RESULTS TO BE PRESENTED

1) TRIGGER EFFICENCY OF THE DETECTOR

2) SHIFT OF THE THE g-g INVARIANT MASS

3) STATUS OF THE 4 BLOCKS ADDED

4) 2D PLOT FOR THE PEDESTALS CHECK

5) PROBLEMATIC BLOCKS

TRIGGER EFFICENCY

- **Kinematics :** Kin_x50_4 (HMS momentum : -5.253, HMS = 16.917 deg, SHMS = 31.747 deg and NPS = 14.447).

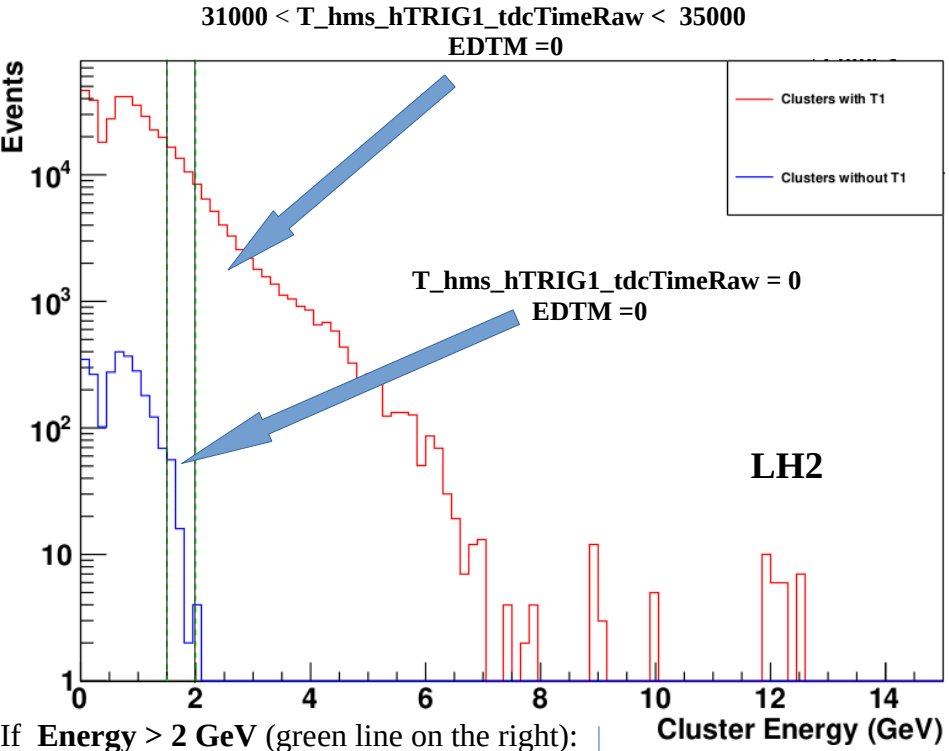
- **13 runs on LH2 (50 k rootfiles):** {1630, 2358, 2379, 2419, 2439, 2467, 2489, 2490, 2549, 2569, 2570, 2601, 2602}.

- **12 runs on LD2 (50 k rootfiles):** {2411, 2412, 2429, 2450, 2467, 2477, 2532, 2559, 2586, 2587, 2617, 2346}.

- Using the **NPS variables for the clustering** and the **T1 trigger TDC raw time** variable: "**T_hms_hTRIG1_tdcTimeRaw**".

- T1 trigger: (NPS VTP1 Cluster **OR** NPS VTP2 Cluster **OR** EDTM Delay).

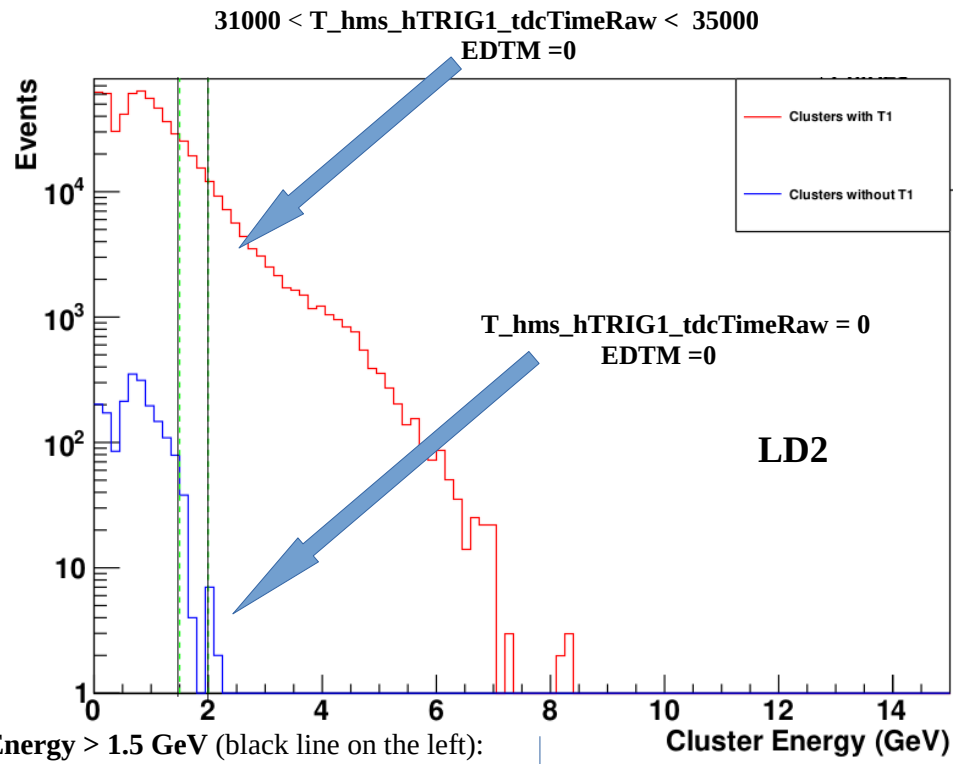
- Taking in account only **the highest energy cluster** in each event.



If **Energy > 2 GeV** (green line on the right):
- **14097** events **with T1**
- **1** events **without T1**
- EFFICENCY = **99.9929 % ± 0.0084**

If **Energy > 1.5 GeV** (Black line on the left):
- **30016** events **with T1**
- **46** events **without T1**
- EFFICENCY = **99.8469 % ± 0.0057**

No cuts on energy :
- **405614** events **with T1**
- **2491** events **without T1**
- EFFICENCY = **99.3896 % ± 0.0015**

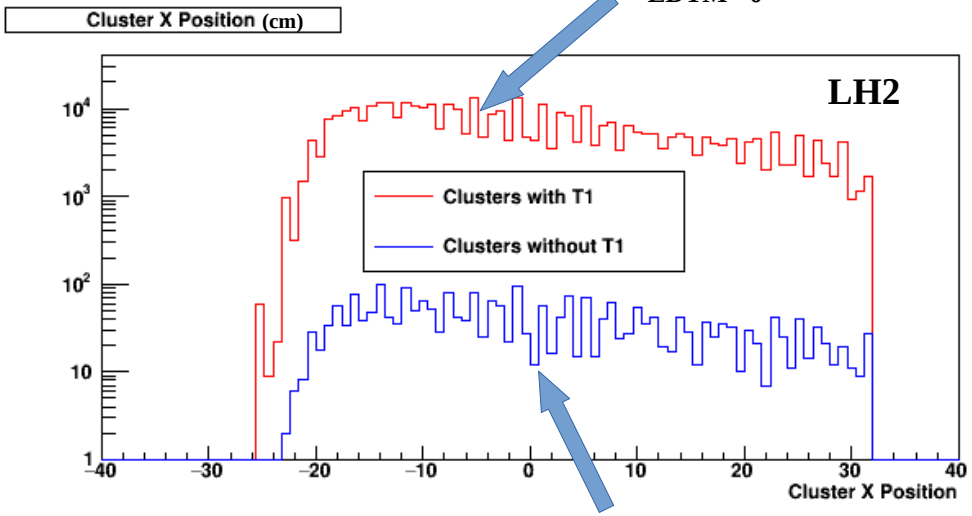


If **Energy > 1.5 GeV** (black line on the left):
- **37283** events **with T1**
- **25** events **without T1**
- EFFICENCY = **99.9329% ± 0.0051**

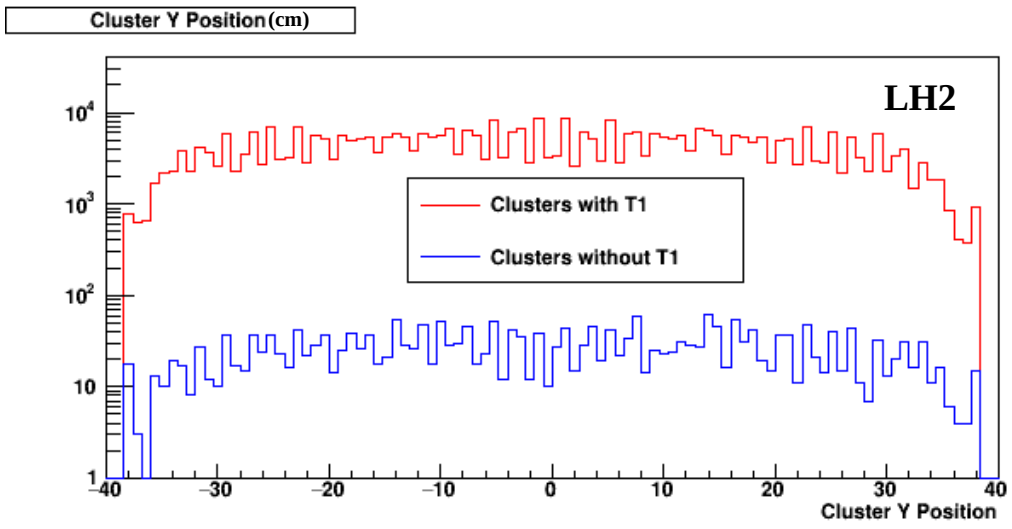
If **Energy > 2 GeV** (green line on the right):
- **16945** events **with T1**
- **1** event **without T1**
- EFFICENCY = **99.9940% ± 0.0076**

No cuts on energy :
- **610466** events **with T1**
- **1918** events **without T1**
- EFFICENCY = **99.6867% ±0.0012**

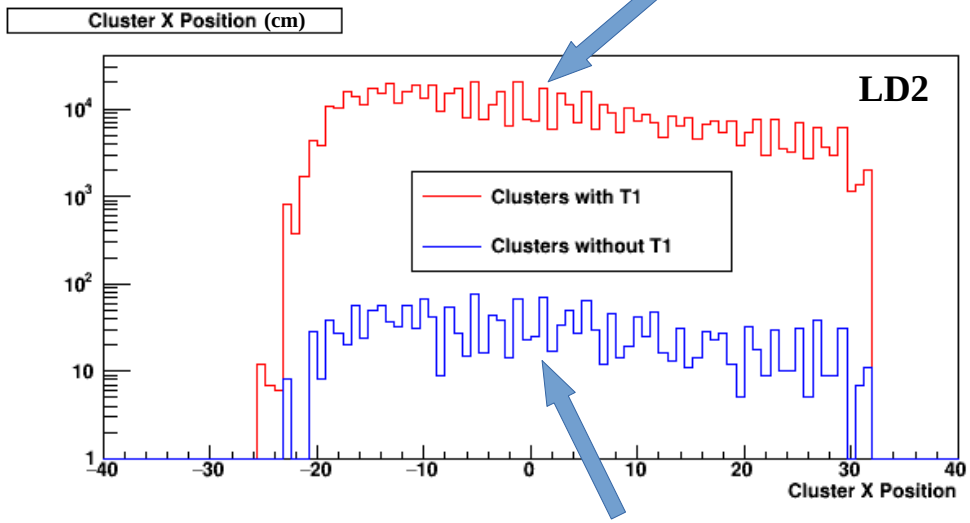
31000 < T_hms_hTRIG1_tdcTimeRaw < 35000
EDTM =0



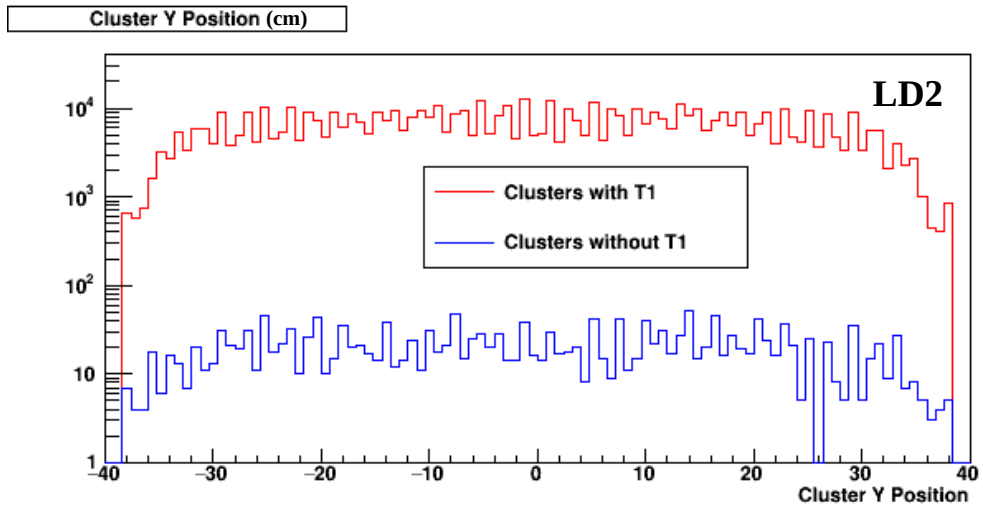
T_hms_hTRIG1_tdcTimeRaw = 0
EDTM =0



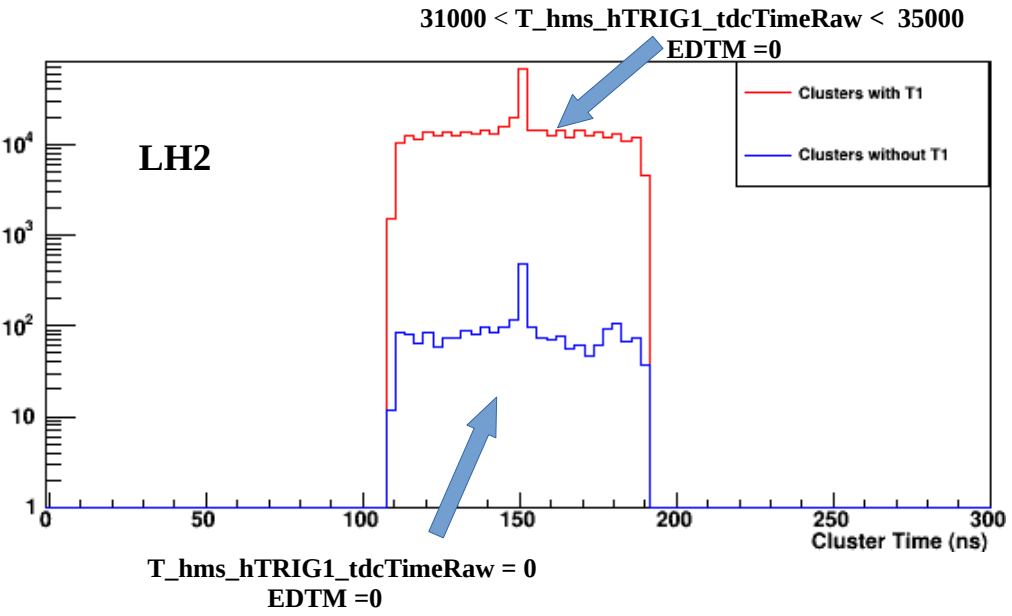
31000 < T_hms_hTRIG1_tdcTimeRaw < 35000
EDTM =0

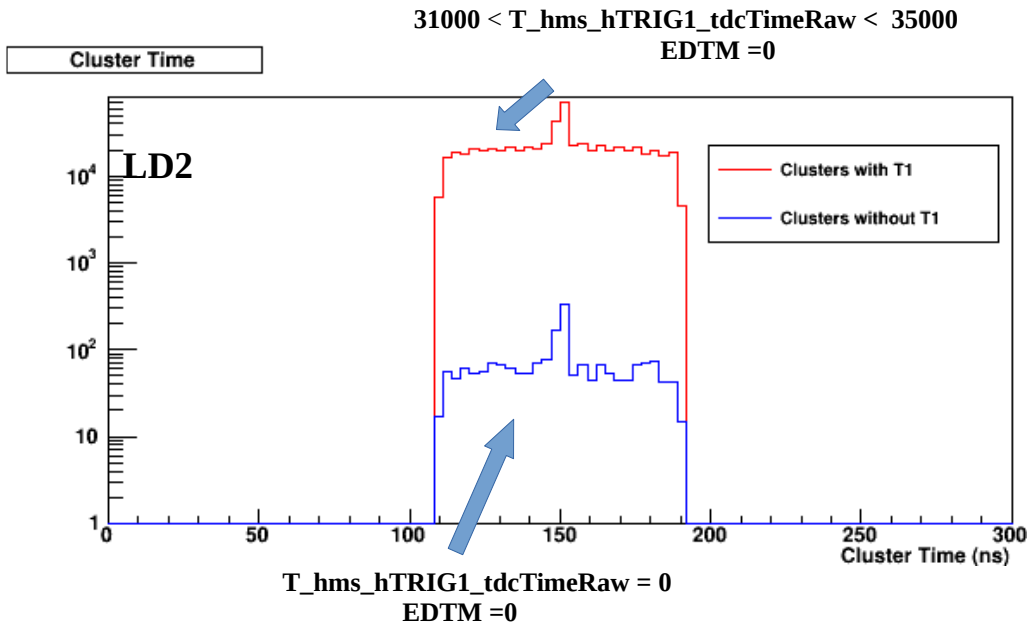


T_hms_hTRIG1_tdcTimeRaw = 0
EDTM =0

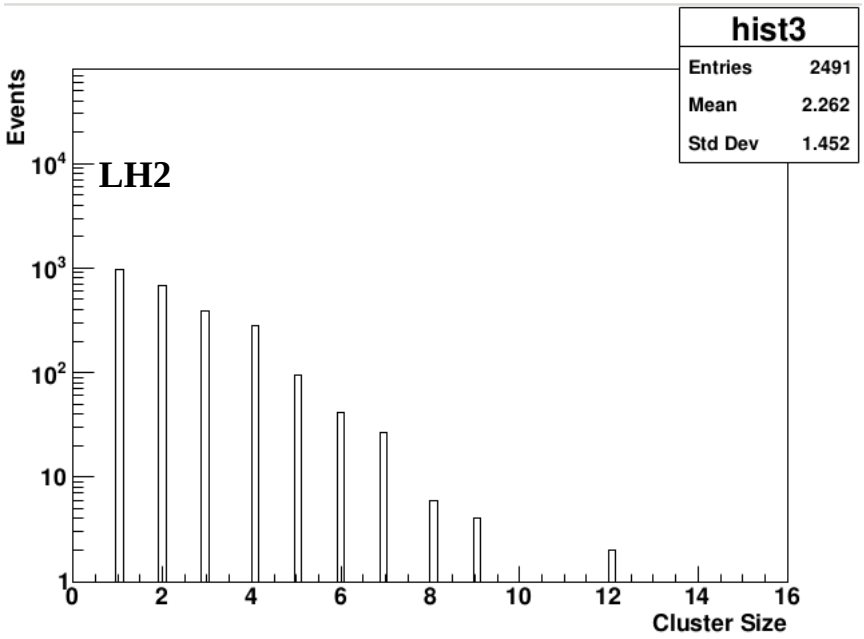


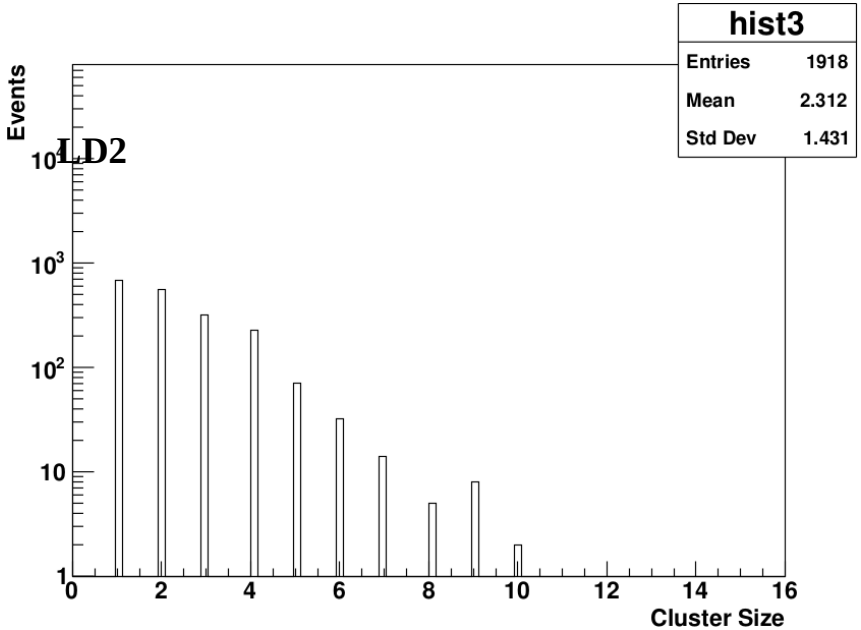
==>> The non triggered by T1 clusters are smeared across the detector





==>> Clusters are centered around 150 ns and a varying cluster size from 1 to 12 for LH2 and 1 to 10 for LD2





SHIFT OF THE THE g-g INVARIANT MASS

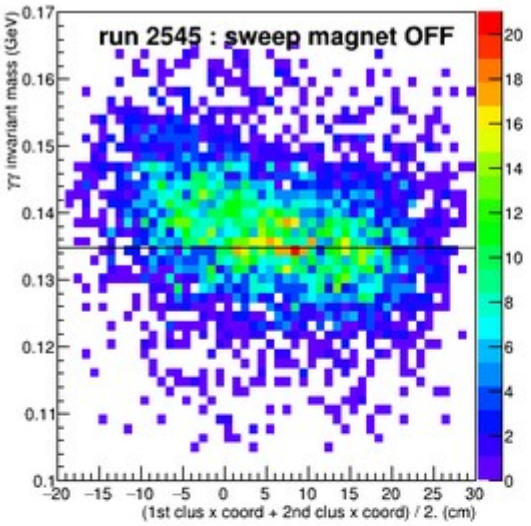
- Applied **pi0 calibration** on couple of runs before the **run 2545**.

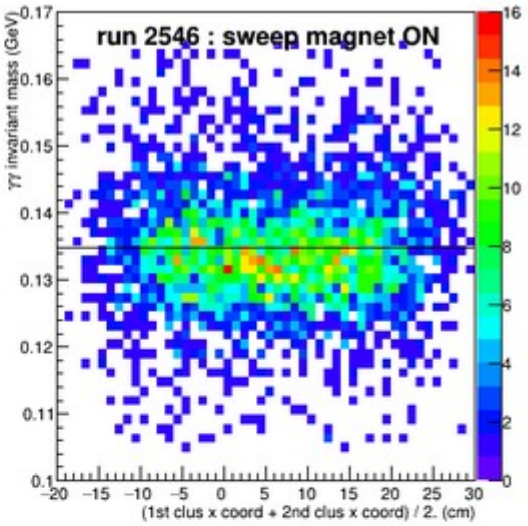
- Applied the **calibration coefficients** obtained on the runs **2545** and **2546**.

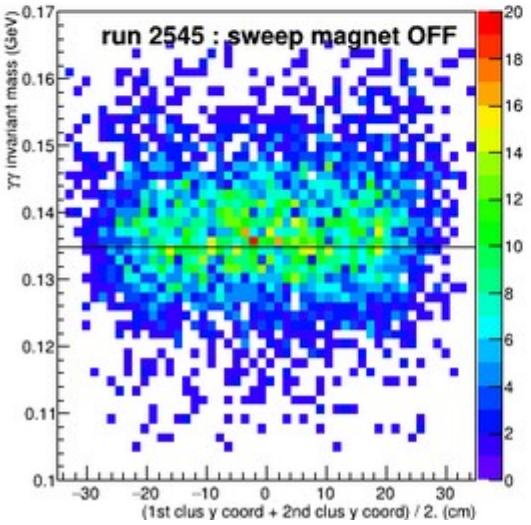
- Same target (**LH2**) and same current (**5 uA**) for both runs.

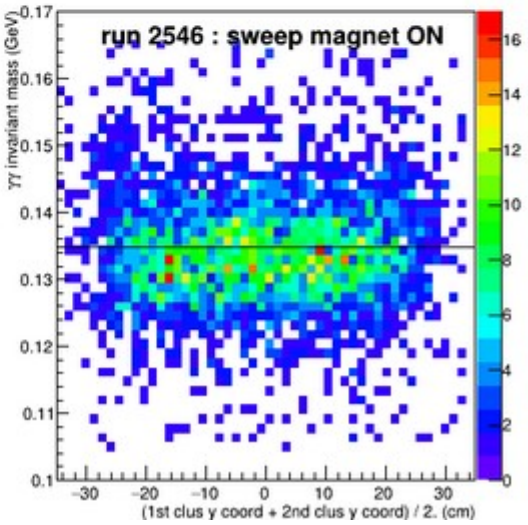
- Cuts applied on both runs:

  ==>> HMS basic cuts (**dp|<8% & |ph|<0.04 & |th|<0.08 & |react.z|<4**).
  ==>> Removed the edge blocks of the NPS.
  ==>> Removed the **5 first** columns (0 to 4).



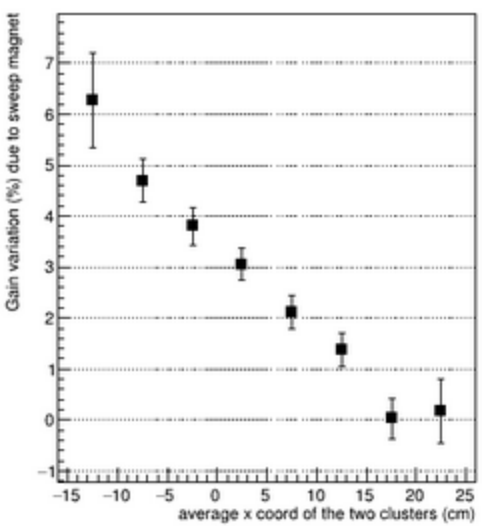


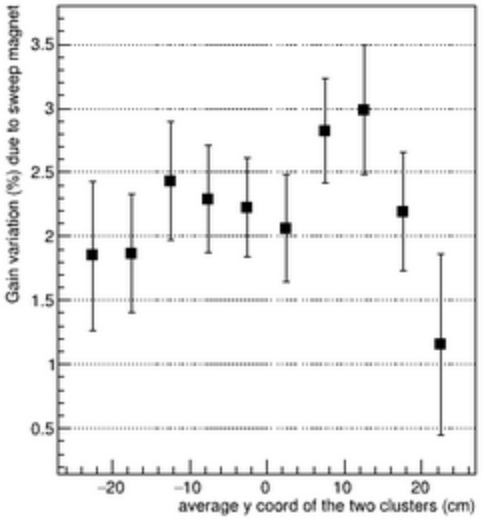




- An apparent **shift** of the invariant mass as a function of the (x1+x2)/2 position especially for the blocks **closest to the Beam line**.

- The shift observed seems more **dependent on x** than on y coordinates of the clusters.





- A drastic variation of the gain as a function of **the average x** coordinates of the clusters.

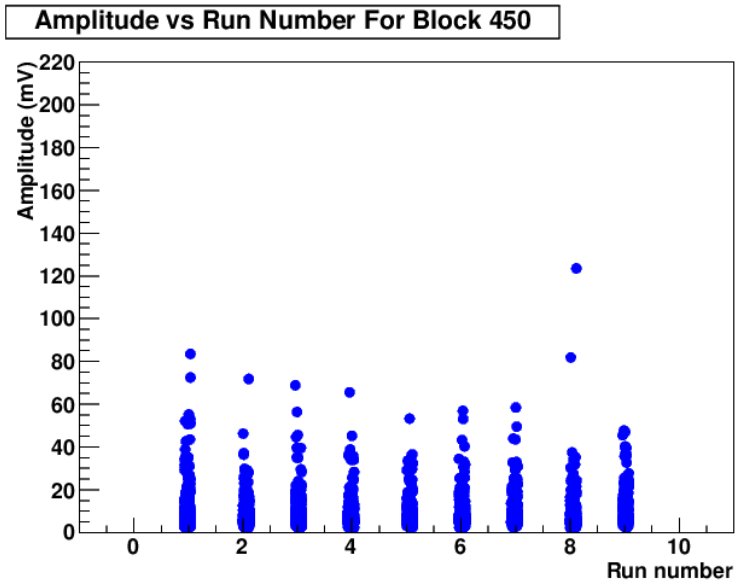
- There is an effect of magnet on the calibration coefficients that we need to take in account.

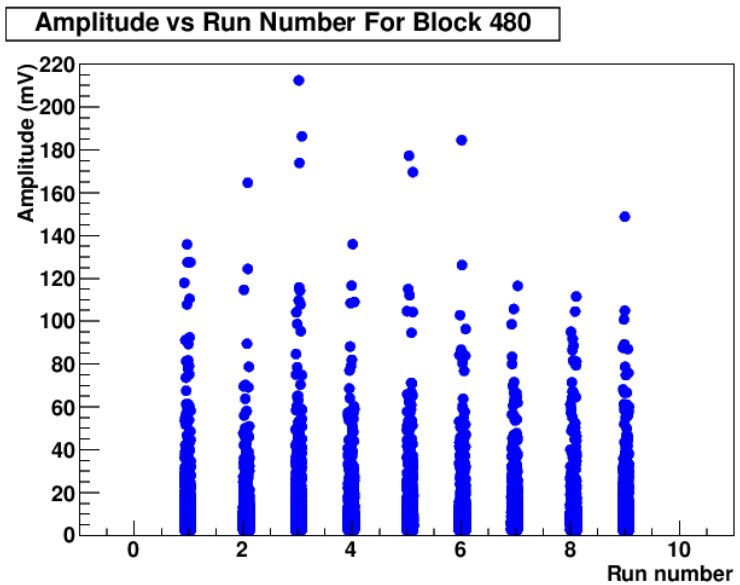
- Why there is an effect ? Maybe the magnetic field is stronger in the region closest to the beam line ? Maybe the blocks closest to the beam accumulate more noise when the magnet is off ? Other reasons ?

STATUS OF THE 4 BLOCKS ADDED

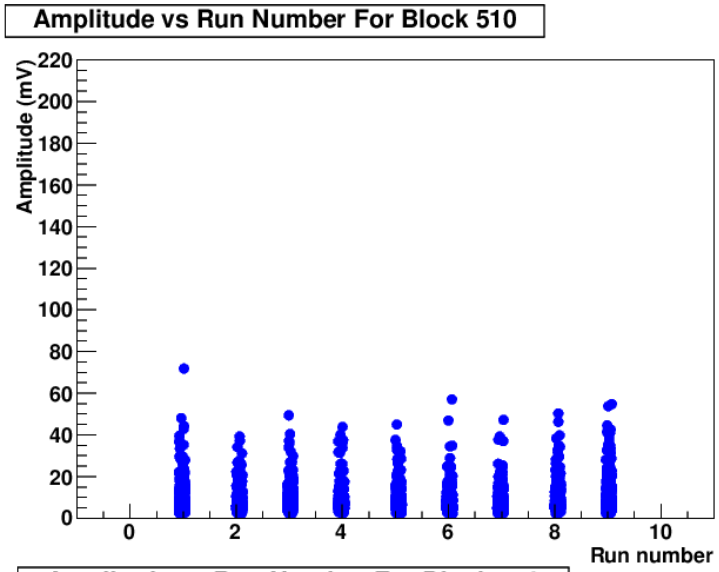
- Checked the last **10 coin runs** : {2498,2536,2551,2561,2572,2591,2606,2622,2633,2646}

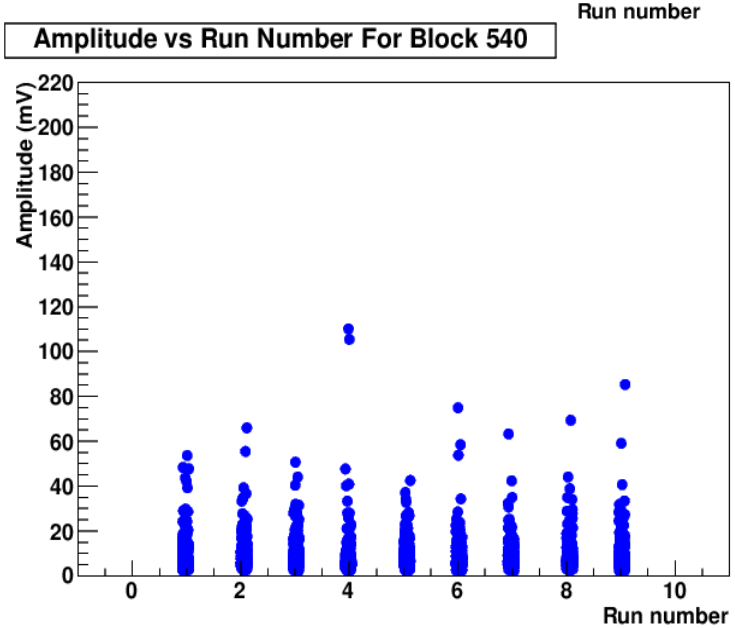
With the regulator



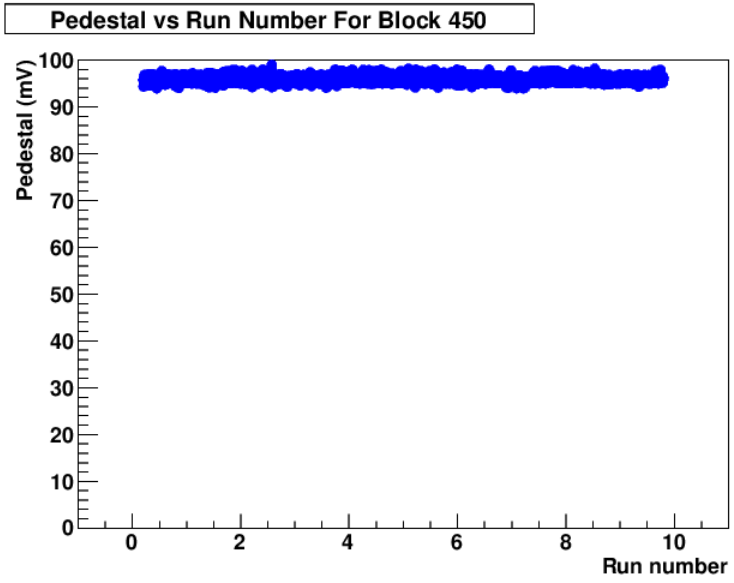


Bypassed regulator

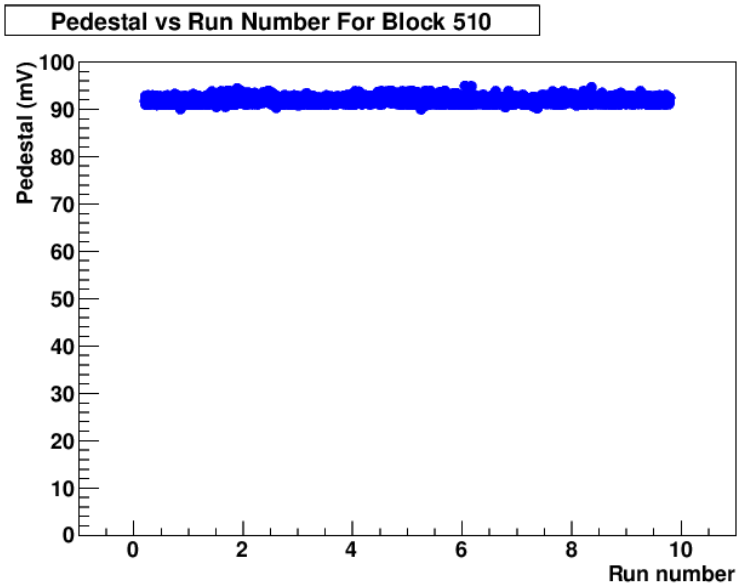


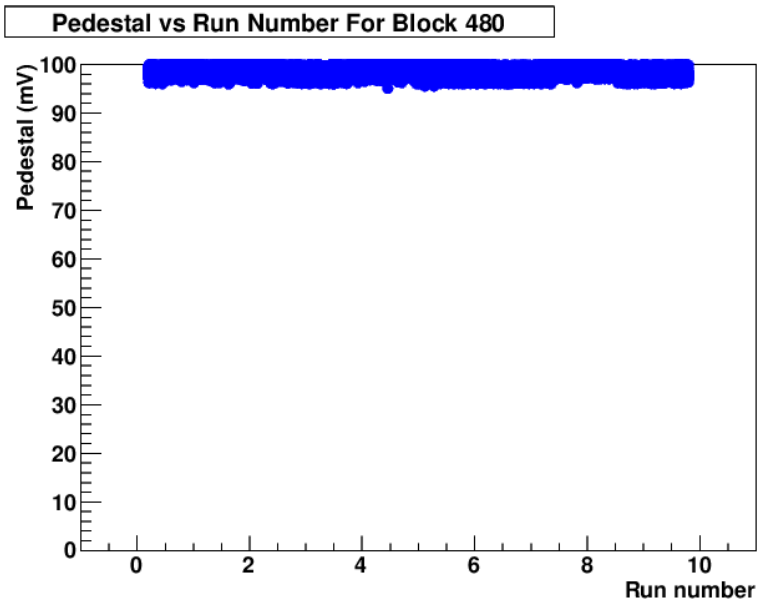


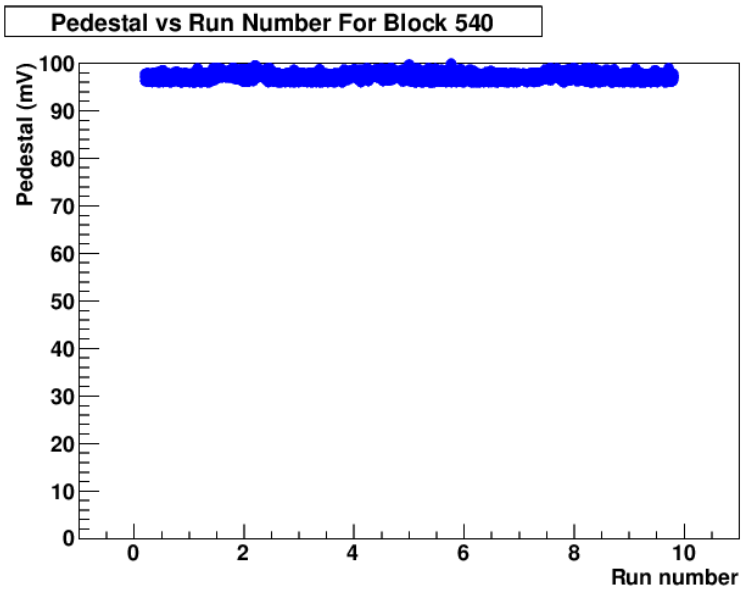
With the regulator



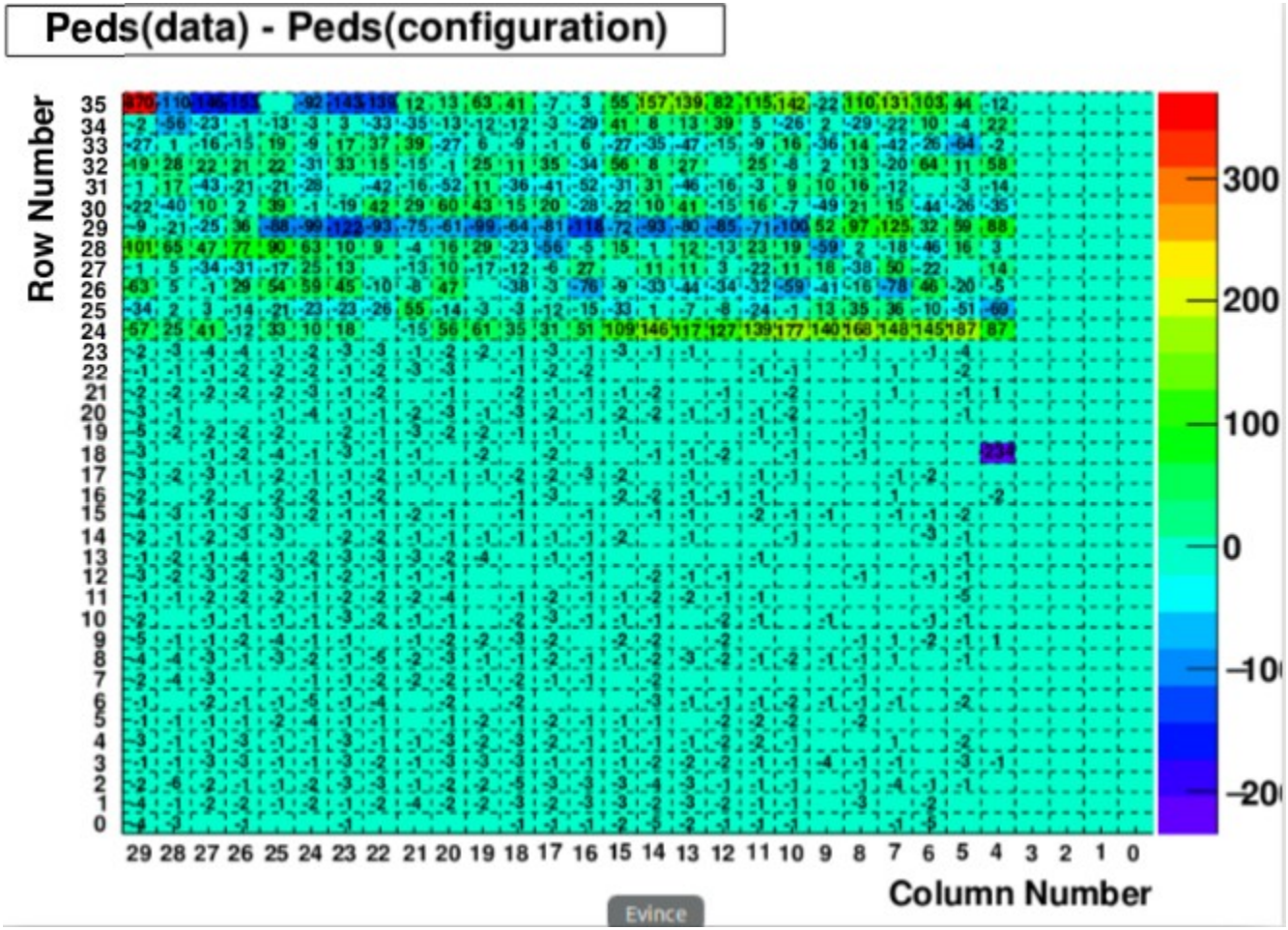
Bypassed regulator







2D PLOT FOR THE PEDESTALS CHECK

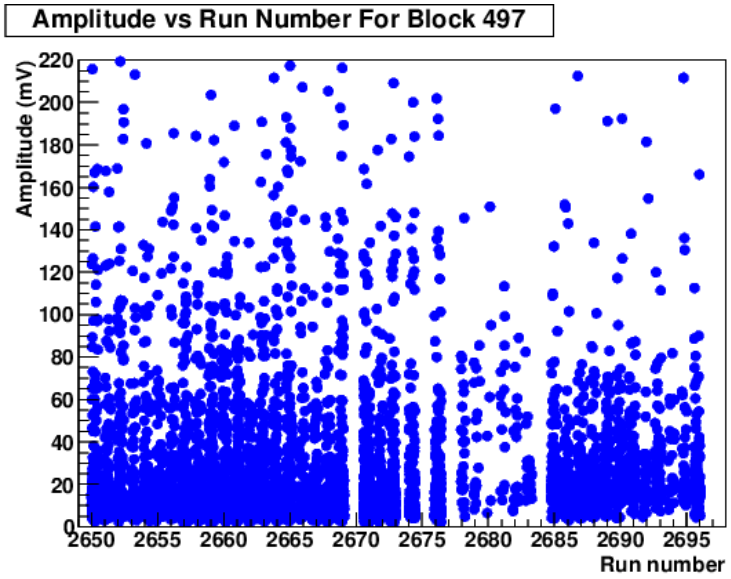


- Script that reads the configuration file and extract the values of the pedestals to a txt file.

- Script that reads the txt file, the pedestals from the rootfile and plots the difference between peds of the current run and the configuration file.

- The 2D shown is a test not actual data.

PROBLEMATIC BLOCKS



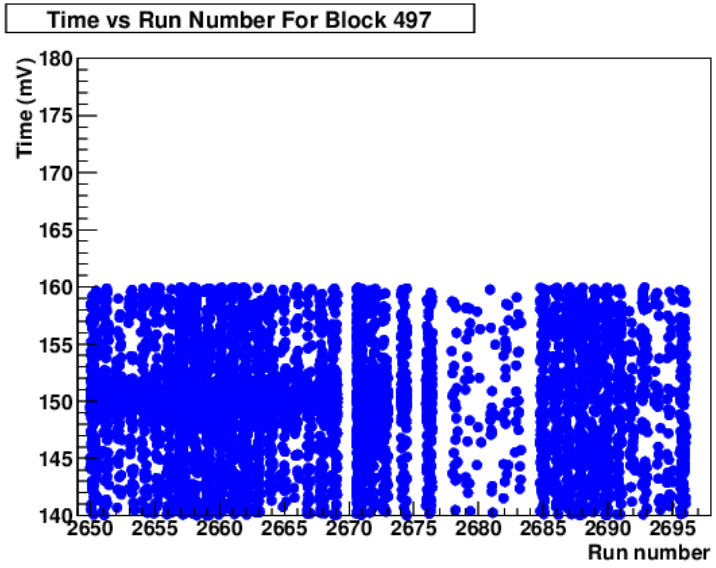
==>> BLOCK 497: (solved)

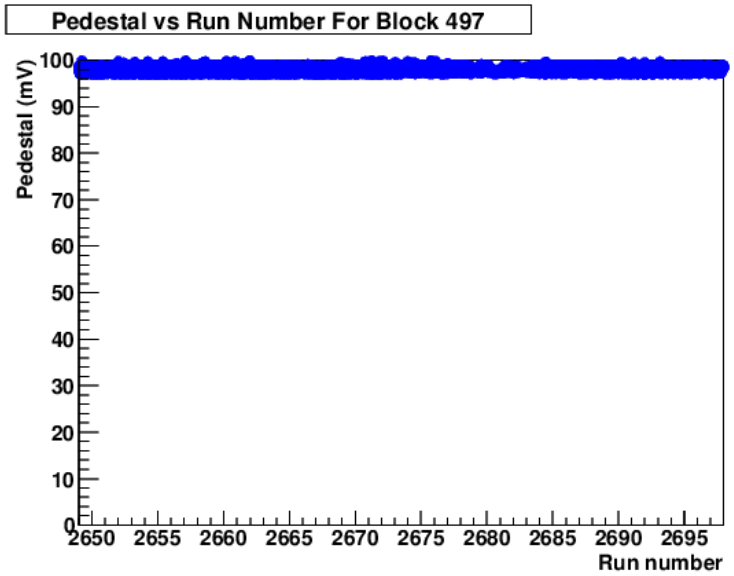
- The pedestal seems stable over all the runs.

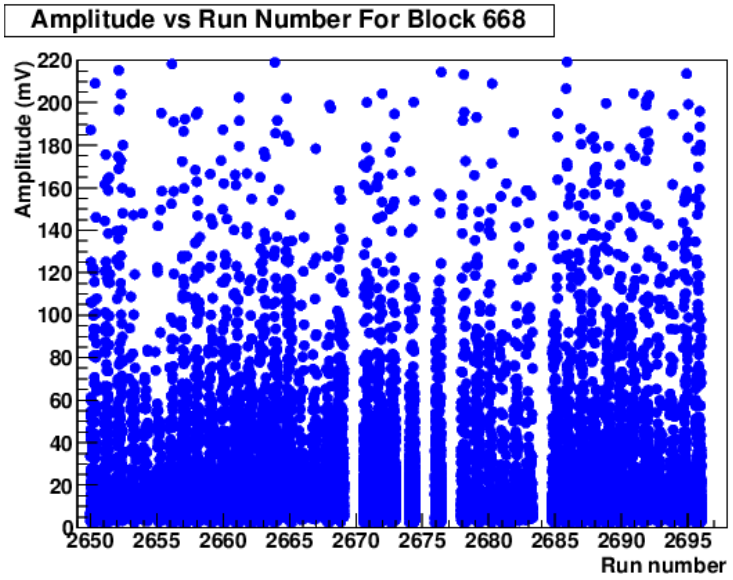
- The amplitude seems fluctuating and during the runs between 2675 to 2685, you can see in the plot that the amplitude stored is lower and less frequent. This means that the hits stored are also lower during these runs. There are some runs which weren't replayed that's why we see some blank vertical lines. I'll try to investigate what happened in the VTP also between these runs to see if there is a possible direct/indirect effect. The power cycle of the VME crate3 that Chandan did didn't affect it also.

- The time behaviour is the same as the amplitude as you can see in the plot.

- It was a VME crate reboot that solved this odd behavior.







==>> **Block 668**:

- For the time and pedestal, both seems to be stable for all the runs. The blank vertical lines as i metioned before are runs that the crew didn't replay, so no serious issue.

- The amplitude also seems fluctuating over some runs but no signs for odd dips. Indeed, you can see between the runs 2675 to 2685 the amplitude and hits were quite lower than usual. If you compare that plot to the other plot for the block 497, you will see that the block 497 does really have a problem.