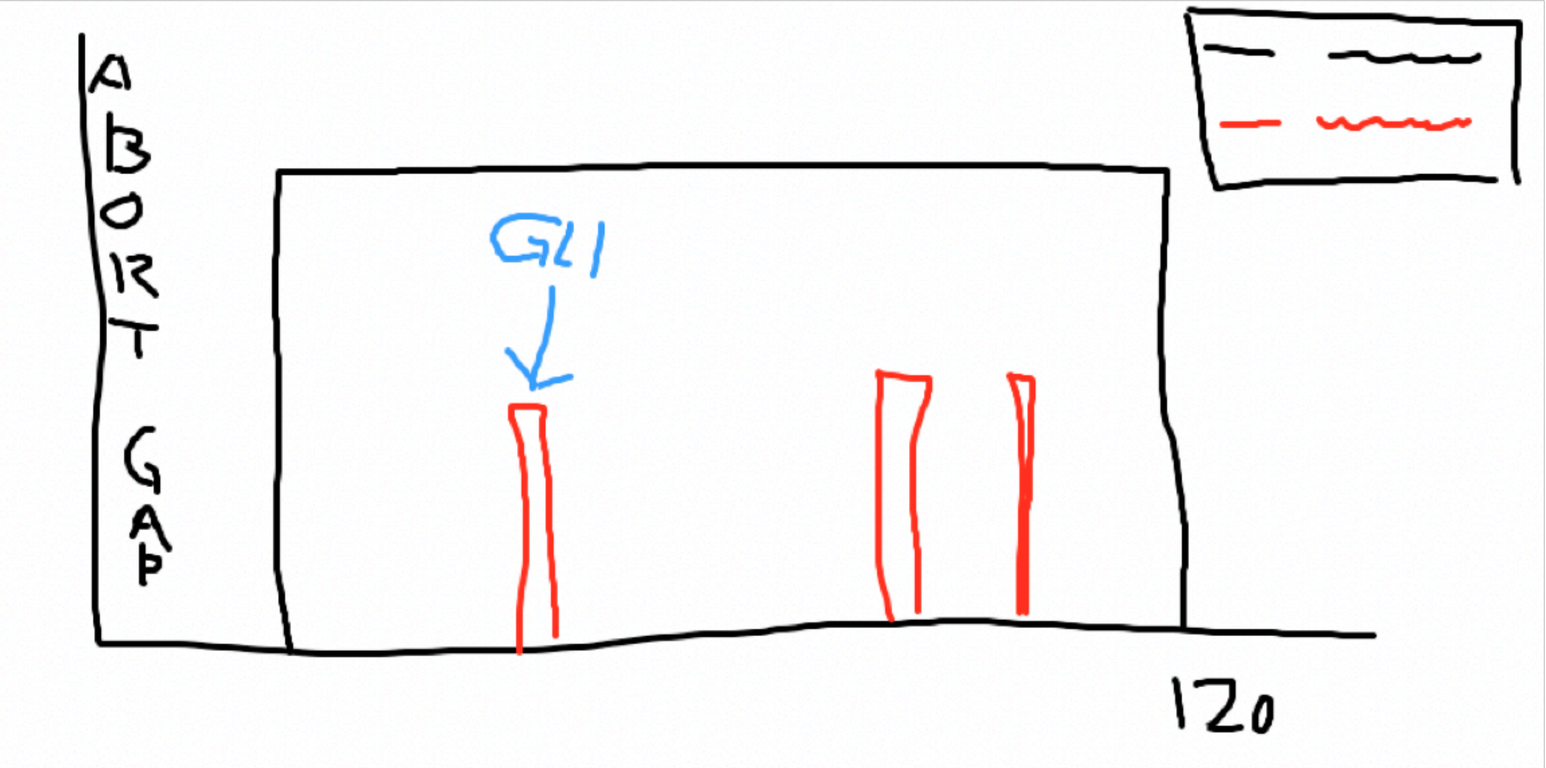
Timing plot for streaming data

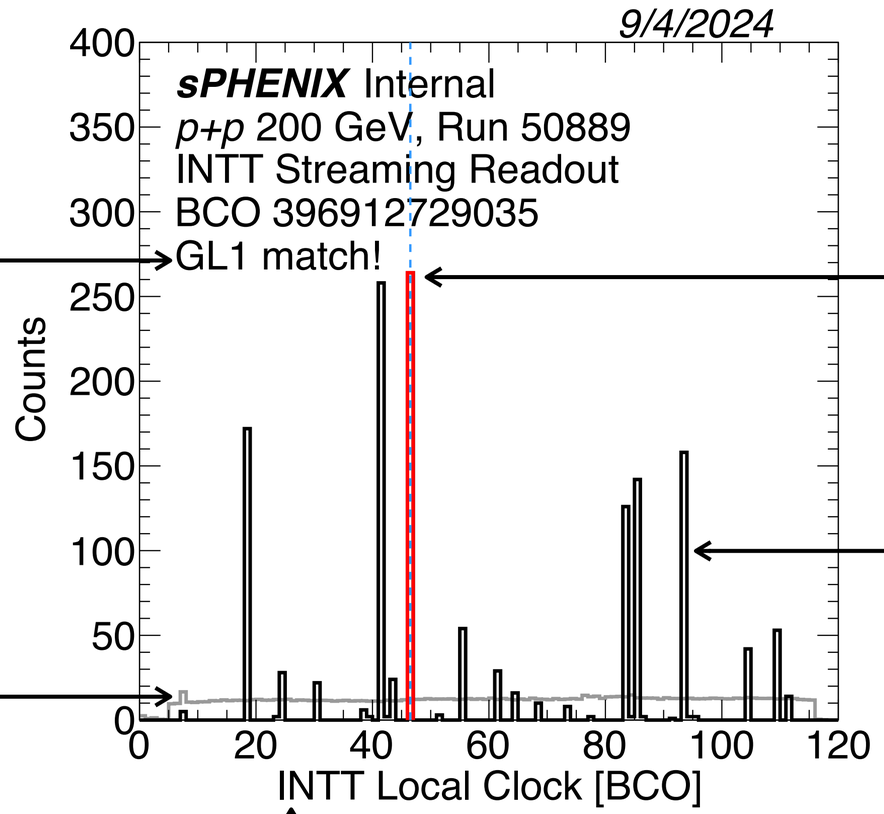
Genki Nukazuka (RIKEN)

Timing plot of the INTT streaming readout data



FPHX BCO distribution of a particular event requested by Takashi.
We can see bunches of hits at some BCO values, i.e. collisions

Timing plot of the INTT streaming readout data



I'll take it out.

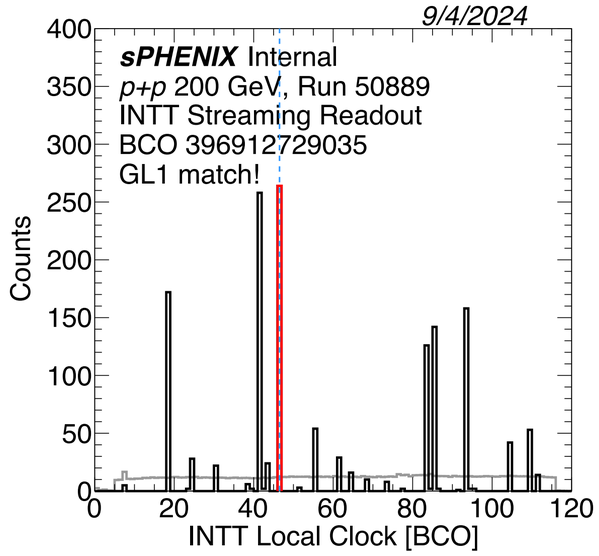
GL1 timing of this event. One of the blue line and red histogram may be enough.

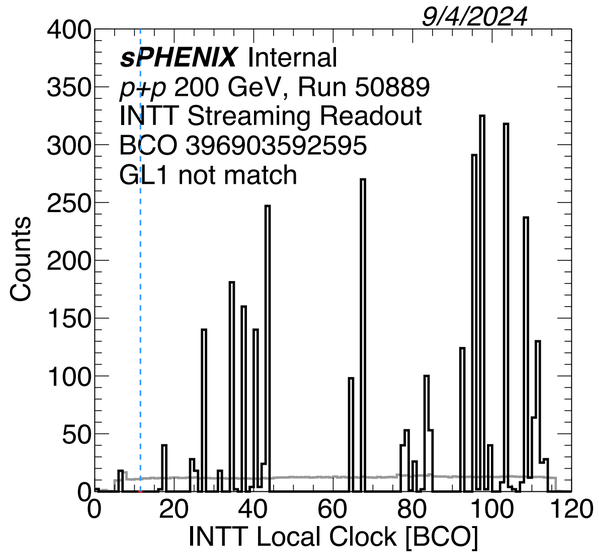
FPHX BCOs from a particular event. #peaks means the number of collisions in this RHIC turn. It's too many, isn't it?

FPHX BCO distribution per event using all events. Is it needed?

It means FPHX BCO [BCO]. What is better?

What about GL1 matching?





GL1 timing:

```
gl1_ = findNode::getClass<Gl1Packetv2>( topNode,  “GL1RAWHIT” );
auto bco_gl1 =  (gl1_->getBCO() & 0xFFFFFFFFFF);
```

INTT timing:

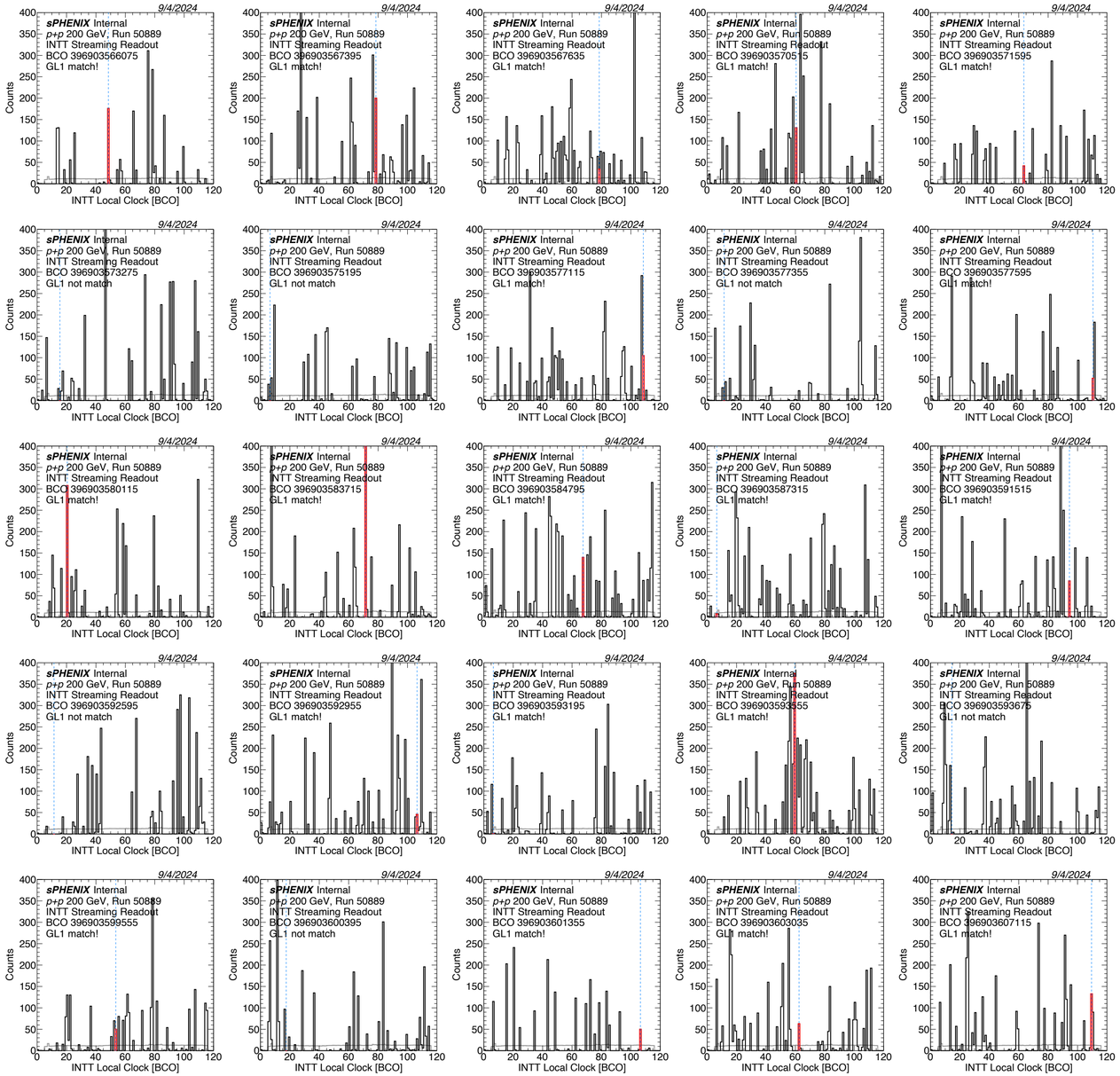
```
node_inttrawhit_map_ = findNode::getClass<InttRawHitContainer>(topNode, “INTTRAWHIT”);
auto bco_intt = (node_inttrawhit_map_->get_hit( 0 )->get_bco());
for( /* loop over hits */ ){
   int bco_fphx = bco_event_counter_pair[i].first;
   auto bco_hit = bco_intt + bco_fphx;
   }
```

GL1 matching

Checking whether an INTT hit can be found at GL1 timing

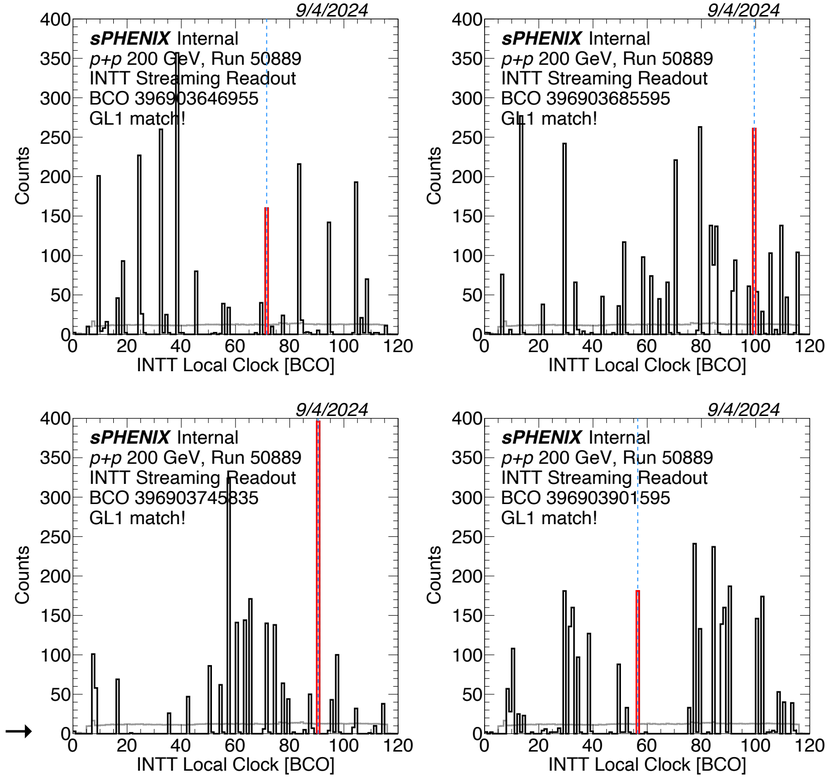
Ratio: 84.7%

What about GL1 matching?

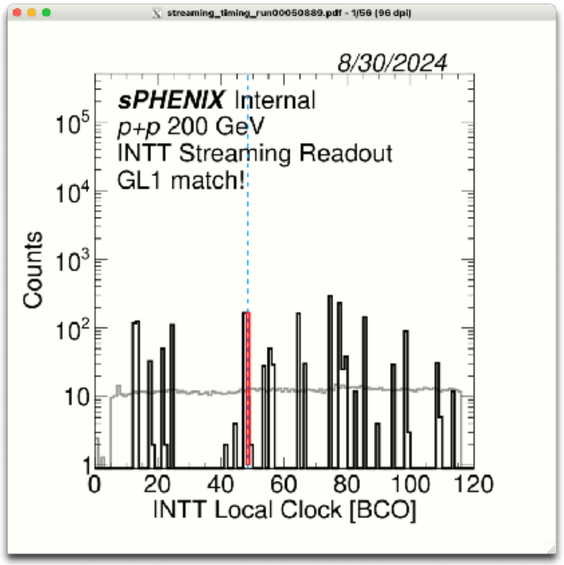


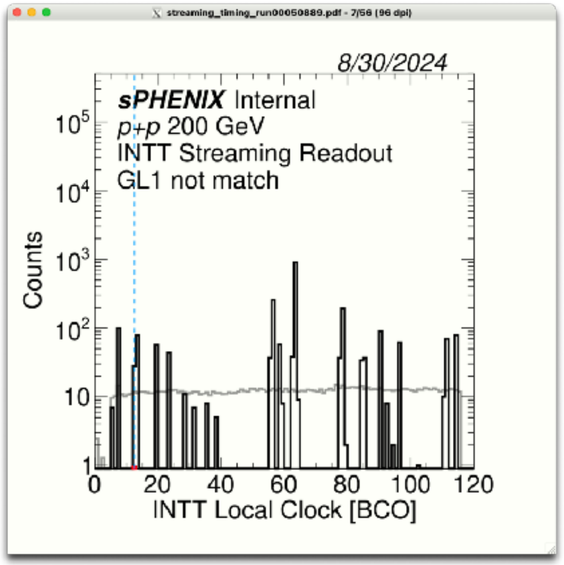
←Random choice

Good plots →



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.