

Beam Test Analysis – II

Calice Collaboration Meeting @ Valencia

Apr 22, 2022

Yuichi Okugawa

Affiliation:

université
PARIS-SACLAY



UCLab
Irène Joliot-Curie
Laboratoire de Physique
des 2 Infinis



P2IO
Physique des 2 Infinis et des Origines

In collaboration with:

CALICE
Calorimeter for ILC

CNRS
IN2P3
Les deux infinis

OMEGA
Microelectronics

LPNHE
PARIS

LIR

IFIC
INSTITUT DE FÍSICA
CORPUSCULAR

SUNG KYUN KWAN
UNIVERSITY

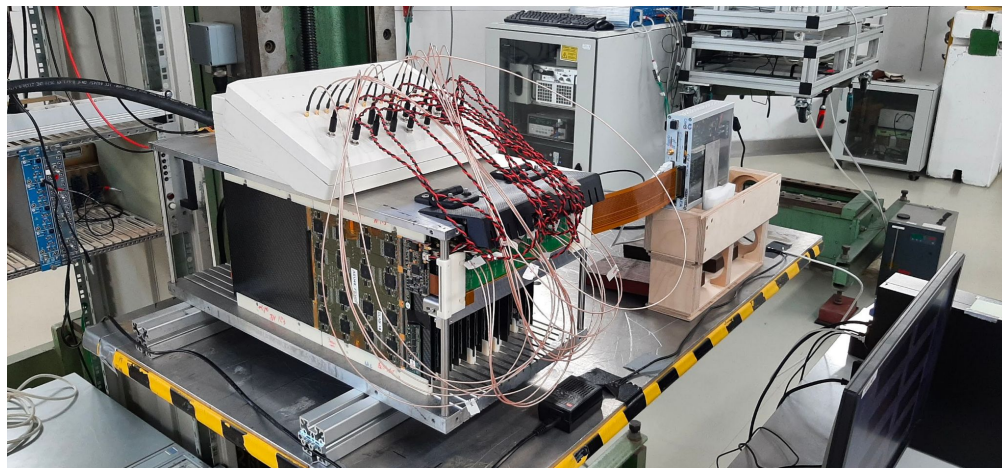
AIDA
innova

LPSC
Grenoble



Data Quality Checks

- Mapping of the COBs
 - Done during the beam test
 - Rotation of mappings in Chip 13 & 15
- Determination of Hit Rates
 - Offline beam rate measurements
 - cycles \rightarrow sec
 - Data quality checks



Mapping



Mapping

Mapping Issue

- Chip 13 & 15 were identified to have mapping issue during the test beam.
- Without proper mapping, one cannot identify the correct beam spot.
- The issue could only be identified during the test beam since cosmic rays will not create a spot, wide enough to show the mapping structure.

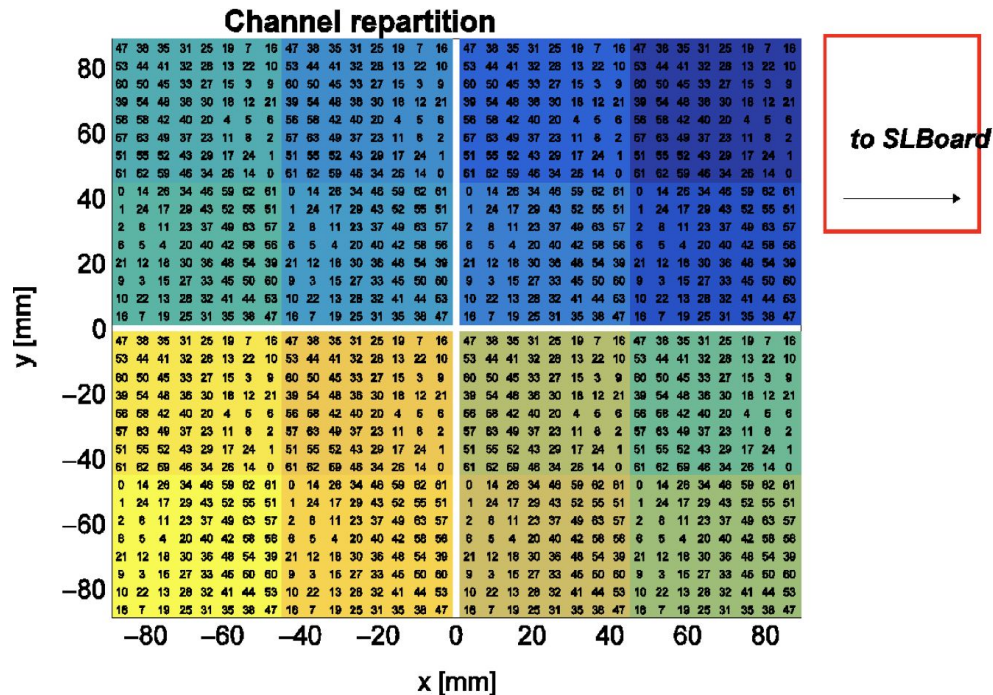
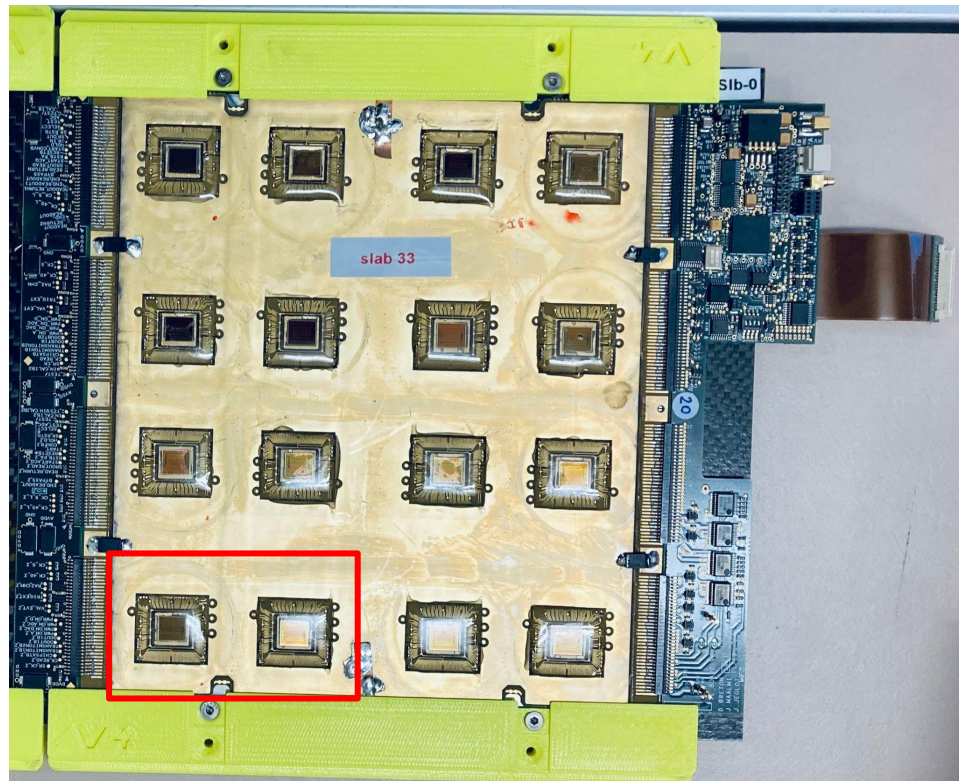


Fig: Channel mapping of **FEV 11** (not COB)

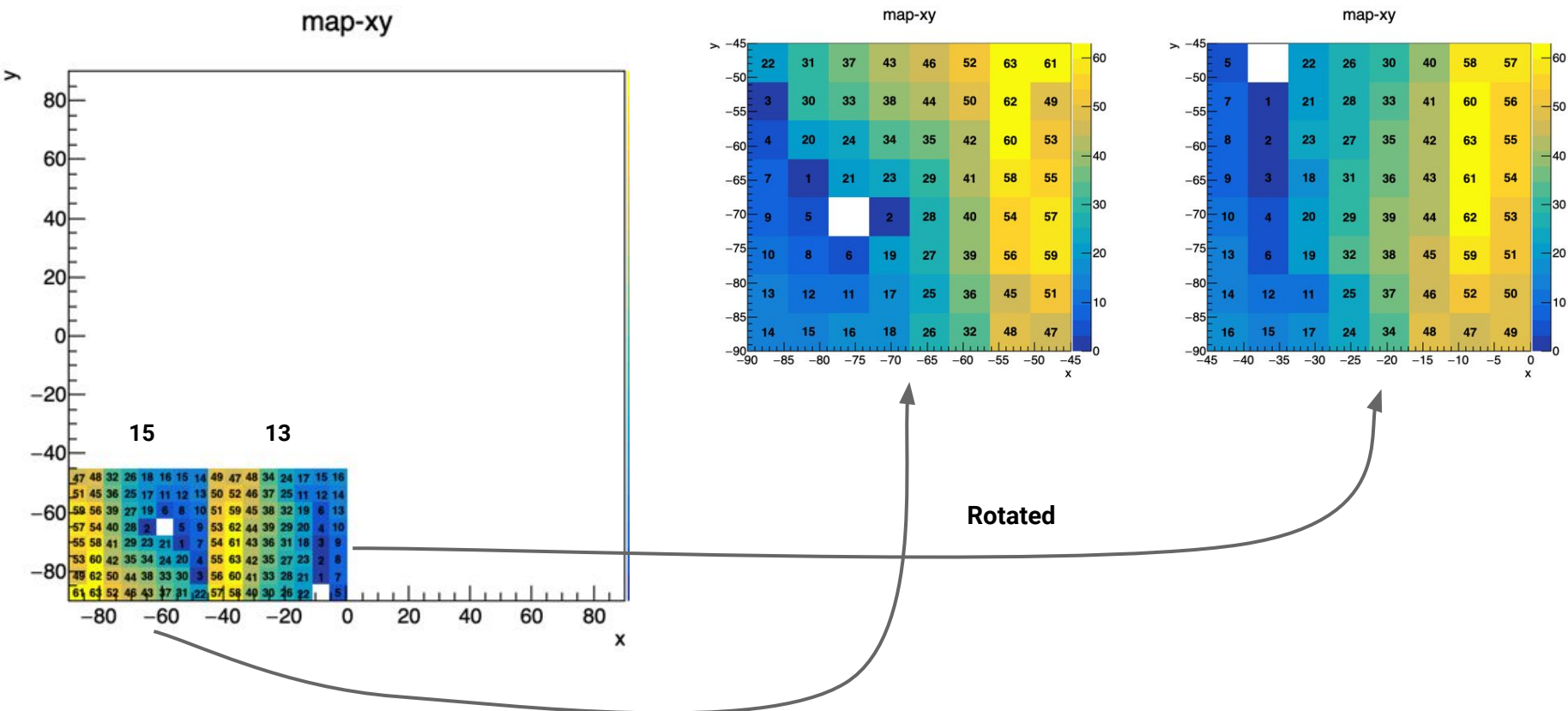
Mapping

Mapping Issue

- Chip 13 & 15 were identified to have mapping issue during the test beam.
- Without proper mapping, one cannot identify the correct beam spot.
- The issue could only be identified during the test beam since cosmic rays will not create a spot, wide enough to show the mapping structure.

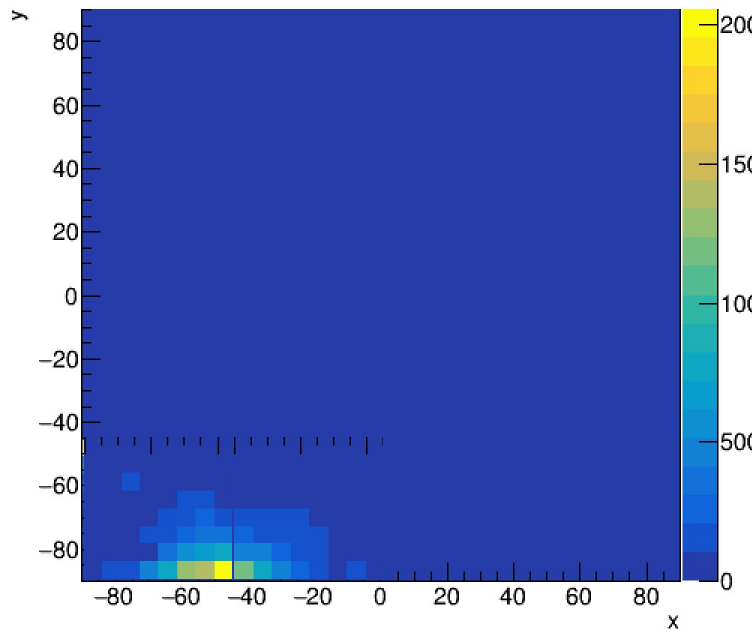
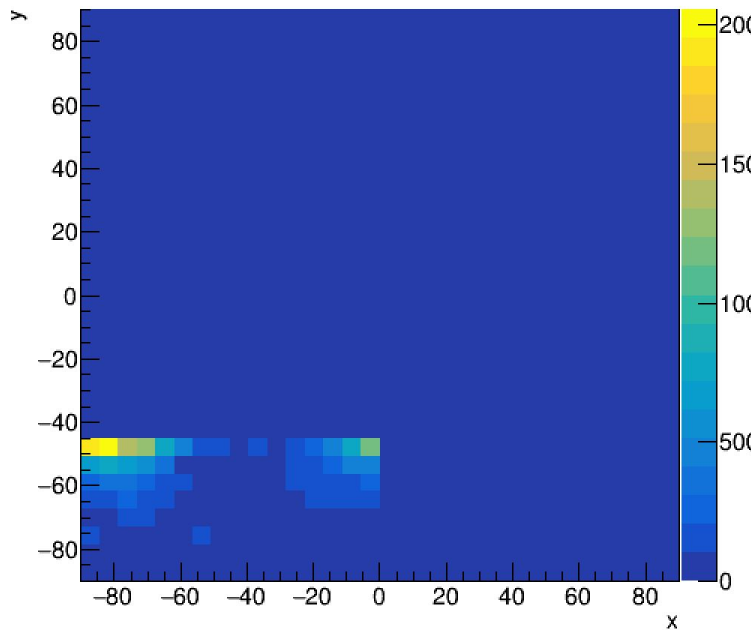


Mapping



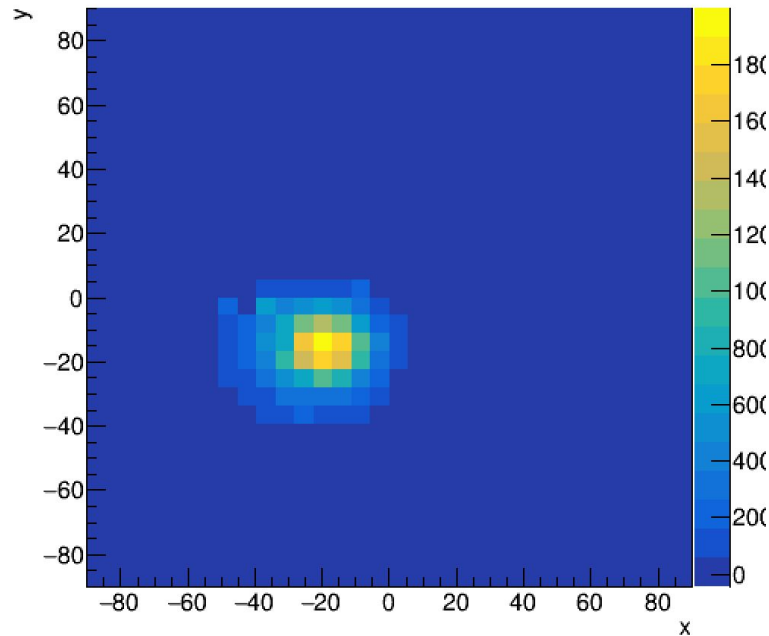
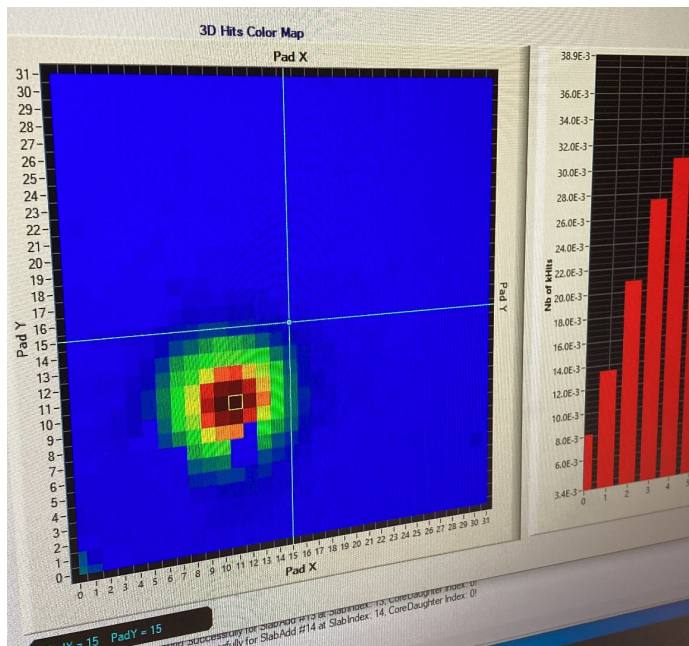
Mapping

Layer 2 : 3.0GeV MIP Position Scan



Supposed to see

Mapping



Hit Rate



Hit Rate Checks

- **Hit rate** is used to check the **data quality** of the signals.
 - During the beam test, the hit rate of the first layer was used to estimate the read beam rate.
 - DAQ software is already equipped with online hit rate monitoring.
 - The attempt was made to check data quality **offline**.
- Evaluation of **Noise Rate**
 - One needs to know the noise ratio of the detector to evaluate the background events from the data.
 - Combined with noise rate observed from the off-beam analysis, one can estimate the background during the beam test.
 - This requires hit rate information.
- eg) 1 ms window + 10ms delay = 11 ms / cycle

Hit Rate

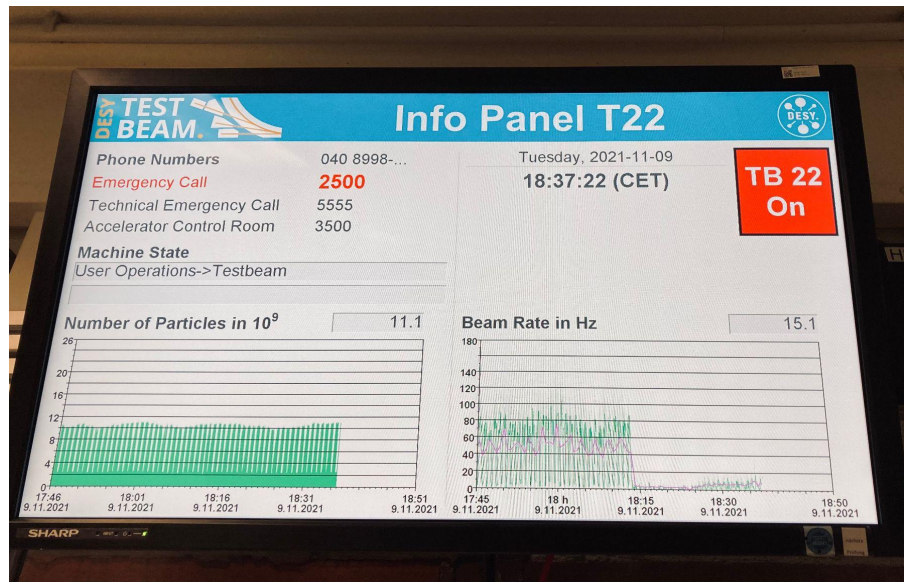


Photo: Beam Monitor at DESY site (From TB2021-11)

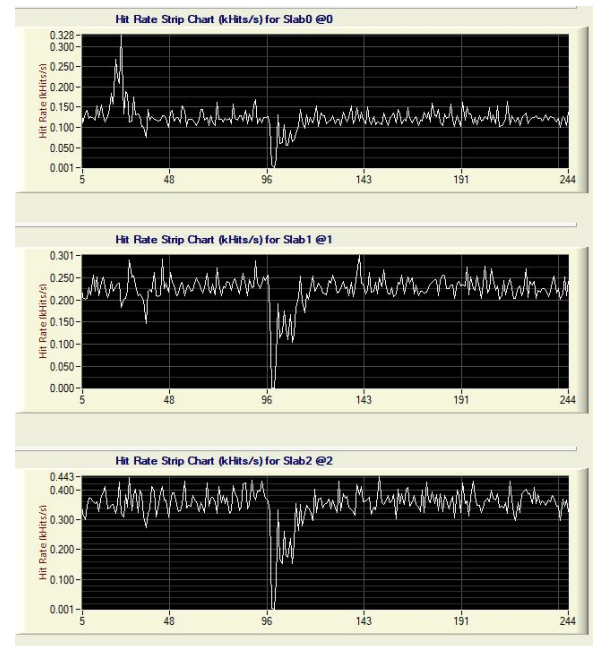
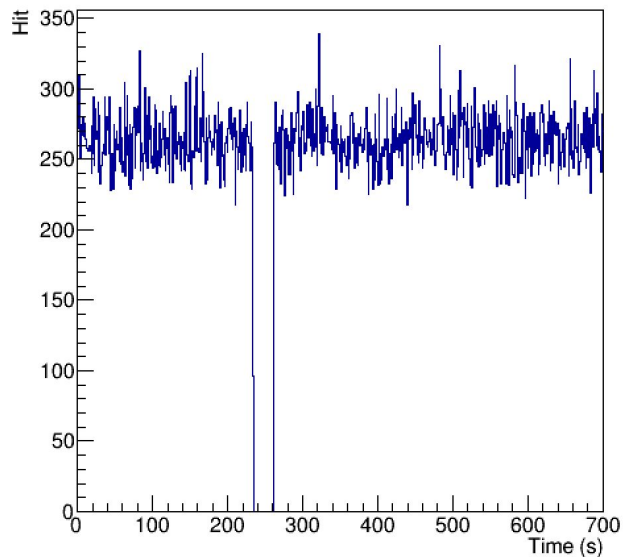


Fig: DAQ software (4.6 GeV Energy Scan)

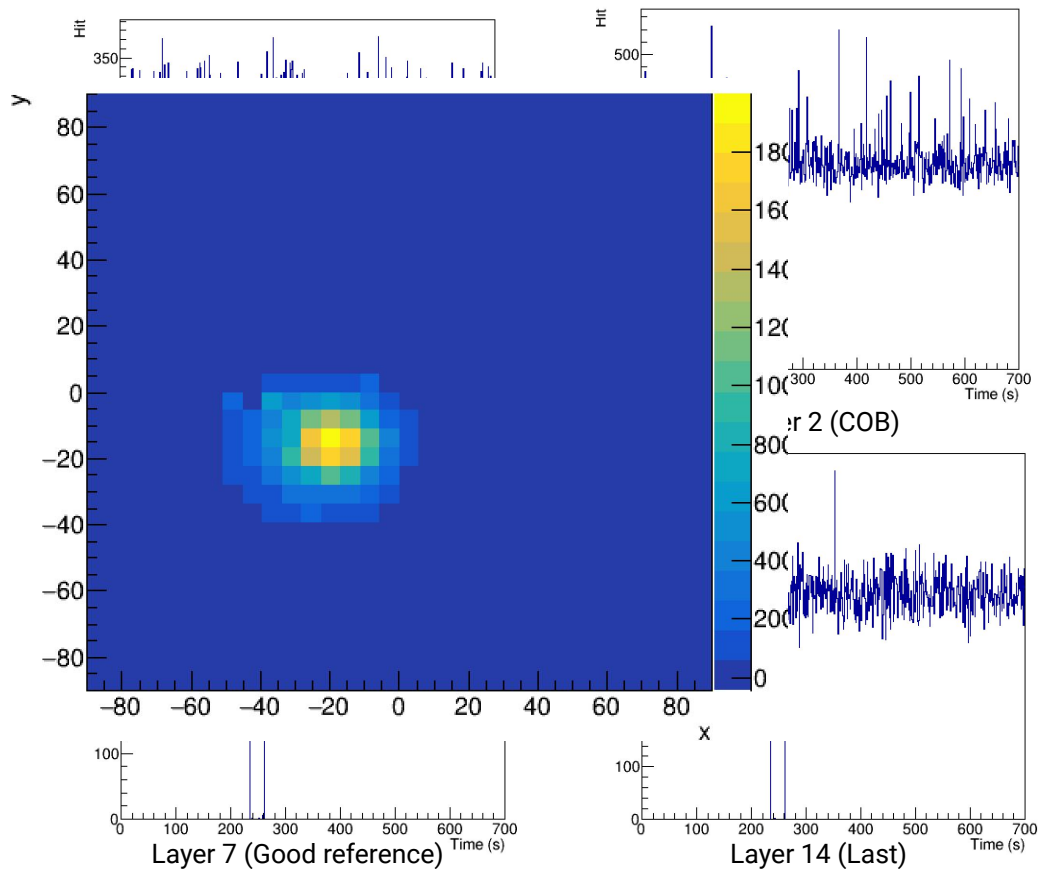
Hit Rate

Position Scan (1)



Layer 0 (First)

Sample) 3GeV_MIPscan_eudaq_run_050480

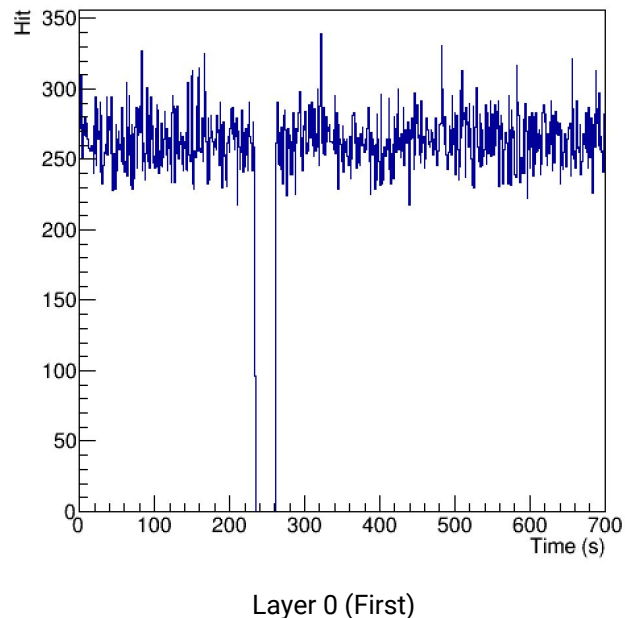


Layer 7 (Good reference)

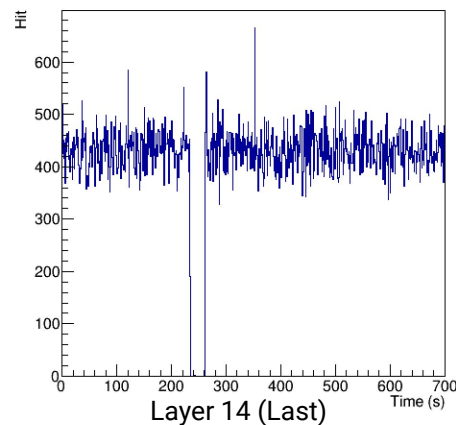
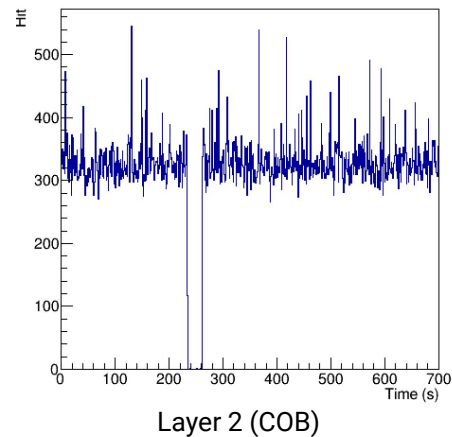
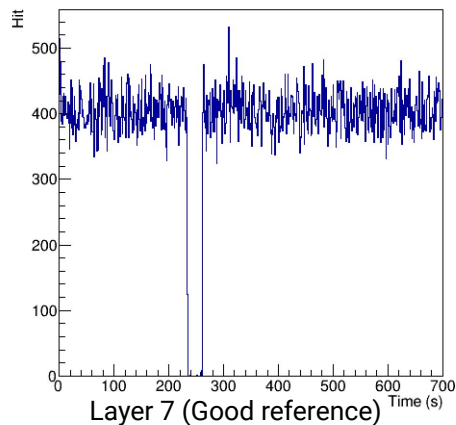
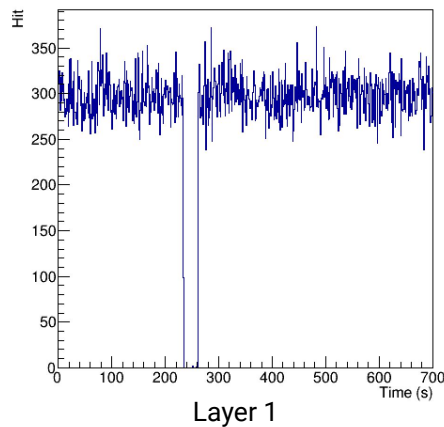
Layer 14 (Last)

Hit Rate

Position Scan (1)

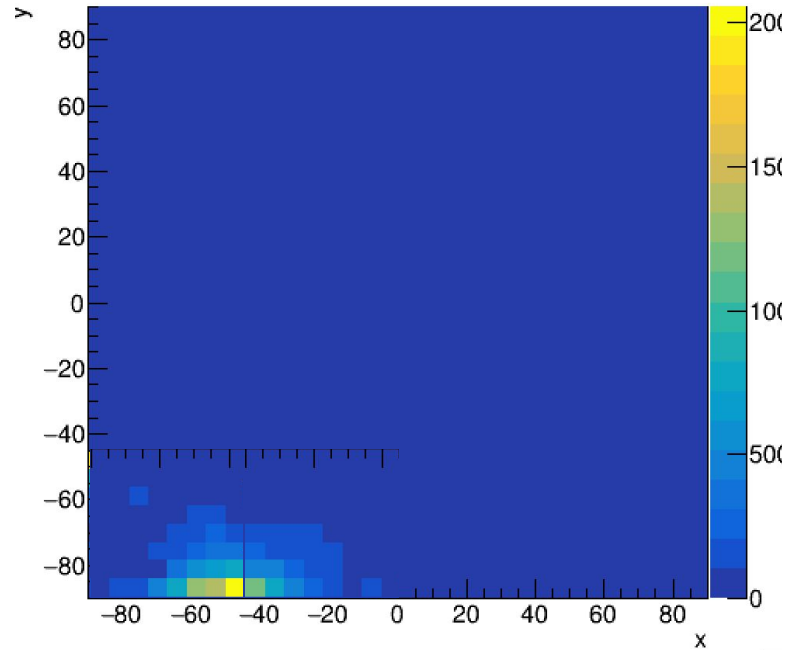
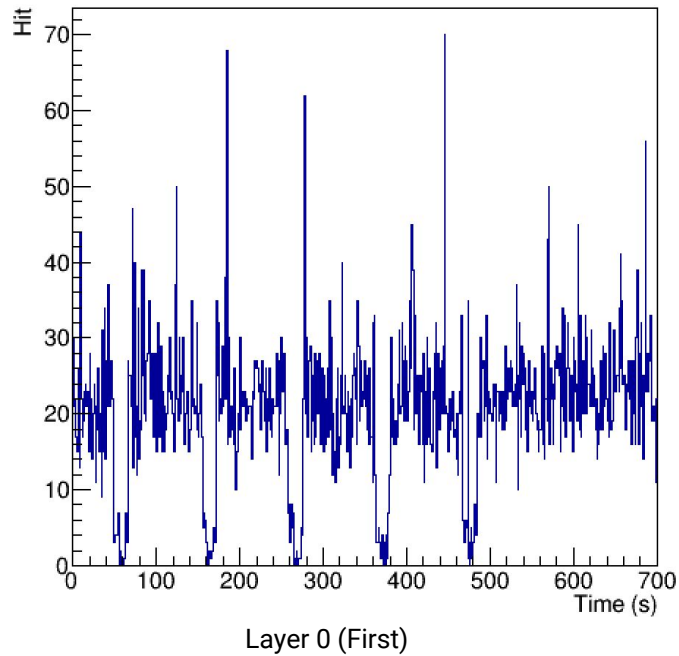


Sample) 3GeV_MIPscan_eudaq_run_050480



Hit Rate

3GeV_MIPscan_eudaq_run_050490



Summary

- **Mapping**

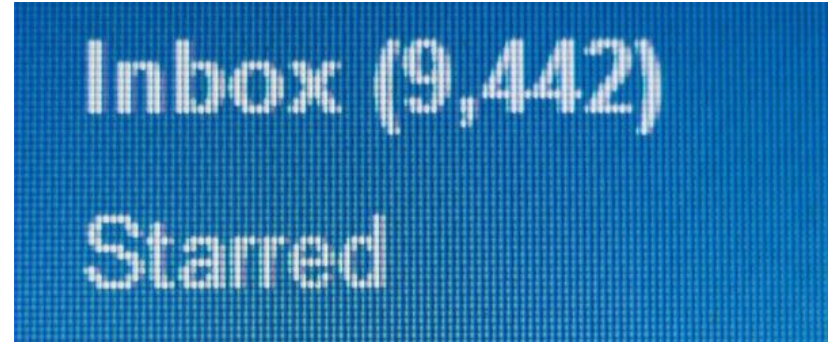
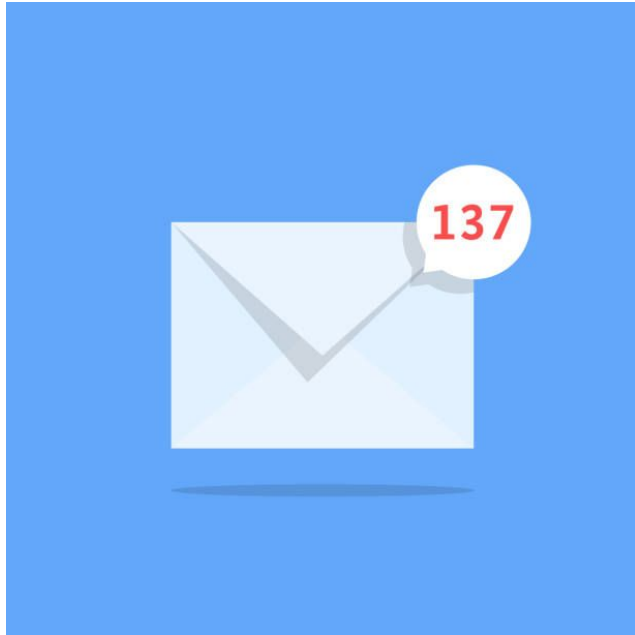
- COB mapping was corrected with rotating mapping of chip 13 & 15

- **Hit Rate**

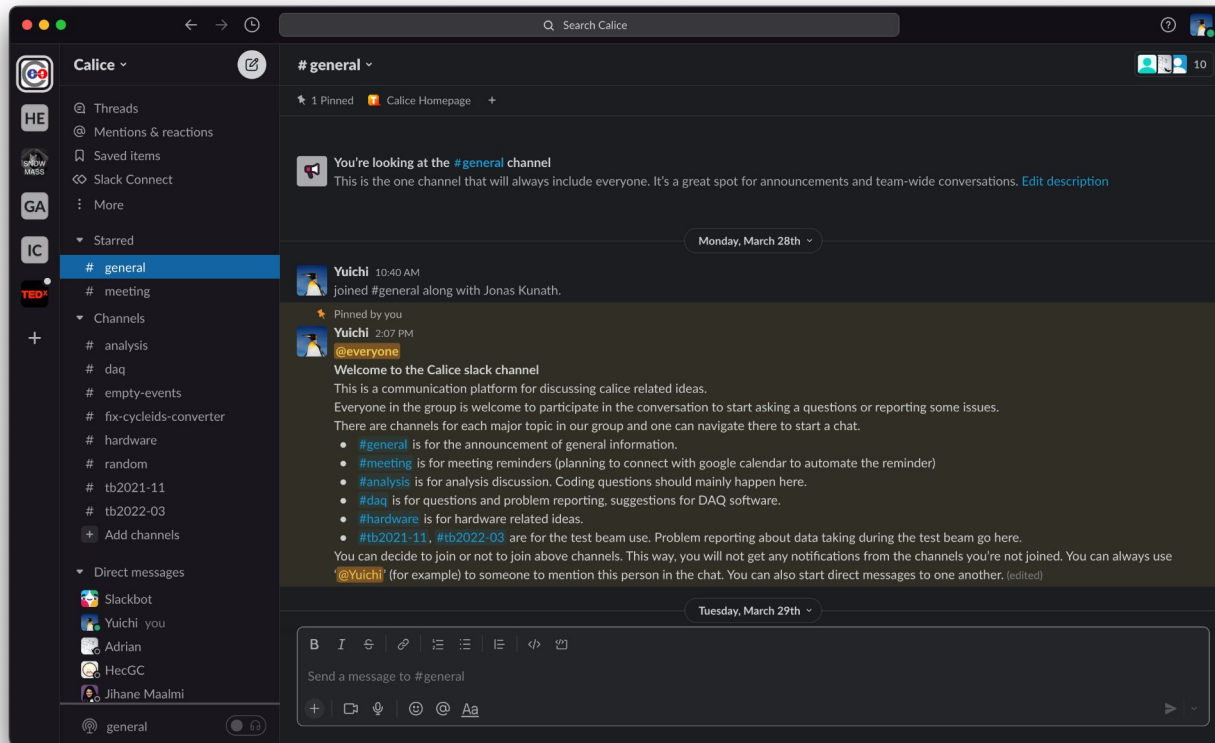
- Offline hit rate monitoring was examined.
- Assist data quality check
- Noise analysis is to be done with the hit rate information obtained from the beam test.

Advertisement

CALICE Slack Group



CALICE Slack Group



https://join.slack.com/t/calice-workspace/shared_invite/zt-16403o2zp-nU88X2~Gg1DwJgBcFULzqA

CALICE Slack Group

The screenshot displays the CALICE Slack workspace. On the left sidebar, the channel list is visible, with the `# analysis` channel highlighted and enclosed in a red rectangle. The main content area shows the `# analysis` channel feed. A message from Yuichi, dated Wednesday, March 30th at 6:04 PM, asks: "Perhaps it's a naïve question but can hit_isHit ever be 0?". This message and its two replies are highlighted with a red rectangle. Below it, another message from Yuichi at 7:21 PM includes a screenshot of a plot titled "Screen Shot 2022-03-30 at 7:19:33 PM.png". The plot shows a histogram of hit rates over time, with a table of statistics in the top right corner: Mean: 2257.99, Std Dev: 1780, and Std Dev: 1094. A message from Jonas Kunath on Thursday, March 31st at 10:05 AM discusses merging files, mentioning `full_converted.root`. The bottom of the interface shows a message input field and a list of direct messages.

Calice

analysis

Analysis Tools

joined #analysis.

Wednesday, March 30th

Yuichi 6:04 PM

Perhaps it's a naïve question but can hit_isHit ever be 0 ?

2 replies Last reply 20 days ago

Yuichi 7:21 PM

Offline hitrate display (run_050282 layer 0)

Screen Shot 2022-03-30 at 7:19:33 PM.png

1 reply 14 days ago

Thursday, March 31st

Jonas Kunath 10:05 AM

Just a remark concerning @Adrian's comment in the daily TB meeting: When running the monitoring, converted files are of course also produced on the fly. Only step missing is to merge the parts into 1 file (`hadd`). In the runs I converted on the eos, that file is named `full_converted.root`.

1 reply 19 days ago

Send a message to #analysis