Task list for analyses and operations

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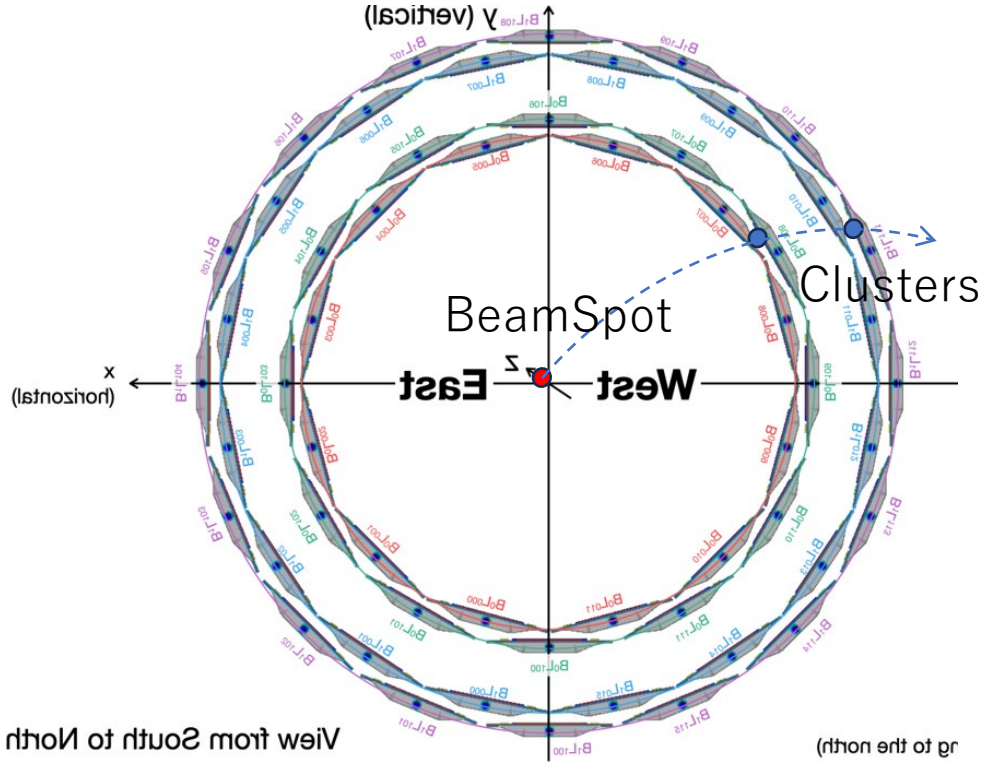
Toward analyses

- dN_ch/deta : Meaningful for 1st sPHENIX paper
  - Good to check INTT performance by using dN/deta as well
  - Two ways for dN/deta measurement:
    - Single cluster method: Inner layer、Outer layer separately
  - Tracklet (cluster pair from vertex
  - Need to develop
    - Analysis code
    - Simulation data with HIJING input
      - HIJING＋SPHENIX-GEANT＋RECO(for clustering)

- Momentum measurement by INTT tracklet
  - INTT can measure pT by tracklet from the commissioning data

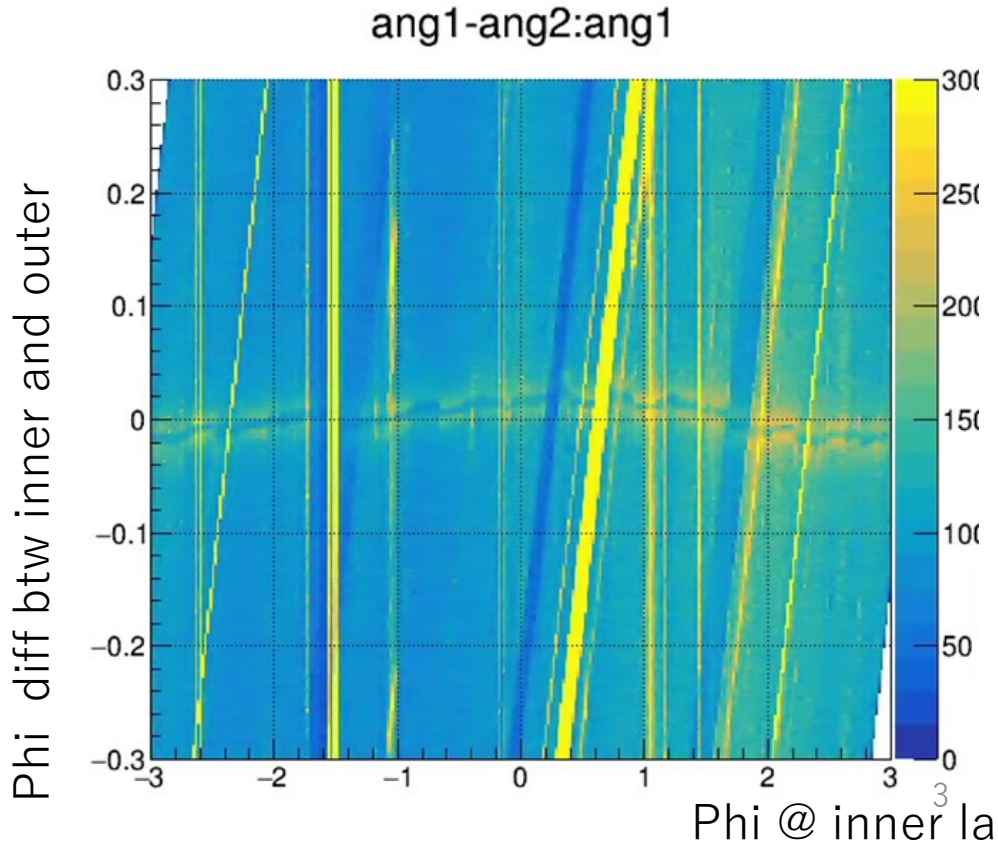
Toward momentum measurement

- Momemtum measurement by tracklet + Vertex (X-Y-Z)
  - Angle



Correlation is splitted into two lines,
Indicates +/- particle bend to opposite direction

B-Field ON



Tasks for offline/analysis

	Task	subtask		Who	Who	Status
2	Vertex Reconstruction					
3		Make module to calculate Zvertex & Beam Spot				
4		Tracklet finding cuts tuning				
5		Beam spot finding by fitting the dca vs phi distribution w/ sin curve				
6		Parameter tuning on ZVertex finding algorithm				
7						
8	Tracklet reconstruction					
9		Make module to find tracklet		Genki		
10		Tune algorithm		Genki		
11		Track finding to determine pT (p)		Genki		
12		Propose new tracking method by INTT tracklet with inner/outer detectors				
13		Simulation to estimate pT resolution				
14						
15	Geometry calibration					
16		Use survey geometry as initial geometry for reconstruction				
17		Beam Spot by West/East separately				
18		Imprement the Half barrel cage for west and east detector				
19		Cosmic ray w/ B-field OFF				
20						
21	Fun4All	test Chris's new Fun4All input to synchronize 8 FELIX				
22						
23						
24	Hot/Deadmap					
25		Develop algorithm	Joseph's algorithm			
26			Jaein's algorithm			
27			Yuka's algorithm			
28		Scan data to determine Hot/Dead run by run				
29		Develop/Manage DB				

https://docs.google.com/spreadsheets/d/19oZJ2UAu-wwczQBbfpat8sEreKFuLpSZrDDzt1xYgPA/edit?usp=sharing

Tasks for operation next year

	A	B	C	D	E
1	Task	subtask		Who	Status
2	Expert GUI	read setttings from DB			
3					
4	Hot map	determine hot map			
5					
6	Time-in	resolve multiple peaks in BCO-BCOFULL			
7					
8	Performance	efficiency			
9		timing resolution			
10					
11	DAC scan	w/ beam			
12		w/ cosmic			
13					
14	Bias scan				
15					
16	Gain parameter scan				
17					
18	Stream Readout Run				
19					
20	Online Monitor				
21					
22	Stability monitor				
23					
24	Error Check	Check FPHX_FULL and XX_FULL in raw data			

Review: Module to calculate Z-vertex under Fun4All

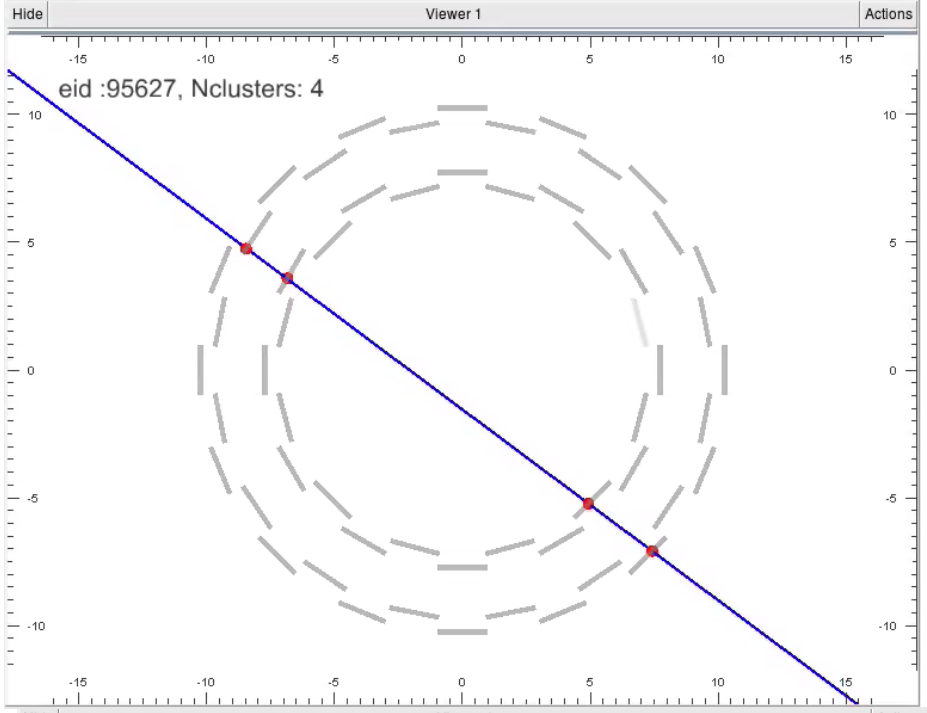
- Will be placed under coresoftware/offline/packages/intt
  - InttVertexFinder.h/cc : analysis module
  - InttVertex.h, InttVertexv1.h/cc : (Val) store Zvertex value (for Fun4All)
  - InttVertexMap.h/cc, InttVertexMapv1.h/cc : (Val)InttVertex array (for Fun4All)
    - Array is a place holder to store multiple vertex in the future (high luminosity p+p and etc)
    - This implementation is the same with that MBD did

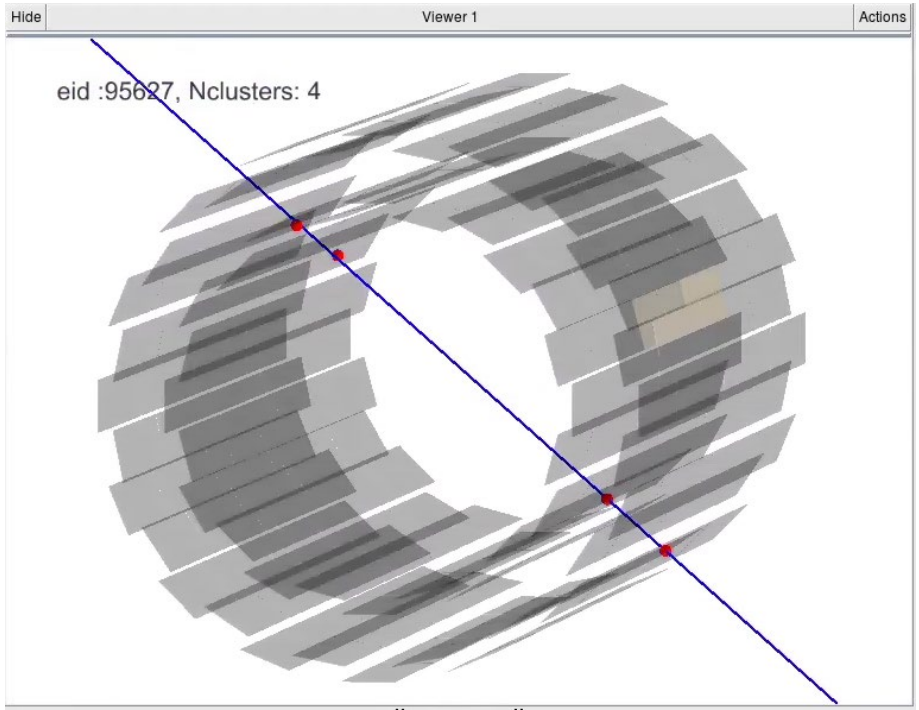
```
double zcenter, zrms, zmean;
double zvertex = calculateZvertex(&zcenter, &zrms, &zmean);


auto vertex = std::make_unique<InttVertexv1>();
vertex->set_z(zvertex);
//vertex->set_z_err(); // no value asigned yet

if (Verbosity() > 0)
{
  std::cout << "intt vertex z " << zvertex << std::endl;
}

m_inttvertexmap->insert(vertex.release());
```

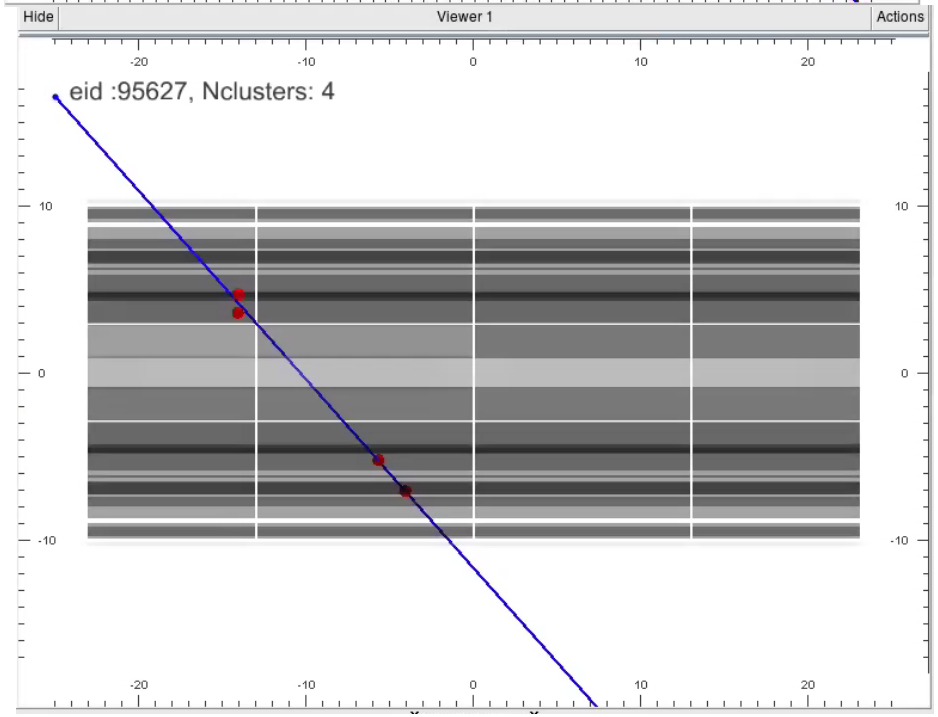
Is it OK to commit this code into GIT?

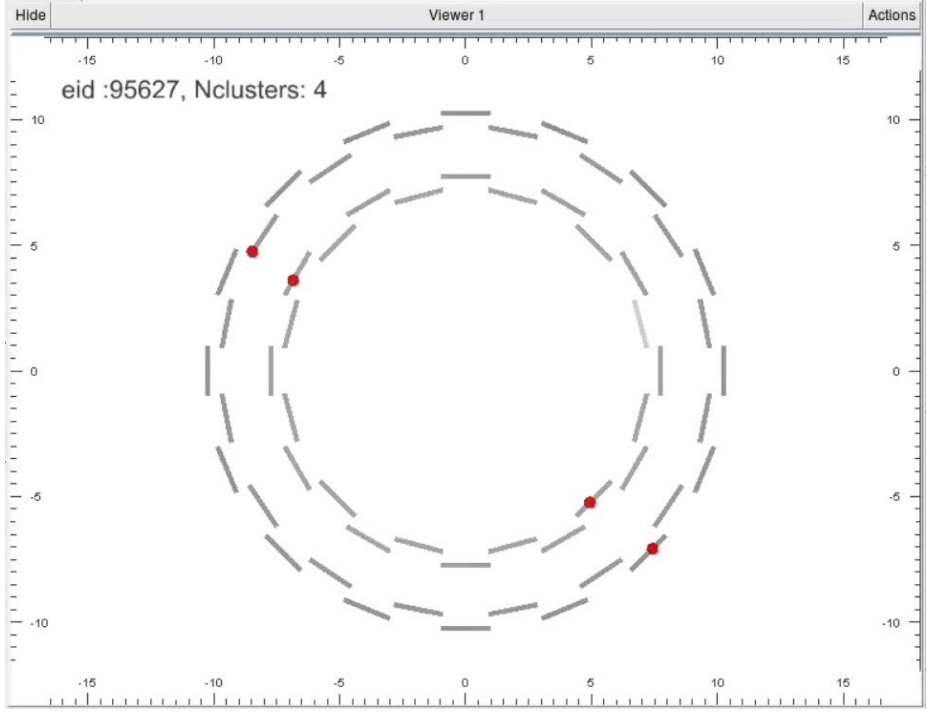
Event display updated

- INTT event display is updated for the cosmic run
- 3D fit has done in this event
- The display is often updated on GITHUB
- This displays are requested for the preliminary





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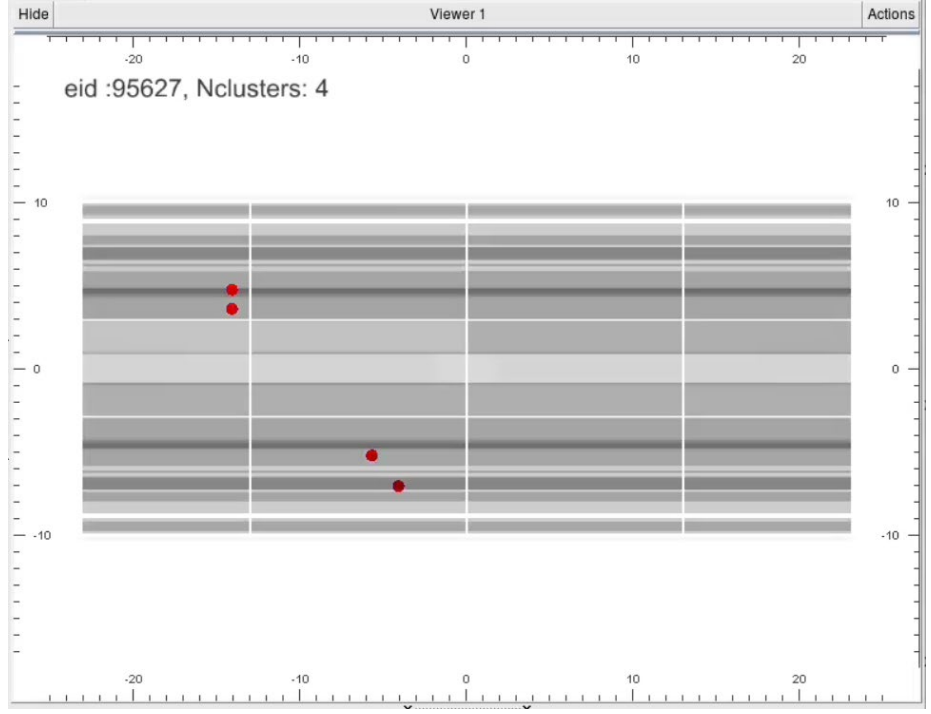
Actions
eid :95627, Nclusters: 4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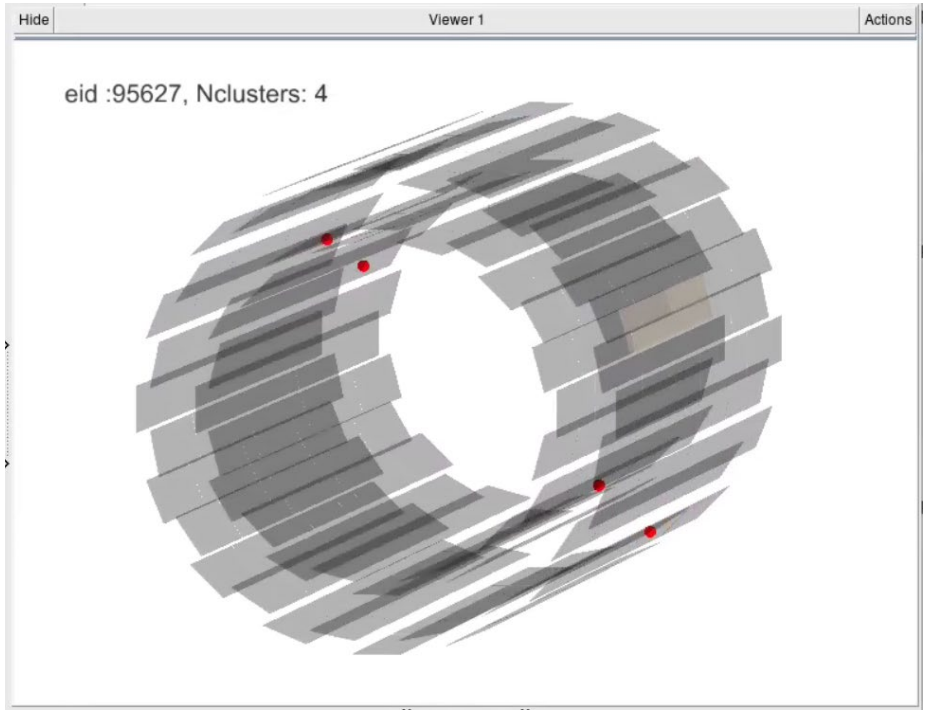
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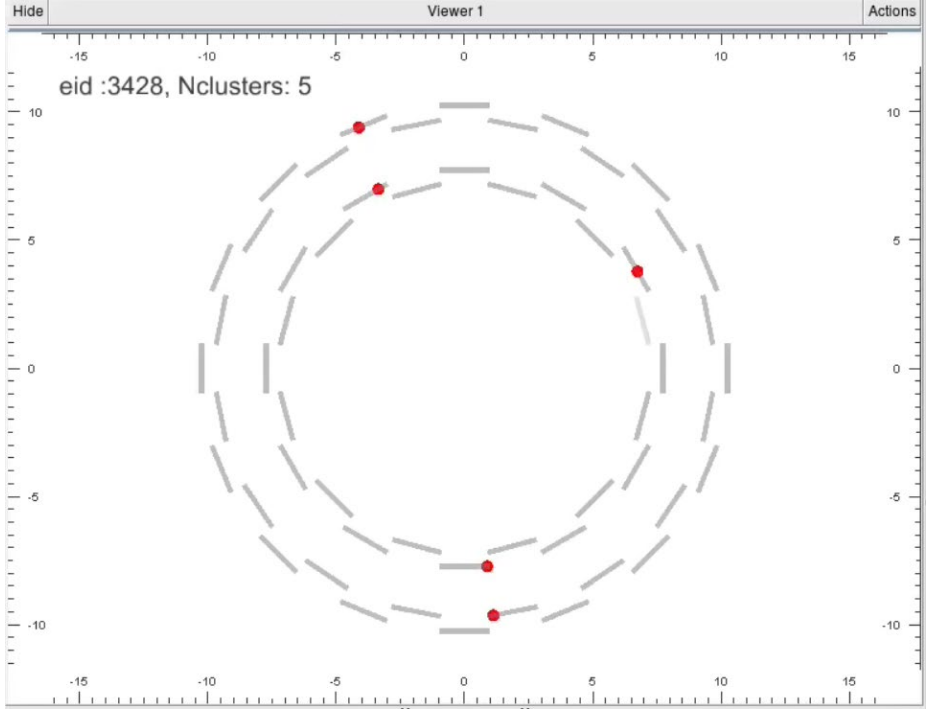
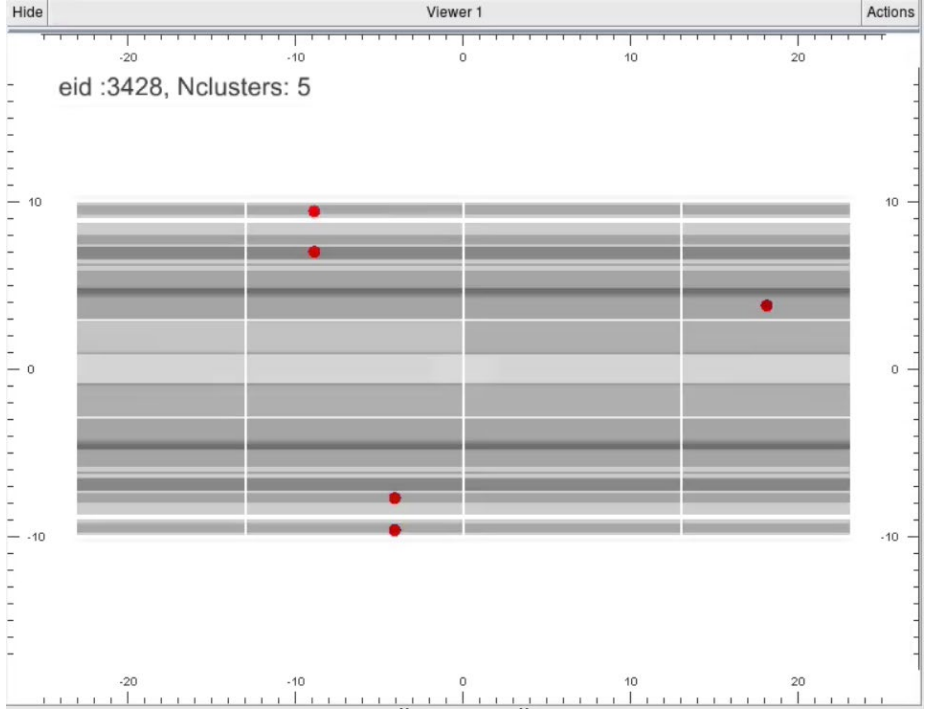
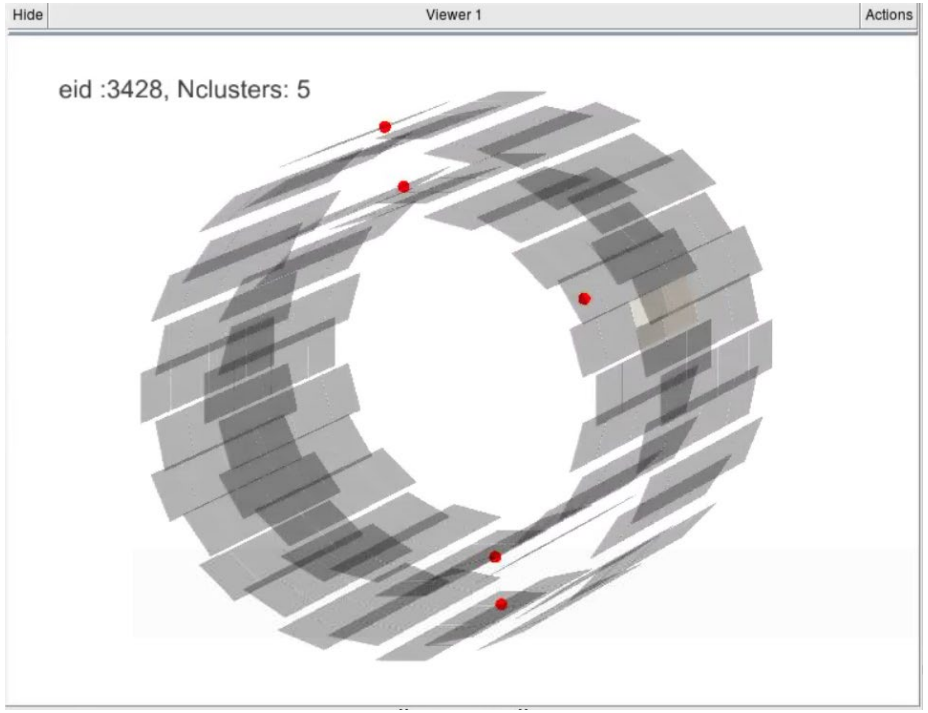
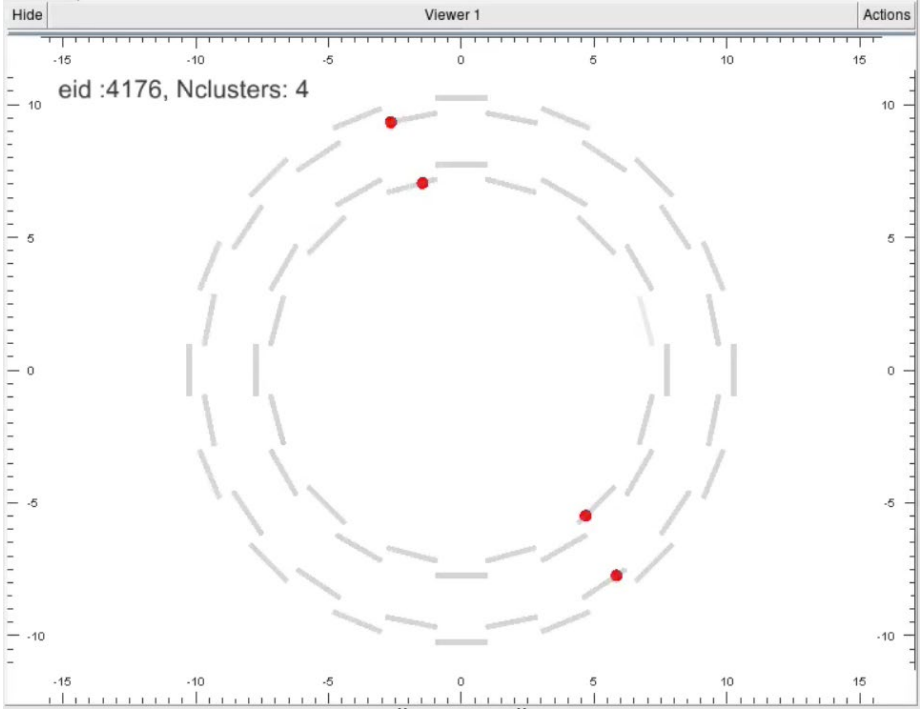


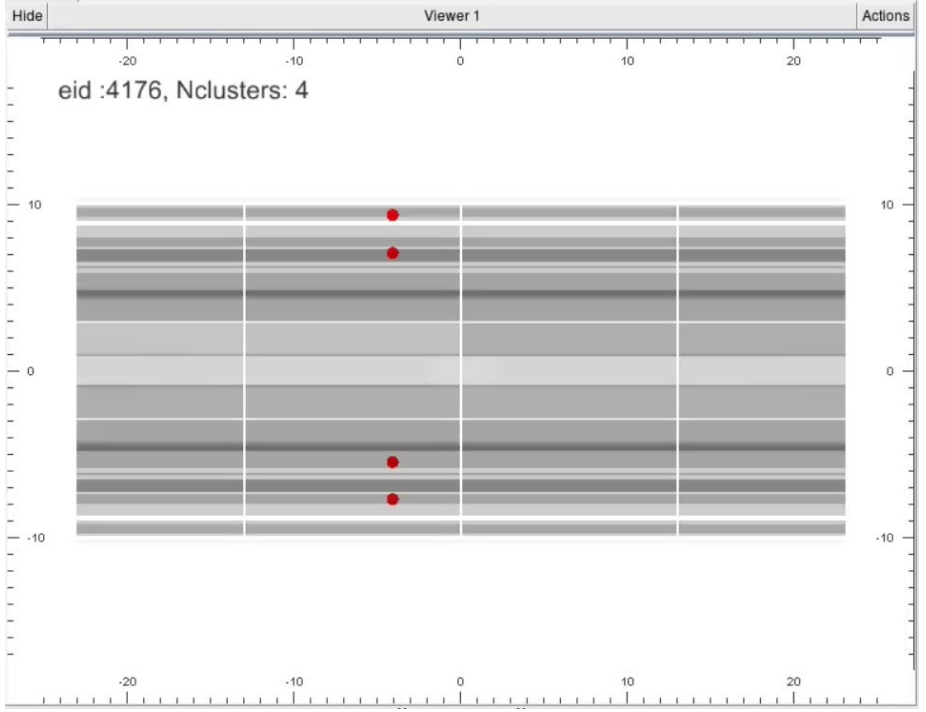


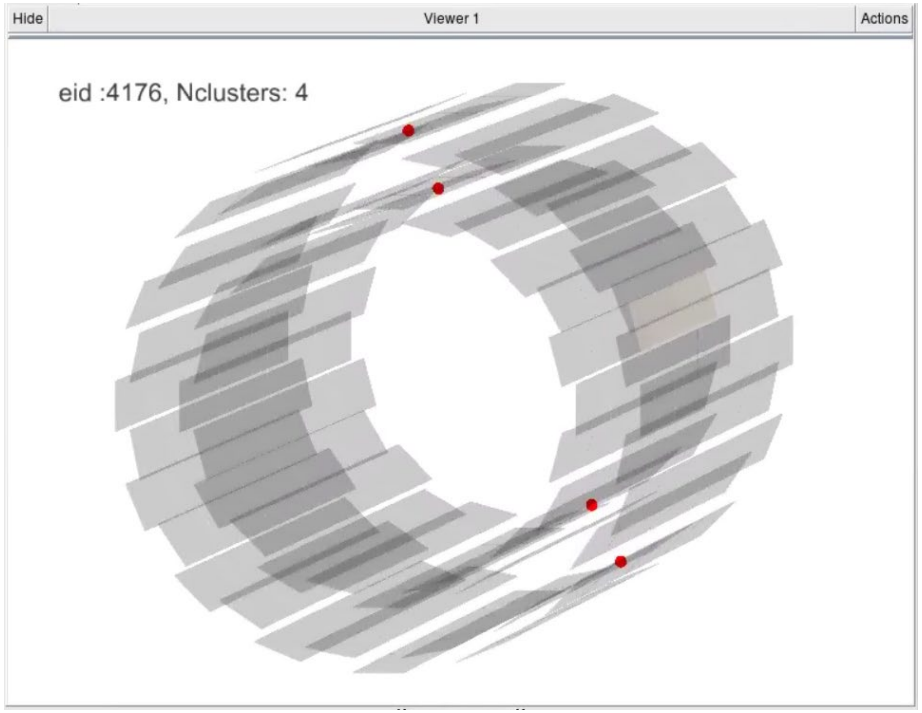


sPHENIX Internal
Cosmic run
2023-08-14, Run 25475
MVTX+INTT+TPOT

- Run25475
  - BCO: 883719272337
  - InttEvent: 3425 883719272337 cdc1c5f791 3428

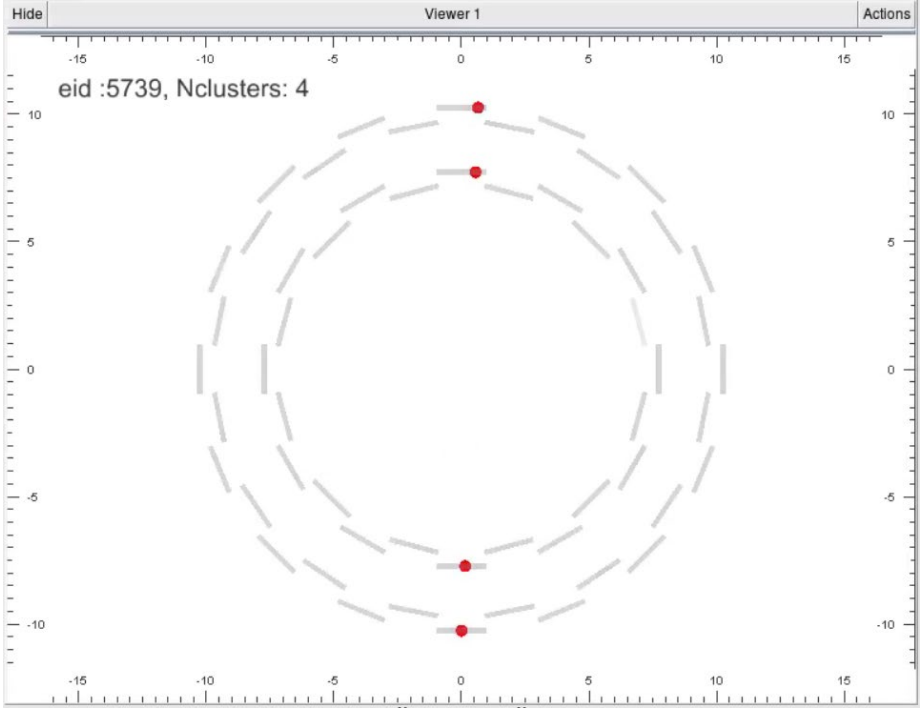


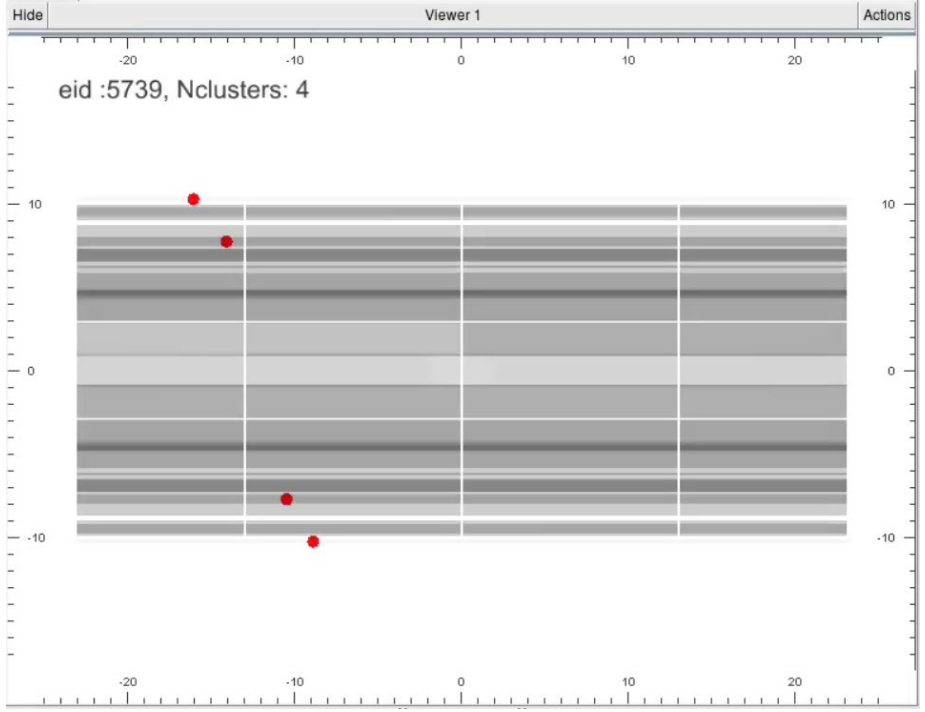


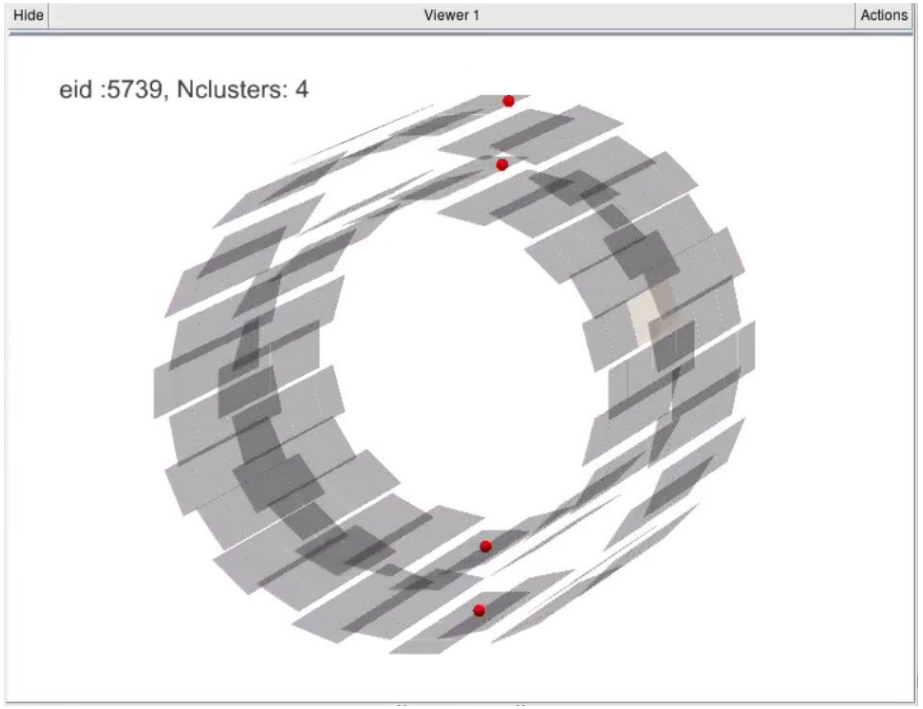


sPHENIX Internal
Cosmic run
2023-08-14, Run 25475
MVTX+INTT+TPOT

- Run25475
  - BCO 884330860848
  - InttEvent: 4173 884330860848 cde63a1130 4176





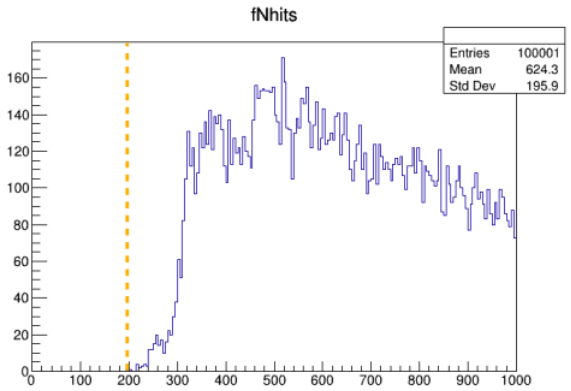


sPHENIX Internal
Cosmic run
2023-08-14, Run 25475
MVTX+INTT+TPOT

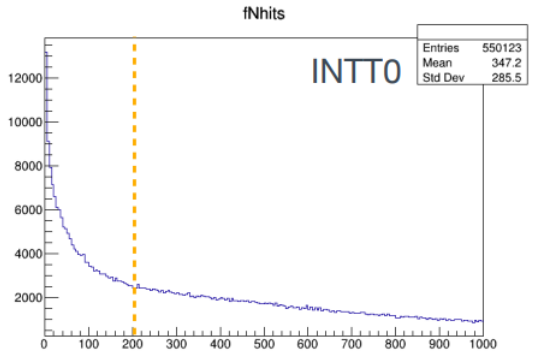
- Run25475
  - BCO:885603848940
  - InttEvent: 5736 885603848940 ce321a52ec 5739

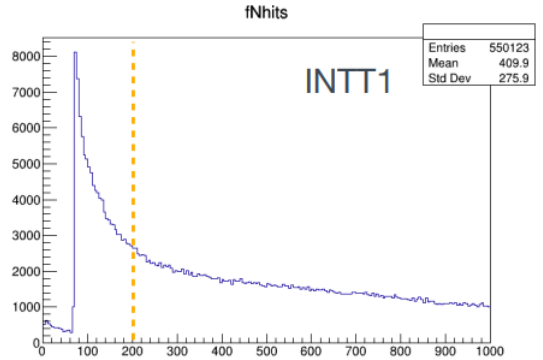
Stability issue of INTT

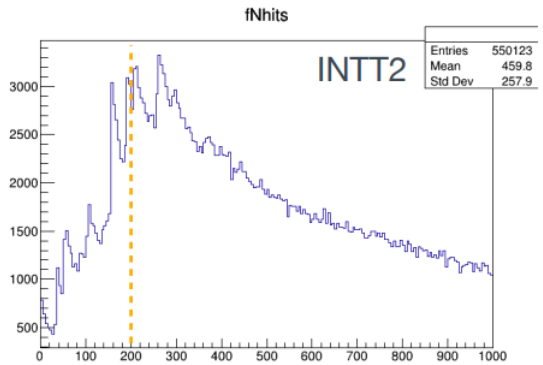
Run 20869, zero field. n_collision 127

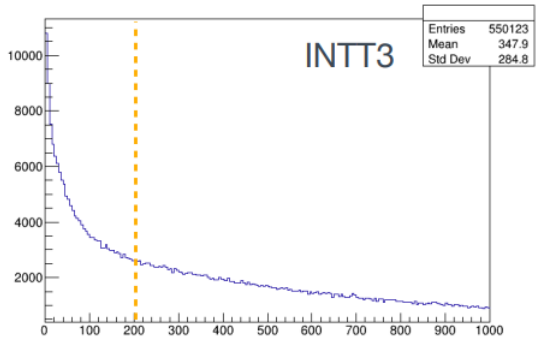


8 FELIX combined



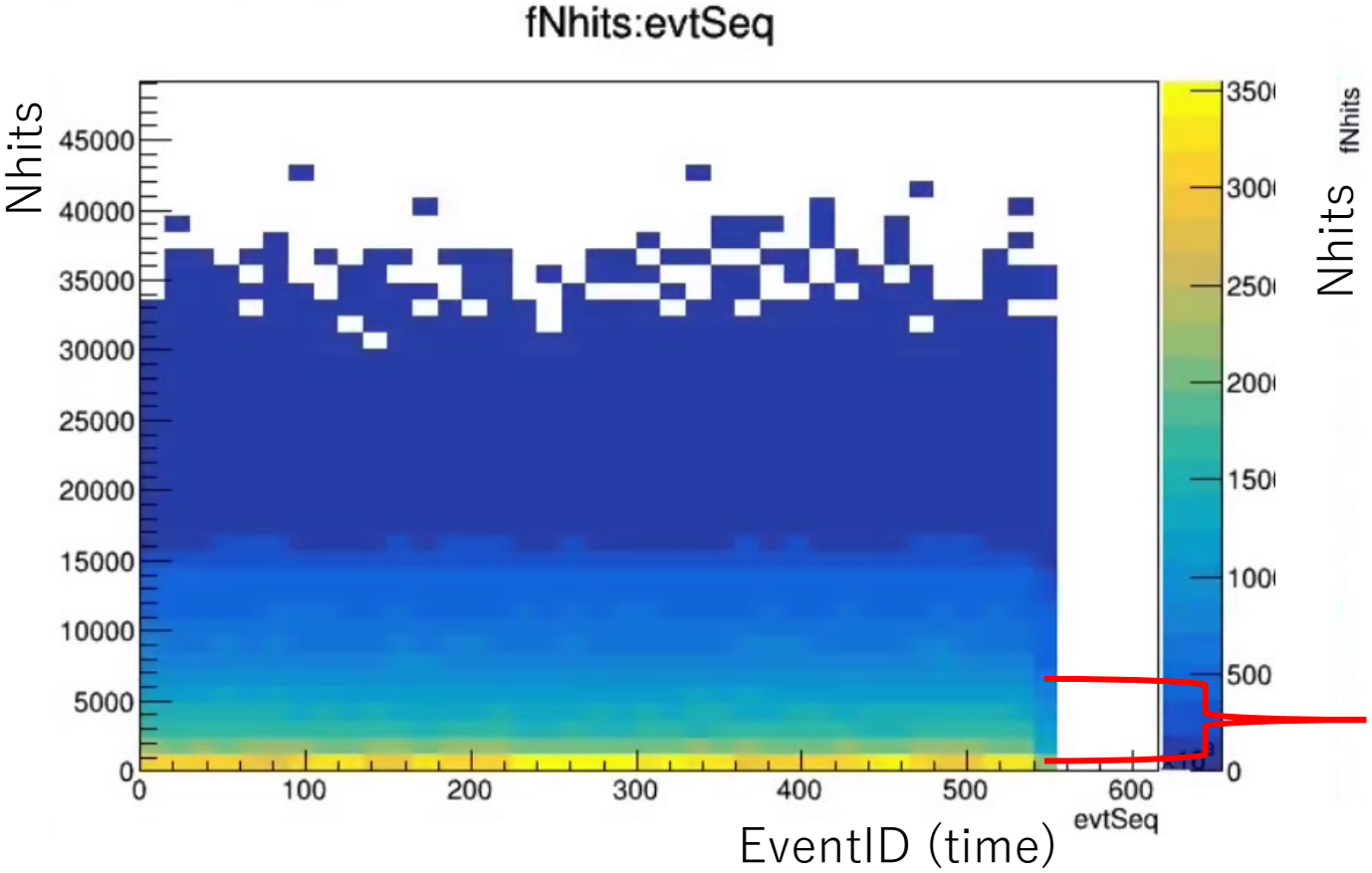


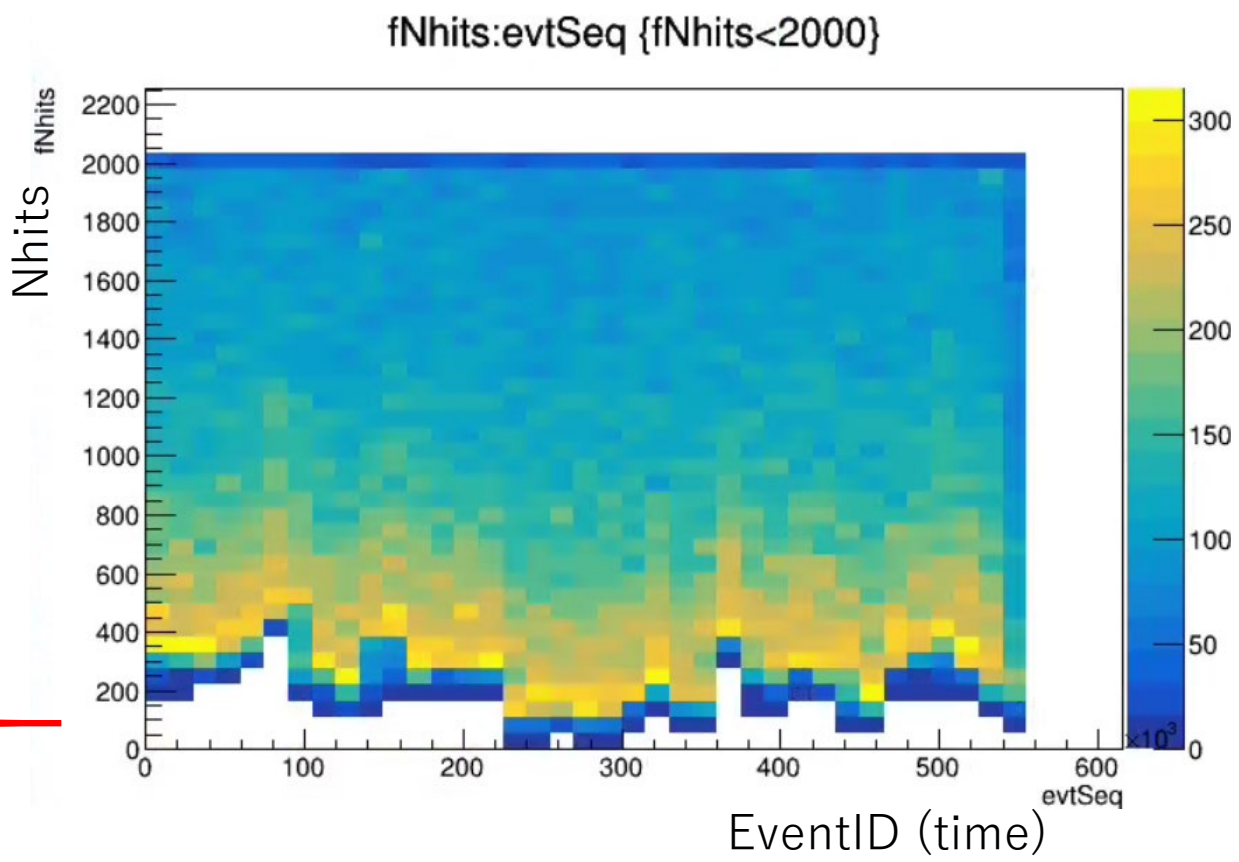




- ChengWei reported variation of nHits in 8 FELIXs

Run20869

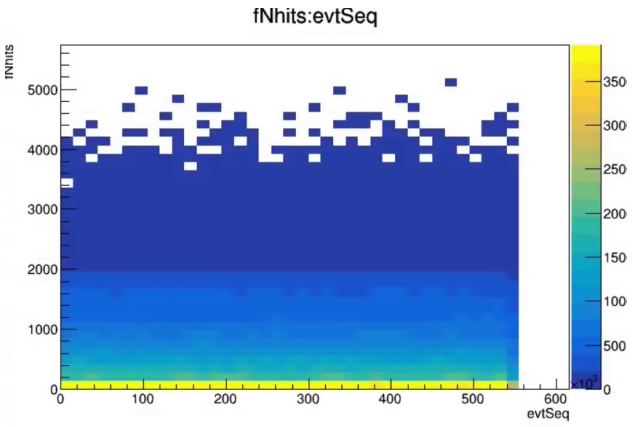




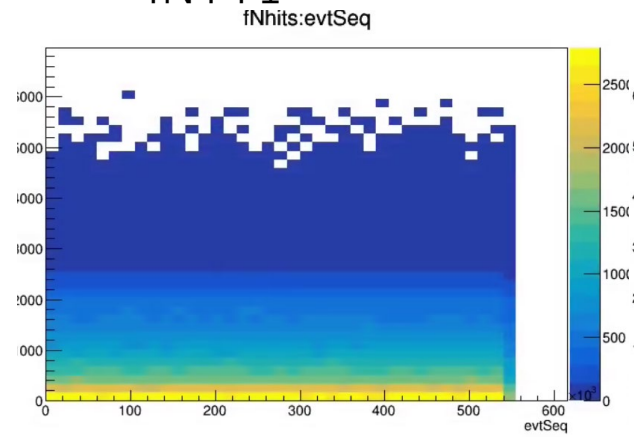
- Minimum of Nhits fluctuates time by time
- Hot and CopyHit still in the data (not removed yet)

Run20869

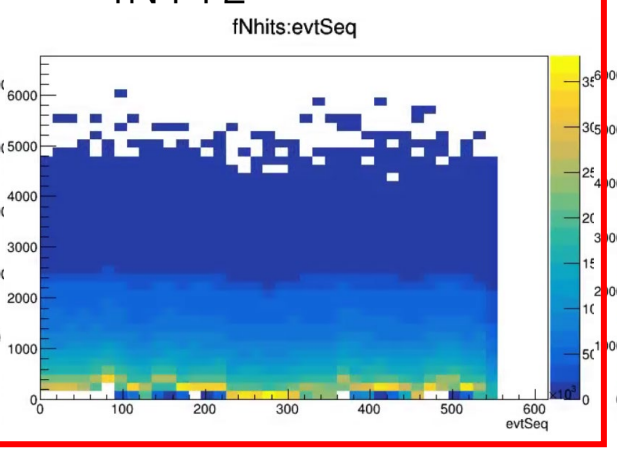
INTT0



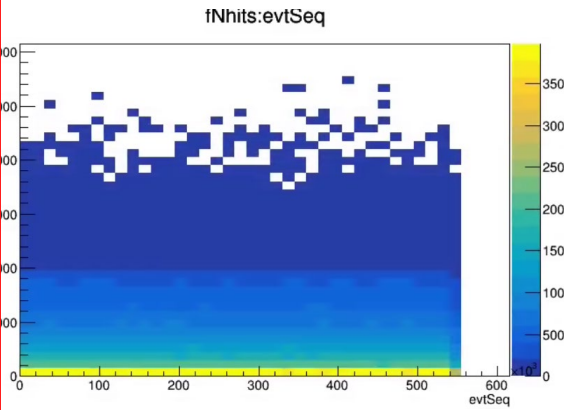
INTT1



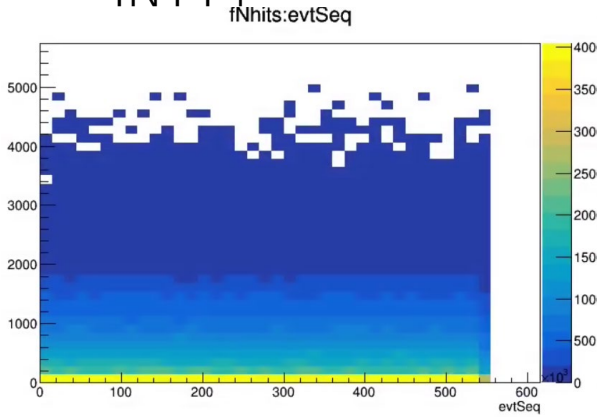
INTT2



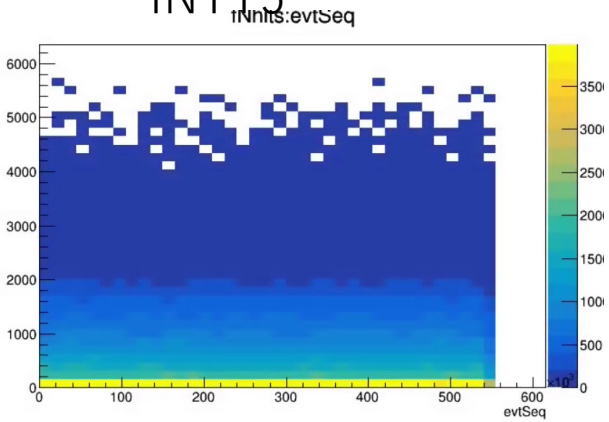
INTT3



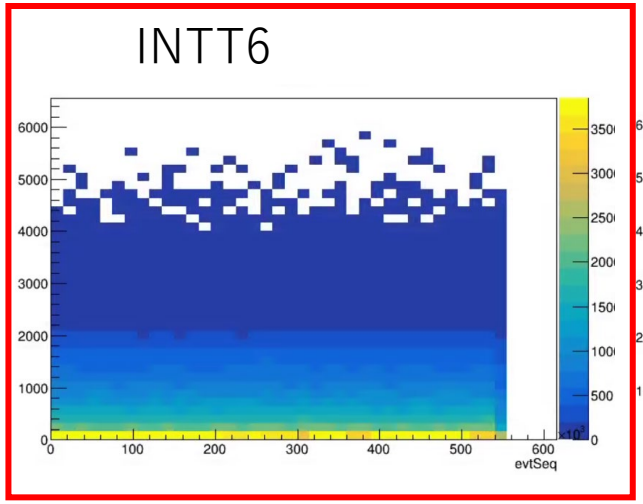
INTT4



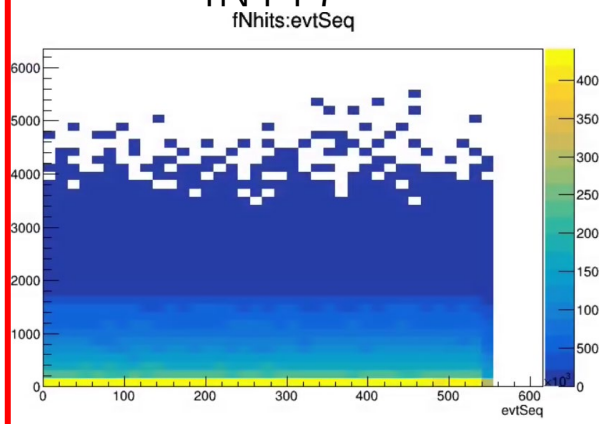
INTT5



INTT6



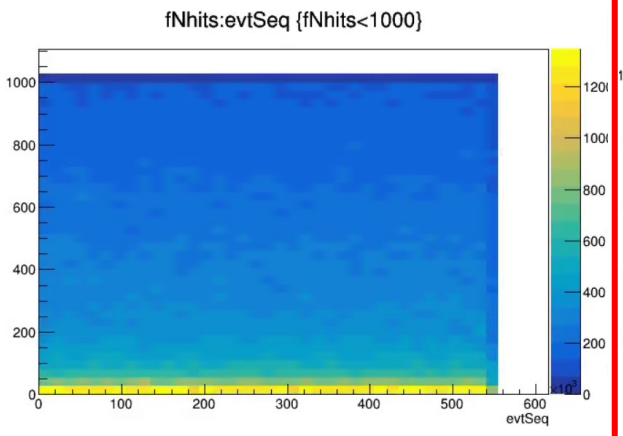
INTT7



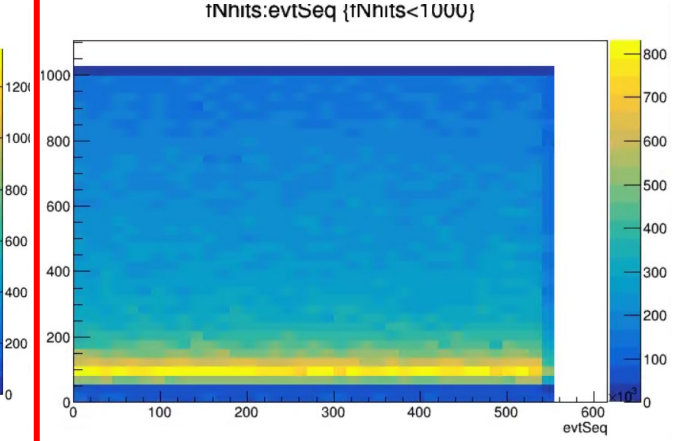
- Variation is seen FELIX by FELIX

Run20869: Focus on small Nhits region

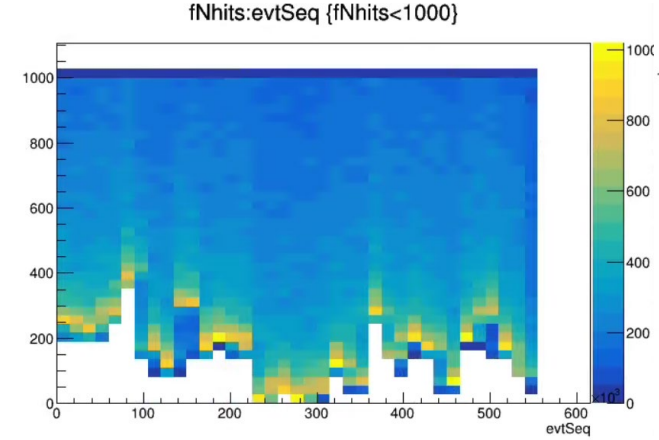
INTT0



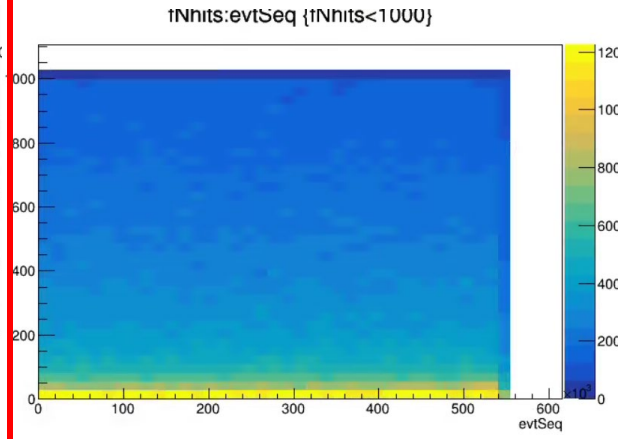
INTT1



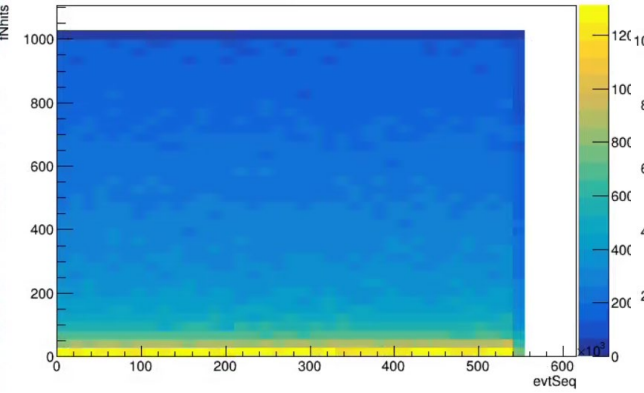
INTT2



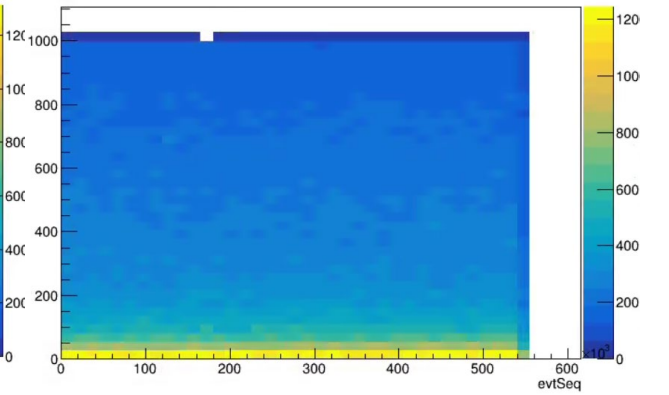
INTT3



INTT4



INTT5



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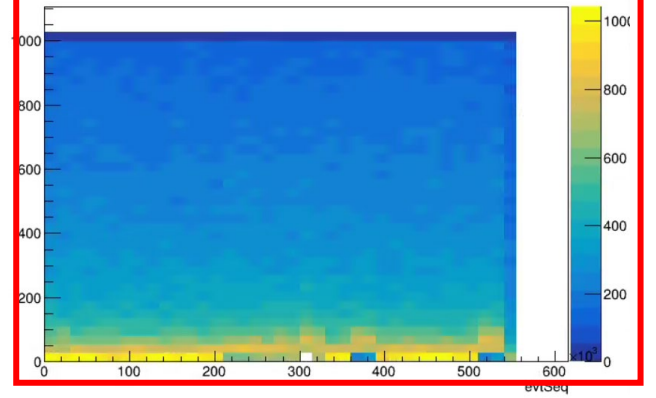

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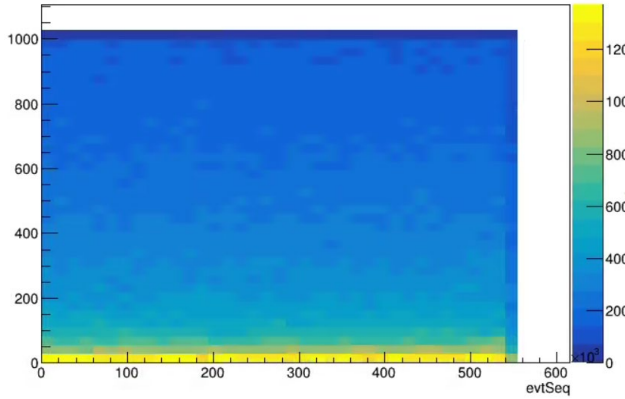
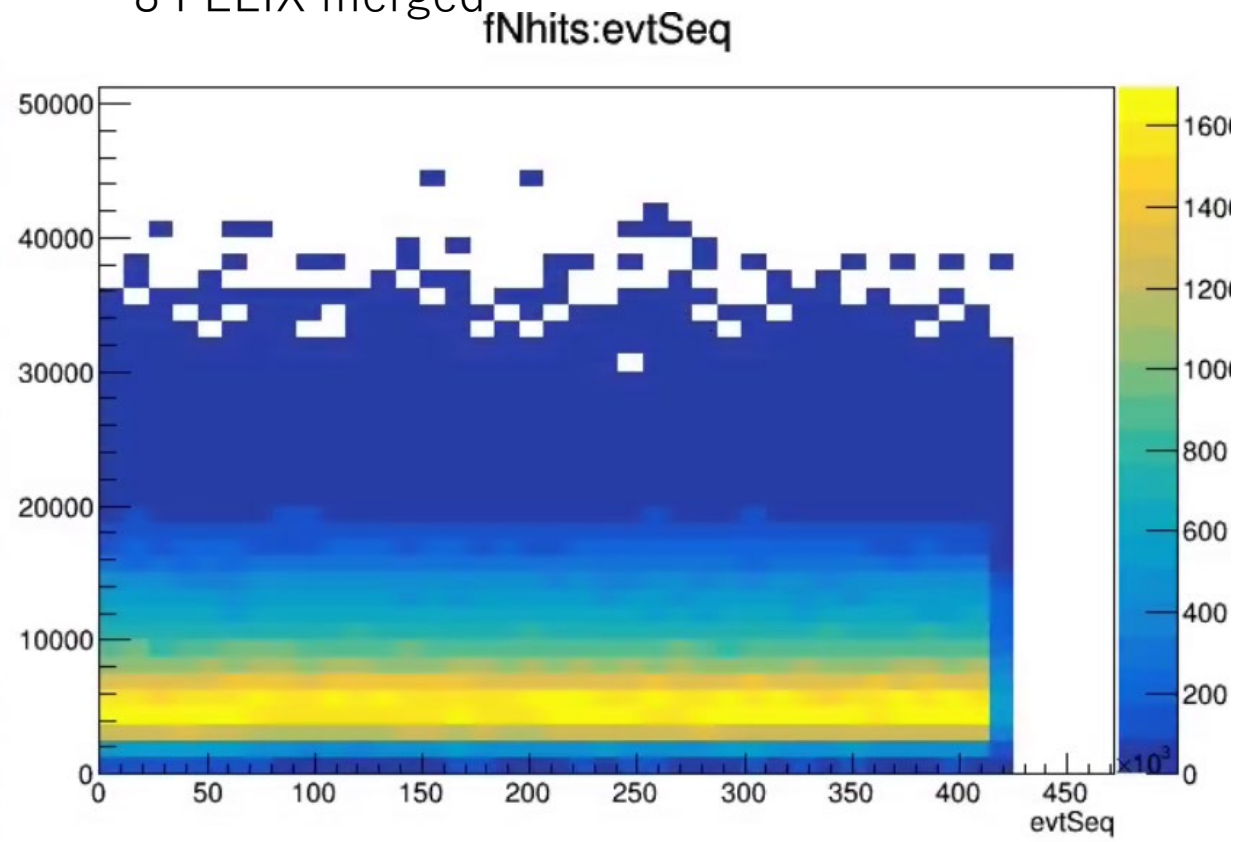
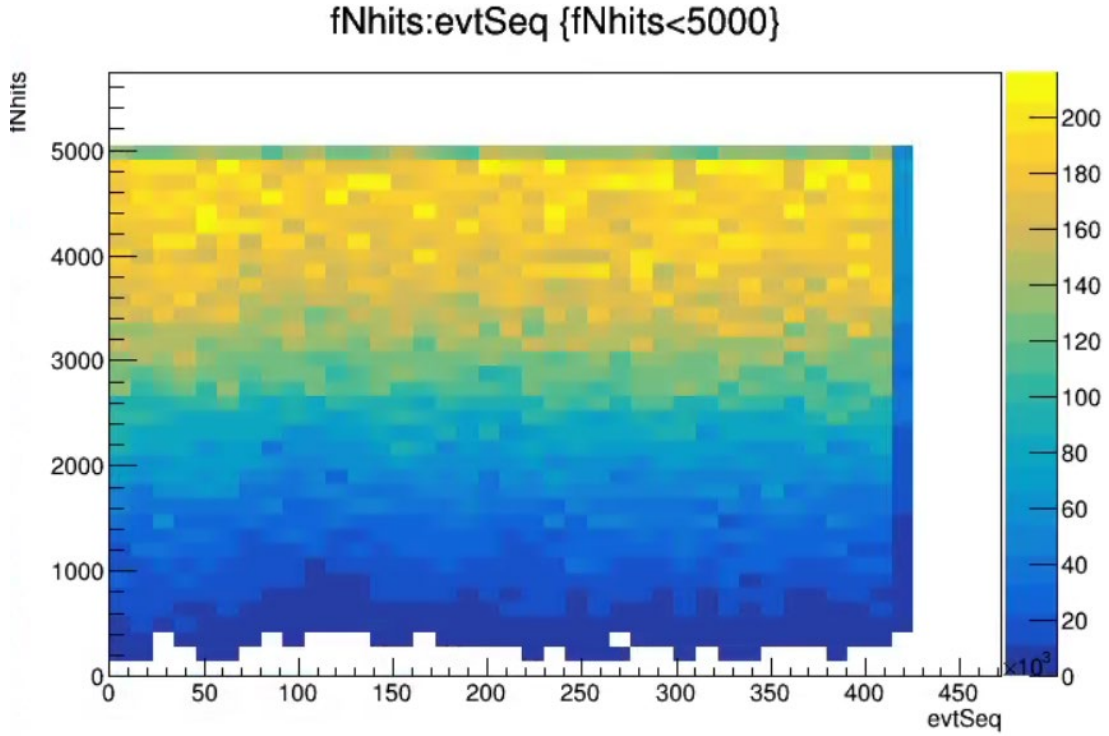


- FELIX1: peak at NHIT~100
- FELIX2&6: minimum Nhits is fluctuated

Run20864　checking different run

8 FELIX merged

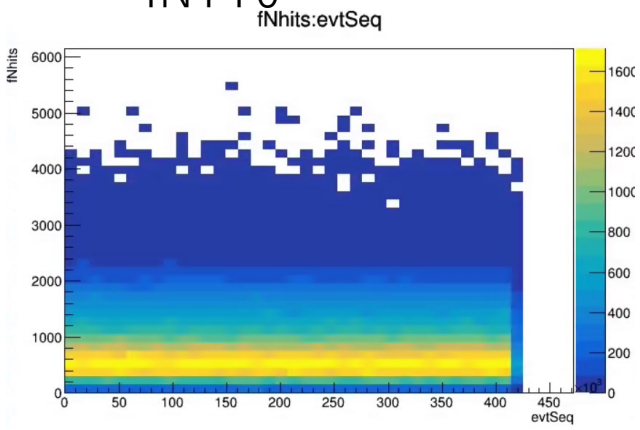




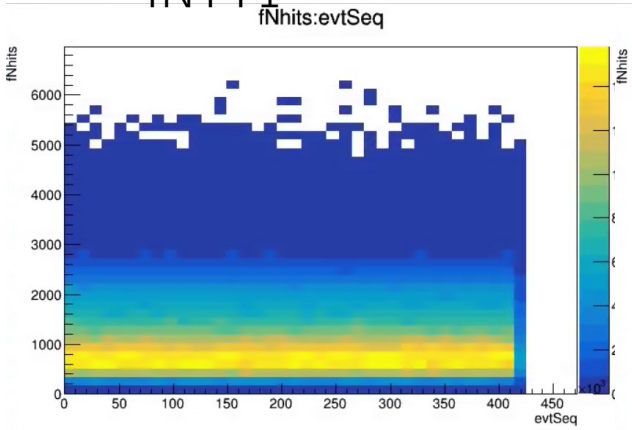
- Yellow band appeared in ~5000
  - Many hot channels and fluctuated

Run20864 single FELIX

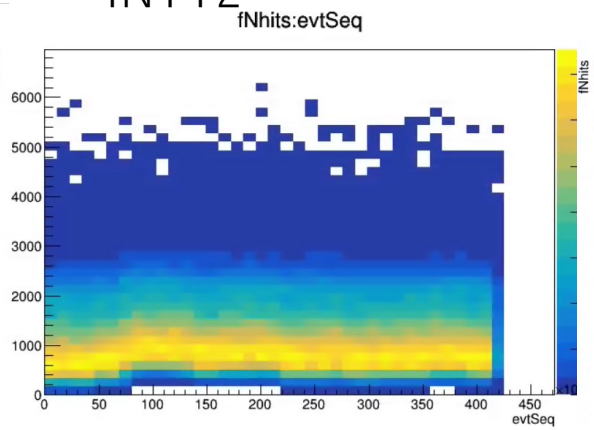
INTT0



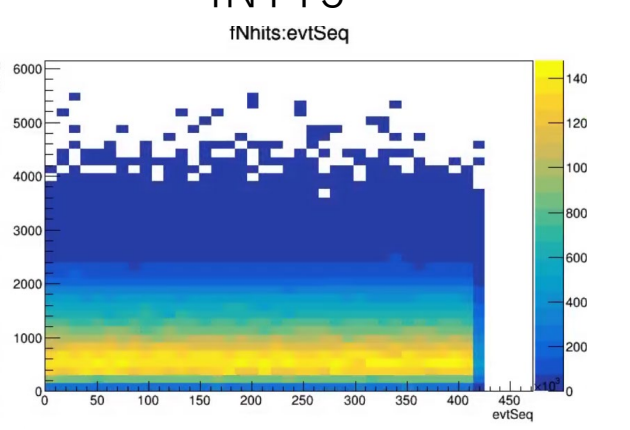
INTT1



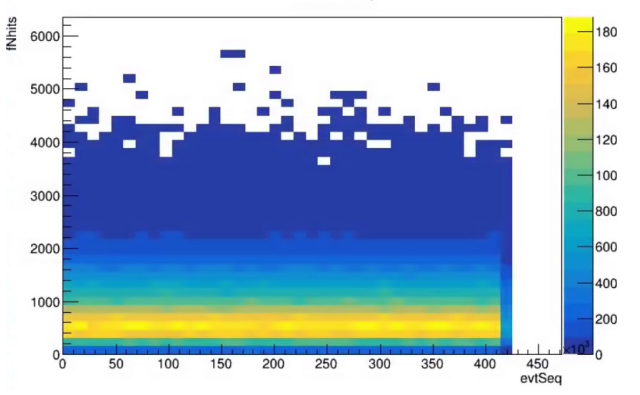
INTT2



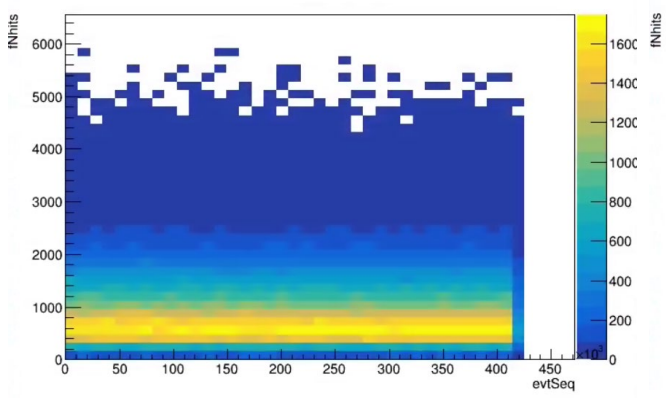
INTT3



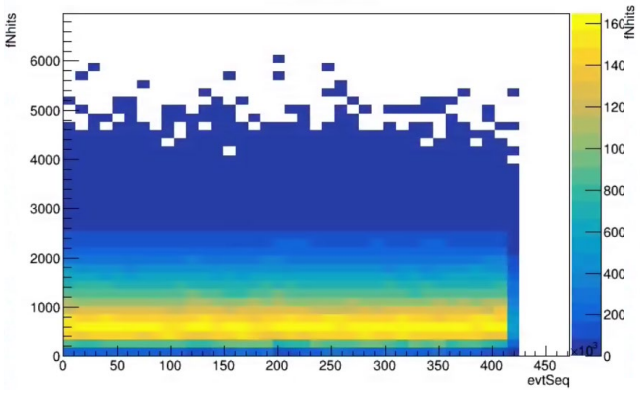
INTT4



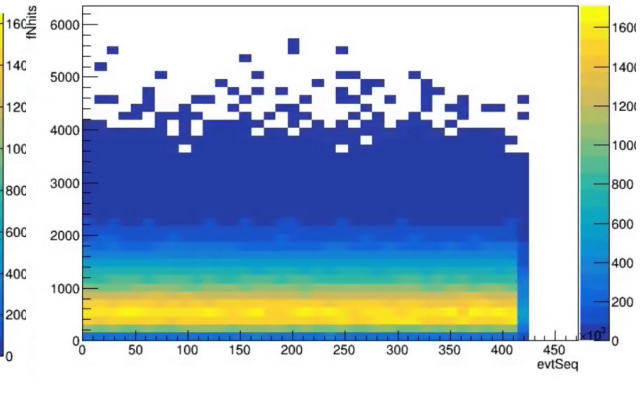
INTT5



INTT6



INTT7



- There are many hot channel changing run by run and time by time