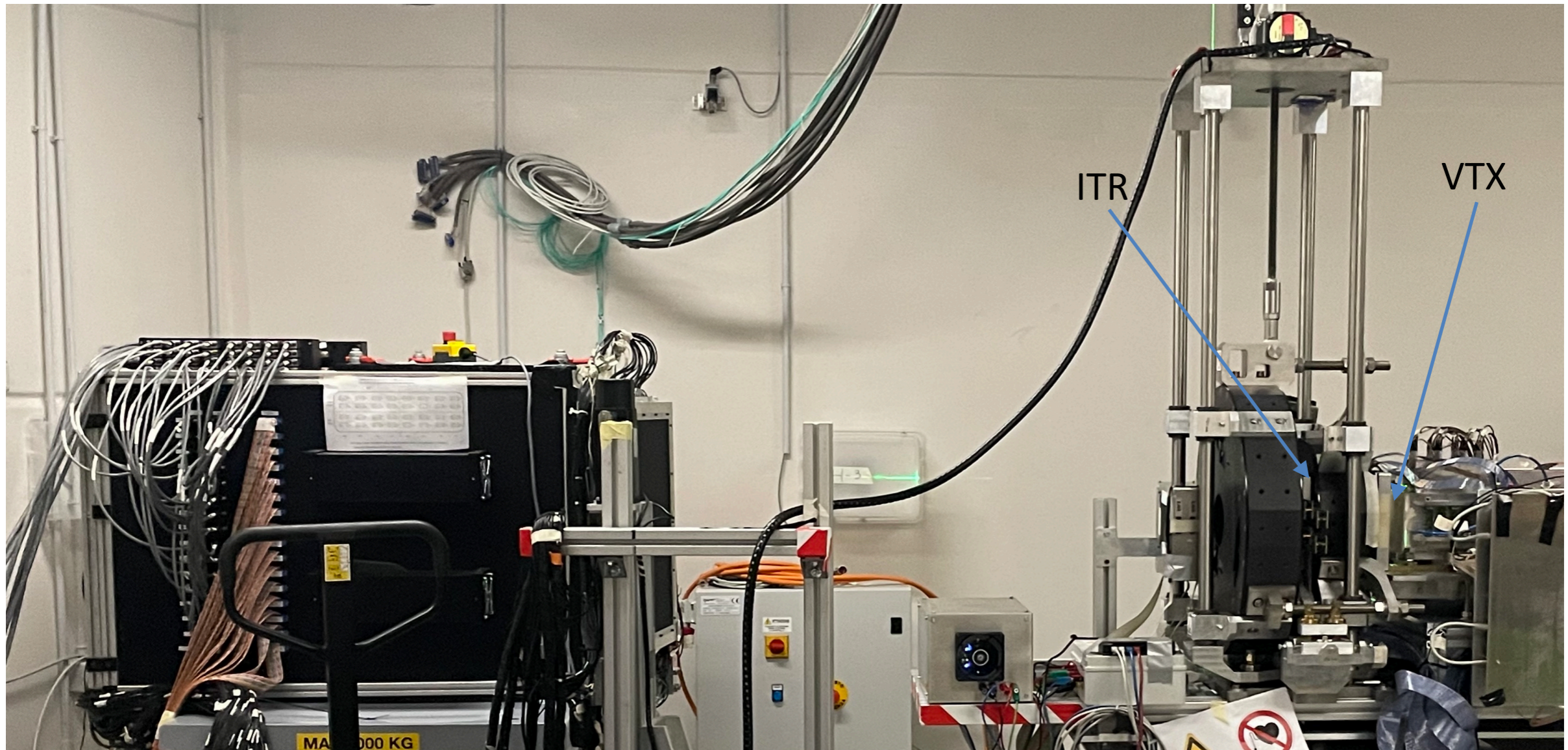


VTX-ITR report

CNAO2023

CNA2023

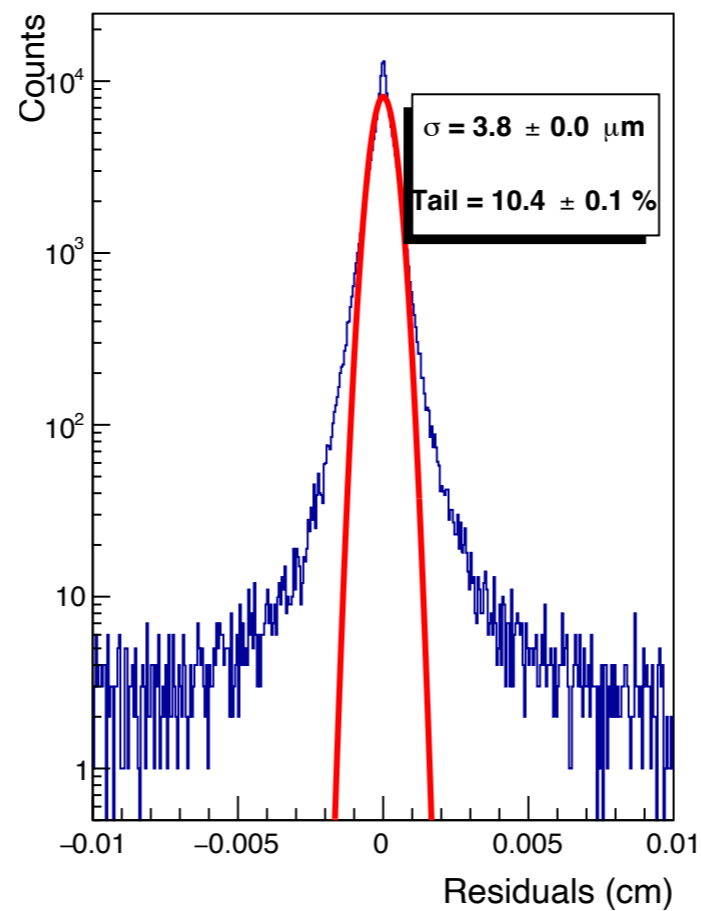
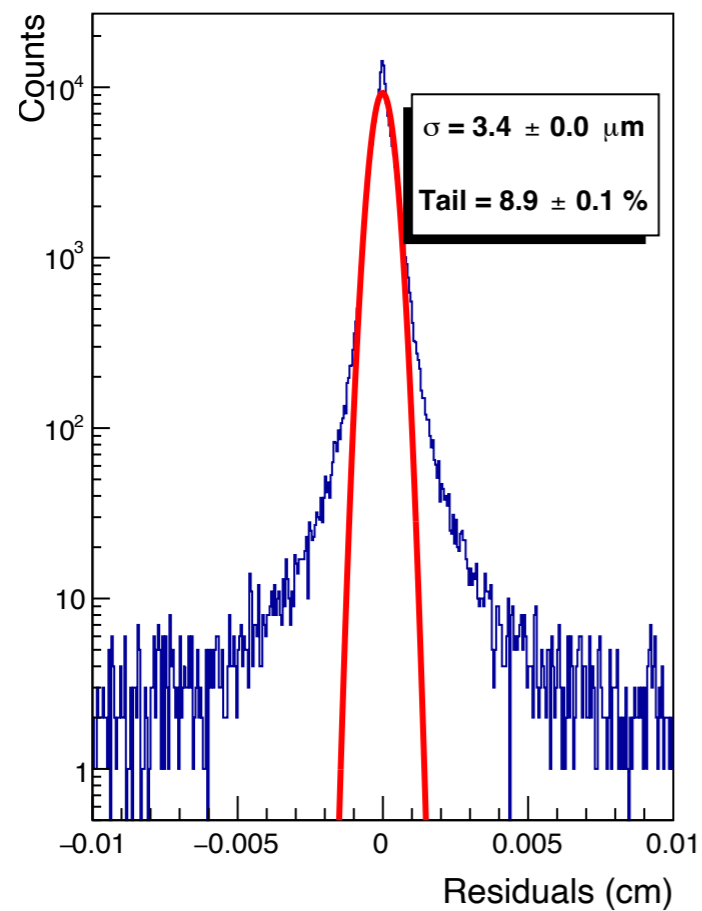


VTX

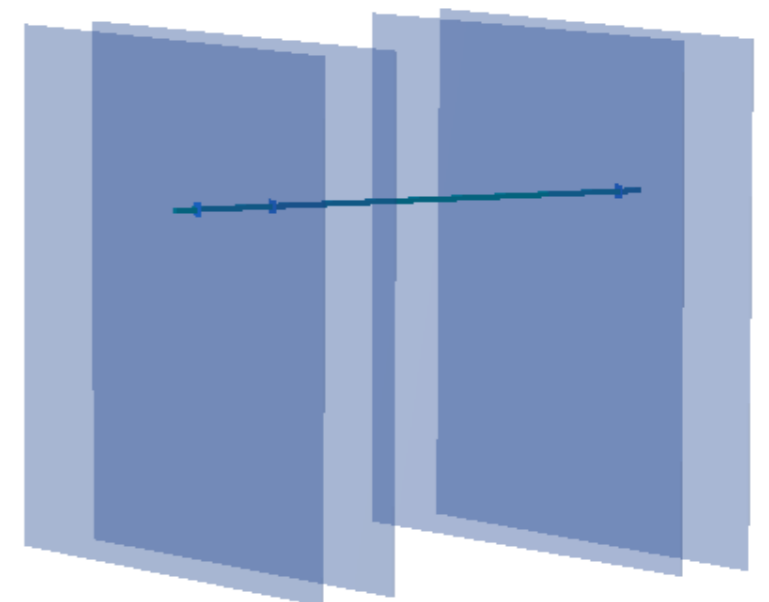
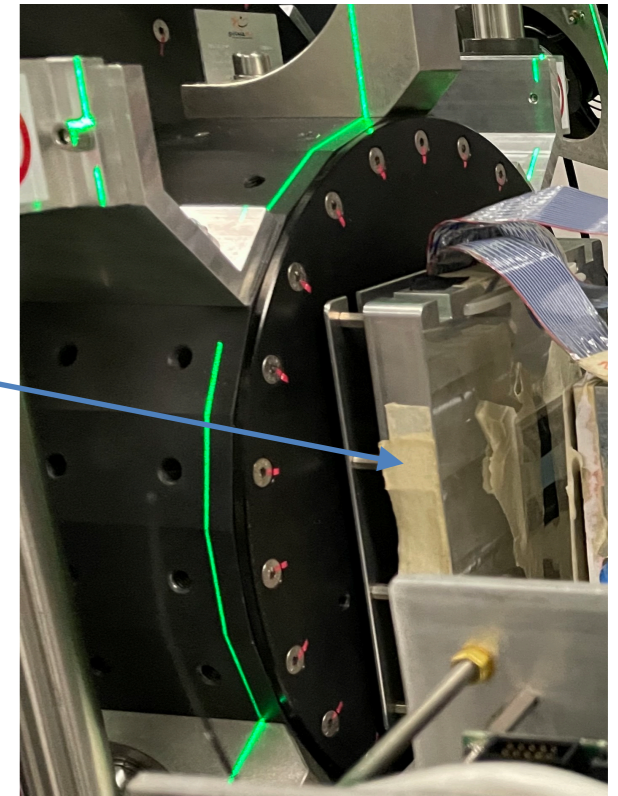
Alignment

□ VTX:

- ➔ Run (6144), cut on cluster size (> 15)
- ➔ Alignment procedure not converged, do it “by hand”



VTX



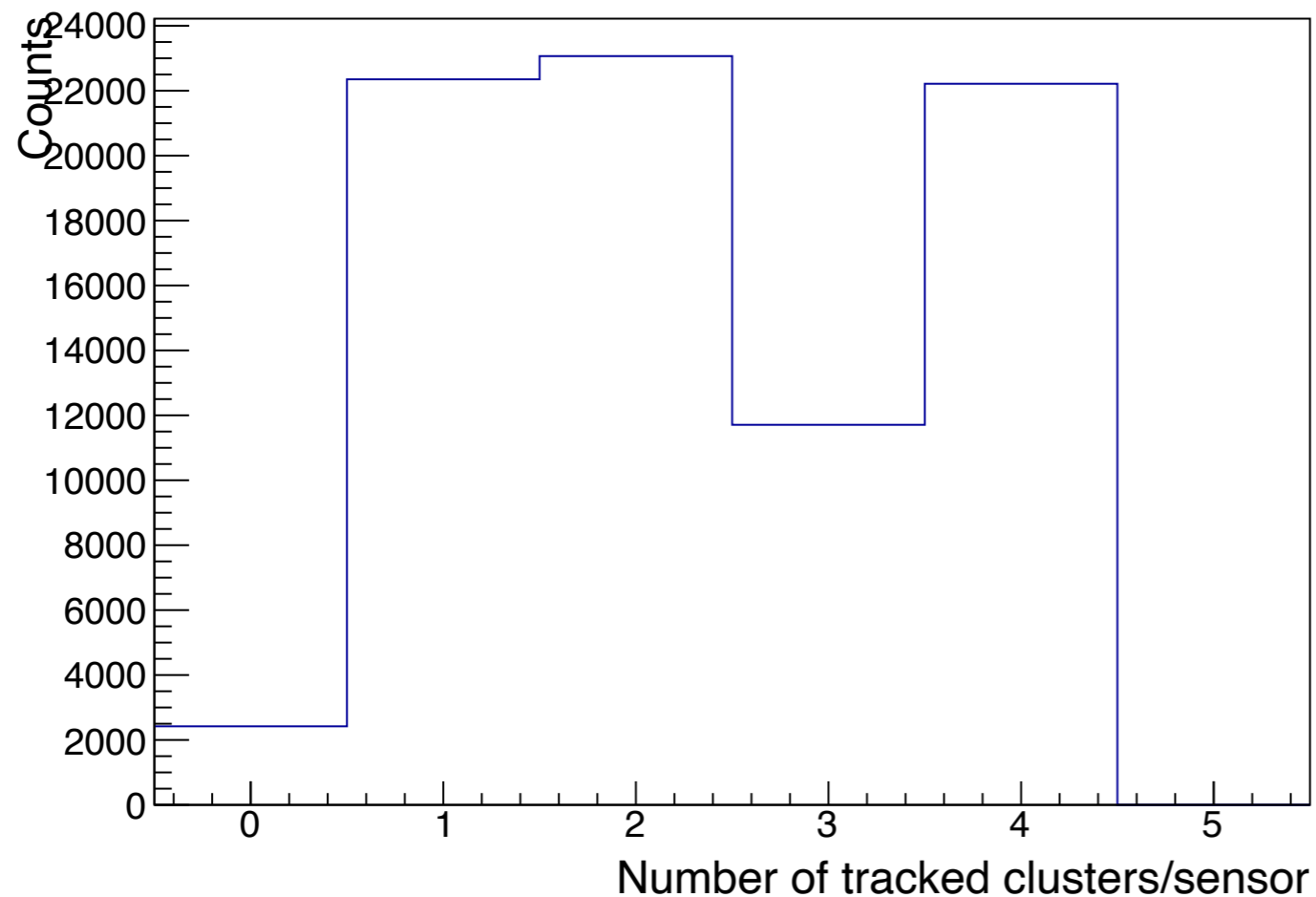
- ➔ $\sim 1 \mu\text{m}$ worse compare to GSI data, same tails

Tracking (i)

(CNAO2023)

□ VTX (run6144):

- Number of tracked cluster per sensor



- ➔ 15 % of events with no tracks (tracks out of VTX acceptance ?)
- ➔ All sensors has same efficiency except sensor 3, drop to 52 %

Framework

□ Reconstruction

- Add calibration file for VTX, **pixel** efficiency per quadrant (TAVTdetector.cal)

```
# Landau parameter for pixels number
# Add quenching parameter in Landau
# assuming a weak dependance on energy
#
chargesN: 6
#      Cst      MPV      Sigma      Quench
charge 1: 264    6.1    0.43    0.001
charge 2: 419    8.8    0.54    0.002
charge 3: 463   11.0    0.62    0.012
charge 4: 673   13.3    0.68    0.017
charge 5: 1377  15.8    0.70    0.009
charge 6: 204771 18.5    0.83    0.004

#####
# sensor efficiency per quadrant
sensorsN: 4
sensor 1: 1.    1.    1.    1.
sensor 2: 1.    1.    1.    1.
sensor 3: 0.    0.1  1.    1.
sensor 4: 1.    1.    1.    1.
```

- ➔ Update campaign MC files
- ➔ Implement in the MC reconstruction chain

Tracking (ii)

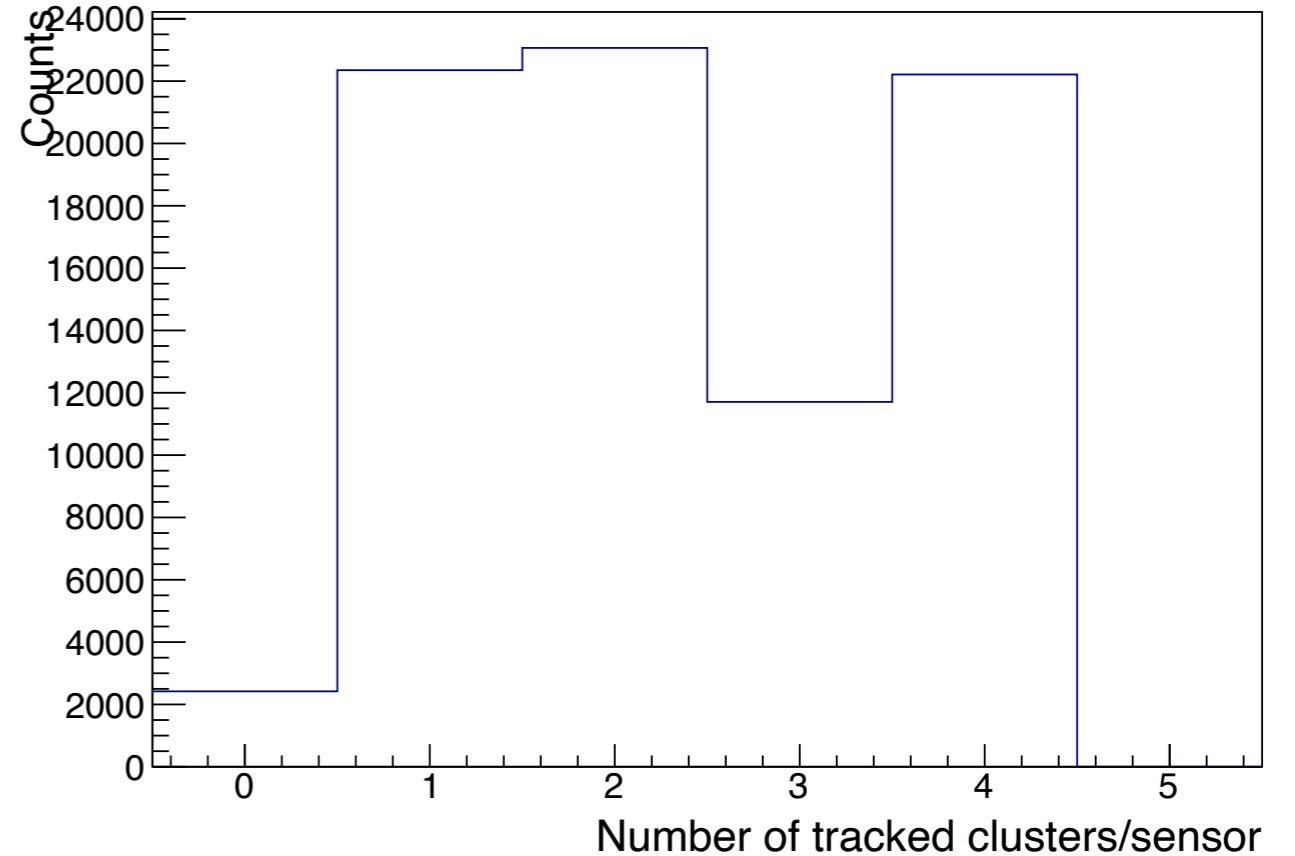
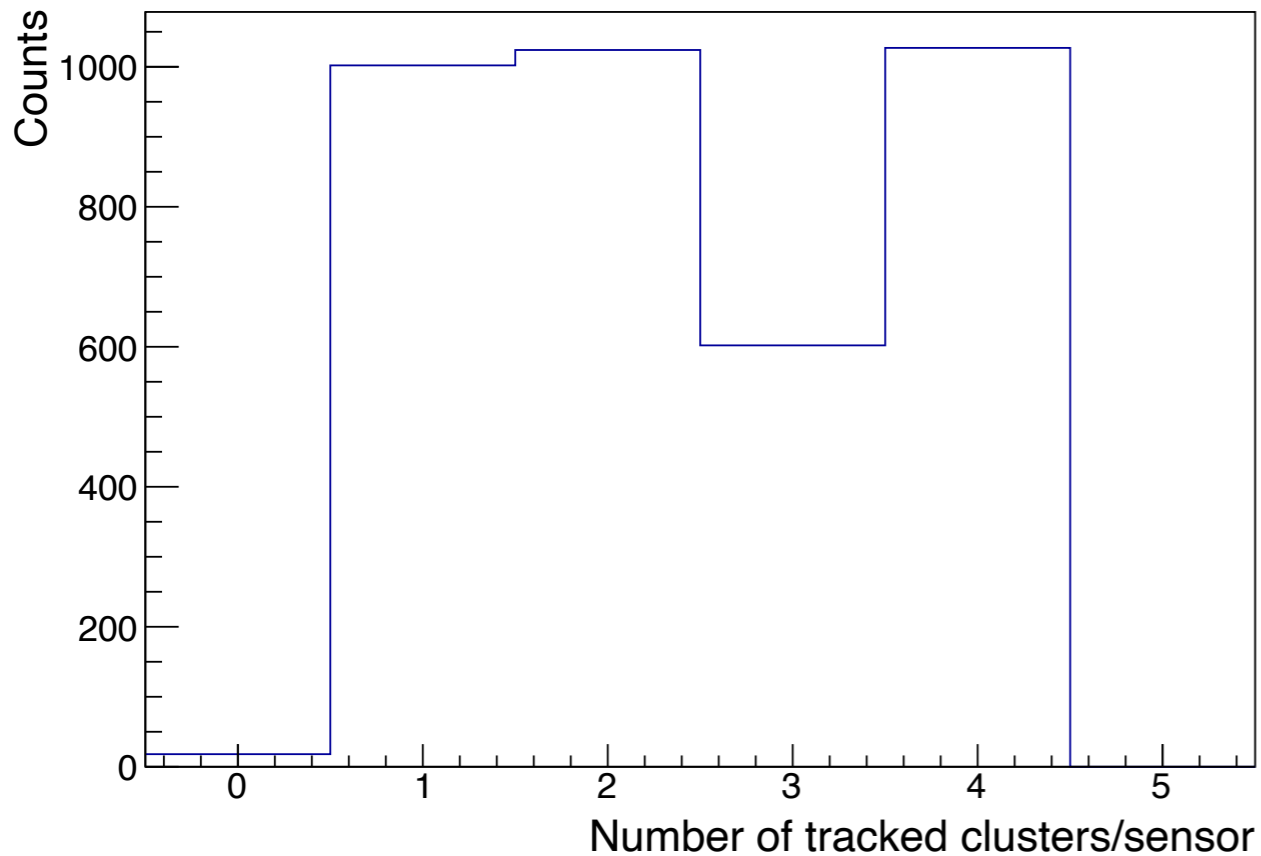
(CNAO2023_MC)

□ VTX:

- Number of tracked cluster per sensor

MC:

Run: 6144

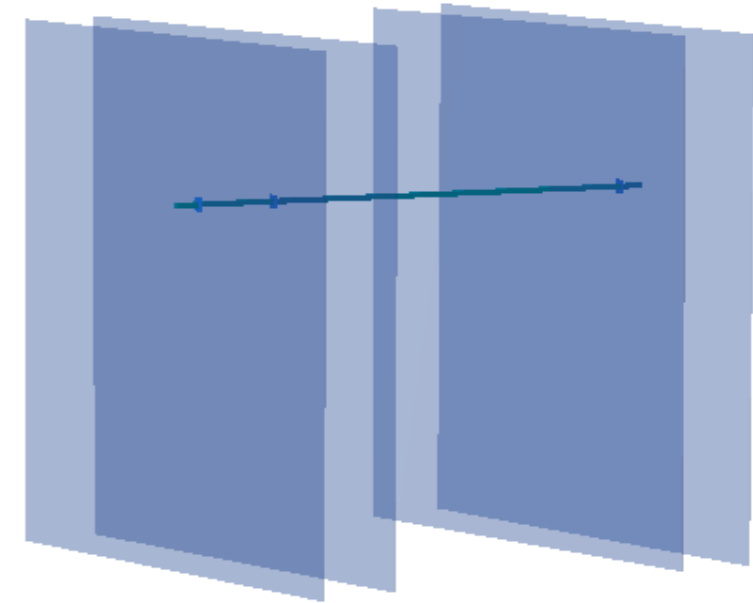
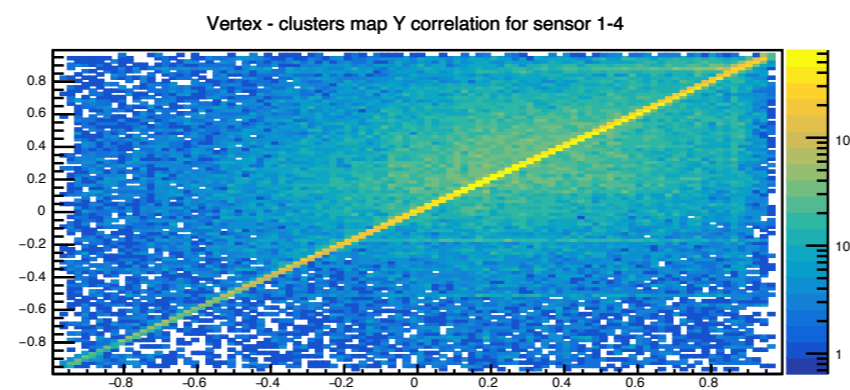
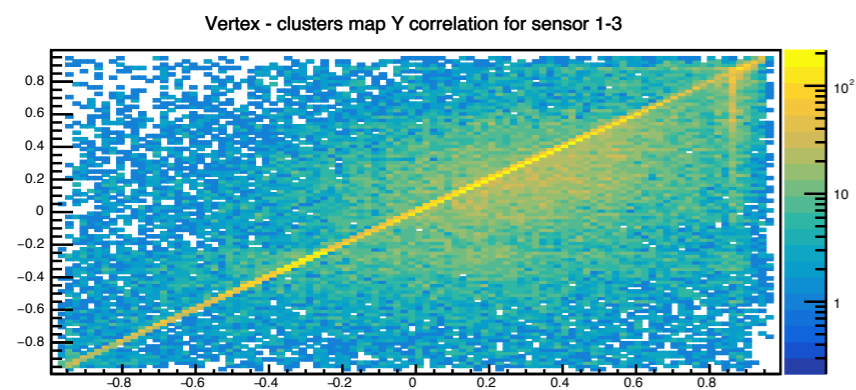
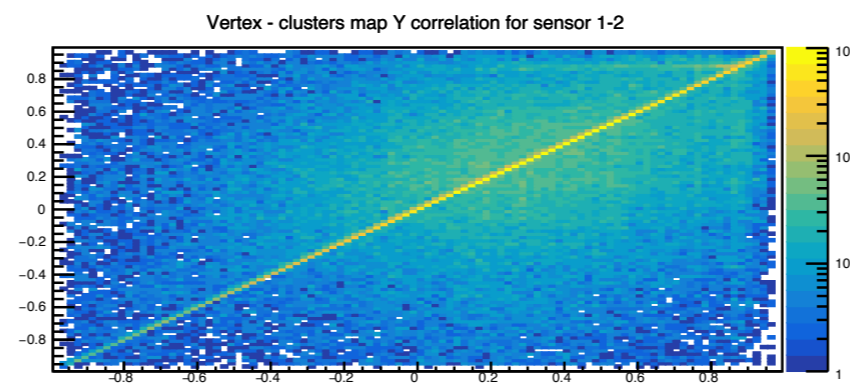
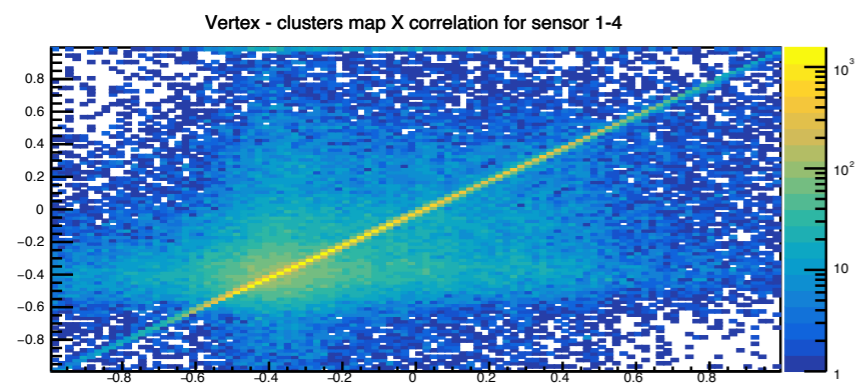
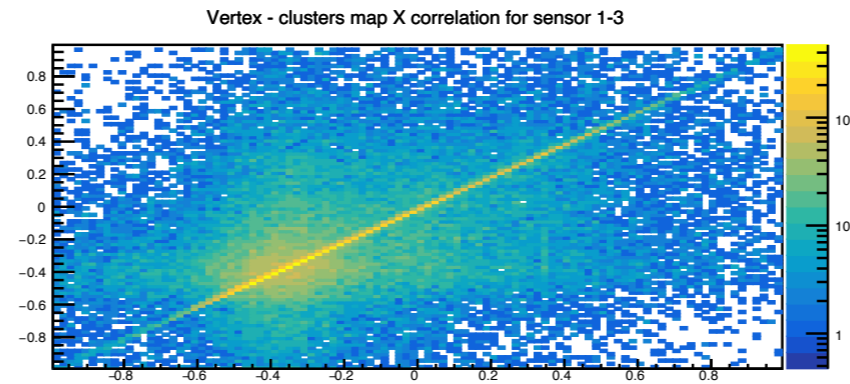
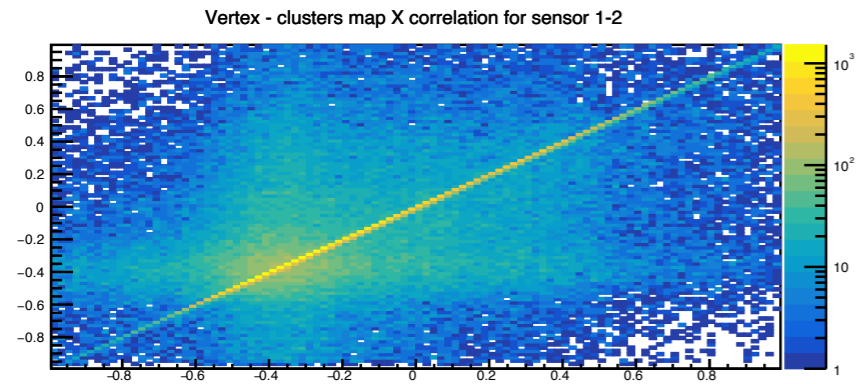


➔ The parameters can be tuned to reproduced the data

Correlation (i)

Correlation position btw 2 VTX's sensors in the detector framework

Run 6309

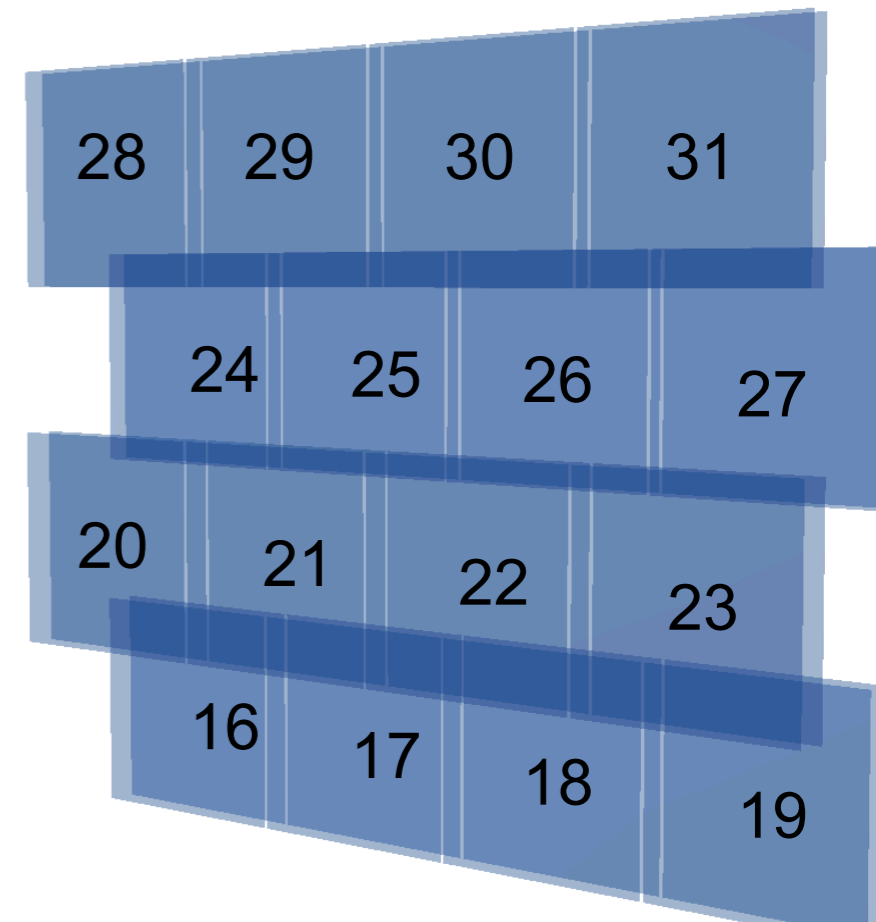
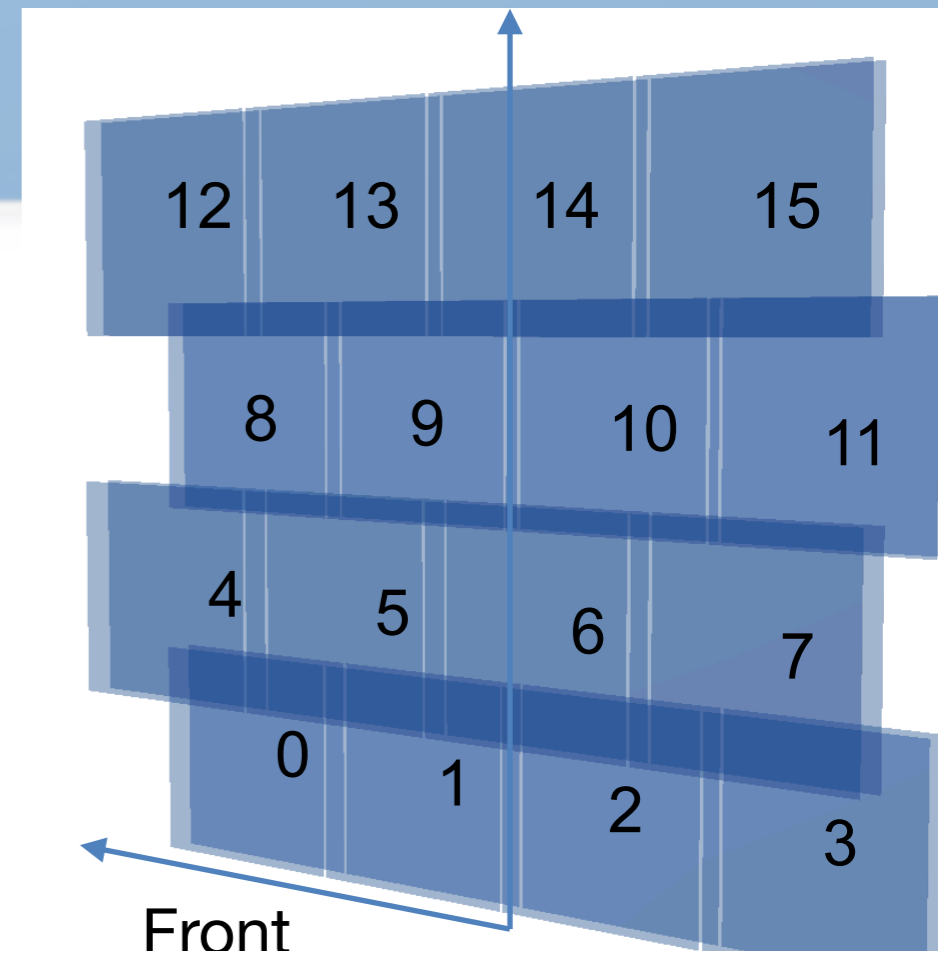
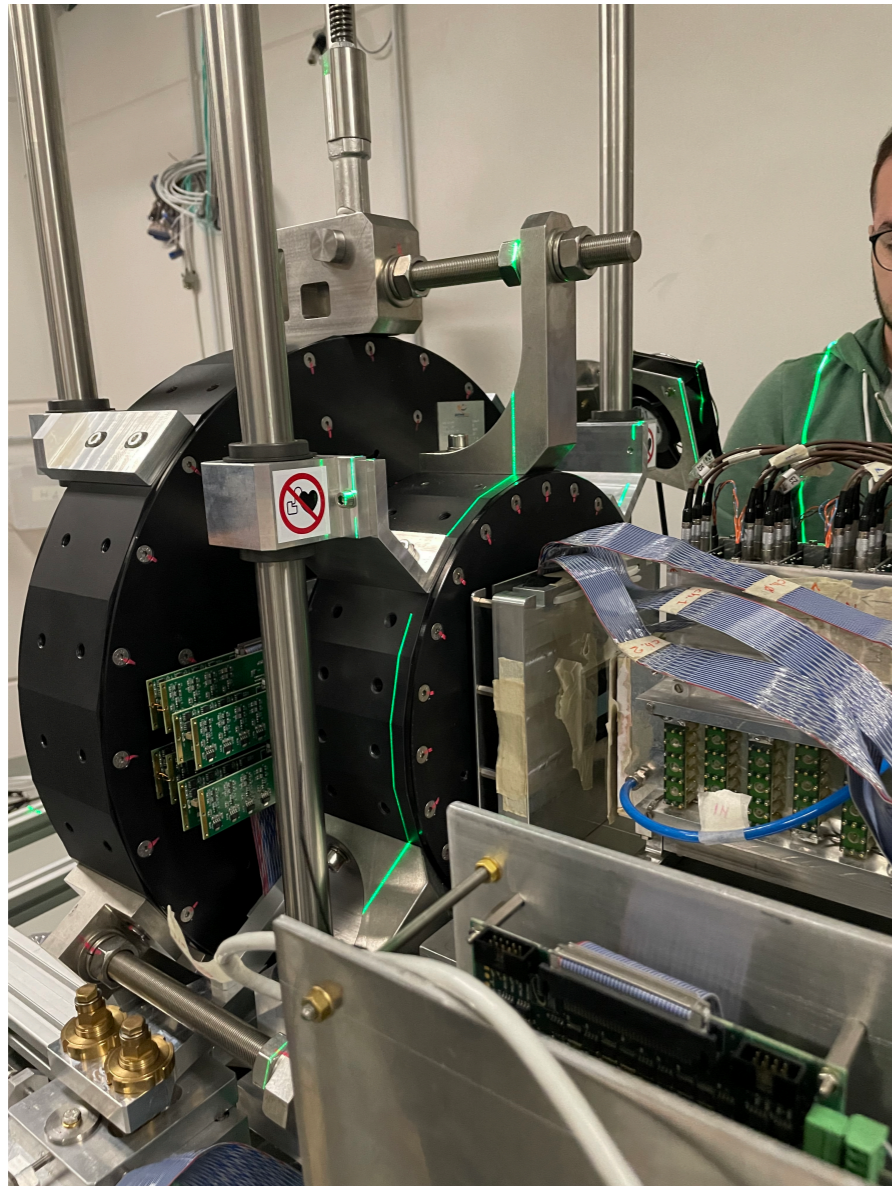


➔ Correlation btw all sensor in X & Y

ITR

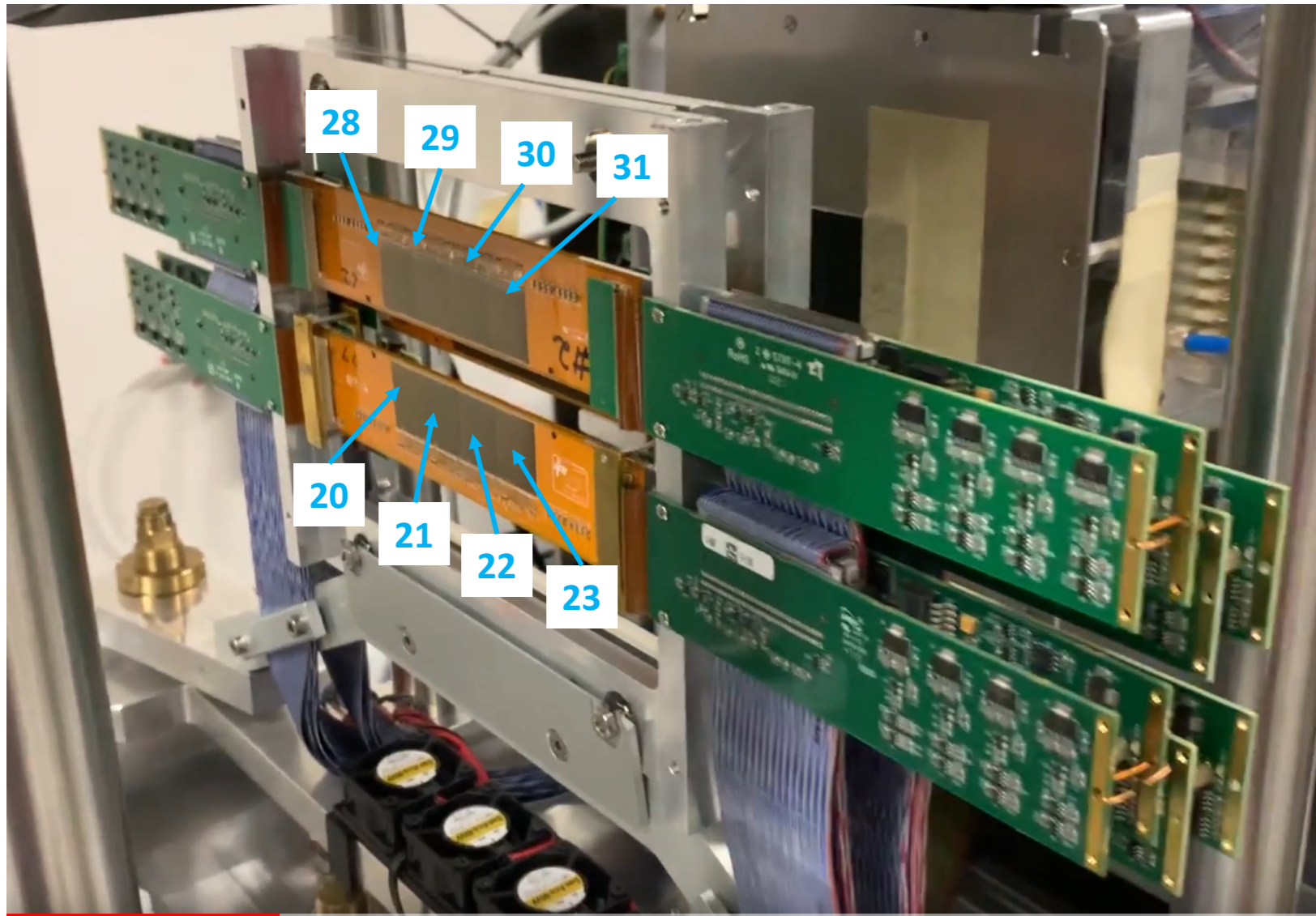
Numbering (i)

Numbering in raw data

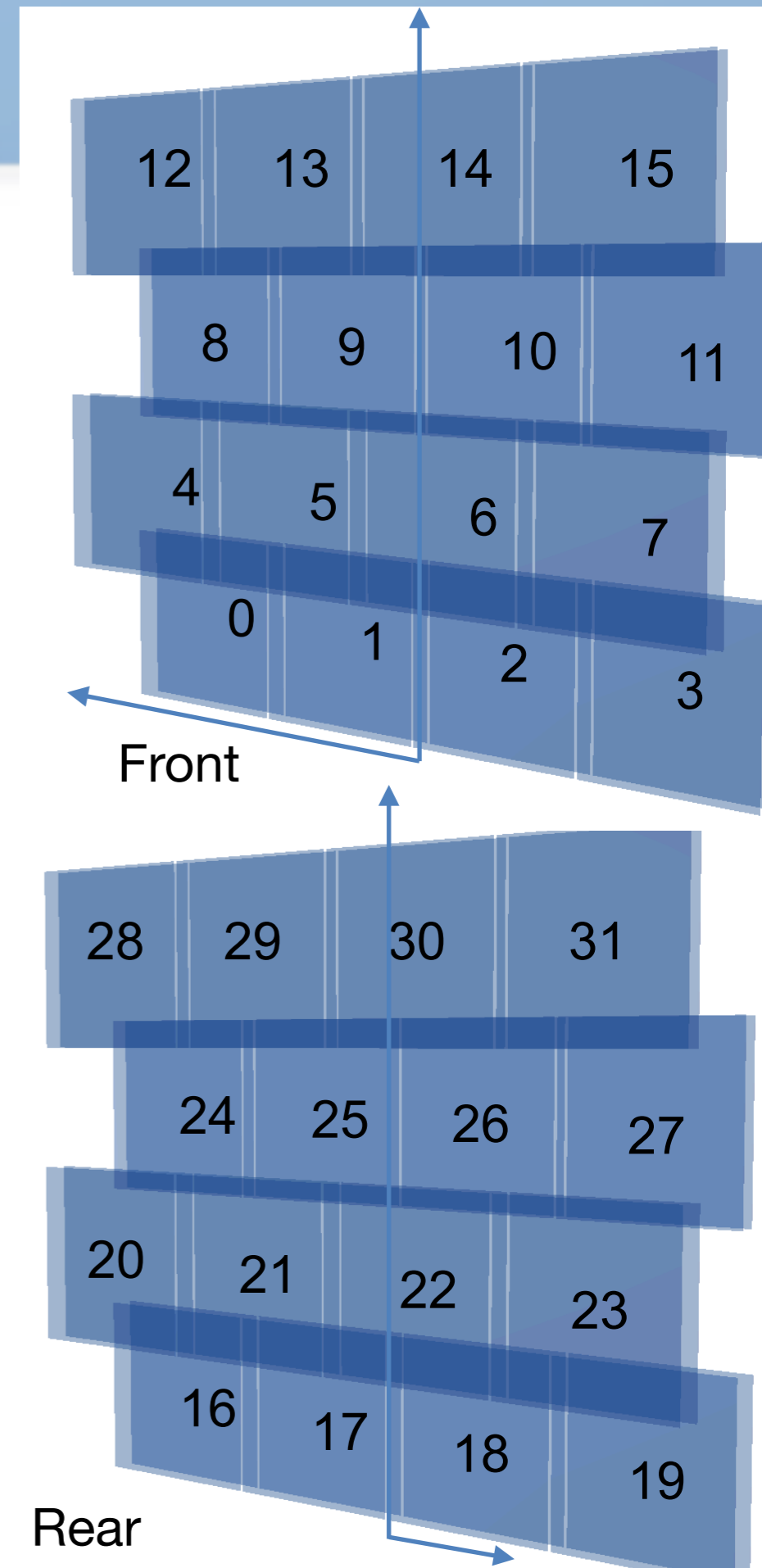


Numbering (ii)

- Numbering from MC simulation (Giuseppe)



➔ Seems now coherent

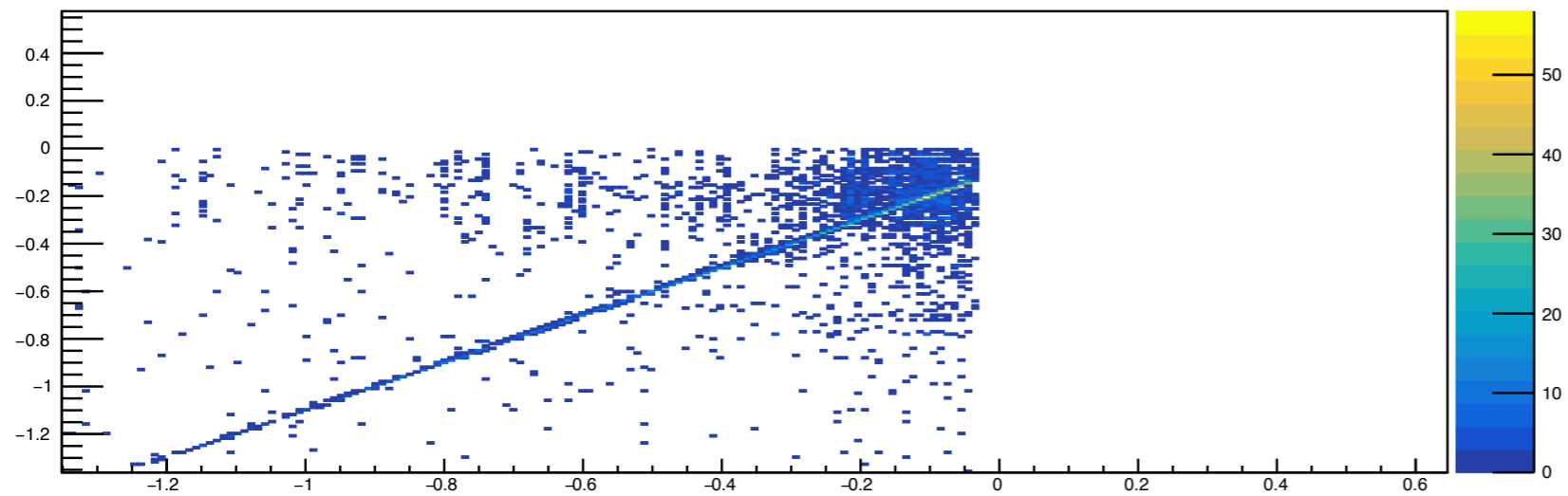


Correlation (i)

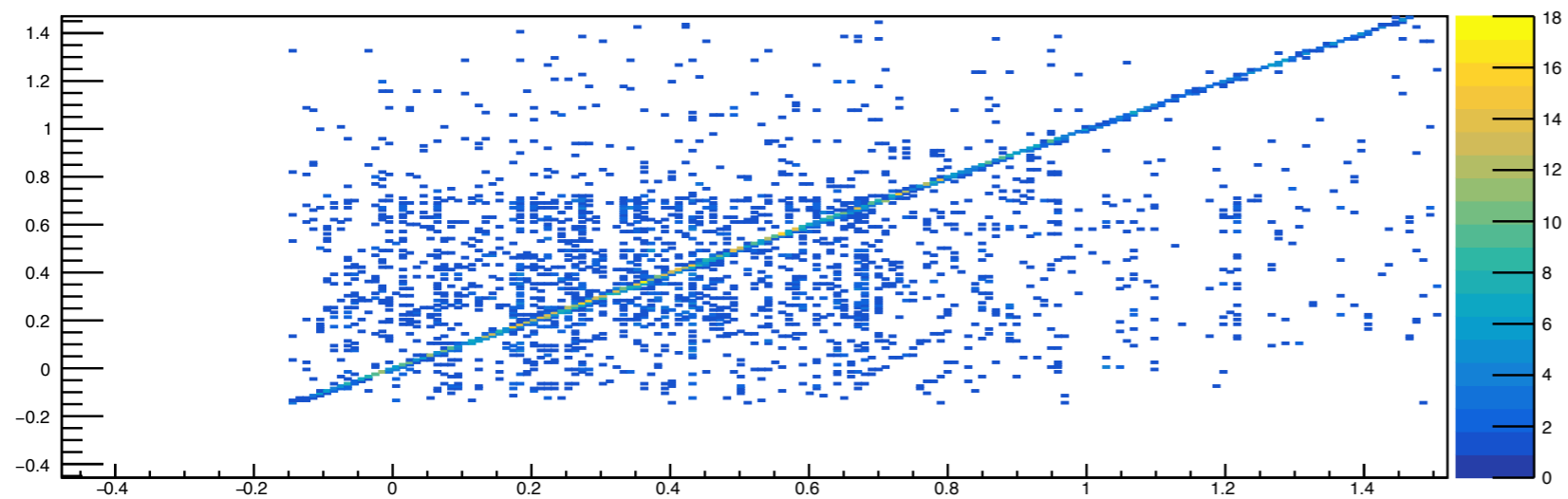
Correlation position btw 2 ITR's sensors in the detector framework

Run 6309: 113-0 / 111-3

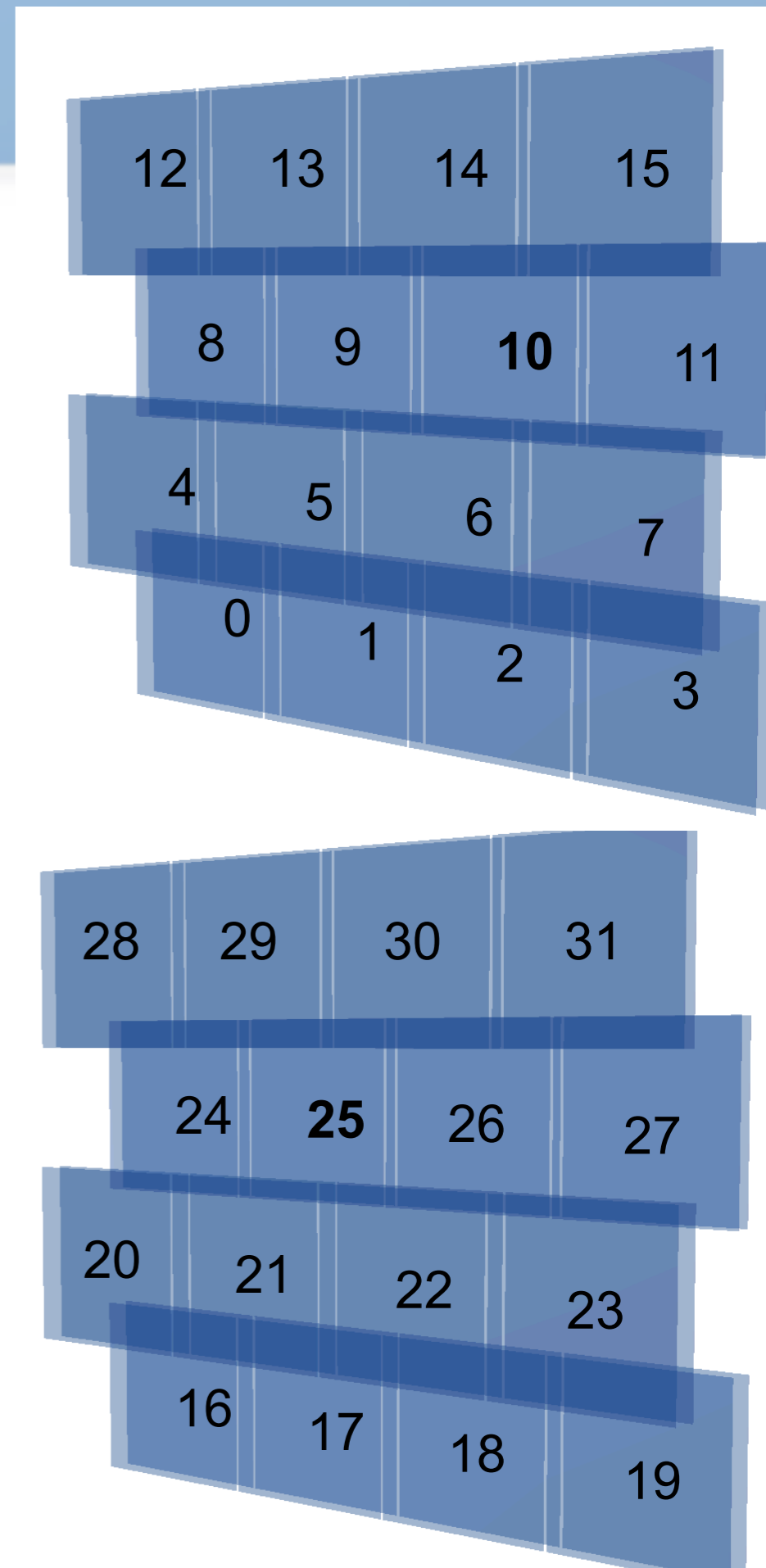
Vertex - clusters map X correlation for sensor 11-26



Vertex - clusters map Y correlation for sensor 11-26



Correlation btw two boards front/rear side

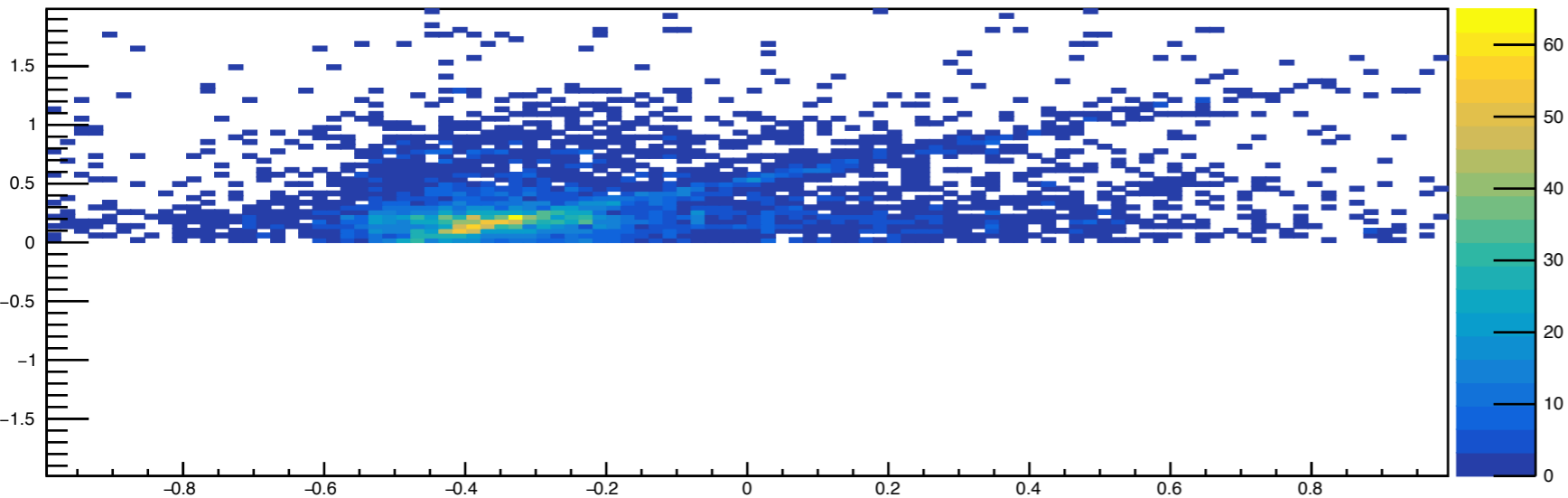


Correlation (ii)

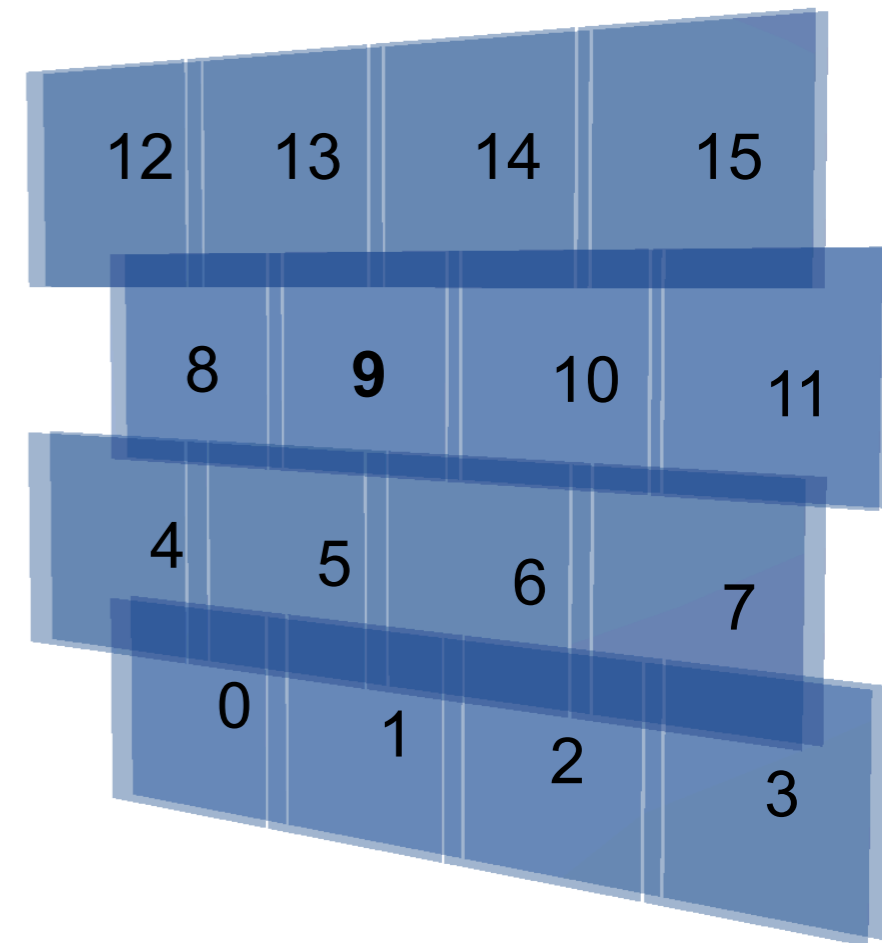
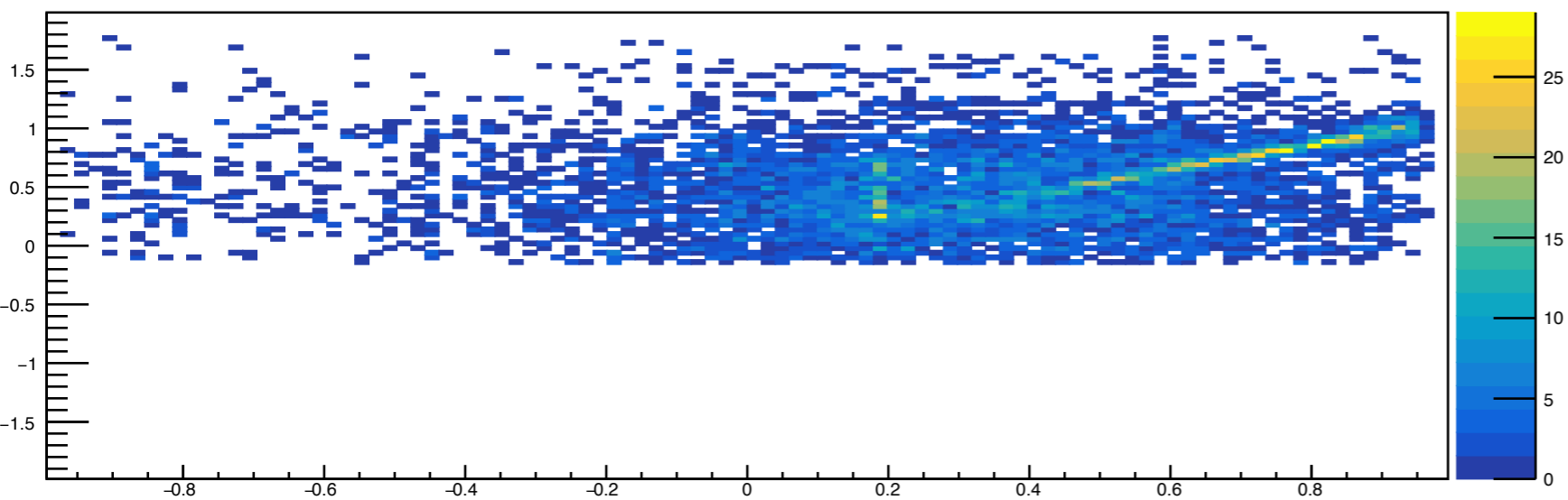
Correlation position btw 1 VTX & 1 ITR sensor

Run 6309 resync: VTX1 & ITR10 (111-3)

Vertex - clusters map X correlation for sensor 1-10



Vertex - clusters map Y correlation for sensor 1-10



Correlation btw one sensor of VTX with one of ITR (front side)

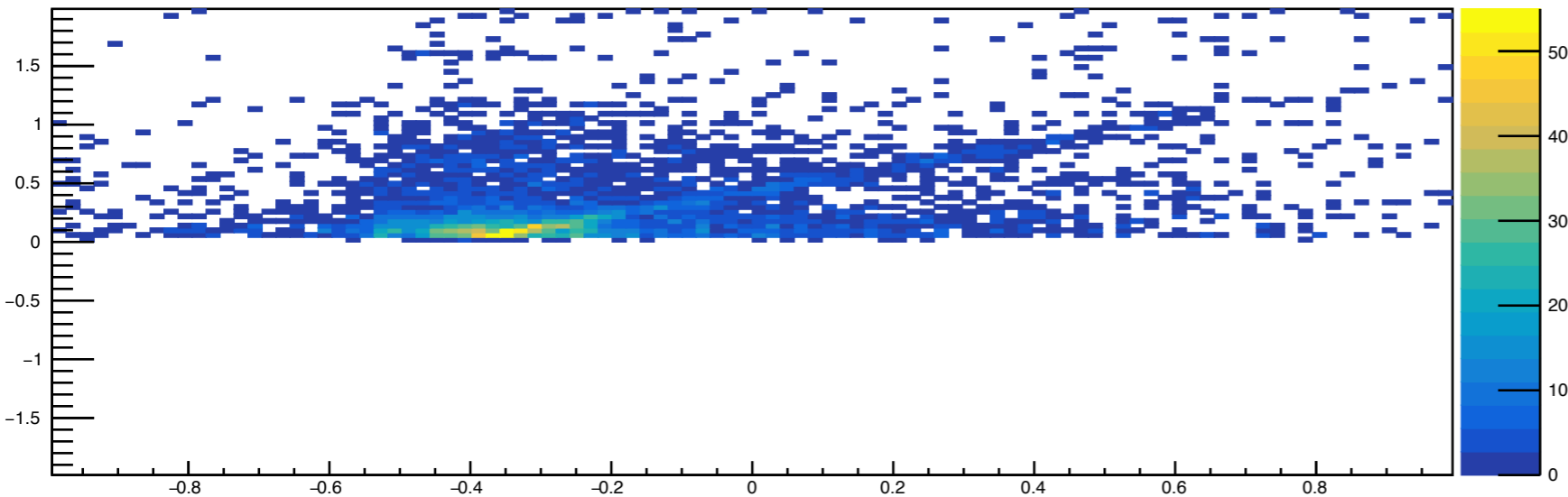
Correlation in X-Y in detector frame

Correlation (iii)

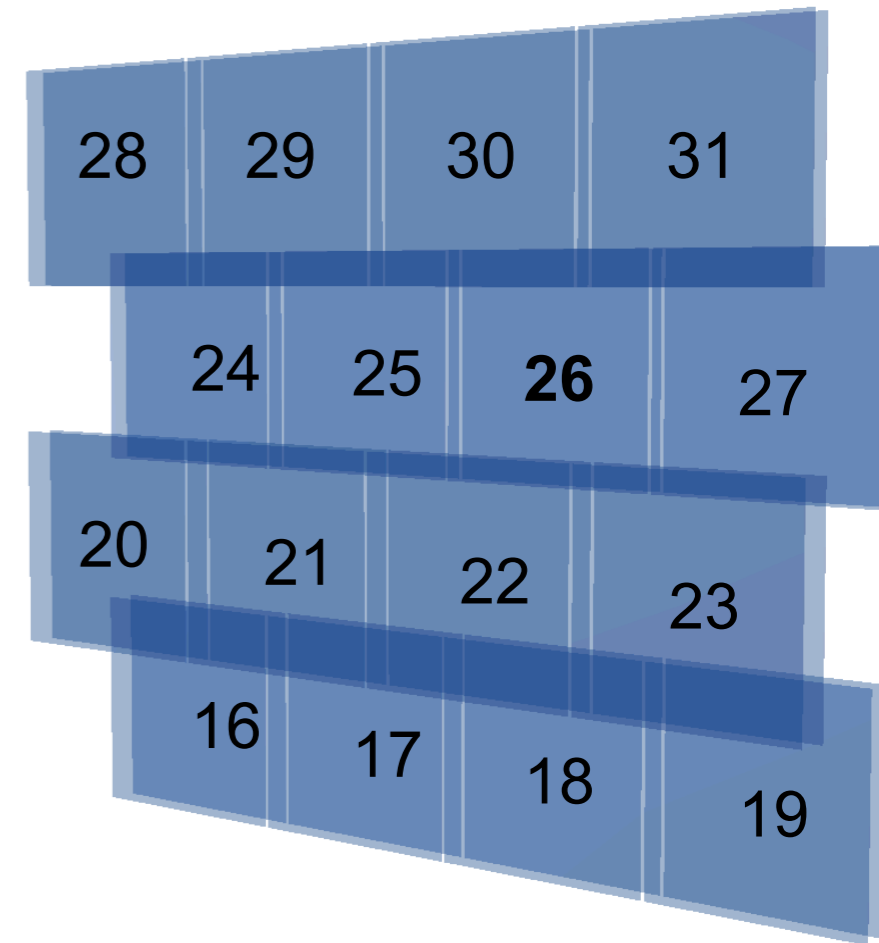
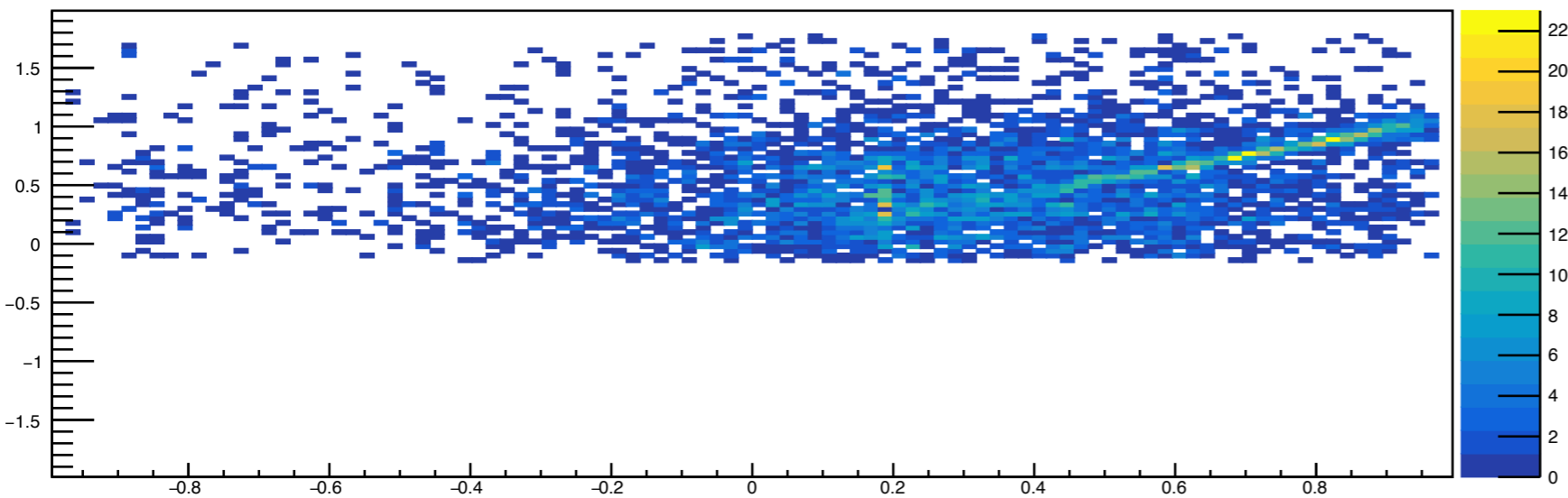
Correlation position btw 1 VTX & 1 ITR sensor

Vertex - clusters map X correlation for sensor 1-27

Run 6309 resync: VTX1 & ITR26 (113-0)



Vertex - clusters map Y correlation for sensor 1-27

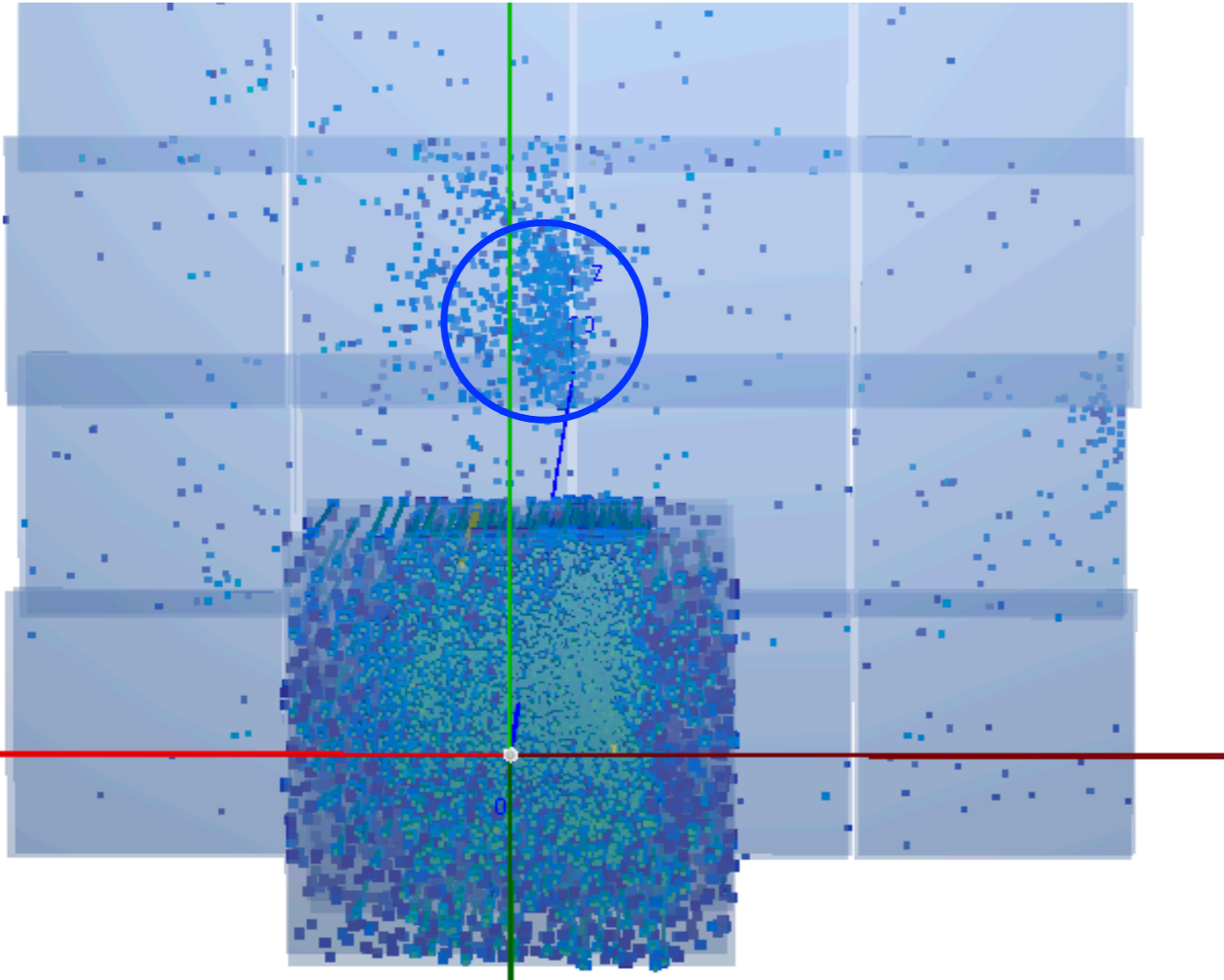


Correlation btw one sensor of VTX with one of ITR (rear side)

Correlation in X-Y in detector frame

Display

□ VTX+ITR: run6309 (alignment run)



➔ Still displacement in X

Conclusions

□ Pixel efficiency

- ➔ Tune for pixel inefficiency of quadrants (sensor 3)

□ Correlation

- ➔ Btw sensors of VTX or ITR and btw both detectors
- ➔ Pb with X direction for ITR, a displacement of 0.4 cm ??
- ➔ Alignment studies with millepede ?

□ Manpower

- ➔ Only one person taking care of SW for VTX+ITR
- ➔ No more major project in our team/lab (no student since 2 years)