Correlation among different felixs

Maya Shimomura
Nara Women's Univ.

Inside of the data run9328

Intt2
evtSeq, #of hits, #of clusters, BCO_full

```
2    18    14   729115387359
3    74    48   729890558415
4    0    0   0
5    0    0   0
6    0    0   0
7    138    69   729890573631
8    0    0   0
9    0    0   0
10    0    0   0
11    39    28   729890633499
12    0    0   0
13    0    0   0
14    0    0   0
15    1188    365   729890656787
```

Intt3
evtSeq, #of hits, #of clusters, BCO_full

```
2    30    21   729115387359
3    0    0   0
4    0    0   0
5    0    0   0
6    54    35   729890558415
7    0    0   0
8    0    0   0
9    0    0   0
10    30    24   729890573631
11    0    0   0
12    0    0   0
13    0    0   0
14    90    51   729890633499
15    0    0   0
```

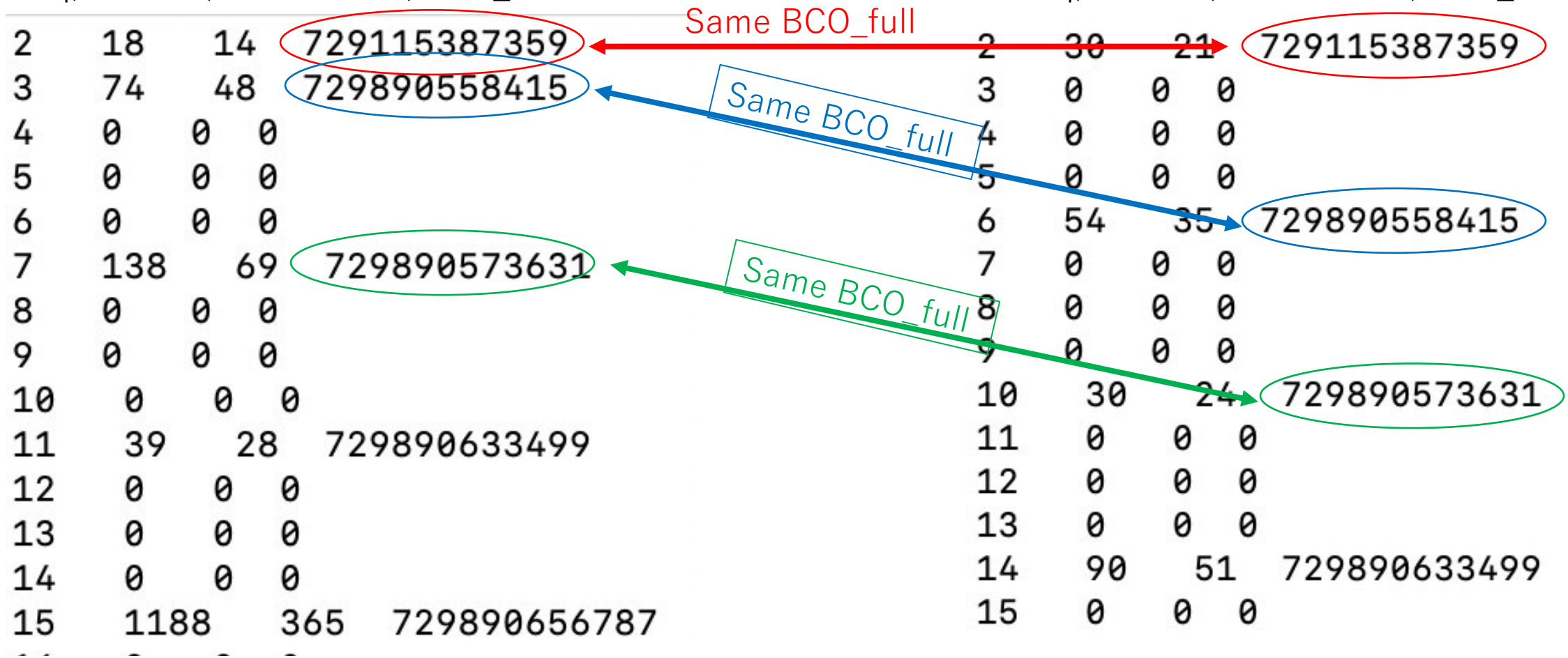
Inside of the data run9328

Intt2
evtSeq, #of hits, #of clusters, BCO_full

```
2    18    14   729115387359
3    74    48   729890558415
4    0     0    0
5    0     0    0
6    0     0    0
7    138   69   729890573631
8    0     0    0
9    0     0    0
10   0     0    0
11   39    28   729890633499
12   0     0    0
13   0     0    0
14   0     0    0
15   1188  365  729890656787
```

Intt3
evtSeq, #of hits, #of clusters, BCO_full

```
2    30    21   729115387359
3    0     0    0
4    0     0    0
5    0     0    0
6    54    35   729890558415
7    0     0    0
8    0     0    0
9    0     0    0
10   30    24   729890573631
11   0     0    0
12   0     0    0
13   0     0    0
14   90    51   729890633499
15   0     0    0
```



What I did. (1)

Intt2
evtSeq, #of hits, #of clusters, BCO_full

```
2    18    14   729115387359
3    74    48   729890558415
4    0     0    0
5    0     0    0
6    0     0    0
7    138   69   729890573631
8    0     0    0
9    0     0    0
10   0     0    0
11   39    28   729890633499
12   0     0    0
13   0     0    0
14   0     0    0
15   1188  365  729890656787
```

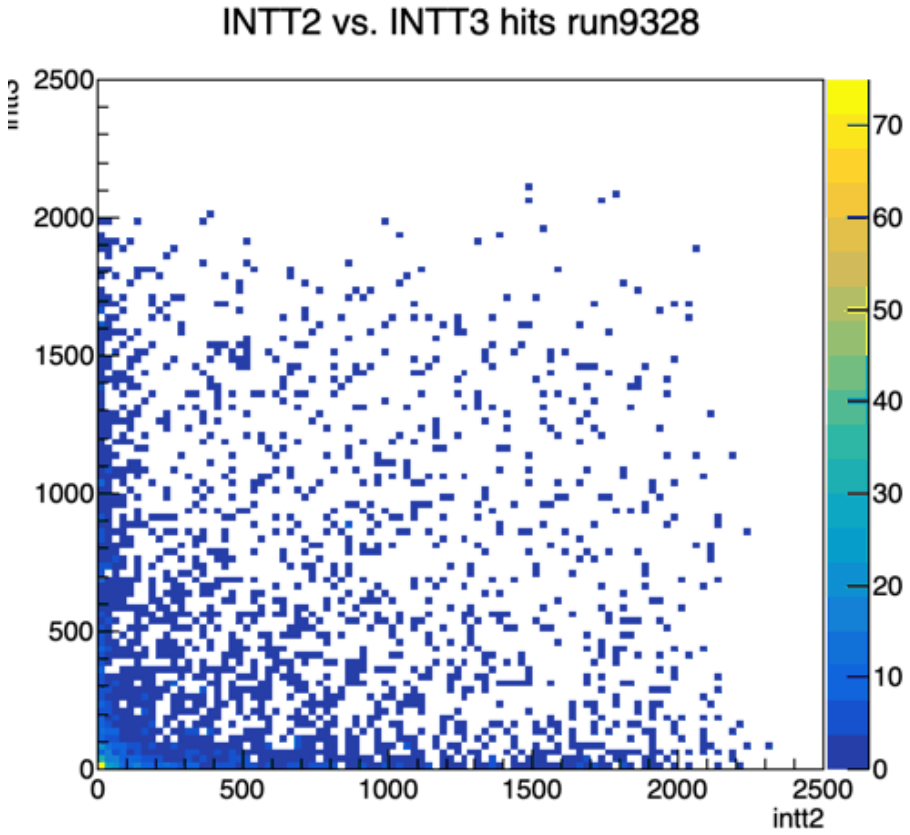
Intt3
evtSeq, #of hits, #of clusters, BCO_full

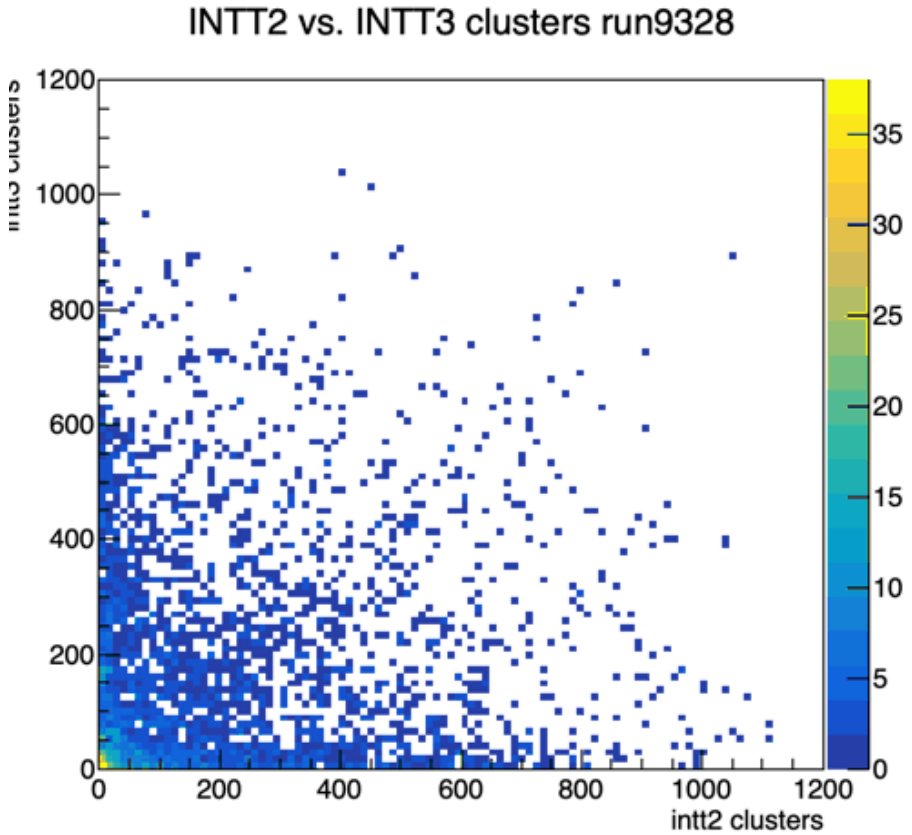
```
2    30    21   729115387359
3    0     0    0
4    0     0    0
5    0     0    0
6    54    35   729890558415
7    0     0    0
8    0     0    0
9    0     0    0
10   30    24   729890573631
11   0     0    0
12   0     0    0
13   0     0    0
14   90    51   729890633499
15   0     0    0
```

Remove the events which have bco_full == 0

Comparison between intt0 and intt1 without bco_full ==0 data

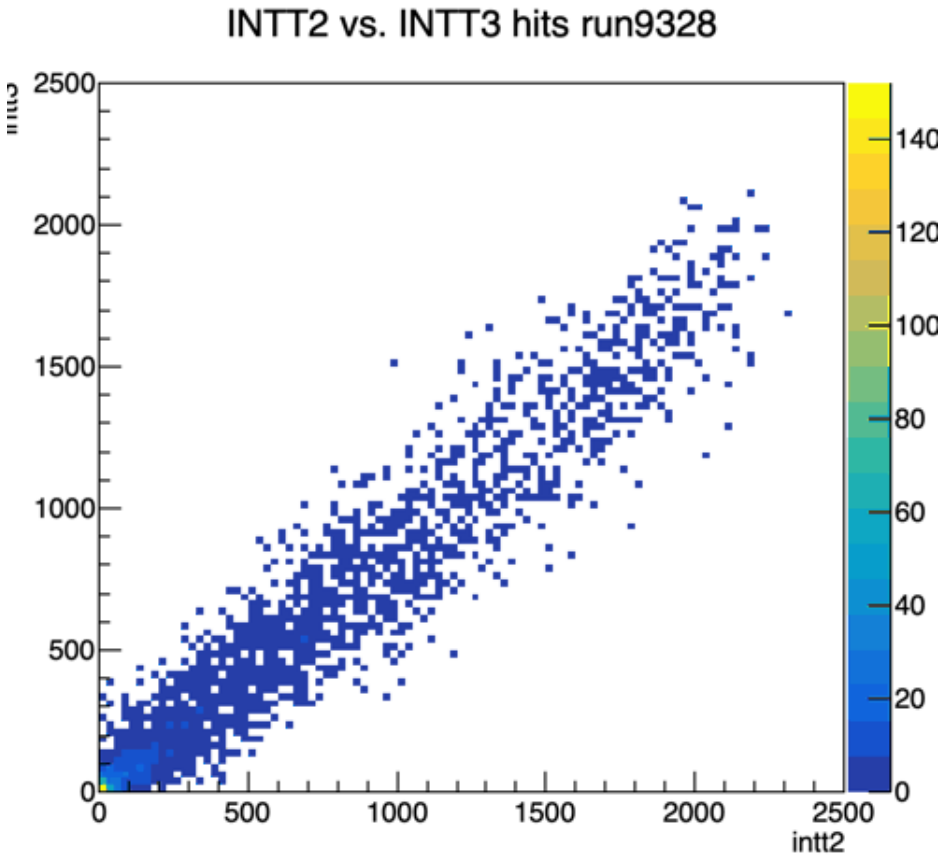
Remove the events which have bco_full == 0 and take correlation between intt2 and intt3

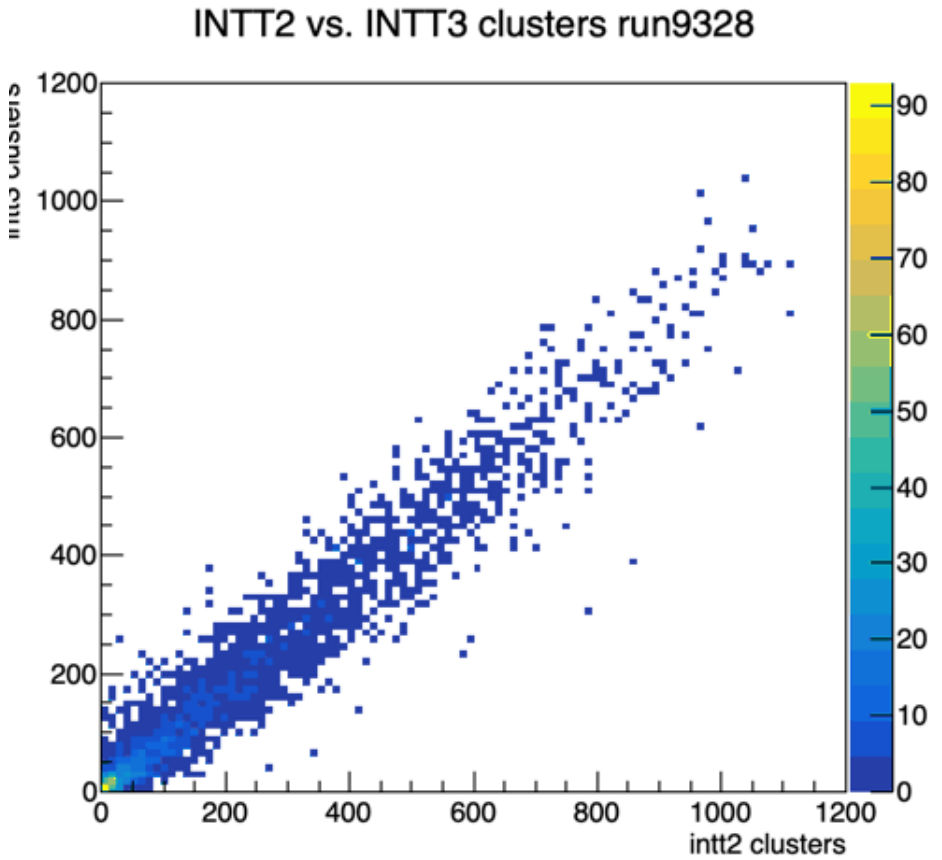




No correlation is seen.

Comparison between intt2 and intt3 requiring the same bco_full





Clear correlation is seen on #of hits and #of clusters between intt2 and intt3

Look into data closer

* After removing the events with bco_full ==0

Intt2
evtSeq, #of hits, #of clusters, BCO_full

```
42    135    60   729890893783
45    184    69   729890906579
47    10     8   729890928931
48    17     17   729890928931
52    149    78   729890965271
55    667    306   729890995555
61    635    315   729891084883
64    2     2   729891134035
67    36    28   729891134035
```

Intt3
evtSeq, #of hits, #of clusters, BCO_full

```
46    192    88   729890893783
50    38     27   729890906579
54    6     4   729890906579
58    82    37   729890950074
62    166    43   729890965271
66    368    226   729890995555
70    9     7   729890995555
74    430    243   729891084883
78    59    34   729891134035
82    12    9   729891134035
```

Look into data closer

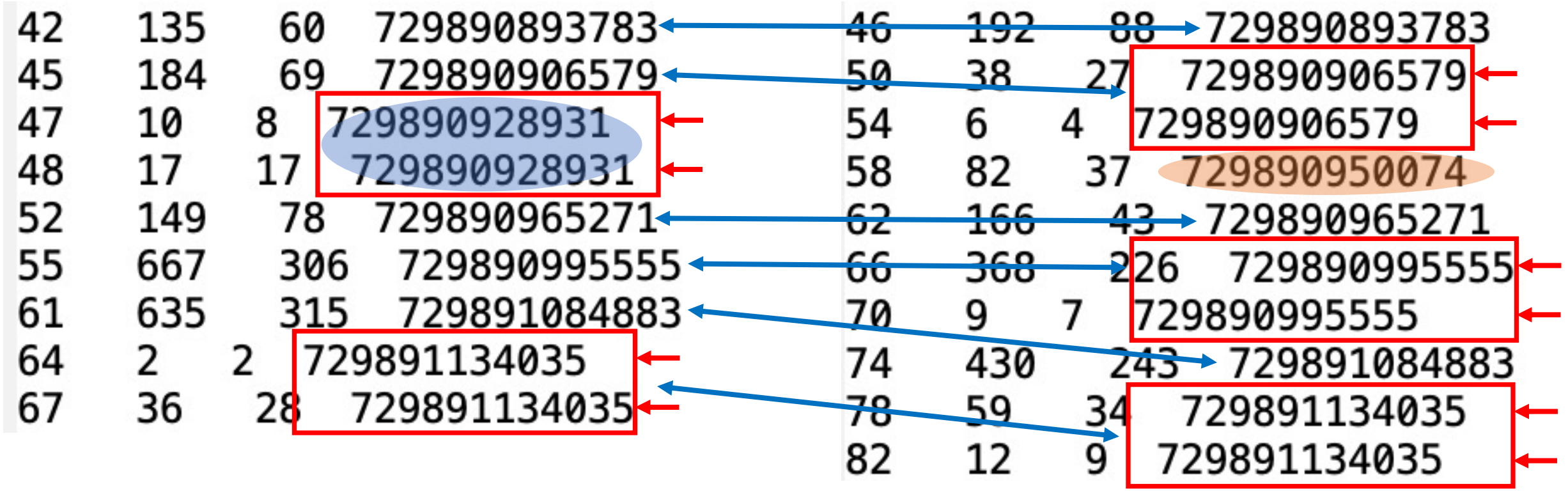
BCO_full match

Same BCO

* After removing the events with bco_full ==0

Intt2
evtSeq, #of hits, #of clusters, BCO_full

Intt3
evtSeq, #of hits, #of clusters, BCO_full



There are two bco_full = 72980928931 events in intt2 and no intt3.
There is no bco_full = 729890950074 in intt2.

Questions (to be fixed ?)

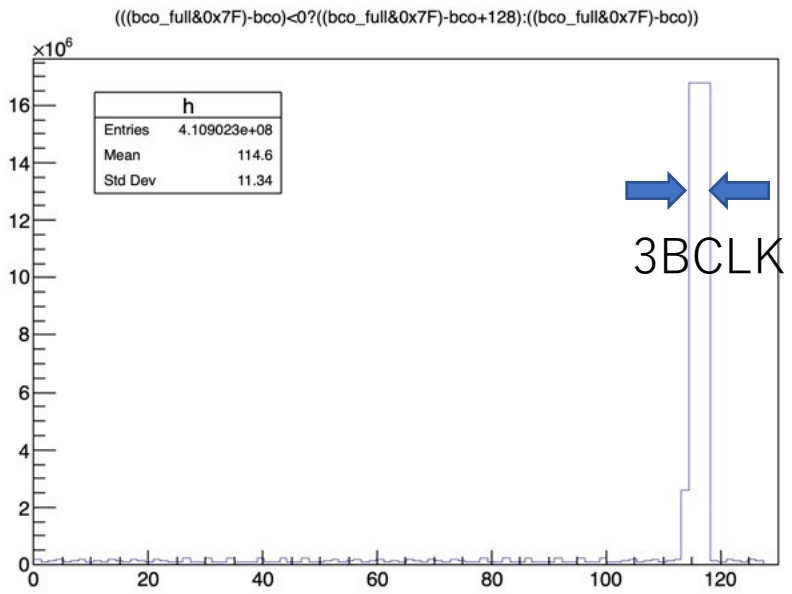
1. Why are there a lot of events which bco_full is zero and number of hits is zero ?
2. Why are there some bco_full which appear only either intt2 or intt3?
3. Why are there two series of the events which have same bco_full and different hits info?

Back Up

BCO Issues

Maya SHIMOMURA, Itaru Nakagawa, Takashi Hachiya

bco_full – bco distribution on a felix (Run#9328)



Plot : run#9328, intt2, n_collision=4

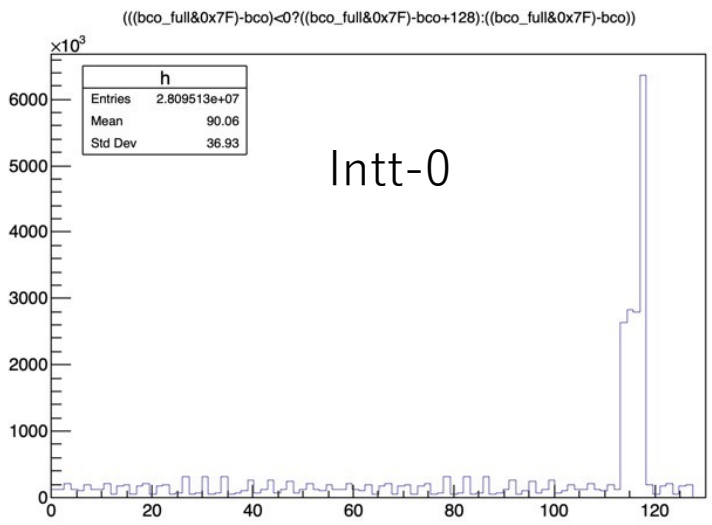
Subtracting “bco” from the lower 8 bits of “bco_full”

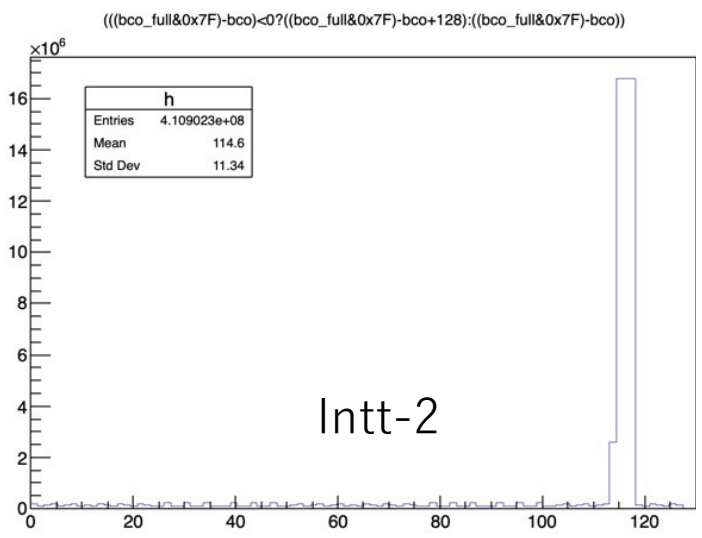
What we expect is 1 BCLK peak.

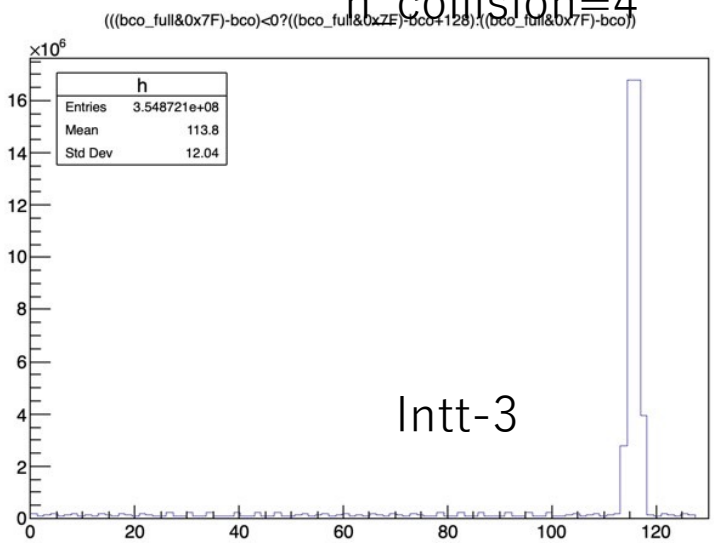
- Although we confirmed 1BCLK time resolution when we timed in intt-2 on May 31st, the peak is composed by 3BCLK size in Run#9328. Inconsistent.
- MBD phase timing change can only explain only 2BCLK.
- Satellite shoulder may be invisible in the time-in plot made on May 31st.

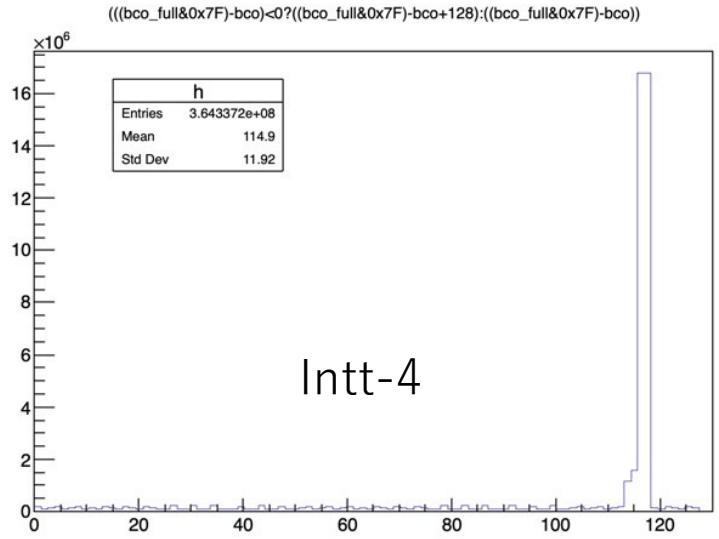
bco_full – bco distribution on other felixs (Run#9328)

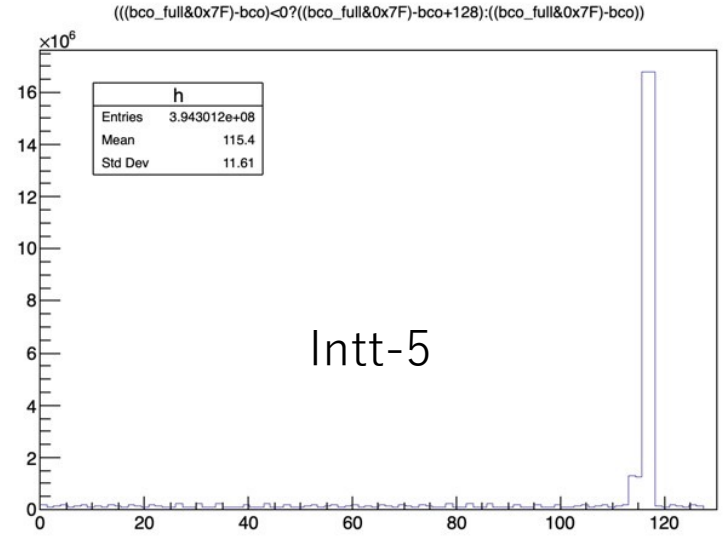
n_collision=4

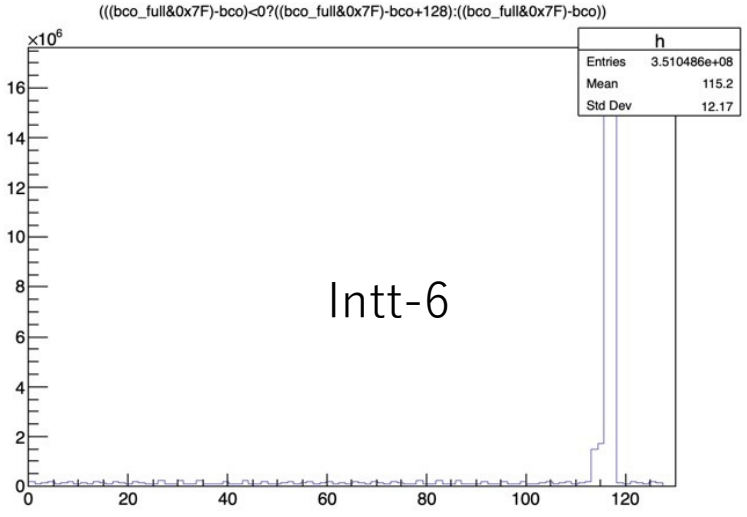






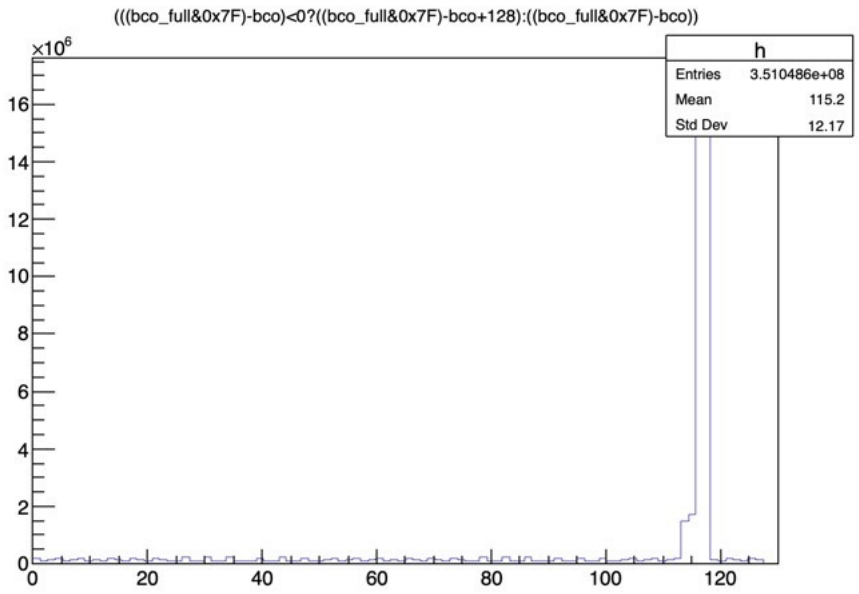


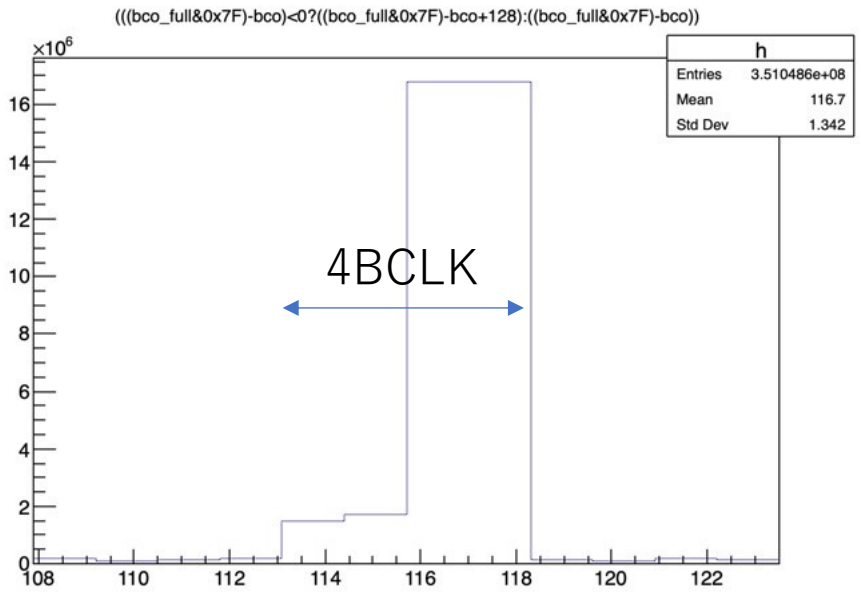




Same tendency.
Different number of events between different felixs which should not be.

Intt-7 BCO Peak with zoomed up

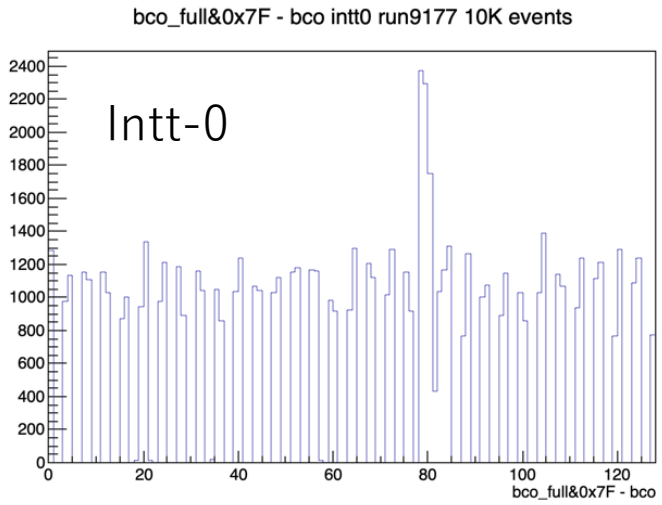


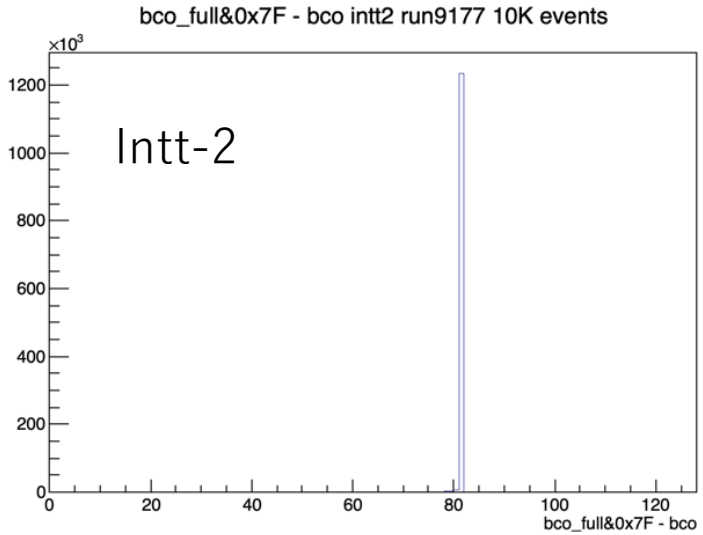


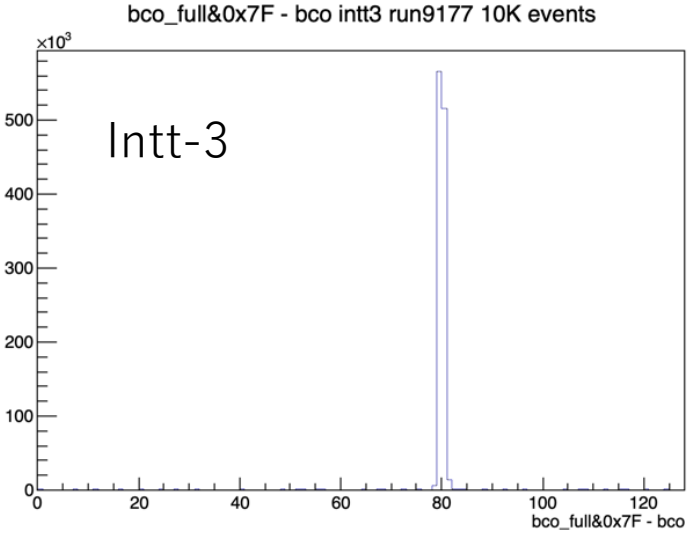
Most of the peaks are ~3 BCLK. Some felix has even more than 4BCLK.

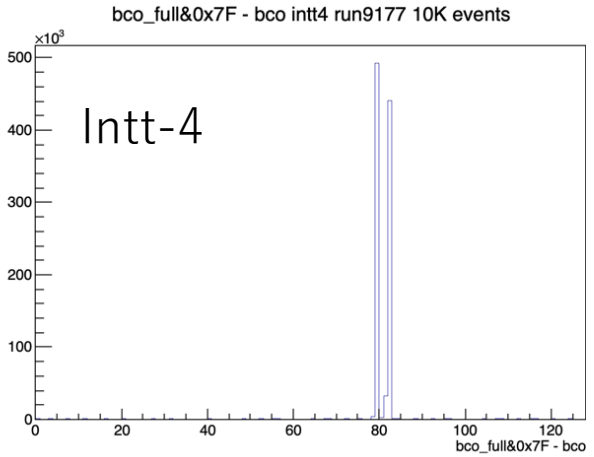
n_collision=1

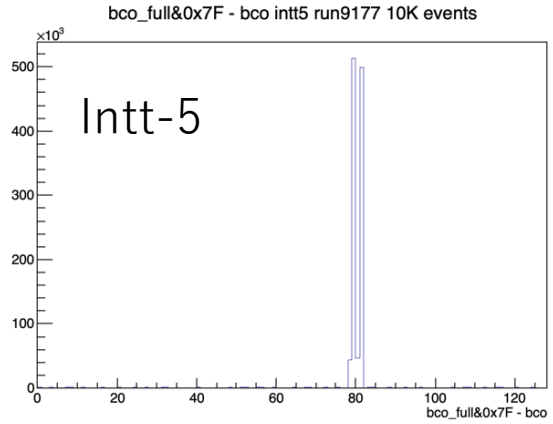
bco_full – bco distribution on other felixs (Run#9177)

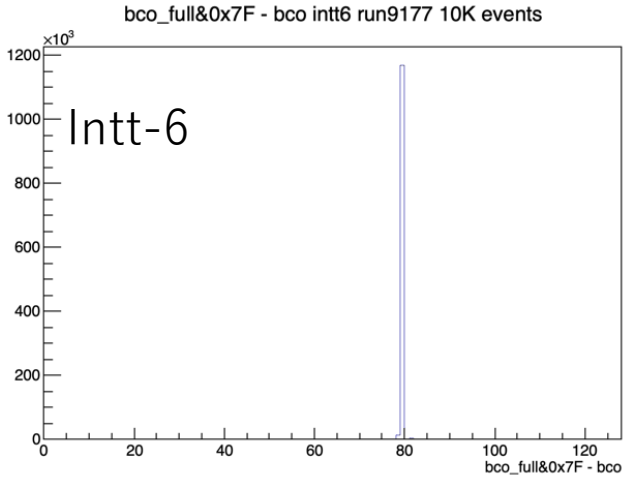


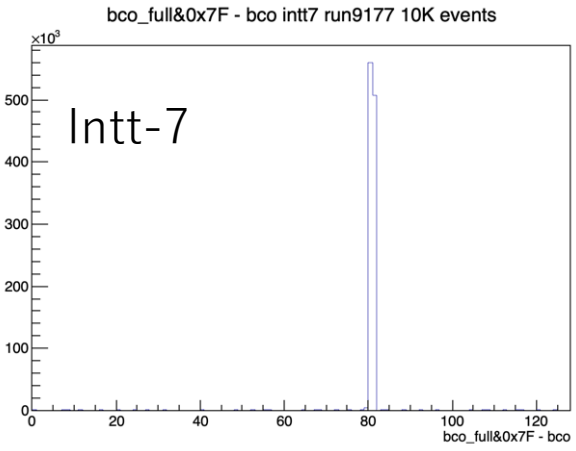






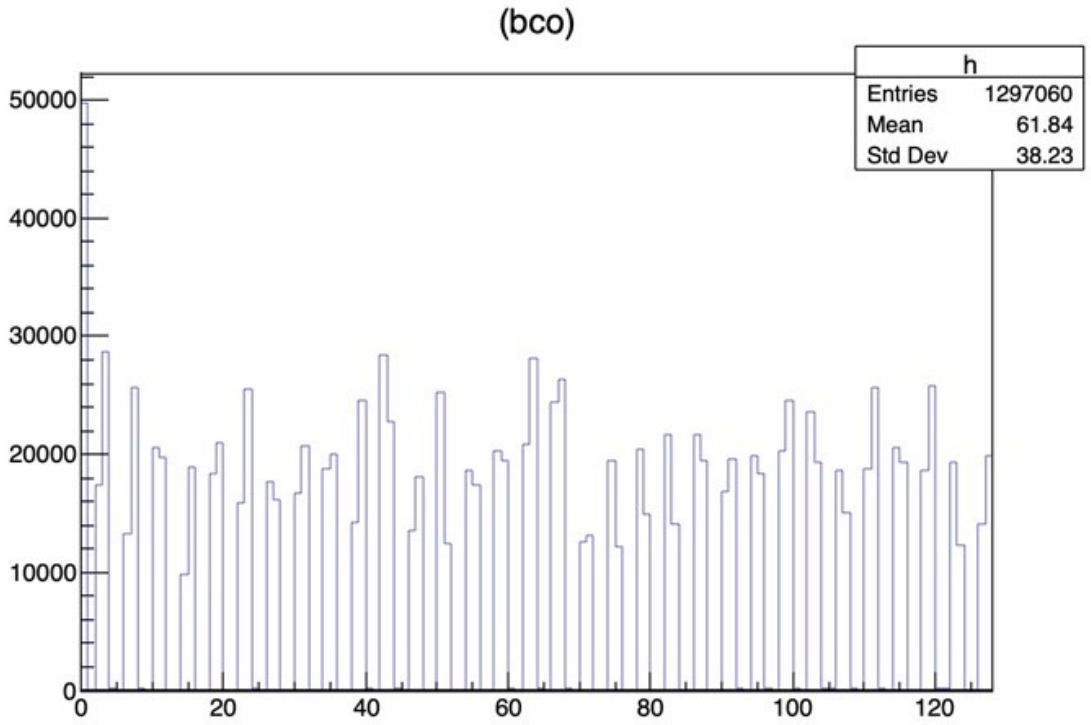


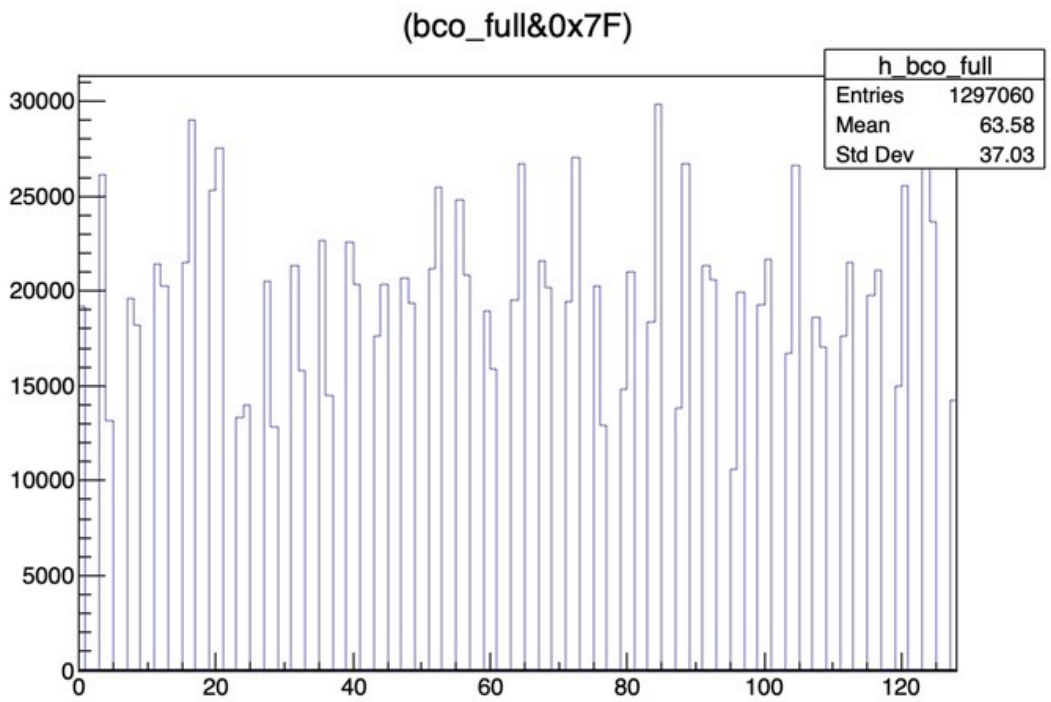




Narrower peaks (~2 BCLK) for intt2, 3, 6 and 7 than the run with n_collision =4.

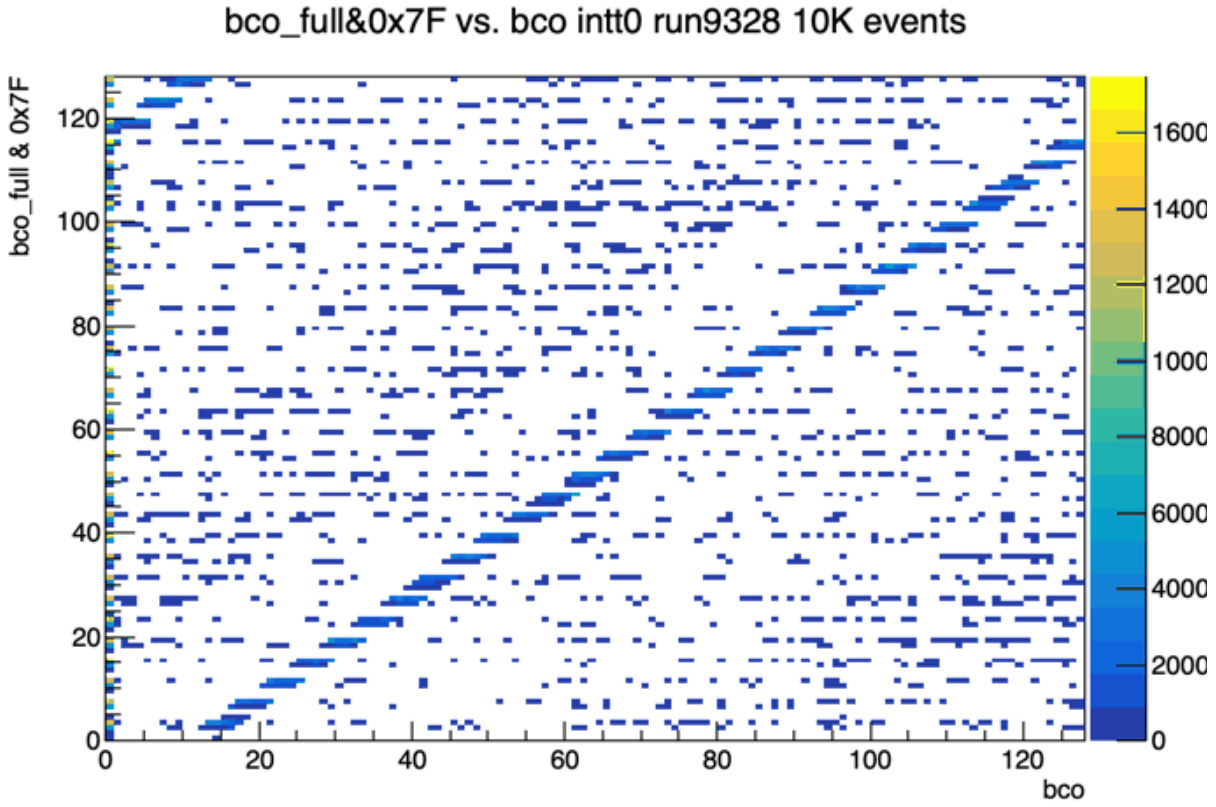
Run#9177 intt2
n_collision=0, modebit 76:0x35





A lot of bco are 0.
Run #9328 shows same tendency.

Correlation of bco_full and bco

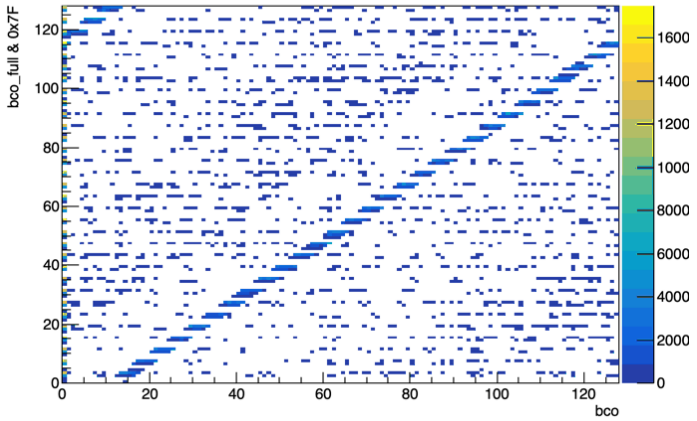


Run 9328
n_collision = 4
Intt0
# of events =10K

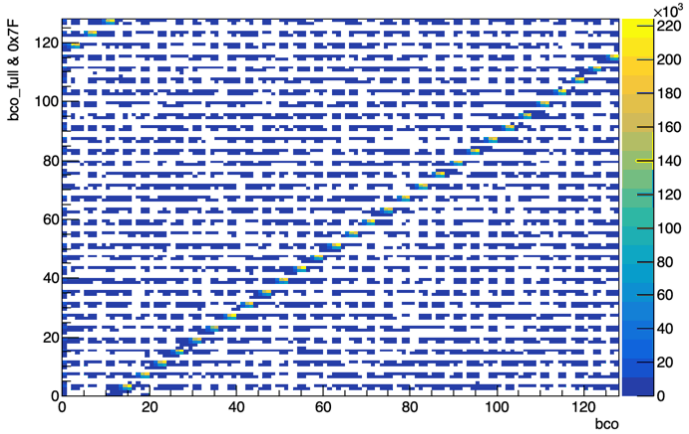
The correlation can be seen.
A lot of background there.

Correlation of bco_full and bco Run 9328 n_collision =3

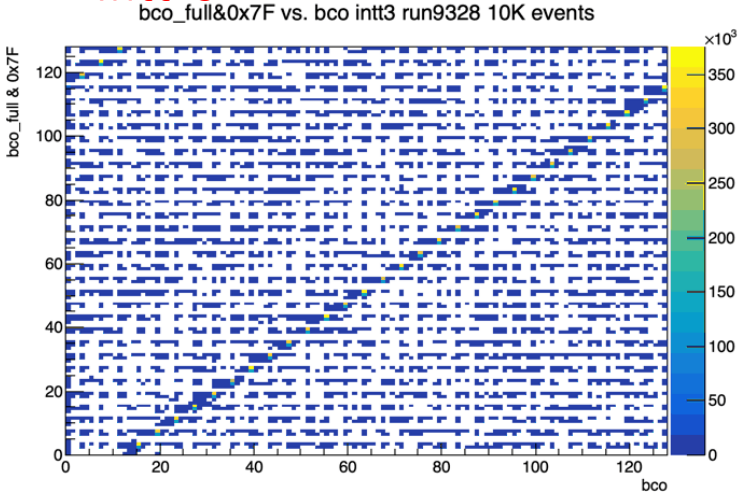
Intt-0



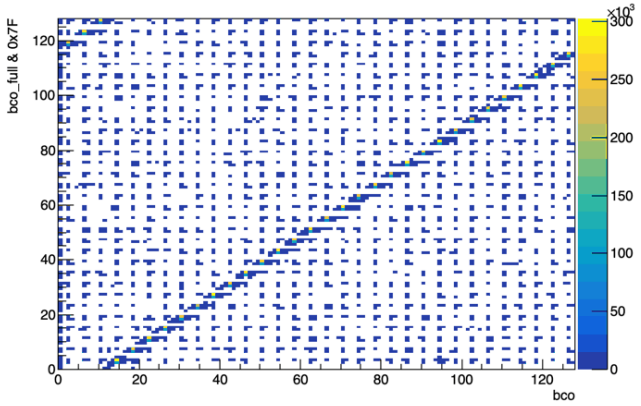
Intt-2



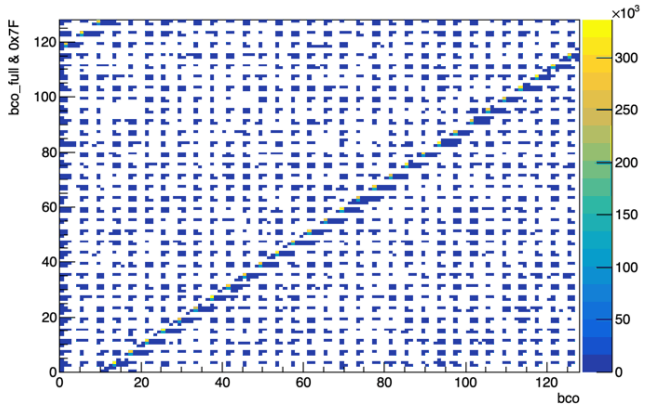
Intt-3



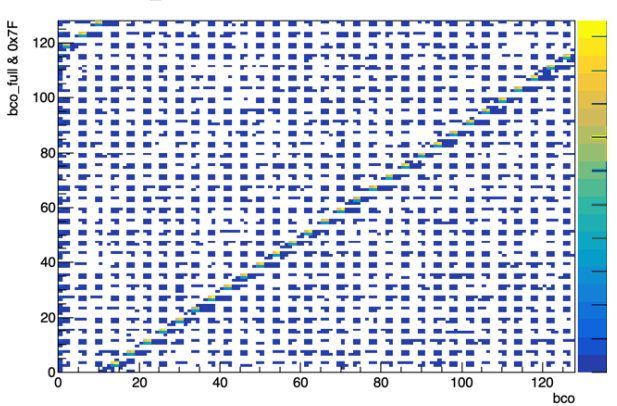
Intt-4



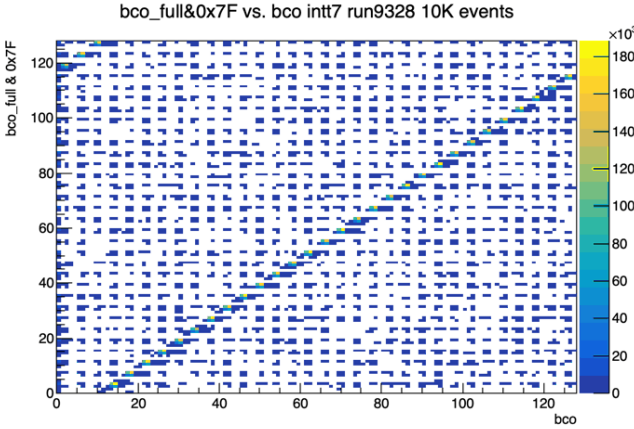
Intt-5



Intt-6



Intt-7

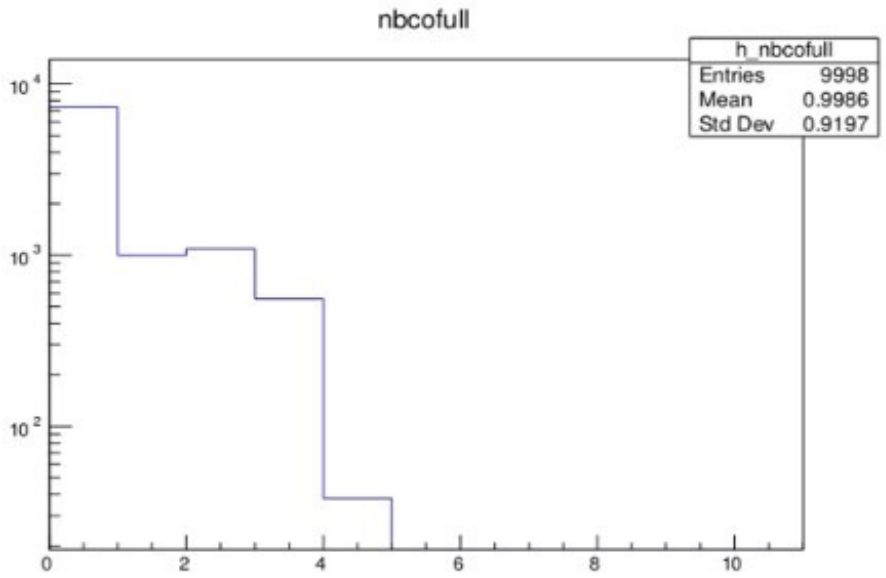


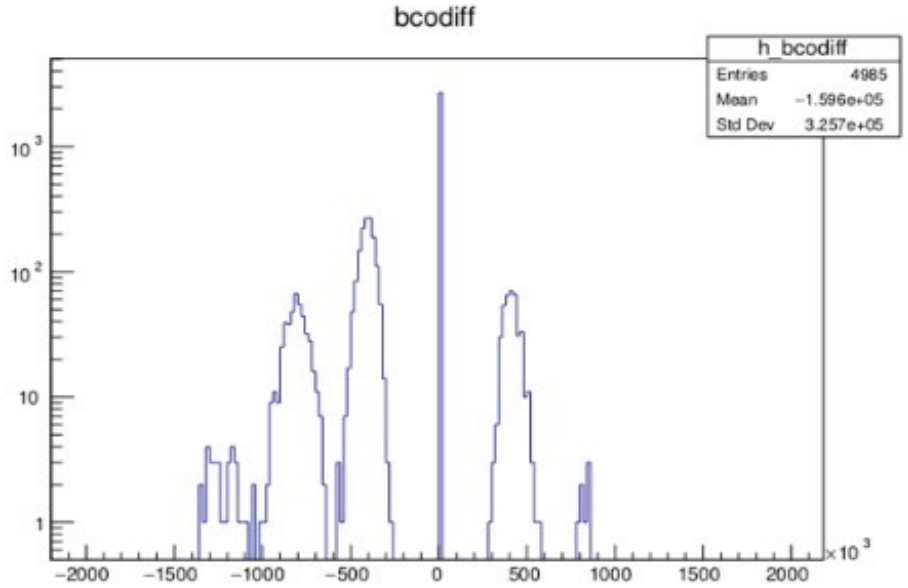
Studied and plotted by Takashi

bco_full distribution at the same events.

Run 9185-0

BCOdiff = BCOFULL – BCOFULL_MAIN

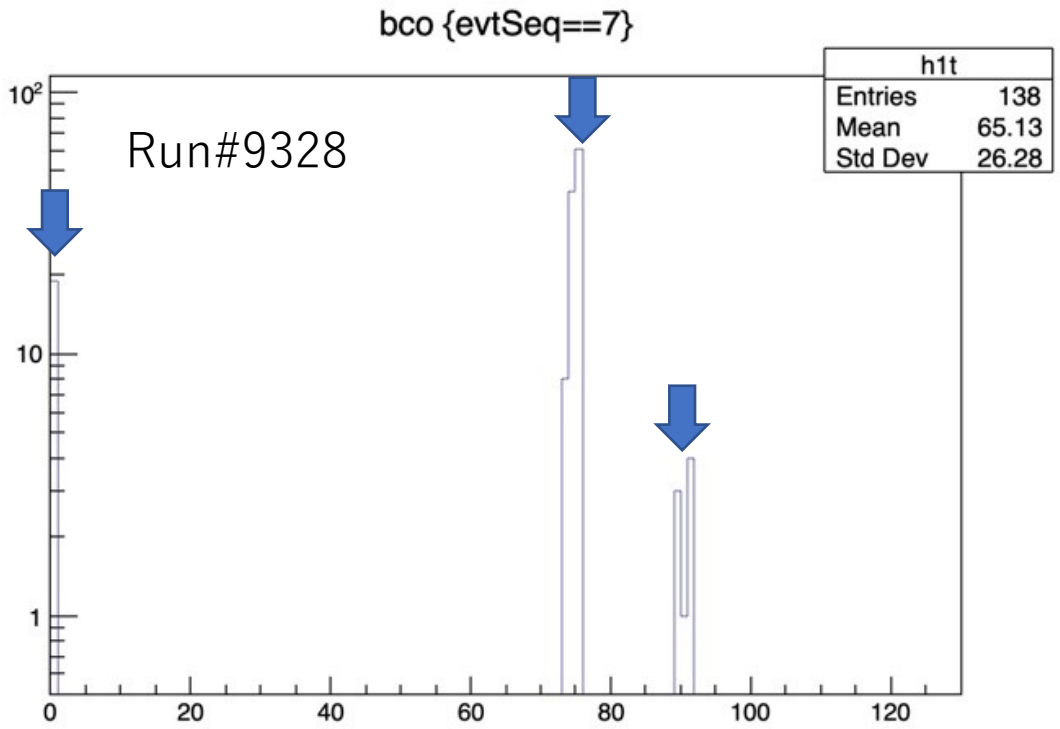




- NBCO=0をのぞくと、　両方のエントリーは同じになりそう。

BCO Structure in a Given Event

Multpilpe BCO hits in a given event

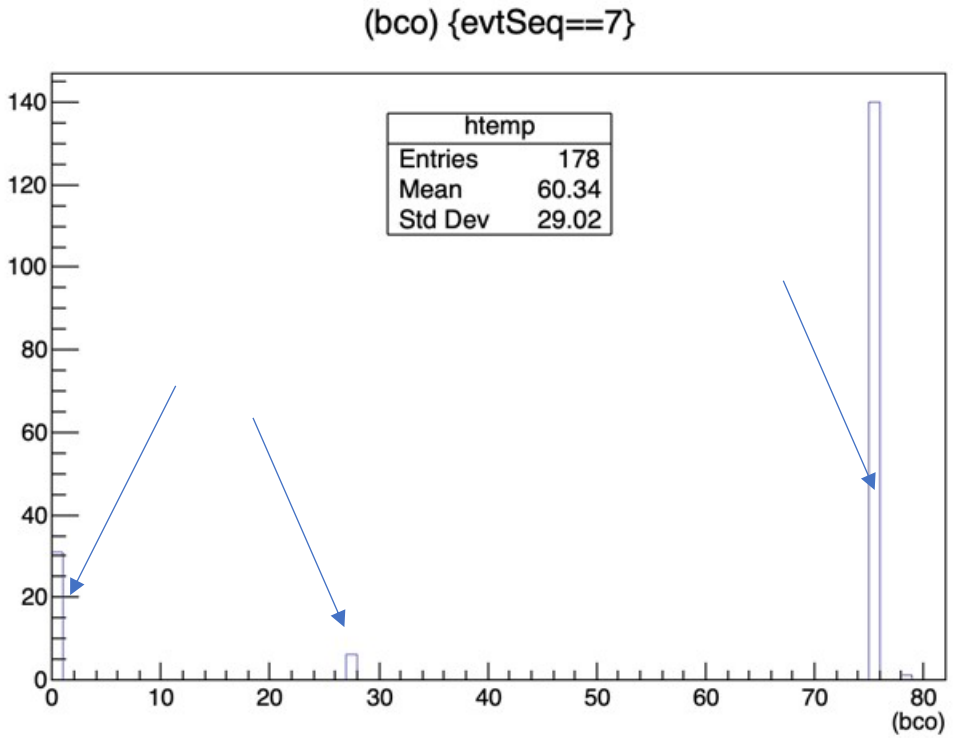


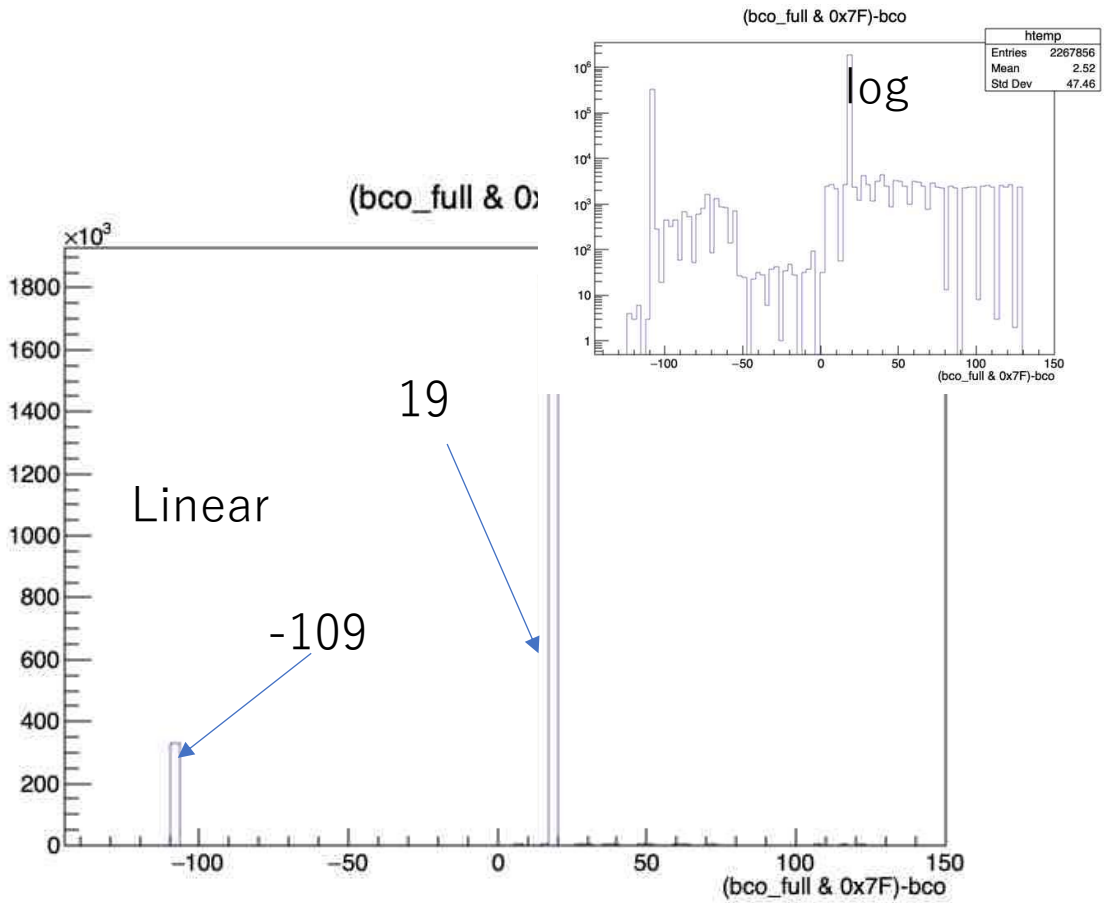
evtSeq ==7 of intt2

- Timed-in, n_collision=4
- Split into multiple peaks somehow.
- # of events in INTT are factor of 3~4 larger than these of MBD.

FPHX-BCO and Full-BCO Correlation

Main and sub-peaks fraction varies

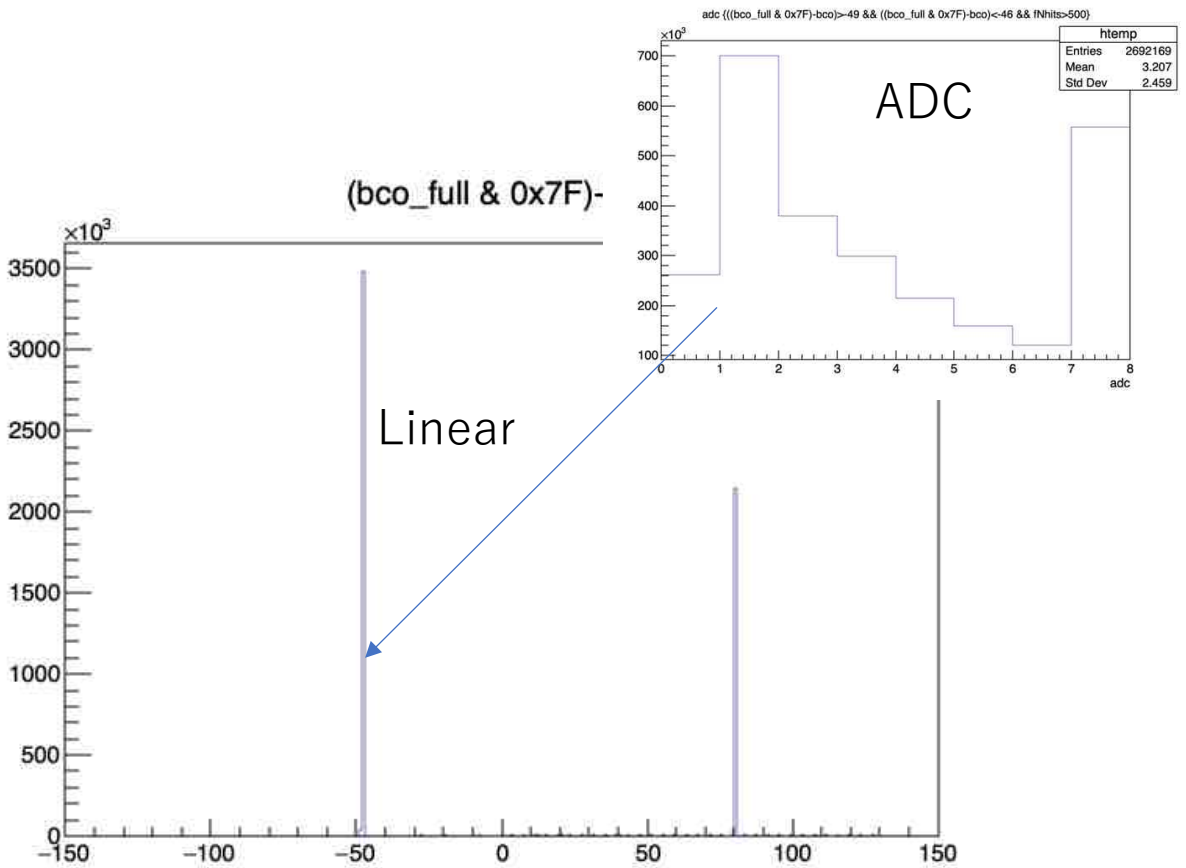


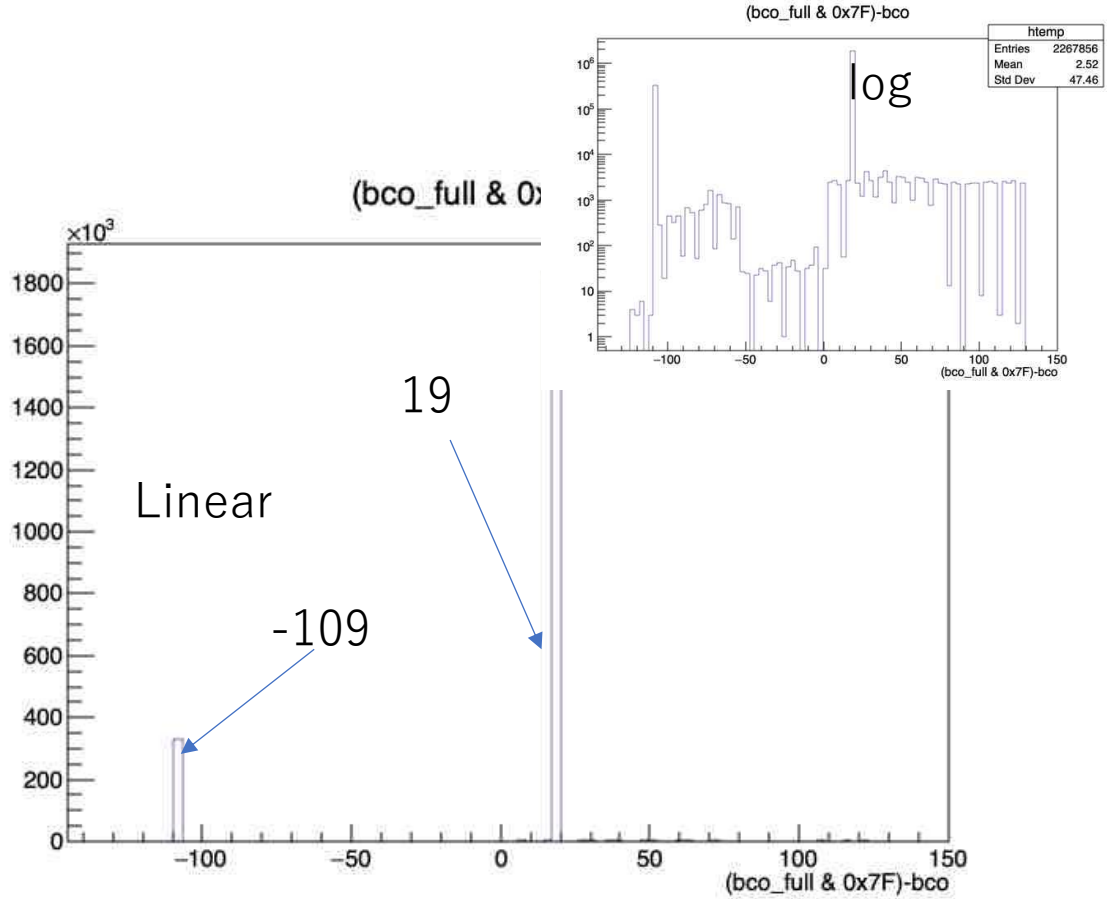


Run#9177: L1Delay=25,n_collision=0, open time=35, 76:0x35

Run#8059: L1Delay=25,n_collision=54,open time=35, 2:0x33

FPHX-BCO and Full-BCO Correlation





Run#8020: L1Delay=0,n_collision=127, open time=120

Run#8059: L1Delay=25,n_collision=54,open time=35

Plot by Takashi