



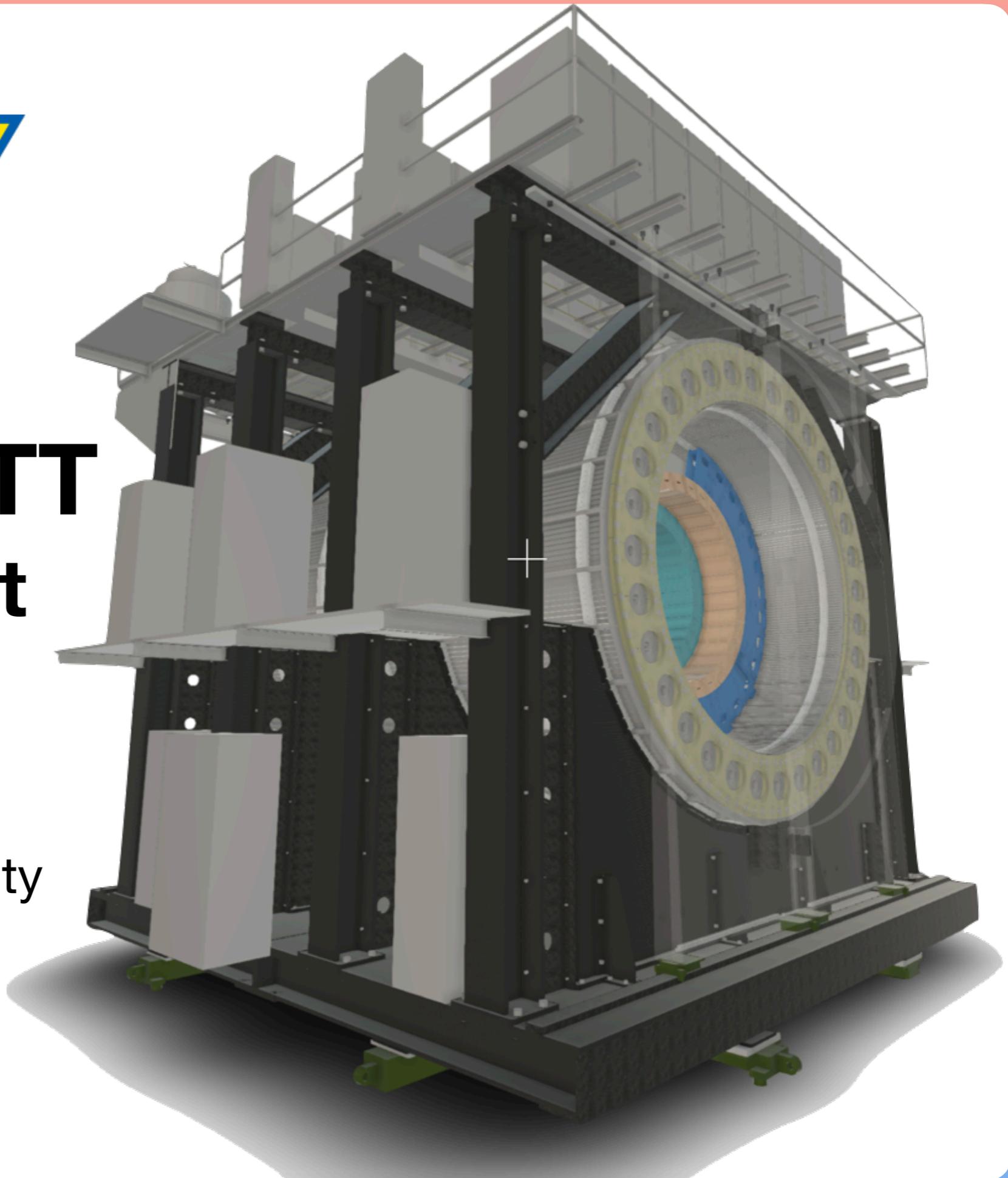
SPHENIX INTT

- Weekly Report

Cheng-Wei Shih,
Chia-Ming Kuo

National Central University

2021/7/17



Cosmic test



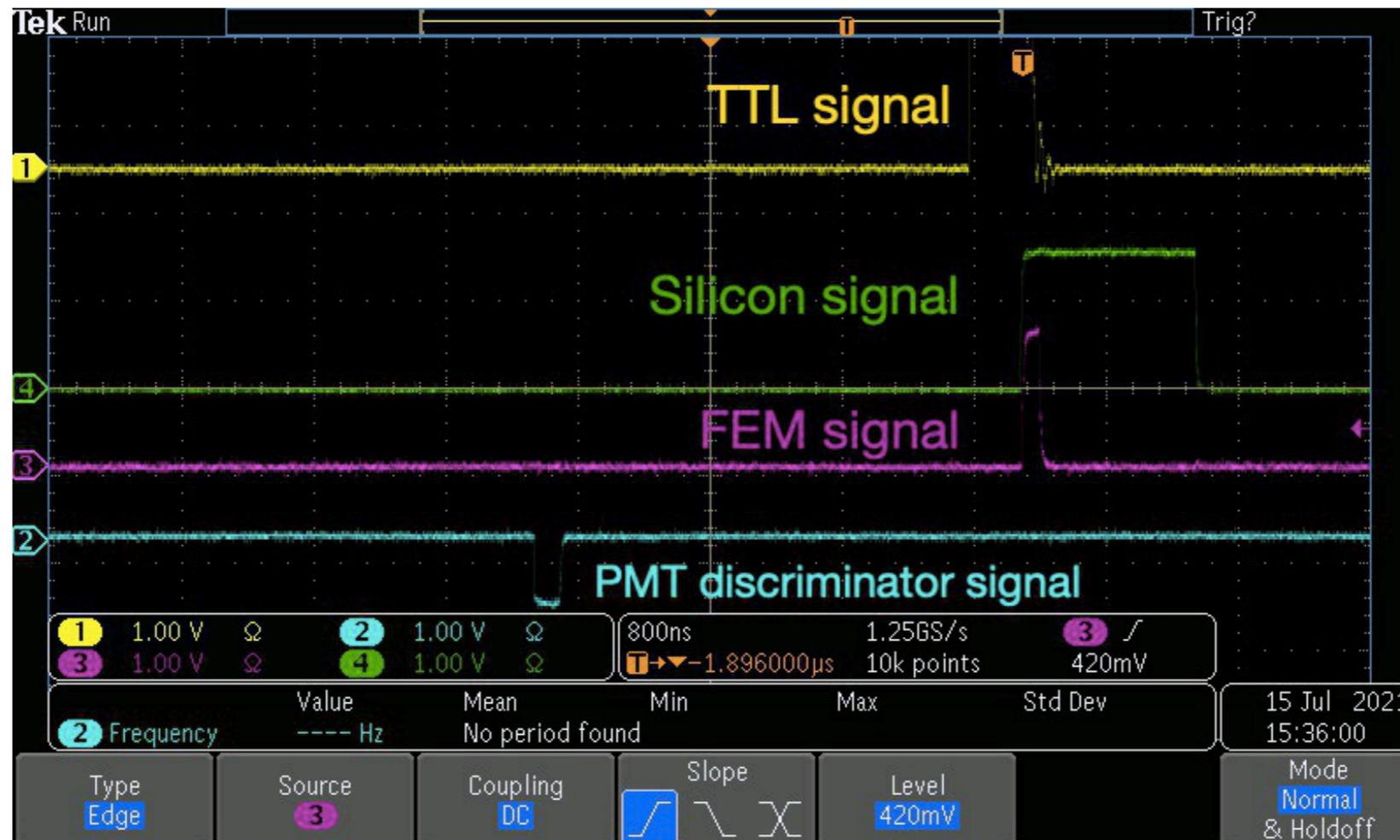
- The signals were checked by oscilloscope.

TTL signal : final signal from NI modules.

Silicon signal : the signal from half-ladder

FEM signal : coincidence signal of TTL signal and FEM signal.

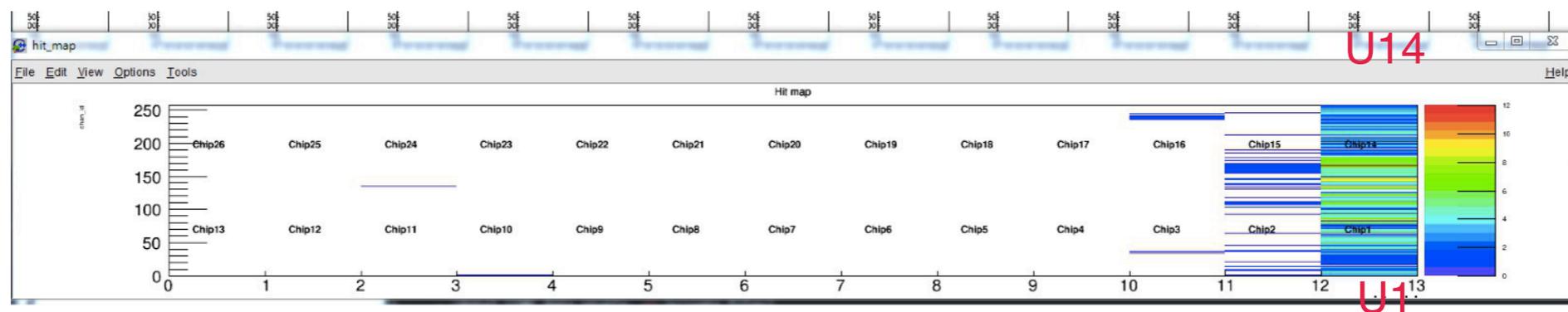
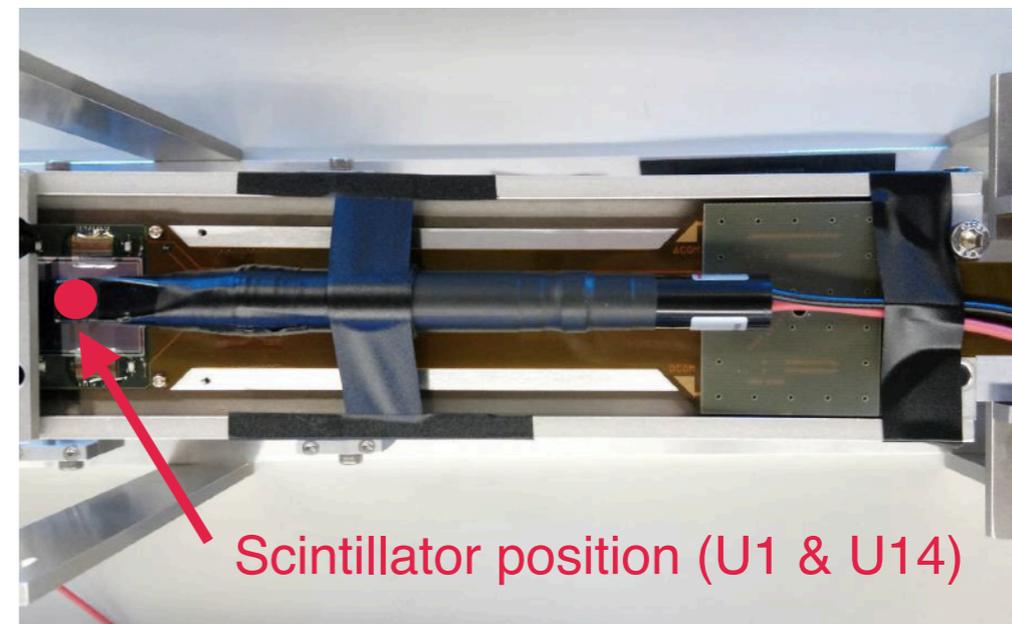
Discriminator signal : if PMT signal > threshold



The signal seemed to be good

Cosmic test

Data taking ~ 1000 mins



Very nice results !!!

Cosmic test : Preliminary data checking



Data with the same bco and bco_full is considered as same event

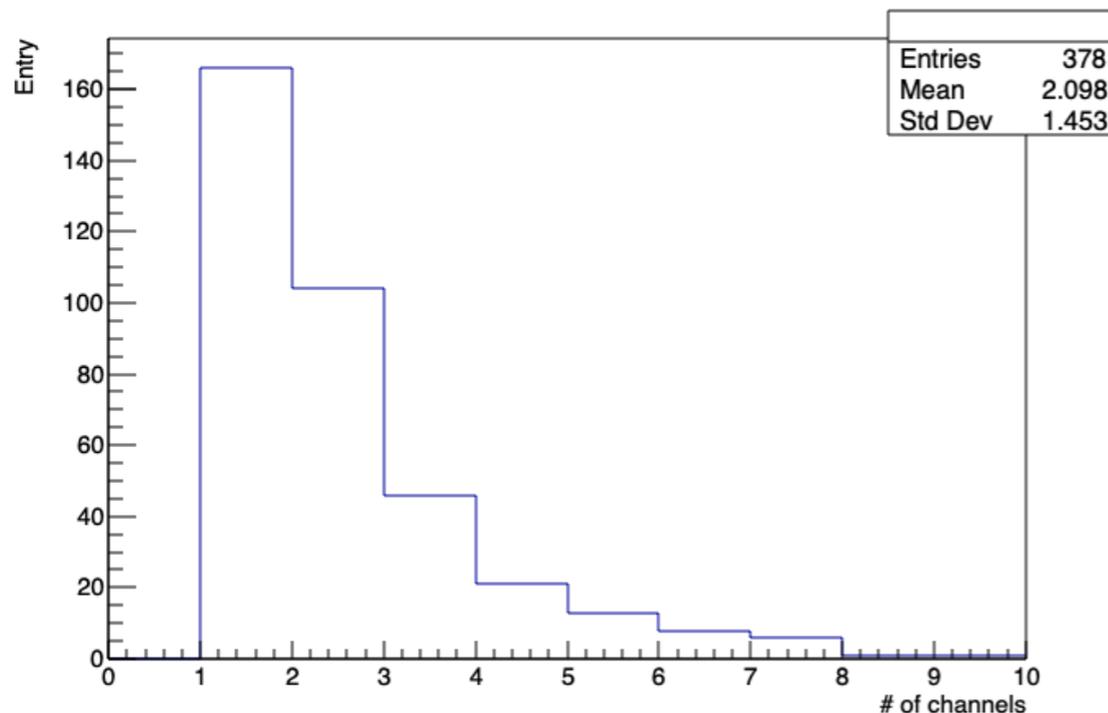
DAC setting

DAC 0	15
DAC 1	23
DAC 2	60
DAC 3	98
DAC 4	135
DAC 5	173
DAC 6	210
DAC 7	248

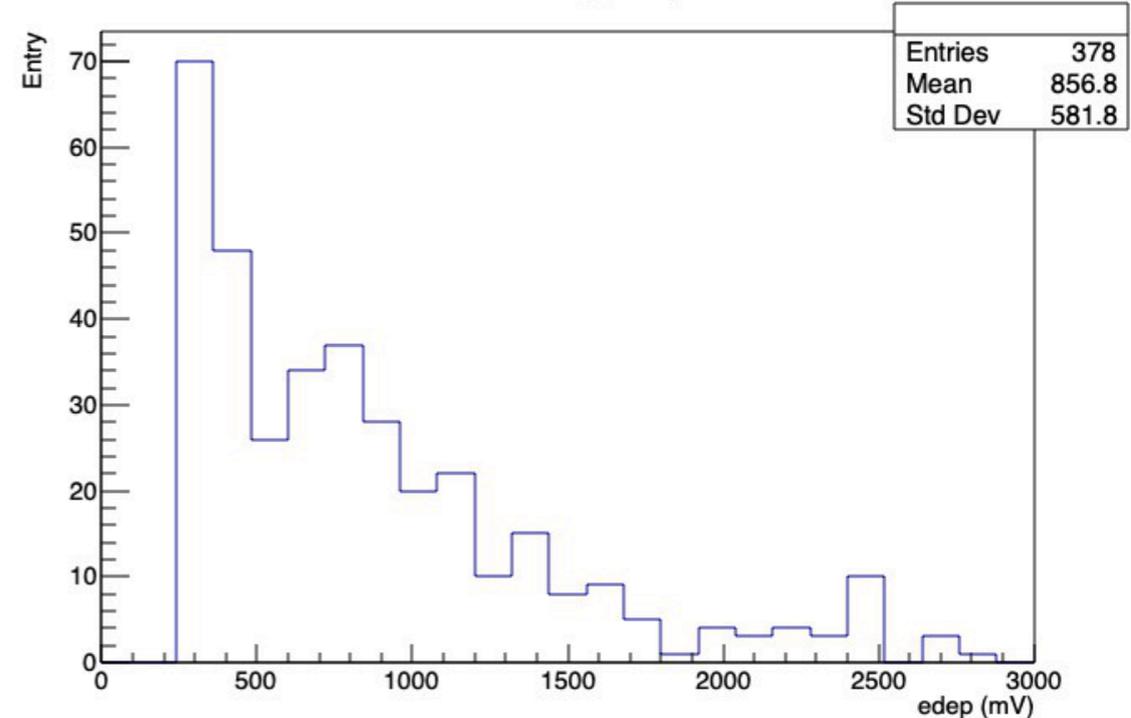
```
[root [10] tree->Scan("event:chip_id:chan_id:adc", "bco==22 && bco_full==44182")
*****
*   Row   *   event *   chip_id *   chan_id *   adc *
*****
*     8 *     8 *     1 *     23 *     0 *
*     9 *     9 *     1 *     24 *     1 *
*    10 *    10 *     1 *     25 *     1 *
*    11 *    11 *     1 *     26 *     1 *
*    12 *    12 *     1 *     27 *     1 *
*    13 *    13 *     1 *     28 *     1 *
*****
```

$$\text{edep} = \sum (\text{DAC of hit channels})$$

hit channels

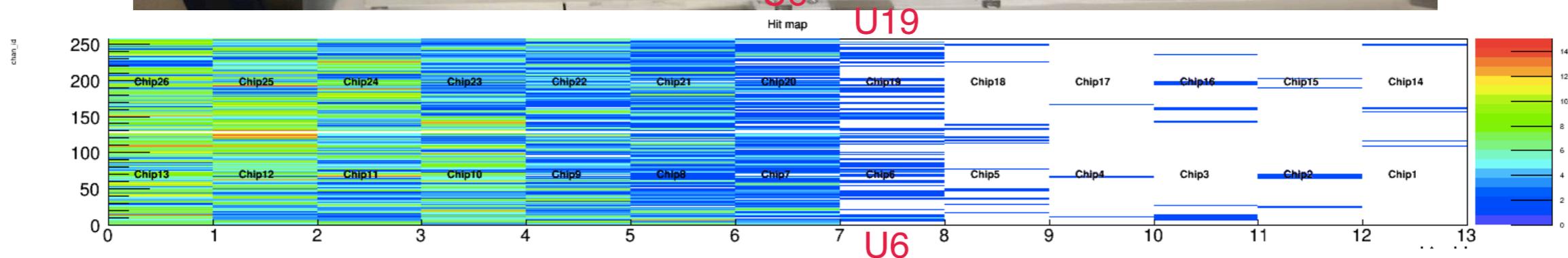
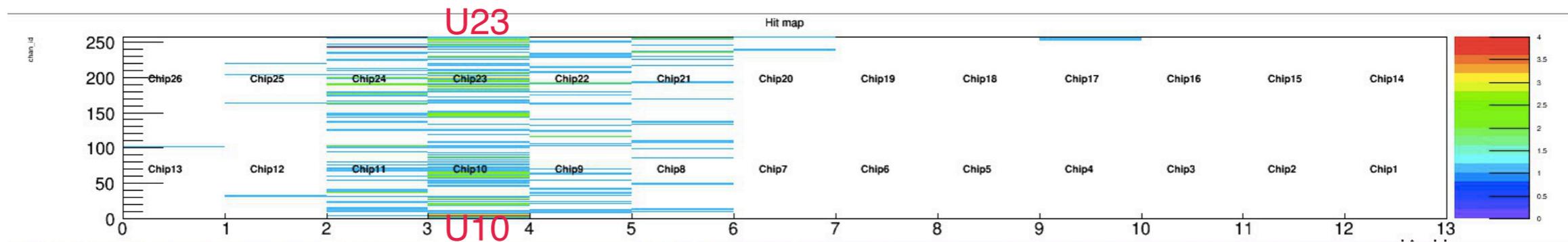
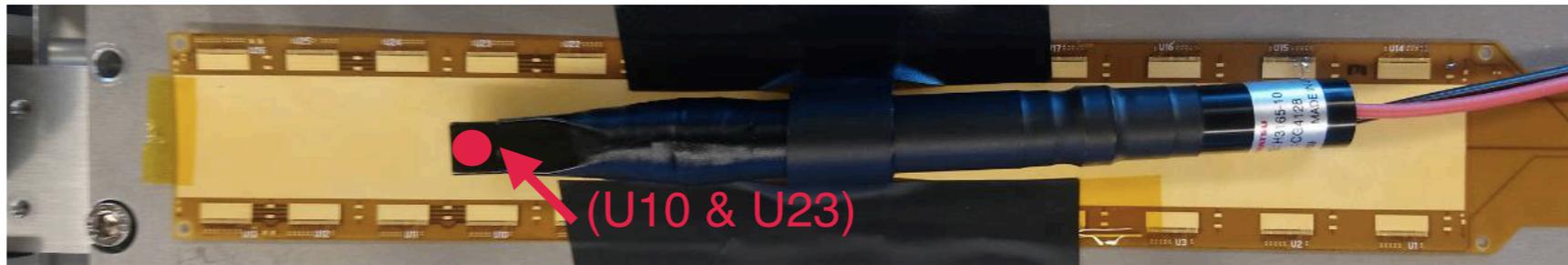


sensor energy deposit



cosmic test

- Other cosmic test results :



The Testbench in NCU can perform the cosmic test & calibration test well. Huge thanks yo Miu !!!

Source test



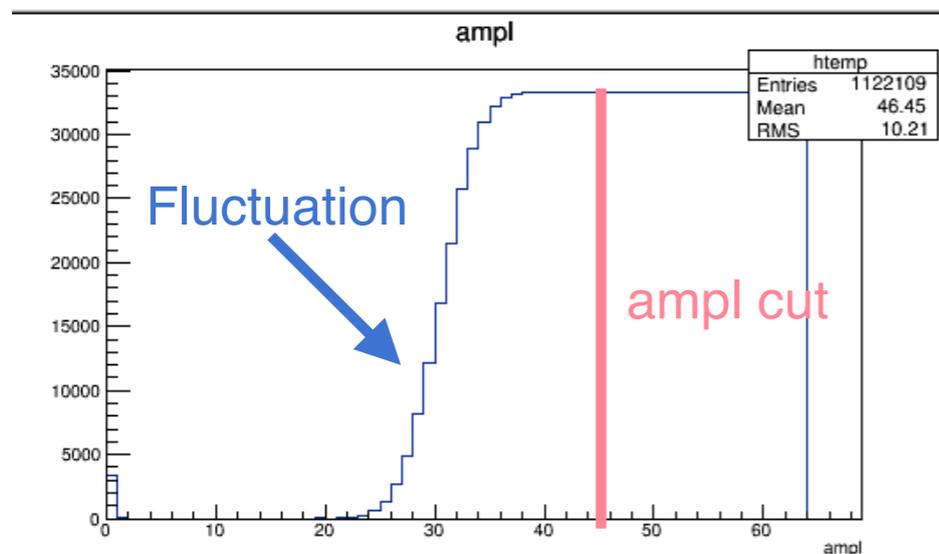
- The radioactive source is not allowed in the room where Testbench is.
- The radiation-available room is in another building.
- Missing component for another Testbench system : FEM-IB
- Feasible solution :
 1. Produce FEM-IB domestically, requirement : gerber file of FEM-IB.
 2. Set up the Testbench in radiation-available room without “FEM-IB”. We switch one FEM-IB between 2 Testbenches.
 3. Ship the ladders to NWU to do source test.
 4. Cosmic test with large scintillator ?

Channel classification update

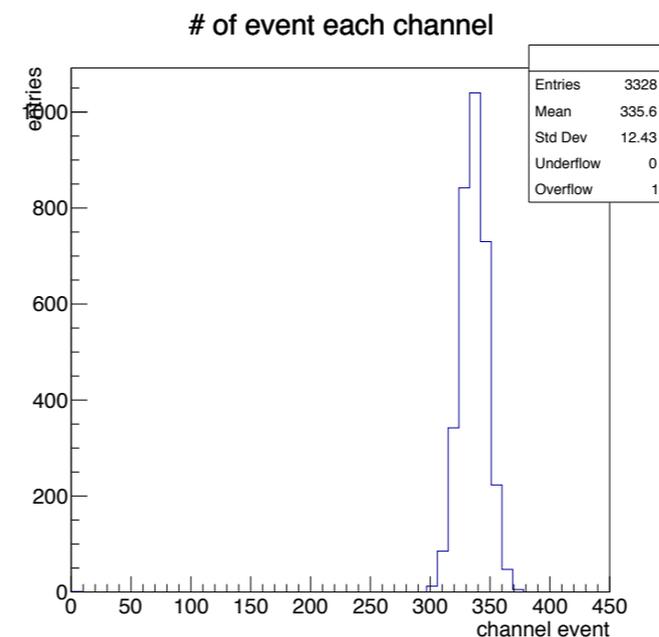


- “Gaussian width” & “# of event” of each channel are stored in the output root file.
- New entry criteria candidate : applying a ampl cut.

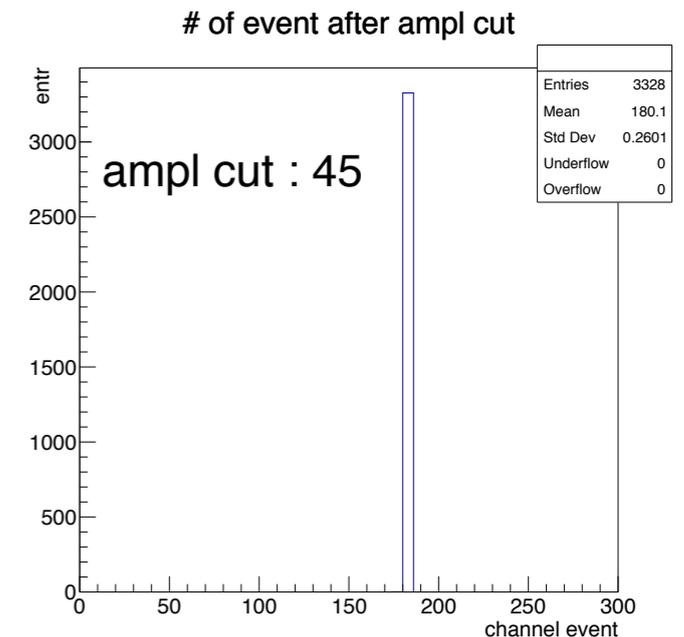
The width of gaussian is mainly contributed by the fluctuation around DAC0.



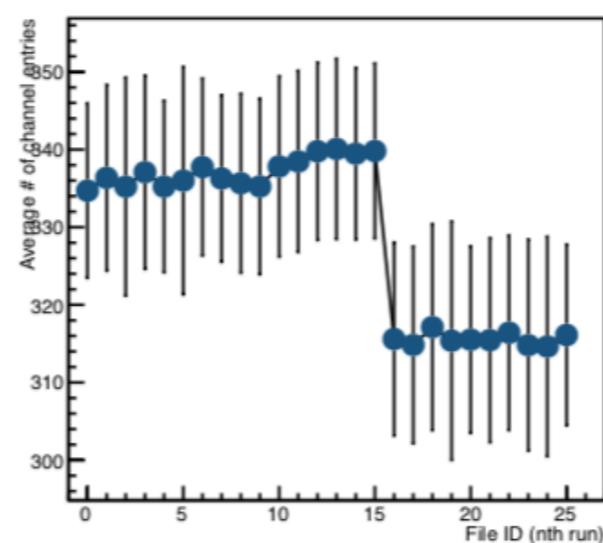
Without ampl cut



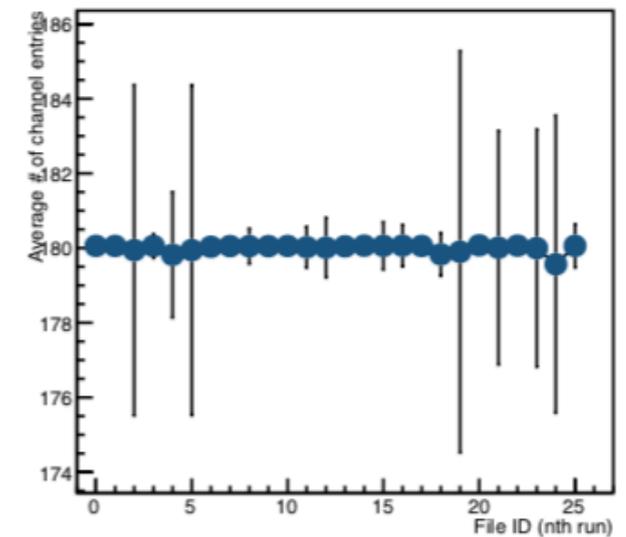
With ampl cut



Average # of channel entries vs nth runs



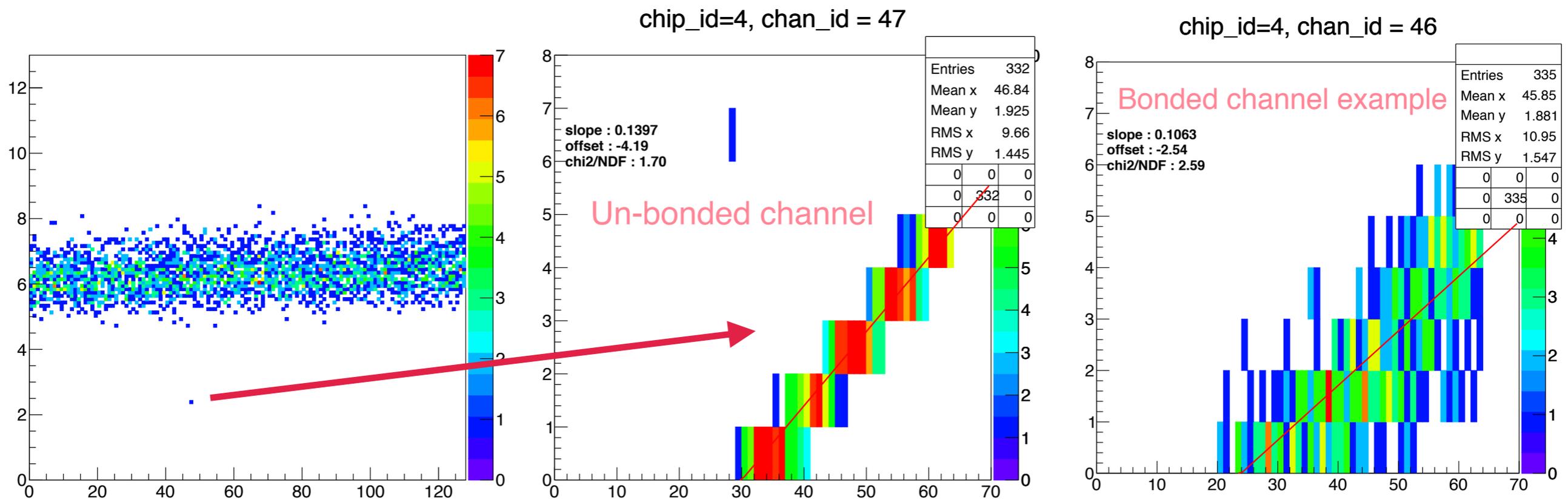
Average # of channel entries after ampl cut vs nth runs



Channel classification update



- Question : should un-bonded channel be considered as bad channel?
- The Un-bonded channel can be checked by running calibration test without bias voltage.
- One un-bonded channel was found in BNL ladder (PPB2-L2N)
File : fphx_raw_20210212-0942_0.dat



Summary



- Stave quality test is ongoing
 - 20 staves have been applied with DP460, and passed the twist test.
 - Leakage test & Twist test are on going.
- The Testbench in Taiwan can perform cosmic test & calibration test now.
- Channel classification update
 - All required informations are stored in output root file
 - New criteria candidate : ampl cut.
 - Question : should the un-bonded channel be considered as bad channel ?

Back up



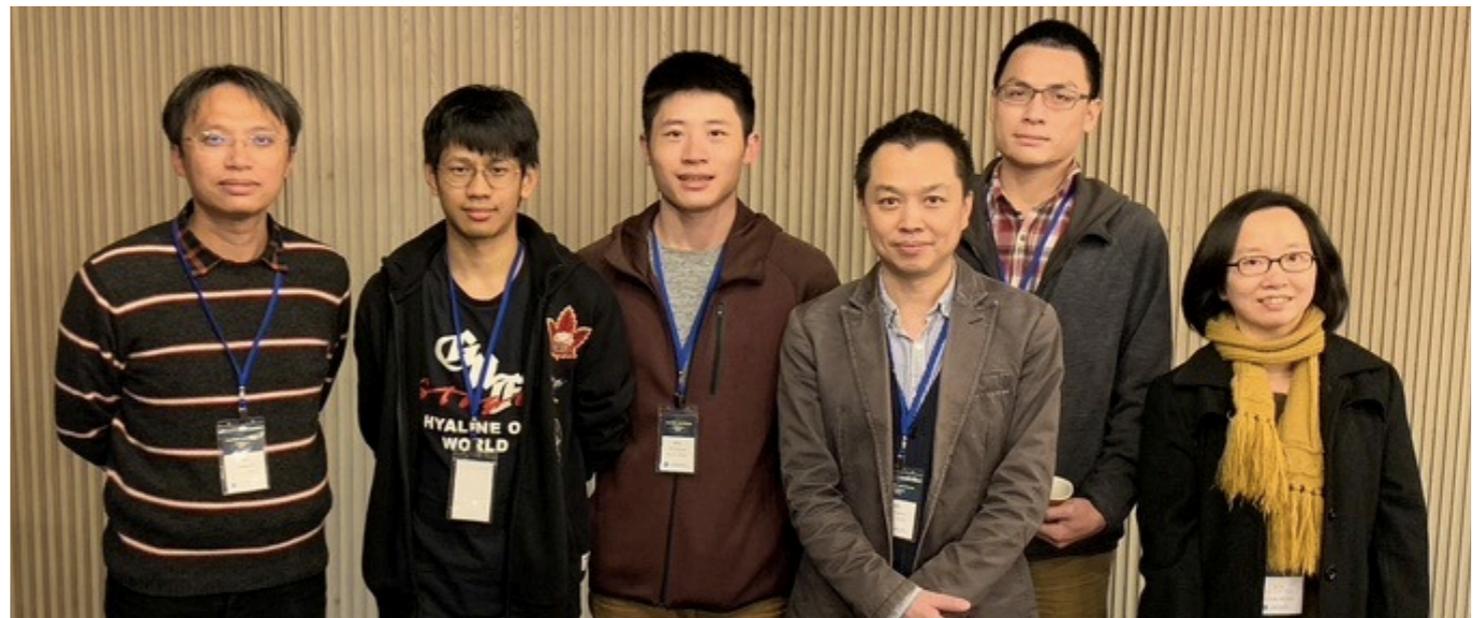
Taiwan INTT team



Ou-Wei Cheng



Kai-Yu Cheng



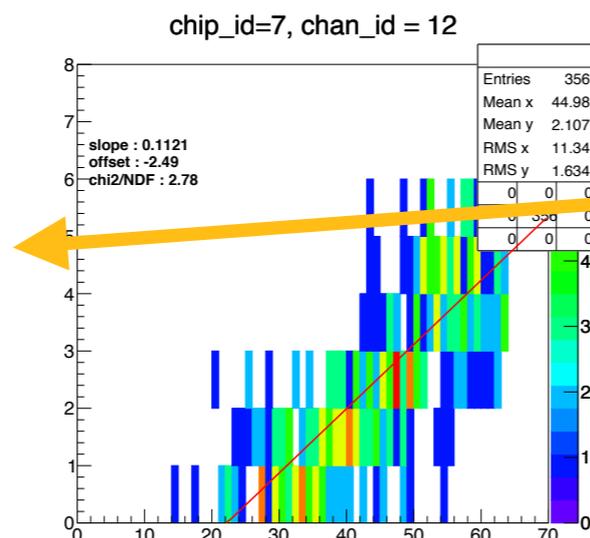
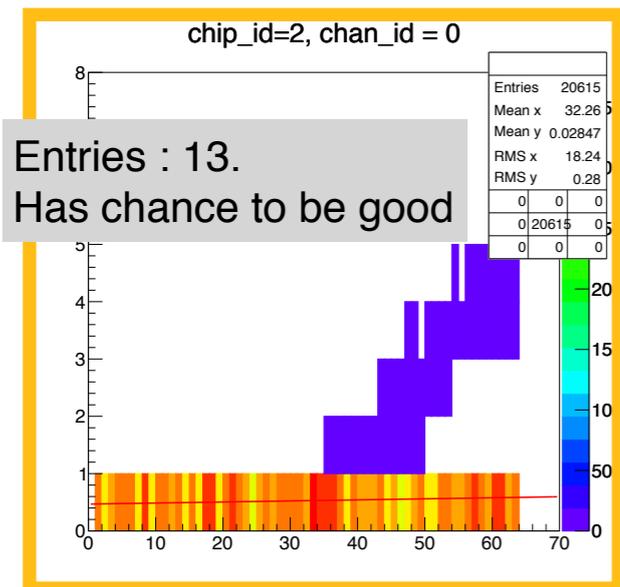
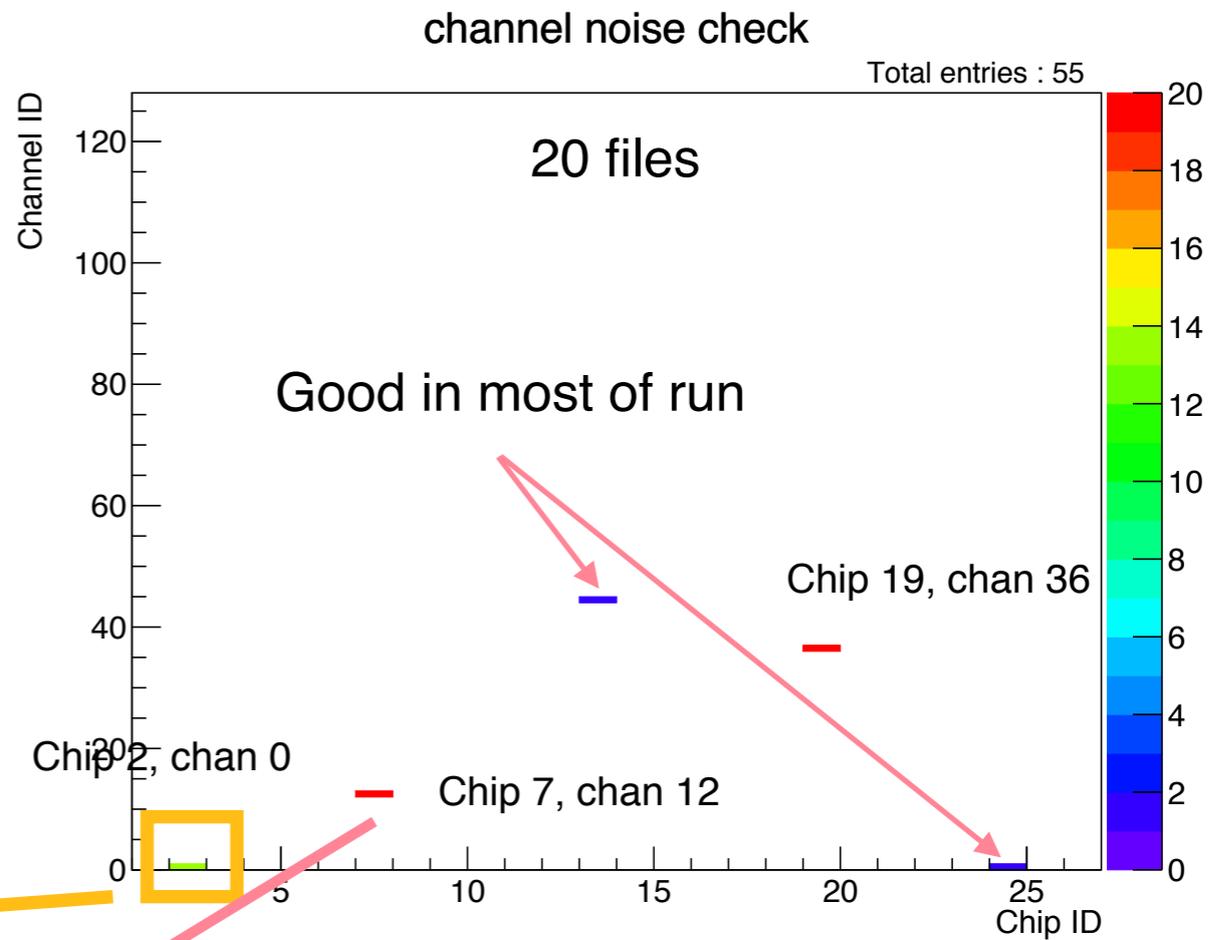
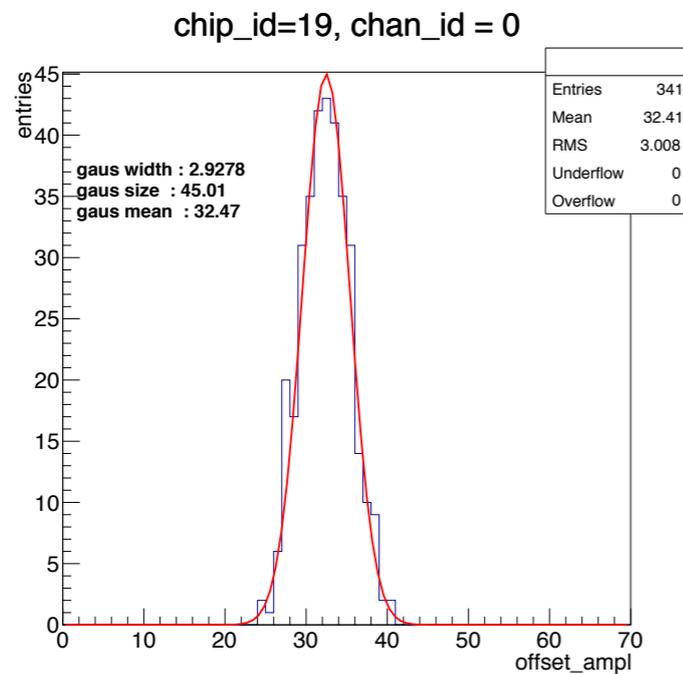
Chia-Ming Kuo Cheng-Wei Shih Lian-Sheng Tsai
Wei-Che Tang Rong-Shyang Lu Jenny Huang

Algorithm introduction



- My algorithm, 2 criteria : noise and entries

Gaus width > 4 will be shown in right plot

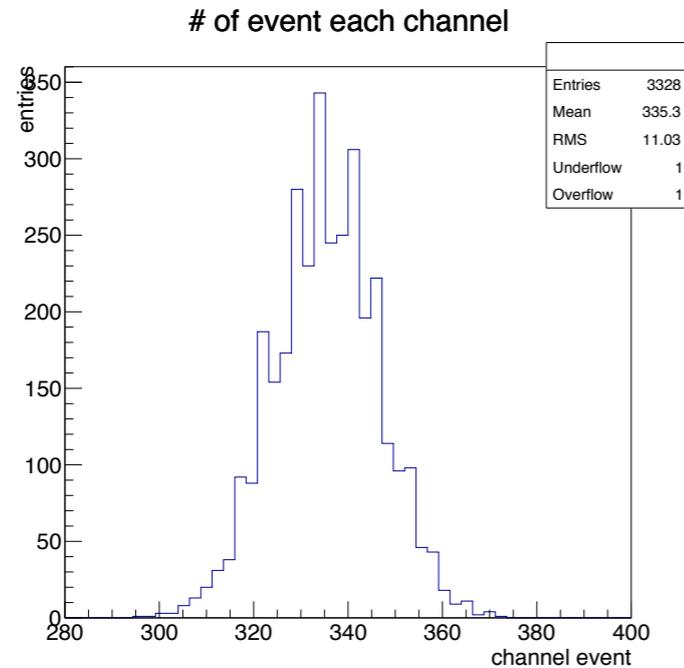


The less entries in plot, better performance it is.

Algorithm introduction

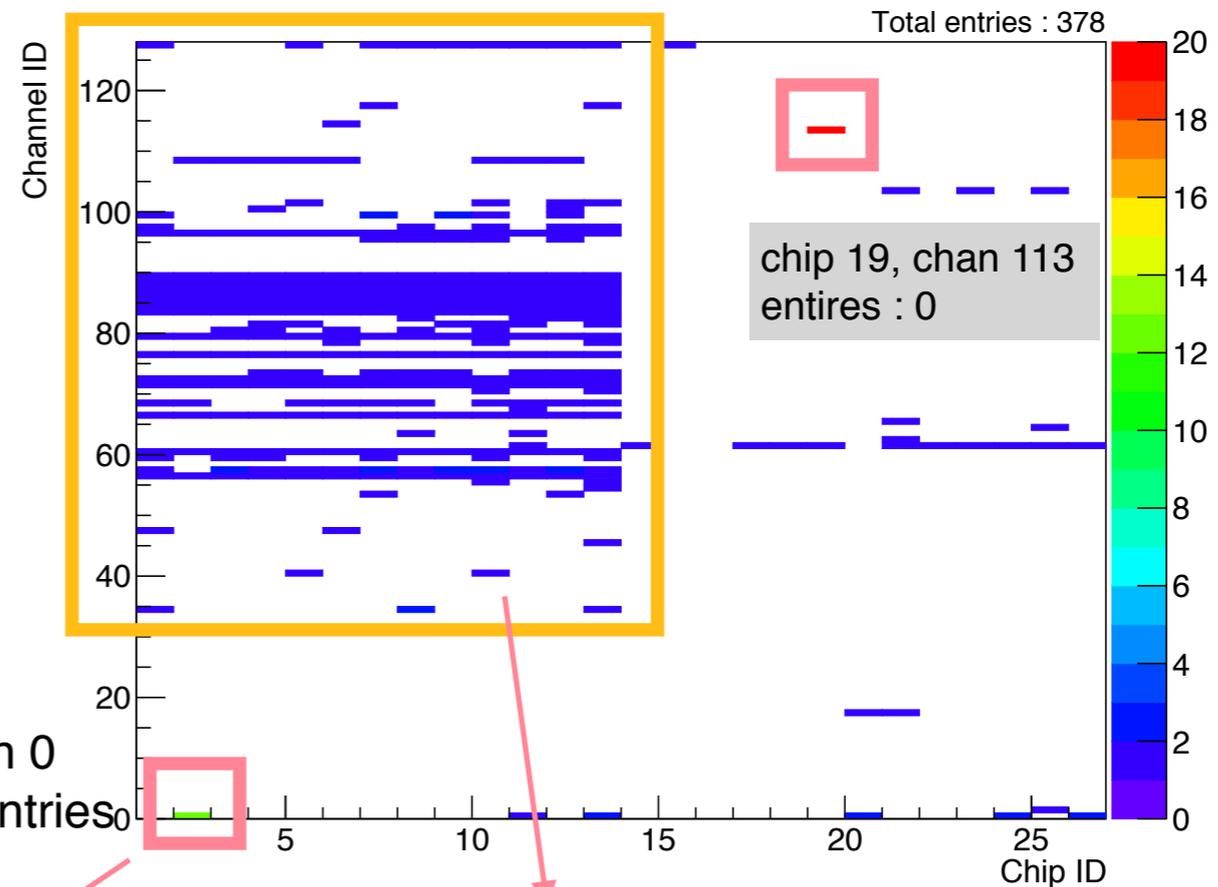


of event of each channel ~ 330

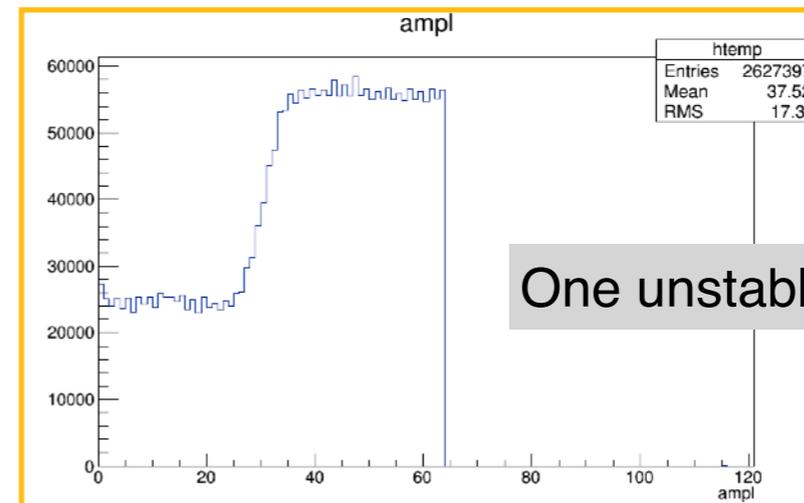
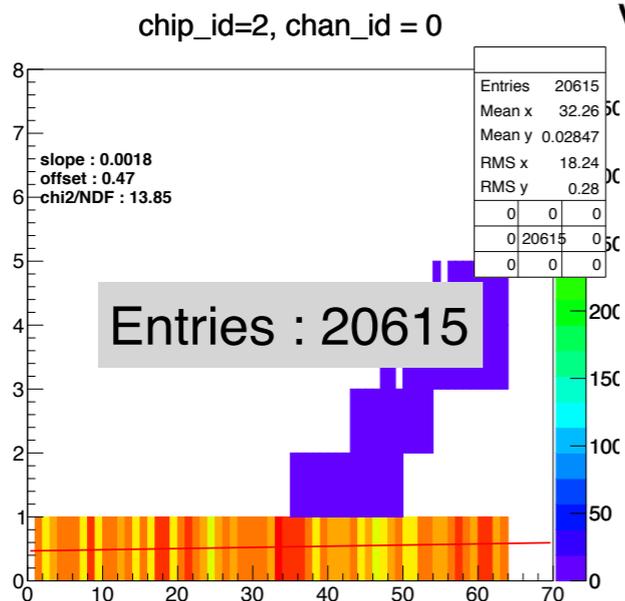


of event > 400 or < 280 will be filled in the plot

channel entries check



chip 2, chan 0
Very high entries



Conversion of DAC & mV



表 3.2 DAC 閾值設定

DAC	DAC 設定値	対応電圧 [mV]
DAC0	15	270mV
DAC1	23	300mV
DAC2	60	450mV
DAC3	98	600mV
DAC4	135	750mV
DAC5	173	900mV
DAC6	210	1050mV
DAC7	248	1200mV