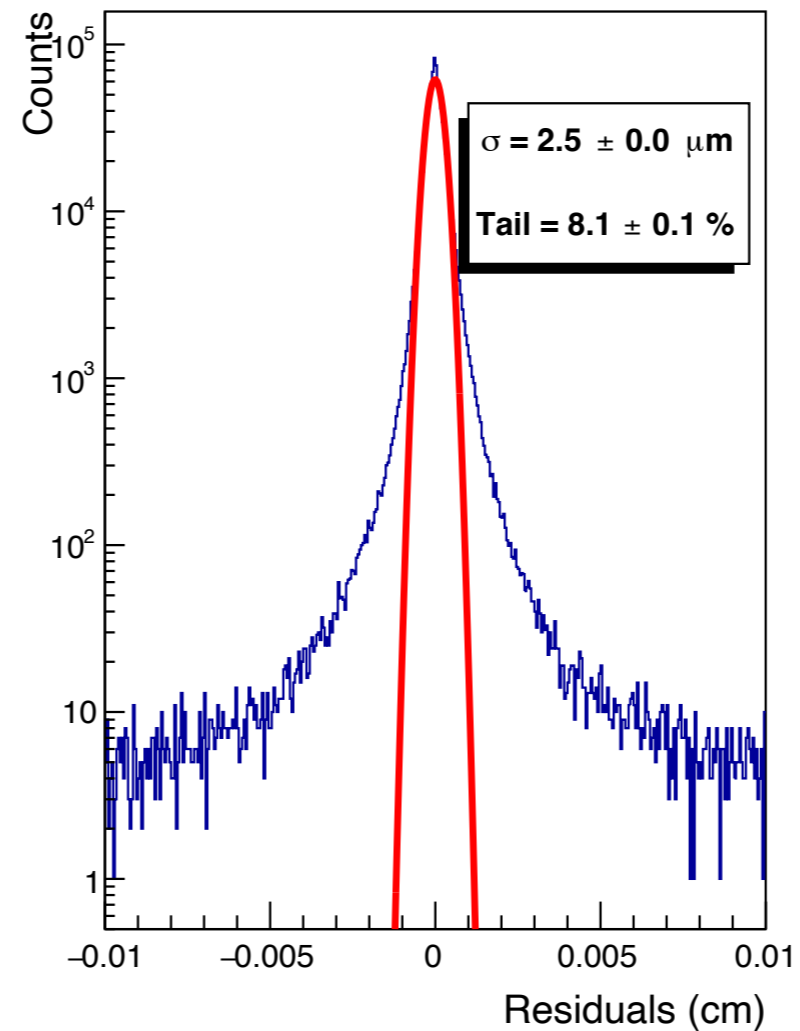
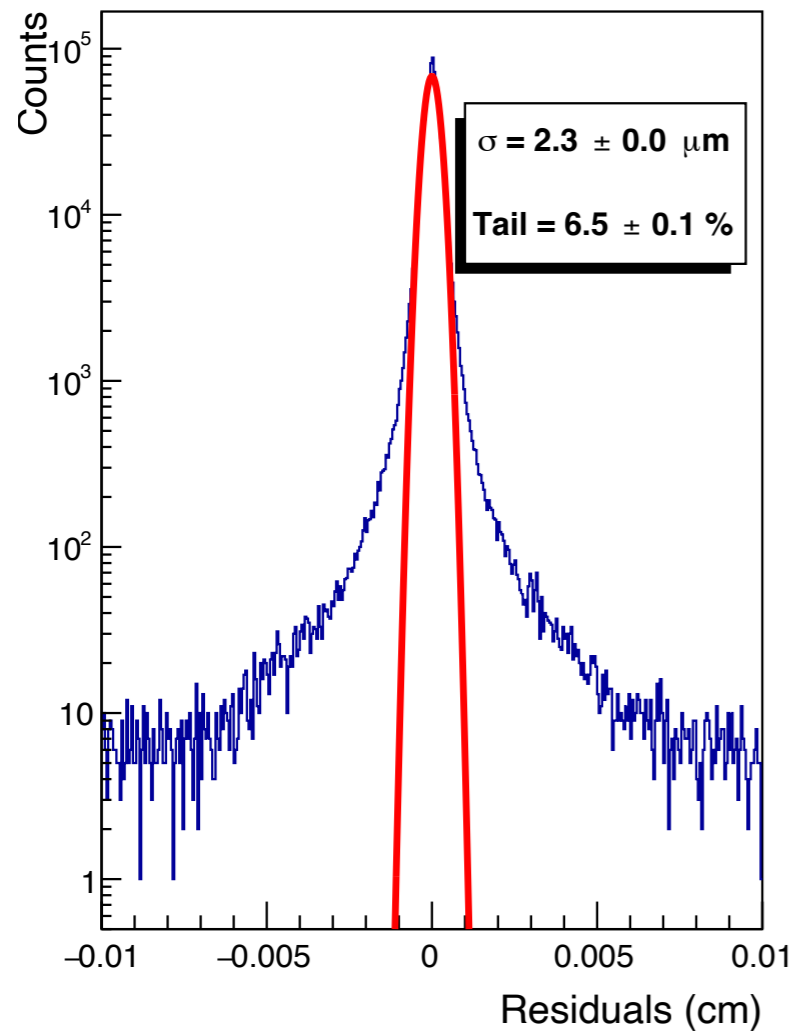


Global Alignment

GSI 2021 data run with target
(4306)

Vertex Alignment

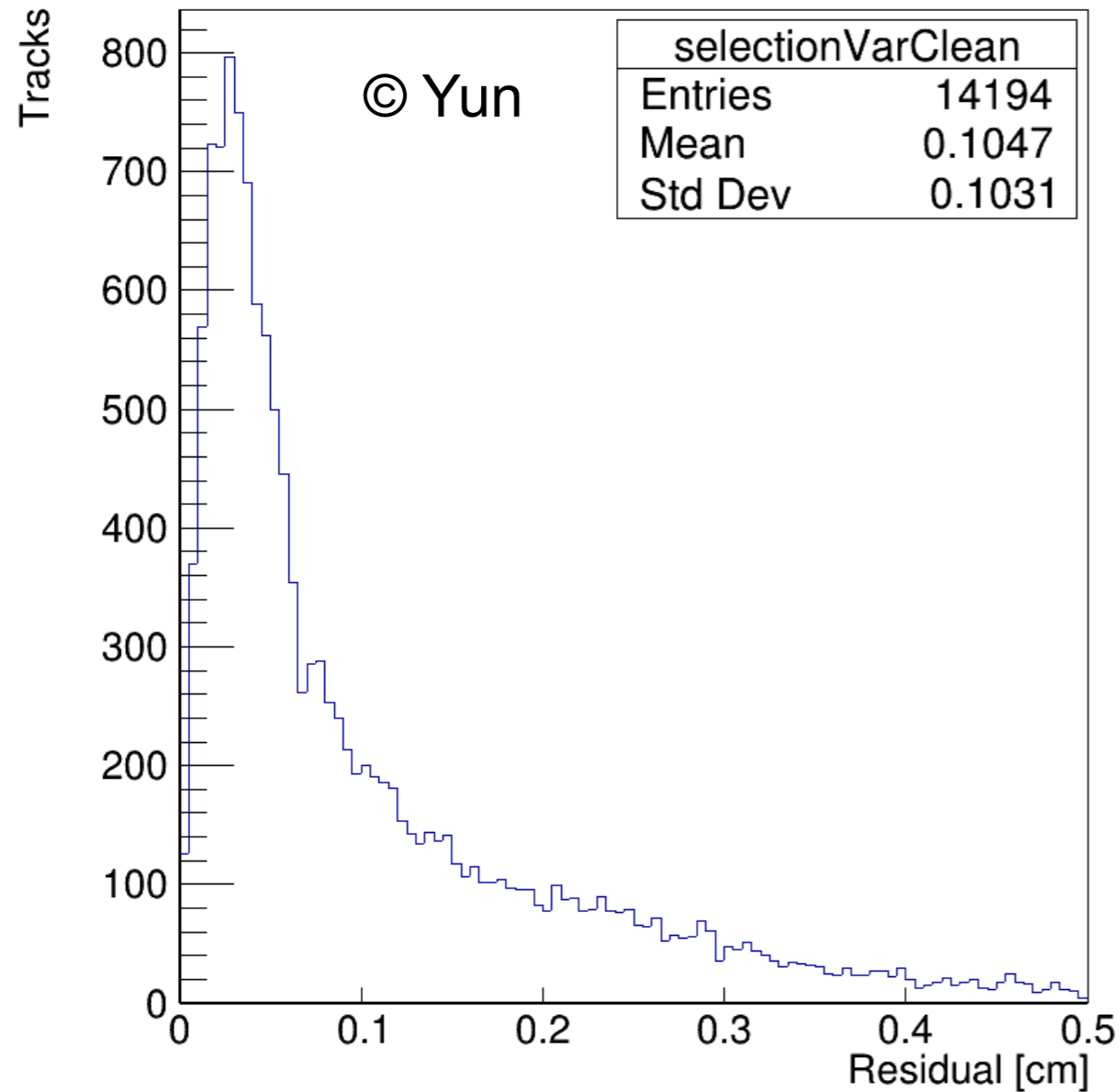
• Residuals (cluster size > 20):



➔ Good alignment !

Vertex - BM Alignment

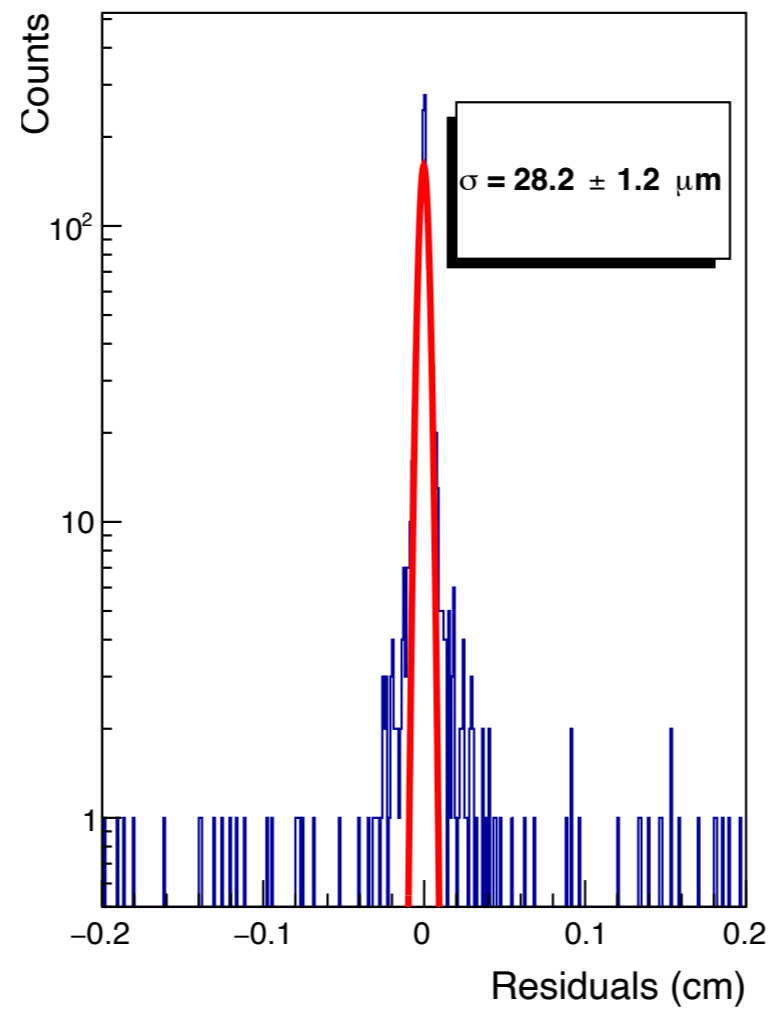
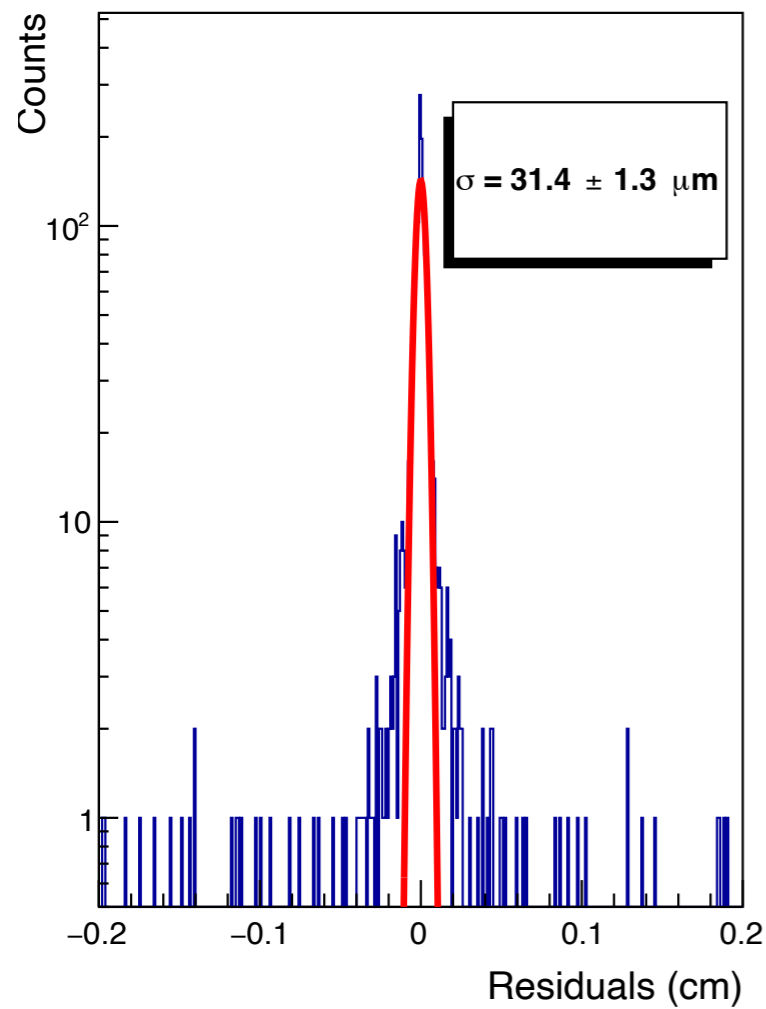
• Residuals (distance): 1 track in VTX and 1 track in BM



➔ Relative alignment < 300 μm

Global Alignment (i)

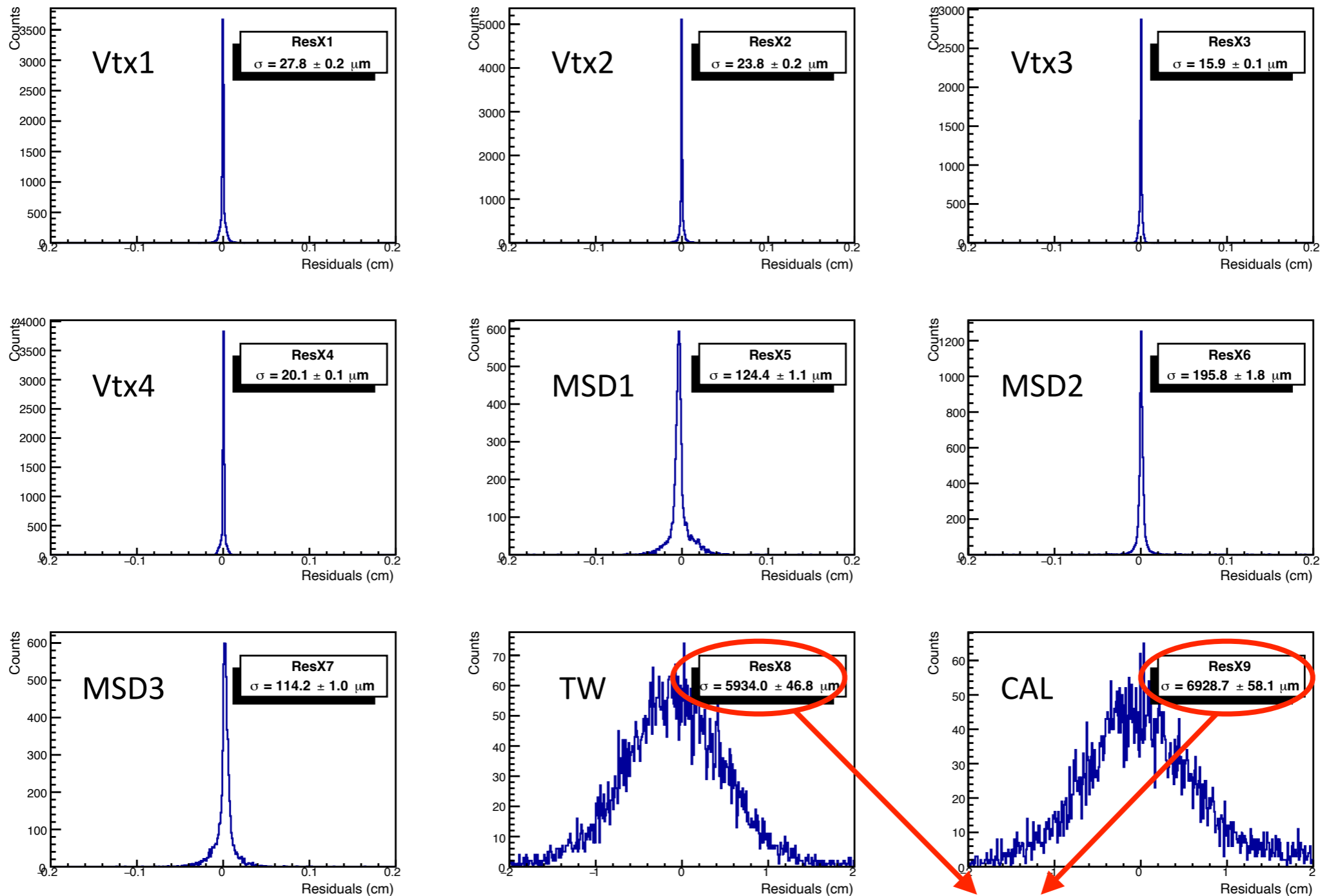
• Residuals with extrapolated VTX track to TW (after alignment)



➡ Resolution around 30 μm

Global Alignment (ii)

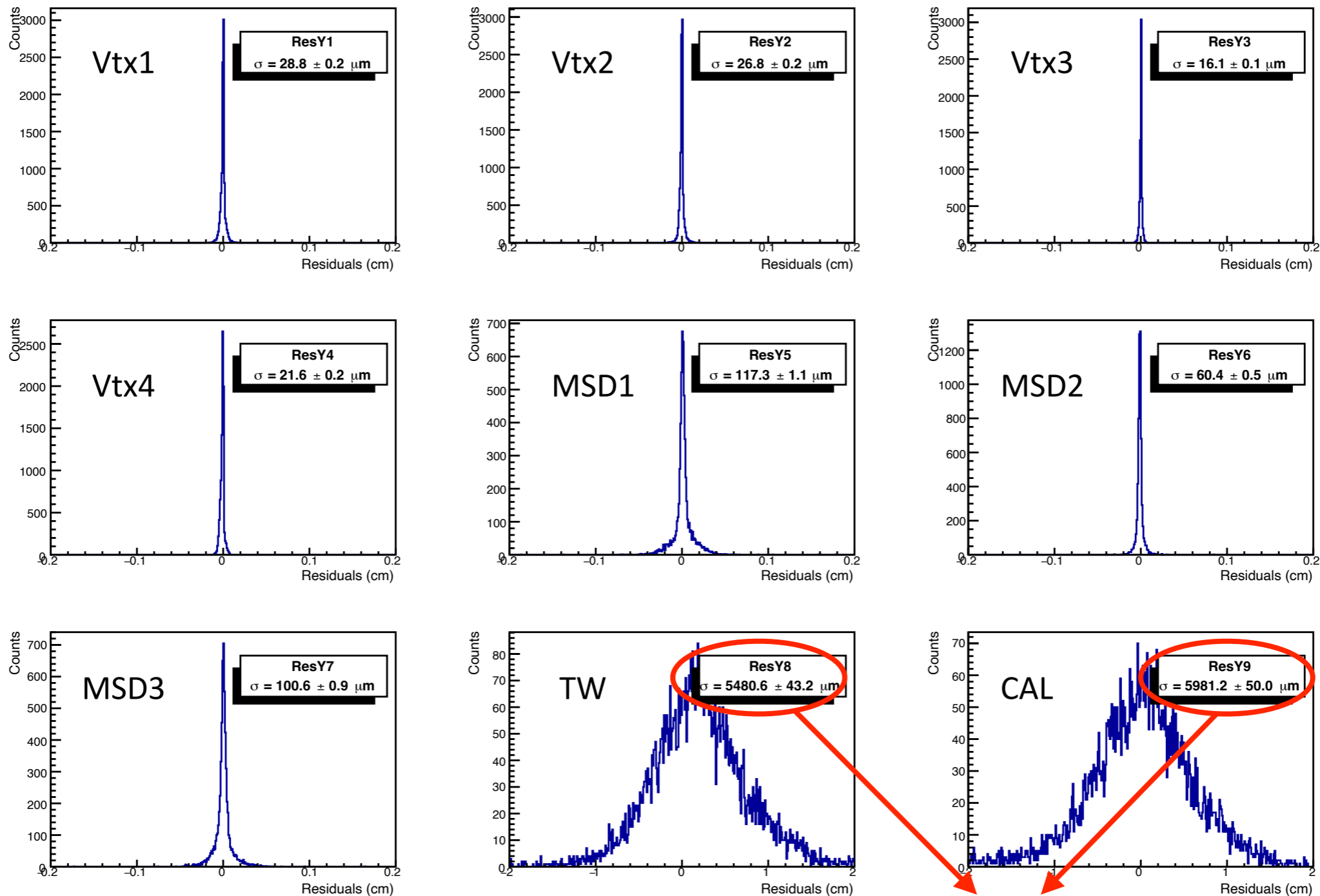
X-Residuals with extrapolated VTX track to TW (after alignment)



$$RMS = \frac{2 \text{ cm}}{\sqrt{12}} = 5773 \mu\text{m}$$

Global Alignment (iii)

• Y-Residuals with extrapolated VTX track to TW (after alignment)



$$RMS = \frac{2 \text{ cm}}{\sqrt{12}} = 5773 \mu\text{m}$$

Global Alignment (iv)

Alignment with TW and CAL

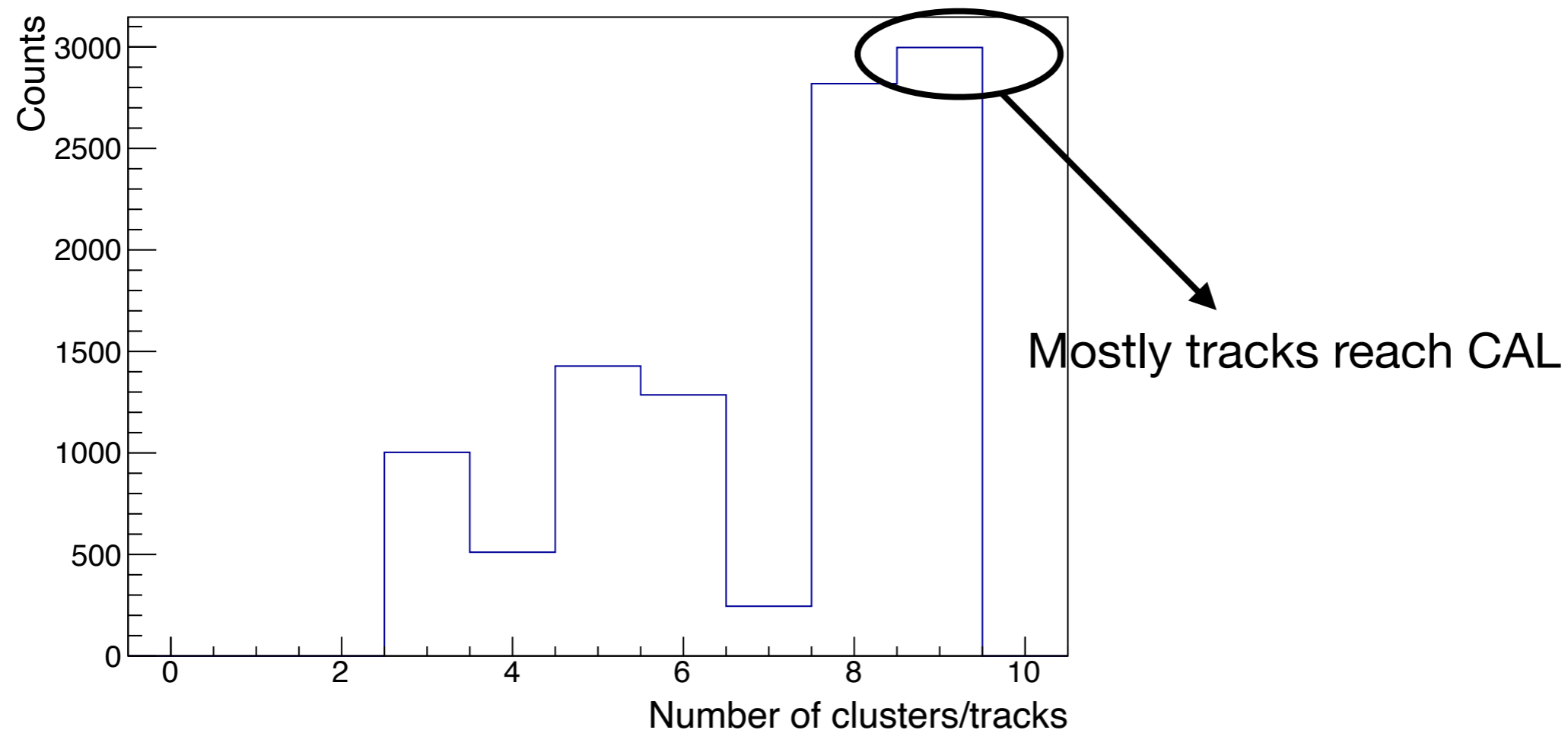
- FOOT_4271.geo

```
MicroStripBaseName: "MSD"  
MicroStripPosX: 0.8 MicroStripPosY: 0. MicroStripPosZ: 44.65  
MicroStripAngX: 0. MicroStripAngY: 0. MicroStripAngZ: 0.  
  
TofWallBaseName: "TW"  
TofWallPosX: -0.850 TofWallPosY: -1.150 TofWallPosZ: 193.5  
TofWallAngX: 0. TofWallAngY: 0. TofWallAngZ: 0.  
  
CaloBaseName: "CA"  
CaloPosX: -2.40 CaloPosY: 2.52 CaloPosZ: 211.7  
CaloAngX: 0. CaloAngY: 0. CaloAngZ: 0.
```

➔ Seems to be displaced by one crystal in CAL (mapping ?)

Global Alignment (v)

• Number of cluster per global track

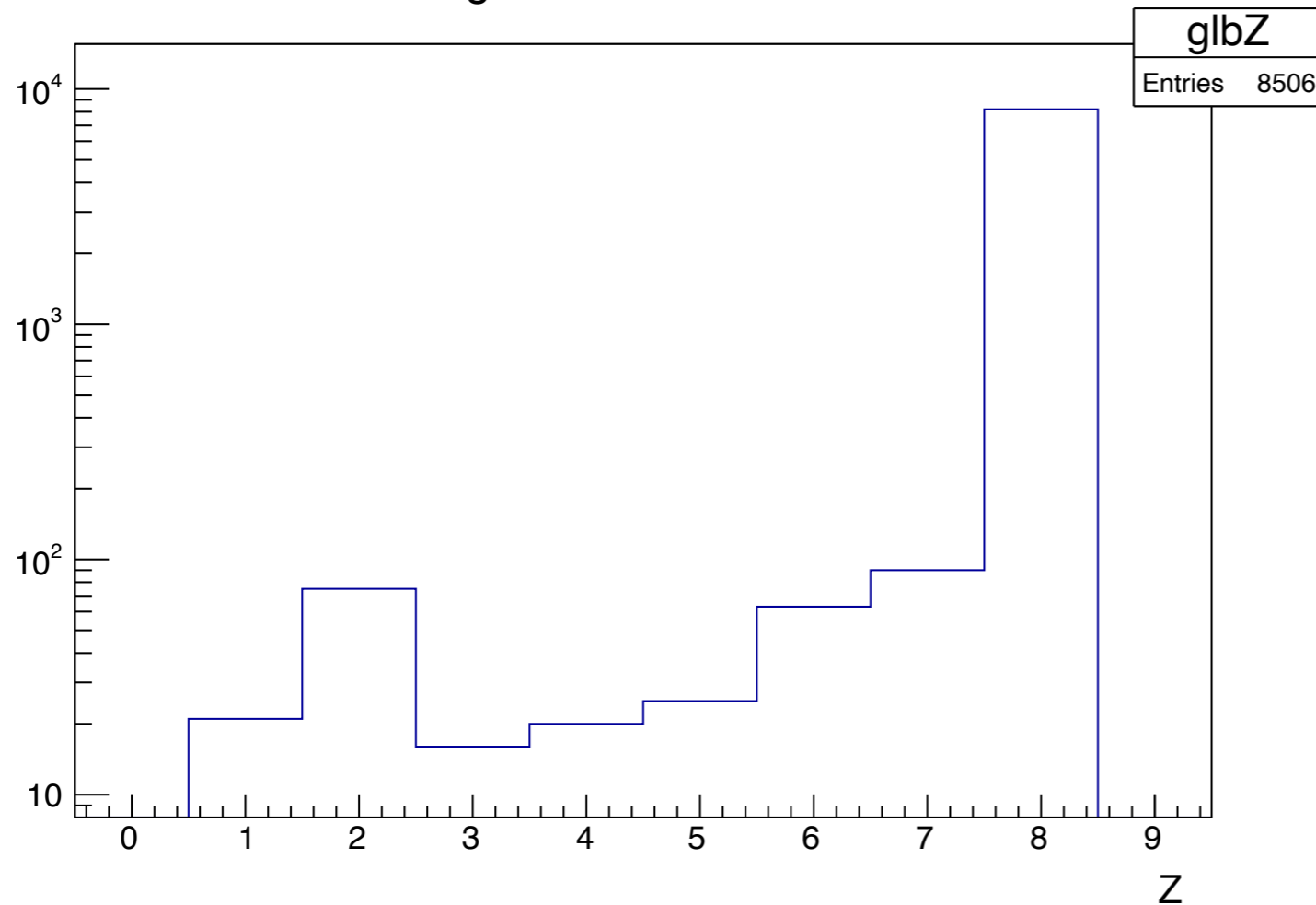


- Mostly when 4 sensors fired in VTX, find a corresponding cluster in MSD
- As well when 3 stations in MSD fired, find a corresponding point in TW
- Nearly 50 % of the tracks reaching TW do not match with CAL (only one module)

Atomic charge

Atomic charge distribution in TW

glb - Z distribution

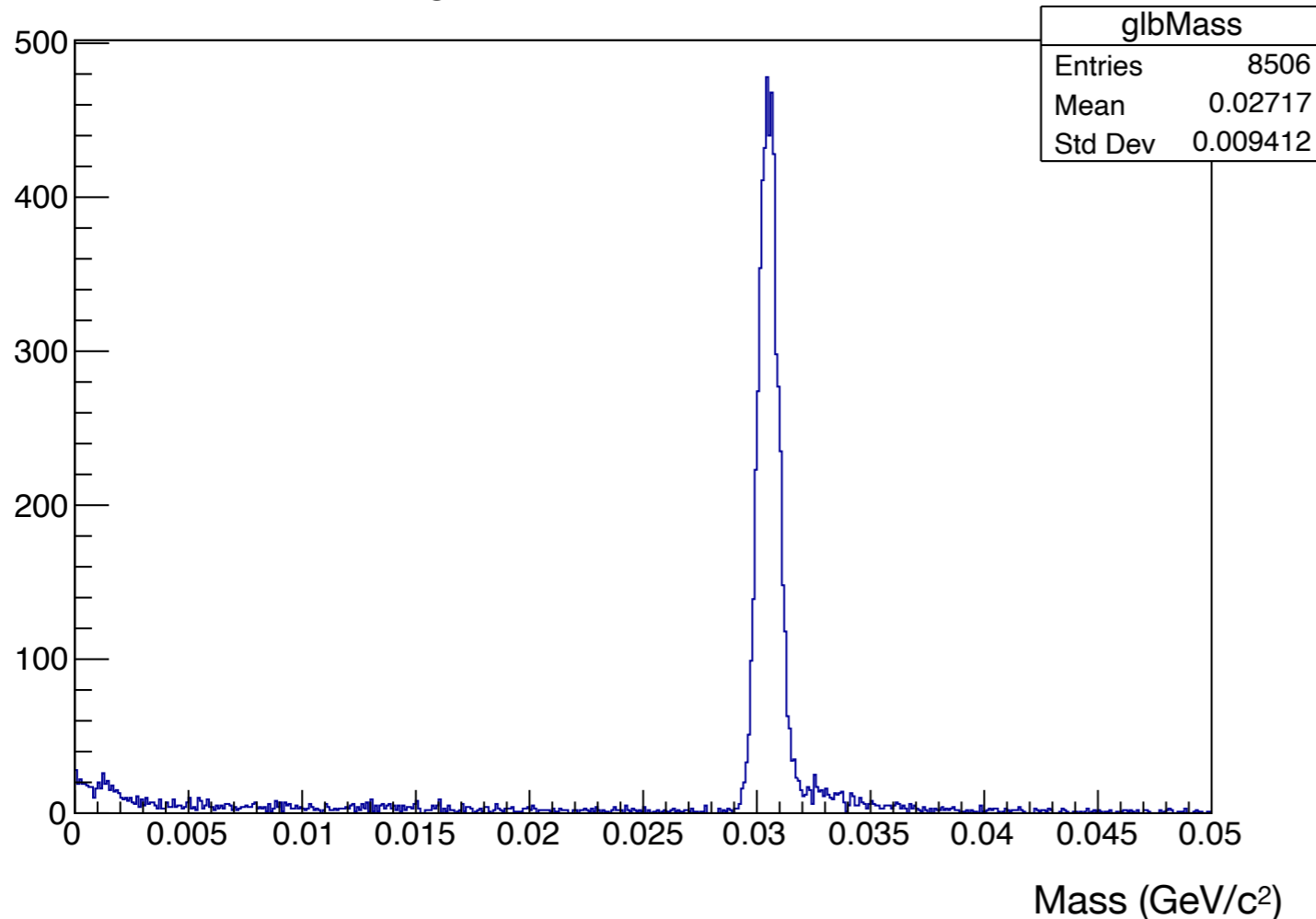


- Mostly oxygen beam
- See also the fragments

Mass

• Mass distribution in CAL

glb - Mass distribution



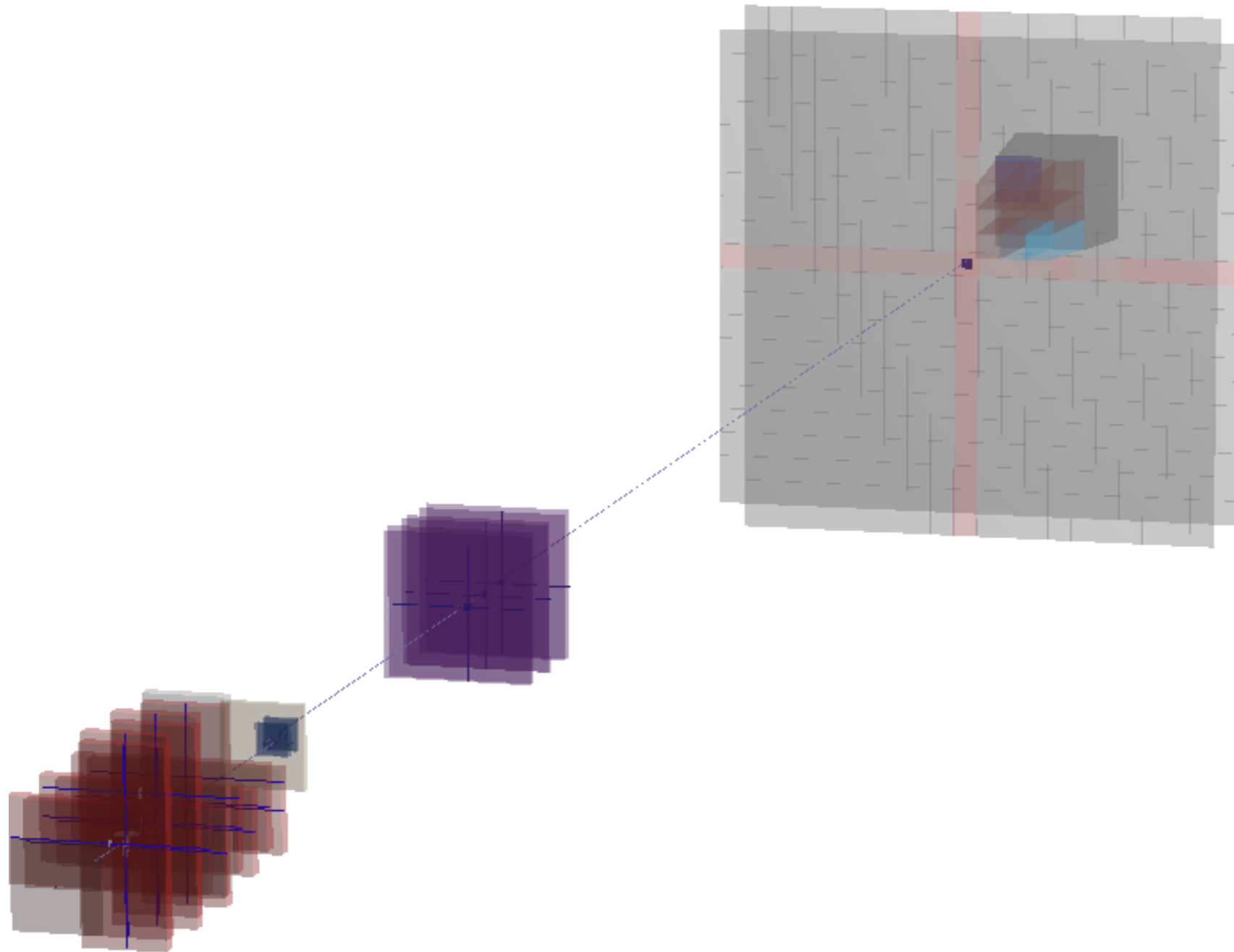
$$\beta c = \frac{L_{track}^{Glb}}{ToFTW} \quad \gamma = \frac{1}{\sqrt{1 - \beta^2}}$$

$$Mass = \frac{E_{kin}^{CAL}}{(\gamma - 1)}$$

- See one peak, since no full calibration wrong mean value
- Do not see secondaries, since only one module at 0°

Global Alignment (vi)

• Global Display



Conclusions

- Thanks to the hard work of Roberto and Yun et al.
 - We are able to align trackers + TW & CAL
 - Need to understand the displacement of CAL
- Any hope for charge calibration in CAL (GSI2021) ?