CDCTRG status
2024/10/4
T.Koga

CDCTRG status

-MGR,TSF,2D: almost finish development.
              same firmware as 2024ab will be used for operation.

-NN: send data to GRL by using NIM, not optical link

-3D: performance evaluation with beam, cosmic

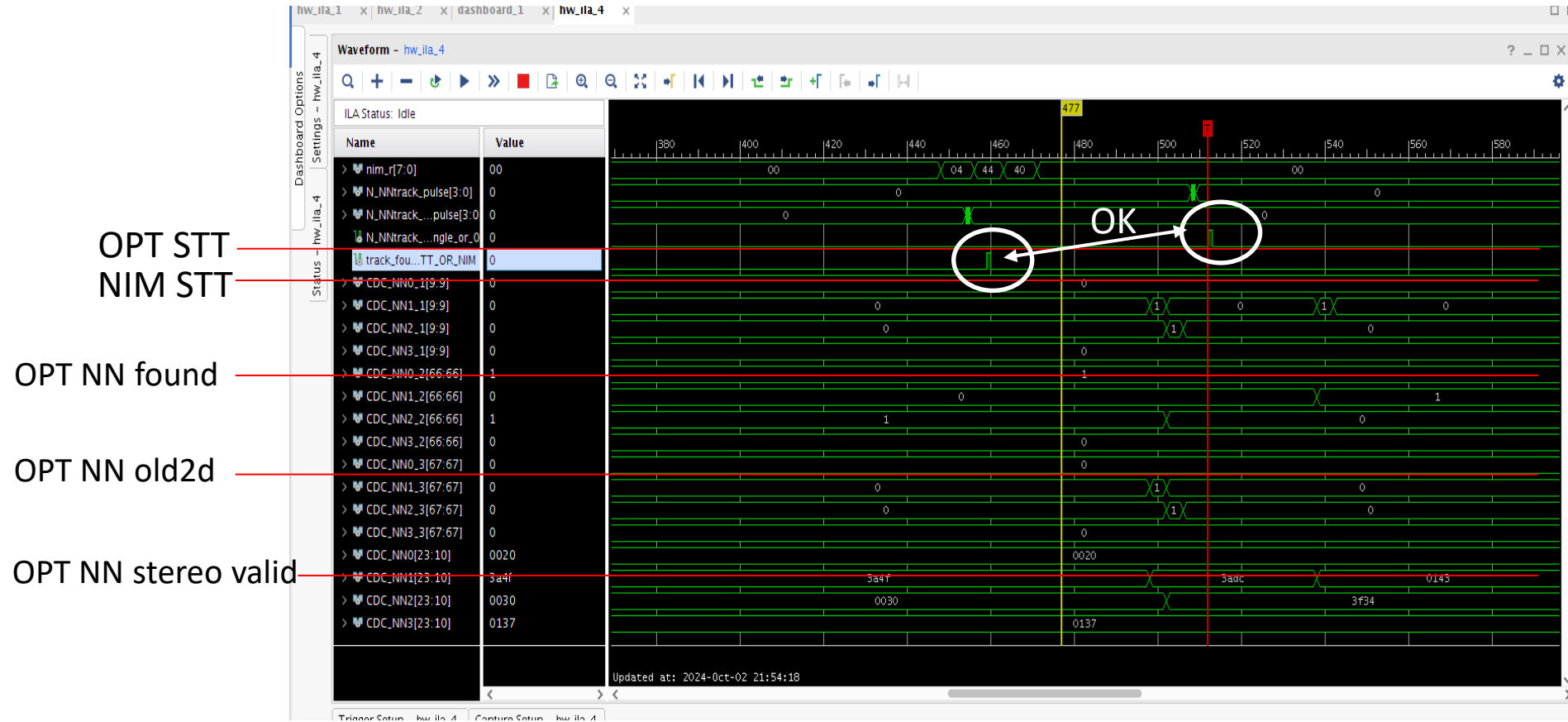-GRL: adjust latency for CDC-TOP/ECL/KLM matching

CDCTRG dataflow update

-Optical data transmission has been updated to reduce latency

-UT3 NN->UT4 GRL: updated from Optical to NIM

-UT4 ETF->UT4 3D: updated from 5Gbps to 25Gbps

-UT4 2D->UT4 3D: updated from 5Gbps to 25Gbps

NN->GRL NIM

-Kai modified NN->GRL connection from OPT to NIM

  -y and stt are send from each NN0-3 to GRL. total 8 NIM cable

  -validated with cosmic: bug fixed and looks working well
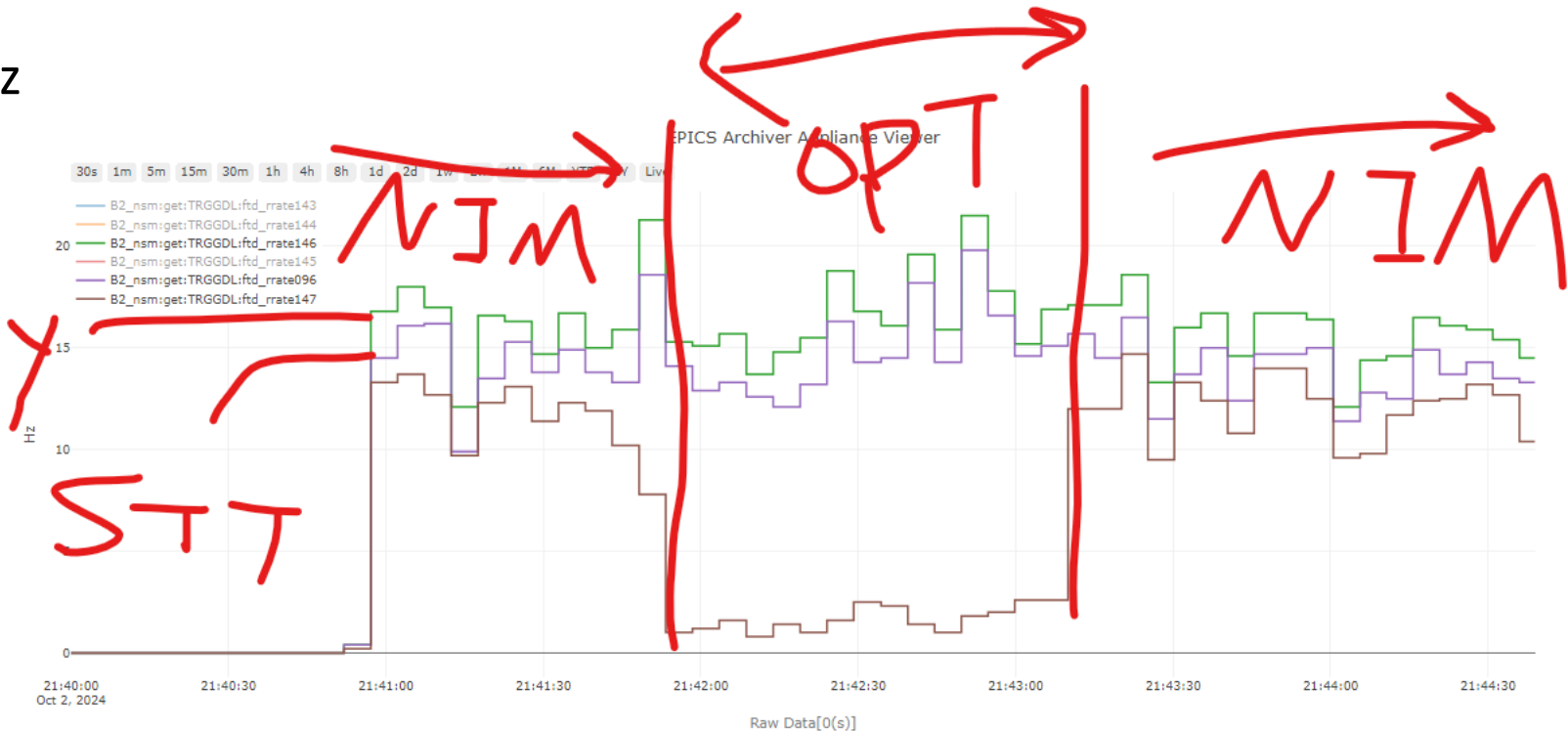
NN->GRL NIM

-Kai modified NN->GRL connection from OPT to NIM
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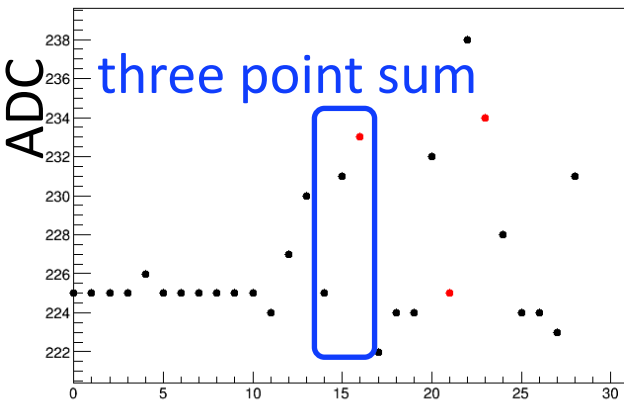 -validated with cosmic: bug fixed and looks working well

CDCTRG ADC filter

-ADC information is newly sent from CDCFE to CDCTRG TSF

  -latency increased ~320ns: acceptable because latency budget is improved by UT4

  -ADC>8 is required for each wire hit to remove noise, beam background
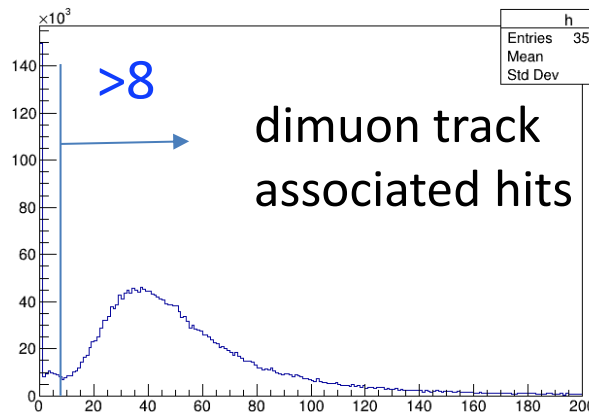

-ADC cut has been activated from the beginning of exp35(2024c)

  -threshold is set to 10, will be changed to 6

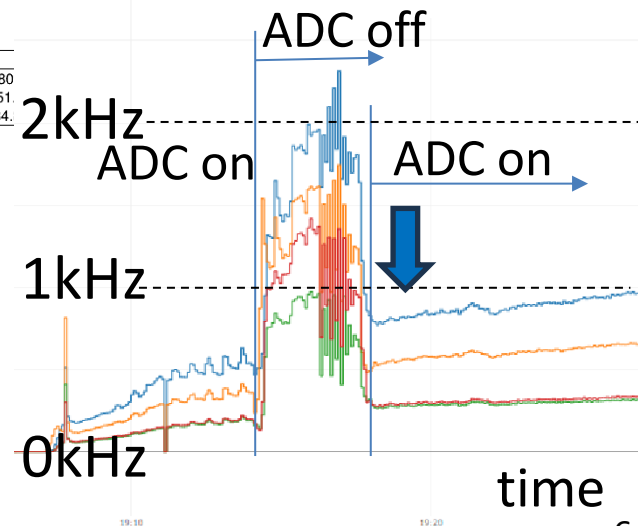 -CDCFE will be updated to change ADC threthold by B2L

-2D track rate
-short track rate
-NN track rate
-3D track rate

three point sum

32MHz sampling on CDCFE

>8

dimuon track associated hits

ADC sum

ADC off

ADC on

ADC on

2kHz

1kHz

0kHz

time

6

latency adjustment
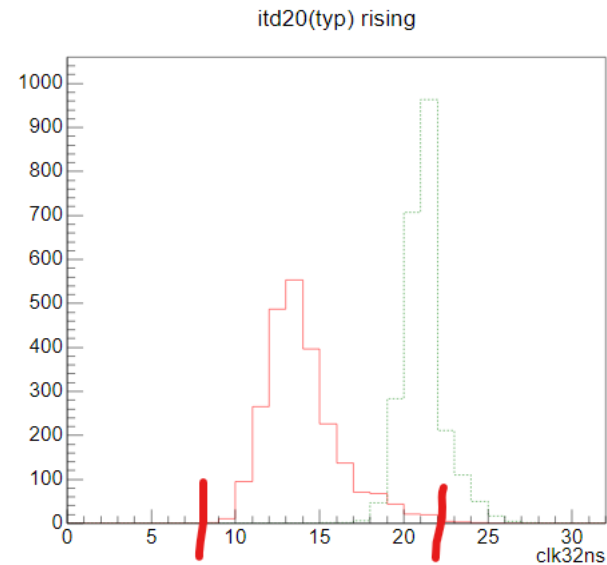
-Latency is adjusted on GRL and GDL to mitigate the latency by ADC and data transmission

-All bits are in required latency

 -at minimum 23clk × 7.8ns=~180ns latency budget (stt and y)

 -stt4,5,6 are not in time but they are not used (prescale=0)

	input name	DELAY	WIDTH	raw rate	count
0	t3_0	43	31	15	85
1	t3_1	43	31	4	20
2	t3_2	43	31	0	0
3	t3_3	43	31	0	0
4	ty_0	24	31	3	12
5	ty_1	24	31	6	59
6	ty_2	24	31	0	3
7	ty_3	24	31	7	92
8	t2_0	51	31	25	116
9	t2_1	51	31	12	83
10	t2_2	51	31	0	1
11	t2_3	51	31	0	0
12	ts_0	23	31	4	18
13	ts_1	23	31	1	1
14	ts_2	23	31	0	0
15	ts_3	23	31	0	0
16	ta_0	55	31	25	113
17	ta_1	55	31	12	84
18	ta_2	55	31	1	3
19	ta_3	55	31	0	0
20	typ	24	31	17	203
21	typ4	0	31	13	63
22	typ5	0	31	15	72
23	cdc_open90	51	31	12	84

itd20(typ) rising

GDL timing window

Update of B2L

-CDCTRG UT4 B2L has problem during 2024ab
  -stop->start does not work (abort is needed)
  -sometimes event mis-match happen

-Nakazawa-san found a bug and prepare a patch
  -see Nakazawa-san's report at Wednesday in detail

-UT4 3D firmware is updated with new B2L.
 Being tested with global run.

-If succeeded, all UT4 modules will be re-compiled.

Summary

-Optical data transmission has been updated to reduce latency
  -UT3 NN->UT4 GRL: updated from Optical to NIM
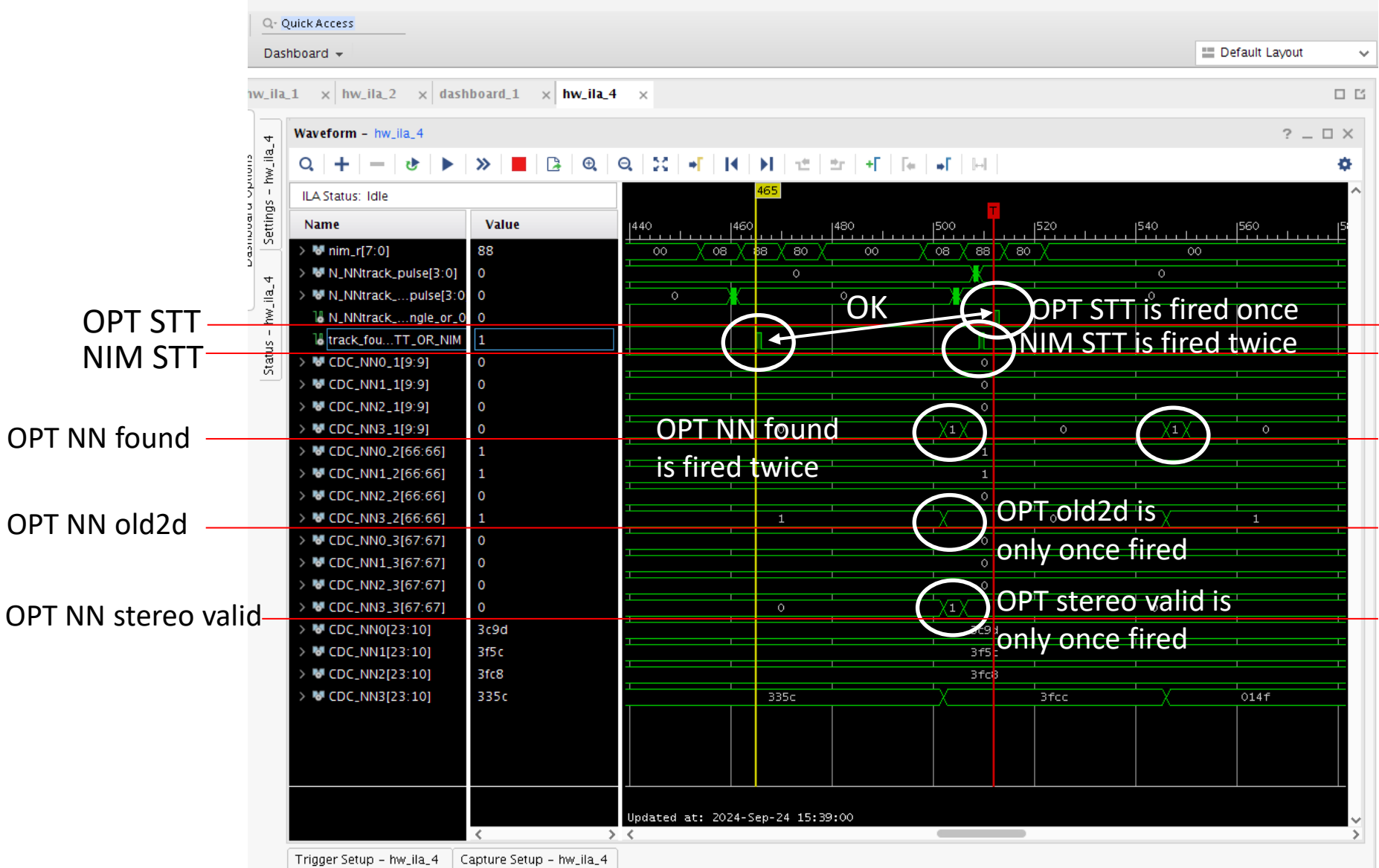 -UT4 ETF->UT4 3D: updated from 5Gbps to 25Gbps
  -UT4 2D->UT4 3D: updated from 5Gbps to 25Gbps

-ADC filter has been turned on

-B2L of 3D is modified: if succeeded, all UT4 FW will be compiled.

backup

- NIM STT signal is found twice but OPT STT signal is found only once
- OPT NN found flag is fired two times
- OPT stereo valid, old2d are only once fired

OPT STT
NIM STT

OPT NN found

OPT NN old2d

OPT NN stereo valid

OK
OPT STT is fired once
NIM STT is fired twice

OPT NN found
is fired twice

OPT old2d is
only once fired

OPT stereo valid is
only once fired

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-NIM STT signal is found twice but OPT STT signal is found only once
-OPT NN found flag, stereo valid are fired two times
-OPT old2d is only once fired

OPT STT

NIM STT

OPT NN found

OPT NN old2d

OPT NN stereo valid

OK

OPT STT is fired once
NIM STT is fired twice

OPT NN found
is fired twice

OPT old2d is
only once fired

OPT stereo valid is
fired twice