

New alignments updates 2016 0.5 mm alignment

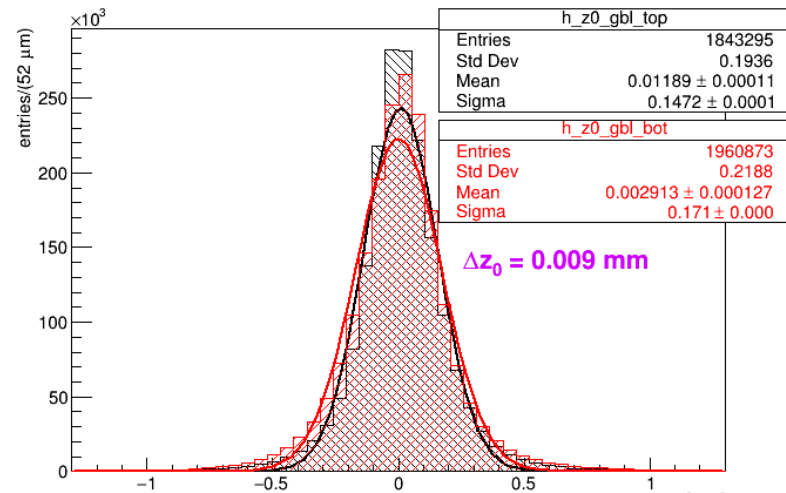
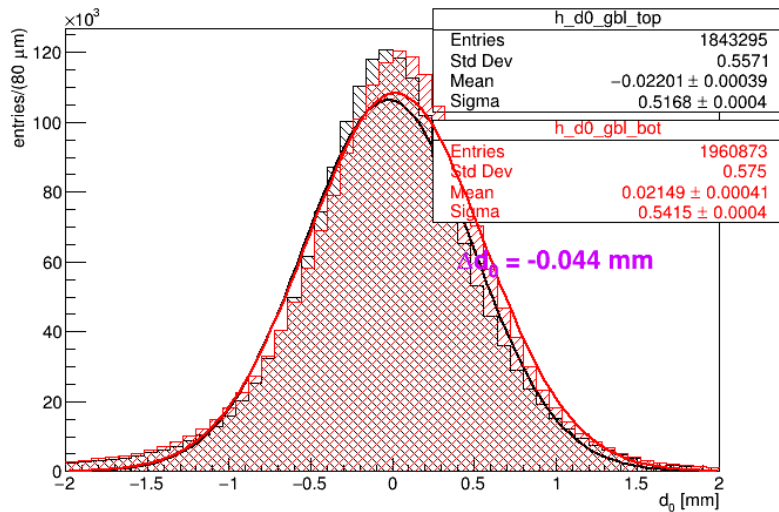
Alessandra Filippi
January 22, 2018

2016 data @ 0.5 mm alignment

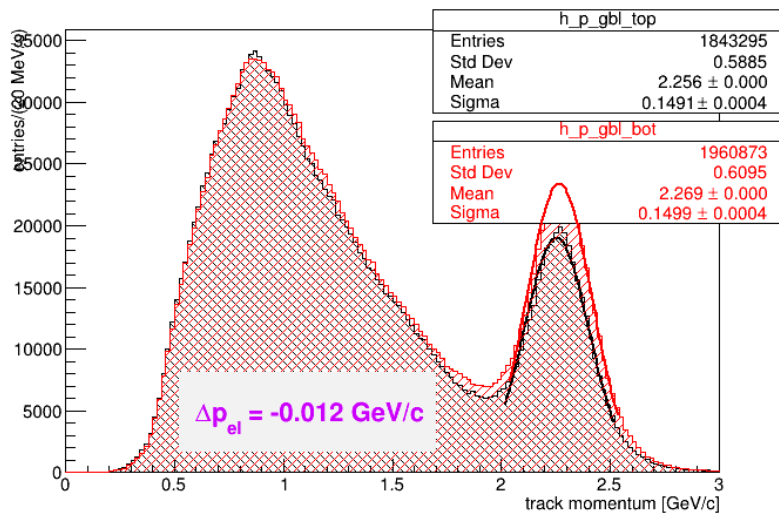
- Need to improve currently available detector (v 5.3)
- Start from scratch following the steps used for 2015 data
 - Use of a selected sample of FEE tracks (those in run 7798 which had the right opening angle)
 - Curved + straight tracks (Mariangela's version), or curved only (myself)
- Two detectors with good internal alignment, but some pitfalls on both of them
 - Hard to decide the rightest one
 - It would be useful to look at some physical quantity (other than momentum calibration)

OLD

2016 current geometry (v5.3) w fieldmap, 0.5mm curved + straight tracks + global alignment

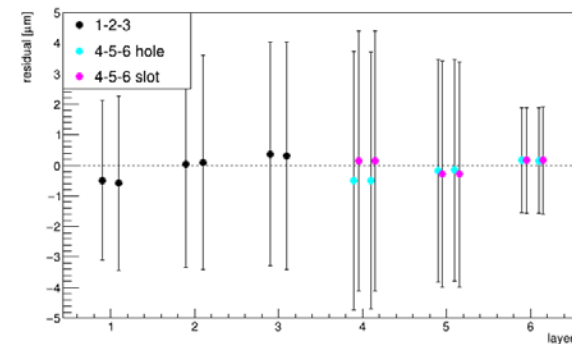
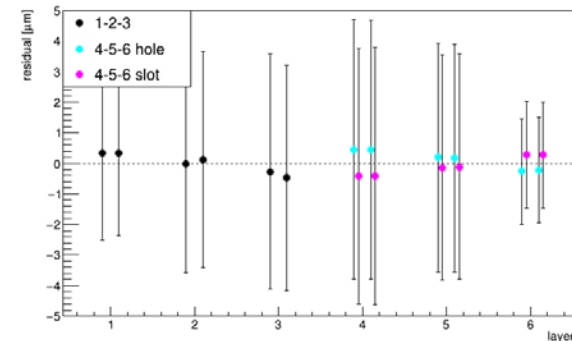


No cut on track χ^2



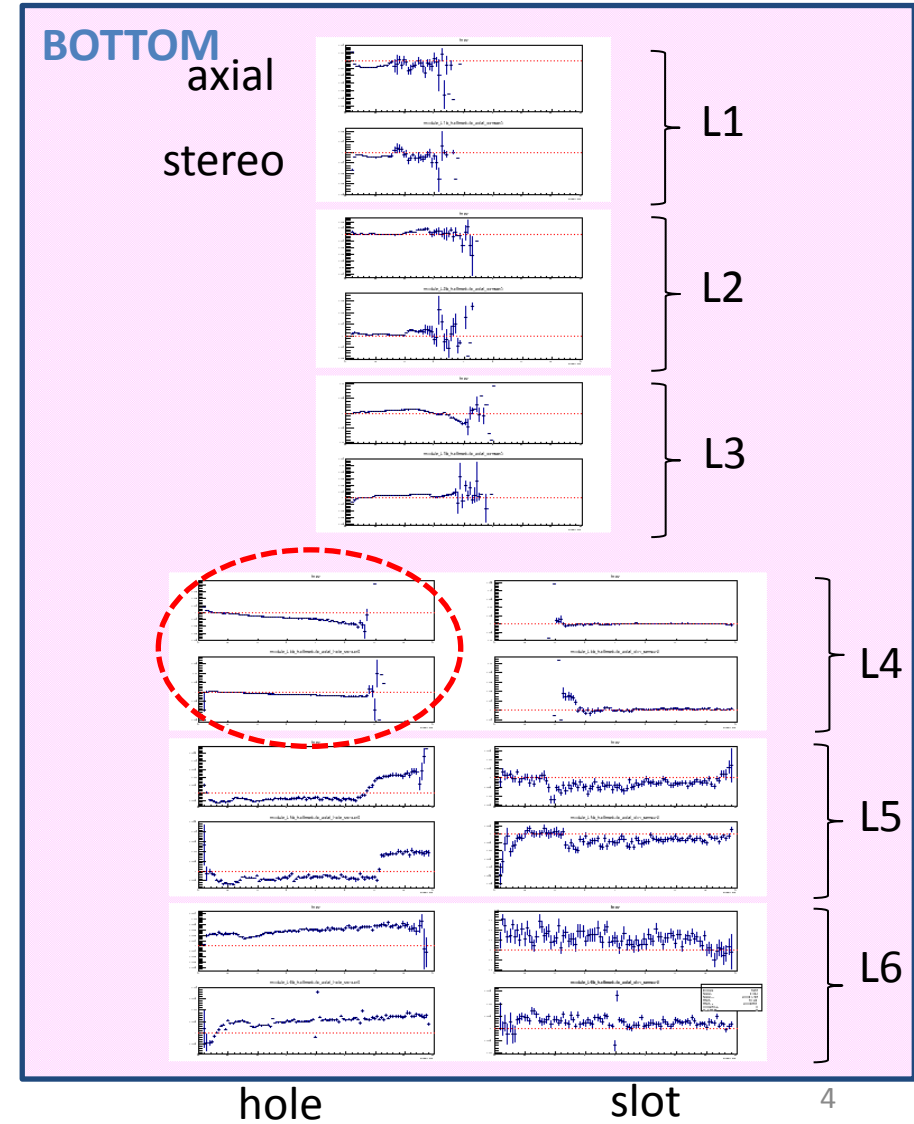
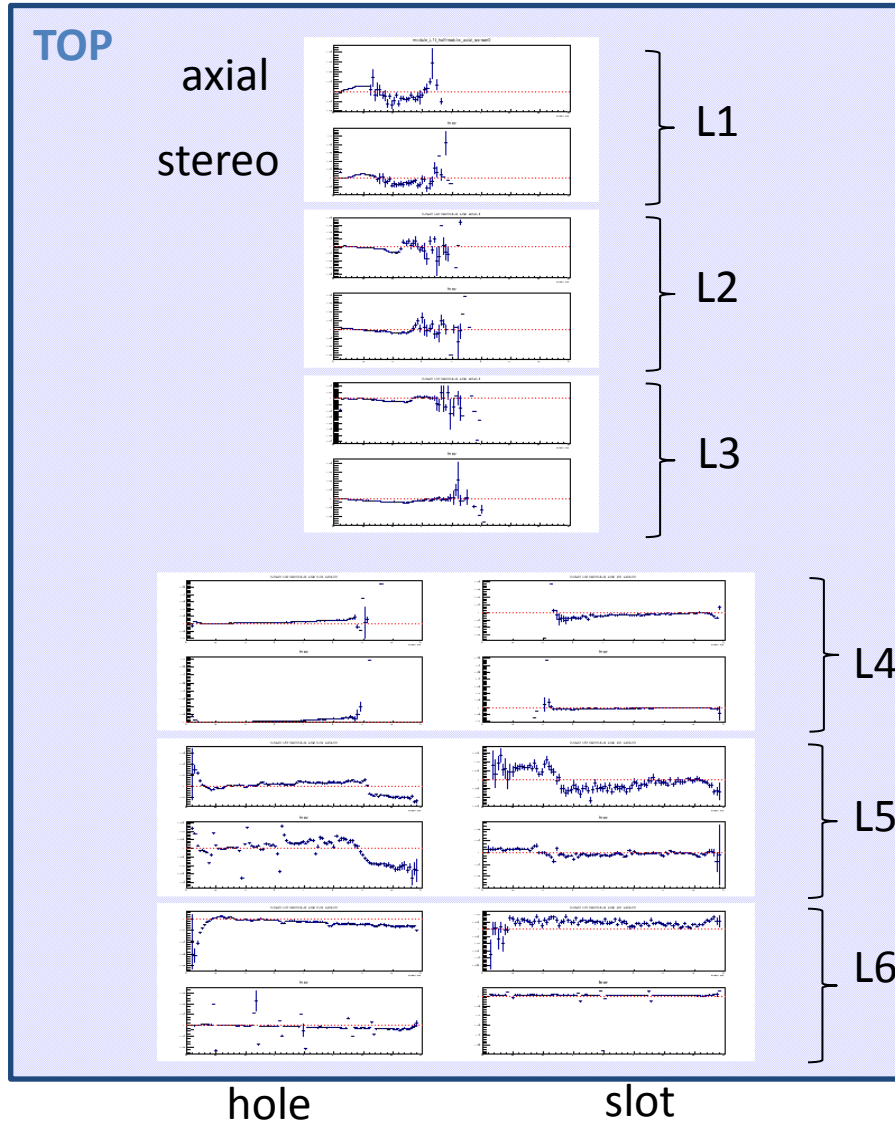
T/B diff
 $\Delta d_0 = 44 \mu\text{m}$
 $\Delta z_0 = 9 \mu\text{m}$
 $\Delta p = -12 \text{ MeV/c}$

$p_{\text{top}} = 2.256 \text{ MeV/c}$
 $p_{\text{bot}} = 2.269 \text{ MeV/c}$

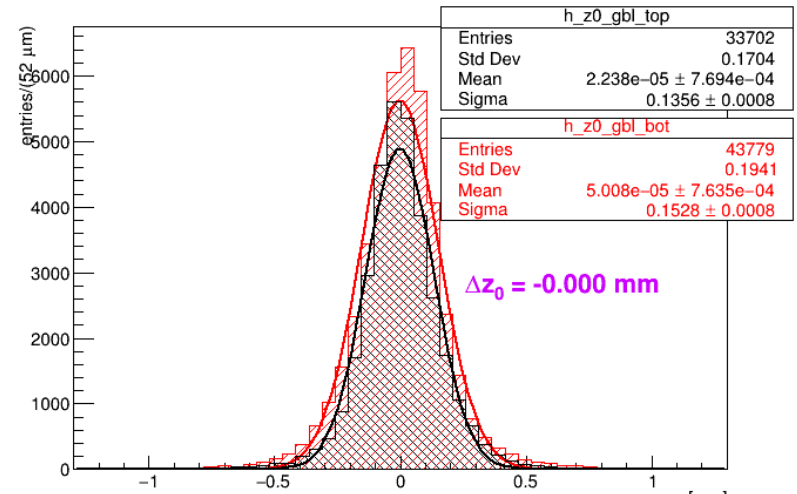
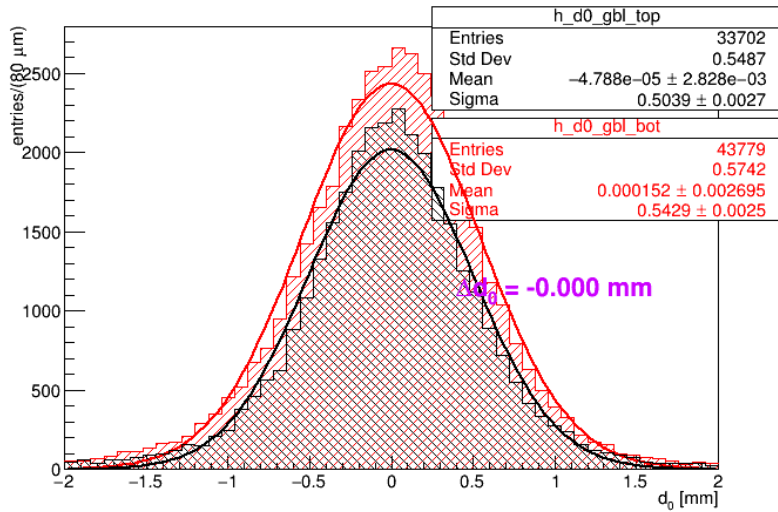


Current best geometry 2016 (v5.3)

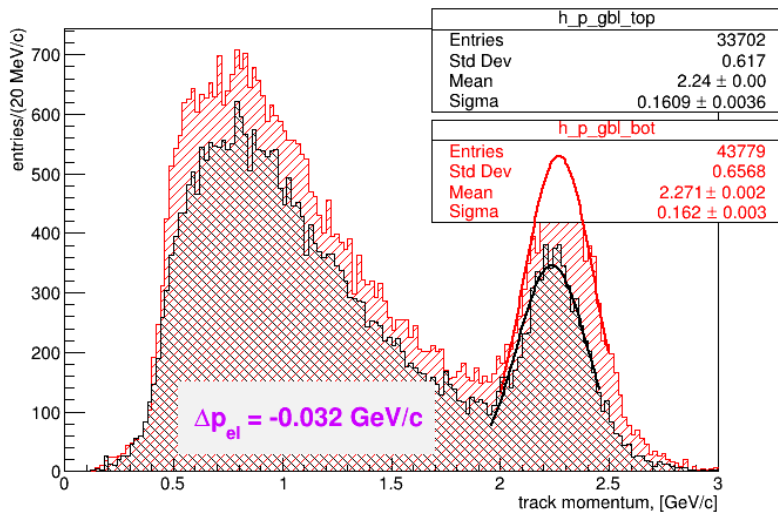
GBL u residuals vs u position



2016 newgeo1 (MB) w fieldmap, 0.5mm curved + straight tracks + global alignment

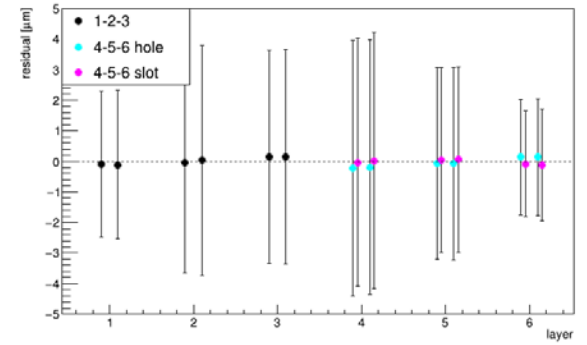
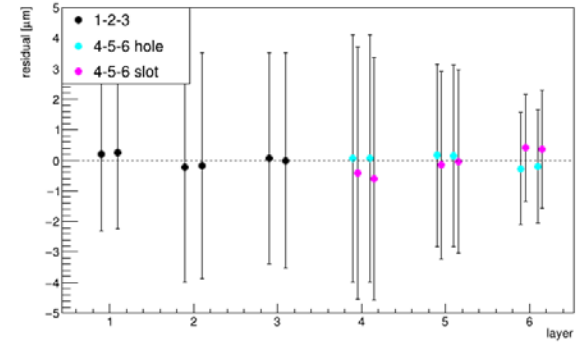


Cut on track χ^2 : $\chi^2 < 20$

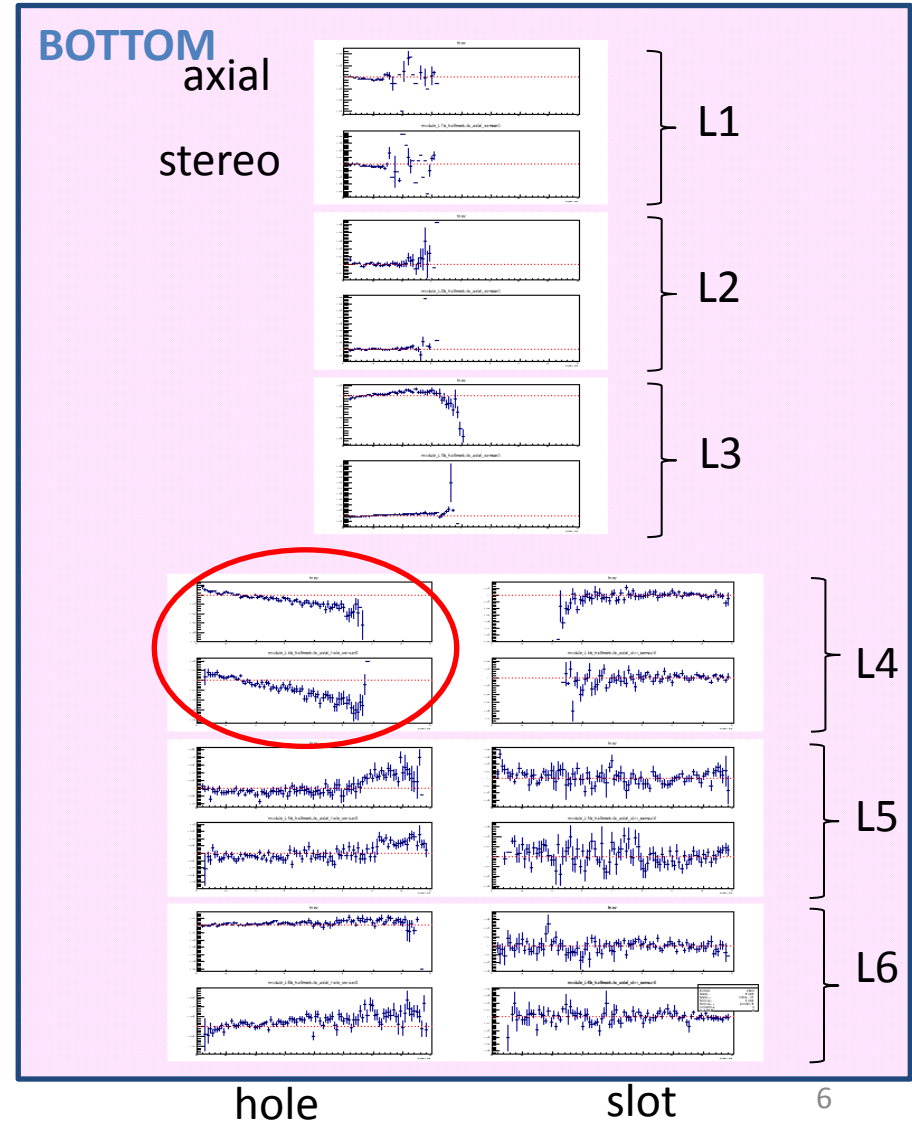
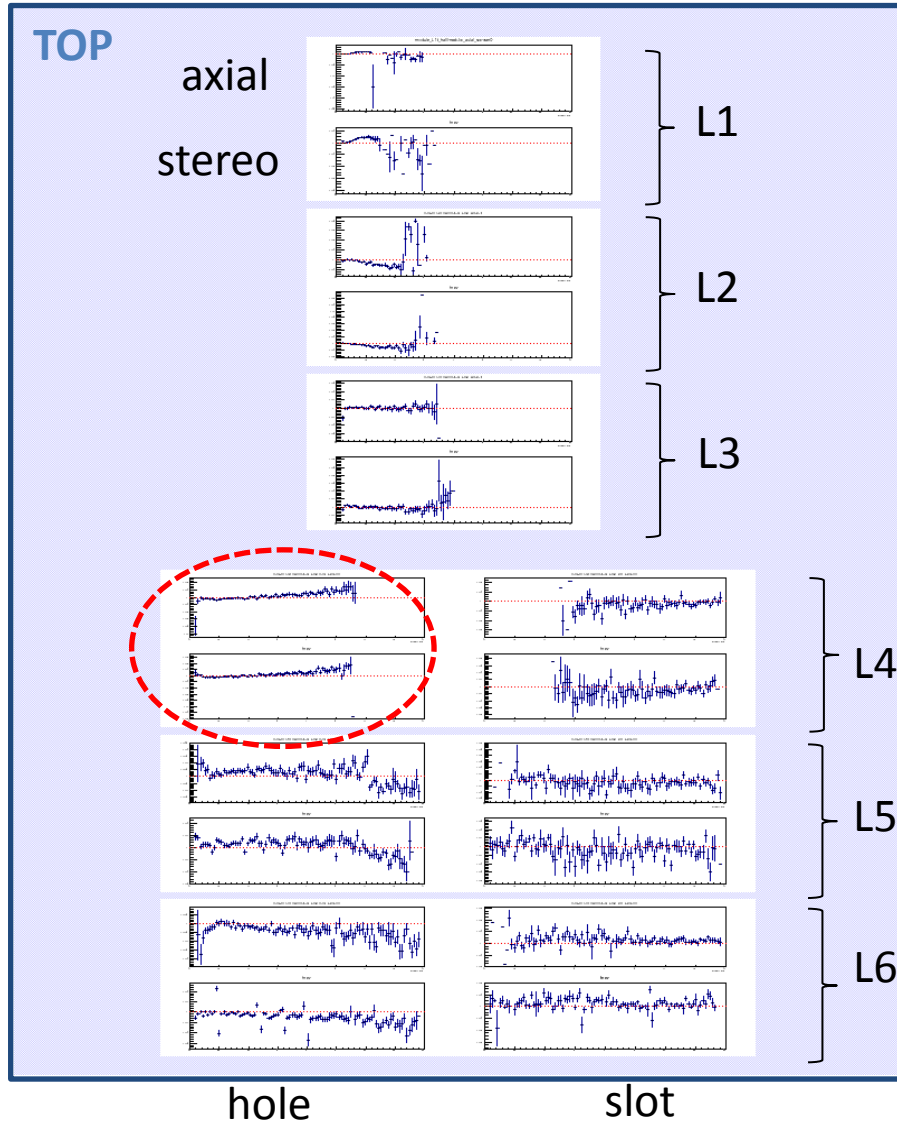


T/B diff
 $\Delta d_0 = 0 \mu\text{m}$
 $\Delta z_0 = 0 \mu\text{m}$
 $\Delta p = -32 \text{ MeV/c}$

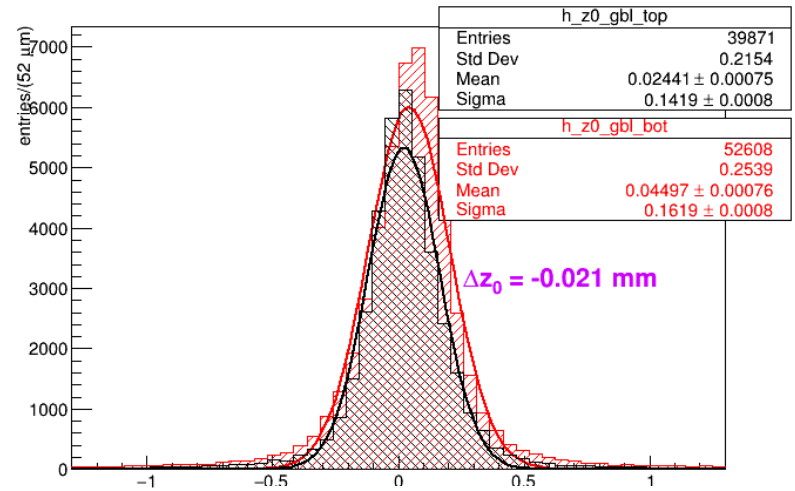
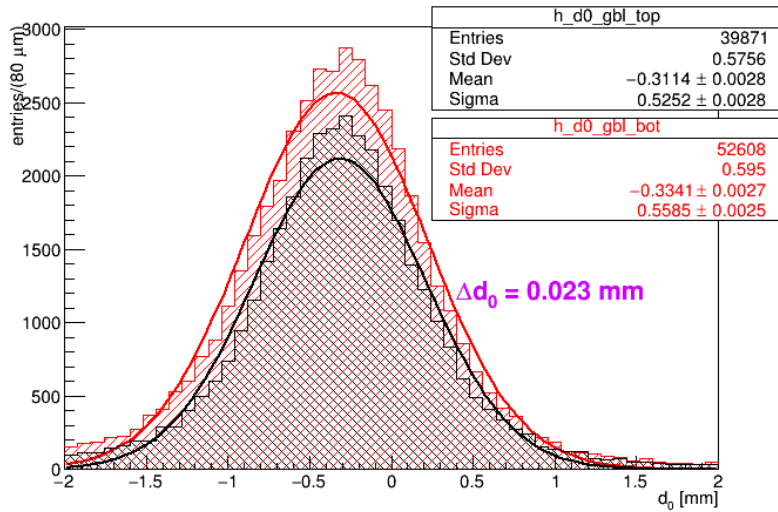
$p_{top} = 2.24 \text{ MeV/c}$
 $p_{bot} = 2.271 \text{ MeV/c}$



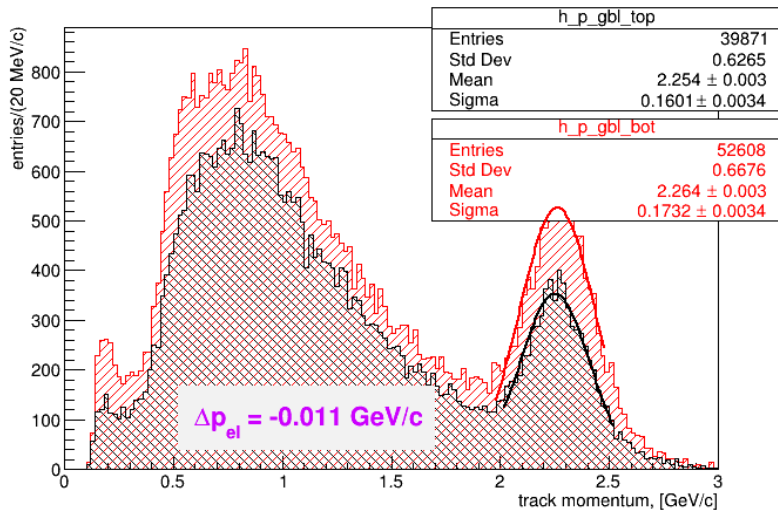
Newgeo 2016 (MB): GBL u residuals vs u position



2016 newgeo 1 (AF) w fieldmap, 0.5mm curved tracks (no global alignment yet)

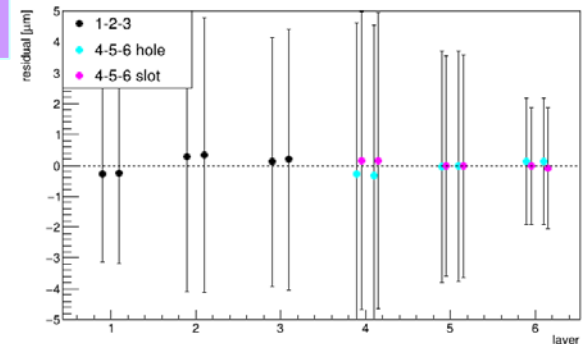
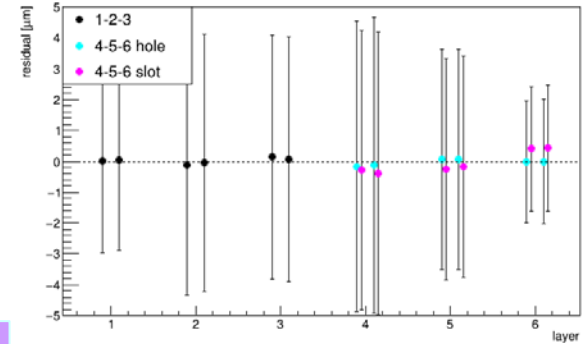


No cut on track χ^2
No global alignment

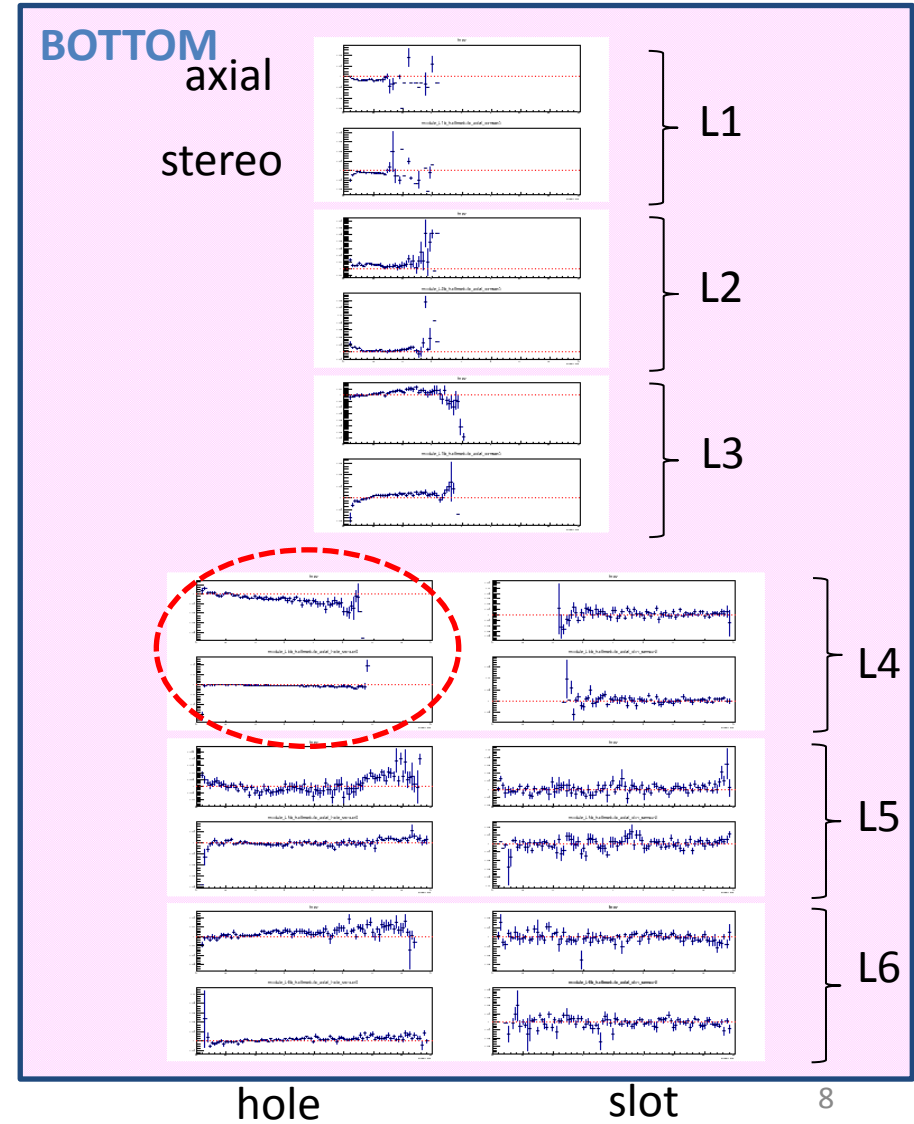
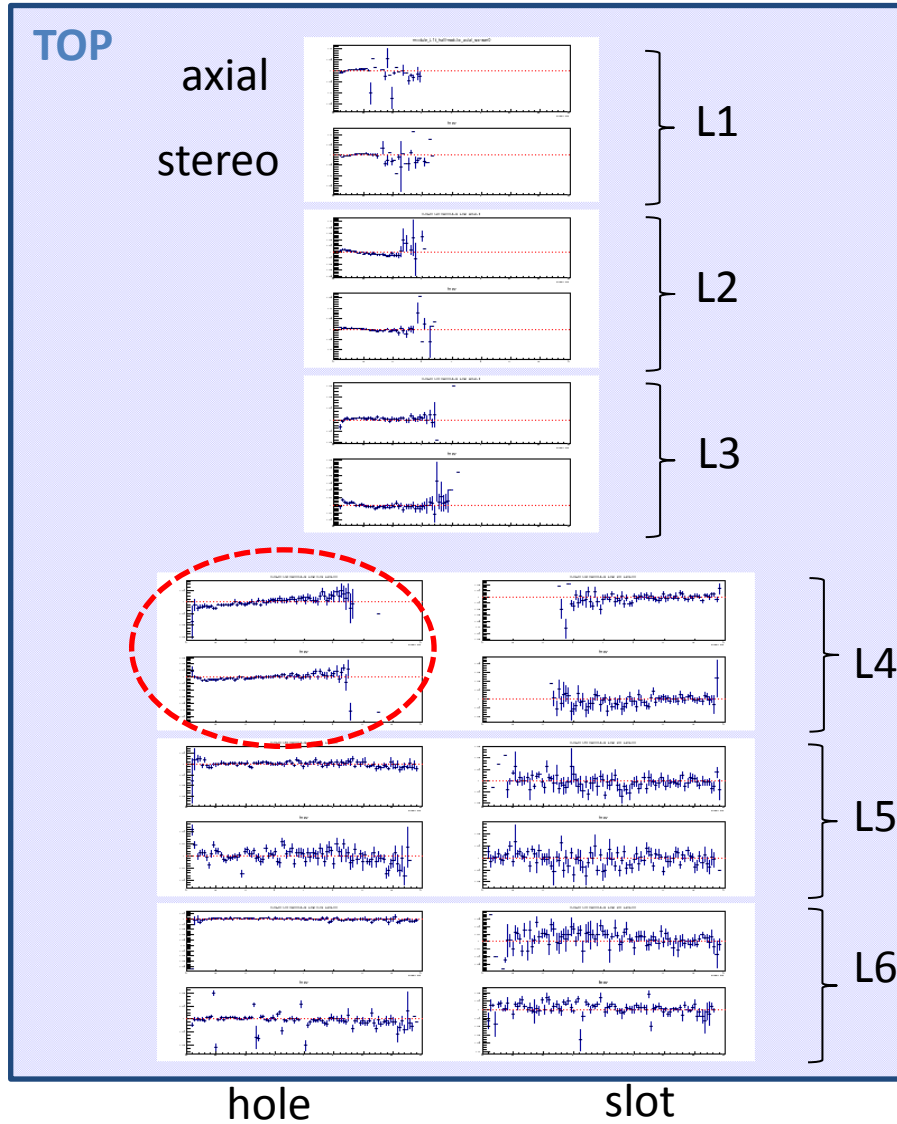


T/B diff
 $\Delta d_0 = 23 \mu\text{m}$
 $\Delta z_0 = 21 \mu\text{m}$
 $\Delta p = -11 \text{ MeV/c}$

$p_{top} = 2.254 \text{ MeV/c}$
 $p_{bot} = 2.264 \text{ MeV/c}$

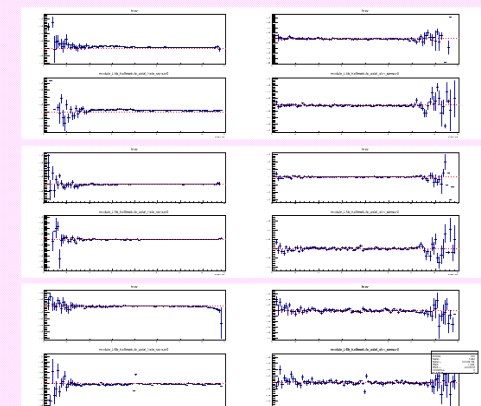
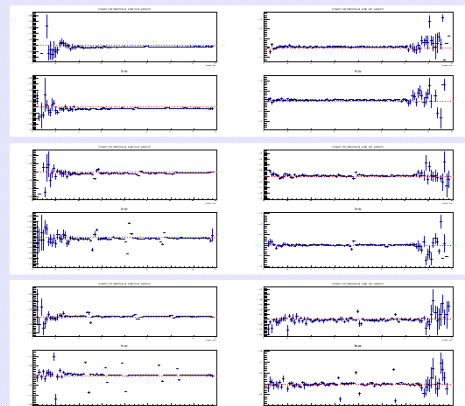
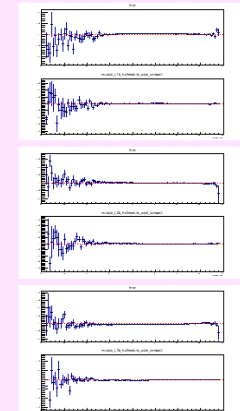
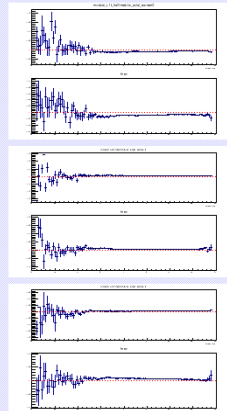
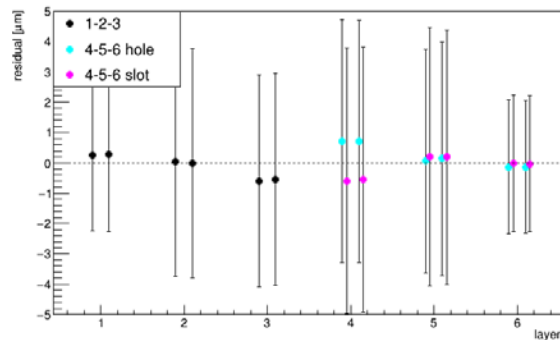
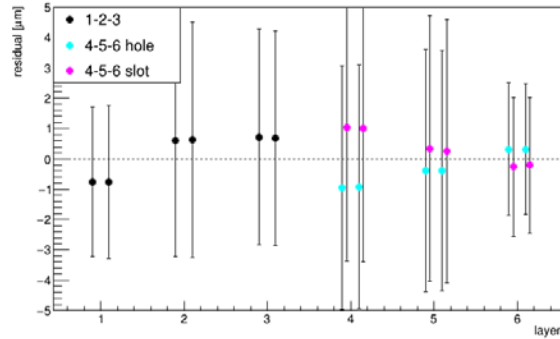


Newgeo2 2016 (AF): GBL u residuals vs u position



Newgeo2 2016 (AF): GBL u residuals and profiles for straight tracks

Profile plots are ok but the residuals mean values float wildly



Any ideas?

- Several attempts to move sensors 3-4 to improve sensor 4b behavior: no way so far
 - No improvement with single rotations
 - No improvement with single translations
 - No improvement including some offsets in the opening angle
- Need better understanding of the differences between the two found geometries
- More statistics needed
- Some studies on systematic effect of opening angle currently ongoing