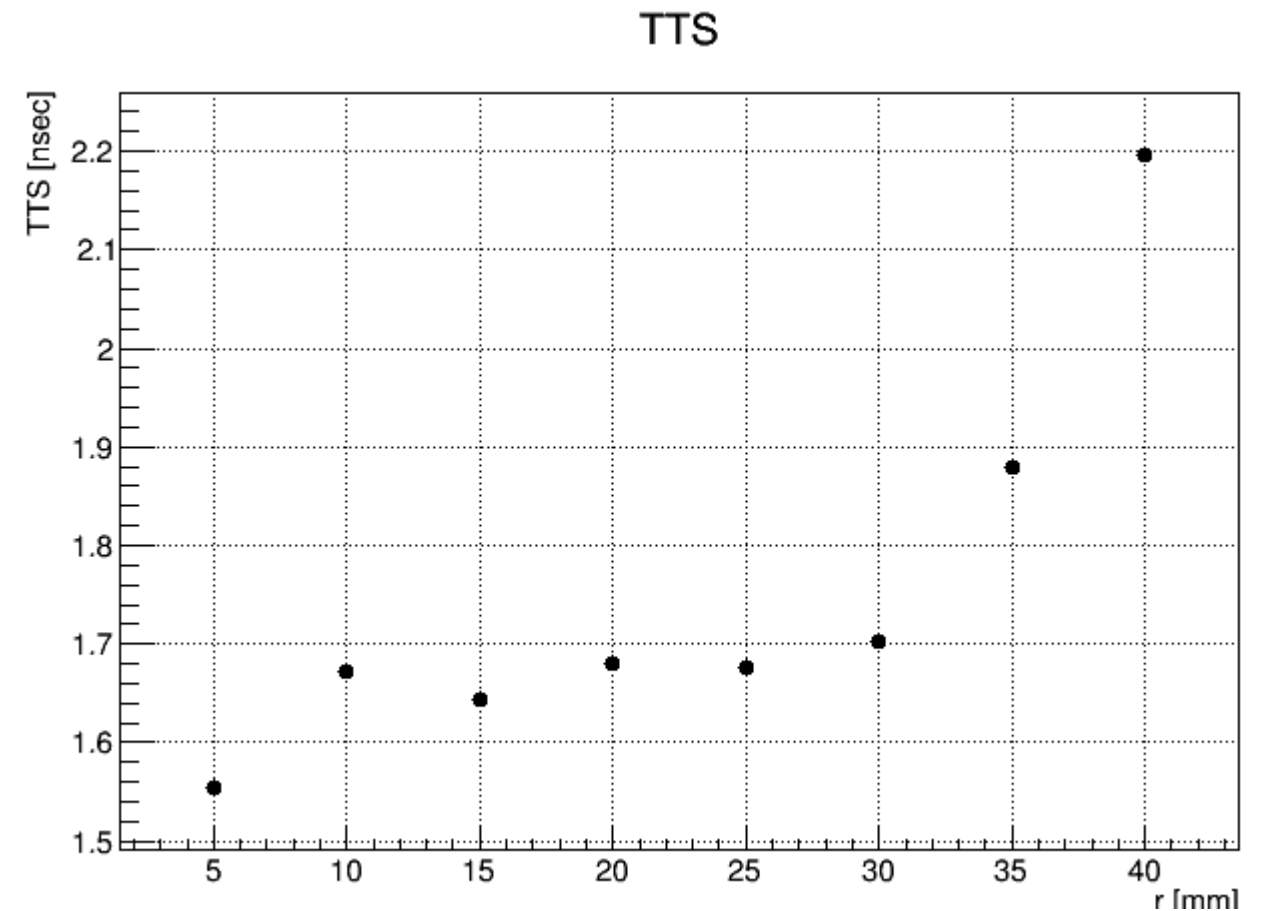
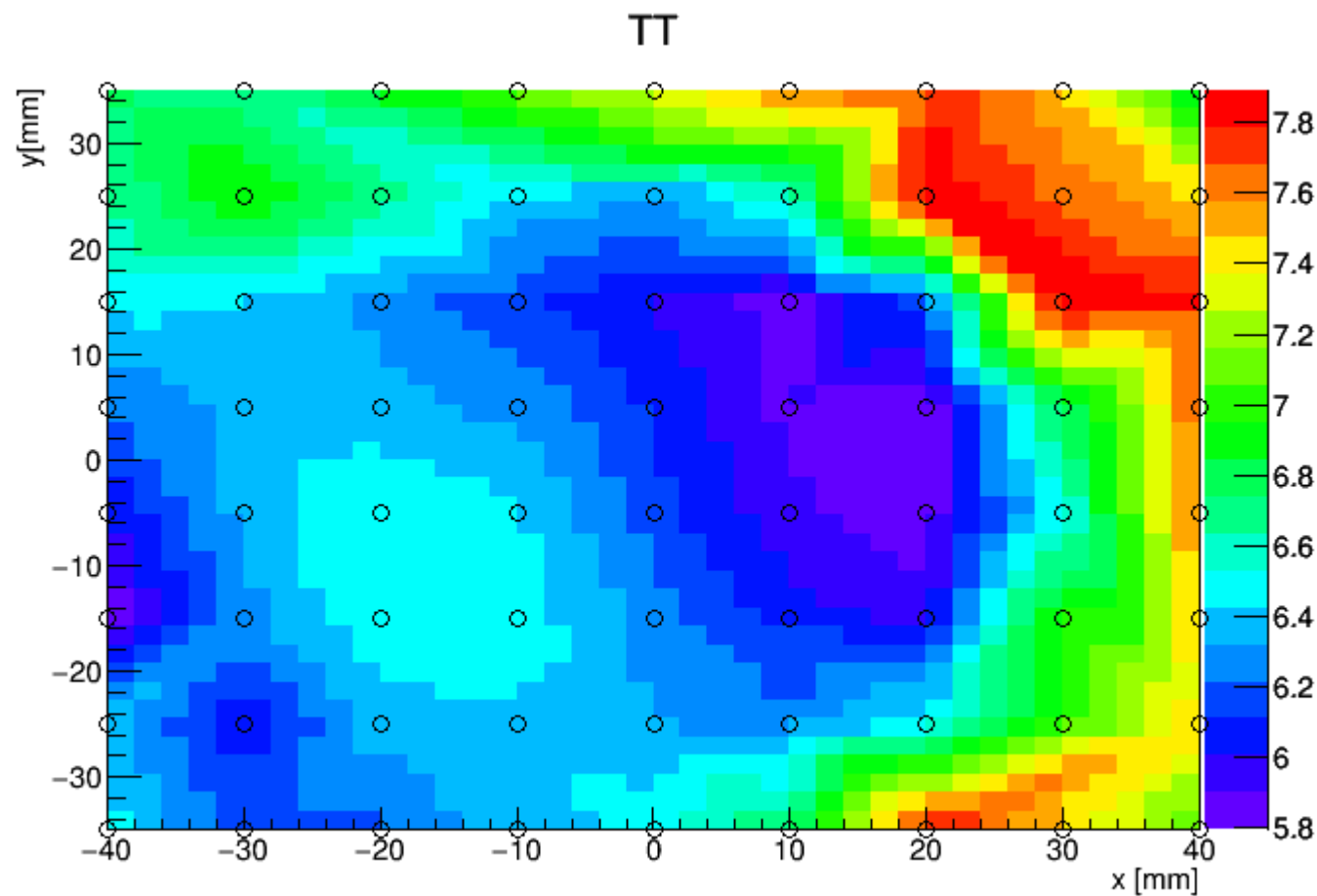


Status Report

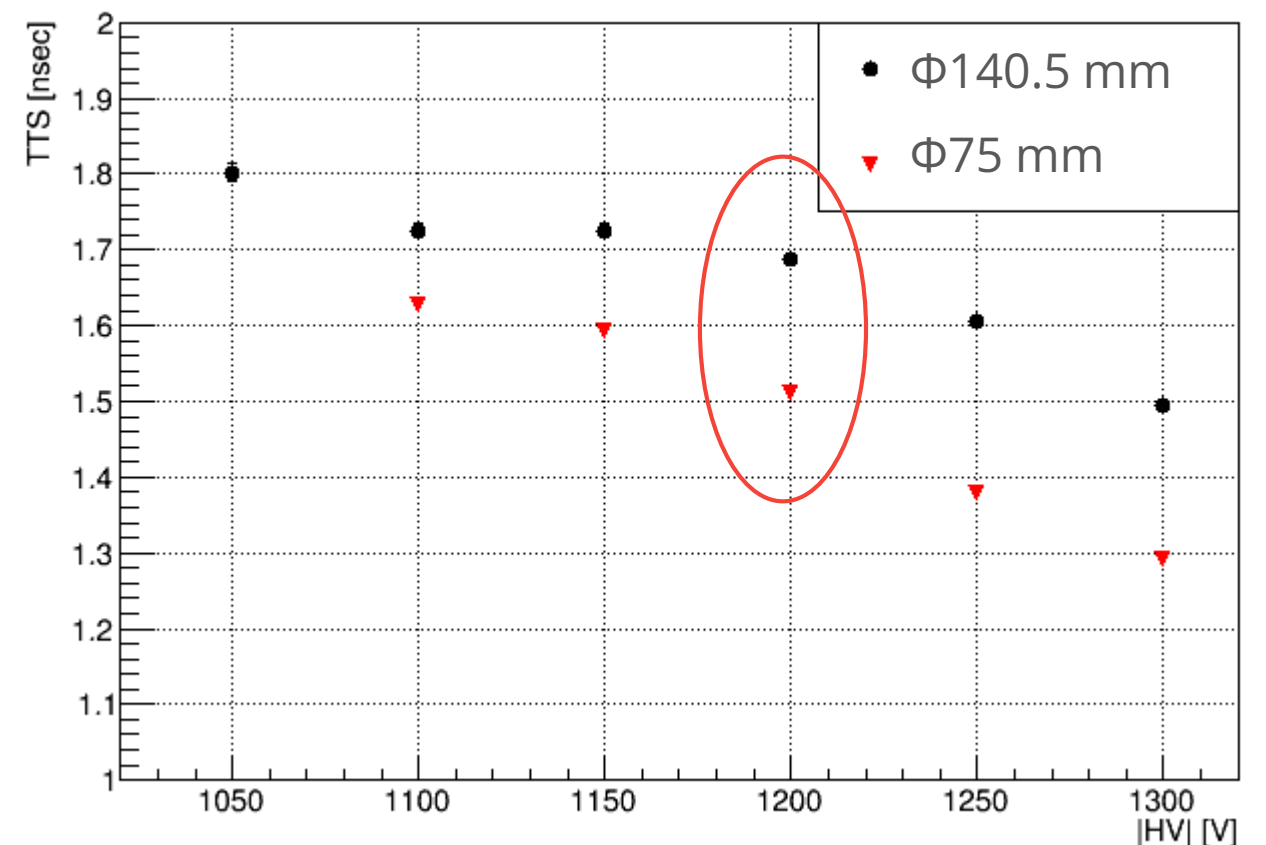
February 22nd, 2019

Haruya Morikawa
Tokyo Institute of Technology

BC0038 -1200 V run595(Mot.) 638(Uni.)

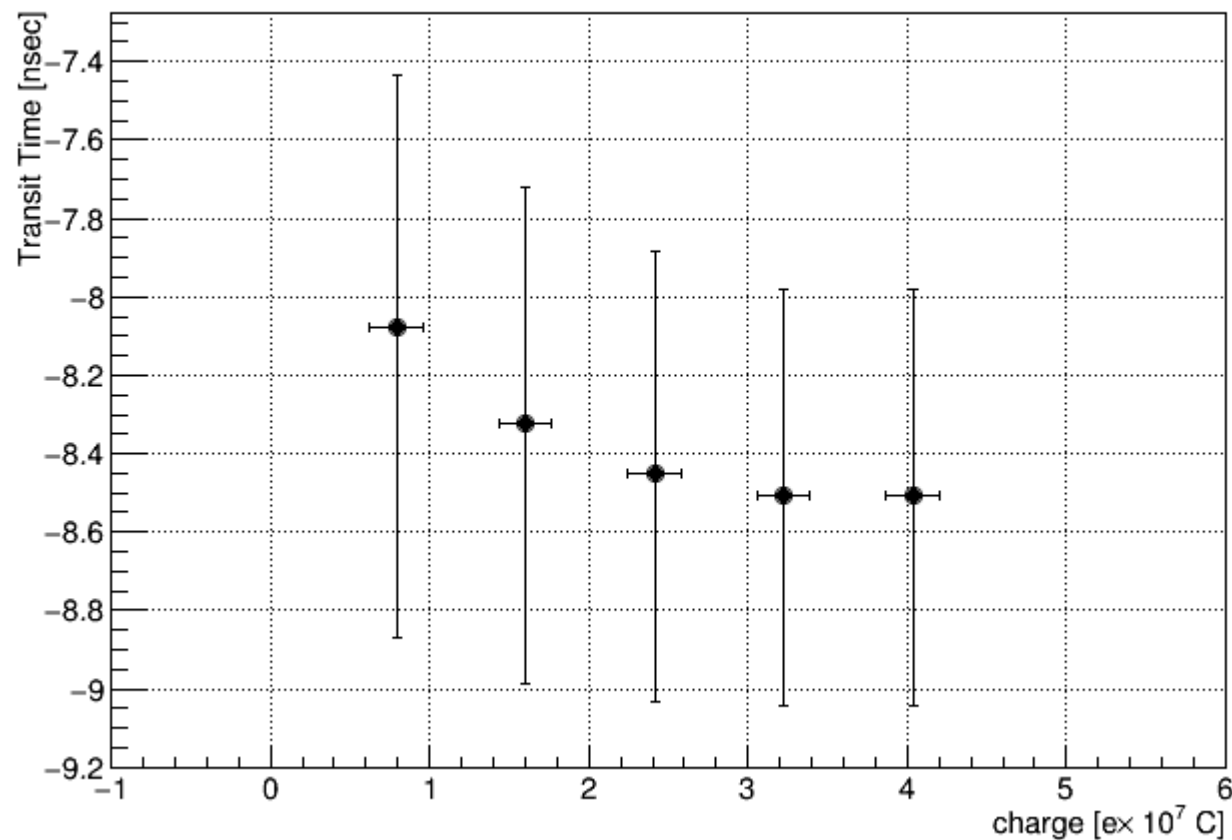


- $r = 0 \Leftrightarrow x = y = 0$
- Total Transit Time histograms within r
→ calculate TTS
 - each TT hist. is scaled (10,000/entries)



BC0038 -1200 V run595(Mot.) 638(Uni.)

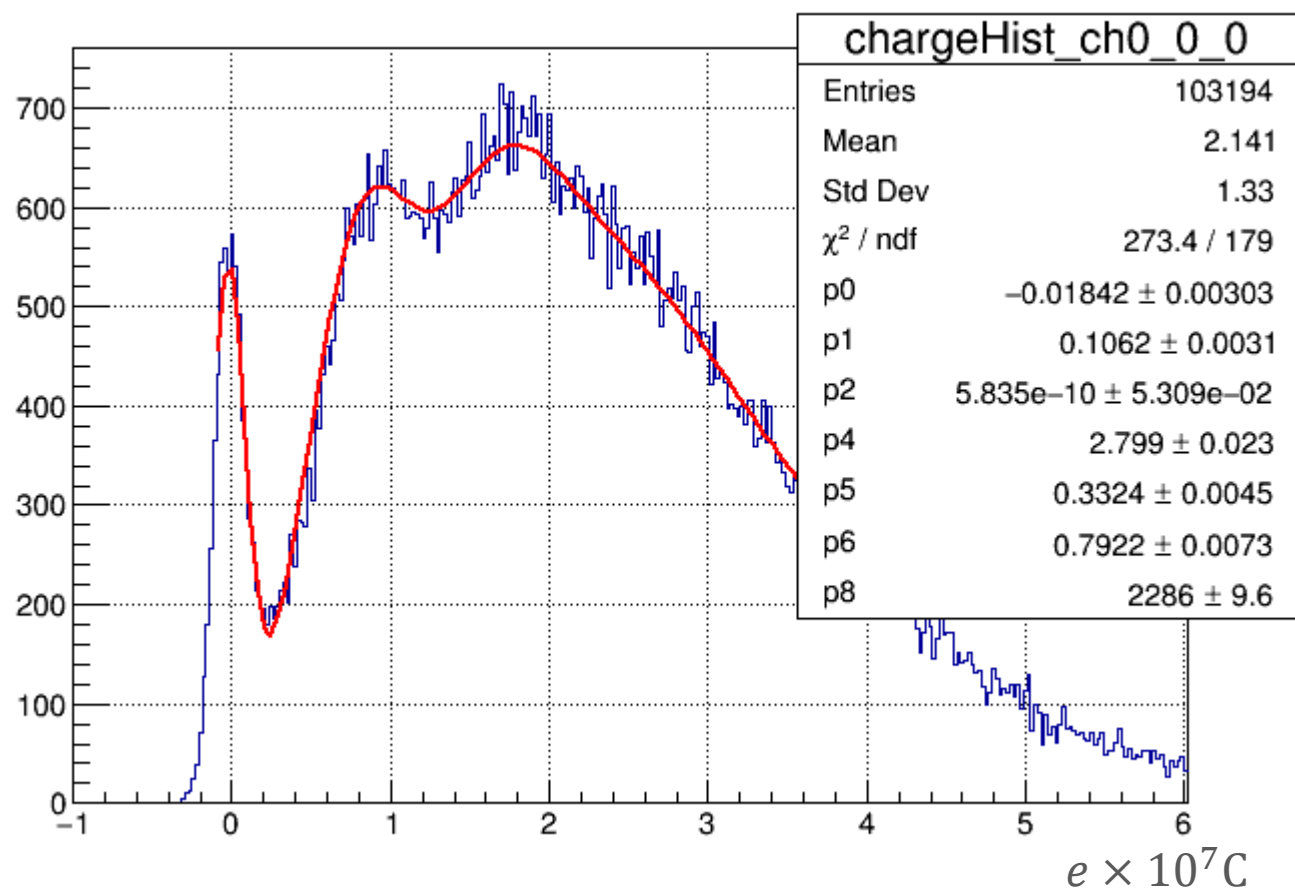
Transit Time (-1200 HV 20181219 run=638)



- Transit Time vs. charge
 - decreasing with charge
- charge value is equal to $Q_0 + (n - 1)(Q_1 - Q_0)$
 - n : # of photoelectron
 - Q_1 : peak of 1pe peak (p6)
 - Q_0 : peak of pedestal (p0)
 - its error bar is $0.5 \sigma_1$
 - σ_1 : S.D. of 1 pe peak (p5)

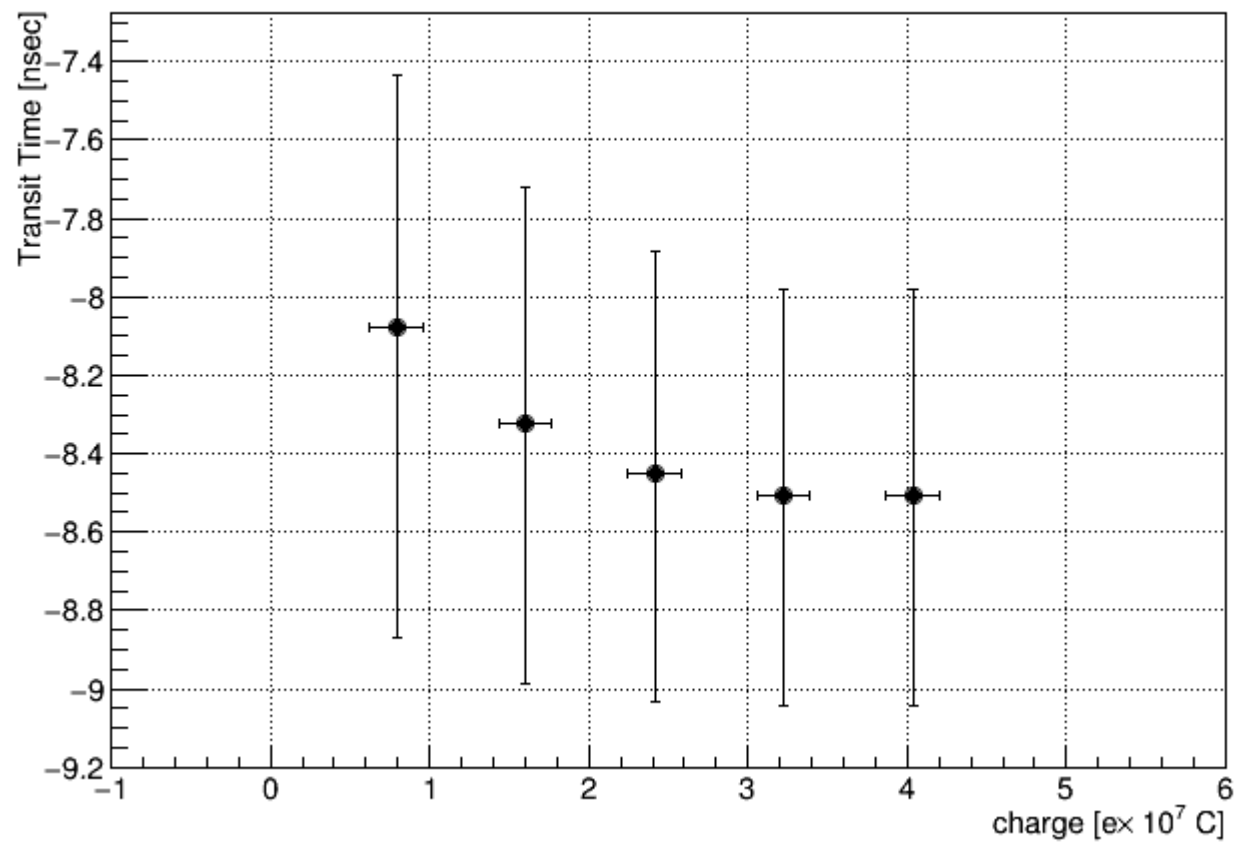
- TT error bars are brought from the 2 TT values when calculating TTS (FWHM)

- when $TTS = t_1 - t_0$,
- upper error is $t_{\text{mean}} - t_1$
- lower error is $t_1 - t_{\text{mean}}$
- t_{mean} is mean of EMG ($\mu + 1/\lambda$)

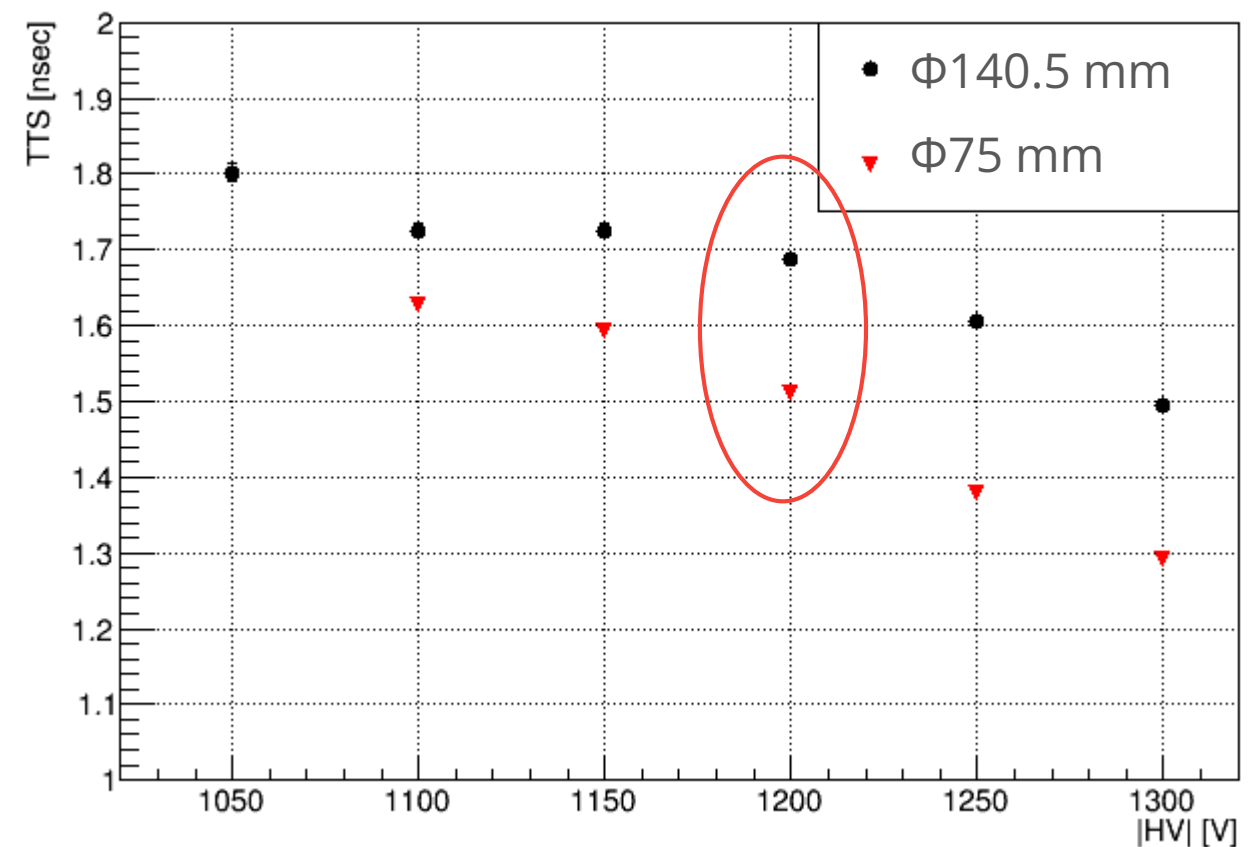
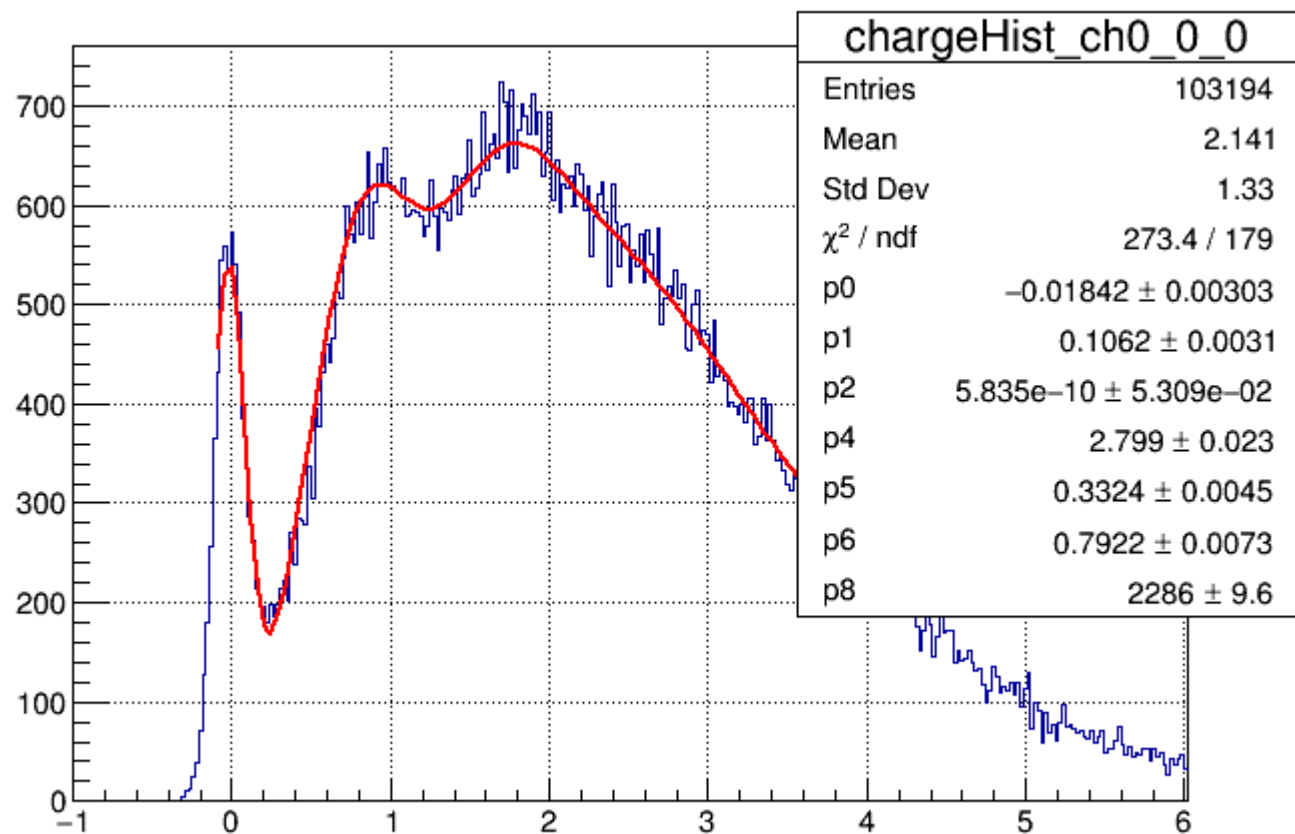
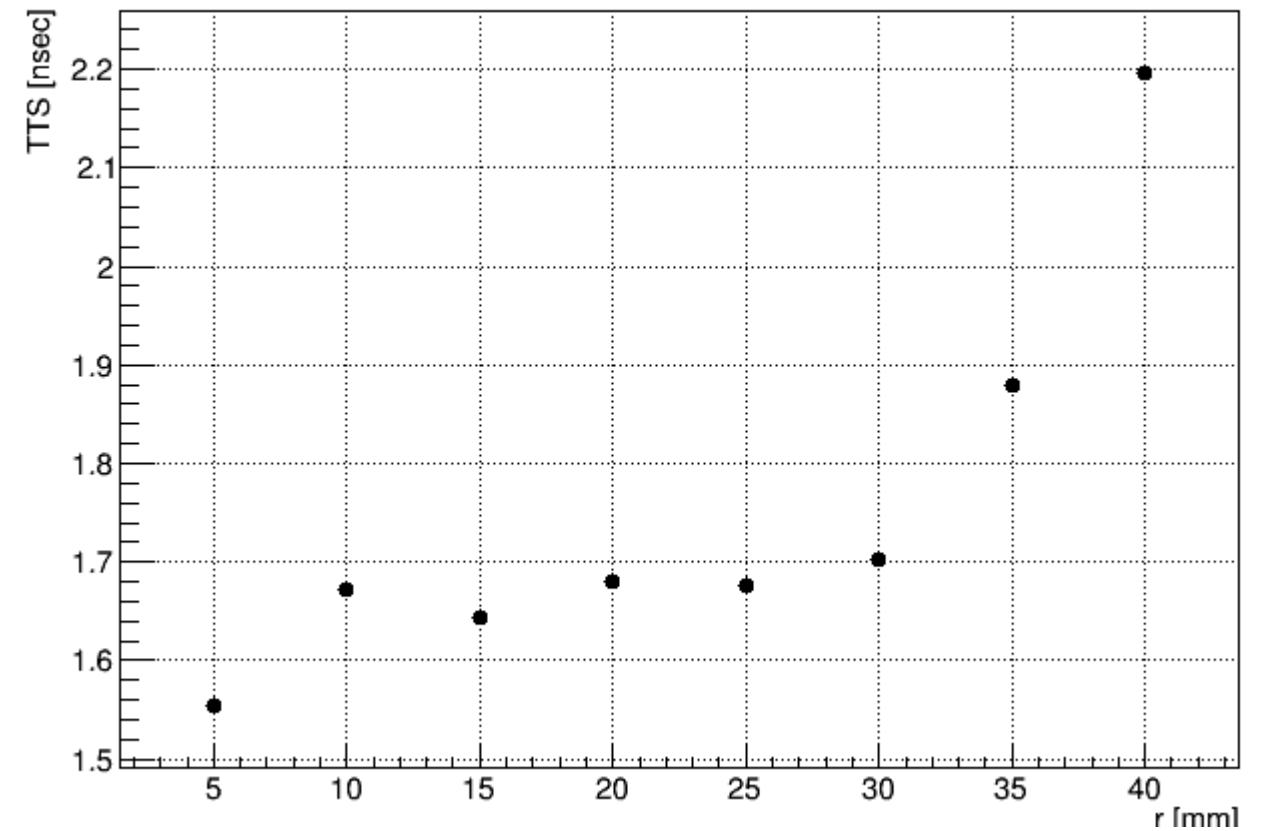


BC0038 -1200 V run595(Mot.) 638(Uni.)

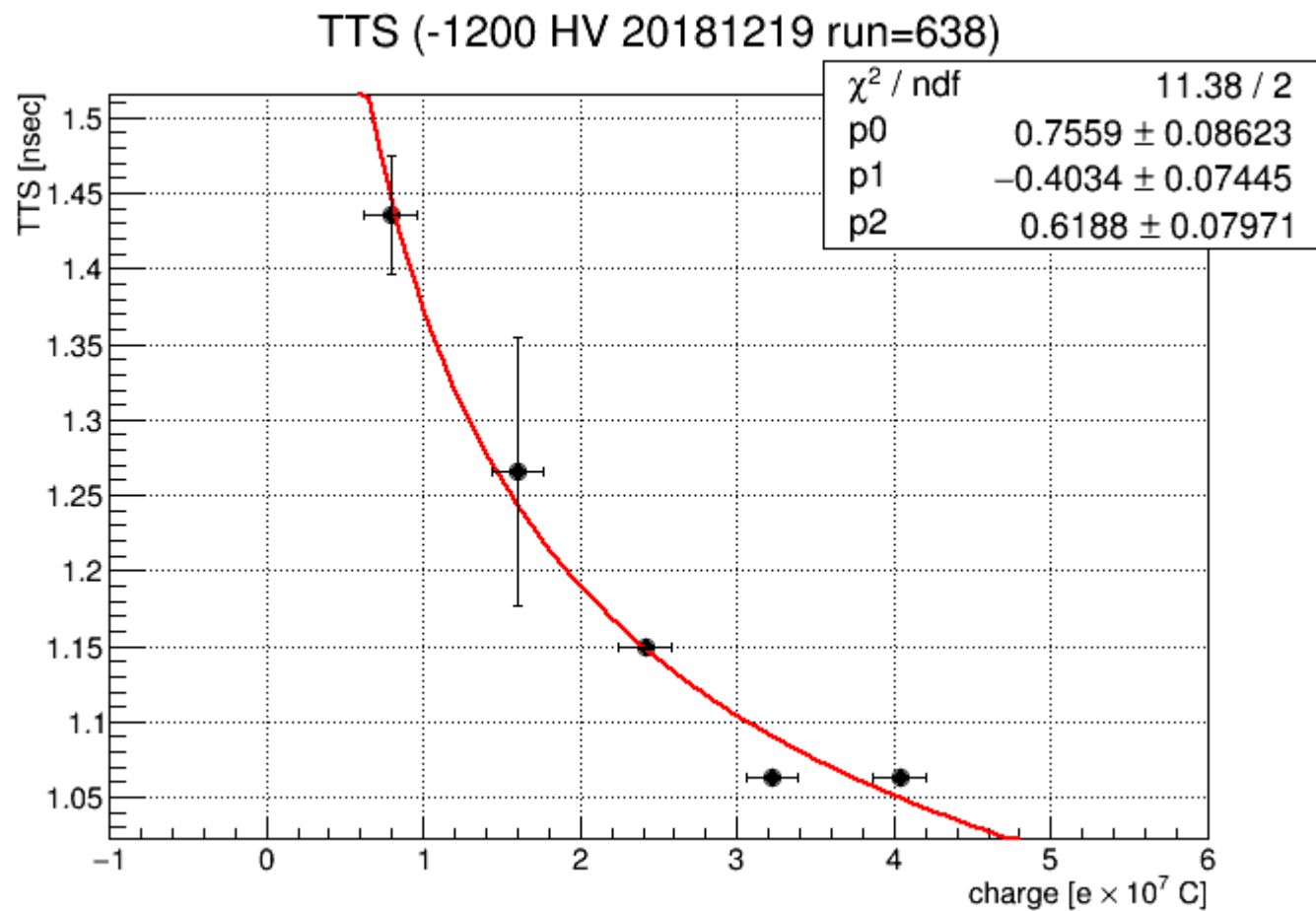
Transit Time (-1200 HV 20181219 run=638)



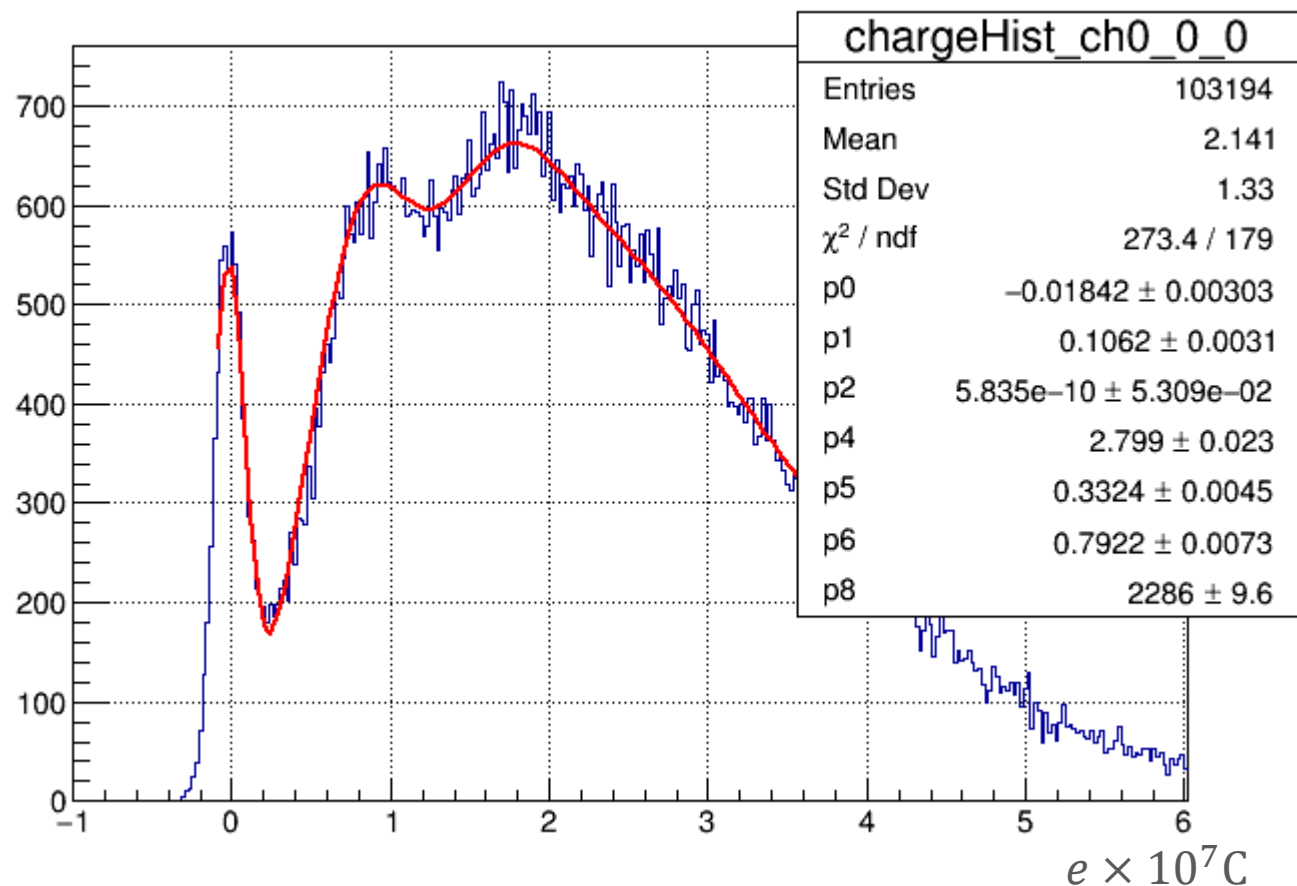
TTS



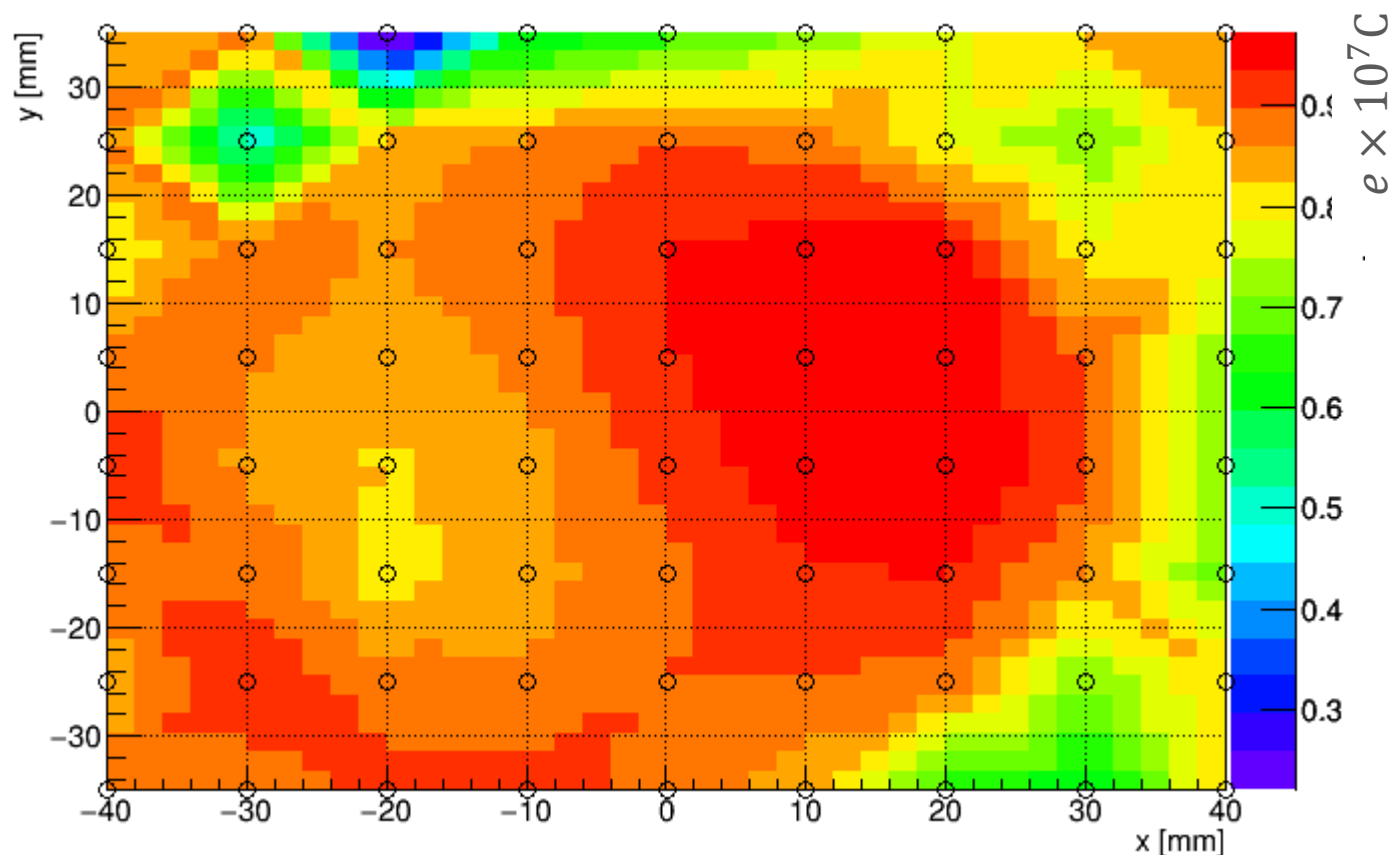
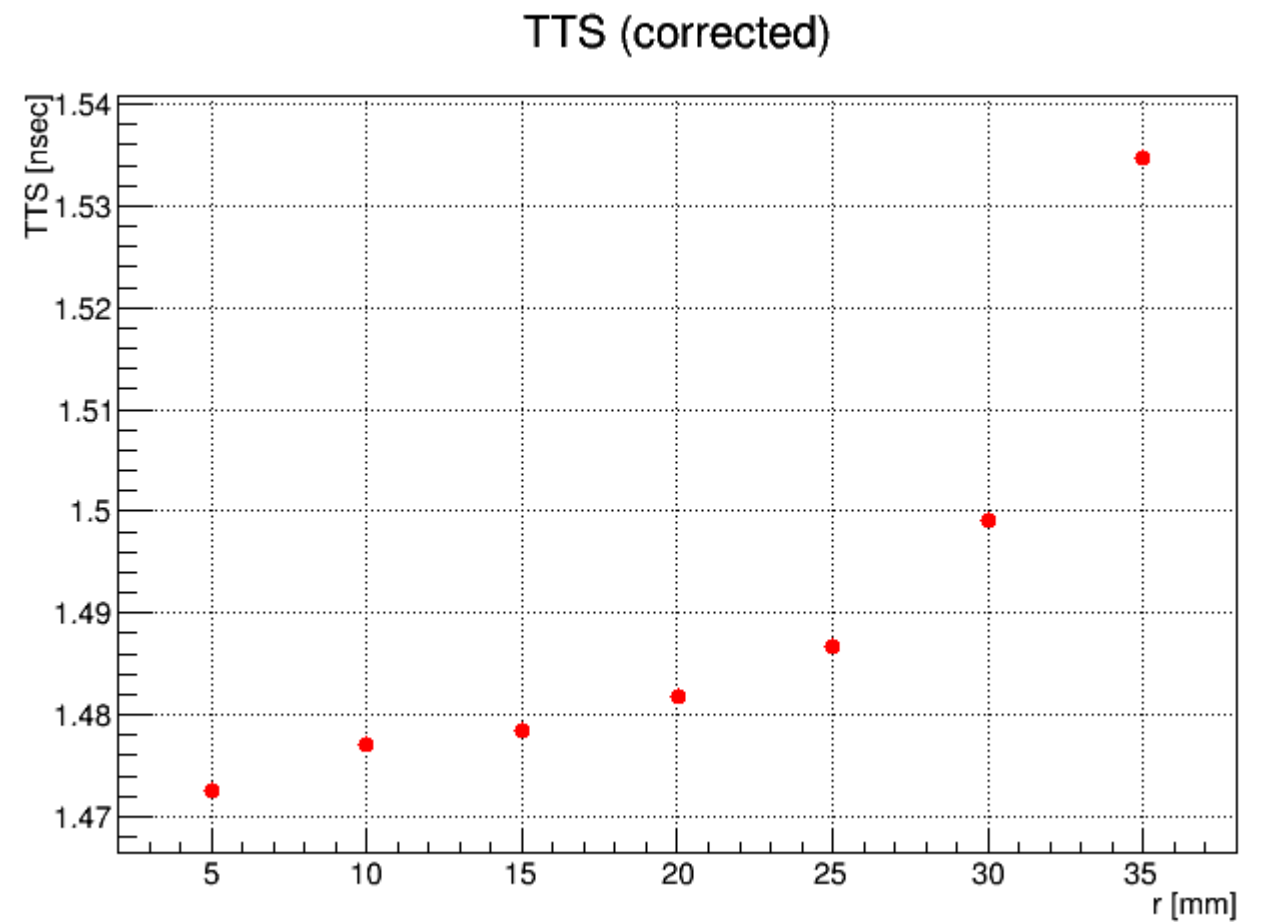
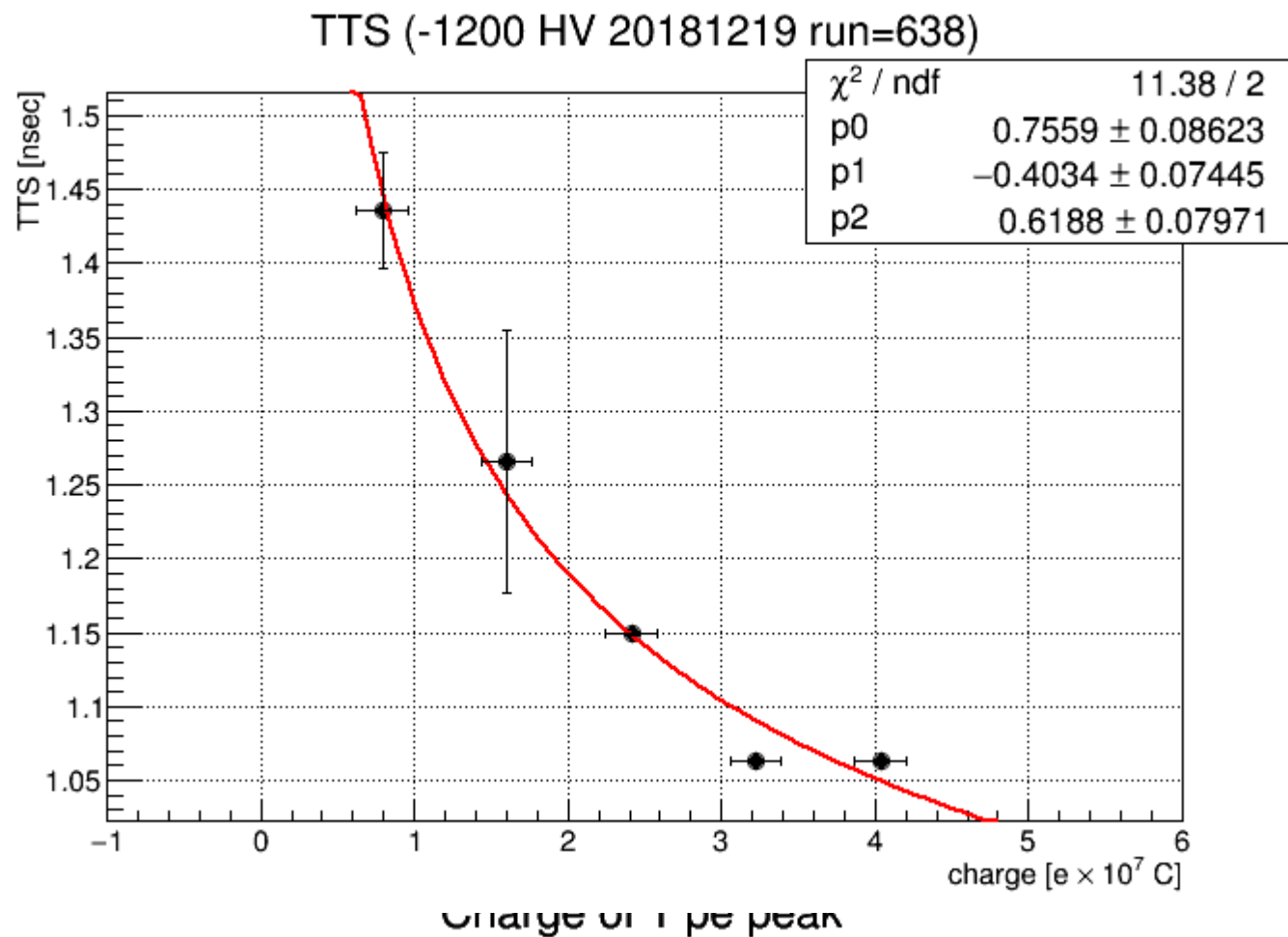
BC0038 -1200 V run595(Mot.) 638(Uni.)



- TTS vs. charge
 - fit: $p0 \times \text{charge}^{p1} + p2$
- charge value is equal to $Q_0 + (n - 1)(Q_1 - Q_0)$
- TTS error bar
 - $= \sqrt{\Delta\sigma^2 + \Delta\lambda^2/4}$
 - calculate from $\sqrt{\sigma^2 + 1/\lambda^2}$ (standard deviation of EMG)
 - though maybe not correct error
 - error > 0.5 ns -> set to 0 ns

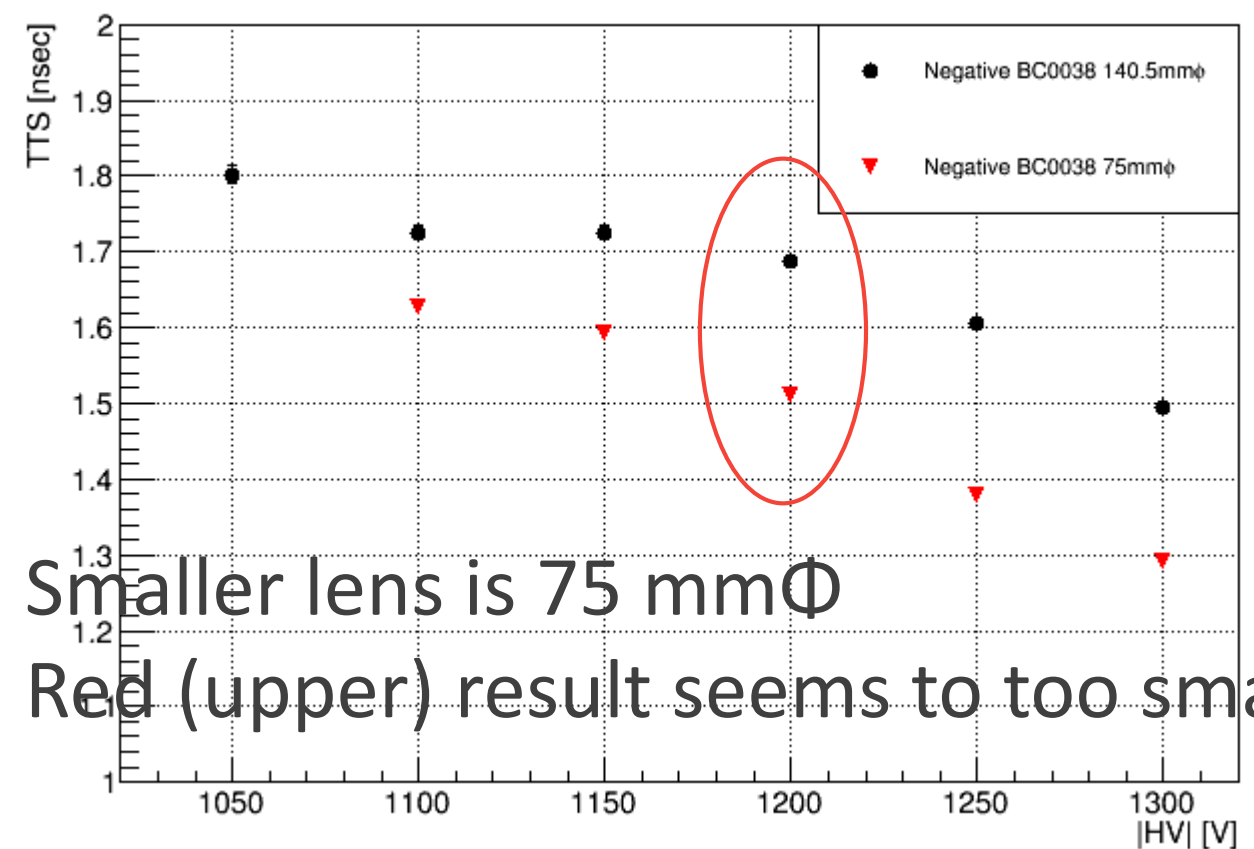
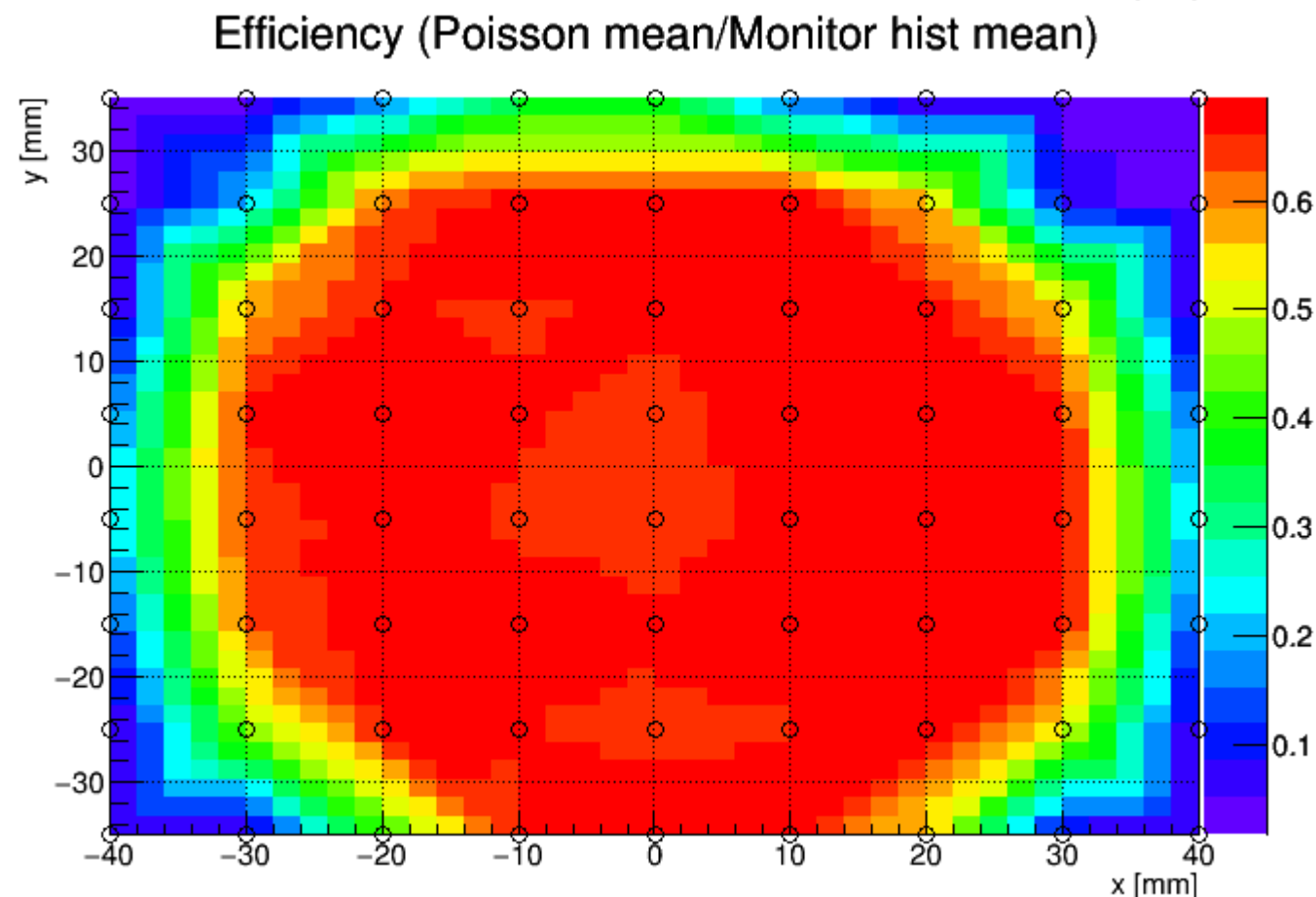
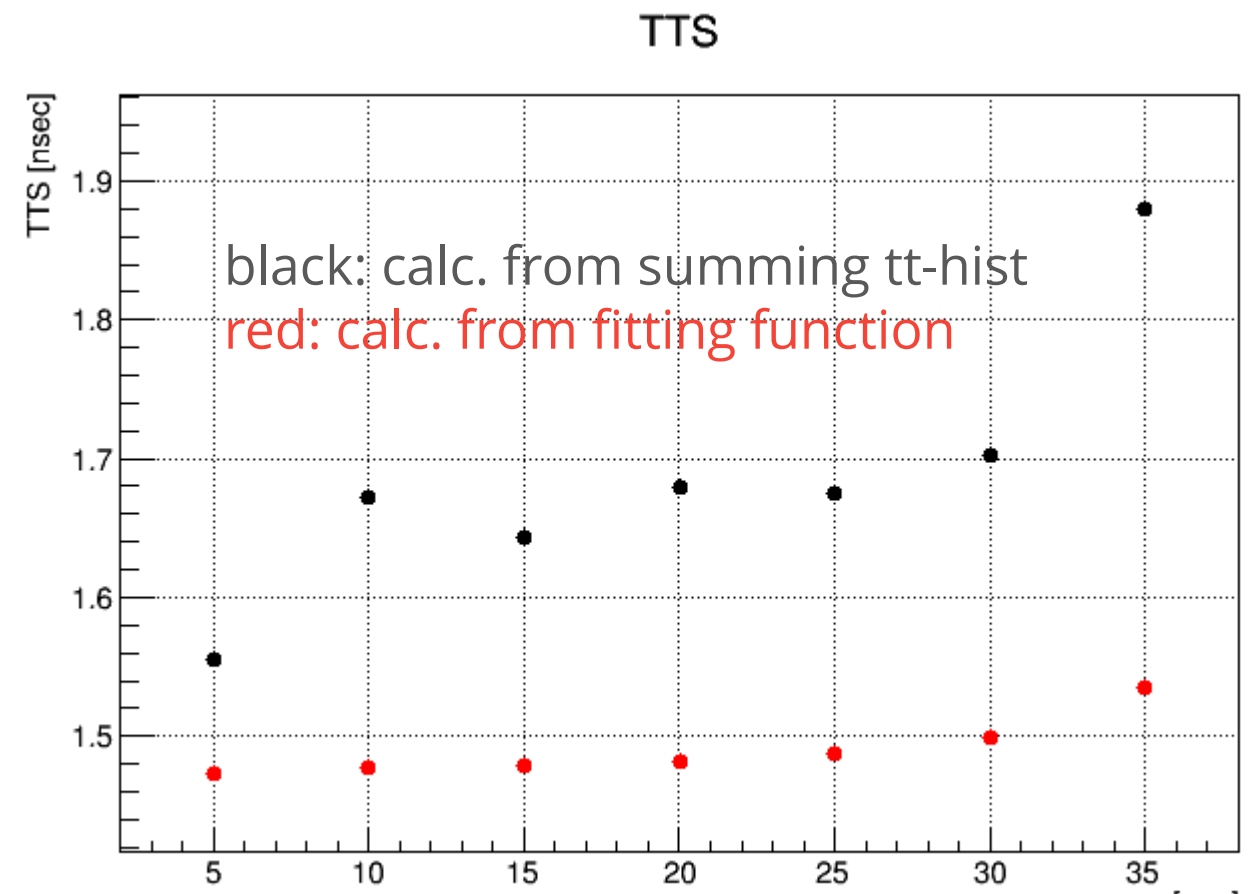
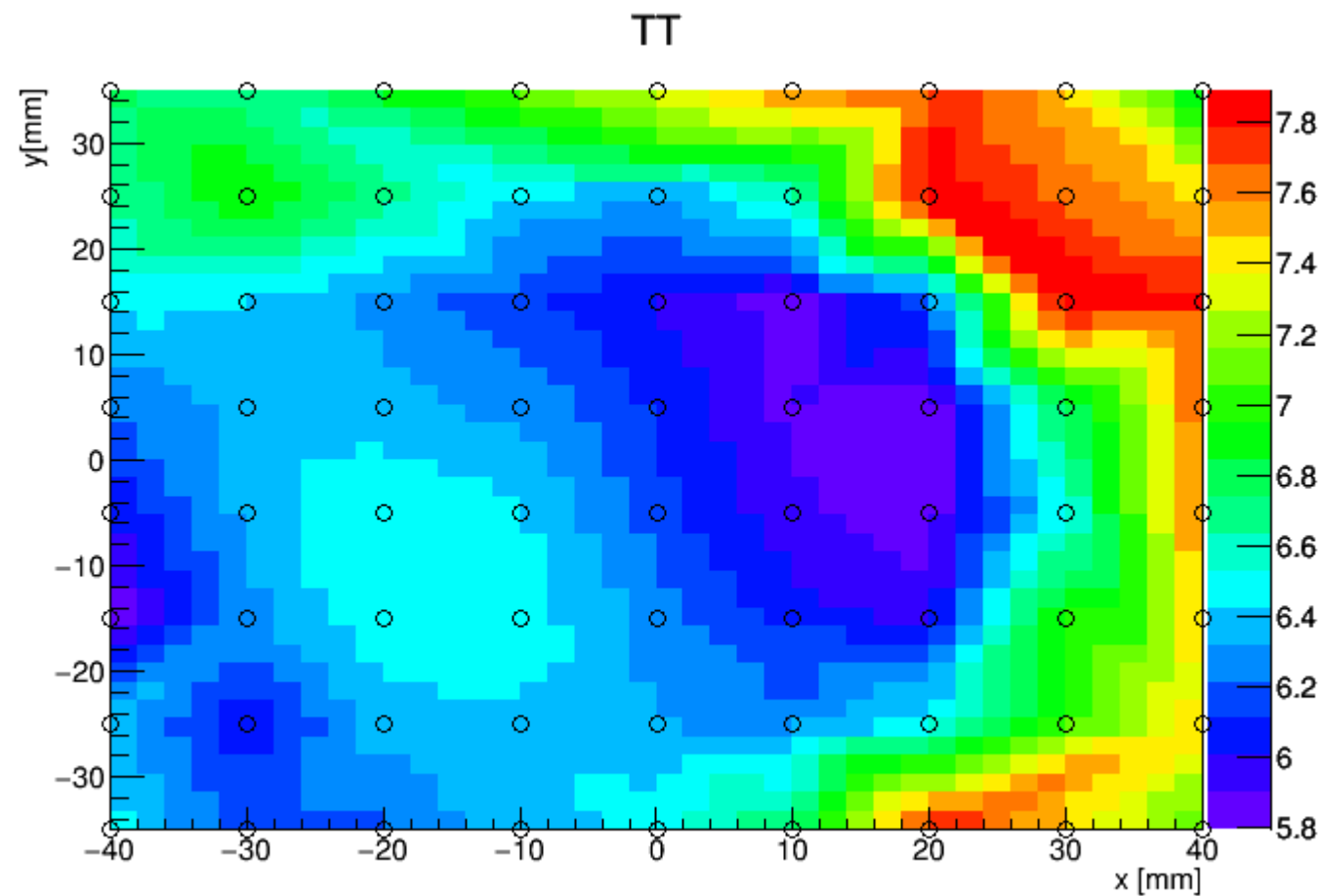


BC0038 -1200 V run595(Mot.) 638(Uni.)



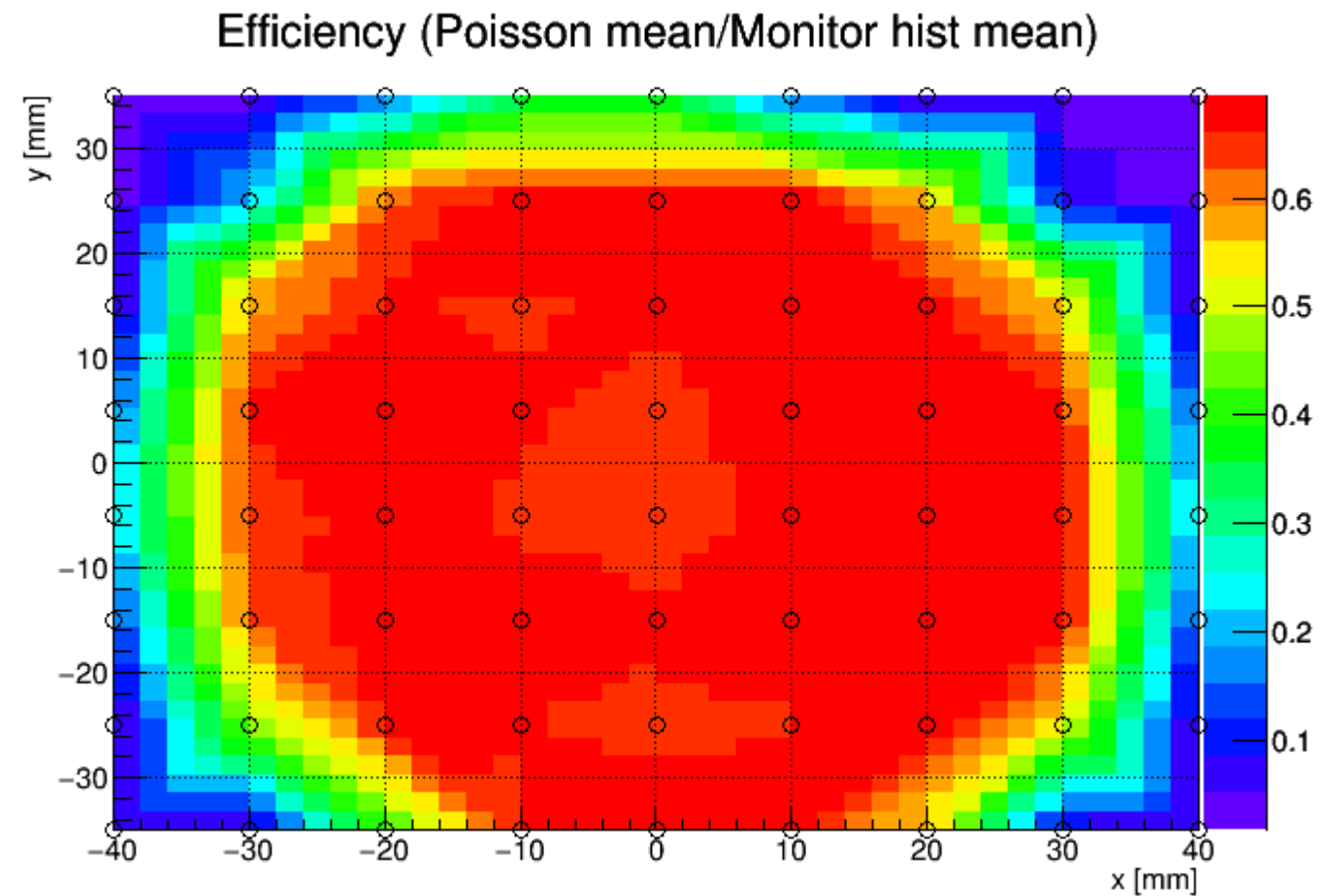
- Calculate TTS from fitting function
- 2d graph: z-value=Q1
 - mean charge of 1pe peak

BC0038 -1200 V run595(Mot.) 638(Uni.)



Smaller lens is 75 mm Φ
Red (upper) result seems to too small

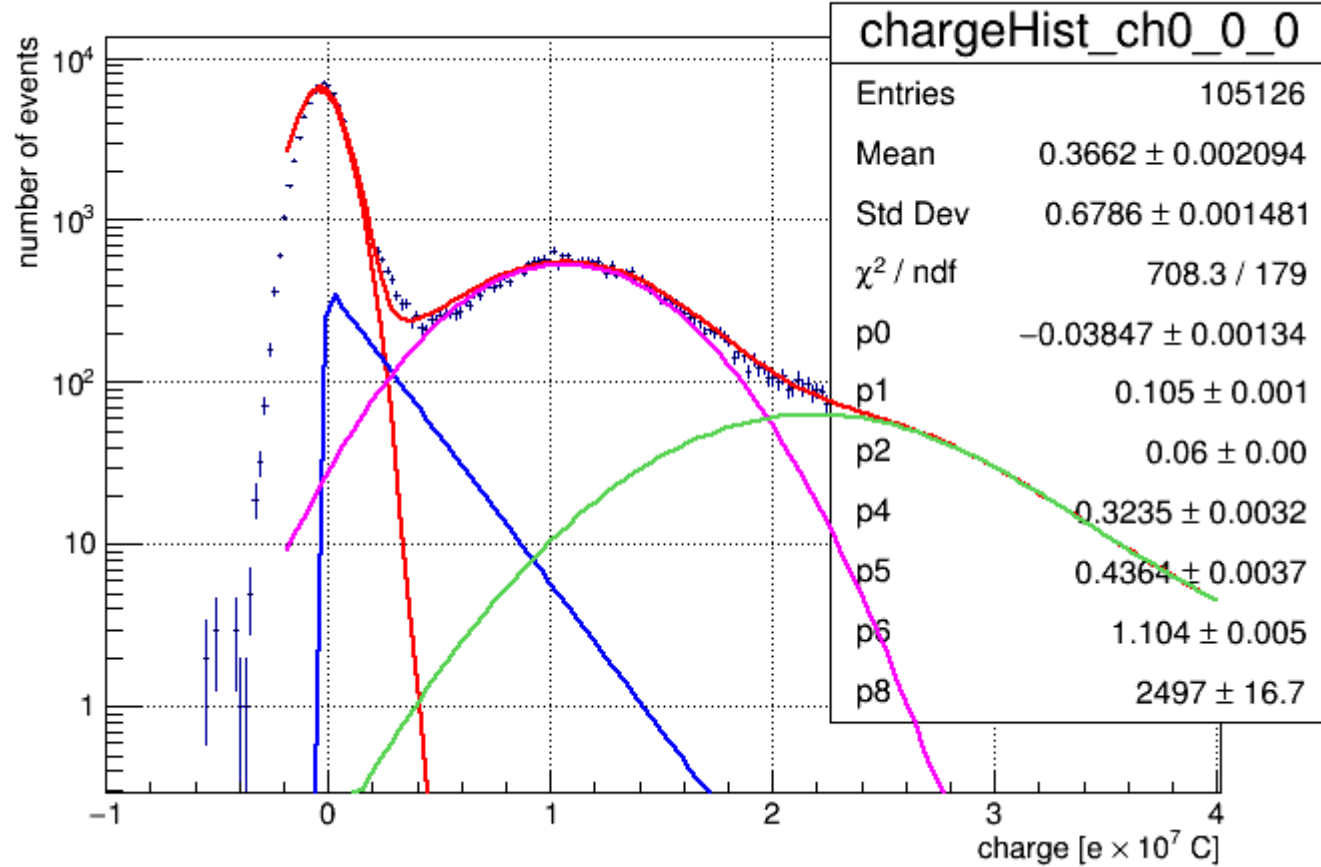
BC0038 -1200 V run595(Mot.) 638(Uni.)



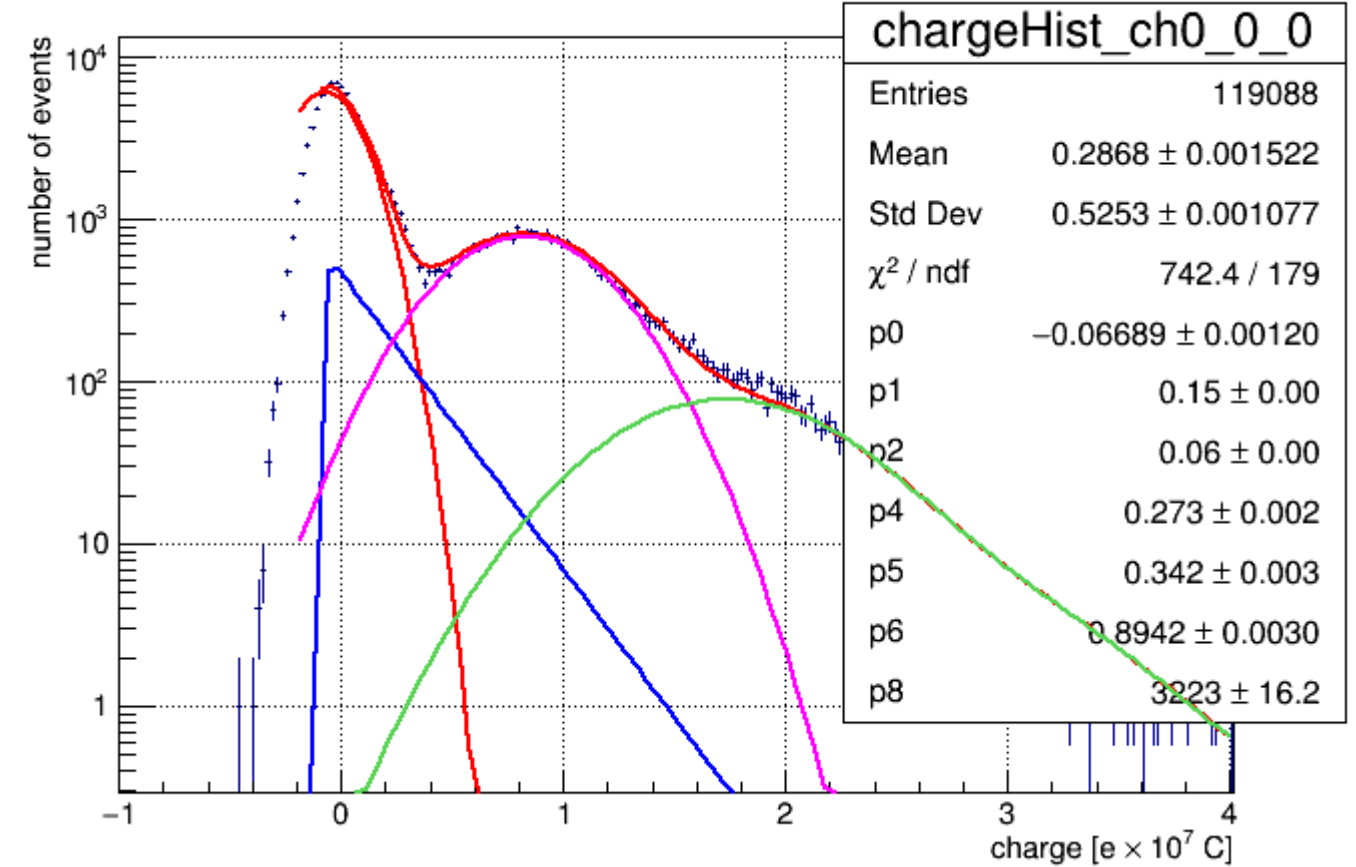
- What kind of algorithm should be used when we determine the center of PMT ($r=0$) ?
- In this slide just set $r=0$ as $x=y=0$.

What causes outlier?

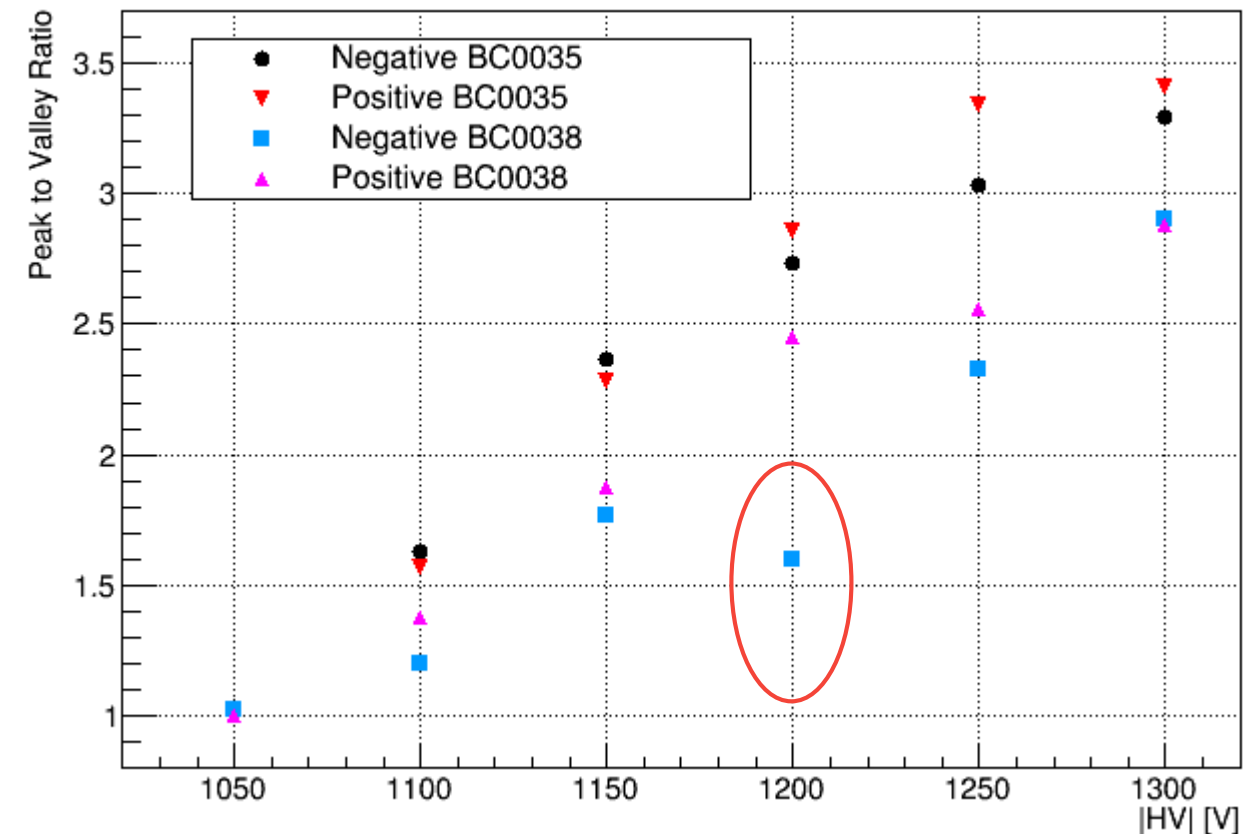
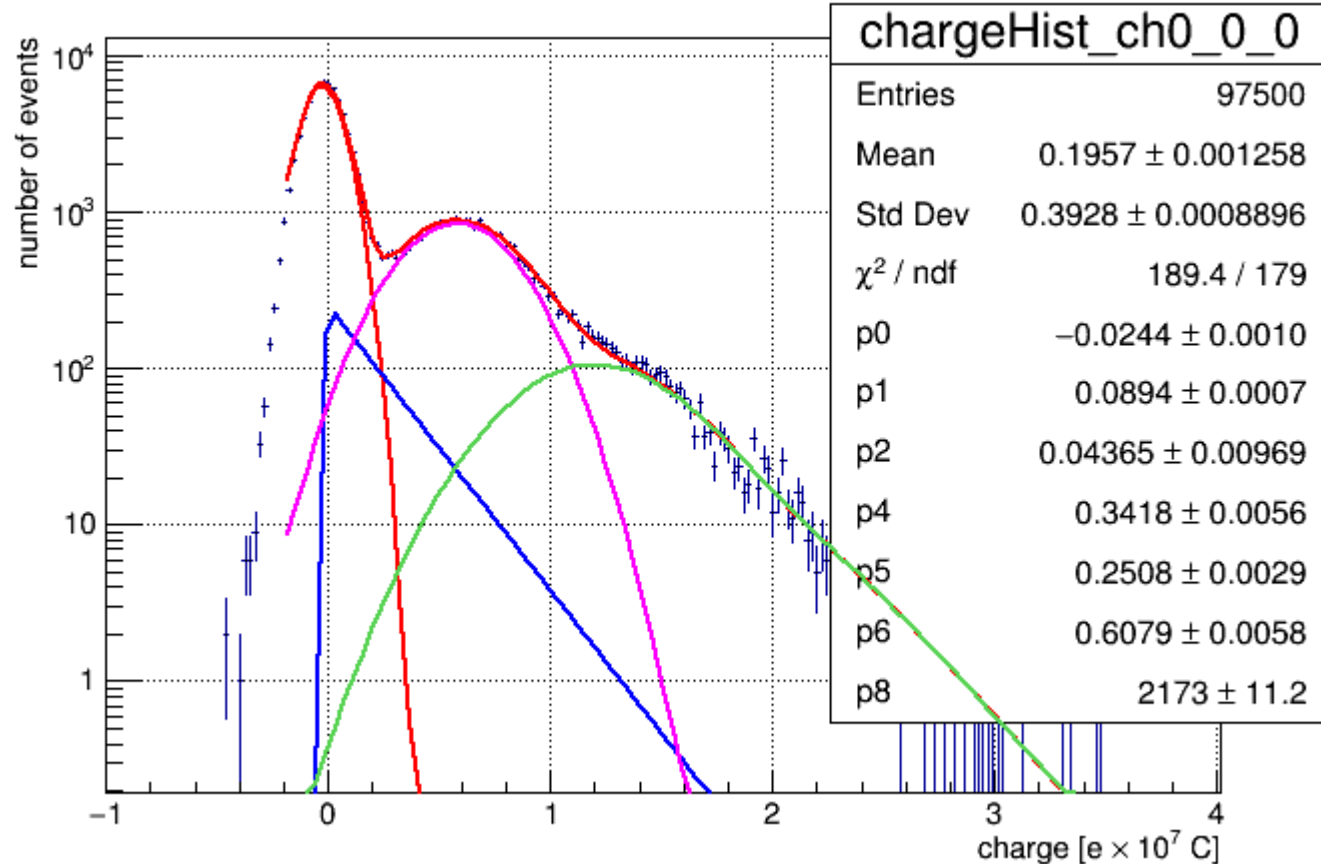
charge hist. ch0 (-1250 V 20190123 run=680)



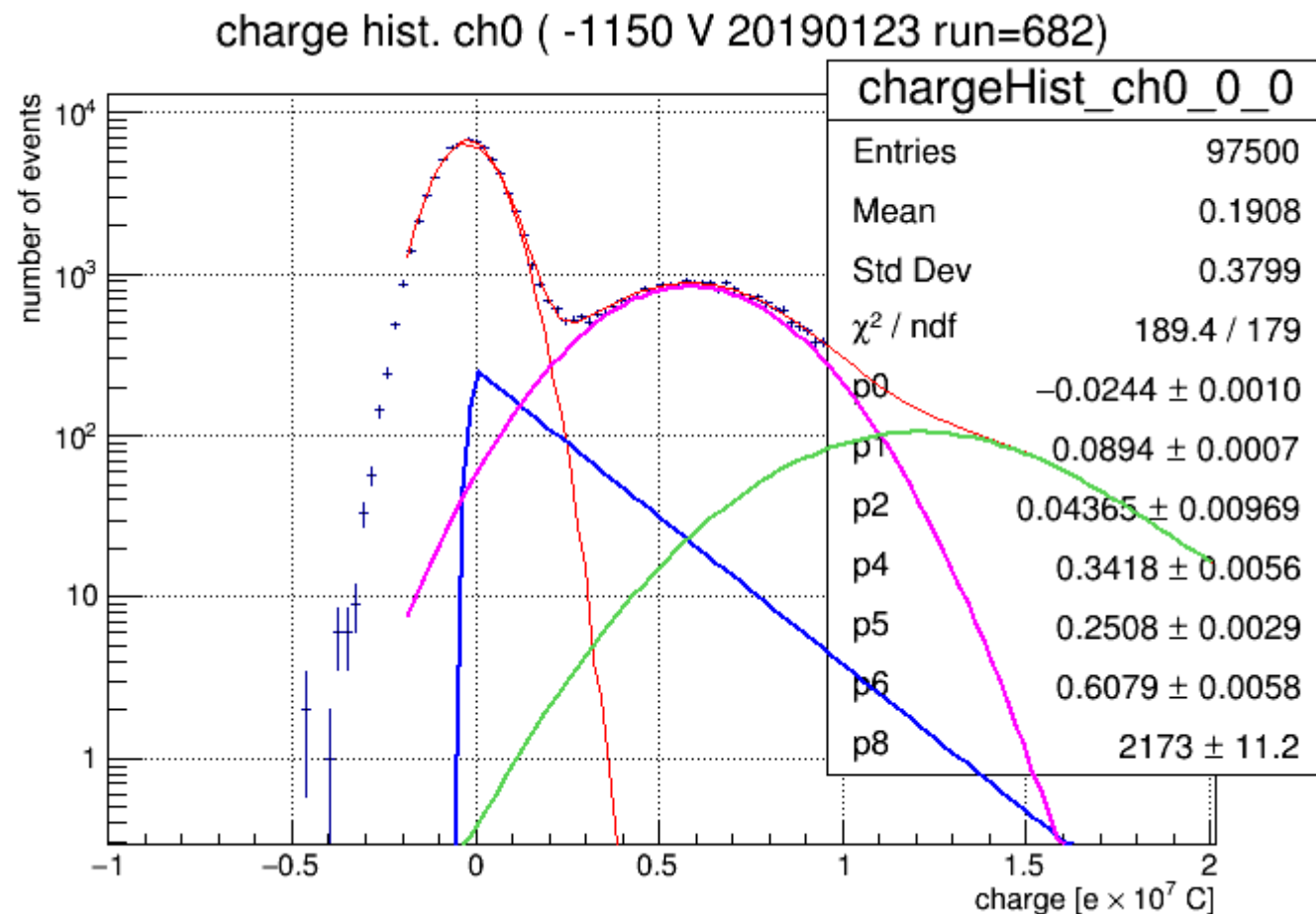
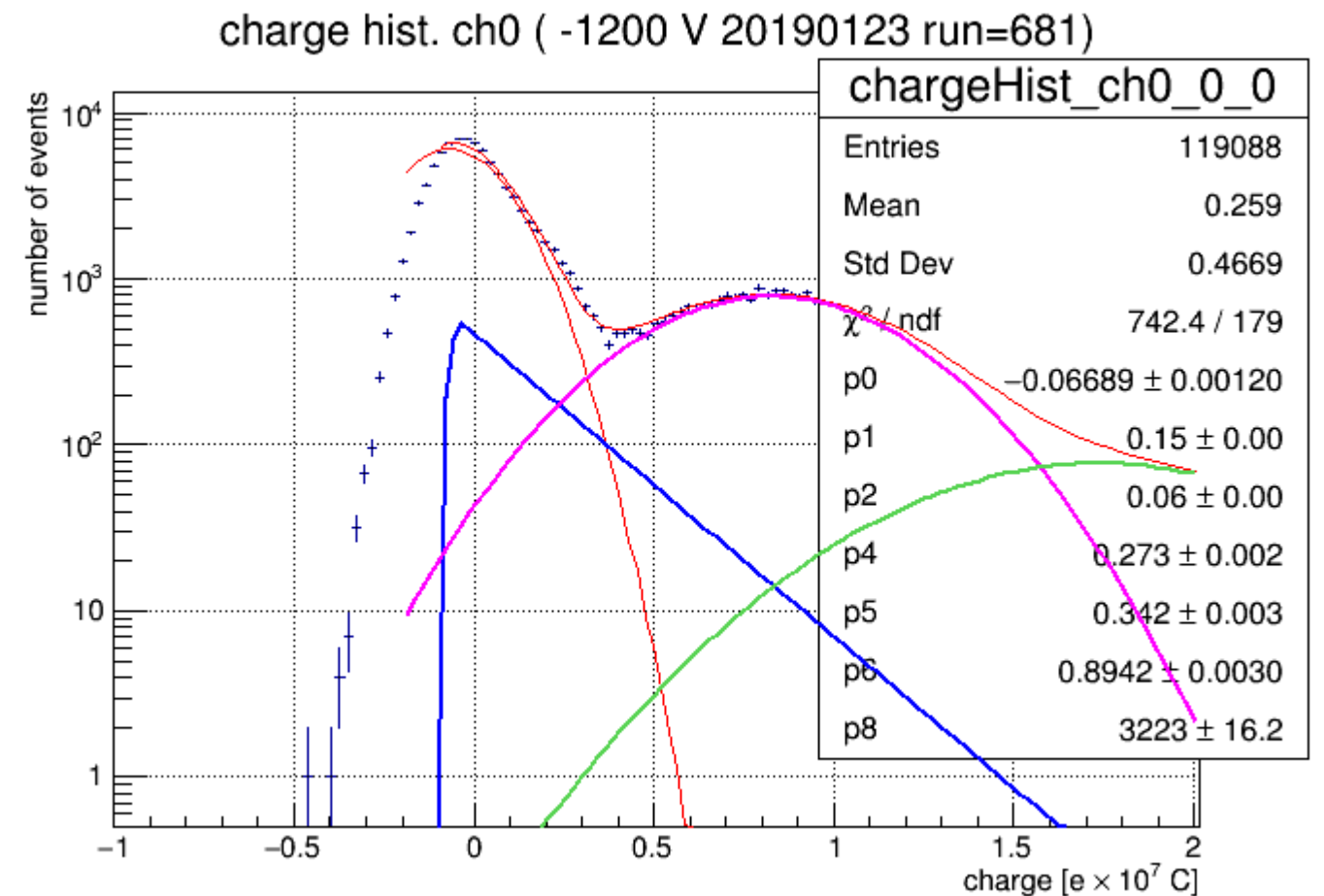
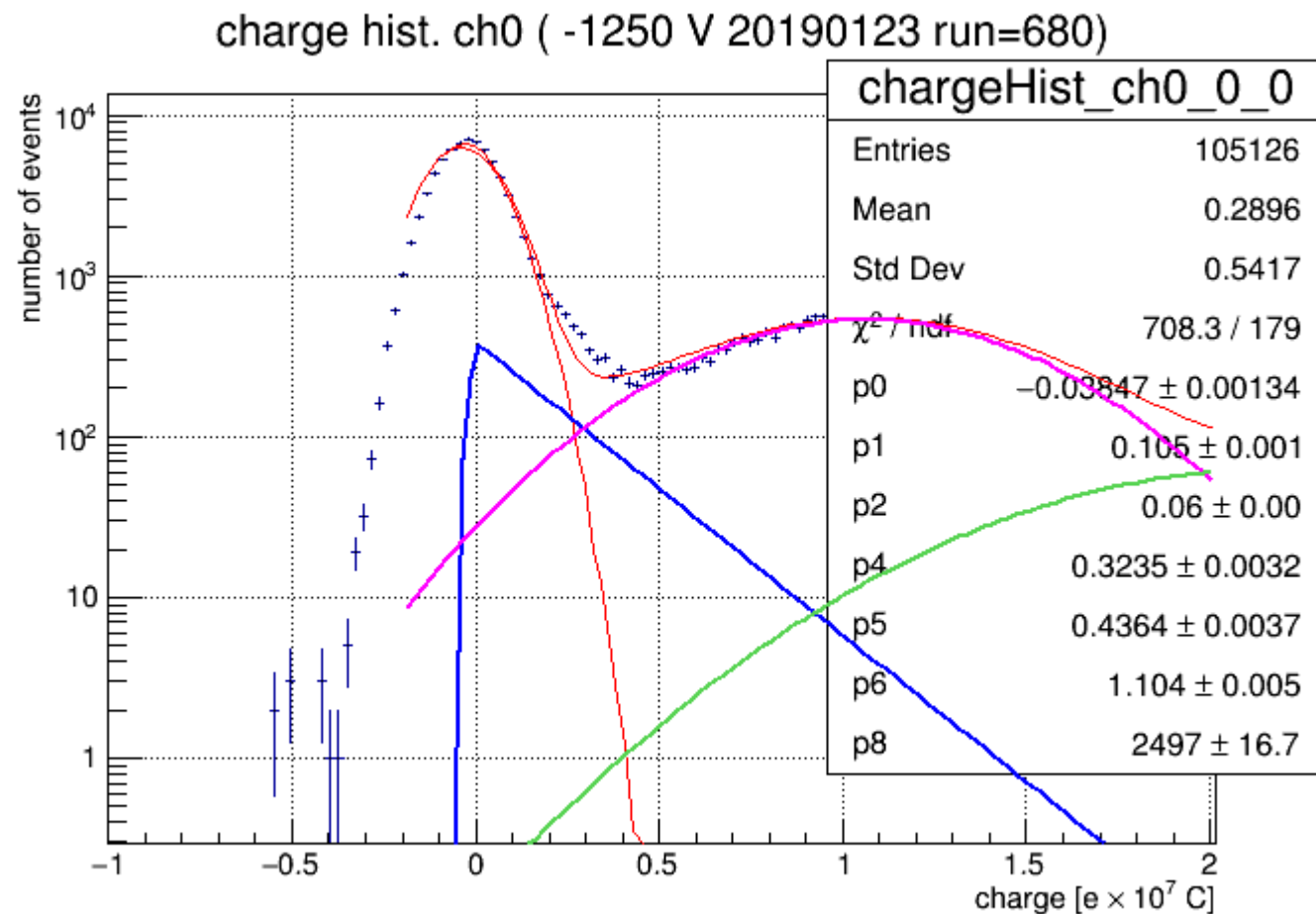
charge hist. ch0 (-1200 V 20190123 run=681)



charge hist. ch0 (-1150 V 20190123 run=682)



What causes outlier?



- p1 is sigma of pedestal
 - -1200 V has the largest sigma0
 - -> the cause should be any abnormality in pedestal
- bump appeared again?