

Status on ecl trigger

2025/02/19

B2GM

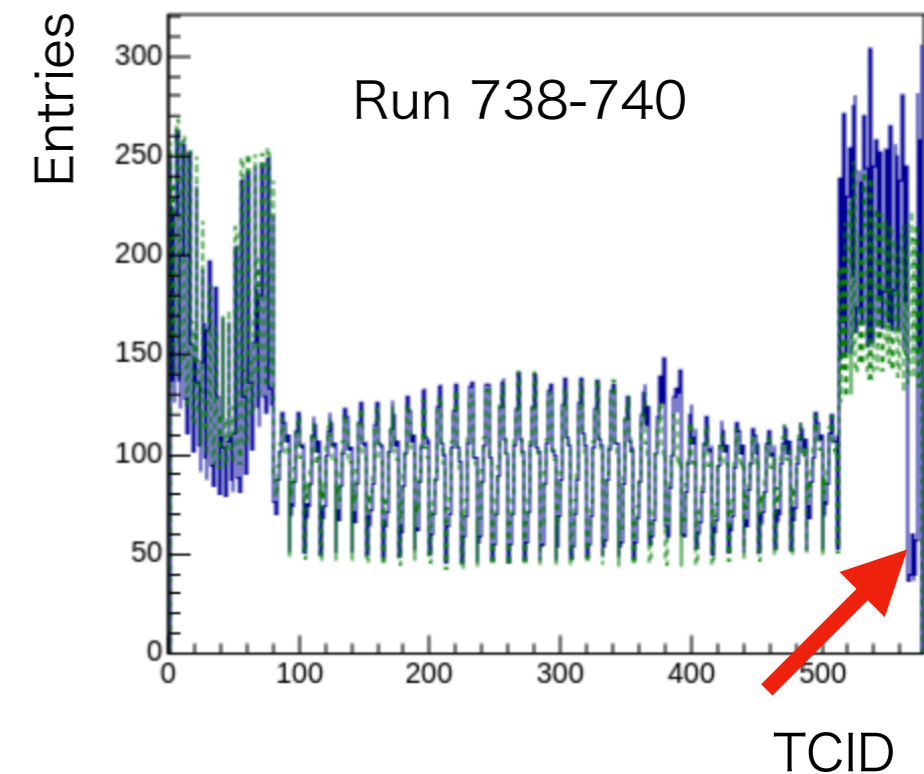
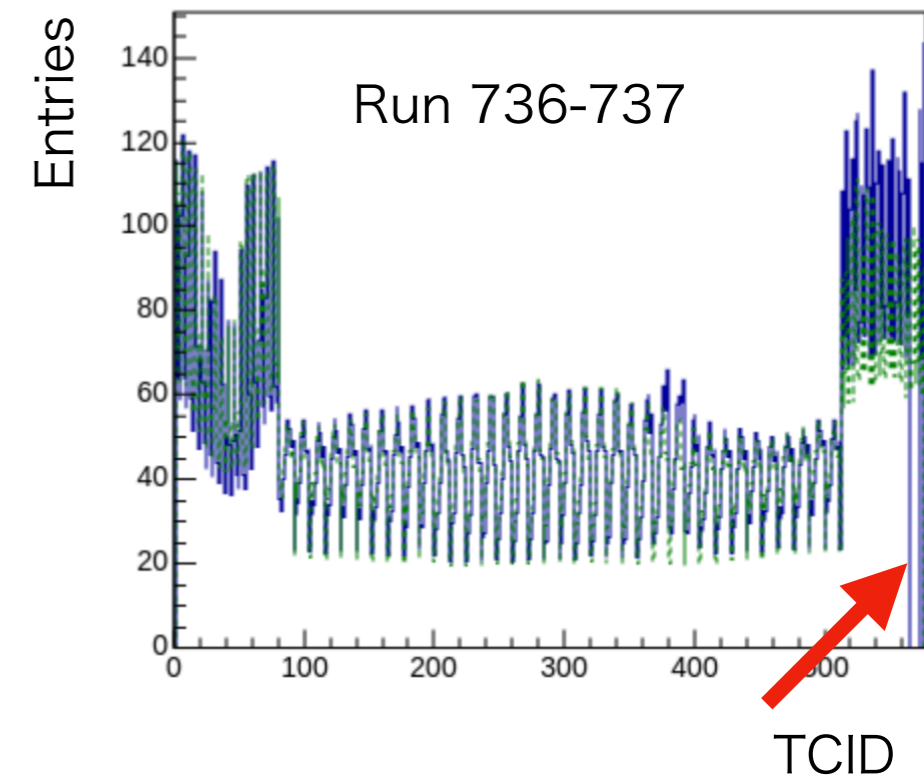
Y.Unno

Updates and problems in exp35

- BAD runs due to dead channels
- Link instability between TMM and ETM
- Alignment problem on TMM and ETM
- Noisy TCs
- EventTiming DQM
- Improved infrastructure of GNN-ETM b2link readout
- Updated energy dependent TC timing correction
 - => Hobin's report

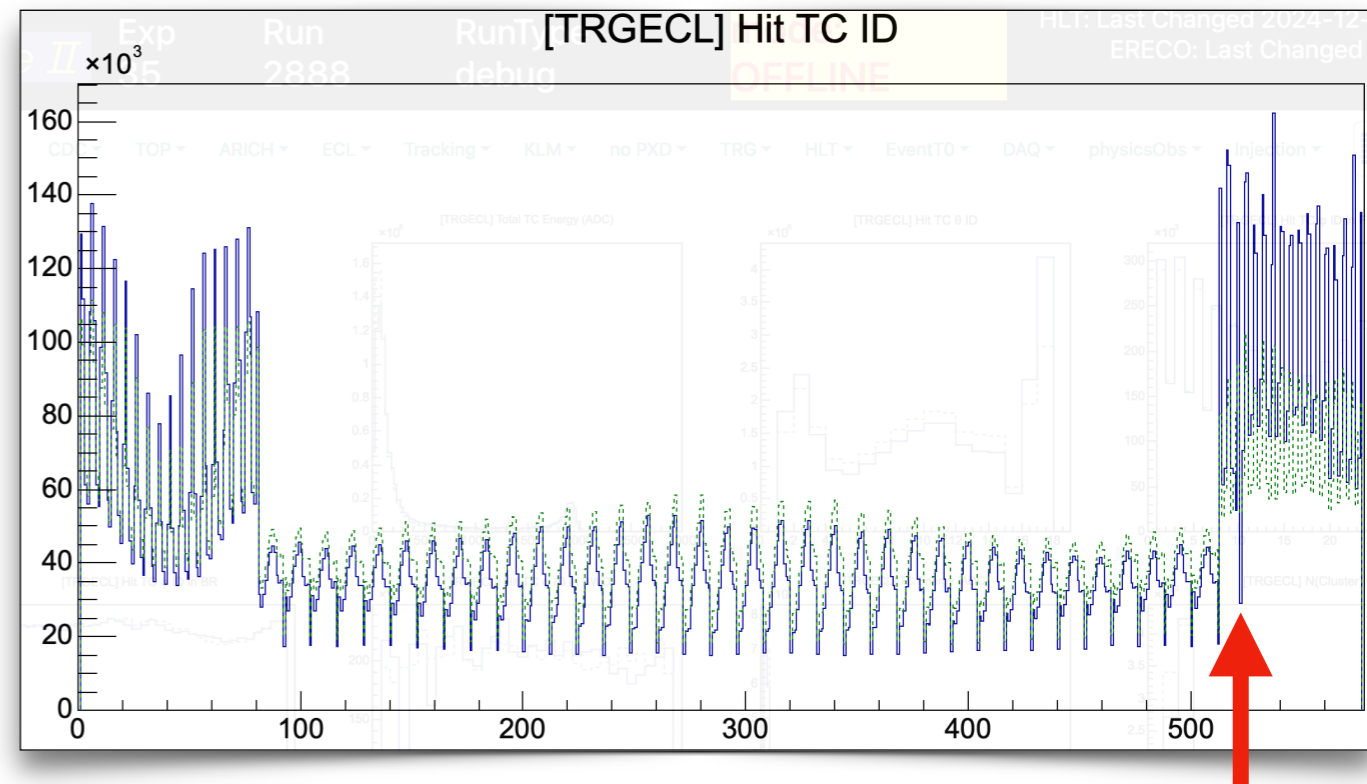
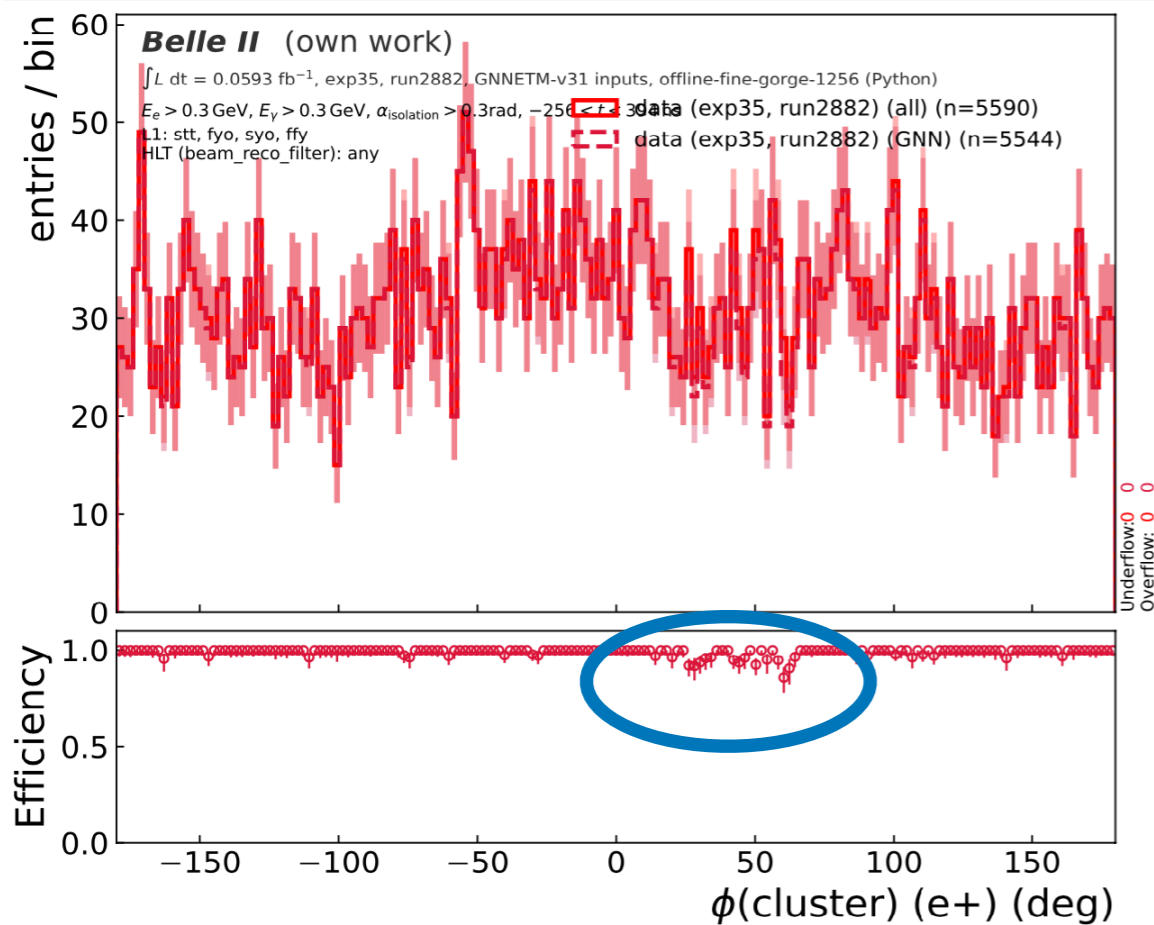
BAD runs(exp35 r736-740)

- Gitlab issue ([link](#))
- Bad runs
 - (A) run 736-737 (61m)
 - (B) run 738-740(25m)
- (A)
 - b2tt down on one FAM happened at first.
 - TC E threshold became maximum for the FAM
 - TRGECL SLC detected it and sent signal to TRG_READY mode
 - Due to a bug(?) in TRG_READY, run didn't stop
 - The bus(?) was fixed.
- (B)
 - The reason is unknown, but I guess it's due to instability of TMM-ETM link
 - Best solution is to stabilize the link
 - It would take time, but anyway plan to try.
 - It's not easy to detect the problem by looking at # of hit, so plan to try alternative method to detect the similar problem by looking at data itself on ETM.



Problem in e35 run2870-2888

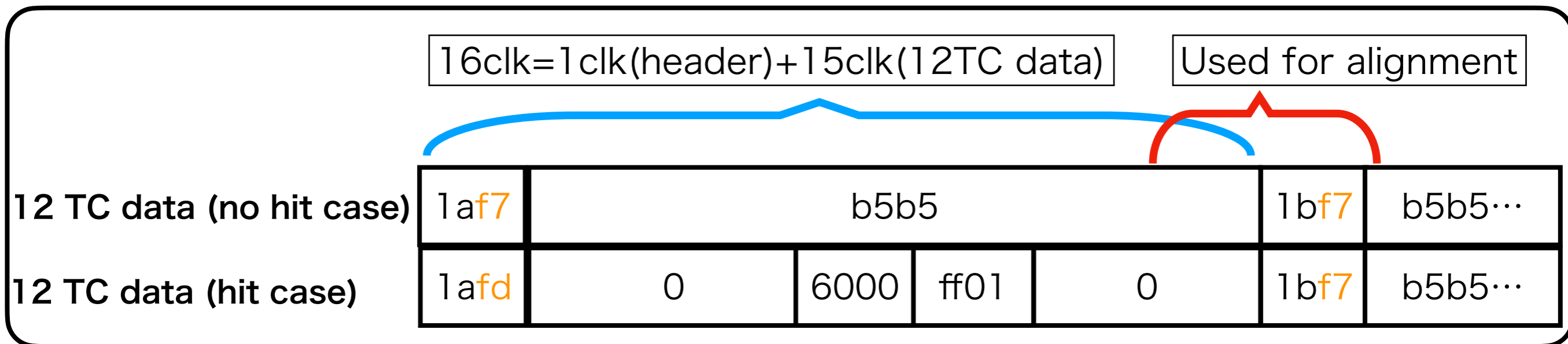
- Torben found some inefficiency of ecl trigger cluster in e35 run 2882
 - radiative Bhabha with CDC trigger and compare ECL and ecl trigger clusters



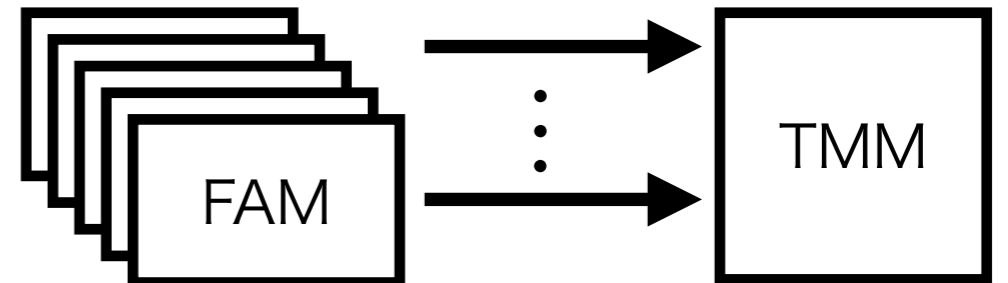
- run 2870-2888 => 11 physics runs (in total, 2hour run and 0.19/fb)
- 4TCs in backward endcap had inefficiency due to link instability
 - Fixed from run 2889 after ETM reboot or link reset
- no problem in other runs except for run 736-740 (dead channels).
- Will not consider the runs as BAD
- Plan to implement a logic to detect same problem in ETM, somehow.

Data alignment problem

- The reason of data alignment instability is (probably) identified.
 - It's most likely due to imperfect alignment logic in TMM and ETM



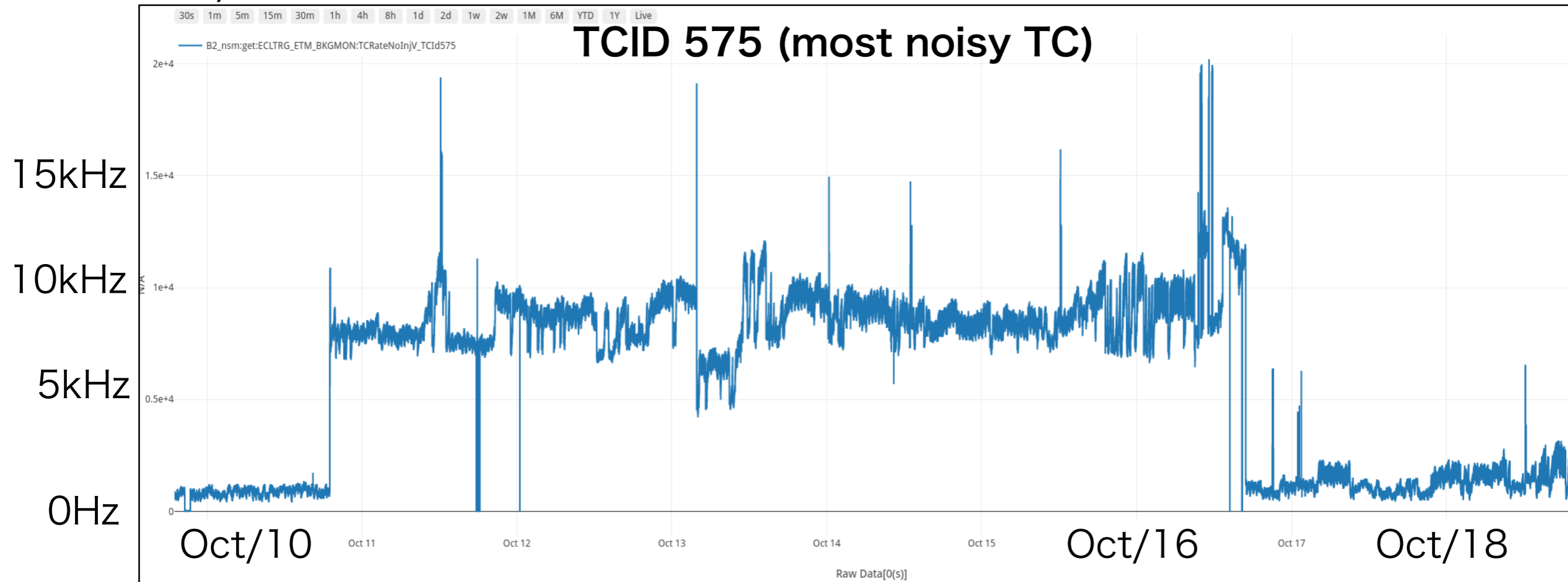
- 12TC data consist of
 - 1clk header : 8bit revo + 8bit (D or K code)
 - 15clk 12TC data
 - B5B5 for 15clk if no TC hit



- Data alignment is done by looking at (B5B5 for a few clks and 8bit header)
- The condition is met for data when non-zero TC hits.
 - Then, data alignment is broken.
 - But, it recovers next data clock (since alignment logic is running every clock)
- They will be fixed by looking at all 16 clocks.

Noisy TCs

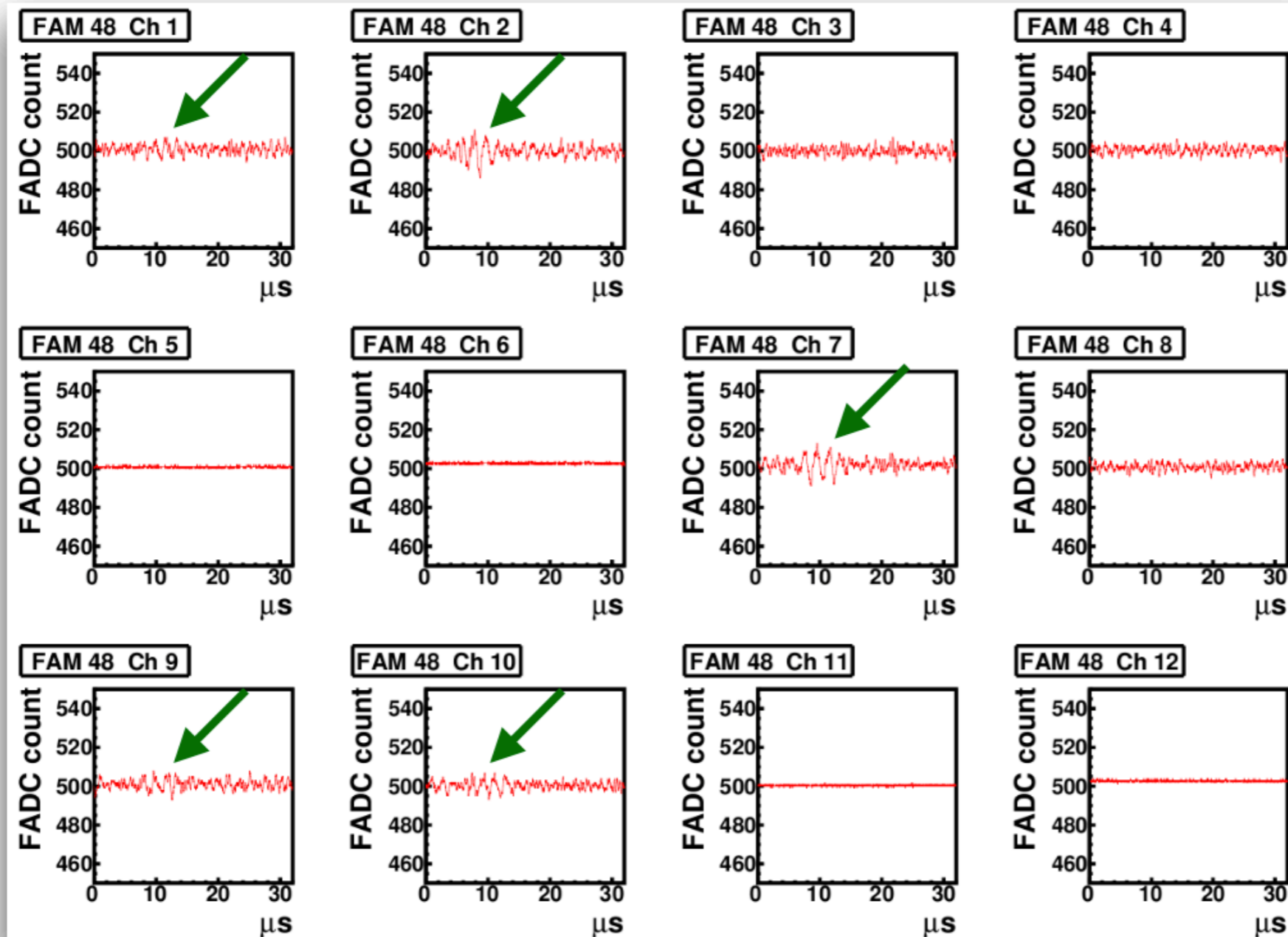
- There were VERY noisy 8 TCs in endcap just before exp35 started
- From Oct/10 to Oct16



- The reason is unknown, why appeared and disappeared.
- For one TC, it became noisy before Oct/10 (it seems it was ok in Sep.)
 - 2 channels(xtal) out of 16 channels produce the noise
- Currently (2025/Feb), some channels in endcap are noisy again.

Noisy TCs

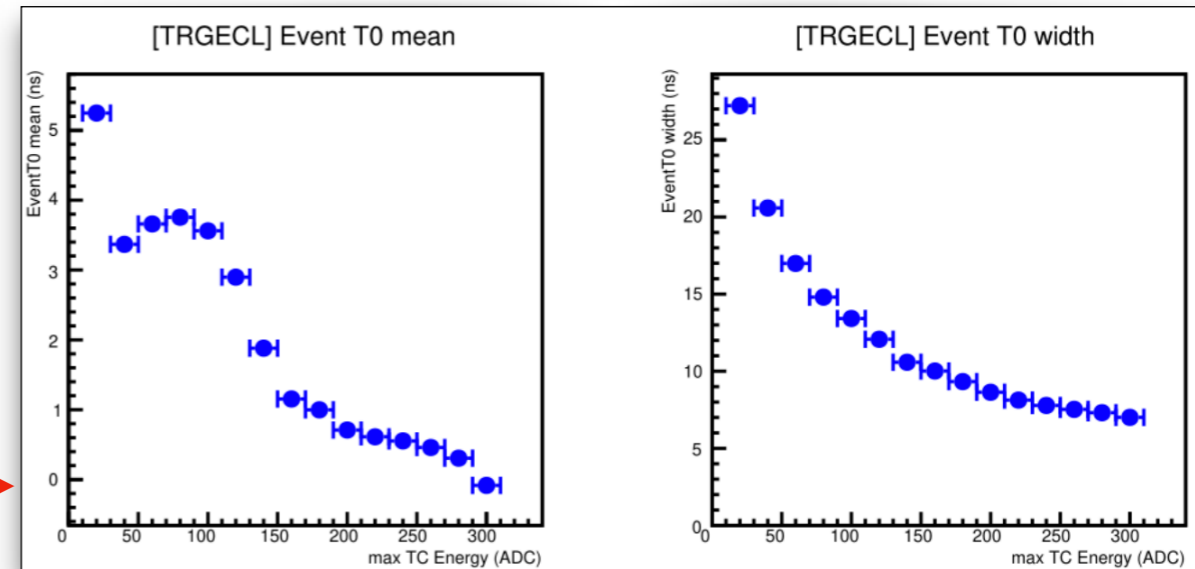
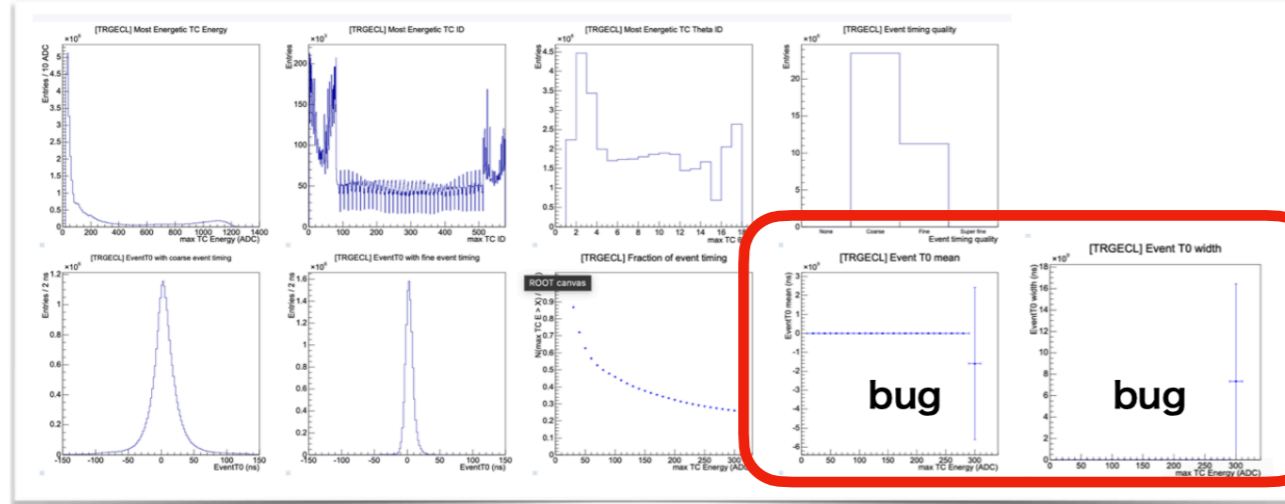
- Some channels became noisy
 - Normal TC hit rate for cosmic is 10Hz, but >1000Hz sometimes
 - Noisy channels are all in endcap, and noise level is changing...
 - Example waveform



Event timing DQM

- Event timing DQM were prepared during 2024b run

- bug was found



- The bugfix and MR are done, and ready for 2024c run.

- Plan

- Prepare manual
- Add some parameters to QAM (or mirabelle)
- Report and discuss with SVD experts for next updates.

- Bugs were fixed and plots were correctly shown in exp35.

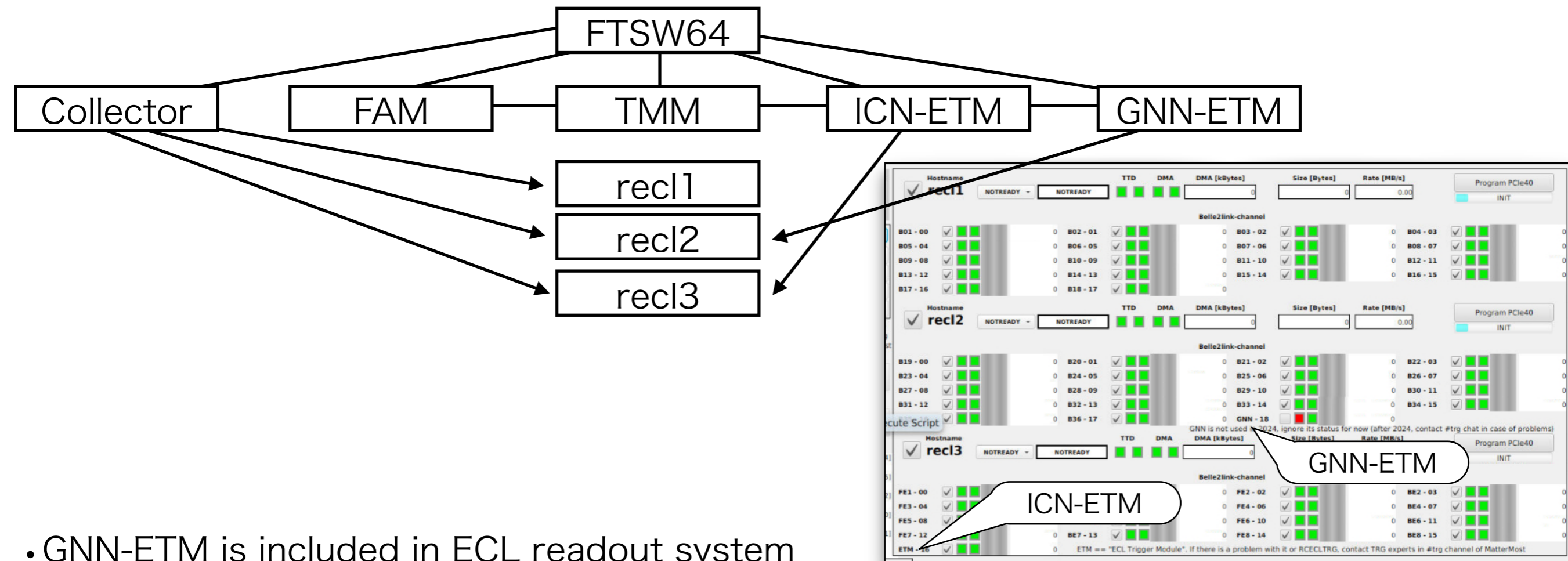
- Manual was prepared and passed to SVD group.

- Currently OnlineEventT0(all sub detectors) is used

- Some plots were affected by timing shifts in each sub detectors

- Plan to add some plots with only SVD OnlineEventT0 to have more reliable plots.

GNN-ETM b2link readout



- GNN-ETM is included in ECL readout system
 - Thanks to big efforts of Yamada-san, Mikhail, Marc and Isabel
- ECL run control GUI includes GNN-ETM
- GNN-ETM data is split and stored to TRG dataobject on rec2
- Updated unpacker of ICN-ETM in order to distinguish ICN-ETM and GNN-ETM data in TRG dataobject, and also Isabel prepared GNN-ETM unpacker
- Local run with GNN-ETM works
 - Plan to update ECL GUI to configure ICN-ETM and GNN-ETM from the GUI for different type of local runs(cosmic and test pulse)

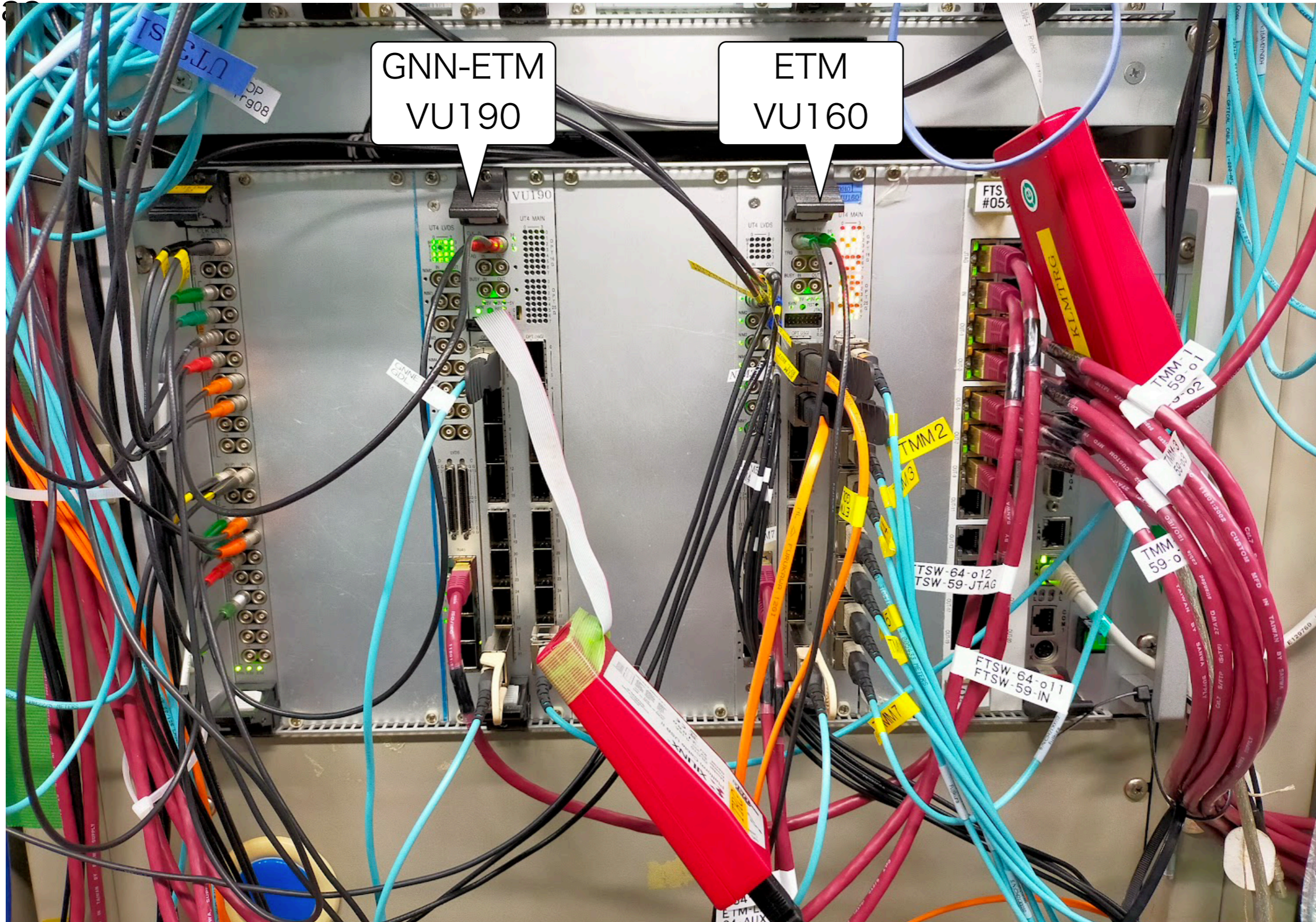
Plan

- Investigate the reason of TMM-ETM link instability
- Prepare logic to detect TMM-ETM link instability from data
- Update data alignment logic in TMM and ETM
- Update DQM
- Update ETM slow control to have parameter check logic
- OS update for btrgctr0/1 (together with all servers in B2)
- Investigation of FAM29 ttlost
- Investigation of noisy TC
- Update tsim to utilize condition database
- Update CSS (TRG and ECL)
- Improve timing logic (Hobin Lee(SNU))

Backup

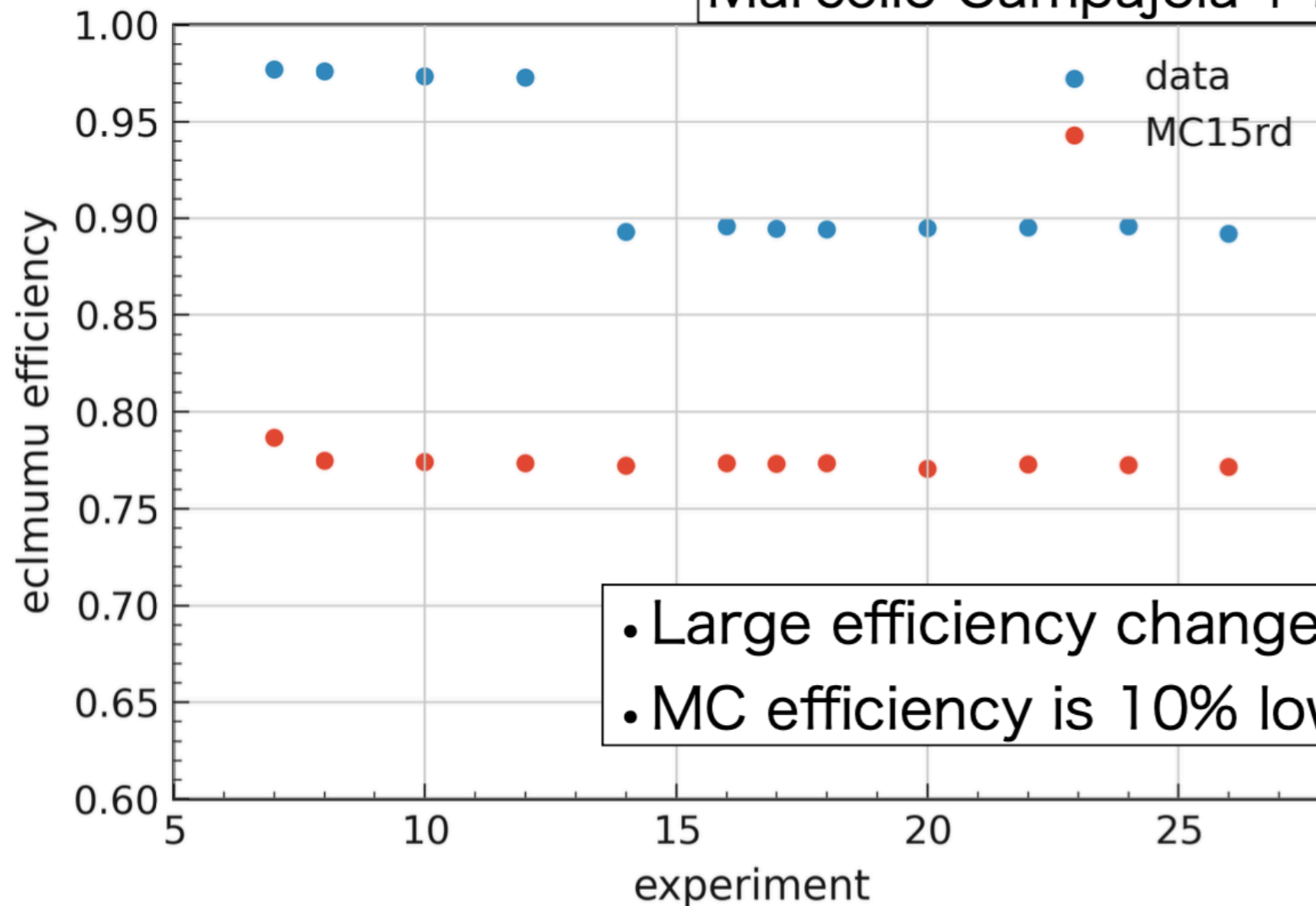
GNN-ETM in ehut

• App



Status of problems found from eclmumu bit

Marcello Campajola + Kang Chen and Yubo Li



- Large efficiency change in data from exp14
- MC efficiency is 10% lower than data

• eclmumu bit, generated by ETM and prescale=1 at GDL

- $165^\circ < \Sigma\theta_{\text{CM}} < 190^\circ$, where $\Sigma\theta_{\text{CM}}$ is sum of polar angles of 2 clusters in CM
- $160^\circ < \Delta\phi_{\text{CM}} < 200^\circ$, where $\Delta\phi_{\text{CM}}$ is difference of phi angles of 2 clusters in CM
- $E(\text{CL1}) < 2 \text{ GeV} \ \&\& \ E(\text{CL2}) < 2 \text{ GeV}$
 - where $E(\text{CLX})$ is energy of cluster number X ($X=1,2$) in CM

Status of problems found from eclmumu bit

- With large contributions from Kang, Yubo, Junhao, and Koga-san,
 - For tsim, bugs were found
 - Affected all ecl trigger bits, but mainly for ecl mumu
 - For FW, wrong cluster energy threshold for exp14-26 were found
 - The threshold was ok for $\leq \text{exp}12$ and $\geq \text{exp}27$
- Yubo prepared script which check parameter in real data and checked past data if similar problem for other bits exist or not.
 - Fortunately, no problem in other trigger bit was confirmed.
- Bugfix tsim was prepared and it is in release.
- In order to have exp dependent parameter, tsim is updated again.
 - updated tsim is in MR
 - conditionDB related update is in MR
- Plan
 - Complete tsim updates with conditionDB
 - Update ETM SLC to monitor all parameters