

CNAO2023

Updates

Framework (i)

❑ Reconstruction

- Re-sync of VTX per default off (new flag)
- New option for automatic naming of the output file: *-out auto*

```
DecodeGlb -in dataRaw/data_test.00006144.physics_foot.daq.RAW._lb0000._F00T-RCD._0001.data.moved -out auto -nev 15000 -exp CNA02023
```

```
Info Header lumi: LumiBlock=0
-----END OF HEADER FILE-----

Info in <RecoRaw::OpenFileOut()>: Output file name run_00006144_vtx_itr.root

TAGroot:
Known Actions:
```

IncludeDI:	n
IncludeST:	n
IncludeBM:	n
IncludeTG:	y
IncludeVT:	y
IncludeIT:	y
IncludeMSD:	n
IncludeTW:	n
IncludeCA:	n

- ➡ Target is excluded in name
- ➡ If all detectors included: `_all`

Framework (ii)

□ Run manager

- Import Excel file from Riccardo: CNAO2023.run in cammaps folder

```
# Run file
CamName: "CNAO2023"
RunNumber: 5957-6313;
```

#Idx	Type	Main trigger	Beam	Energy	Target	Size(cm)	Total events	Detector Out	Comments	Magnet	
1	"Carbon target"	"MargaritaMajority"	"12C"	200	"Carbon"	0.5	1186792	"None"	"None"	"Yes"	
2	"Poly target"	"MargaritaMajority"	"12C"	200	"Poly"	1.0	590368	"None"	"None"	"Yes"	
3	"Pedestal"	"Pedestal"	"None"	0	"None"	0.0	799439	"None"	"None"	"No"	
4	"Carbon target & frag"	"Fragmentation"	"12C"	200	"Carbon"	0.5	1921722	"None"	"None"	"Yes"	
. . .											
28	"Tracker test"	"T0Falone"	"p"	100	"None"	0.0	146158	"None"	"None"	"No"	
29	"Tracker test"	"T0Falone"	"p"	200	"None"	0.0	135351	"None"	"None"	"No"	
40	"Emulsion"	"Emulsion"	"12C"	200	"None"	0.0	355805	"None"	"None"	"No"	
. . .											
# run	starttime	stoptime	Daq Evt	Duration	DAQ Rate	Run	type	Comment			
#			(#)	(s)	(Hz)						
5957	"2023-10-27 23:56:13"	"2023-10-27 23:59:19"	79889	186	429	7		"None"			
5958	"2023-10-27 23:59:50"	"2023-10-28 00:00:46"	26711	56	476	7		"None"			
5959	"2023-10-28 00:02:15"	"2023-10-28 00:04:03"	40822	108	377	7		"None"			
. . .											
6311	"2023-11-08 03:18:03"	"2023-11-08 03:40:36"	119130	1353	88	5		"large TDC window no clipping"			
6312	"2023-11-08 03:42:38"	"2023-11-08 04:17:36"	193105	2098	92	5		"large TDC window no clipping"			
6313	"2023-11-08 04:19:43"	"2023-11-08 04:20:36"	12128	53	228	3		"Pedestal"			

- ➡ Extremely useful, in one glance provides an overview of the campaign
- ➡ Added durations and rates (some start/stop times are not always correct)

Dead map (i)

□ VTX

- From run 6061 to 6113: low threshold
- From run 6061 to 6123: sensor 3 excluded
- ➡ After run 6123: threshold max (255) and sensor 3 included
- ➡ Considered as noisy pixel when firing more than 0.5% of the events

□ ITR

- From run 6061 to 6113: low threshold
- From run 6061 to 6113: some sensors excluded
- ➡ After run 6113: threshold max (255) and all sensors included
- ➡ Considered as noisy pixel when firing more than 1% of the events

Dead map (ii)

□ VTX (i)

- From run 6061 to 6113: low threshold

```
/ -*-Plane 1 -*-
InputNumber:      1
Status:           0
MinNofPixelsInCluster: 1
MaxNofPixelsInCluster: 400
DeadPixels:       544,257; 365,305; 461,292; 529,302; 558,317; 611,351; 445,255; 258,324; 9,338; 23,13; 31,613; 125,392;
174,573; 203,557; 205,34; 231,130; 248,162; 251,782; 281,185; 307,605; 377,278; 387,322; 473,537; 483,923; 518,897; 557,912;
597,862; 621,723; 707,1; 4,479; 34,311; 113,286; 160,168; 195,342; 241,135; 259,487; 272,459; 309,772; 360,233; 366,447; 406,737;
417,782; 421,321; 421,813; 462,678; 473,527; 600,650; 640,884; 662,180;
// -*-Plane 2 -*-
InputNumber:      2
Status:           2
MinNofPixelsInCluster: 1
MaxNofPixelsInCluster: 400
DeadPixels:       282, 959; 48, 959; 183, 894; 695, 647; 784, 600; 742, 540; 5,653; 15,500; 78,629; 164,371; 190,827;
194,595; 197,600; 216,702; 252,704; 312,696; 316,722; 11,292; 41,666; 63,606; 79,75; 119,322; 142,605; 180,621; 187,628; 235,740;
241,656; 251,728; 258,282; 258,483; 270,402; 456,348; 499,839; 886,811;

// -*-Plane 3 -*-
InputNumber:      3
Status:           -1
MinNofPixelsInCluster: 1
MaxNofPixelsInCluster: 400
DeadPixels:       -1

// -*-Plane 4 -*-
InputNumber:      4
Status:           1
MinNofPixelsInCluster: 1
MaxNofPixelsInCluster: 400
DeadPixels:       371, 959; 372, 959; 376, 959; 3,835; 146,735; 236,881; 245,779; 319,859; 332,824; 361,778; 434,143;
495,732; 516,737; 565,851; 595,870; 654,505; 107,901; 113,758; 170,898; 188,833; 239,856; 263,765; 276,878; 305,620; 343,785;
417,913; 475,737; 791,798;
```

Dead map (iii)

□ VTX (ii)

- After run 6123: threshold max (255) and sensor 3 included

```
/ -*- Plane 1 -*-
InputNumber:      1
Status:           0
MinNofPixelsInCluster: 1
MaxNofPixelsInCluster: 400
DeadPixels:       -1

// -*- Plane 2 -*-
InputNumber:      2
Status:           2
MinNofPixelsInCluster: 1
MaxNofPixelsInCluster: 400
DeadPixels:       282, 959;

// -*- Plane 3 -*-
InputNumber:      3
Status:           1
MinNofPixelsInCluster: 1
MaxNofPixelsInCluster: 400
DeadPixels:       335,209; 336,209; 337,209; 338,209; 339,209; 340,209; 341,209; 342,209; 343,209; 344,209; 345,209;
346,208; 346,210; 348,209; 349,209; 350,209; 351,209; 352,209;

// -*- Plane 4 -*-
InputNumber:      4
Status:           1
MinNofPixelsInCluster: 1
MaxNofPixelsInCluster: 400
DeadPixels:       371, 959; 372, 959; 376, 959;
```

➡ Less masked pixels, speed up clustering !

Dead map (iv)

 ITR (i)

- From run 6061 to 6113: low threshold

```
// -*-*-*-*- Plane 1 -*-*-*-*-
InputNumber:      1
Status:           1
MinNofPixelsInCluster: 1
MaxNofPixelsInCluster: 400
DeadPixels:       899,895; 903,895; 903,906; 904,912; 8,672; 163,601; 235,16; 256,516; 265,287; 274,612; 278,250; 473,270;
607,402; 615,618; 668,25; 904,907; 905,921;

. . .

// -*-*-*-*- Plane 23 -*-*-*-*-
InputNumber:      23
Status:           2
MinNofPixelsInCluster: 1
MaxNofPixelsInCluster: 400
DeadPixels:       164,64-66; 165,63-67; 166,64-66; 3,870; 22,490; 71,495; 81,853; 99,909; 169,915; 172,293; 193,319;
197,607; 215,503; 238,526; 246,668; 264,349; 265,374; 352,22-23; 353,22-23; 354,22-23; 355,22-23; 356,22-23; 357,22-23; 358,22-23;
359,22-23; 360,22-23; 361,22-23; 362,22-23; 363,22-23; 364,22-23; 378,417; 413,662; 414,572; 1,43; 4,13; 4,422; 9,852; 14,384;
21,519; 32,677; 40,767; 41,880; 56,475; 59,579; 60,316; 65,244; 68,911; 69,43; 73,38; 74,29; 81,453; 83,75; 84,744; 85,429; 86,119;
87,74; 87,855; 89,439; 93,481; 95,504; 101,326; 103,697; 105,705; 110,57; 116,181; 117,255; 120,400; 129,287; 129,532; 139,441;
139,518; 141,643; 143,104; 147,672; 151,559; 153,741; 162,640; 162,772; 164,23; 171,898; 173,406; 177,625; 177,835; 184,685;
186,804; 187,115; 191,156; 191,752; 194,43; 195,307; 202,255; 204,633; 204,720; 205,747; 213,69; 213,828; 217,467; 223,46; 231,602;
233,704; 240,37; 247,357; 248,32; 258,307; 259,883; 261,159; 269,107; 269,717; 271,607; 274,392; 275,460; 277,243; 281,224;
283,832; 286,907; 292,724; 293,569; 295,85; 296,824; 298,880; 301,2; 301,82; 301,308; 312,777; 312,792; 316,577; 317,865; 324,45;
326,797; 330,107; 333,348; 335,817; 342,286; 344,600; 344,840; 348,635; 354,478; 355,121; 356,293; 356,768; 362,427; 365,22-23;
365,411; 366,22-23; 367,22-23; 368,22-23; 369,668; 390,446; 391,789; 395,809; 409,635; 412,186; 414,532; 416,346; 417,80; 417,111;
419,445; 423,630; 433,1; 435,126; 437,54; 440,391; 442,8; 442,480; 443,179; 453,763; 465,555; 467,817; 469,695; 471,534; 472,885;
473,585; 476,266; 477,360; 479,109; 480,304; 481,35; 482,888; 483,819; 487,751; 496,677; 498,601; 503,542; 512,796; 516,604;
548,888; 552,762; 568,182; 570,603; 570,857; 571,276; 590,859; 591,76; 595,77; 614,698; 623,826; 652,41; 662,746; 674,482; 690,339;
696,314; 696,639 ;

// -*-*-*-*- Plane 24 -*-*-*-*-
```

- ➡ Many masked pixels (takes time to upload the map of masked pixels !)

Dead map (v)

 ITR (ii)

- After run 6123: threshold max (255) and all sensors included

```
// -*-*-*-*- Plane 1 -*-*-*-*-
InputNumber:      1
Status:           1
MinNofPixelsInCluster: 0
MaxNofPixelsInCluster: 400
DeadPixels:       899,895; 903,895; 903,906; 904,912;

. . .

// -*-*-*-*- Plane 23 -*-*-*-*-
InputNumber:      23
Status:           2
MinNofPixelsInCluster: 0
MaxNofPixelsInCluster: 400
DeadPixels:       164,64-66; 165,63-67; 166,64-66;

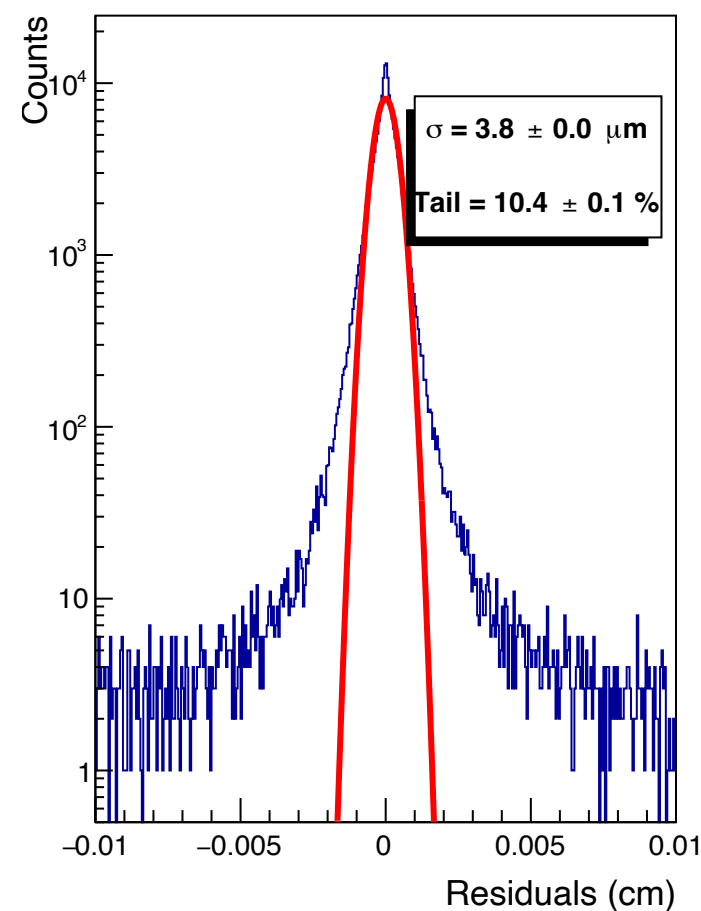
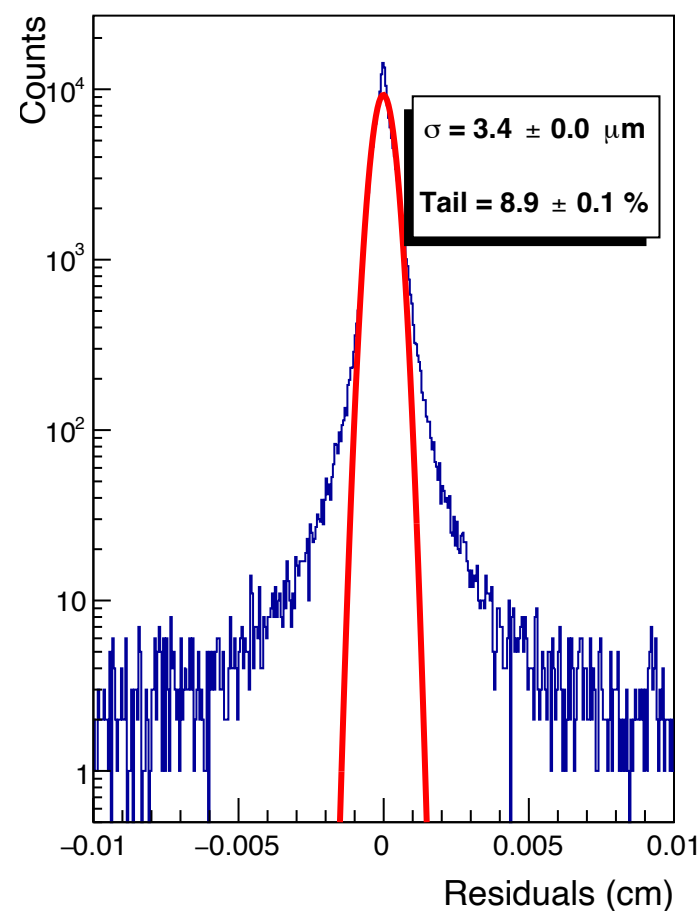
// -*-*-*-*- Plane 24 -*-*-*-*-
```

➔ Less much dead pixels !

Alignment

□ VTX:

- No alignment run taken after all sensors included
- ➔ Taken a fragmentation run (6144), cut on cluster size (> 15)
- ➔ Alignment procedure not converged, do it “by hand”

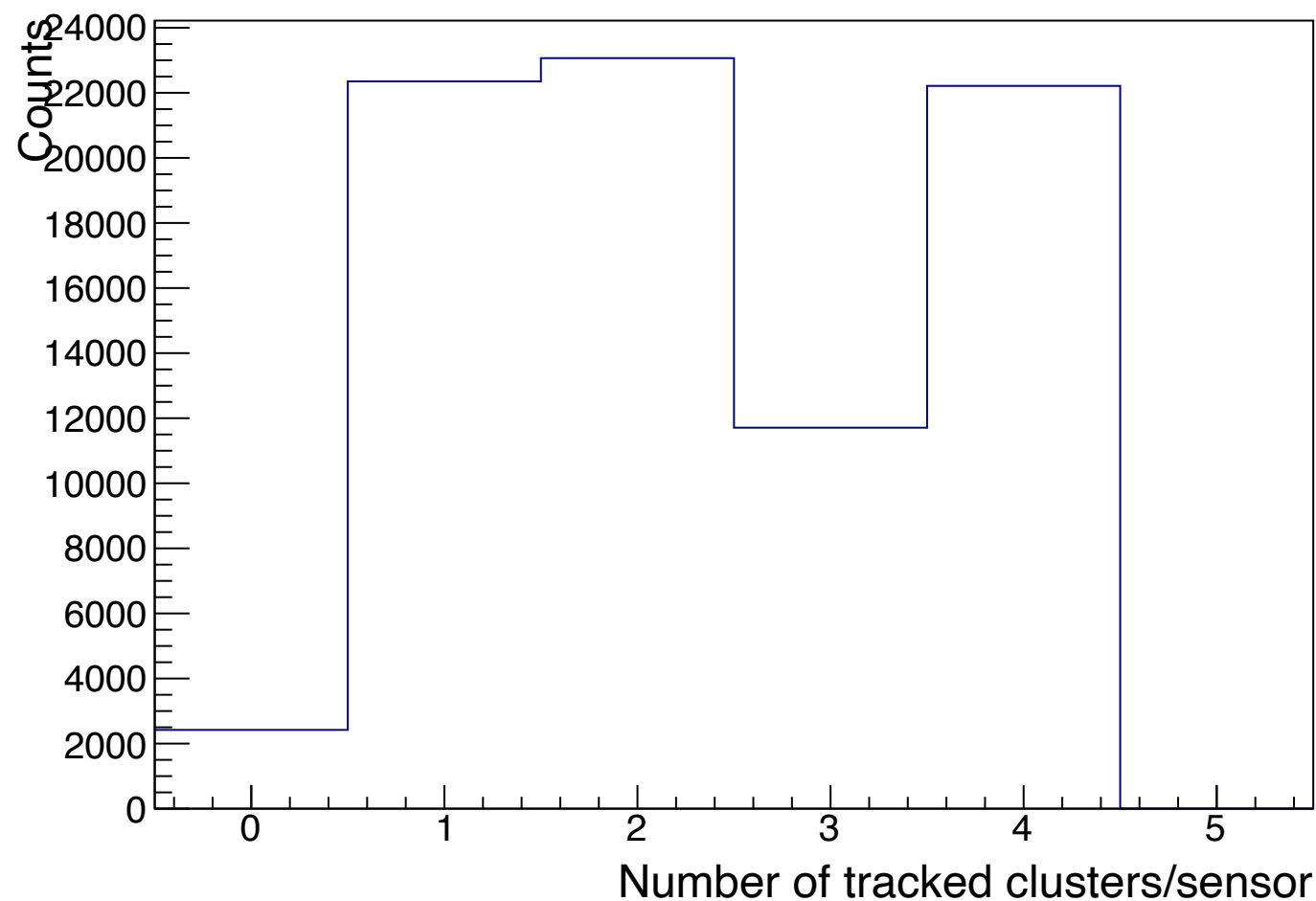


➔ $\sim 1 \text{ } \mu\text{m}$ worse compare to GSI data, same tails

Tracking (i)

□ VTX:

- Number of tracked cluster per sensor

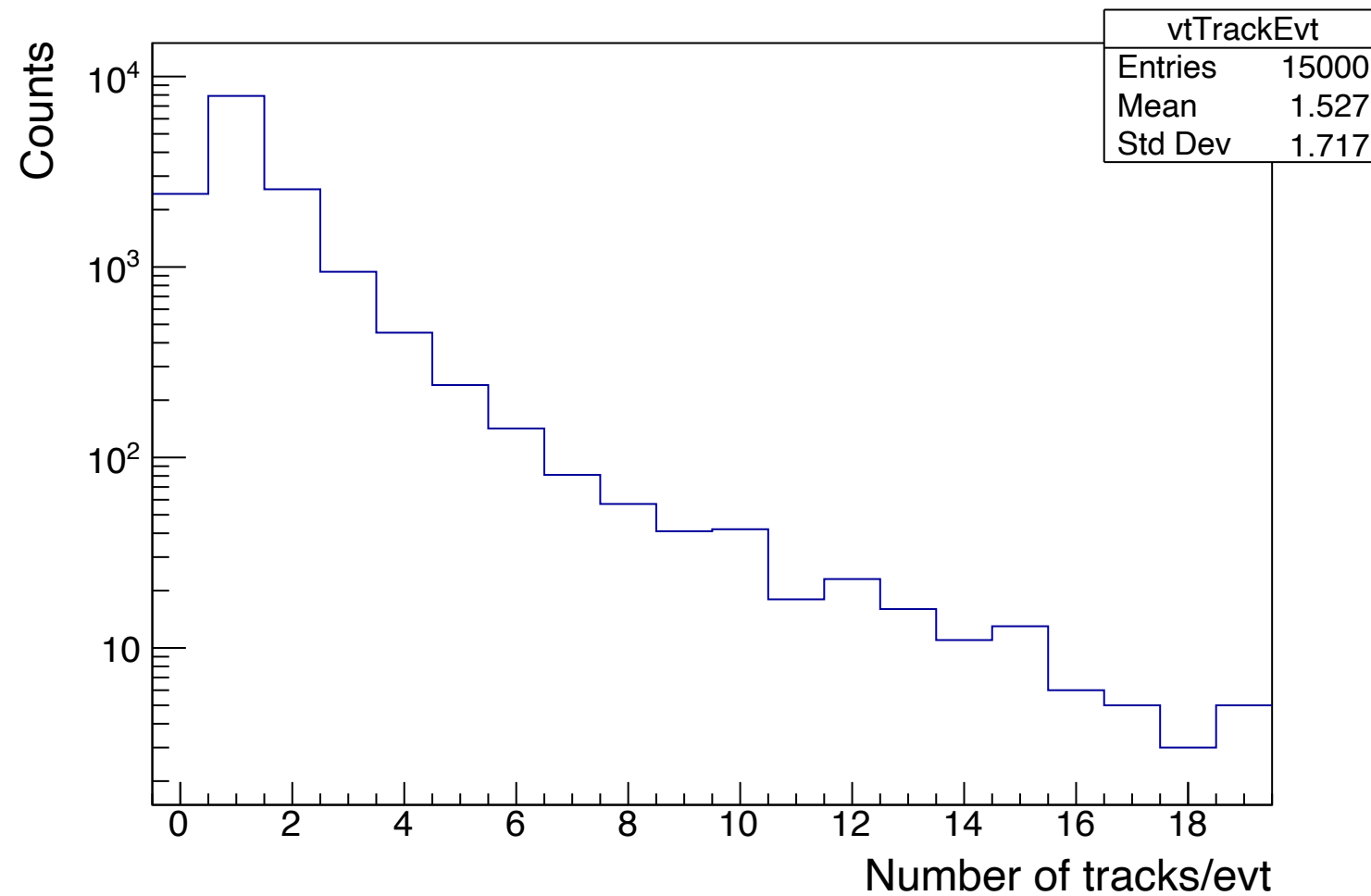


- ➔ 15 % of events with no tracks (tracks out of VTX acceptance ?)
- ➔ All sensors has same efficiency except sensor 3, drop to 52 %

Tracking (ii)

VTX:

- Number of tracked per event



➡ 50 % contains only one track

Conclusions

- ❑ Dead map: VTX+ITR
 - ➔ Update file in shoe

- ❑ Alignment parameters: VTX
 - ➔ Update file in shoe

- ❑ Tracking: VTX
 - ➔ Still pending issue with sensor 3 (to be replaced !)
 - ➔ Don't see any fragmented events in the ED ??