

# Status Report #38

- ✓ Beta-ray test
- ✓ Status of detector test

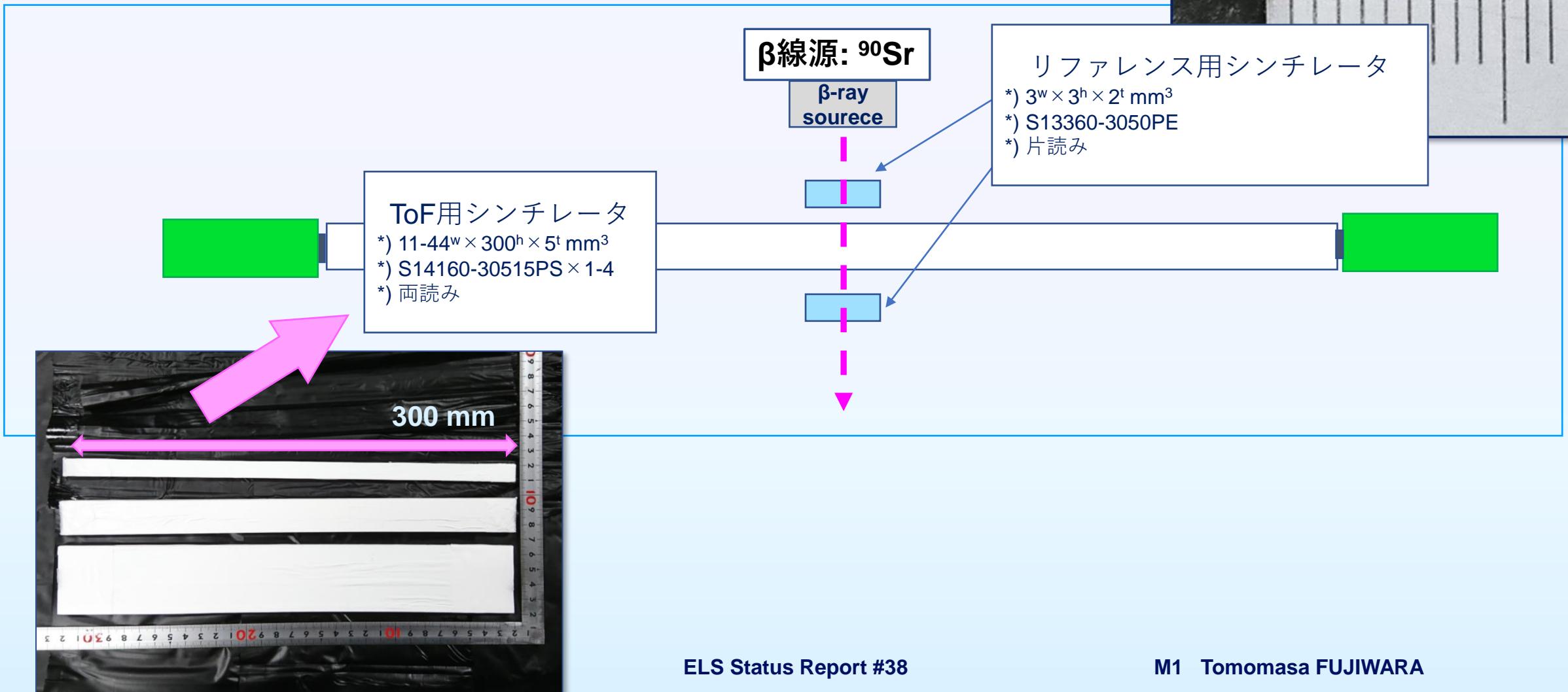
2020. 07. 28 (Fri)

Tohoku Univ.  
M1

Tomomasa FUJIWARA

# Beta-ray test

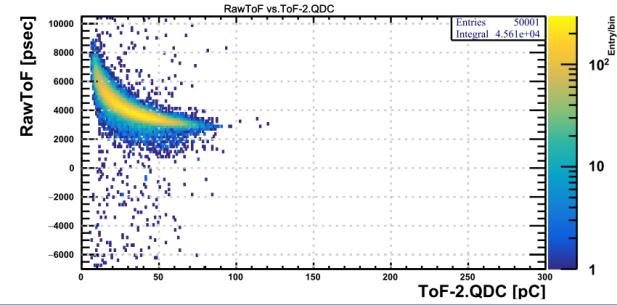
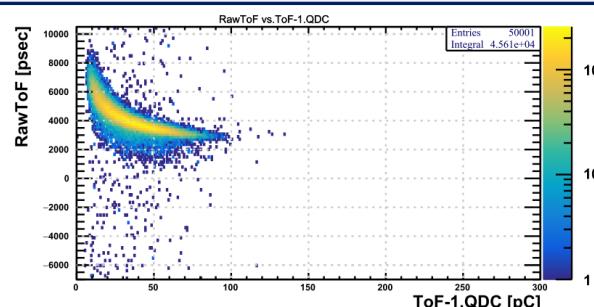
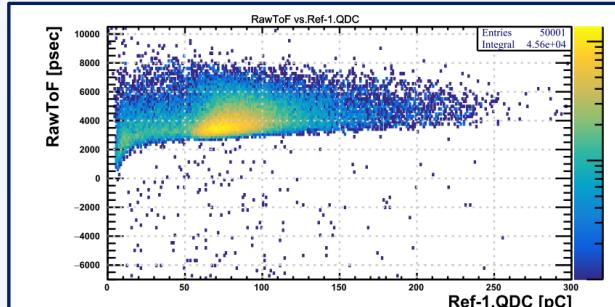
## ✓ Setup



# Beta-ray test

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- Ref. Counter の印加電圧を変えて再度データ取得 (+0.0 V → +3.0 V), Ref × 1 & ToF
- ToF側のセットアップ >> 5<sup>t</sup>11<sup>w</sup>300<sup>h</sup>, MPPC × 1 series,



Bias:

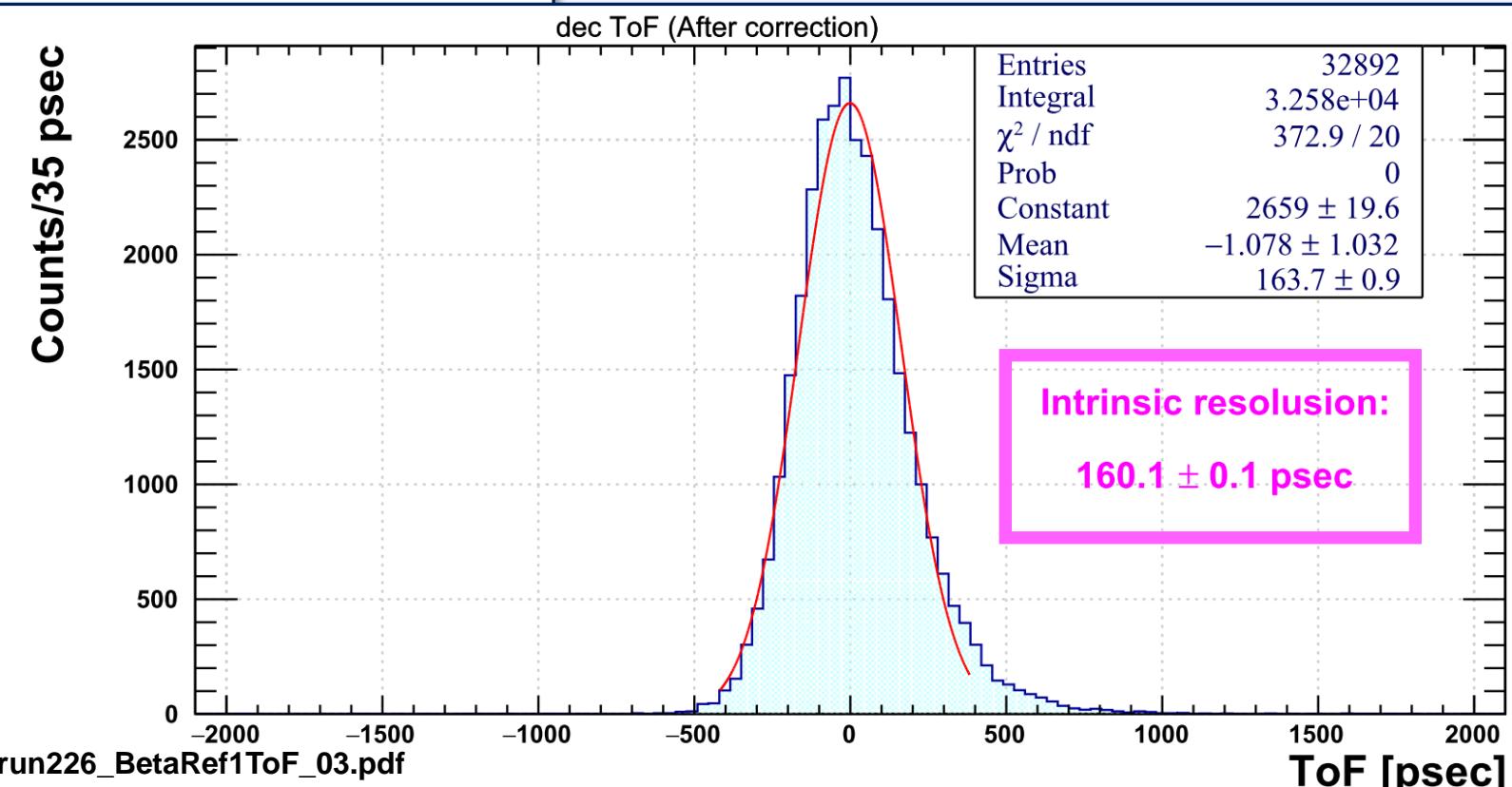
$$\text{Ref.} \rightarrow V_b[\text{V}] = 58.8$$

$$\text{ToF} \rightarrow V_b[\text{V}] = 44.7 (+3.0 \text{ V/MPPC})$$

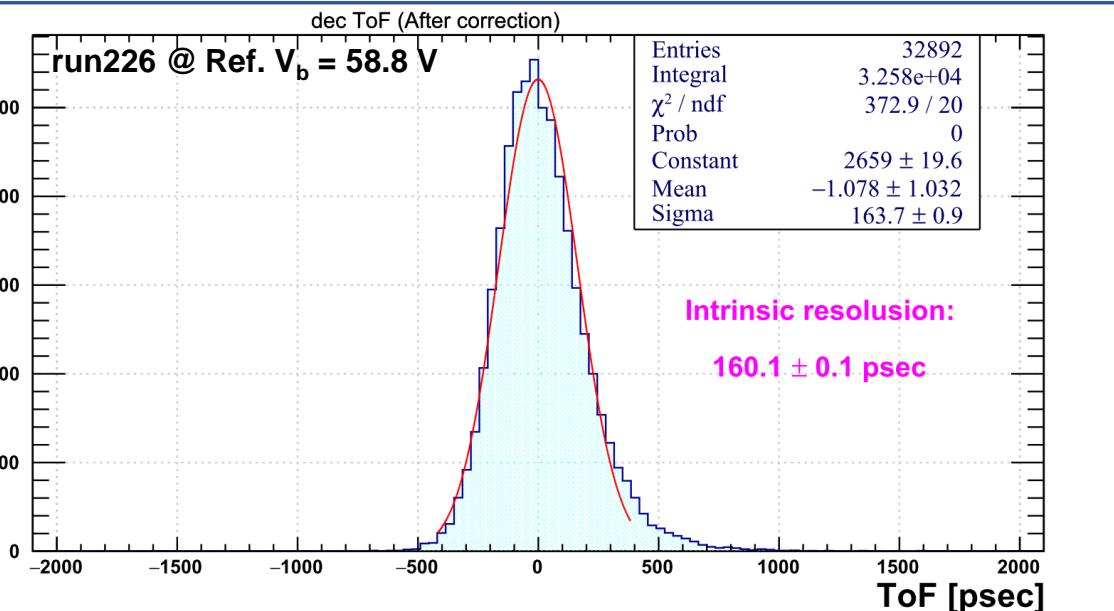
Offset voltage ~15 mV

$V_{\text{th}}[\text{mV}] \rightarrow \sim 0.1 * \text{MIP pulseheight}$

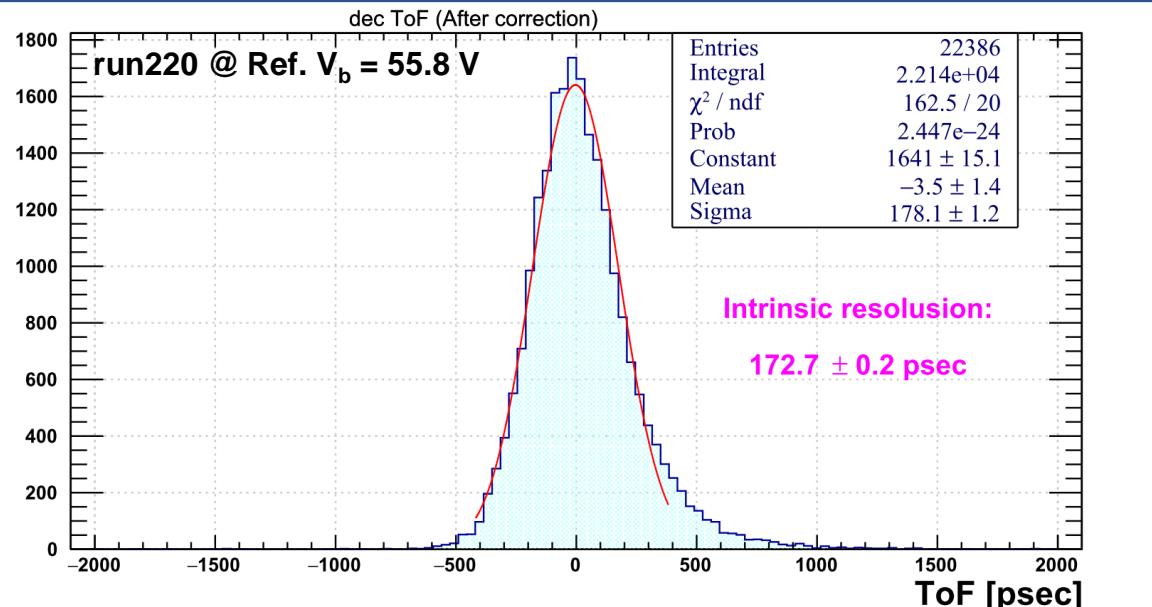
Trigger  $\rightarrow$  Ref-1  $\otimes$  ToF-1  $\otimes$  ToF-2



Counts/35 psec

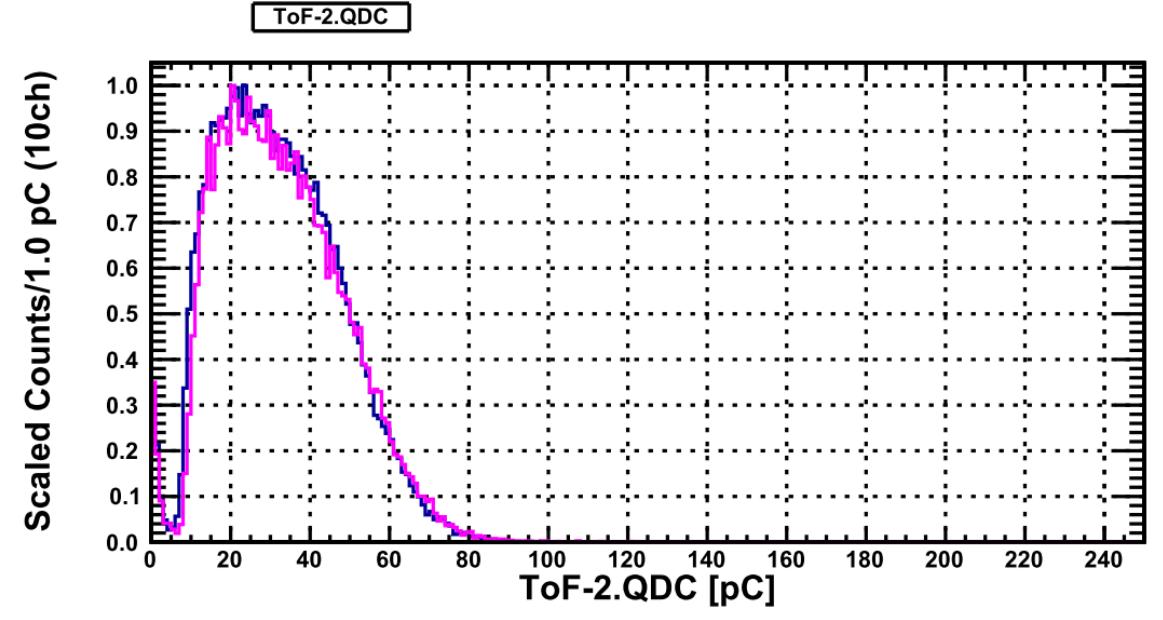
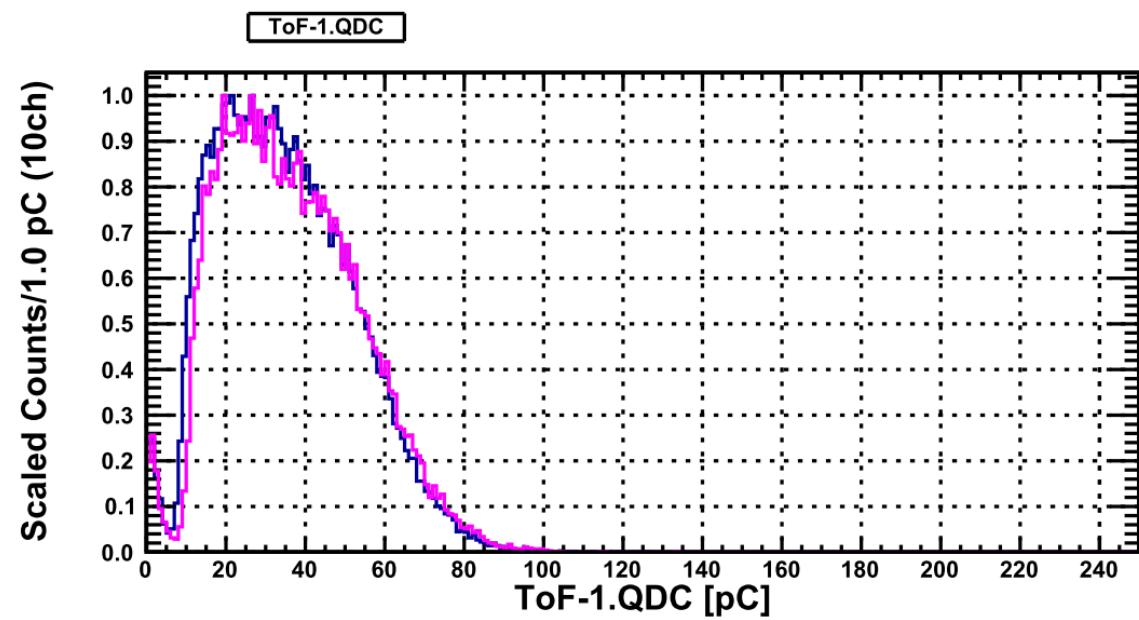
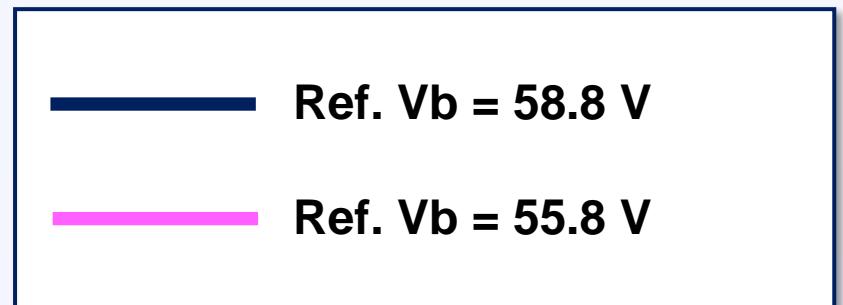


Counts/35 psec

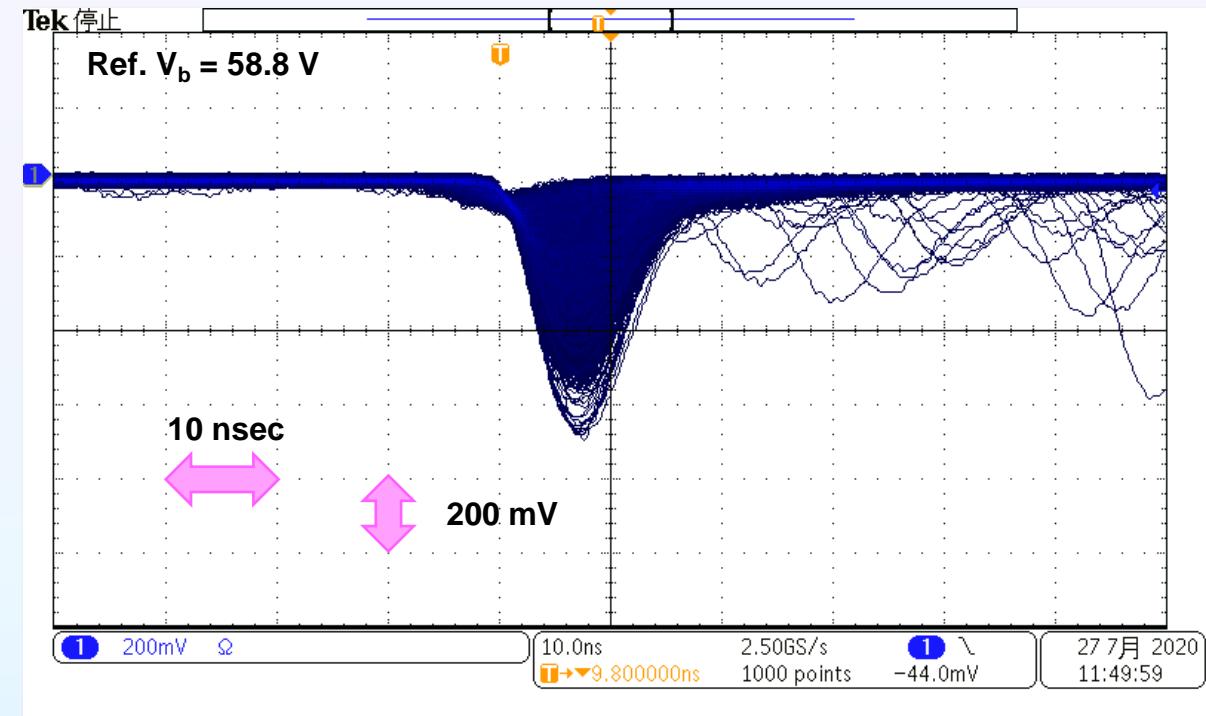
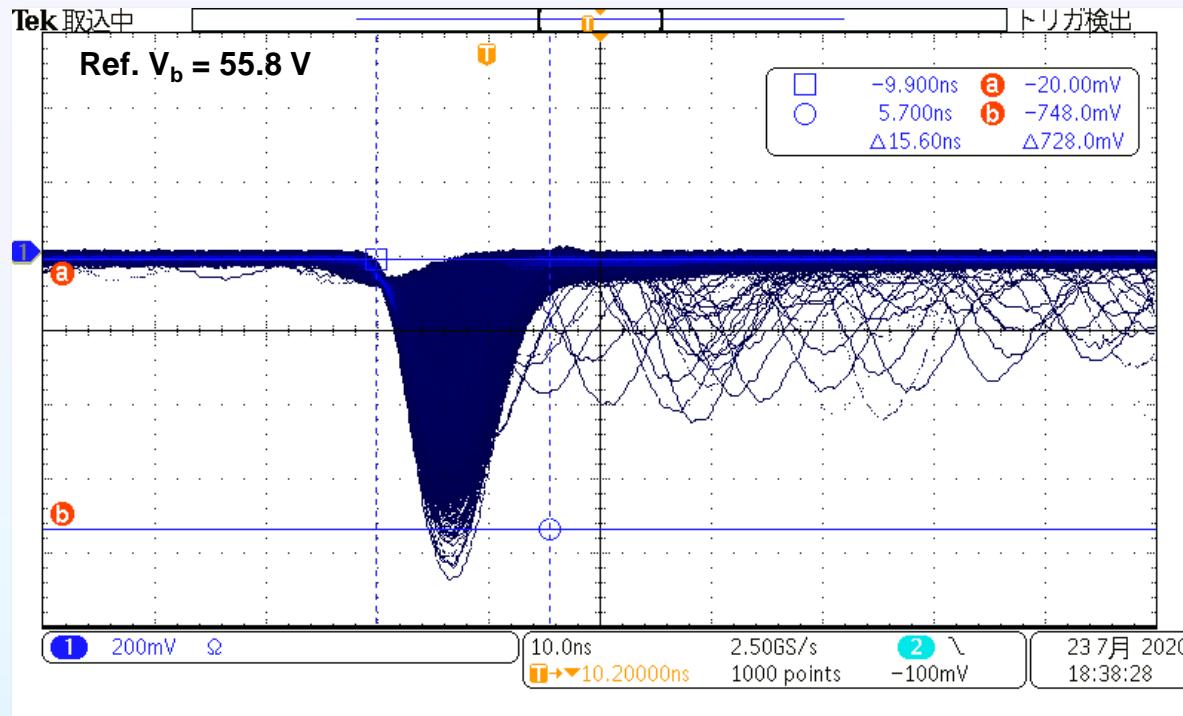


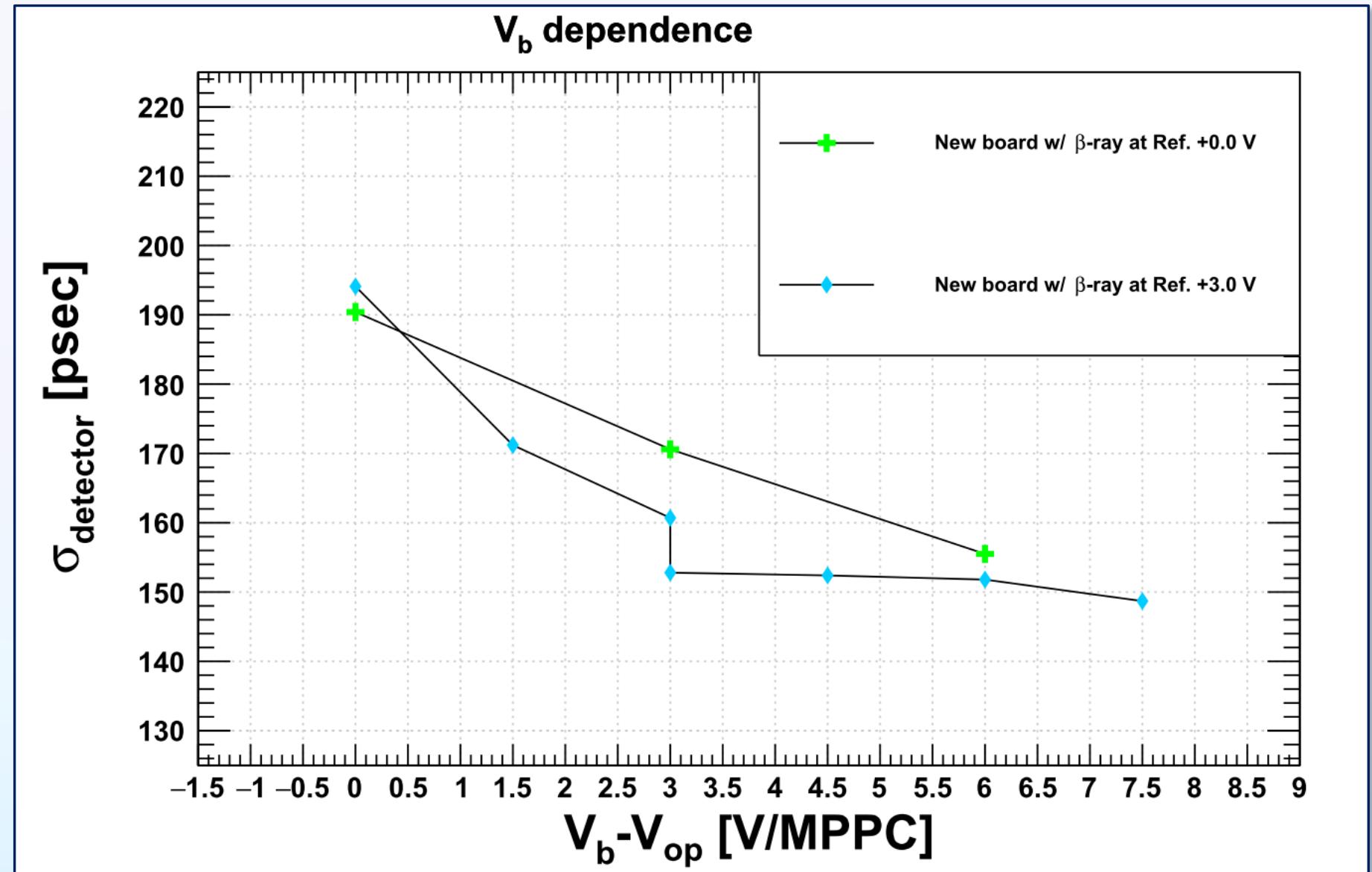
- Ref. Counter の電圧を変えただけ.
- ToF側のセットアップは変えてはいない(はず)
- 日をまたいだためシンチを付け直した
- gainの違いがある?  
→ 確認した(次スライド)

- QDC分布の比較
- pedestal=0 に合わせ, 1ch = 0.1pC で換算
- エントリー数最大のbinの高さ=1となるよう2つのrunのヒストをスケール.
- 統計量の違いはあるが, 分布の形はほぼ一致しているように見える...



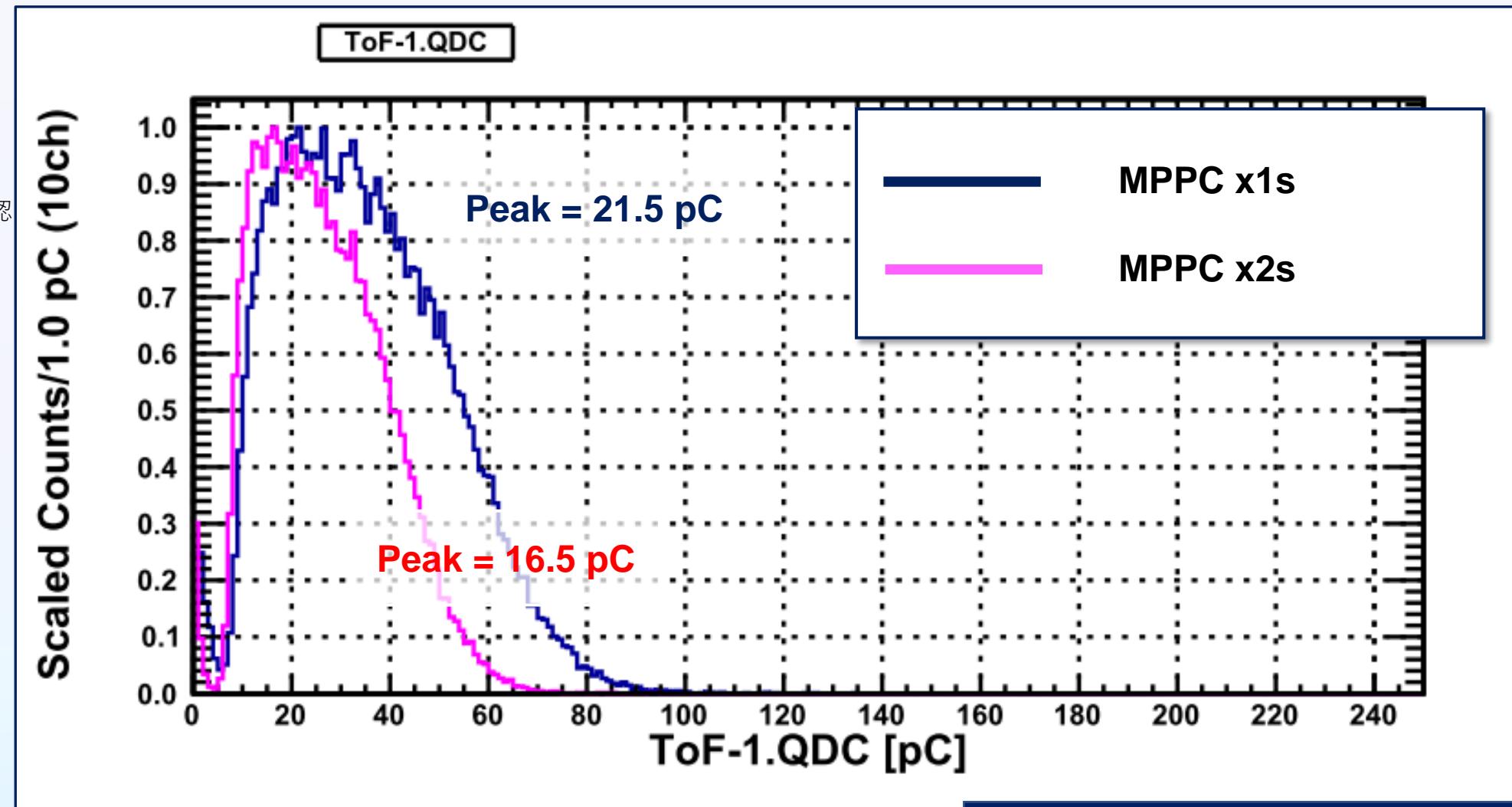
- オシロ画像 w/ beta-ray PMアンプ後
- $V_b[V] = 44.7 (+3.0 V)$
- オシロの画像上ではRef.  $V_b = 55.8 V$ の方方がパルスが大きい。⇒ 信号幅はほとんど同じ。だとするとQDCが同程度になるのは不自然では...??





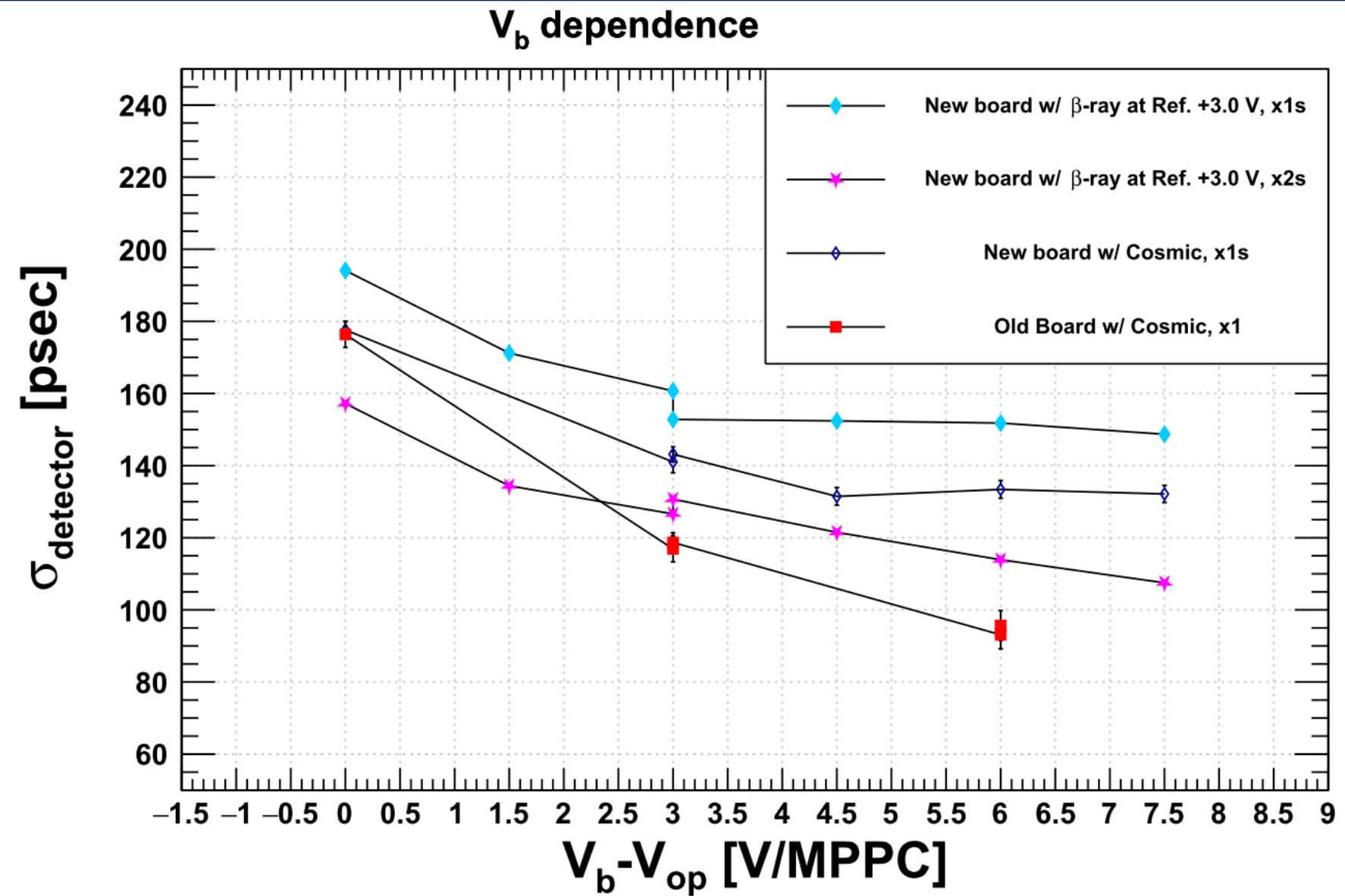
✓ MPPC × 2個直列

1個読みと比較して  
~20%程度のゲインの低下を確認



※peak の位置は最大エントリー数をとるビンの中央値として決定している

- 印加電圧をMPPC当たりに換算.
- +7.5 V/mppc 時で~100 psec



# Status of detector test

## ✓ KiNOKO PC trouble

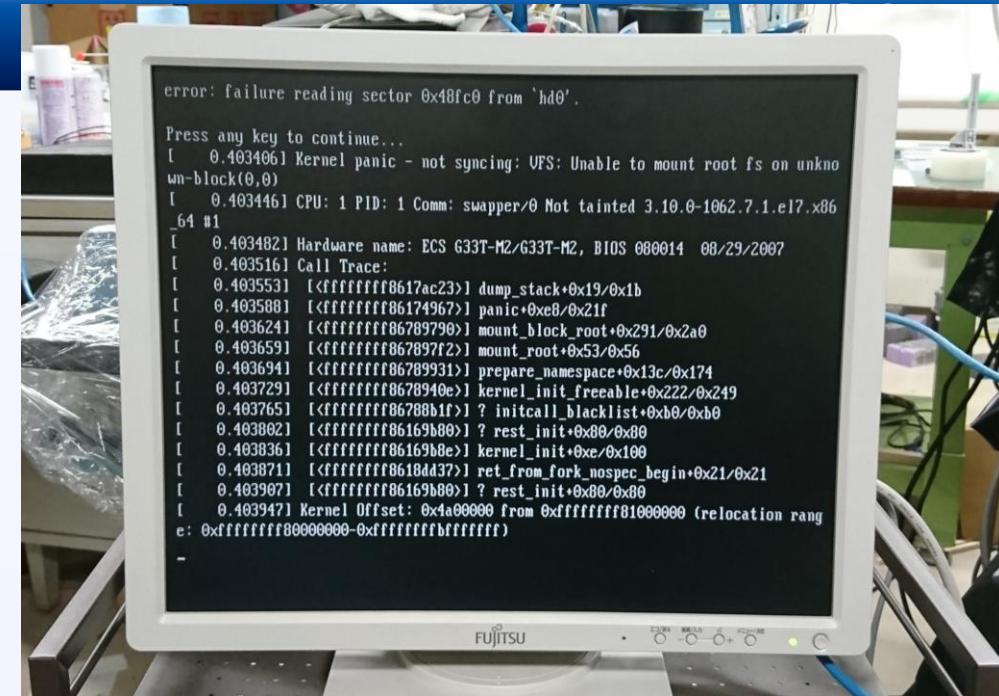
- DAQに使用していたPCがダウン (7/27 夜)
- 永尾さんに確認していただいたところ、ハードディスクが故障していた
- マザーボードのコンデンサも1個異常に膨らんでいた  
(いつ死んでもおかしくない状態)
- データの吸出しが出来なかった
- 藤原ToFの測定でのrootファイル(run001 – 251)中001-245はfarm41に転送済み。
- 最後に取得したペデスタルrun\*5 は消失

- -7/29, 代替のハードディスクを導入
- OS, Kinoko 再インストール。→ 無事に動作を確認。
- 現在、代替のPCの見積もりをしていただいている。

## ✓ 今週後半

- カウンター部屋(637号室)の $\beta$ 線源がすべて使用中。(水-木曜)
- 来週から頑張ります...

お手数おかけして申し訳ございません。  
本当にありがとうございます。



- ✓  $5^t22^w$ (w/ 1-2個直列),  $5^t44^w$ (w/ 1, 2, 4個直列)でのデータ取得.  
⇒ 時間分解能 + ゲインの評価
  - ✓ 異なる厚さ・長さのシンチレータでもデータをとる
  - ✓ (MPPC - バイアス供給, MPPC-読み出しの経路を改良した基板を考える)
- ✓ 期末レポート

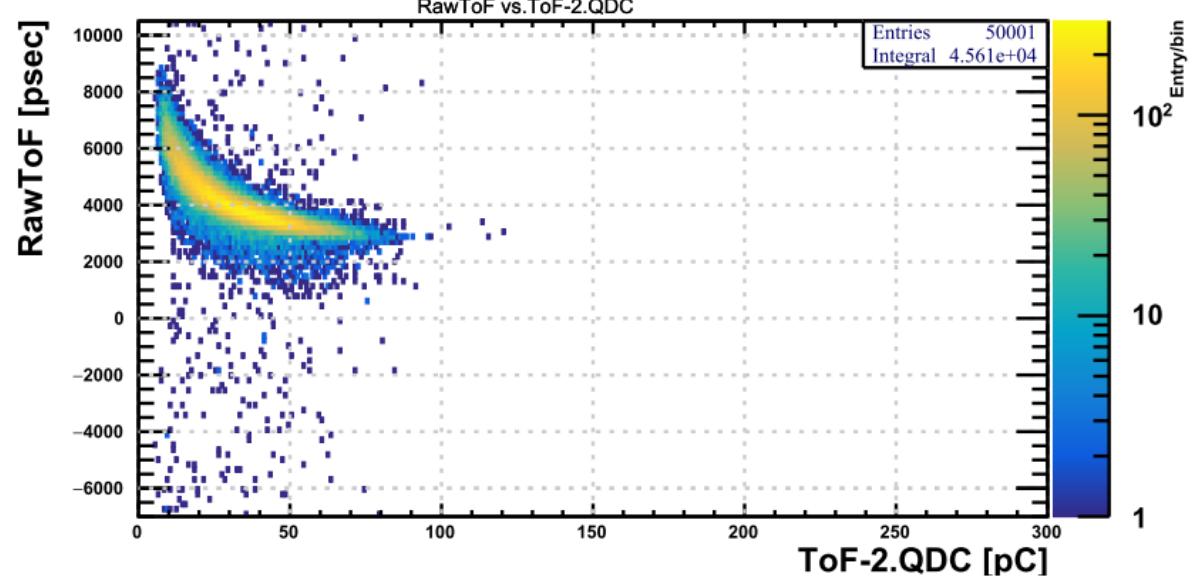
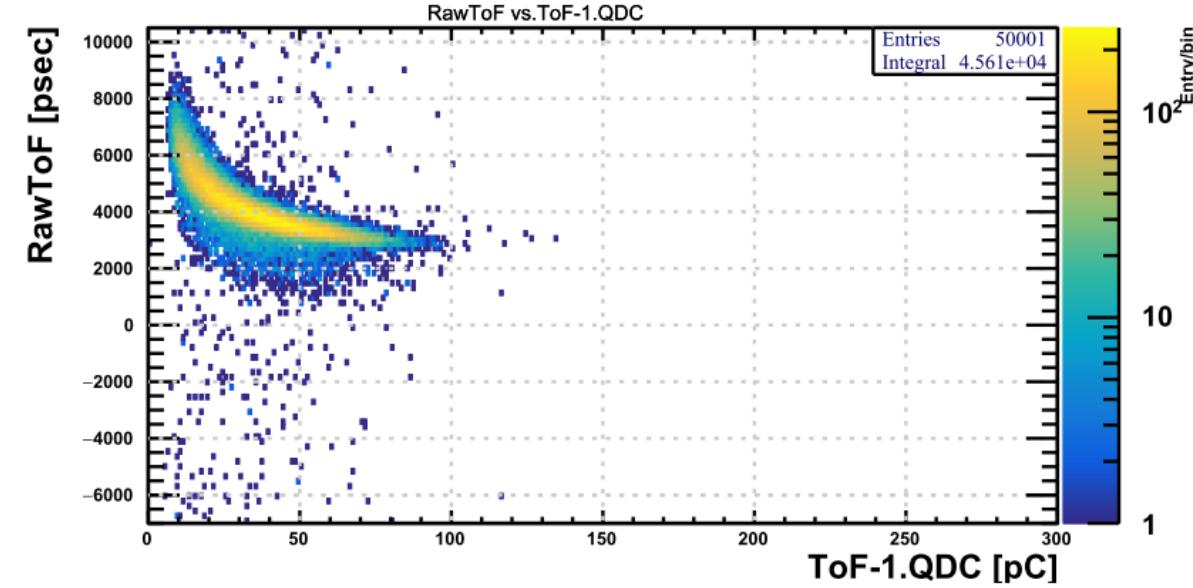
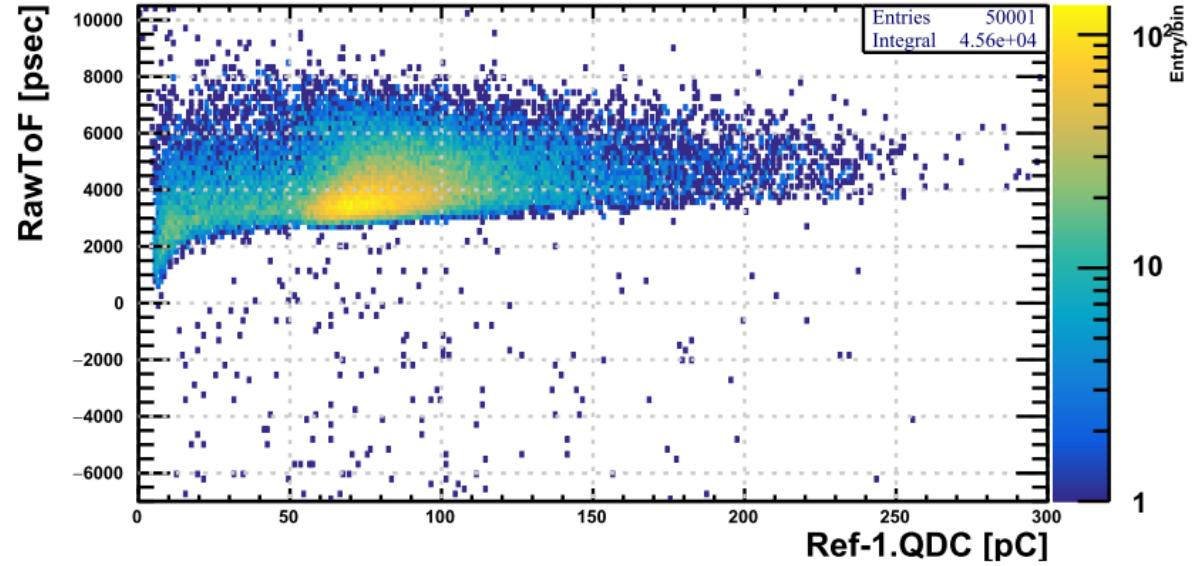
# Backup

# Plan

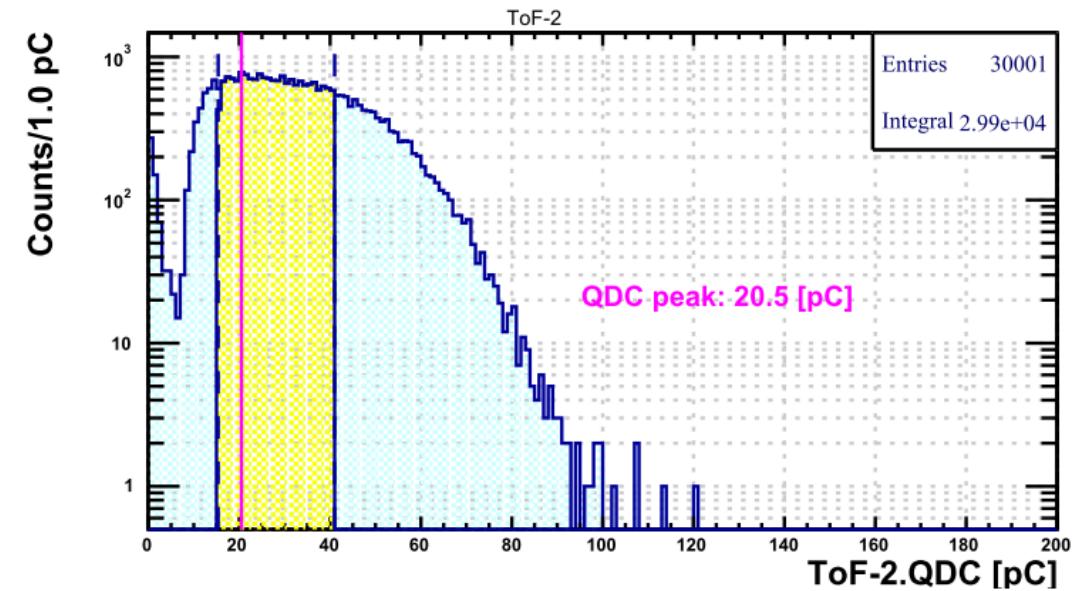
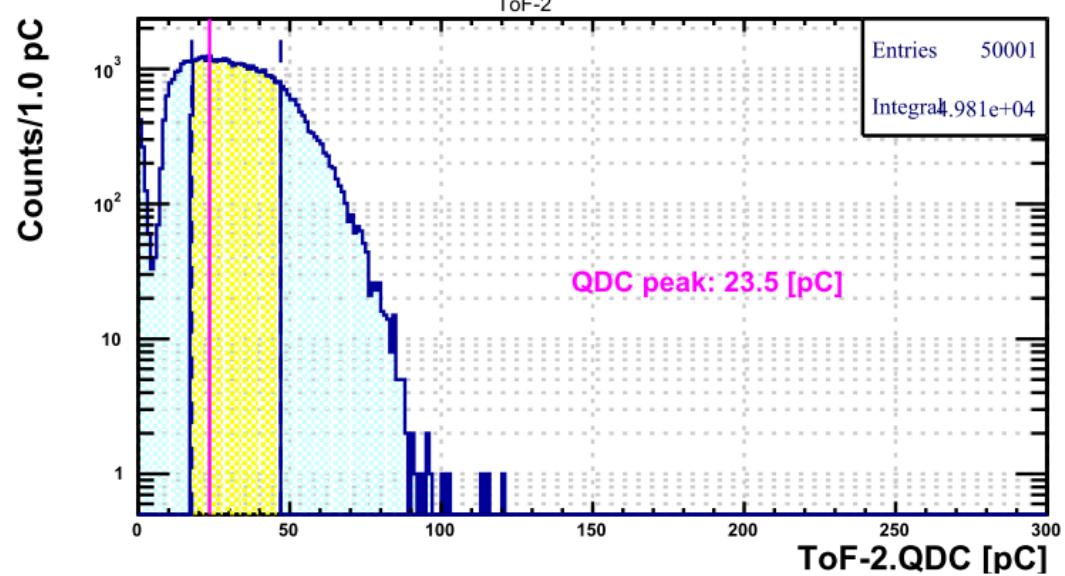
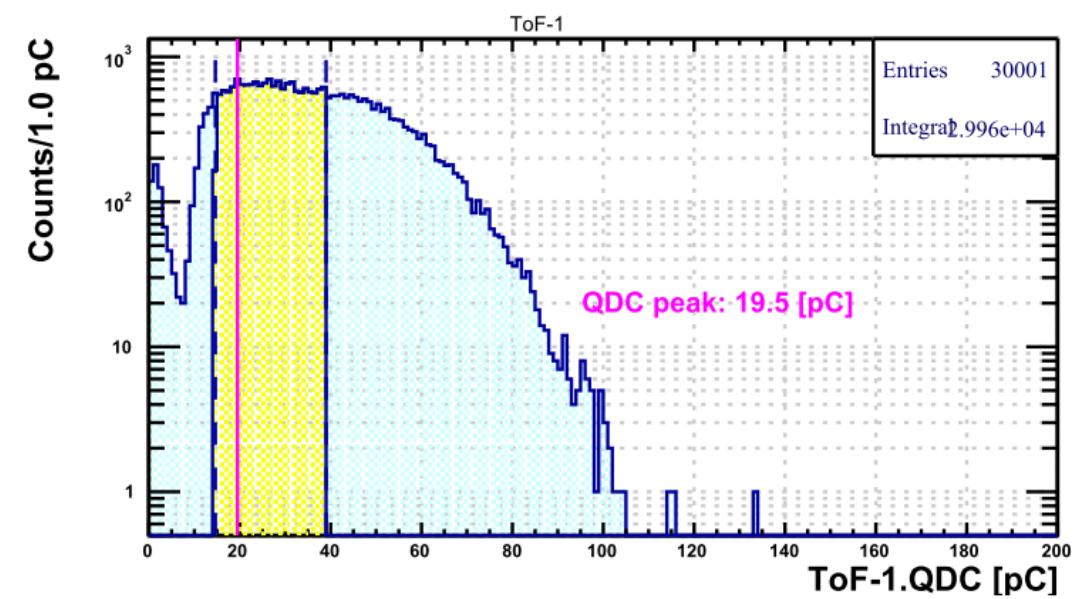
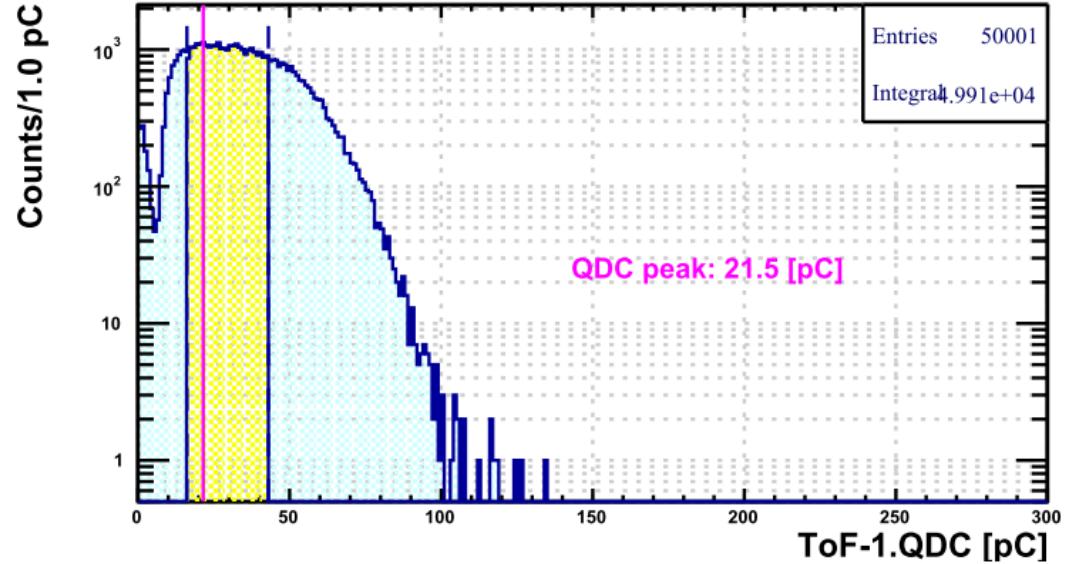
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- 緑: 平日

Sun	Mon	Tue	Wed	Thu	Fri	Sat
26	27	28	29	30	7/31	8/1
					Today	
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
 <b>Internship (in Sendai but absent in daytime) 仮, 事前審査の結果次第</b>						

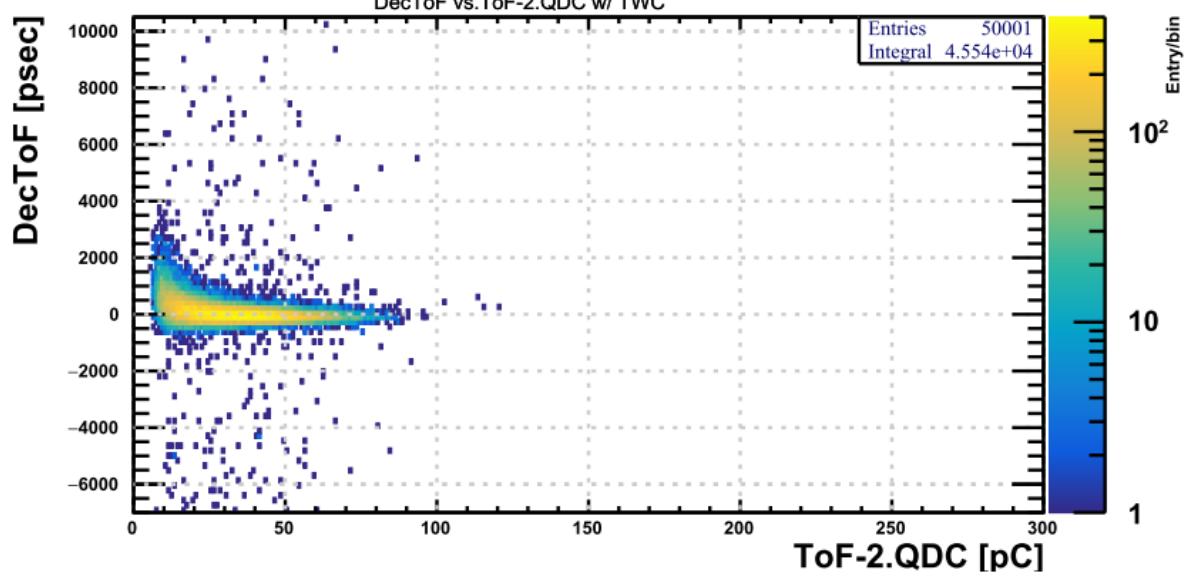
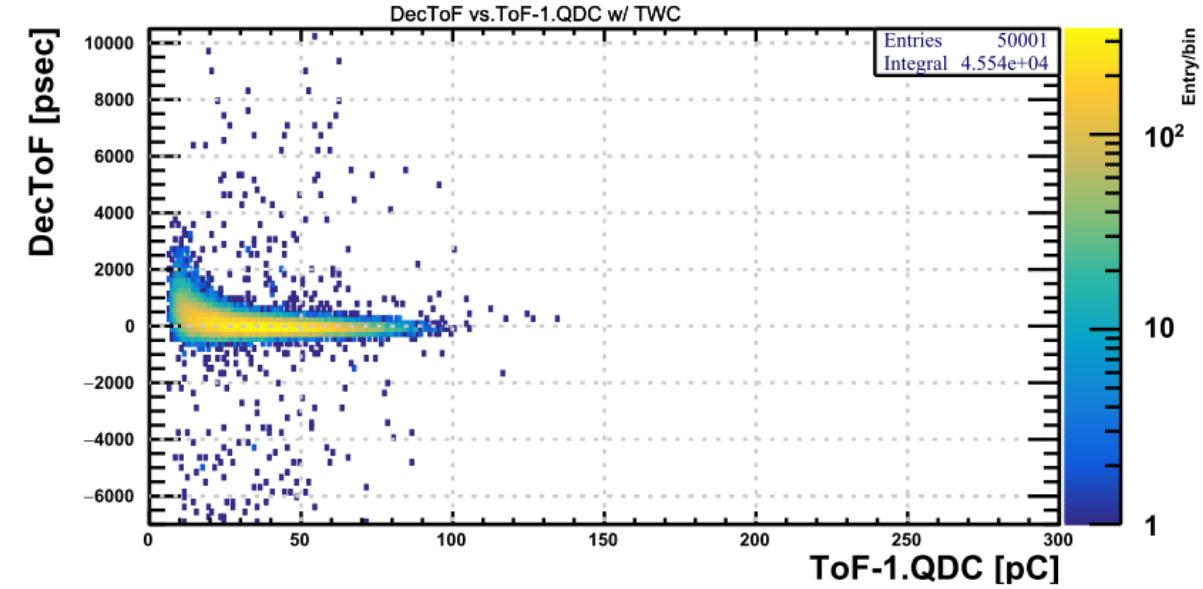
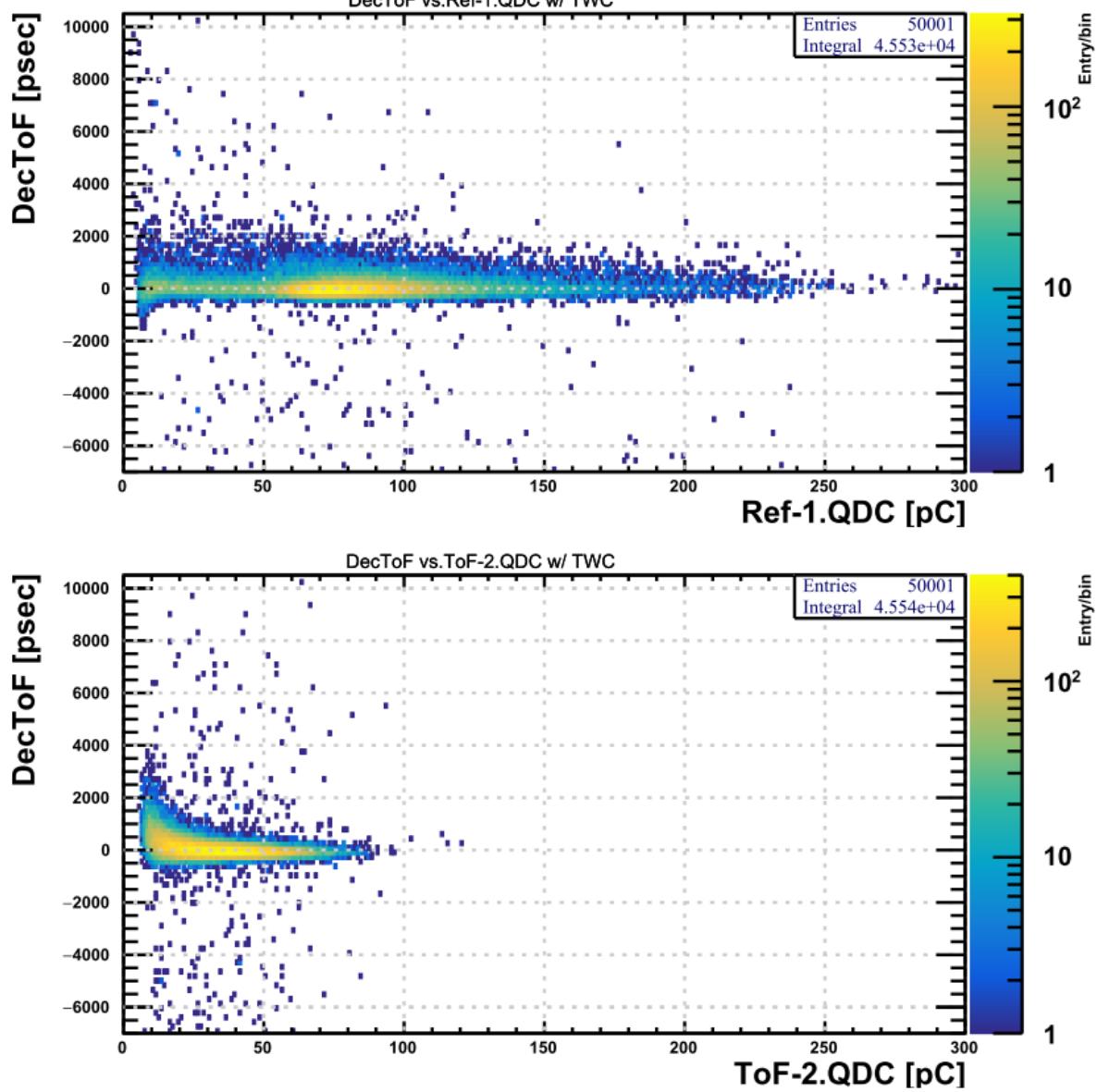


run226\_BetaRef1ToF\_03.pdf

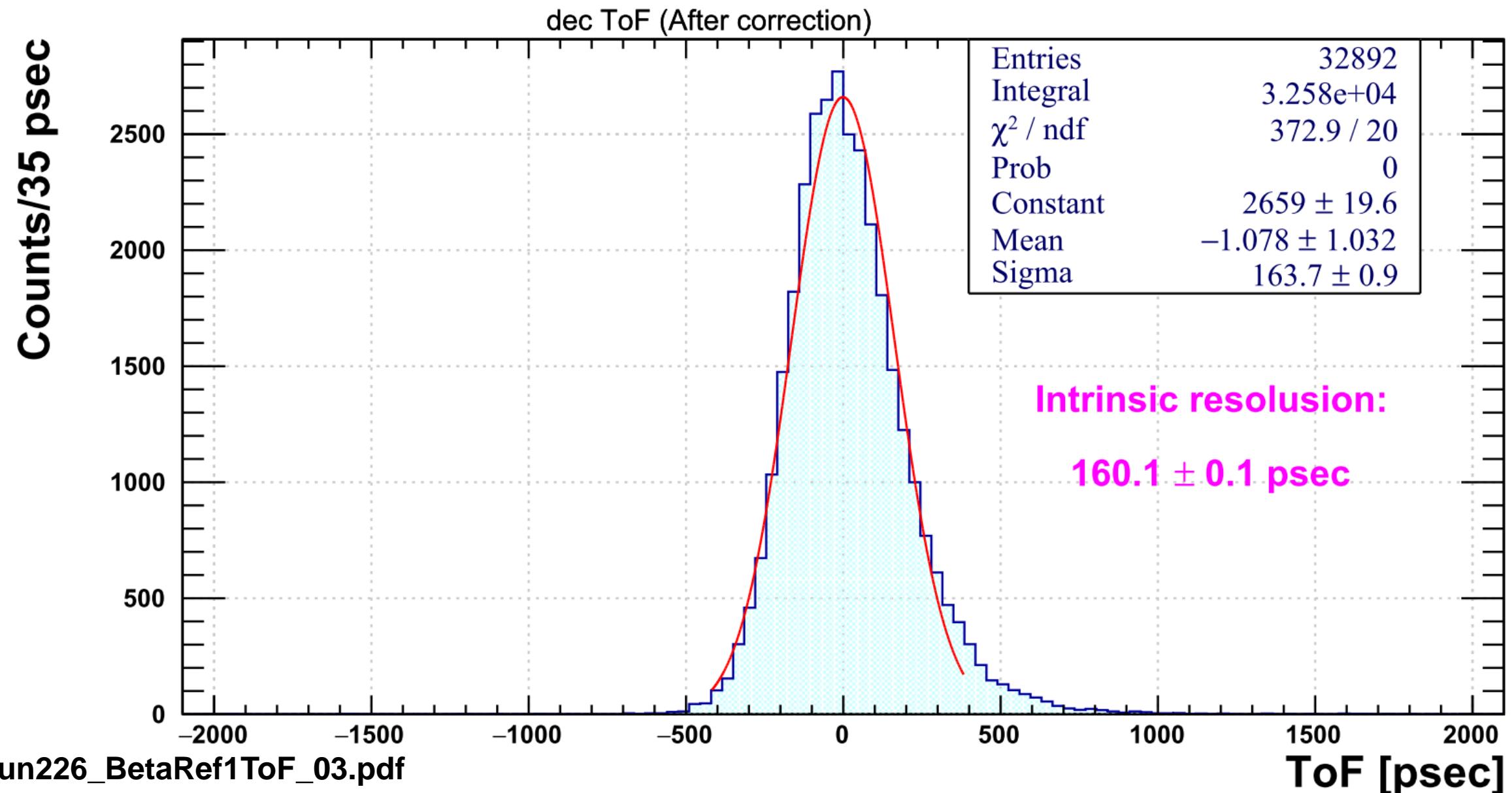


run226\_BetaRef1ToF\_03.pdf

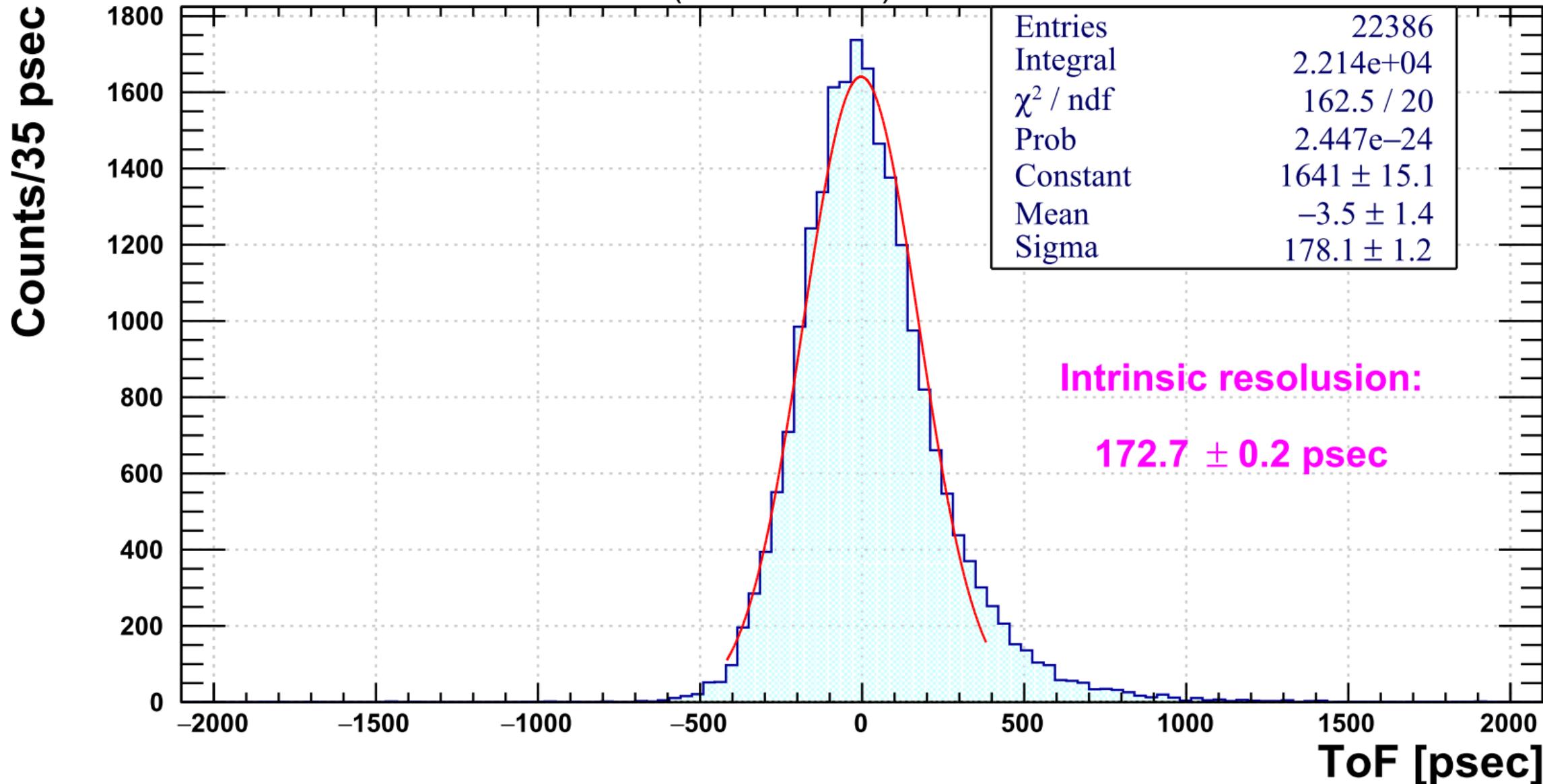
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run226\_BetaRef1ToF\_03.pdf

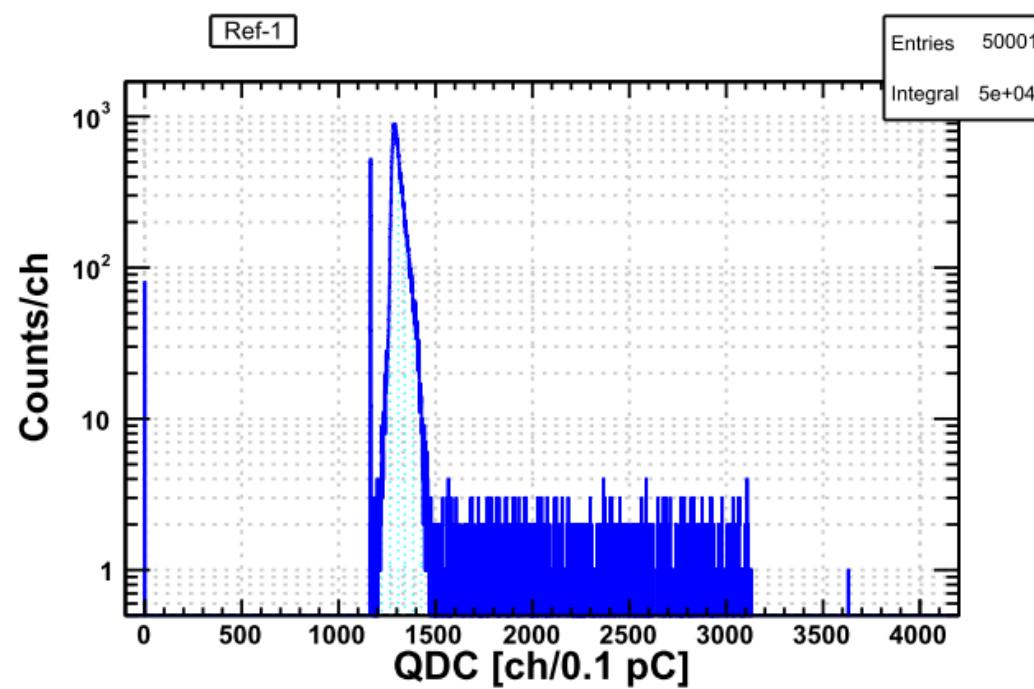


# dec ToF (After correction)

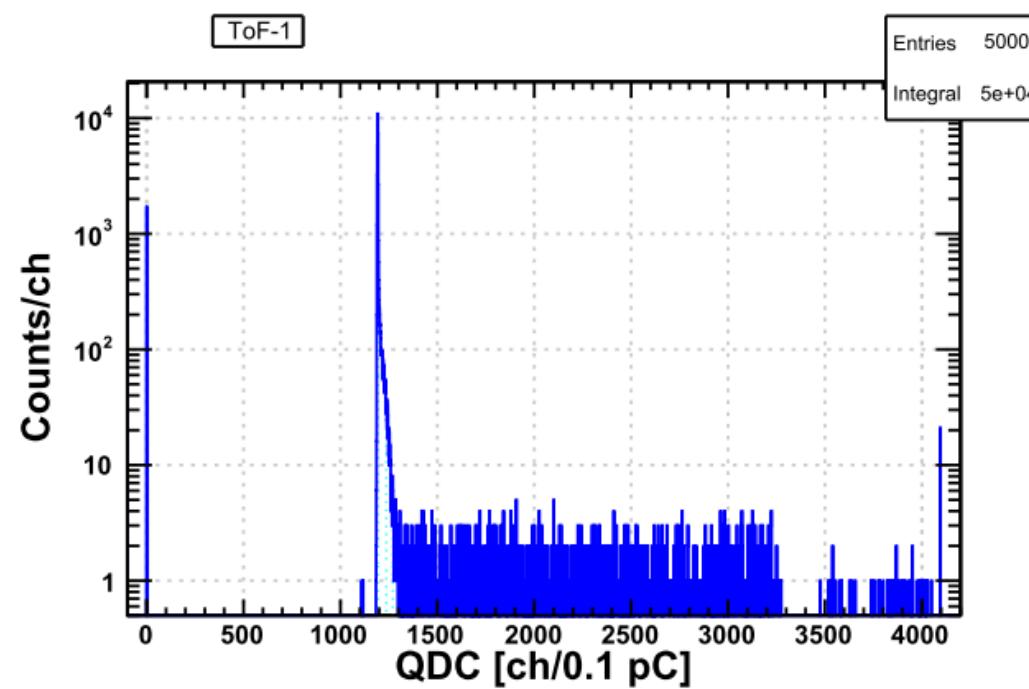


run220\_BetaRef1ToF\_03.pdf

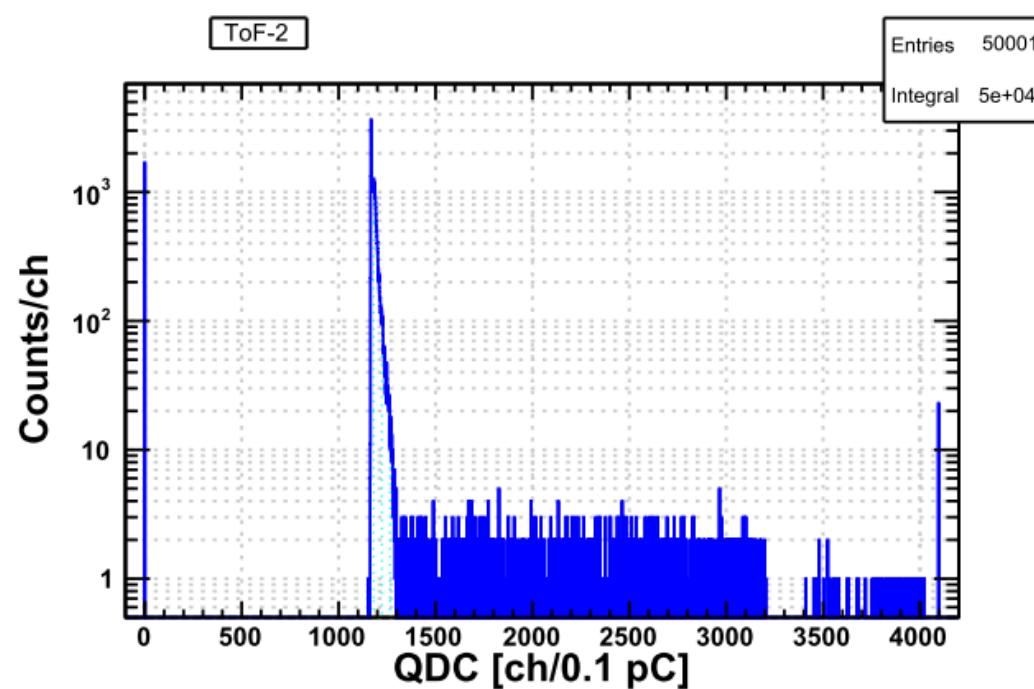
Ref-1



ToF-1



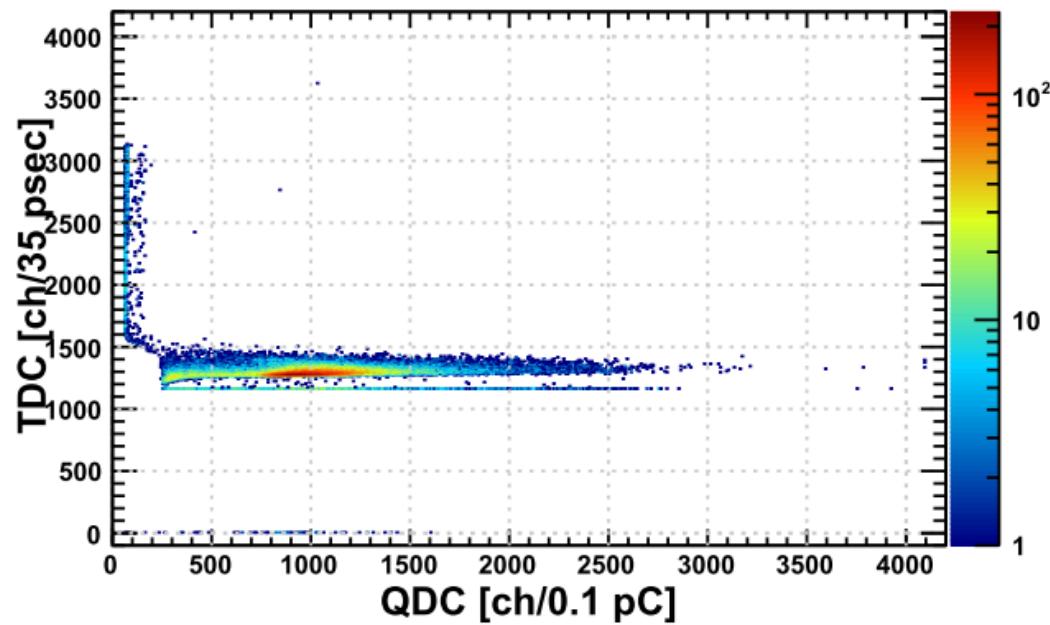
ToF-2



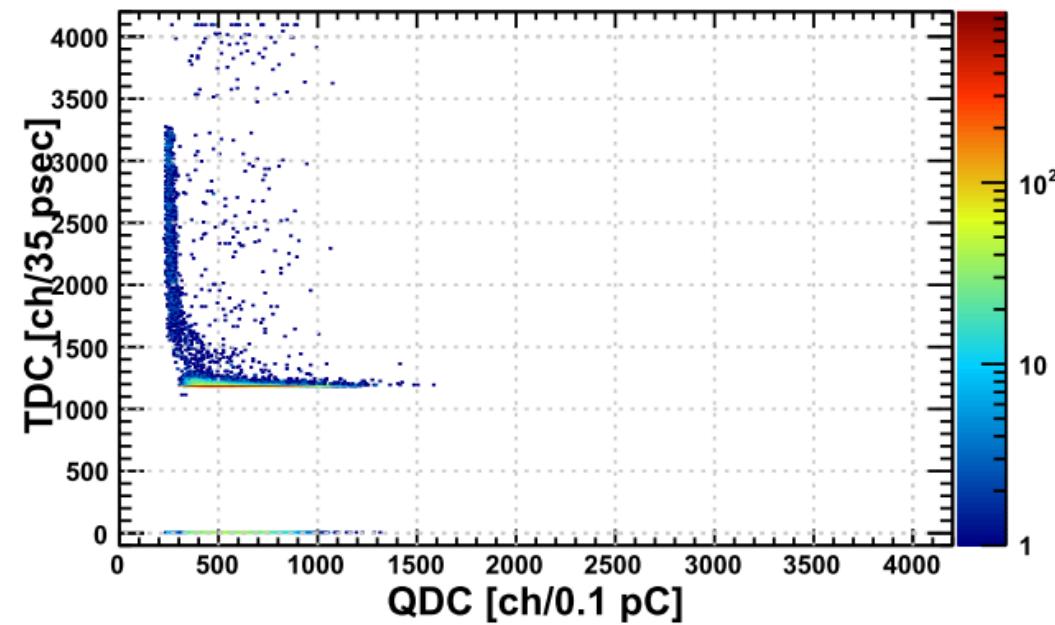
TandQ\_run226\_00.pdf

A

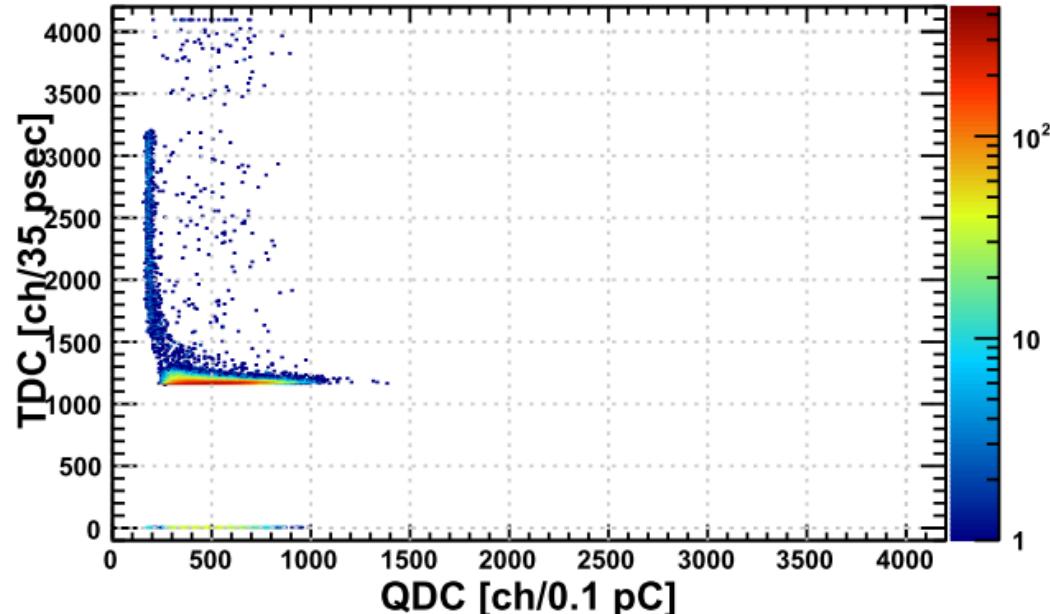
Ref-1

Entries 50001  
Integral 5e+04

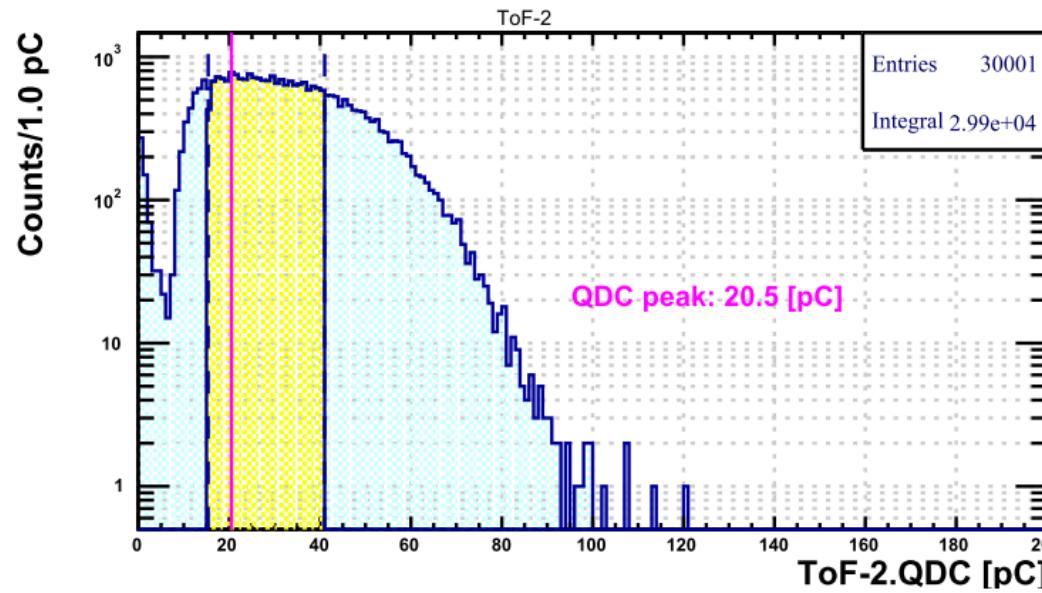
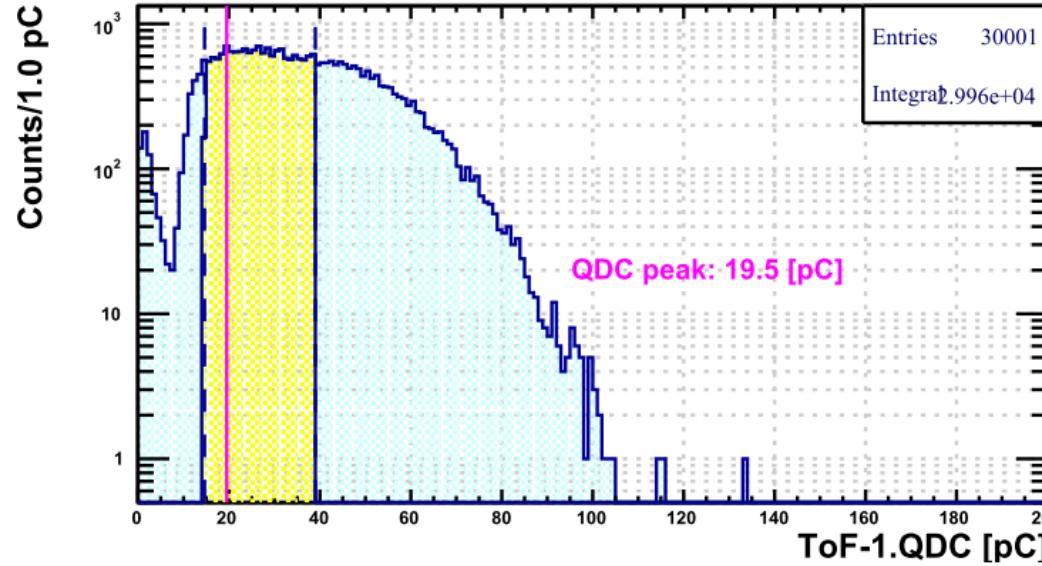
ToF-1

Entries 50001  
Integral 5e+04

ToF-2

Entries 50001  
Integral 5e+04

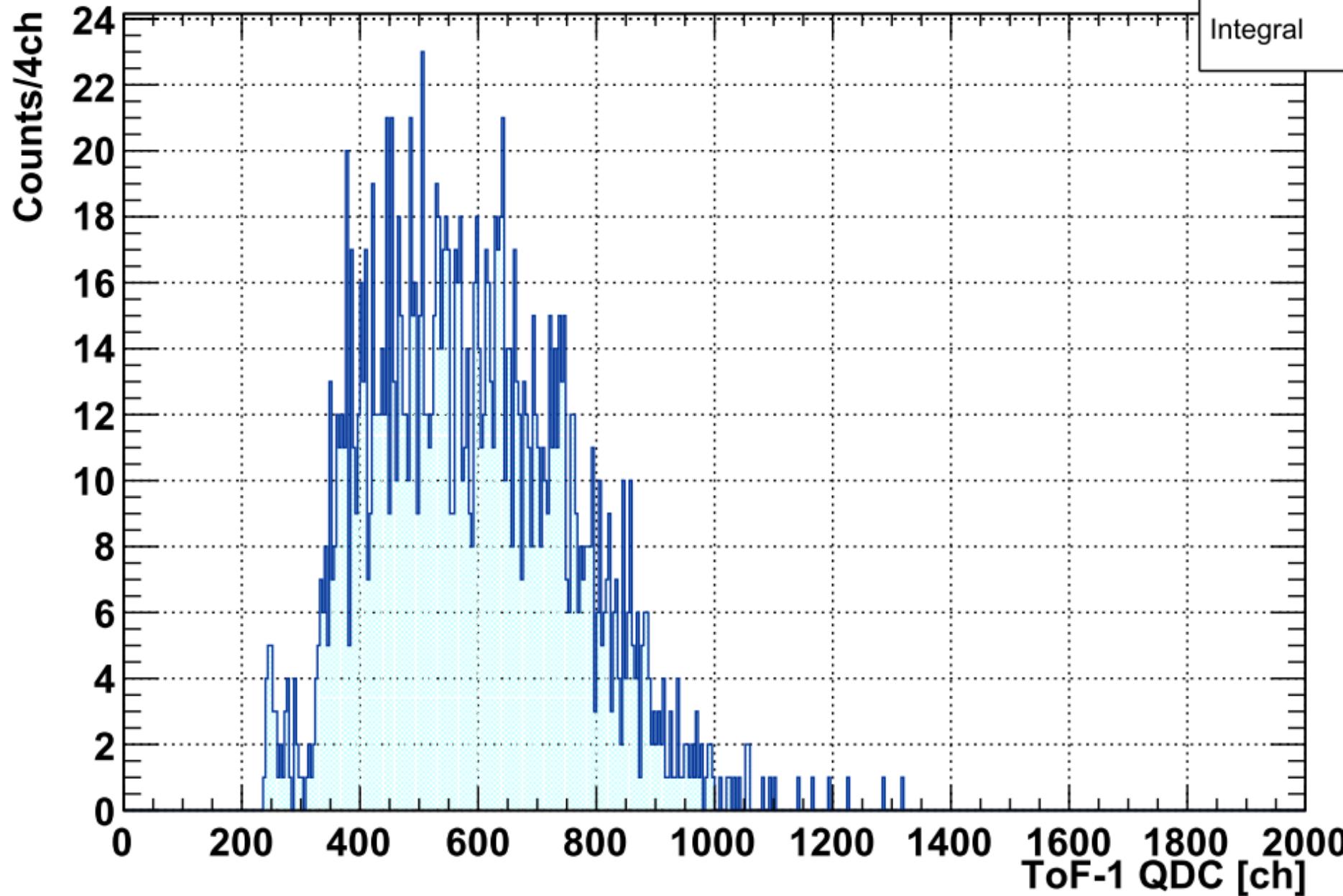
TandQ\_run226\_00.pdf

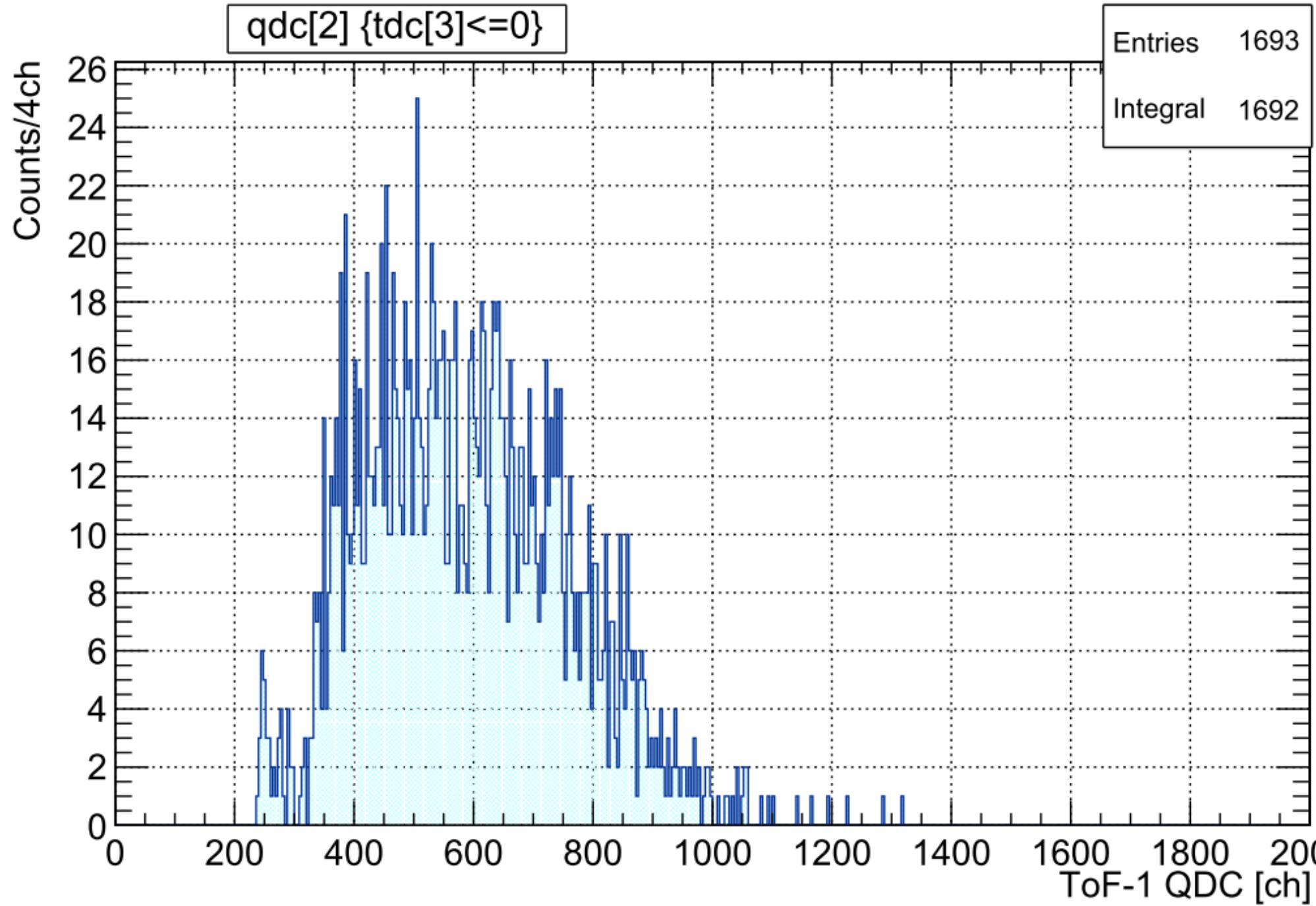


run220\_BetaRef1ToF\_03.pdf

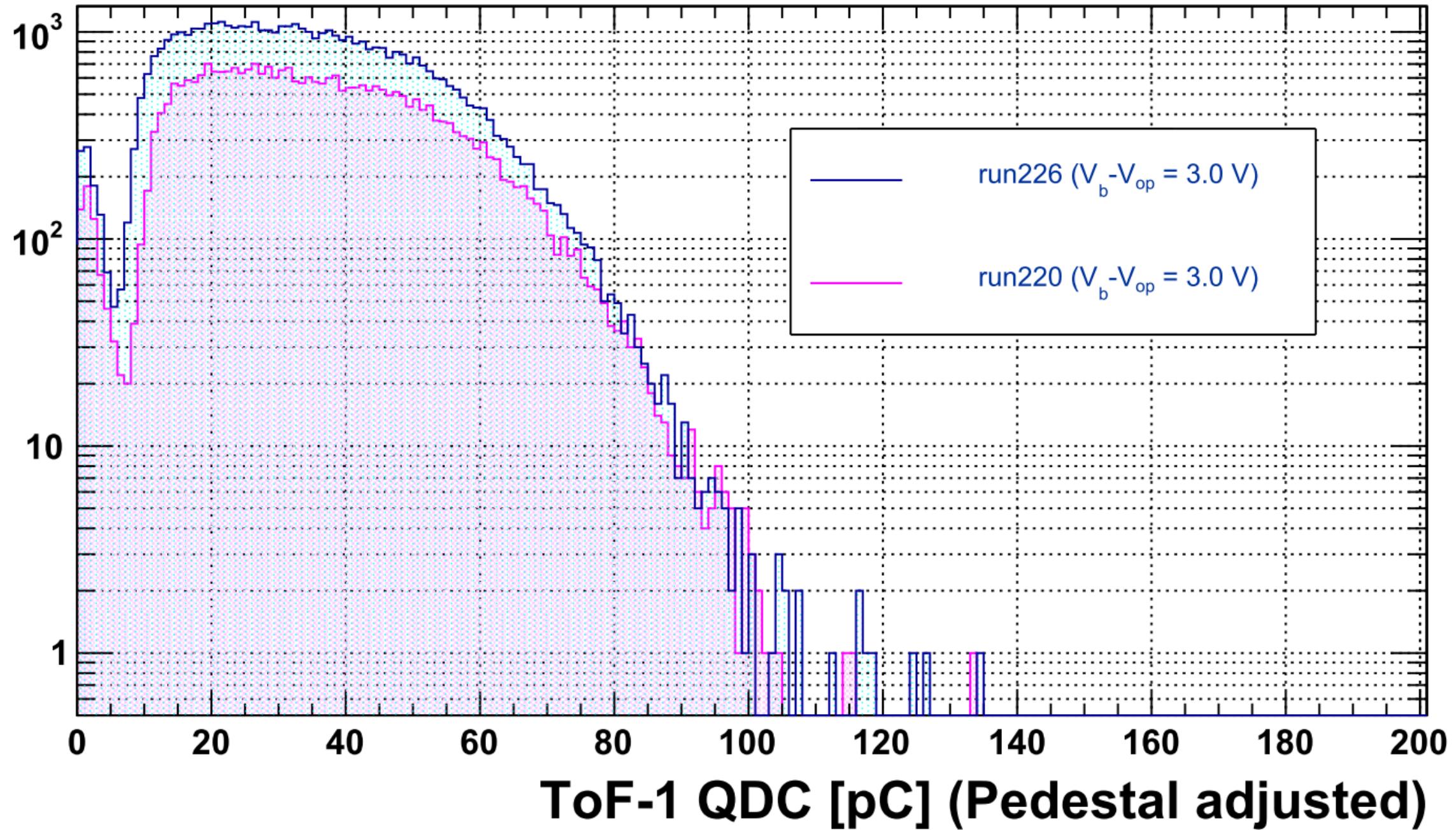
**qdc[2] {tdc[2]<=0}**

Entries 1715  
Integral 1714



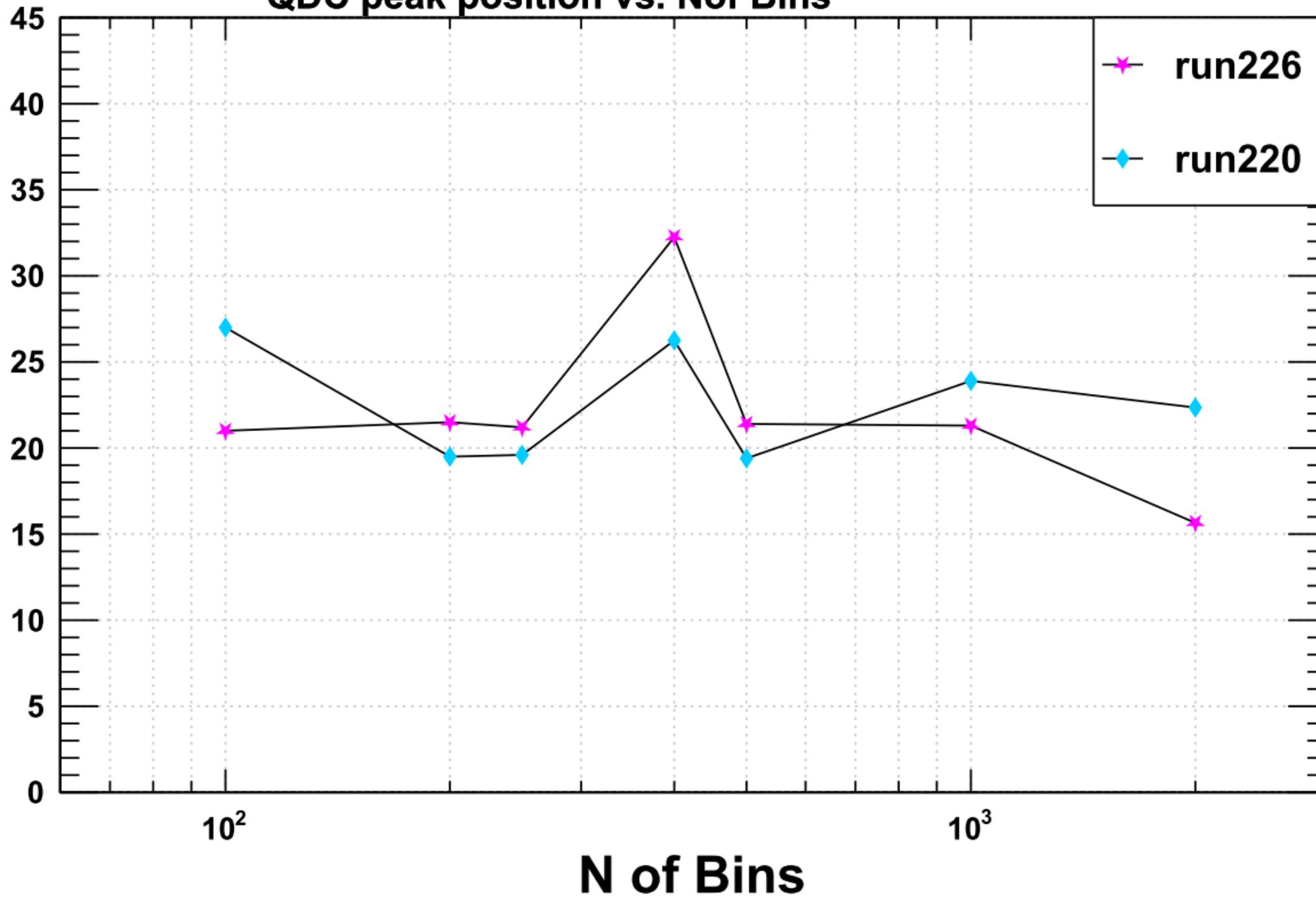


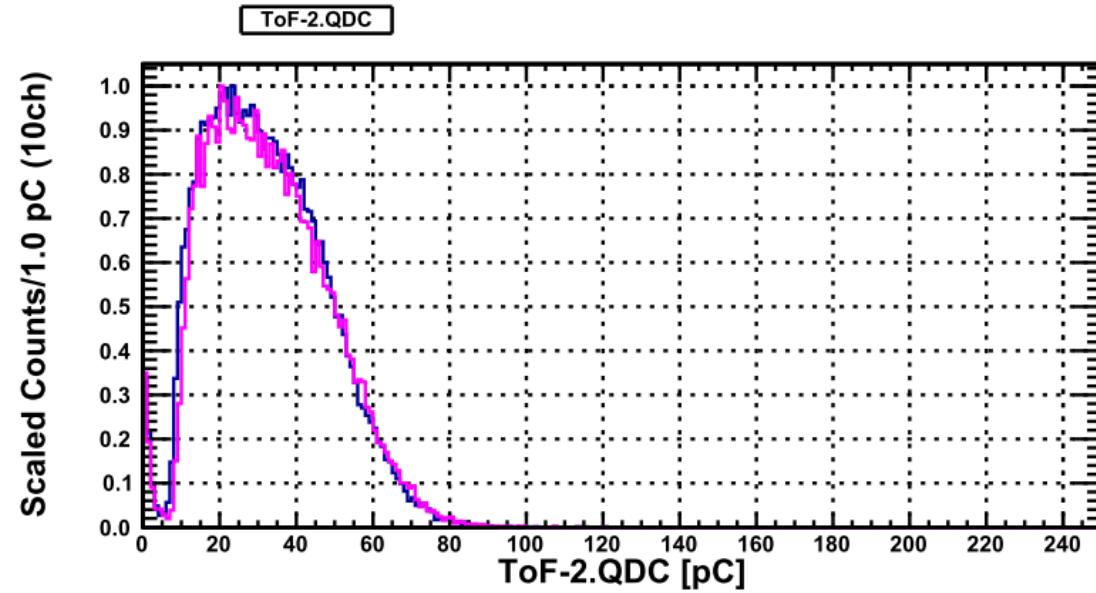
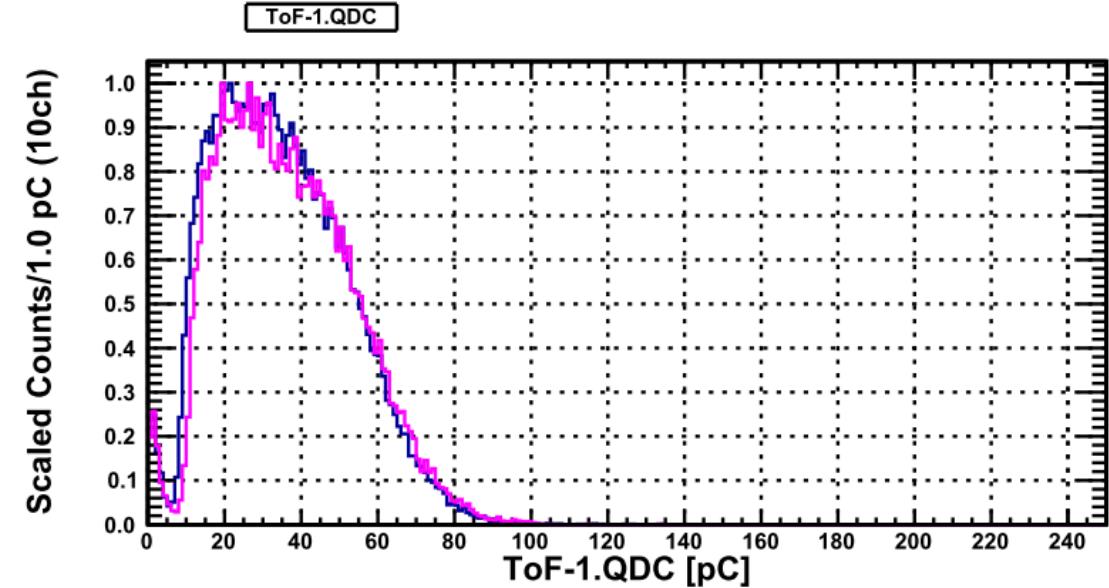
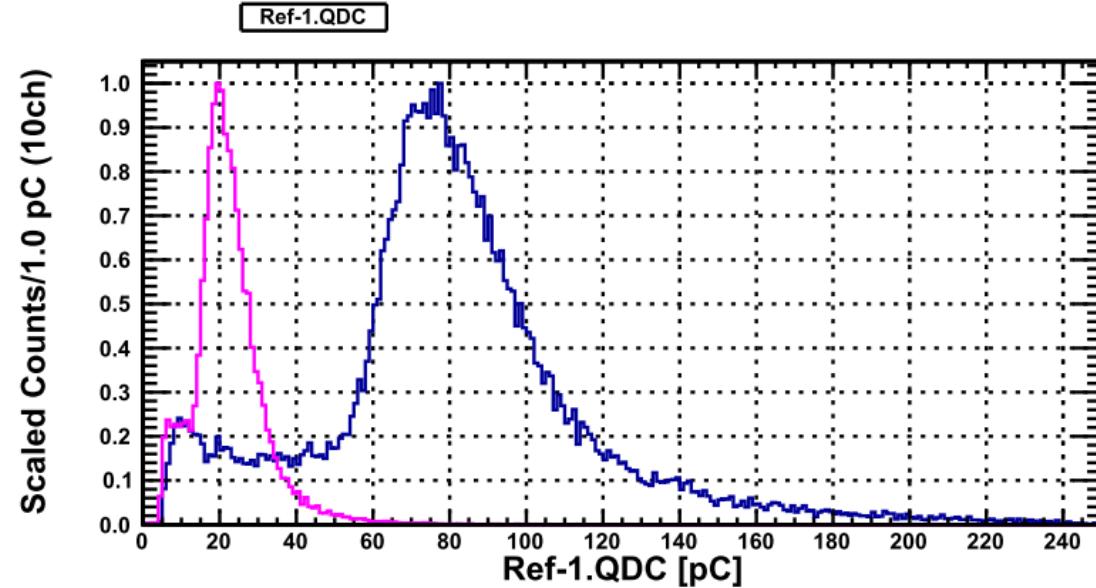
# ToF-1 QDC



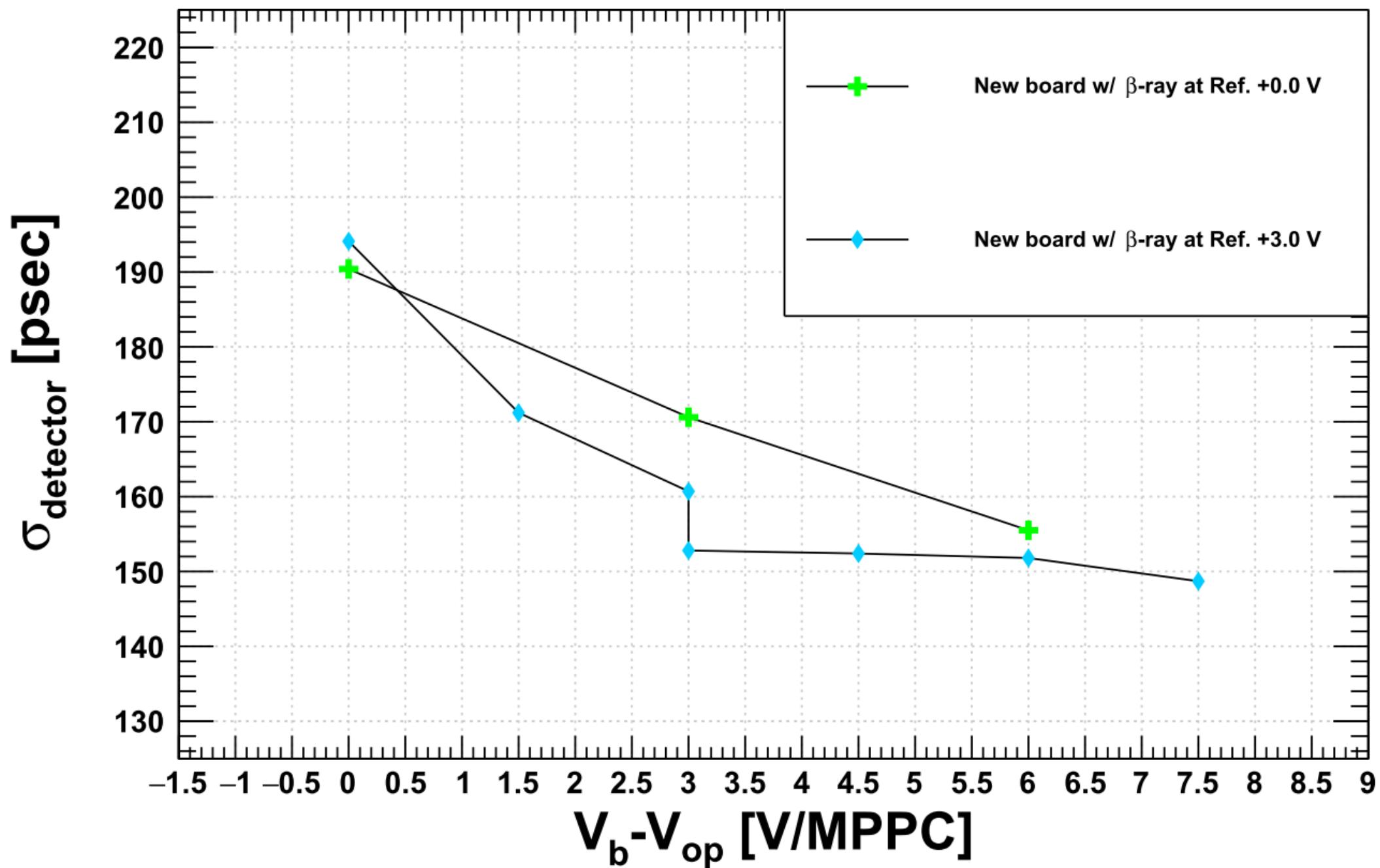
# QDC peak position vs. Nof Bins

QDC Peak [pC]

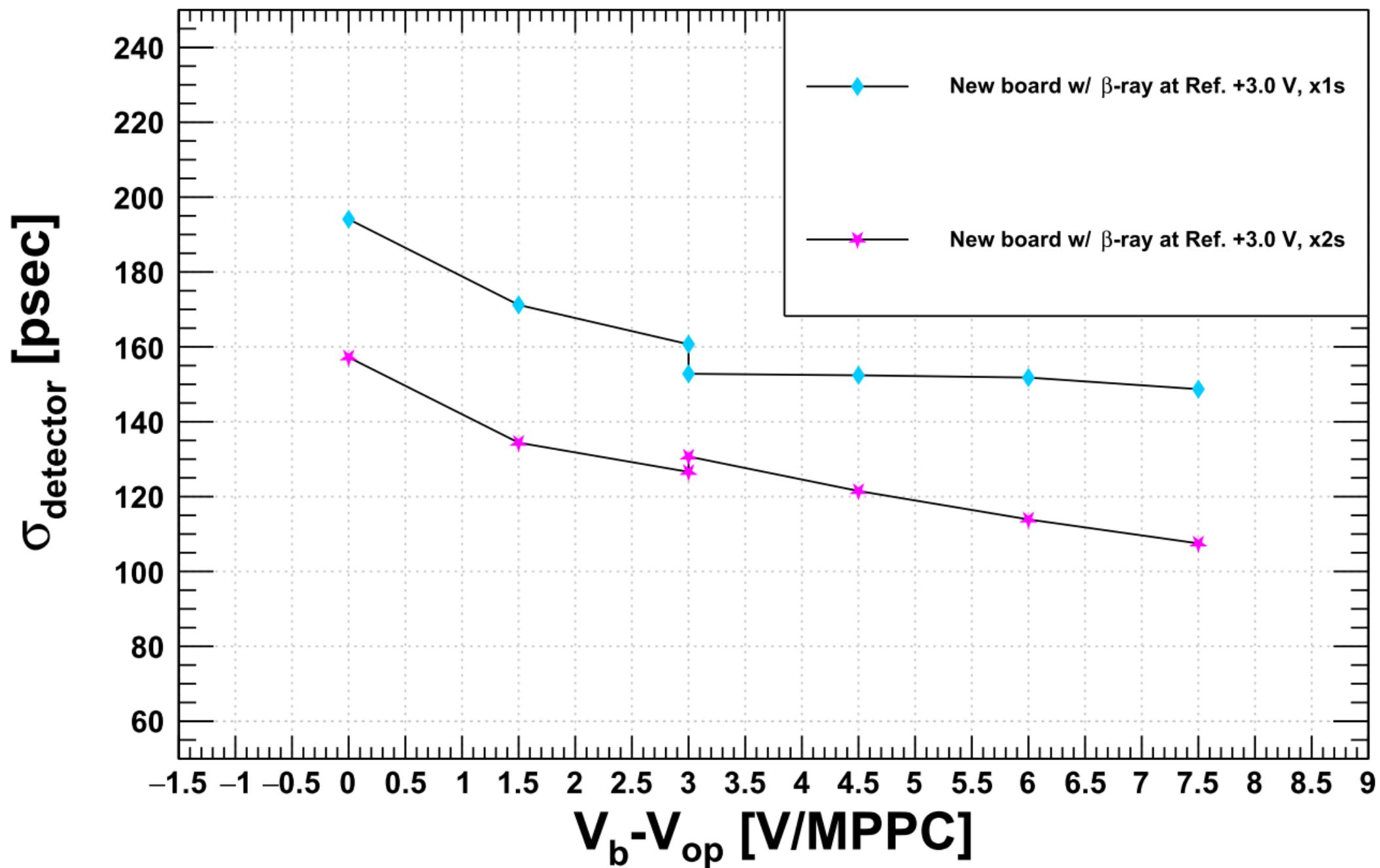




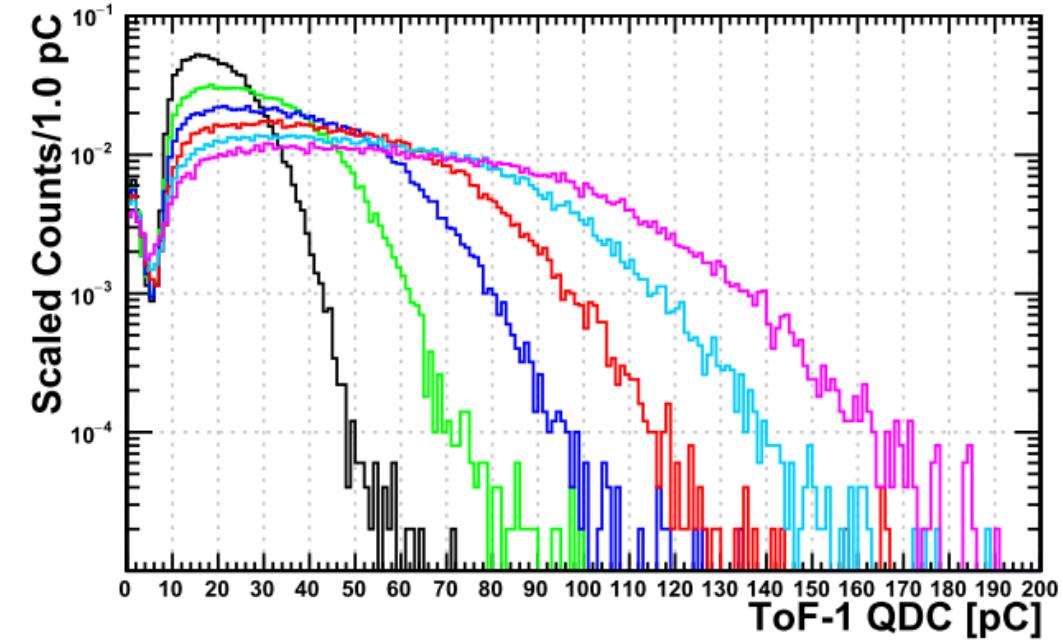
# $V_b$ dependence



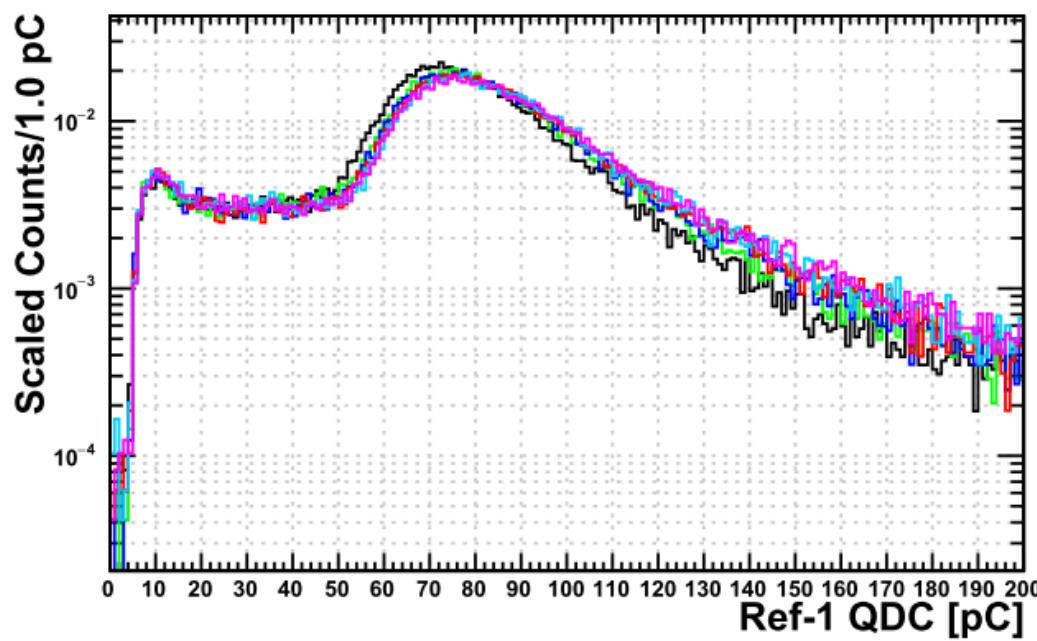
# $V_b$ dependence



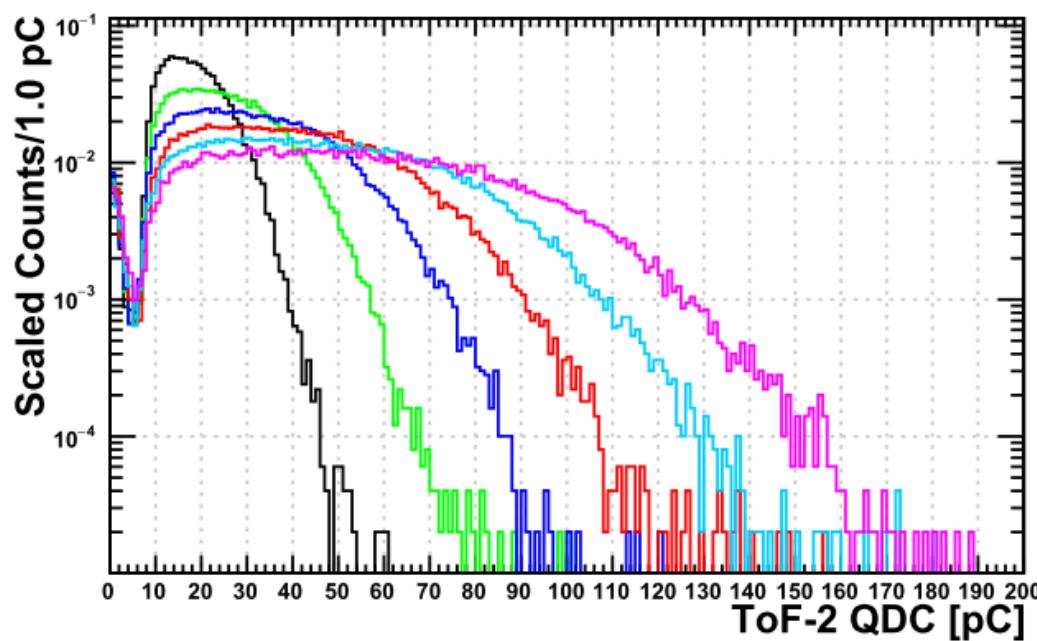
ToF-1 QDC



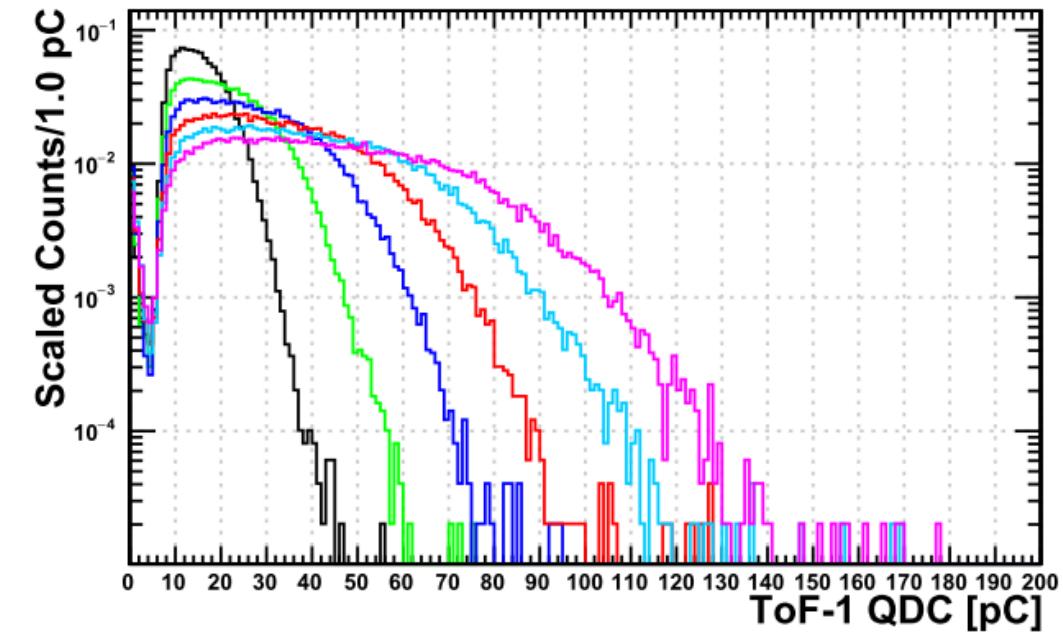
Ref-1 QDC



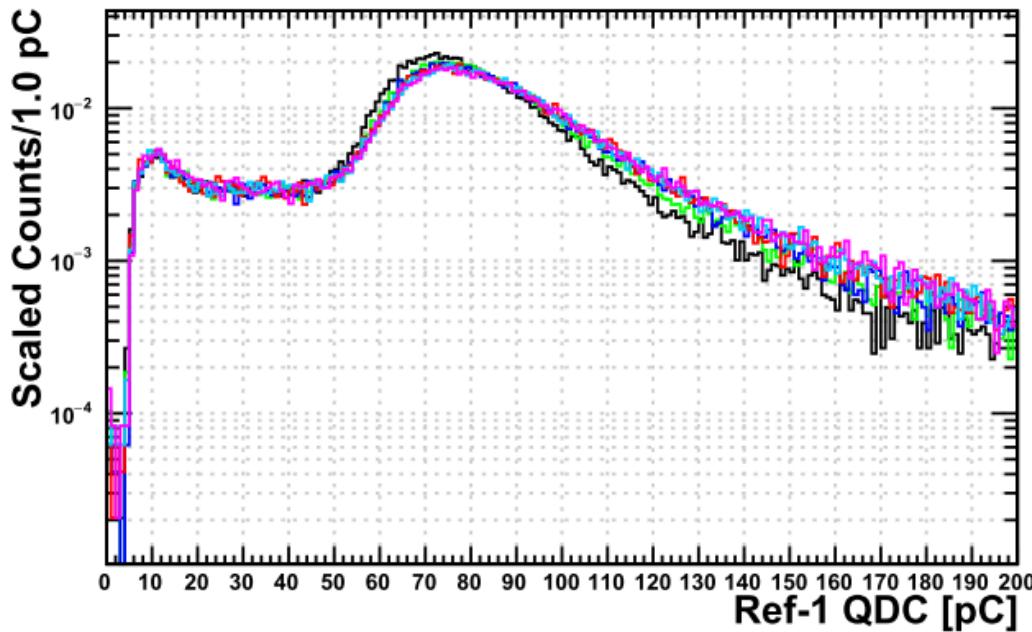
ToF-2 QDC



ToF-1 QDC



Ref-1 QDC



ToF-2 QDC

