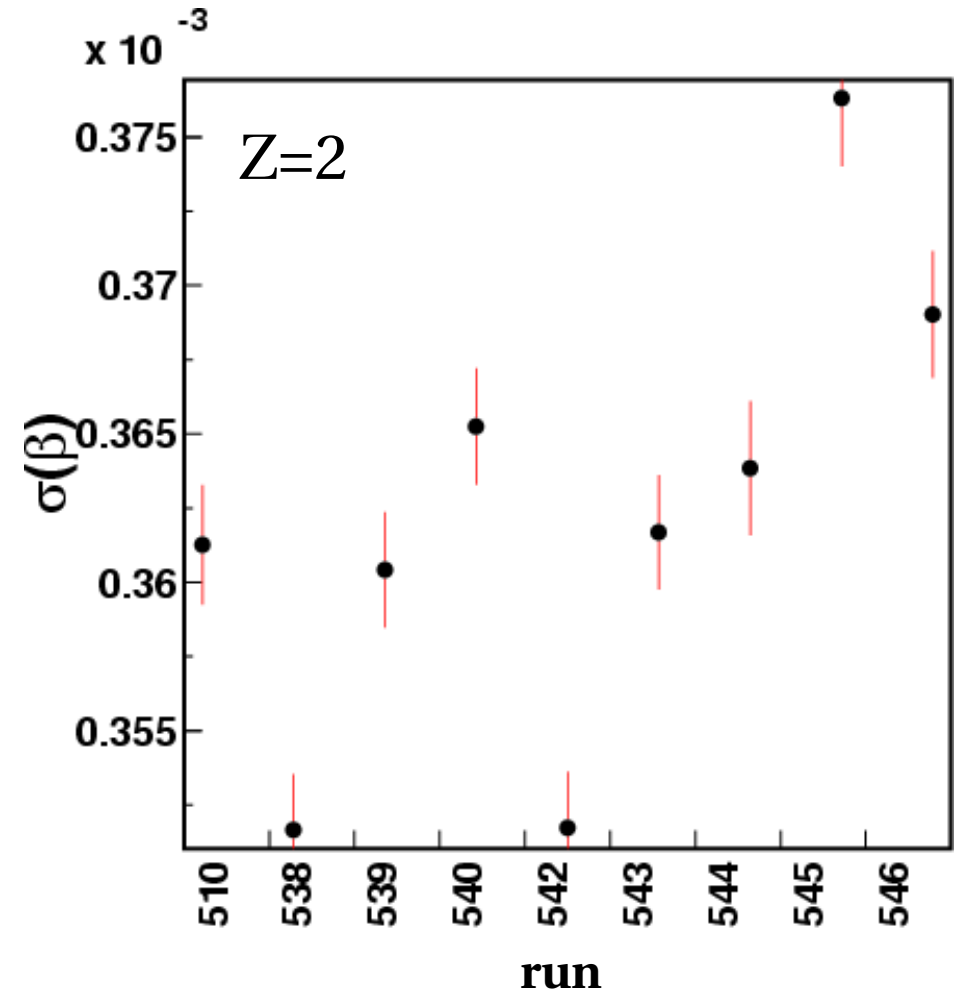
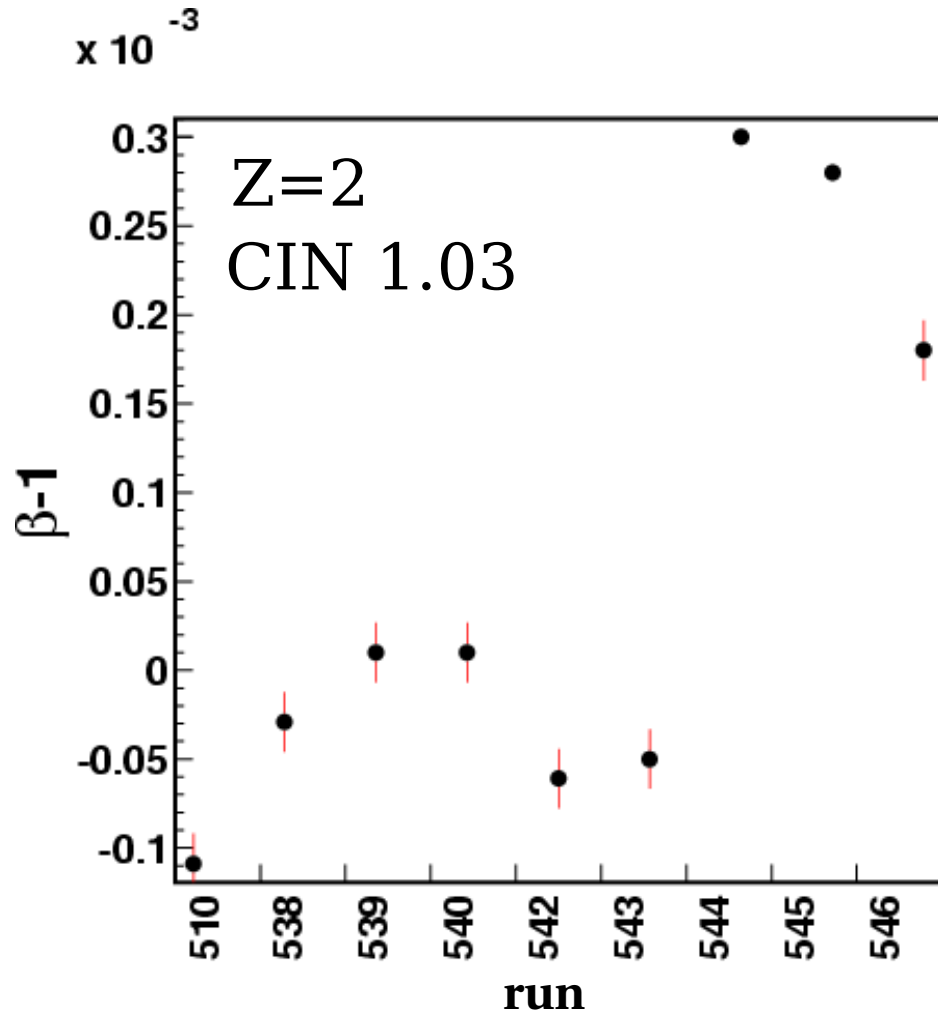


CIN agl. 1.03 and 1.05 uniformity  
from  $\beta$  reconstruction.

## Previous results:

Confusing due to likely systematic fluctuations on beta.



## New analysis:

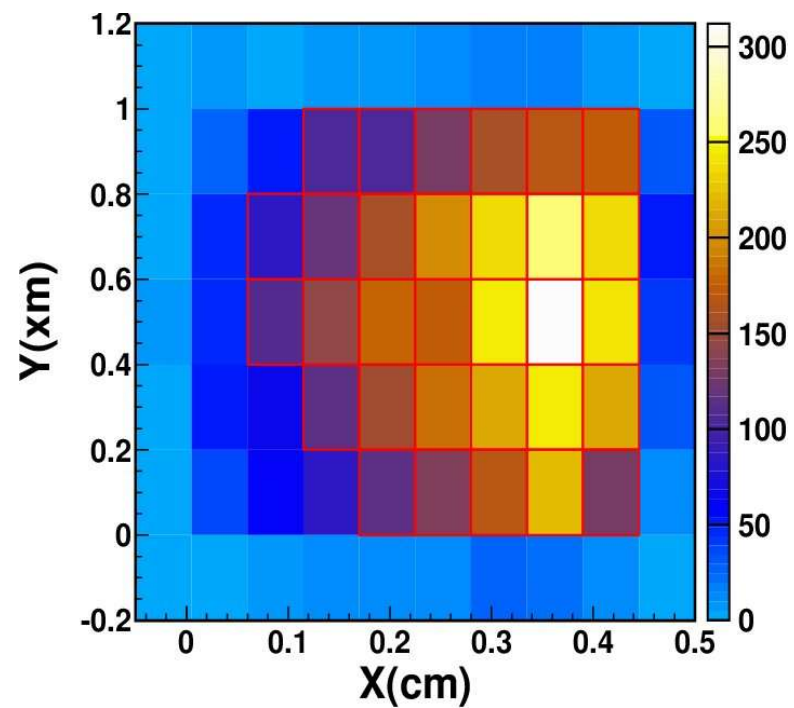
- Use a single run for scanning.
  - A single for for each radiator so fluctuations from the opening/closing cycle are discarded.
  - Relatively wide beams for 607 and 612 compared with other runs, so 'scanning' is possible.
  - Low statistics for each 'scanning point'.
  - Care have to be taken with  $n=1.05$  due to its big Cerenkov radius compared with the PMT matrix.
  - Use  $\beta$  as it is more sensible to index than  $\sigma(\beta)$ .
  - Scales could be important.

## Selection:

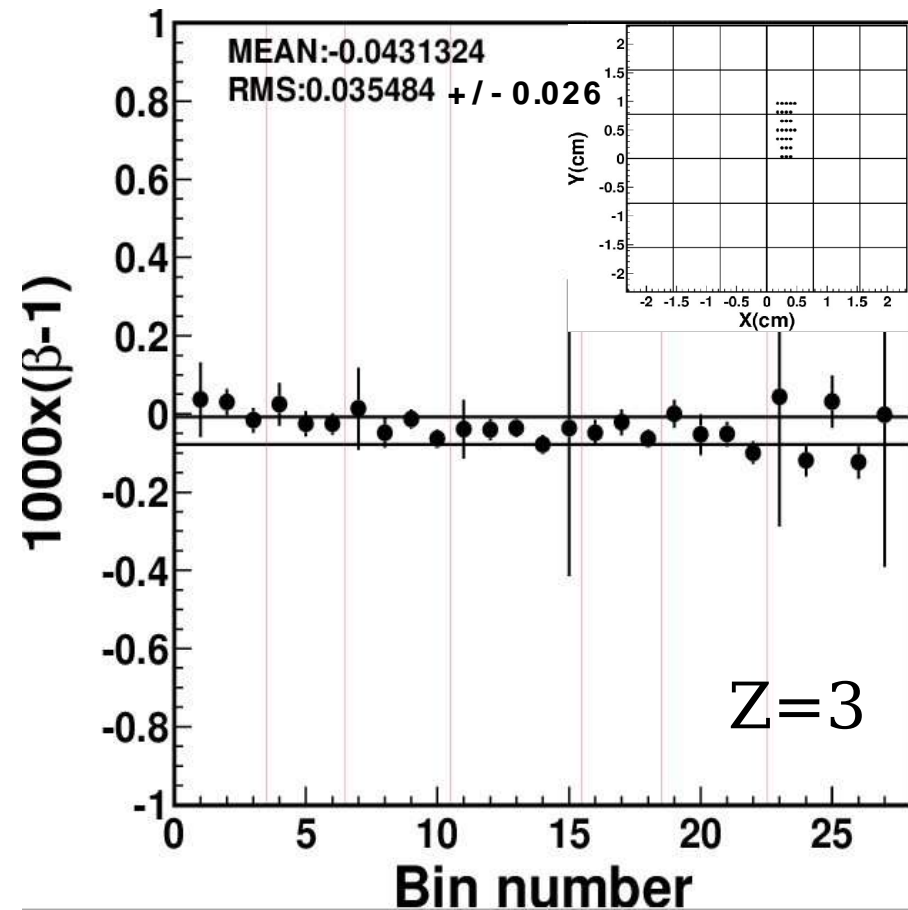
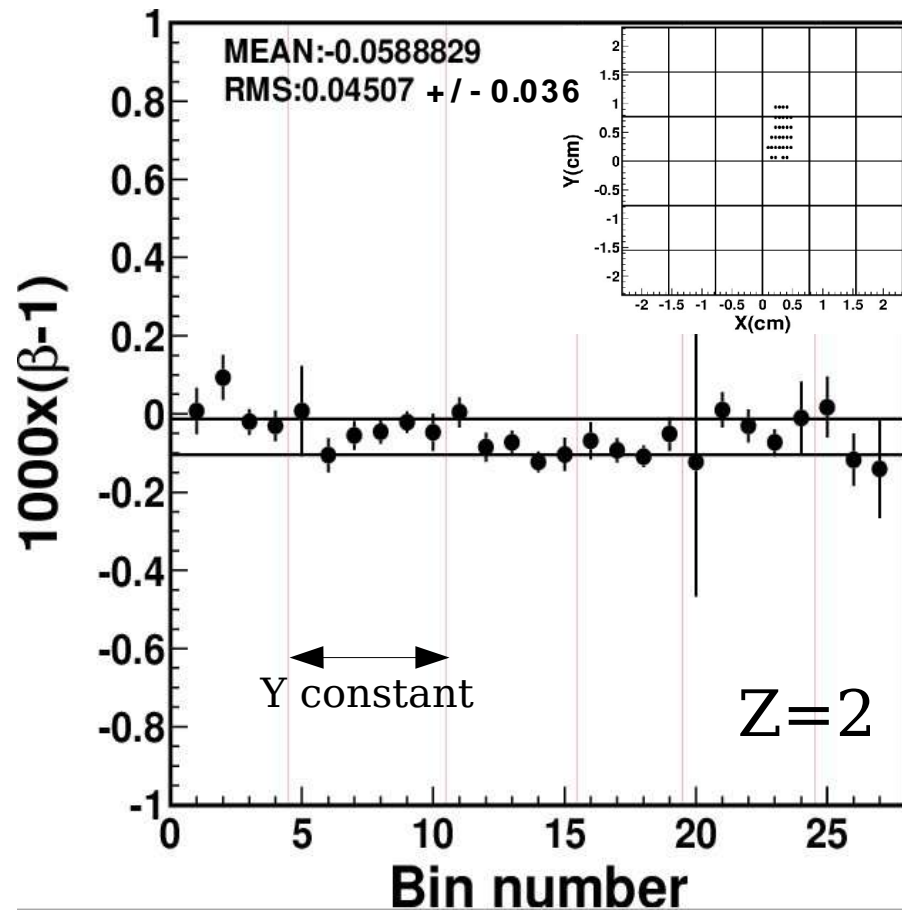
- Use STD track for beta reconstruction.
- Select good reconstructed rings ( $n_{part} < 2$  &  $prob > 3\%$ )
- Select Z using STD K and S side ( $Z=1,2$  or 3)
- Soft Z selection with RICH to discard remaining events with fragmentation.
- Select events in the bulk of the beam profile, **after** selecting Z.

# WIDE BEAM RUNS: 607 & 612

Beam profile (607 Z=3)

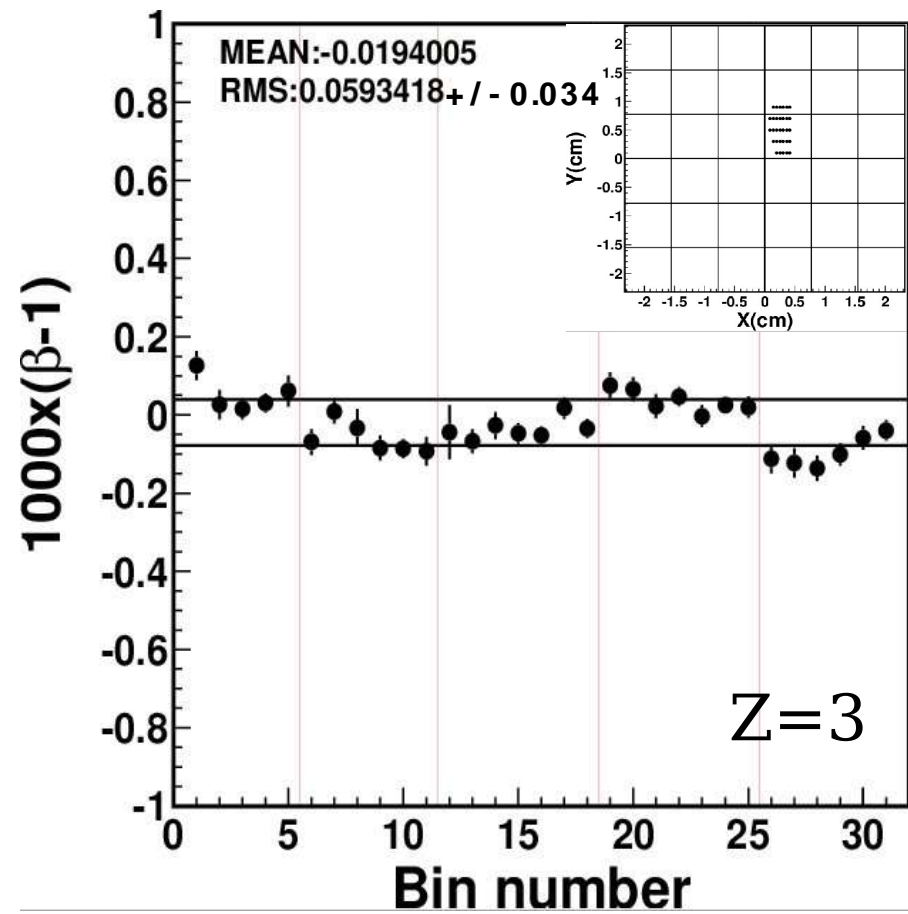
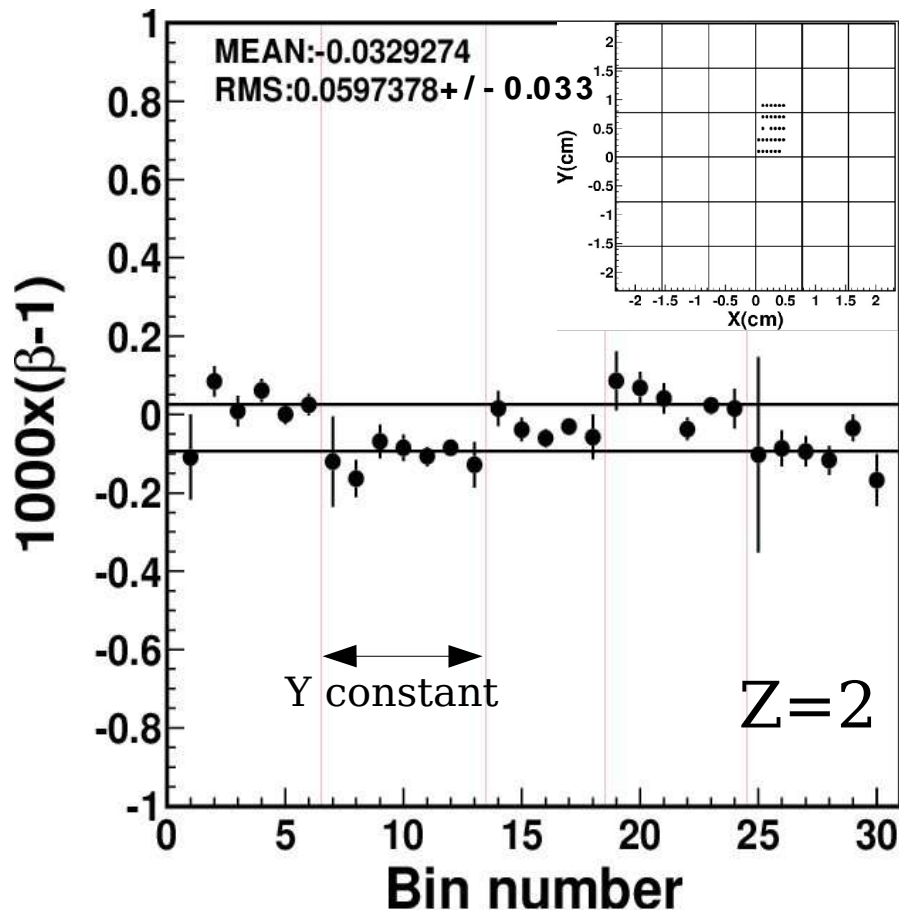


# Run 612: CIN 1.03



- No systematic observed
- Result from MC (Z=2) for similar statistics:  $\text{RMS}=0.031\pm 0.021$
- Result from MC (Z=3) for similar statistics:  $\text{RMS}=0.029\pm 0.021$
- Fine grain value for  $\Delta n=(0.019\pm 0.033(\text{stat}))\times 10^{-3}$  (from Z=3)

# Run 612: CIN 1.05



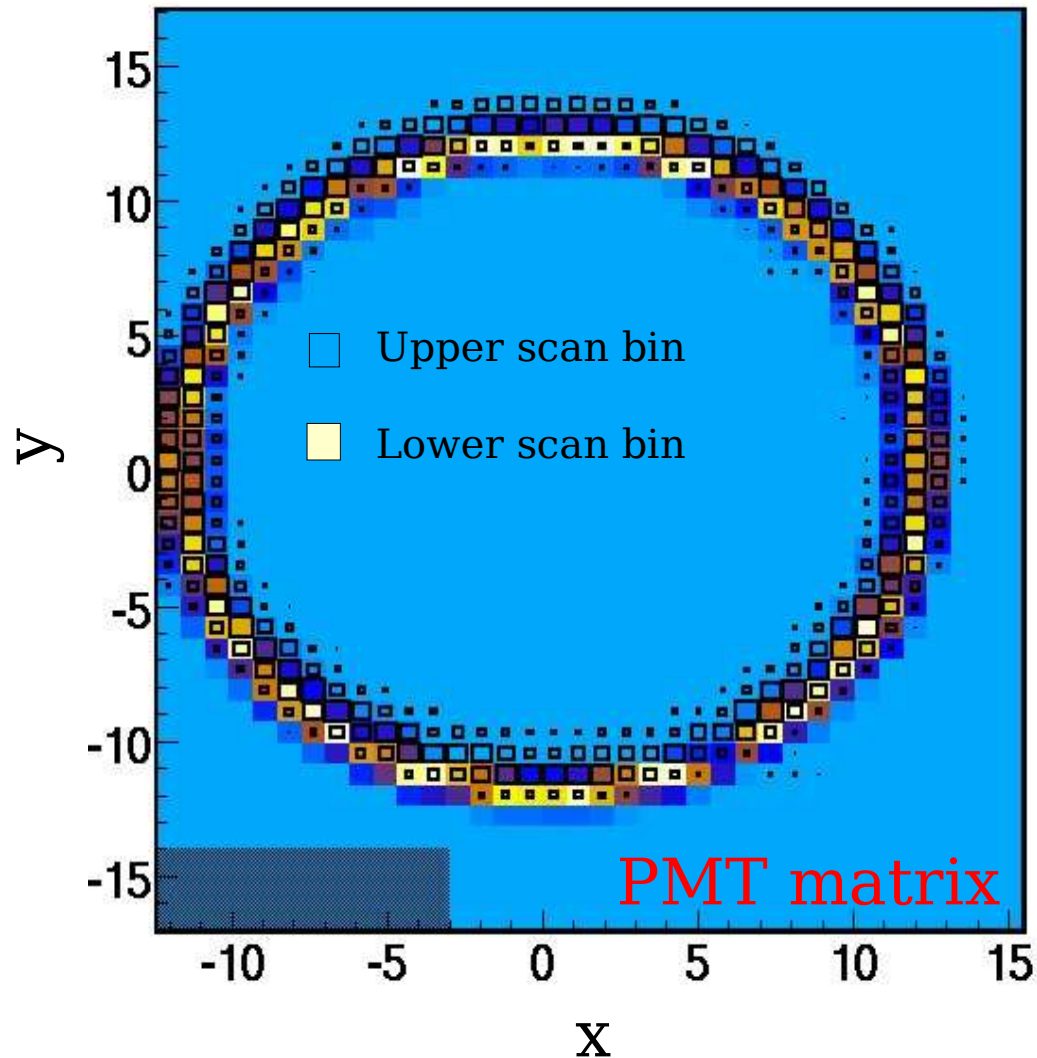
- Systematic observed (dependence with Y).
- Result from MC (Z=2) for similar statistics: RMS=0.044+/-0.034
- Result from MC (Z=3) for similar statistics: RMS=0.031+/-0.022
- Fine grain value for  $\Delta n = (0.050 \pm 0.040(\text{stat})) \times 10^{-3}$  (from Z=3)

## Origin of systematic for CIN 1.05

- Fluctuations on reconstructed  $\beta$  depends only on  $Y$ .
- Not observed in MC data.

# Origin of systematic for CIN 1.05

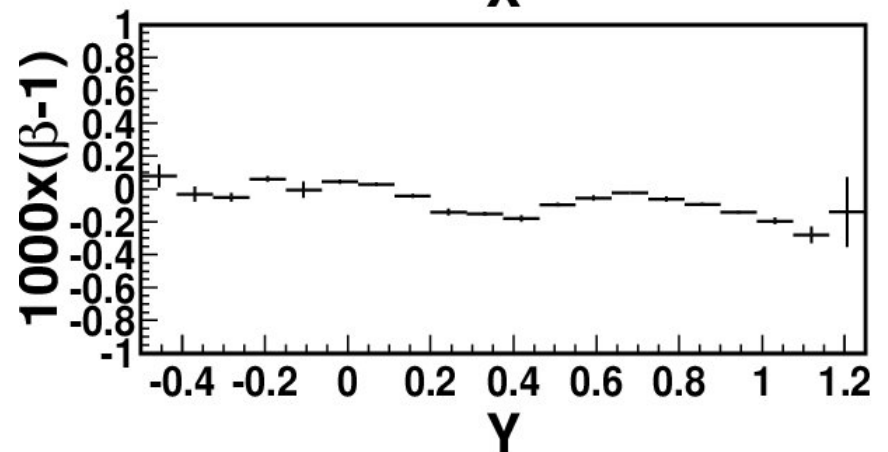
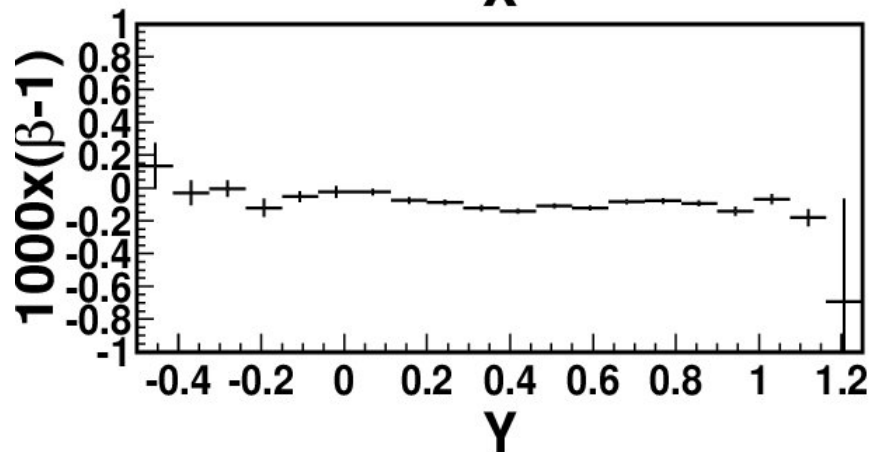
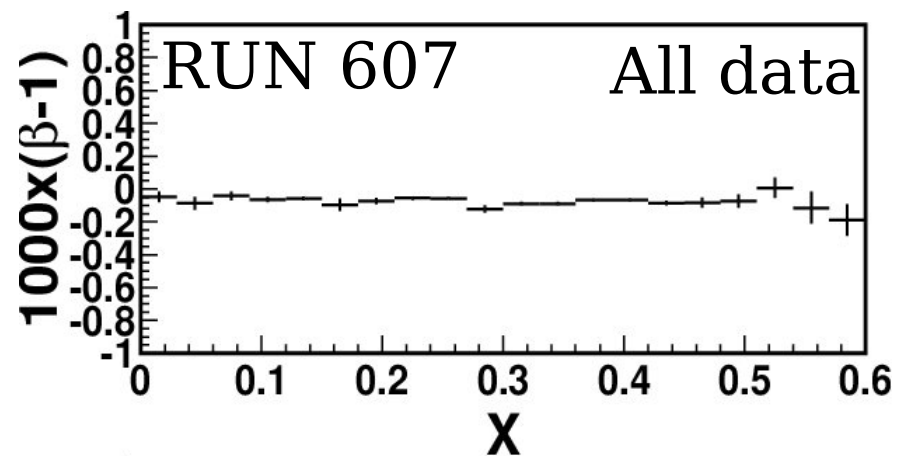
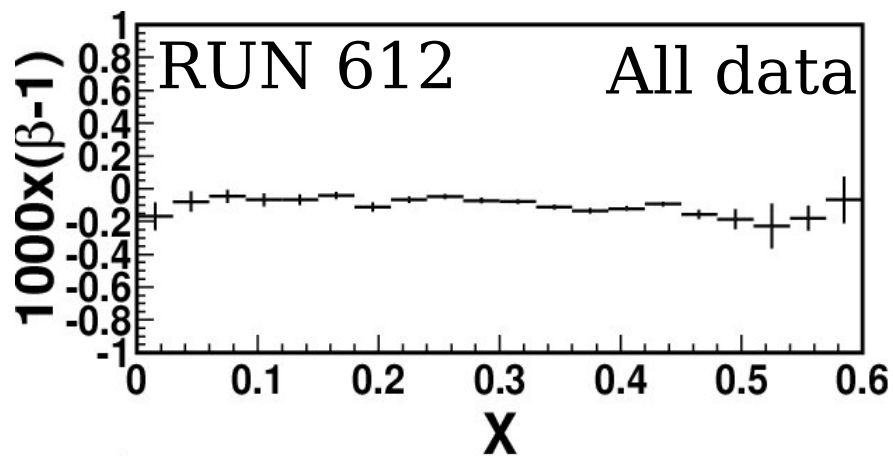
- Fluctuations on reconstructed  $\beta$  depends only on  $Y$ .
- Not observed in MC data.
- Not likely due to lost hits.





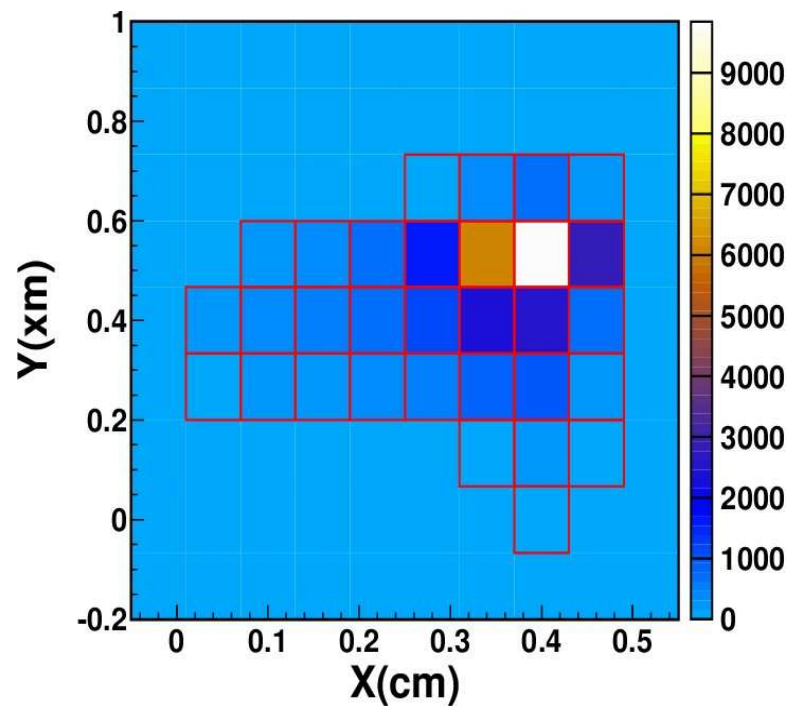
# Origin of systematic for CIN 1.05

- Fluctuations on reconstructed  $\beta$  depends only on  $Y$ .
- Not observed in MC data.
- Not likely due to lost hits.
- Not likely due to real uniformity (unless anisotropy added).

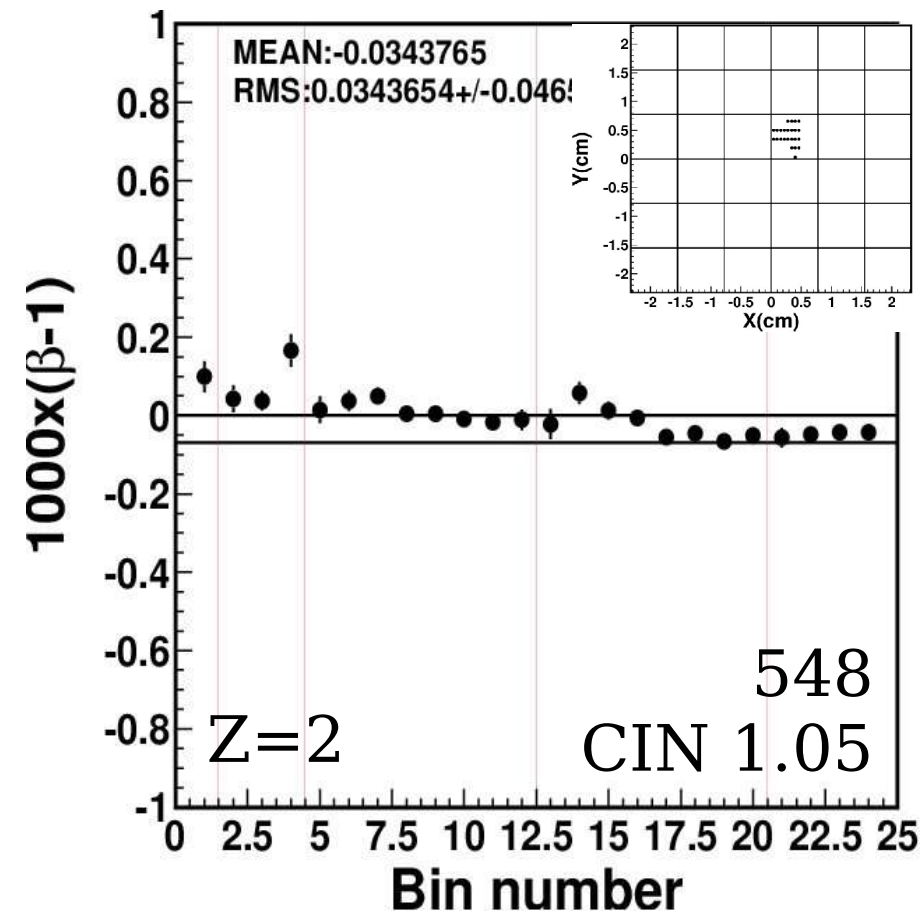
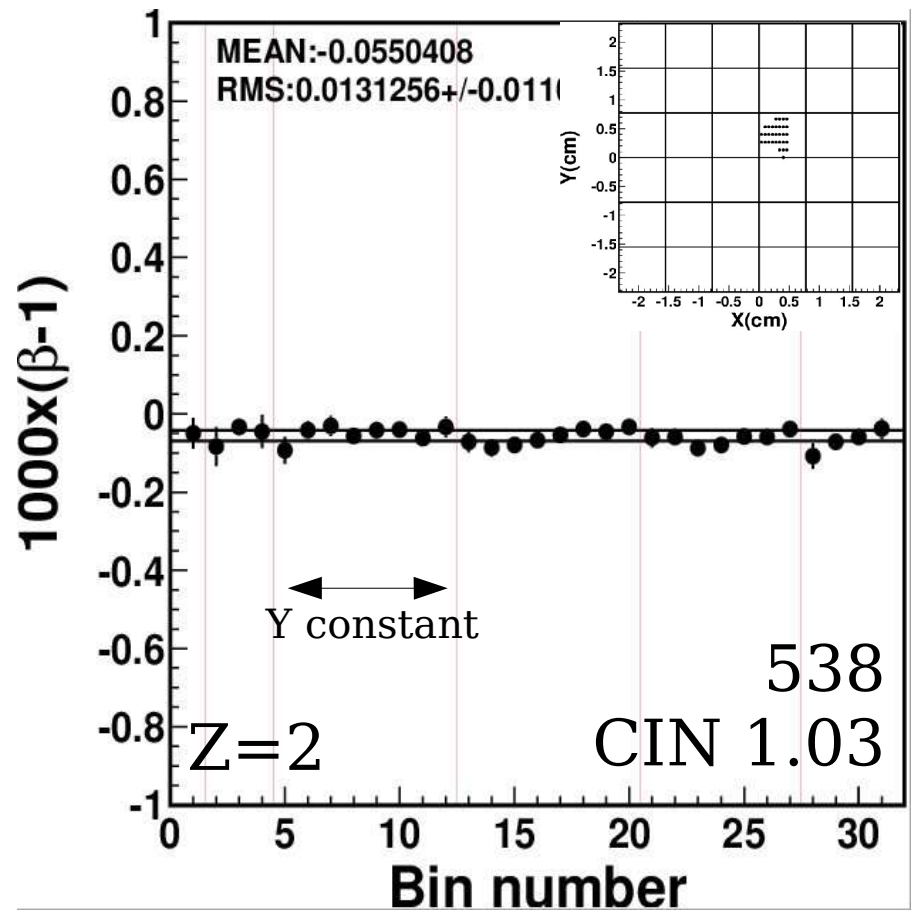


# NARROW BEAM RUNS: 638 & 648

Beam profile (538 Z=2)



# Run 538(CIN 1.03) and 548(CIN 1.05)



## Summary/conclusion

- Uniformity for CIN 1.05 and 1.03 tested with a fine mesh.
- A systematic effect, not likely related to radiator uniformity, has been found for CIN 1.05
- Even with this effect, uniformity in refractive index is better than 0.01% for both radiators:

### Wide beam

RAD	$1000 \times \Delta n$	
1.05	$< 0.050 \pm 0.040$	MC subtracted
1.03	$0.019 \pm 0.033$	

### Narrow beam

RAD	$1000 \times \Delta n$
1.05	$< 0.034 \pm 0.046$
1.03	$< 0.013 \pm 0.011$