Status Report

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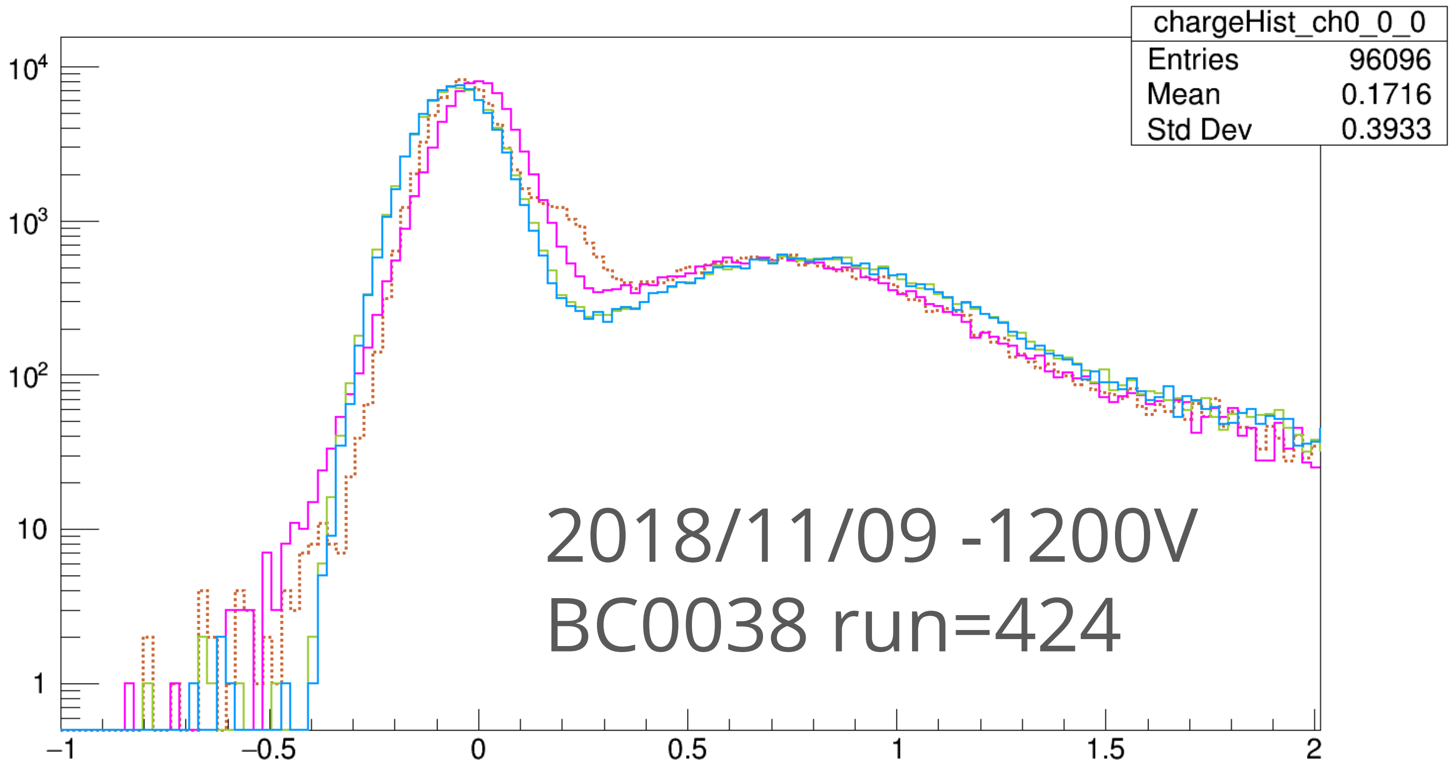
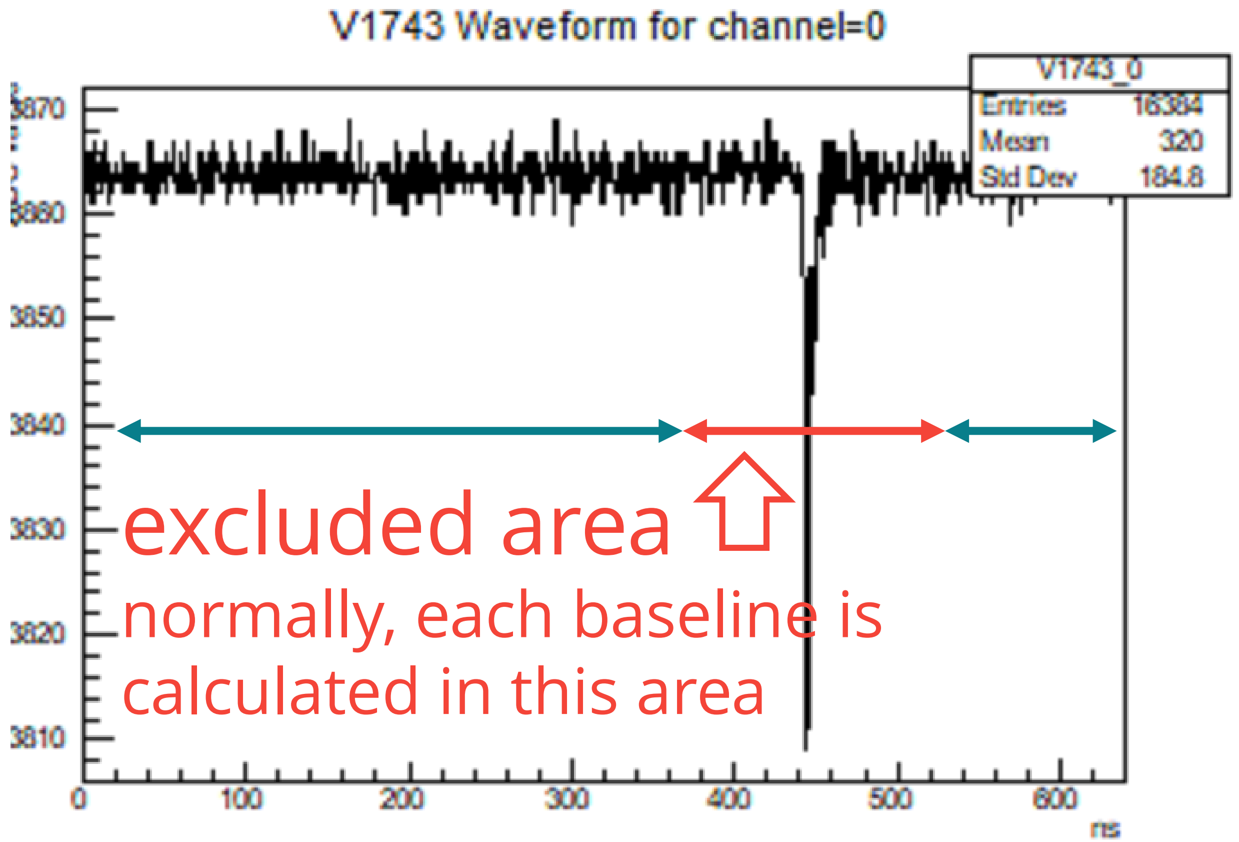
Abstract

- Different Methods to calculate baseline
  - test using the data set which has a bump in the charge histogram
- HV vs. Gain/TTS plots
  - Negative/Positive HV for BC0035/38
  - for BC0038 the fit was failed, too high intensity or
- # of p.e. vs TTS plots
  - Negative/Positive HV for BC0035

- Light Uniformity -> Changed each distance
  - 3”PMT became closer to the lens
  - LED was moved away from the lens
  - -> check in next week
- Monitor PMT Instability
  - Monitor PMT was returned in the uniform set.
  - -> check in next week

Method of calculating a baseline





- kOrange+5: previous method (not Gaussian fit)
  - Calculate 100 ns region which has a signal (= above excluded area)
- kMagenta: Gaussian fit
  - Same region as the Orange method
- kSpring+5: excluded area=100 nsec
  - Calculate a baseline in all area on both sides of the excluded area (i.e. in green area)
- kAzure+7: excluded area=50 nsec
  - Same as the Spring method

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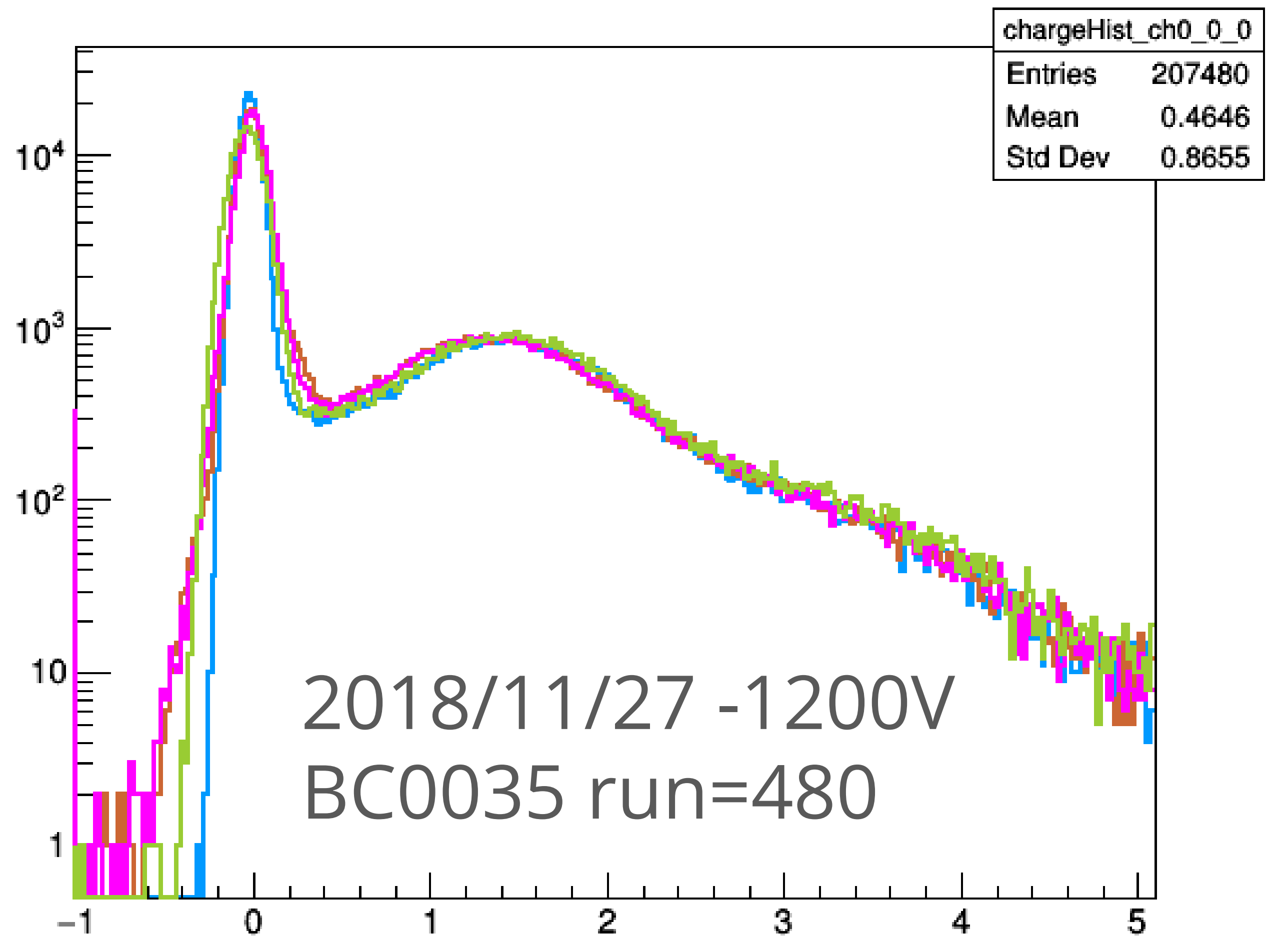

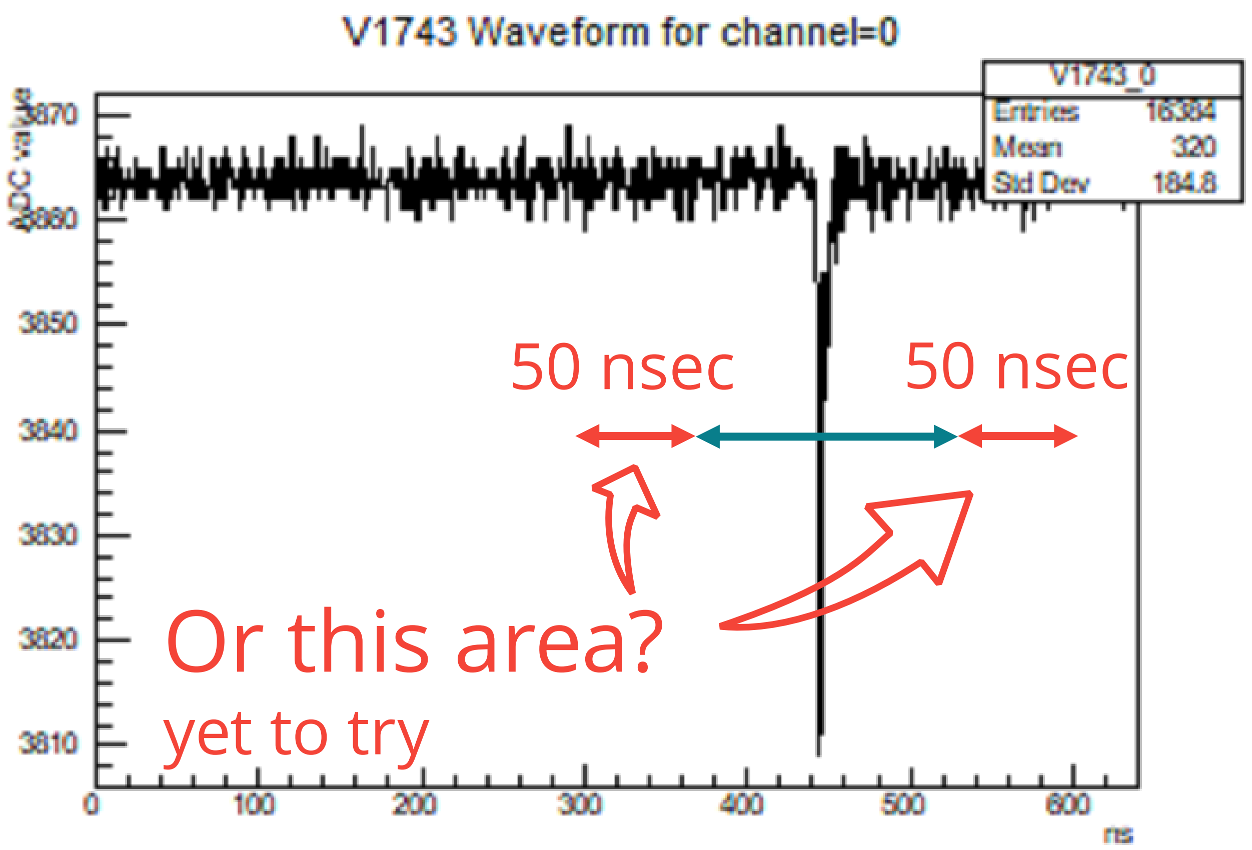

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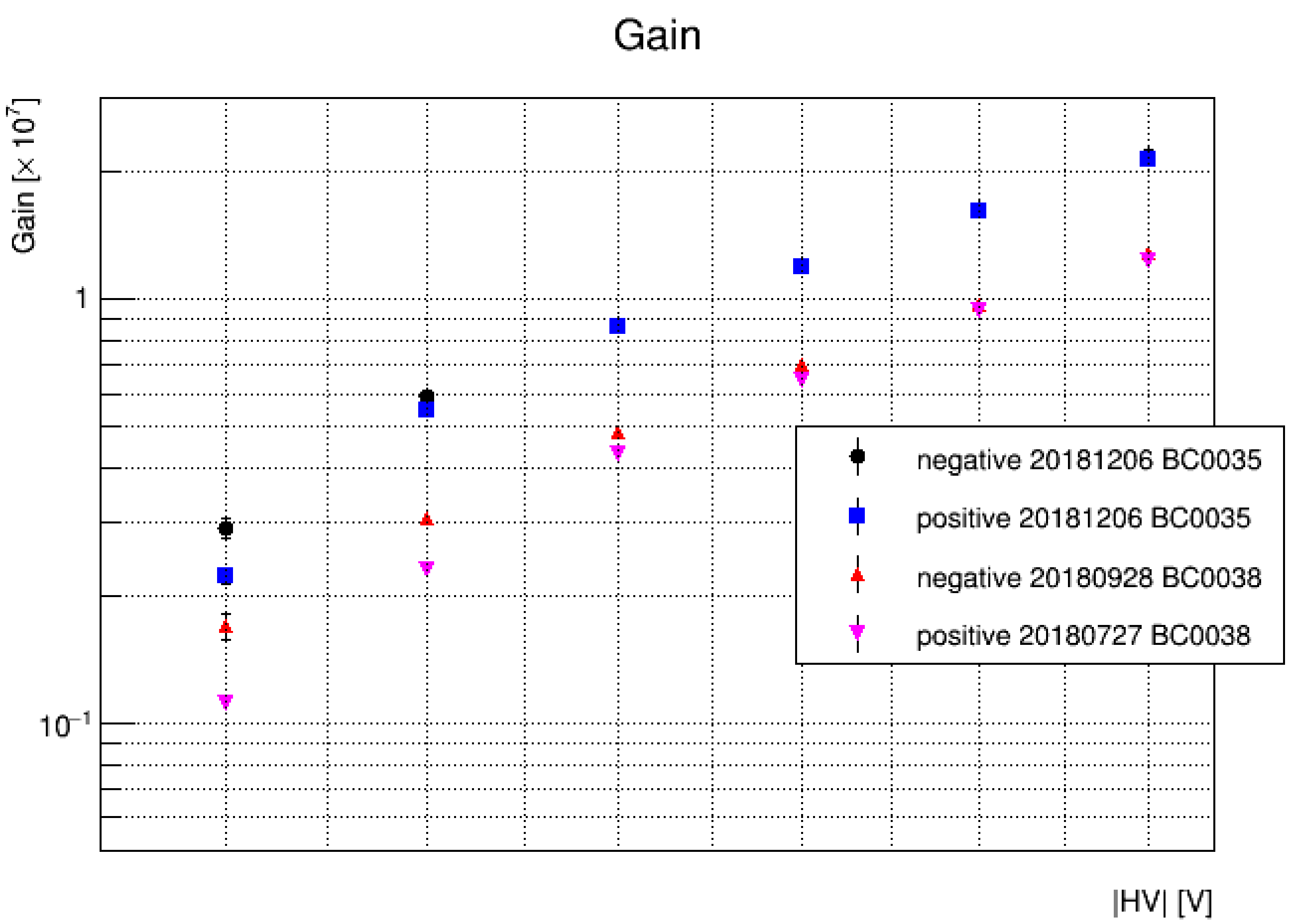
Gain

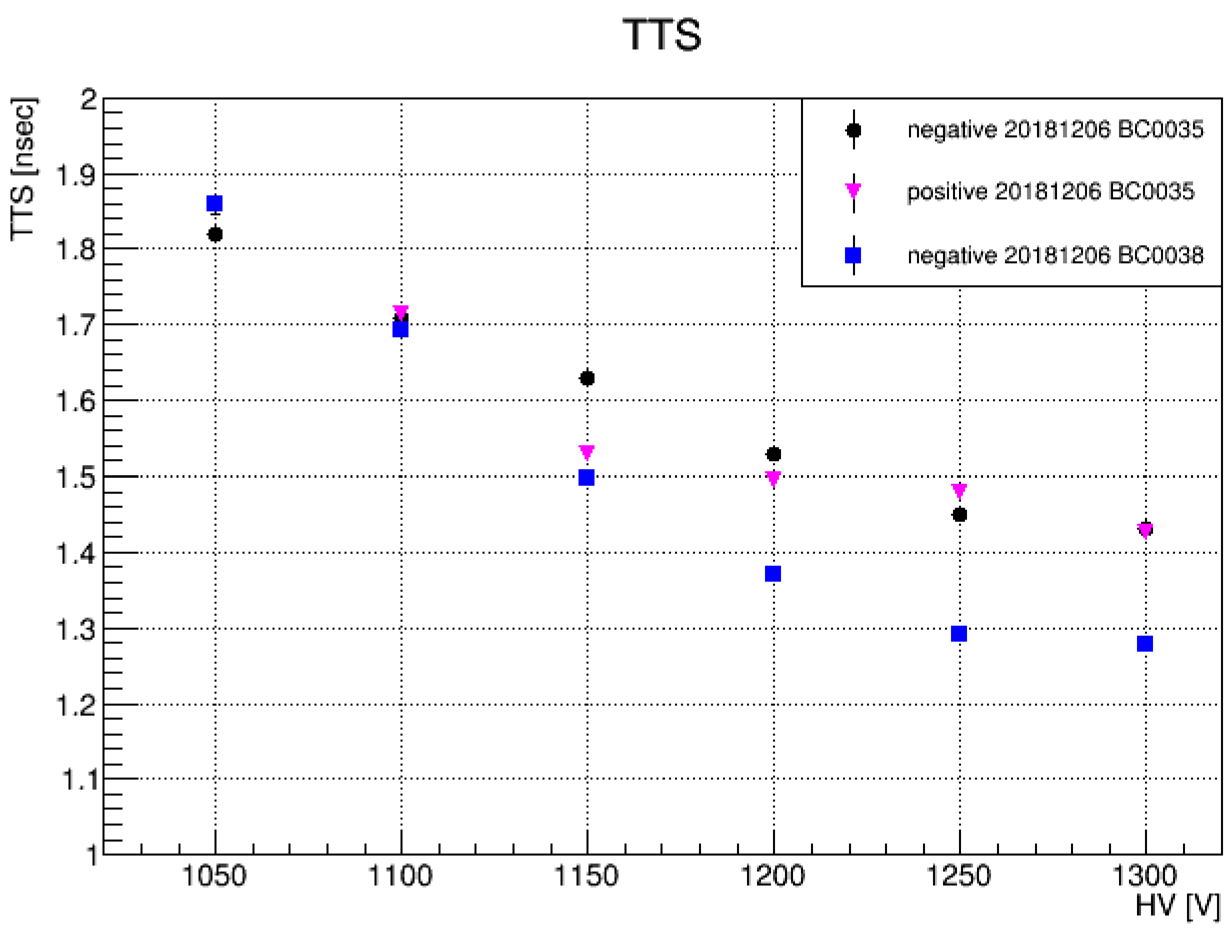


Gain [$\times 10^7$]	-1200 V	+ 1200V
BC0035	1.212+/-0.004	1.188+/-0.004
BC0038	0.705+/-0.006	0.646+/-0.003

Both axis is log-scale

- BC0035 has about twice value of Gain compared with BC0038.
- There isn't significant difference in negative/positive HV.

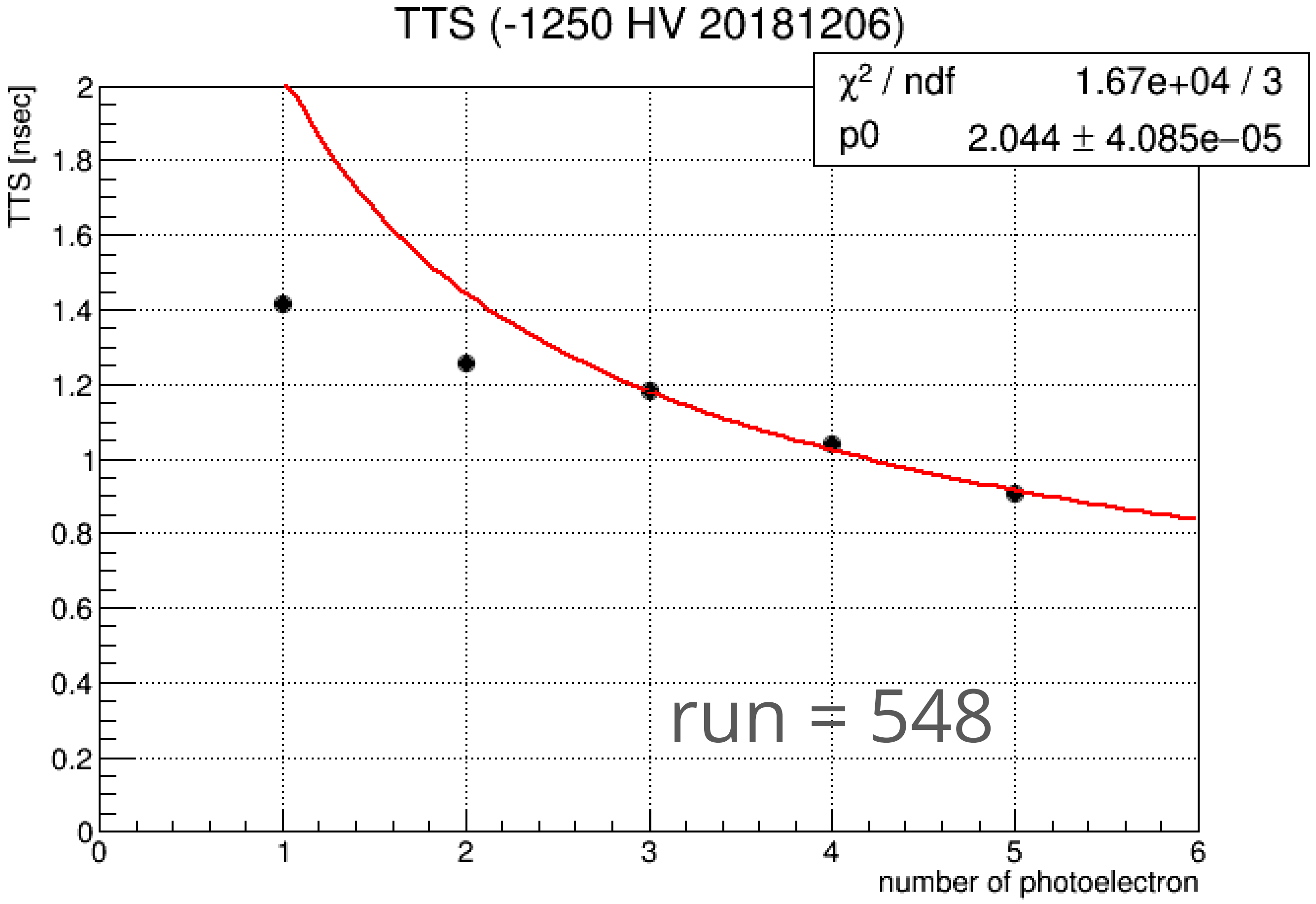
TTS

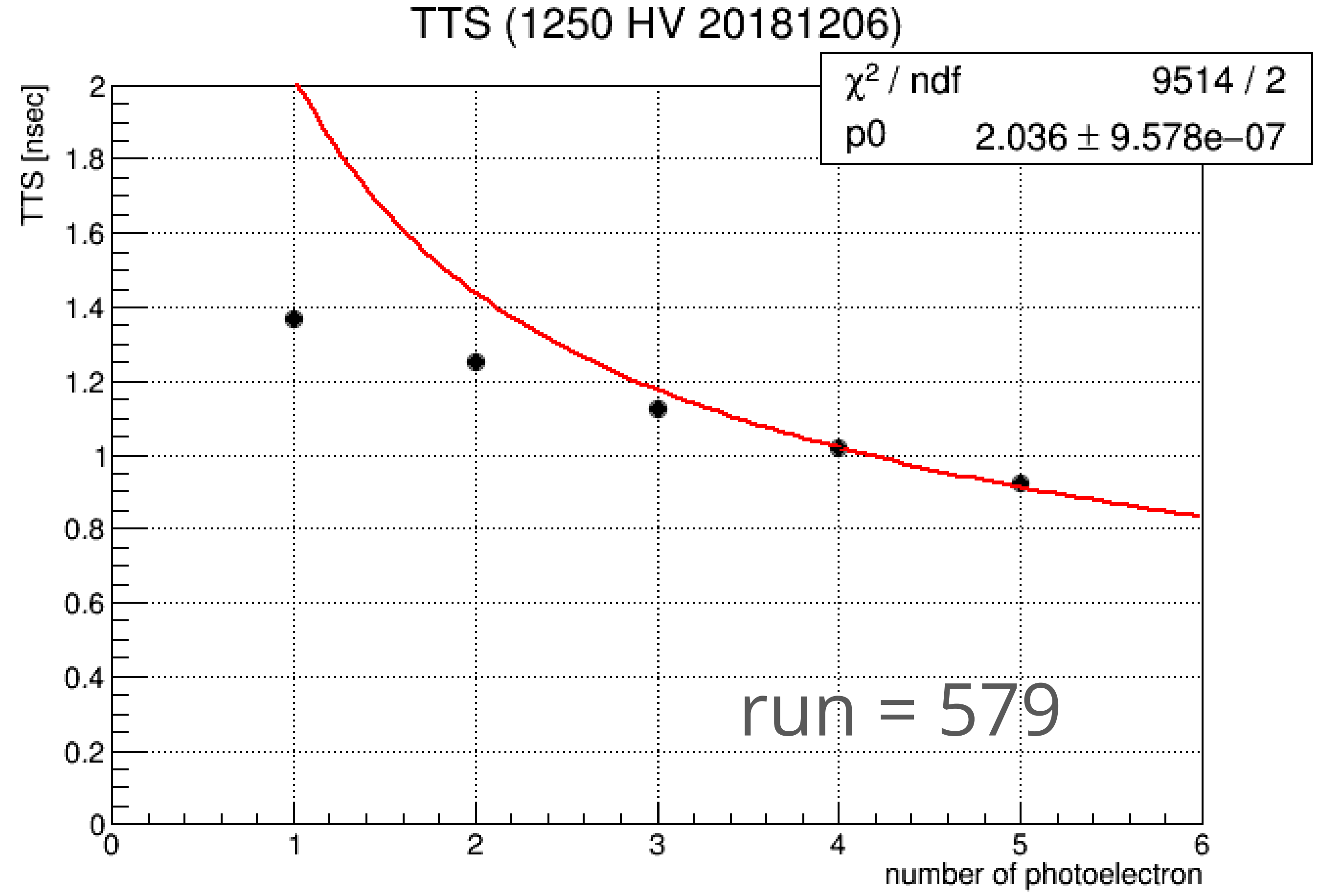


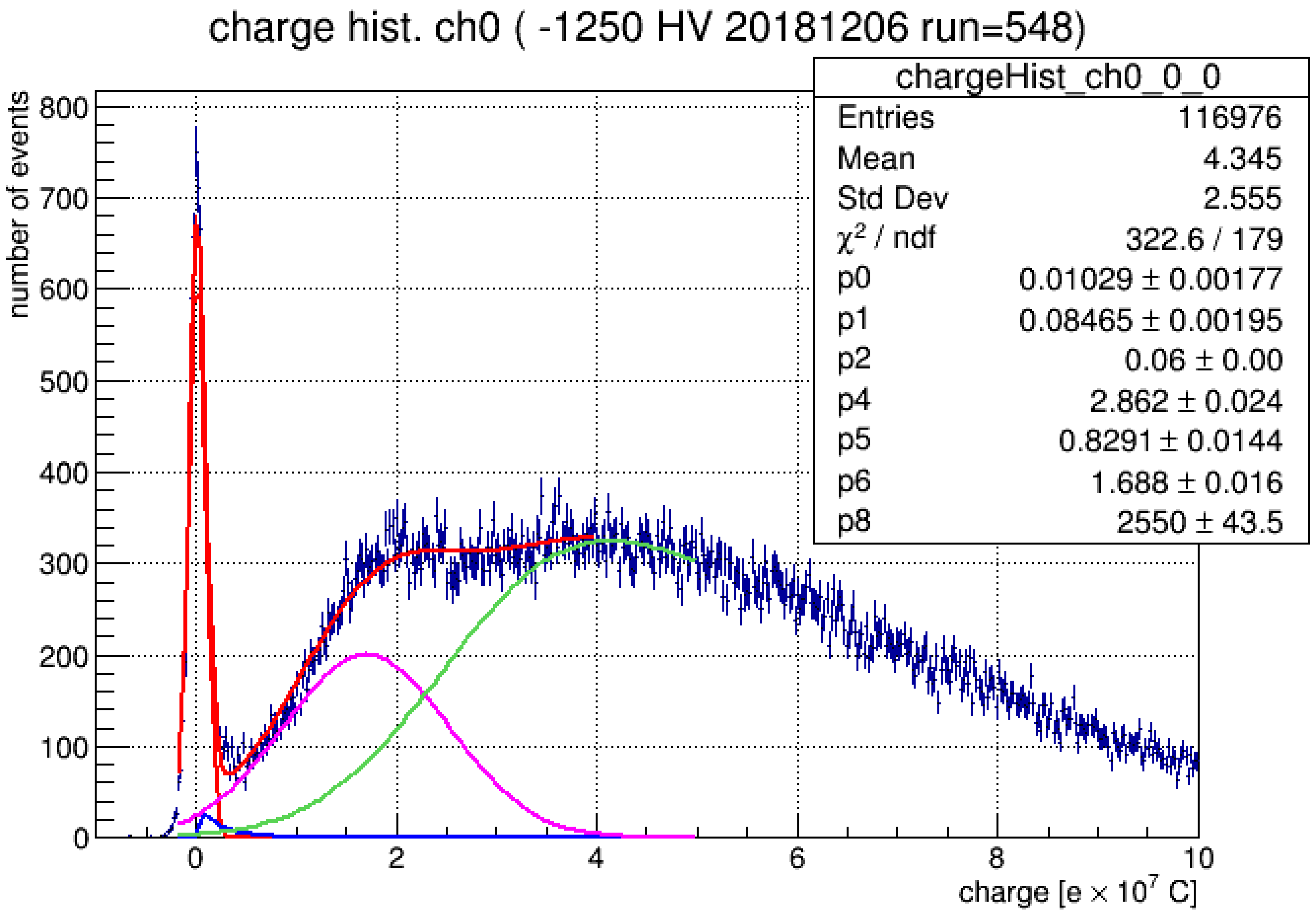
TTS [nsec]	-1250 V	+ 1250V
BC0035	1.451+/-0.004	1.479+/-0.006
BC0038	1.292+/-0.006	

- BC0038 has better TTS by ~0.2 nsec compared to BC0038.

TTS vs #pe

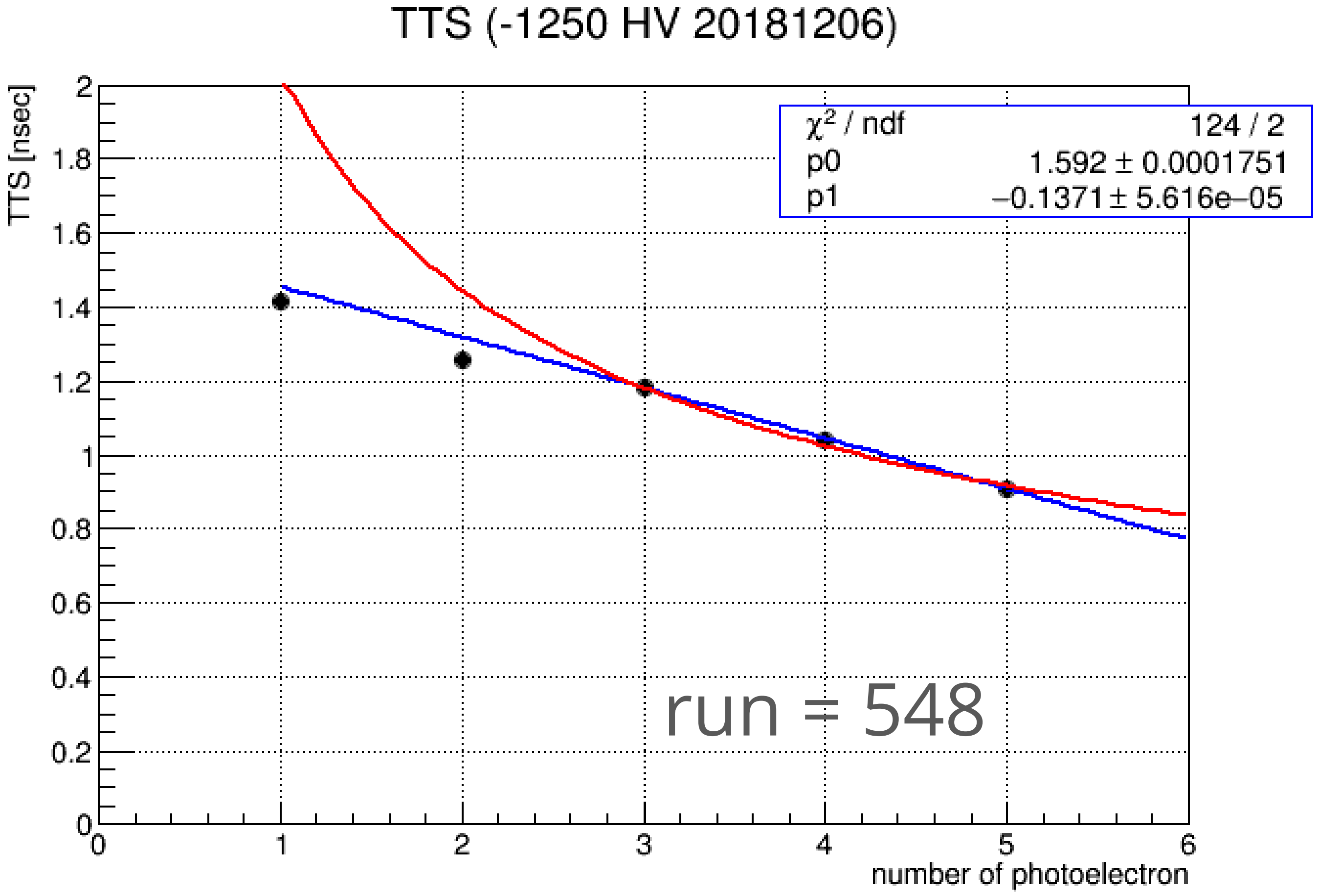


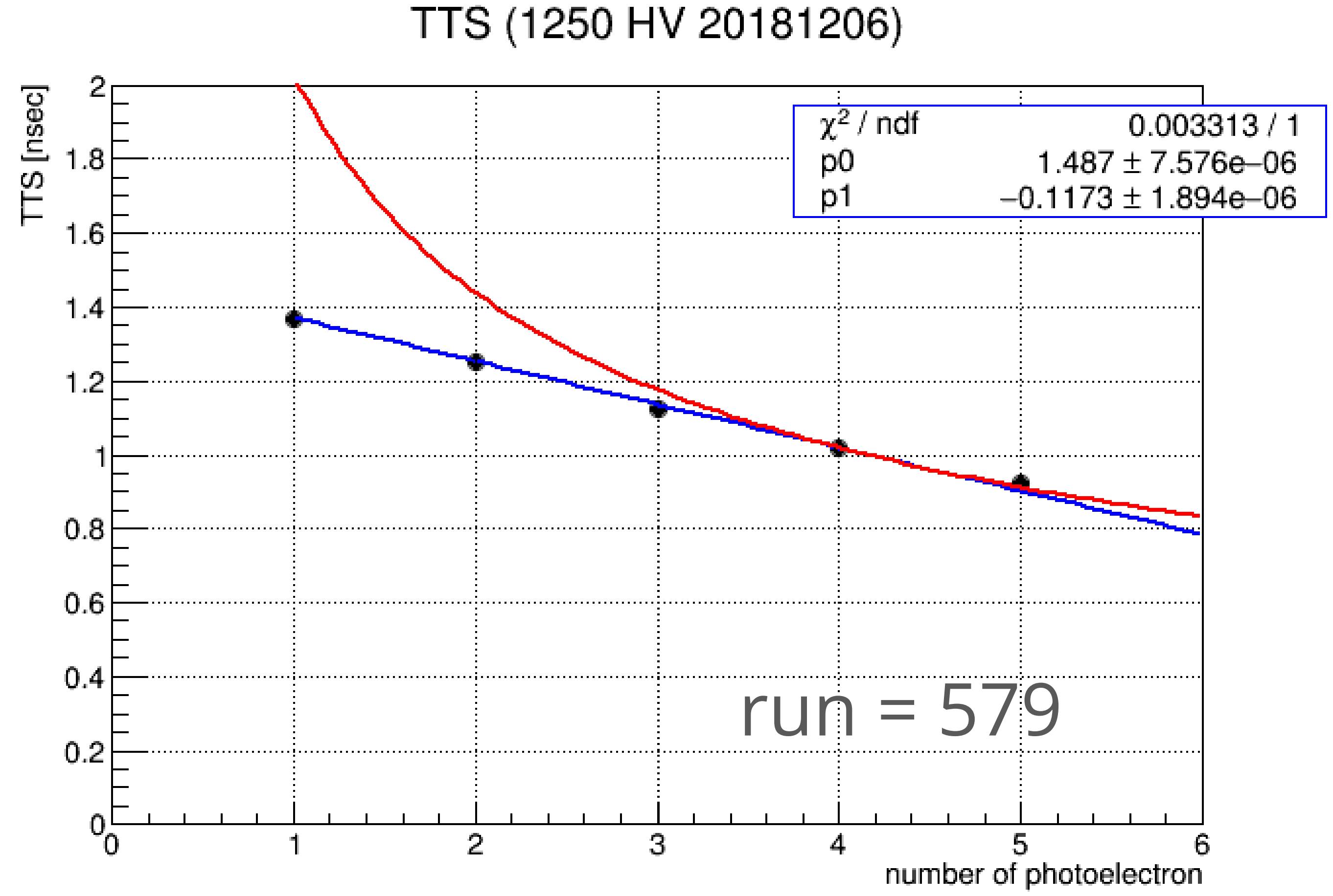


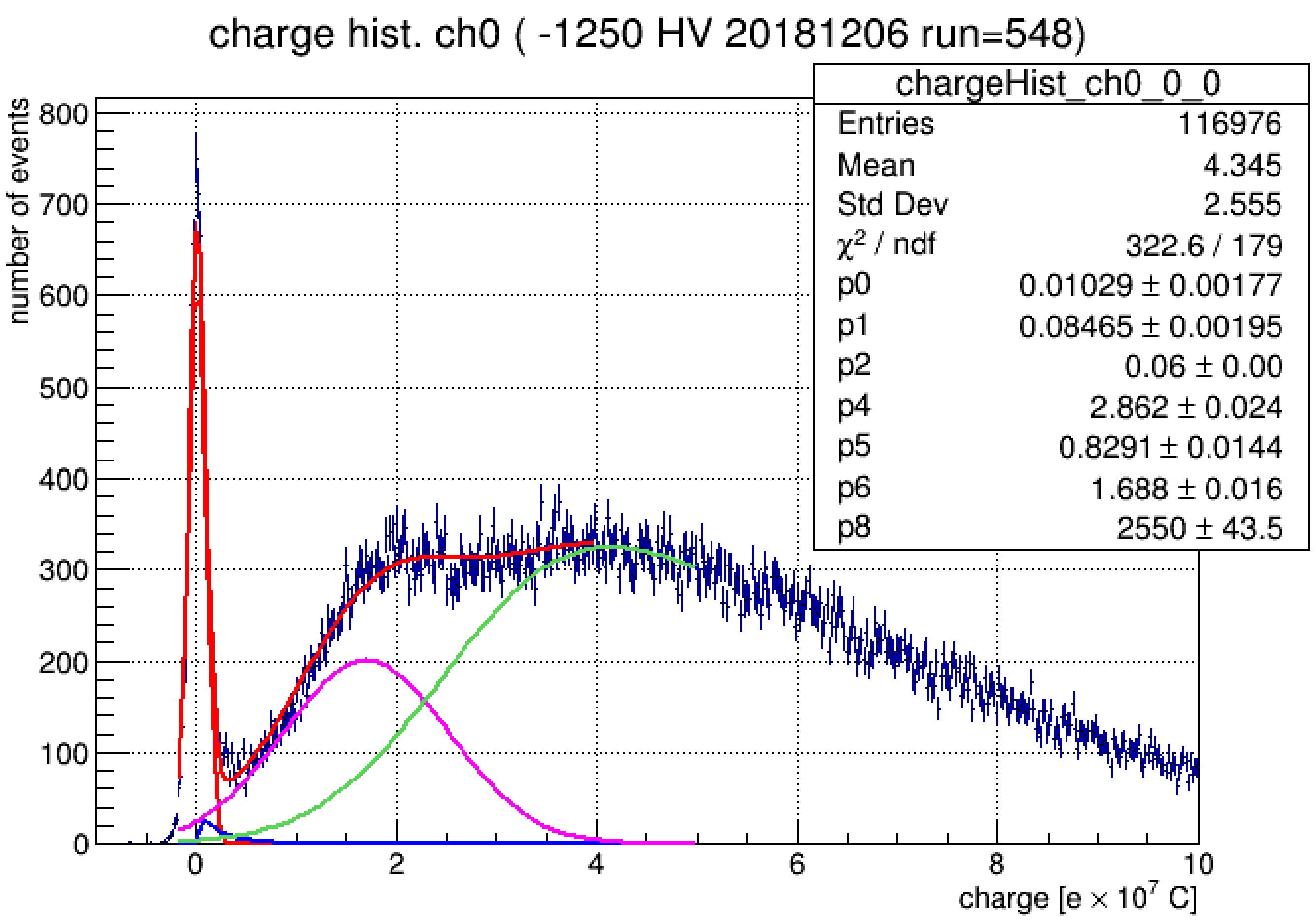


- For BC0035.
- Fitting function: $\mathrm{par}[0]/\sqrt{x}$ -> failed
- p6 is the mean of 1pe dist.
  - #pe events were chosen as #pe×p6 with 0.5σ of 1pe.
  - e.g. 2pe, 2×p6+/-0.5σ.

TTS vs #pe (Update!)







- For BC0035.
- Fitting function (blue):

$$p0 + p1 \times x$$

Summary

- If there is no problem, I would like to adopt the methods to calculate a baseline outside of a signal area (not Gaussian fit) for quick processing.
    - cf. 100 nsec signal area is selected by the algorithm following FindEdge() function.
- Gain/TTS/TTS for #pe
    - need to re-measure for positive HV of BC0038
- Stability -> to measure in next week
- Light uniformity for Reflector -> need the help.