Beamspot inclusion/global translations - 2

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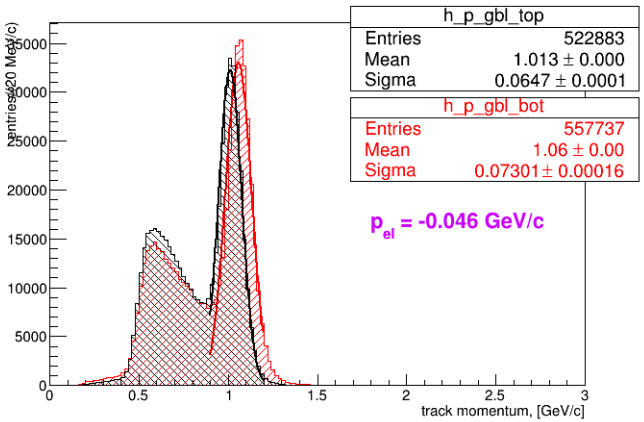
Beamspot search with millepede

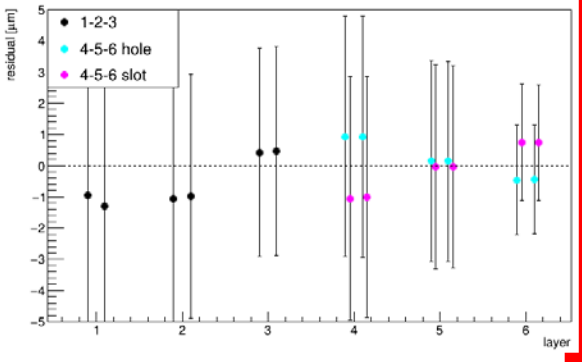
- With some iterations the x_T, y_T beamspot coordinates can be included in the reconstruction
  - Convergence to narrow distributions
  - Good alignment disruption

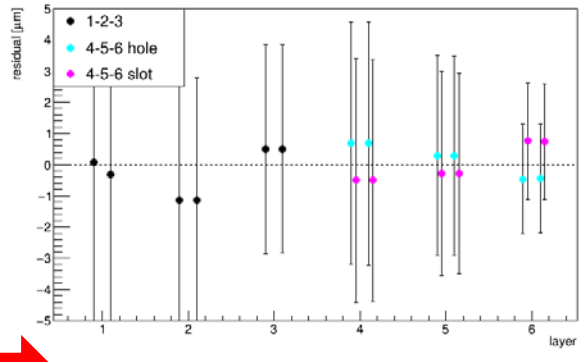
- Can a good alignment be recovered by floating again the sensors, including the fictitious sensor 0?
  - Center of the sensor: beamspot coordinates
  - Same center for top/bot ax/stereo
  - MP constraints to fix floats
    - Answer: **NO**
    - Several attempts to float sensors, all of them not excitingly successful

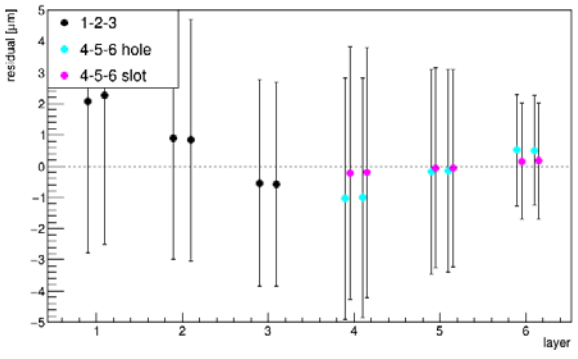
Some results with beamspot MP inclusion

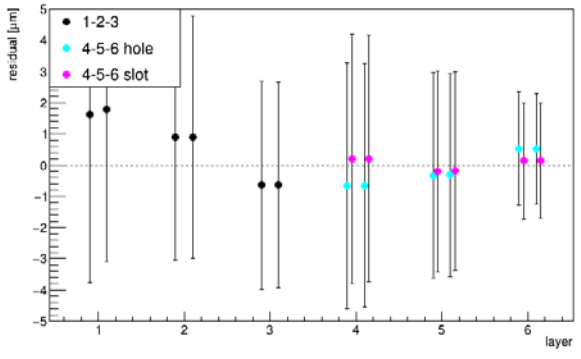
- Example: float L0+L1+L4
  - uT for L0, uT + wT + uT (3 iterations) for L1-L4
  - L1-L4 modified offsets only are not inserted in the reconstruction, no L0 (no corresponding geo volume existing in the geometry)
- Reconstruction with beamspot coordinates: bad alignment
  - Some improvements, but MP does not allow to recover previous alignment quality
  - Worst of all: the elastic peaks for t/b move farther away, instead of converging
- One could insist moving other layers…









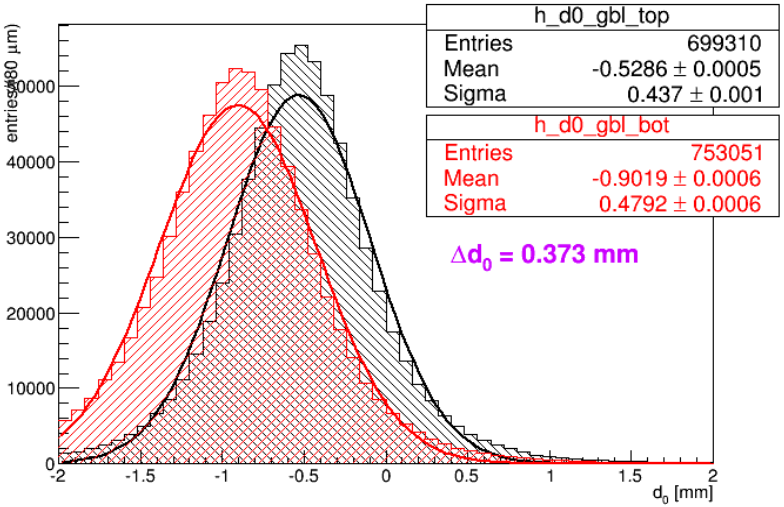


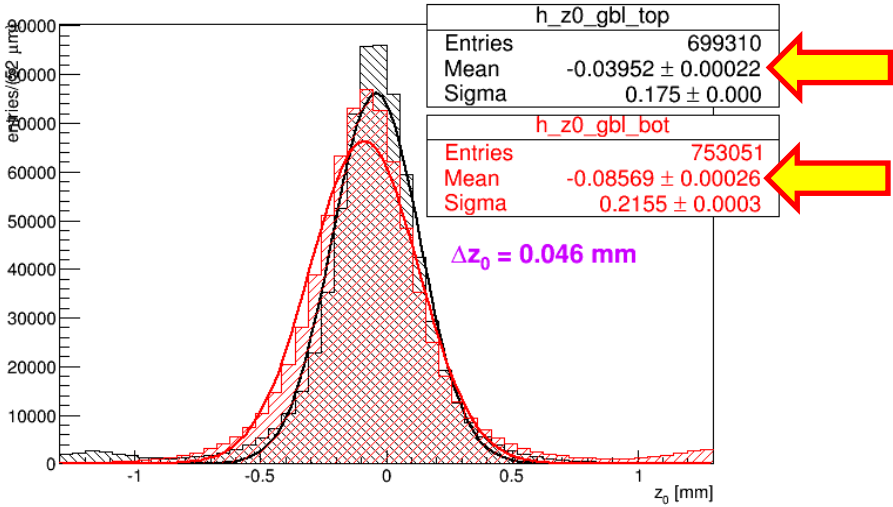
Restart from scratch…

- Start from best alignment version ok for curved and straight tracks
- Insert global offsets in the compact.xml file, as deduced from data
  - $d_0 \sim x_T \rightarrow$ u translations
  - $z_0 \sim y_T \rightarrow$ v translations
  - Take care of signs!!

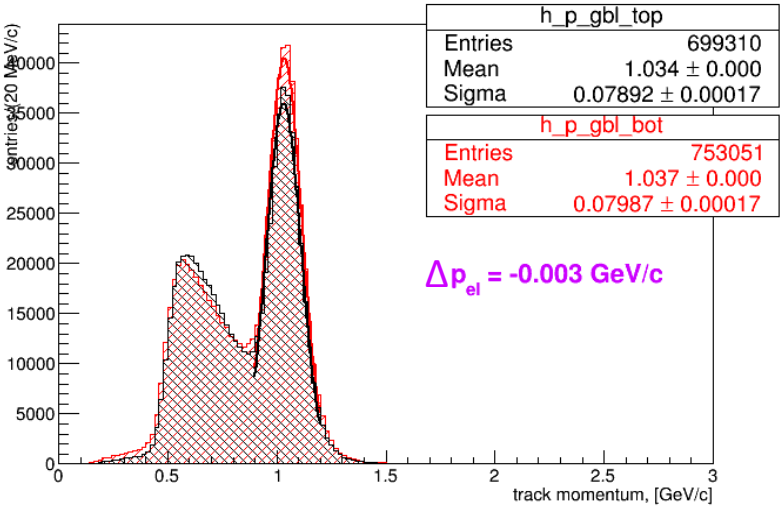
- A part of the tweaks introduced in the current geometry by Sho already include such kind of corrections
  - But new offsets are needed as the internal alignment is different

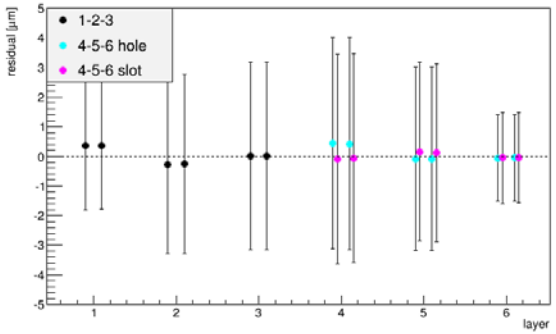
impact parameters – start

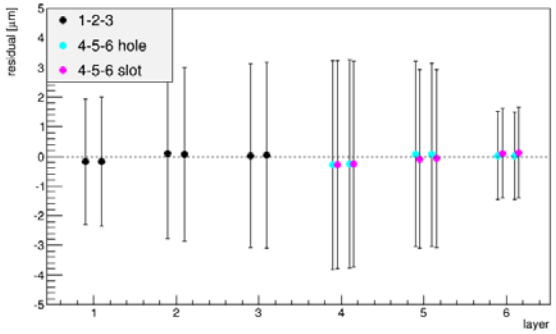




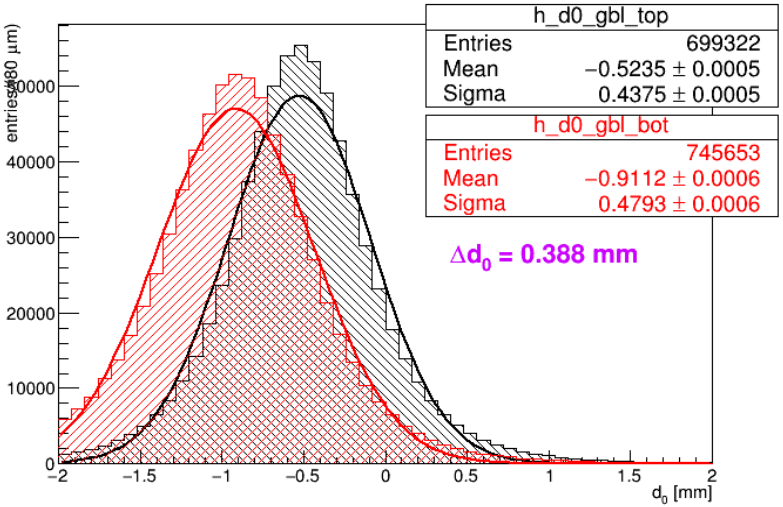
No beamspot



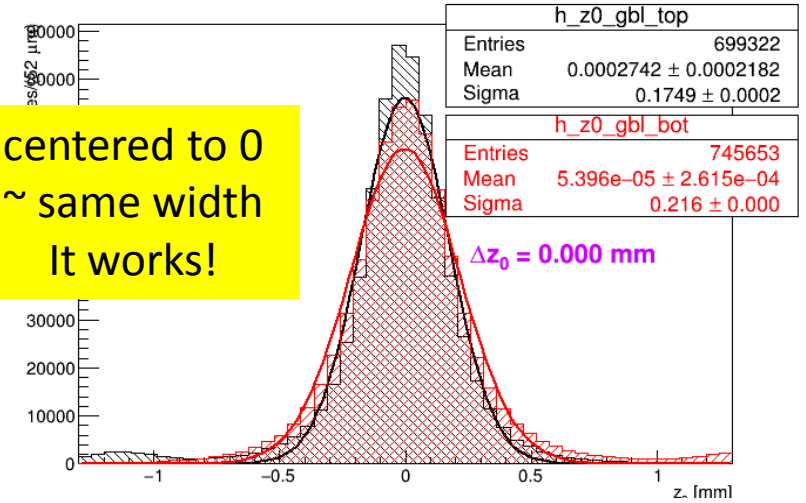




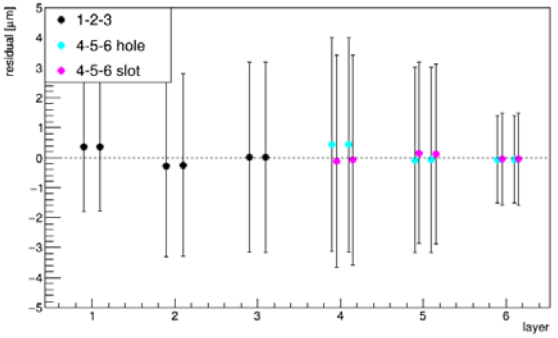
Test: global translations along u



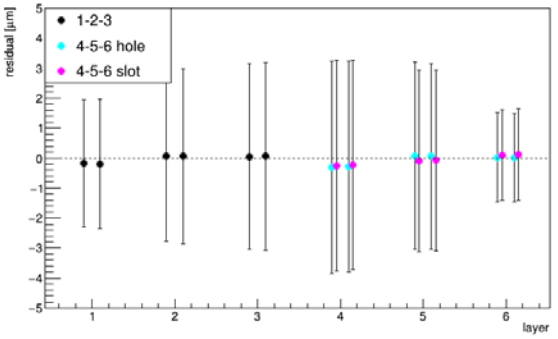
(slightly worse)

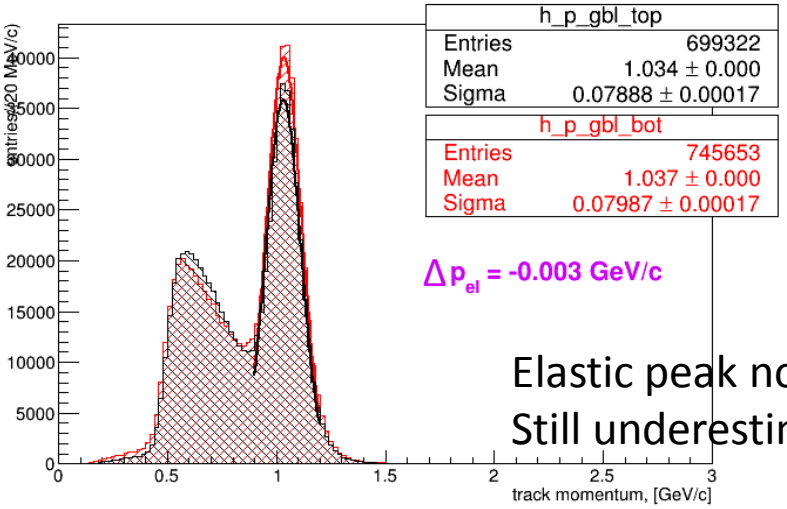


centered to 0
~ same width
It works!



Residuals are not changed

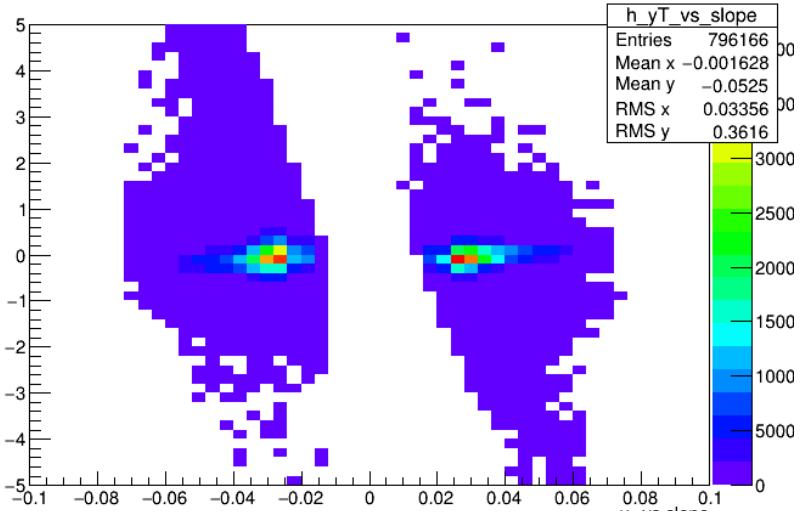




Elastic peak not moved
Still underestimated

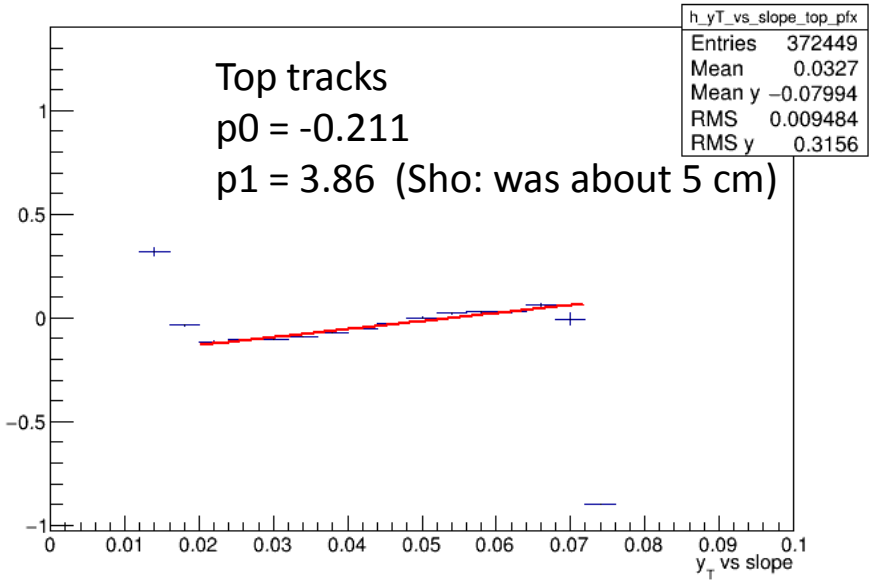
Global translations along w

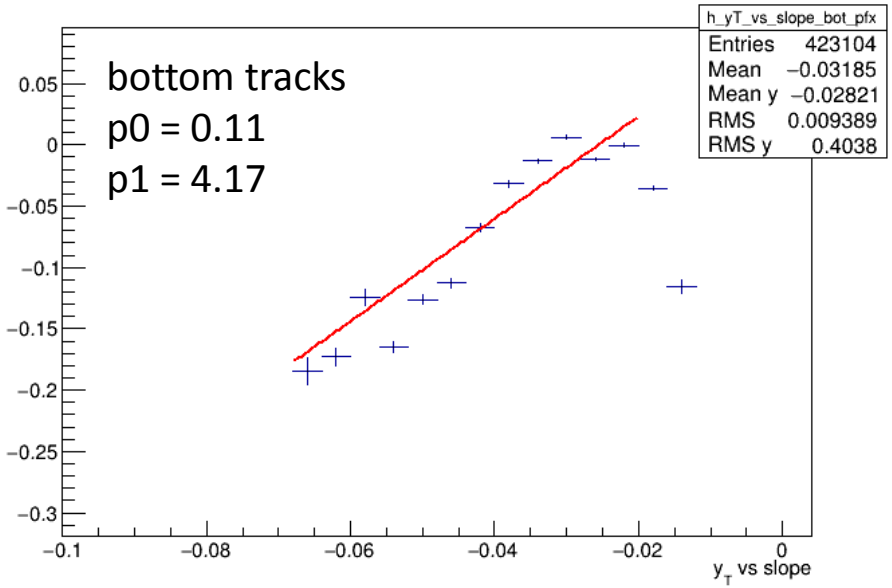
Use of tracks selected in the elastic peak



- Study of the profile distributions of y_T vs tanλ
- One should be able to infer the z coordinate of the target, by solving:

$$y_T(z=0) = \underbrace{y_{beamspot}}_{p0} - \underbrace{z_{tgt}}_{-p1} \cdot \tan\lambda$$





Next steps

- Study on how to include this information in the compact.xml file (sign consistency for t&b modules)
- Inclusion of global translations along v (pattern already present in existing compact.xml file)
- Further studies on additional tweaks depending on λ and other angles
- How it possible to get narrower distributions for impact parameters?

- Validate each step with straight tracks