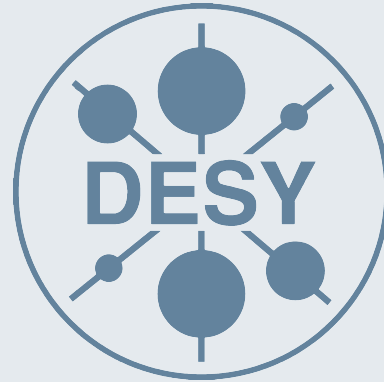




Validation of the Backplane calibration



- validation setup
- validation plots

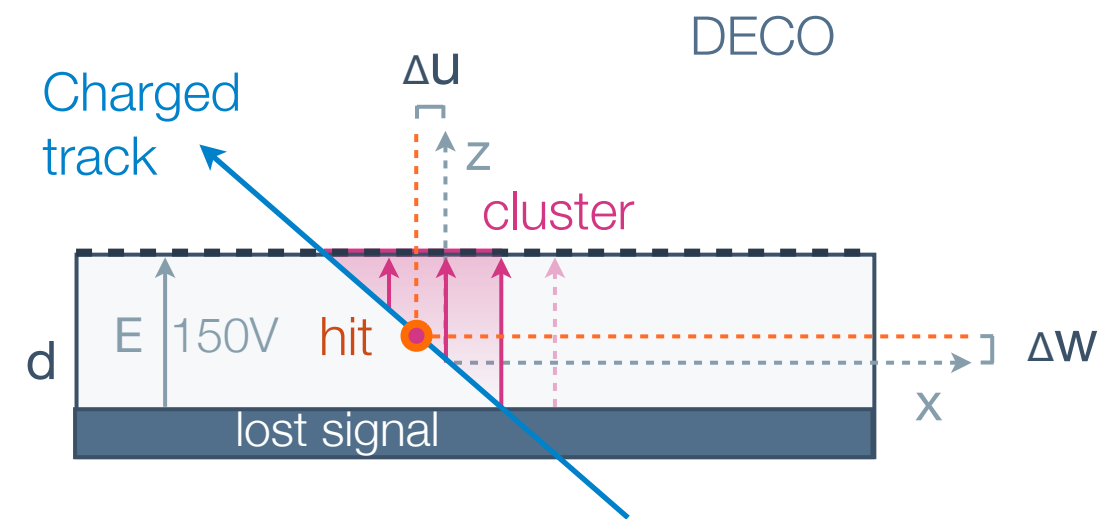
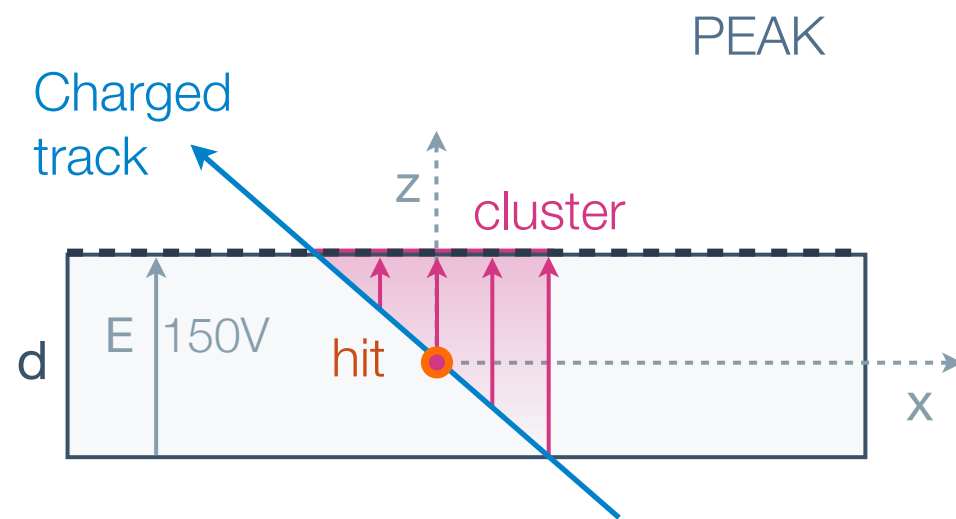
Nazar Bartosik

Tracker Alignment Meeting
DESY, Hamburg

7.08.2013

Introduction

- Alignment performed with and without Backplane correction calibration (+ lower statistics for peak LA in TIB).



- Validation with SingleMuon tracks showed almost no difference between the 2 alignments.
- Gero recommended to use Surface shape validation plots to check the effect from BP calibration.
- Validation performed using deco collision data and peak cosmoics data.

Validation setup

Compared 2 geometries:

mpI296:

Full scale alignment +
LA in BPIX, FPIX, TIB, TOB

mpI330:

starting from mpI296
LA in TIB, TOB (less IOVs for peak LA)
BP in TIB, TOB ← main difference

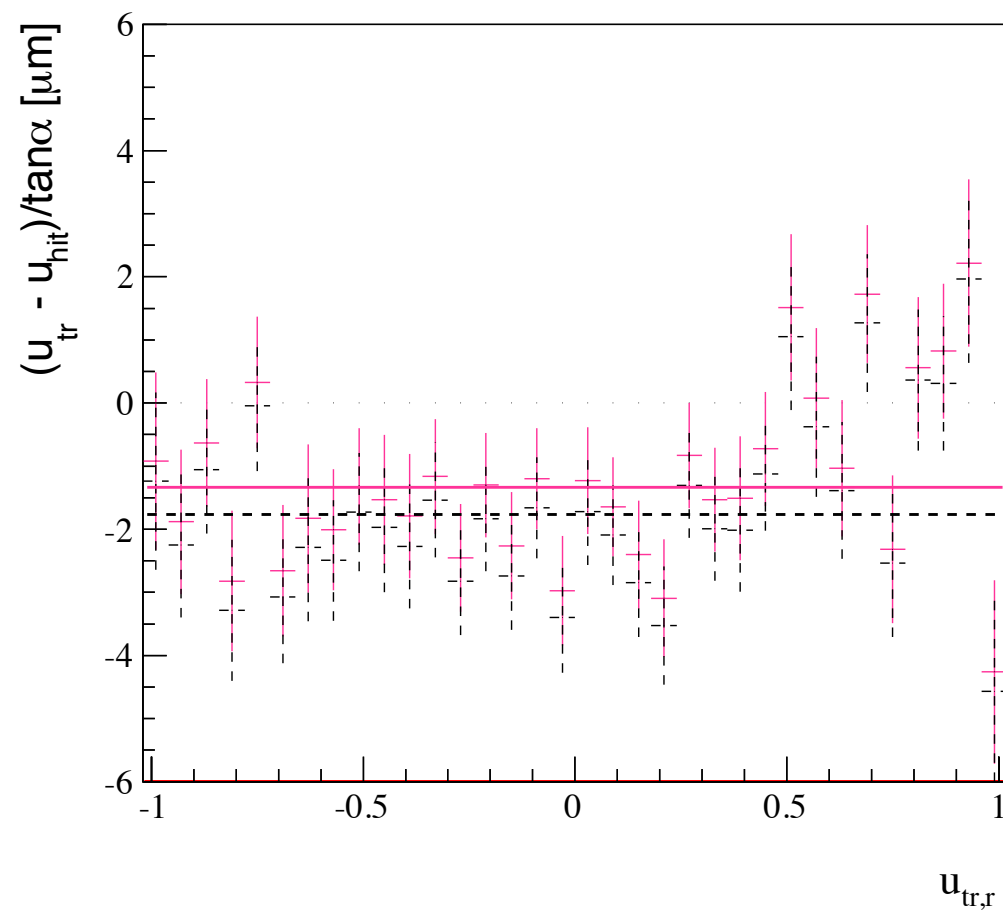
Validation to show effect from BP calibration and better peak LA:

SingleMuon 3.8T deco 2012D (3 million tracks)

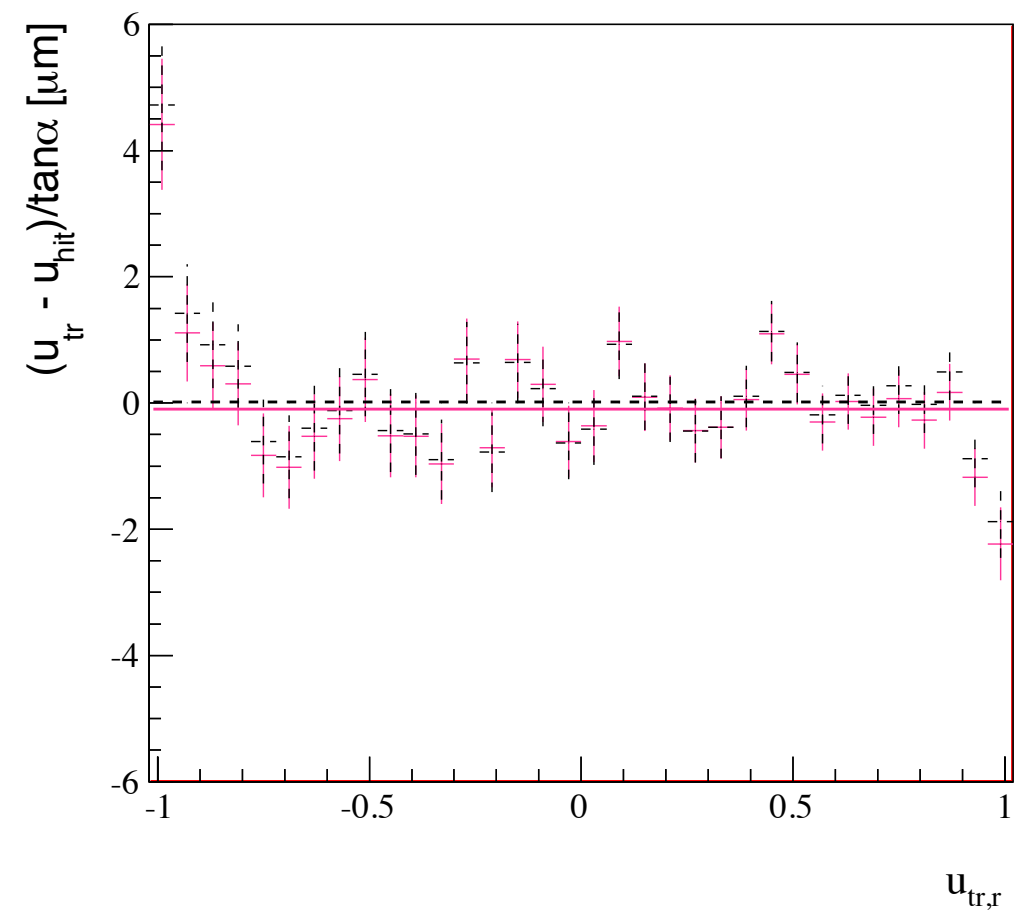
Cosmics 3.8T peak (1.8 million tracks)

BP evolution/validation:TIB

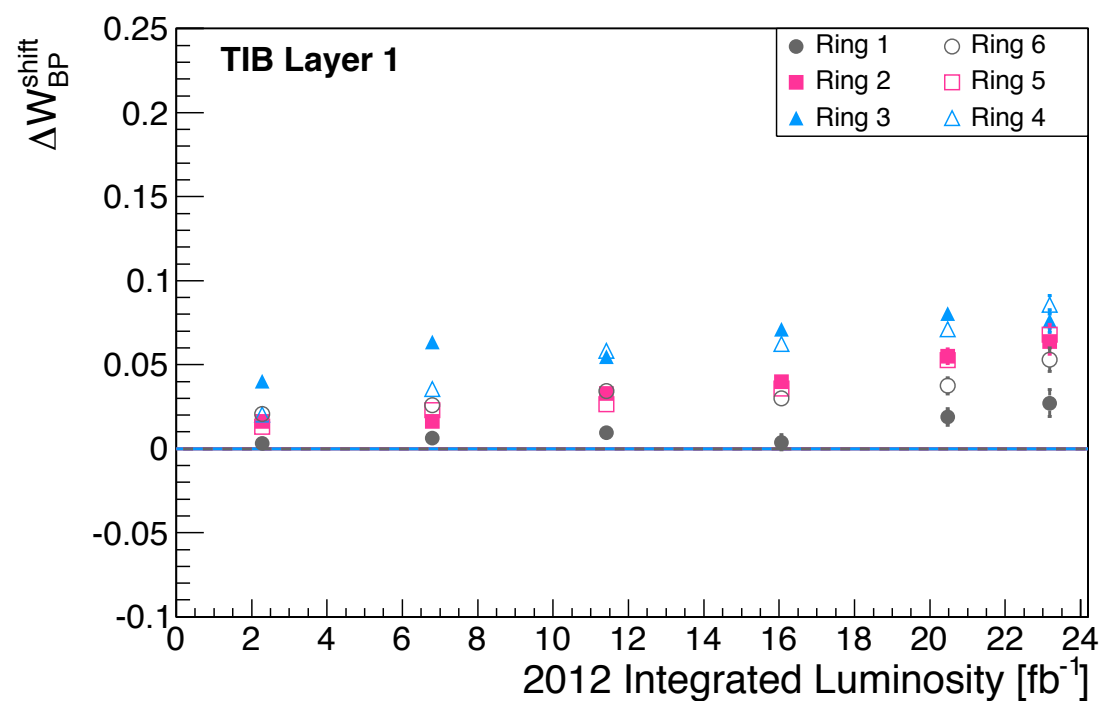
Surface Shape, TIB, layer 1 **peak**



Surface Shape, TIB, layer 1 **deco**

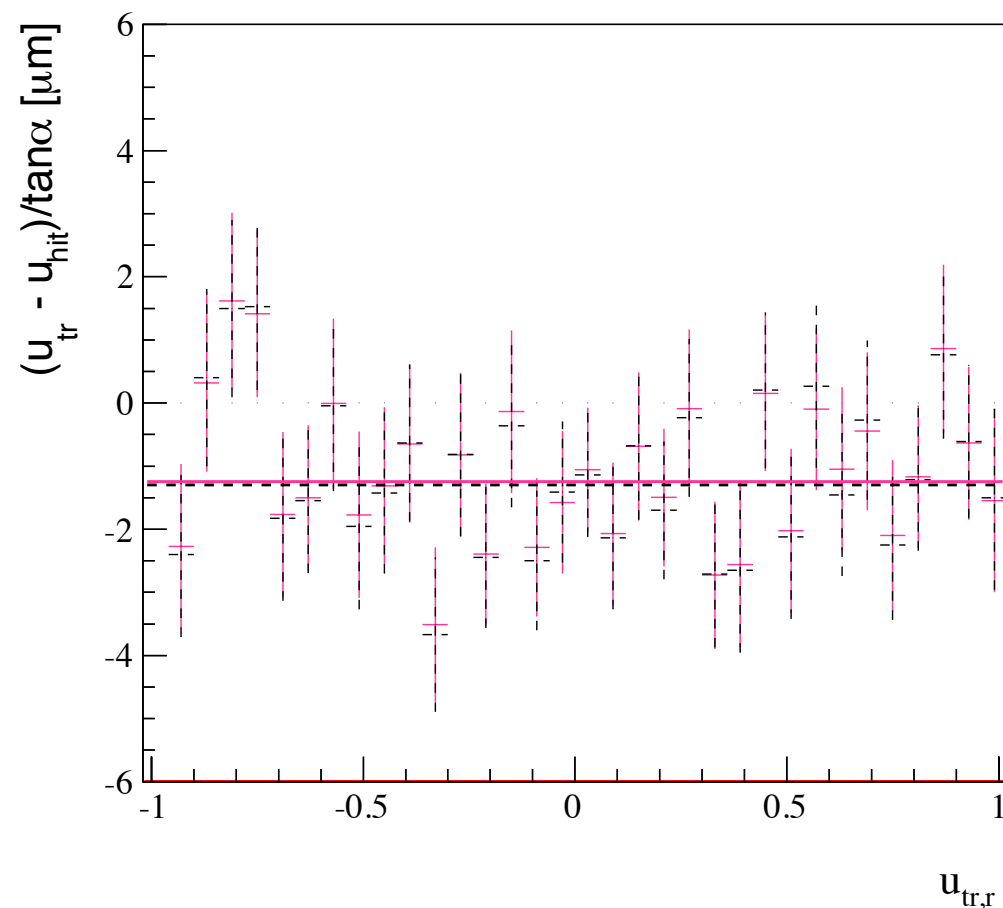


LA
LA+BP

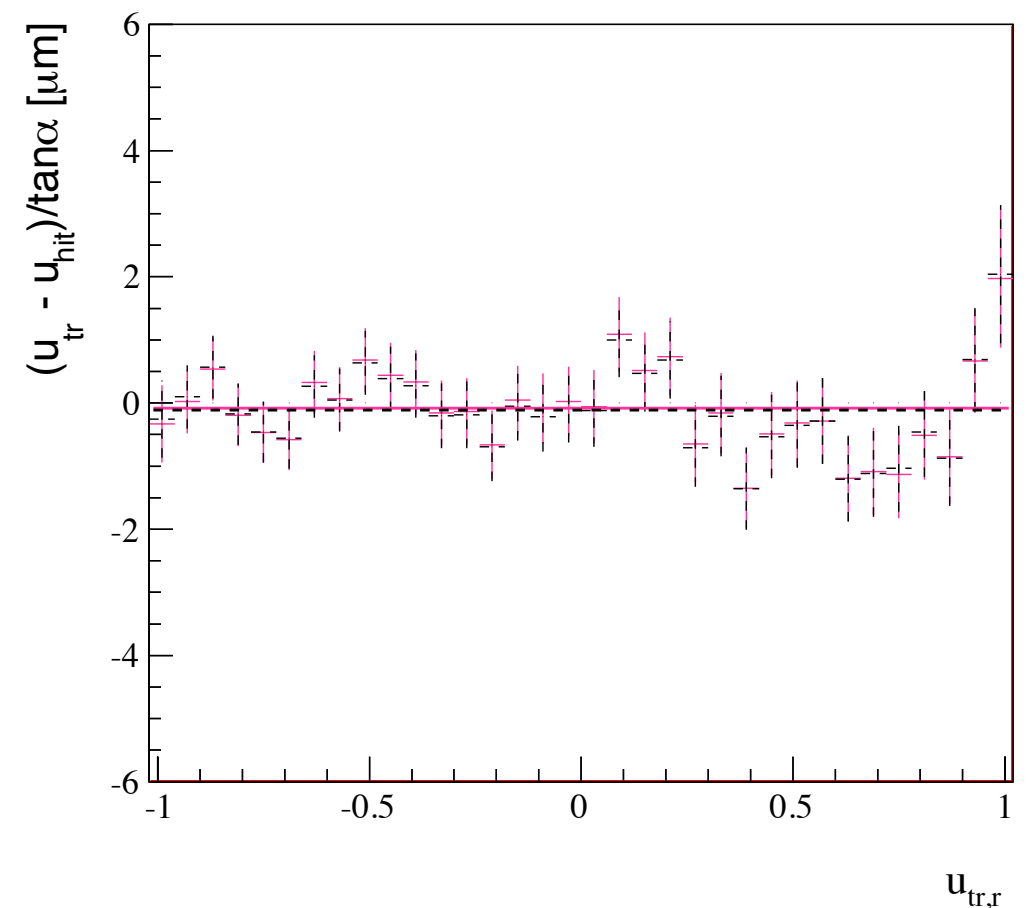


BP evolution/validation:TIB

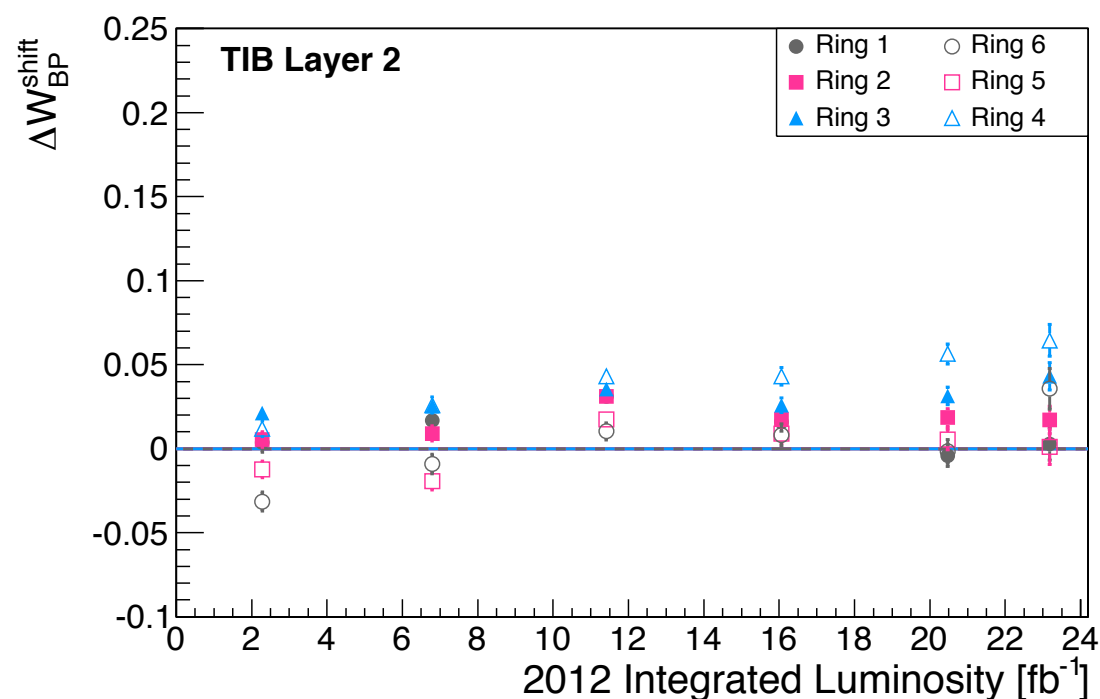
Surface Shape, TIB, layer 2 **peak**



Surface Shape, TIB, layer 2 **deco**



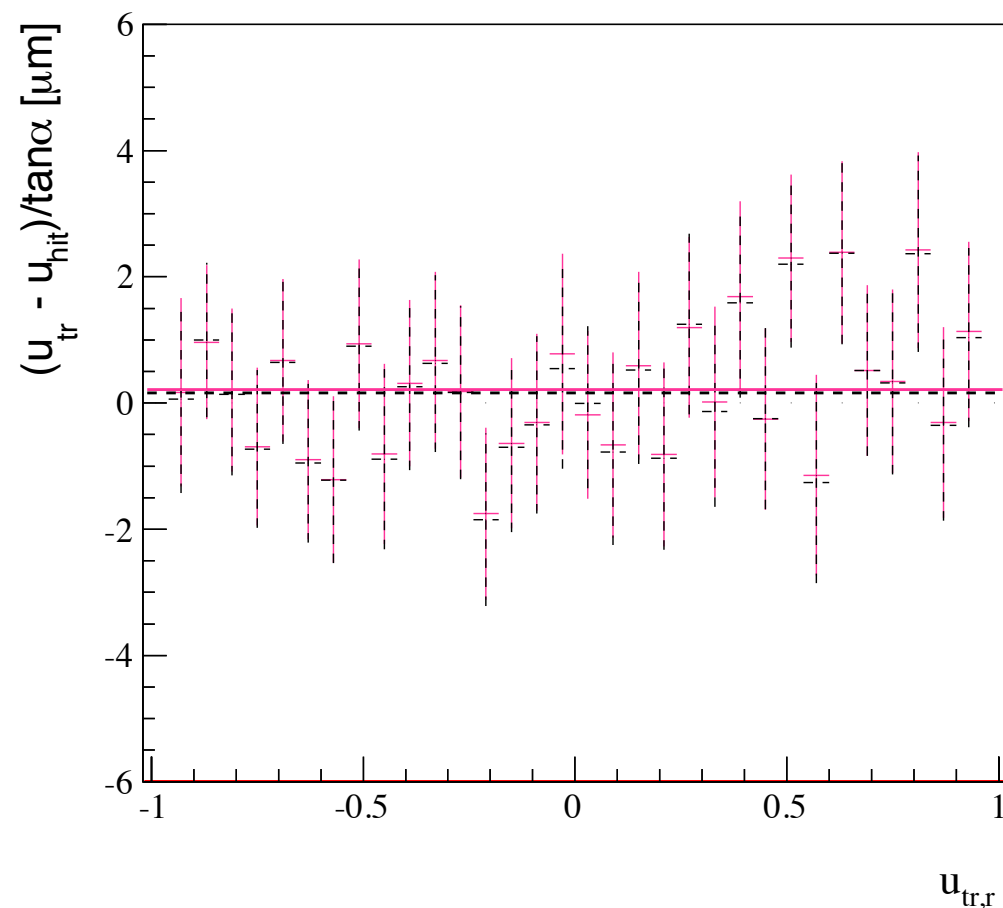
LA
LA+BP



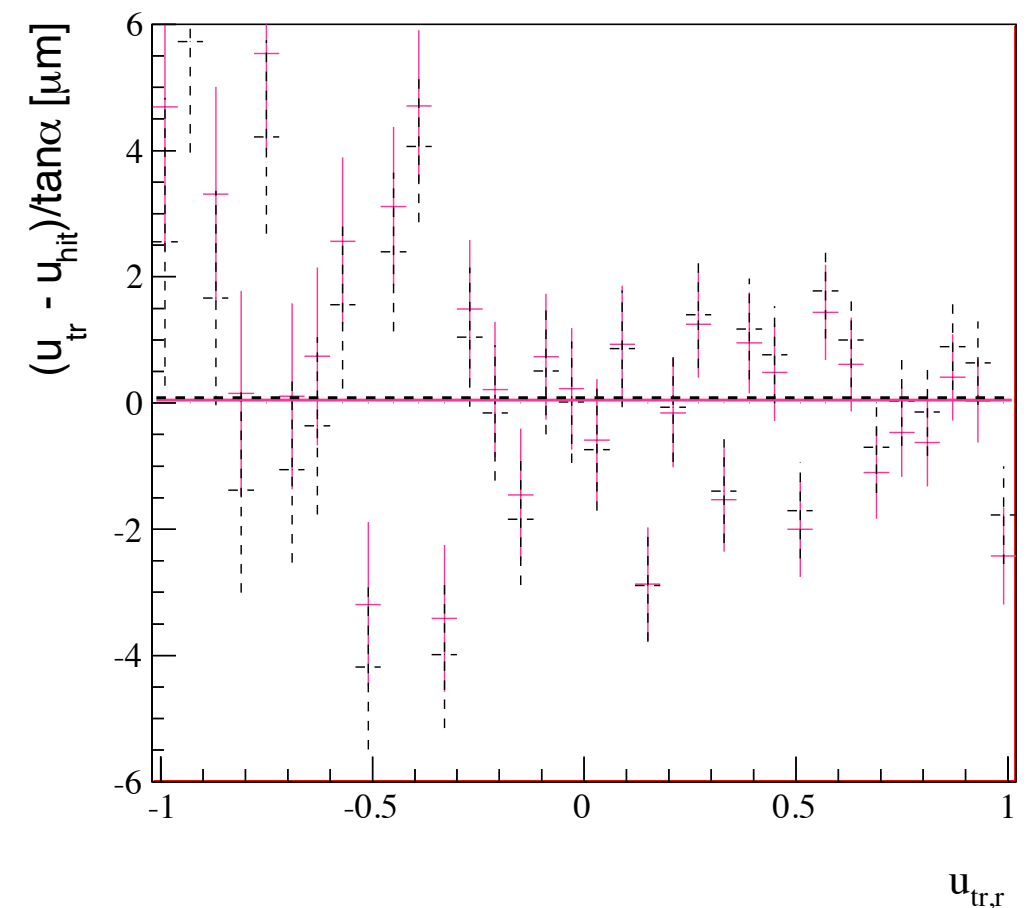
- Small corrections for whole layer.
- No visible effect in validation plot.

BP evolution/validation: TIB

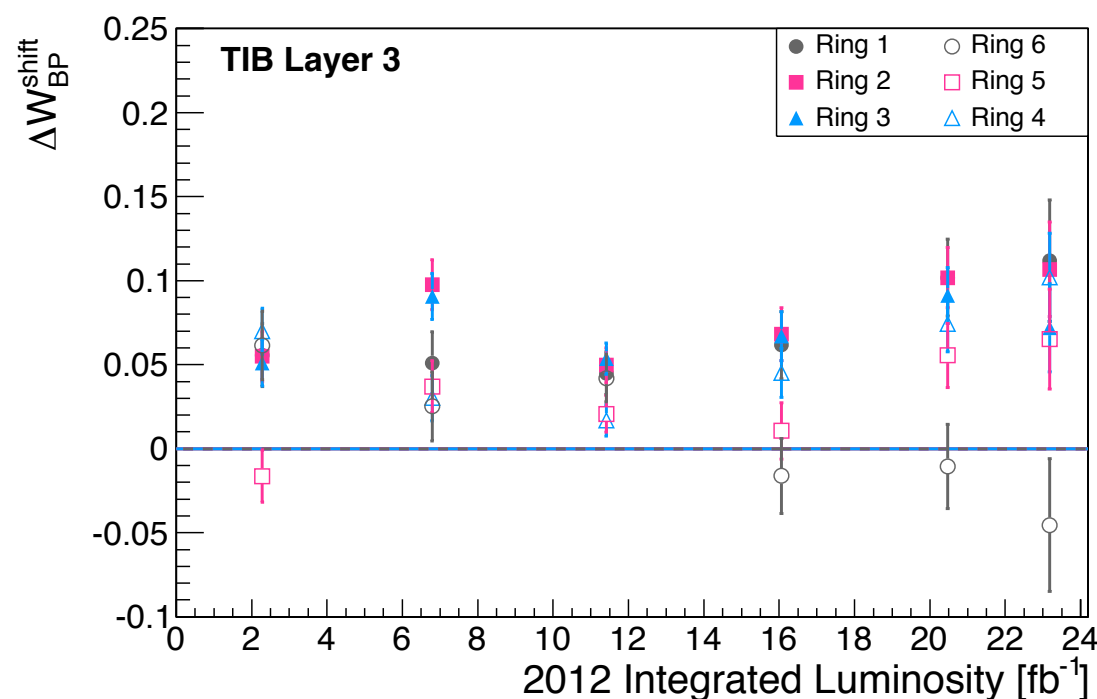
Surface Shape, TIB, layer 3 **peak**



Surface Shape, TIB, layer 3 **deco**



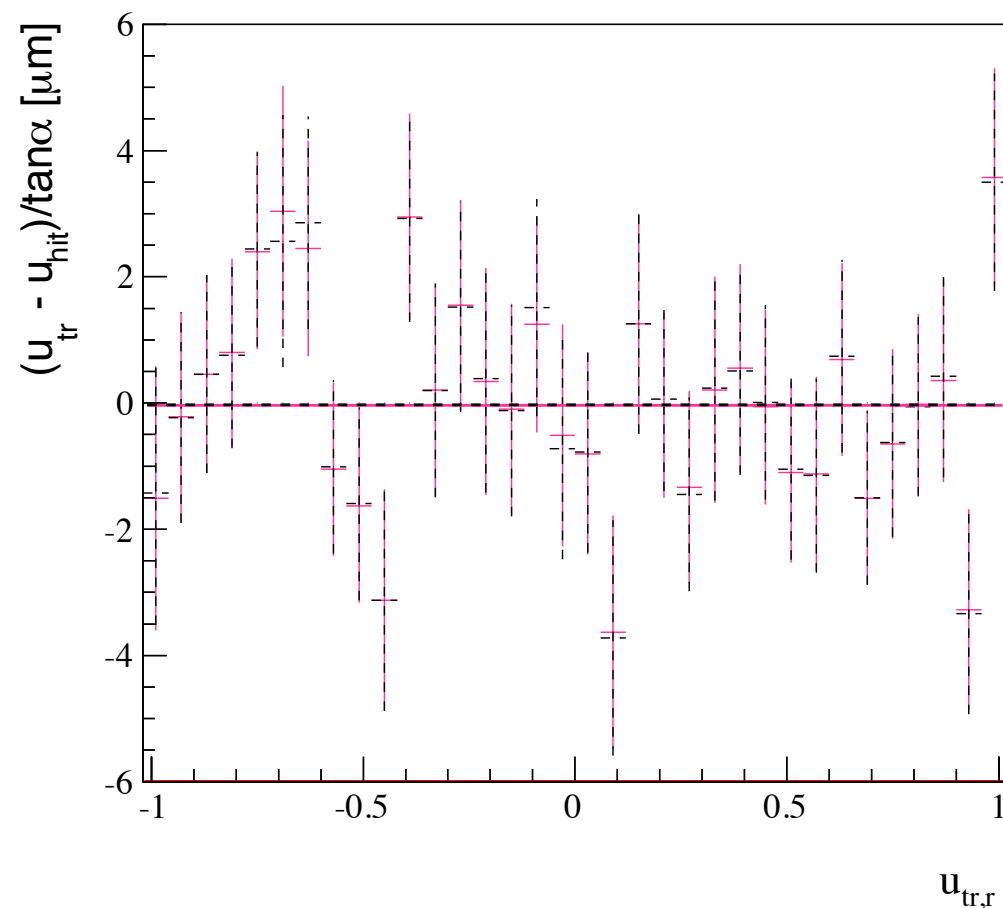
LA
LA+BP



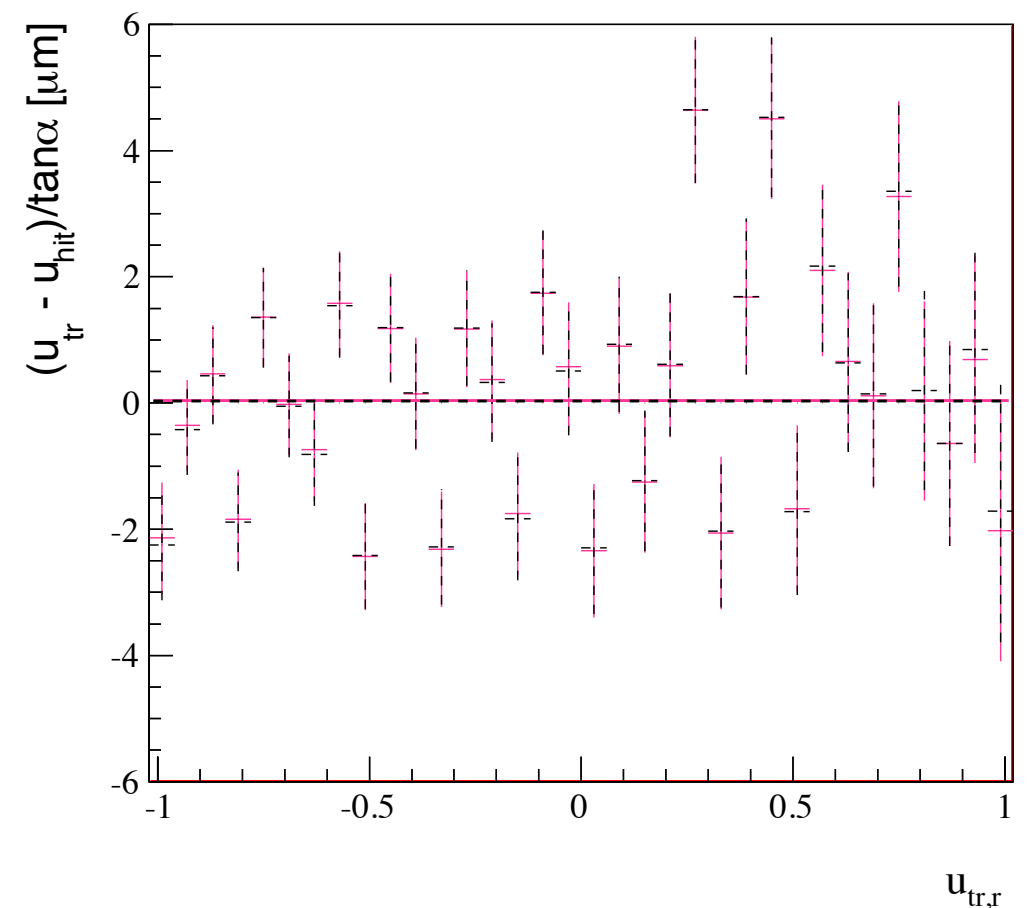
- Large uncertainties.
- No effect in validation plots.

BP evolution/validation: TIB

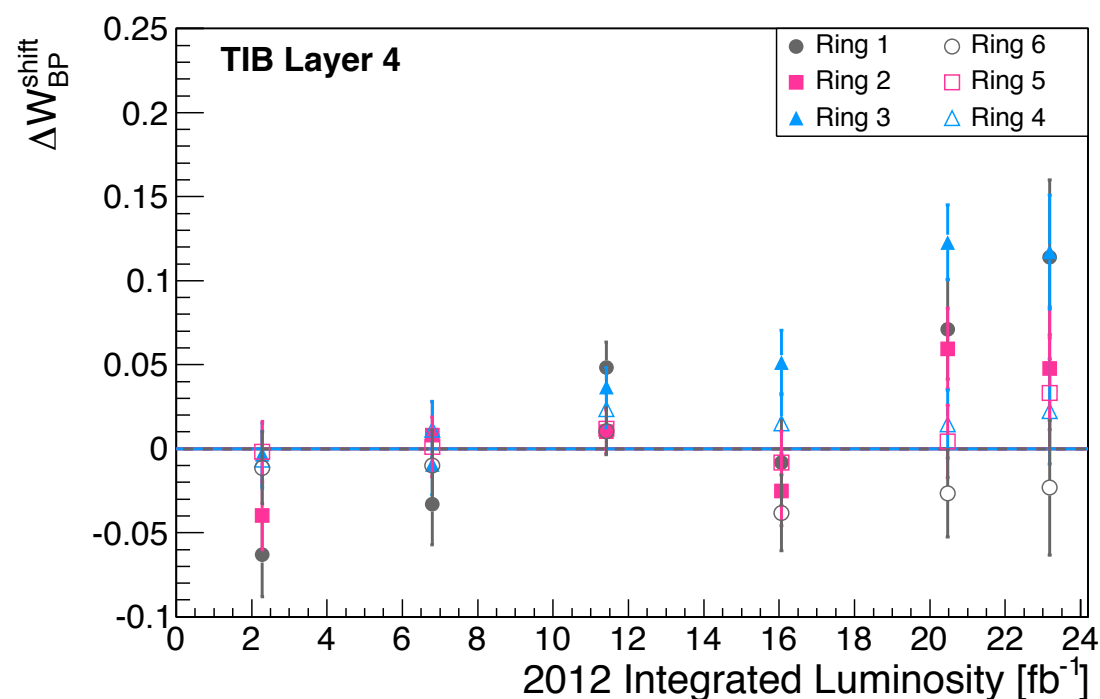
Surface Shape, TIB, layer 4 **peak**



Surface Shape, TIB, layer 4 **deco**



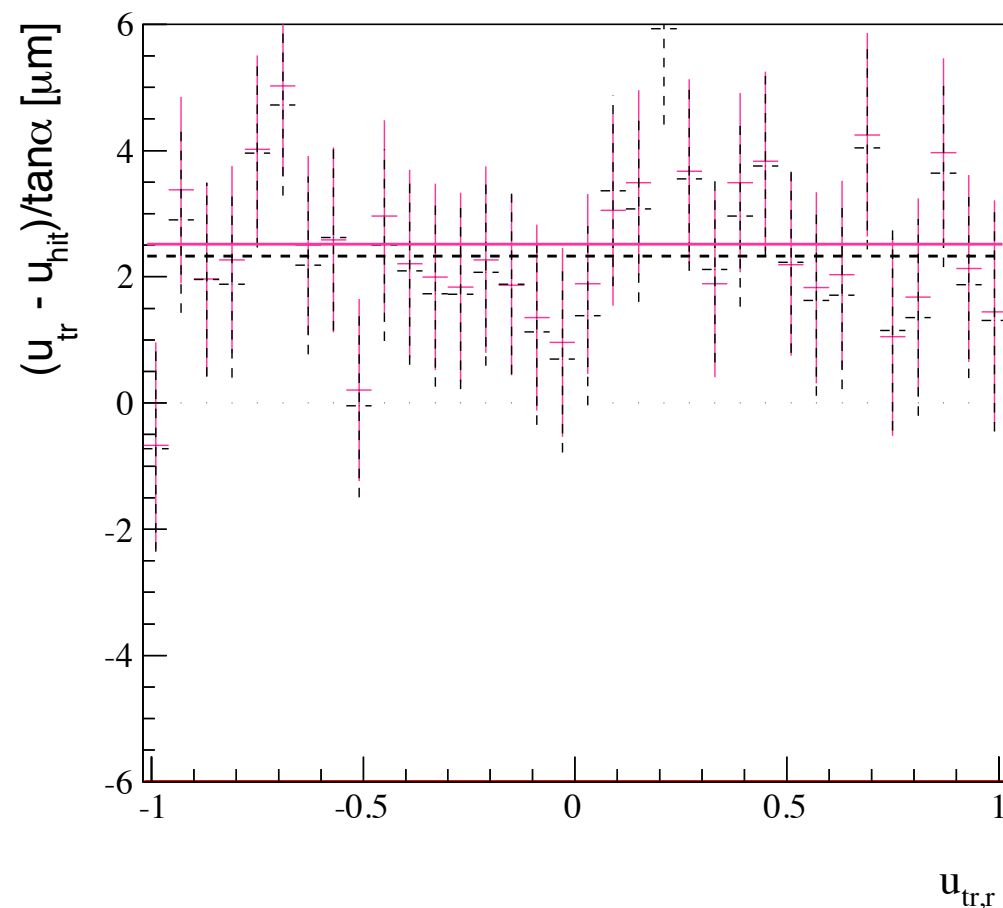
LA
LA+BP



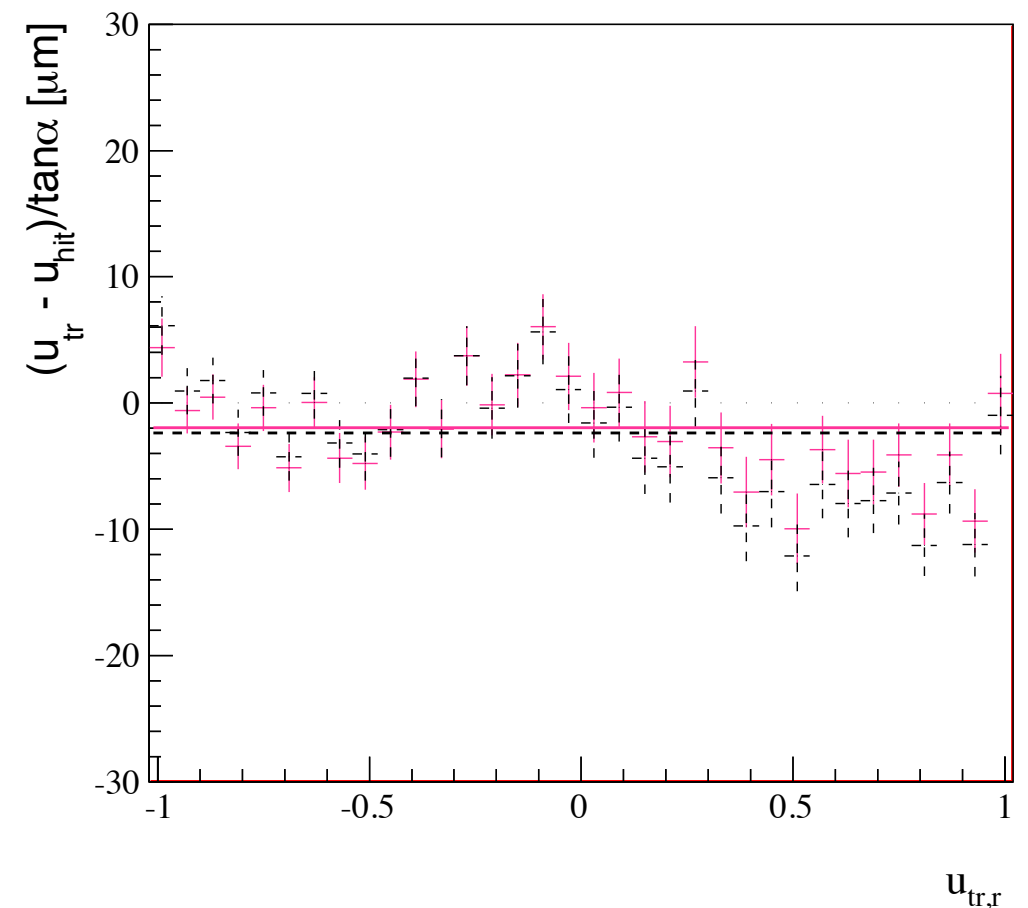
- Large uncertainties.
- No effect in validation plots.

BP evolution/validation: TOB

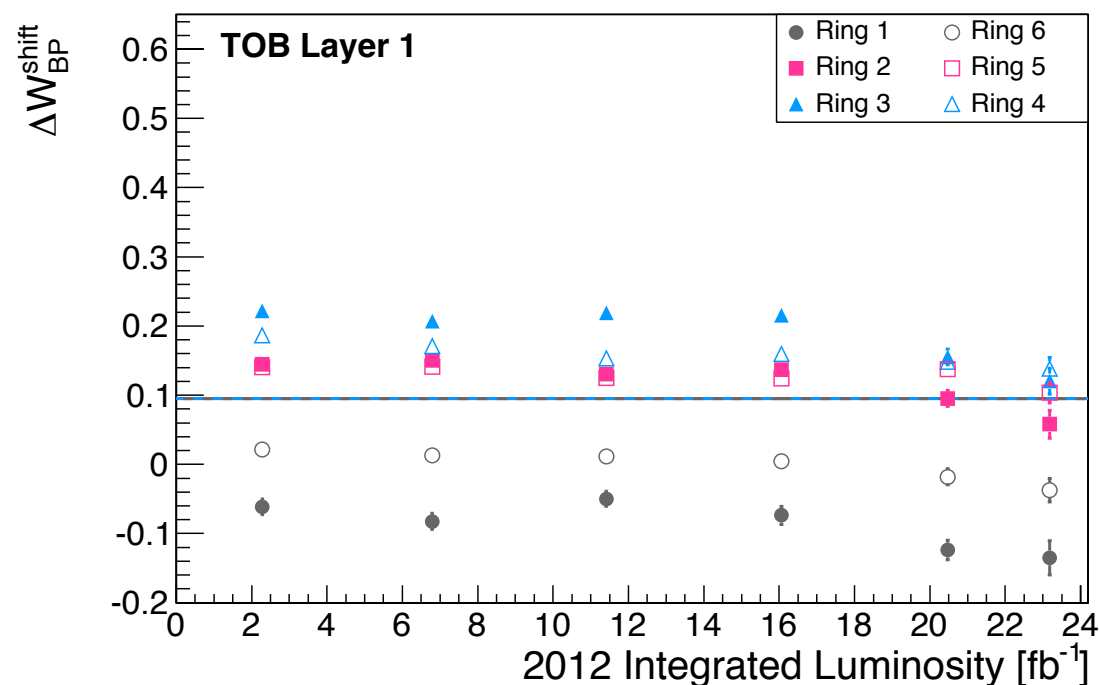
Surface Shape, TOB, layer 1 **peak**



Surface Shape, TOB, layer 1 **deco**



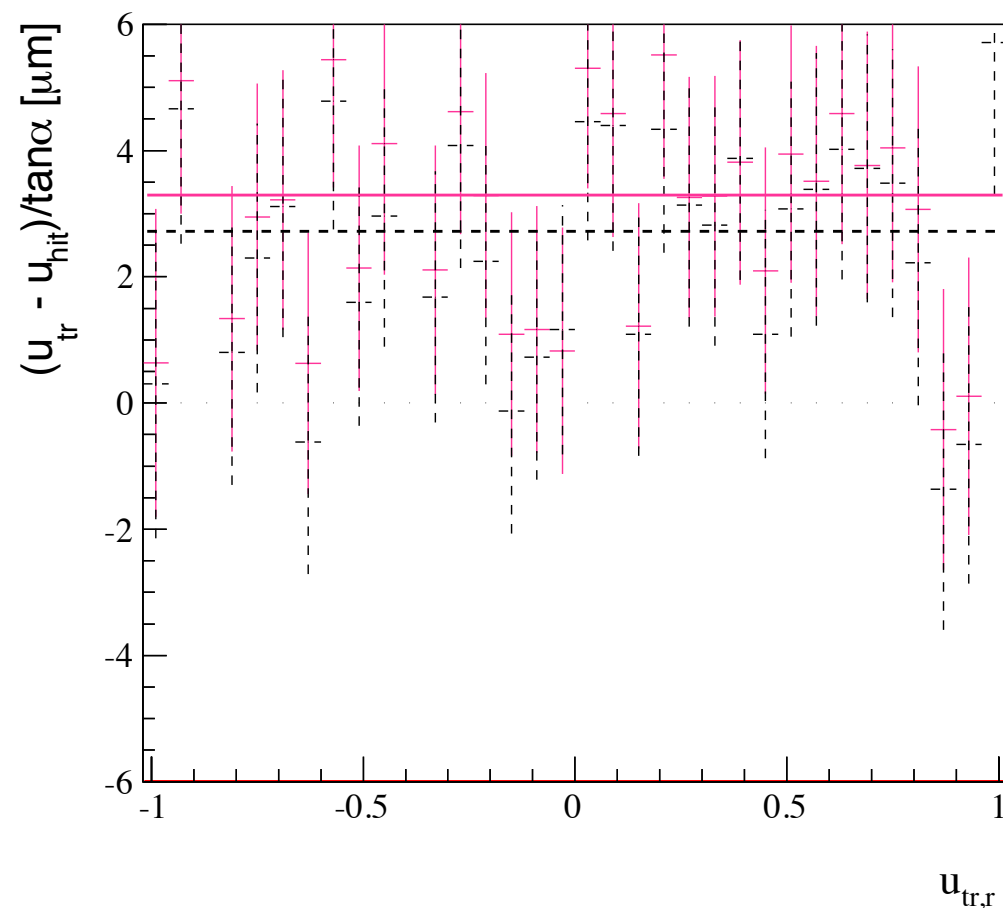
LA
LA+BP



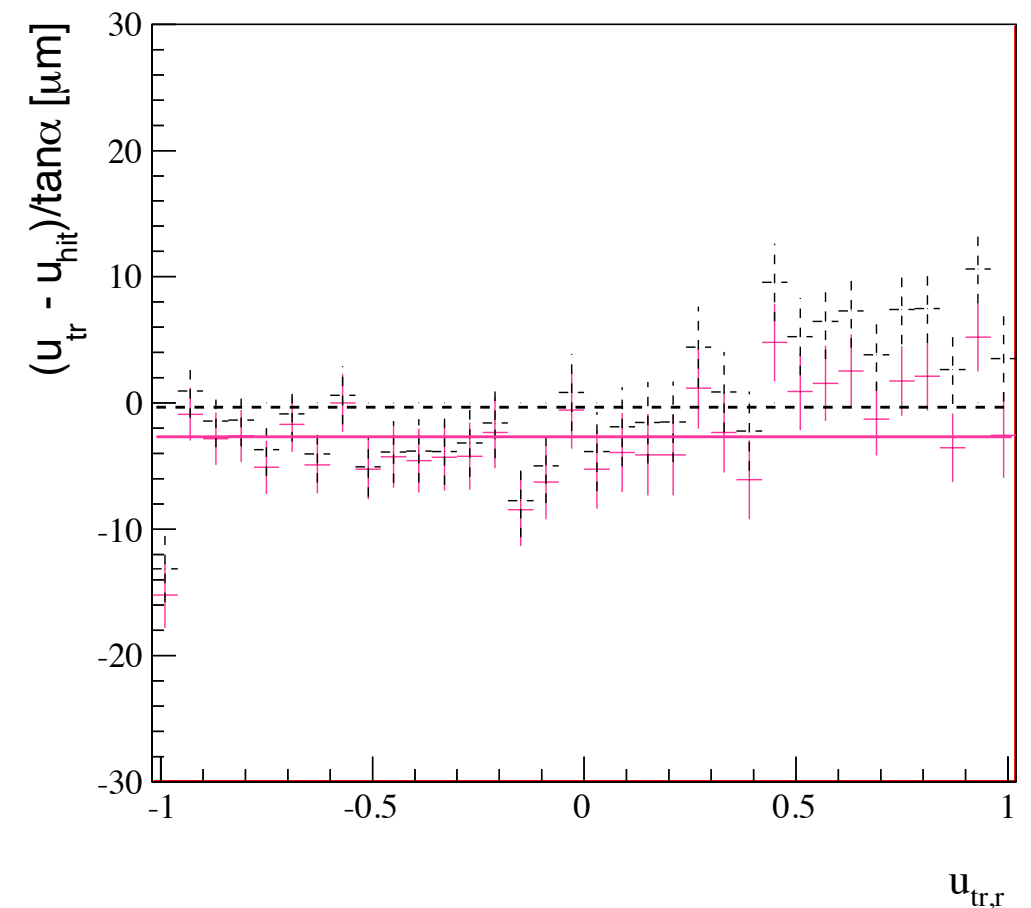
- Correction in correct direction for peak mode.
- In deco mode correction averages to null effect.

BP evolution/validation: TOB

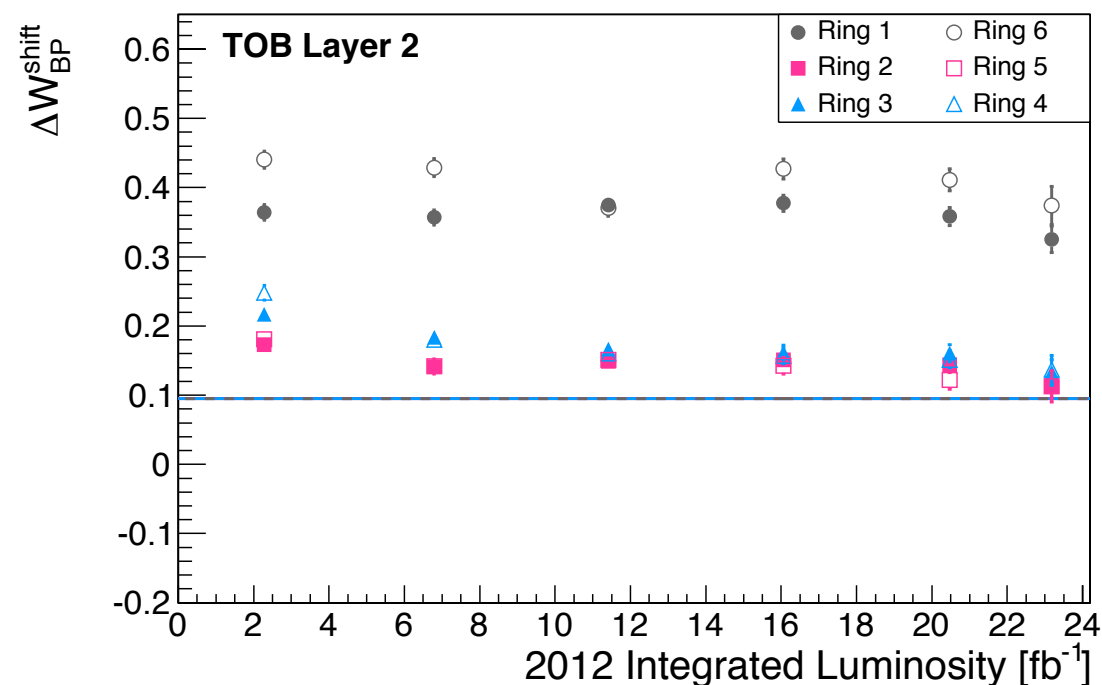
Surface Shape, TOB, layer 2 **peak**



Surface Shape, TOB, layer 2 **deco**



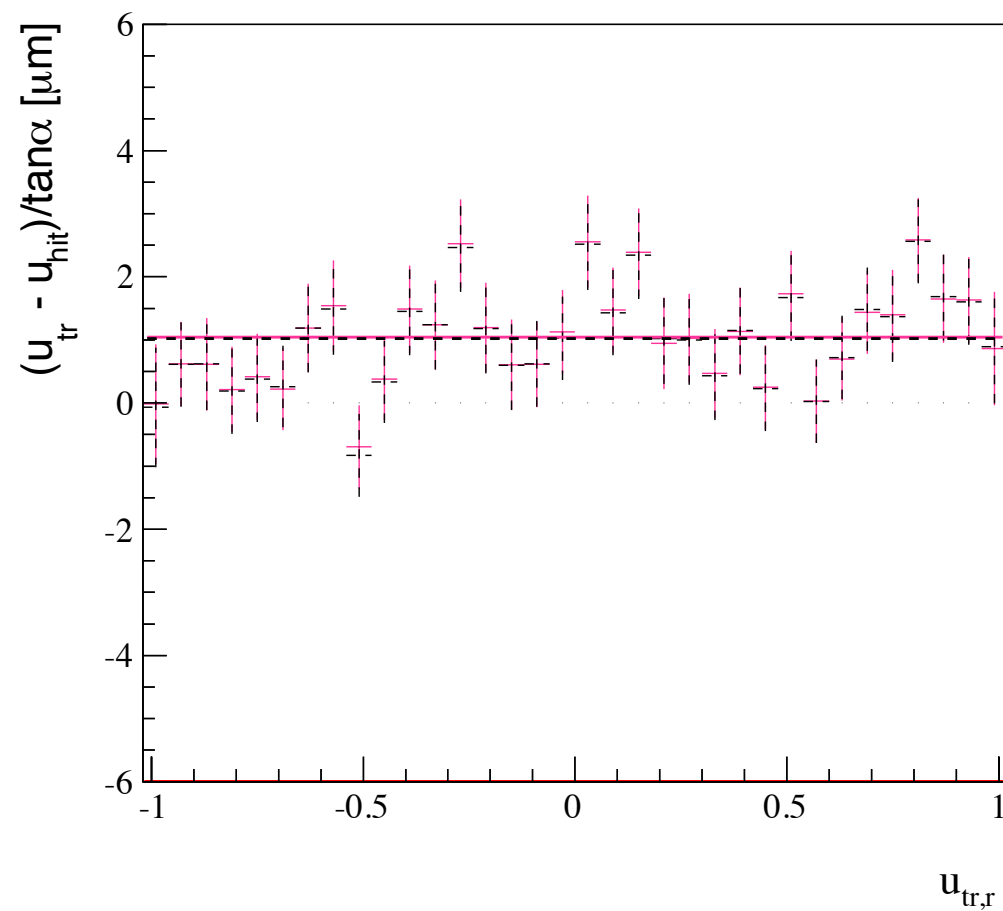
LA
LA+BP



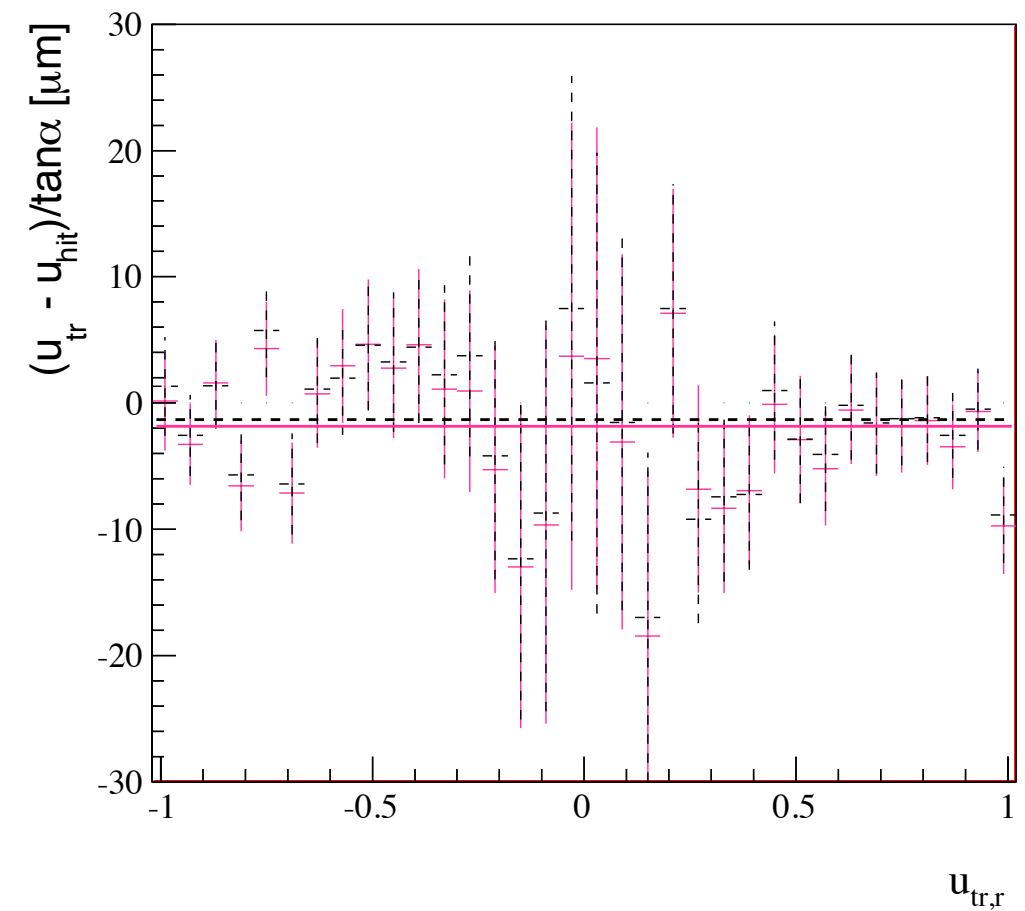
- Correction in correct direction in both modes.

BP evolution/validation: TOB

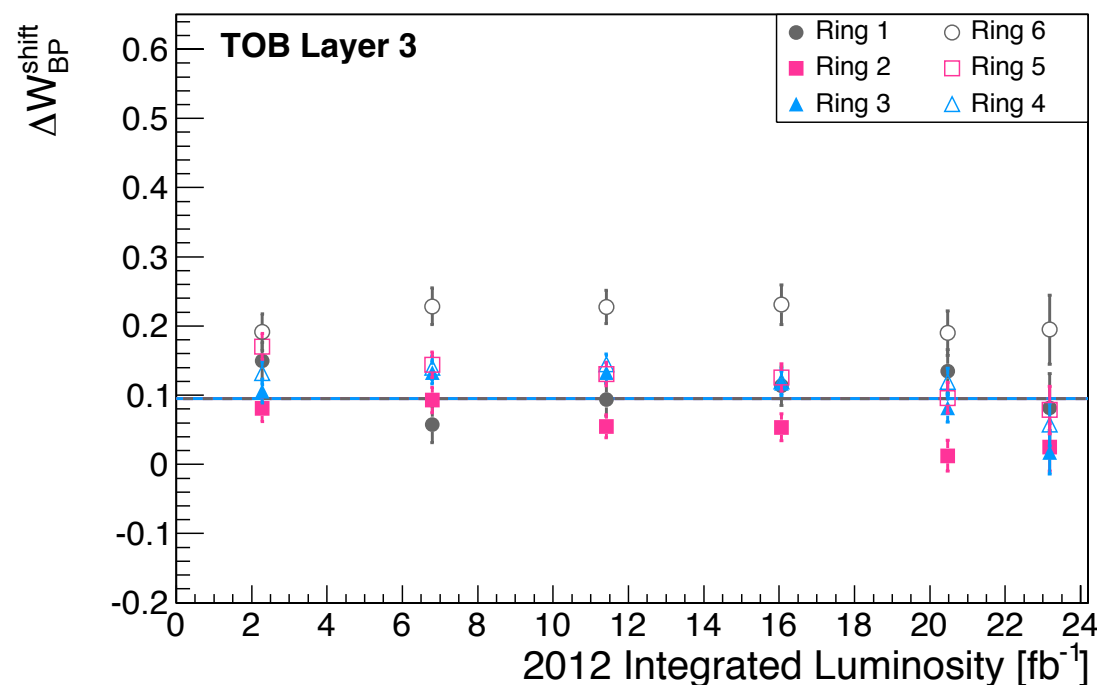
Surface Shape, TOB, layer 3 **peak**



Surface Shape, TOB, layer 3 **deco**



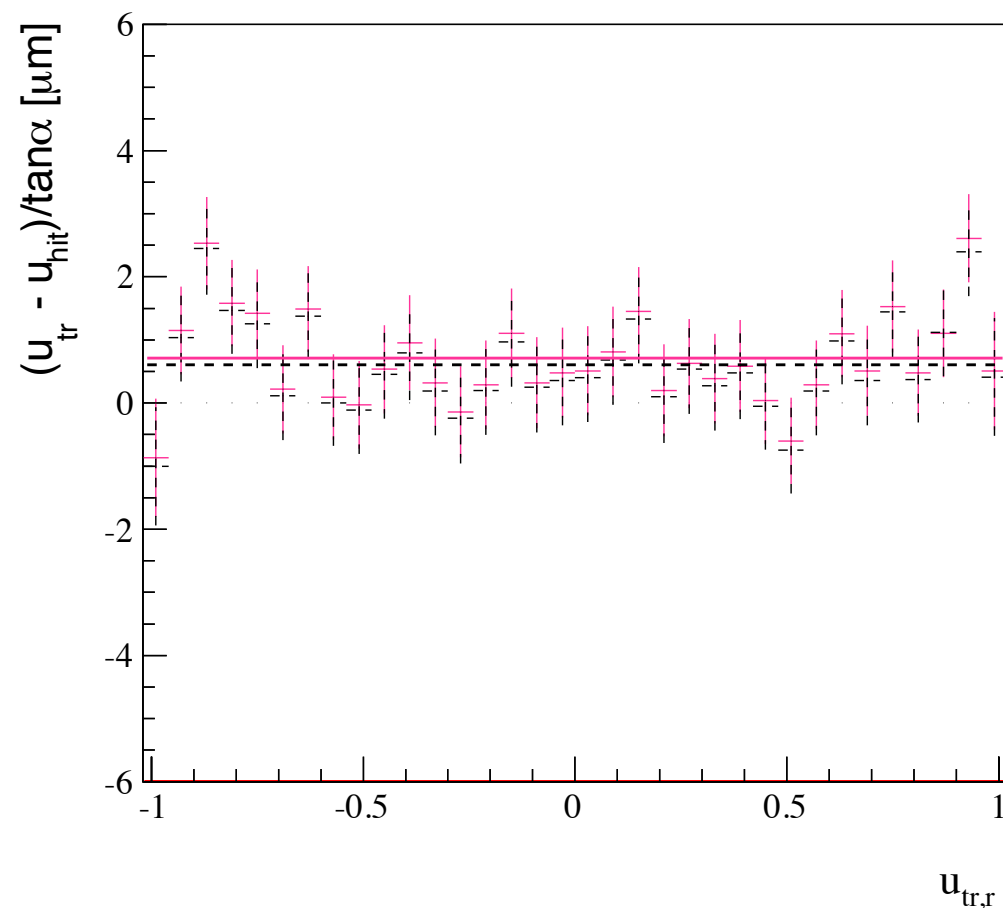
LA
LA+BP



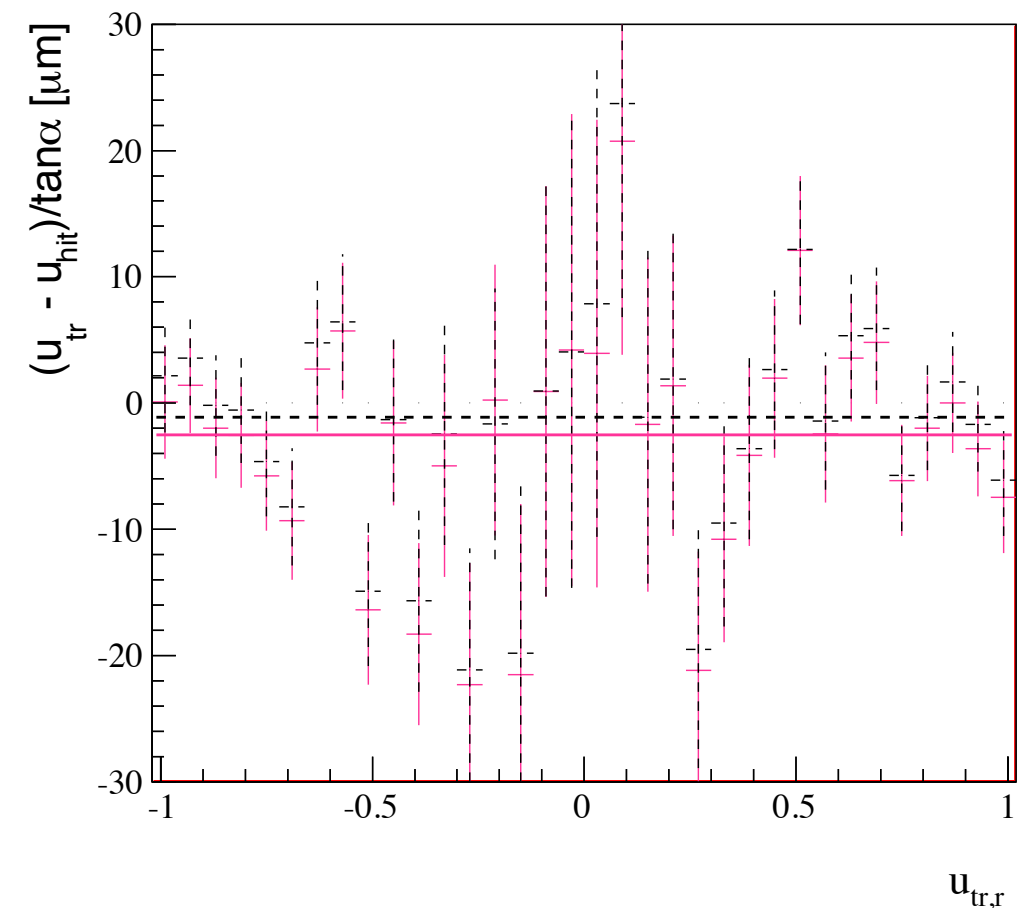
- Correction in correct direction in both modes.

BP evolution/validation: TOB

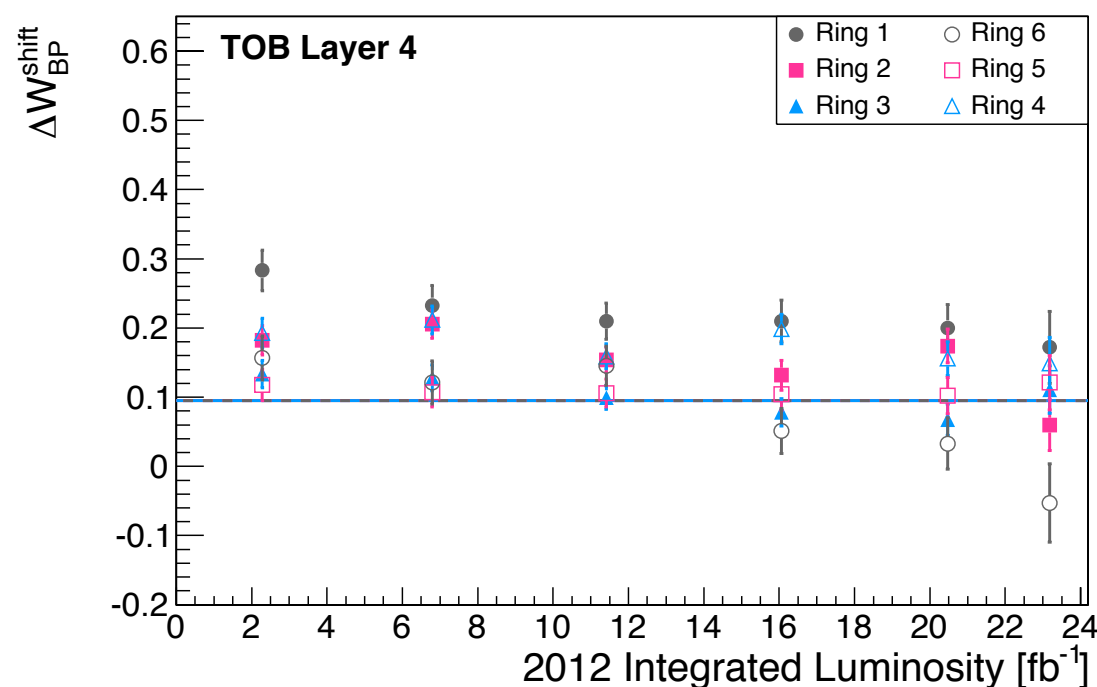
Surface Shape, TOB, layer 4 **peak**



Surface Shape, TOB, layer 4 **deco**



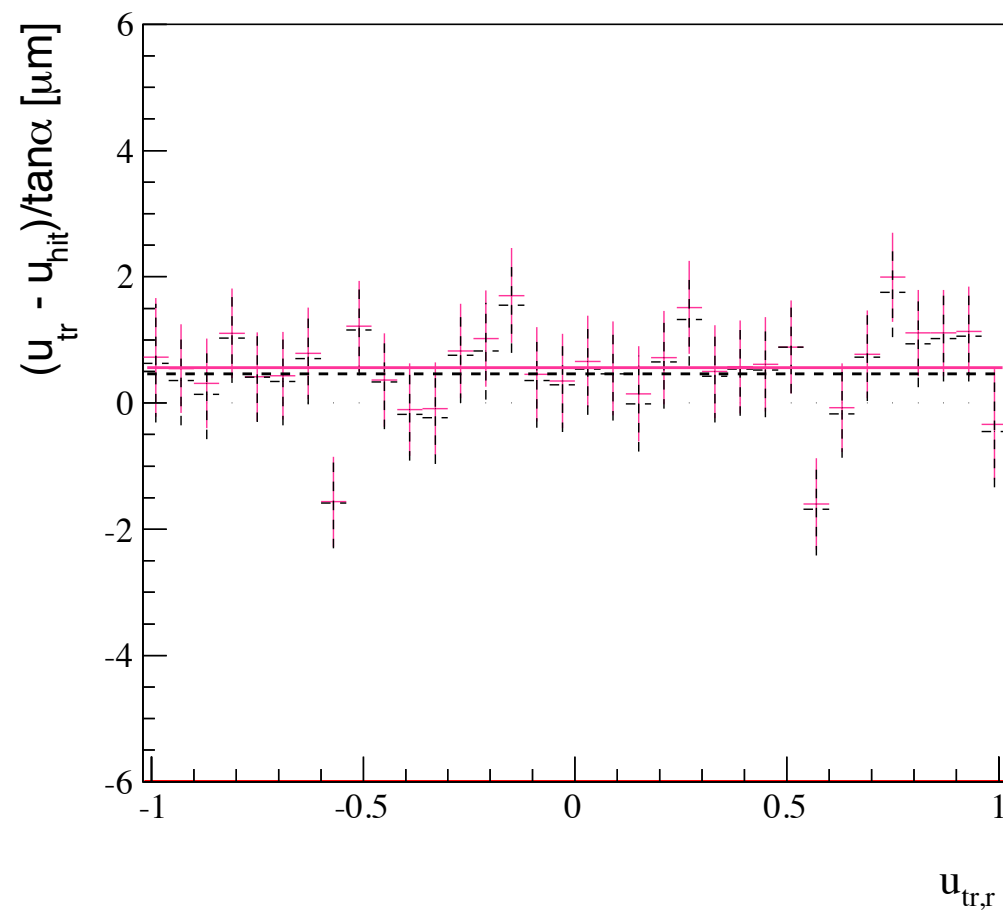
LA
LA+BP



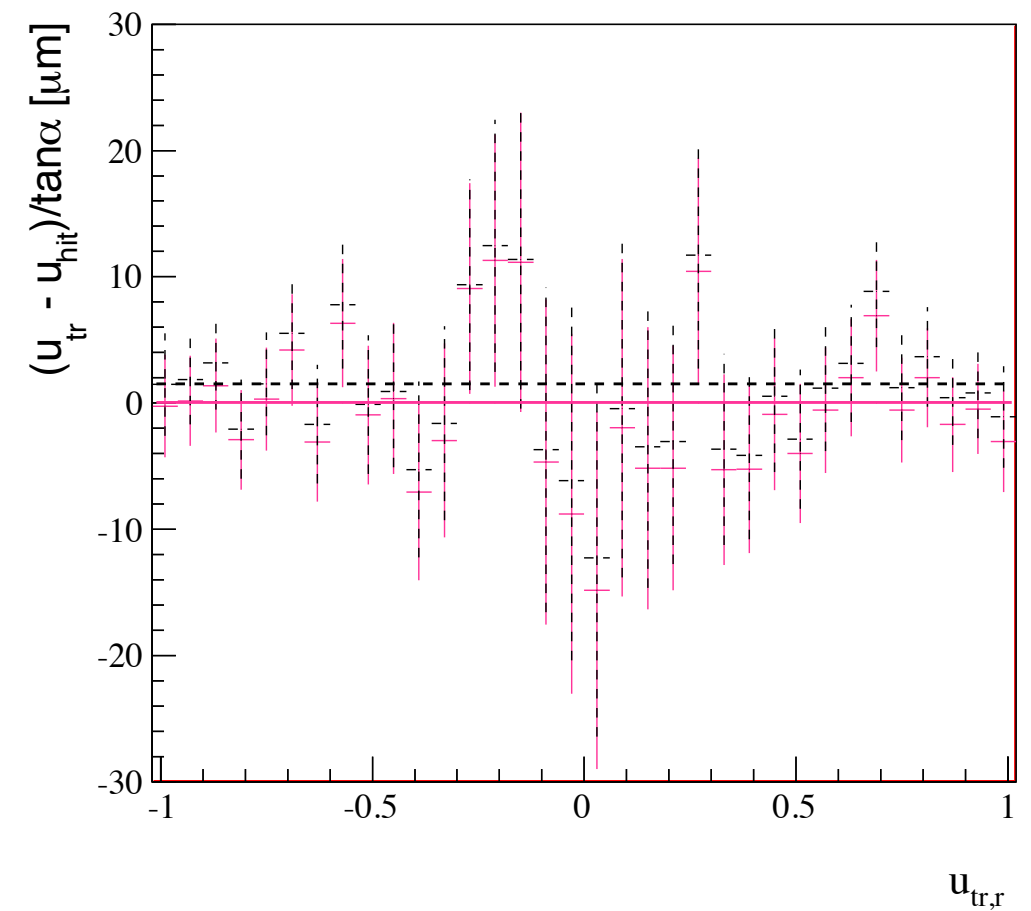
- Correction in correct direction in both modes.

BP evolution/validation: TOB

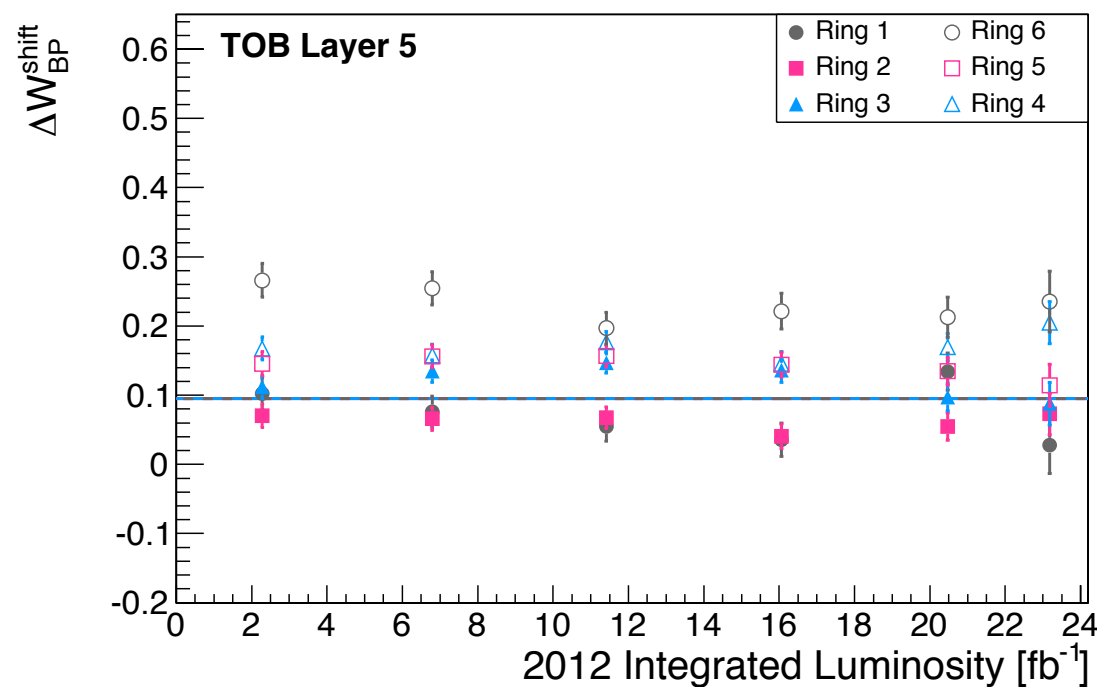
Surface Shape, TOB, layer 5 **peak**



Surface Shape, TOB, layer 5 **deco**



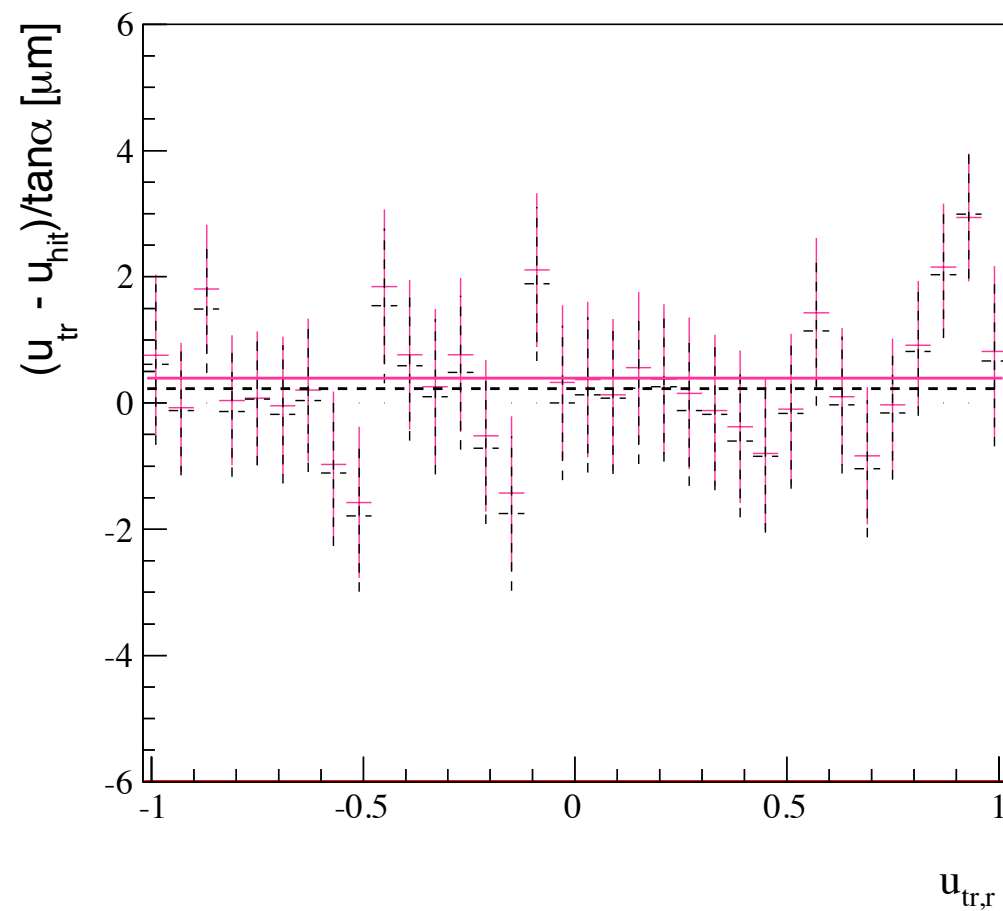
LA
LA+BP



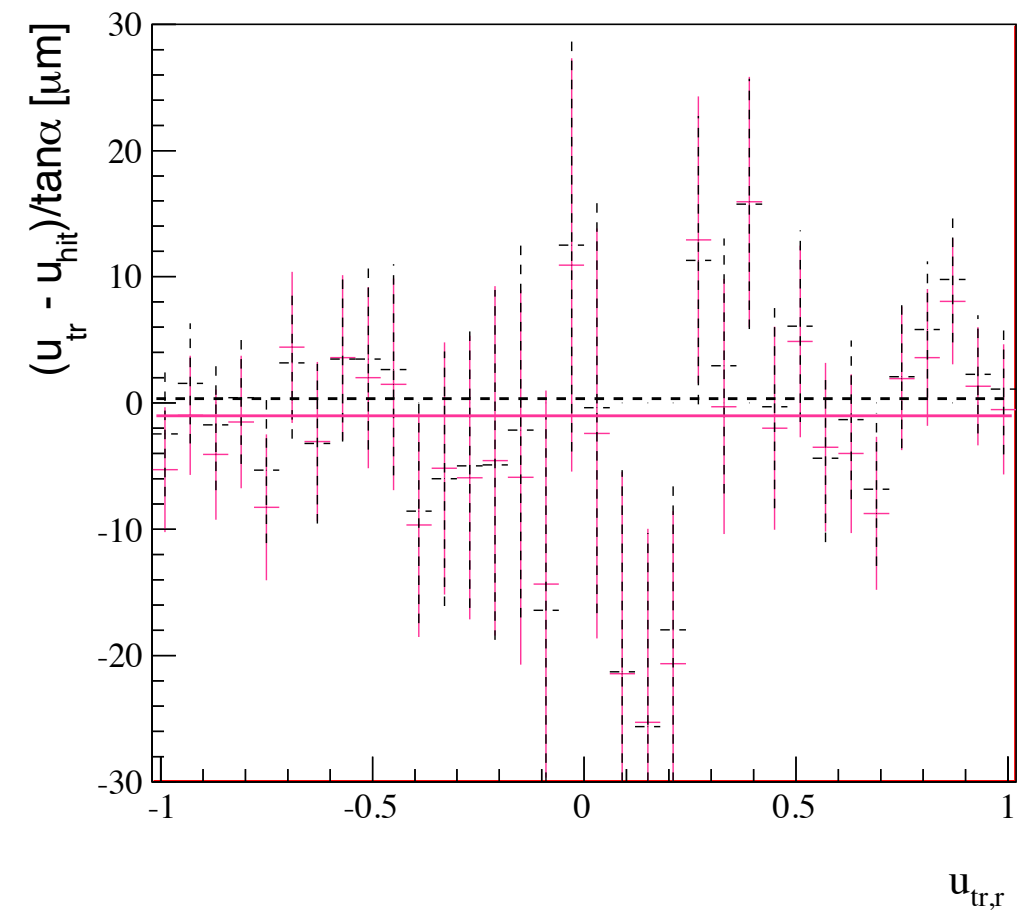
- Uncertainties get larger.

BP evolution/validation: TOB

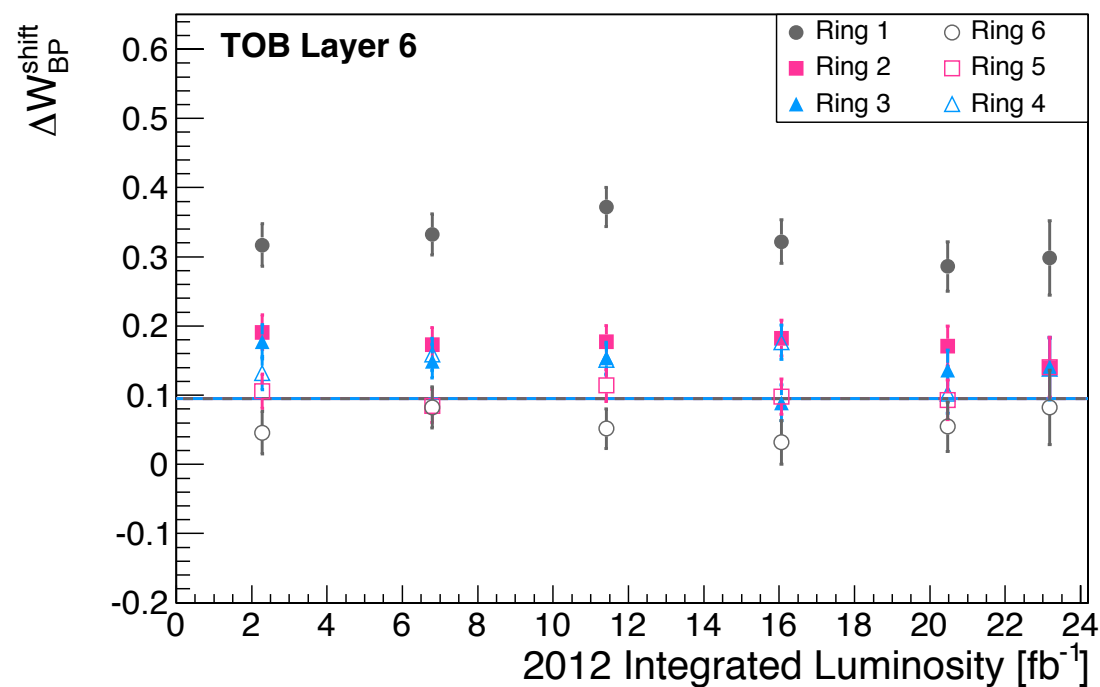
Surface Shape, TOB, layer 6 **peak**



Surface Shape, TOB, layer 6 **deco**



LA
LA+BP



- Uncertainties get larger.

Conclusions

- Effect in surface shape plots is small ($<2\text{ }\mu\text{m}$), but mainly in correct direction.
- Especially visible in layer 2 of TOB: largest BP correction.
- Granularity should be reduced for outer layers to improve BP correction precision.

Next plans

- Run full scale alignment with LA/BP calibration to eliminate possible effect from not completely correct geometry used for BP calibration (reason of strange BP correction values?).
- Maybe take input BP values from GT. Correction would be larger. Should get the same result as in current alignment.