

# GBL Fit of Straight Throughs

Pelle

# GBL Straight Through Fit

STUtils fitter is used as seed to GBL

- 1 hit per sensor (in time)
- Multiple scattering: assume beam energy electrons
- Use default measurement uncertainty ( $\text{pitch}/\sqrt{12}$ )

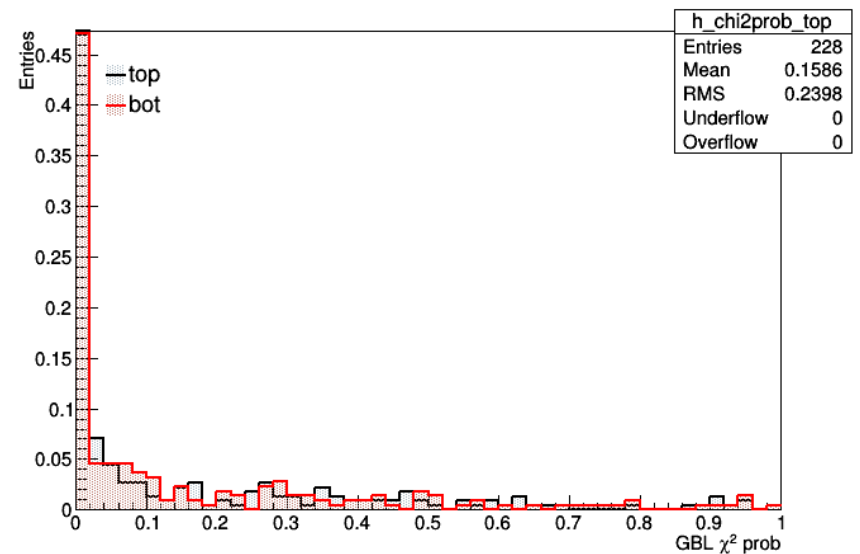
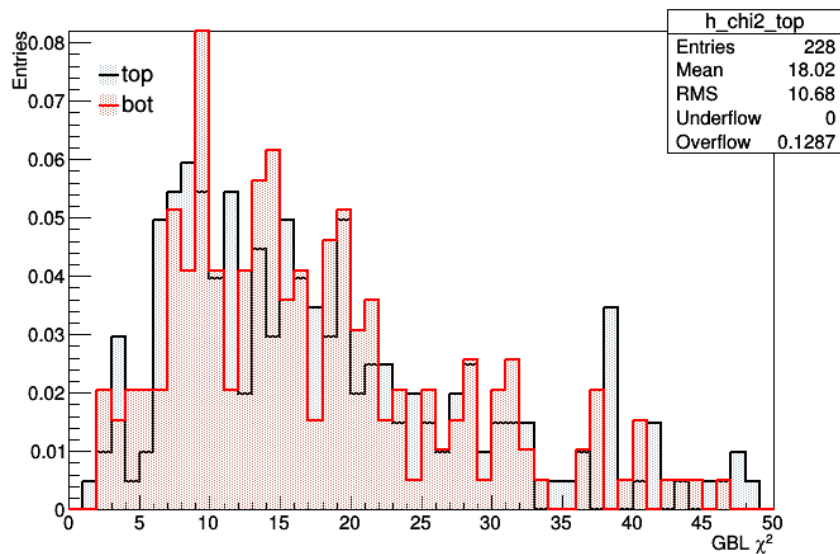
New Python GBL implementation

- Similar to existing helix implementation: mostly re-organization
- Will add to instructions

Run 5784

- More stat available than this

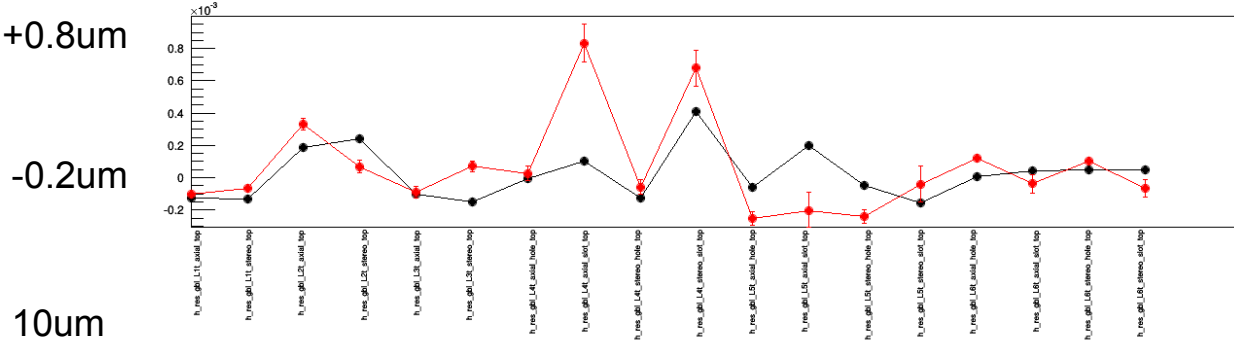
# Chi2



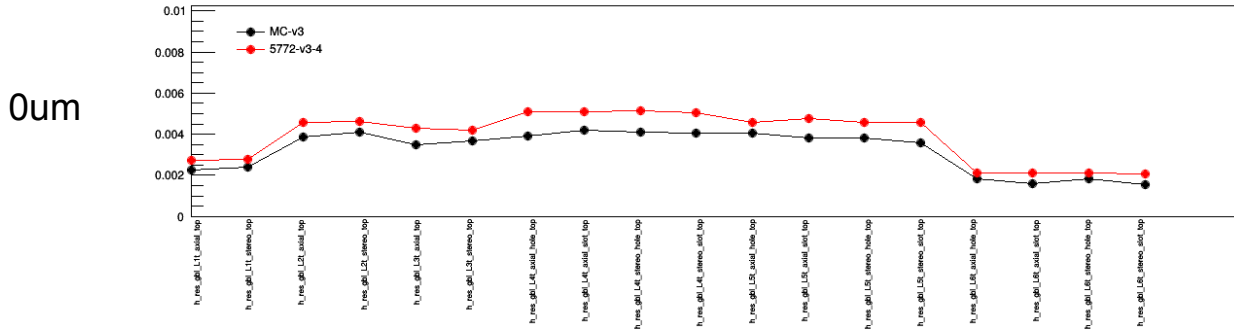
Looked at low chi2 (prob<0.01 or chi2>~15)  
Looks "fine": just worse fitted tracks, no obvious bias

# Reminder: v3-4 residuals with B-field

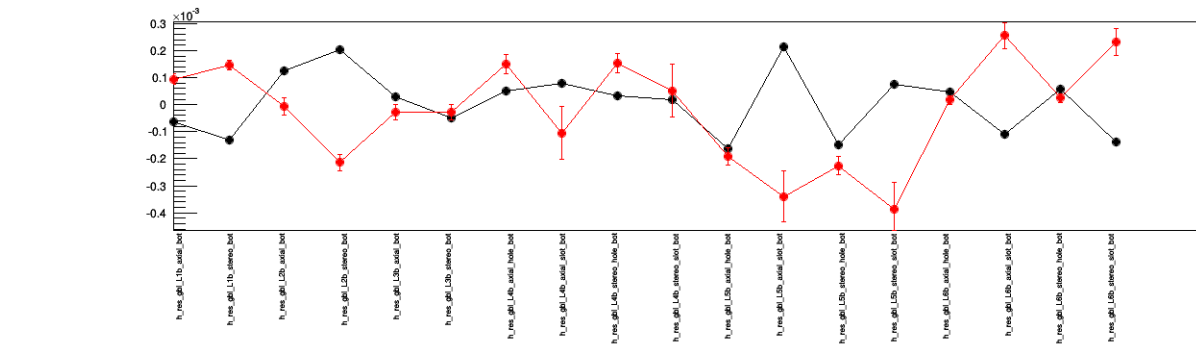
Top +0.8um



Top mean

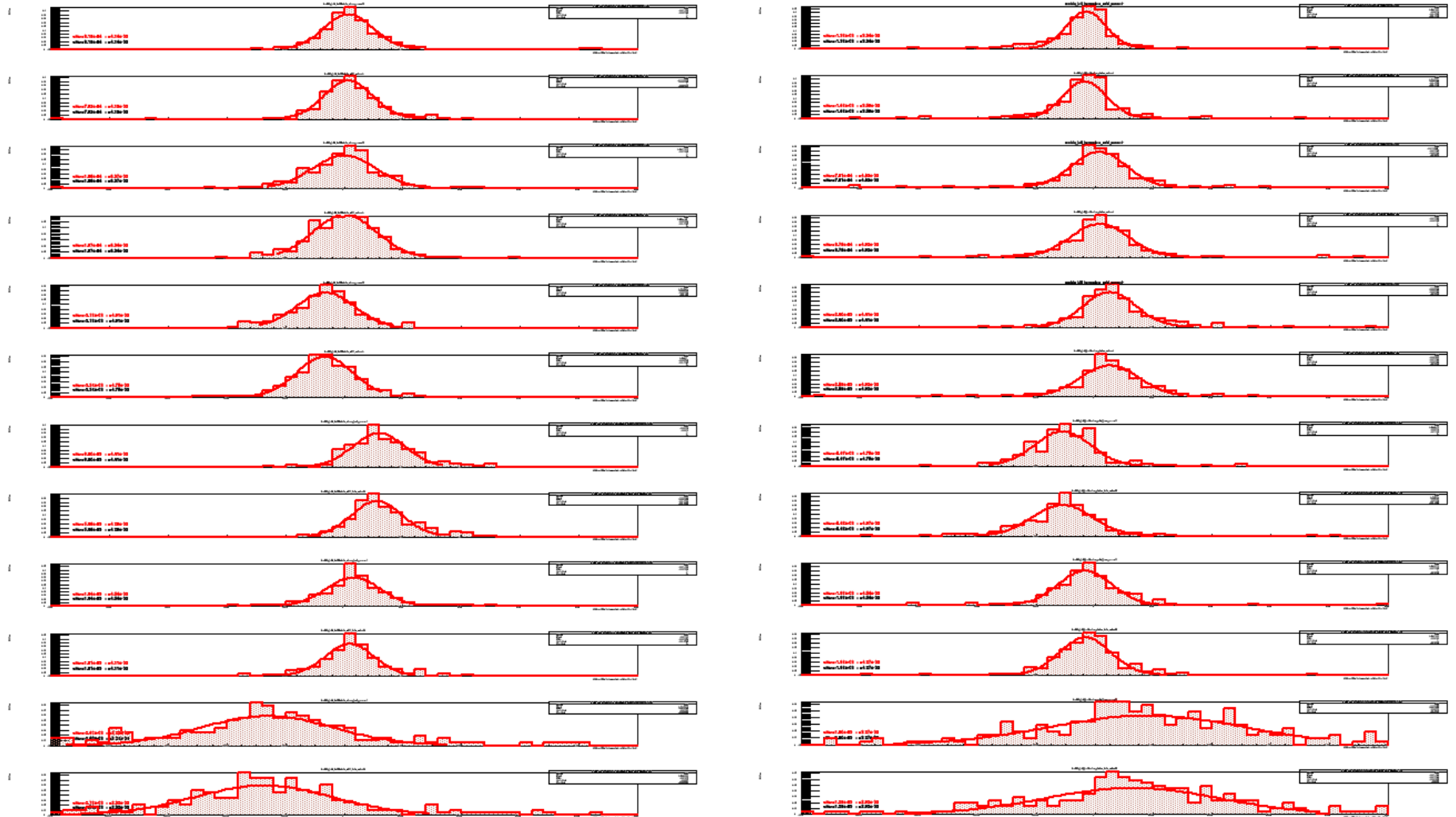


Top width



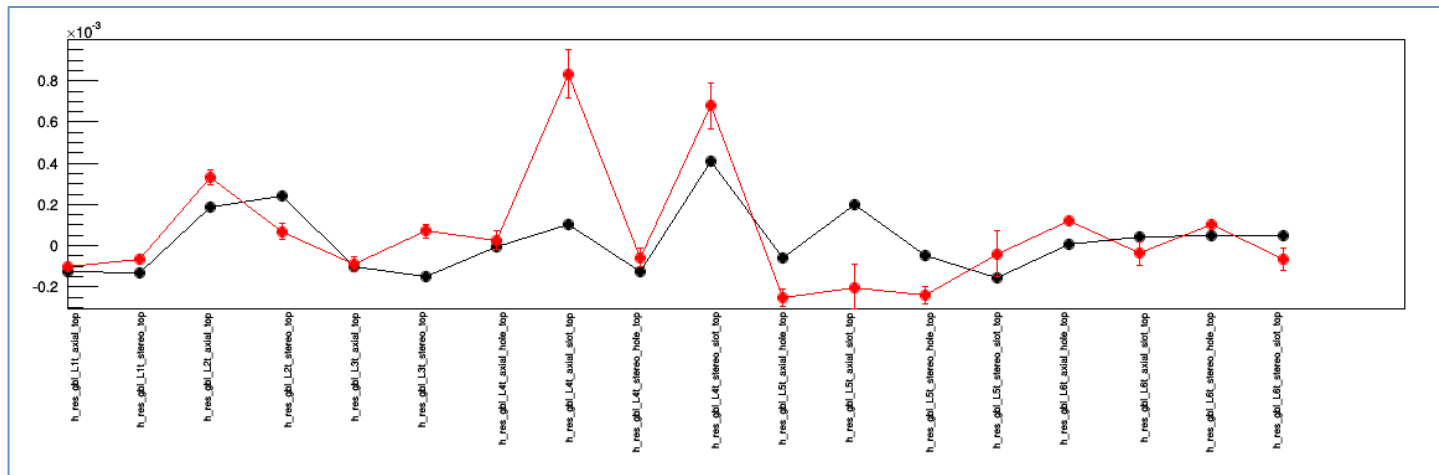
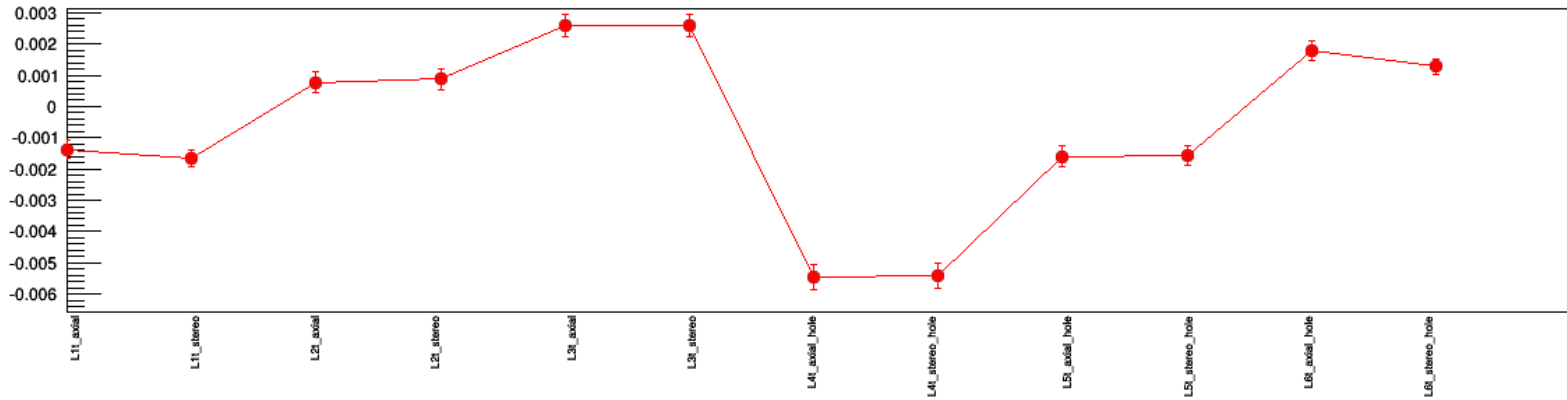
Bottom mean

# Residuals (left: top)



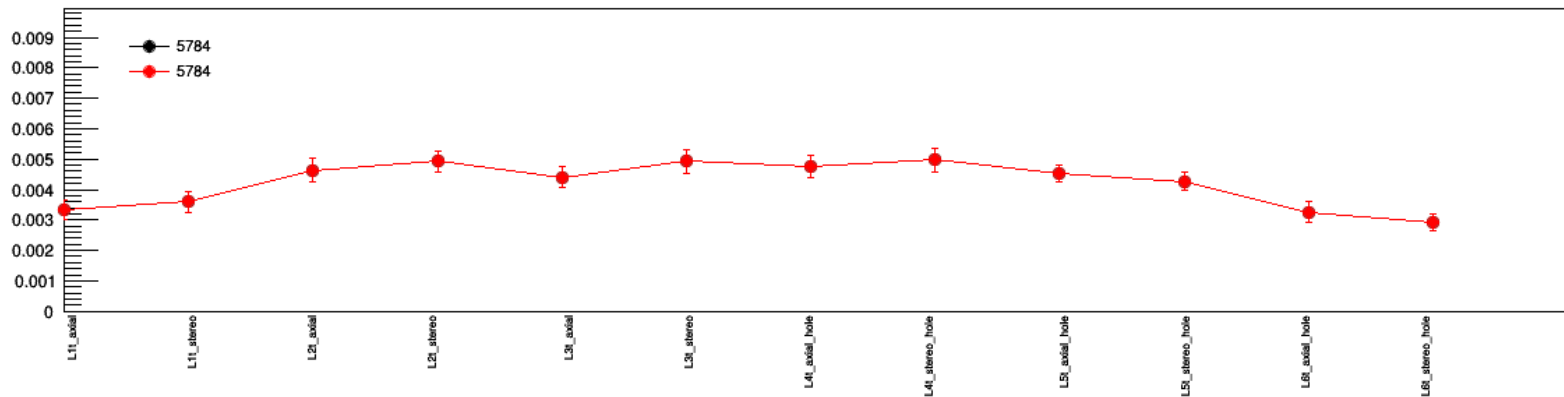
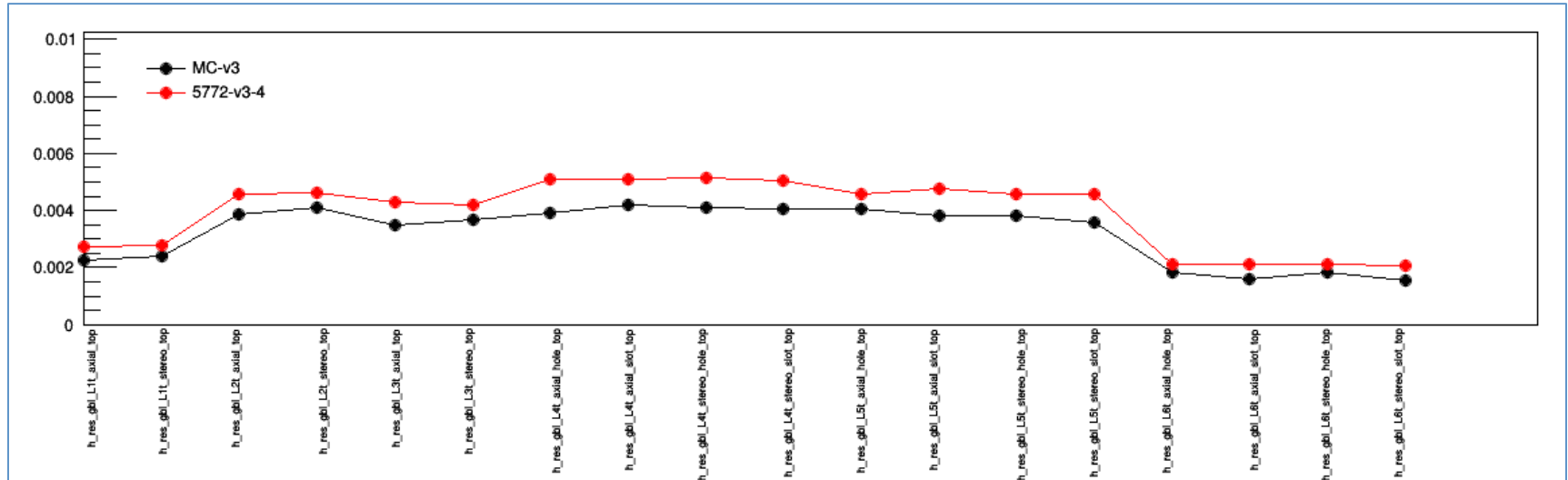
Note that scales differ

# Residuals top



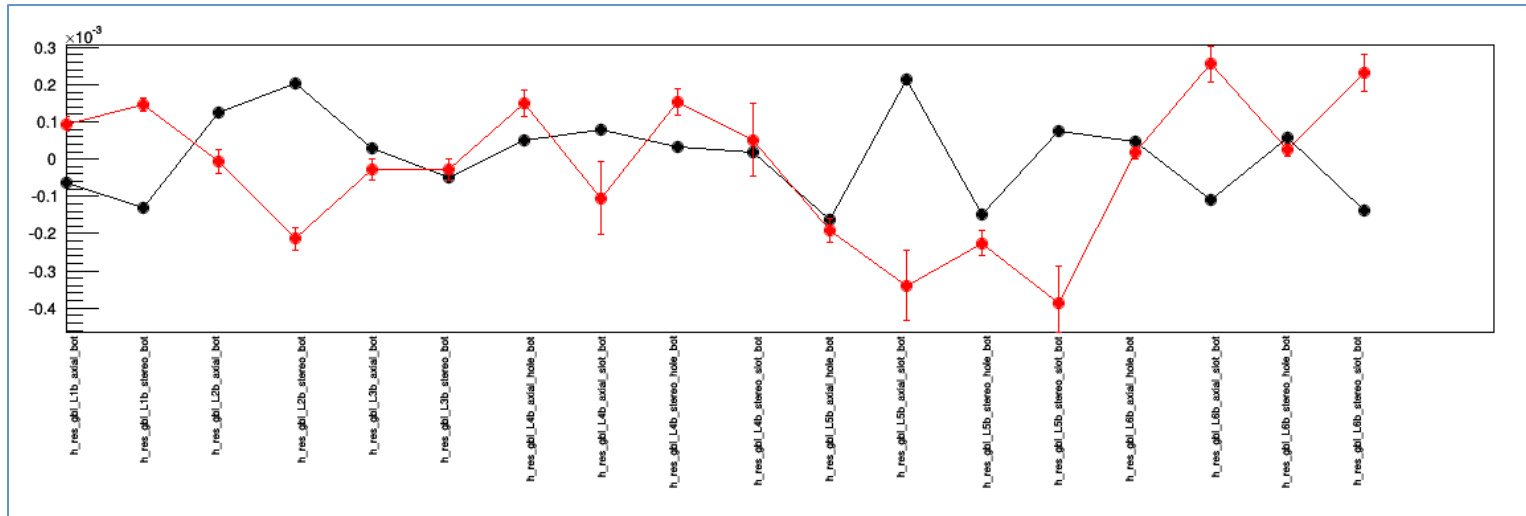
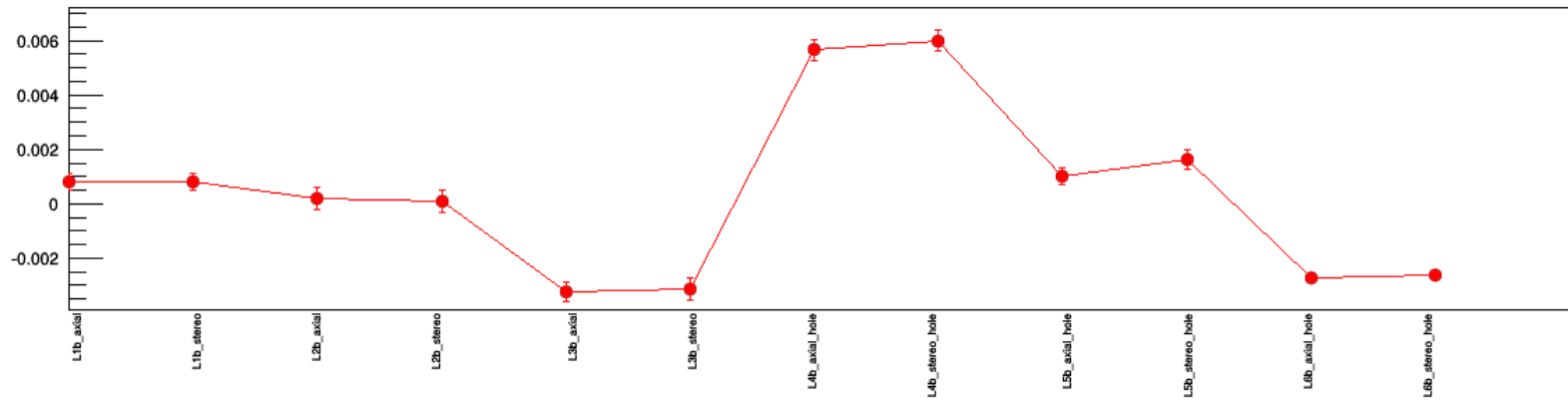
Compared to B-field: mean larger, widths similar (cross-check code!)

# Residuals top



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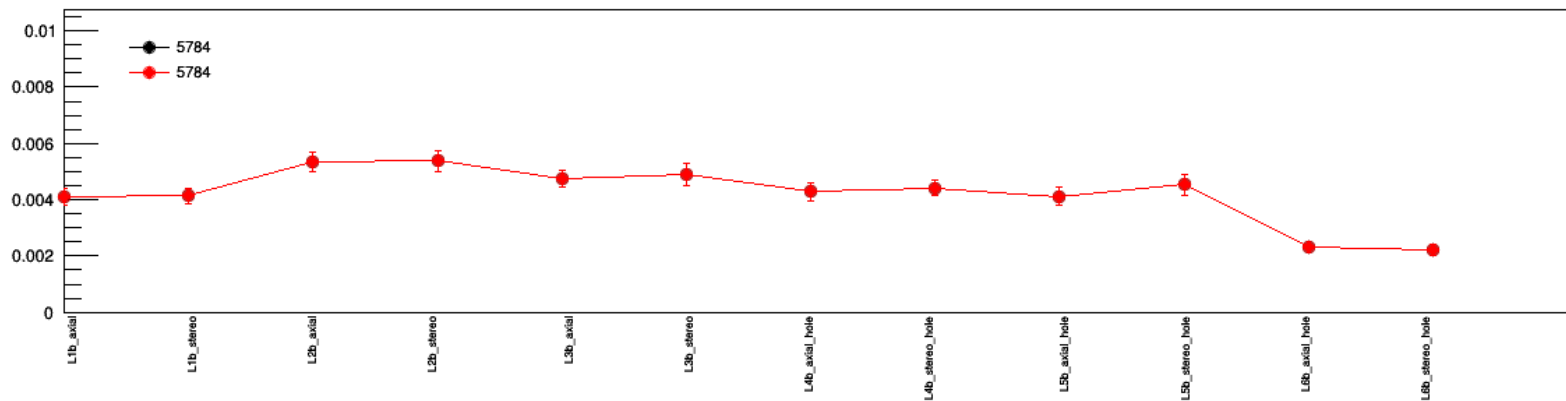
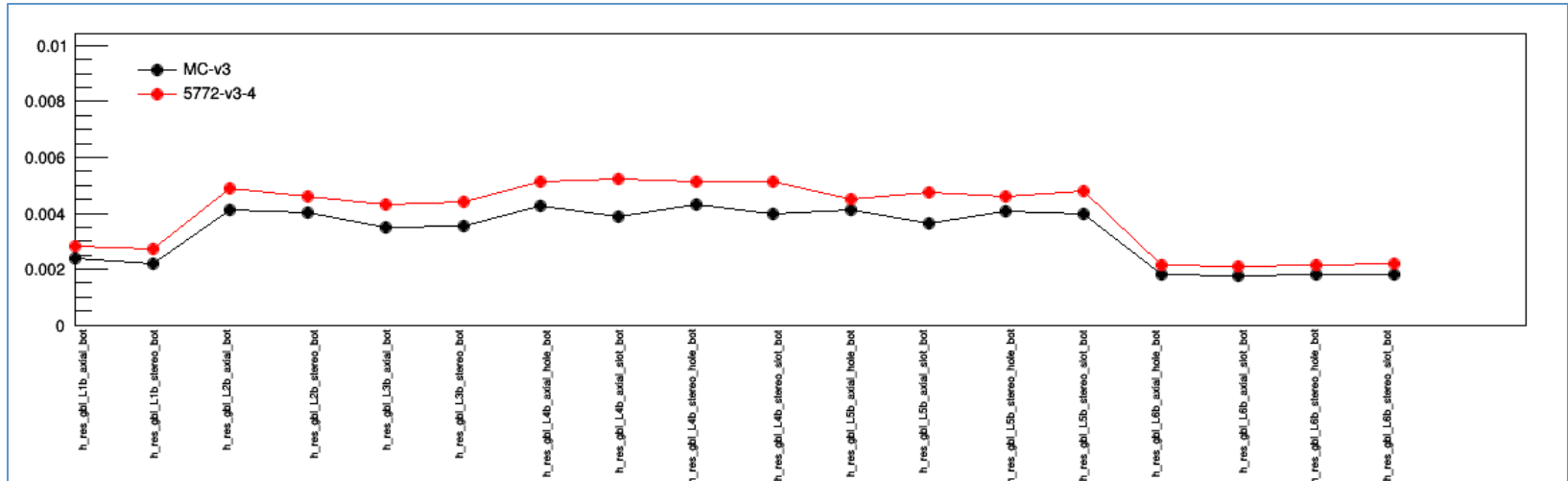
# Residuals bottom



Compared to B-field: mean larger, widths similar (cross-check code!)

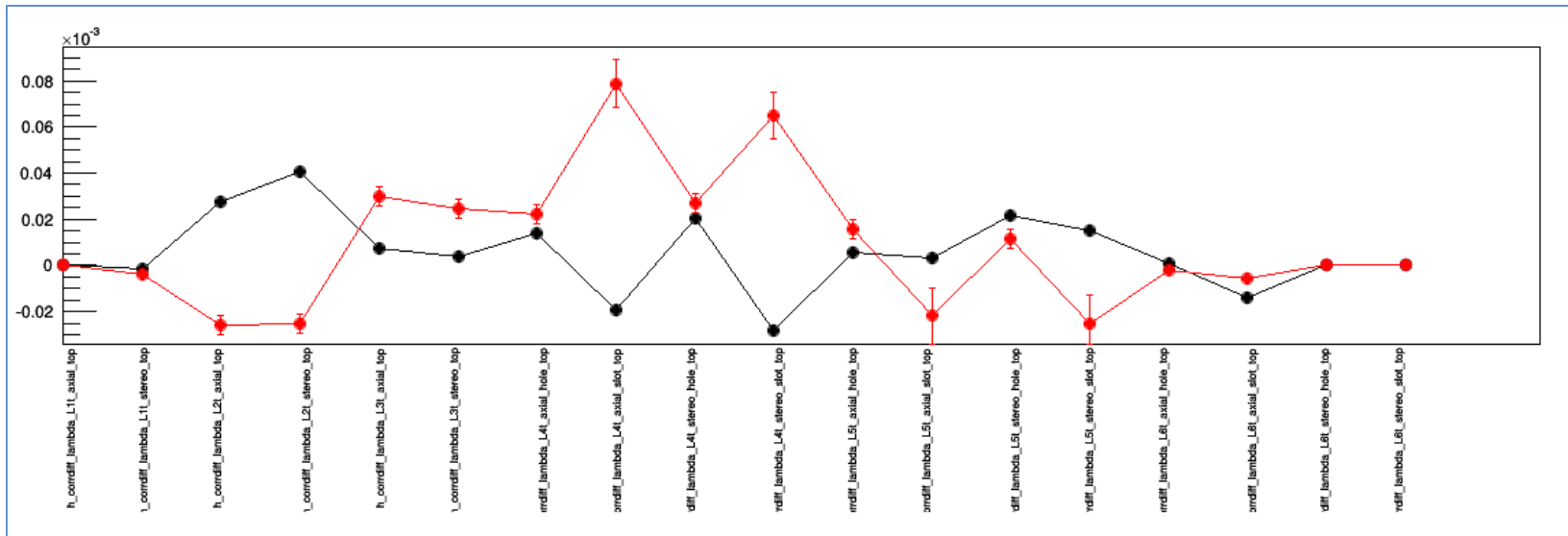
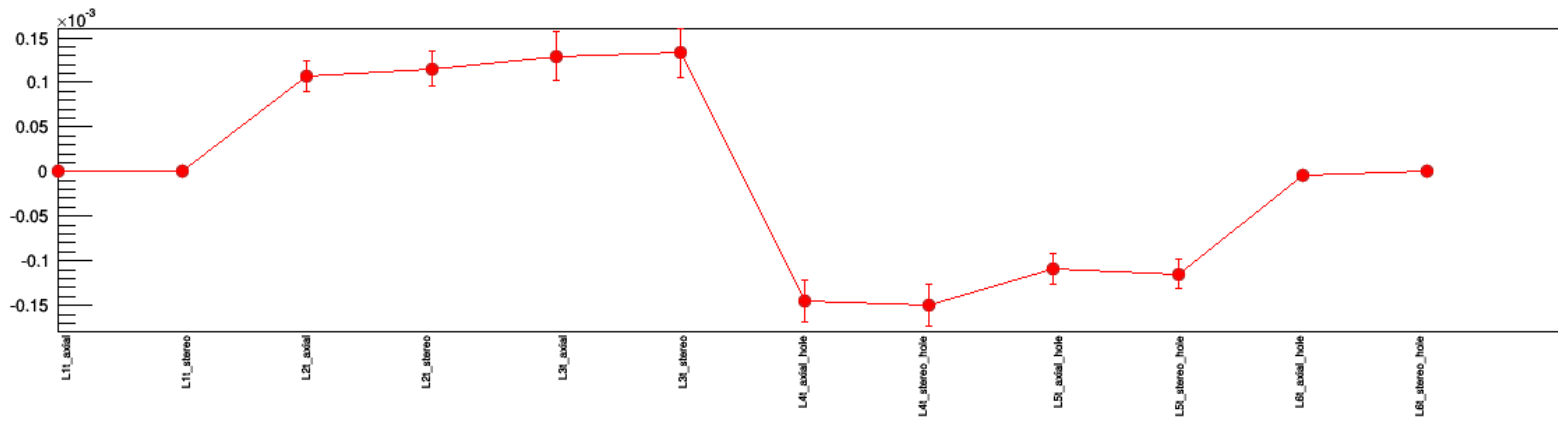


# Residuals bottom

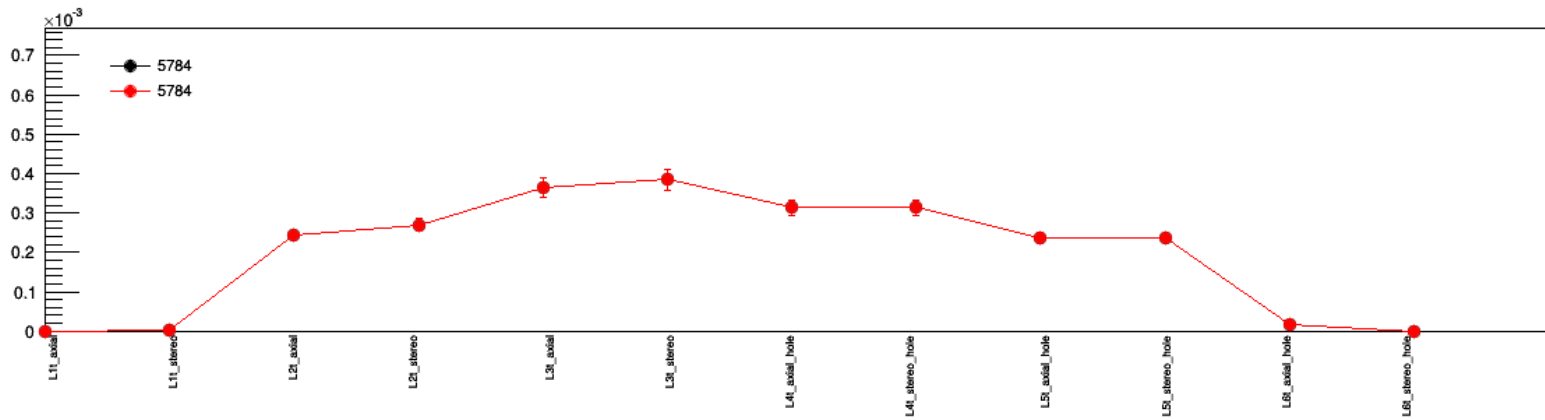
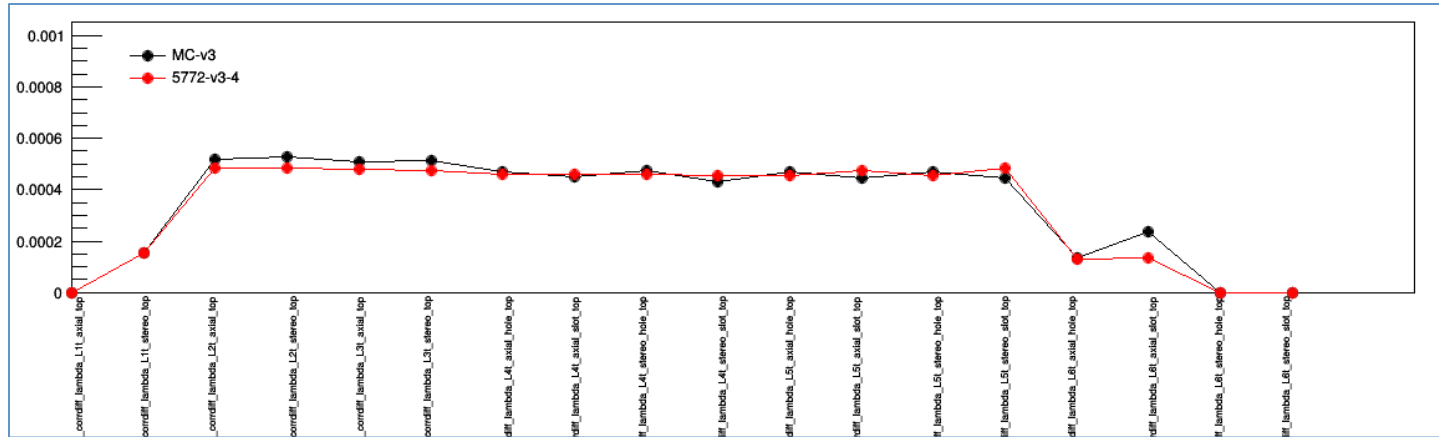


Compared to B-field: mean larger, widths similar (cross-check code!)

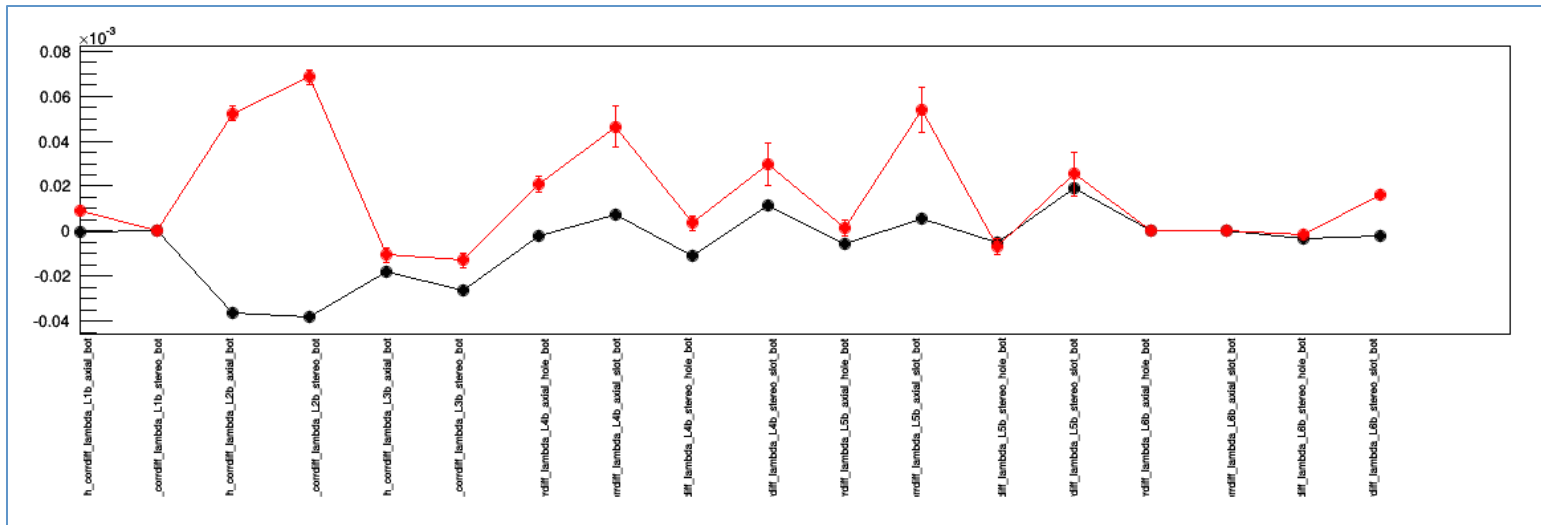
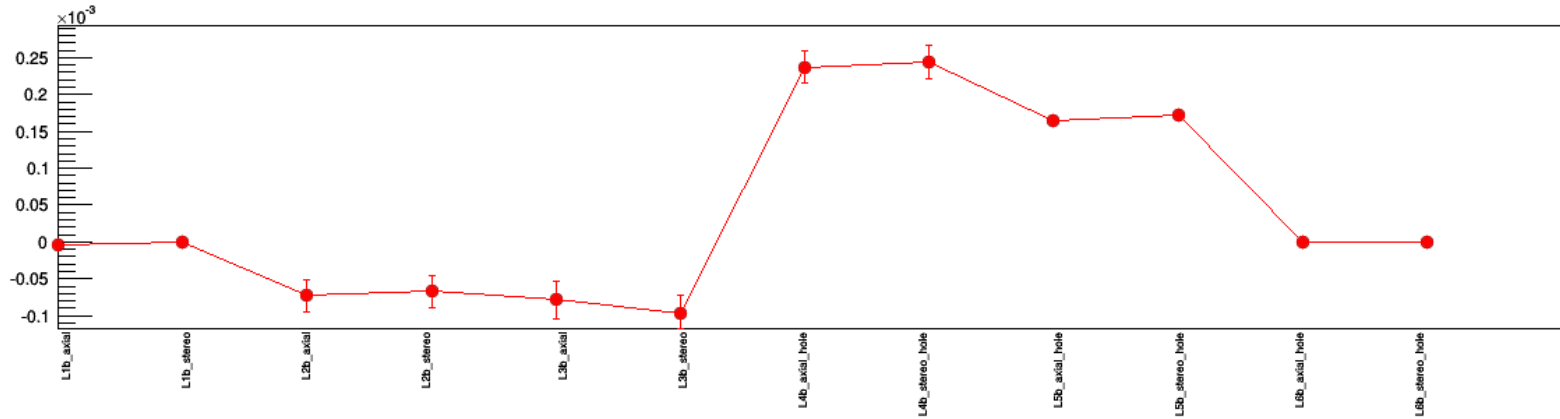
# Kinks lambda top



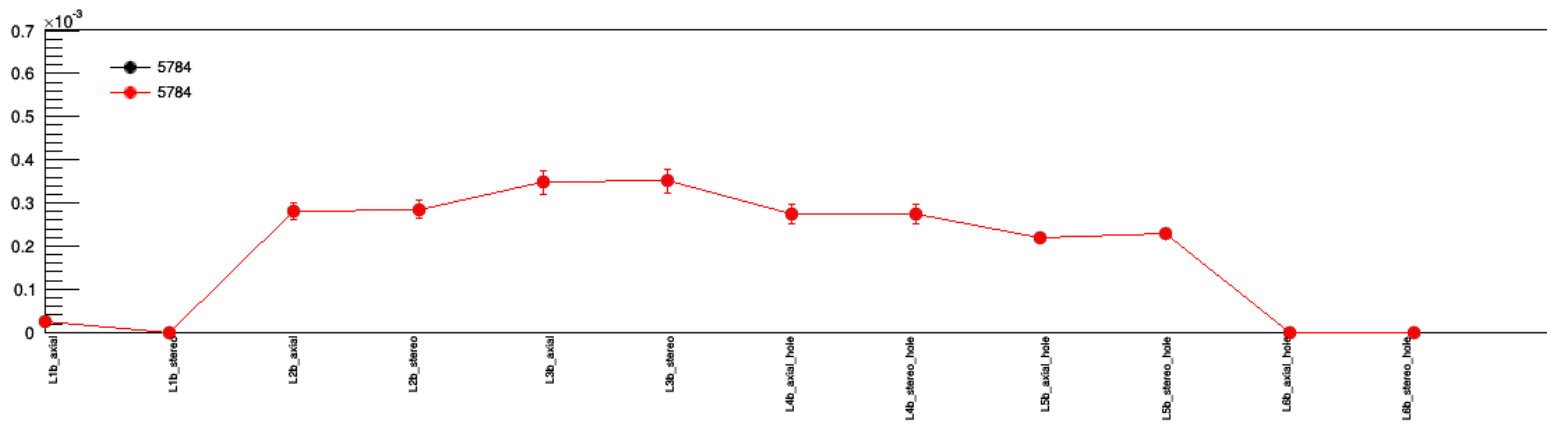
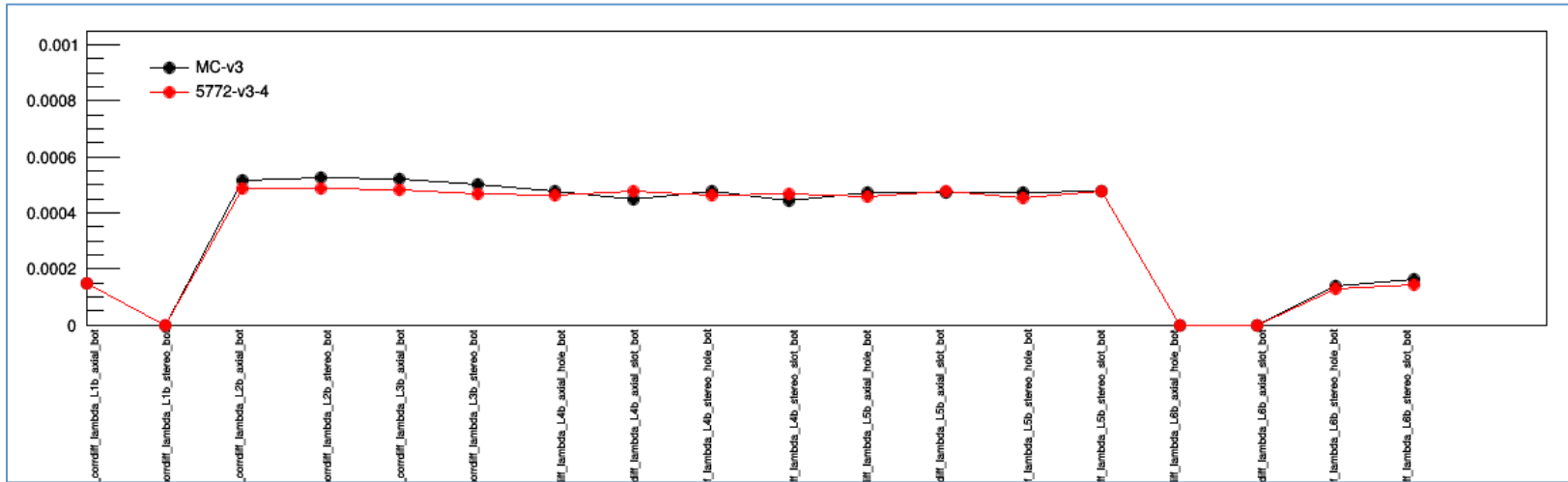
# Kinks lambda top



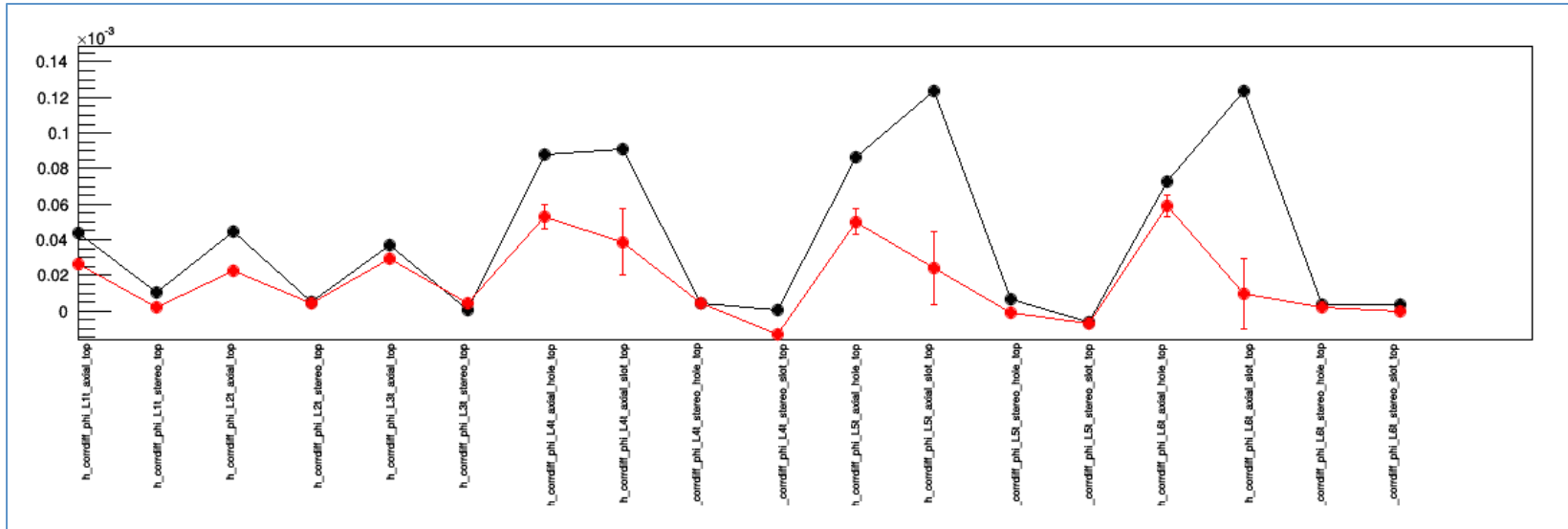
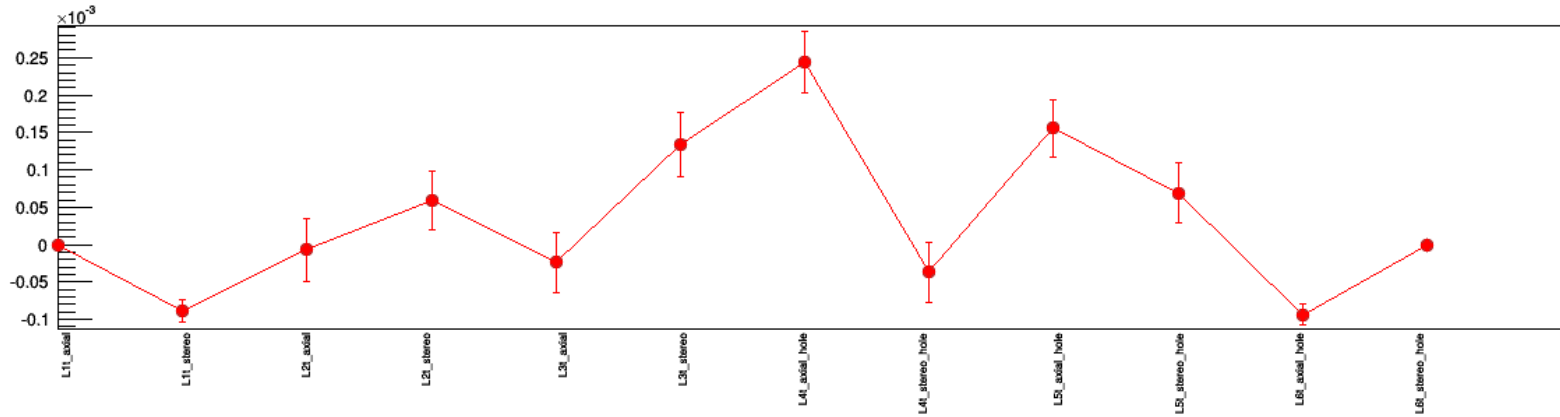
# Kinks lambda bottom



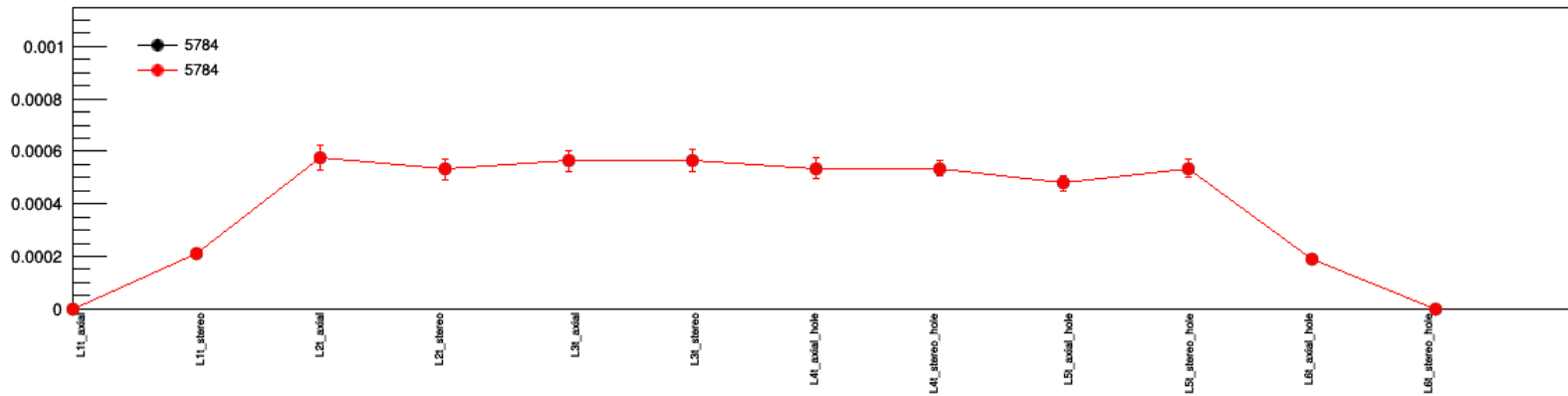
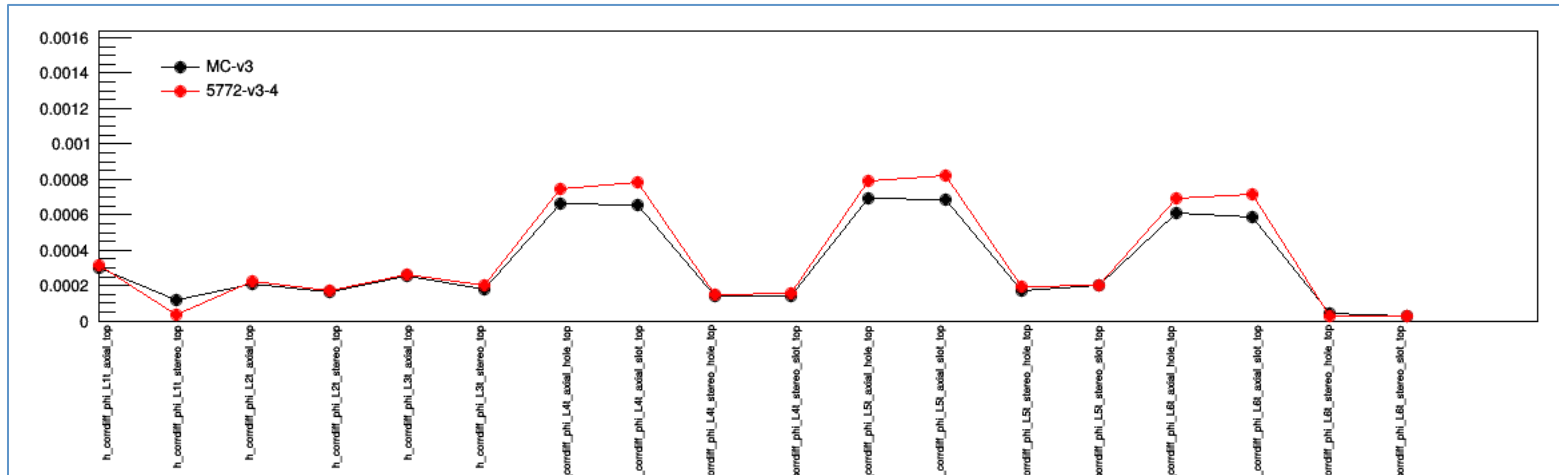
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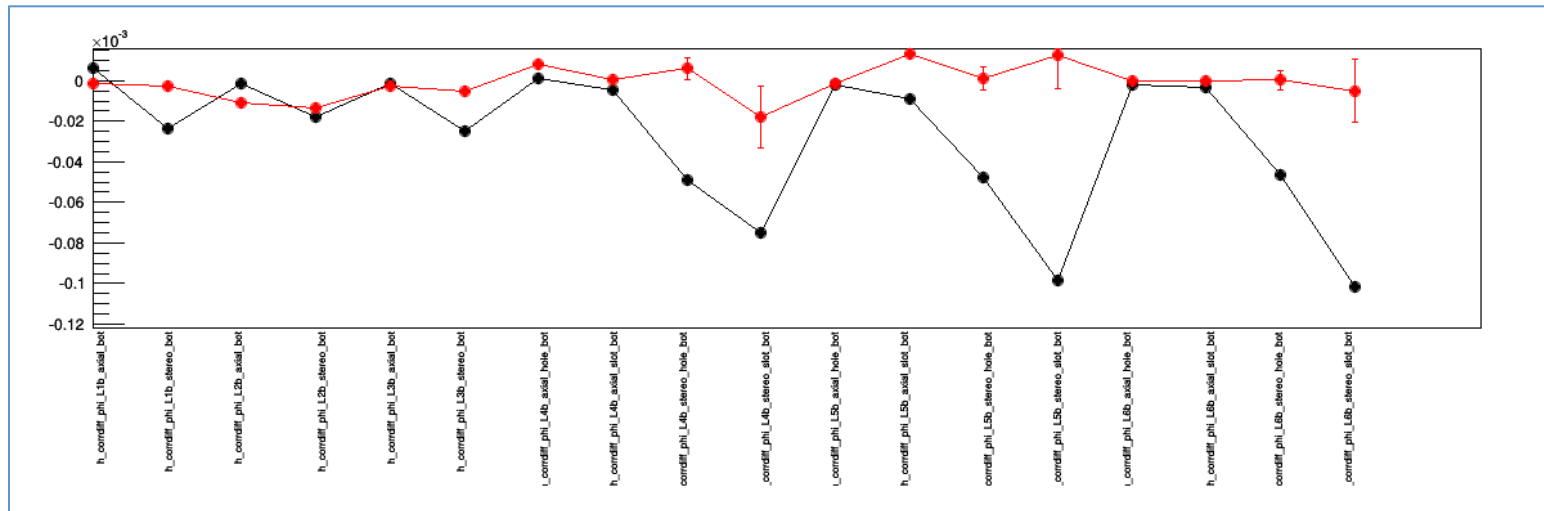
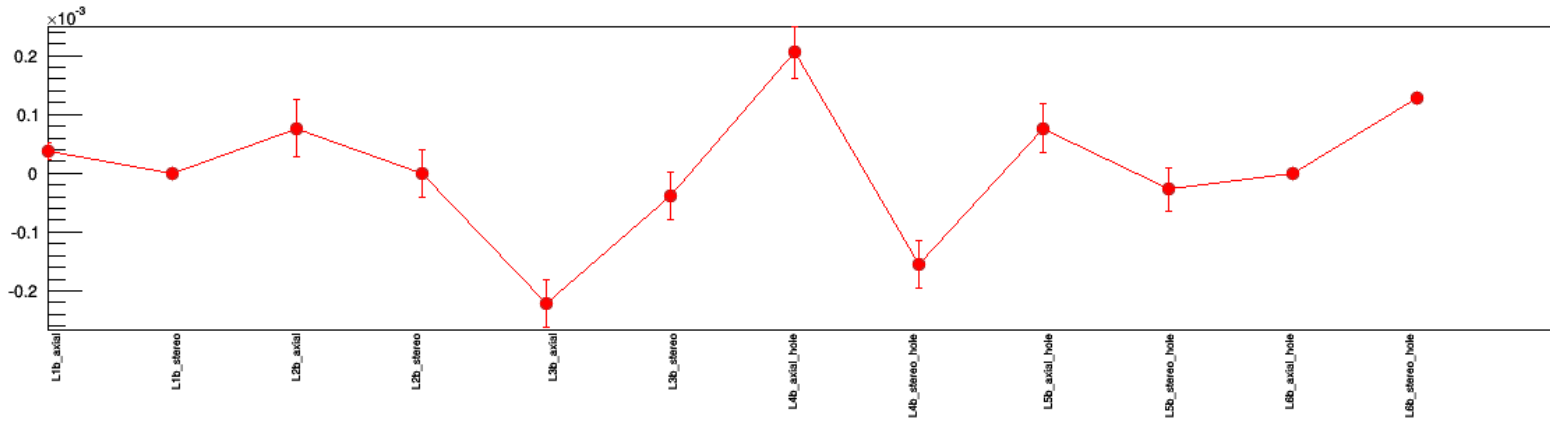
# Kinks phi top



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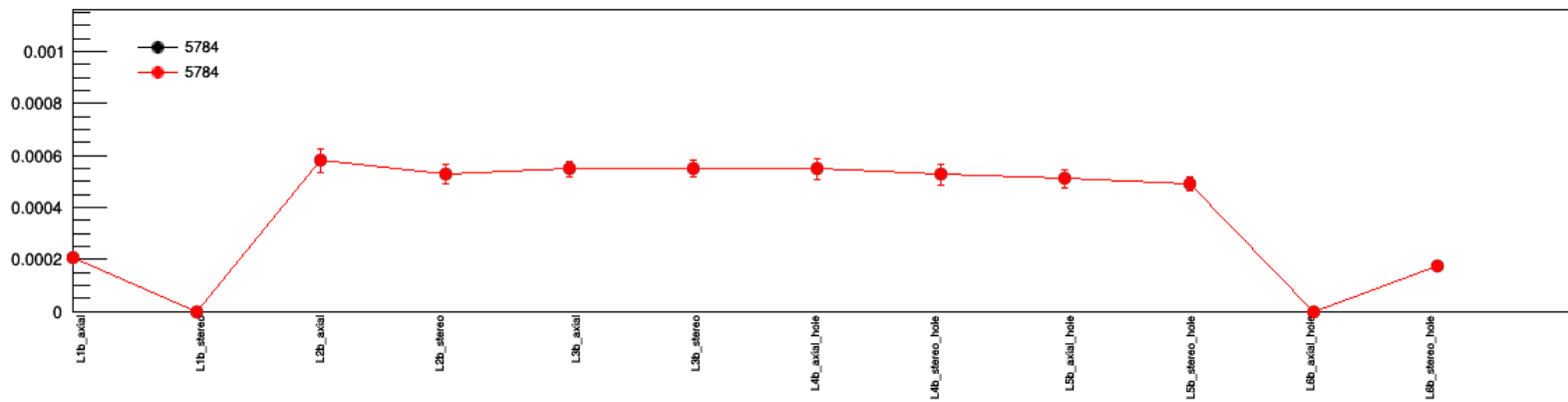
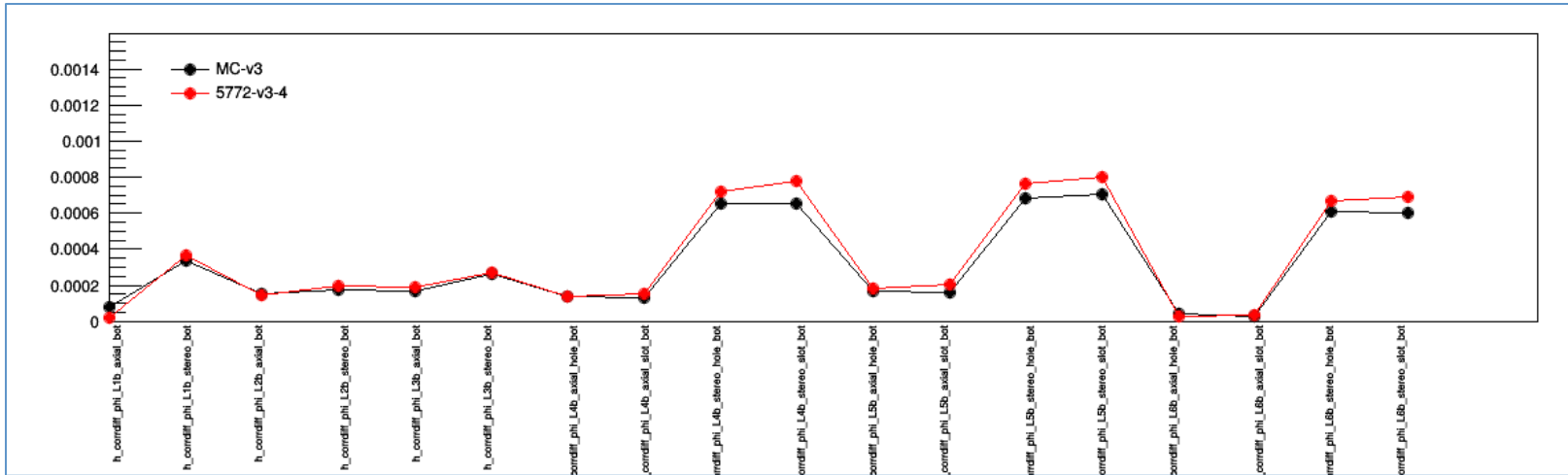


# Kinks phi bottom





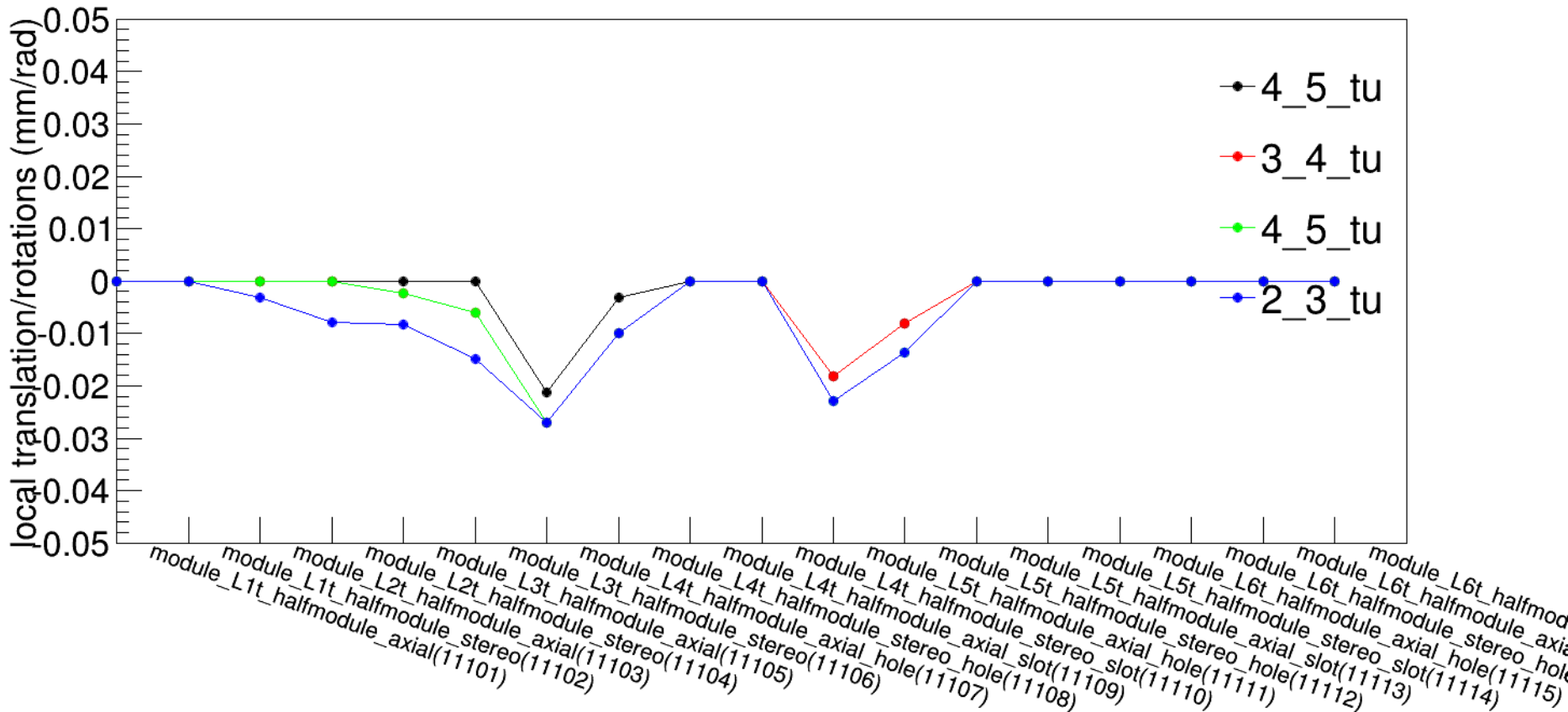
# Kinks phi bottom



# Millepede test

## Float L2,3,4,5 u-translations

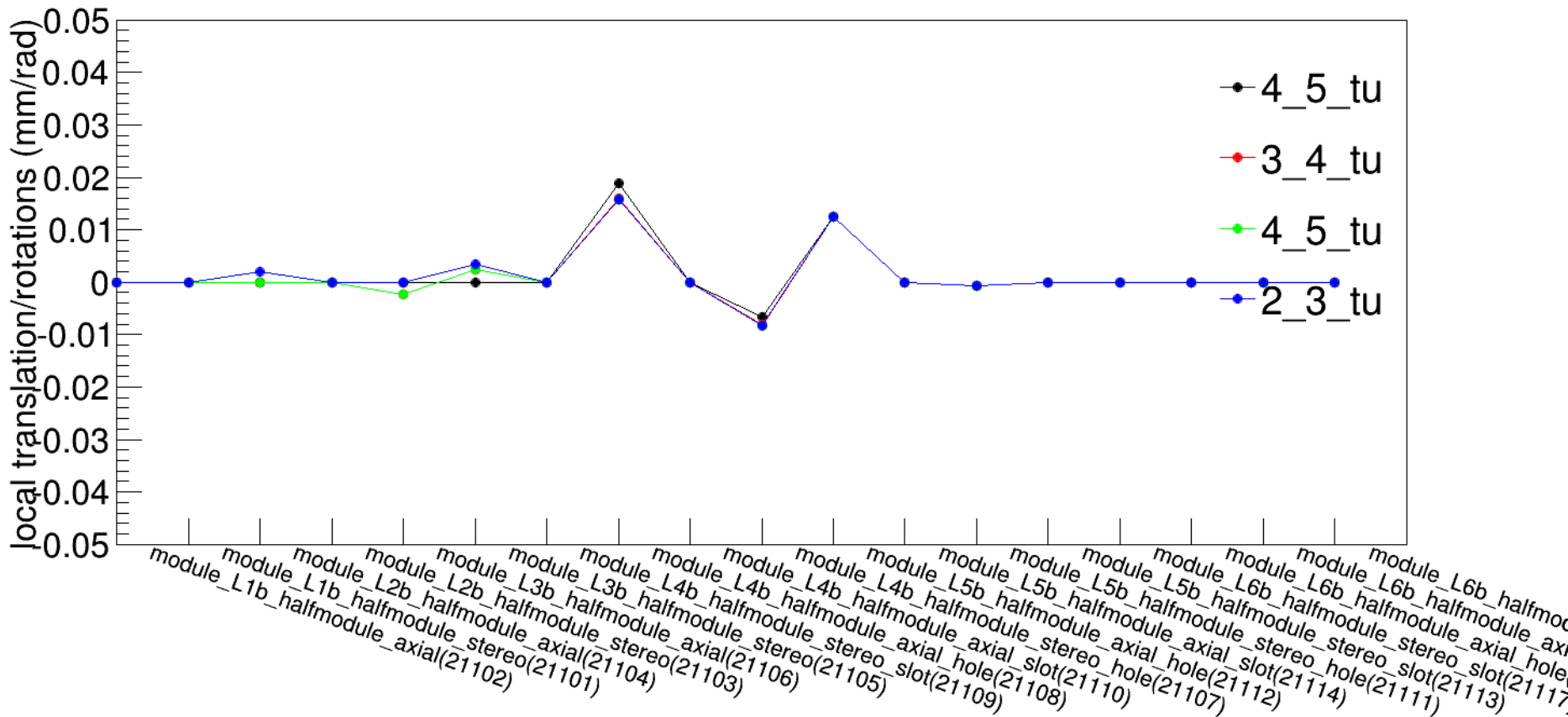
### Millepede corrections per sensor



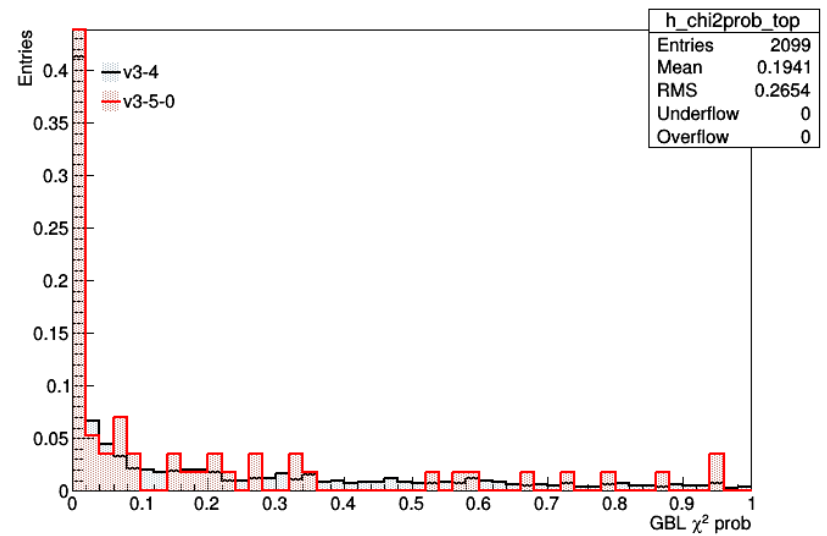
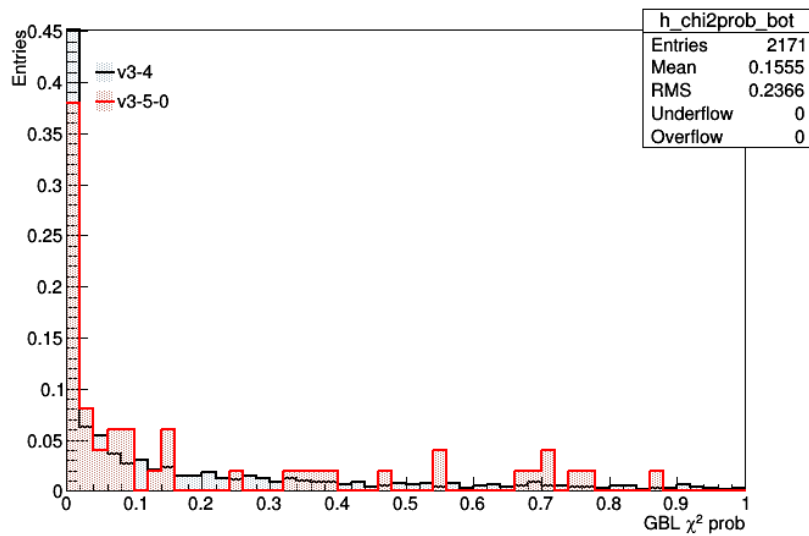
# Millepede test

## Float L2,3,4,5 u-translations

### Millepede corrections per sensor

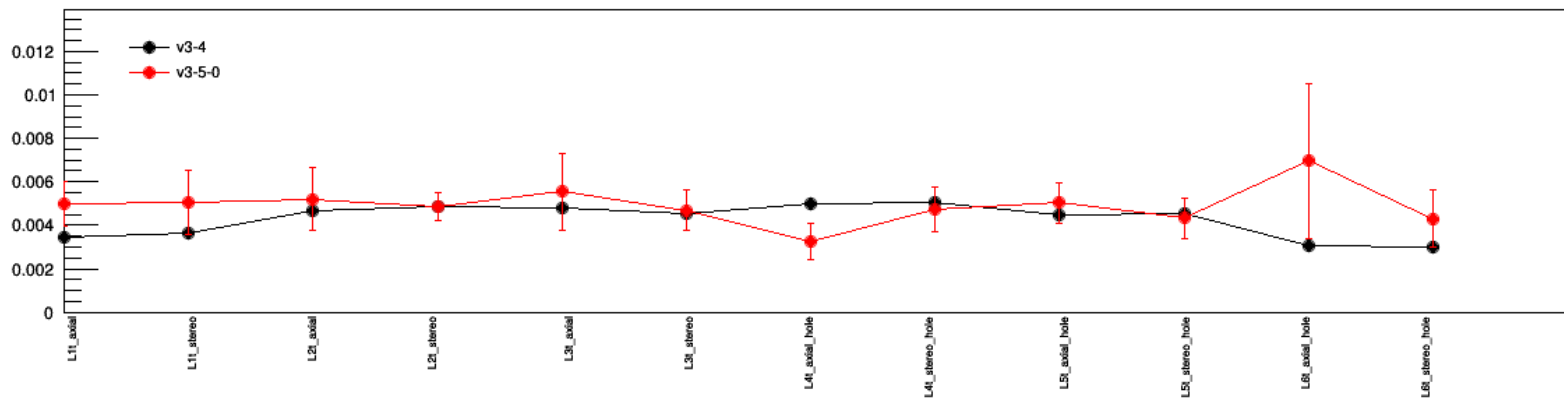
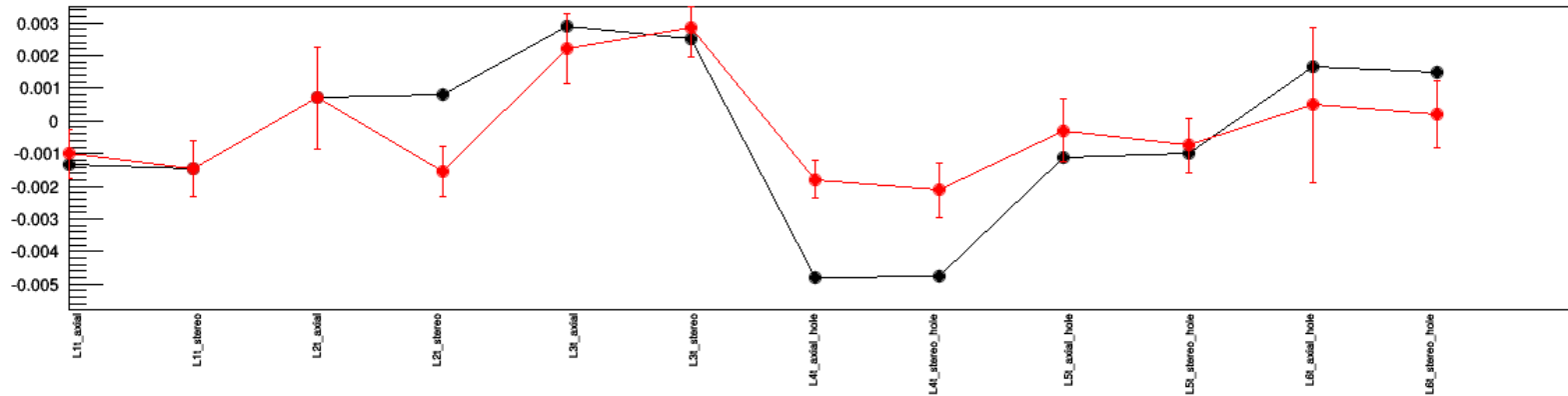


# v3-4 vs v3-5-0



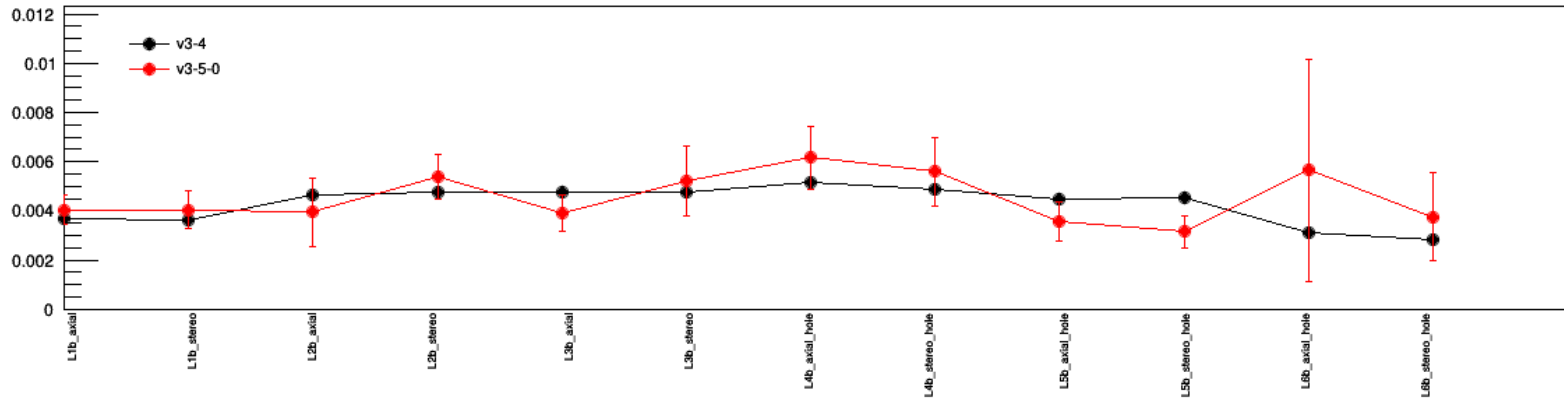
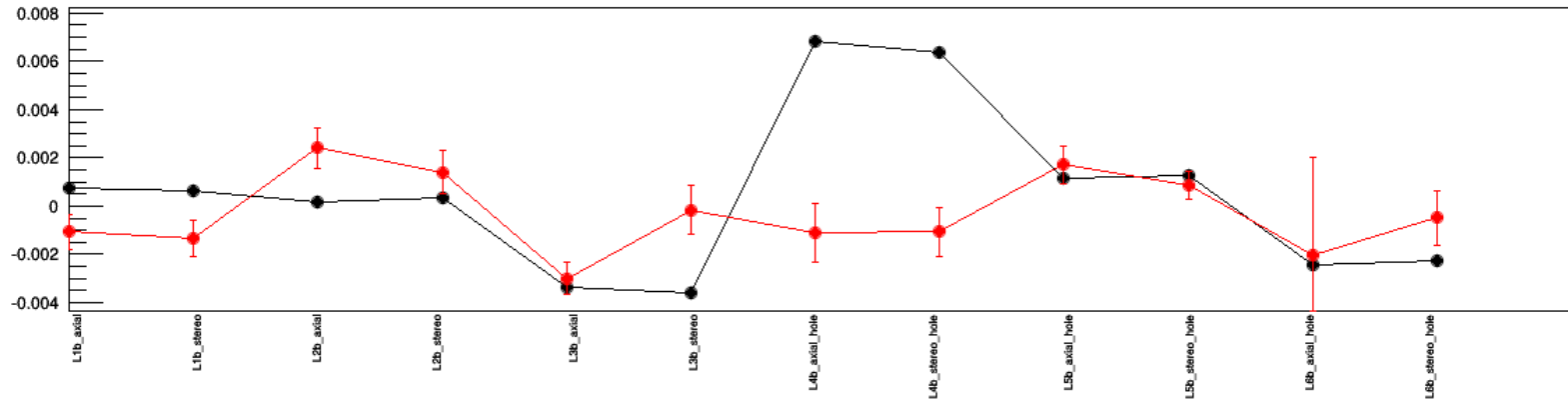
# v3-4 vs v3-5-0 GBL residuals

top



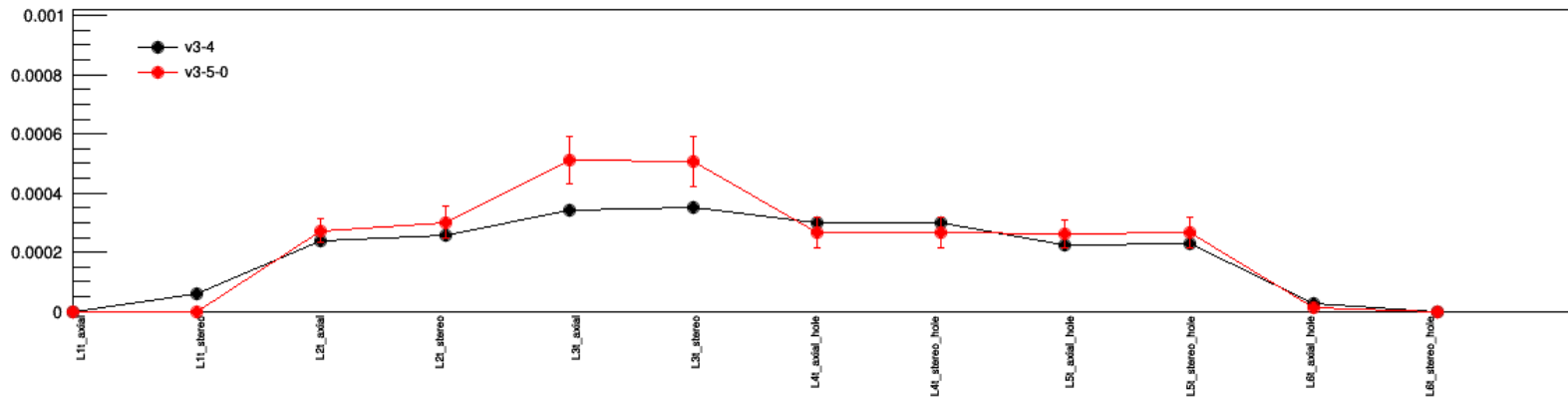
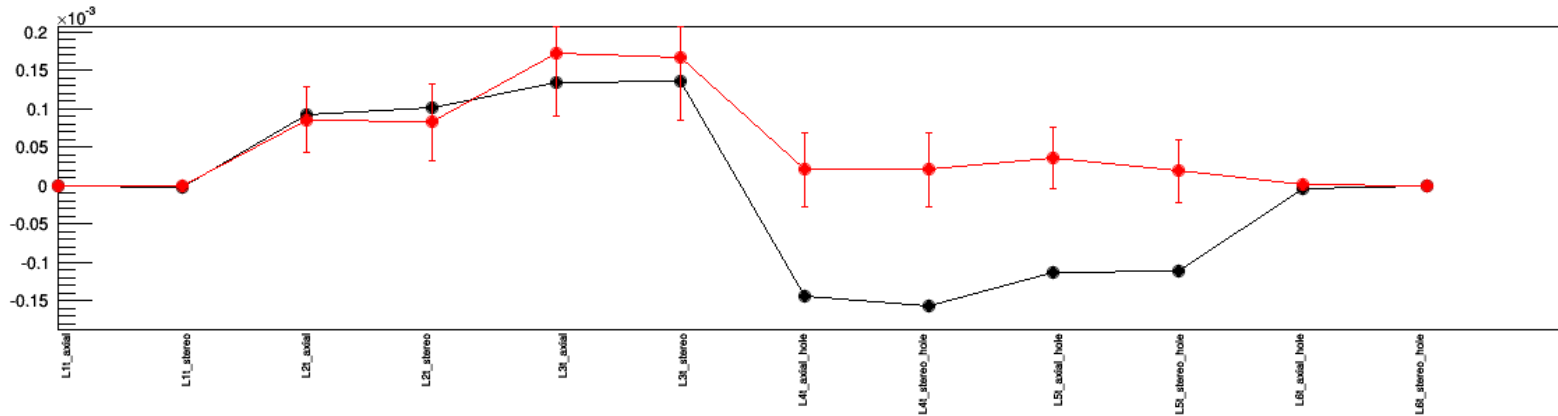
# V3-4 vs v3-5-0 GBL residuals

bot



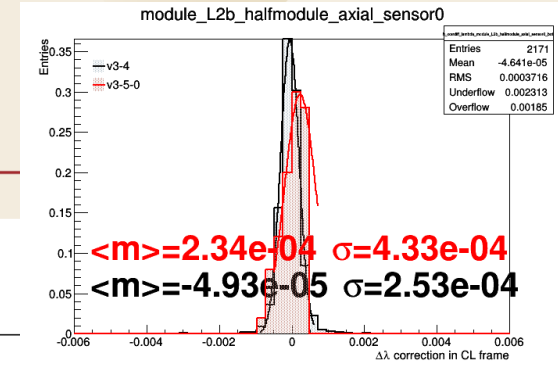
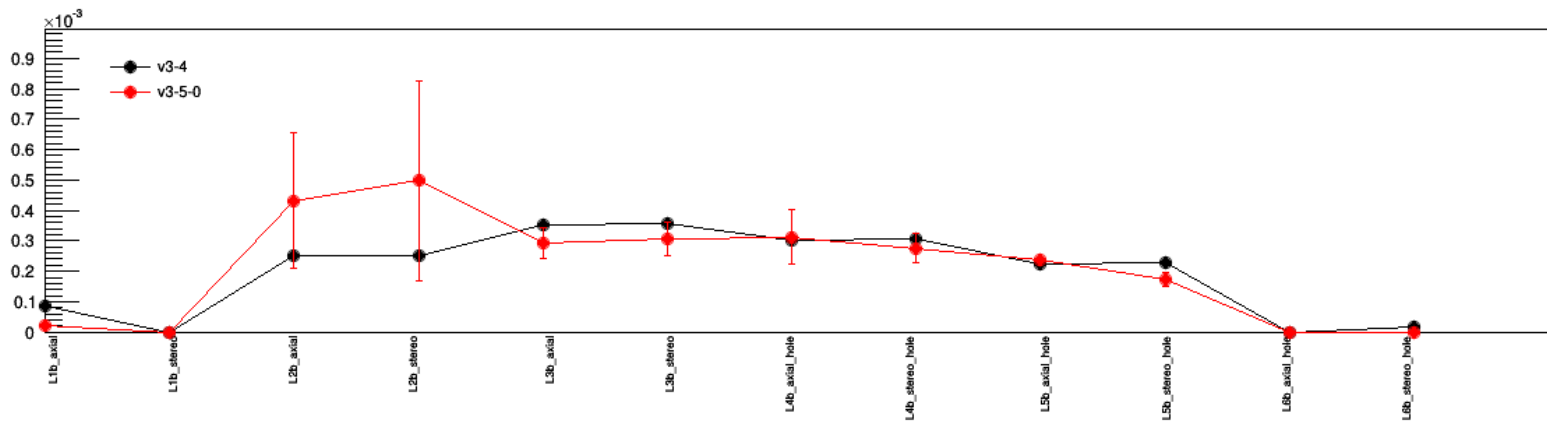
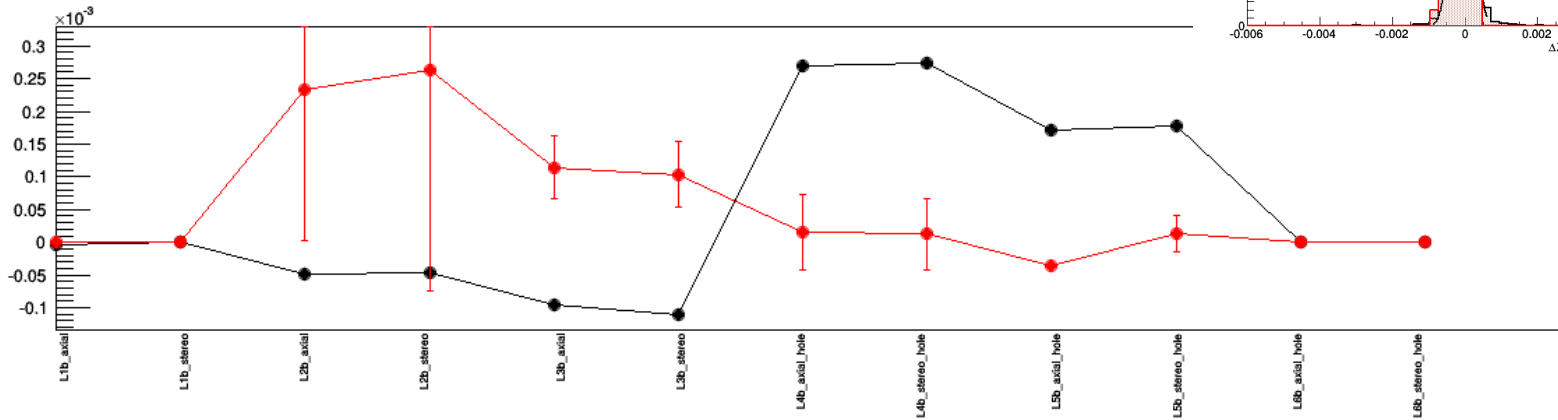
# v3-4 vs v3-5-0 GBL lambda kinks

top



# V3-4 vs v3-5-0 GBL kinks lambda

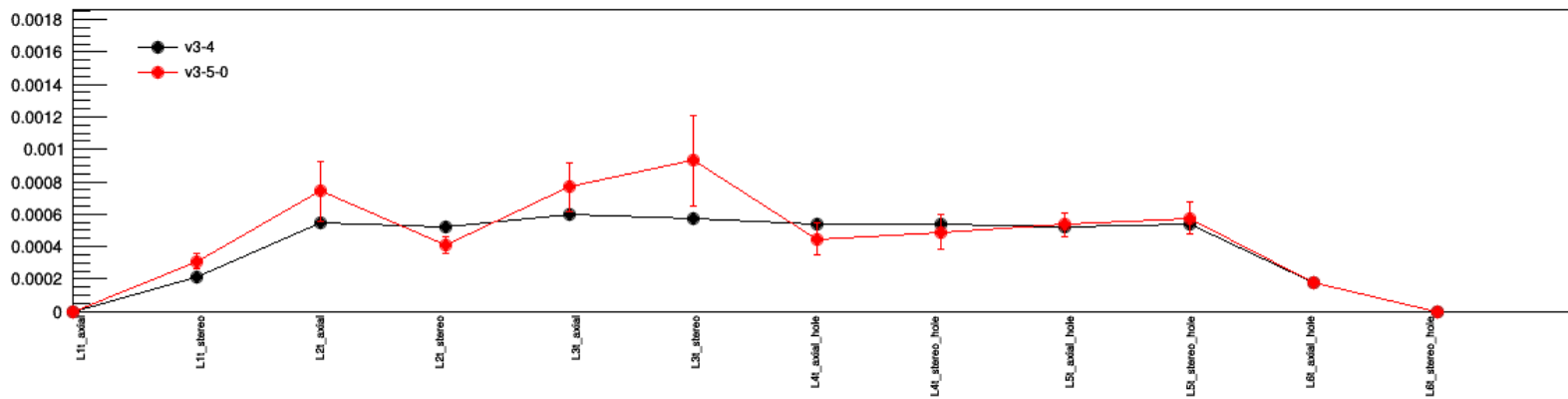
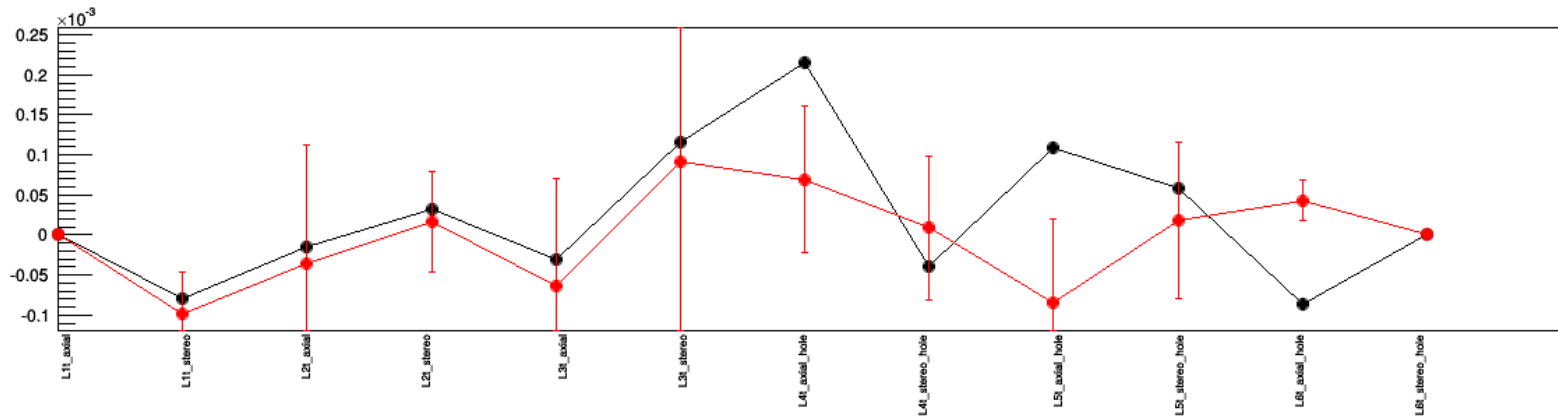
bot





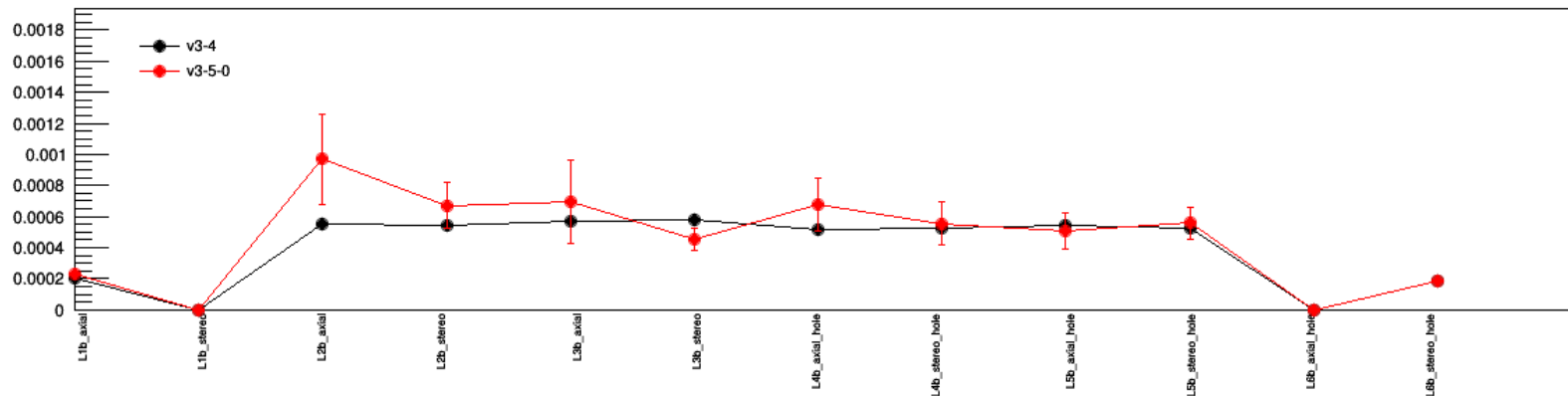
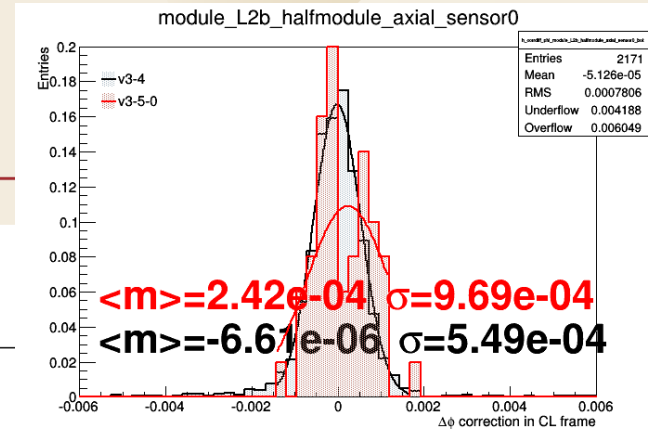
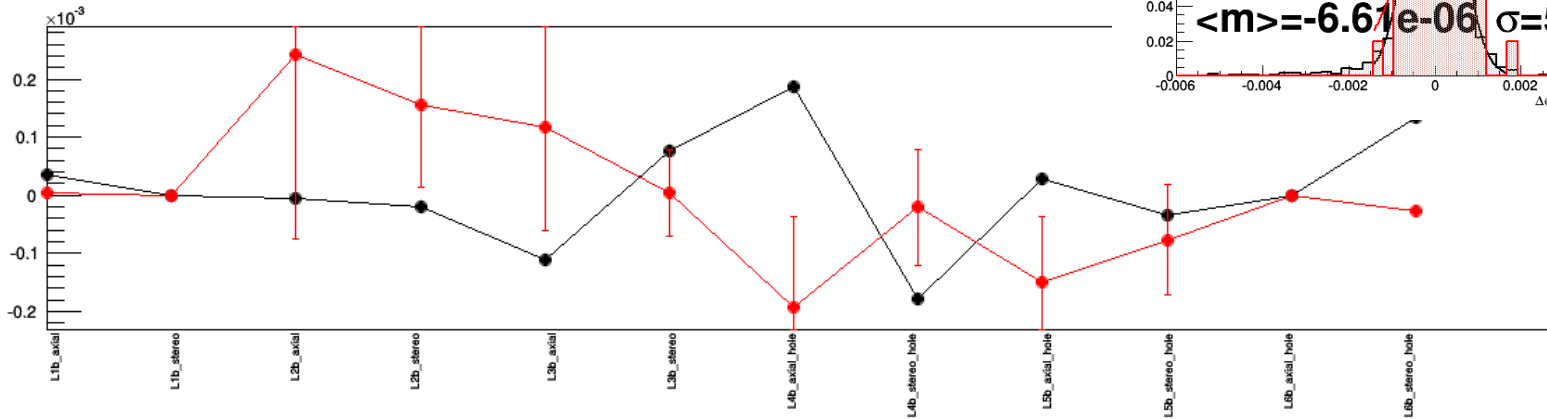
# v3-4 vs v3-5-0 GBL phi kinks

top



# V3-4 vs v3-5-0 GBL kinks phi

bot



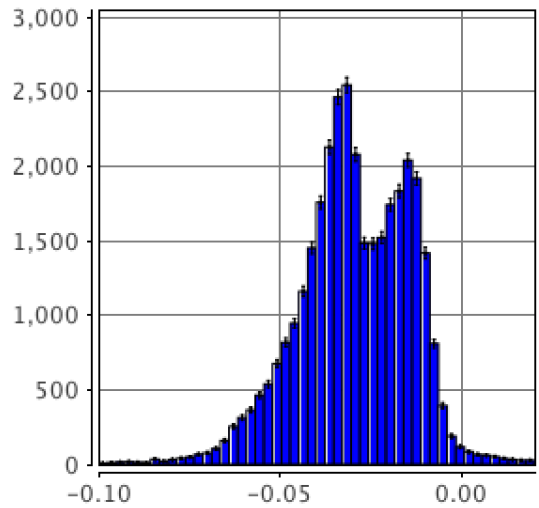
# L1-3 and L4-6 tracks

Study 3-hit tracks

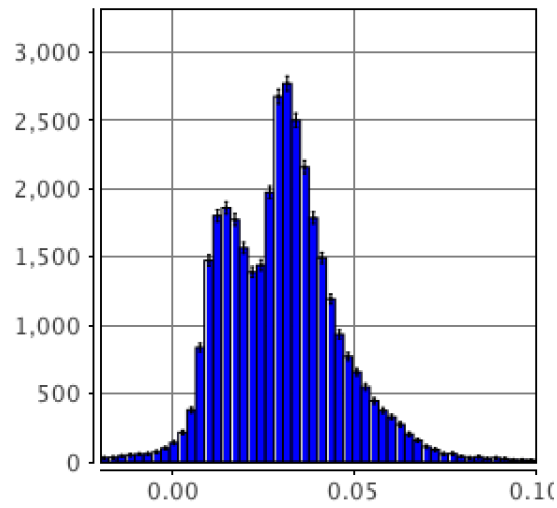
Compare L1-3 and L4-6 track parameters

# L4-6 tracks

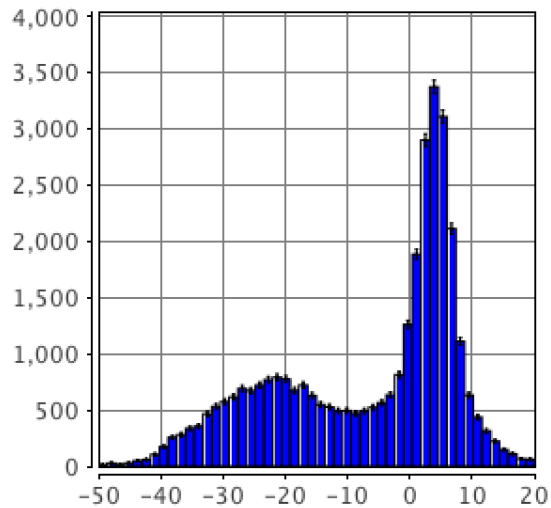
Track L46 axial bottom slope



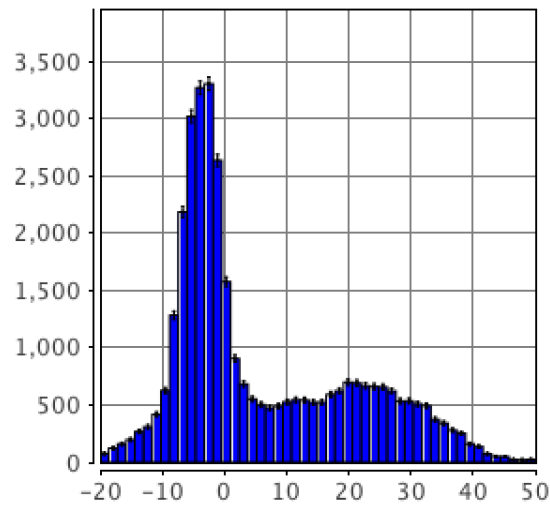
Track L46 axial top slope



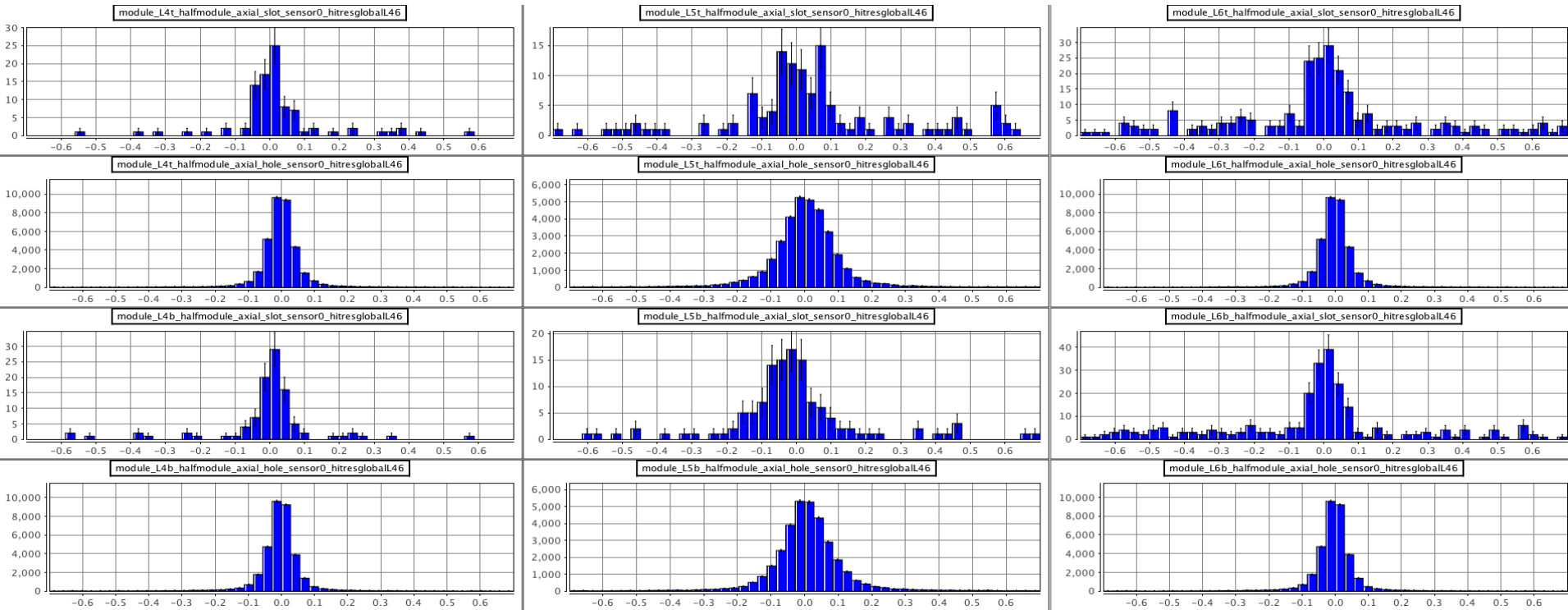
Track L46 axial bottom intercept



Track L46 axial top intercept

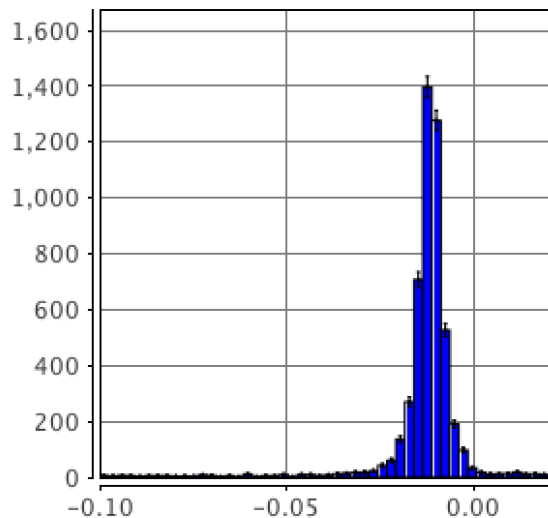


# L4-6 tracks

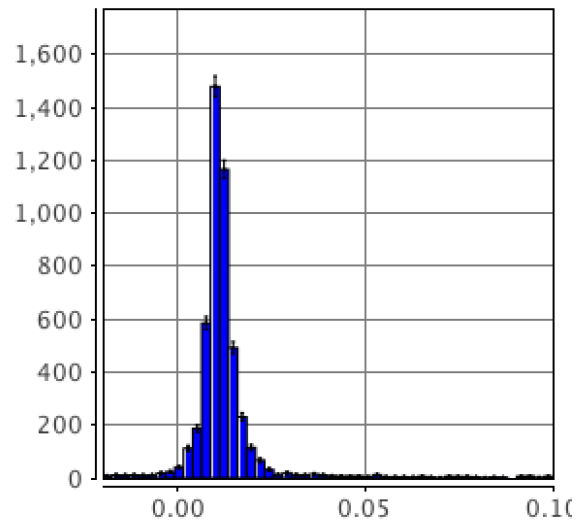


# L1-3 tracks

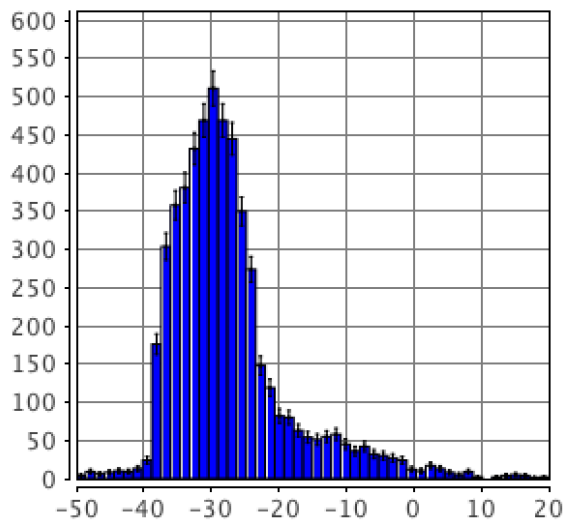
Track L13 axial bottom slope



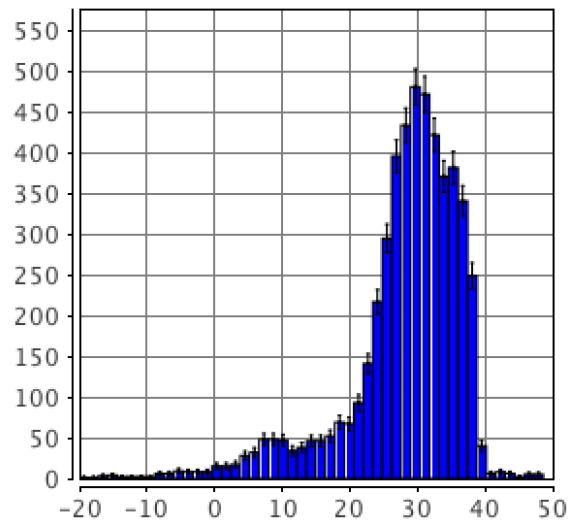
Track L13 axial top slope



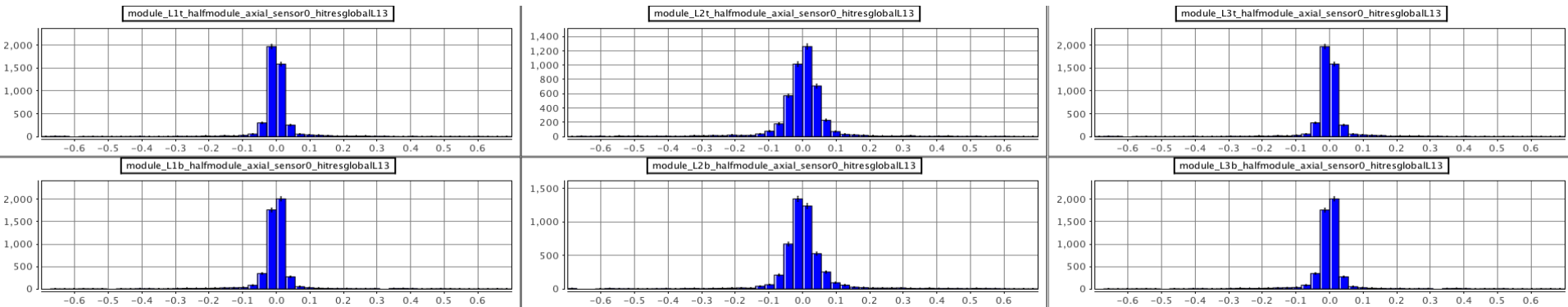
Track L13 axial bottom intercept



Track L13 axial top intercept

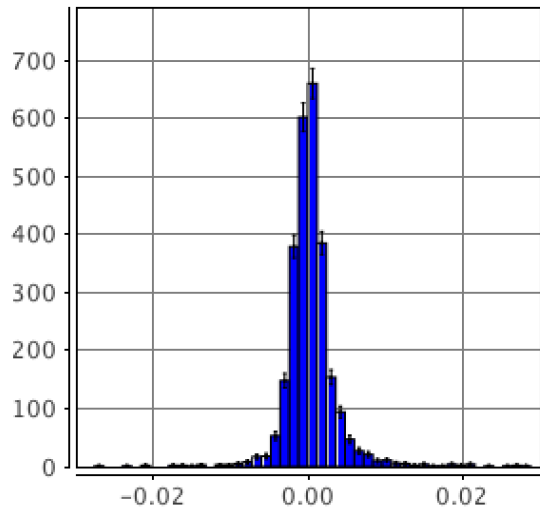


# L1-3 tracks

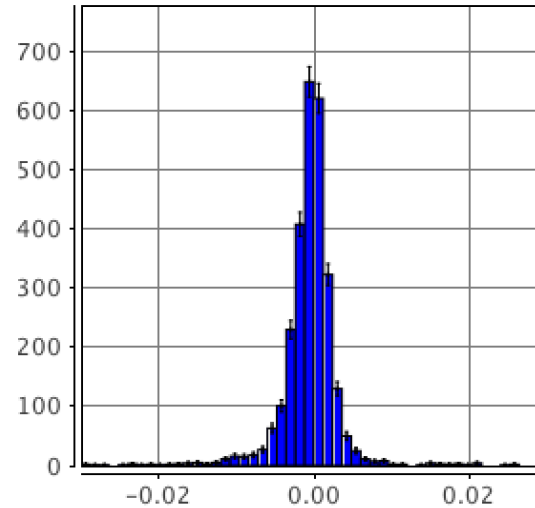


# L1-3 – L4-6

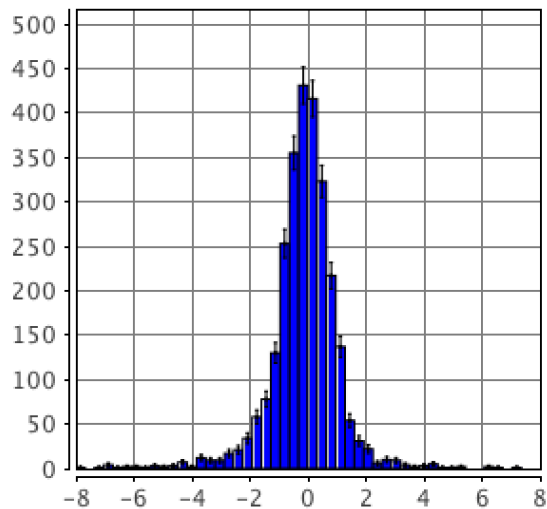
Track L13-L46 axial bottom slope



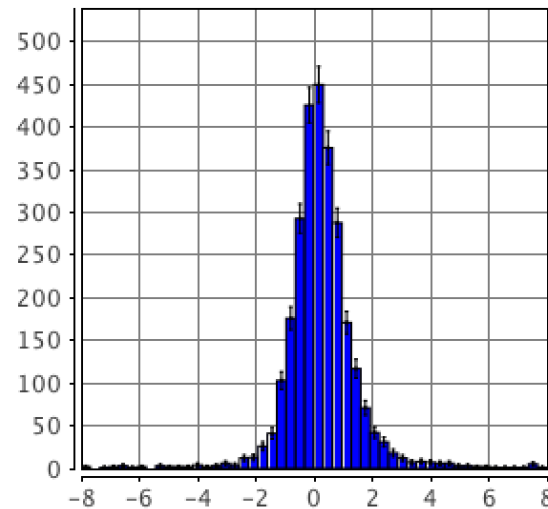
Track L13-L46 axial top slope



Track L13-L46 axial bottom intercept



Track L13-L46 axial top intercept





# Conclusion

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# Next Steps and Random Tasks

## Straight through

- More rigorous Millepede studies of 12 hit tracks (layer six fringe field for example); compare with helix tracks
- Check rotations with straight through tracks
- L1-3 and L4-6 tracks?
- Slot side (apply equivalent corr. as for hole sensor?)?

## Other things

- Global constraint with Mollers: need global variables for Millepede
  - Invariant mass sensor translation/rotation derivatives
  - Invariant mass track parameters derivatives
- GBL studies
  - Hit residuals along track
  - Kink distributions along track
  - Beamspot constraints