



Strip Lorentz angle and Backplane calibration in MP II



- alignment/calibration setup
- mobility evolution

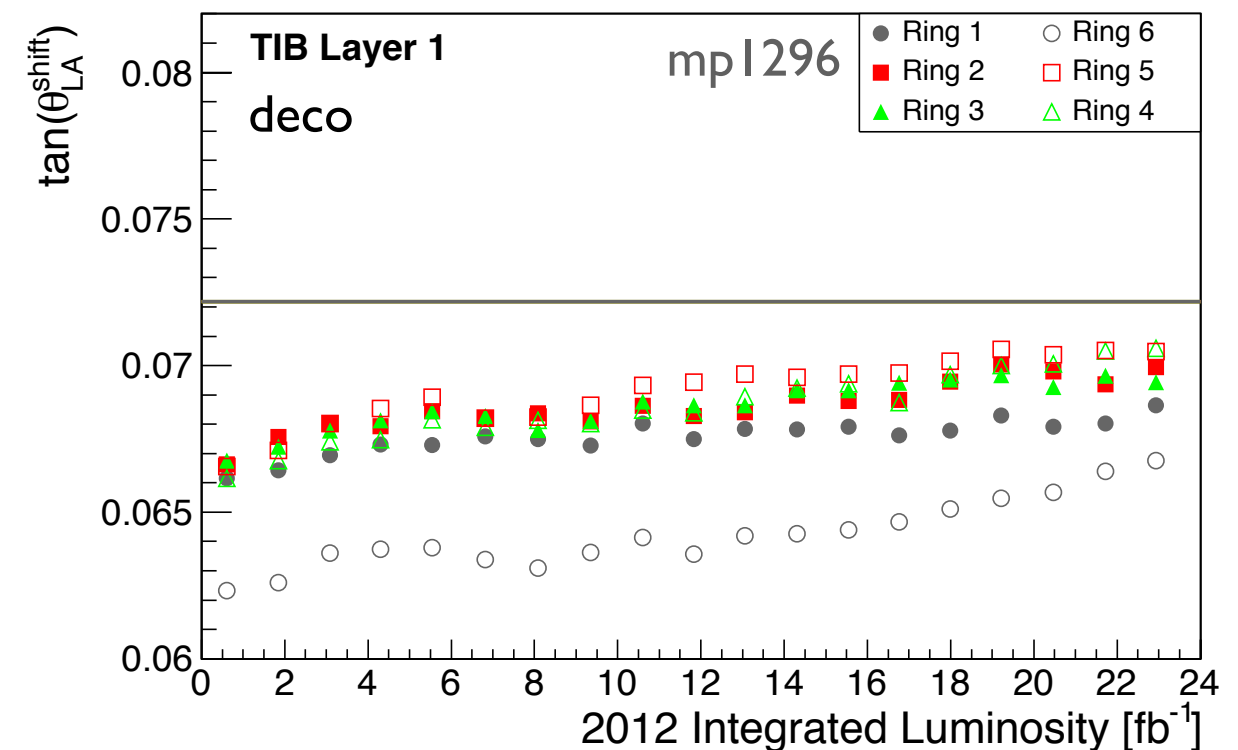
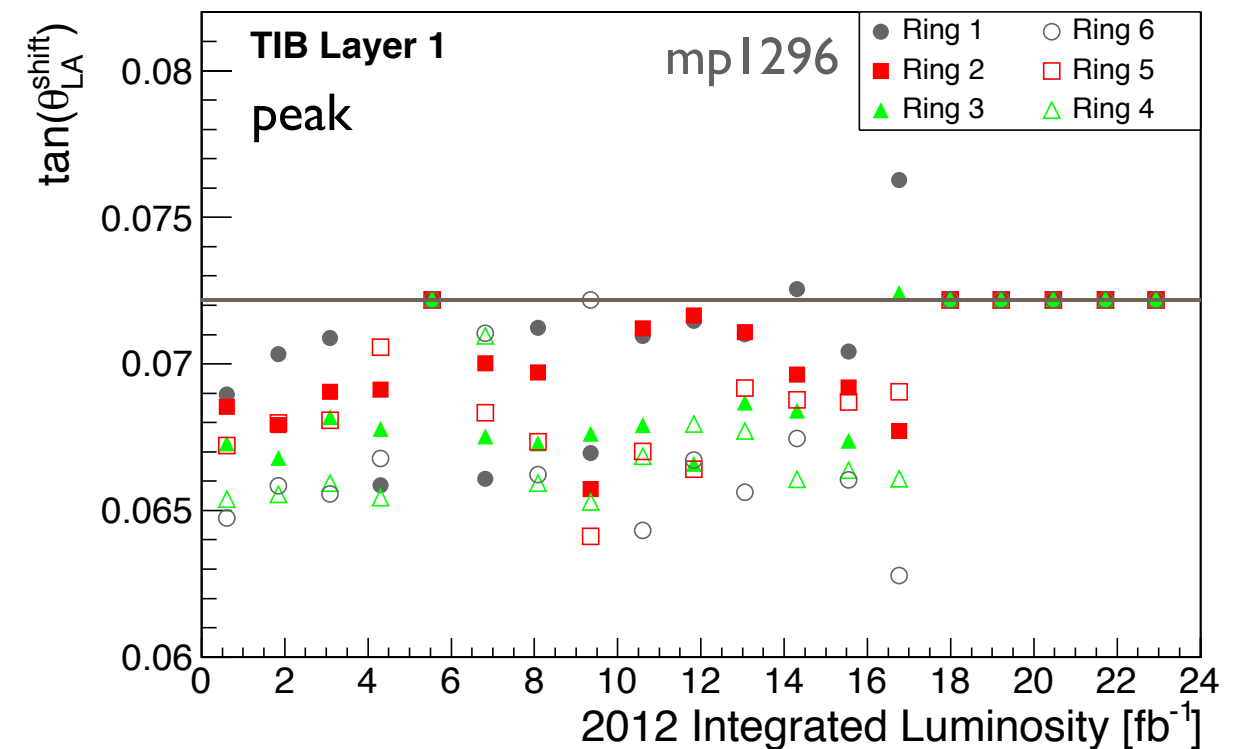
Nazar Bartosik

Tracker Alignment Meeting
DESY, Hamburg

2.07.2013

Introduction

- Lorentz angle determined in Strip detector with high spatial and time granularity.
- Statistics too low for some periods, especially in peak mode.
- Offset in some parts of the detector unclear without uncertainties.
- New alignment with less IOVs in peak mode and enabled uncertainties (inversion mode).



Alignment setup: mp1296 (full)

Alignment starting from CRAFT12; GT: FT_R_53_V21

Data used in alignment (no weights applied):

- MinimumBias | A+B+C+D
- SingleMuon | A+B+C+D
- ZtoMuMu | A+B+C+D
- Cosmics interfill | A+B+C+D
- Cosmics CRAFT12 | A
- Cosmics CRUZET | A (10 GeV P estim.)
- Cosmics 0T | C (10 GeV P estim.)
- 0T Collision (mp1276_0T) | C (3 GeV P estim.)

No Kinks&Bows

Number of used tracks: ~60 M

Large structures, Pixel modules: | | | | | Strip modules: | 0 | | | |

Calibration setup: mp1296 (full)

LA calibration setup:

- BPIX:
24 parameters: 3 layers x 8 rings
- FPIX:
2 parameters: left side, right side
- Time granularity: 65 IOVs
- TIB:
24 parameters: (4 layers x 6 rings) x 2 [strip/deco]
- TOB:
36 parameters (6 layers x 6 rings) x 2 [strip/deco]
- Time granularity: 20 IOVs

Alignment setup: mp1323 (inversion)

mp1296 geometry:

- supposed to have good alignment
- supposed to have good Pixel LA calibration
- used as starting geometry

Pixel LA from mp1296.

Inversion mode to get uncertainties.

Alignables:

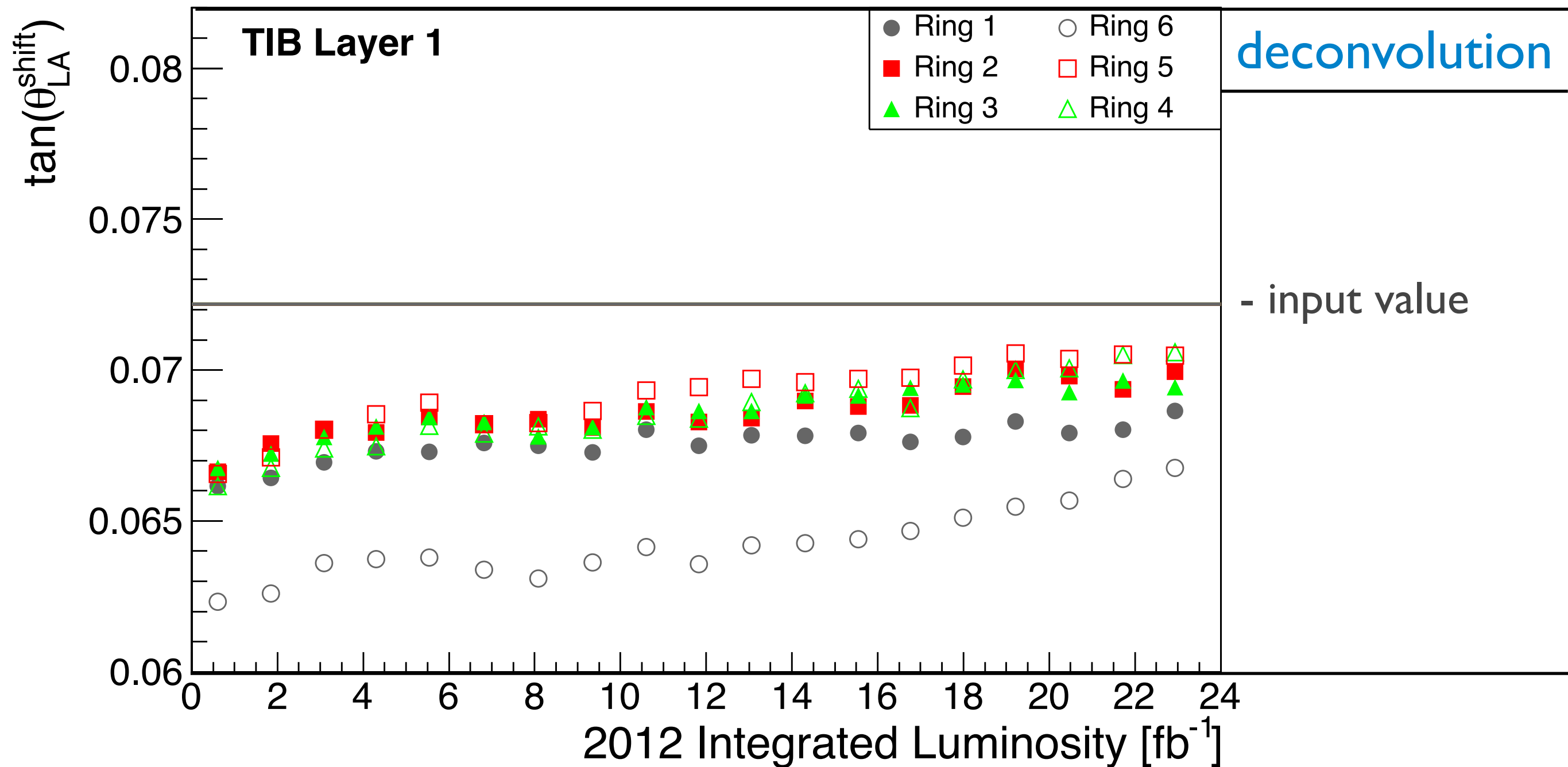
- Large structures: | | | | |
- TIB, TOB modules: 100000
 - Only coordinate most sensitive to LA shift

Calibration setup: mp1323 (inversion)

LA calibration setup:

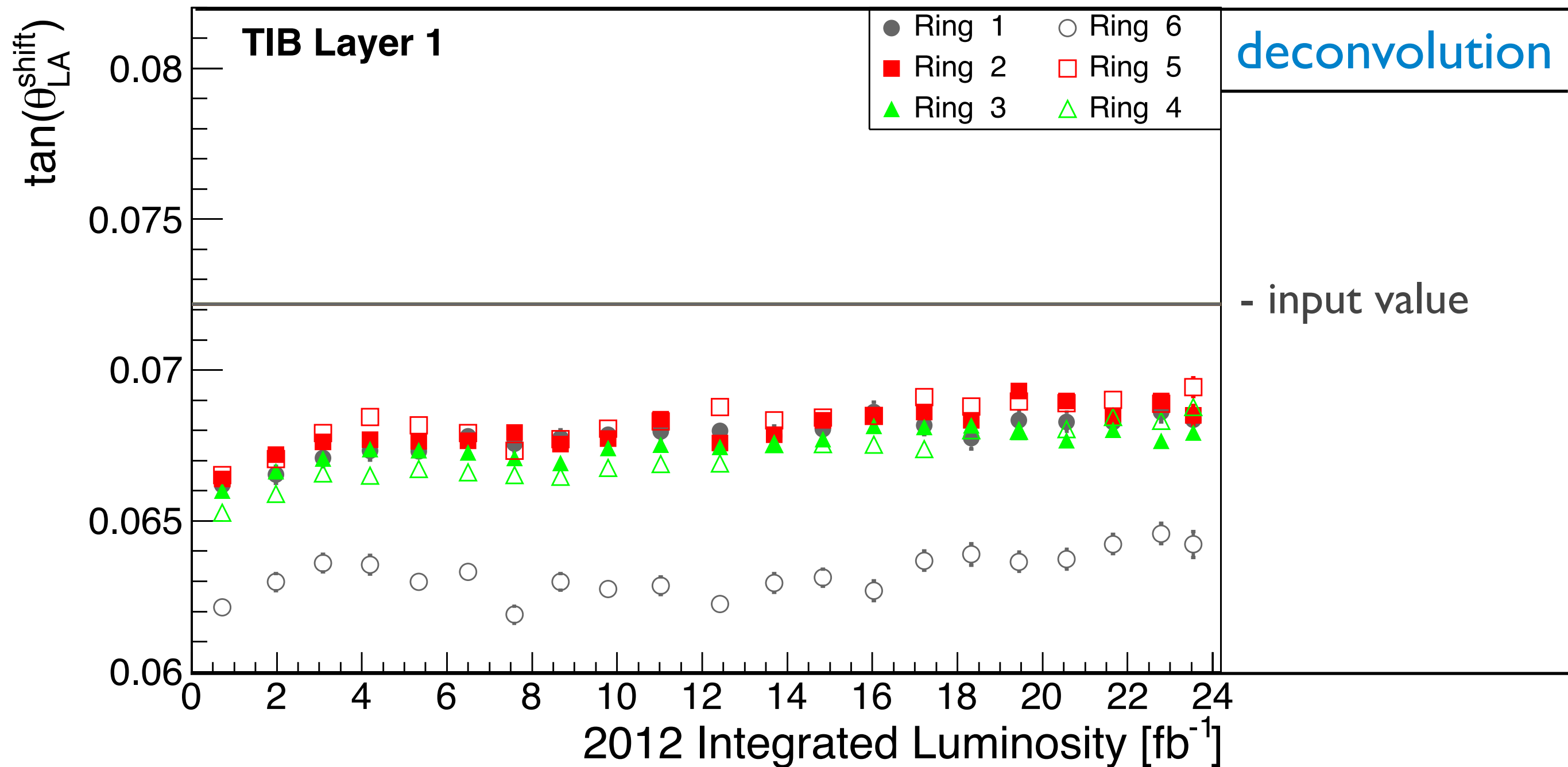
- No LA calibration in Pixel detector
- TIB (deconvolution):
24 parameters: (4 layers x 6 rings)
- TOB (deconvolution):
36 parameters (6 layers x 6 rings)
- Time granularity: 21 IOVs
- TIB (peak):
12 parameters: (4 layers x 3 rings)
- TOB (peak):
36 parameters (6 layers x 6 rings)
- Time granularity: 6 IOVs

LA evolution: TIB (Layer 1) [mp1296]



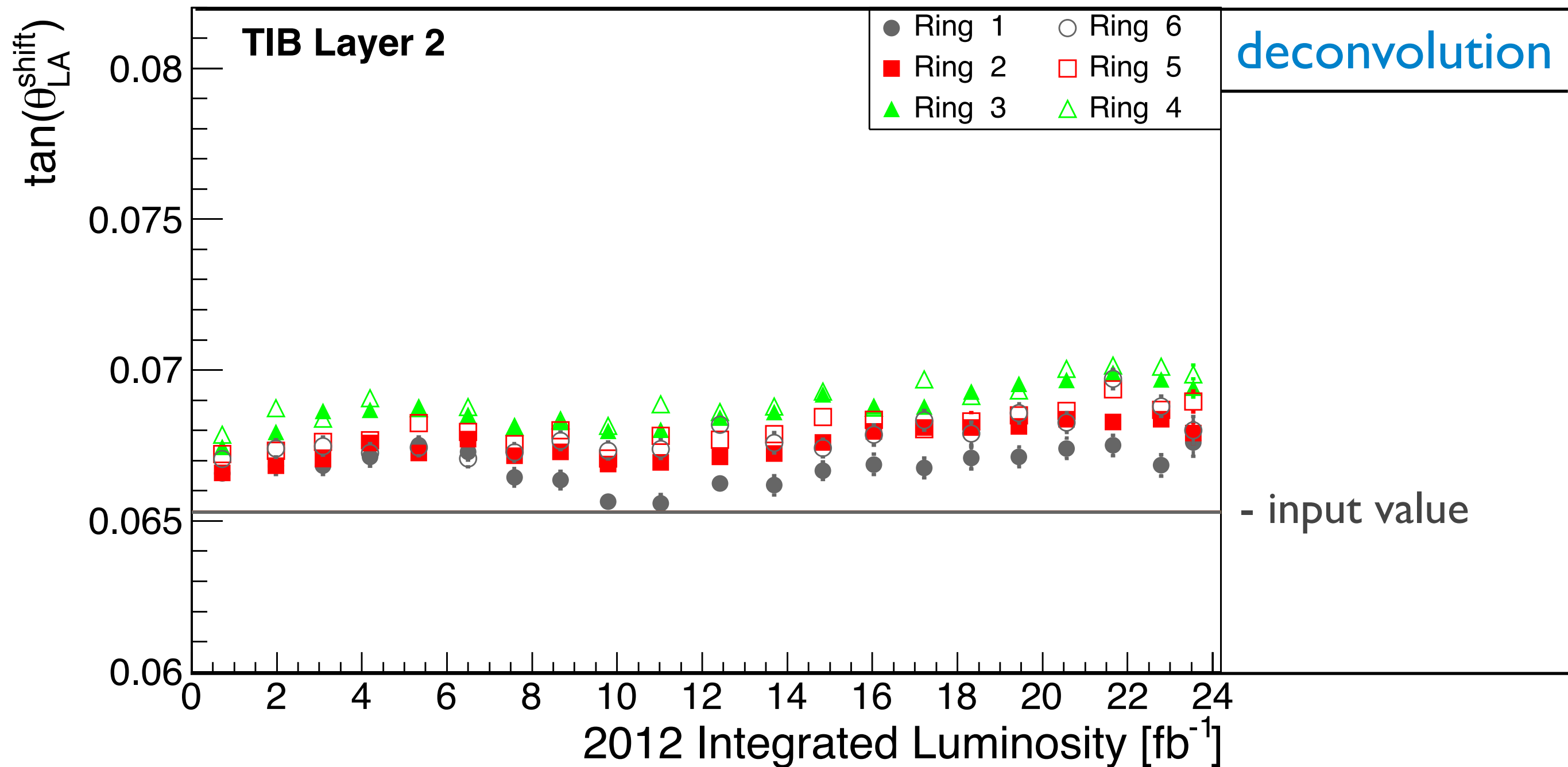
- Offset in Ring 6 could be due to low statistic.

LA evolution: TIB (Layer 1) [mp1323]



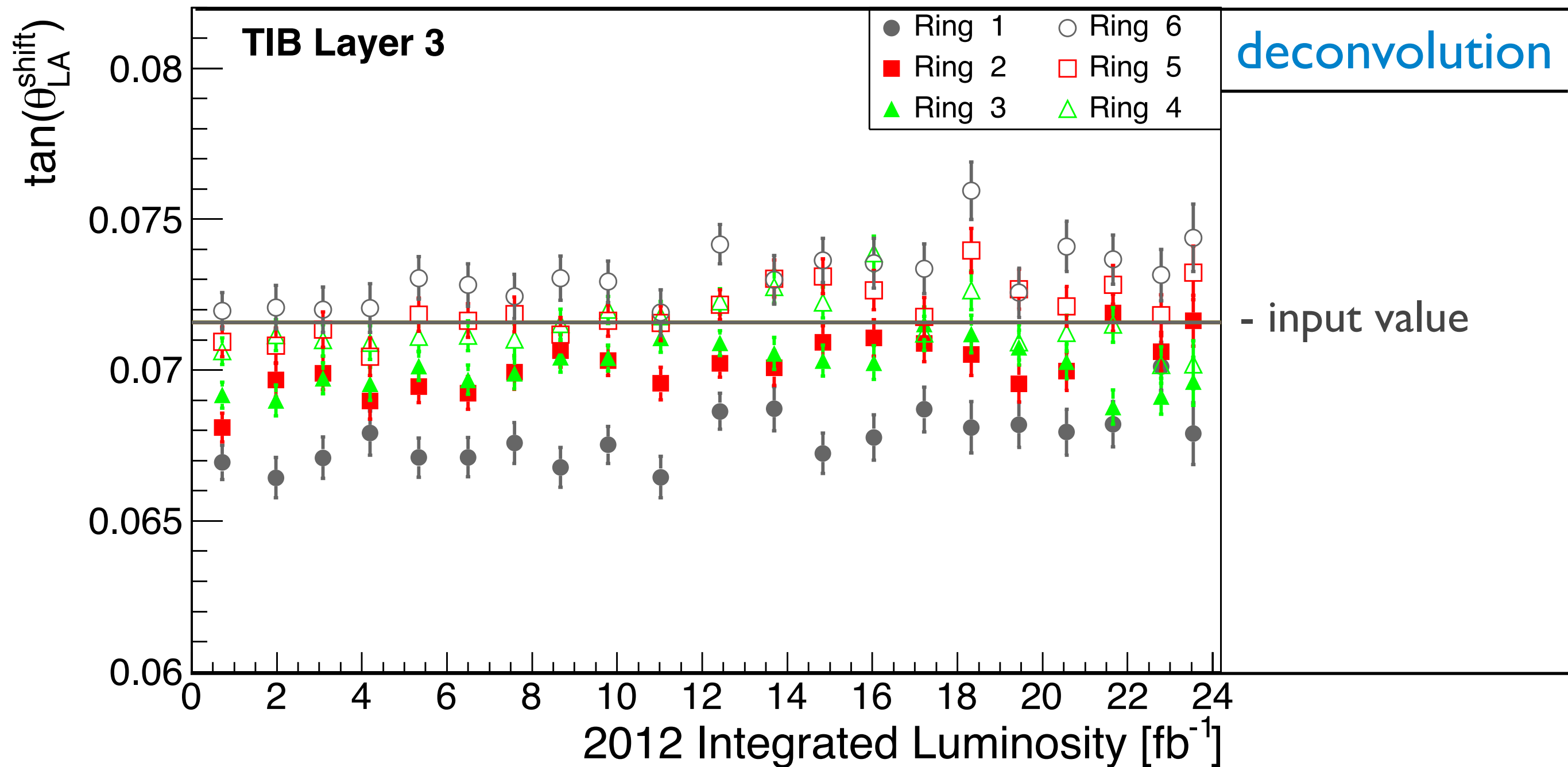
- Offset in Ring 6 is real.

LA evolution: TIB (Layer 2) [mp1323]



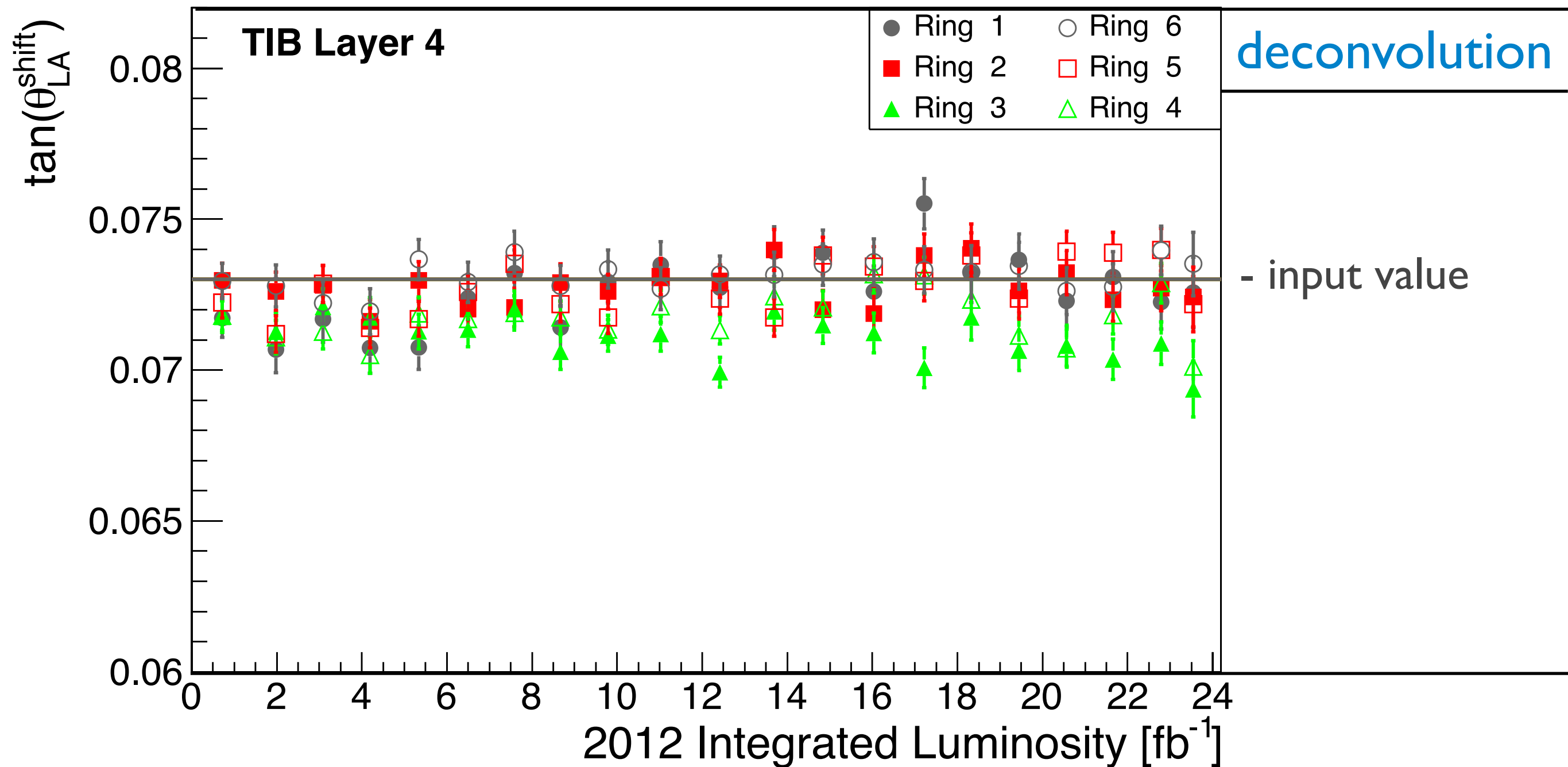
- Number of IOVs could be significantly reduced.

LA evolution: TIB (Layer 3) [mp1323]



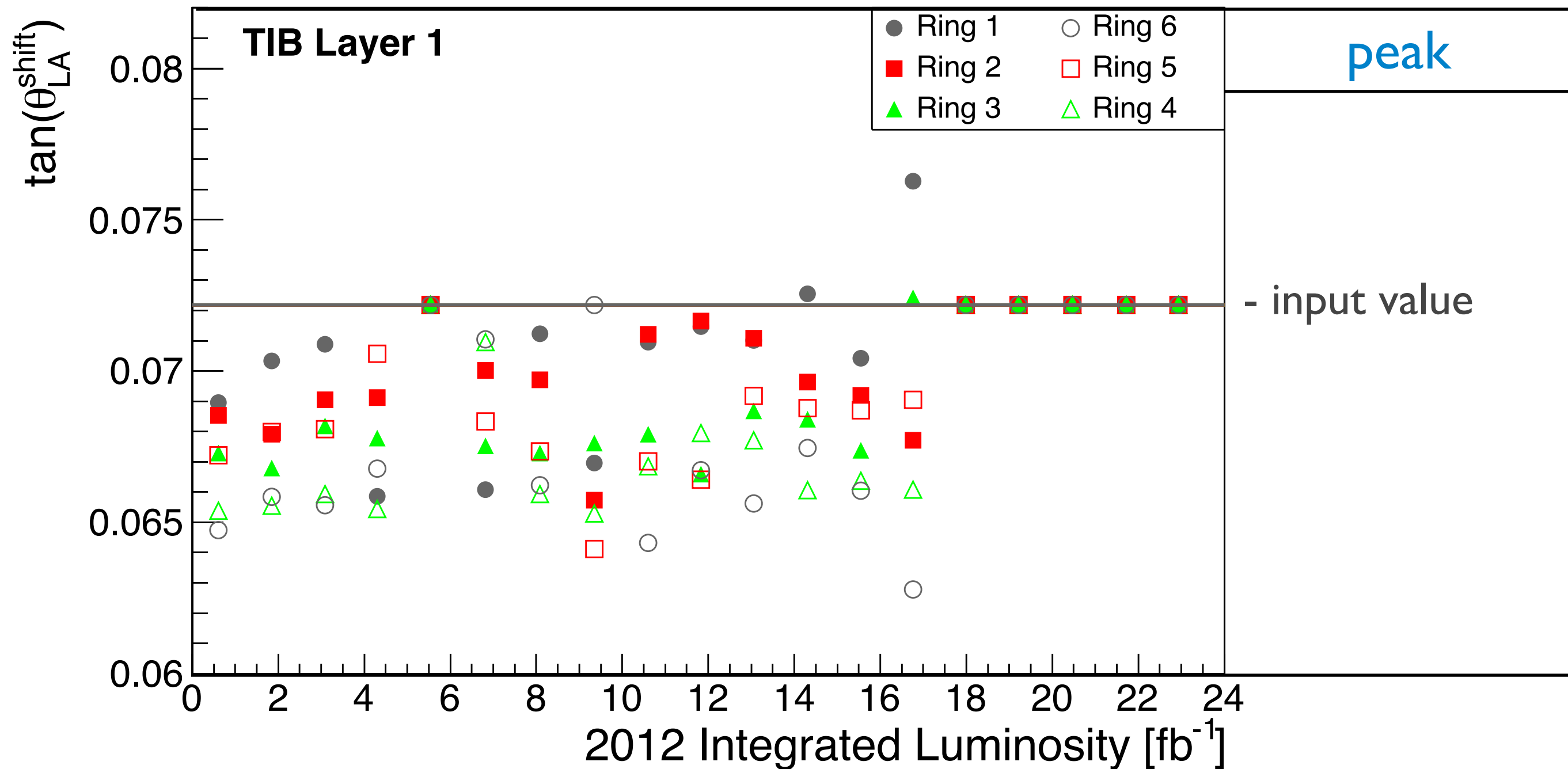
- Statistics much lower.
- Number of IOVs has to be reduced.

LA evolution: TIB (Layer 4) [mp1323]



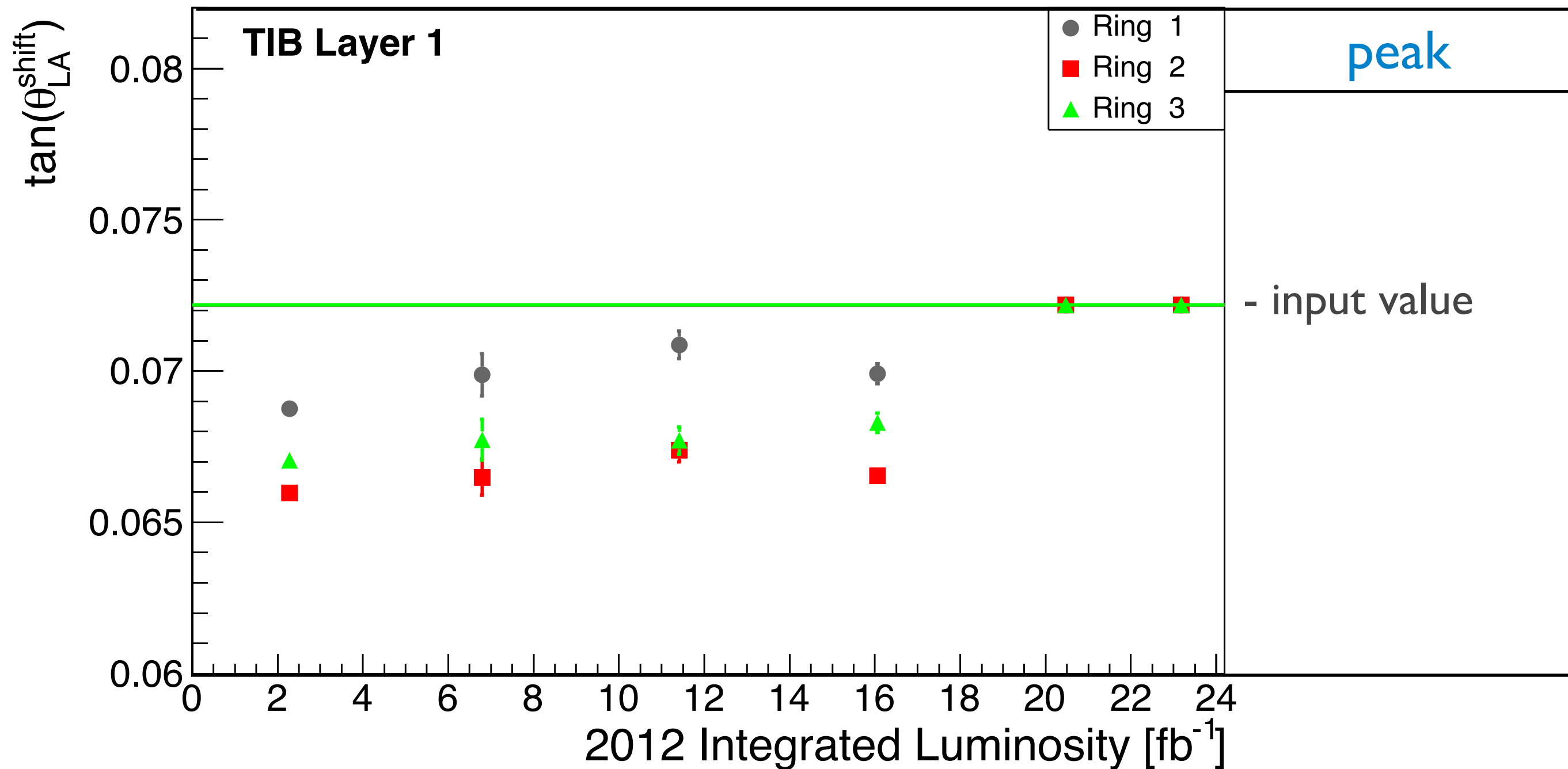
- No visible time dependence in Layer 4.

LA evolution: TIB (Layer 1) [mp1296]



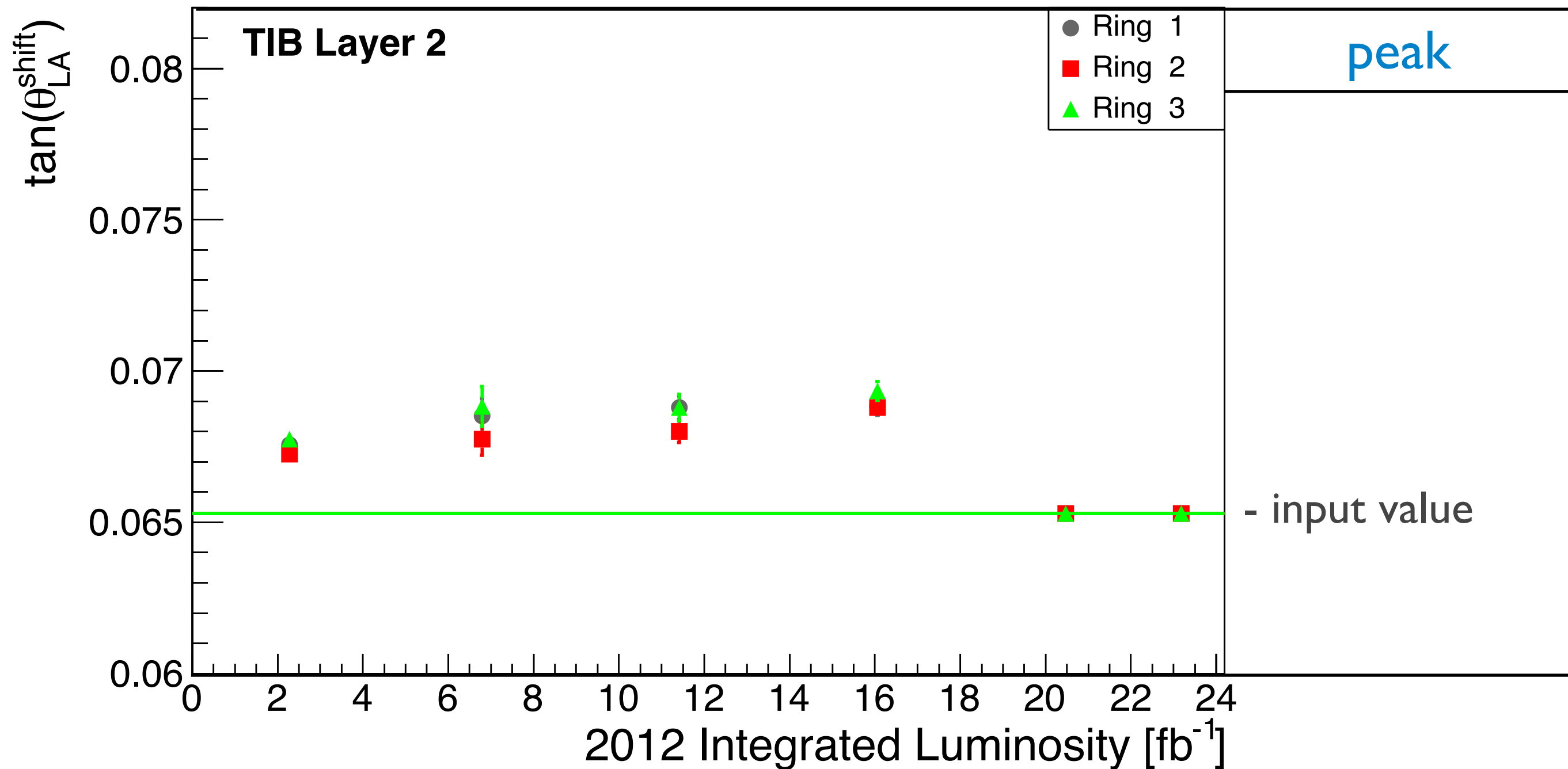
- Statistics were too low for peak mode.

LA evolution: TIB (Layer 1) [mp1323]



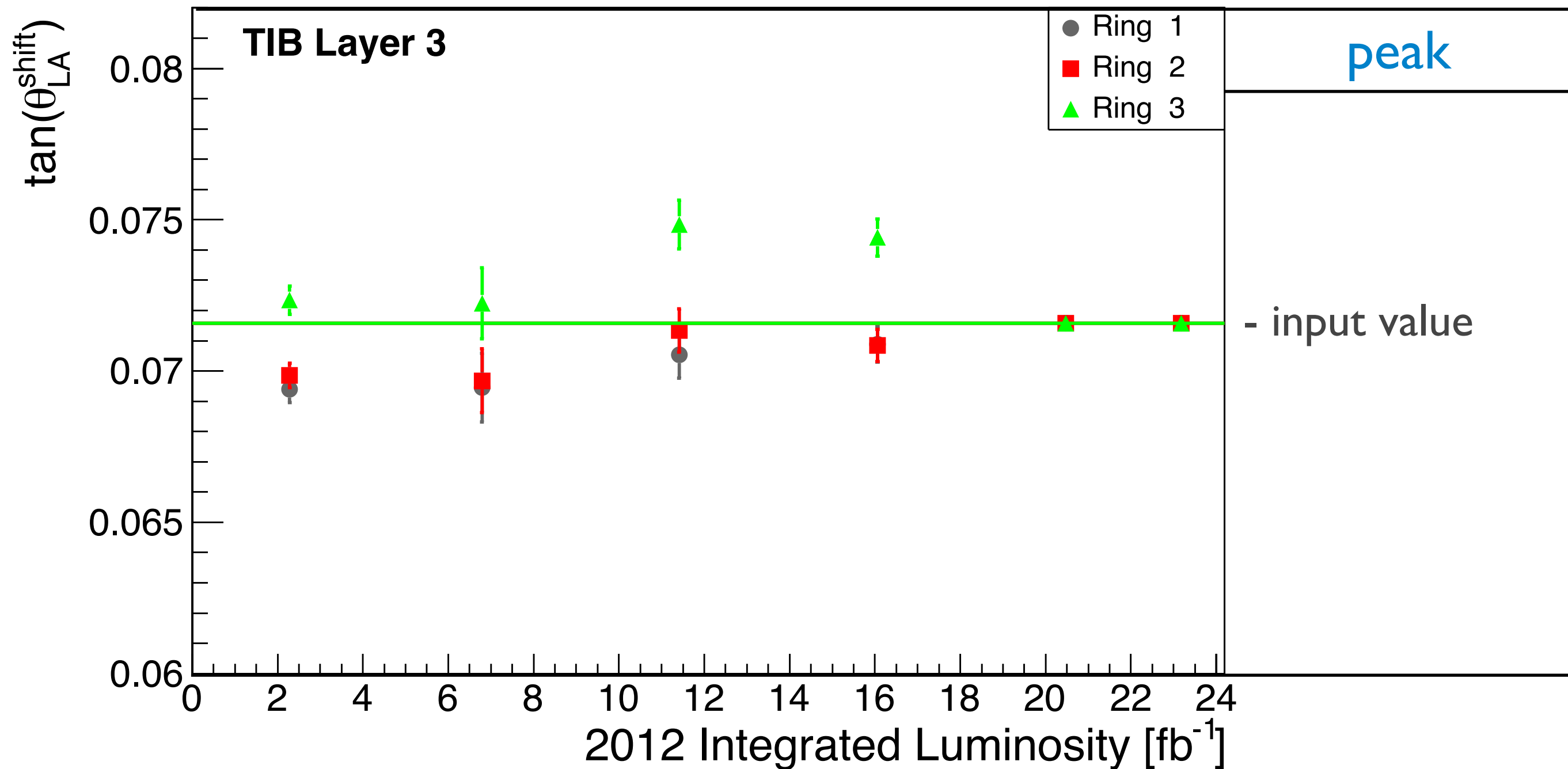
- Still no data in last 2 IOVs.
- Minor time dependence visible.

LA evolution: TIB (Layer 2) [mp1323]



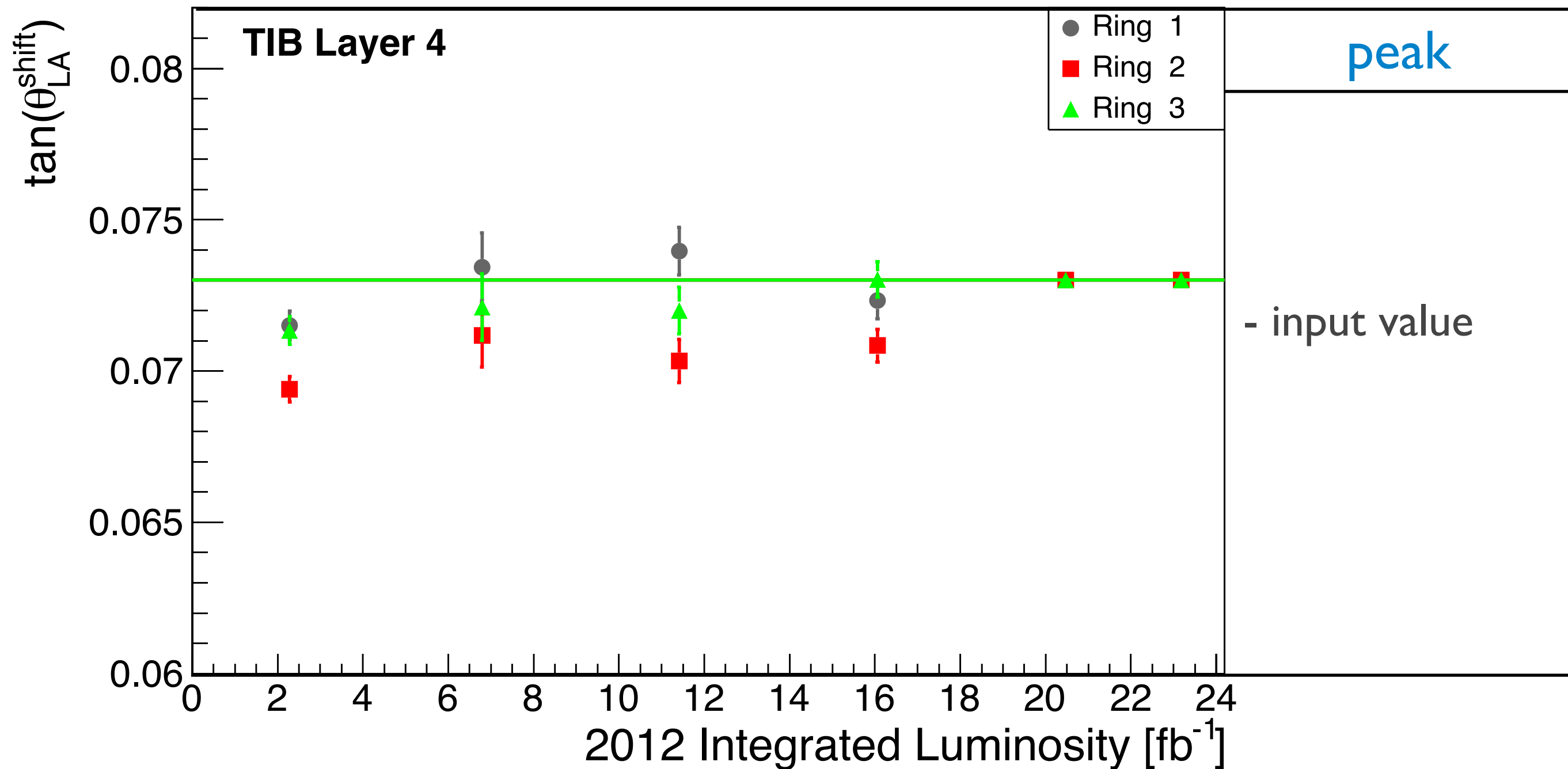
- Almost constant LA.
- No offsets for different rings. 1 parameter for the whole layer.

LA evolution: TIB (Layer 3) [mp1323]



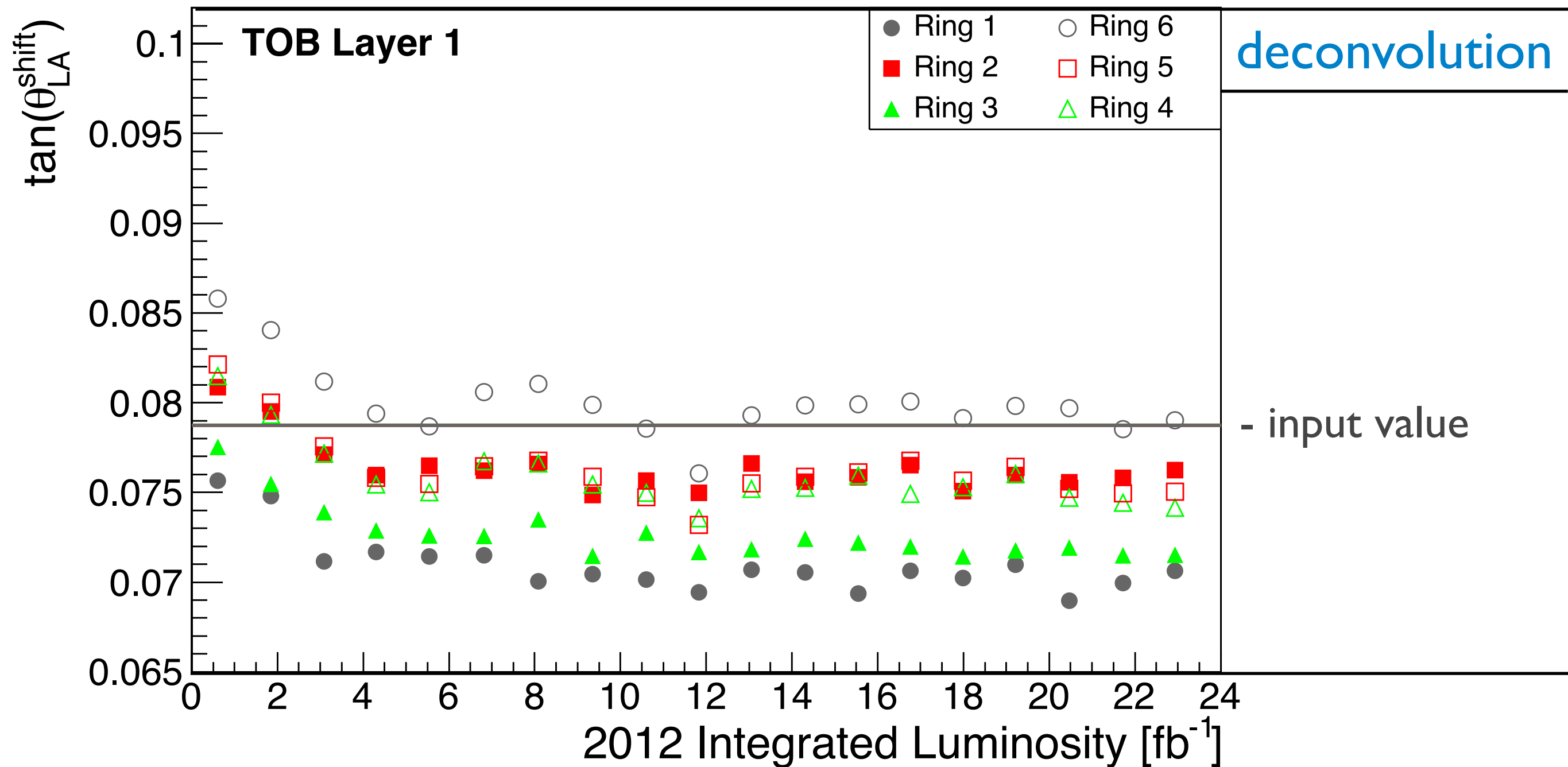
- Almost constant LA.
- Offset in the right part of the detector. Rings 1,2 can be combined.

LA evolution: TIB (Layer 4) [mp1323]



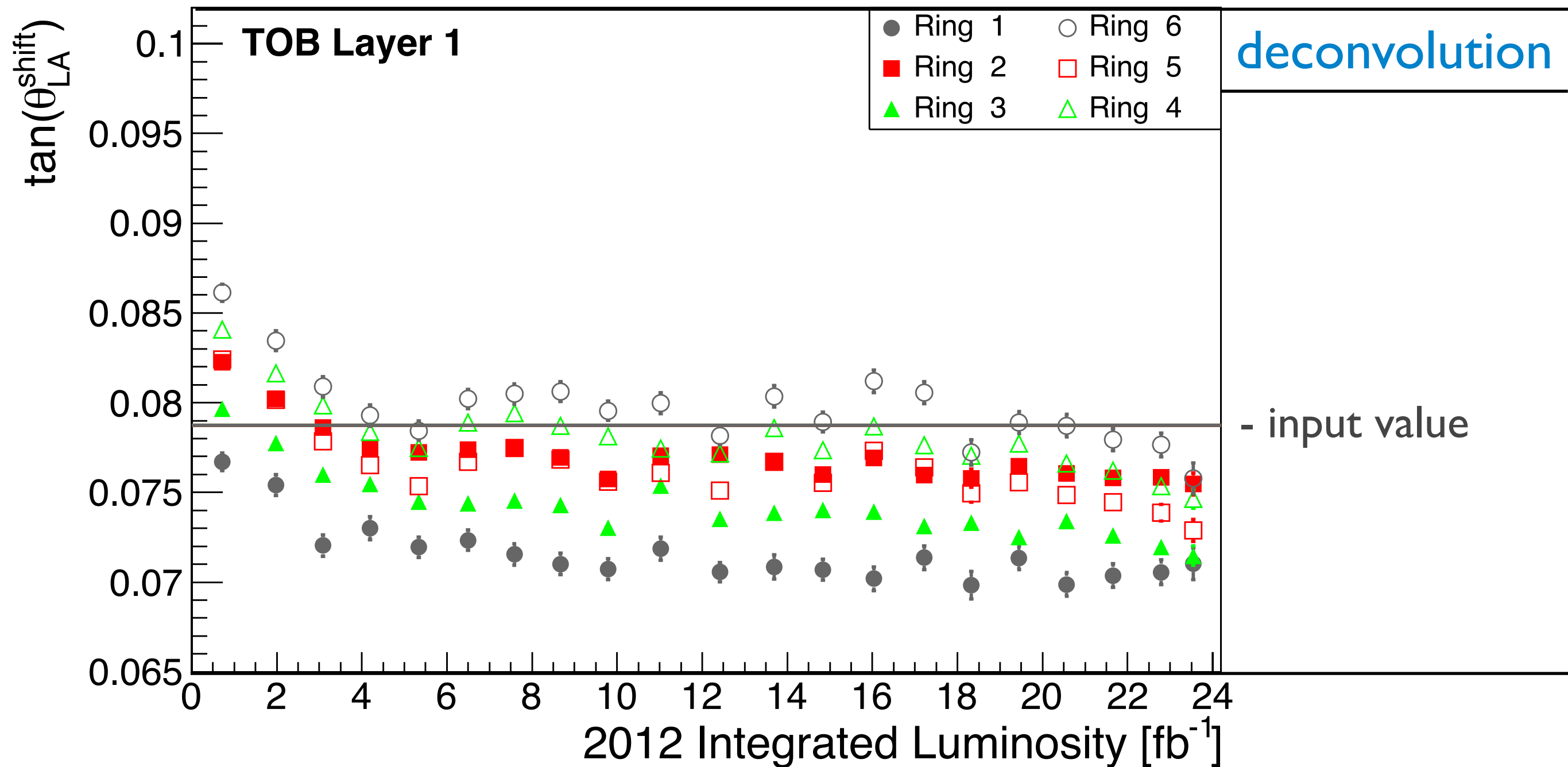
- Almost constant LA.
- Rings 1,3 could be combined.

LA evolution: TOB (Layer 1) [mp1296]



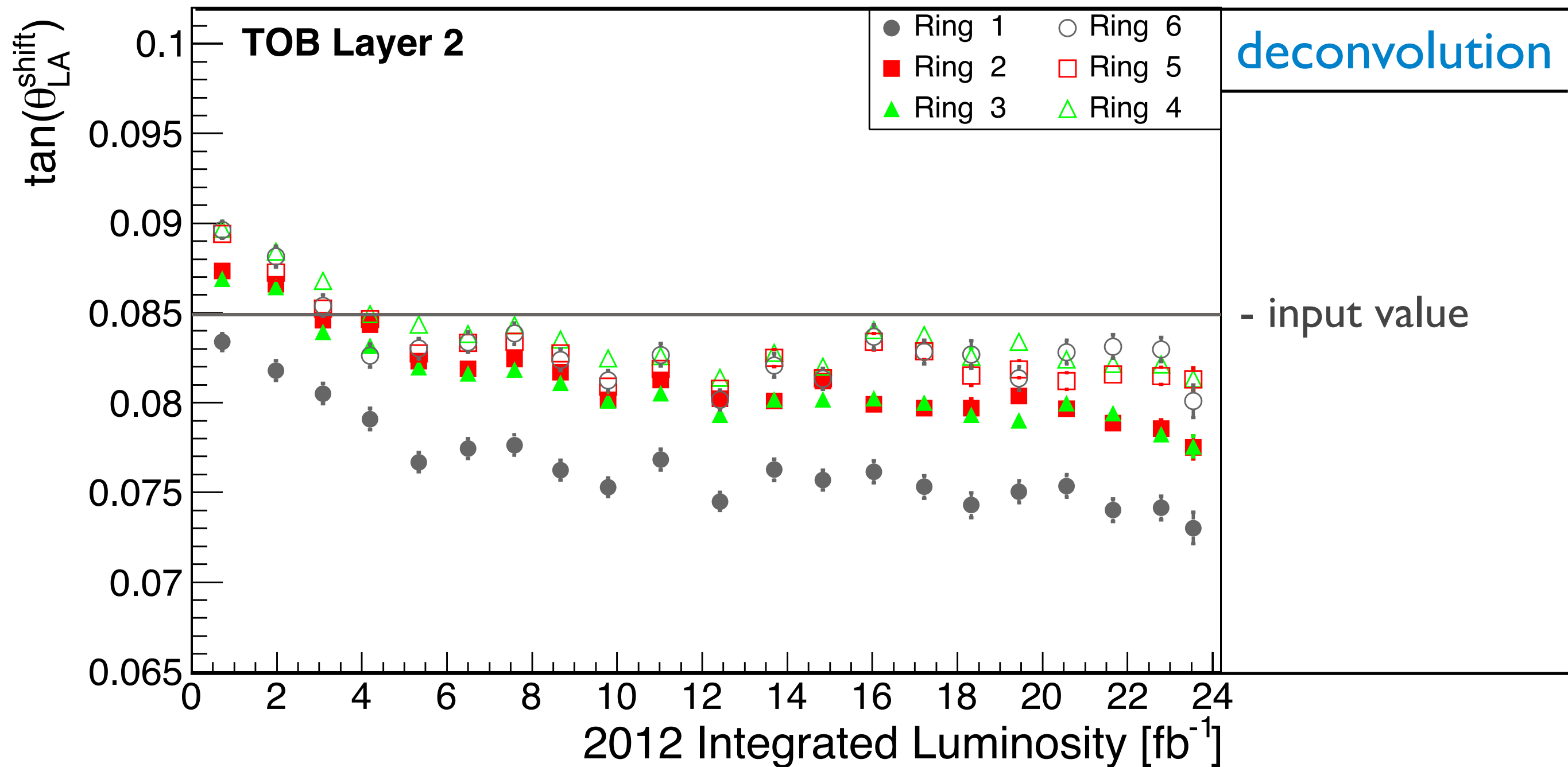
- Quite large spread of absolute values.

LA evolution: TOB (Layer 1) [mp1323]



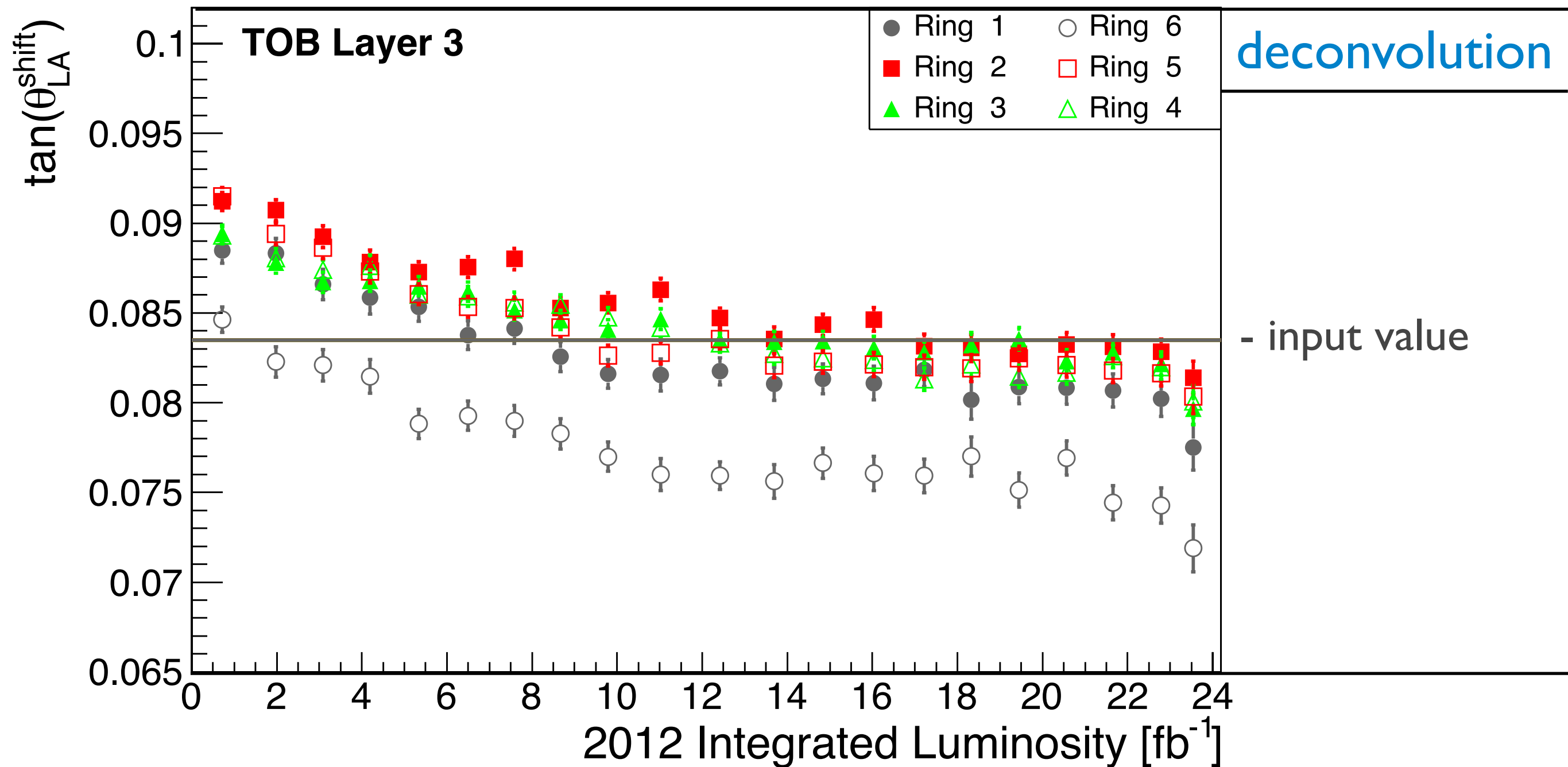
- Smaller spread of the absolute values.
- Offset is real.

LA evolution: TOB (Layer 2) [mp1323]



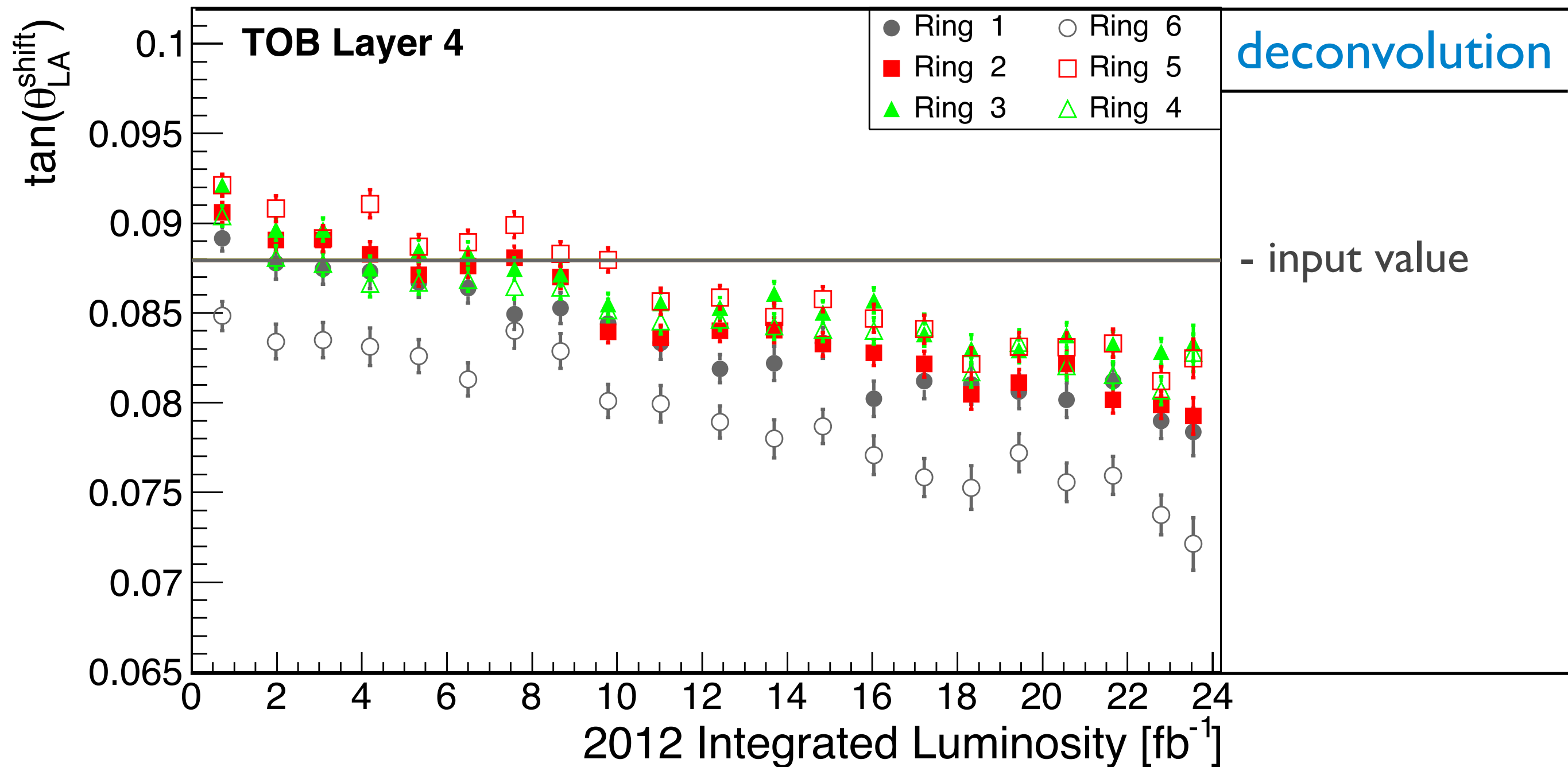
- Offset in the left side of TOB.

LA evolution: TOB (Layer 3) [mp1323]



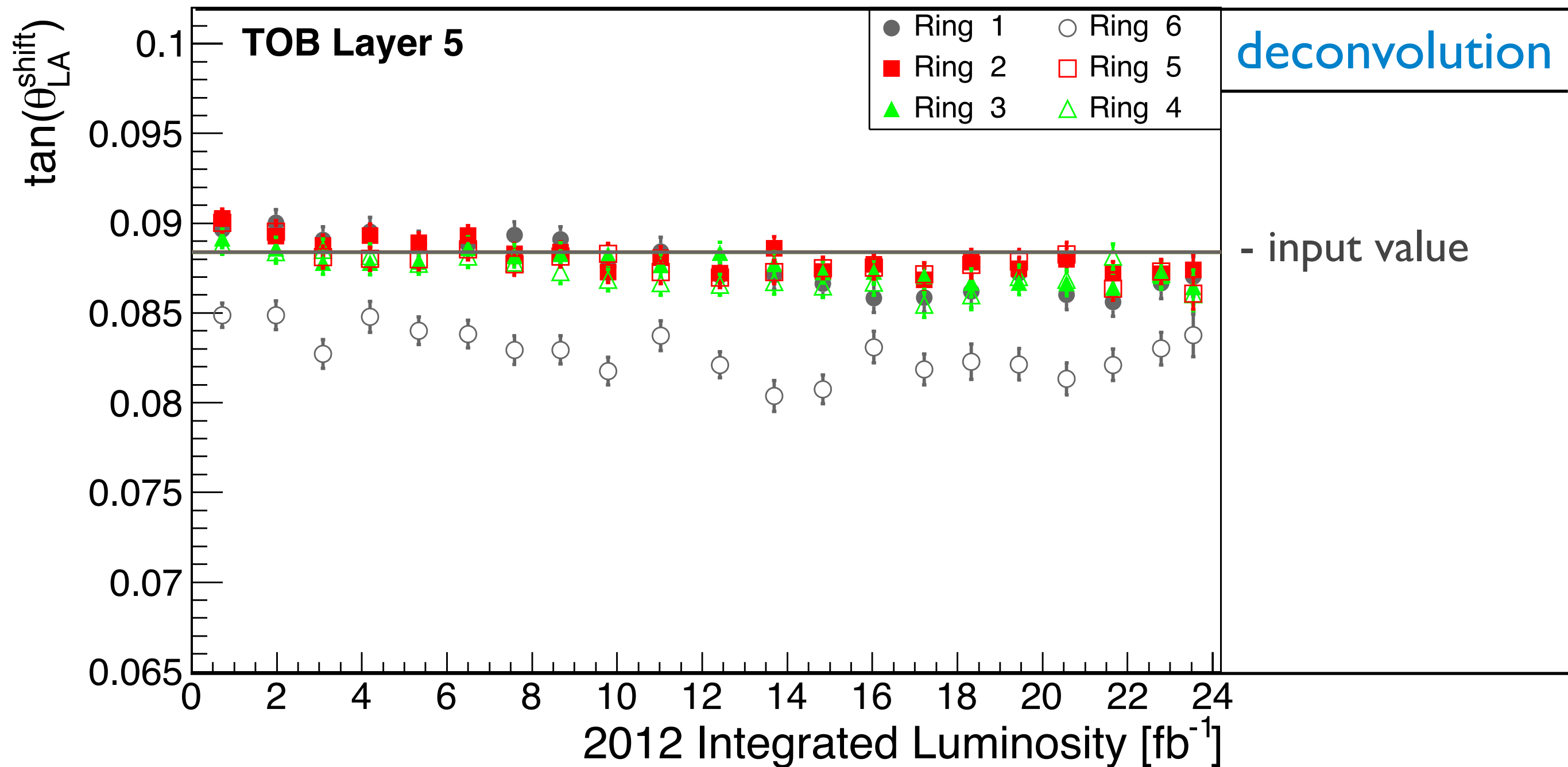
- Offset in the right side of TOB.

LA evolution: TOB (Layer 4) [mp1323]



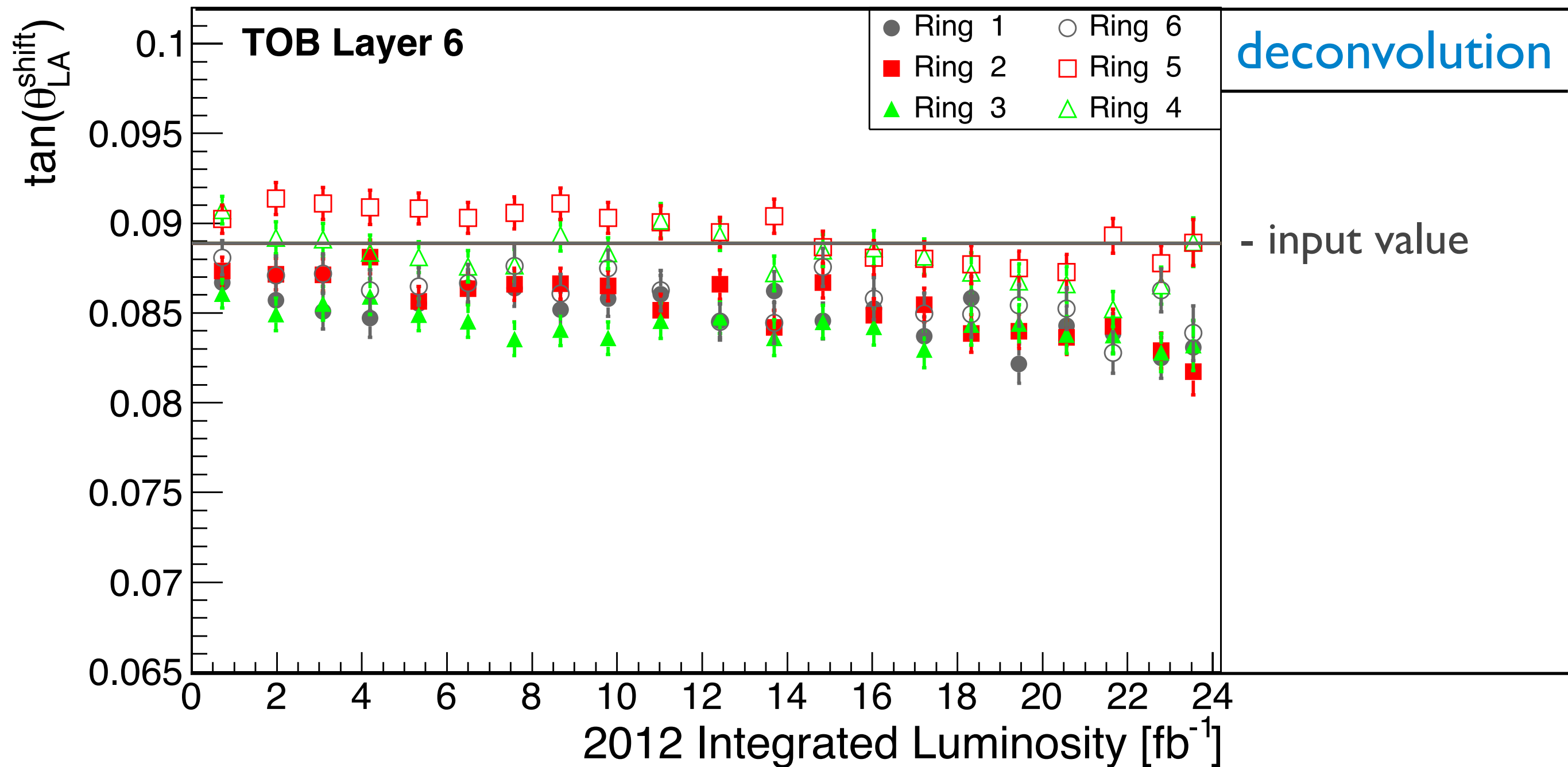
- Offset in the right side of TOB.

LA evolution: TOB (Layer 5) [mp1323]



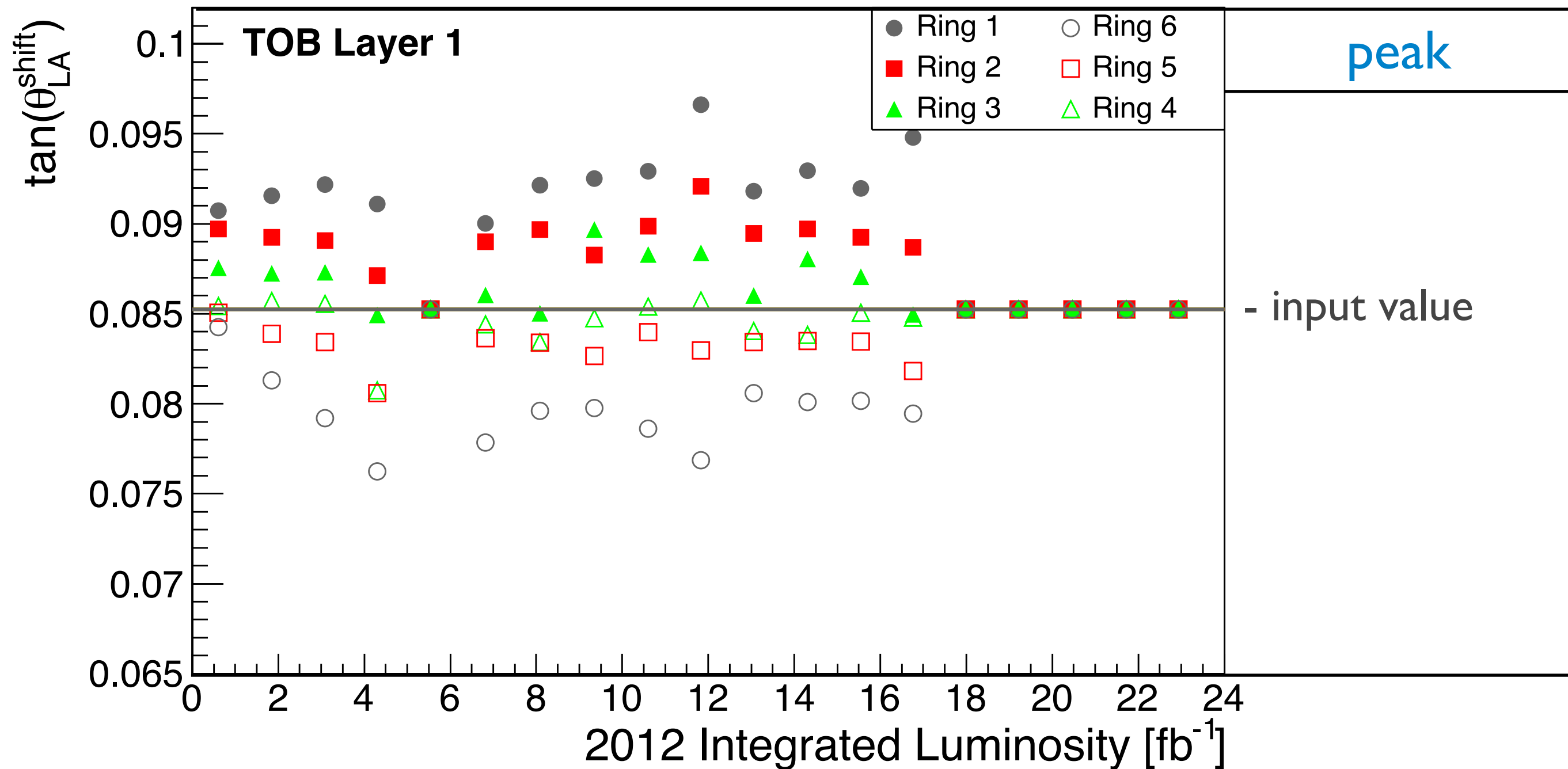
- Offset in the right side of TOB.

LA evolution: TOB (Layer 6) [mp1323]



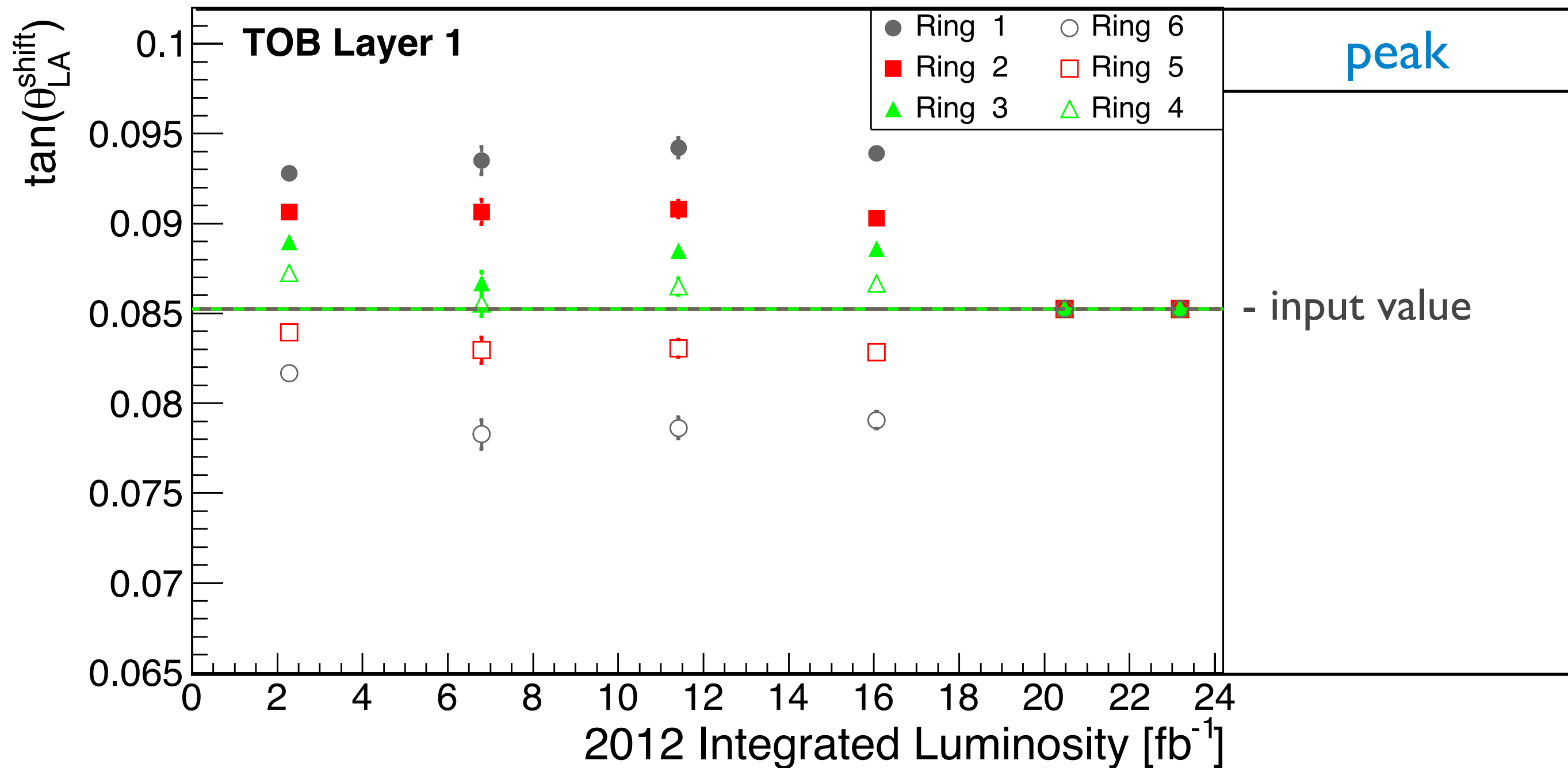
- Offset less significant.

LA evolution: TOB (Layer 1) [mp1296]



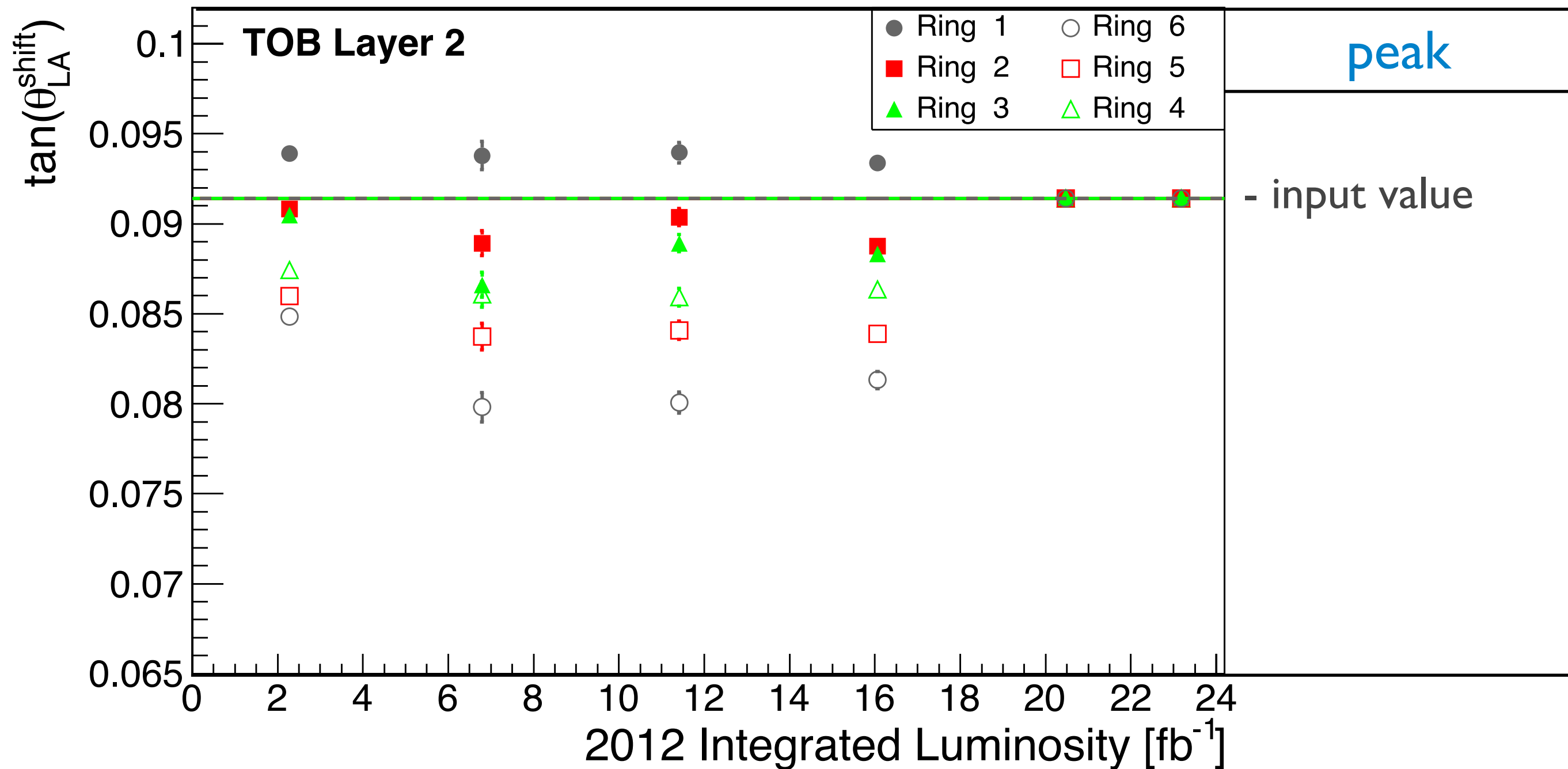
- Quite large spread of absolute values.

LA evolution: TOB (Layer 1) [mp1323]



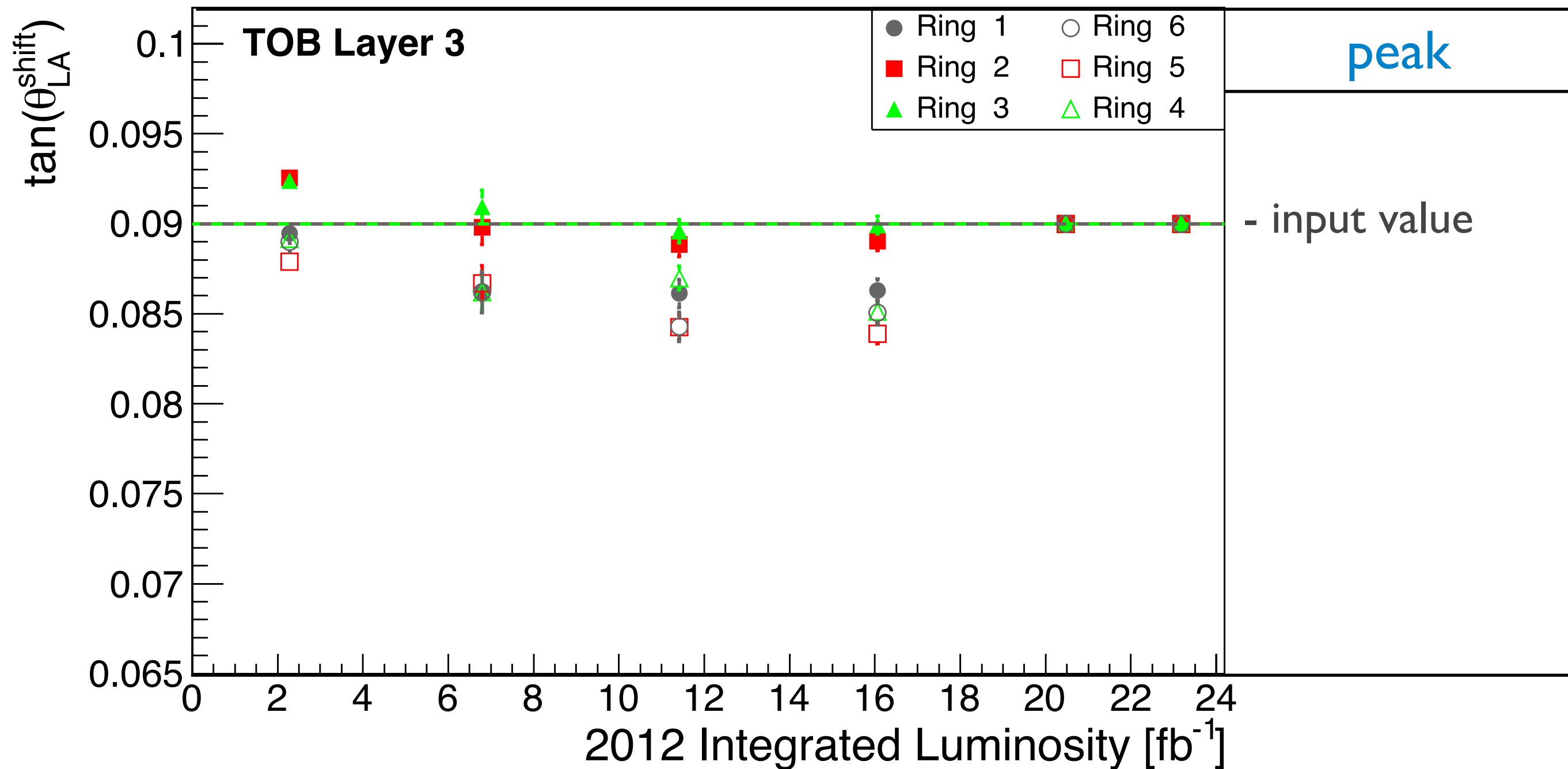
- Very small time dependence.
- Clear offset in all parts along Z.

LA evolution: TOB (Layer 2) [mp1323]



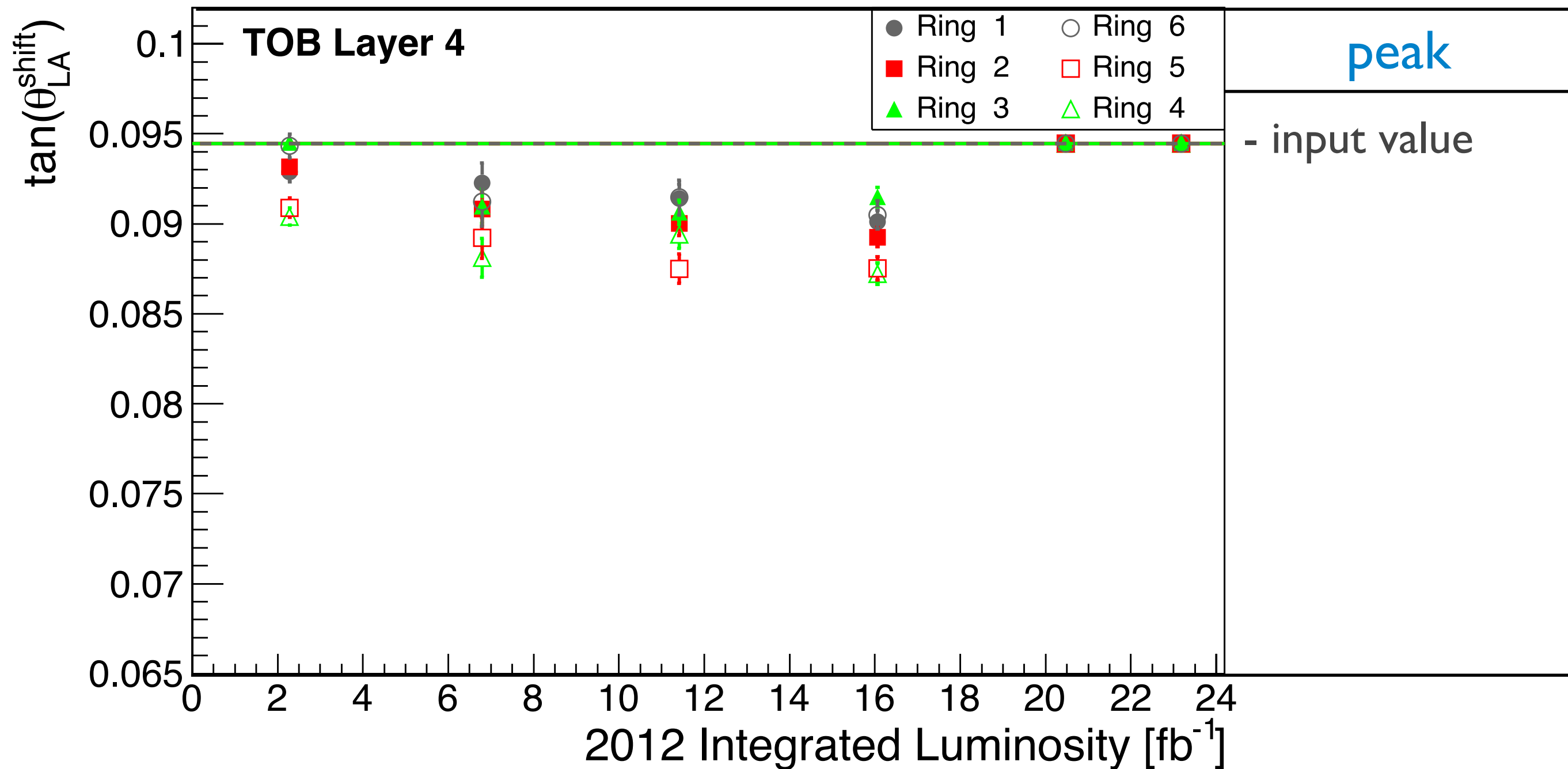
- Very small time dependence.
- Clear offset in all parts along Z.

LA evolution: TOB (Layer 3) [mp1323]



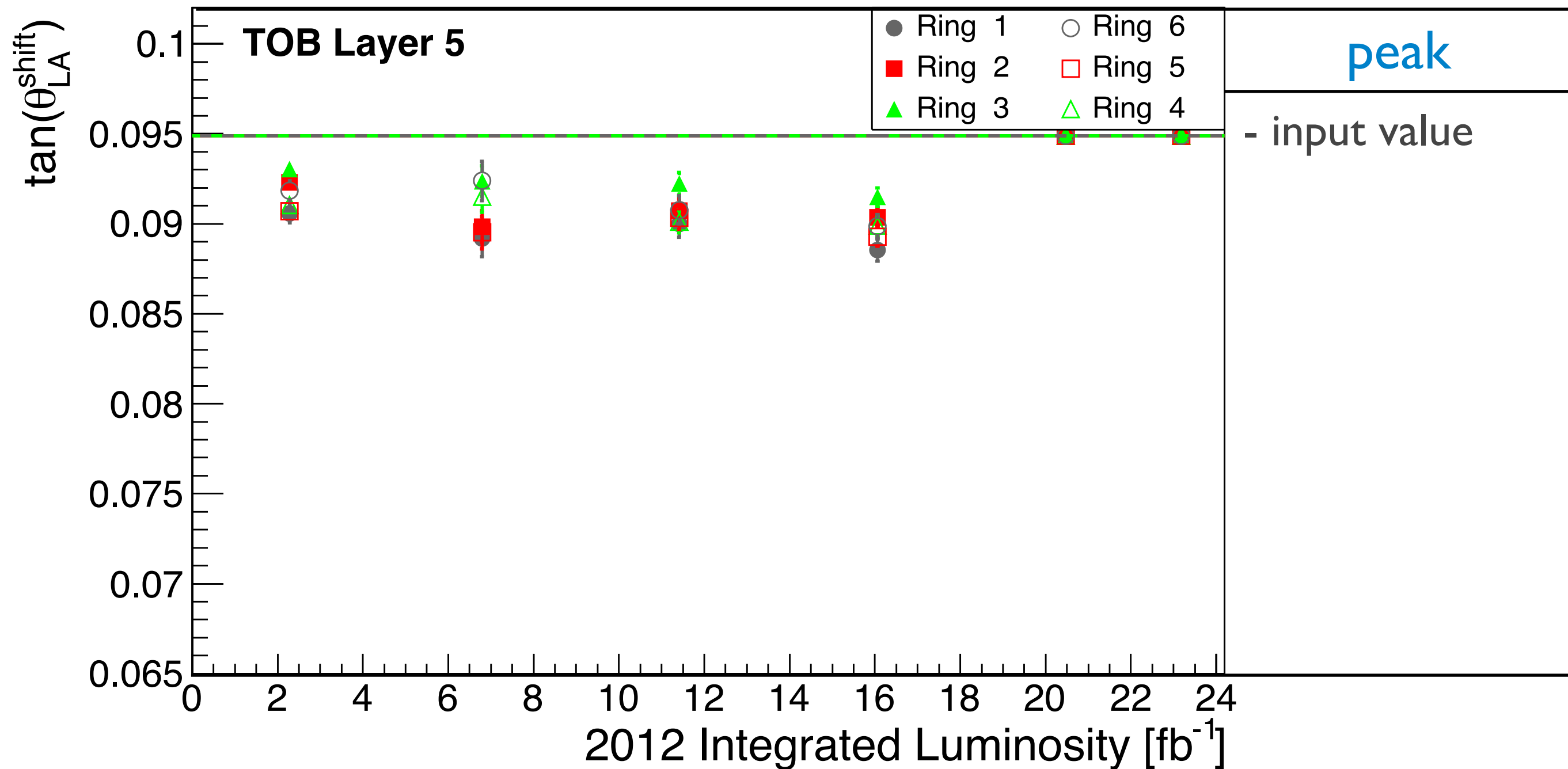
- Larger time dependence.
- Smaller offset.

LA evolution: TOB (Layer 4) [mp1323]



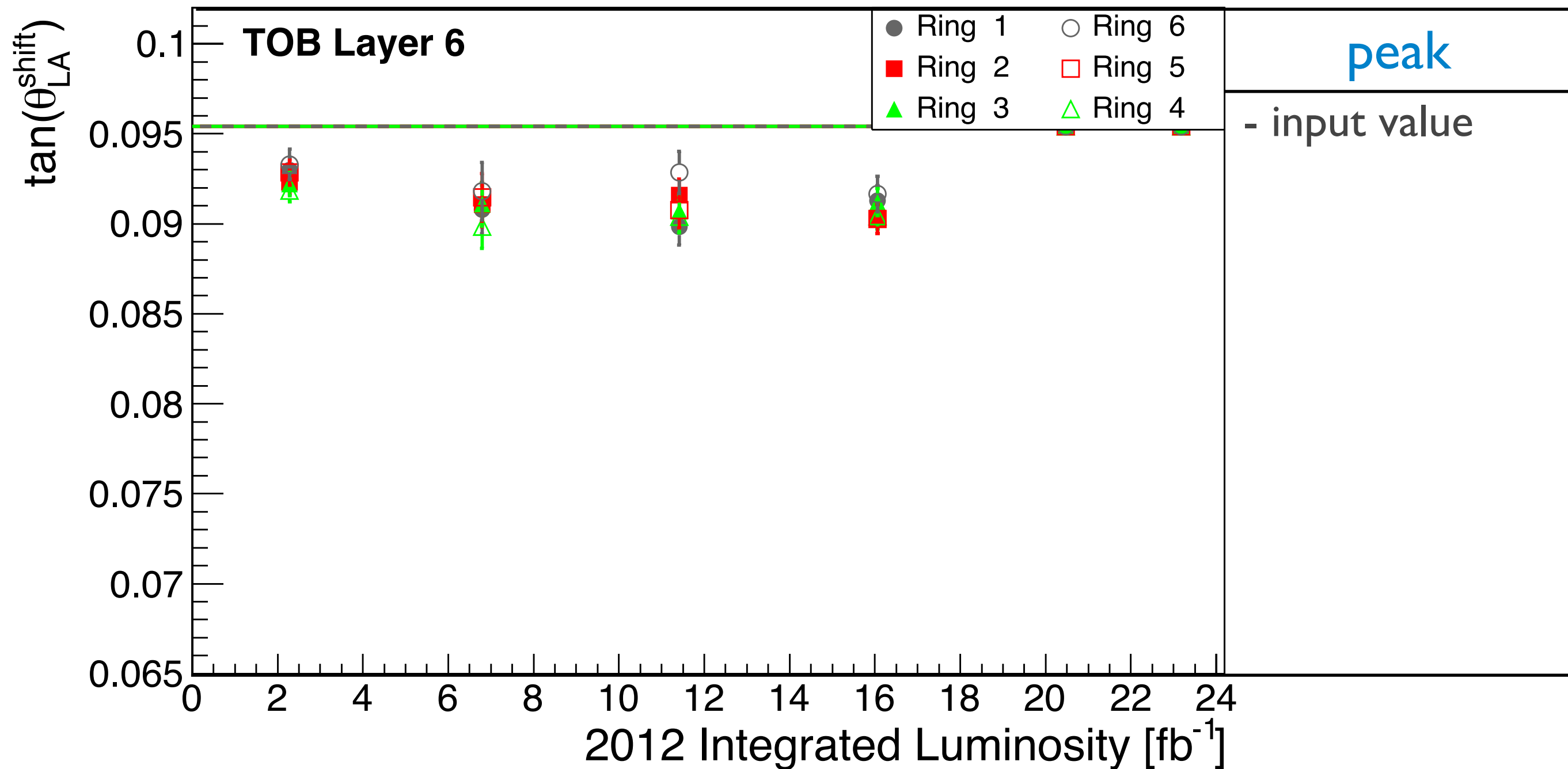
- Visible time dependence.
- Small offset.

LA evolution: TOB (Layer 5) [mp1323]



- All rings could be combined.
- 1 IOV could be enough.

LA evolution: TOB (Layer 6) [mp1323]



- All rings could be combined.
- 1 IOV could be enough.

Conclusion

- New alignment performed with estimated uncertainties for mobility values.
- Lower spatial and time granularity for peak mode allows to see time dependence and offsets in some parts of the detector.
- Validation needed to check the new values more robustly.
- Next alignment can be performed with the optimized granularity.