

Analysis Progress

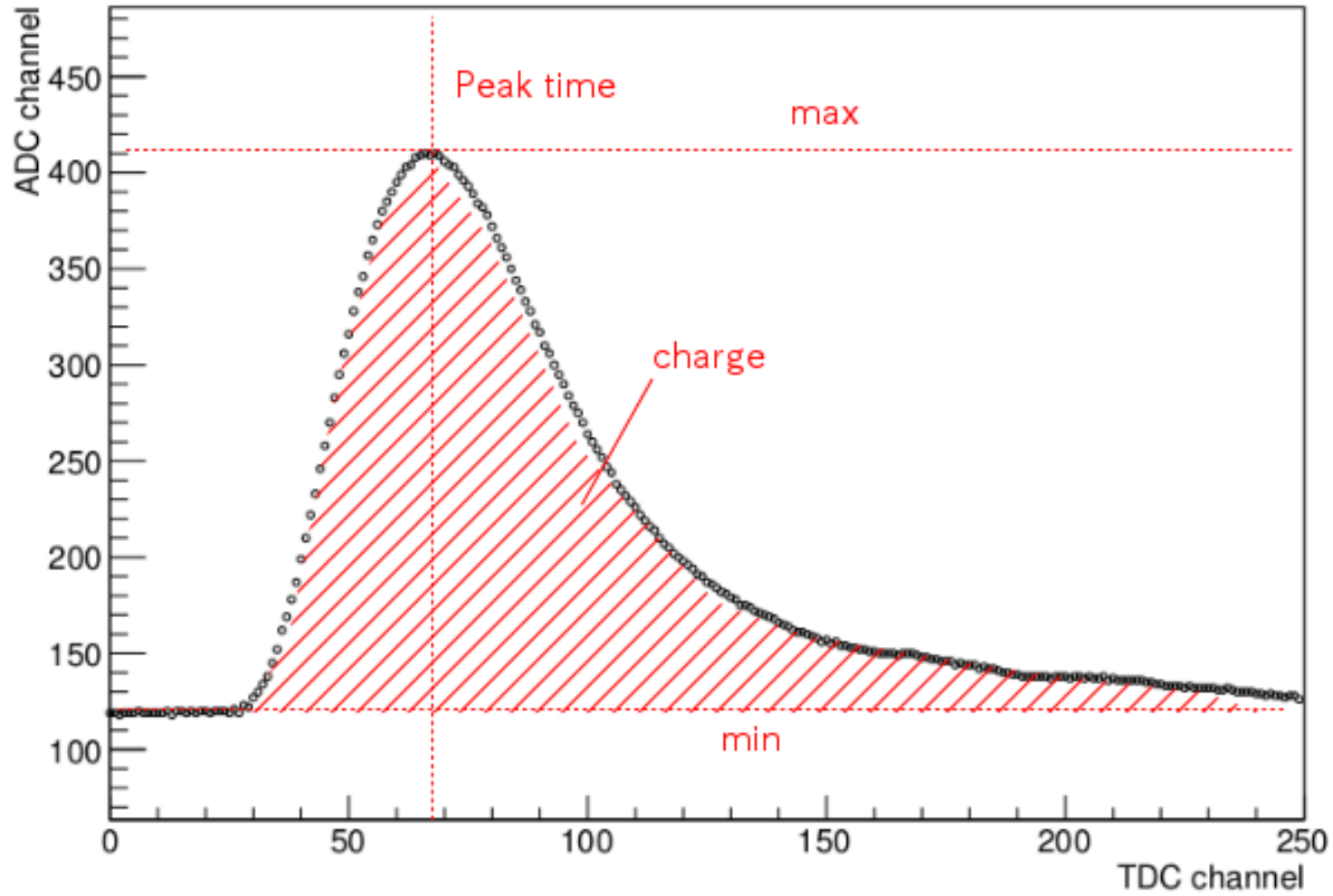
E36 CsI Calibration Using cosmic muons

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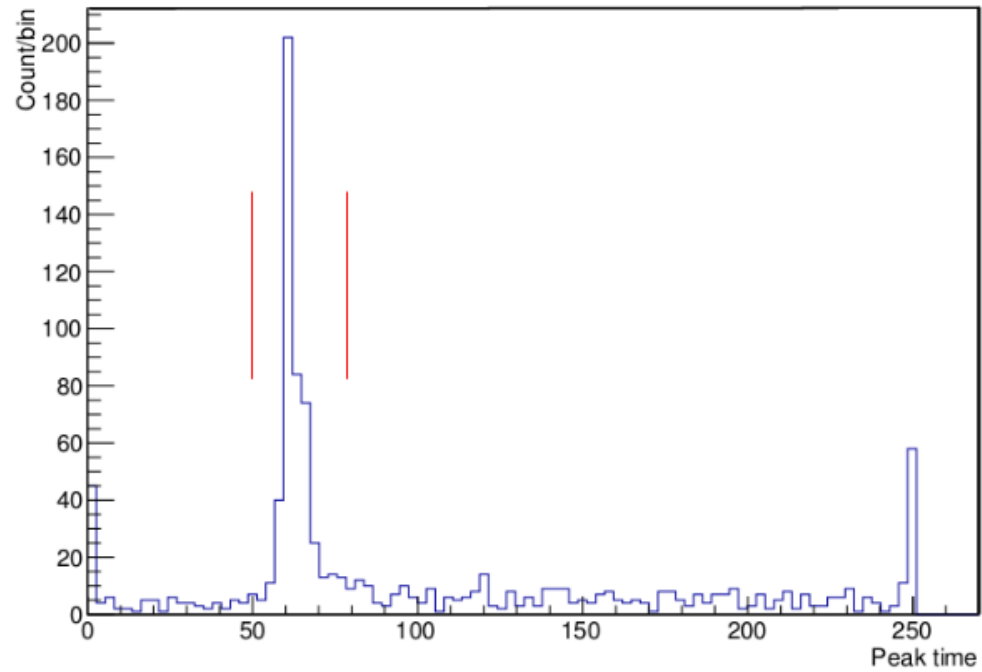
2016.01.29

Typical Waveform

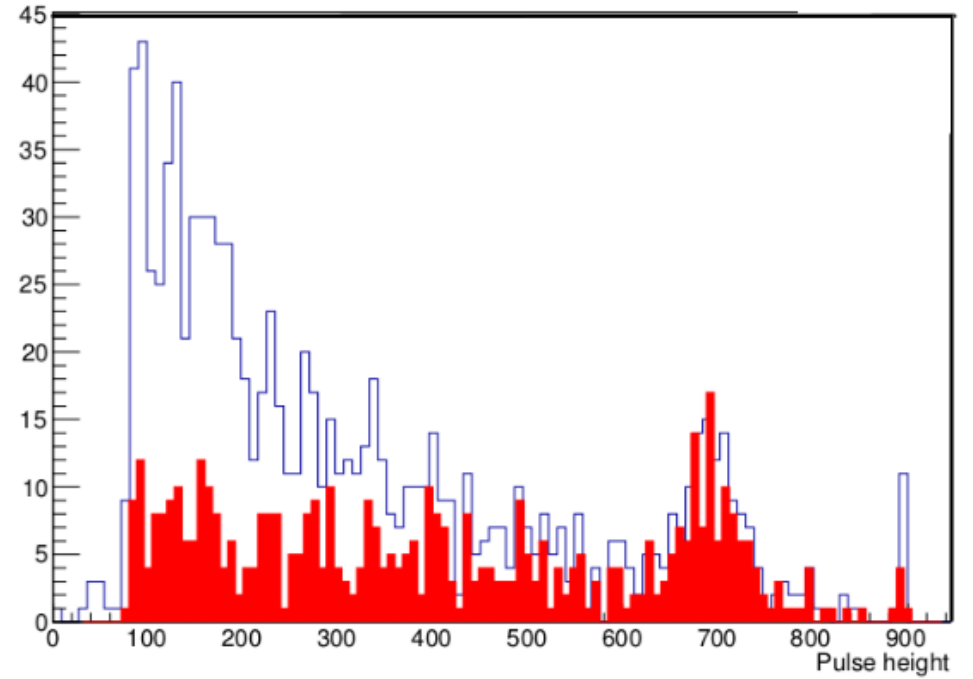


Waveform Properties

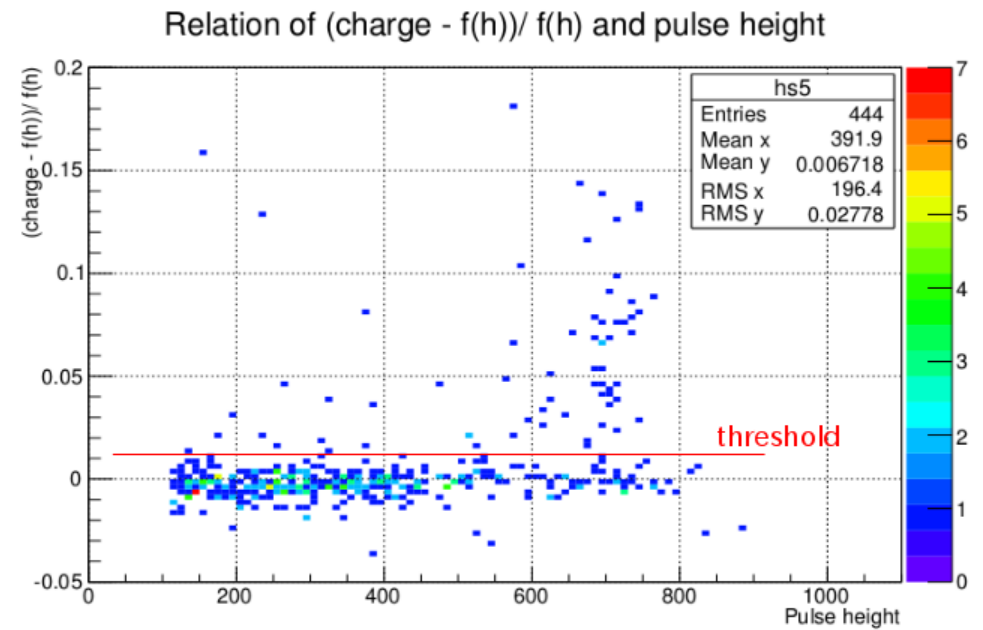
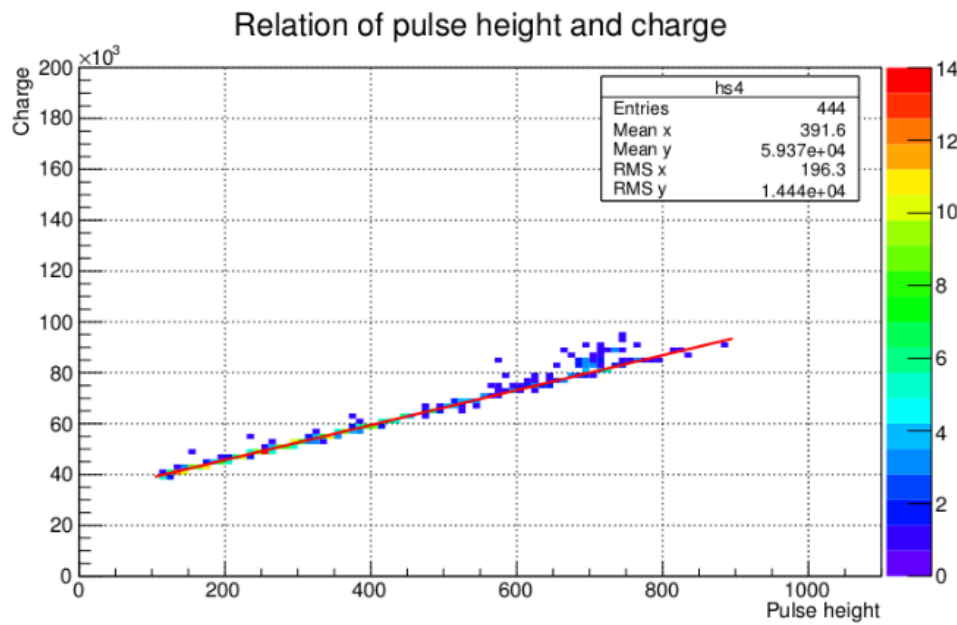
Peak time distribution



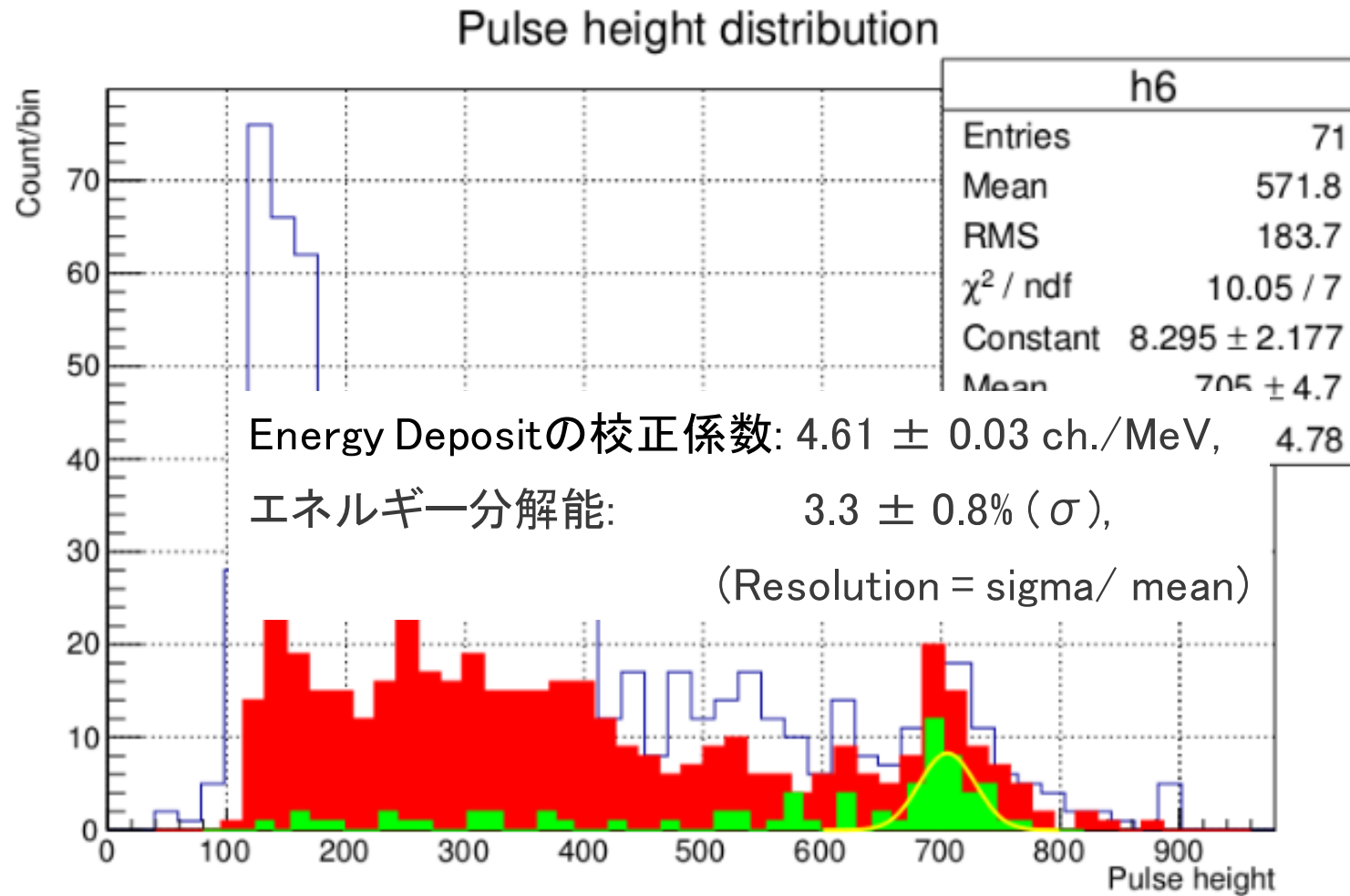
Pulse height distribution



Deviation from linearity relation



Deviation from linearity relation

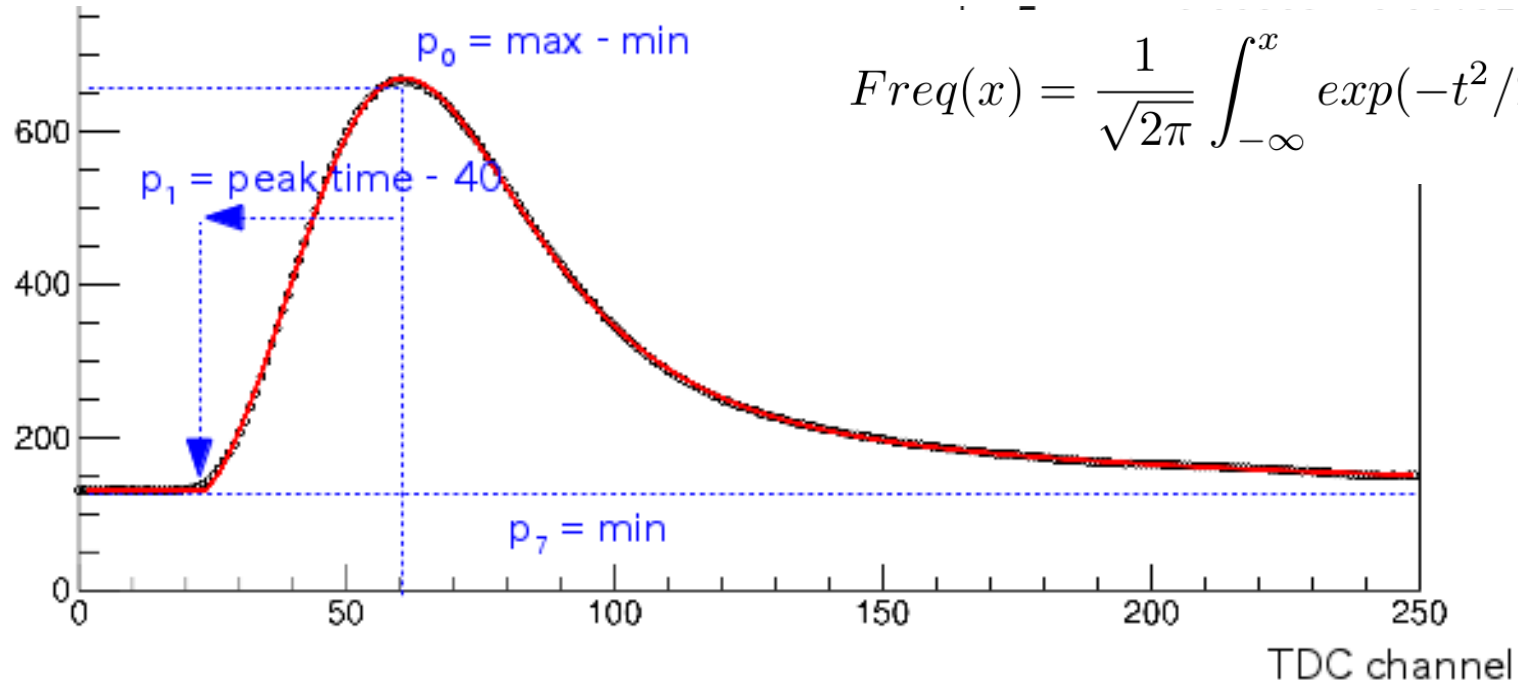


Waveform Model

$$Model(x) = p_0 Freq \left[\frac{x - p_1 - p_2}{p_3} \right] \frac{1}{f(x_0)} \times$$

$$\left(\frac{x - p_1}{p_4} \exp \left[1 - \frac{x - p_1}{p_4} \right] + p_5 \frac{x - p_1}{p_4 + p_6} \exp \left[1 - \frac{x - p_1}{p_4 + p_6} \right] \right) (x > p_1) + p_7$$

$$f(x_0) = \frac{\epsilon \tau_1 (\epsilon \tau_1 + \tau_2)}{\epsilon \tau_1^2 + \tau_2^2} \exp \left(1 - \frac{\tau_1 (\epsilon \tau_1 + \tau_2)}{\epsilon \tau_1^2 + \tau_2^2} \right) + \frac{\tau_2 (\epsilon \tau_1 + \tau_2)}{\epsilon \tau_1^2 + \tau_2^2} \exp \left(1 - \frac{\tau_2 (\epsilon \tau_1 + \tau_2)}{\epsilon \tau_1^2 + \tau_2^2} \right)$$

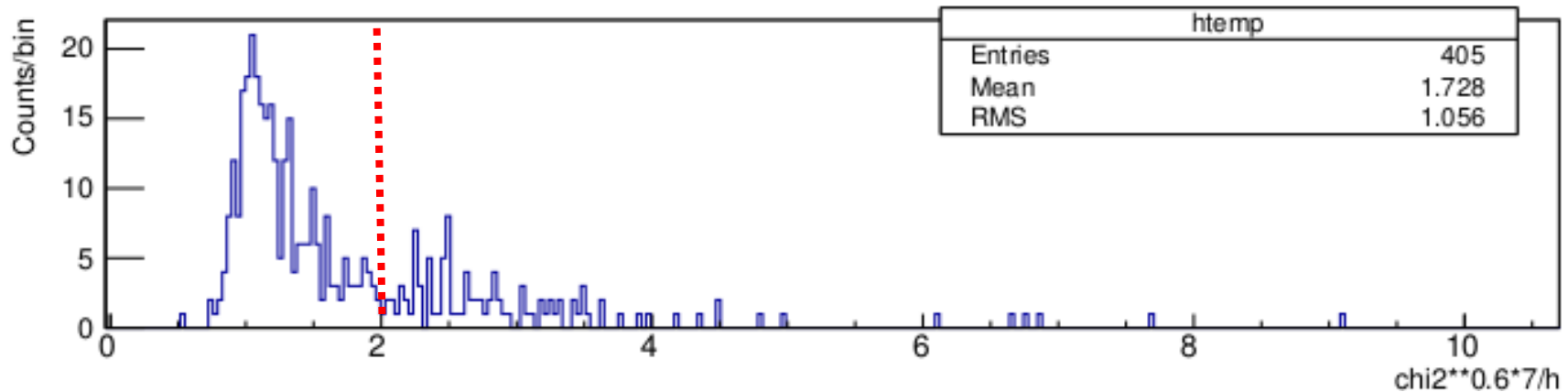
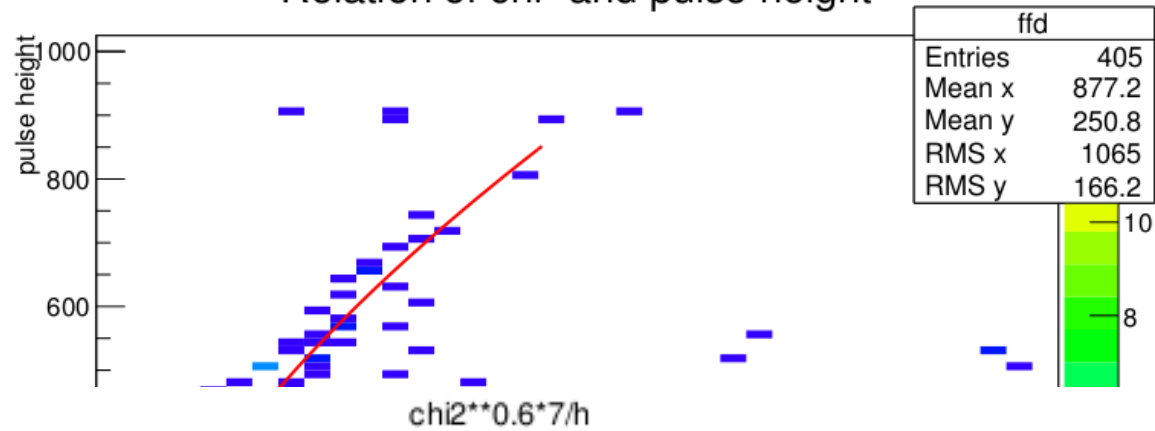


$$Freq(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^x \exp(-t^2/2) dt$$

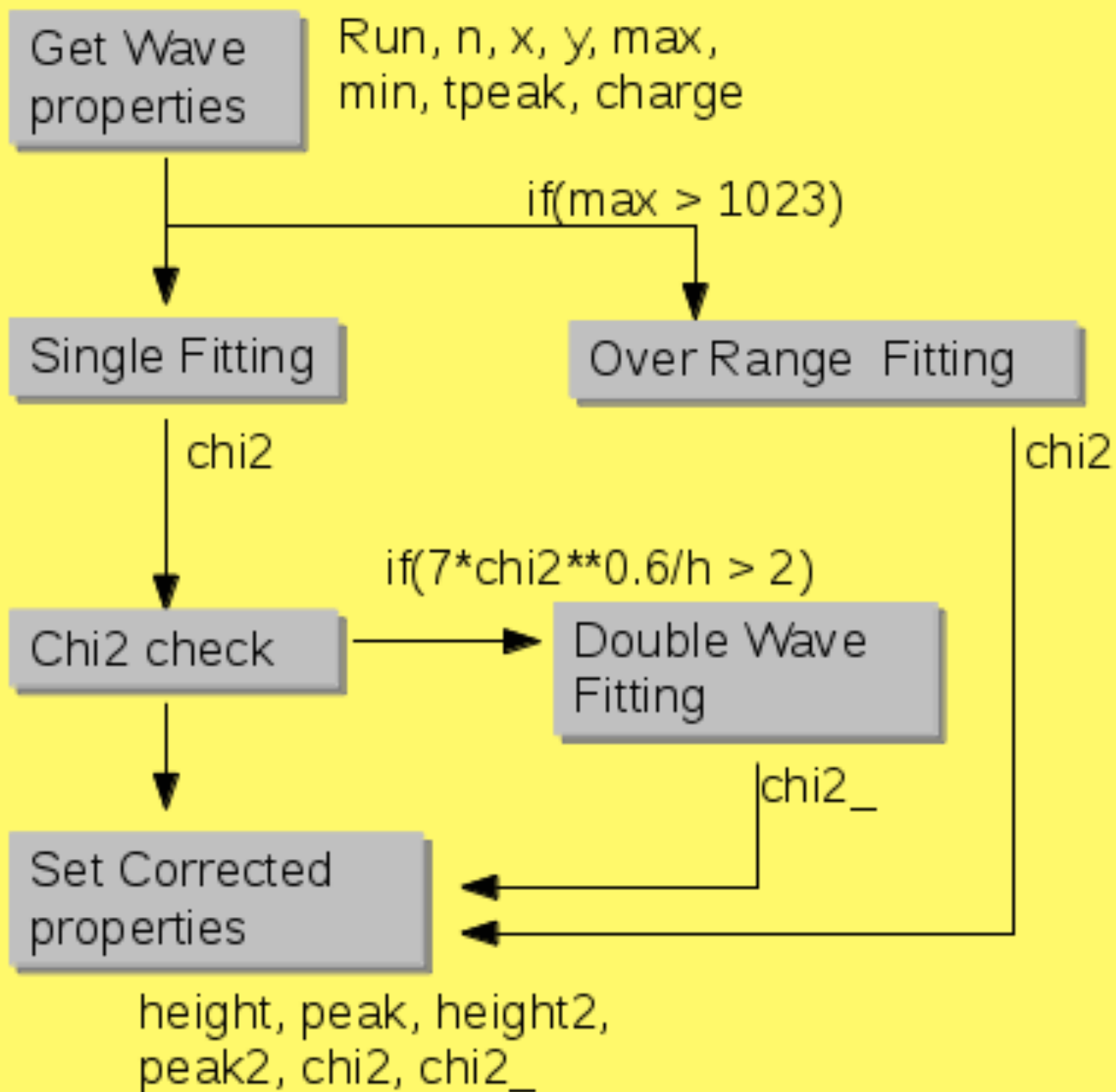
Separation by Chi²

$$\chi^2 = \sum_{i=0}^{250} \frac{(f(x_i : a_1, a_2, a_3 \dots) - y(x_i))^2}{\sigma_i^2}$$

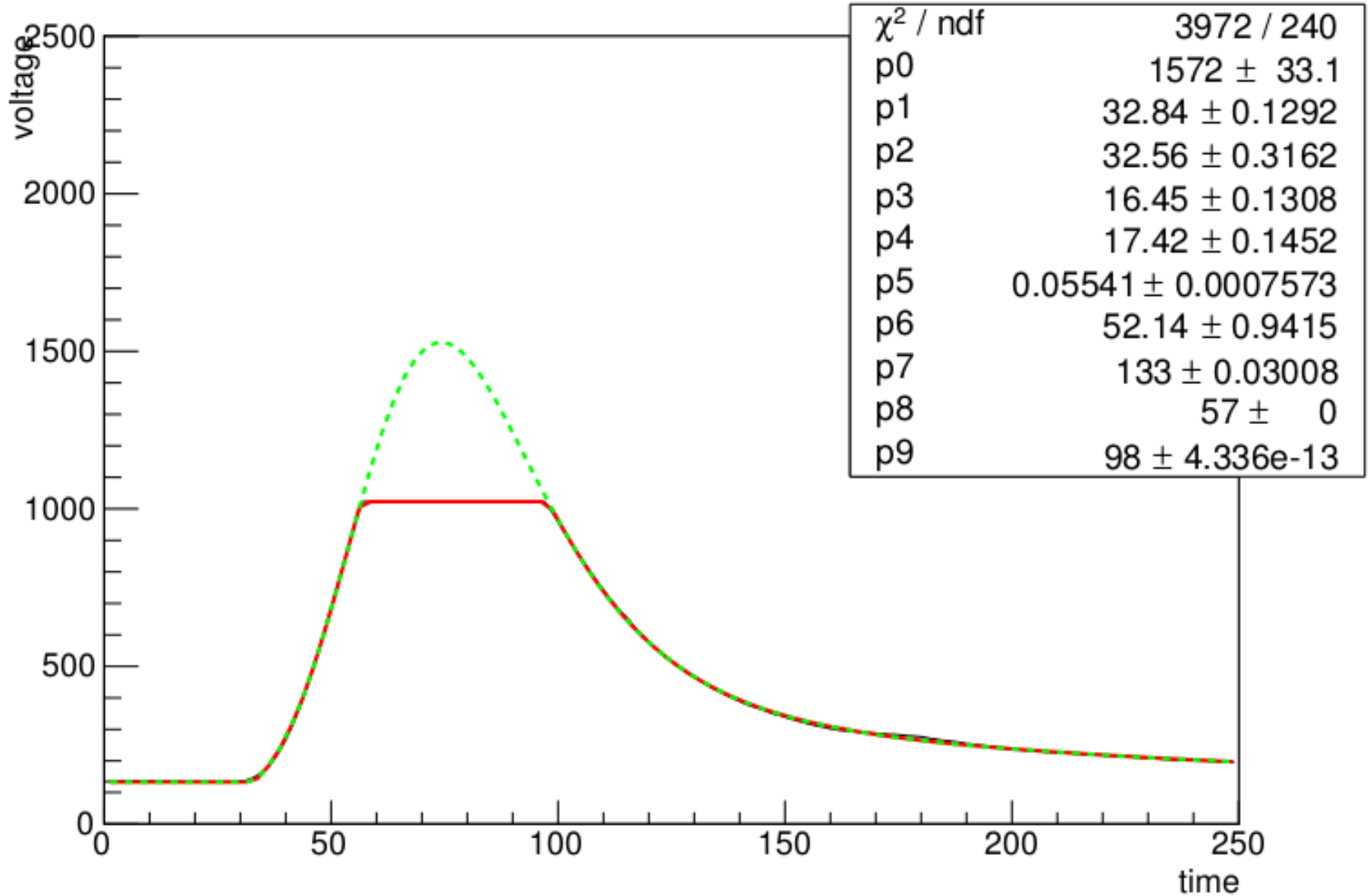
Relation of chi² and pulse height



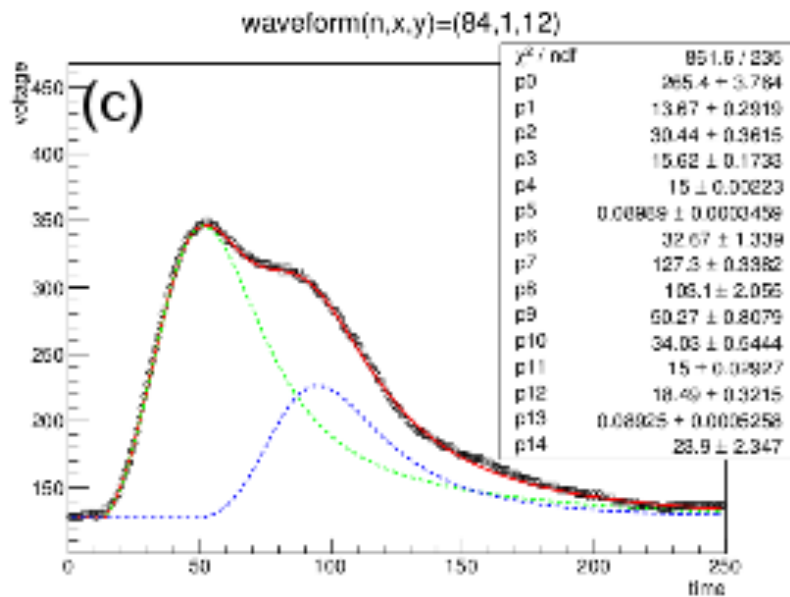
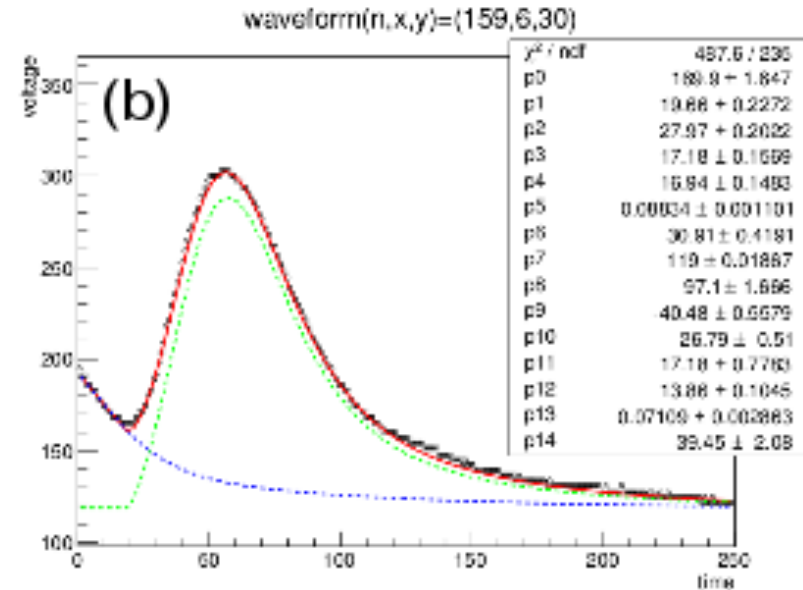
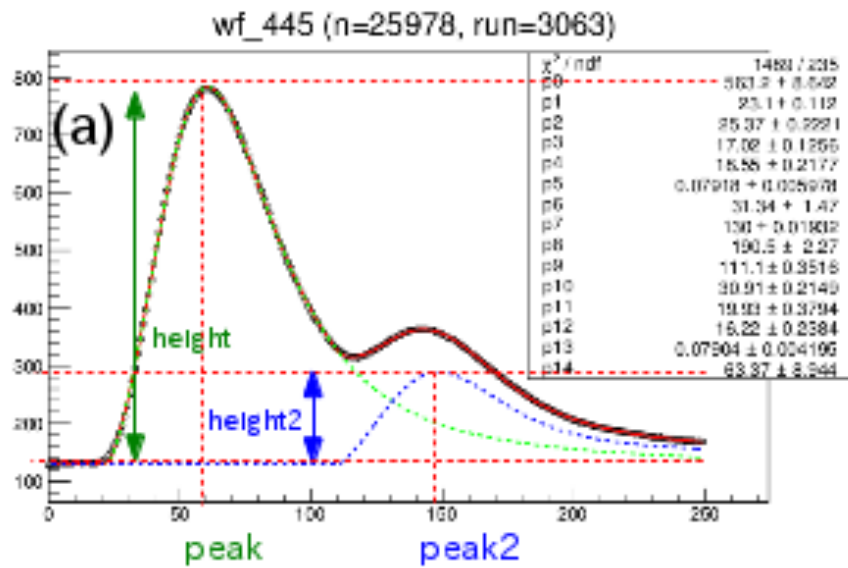
Fitting algorithm



Correction for Over range wave

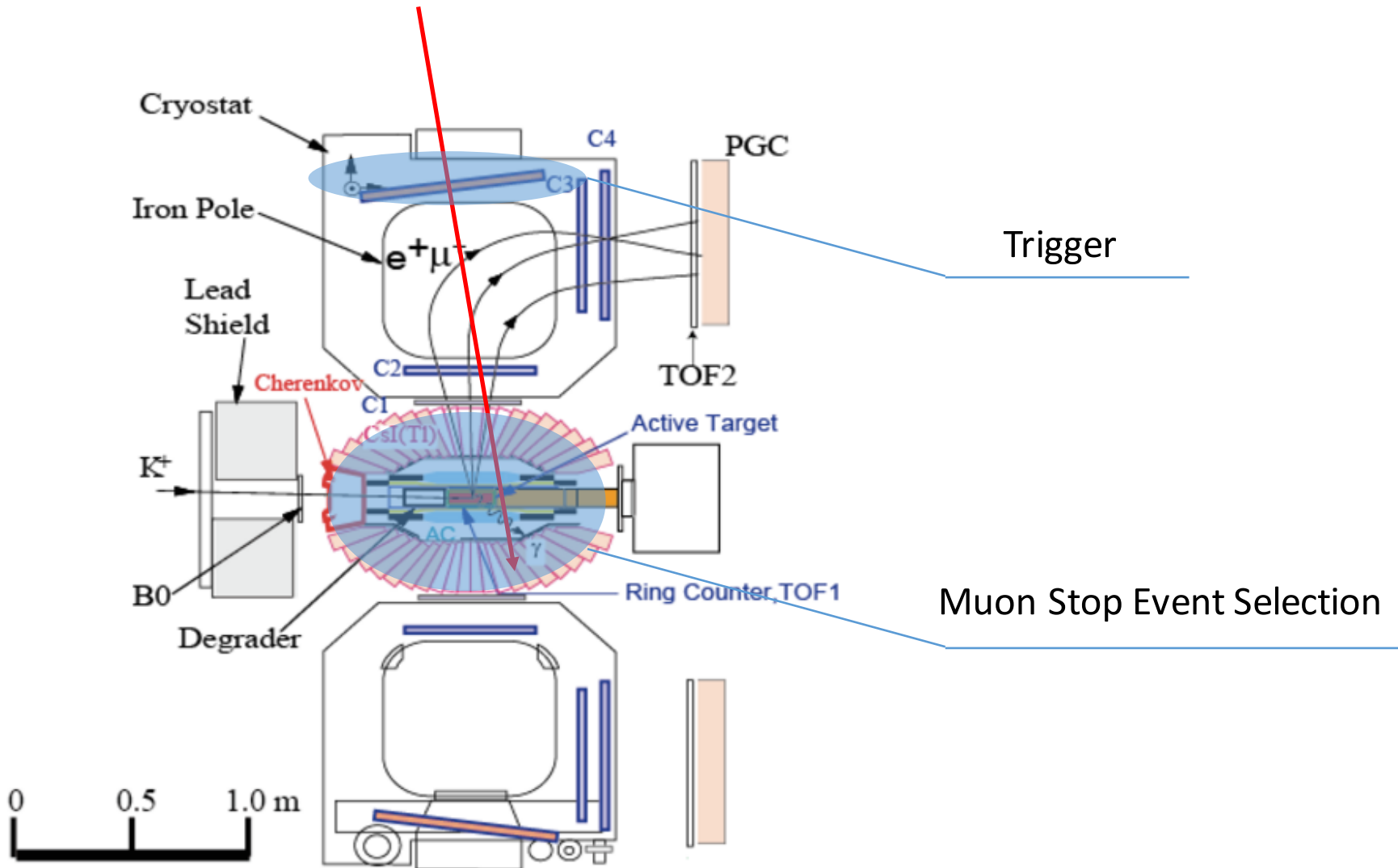


Correction for Double pulse wave



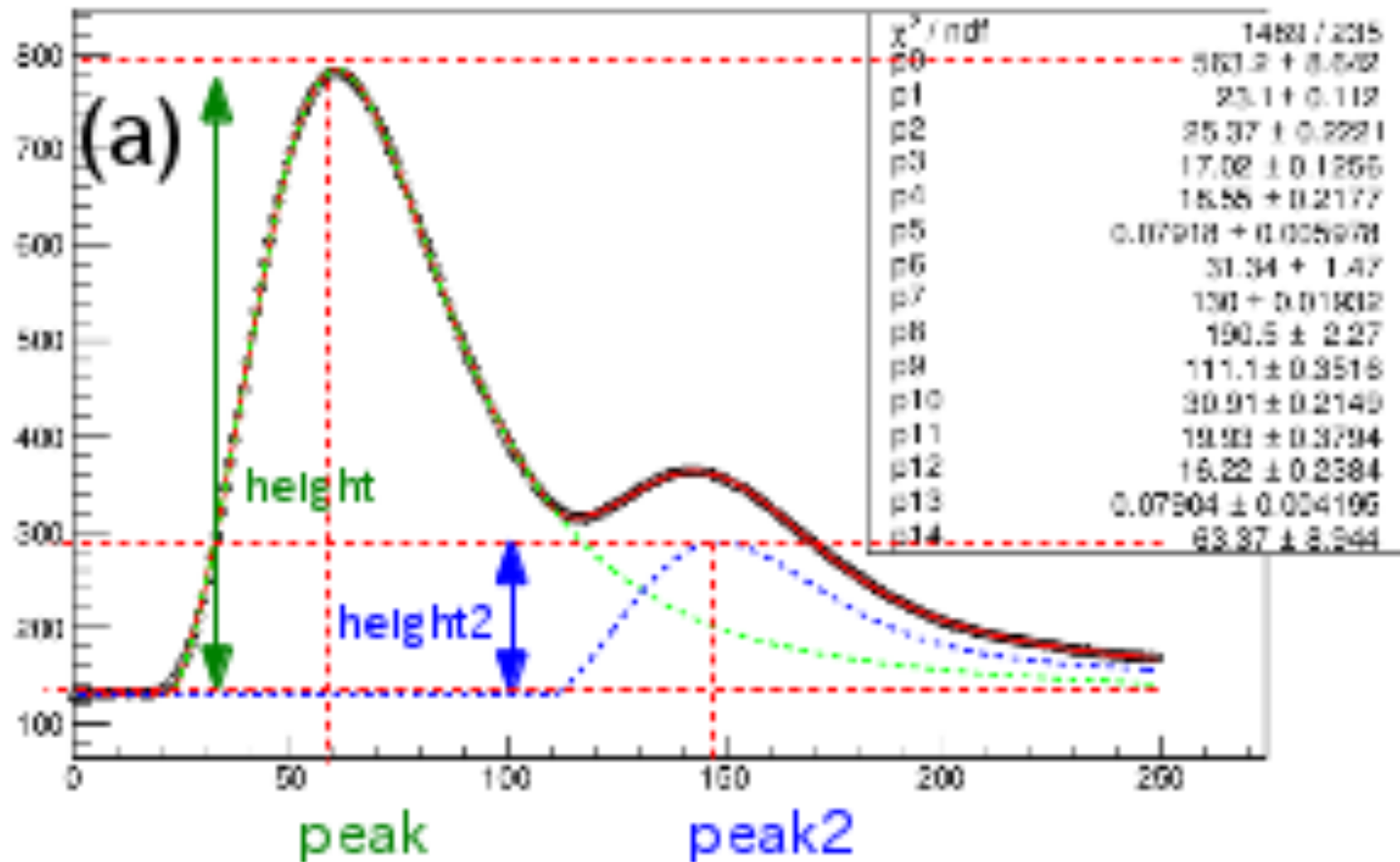
Calibration of deposit energy from e^+

Setup



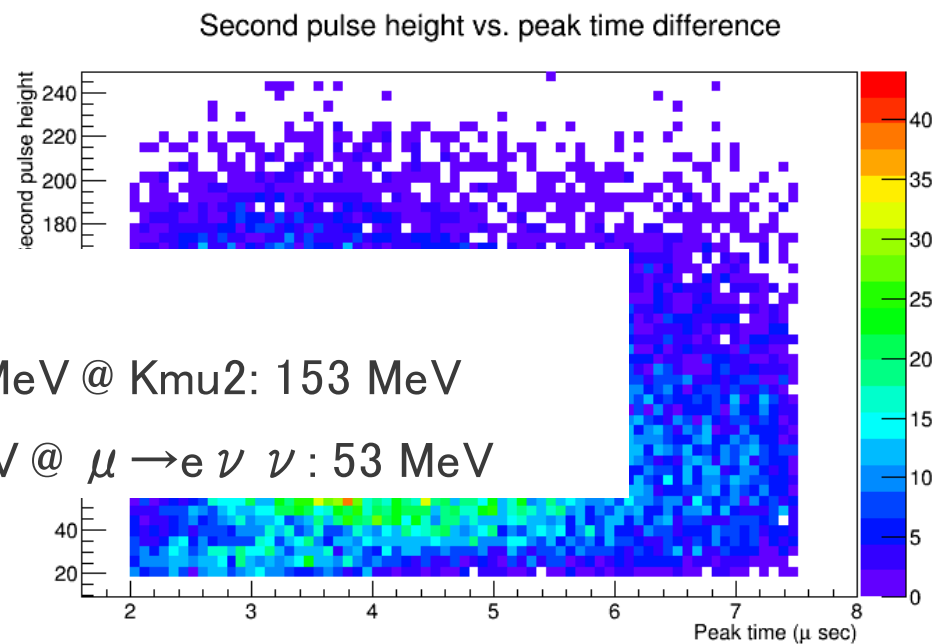
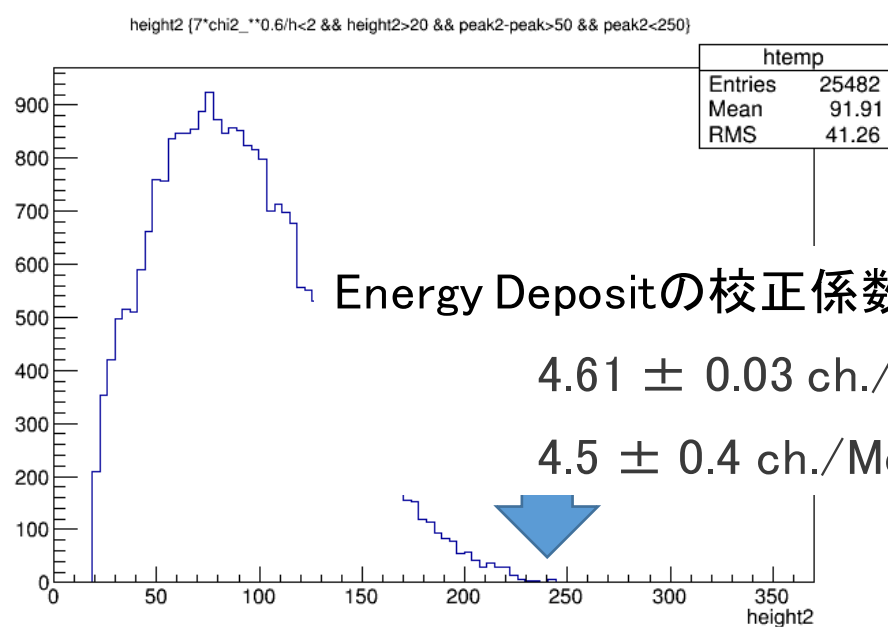
Calibration of deposit energy from e^+

Analysis: Separation second pulse



Calibration of deposit energy from e^+

Analysis: Second pulse properties

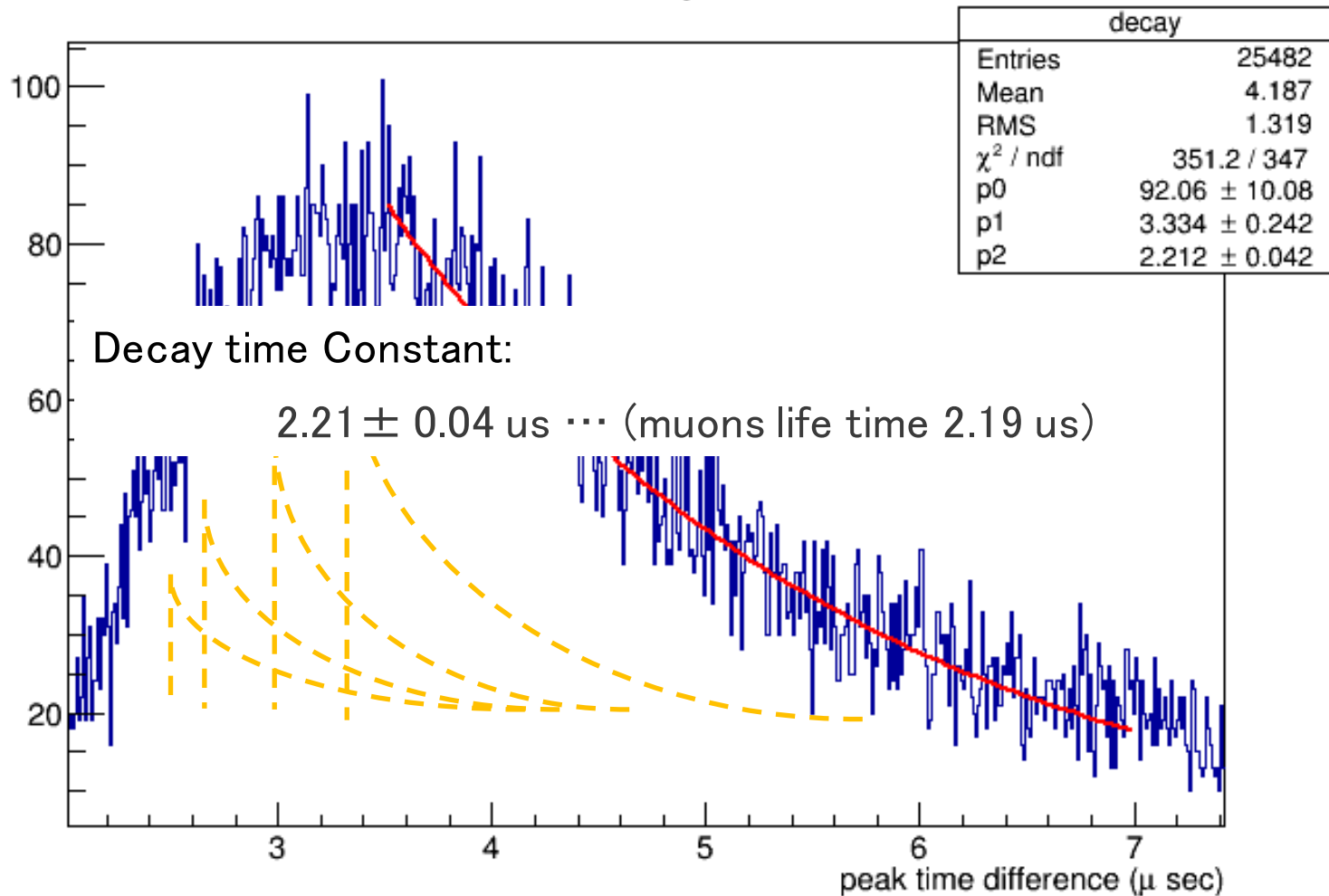


しかし理論曲線 $F(x) = 3x^2 + 2x^3$ に一致しない

Calibration of deposit energy from e^+

Analysis: Difference peak

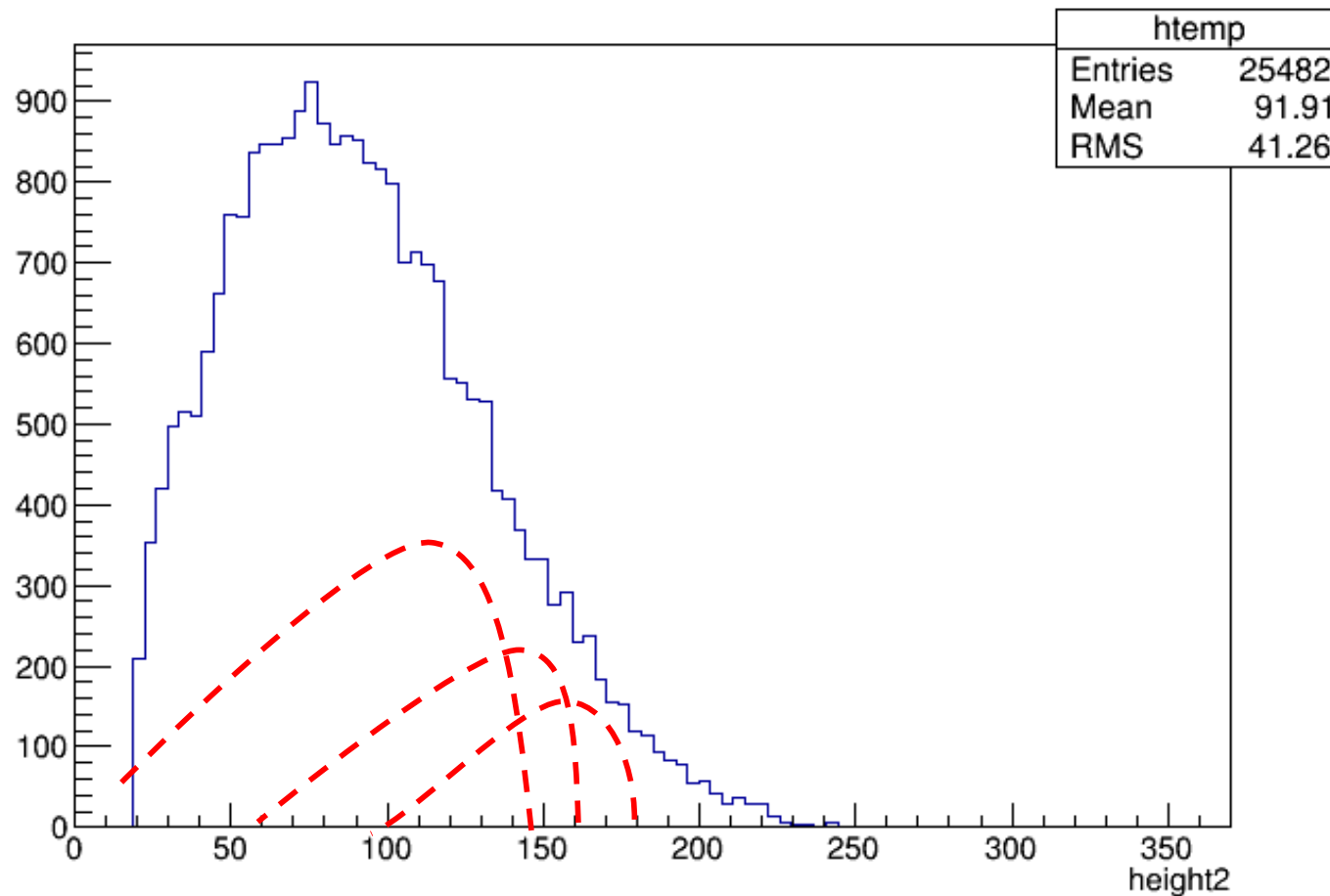
decay



Calibration of deposit energy from e^+

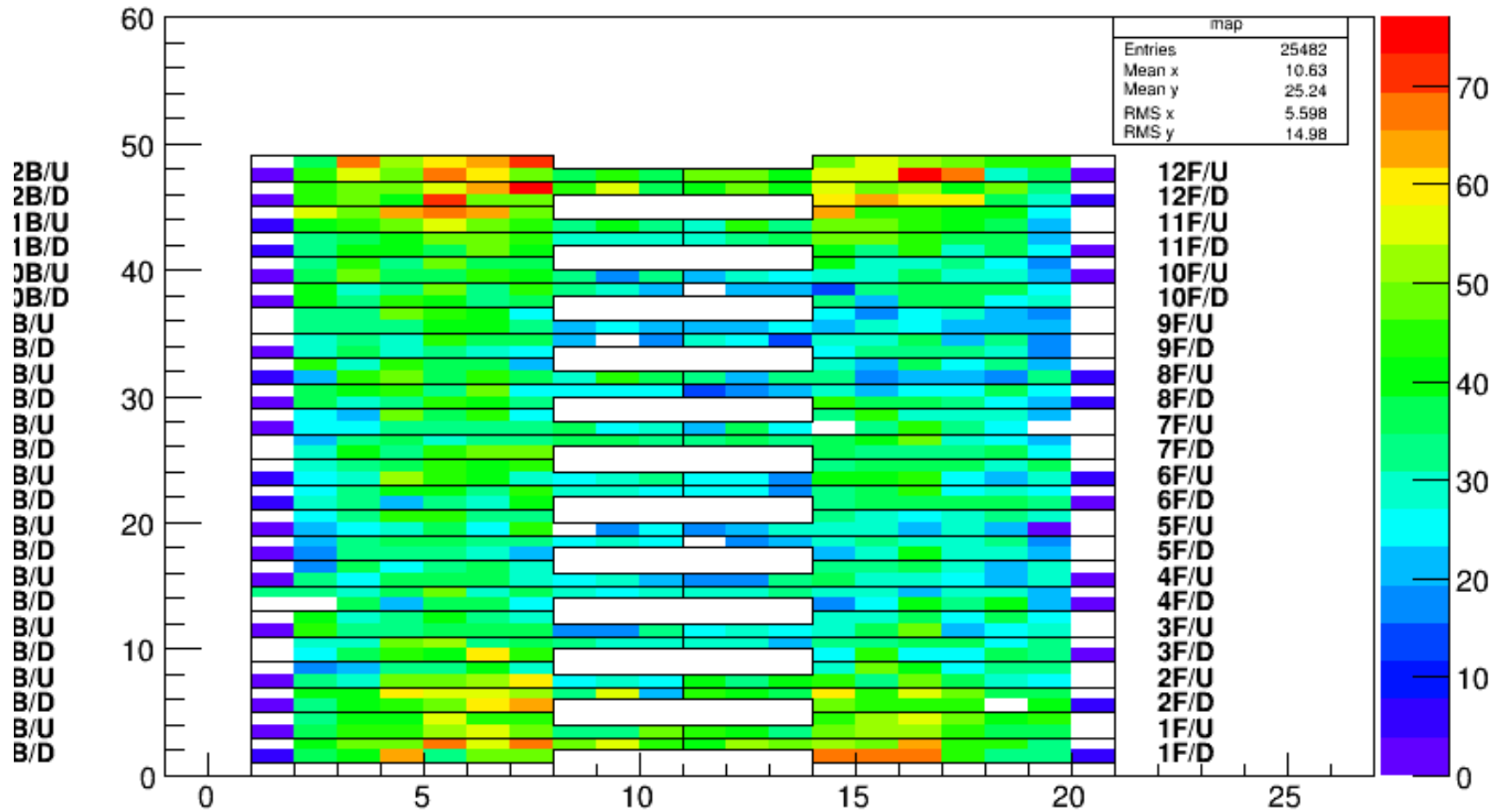
Analysis: Second pulse properties

height2 {7*chi2_**0.6/h<2 && height2>20 && peak2-peak>50 && peak2<250}



Calibration of deposit energy from e^+

map



Calibration of deposit energy from e^+

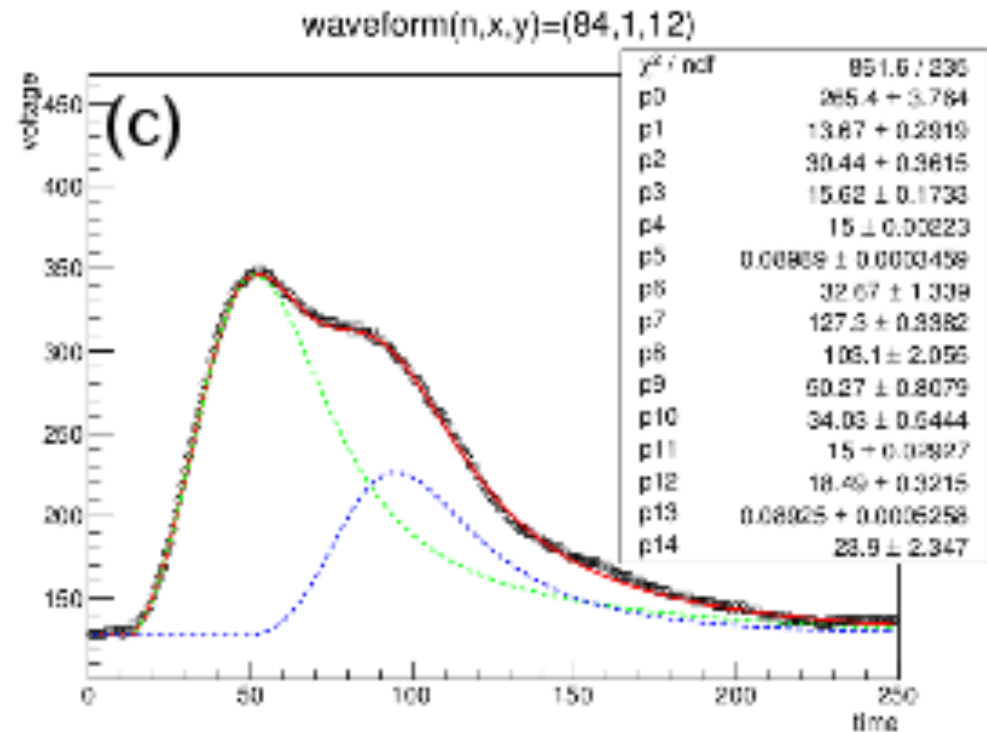
Now Analysis

きわどい波形を含んだデータ解析

状況:

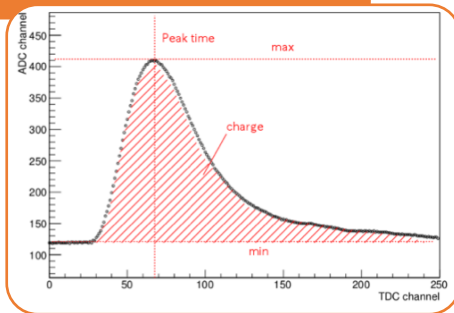
2016.01.15 txt data >> root file
Profile & TGraph save
バグ修復(メモリクラッシュ)

2016.01.25~ TGraph Fitting
現在進行中 ...
課題点: 計算時間が長い
(1/25 - 28) 16%/4日



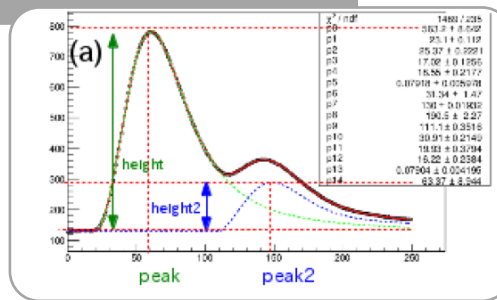
データ解析アルゴリズム

テキストファイルから
ROOTファイルへ変換



波形プロパティGet
run, n, x, y, M
max, min, h, tpeak, charge
TGraph

TGraph 波形フィッティング



フィット補正プロパティGet
height, peak
height2, peak2
Fit par[18]
chi2

フィット波形プロパティの画像化

