TK alignment meeting
26/02/2009

Follow up of MillePede studies on systematic misalignment with CRAFT data

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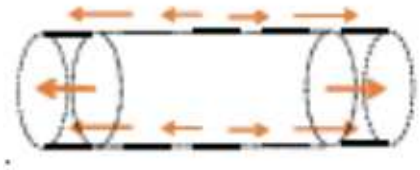
for Torino group

Tracker systematic misalignment on CRAFT data

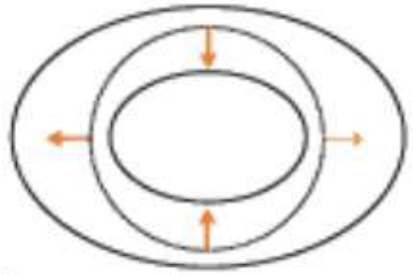
- As Zijin and Nhan did for HIP (see 18th Dec talk), try to investigate some Tracker systematic distorsions:
  - z expansion
  - twist
  - elliptical

- Starting CRAFT object: '3-step approach' MillePede object with PXF modules aligned



Δz vs. z (z expansion)

$r\Delta\phi$ vs. z (twist)

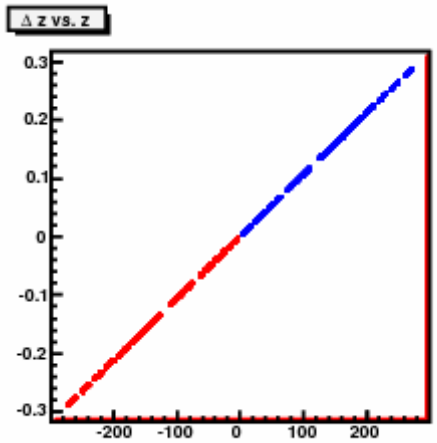


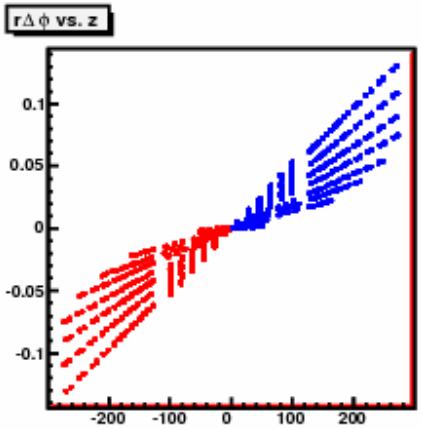
Δr vs. ϕ (elliptical)

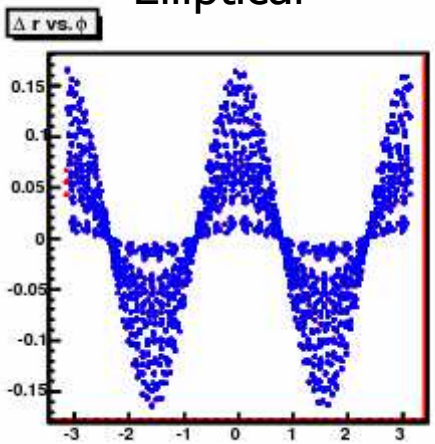
Geometry comparisons (All Tracker)

Z-expansion | Twist | Elliptical

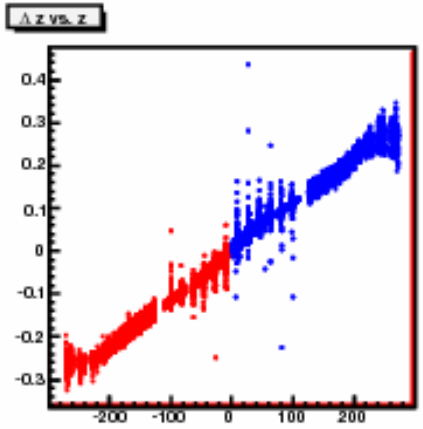
before

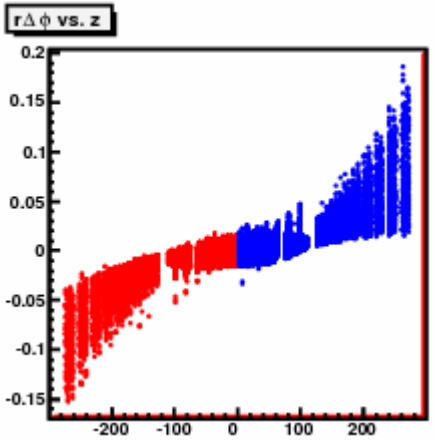


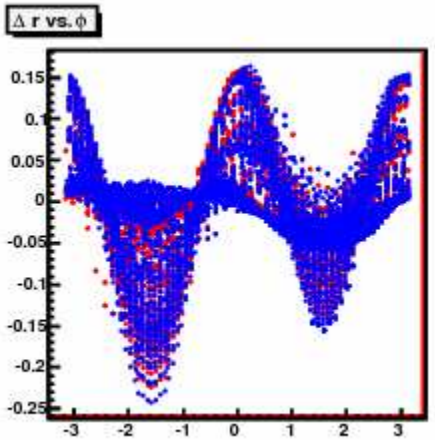




after

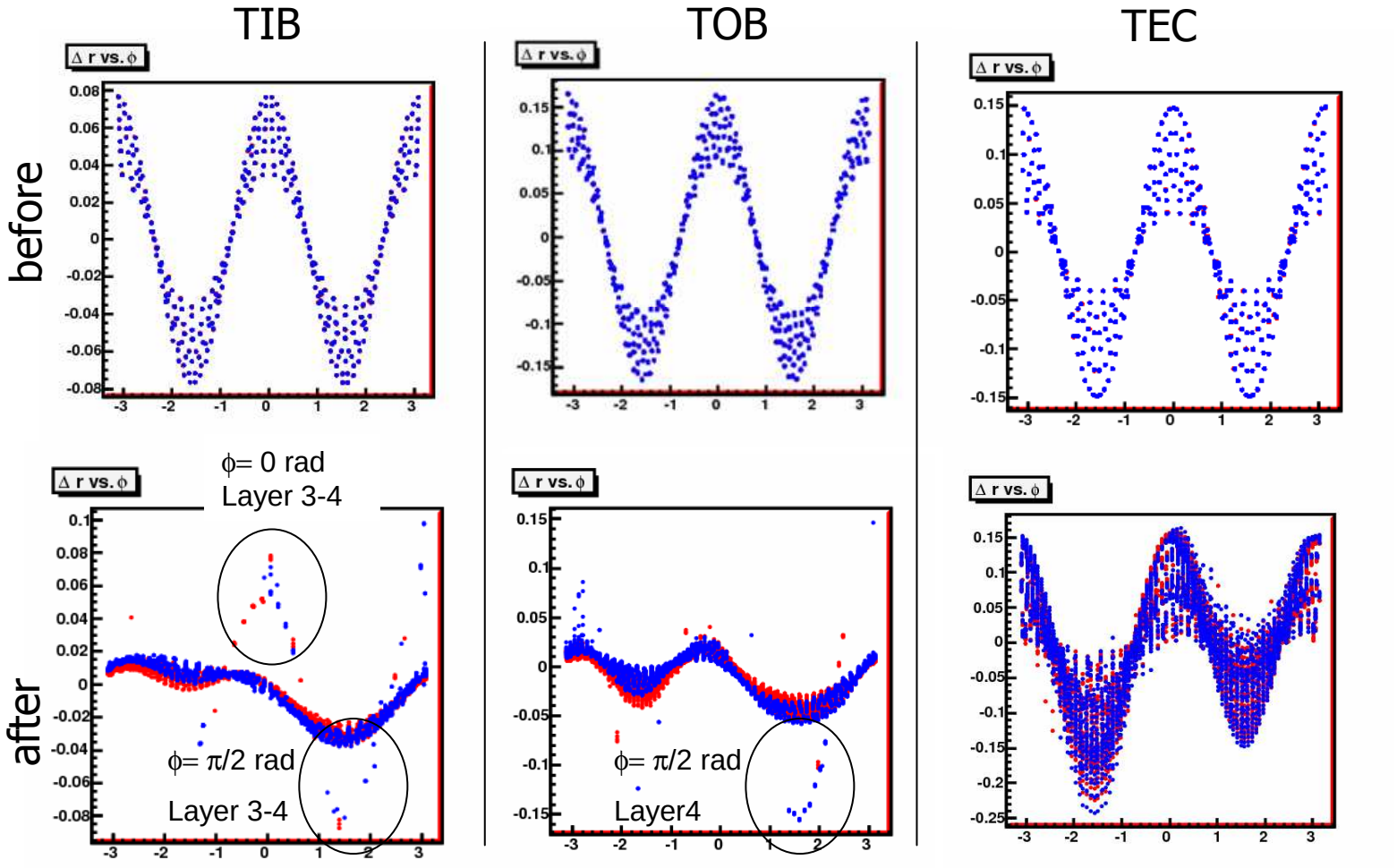






'recovered' in TOB/TIB, not in TEC

More on Elliptical distorsion (Δr vs ϕ)



more geometry comparisons at: http://personalpages.to.infn.it/~castello/CRAFT/TrackerSystMis/

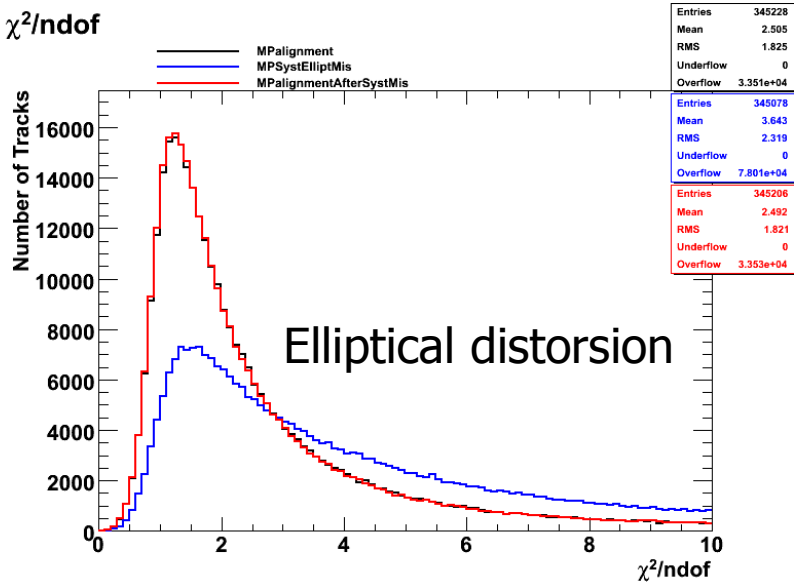
Track based validation

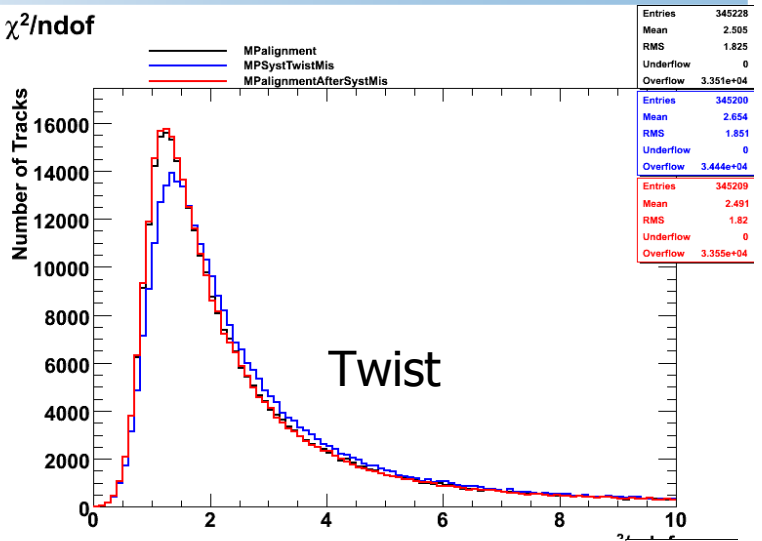
- Validation over 350k tracks

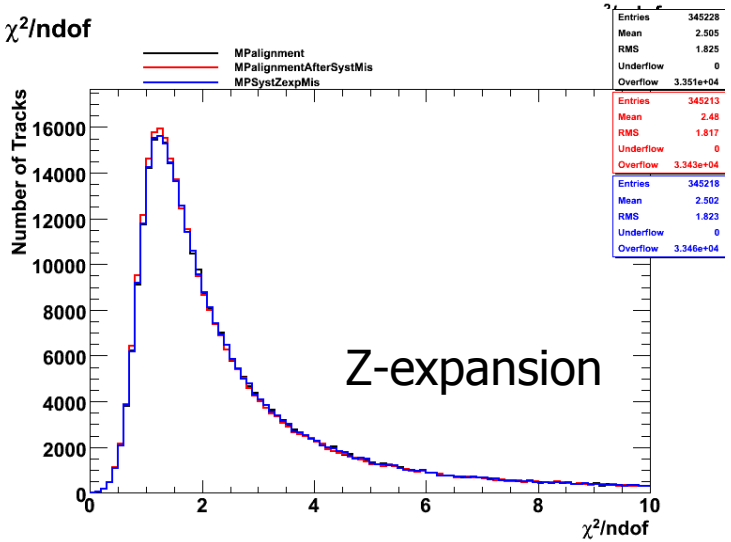
Black= MP starting object

Blue= misaligned

red= aligned on top of misalignment





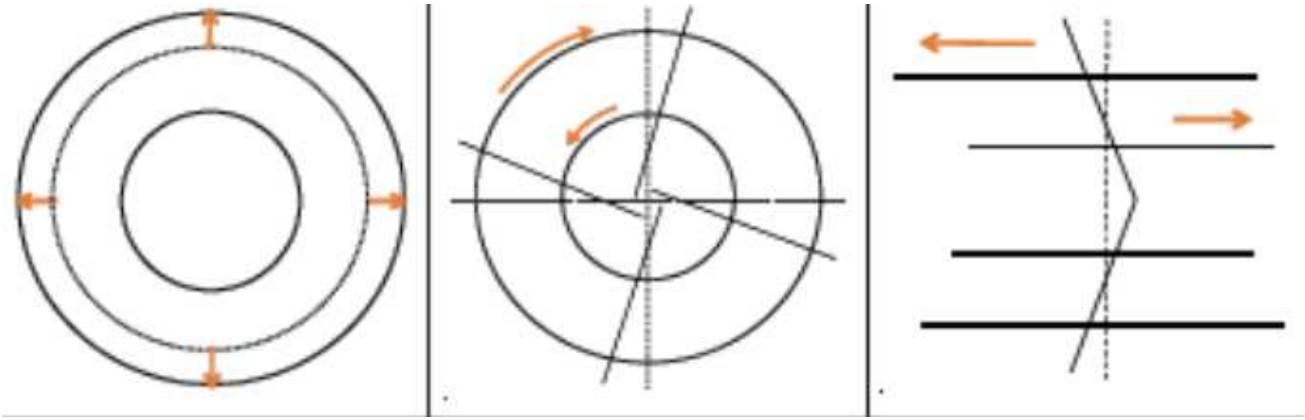


Investigation of remaining modes

- During last week I investigated remaining 'possible' weak modes:
  - radial expansion
  - Layer rotation
  - telescope

  } sensible to tracks coming from the top

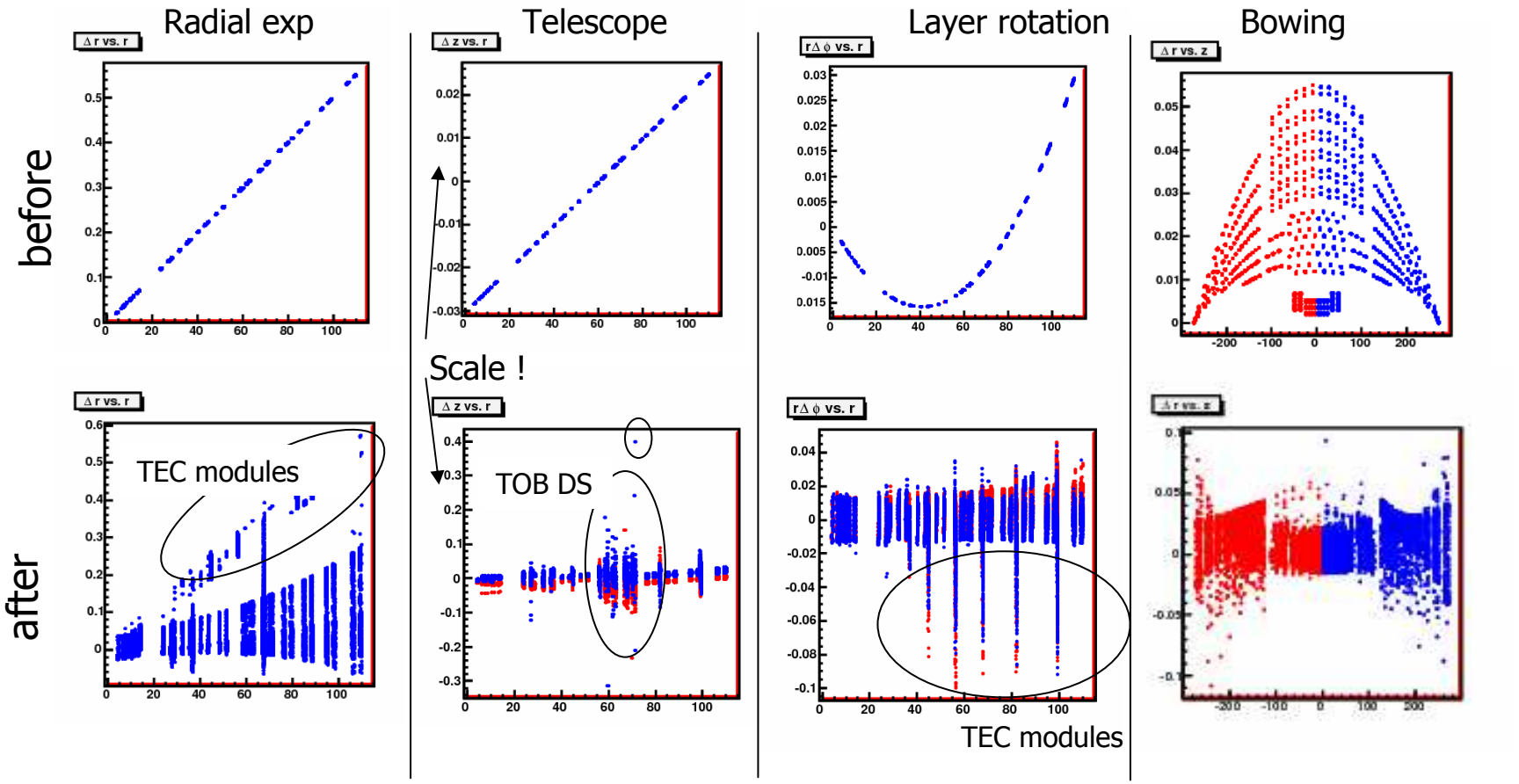
  - bowing
  - skew (not yet available for technical problem)
  - sagitta (not yet available for technical problem)



Δr vs. r (radial exp.) $r\Delta\phi$ vs. r (Layer rotation) Δz vs. r (telescope)

Results

- Detailed geometry comparisons (per subdet) at:
  http://personalpages.to.infn.it/~castello/CRAFT/TrackerSystMis/



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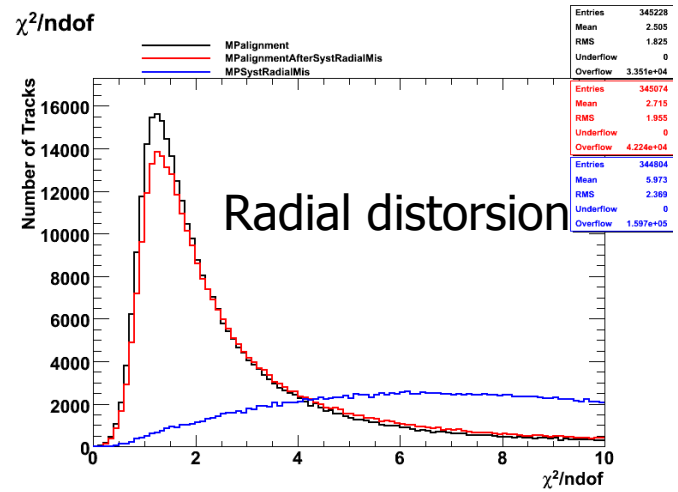

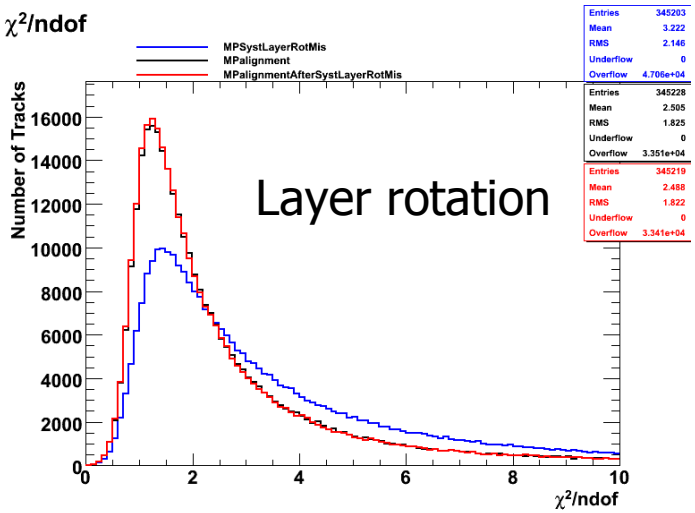

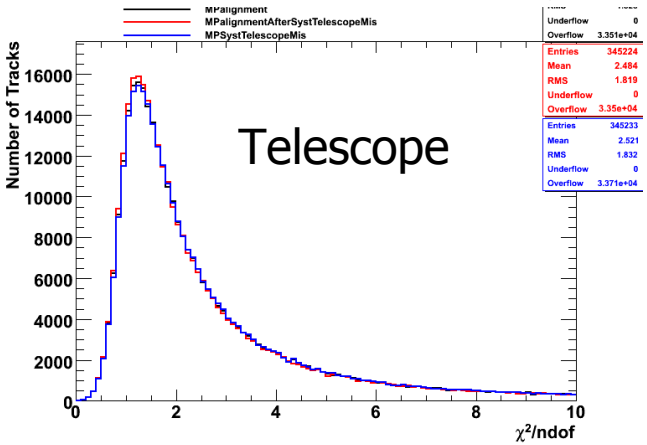

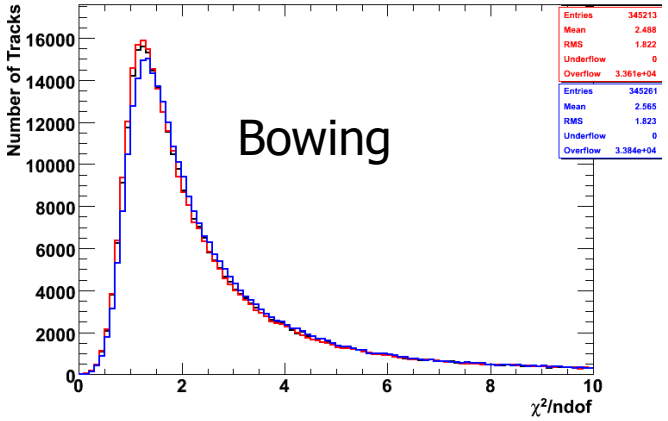

Preliminary conclusions

- Remark 1: First three misalignment scales (z-exp, Elliptical, Twist) tuned according values used by Zijin and Nhan on CRAFT data
- Remark 2: too small values used for misalignment in Telescope and Bowing (to check) need modelling from data

- Time to go through the plots, but…
- Radial expansions seem to be recovered by the algorithm at least in the barrel
- Elliptical distorsion almost recoverd in the barrel not in the Endcap, but χ^2 on top of starting geometry (?)

- Insensitive to Z expansions