Status Report

November 16th, 2018

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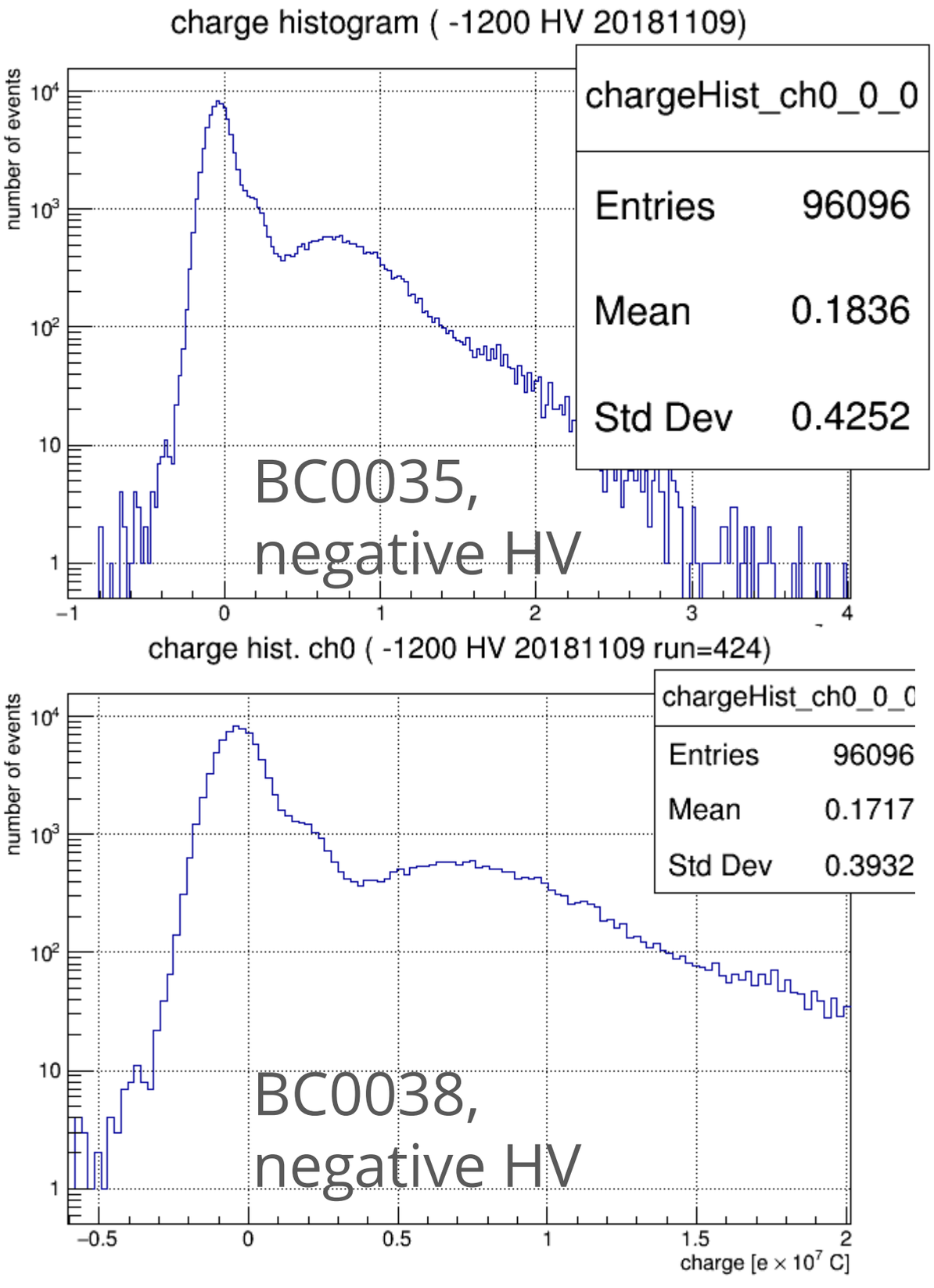
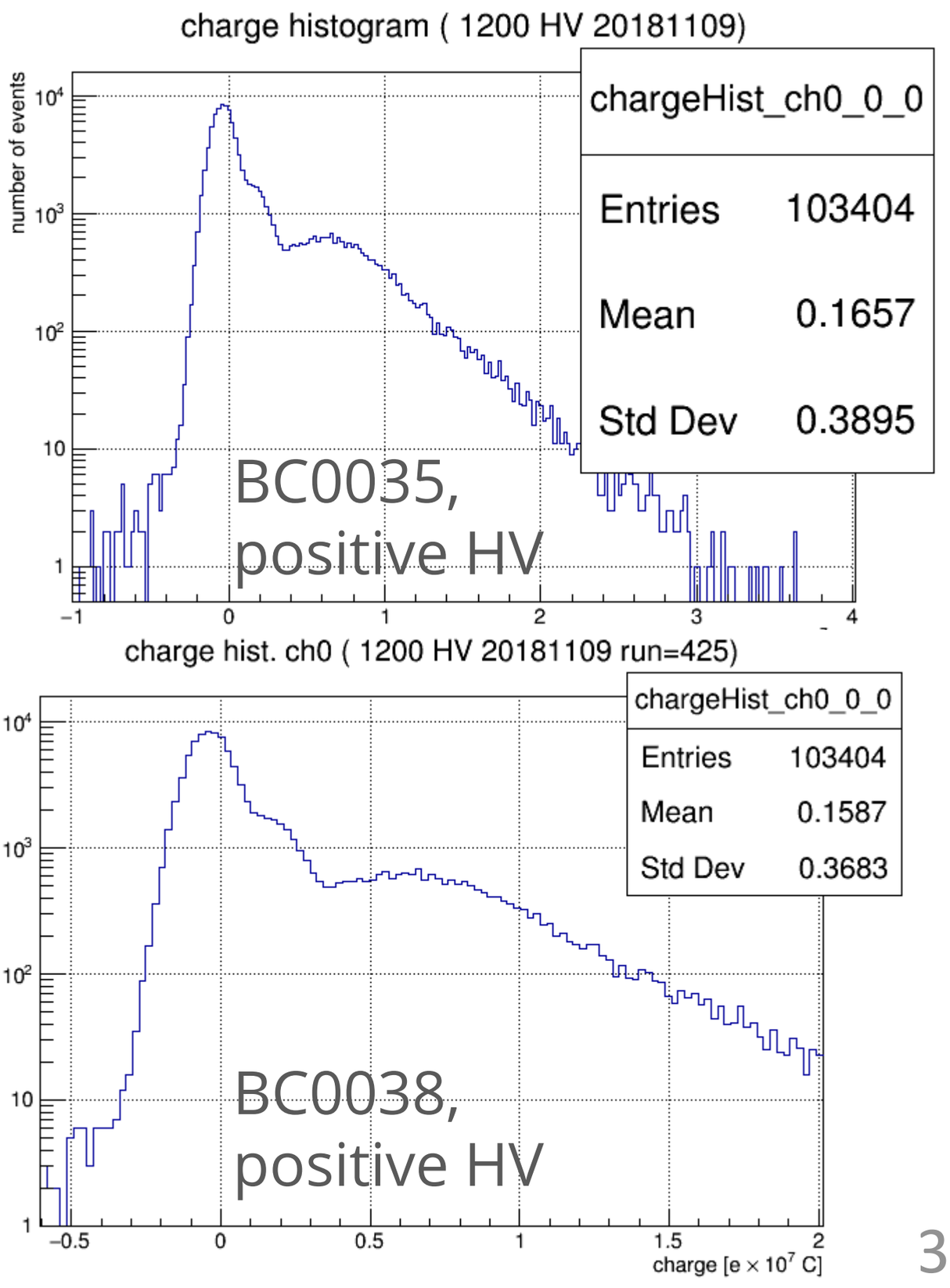
So far

- I am investigating that the bump around a pedestal distribution in a charge histogram.
  - in this week, the measurement was done for BC0038 to compare the previous result.
- This abnormal bump does not seem to be caused by-

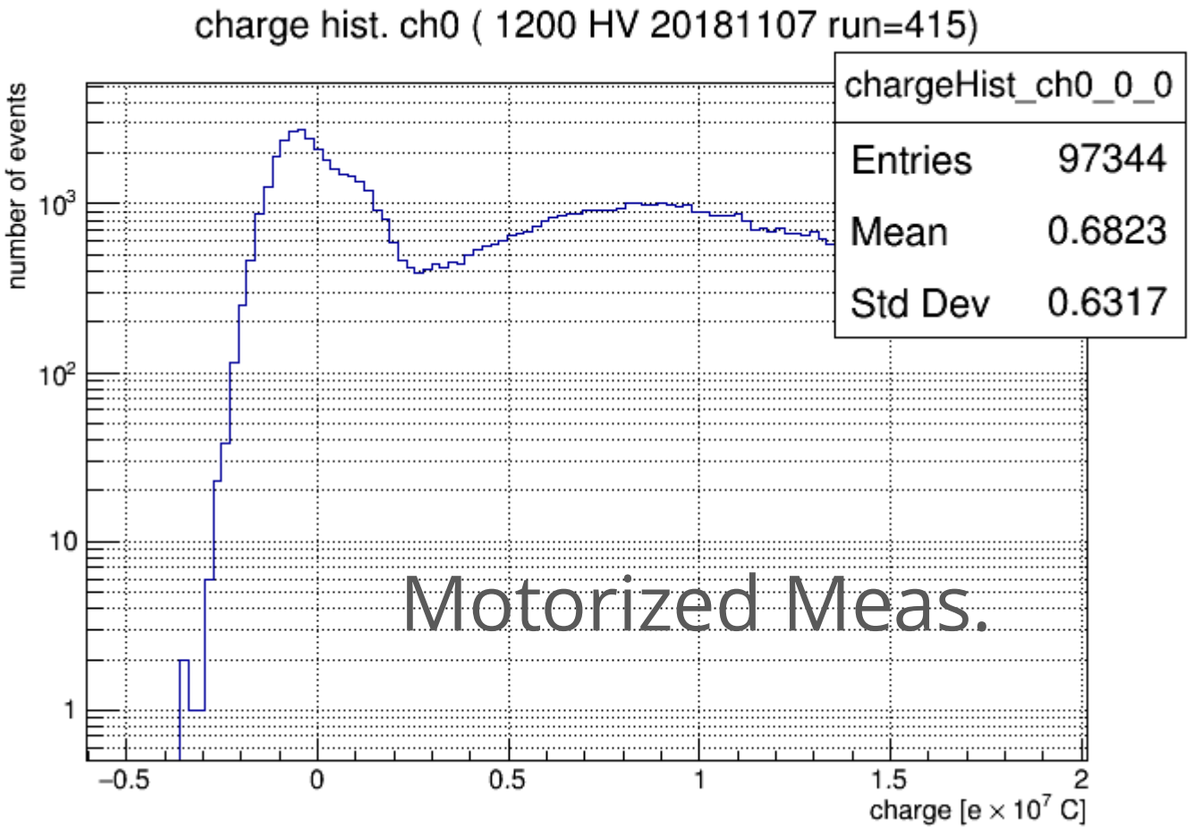
1. - the base/3”PMT itself issue
   - unless negative/positive base and BC0035/38 had broken in the same way
2. -B-field affect/ the effect of the 3”PMT position
   - there was same bump in the result of the motorized stage.
3. - light leakage
   - the bump still existed in the measurement in which laboratory light was off
4. -some cable issue
   - since we checked the things below but couldn’t find any difference :
   - digitizer cable replacement
   - to keep the signal cable of the 3”PMT away from the HV cable and other ones.

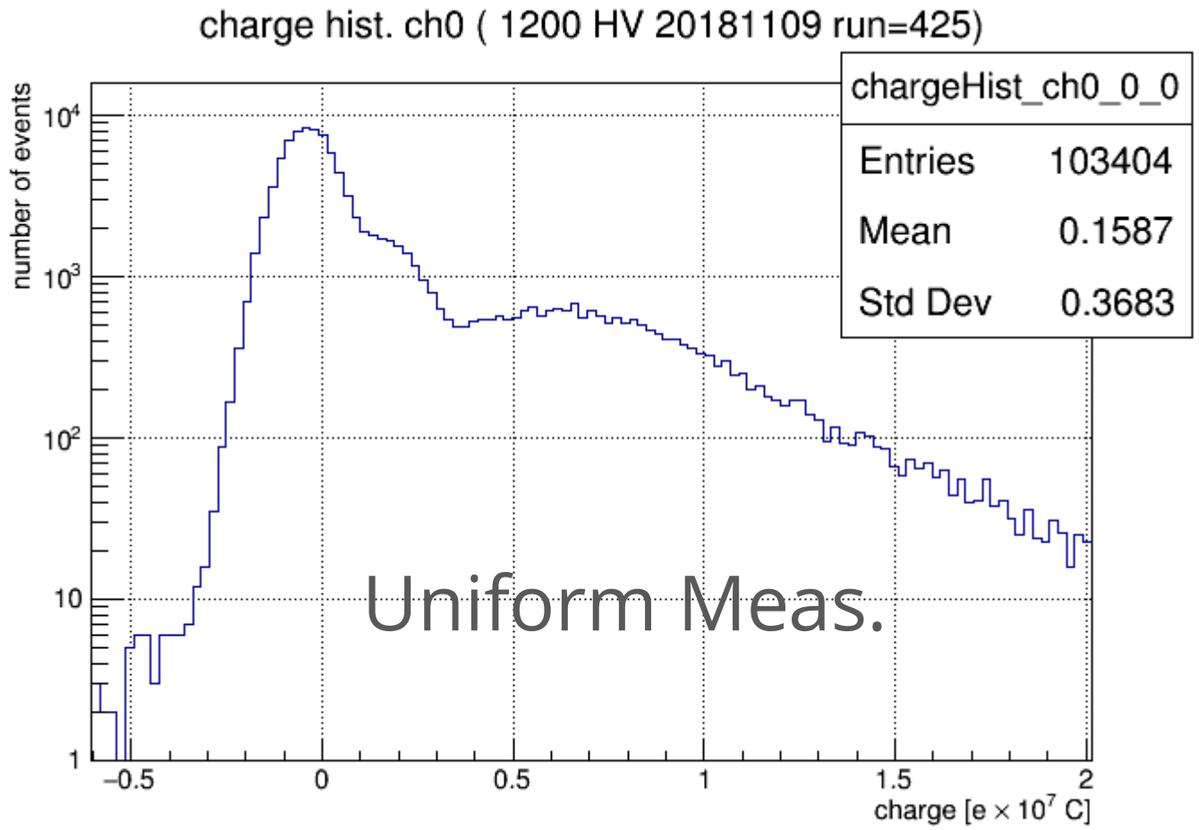
Comparison btw the neg./pos. base





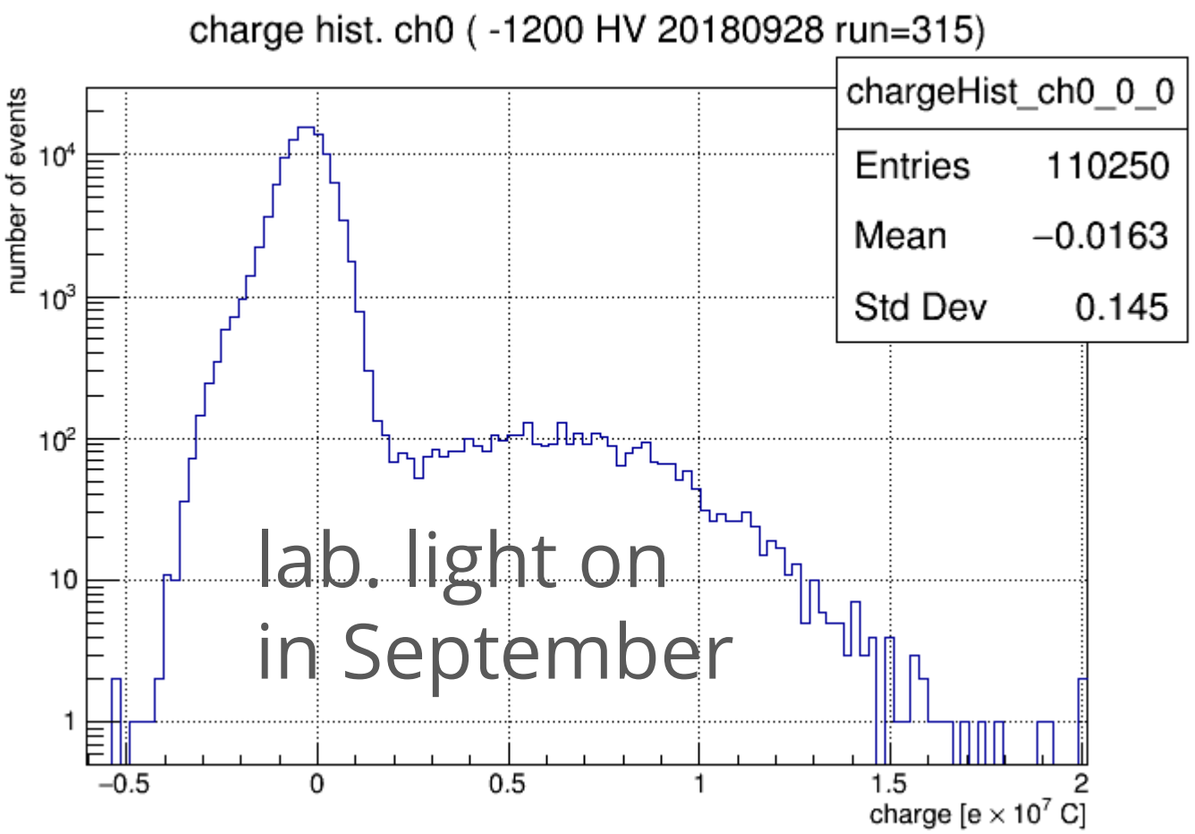
Comparison with Motorized meas.

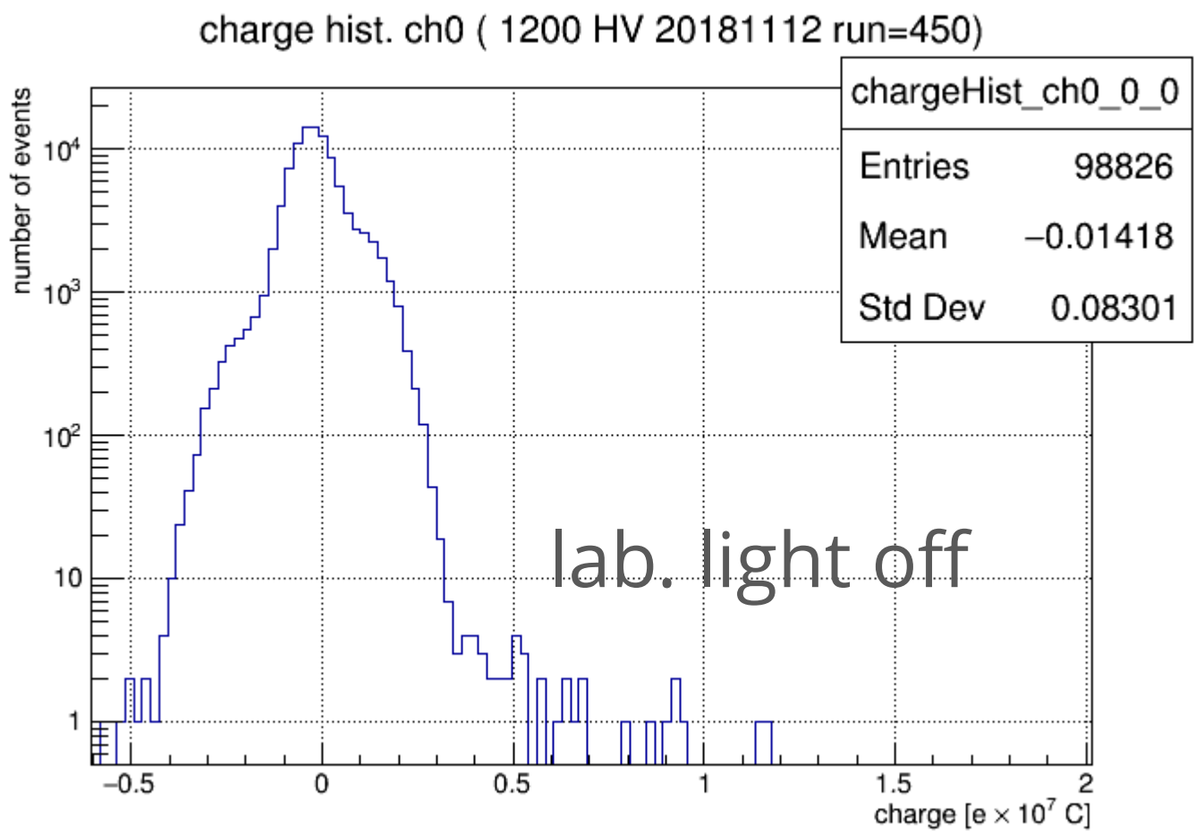


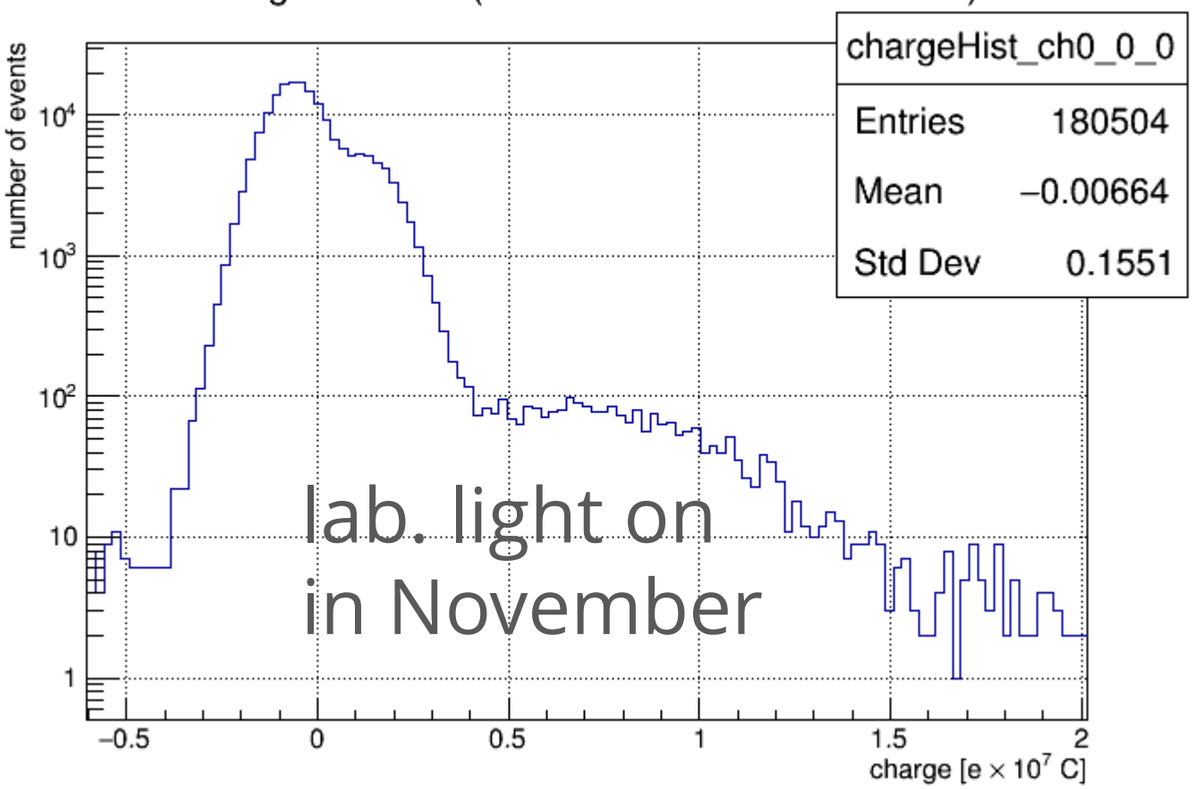


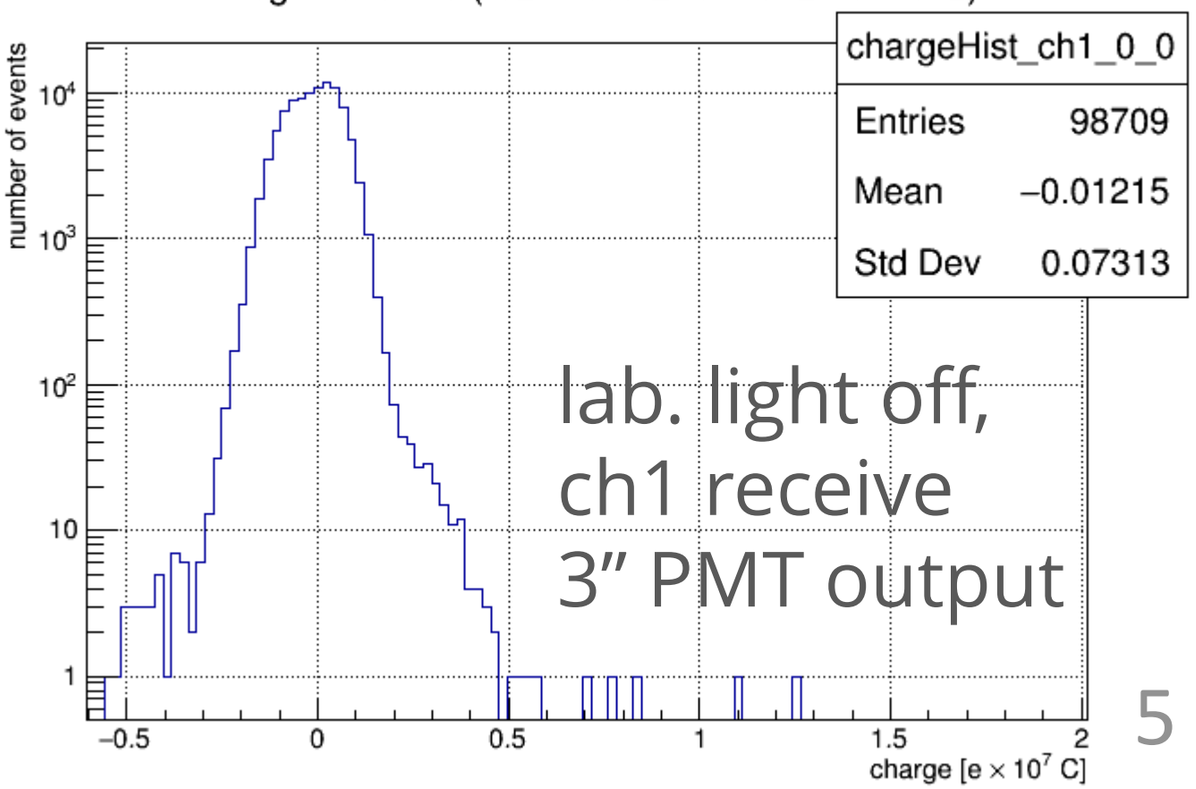
- The result of the motorized measurements have same characteristics as the result of the uniform light measurements.
  - So, for example, the mu-metal shield or distance btw the 3”PMT and the CAEN should not affect the bump.

3”PMT BC0038

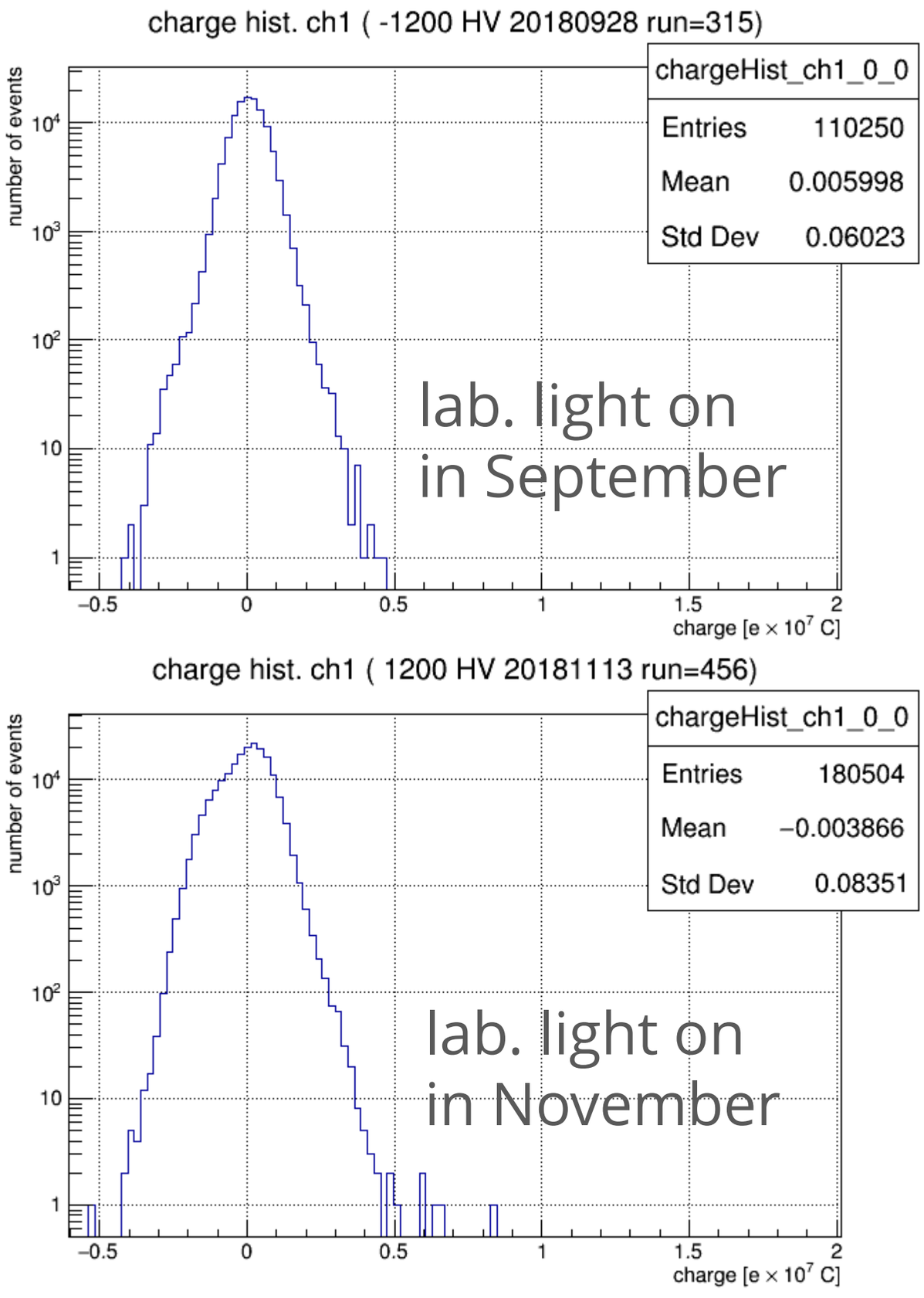

charge hist. ch0 (-1200 HV 20180928 run=315)
chargeHist_ch0_0_0
Entries 110250
Mean −0.0163
Std Dev 0.145
number of events
charge [e × 10^7 C]
lab. light on
in September

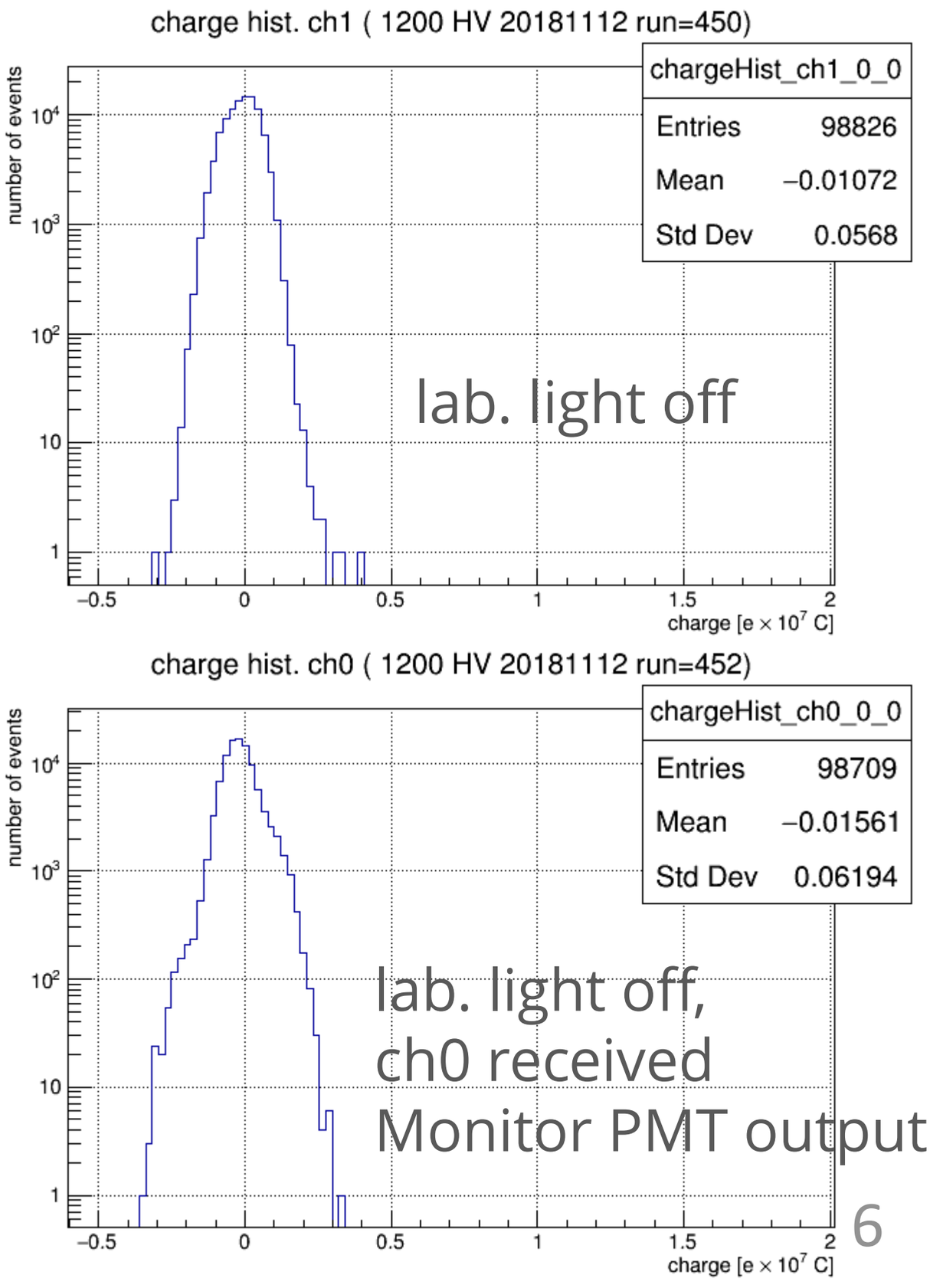

charge hist. ch0 (1200 HV 20181112 run=450)
chargeHist_ch0_0_0
Entries 98826
Mean −0.01418
Std Dev 0.08301
number of events
charge [e × 10^7 C]
lab. light off


charge hist. ch0 (1200 HV 20181113 run=456)
chargeHist_ch0_0_0
Entries 180504
Mean −0.00664
Std Dev 0.1551
number of events
charge [e × 10^7 C]
lab. light on
in November

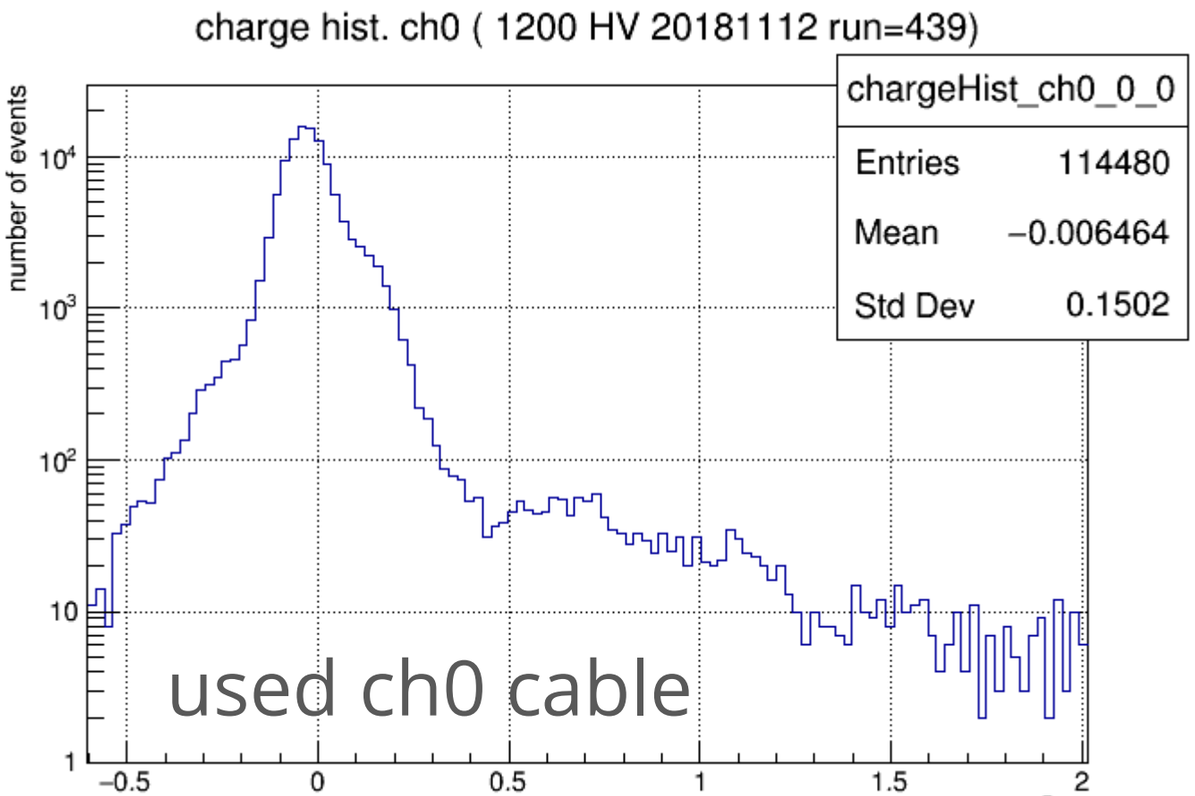

charge hist. ch1 (1200 HV 20181112 run=452)
chargeHist_ch1_0_0
Entries 98709
Mean −0.01215
Std Dev 0.07313
number of events
charge [e × 10^7 C]
lab. light off,
ch1 receive
3” PMT output

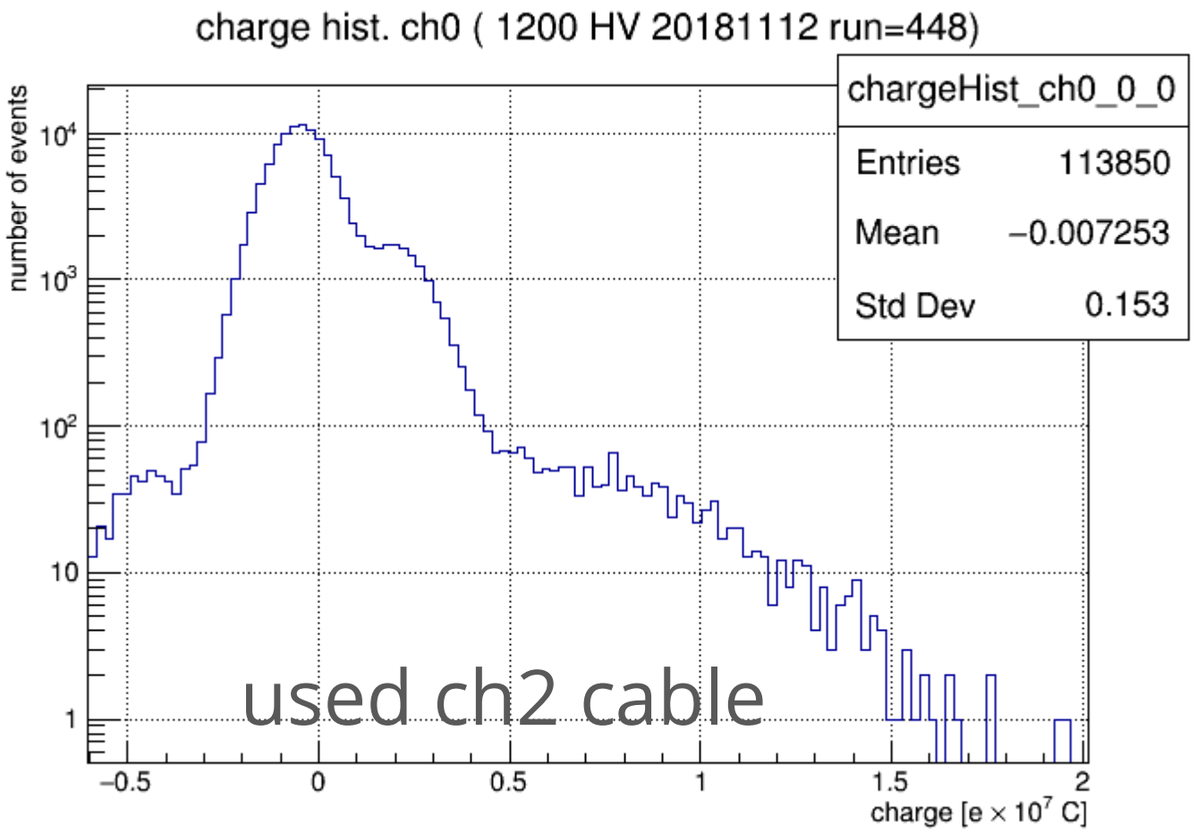
Monitor PMT (LED off)

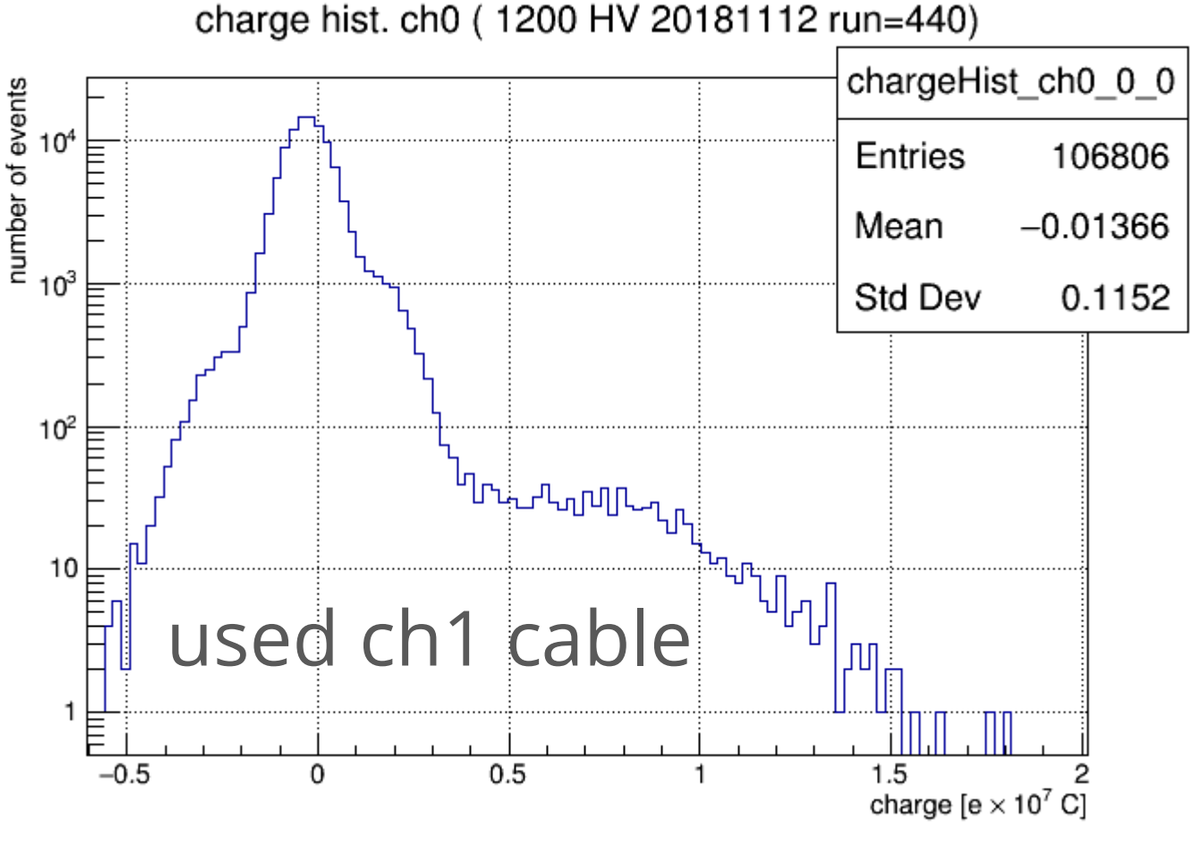




Exchange the cables of digitizer

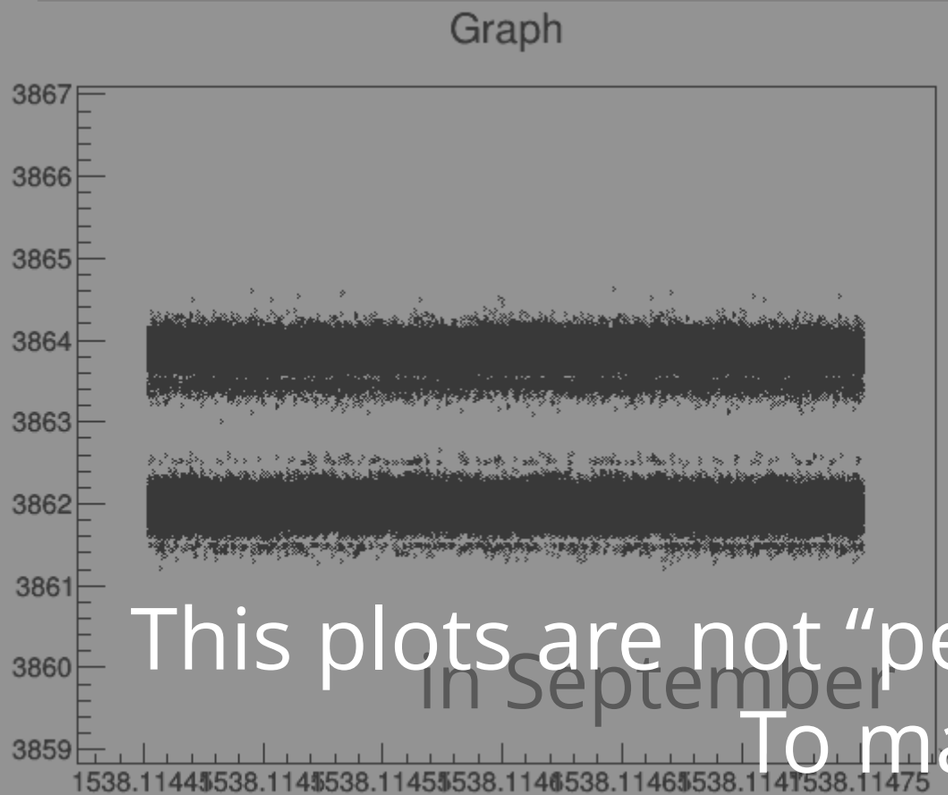


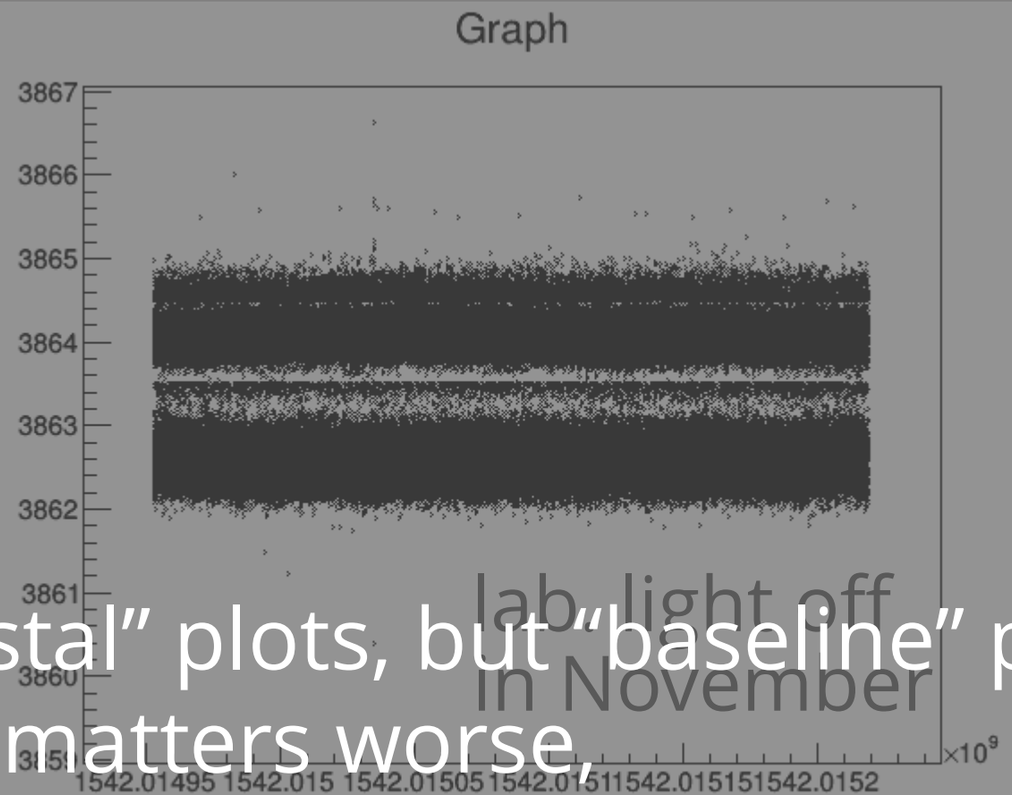




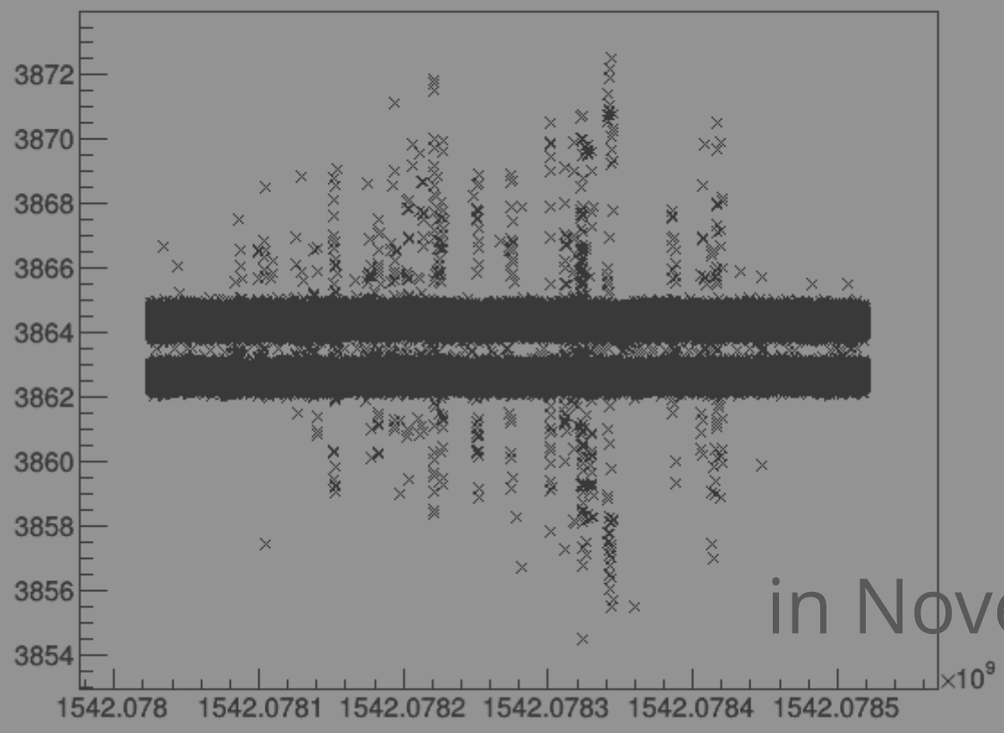
- Changed the cables among ch0, ch1, and ch2
- similar features

Pedestal fluctuation





This plots are not “pedestal” plots, but “baseline” plots.
To make matters worse,
my code creating the plots had been failed.



- For BC0038, LED off
- The pedestal that is the mean of noise of each event.
  - I am trying to create the average pedestal plots since each time contains several number of pedestal value.

Summary

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To do

1. Investigate the cause of noise
2. Stability of Monitor PMT (or LED)
   - Leave Monitor HV on all night.
   - Look for the stable region of the mean.
3. Stability of 3”PMT
   - Look for the stable region of Poisson mean.
4. Make TTS plots:
   - number of p.e. vs. TTS
   - and fit with the function: y = parameter / $\sqrt{x}$
5. Confirm whether after-pulses are included, or not.
   - enlarge the time window of each event, and check the time histogram.