

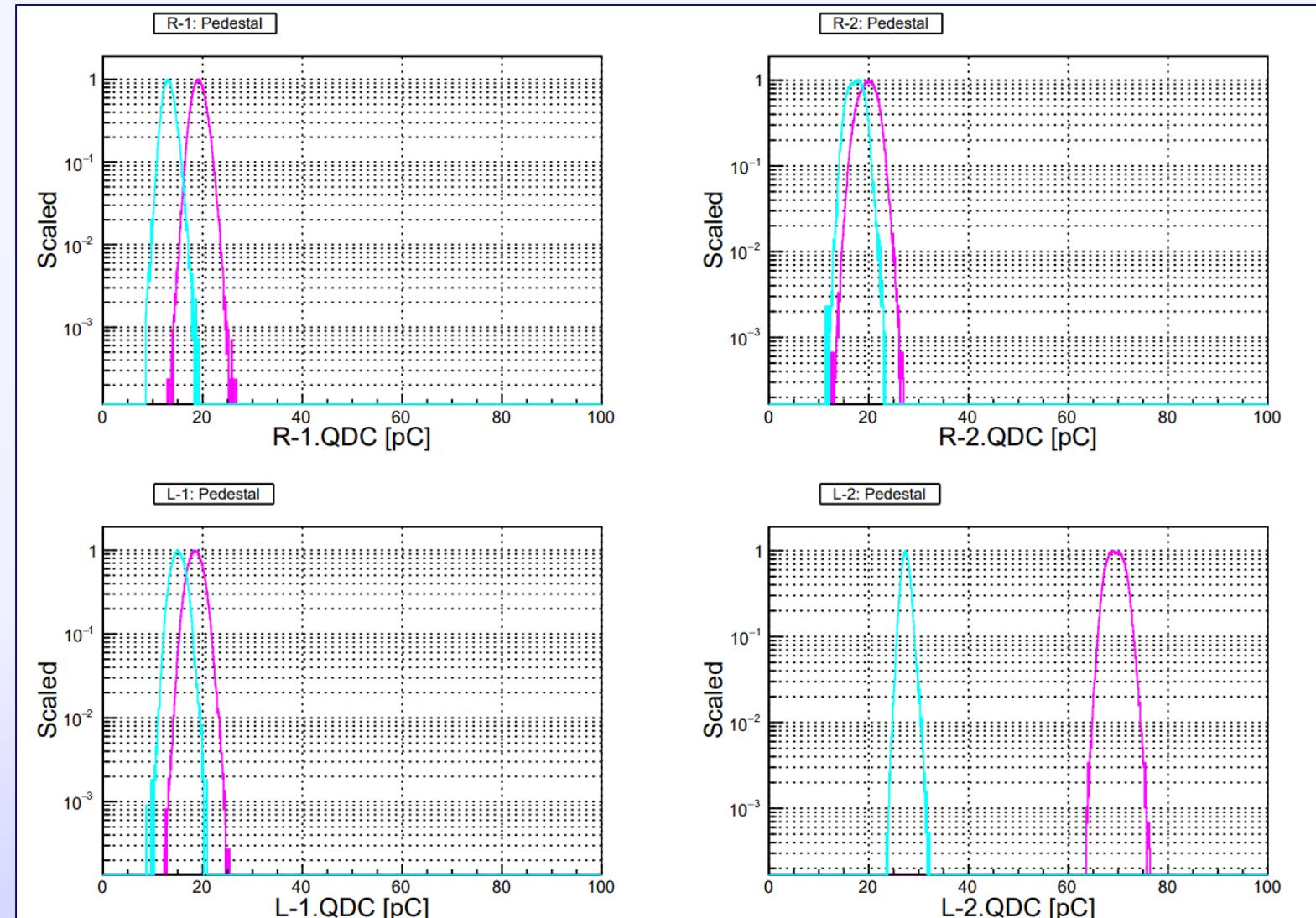
Status Report #18

2020. 03. 11 (Wed)

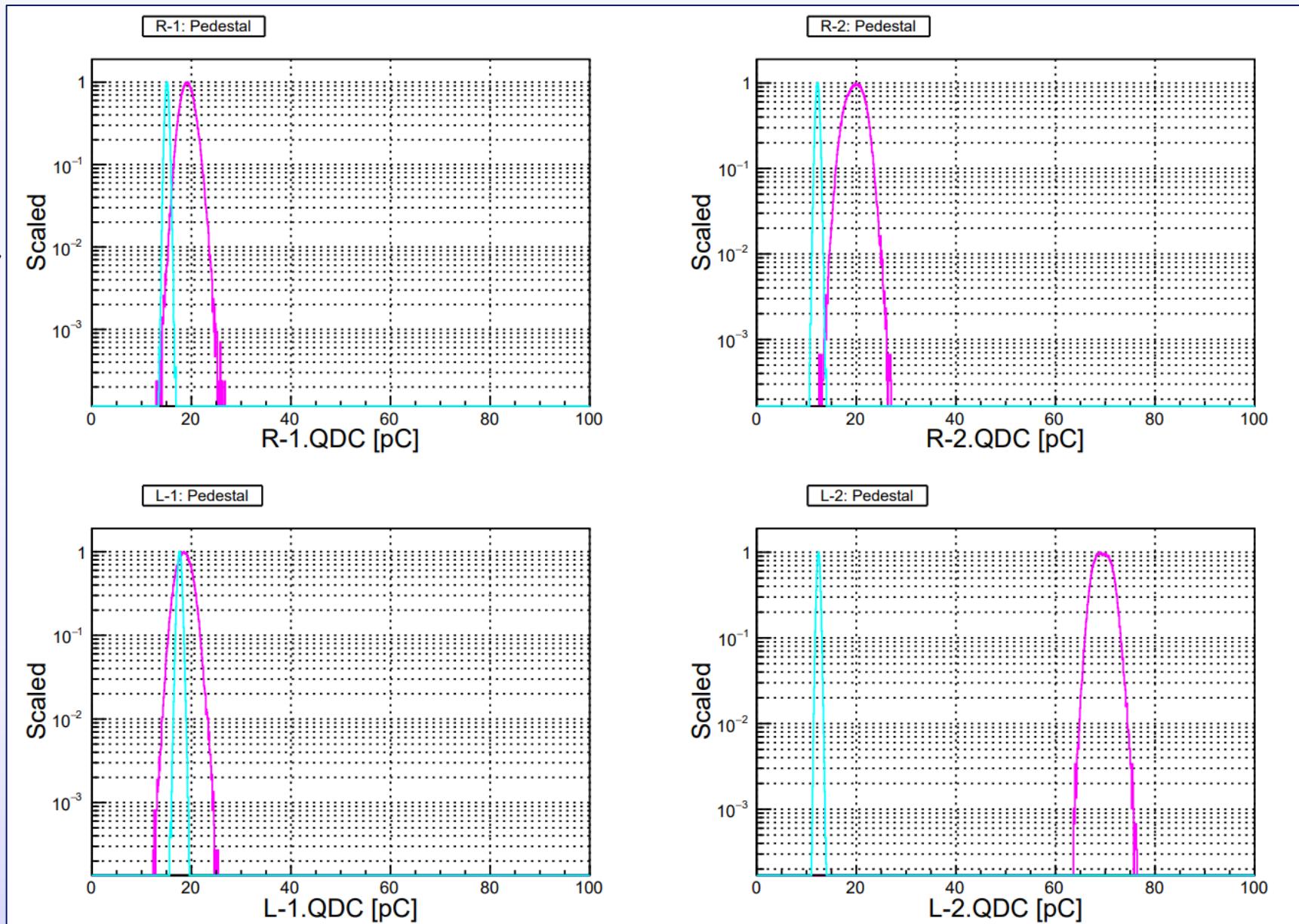
B4 FUJIWARA Tomomasa

- ✓ About modules (PM amp)
- ✓ ToF frame reconstruction
- ✓ ToF cosmic: t=11, w=22 mm
- ✓ TDC & QDC distribution

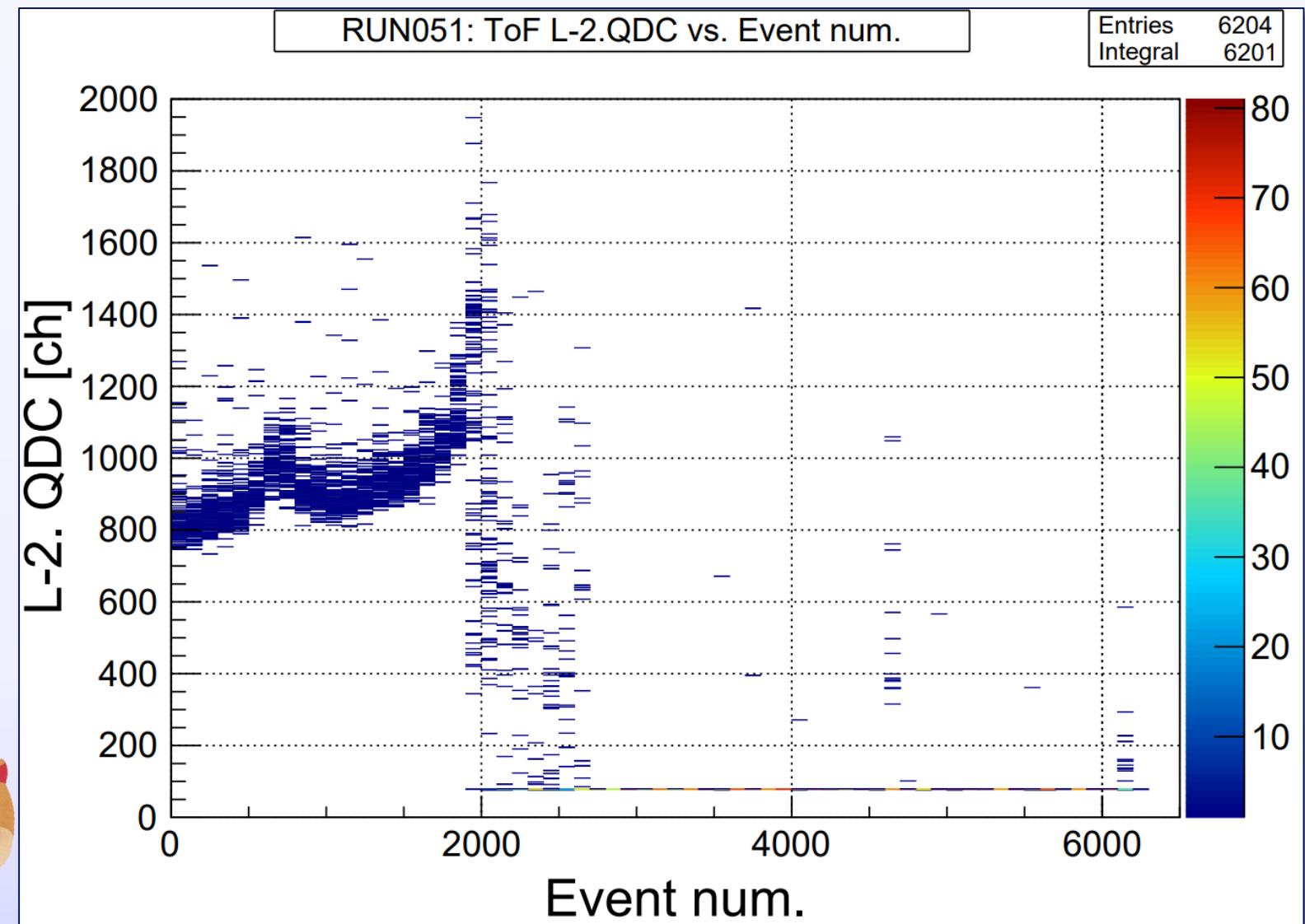
- ToF cosmic-ray \Rightarrow using PM amp w/ offset.
- 2 weeks ago different modules (PM amp w/o offset + quad mixer)
 \Rightarrow strange performance
- Different value run by run...



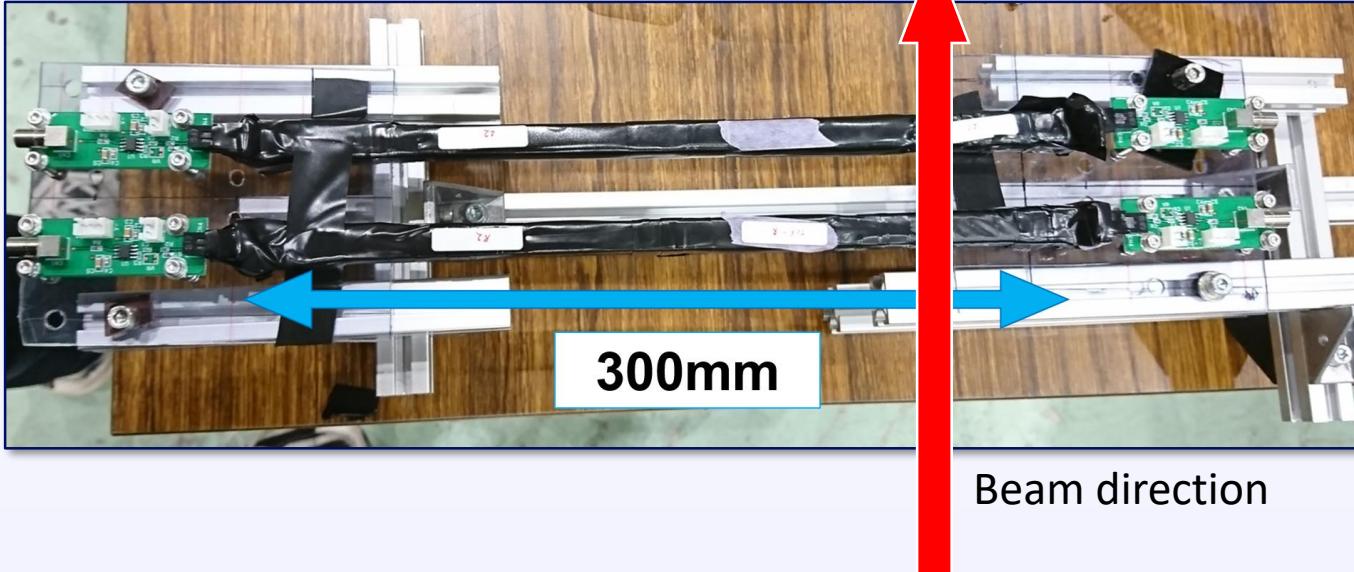
- Comparison between modules
- マジェンタ: 新しく用意したモジュール
- 水色: 元のモジュール
- 明らかにペデスタルが太い



- 宇宙線取得時のデータ
- ランの途中からQDCが飛んでいるCHがある
- 現在: 結局元のPM amp を使用中...



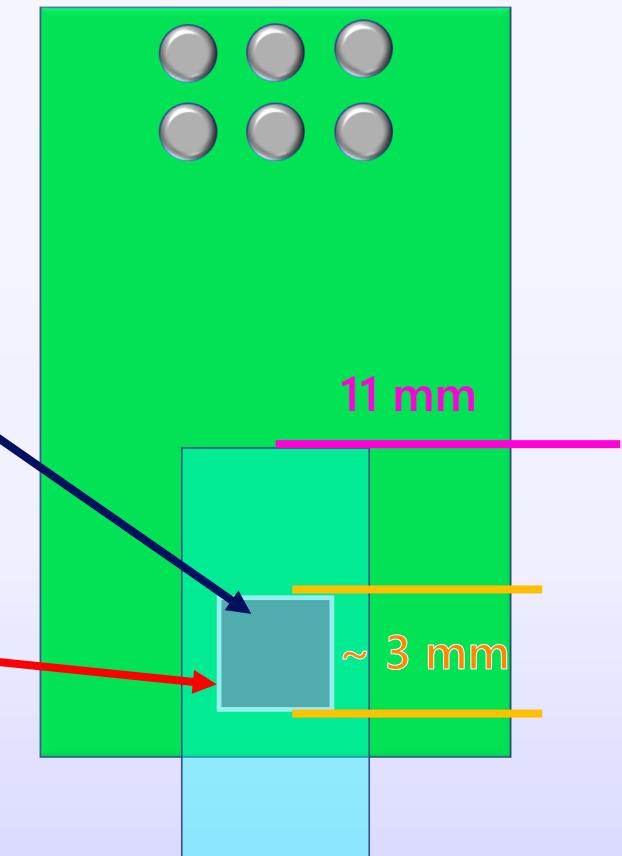
- Conventional frame structure



- For $w=11$ mm scintillator

MPPC: S14160-3015PE

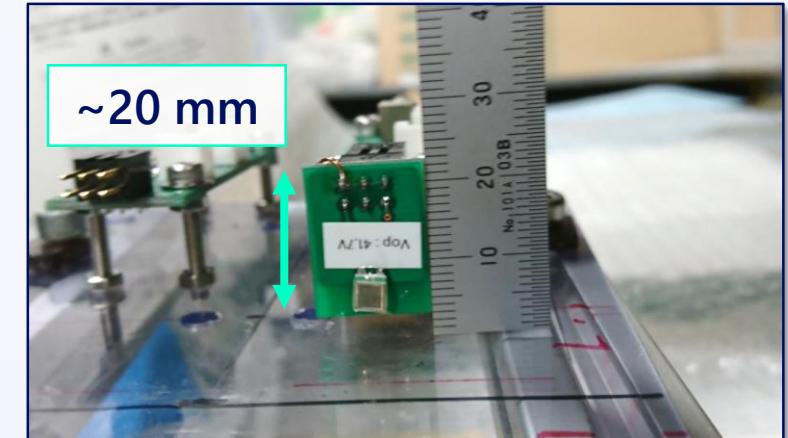
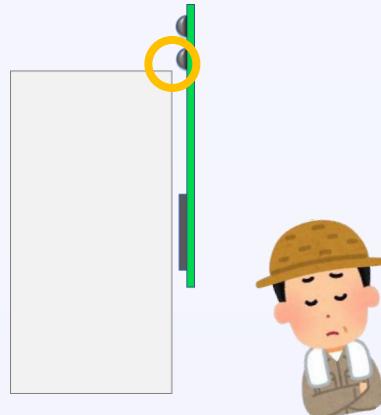
Scintillator: $t=5$, $w=11$ [mm]



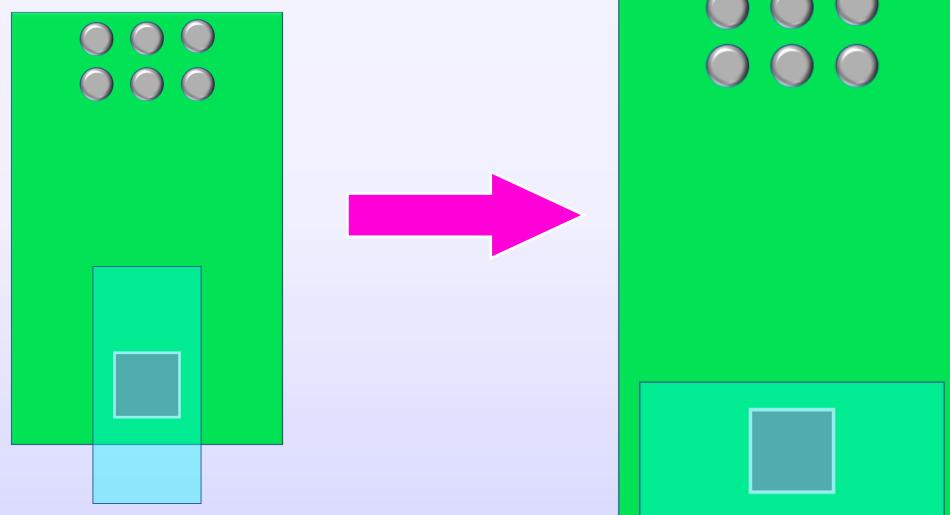
Problem of current setup and my solution

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- Concern: when using $w=44$ mm scintillator, Interfere the surface of scintillator and solder ?

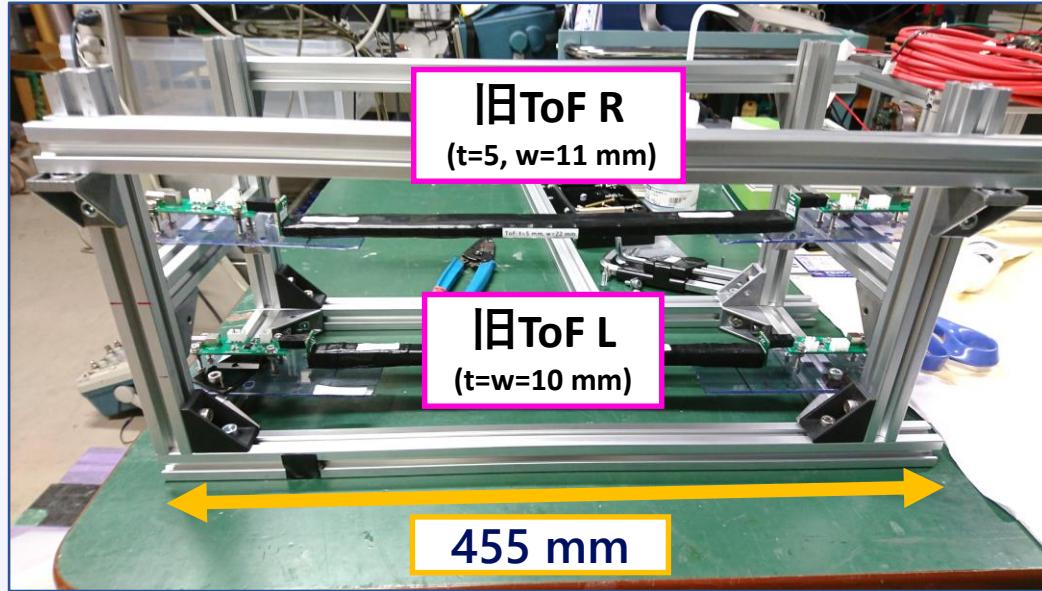


- Change the method of connection

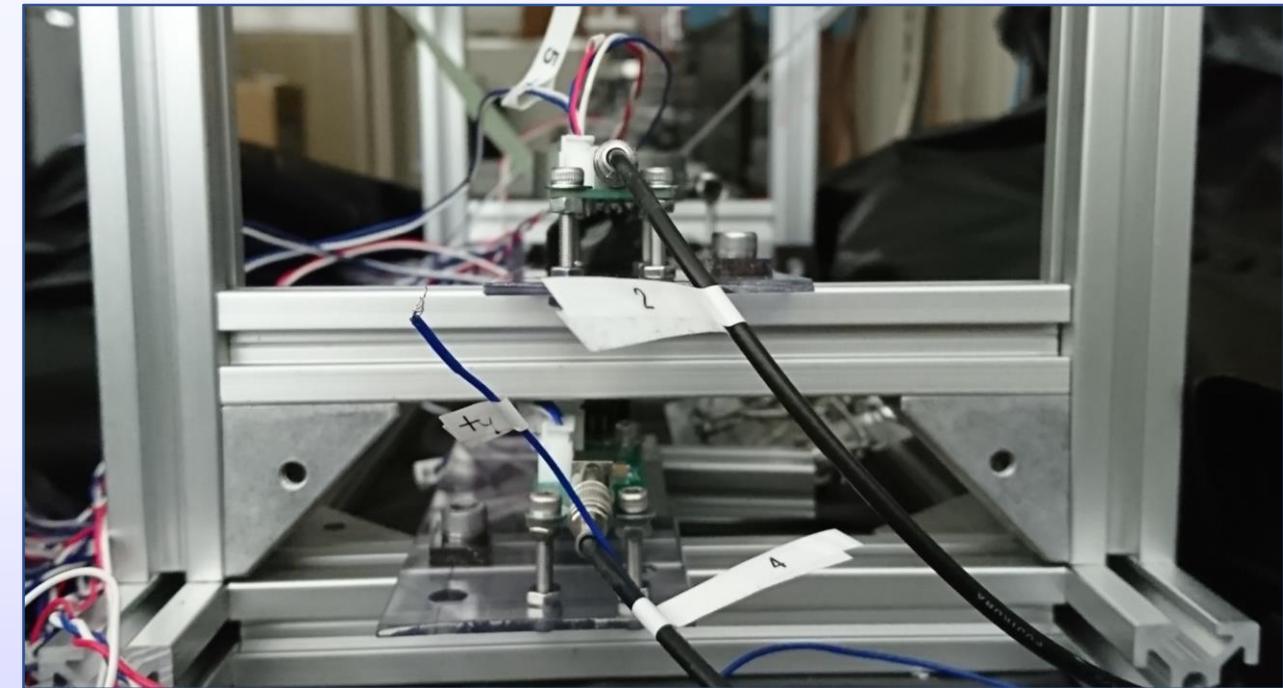


New frame

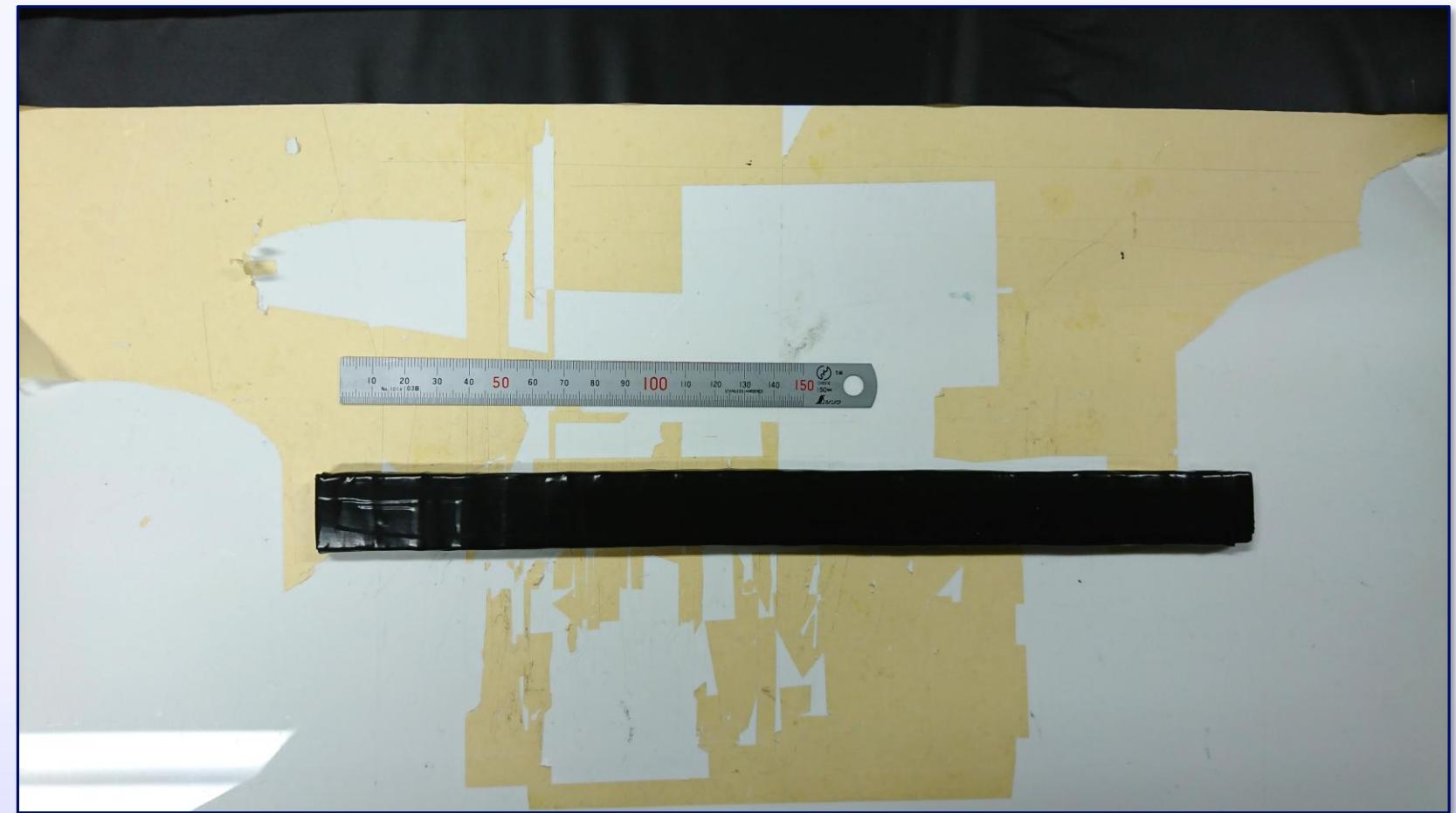
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Scintillators mounted



Check bias dependence:
 $V_b - V_{op} = 0.0, 3.0, 6.0$ [V]



Status of ToF cosmic: run076 (2020. 03. 07 15:24 時点)

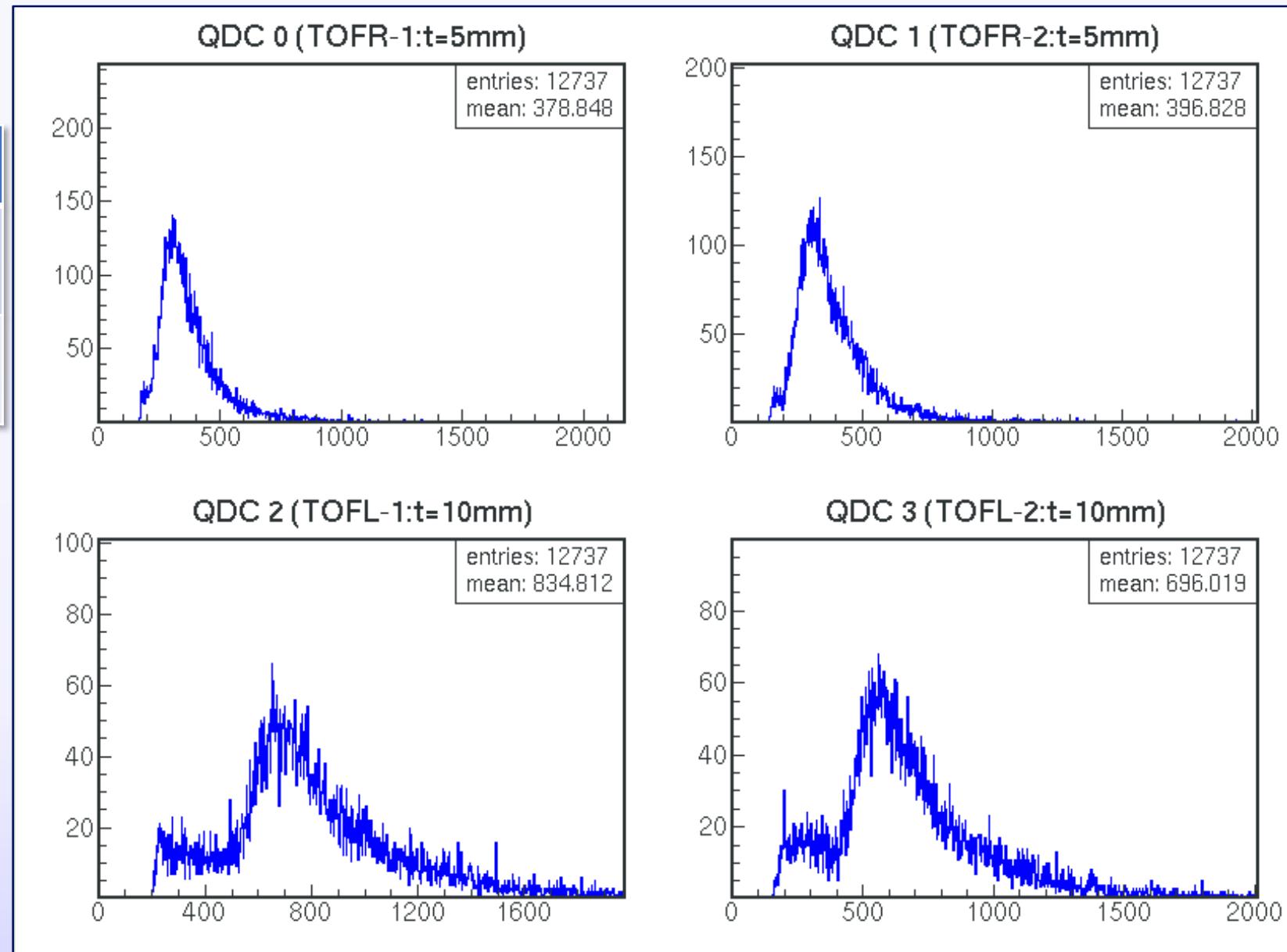
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1454 min. (1 day 0 h 10 min.)

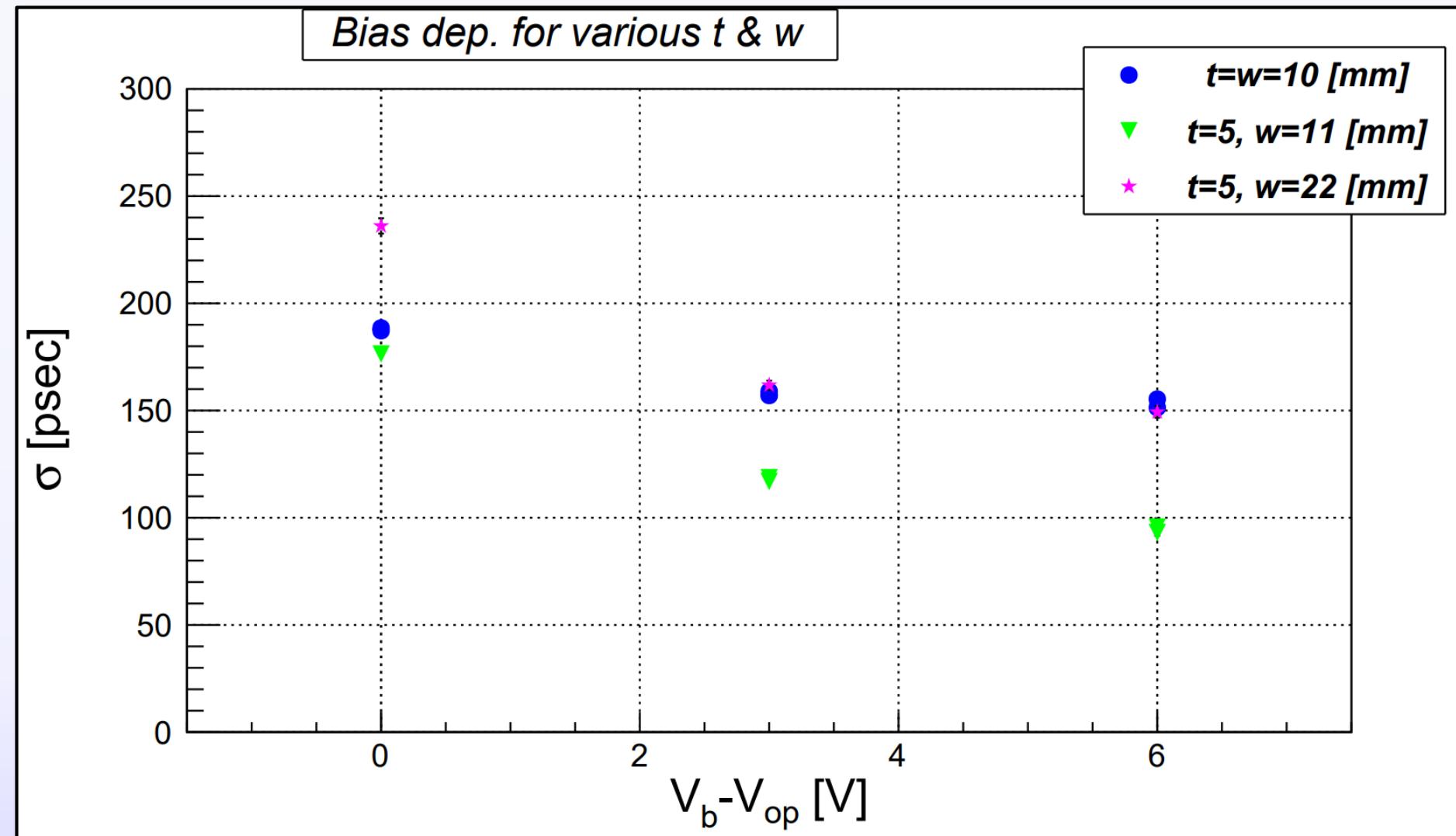
	Counts
Request	12730
Accept	12729

Rate: ~ 9 counts/min.
(1 counts/6~7 sec くらい)

※ $5^t \times 11^w$ mm: ~6-7 counts/min



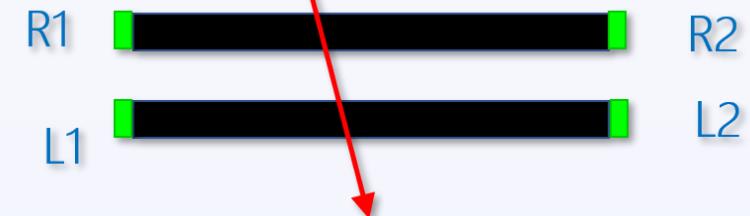
- Result Bias dependence



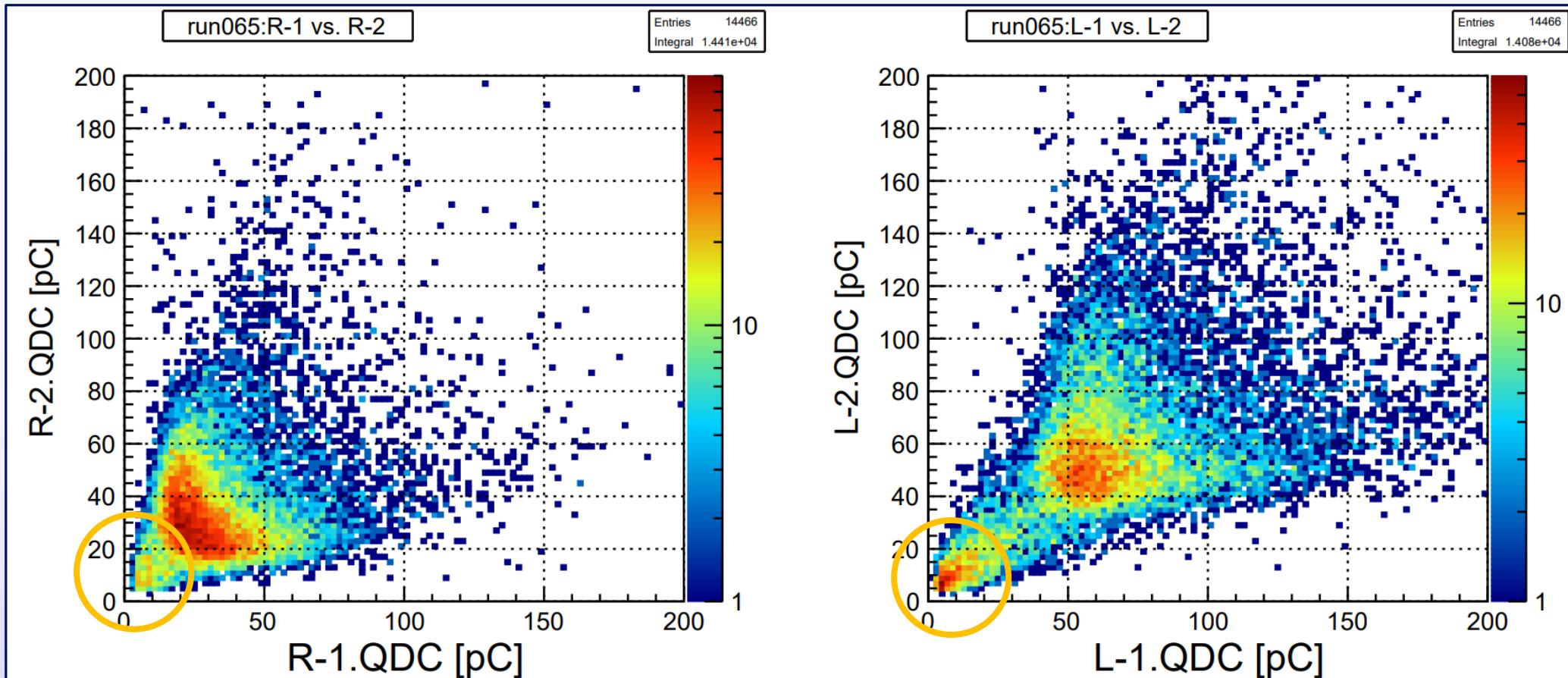
TDC distribution check

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- ✓ Check correlation of QDC & TDC at same scintillator (R-1 vs. R-2 & L-1 vs. L-2)

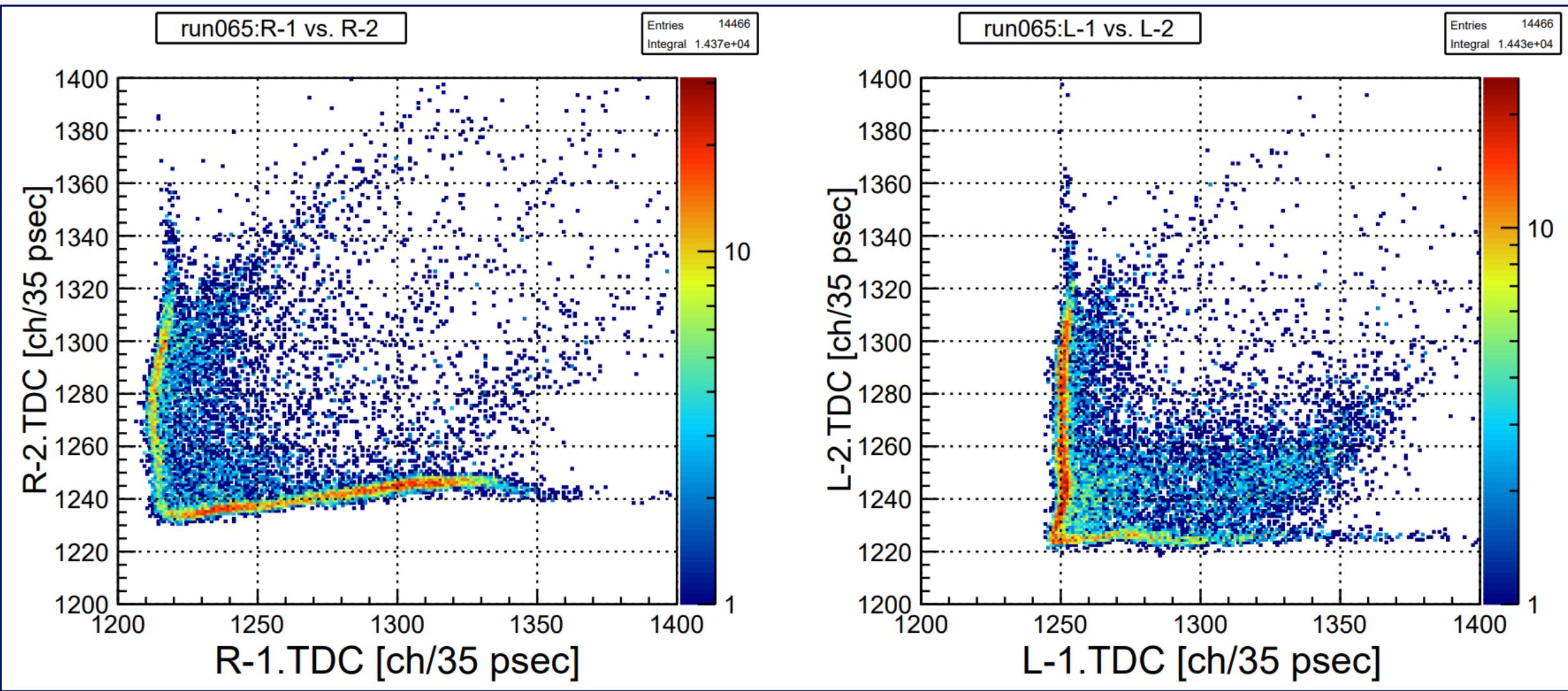


- ✓ run065 ToFR: $t=5$, $w=11$. ToFL: $t=w=10$ [mm]. $V_b=44.7$ V



TDC distribution check

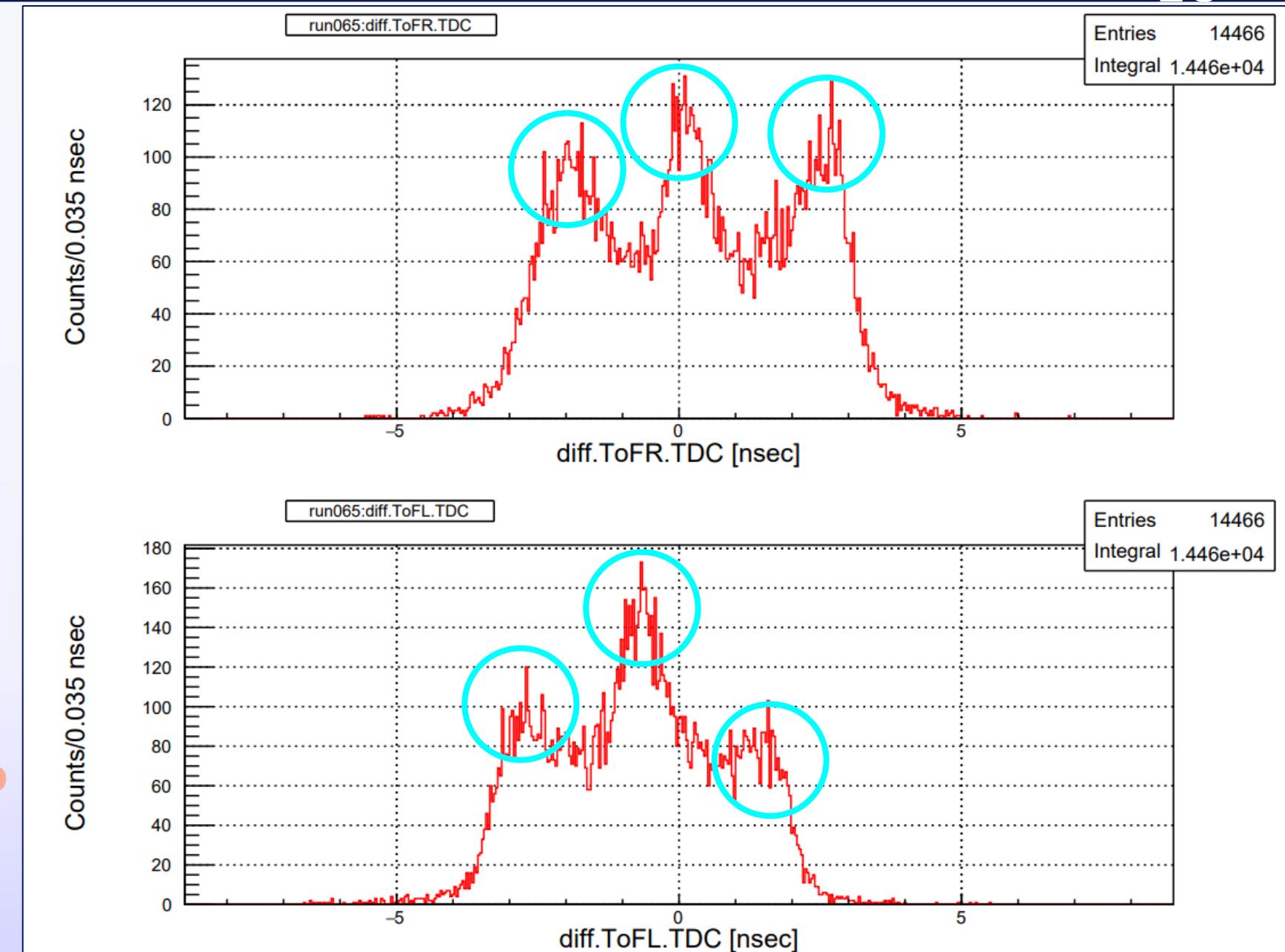
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Difference between left and right TDC

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- There are 3 peak structure



Correlation of difference TDC

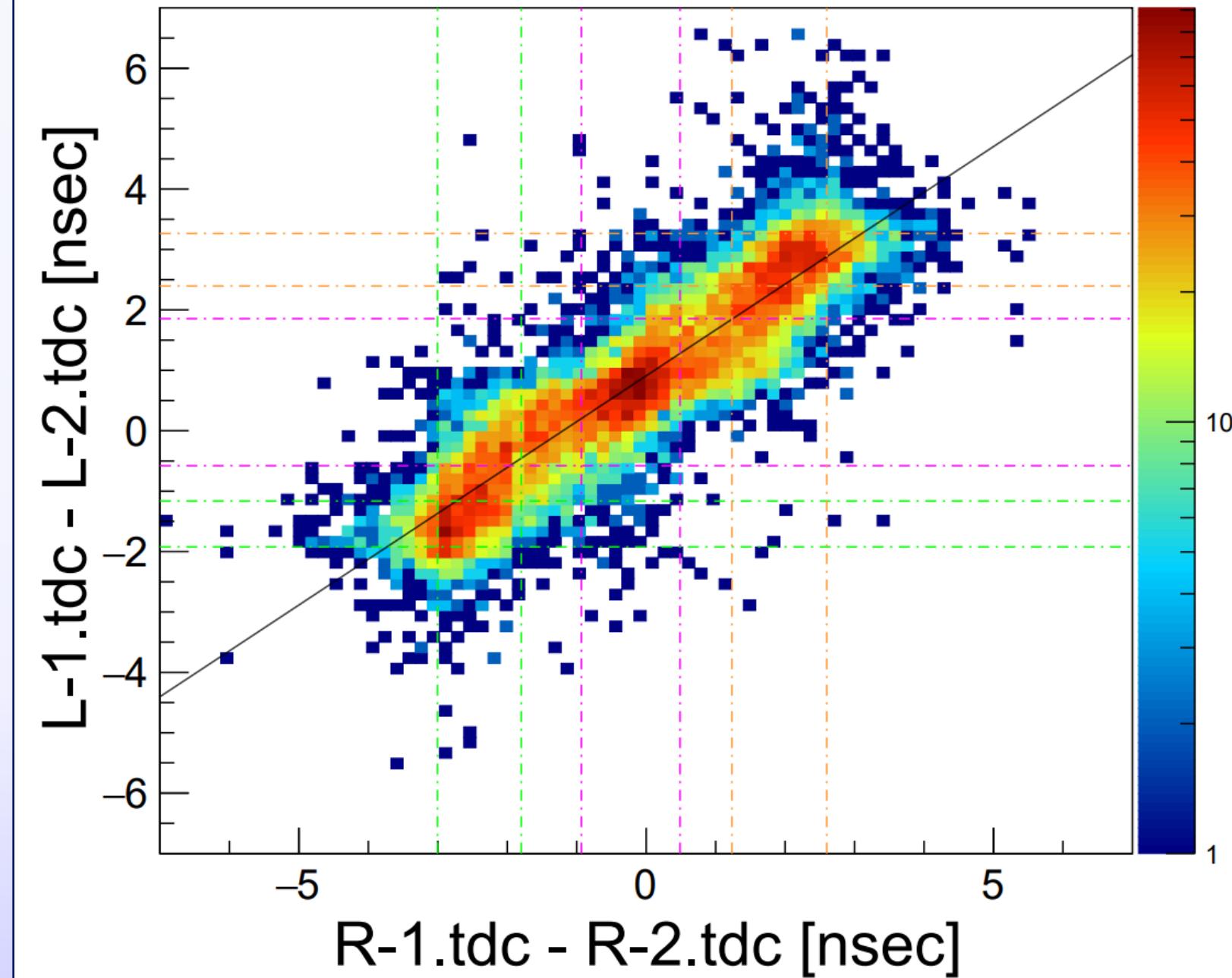
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- They have the linear relation ?
- Fit with linear function :
$$(L1.tdc - L2.tdc) = A(R1.tdc - R2.tdc) + B$$

$$A = 0.7588 \pm 0.01132$$

$$B = 0.9091 \pm 0.02133$$

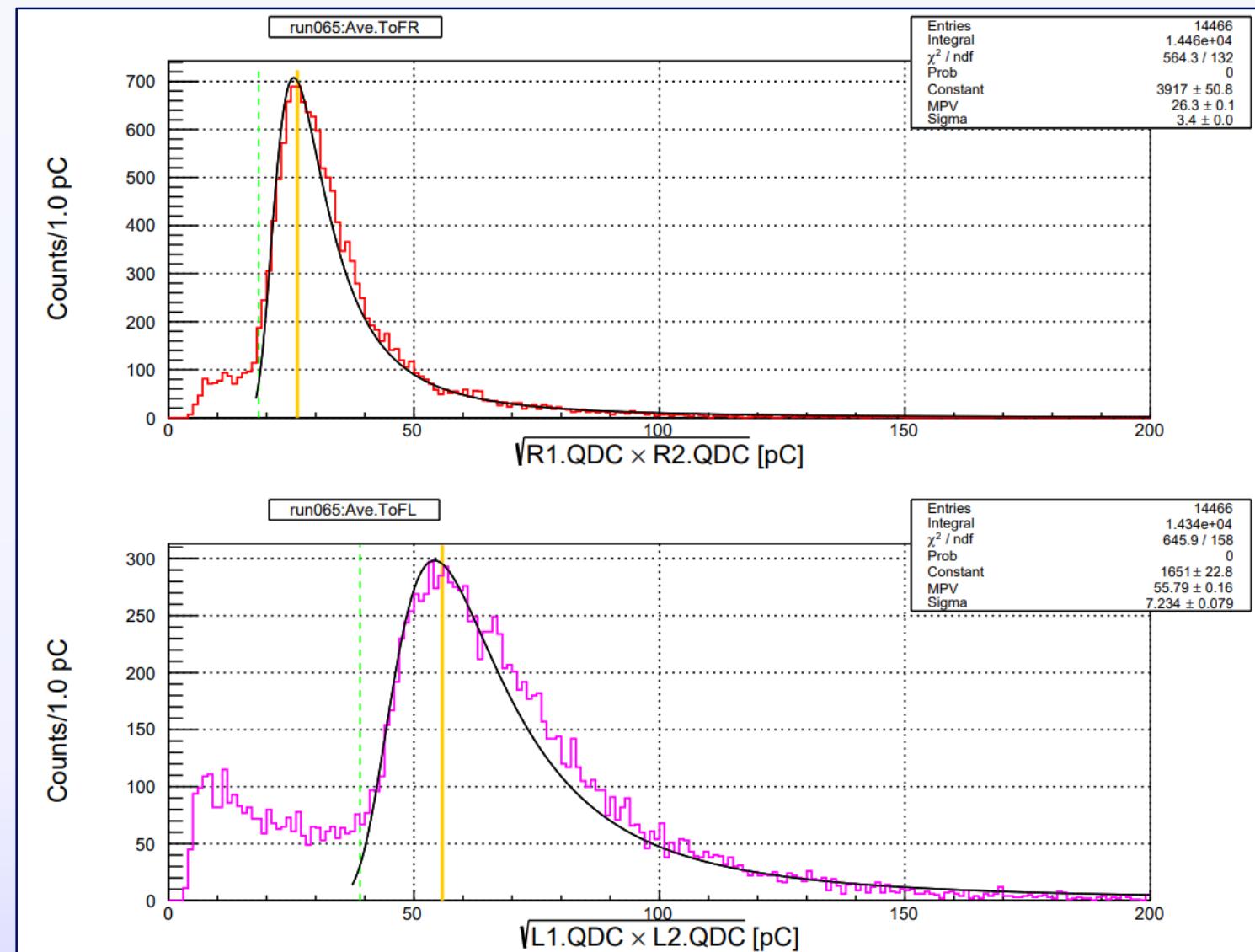
But I could not explain mean of the result.



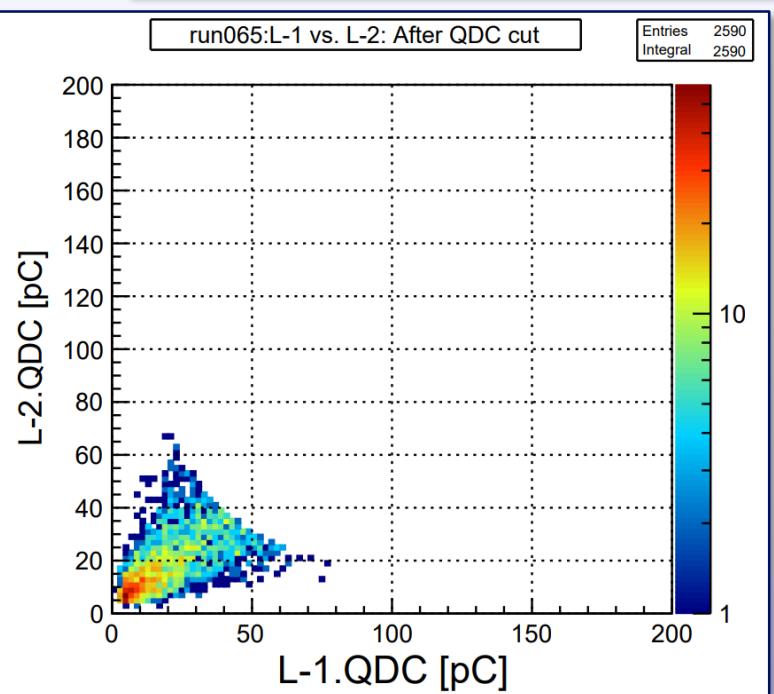
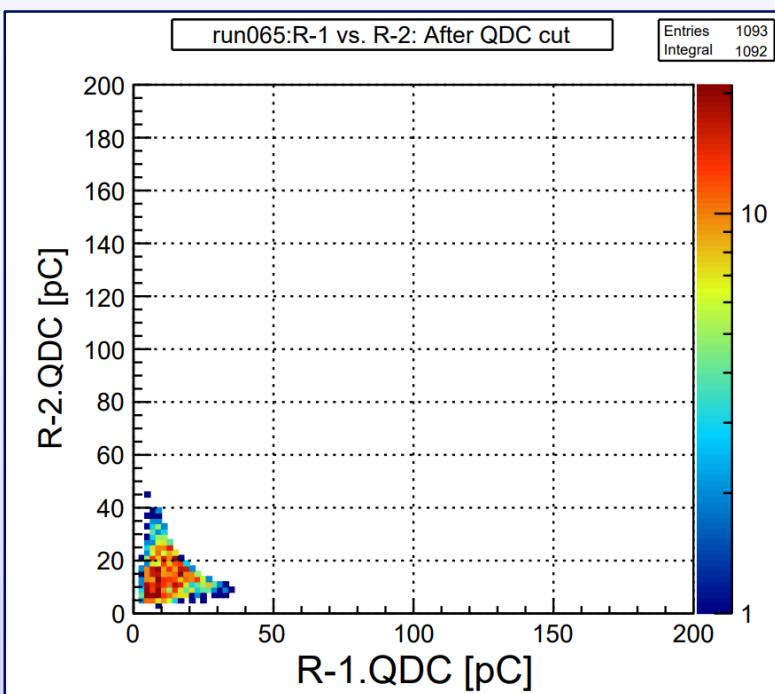
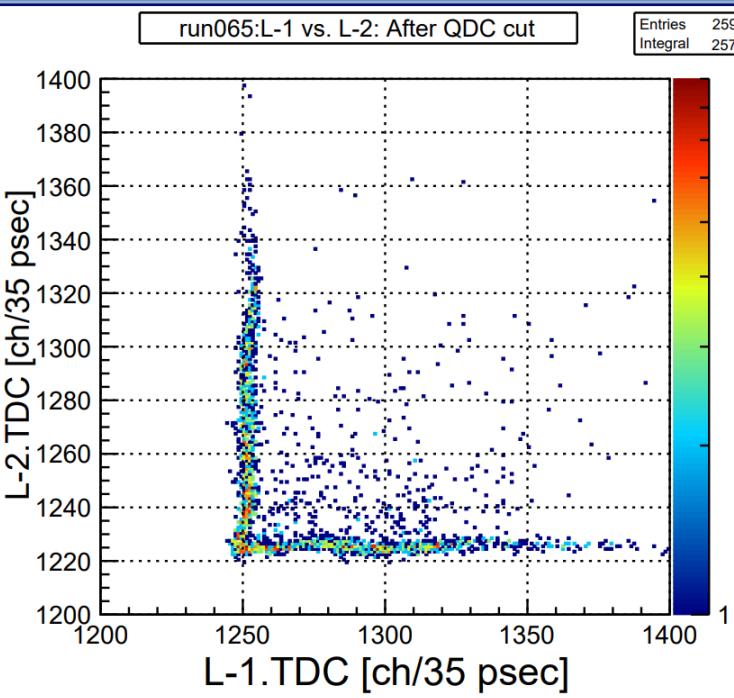
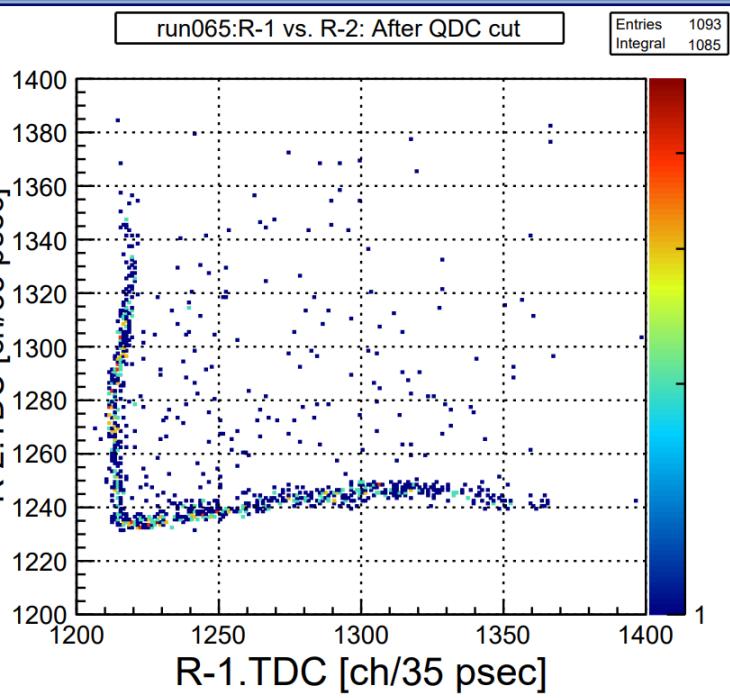
Geometrical average of both side of QDC

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- 両端のMPPCのQDCが小さいイベントを選ぶため
QDC (- pedestal) の相乗平均の分布を調べた
 - ⇒ この分布に対し Landau 関数をフィッティング
 - ⇒ (ピークの位置)×0.7 以下のQDCのみを選んだ



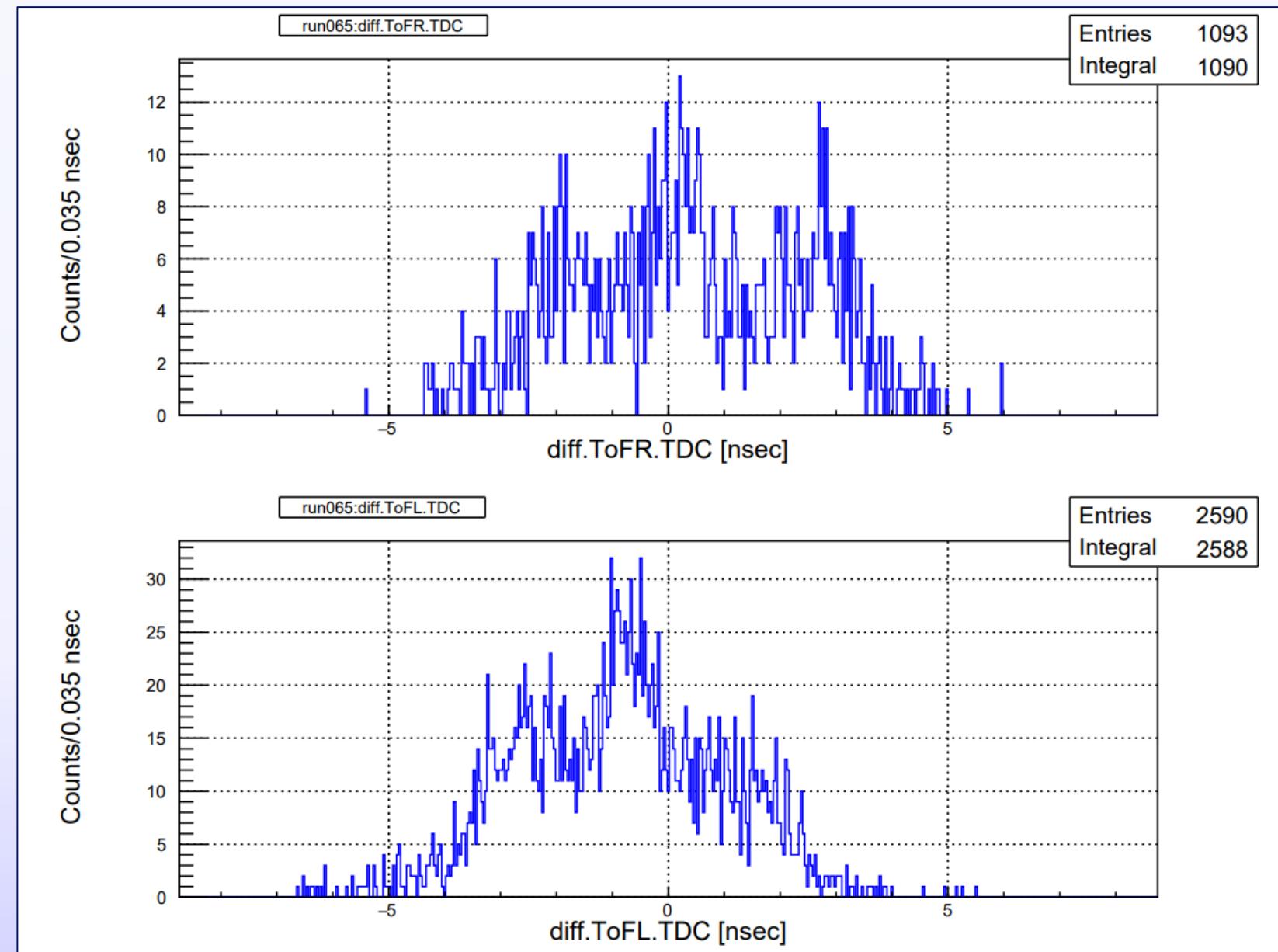
QDC & TDC dist. after cut



Difference of TDC dist. w/ QDC cut

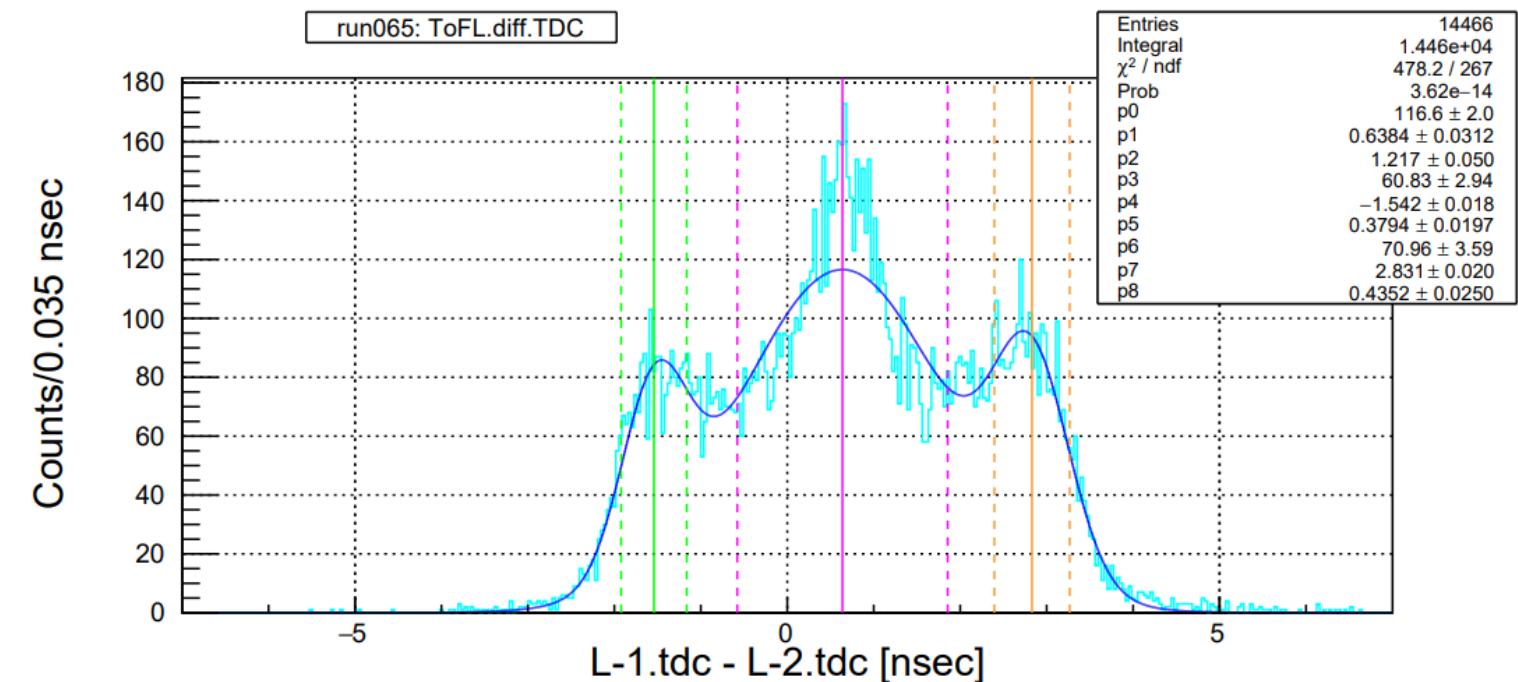
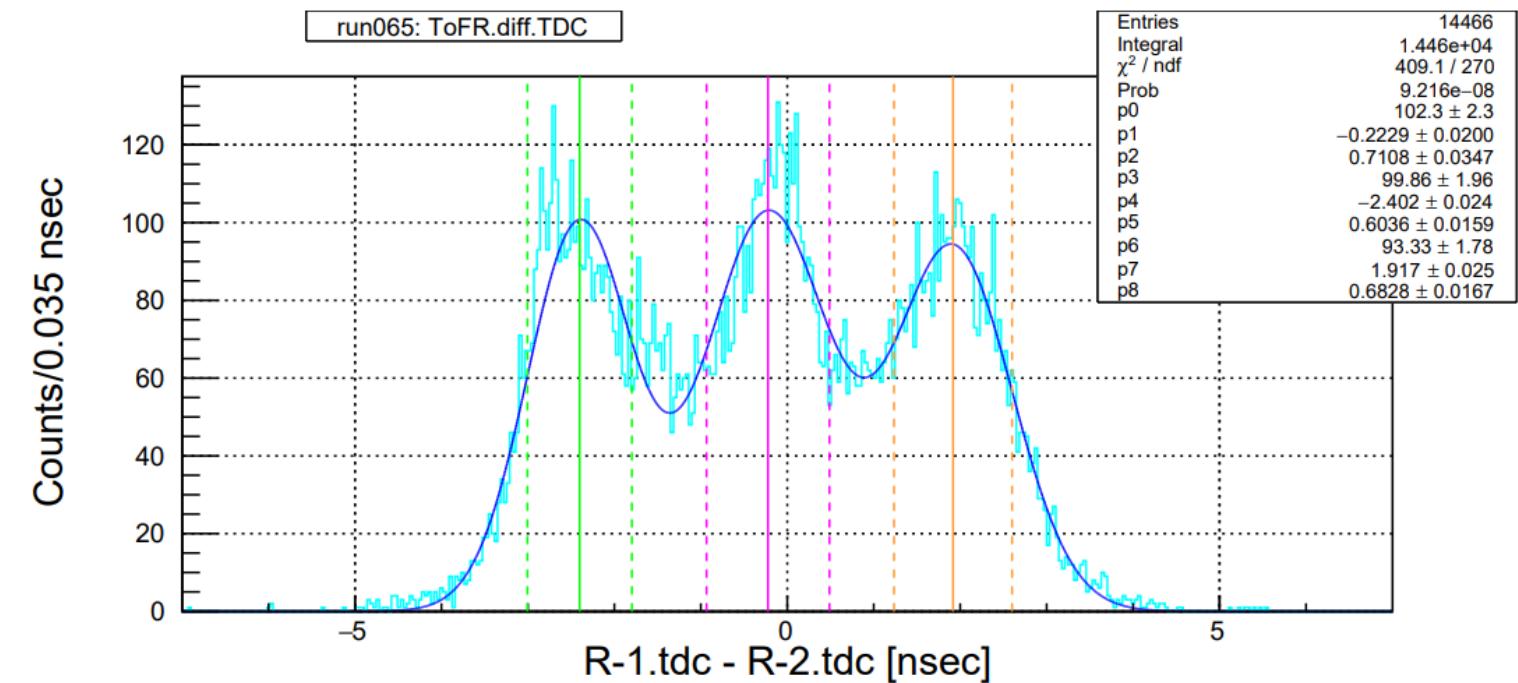
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- Cut constrain: ToFR \otimes ToFL
- 全体的に分布が削られただけのように見える...



Difference of TDC: Peak structure

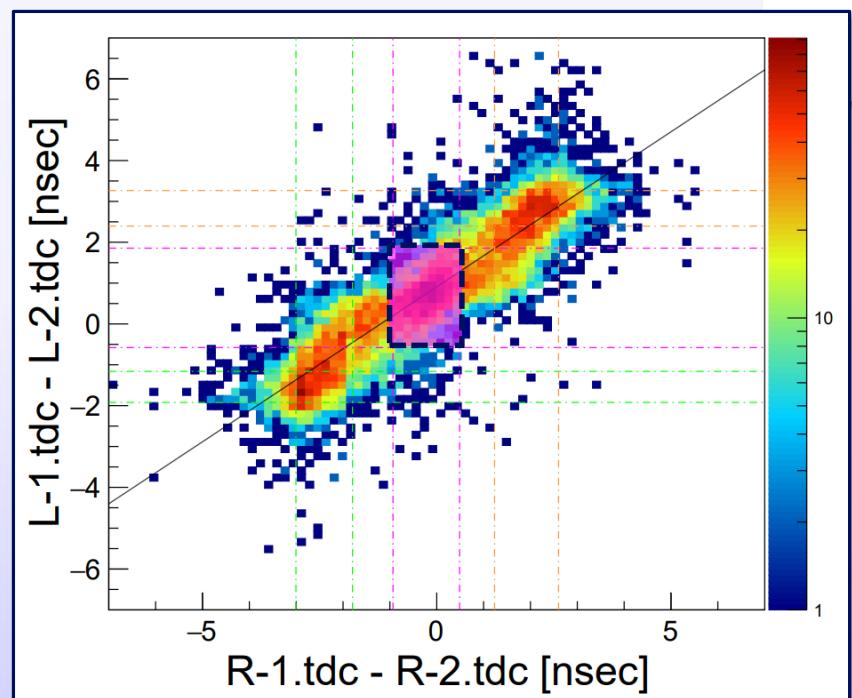
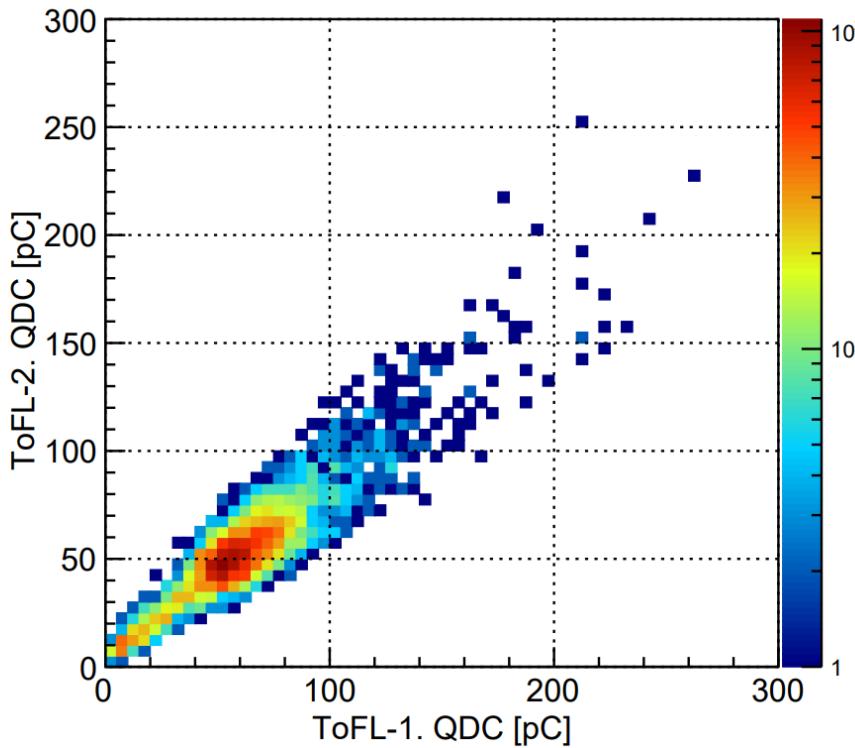
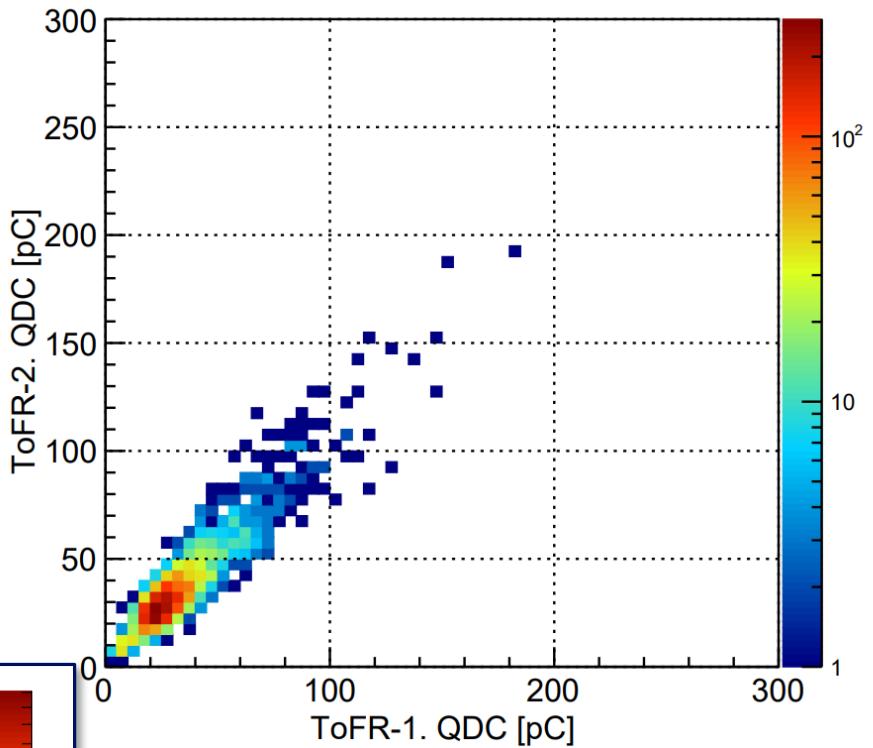
- Fit w/ 3 gaussian.
- For each peak, chose $\pm\sigma$ region.
- Check QDC dist. of these event.
- Magenta : ver.1
- Green: ver.2
- Orange: ver. 3

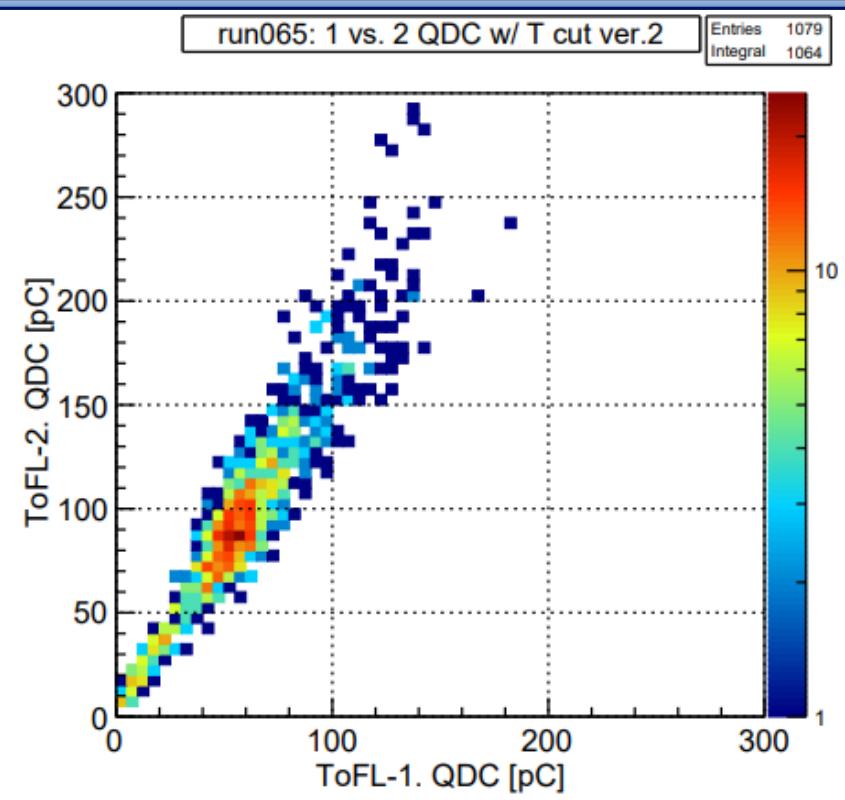
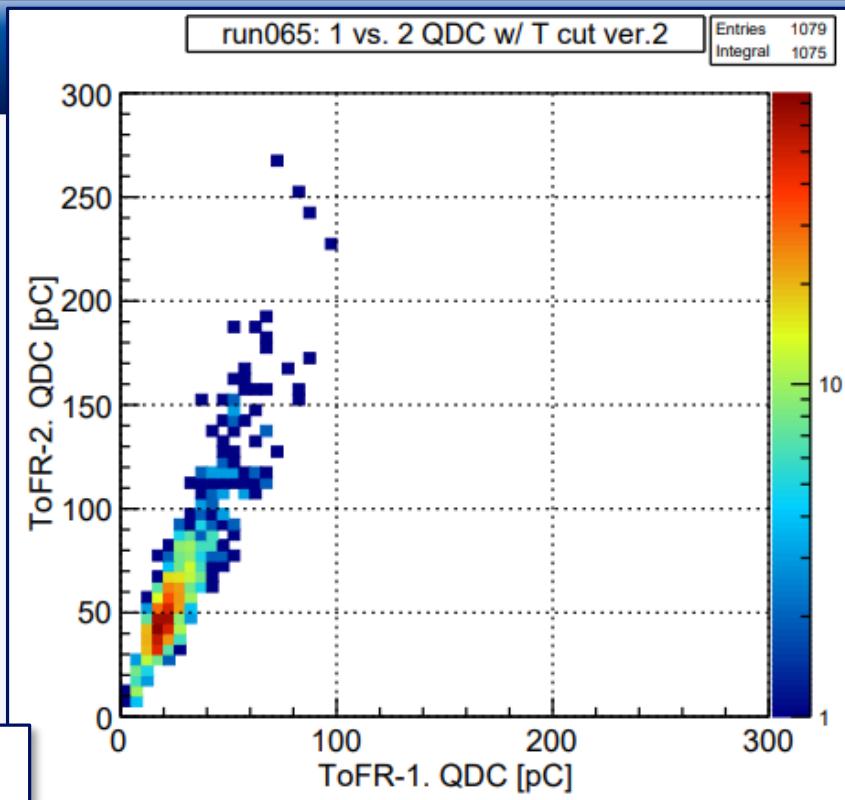
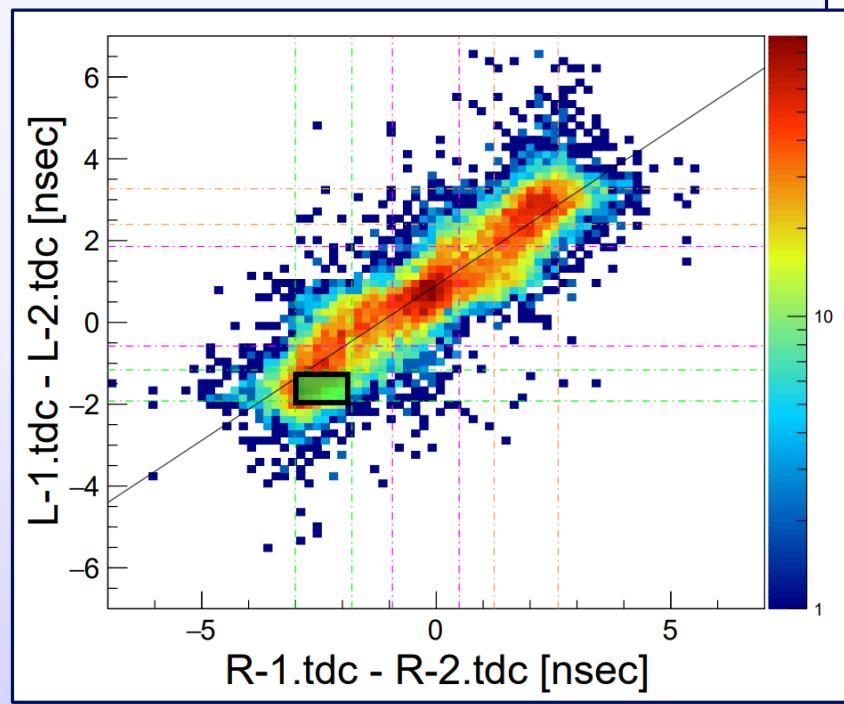


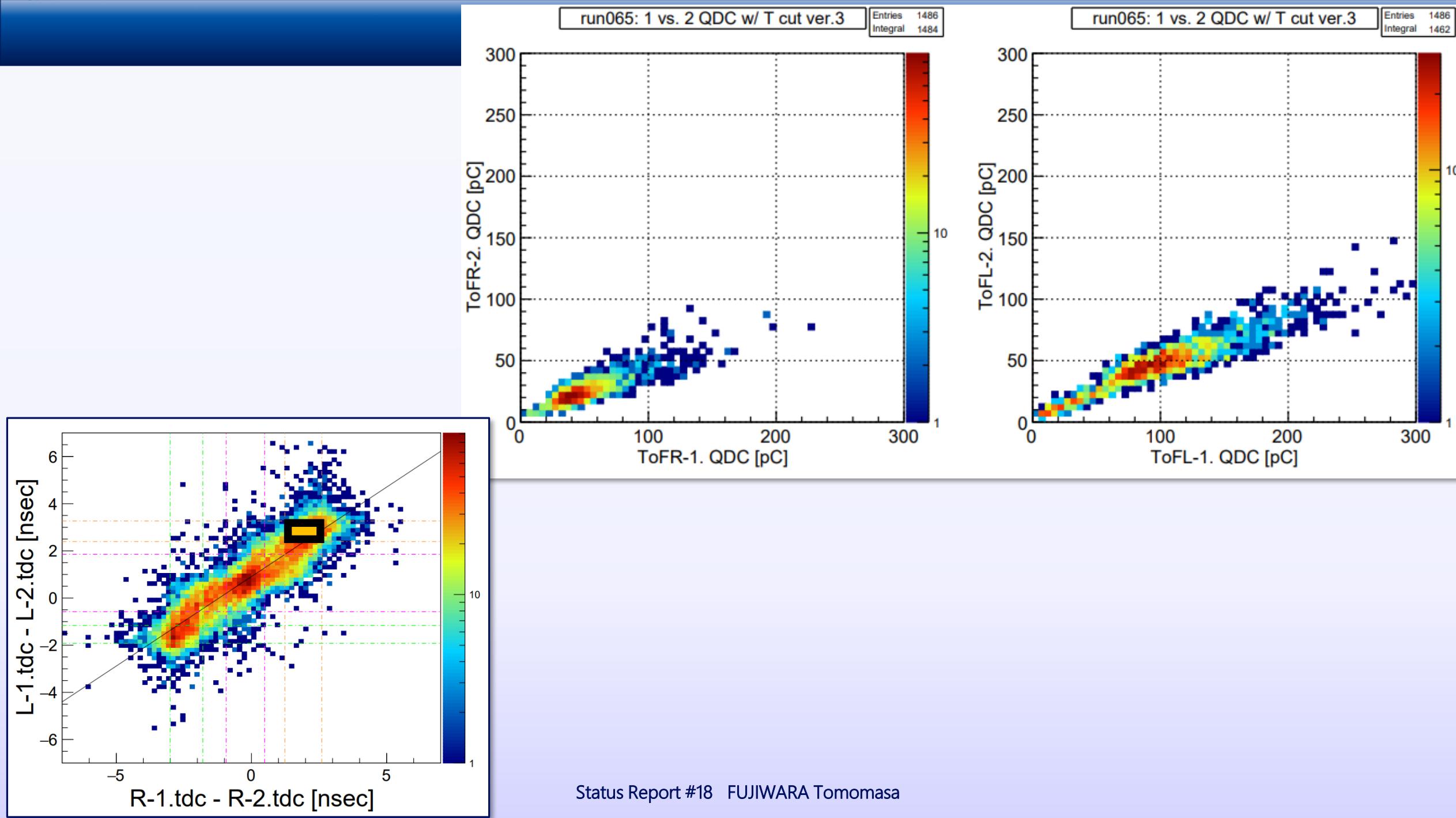
run065: 1 vs. 2 QDC w/ T cut ver.1

Entries 3328
Integral 3327

run065: 1 vs. 2 QDC w/ T cut ver.1

Entries 3328
Integral 3323



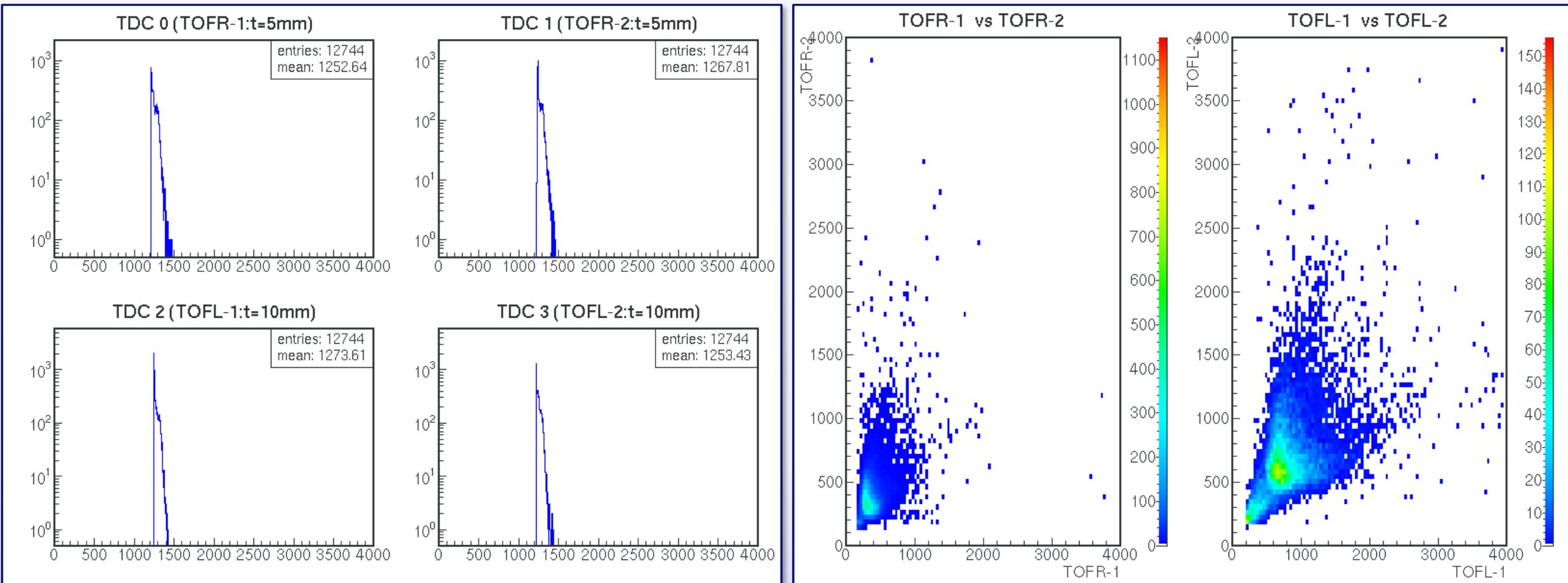


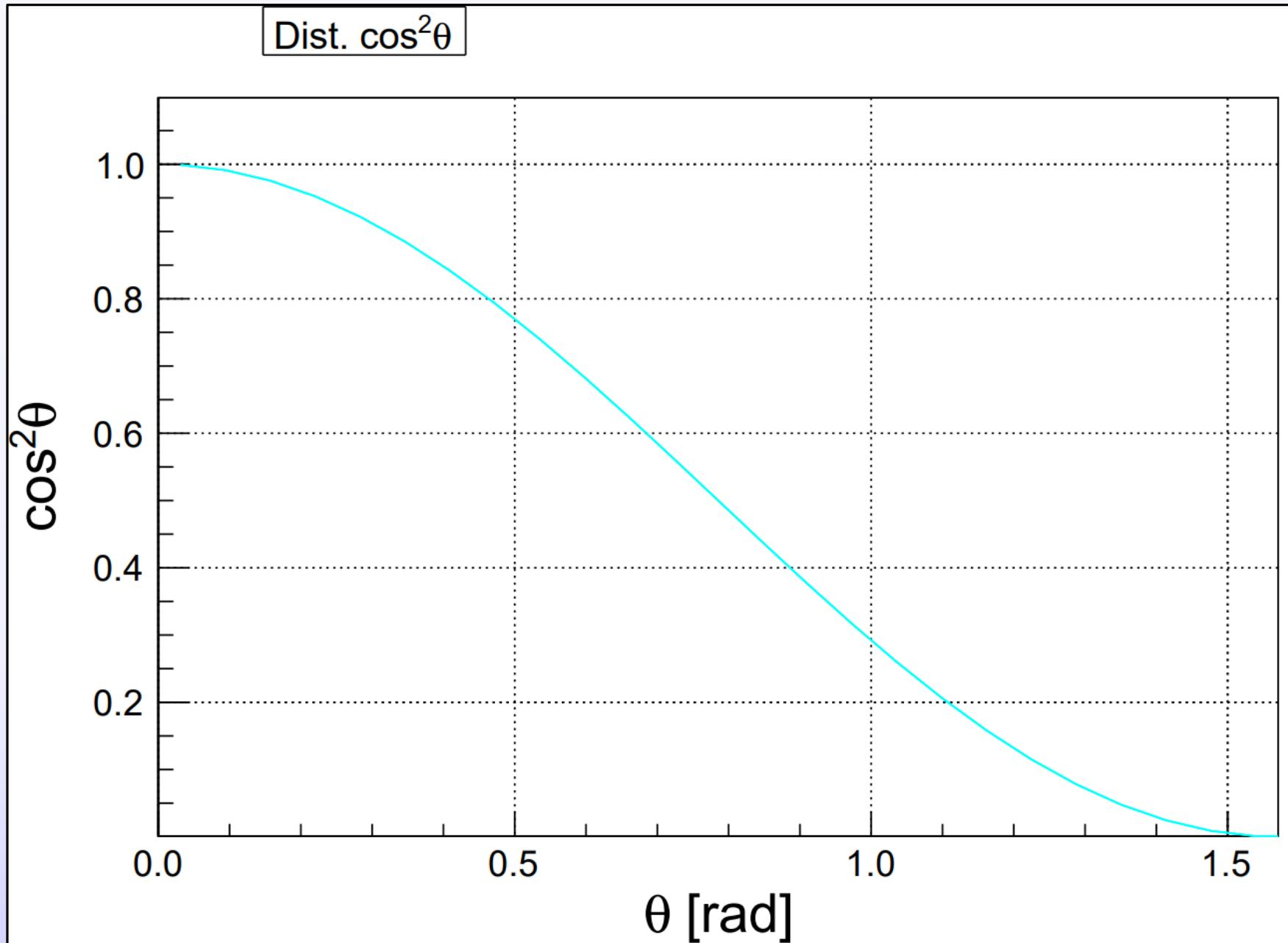
- Cosmic: Test 5t × 44w mm scintillator
- Making Poster
- Prepare B4 thesis presentation

Back up

Status of ToF cosmic: run076 (2020. 03. 07 15:24 時点)

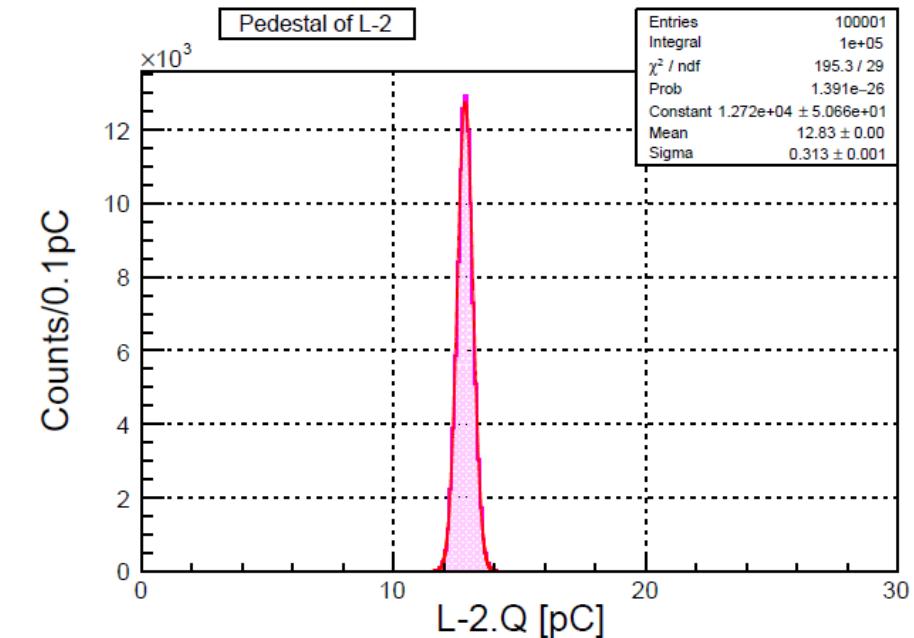
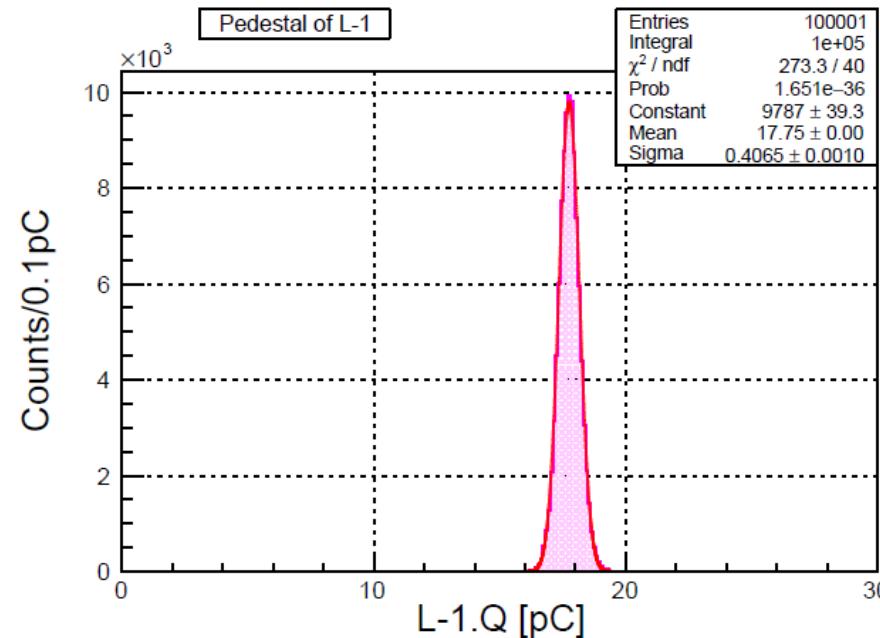
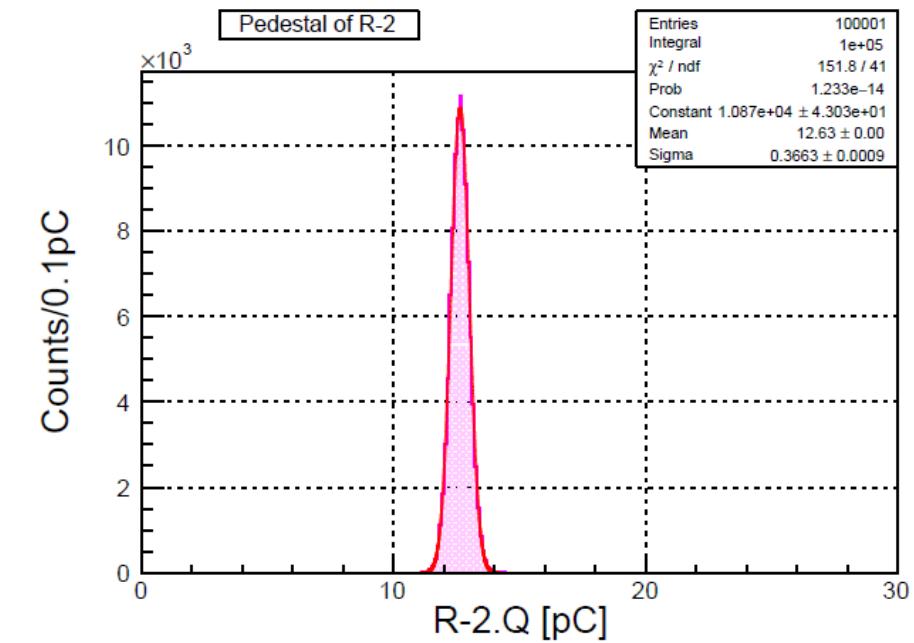
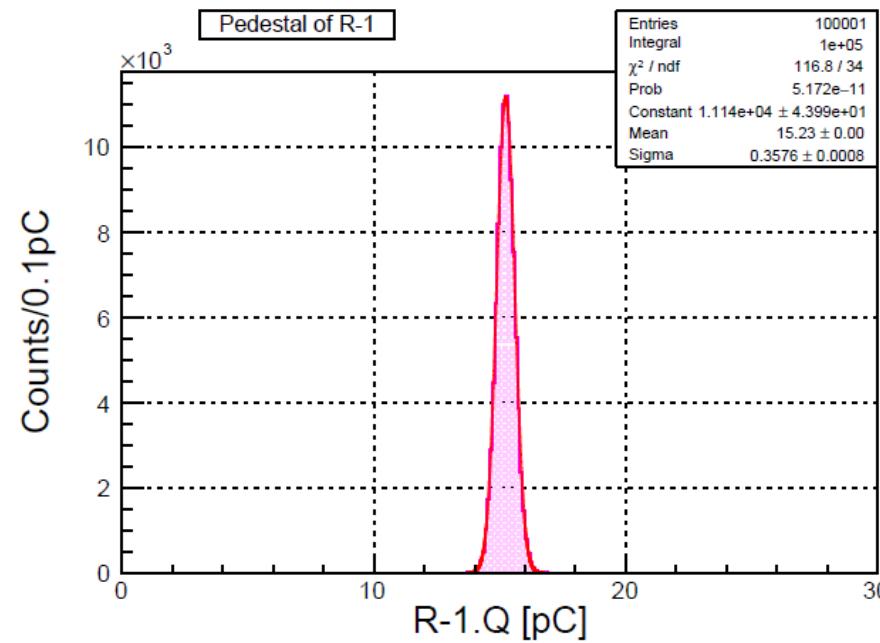
24





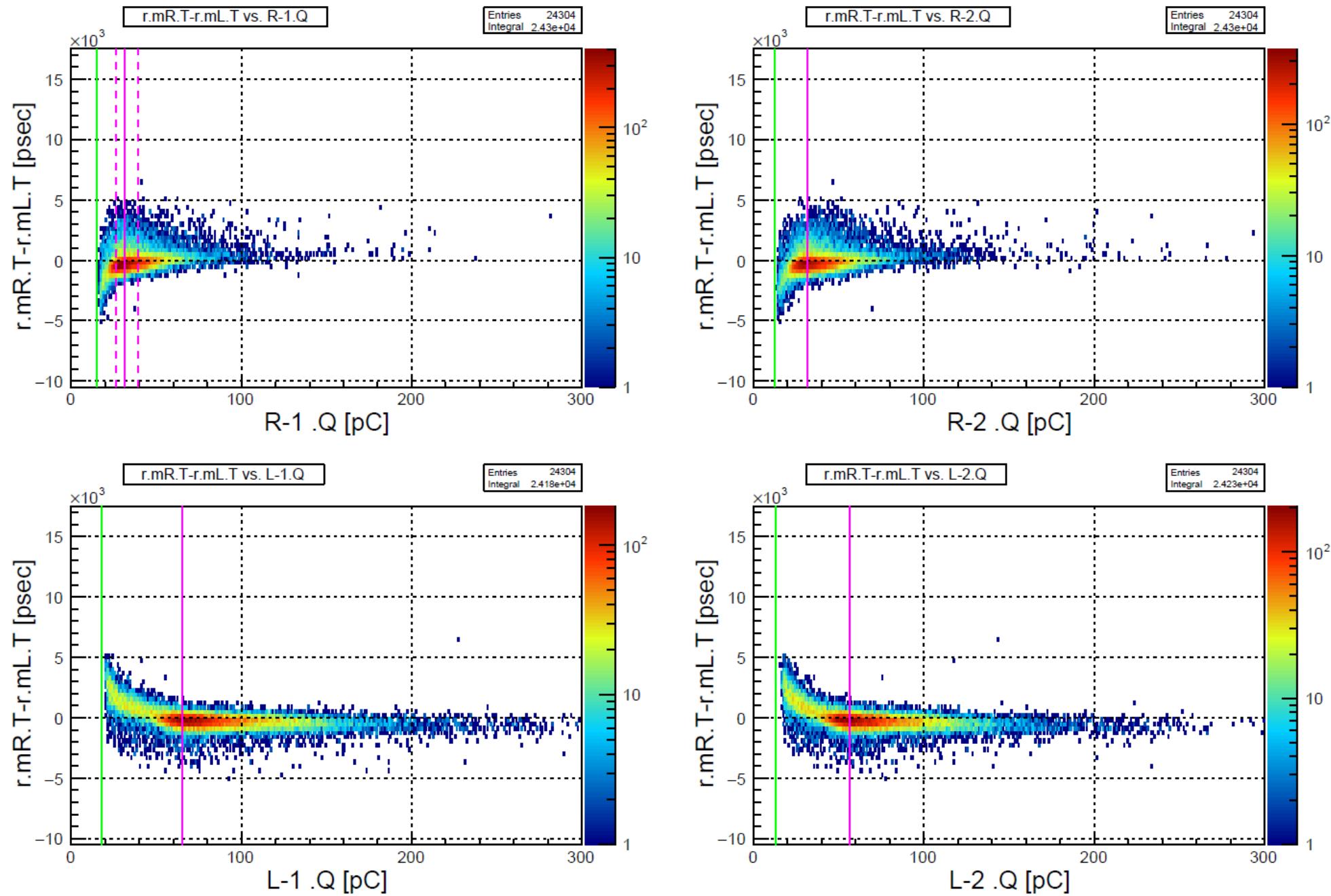
run076: Vb=44.7 V, t=5, w=22 mm

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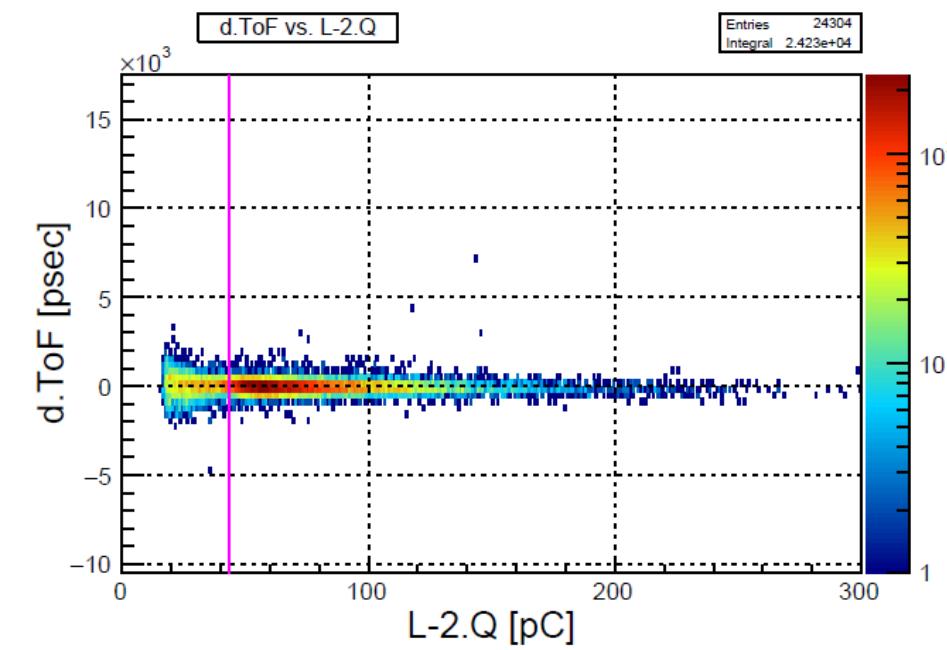
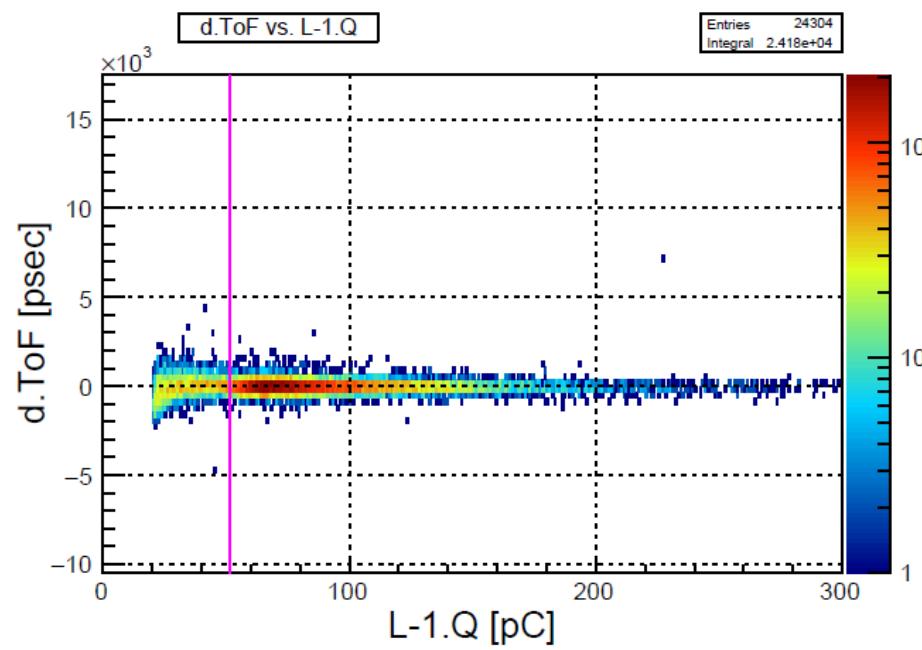
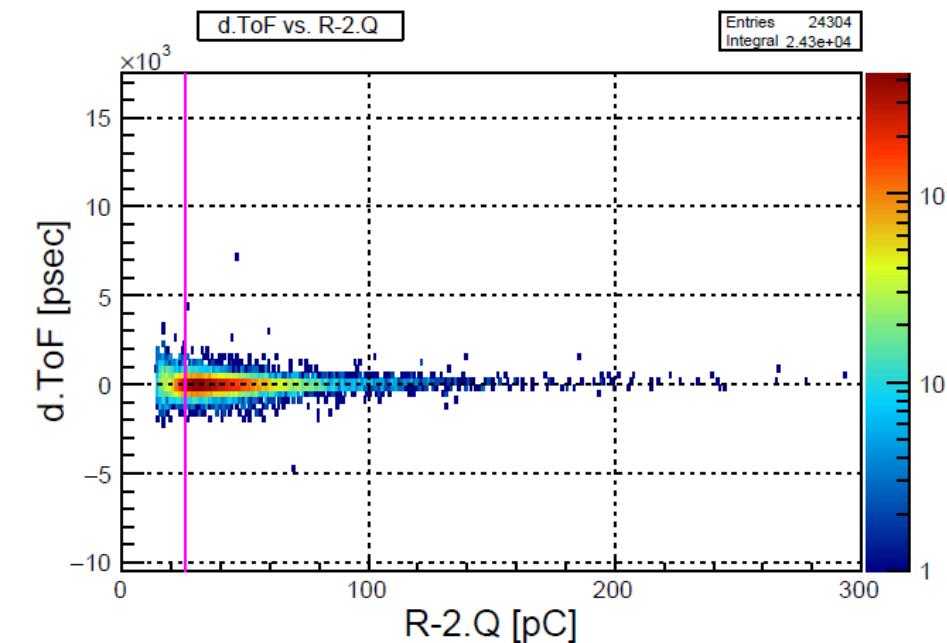
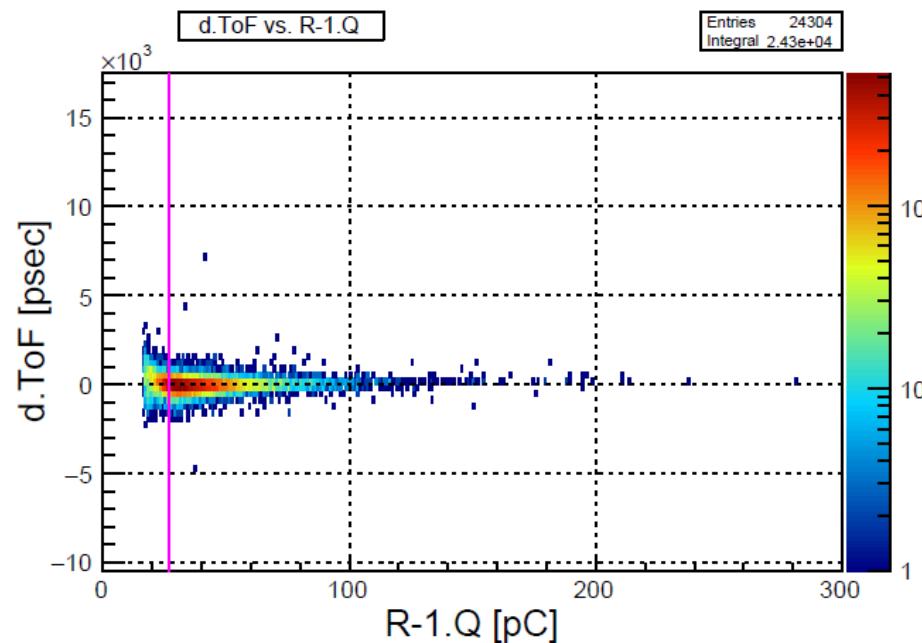
run076: V_b=44.7 V, t=5, w=22 mm

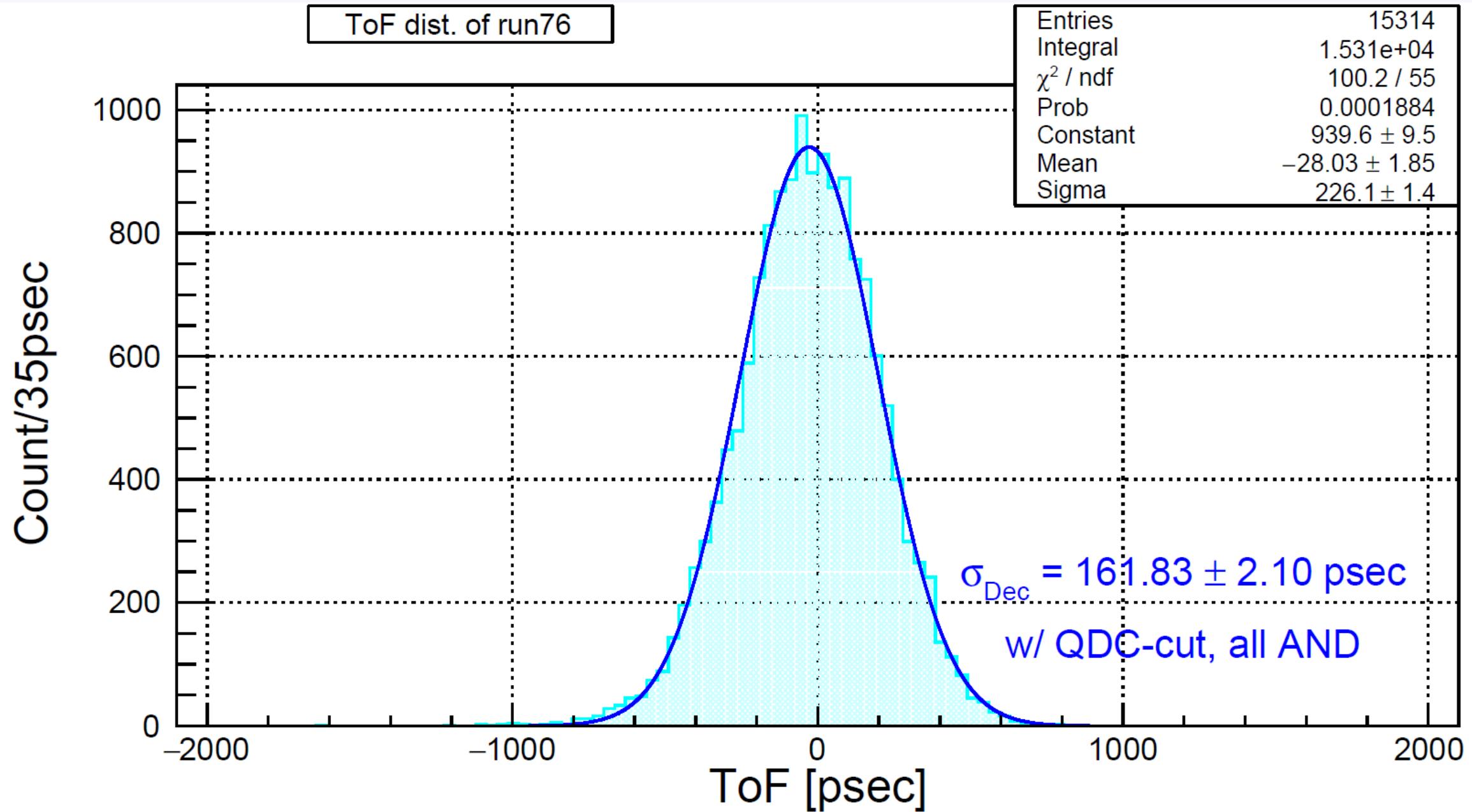
27



run076: $V_b=44.7$ V, $t=5$, $w=22$ mm

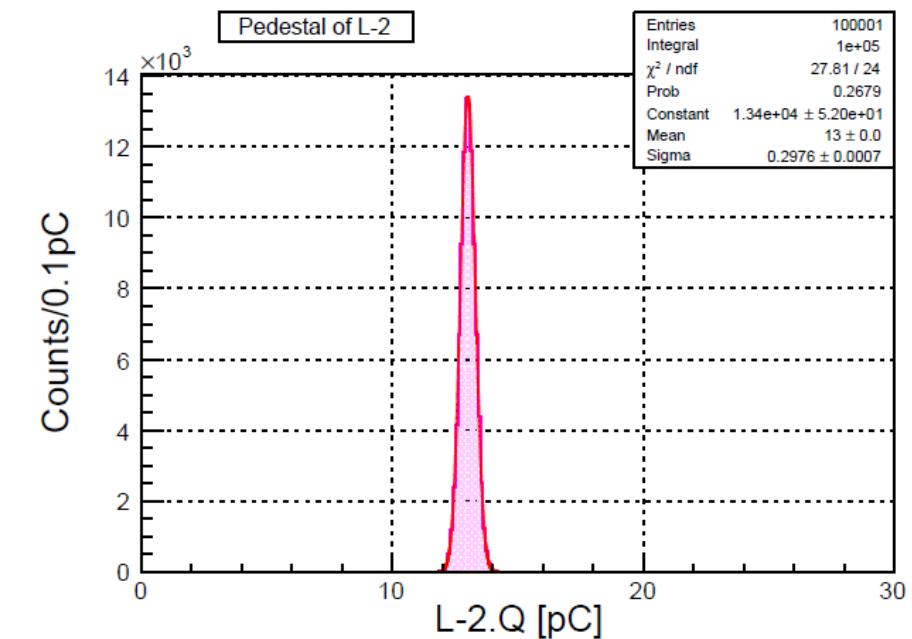
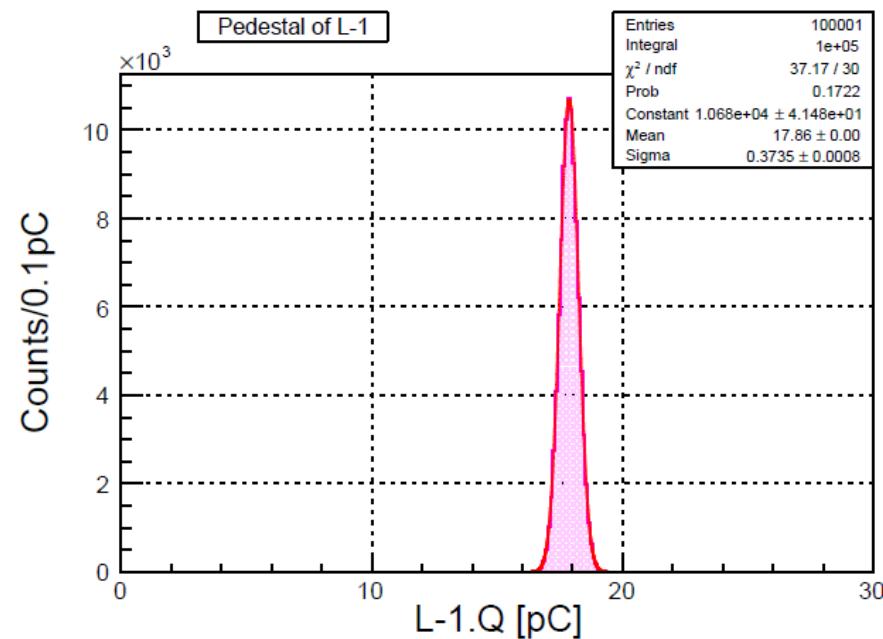
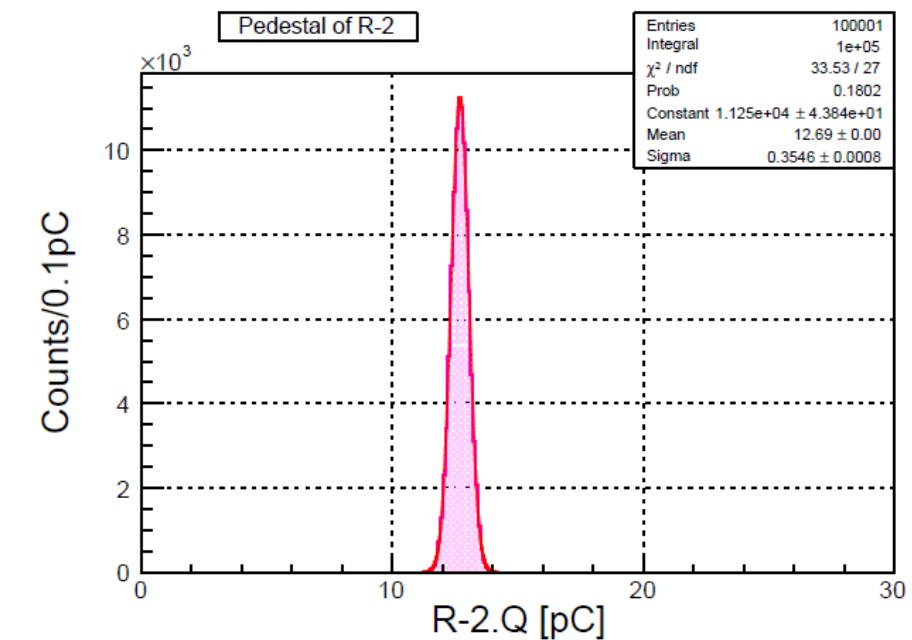
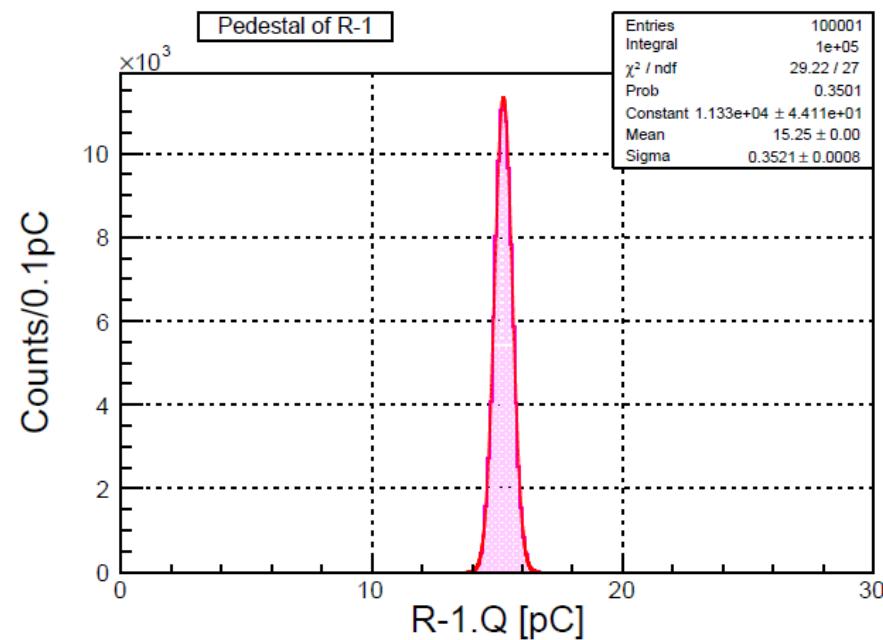
28





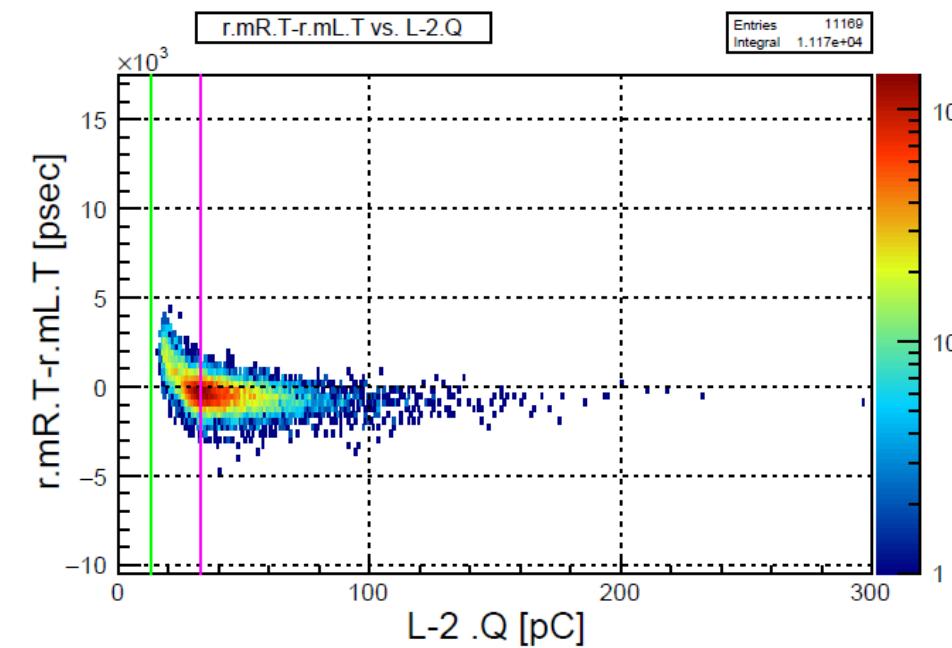
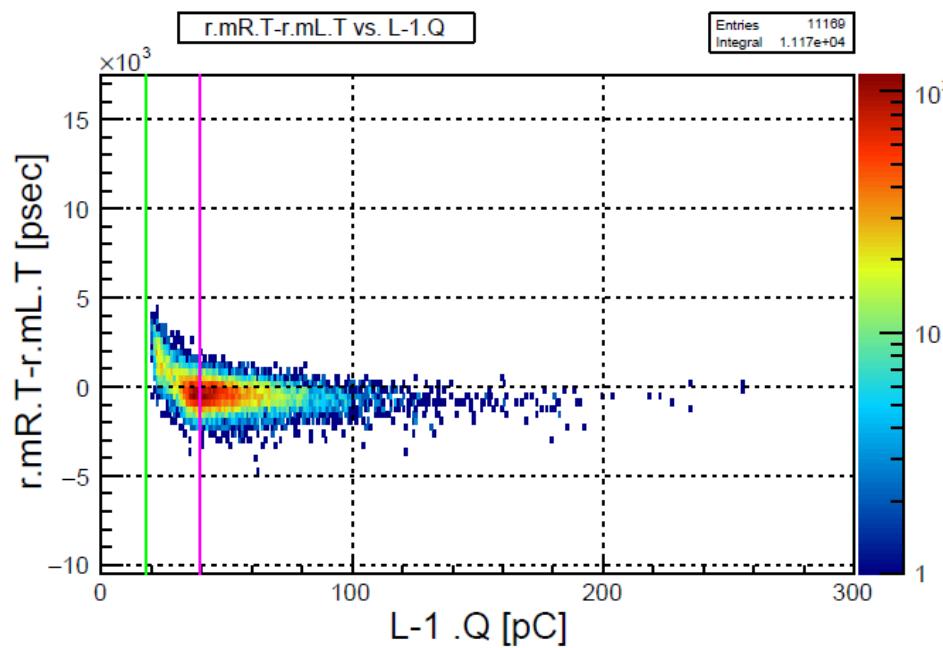
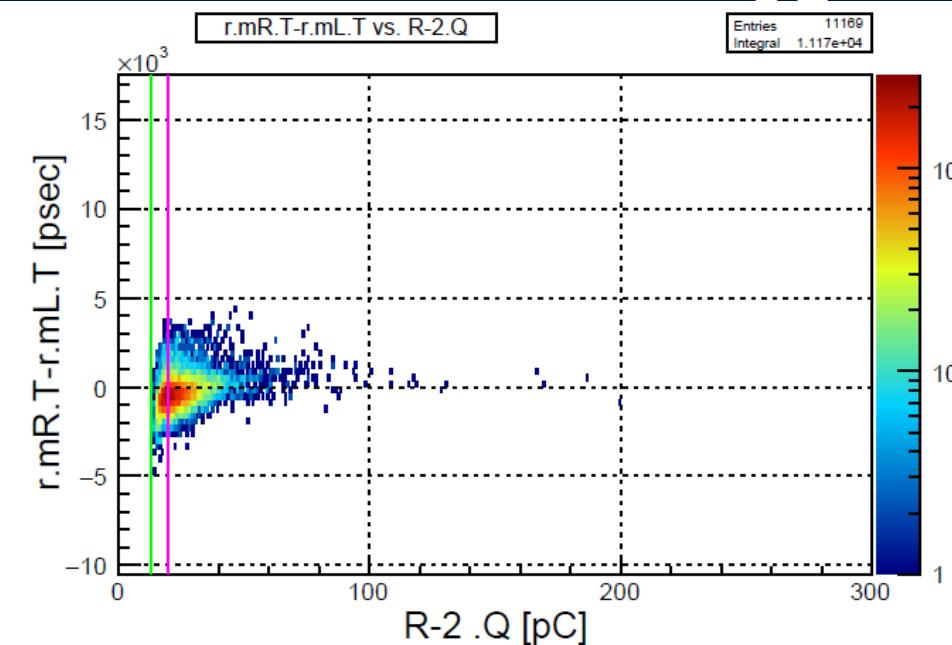
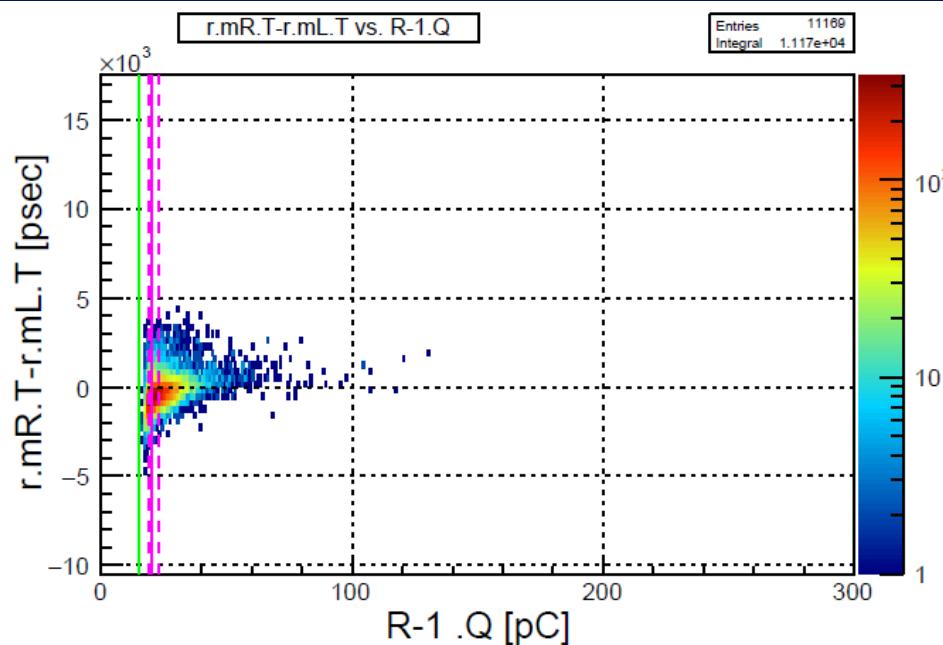
run078: V_b=41.7 V, t=5, w=22 mm

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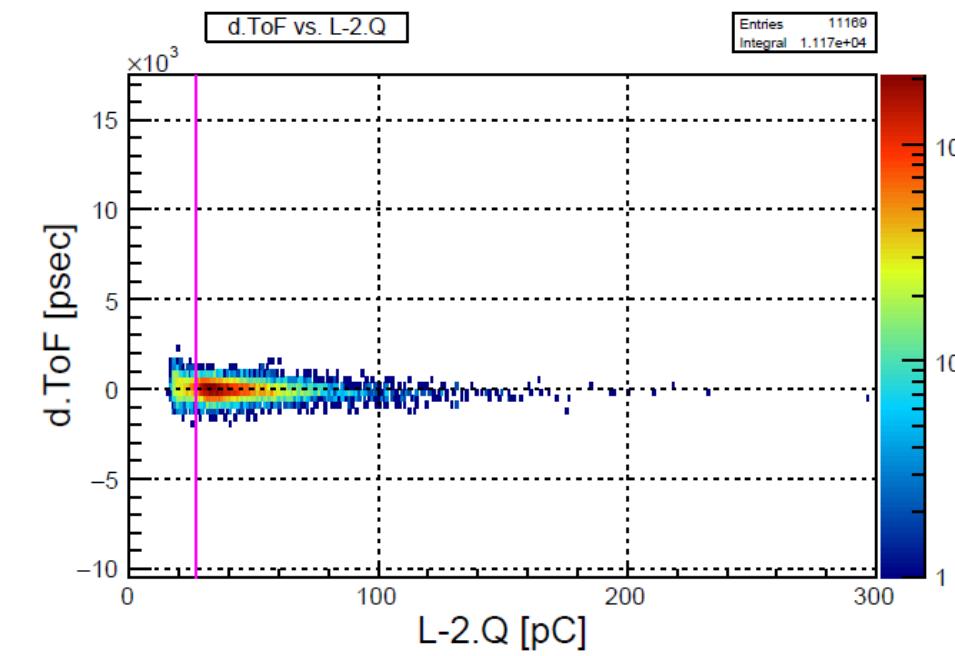
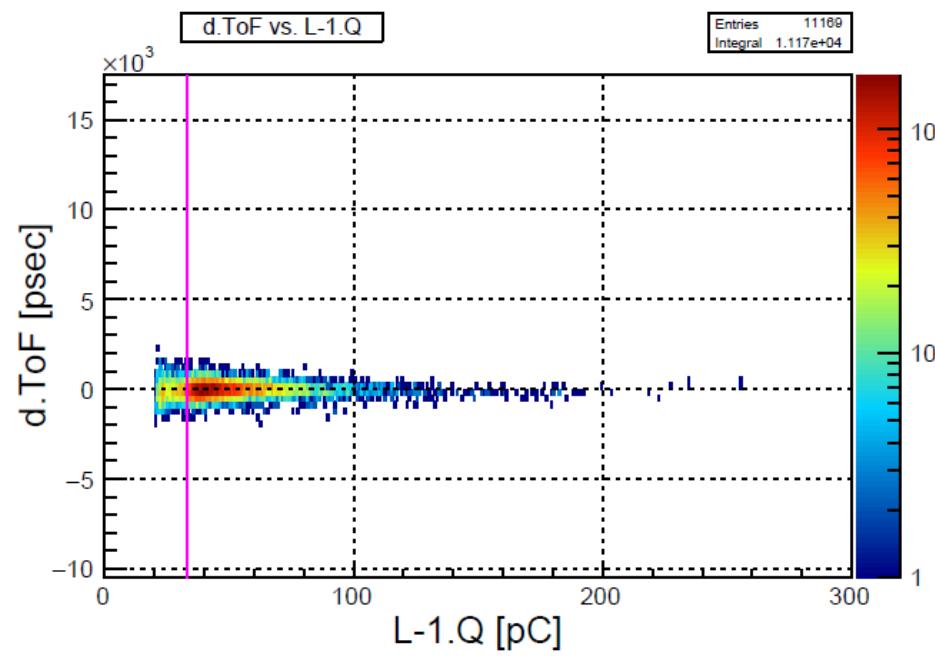
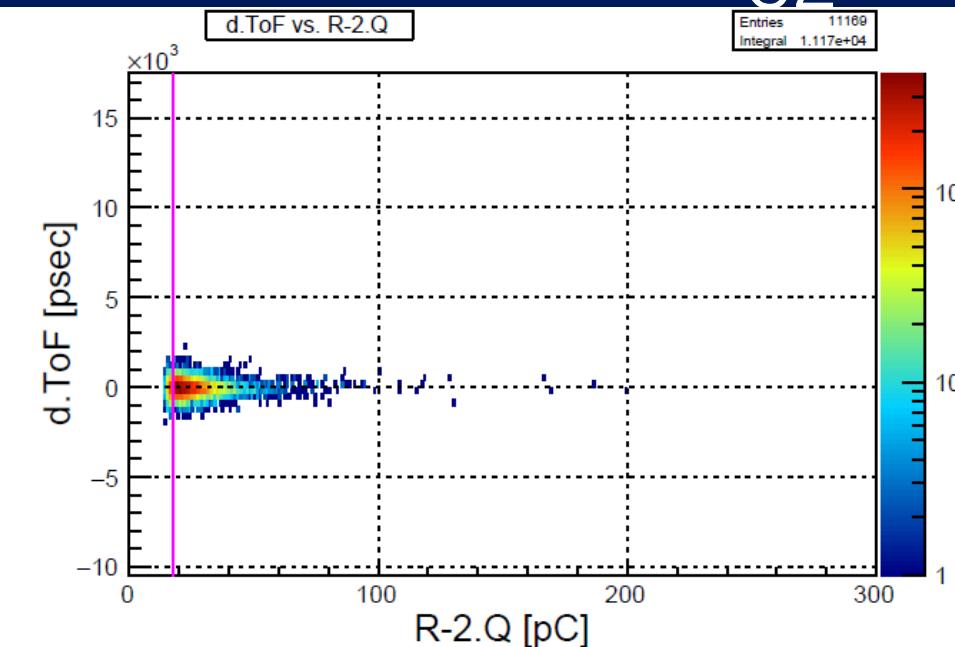
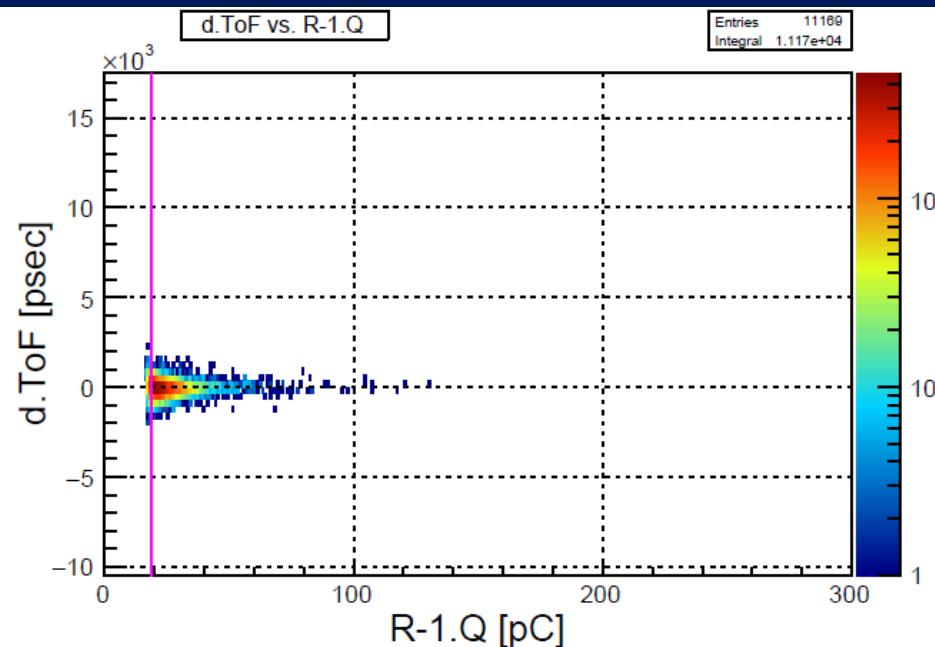
run078: $V_b=41.7$ V, $t=5$, $w=22$ mm

31



run078: $V_b=41.7$ V, $t=5$, $w=22$ mm

32

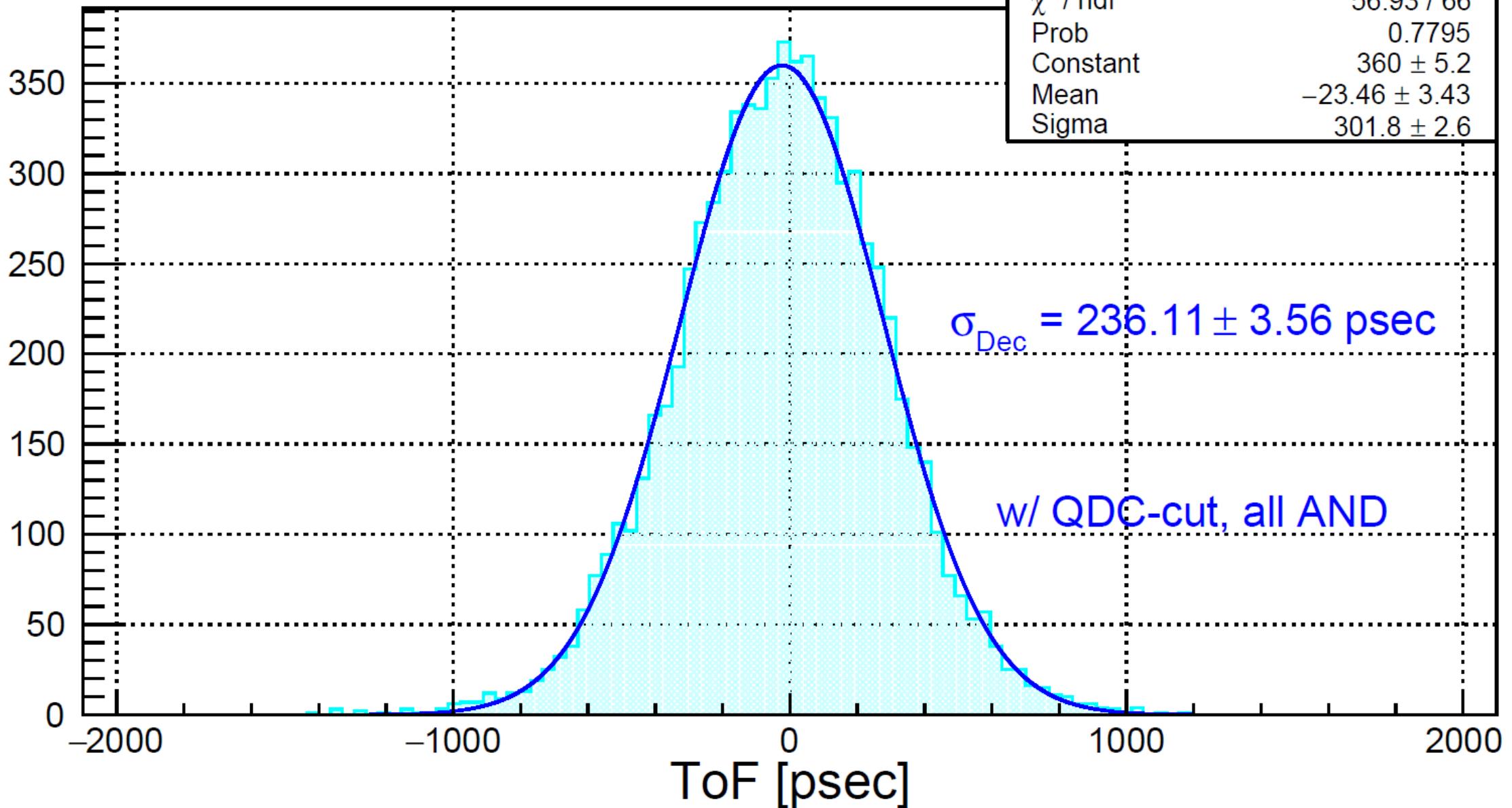


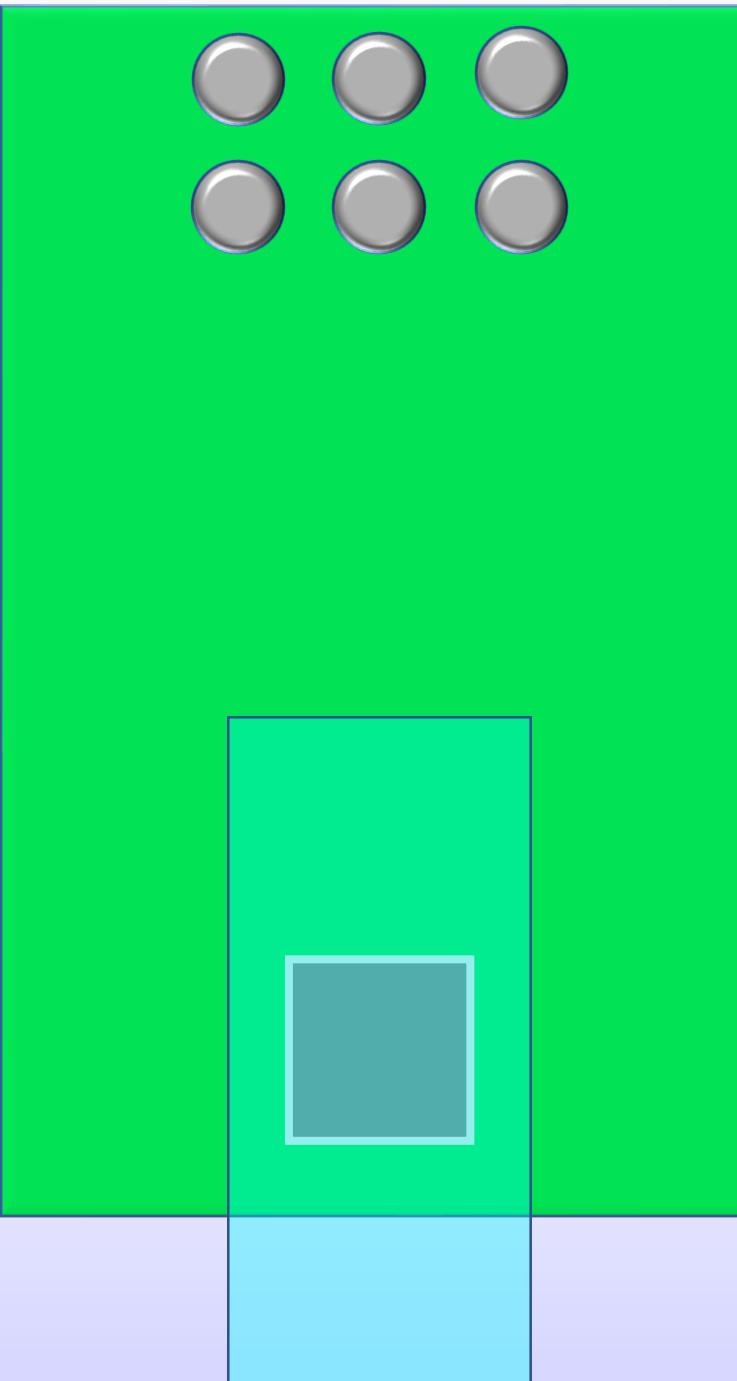
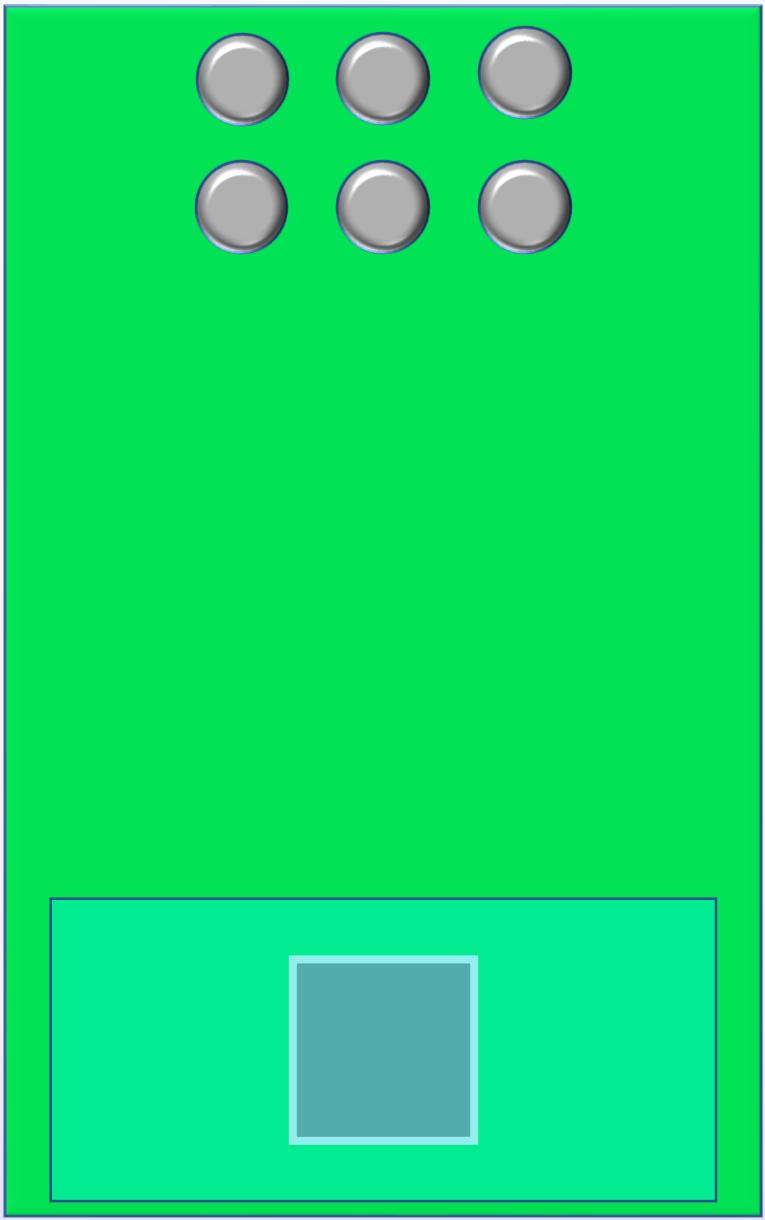
run078: V_b=41.7 V, t=5, w=22 mm

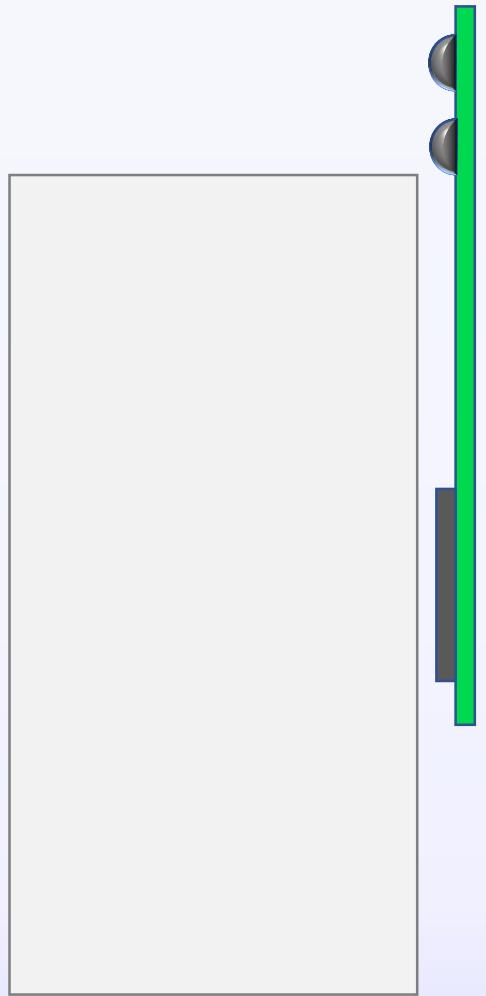
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Count/35psec

ToF dist. of run78







192: This is font sample. $n(K^-, \pi^-) \wedge n(\pi^+, K^+) \wedge p(e, e'K^+) \wedge$

182: This is font sample. $n(K^-, \pi^-) \wedge n(\pi^+, K^+) \wedge p(e, e'K^+) \wedge$

172: This is font sample. $n(K^-, \pi^-) \wedge n(\pi^+, K^+) \wedge p(e, e'K^+) \wedge$

162: This is font sample. $n(K^-, \pi^-) \wedge n(\pi^+, K^+) \wedge p(e, e'K^+) \wedge$

152: Τηισ ισ φοντ σαμπλε. $v(K^-, \pi^-) \wedge v(\pi^+, K^+) \wedge \pi(\varepsilon, \varepsilon \exists K^+) \wedge$

□□□□ *⌘)(♦ ♫♦ ✕□◆ ♦○□●ℳ ⓘ □❀☺❖ ⓘ π❖□Λ □❀π❖ ⓘ ☺❖□Λ □❀ℳ ⓘ ℳ❖□Λ

132: This is font sample. $n(K^-, \pi^-) \wedge n(\pi^+, K^+) \wedge p(e, e'K^+) \wedge$

122: Τηισ ισ φοντ σαμπλε. $v(K^-, \pi^-) \wedge v(\pi^+, K^+) \wedge \pi(\varepsilon, \varepsilon \exists K^+) \wedge$

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52: This is font sample. $n(K^-, \pi^-) \wedge n(\pi^+, K^+) \wedge p(e, e'K^+) \wedge$

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22: This is font sample. $n(K^-, \pi^-) \wedge n(\pi^+, K^+) \wedge p(e, e'K^+) \wedge$

12: This is font sample. $n(K^-, \pi^-) \wedge n(\pi^+, K^+) \wedge p(e, e'K^+) \wedge$

2: This is font sample. $n(K^-, \pi^-) \wedge n(\pi^+, K^+) \wedge p(e, e'K^+) \wedge$