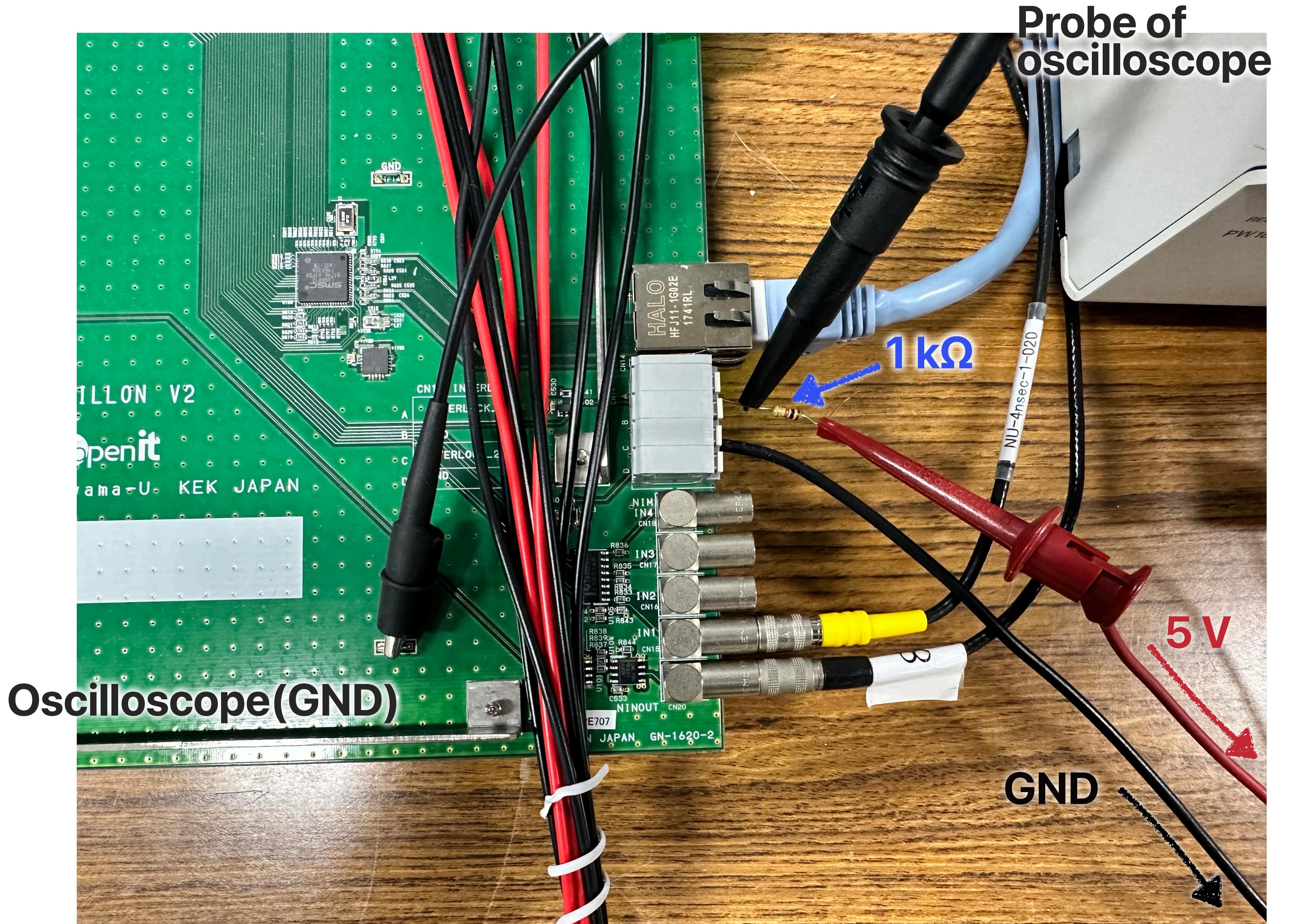


# SSEM19 Interlock Module Improvements

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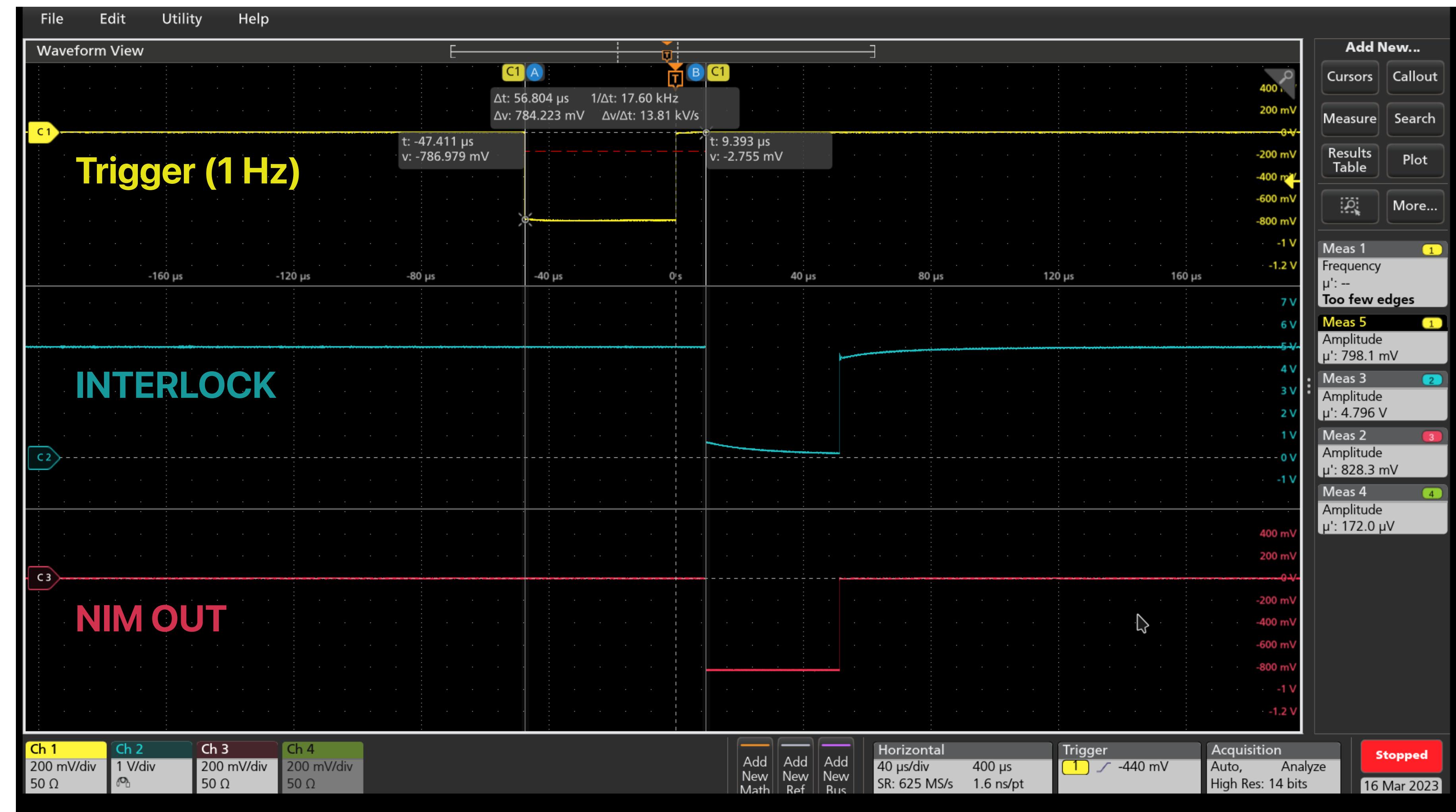
Apr.5, 2023

# Connection of Interlock Connector



# Latency Measurement

Took 10 events, and measure the latency of interlock signal when a result exceeds the threshold.  
 The time difference between the trigger and the interlock signal was 56.8  $\mu$ sec.  
 →sufficiently short than the requirement time; 10 msec (9.04  $\mu$ sec in the older FW)



# Firmware for Actual Beam Test

■ Beam width condition: Fire if  $W < W_{\min}$  ( $W_{\min} - W > 0$ )  $W_{\min} = 3$  mm

We can change these values from the outside of the PAPILLON board through a script.

We should also set the upper limit?

We can use the current FW for the coming beam time.

(Ideally, we should prepare several types of interlock methods and try them...)

## ■ Others

We need to establish the connection between PAPILLON and the whole system.

Ideas of test items:

- beam position scan
- intensity scan
- stability check

Participate into a beam study in Apr.20-22?

## ■ Another(long term?) idea:

We need both of X and Y results to apply the 2D beam width(or density) condition.

→introduce an additional board to mix X&Y results, and calculate beam density?

# Back up

## ■ PAPILLON DAQ

Computer name: tspseb

## ■ Run11 data

- COPPER data of position scan:

</t2k/data/exp/beam/exp/current/run0860243.root>

- COPPER data of long run:

[/t2k/data/exp/beam/exp/current/run086025\\*.root \(22 files\)](/t2k/data/exp/beam/exp/current/run086025*.root (22 files))

- PAPILLON data of position scan:

</export/jnulsv01/home/sedi/work/PAPILLON/work/data/beamtest20210426/PPLrun00000>

- PAPILLON data of long run:

</export/jnulsv01/home/sedi/work/PAPILLON/work/data/beamtest20210426/PPLrun0000031.root>

Copied above files at </export/jnulsv01/home/sedi/work/PAPILLON/work/data>

## ■ How to get an offline analysis output file

- Program: /export/jnulsv01/home/sedi/work/PAPILLON/pkgtop/src/ssem\_ana2
- Build:  
  \$ cd src  
  \$ make
- run:  
  \$ ./pkgtop/bin/ssem\_ana2 -w -o [output file] -i [input data file]

## ■ How to get an PAPILLON output file

- Program: /export/jnulsv01/home/sedi/work/PAPILLON/work/analysis/check\_papi  
  Fill event#, beam position (X, Y), beam width (X, Y) as TTree branches
- run:  
  \$ root -l -q check\_papi.cc+\" input data file \"\n  output file name is specified in check\_papi.cc

## ■ Output files of Run11

/export/jnulsv01/home/sedi/work/PAPILLON/work/analysis/output

## ■ Macro for analysis (ROOT macro)

- linearity check: /export/jnulsv01/home/sedi/work/PAPILLON/work/analysis/PosScanCorrelation
- stability check: /export/jnulsv01/home/sedi/work/PAPILLON/work/analysis/StabilityCheck
- event by event: /export/jnulsv01/home/sedi/work/PAPILLON/work/analysis/EventbyEvent