A first look at the MB2 chamber geometry using data from Calibration Bench and Cosmics runs

(24 chambers used)

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Muon Barrel Week Aachen, 28th April 2004

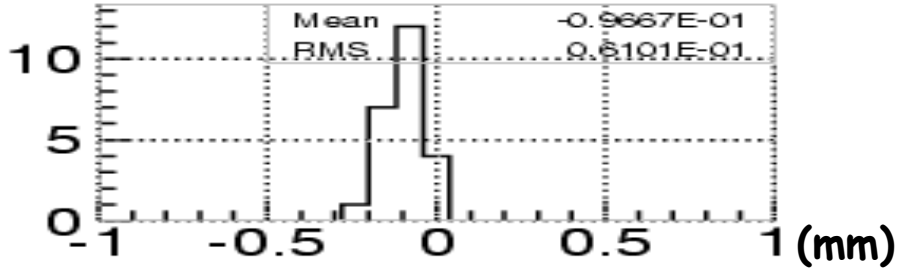
Barrel Chamber calibration bench (G.Bencze): Distance between corner blocks compared to nominal distance

Ciemat

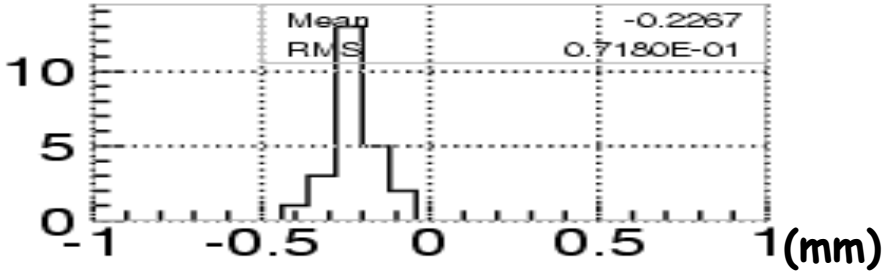
FE side

HV side

SL P1

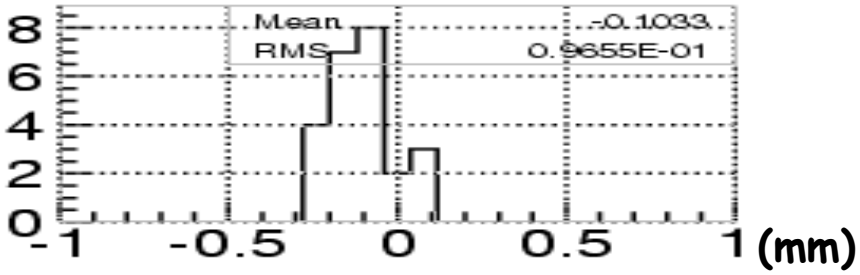


side length ISR - nominal slP1 FE

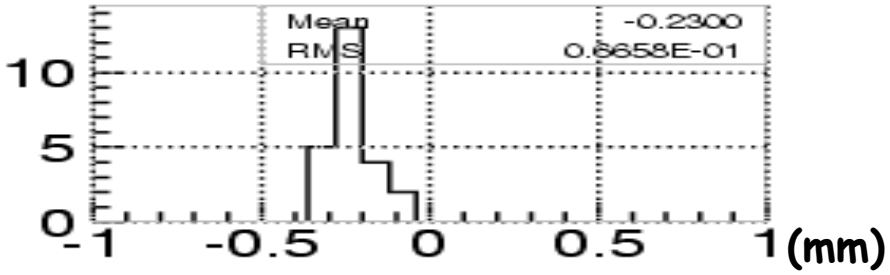


side length ISR - nominal slP1 HV

SL P2

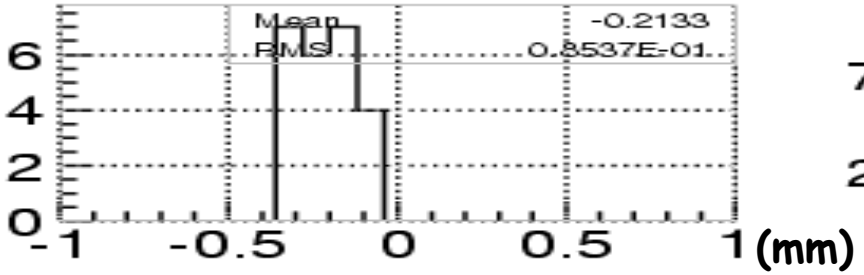


side length ISR - nominal slP2 FE

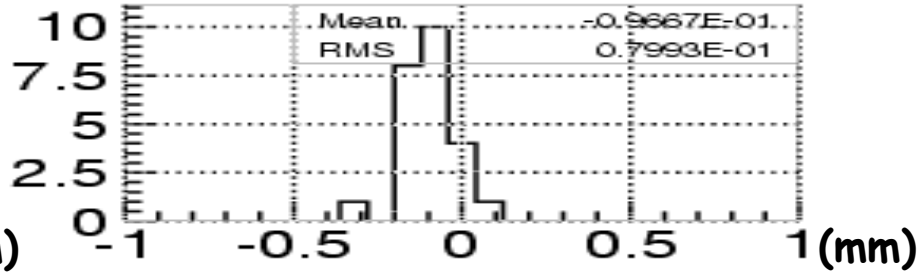


side length ISR - nominal slP2 HV

SL Z



side length ISR - nominal slZ FE



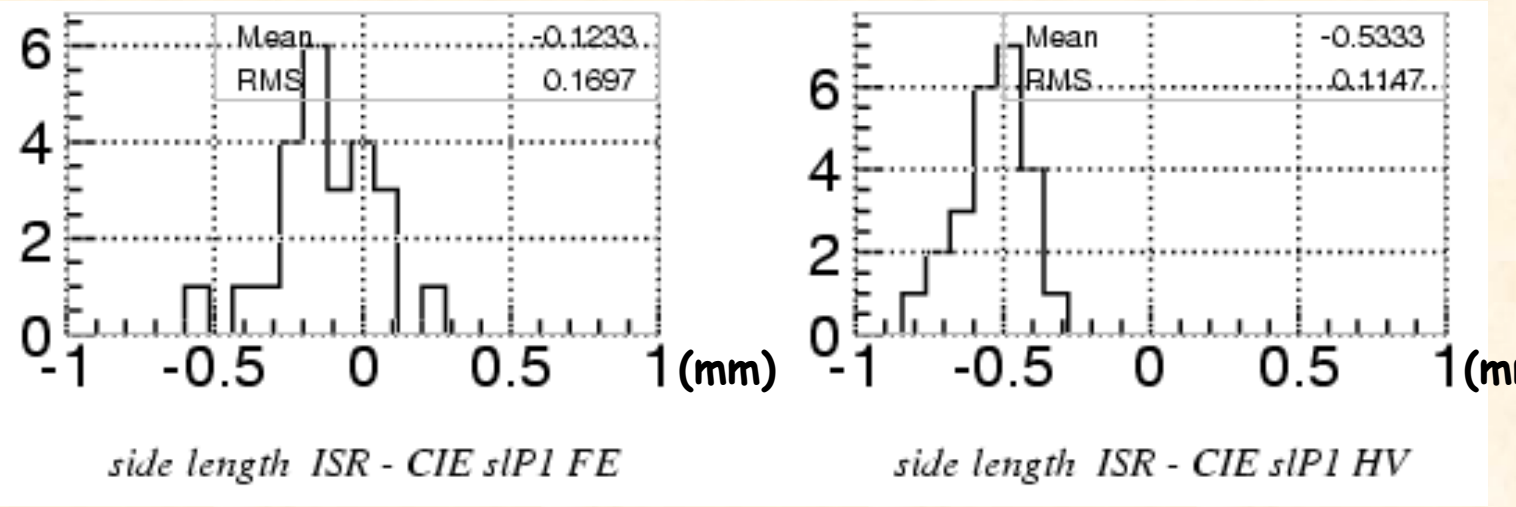
side length ISR - nominal slZ HV

Compare calibration bench to measurements at CIEMAT

- Good agreement for FE side measurement
- ~400 μm disagreement for HV side measurement
  - ✓ We believe this can be tackled back to one the the Corner Block templates used in the HV side at CIEMAT. To be confirmed

FE side **HV side**

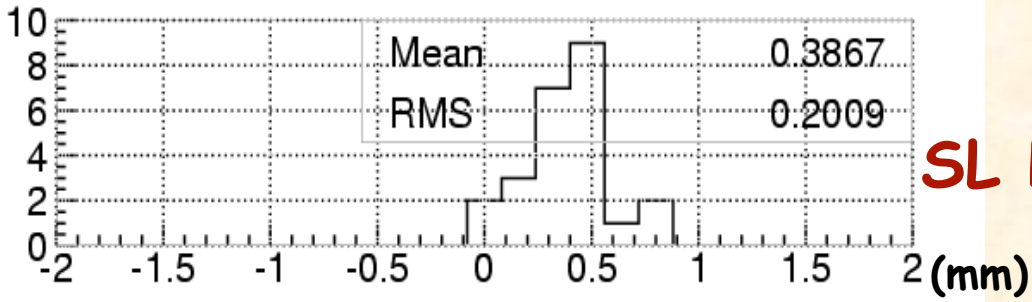
SL P1



Barrel Chamber calibration bench (G.Bencze): **Chamber planarity**

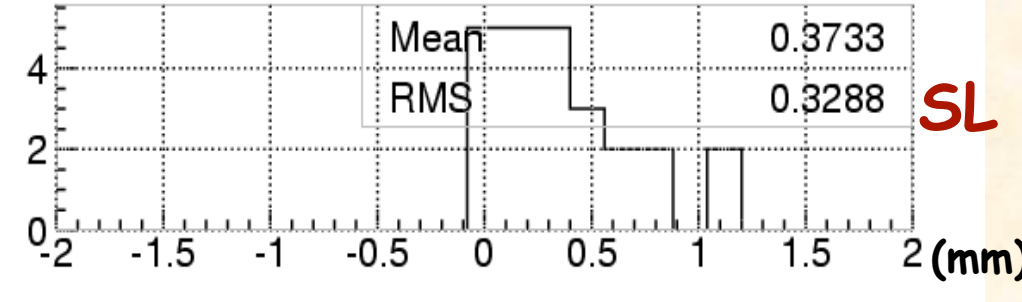
- 3 CB define a plane:
we look at the distance from this plane to the 4th corner block

- Results are quite satisfactory



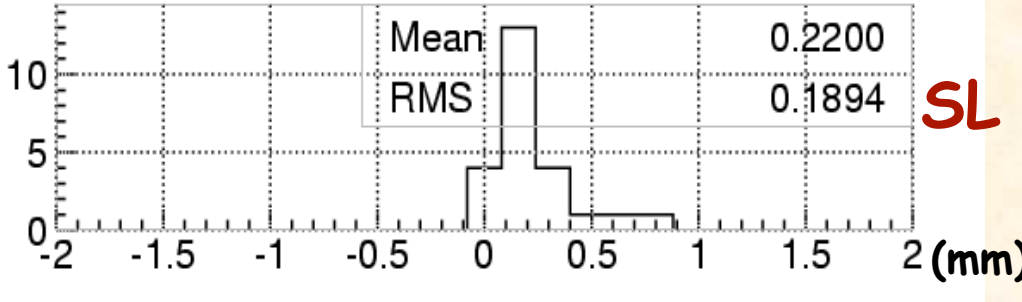
SL P1

planarity slP1



SL P2

planarity slP2



SL Z

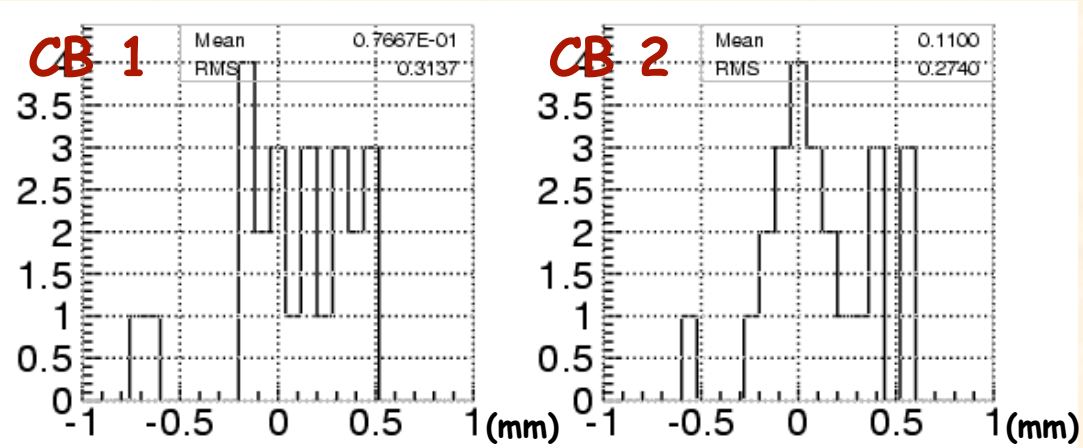
planarity slZ

Barrel Chamber calibration bench (G.Bencze):
Distance between the 2 □ SL's

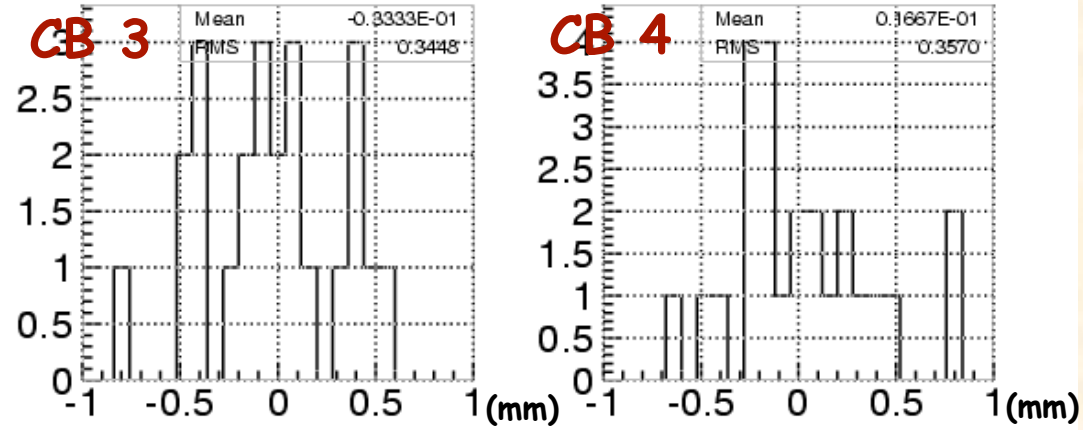
- This is an important parameter that should go to the chamber database
- It depends mainly on the Honeycomb thickness

Mean: 50-100 □m

RMS : ~300 □m



Difference height two CBs phi1-phi2 ISR cbFE



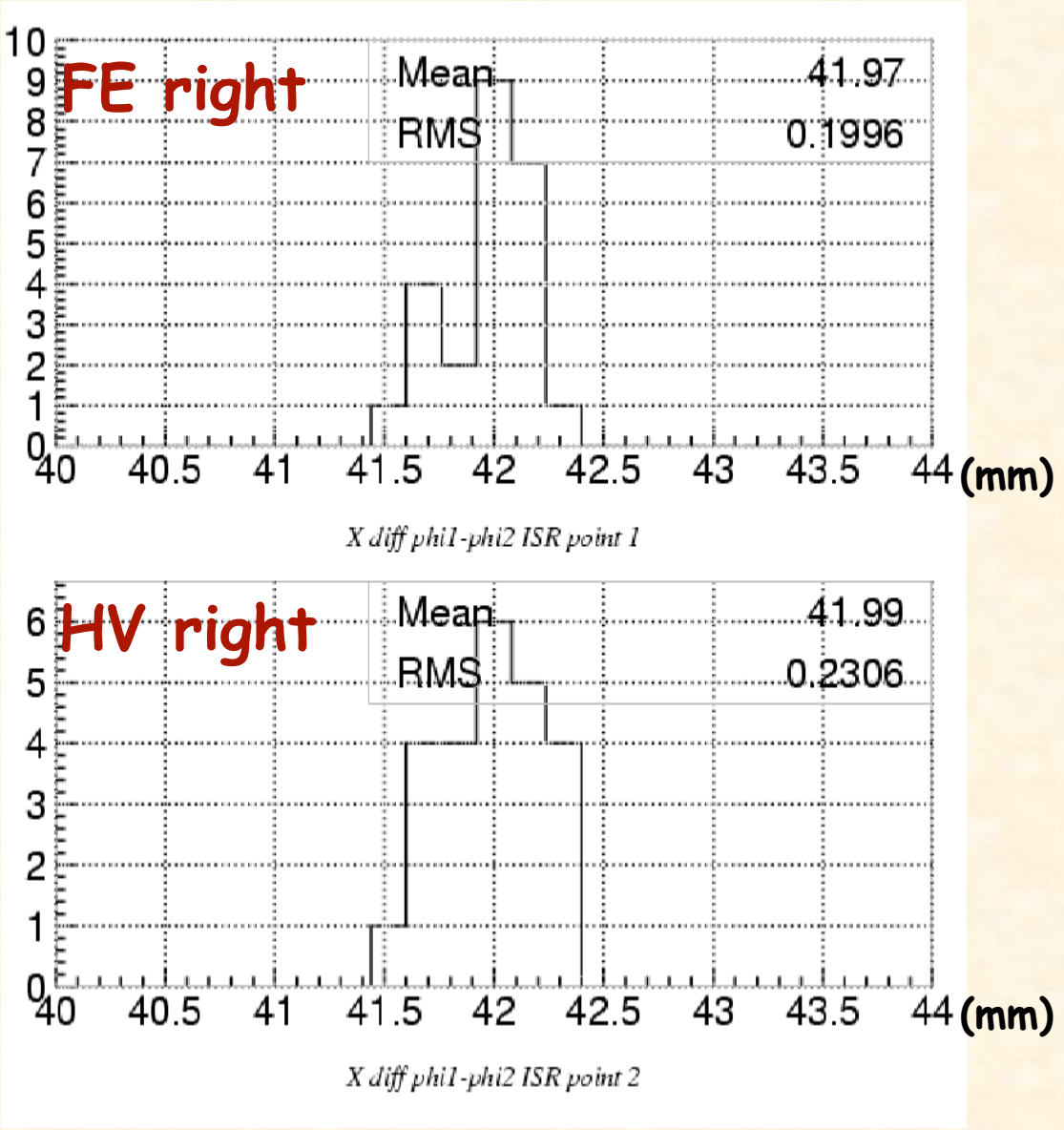
Difference height two CBs phi1-phi2 ISR cbHV

Barrel Chamber calibration bench (G.Bencze): Mechanical alignment of the two SL's

- This gives the alignment of the two SL's.
- It should go to the chamber database

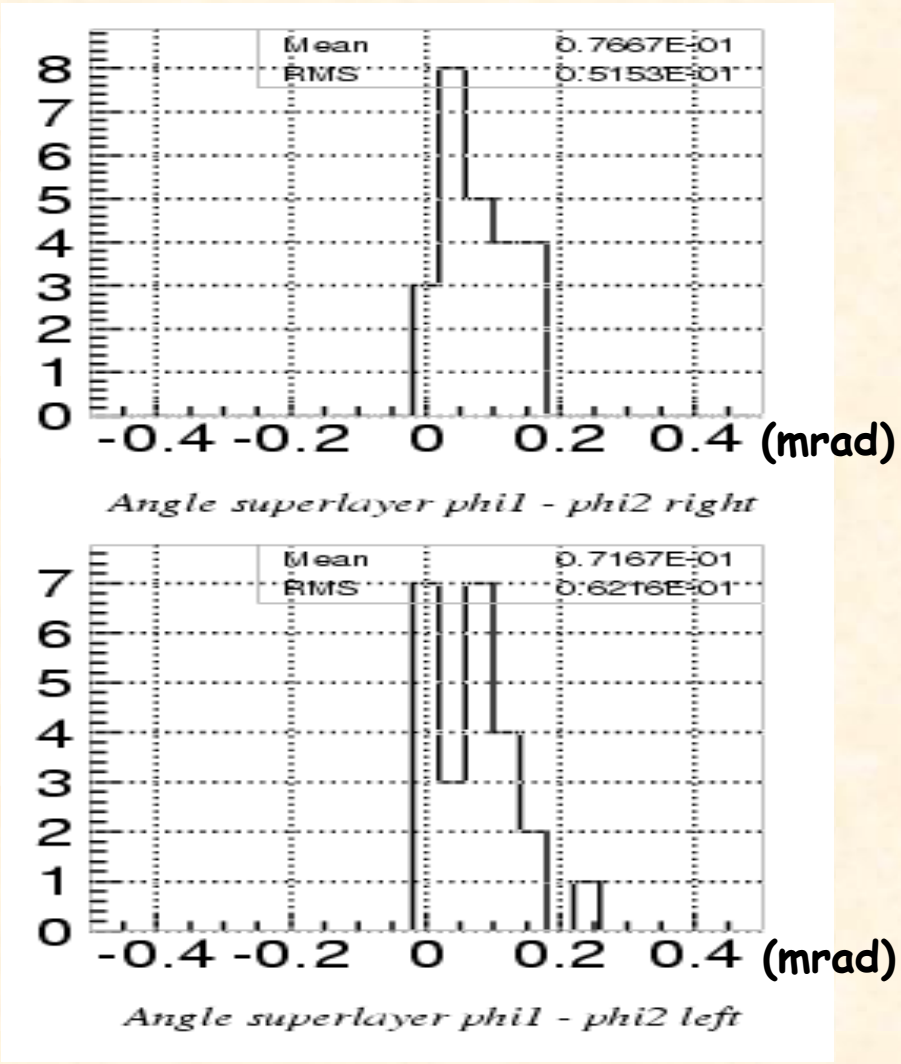
Mean: 20-30 m

RMS : ~200 m

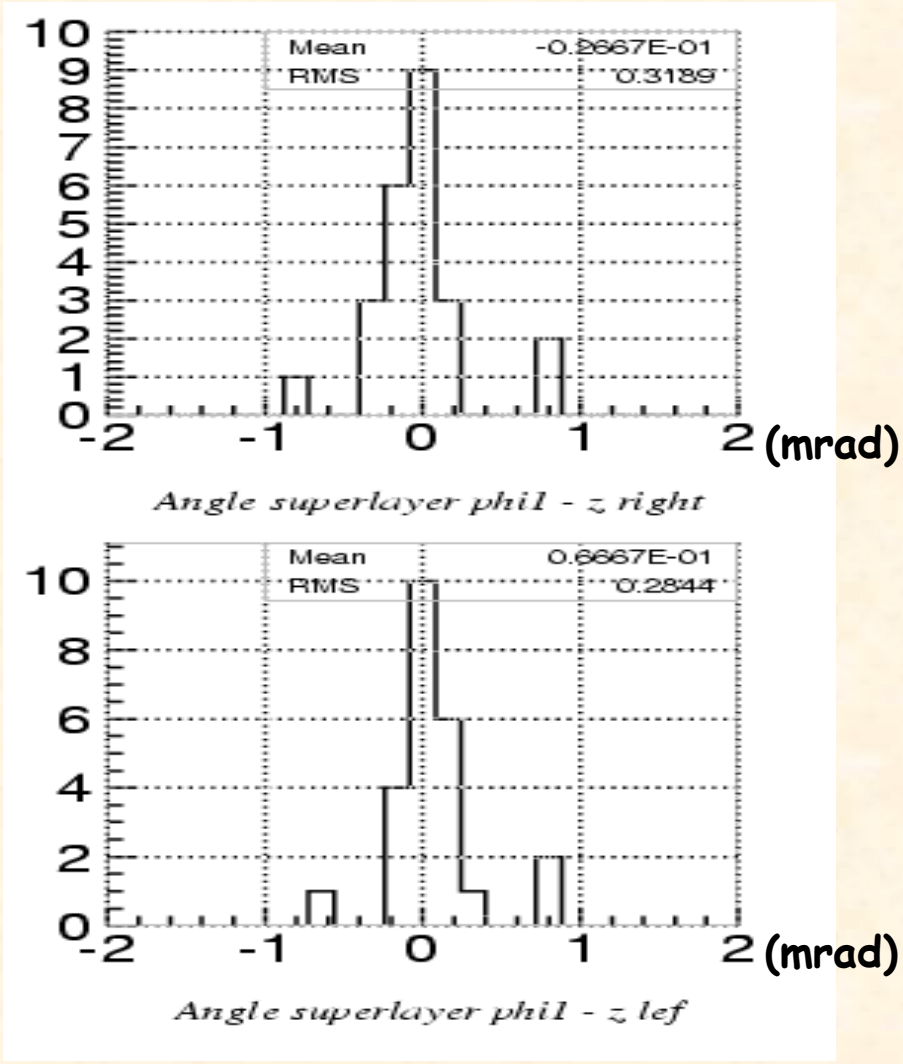


Barrel Chamber calibration bench (G.Bencze): Parallelism of the SL's

Angle SL □ 1 – SL □ 2



Angle SL □ 1 – SL Z (-90º)



Alignment with cosmics: **Method**

- Around 2M cosmics have been taken at ISR for each chambers (A. Benvenuti)
  - Sometimes several runs for chambers
- First step is to align the layers
  - Select good quality (4 points, X2 < 10), vertical tracks (slope < 1 mrad)
  - Select tracks near the side (to account for different misalignment at each side)
  - Calculate the misalignment of the layers: a least square fit to the residuals of the 4 point fit of all the tracks leaving free the position of the wires in 3 layers
  - Correct the hit positions by the obtained wire misalignments and we extrapolate the SL1 and SL2 tracks to the center of the chamber:
    - The difference in the mean of extrapolation points for the SL1 and SL2 tracks gives us the SL misalignment

Alignment with cosmics: first results

- Compare SL misalignment in cosmics data and chamber calibration bench:
  - COSMICS gives wire misalignment while cal. bench gives corner block misalignment
    - Use measurements done at CIEMAT of wire vs corner block position

RESULTS:

- Corrections to layer positions are quite small, a few tens of □m (much smaller than statistical errors)
  - Wire position Correction to SL misa

Difference in SL misalignment between cosmics and chamber calibration bench