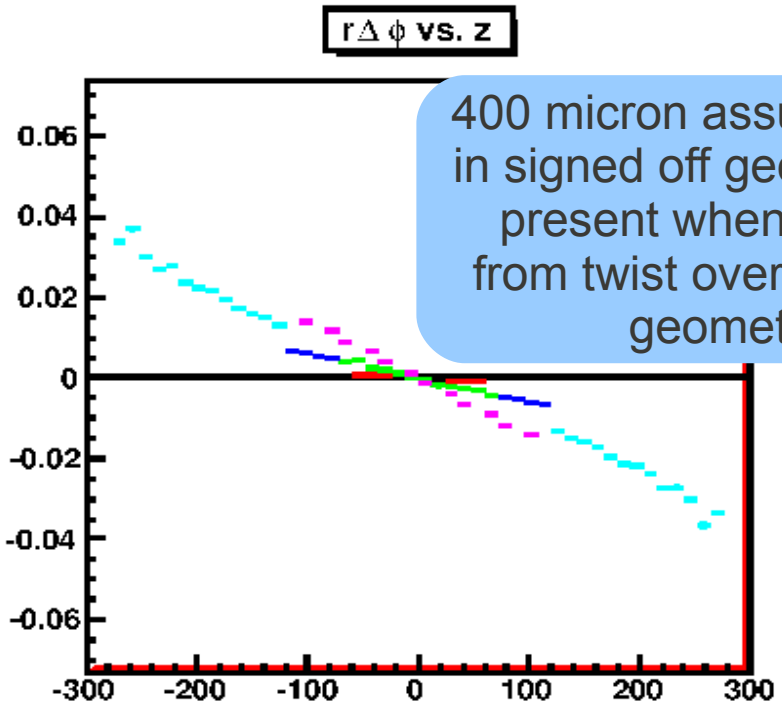


CosMint alignment from anti-twisted geometry (II)



- Twist of 700 micron corrected wrt. starting geometry!!!
- ANTI-twist corrected

Geometry comparison wrt CosMintIOV
(no manipulation in starting geometry)



400 micron assumed twist in signed off geometry not present when starting from twist overcorrected geometry

Result stable? Or further twisting?

CosMin TwistOvercorr

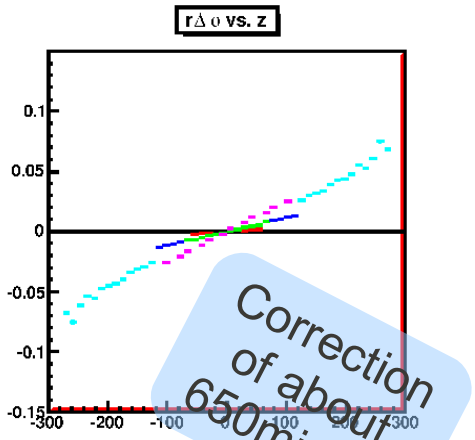
CosMintIOV from twist overcorr.

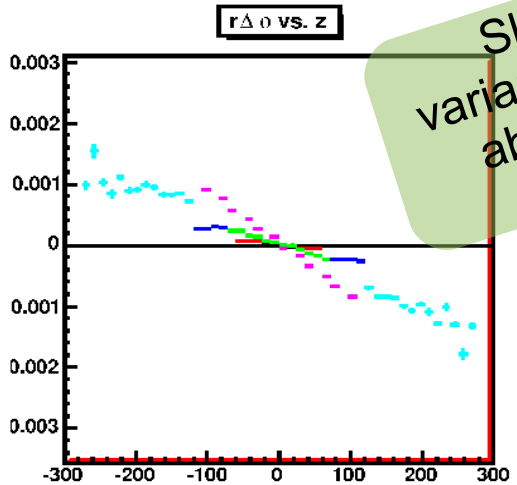
CosMintIOV 1st iter from twist overcorr.

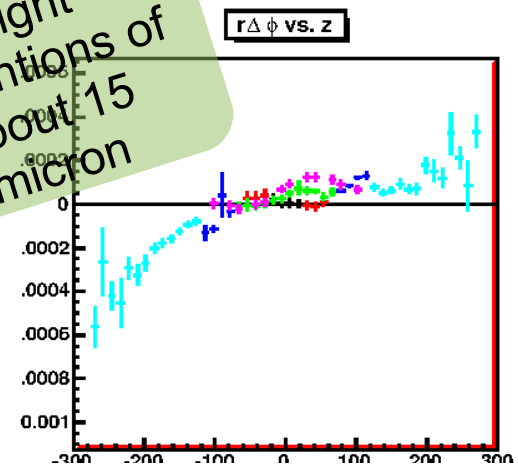
CosMintIOV 1st iter from twist overcorr.

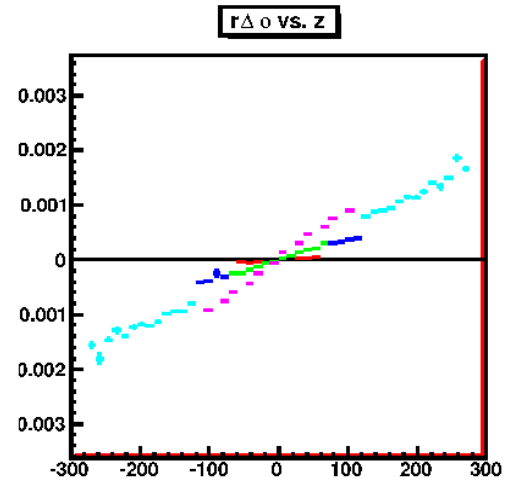
CosMintIOV from twist overcorr.

CosMintIOV 2nd iter from twist overcorr.



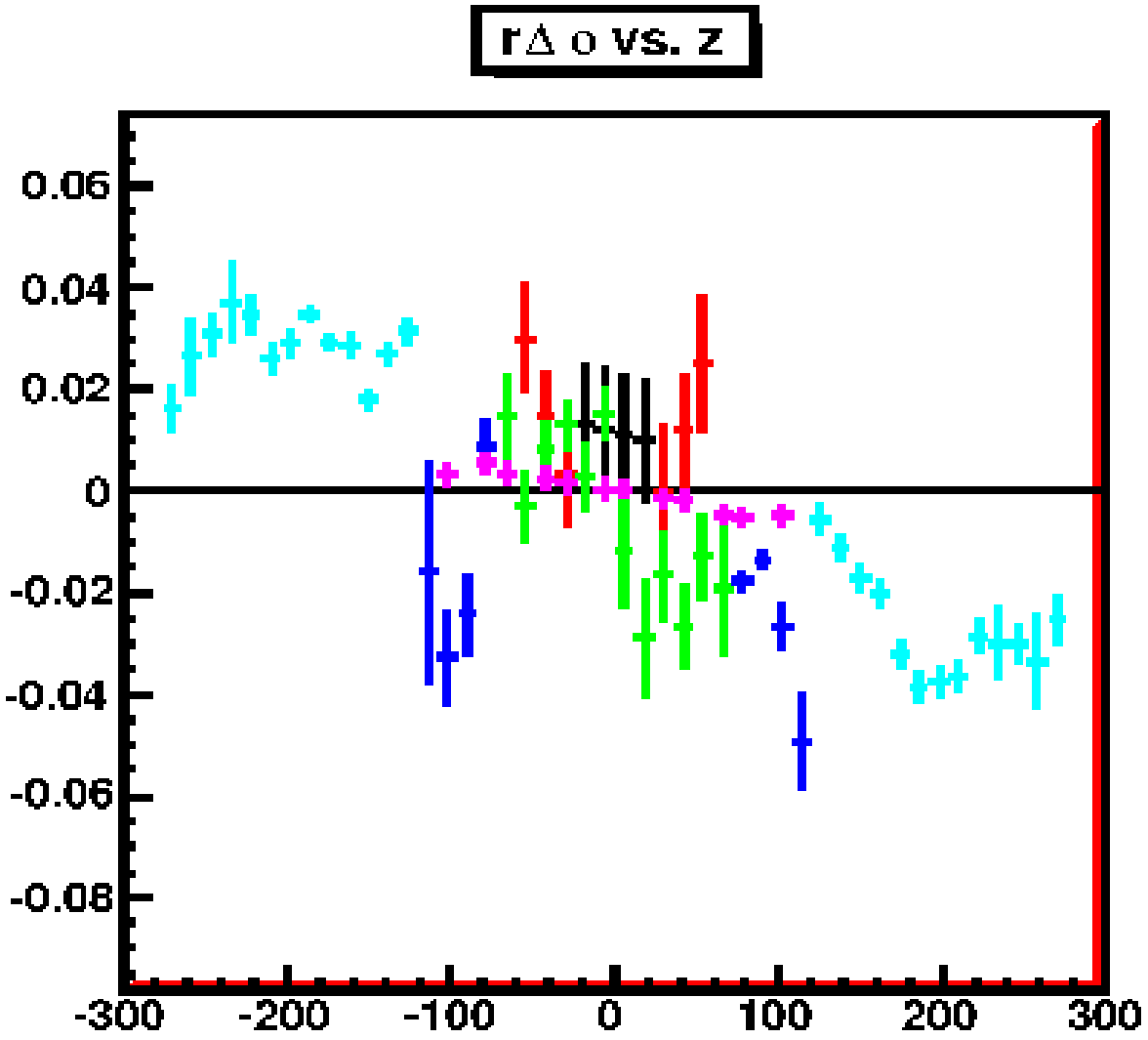






→ can be considered stable!

CosMint from twist corrected vs IDEAL



- Geometry seems to be almost twist free. → test Zmumu validation!

Backup: CosMintIOV from overcorr. Vs ICHEP payload