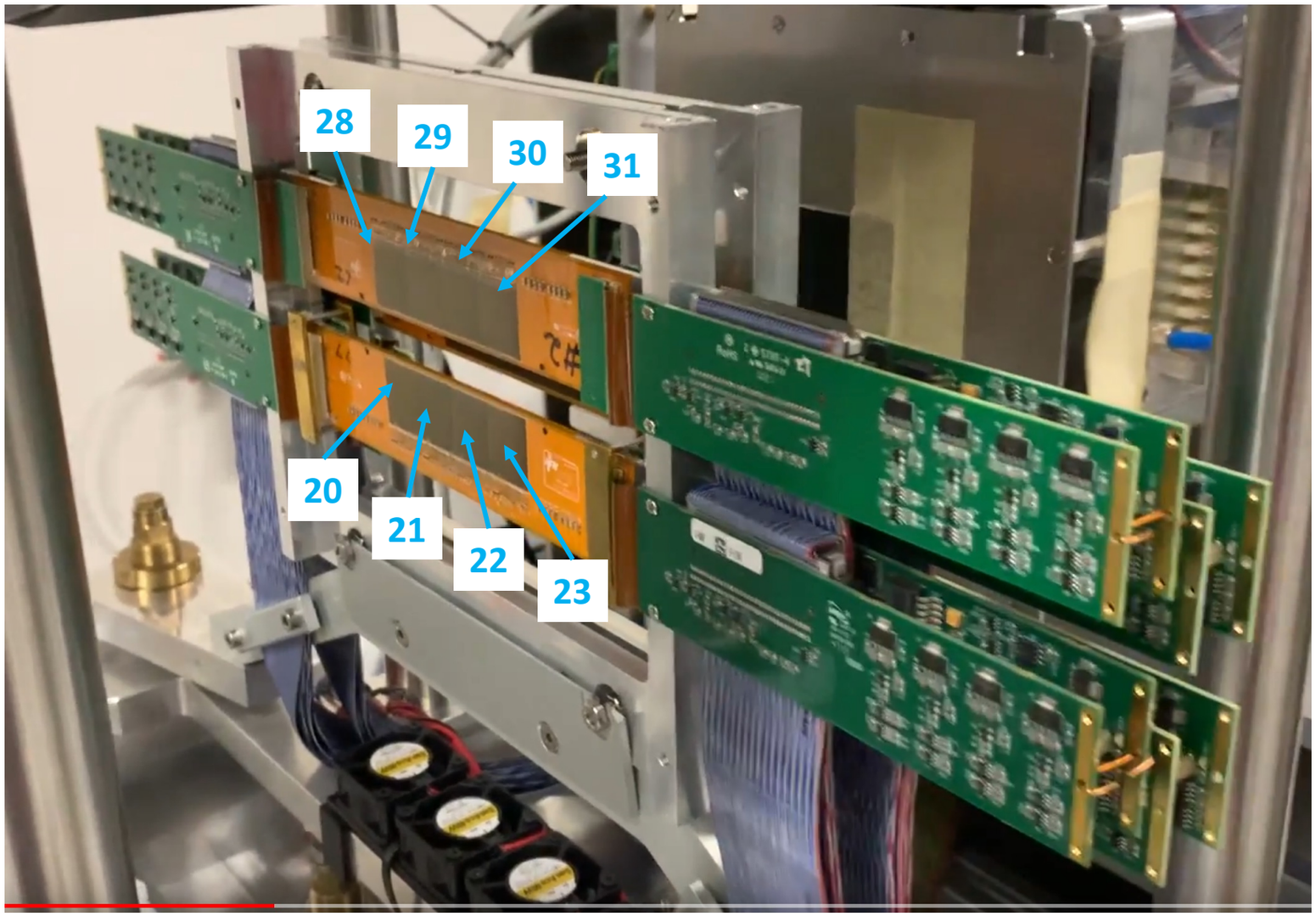
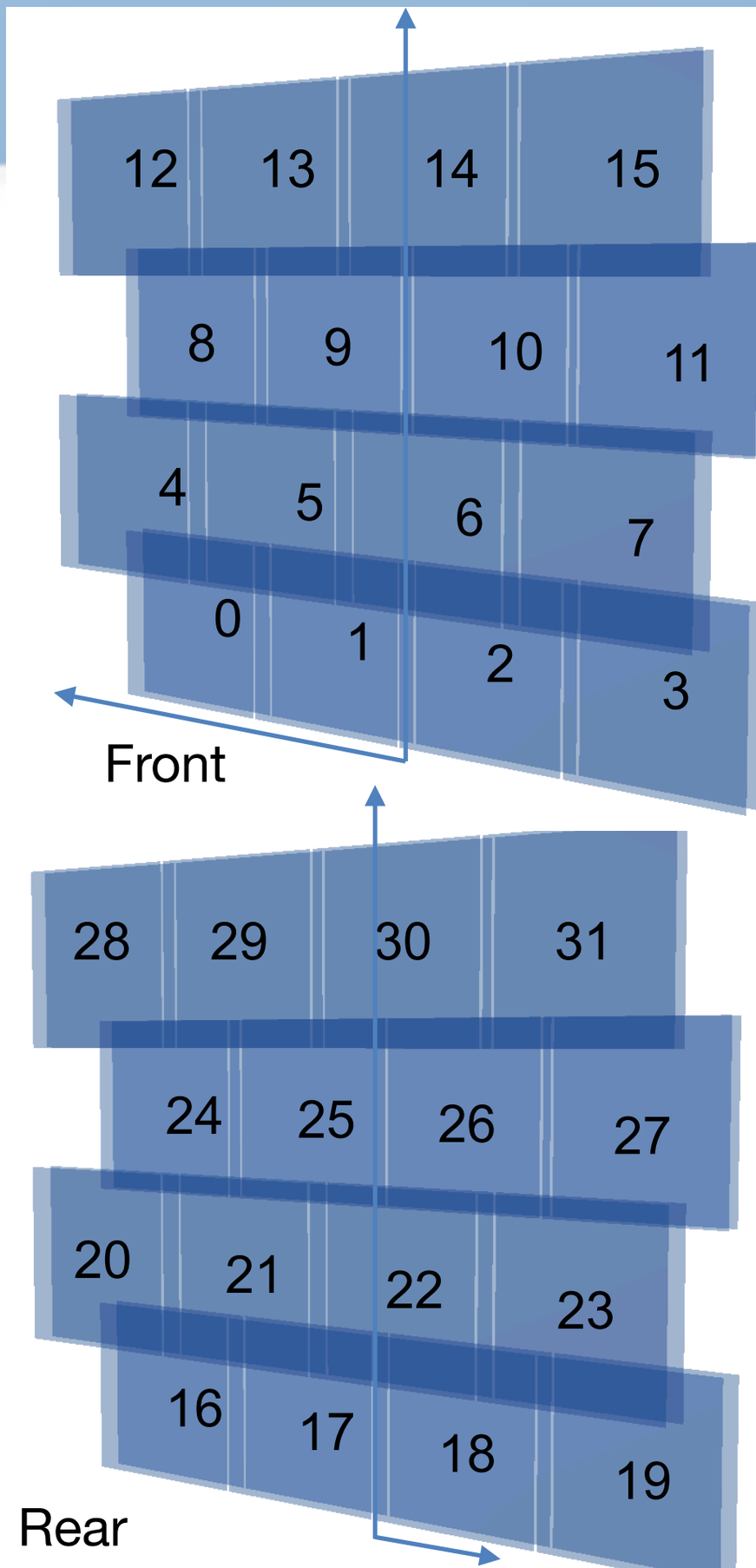
Updates (ter)

Numbering

- Setup





Decoding

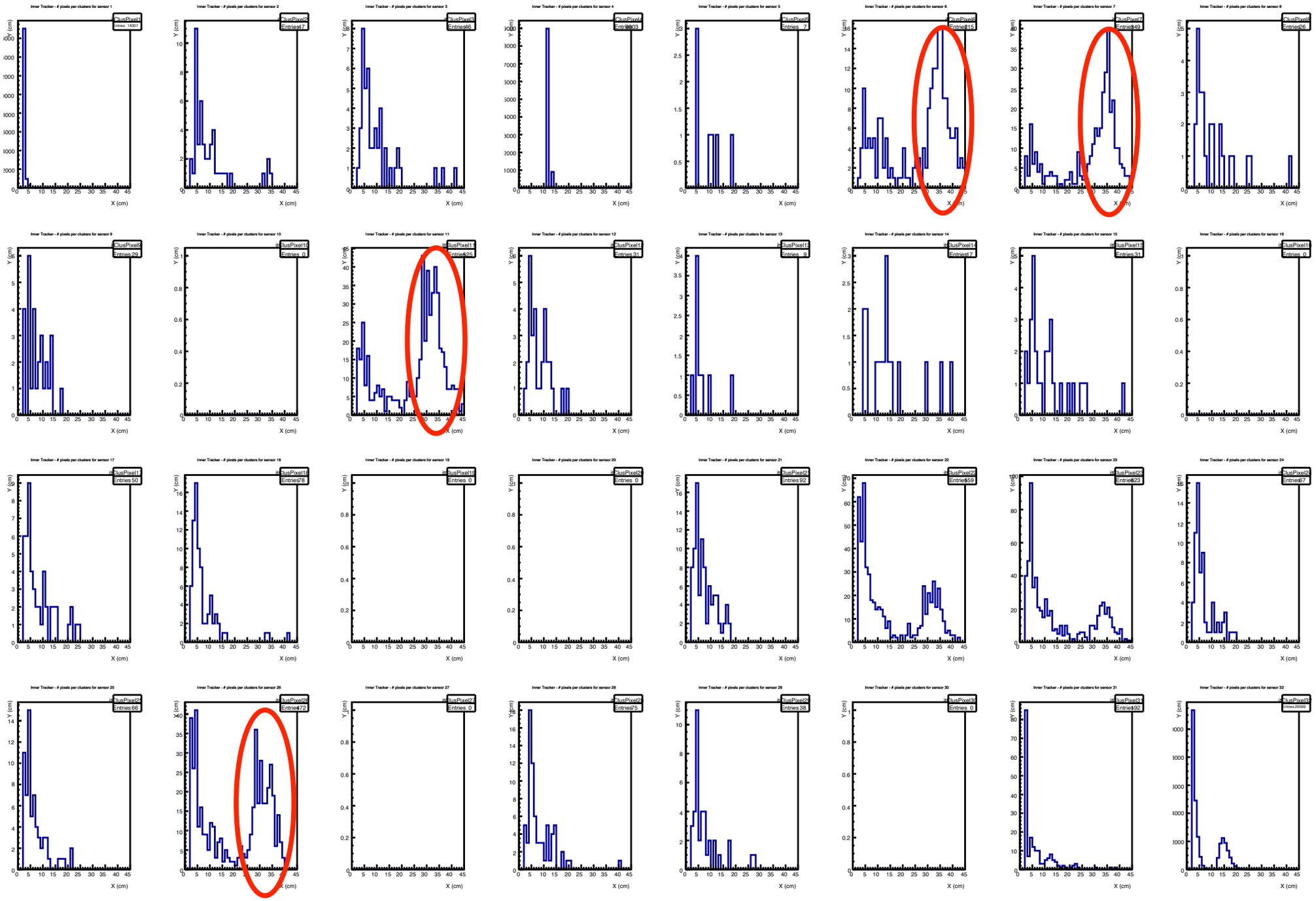
❑ Data format:

0003640	e1a5550a	fafafafa	80008000	00000000
0003660	00000000	e1a5550a	80088007	00000001
0003700	e1a5552a	000ac519	00000000	aaa8aaa7
0003720	80088007	00000001	e1a555e3	000ac51a
0003740	00000000	aaa8aaa7	80088007	00000001
0003760	e1a5569d	000ac51b	00000000	aaa8aaa7
0004000	8bb08bb0	80018001	00000000	00000000
0004020	e1a5550a	80088007	00000001	e1a5556c
0004040	000abb34	00020002	0d381171	02242d71
0004060	aaa8aaa7	80088007	00000001	e1a55625
0004100	000abb35	00050005	0e110331	0e0f0341
0004120	0e0f0351	0e0f0361	0e110371	aaa8aaa7
0004140	80088007	00000001	e1a556df	000abb36
0004160	00000000	aaa8aaa7	8bb18bb1	80028002
0004200	00000000	00000000	e1a5550a	80088007
0004220	00000001	e1a55589	000ab0ba	00010001
0004240	07480db1	aaa8aaa7	80088007	00000001
0004260	e1a55643	000ab0bb	00010001	0ae02e91
0004300	aaa8aaa7	80088007	00000001	e1a556fc
0004320	000ab0bc	00010001	02141941	aaa8aaa7
0004340	8bb28bb2	80038003	00000000	00000000
0004360	e1a5550a	80088007	00000001	e1a5559c
0004400	000aa548	00000000	aaa8aaa7	80088007
0004420	00000001	e1a55655	000aa549	00000000
0004440	aaa8aaa7	80088007	00000001	e1a5570f
0004460	000aa54a	00000000	aaa8aaa7	8bb38bb3
0004500	abcdabcd	00463630	673d2eeb	0001a6df
0004520	00000000	12341234	0000030b	fafafafa
0004540	00aaaa00	00000000	00000001	fafafafa
0004560	fafa0113	00000033	00000001	0102ba3b
0004600	80008000	00000000	00000001	0102ba3b
0004620	80088007	00000000	0102b8b7	000347ca

- Two pb:
  - Extra chunk of data
  - Missing sensor structure when sensor set off
  - ➡ Pb fixed with help of Riccardo and co.

Cluster size

- CNAO2024: run 7074 (threshold: $10 \times \sigma$)



Beam: (start @ 1)

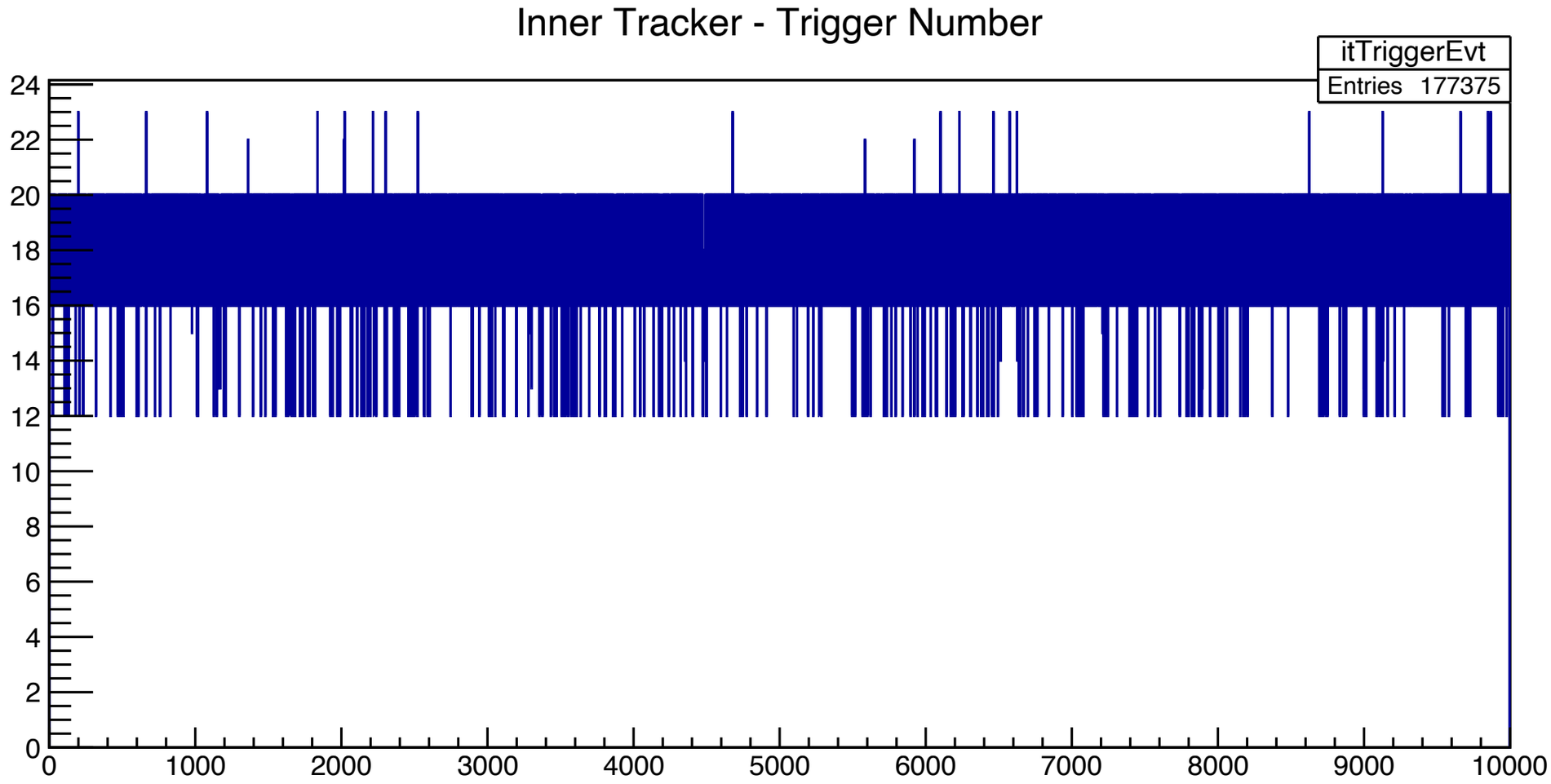
6, 7 & 11, 23

Beam:

~35 pixels/cluster

Trigger number

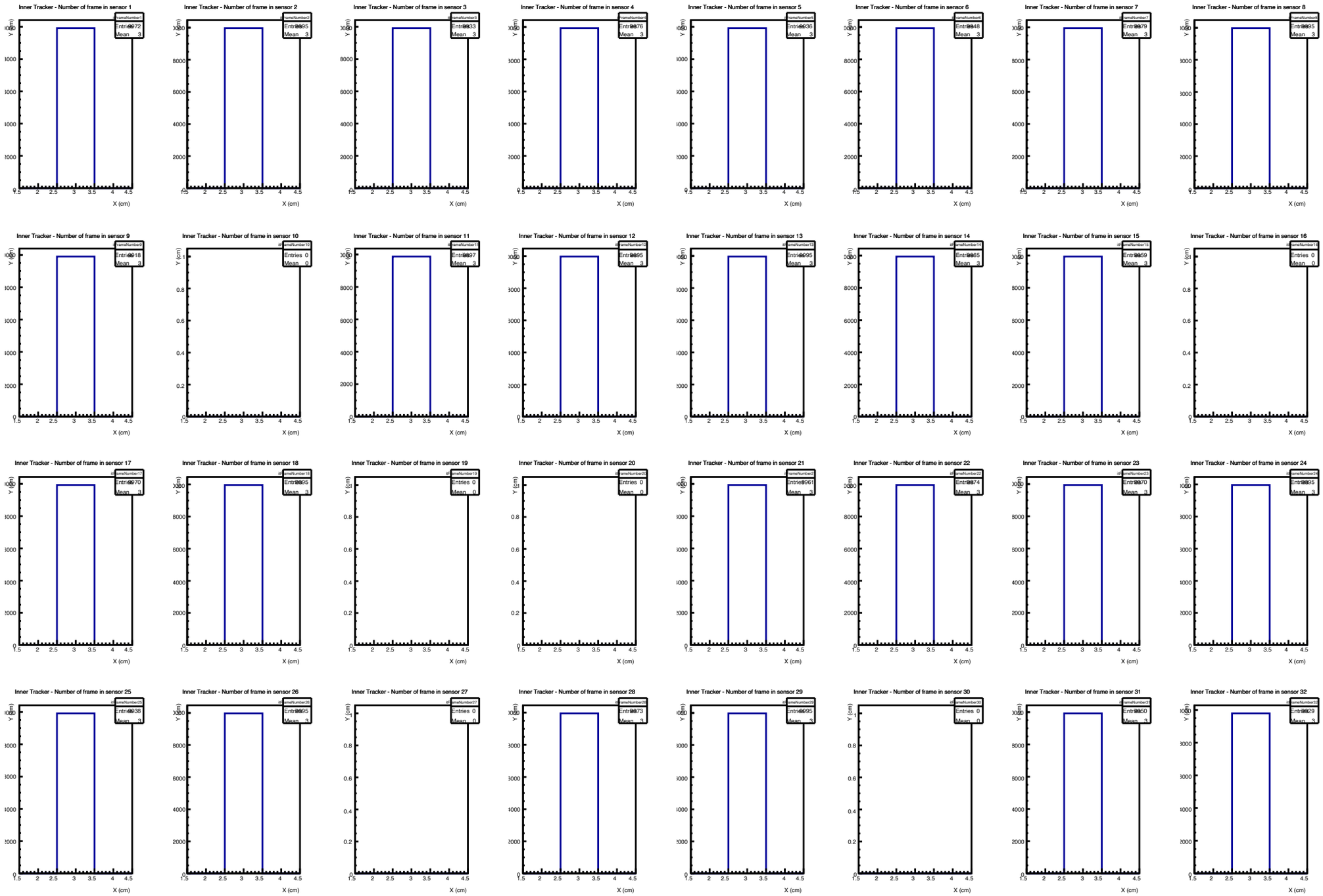
- CNAO2024: run 7074: over 10kEvts



➡ Seems to be ok, do not loose any trigger

Frame number per sensor

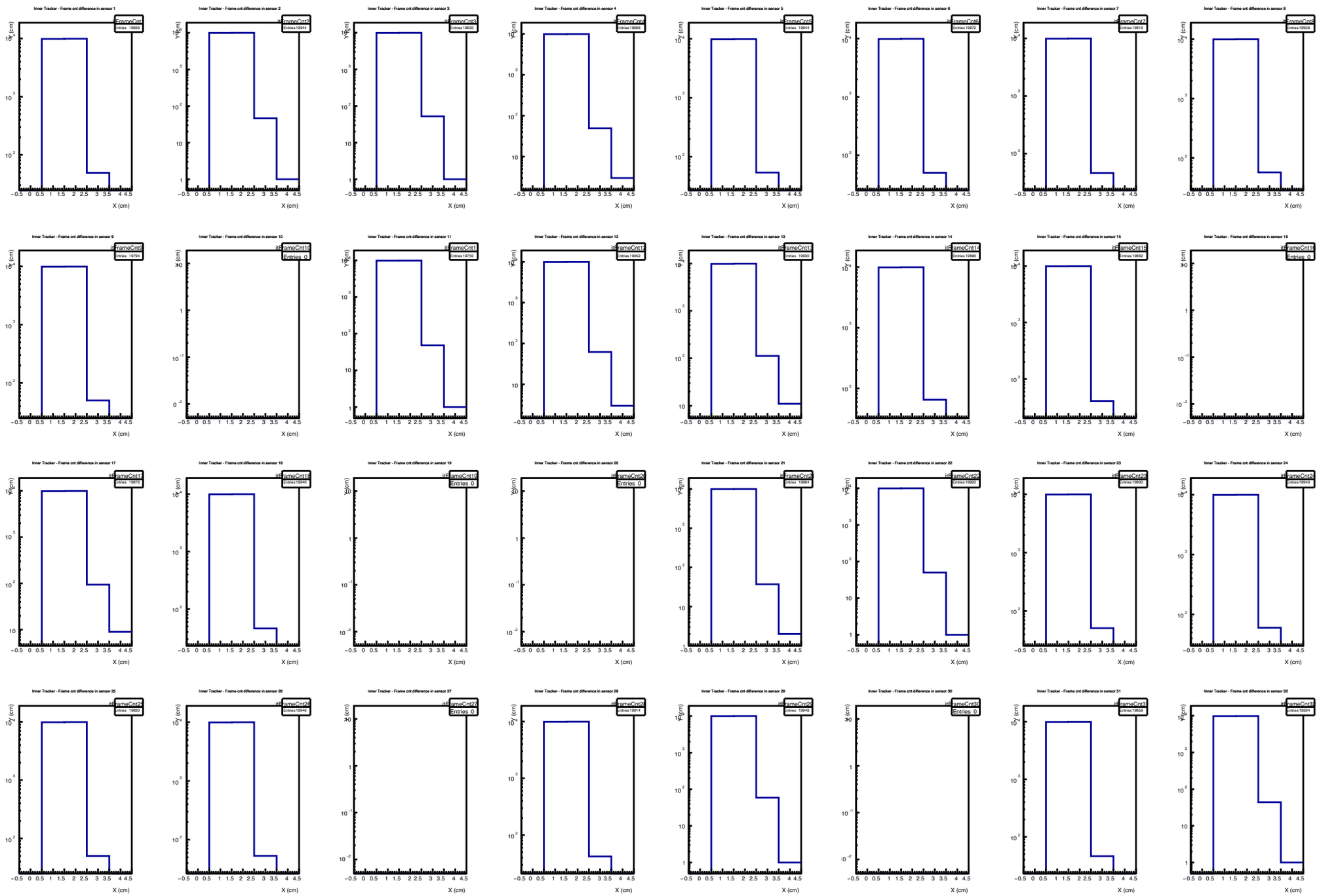
- CNAO2024: run 7074 (threshold: $10 \times \sigma$)



All 3 frames

Frame counter difference per sensor

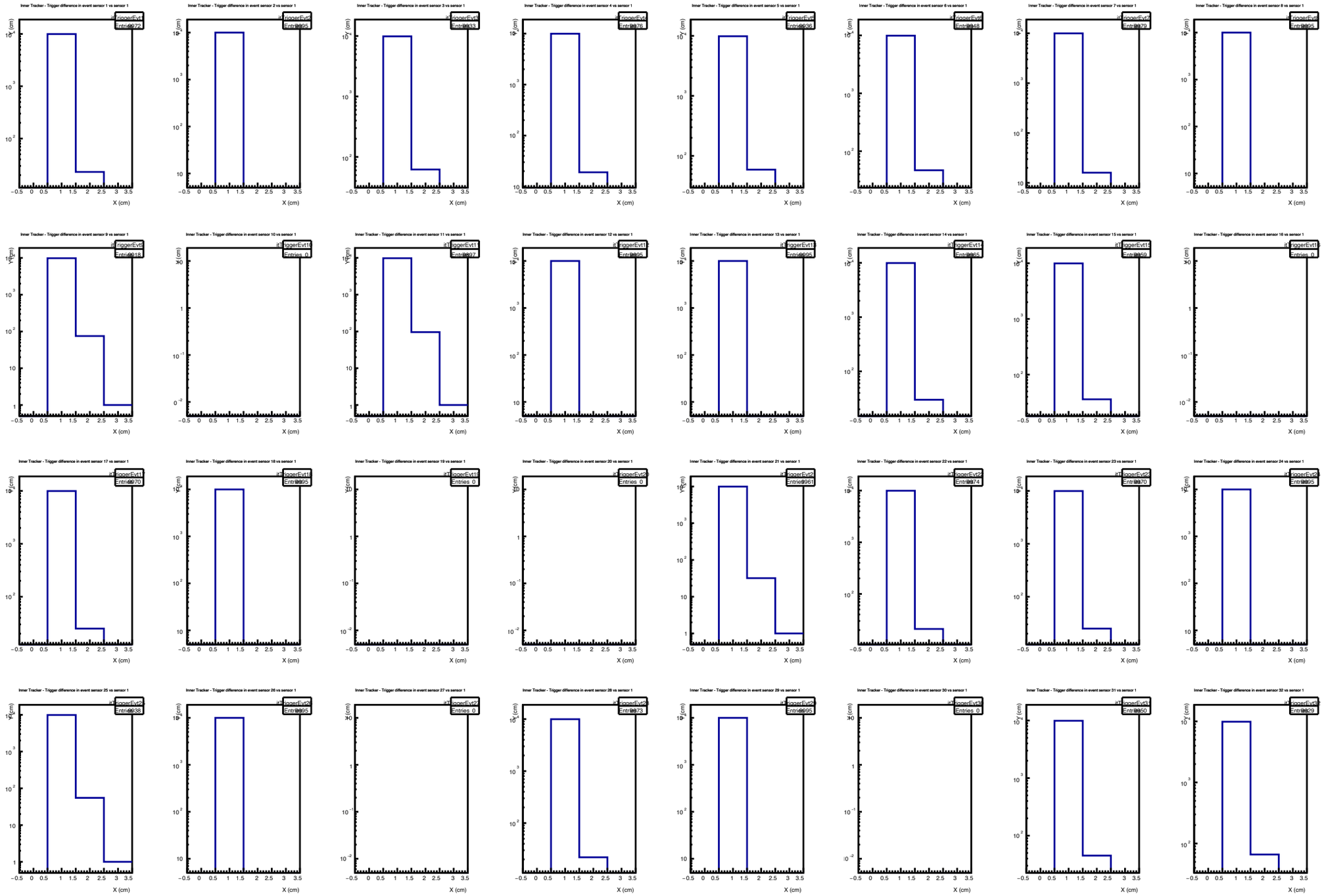
- CNAO2024: run 7074 (threshold: $10 \times \sigma$)



<= 3 as expected

Frame trigger difference per sensor

- CNAO2024: run 7074 (threshold: $10 \times \sigma$)

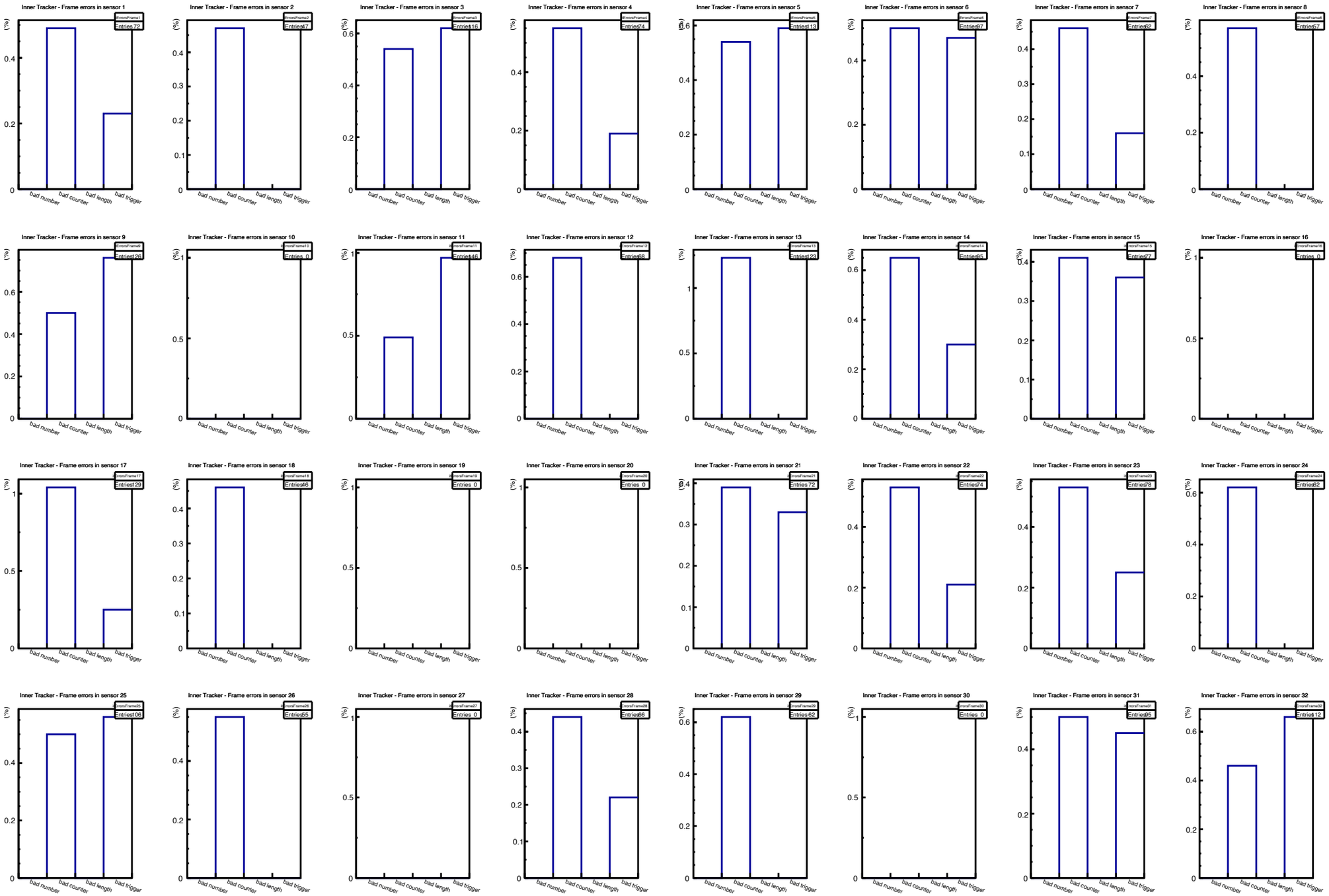


Consecutive

Triggers > 99%

Frame errors per sensor

- CNAO2024: run 7074 (threshold: $10 \times \sigma$)



1: bad frame number

2: bad frame counter

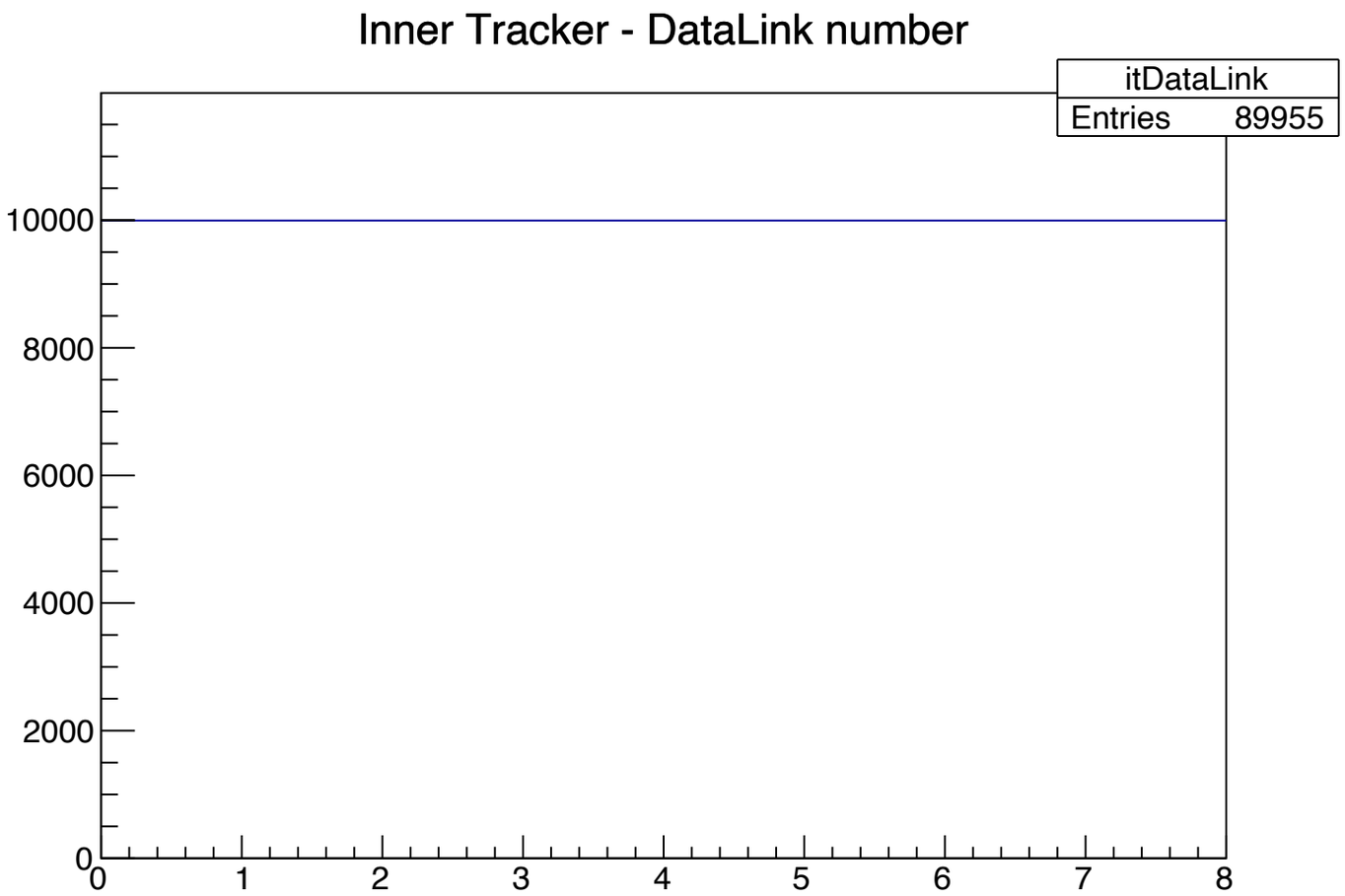
3: bad frame length

4: bad frame trigger

< 1 %

Data link number

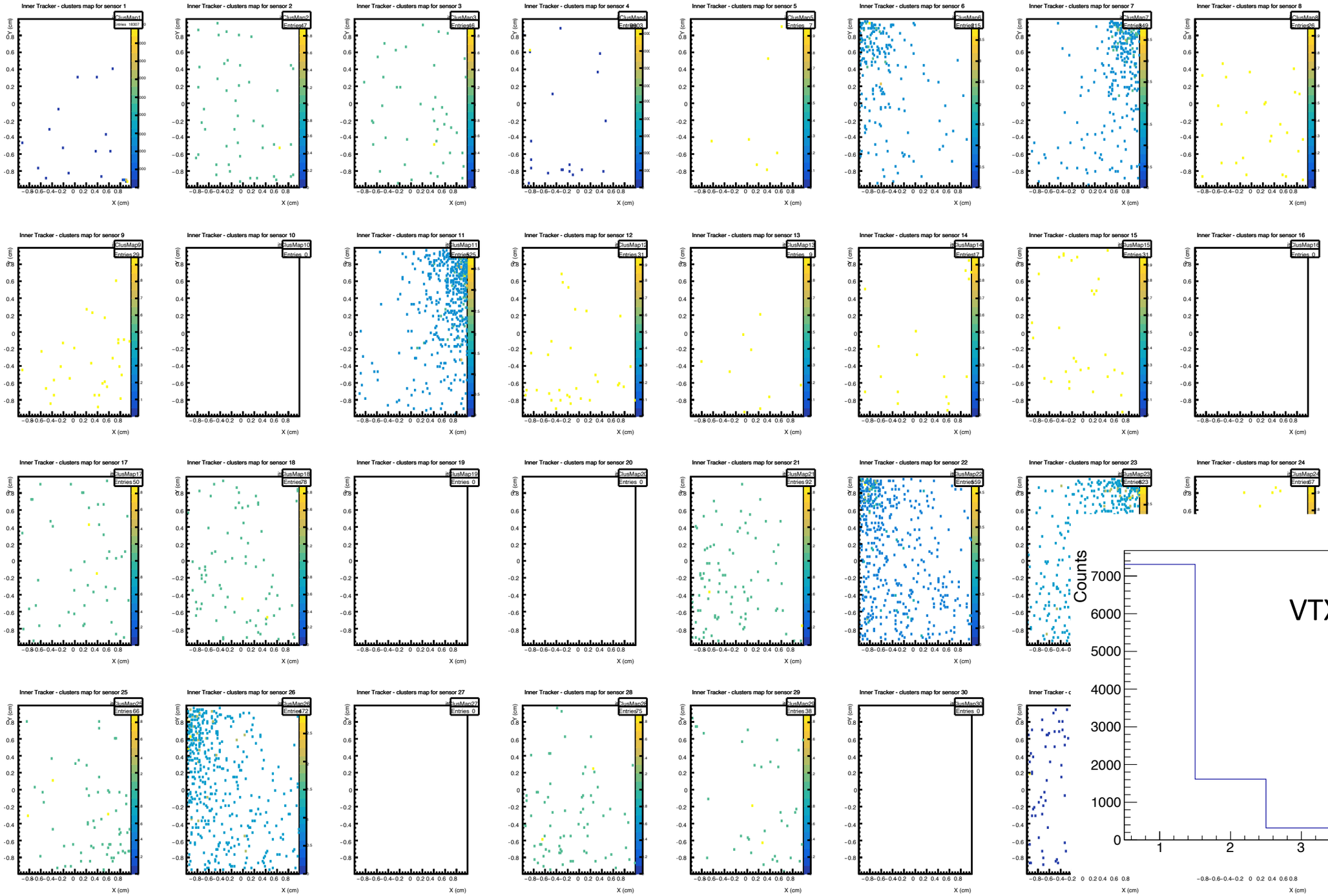
- CNAO2024: run 7074 (threshold: $10 \times \sigma$)



➡ All data links present in each event

Cluster map

- CNAO2024: run 7074 (10 kEvts, threshold: $10 \times \sigma$)



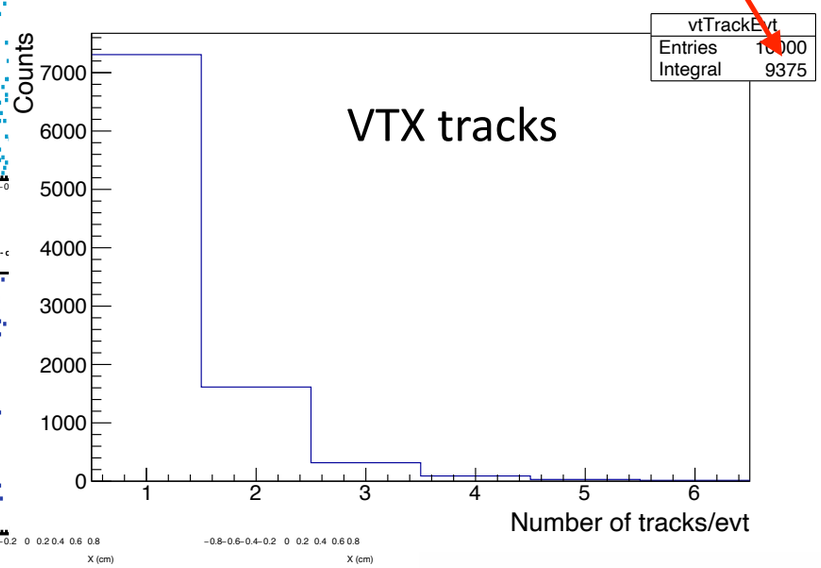
Beam: (start @ 1)

6, 7 & 11

23 & 26

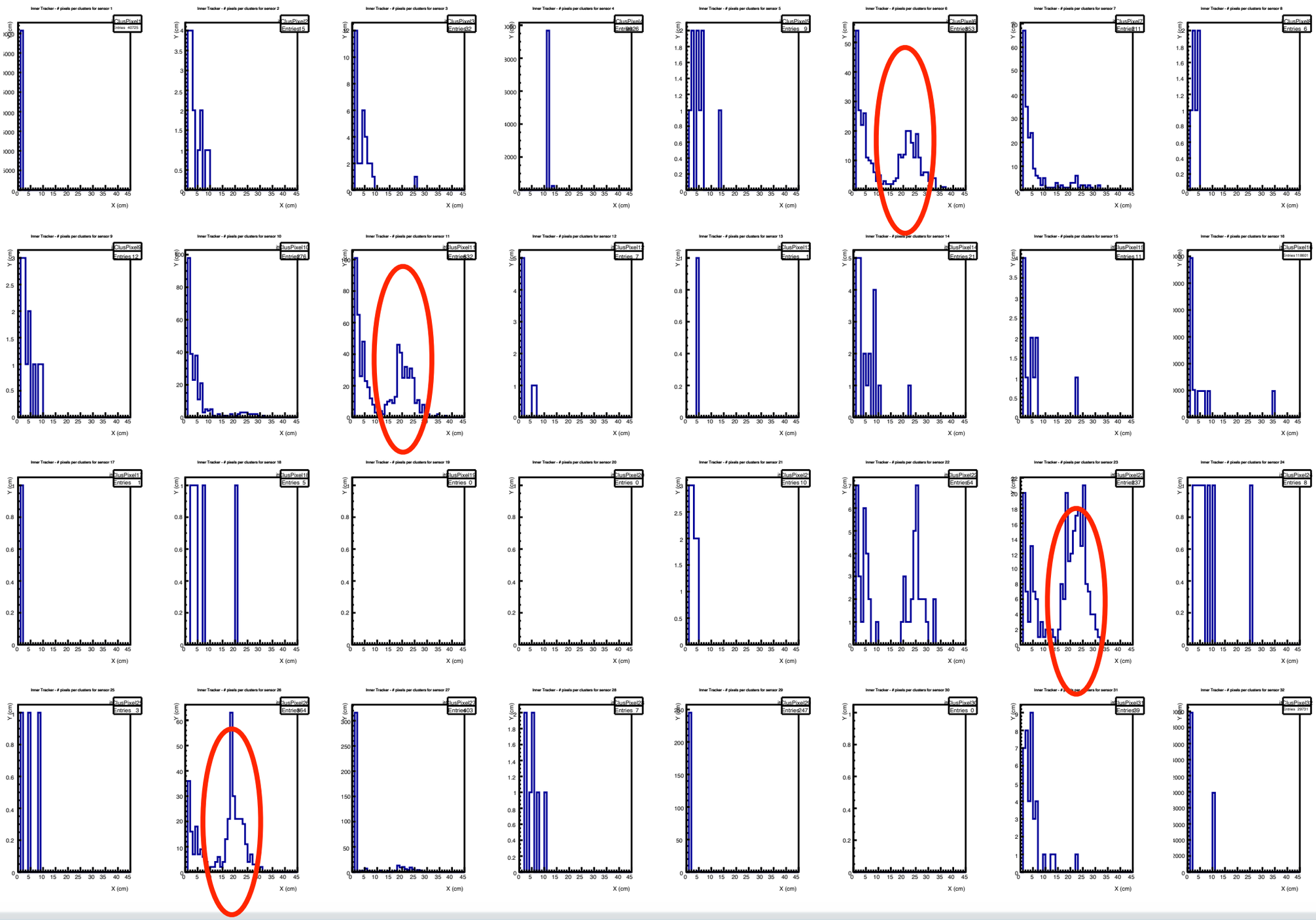
~3 kClusters

Factor ~3



Cluster size

- CNAO2024: run **6962** (10 kEvts, BTF config)



Beam: (start @ 1)

6 & 11

23 & 26

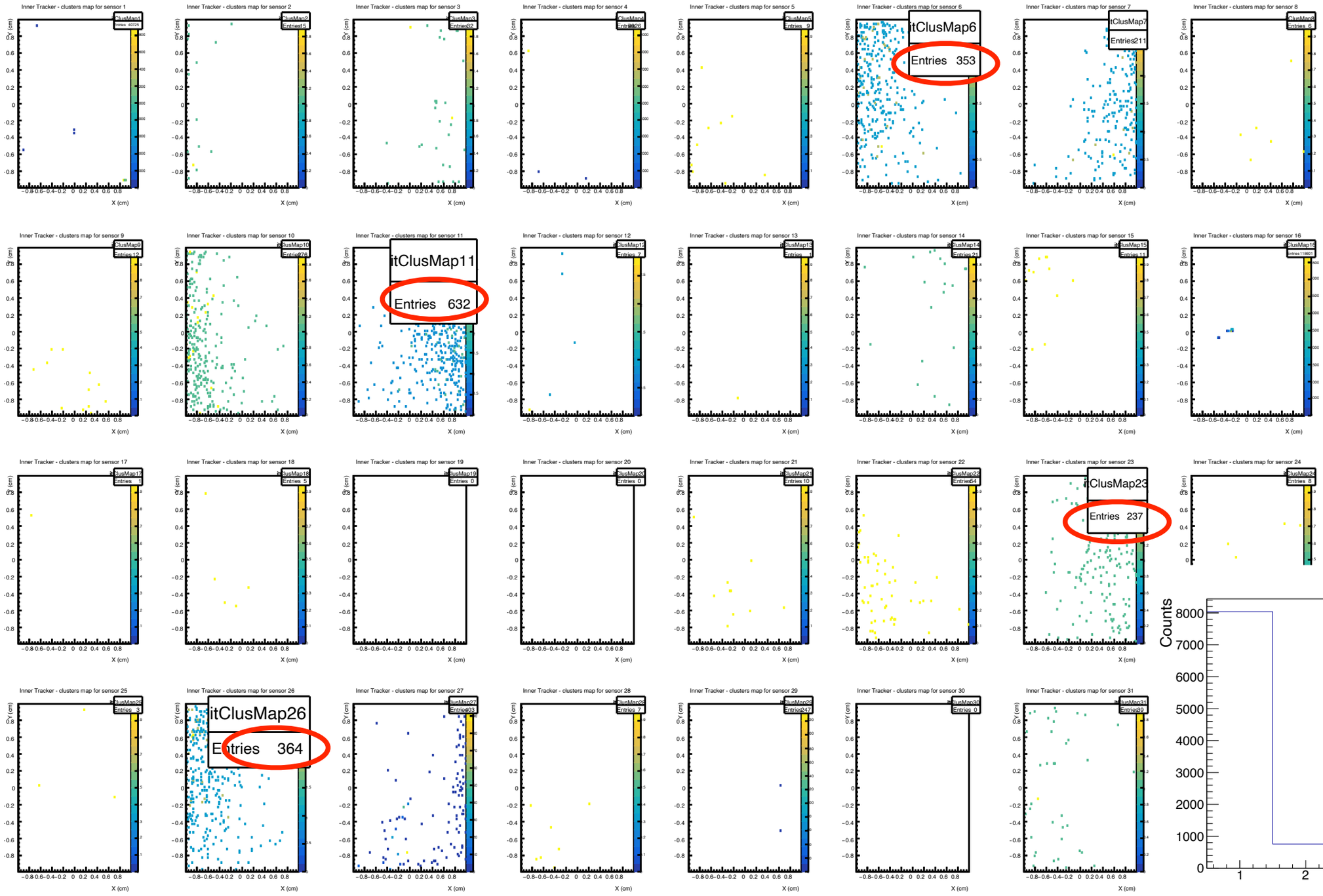
Beam:

~25 pixels/cluster

Less than for 10xσ

Cluster map

- CNAO2024: run 6962 (10 kEvts, BTF config)

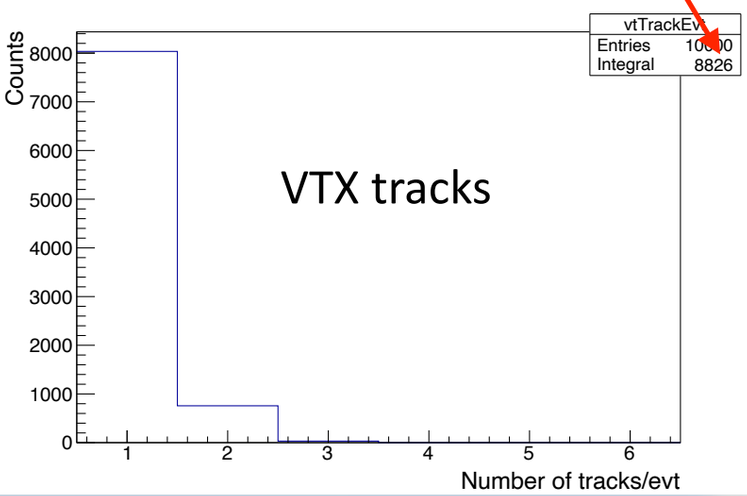


Beam: (start @ 1)

7, 11, 22, 24

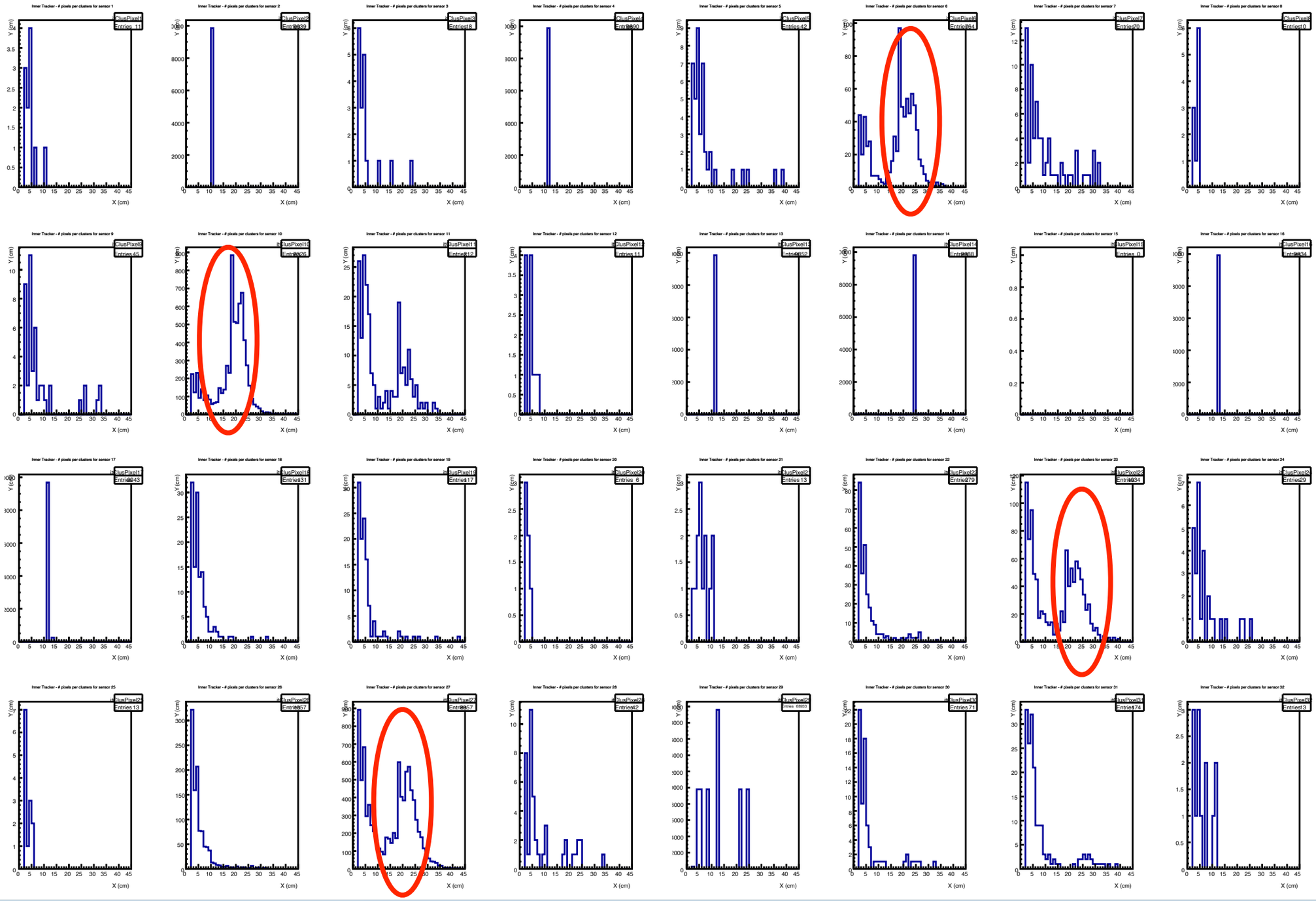
~1 kClusters

Factor ~8



Cluster size

- **CNAO2023**: run 6144 (25 kEvts, config threshold max ?)



Beam: (start @ 1)

6 & 10

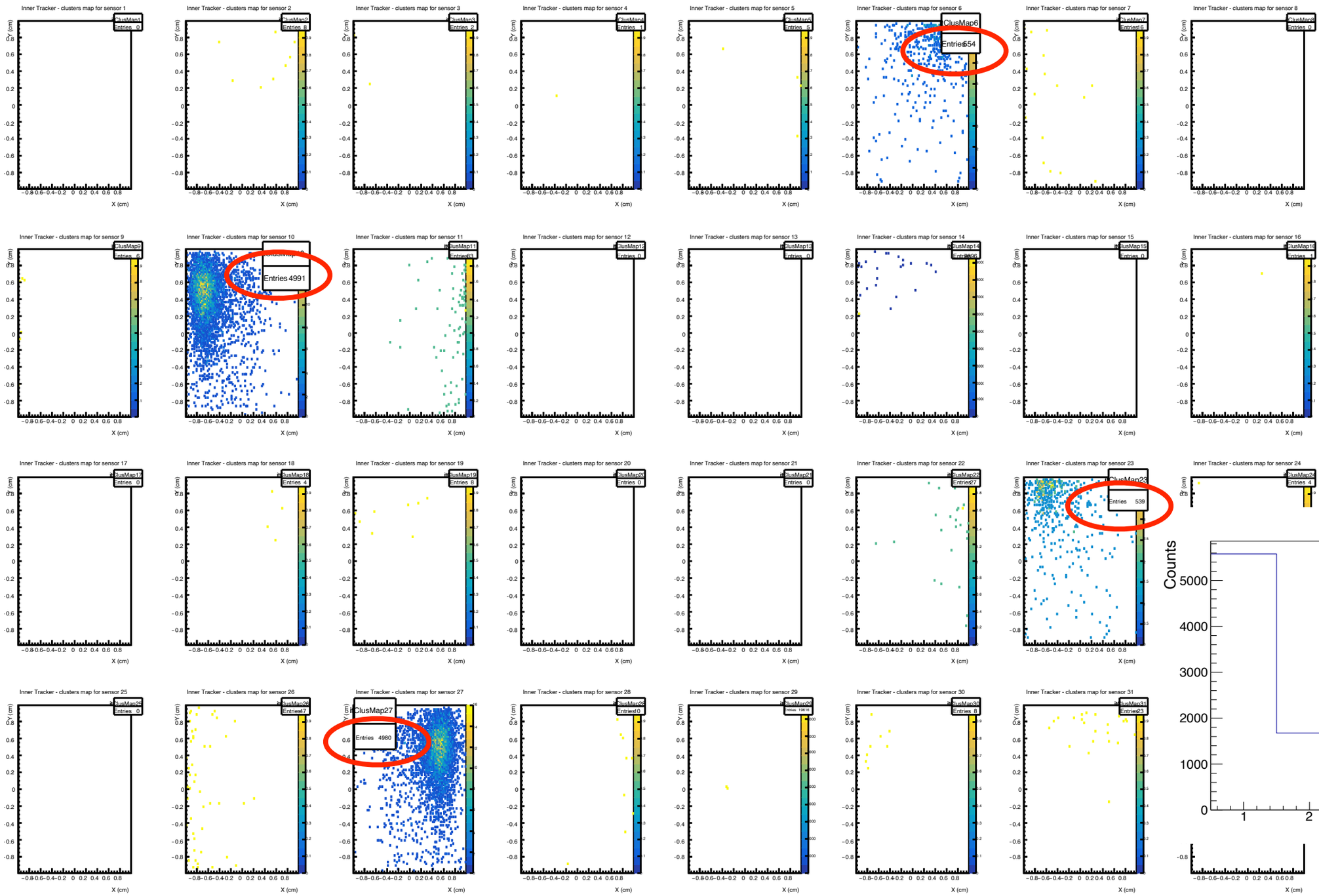
23 & 27

Beam:

~25 pixels/cluster

Cluster map

- **CNAO2023**: run 6144 (25 kEvts, cluster size > 10, config threshold max ?)



Beam: (start @ 1)

6 & 10

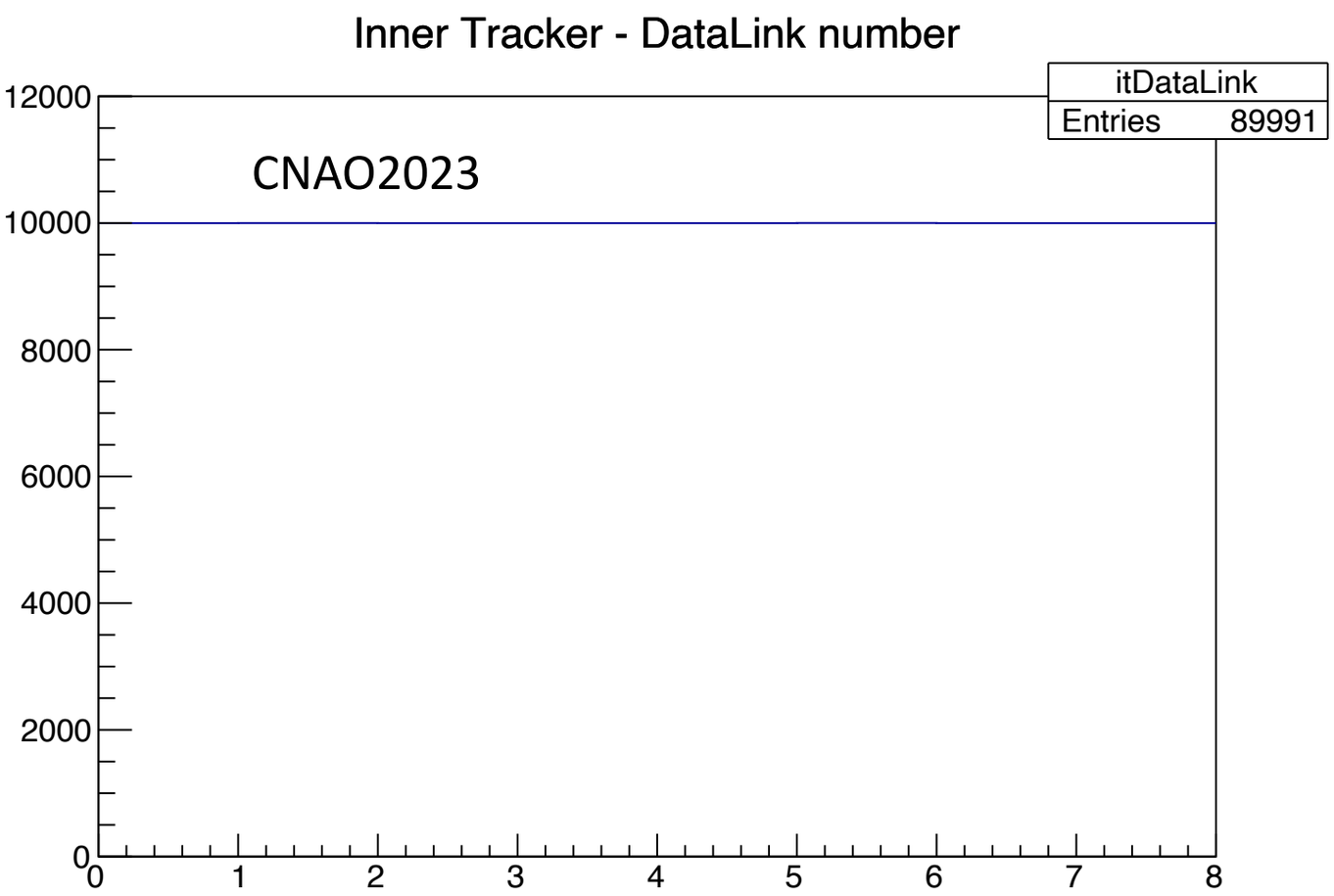
23 & 27

~9 kClusters

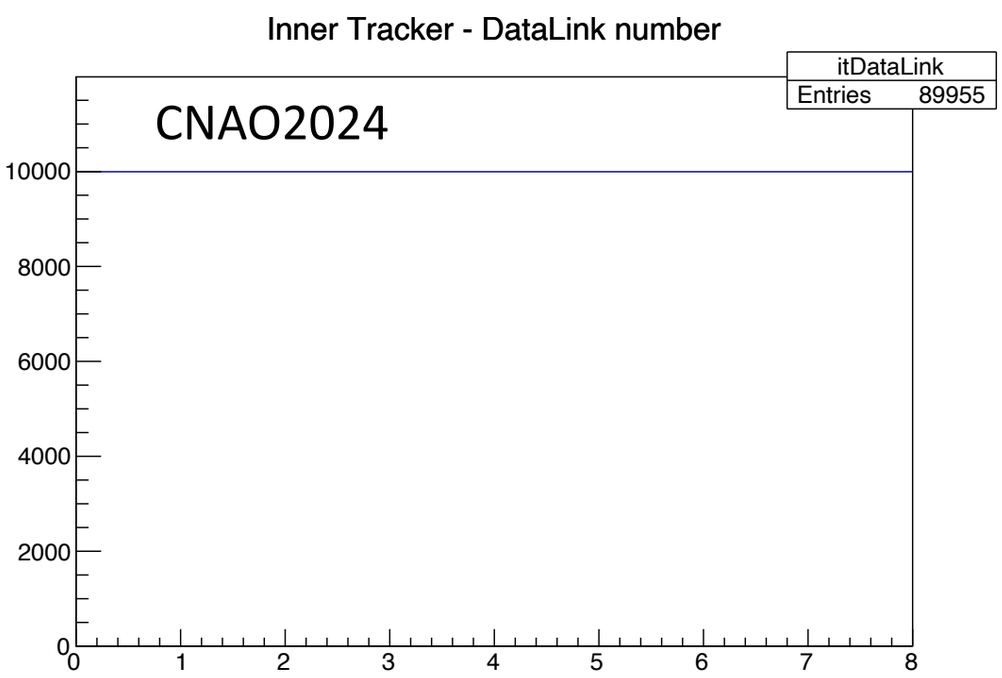
~ same number

Data link number

- **CNAO2023**: run 6144 (10 kEvts, config threshold max ?)



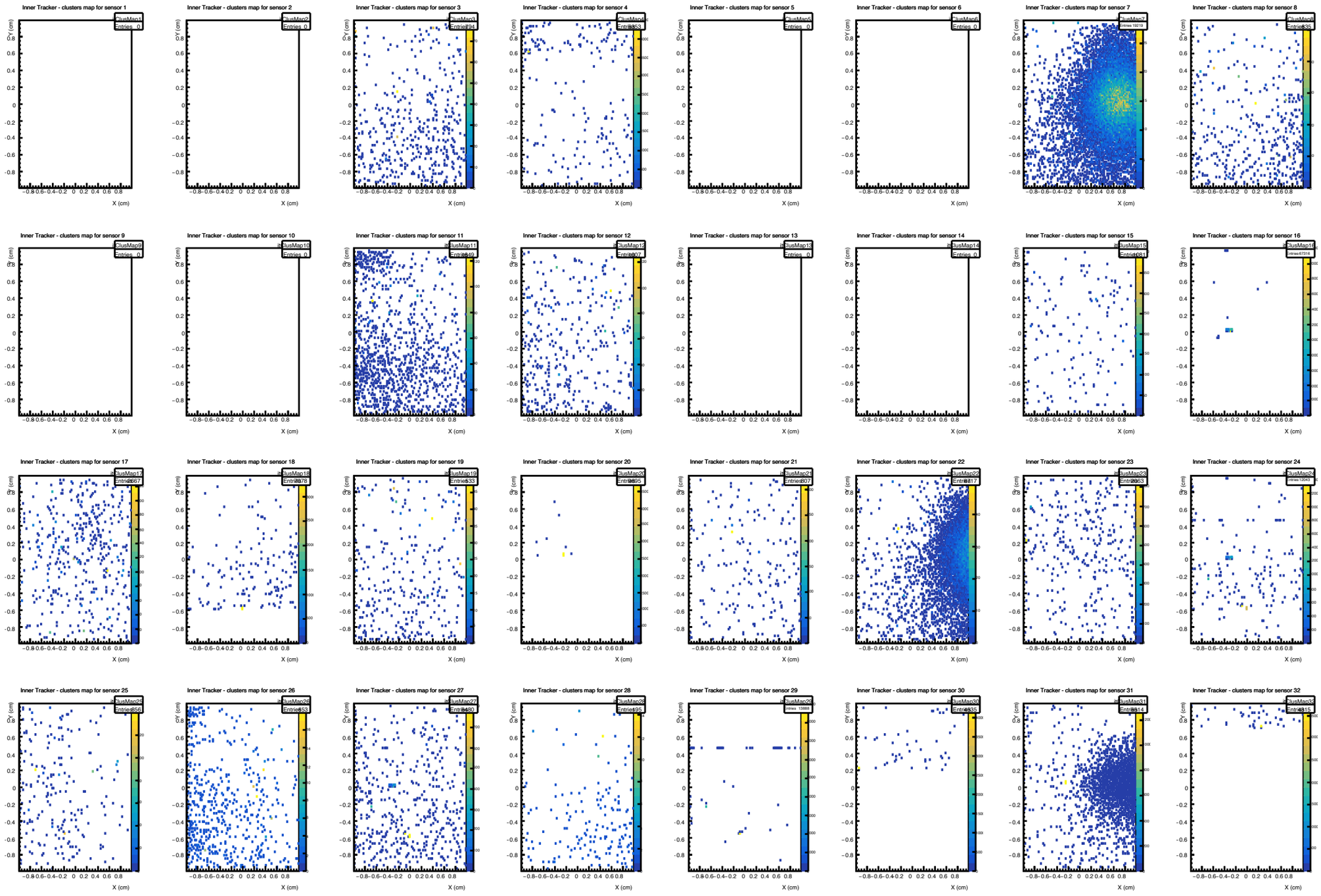
- CNAO2024: run 7074 (threshold: $10 \times \sigma$)



➡ All data links present in each event (as for CNAO2024)

Cluster map

- **Frascati** (e-beam): run 5786 (6kEvts)



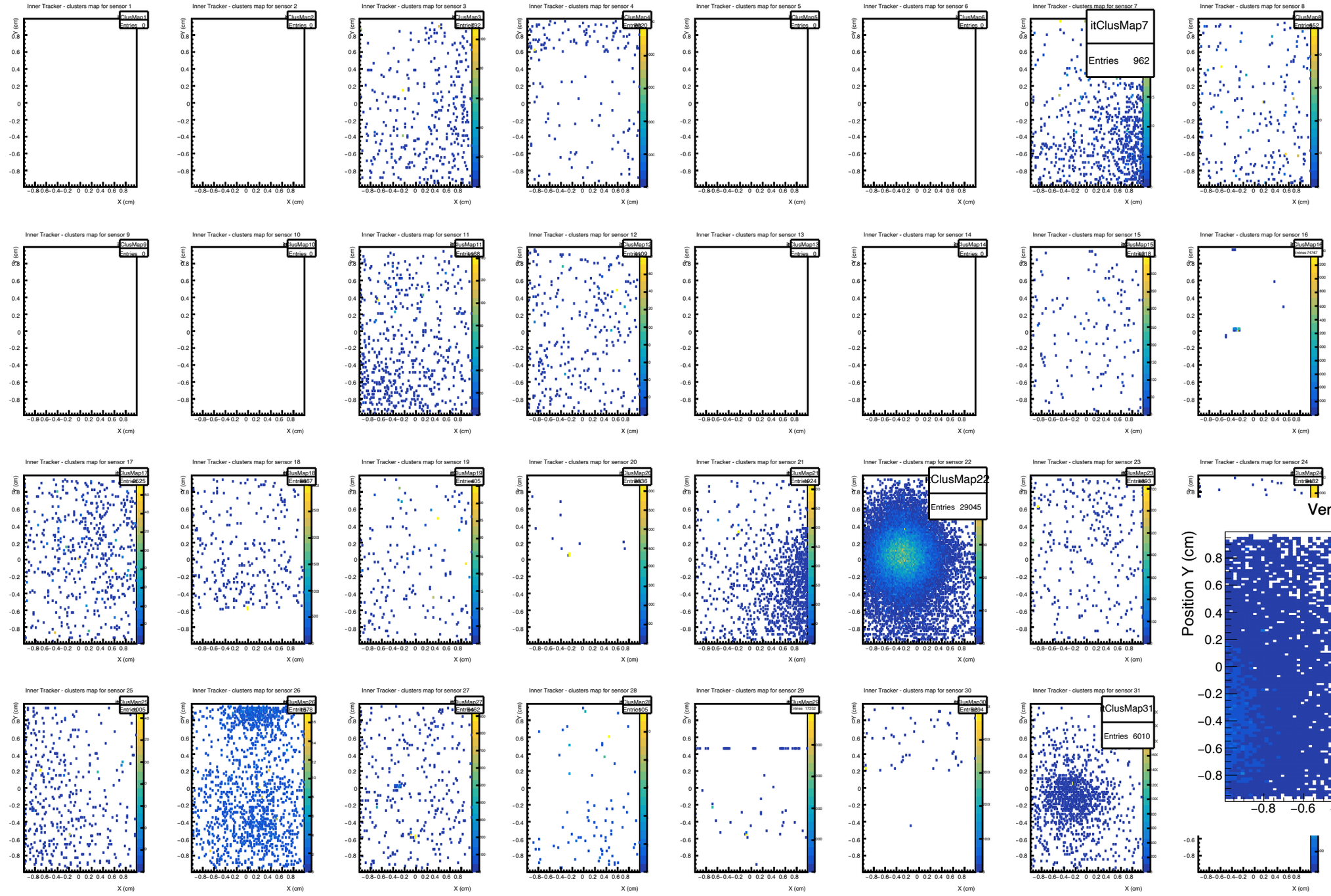
Beam: (start @ 1)

7, 22, 31

~40 kClusters

Cluster map

- **Frascati** (e-beam): run 5783 (6.5kEvts)



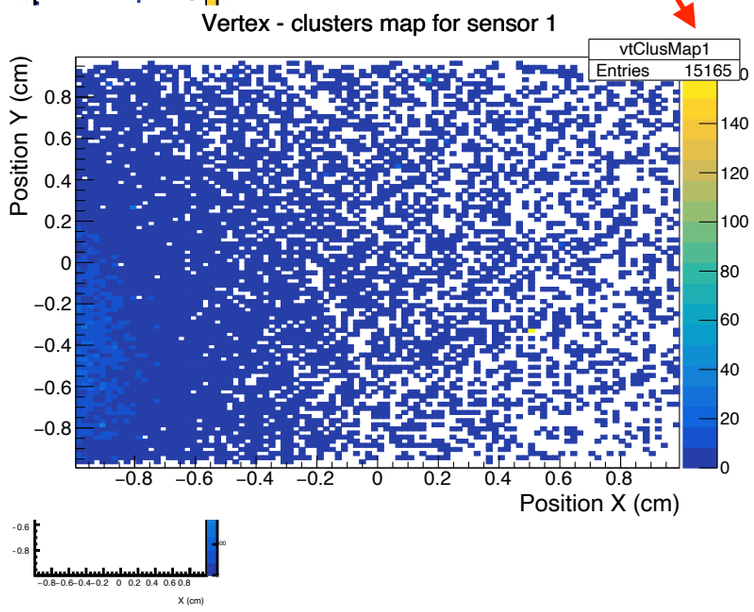
Beam: (start @ 1)

22 & 30

~30 kClusters

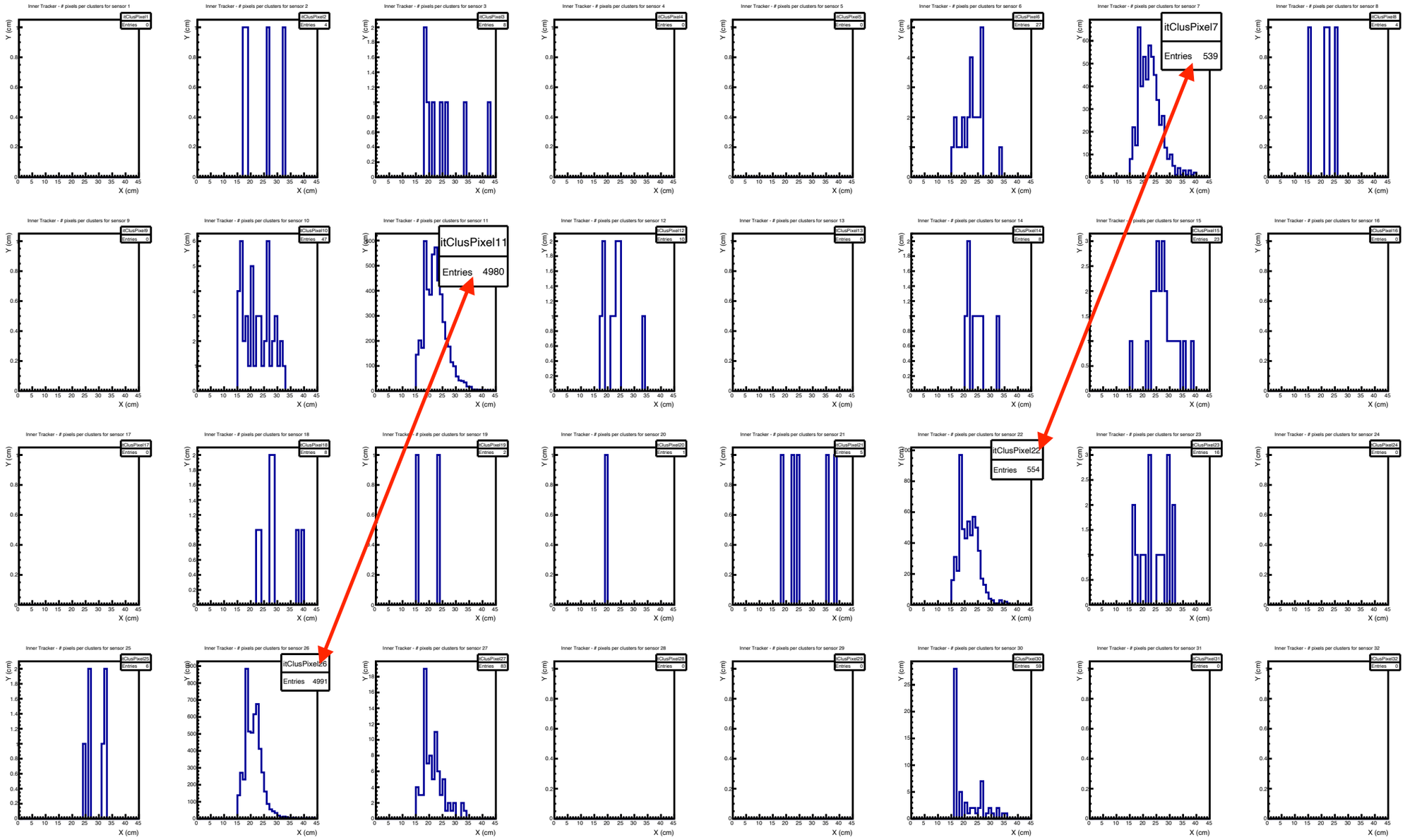
~ same order

Beam not VTX centered



Mapping

- **CNAO2023**: run 6144 (25 kEvts, cluster size > 15, config threshold max ?)
  - Cluster size with new mapping



Beam: (start @ 1)

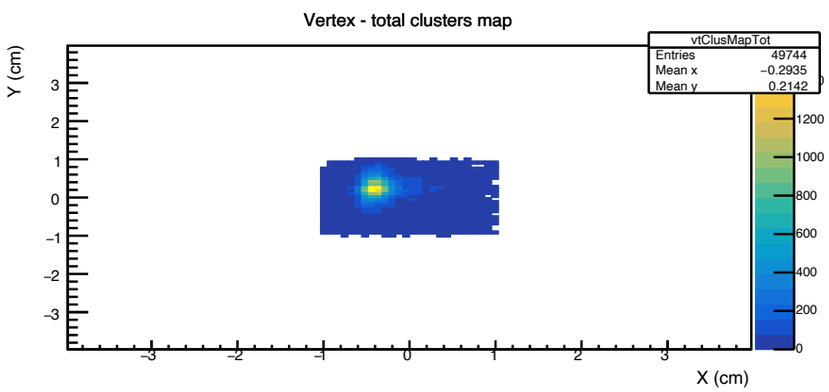
7 & 11

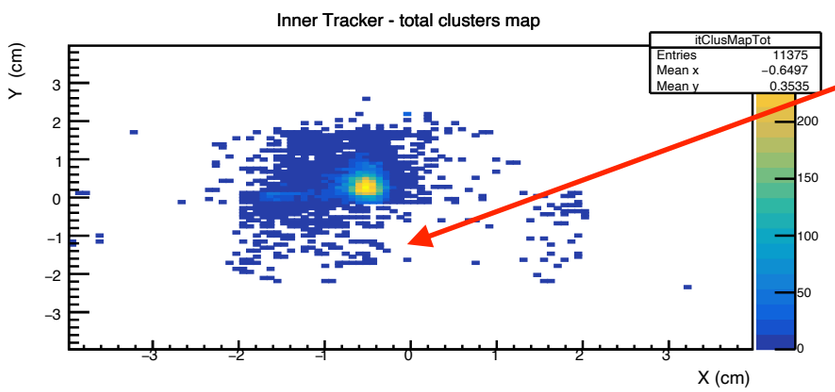
22 & 26

Beam crossing mostly 11 & 26 sensor (which are back to back)

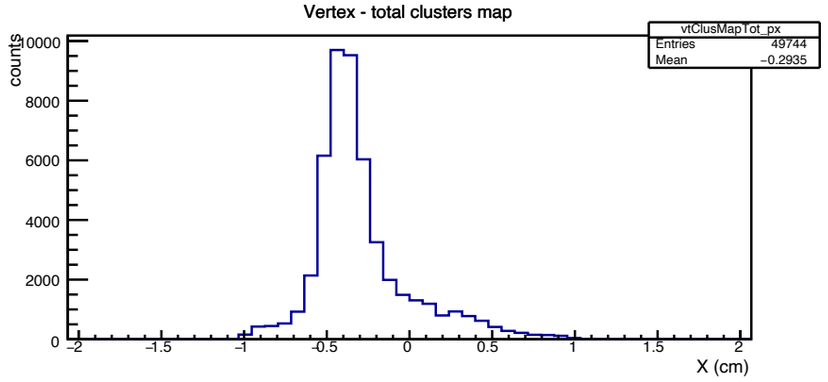
Mapping

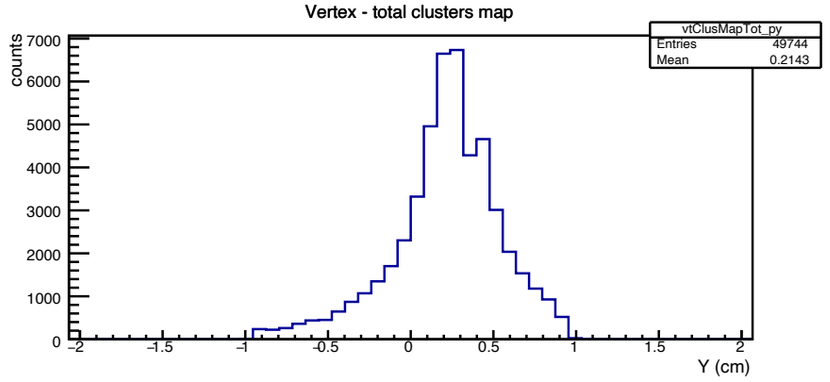
- **CNAO2023**: run 6144 (25 kEvts, config threshold max ?)
  - Project on VTX and ITR with new mapping

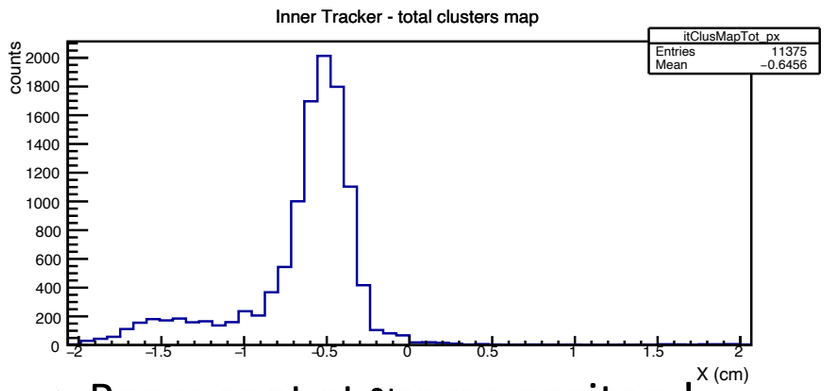


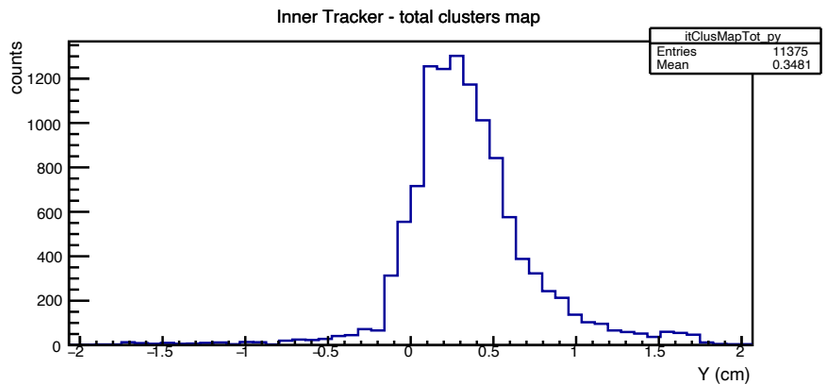


Missing sensors





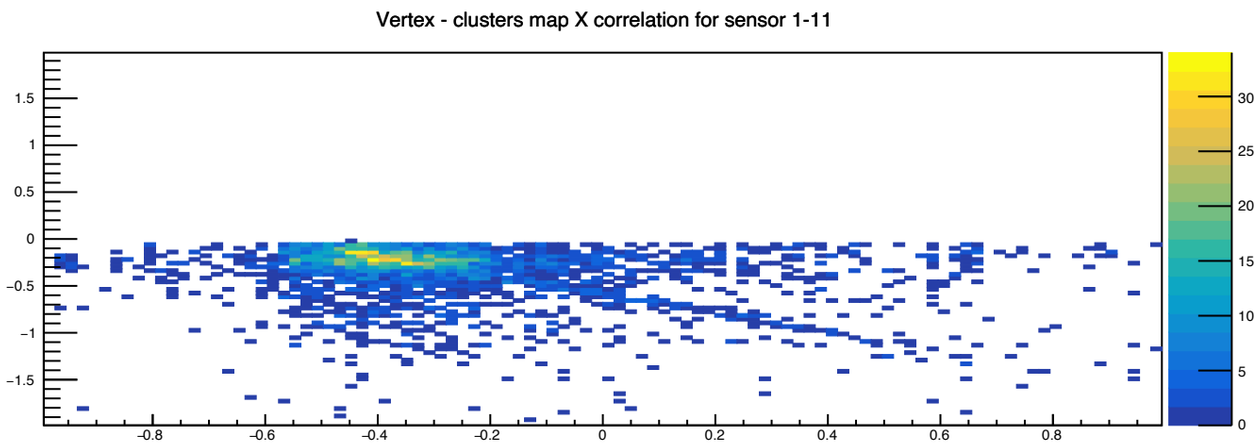


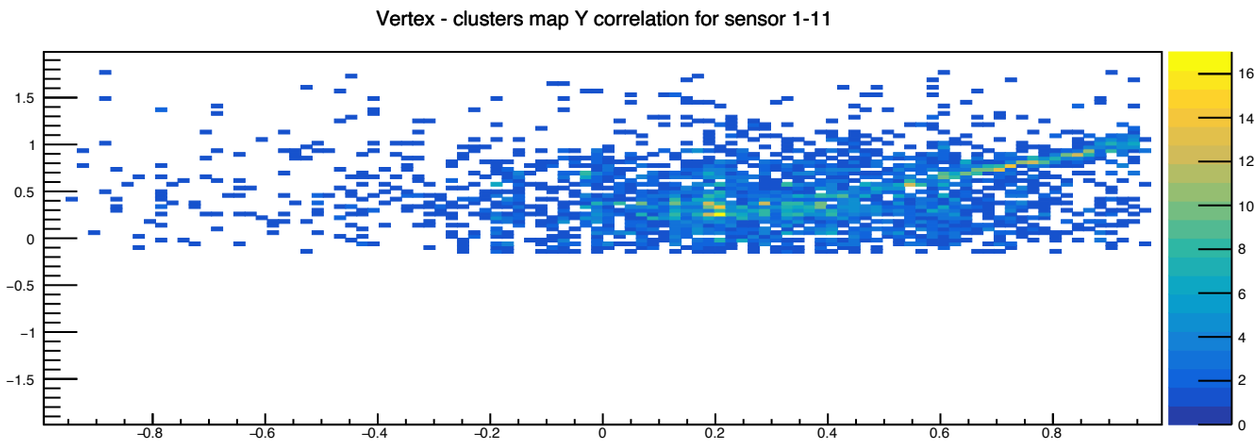


- ➡ Beam spot at ~same positon !
- ➡ Direction of X inverted
- ➡ This run has no correlation btw VTX & ITR

Mapping

- **CNAO2023**: run 6309 (20 kEvts, config threshold max ?)
  - Correlation btw VTX & ITR

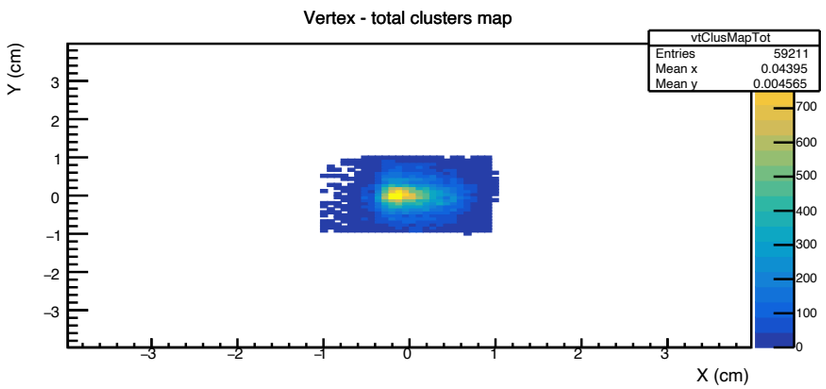


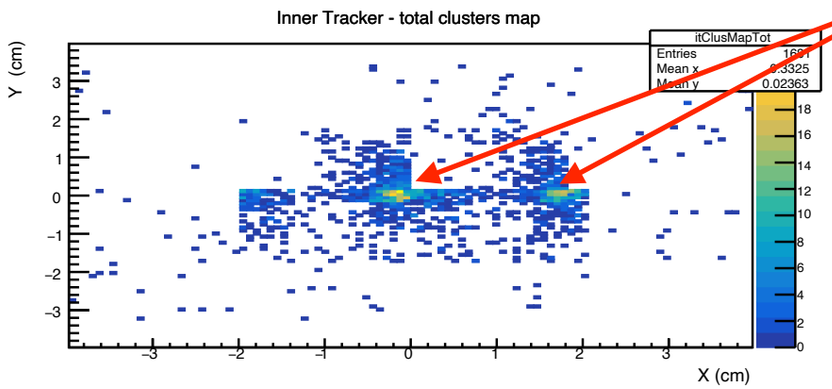


- Clearly see an anti-correlation in X
- Since the IT has been flipped by 180º respect to Y-axis (Need a change in the FOOT.geo file)

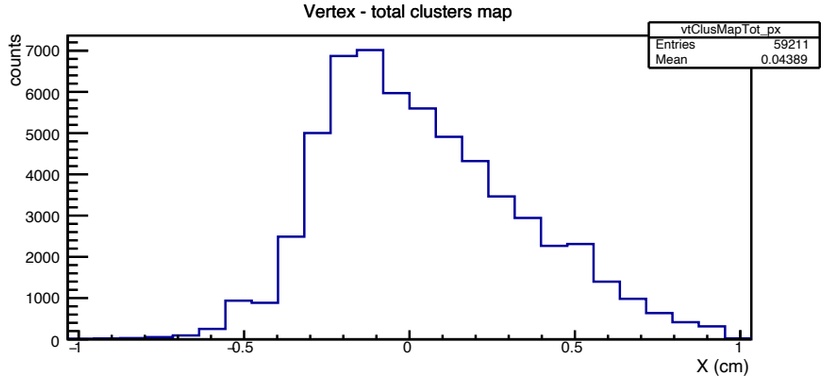
Mapping

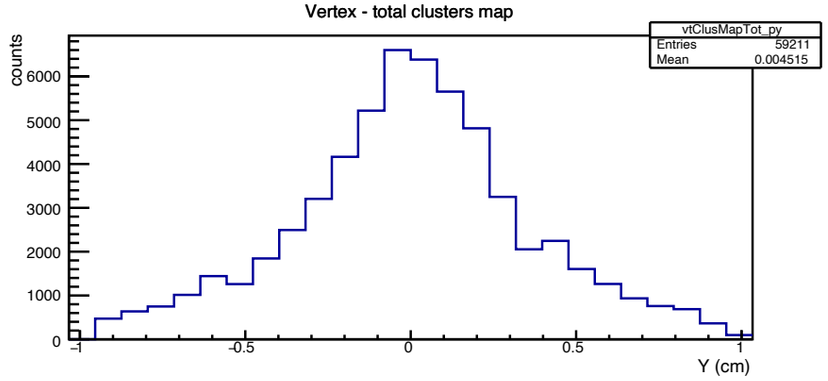
- CNAO2024: run 7074 (10 kEvts cluster size > 15, threshold: $10 \times \sigma$)
  - Project on VTX and ITR

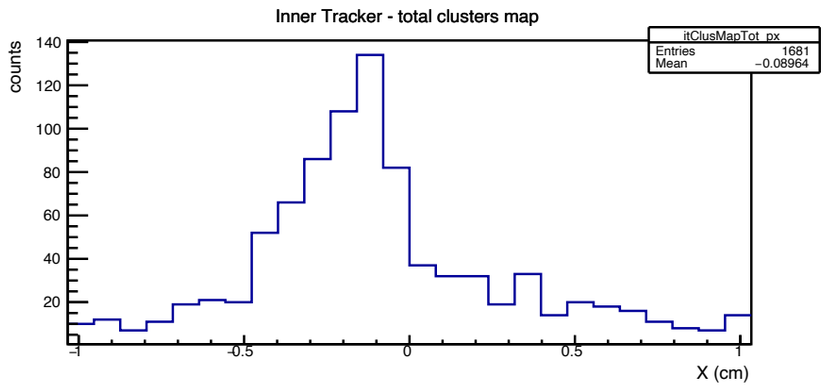


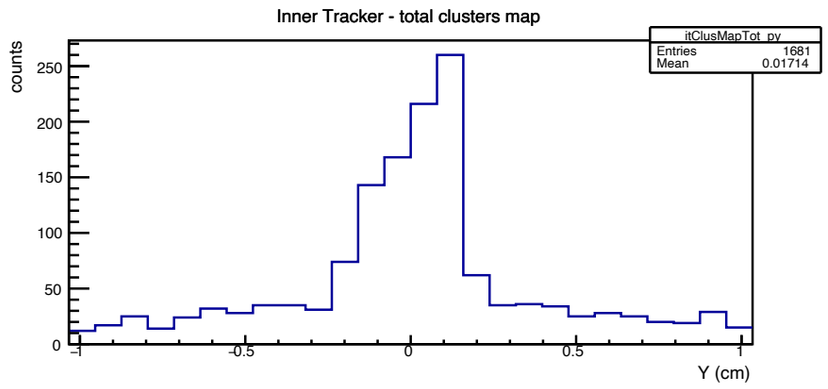


Two peaks









➡ Still pb with mapping or change w.r.t CNAO2024 ?

Conclusions

- Decoding
  - Trigger number ✔
  - Frame number ✔
  - Frame errors < 1 %
  - See threshold effect on cluster size

    ➡ ITR working fine
  - Start debugging mapping

- Efficiency
  - Frascati/CNAO2023 beam: number of hits coherent with VTX
  - Clearly not the case for CNAO2024 data

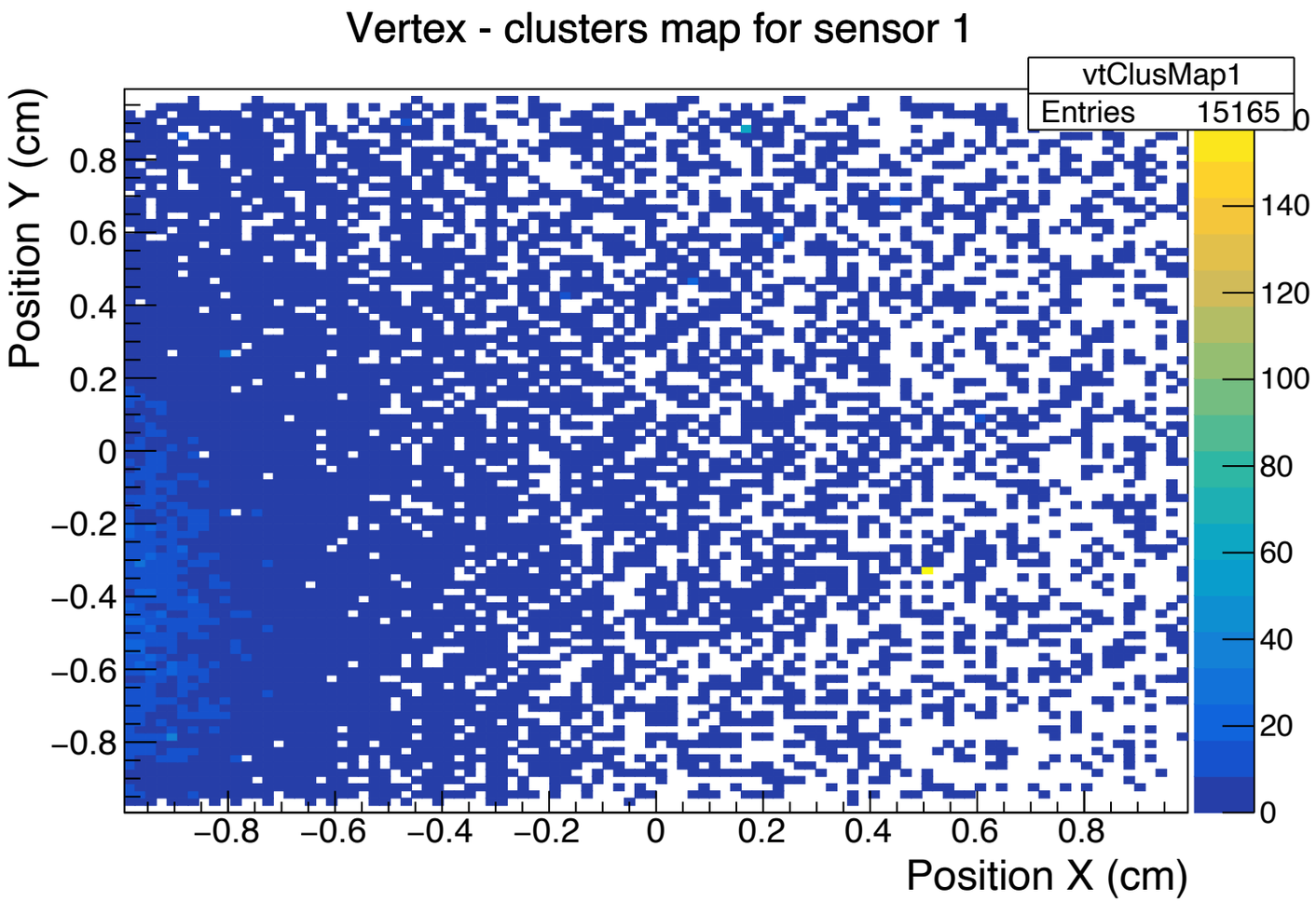
    ➡ Missing the beam (sensor out at beam position)

➡ Need dedicated (beam) time for ITR with experts of VTX/ITR/DAQ for debugging mapping/geometry/hot_pixels

Backup

Cluster map

- **Frascati** (e-beam): run 5783 (6.5kEvts)



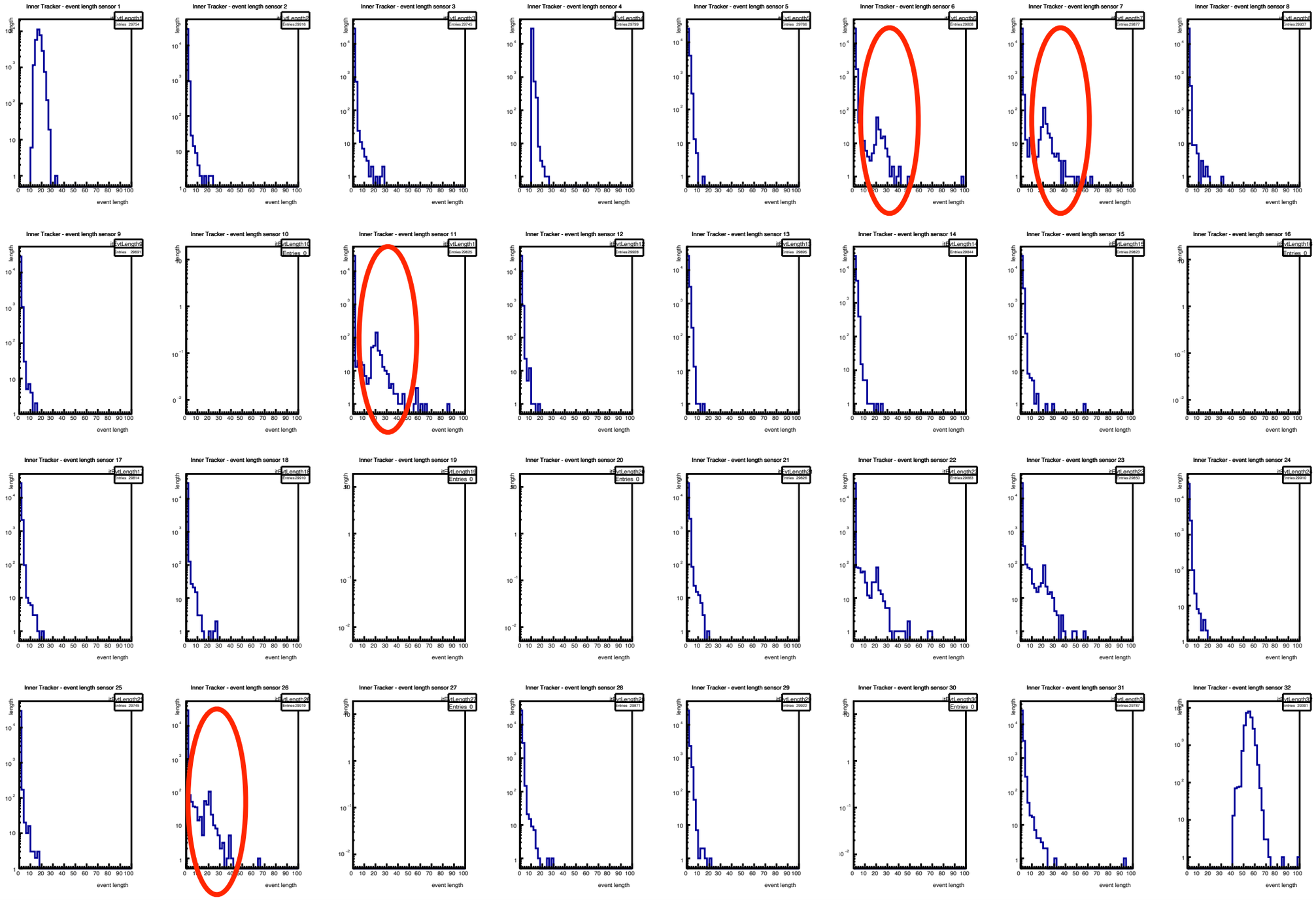
Beam: (start @ 1)

~15 kClusters

- Unfortunately beam not centred on VTX
- But the number of entries same order of magnitude than ITR

Frame data length per sensor

- CNAO2024: run 7074 (threshold: $10 \times \sigma$)



For many events

Length = 0