INTT Stream Readout
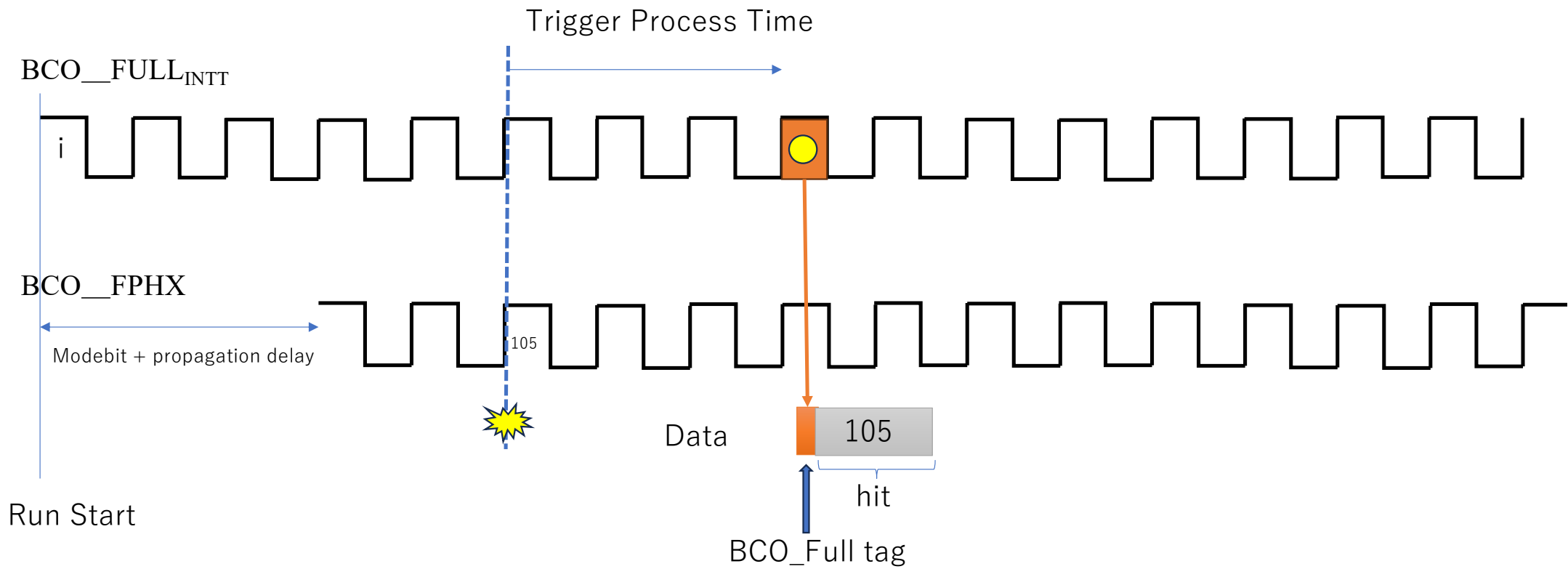
RIKEN/RBRC
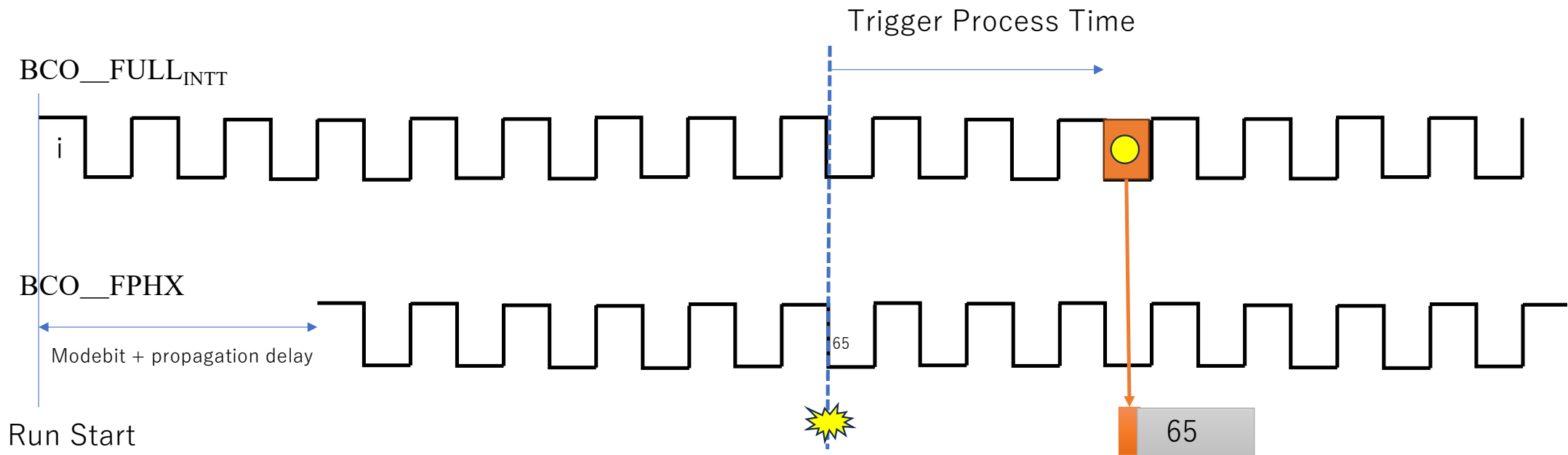
Itaru Nakagawa

Physics Trigger Case

Physics Trigger Case
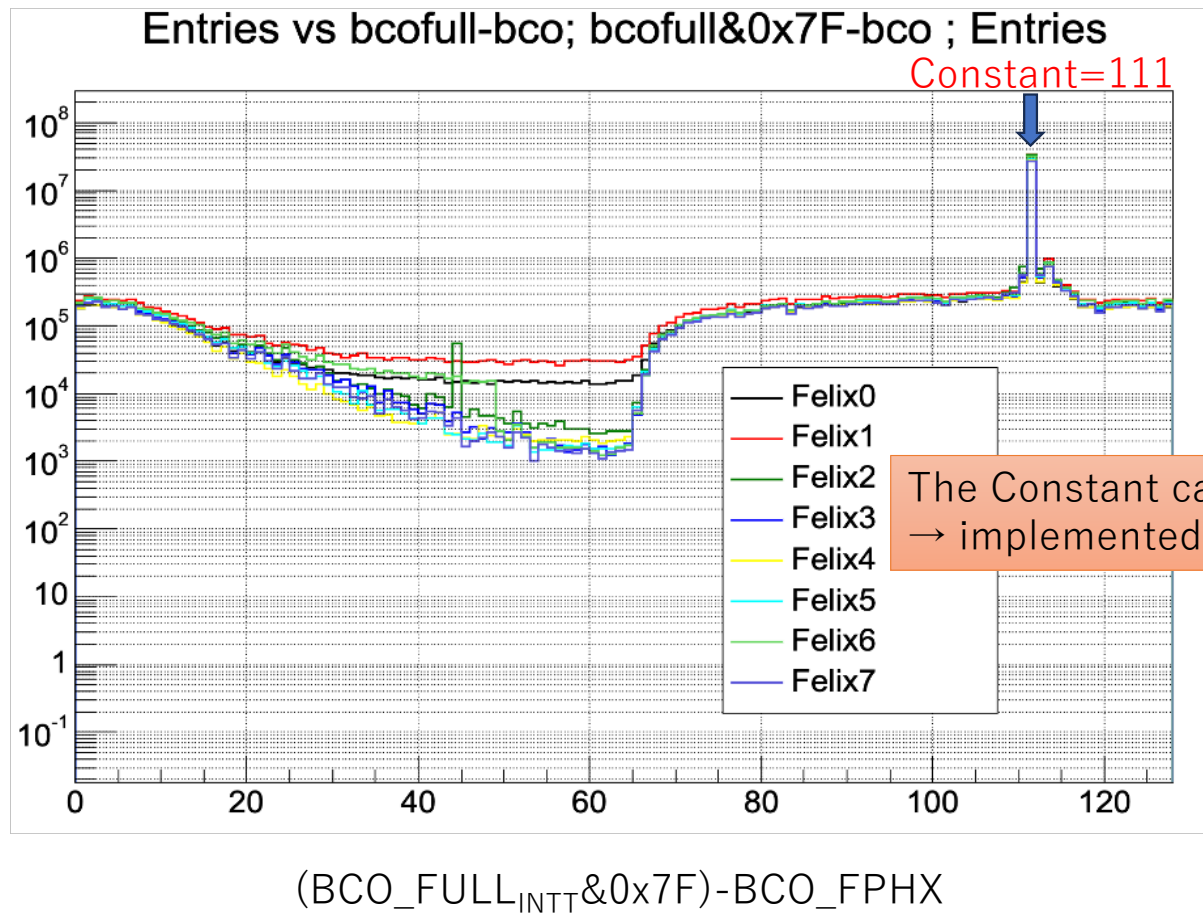
Trigger Process Time

BCO_FULL_{INTT}

i

BCO_FPHX
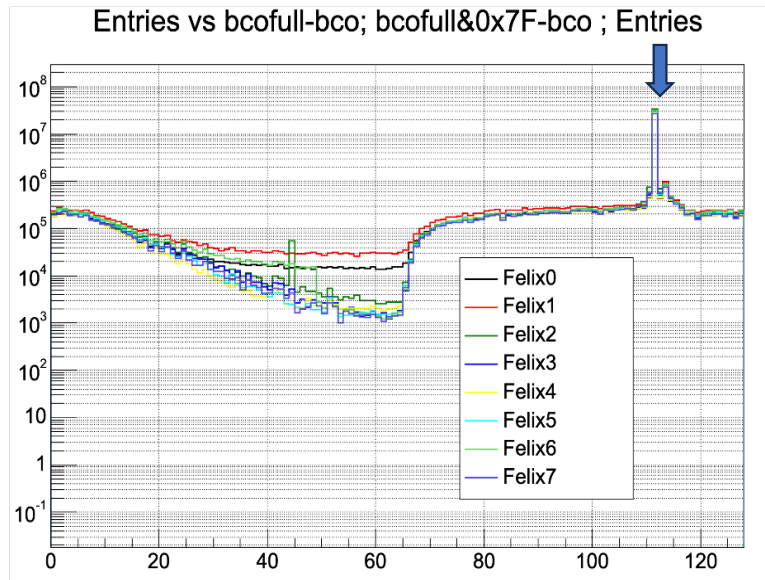
Modebit + propagation delay

105

Run Start

Data

105

hit

BCO_Full tag

Physics Trigger Case

Trigger Process Time

BCO_FULL_{INTT}

i

BCO_FPHX

65

Modebit + propagation delay

Run Start

65

$(BCO\_FULL_{INTT}\&0x7F)-BCO\_FPHX=constant$

Trigger Associated Peak
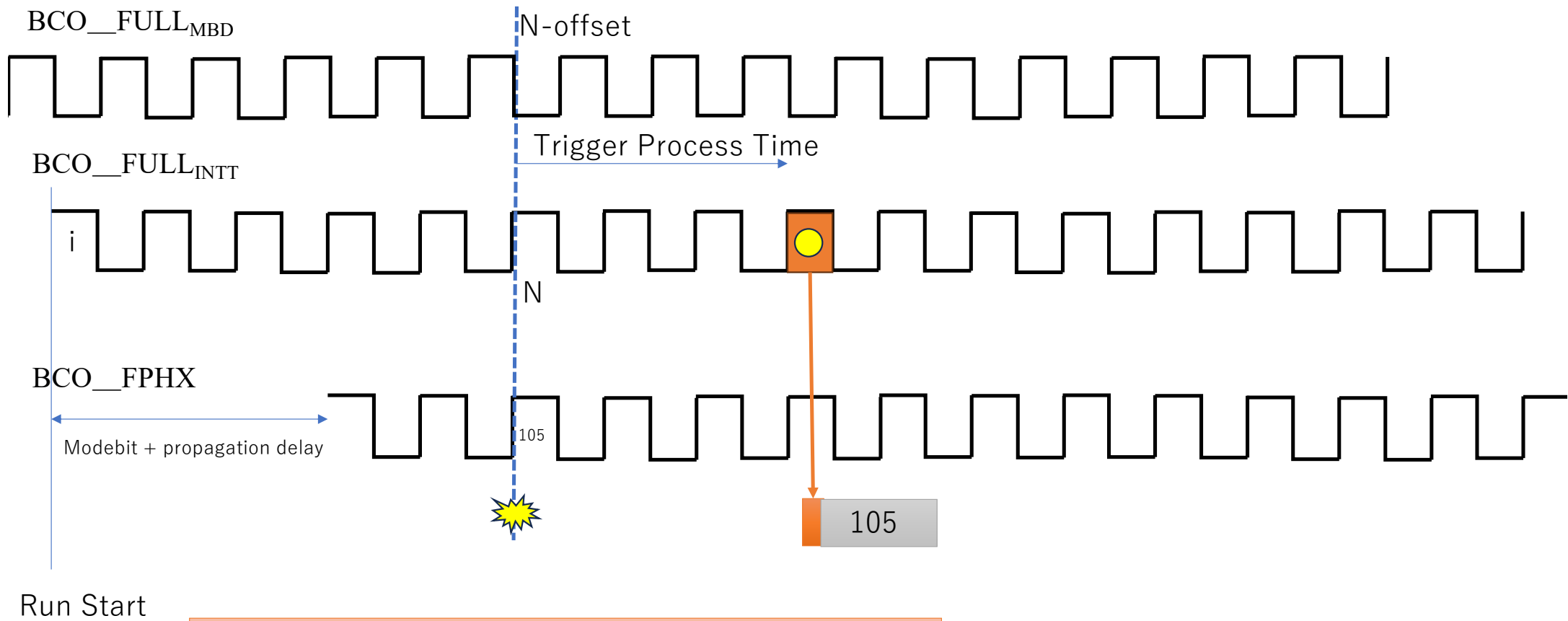

$$(\text{BCO\_FULL}_{\text{INTT}} \& 0x7F) - \text{BCO\_FPHX}$$

Correlation with MBD
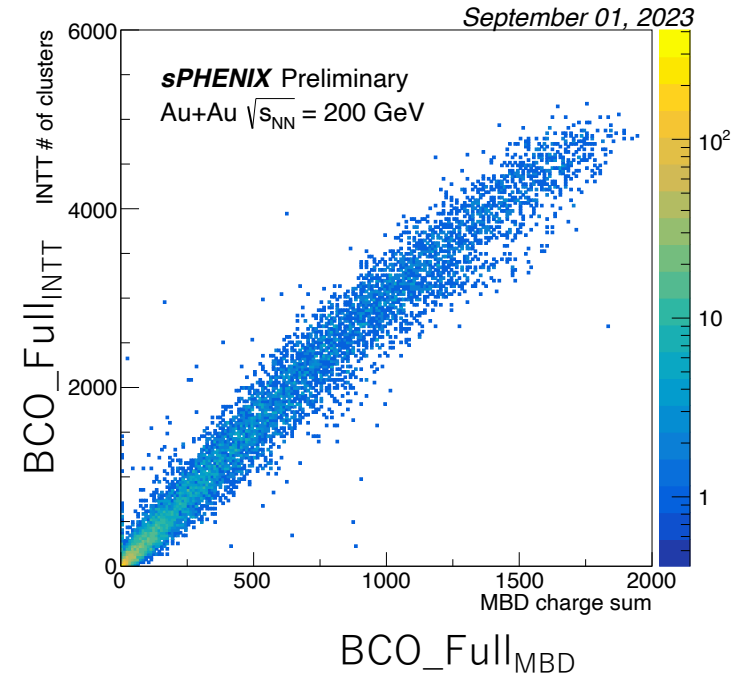
$(BCO\_FULL_{INTT}\&0x7F)-BCO\_FPHX=constant$

$BCO\_FULL_{MBD} = BCO\_FULL_{INTT} - constant + Offset_{run}$

Physics Trigger Case

BCO_FULL$_{MBD}$ N-offset

Trigger Process Time

BCO_FULL$_{INTT}$

i

N

BCO_FPHX

Modebit + propagation delay

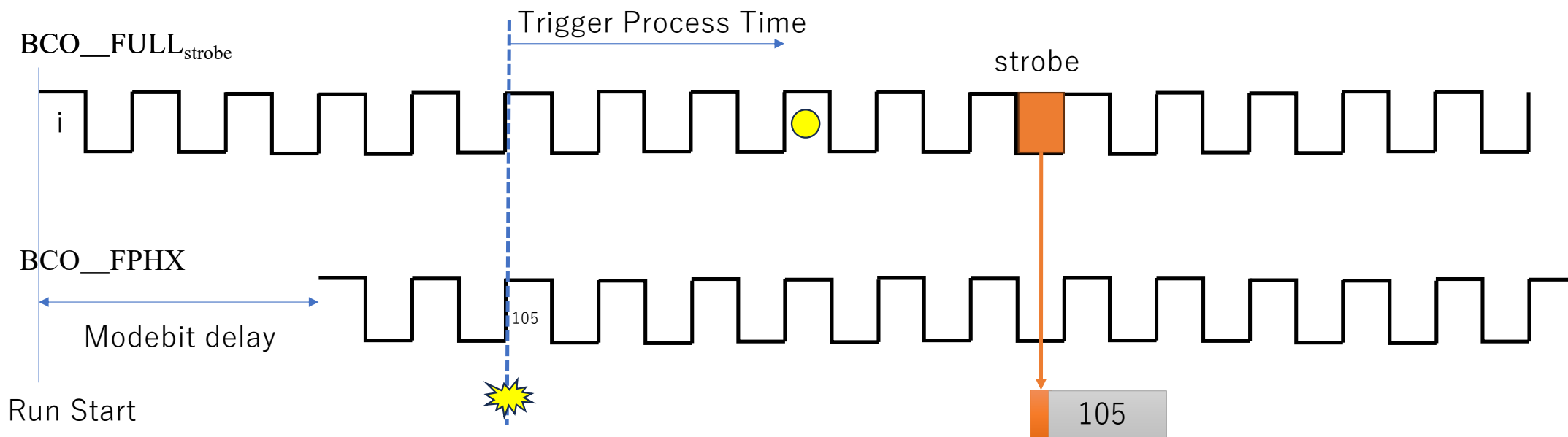105

105

Run Start

$(BCO\_FULL_{INTT}\&0x7F)-BCO\_FPHX=constant$

$BCO\_FULL_{MBD} = BCO\_FULL_{INTT} - constant + Offset_{run}$

Stream Readout

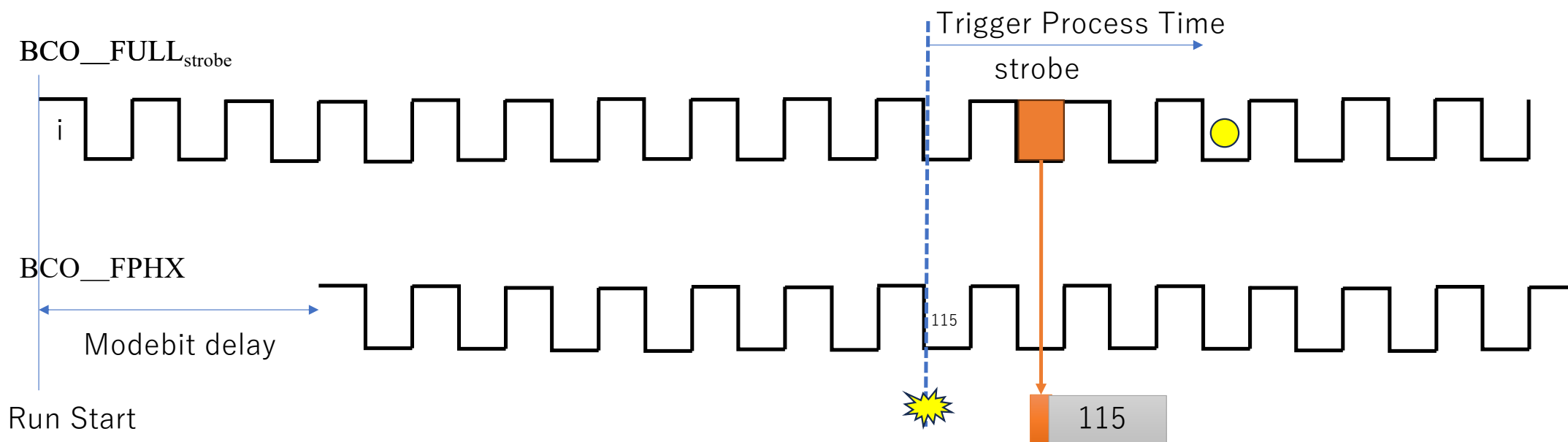Triggered by Clock instead of Physical trigger
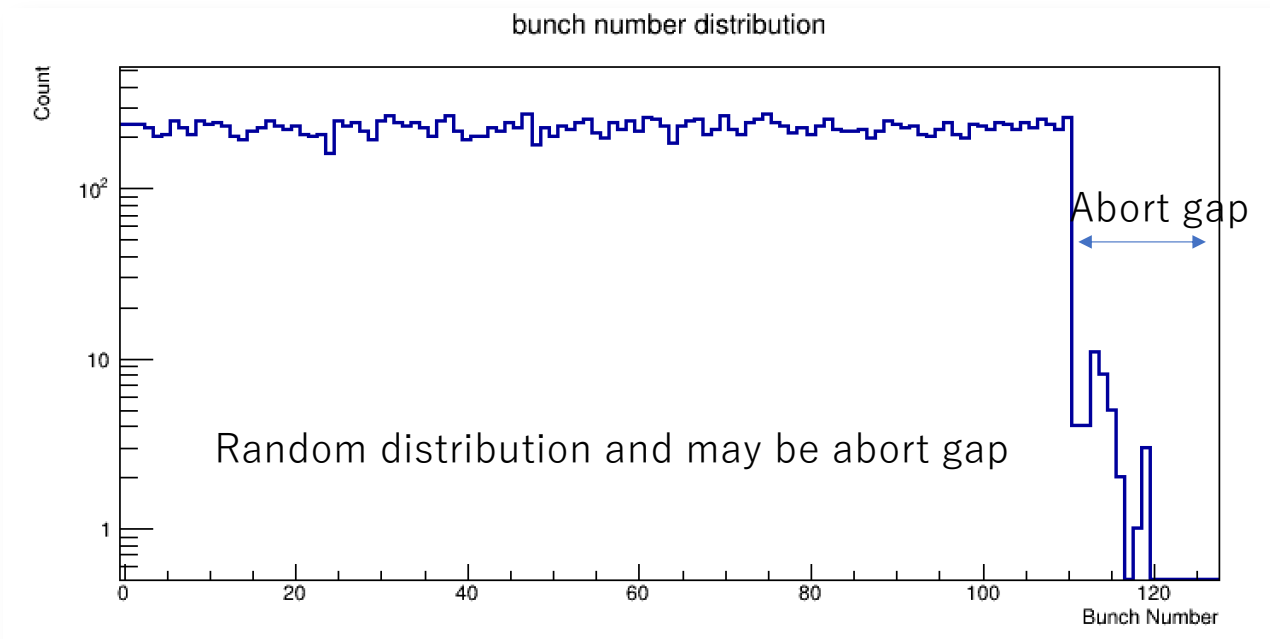
This is called "strobe"

Strobe Trigger Case (1)

The BCO_FULL and BCO_FPHX of true hits are arbitrary for every event.
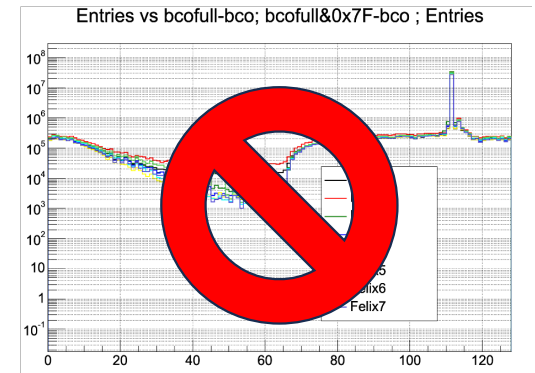
Strobe Trigger Case (2)

BCO_FULL$_{strobe}$

i

Trigger Process Time

strobe

BCO_FPHX

Modebit delay

115

Run Start

115

The BCO_FULL and BCO_FPHX of true hits are arbitrary for every event.

How the timing peak look like in stream readout?

Entries vs bcofull-bco; bcofull&0x7F-bco ; Entries

No peak like this

bunch number distribution

Abort gap

Random distribution and may be abort gap
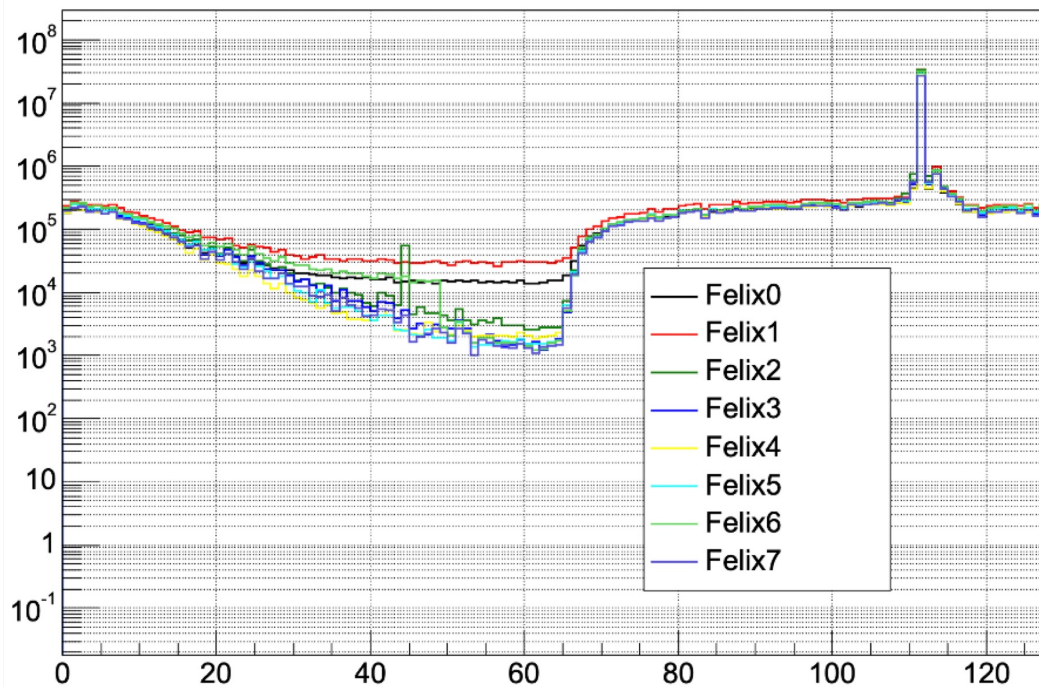
$(BCO\_FULL_{strobe}\&0x7F)-BCO\_FPHX \neq constant$

Offline Reconstruction
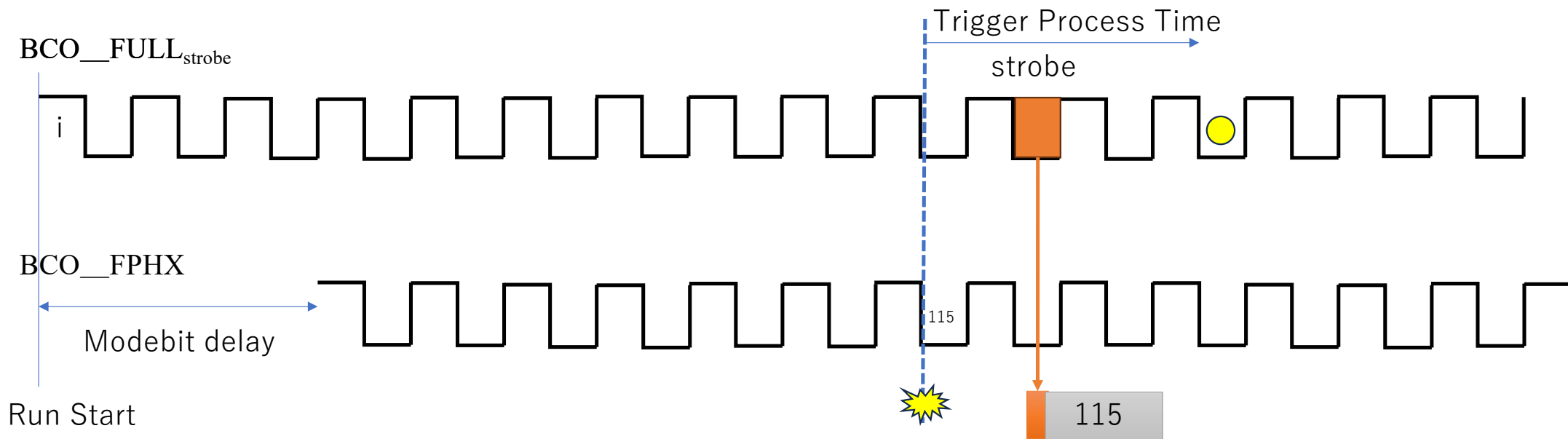

Entries vs bcofull-bco; bcofull&0x7F-bco ; Entries

GL1-Triggered should have constant interval between a given trigger and the trigger associated hits.

The collision associated hits and clock driven LV1 accept will be completely random. No peak.
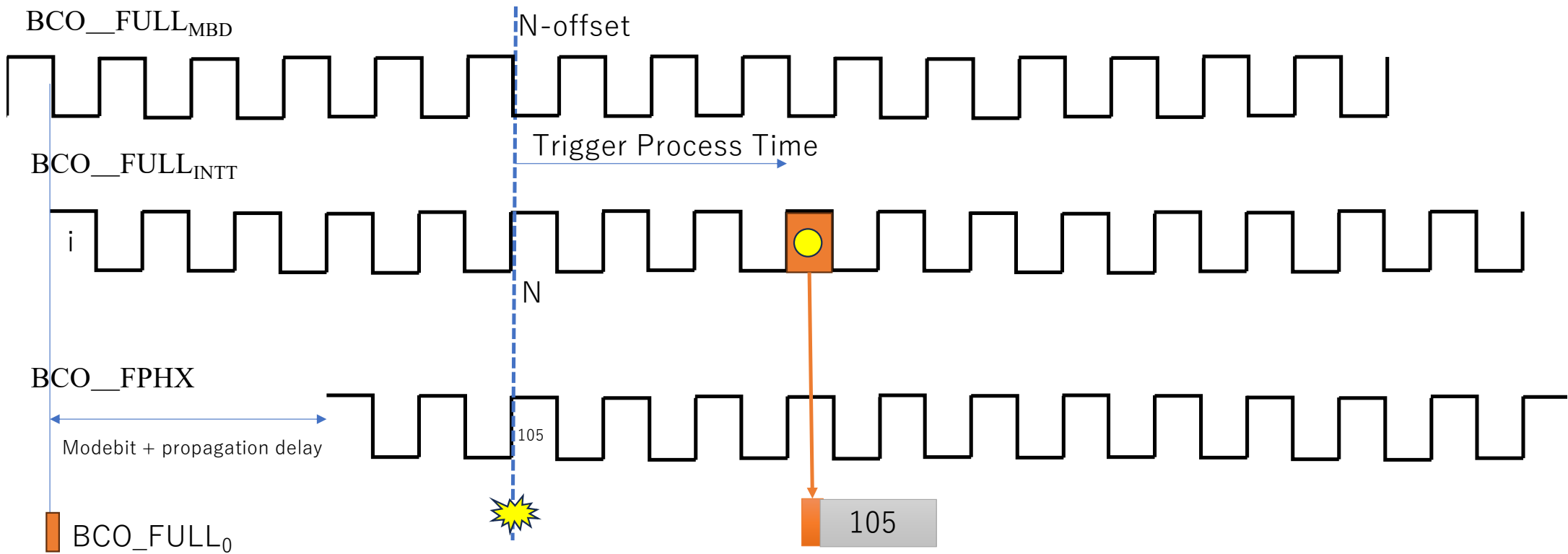
12

Strobe Trigger Case (2)

$(BCO\_FULL_{strobe} \& 0x7F) - BCO\_FPHX$ still identifies hit, but they are not constant.

$(BCO\_FULL_{INTT} \& 0x7F) - BCO\_FPHX \neq constant$

$BCO\_FULL_{MBD} = BCO\_FULL_{INTT} - [(BCO\_FULL_{strobe} \& 0x7F) - BCO\_FPHX] + Offset_{run}$

Physics Trigger Case

BCO__FULL$_{MBD}$

N-offset

Trigger Process Time

BCO__FULL$_{INTT}$

i

N

BCO__FPHX

105

Modebit + propagation delay

BCO_FULL$_0$

Run Start

105

By injecting BCO_FULL$_0$ into the data stream at the beginning of run, we can calculate offset$_{run}$

$(BCO\_FULL_{strobe,1} - BCO\_FULL_0 = Offset_{run}$

$BCO\_FULL_{MBD} = BCO\_FULL_{INTT} - [(BCO\_\_FULL_{strobe} \& 0x7F) - BCO\_FPHX] + Offset_{run}$