

BCO Streaming calibration check

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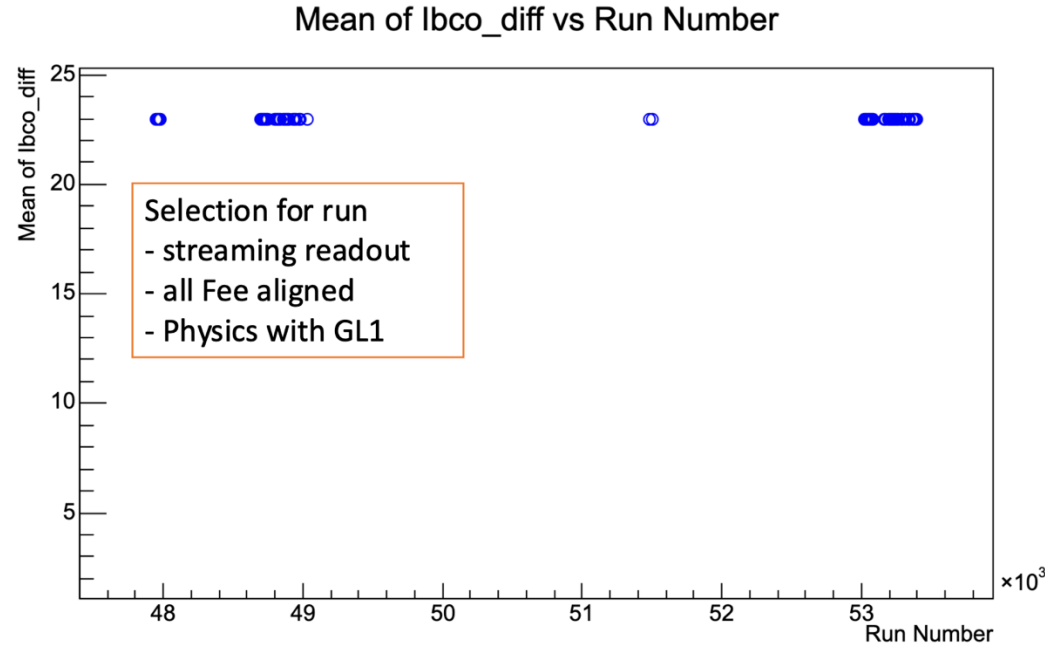


Motivation Review

https://indico.bnl.gov/event/25022/contributions/97378/attachments/57672/99025/INTT_meeting_calib.pdf



Streaming BCO Offset value for streaming data set



Every streaming readout run with GL1 & TPC are aligned with same BCO offset(as designed)
We don't need BCO offset calibration run by run,
but let's use new version of calibration module for future detailed debugging

- From the previous report, I suggested that we don't need BCO offset calibration run by run since we have same offset when all Felix are aligned.
- > Q) Then, how many runs are good and bad?

Run Scan result

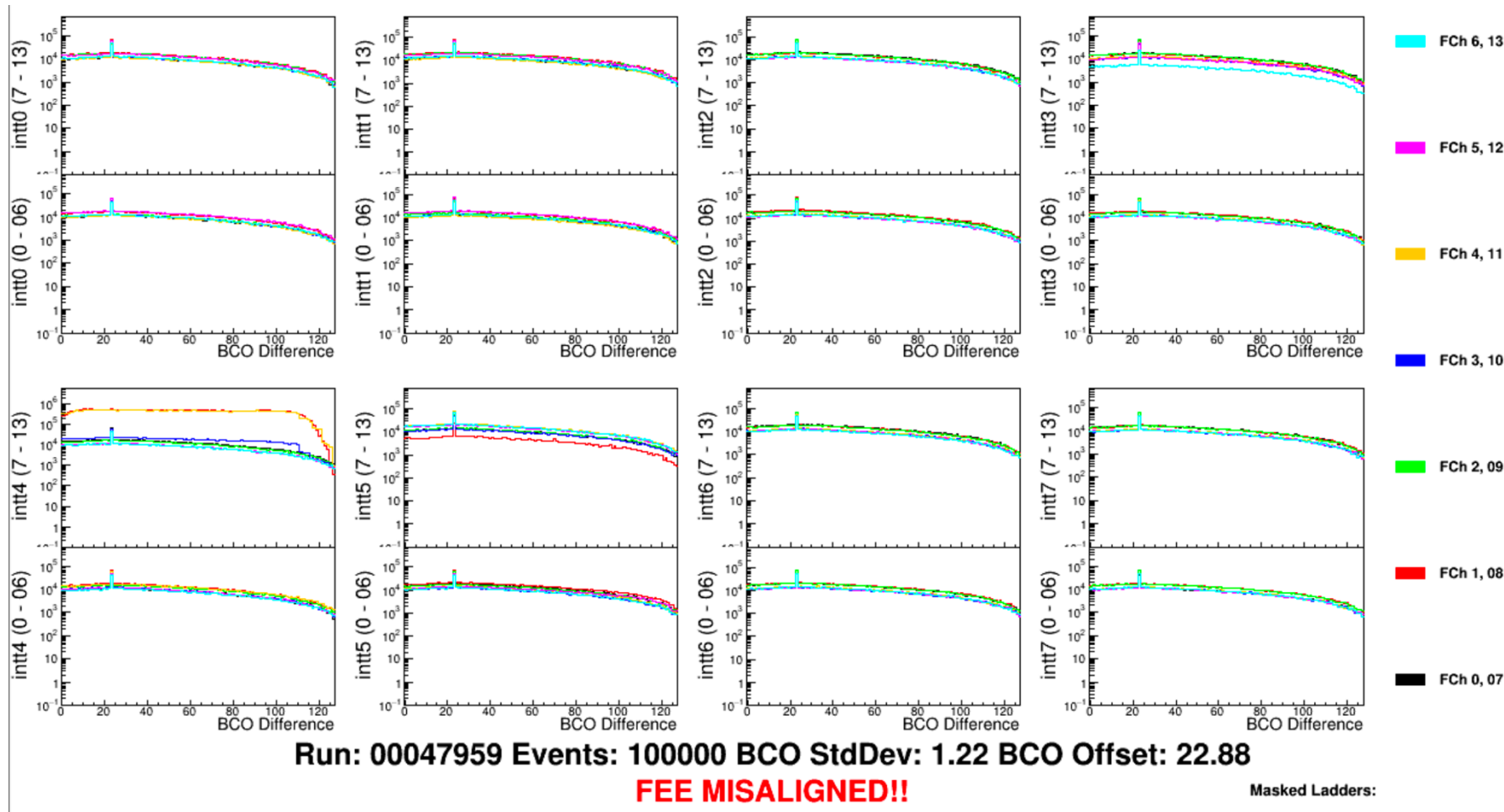


- Physics / streaming run only
- Total # of runs : 1371 (but possibly missed some run mostly due to condor failure)
- # of good runs : 771
 - All FELIX aligned at 23
- # of masked runs : 509
 - All FELIX aligned at 23 expected for masked ladders
- # of low stat runs : 74
 - # events < 10000 mostly for TPC gain run
- # of bad files : 77

- $(771+509)/1371 \sim 93\%$ runs of streaming run : All FELIX expected for masked run are well aligned
- $77/(771+509) \sim 6\%$
- $\sim 1\%$: less stat runs

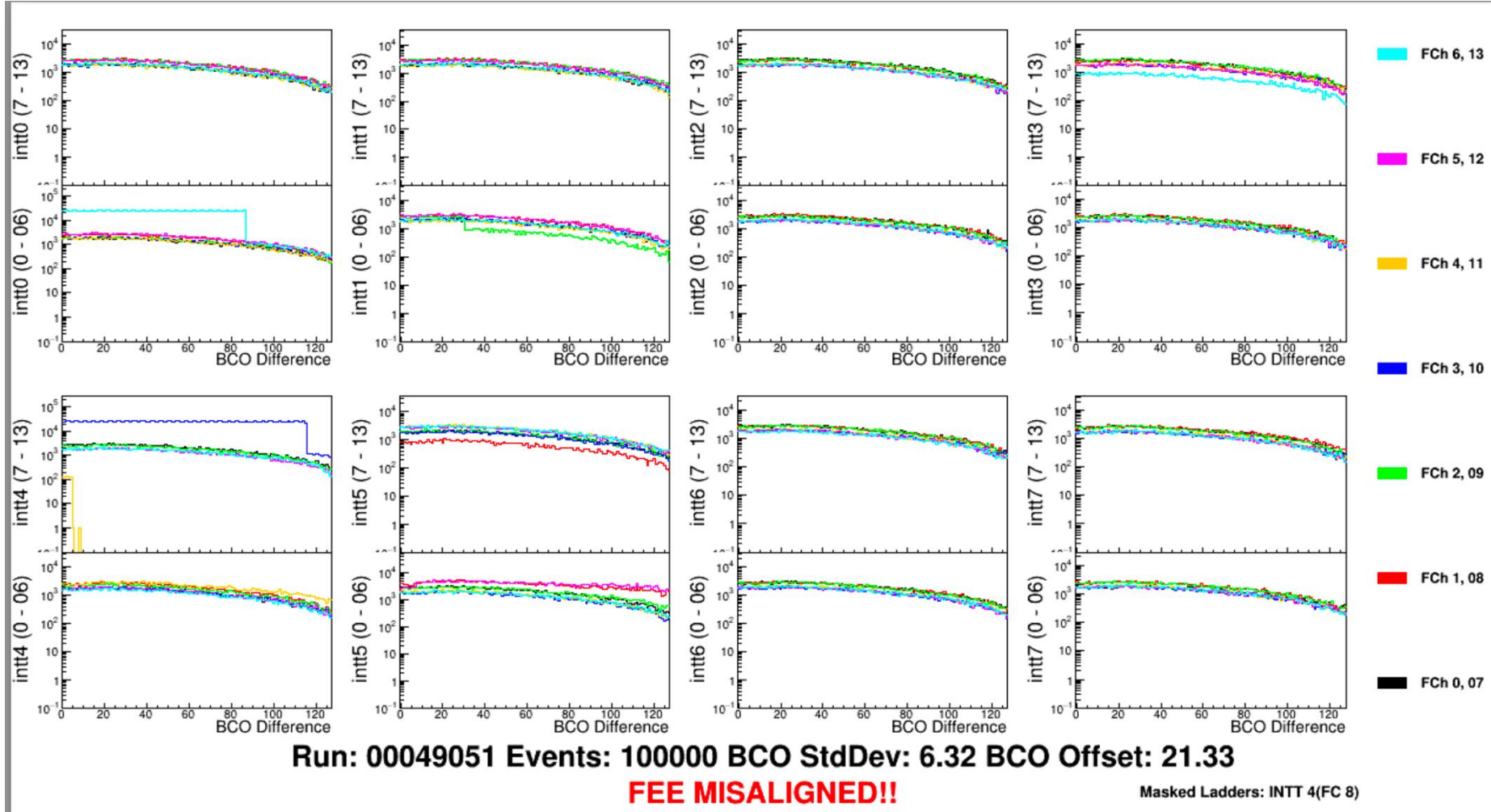
```
Total number of files : 1371
# of low stat files : 74
# of good files : 711
# of bad files : 77
# of masked files : 509
```

Why Bad(1)?



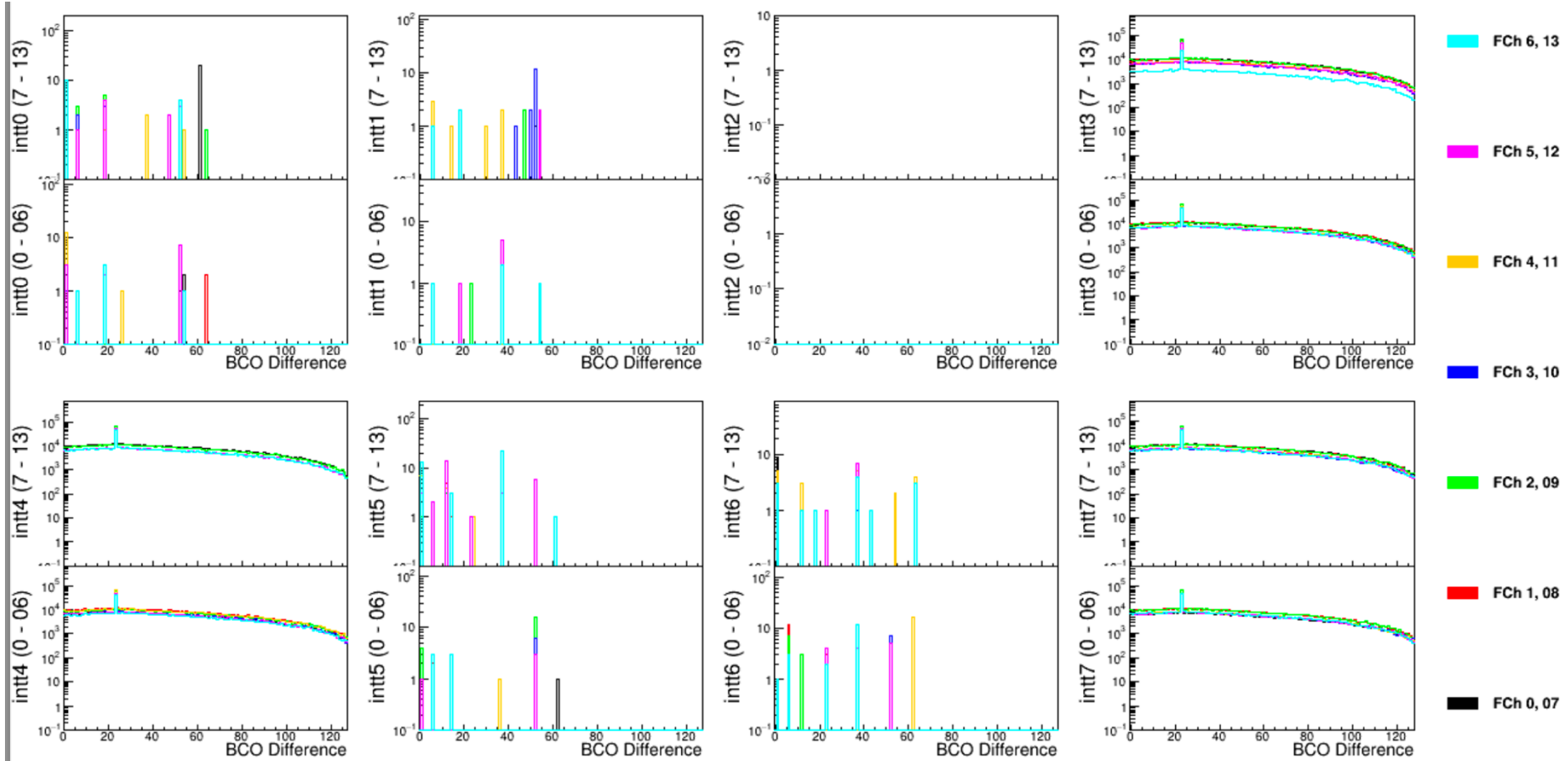
Most of them are due to data taking with hot ladder
But still, all ladders are aligned at 23. We can keep 23 as our calibration value!

Why Bad(2)?



Some runs are totally timed out possibly due to mis-configuration in data taking

Why Bad(3)?



Run: 00049968 Events: 100000 BCO StdDev: 11.29 BCO Offset: 24.86

Red Ladders: INTT 0(FC 0,1,2,3,6,8,10,11,12) INTT 1(FC 0,1,2,3,4,6,7,8,9,11,12,13) INTT 2(FC 0,1,2,3,4,5,6,7,8,9,10,11,12,13) **SEE MISALIGNED!!** INTT 3(FC 8,10,11) INTT 4(FC 8,10,11) INTT 5(FC 0,1,4,5,6,7,9,10) INTT 6(FC 0,9,10,13)

Some FELIX data have almost zero or less than 200 hits.

Conclusion

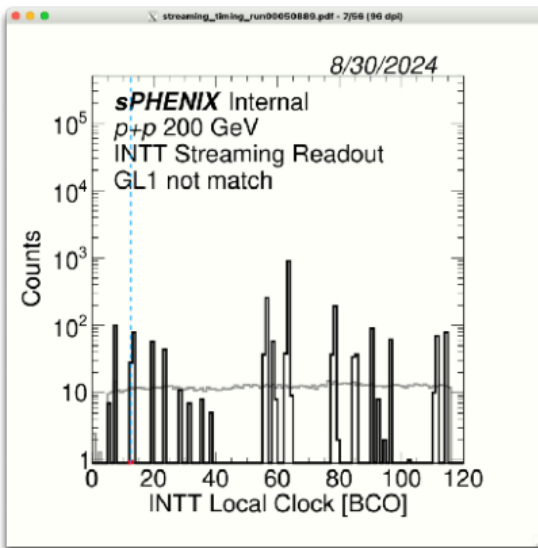
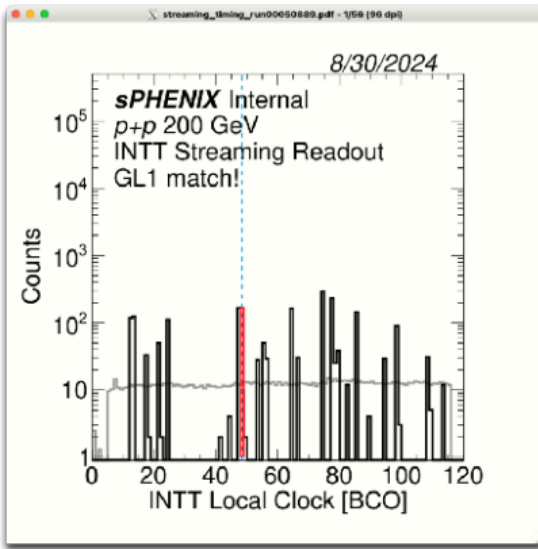


- $(771+509)/1371 \sim 93\%$ runs of streaming run : All FELIX expected for masked run are well aligned
- $77/(771+509) \sim 6\%$
- $\sim 1\%$: less stat runs

- But most of **bad runs** are due to data taking with hot ladder
23 BCO offset value still works for these case

- Still propose we do not need BCO calibration run by run for streaming readout

What about GL1 matching?



Trigger type?:

The trigger type (clock, MBD N&1 >= 1, etc.) should affect to the GL1 matching ratio.
Thanks to Jaein, I could get information like:

```

153 std::vector< int > InttStreamingTiming::GetTriggerBits()
154 {
155
156     uint64_t trigger_vector = gl1->getScaledVector();
157
158     vector< int > rtn;
159     while( trigger_vector != 0 )
160     {
161         int this_bit = 0 ;
162         this_bit = trigger_vector & 1;
163         // cout << std::bitset<32>(trigger_vector) << " "
164         //         << this_bit << "\t";
165
166         trigger_vector = trigger_vector >> 1;
167
168         //cout << std::bitset<32>(trigger_vector) << endl;
169
170         rtn.push_back( this_bit );
171     }

```

~~I don't see trigger dependence.~~
The matching ratio is always too low.
I think I'm wrong.

Bit	Name	#match	#all	Ratio
0	Clock	6	14	0.43
1	ZDC South	0	0	
2	ZDC North	6	14	0.43
3	ZDC N&S	24	43	0.56
4	HCAL Single	24	43	0.56
5	HCAL Coincidence	24	43	0.56
6		24	43	0.56
7		0	0	
8	MBD S>=1	16	31	0.52
9	MBD N>=1	4	7	0.57
10	MBD N&S>=1	100	130	0.77
11	MBD N&S>=2	26	34	0.76
12	MBD N&S>=1 vtx<10cm	216	265	0.82
13	MBD N&S>=1 vtx<30cm	57	73	0.78
14	MBD N&S>=1 vtx<60cm	190	244	0.78
15	HCAL, Singles+MBD NS>=1	32	41	0.78
16	Jet 6GeV+MBD NS>=1	177	224	0.79
17	Jet 8GeV+MBD NS>=1	141	168	0.84
18	Jet 10GeV+MBD NS>=1	242	300	0.81
19	Jet 12GeV+MBD NS>=1	12	21	0.57
20	Jet 6GeV	224	280	0.80
21	Jet 8GeV	320	390	0.82
22	Jet 10GeV	281	347	0.81
23	Jet 12GeV	215	259	0.83
24	Photon 2GeV+MBD NS>=1	52	73	0.71
25	Photon 2GeV+MBD NS>=2	75	98	0.77
26	Photon 2GeV+MBD NS>=3	310	381	0.81
27	Photon 2GeV+MBD NS>=4	82	91	0.90
28	Photon 2GeV	246	309	0.80
29	Photon 3GeV	134	163	0.82
30	Photon 4GeV	584	709	0.82
31	Photon 5GeV	213	254	0.84
all	all	638	778	0.82

Only 1k events were analyzed for each trigger.