

# GEM detector Meeting

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SBU Group

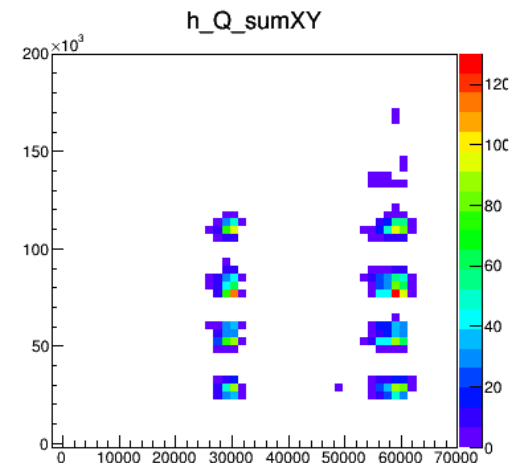
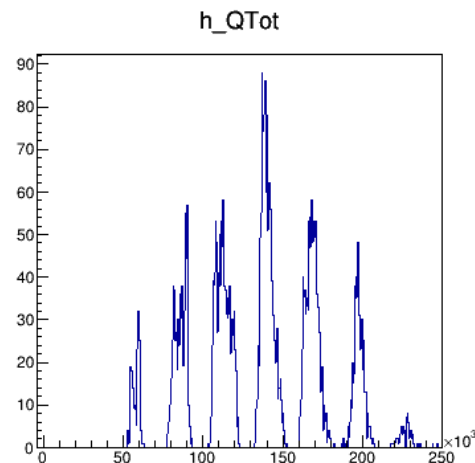
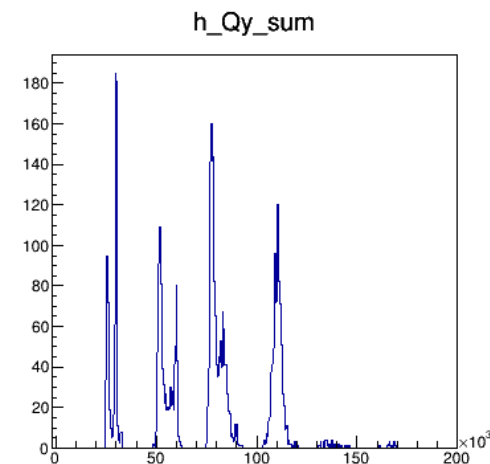
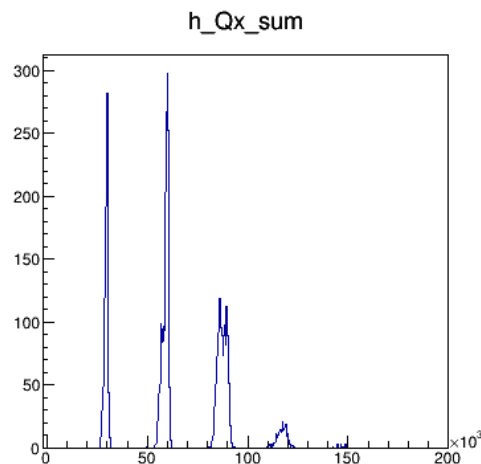
25 May 2018

# From Last presentation

- Event Selection: Event sample –  $V[i, i=1-27]$
- Events are selected if  $V[i+5]-V[i]<10$  &&  $\text{Integral}(1,24)<55000$  (typical no-pulse integral is  $\sim 60000$ )

Typical number of pulse per event  $\sim 6$

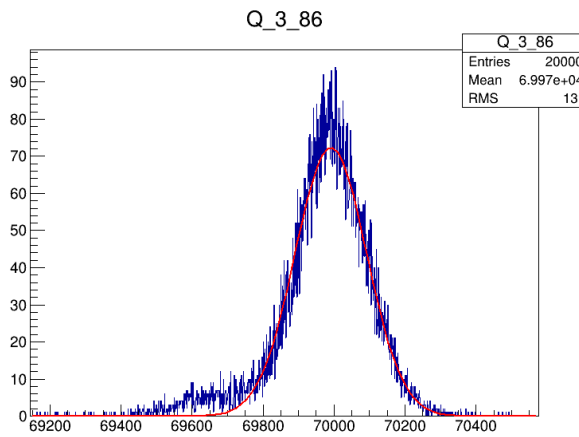
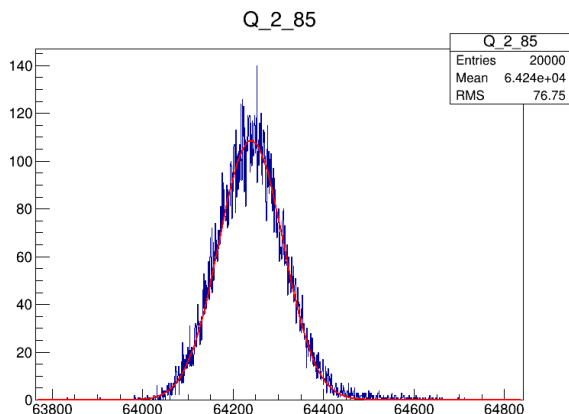
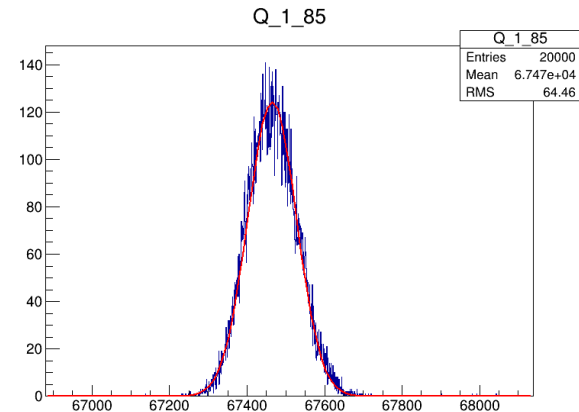
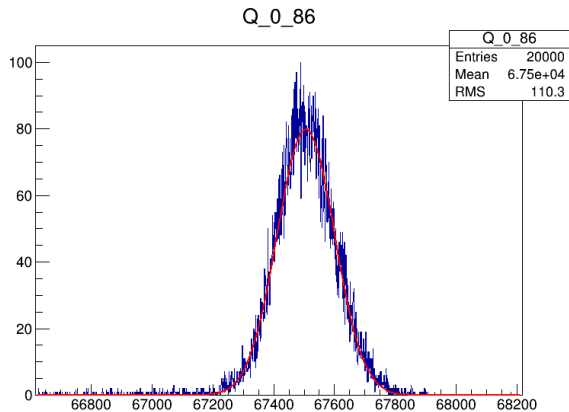
$\Rightarrow$  Missing many good pulses



# Modified the selection criterion

$V_{ij}$  is the  $i$ -th read-out value for  $j$ -th strip  $P_j = \frac{1}{26} \sum_{i=1}^{26} V_{ij}$

Using 20000 events, the resulting histograms are fitted with Gaussian and centroid and sigma are stored  $\Rightarrow$  Pedestal



# Modified selection criterion

- Pulse is selected if  $\text{Integral}(1,26) < (\text{centroid} - 5 * \text{sigma})$

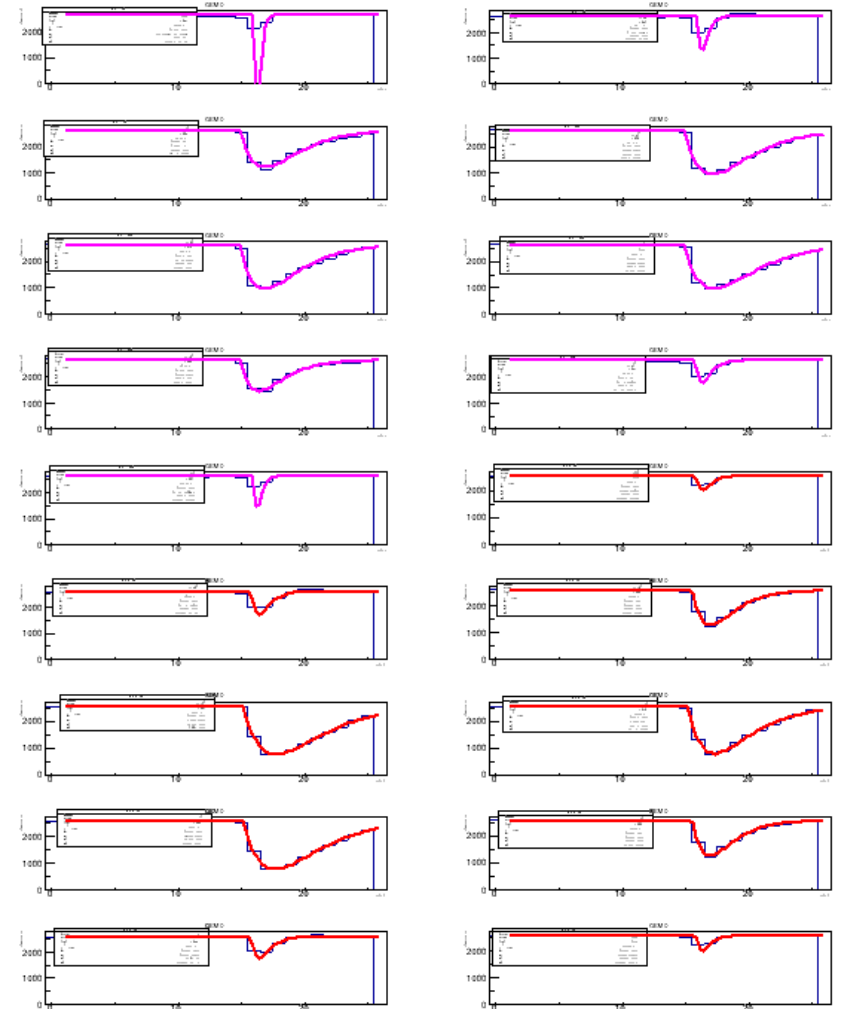
- Magenta – X    Red - Y

- Modified as

- $V = V_{off}$  for  $t \leq t_0$

- $V = V_{off} - V_0 \frac{t-t_0}{\tau} \text{Exp}\left[-\frac{t-t_0}{\tau}\right]$ ,  $t > t_0$

- Pulses are rejected if  $t_0 - 4 < 0$  or  $t_0 + 4 > 26$



# Common-mode-noise calculation

- Event used: Integral within  $2\sigma$  of the centroid

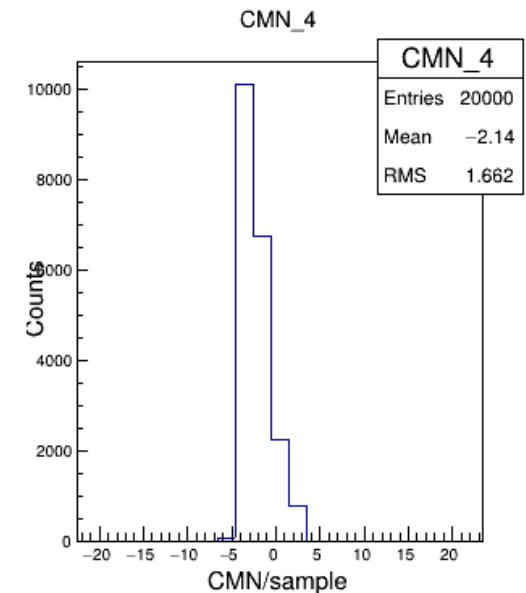
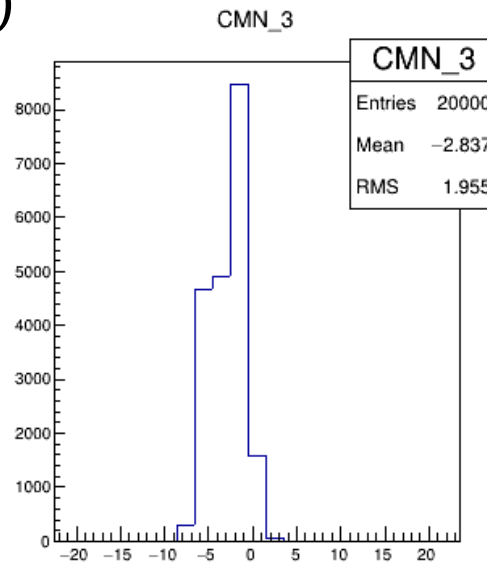
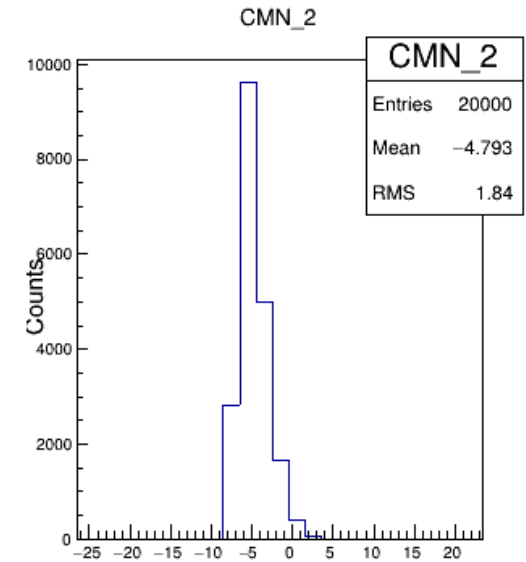
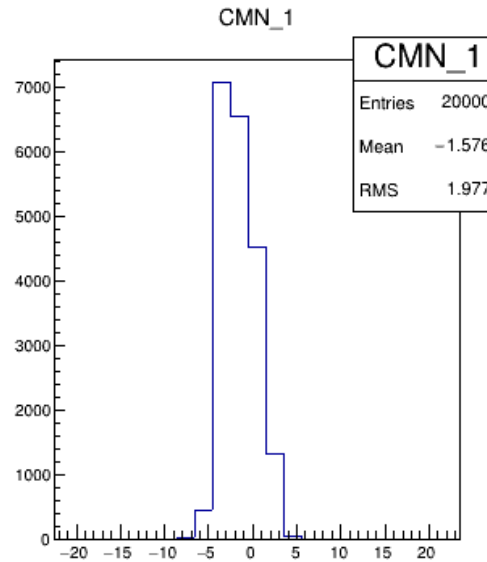
$$CMN_{(l)} = \frac{1}{MN(l)} \sum_{i=1}^{N(l)} (SV_{i(l)} - P_{i(l)})$$

l= hybrid

N= no. of strip used for CMN calculation

$P_i$  = pedestal for i-th strip

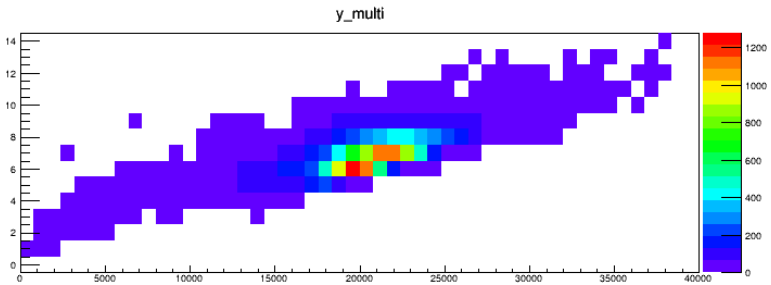
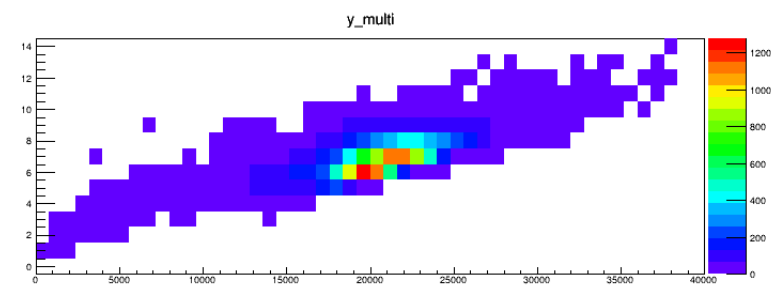
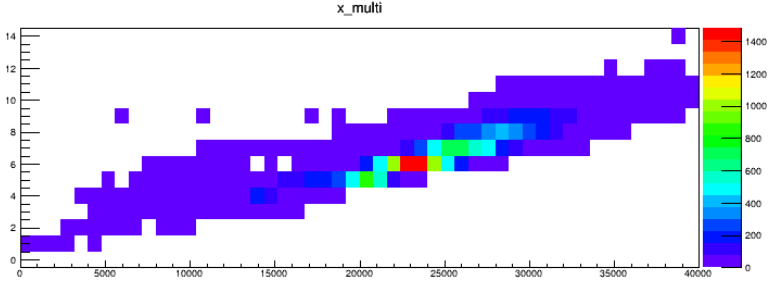
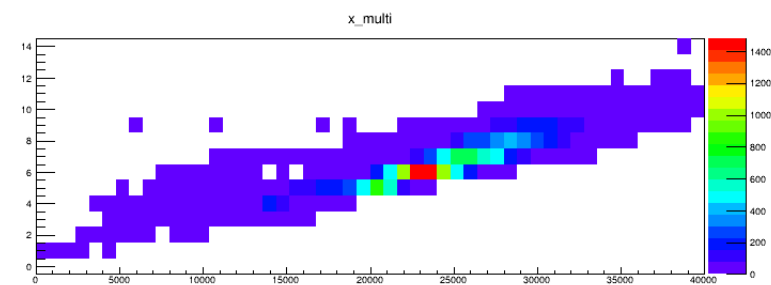
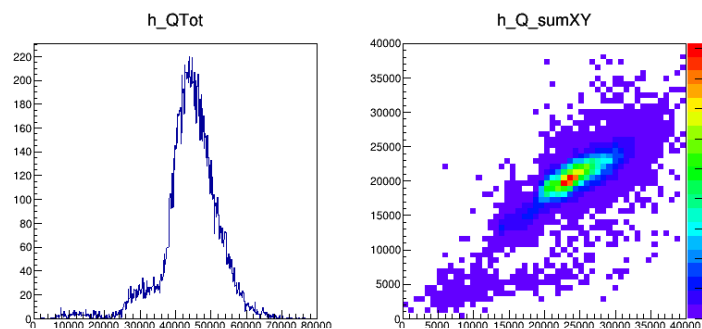
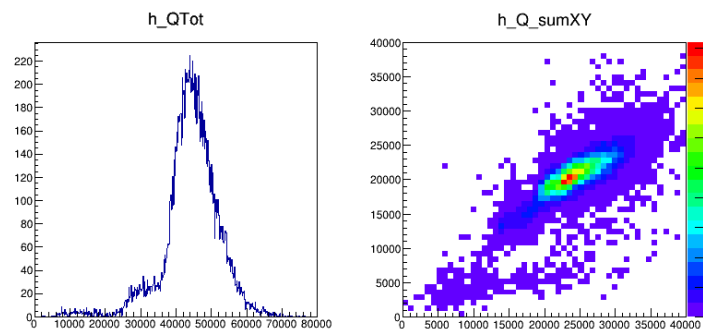
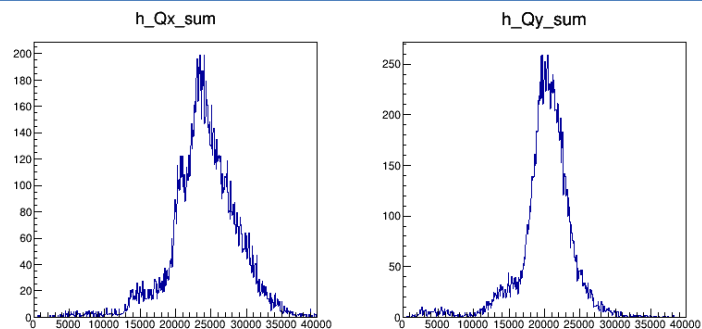
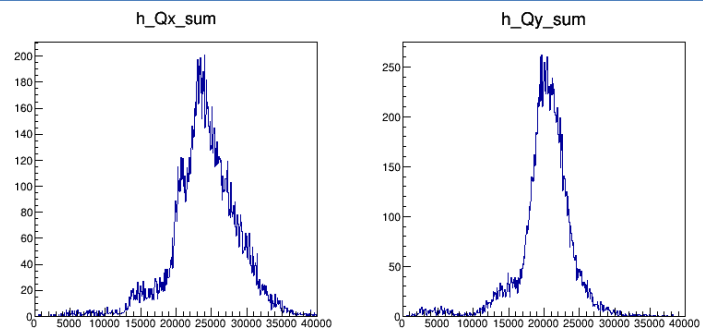
$$SV_i = \sum_{j=1}^{M=26} V_{ij}$$



# Without

## common-mode-noise correction

# With

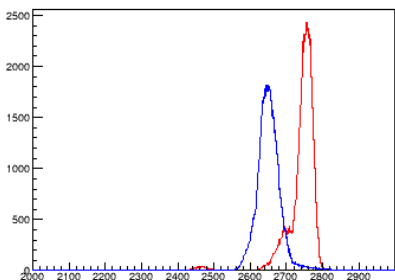


# Fitted parameters without / with common-mode-noise correction

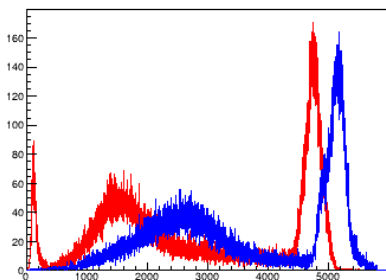
Blue – X

Red - Y

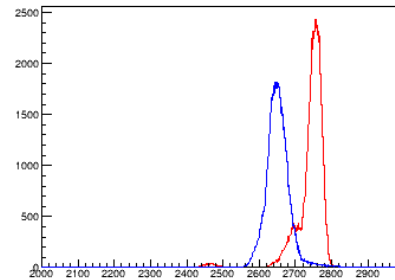
PedestalY



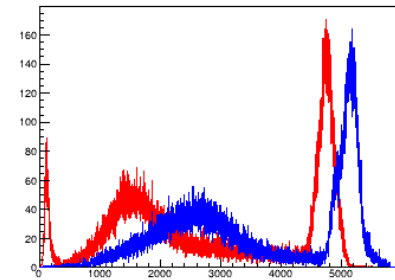
AmplitudeY



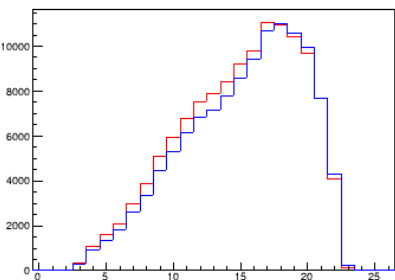
PedestalY



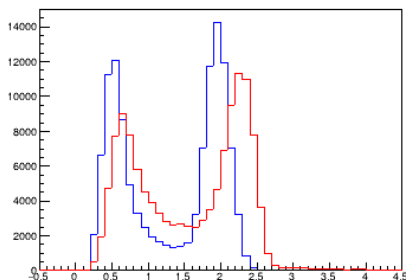
AmplitudeY



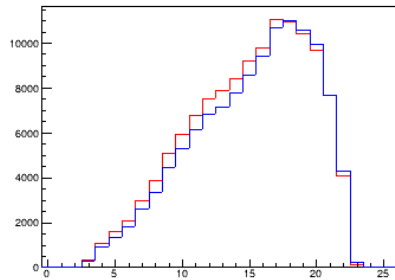
T0Y



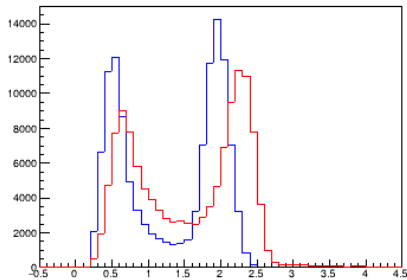
TauX



T0Y



TauX



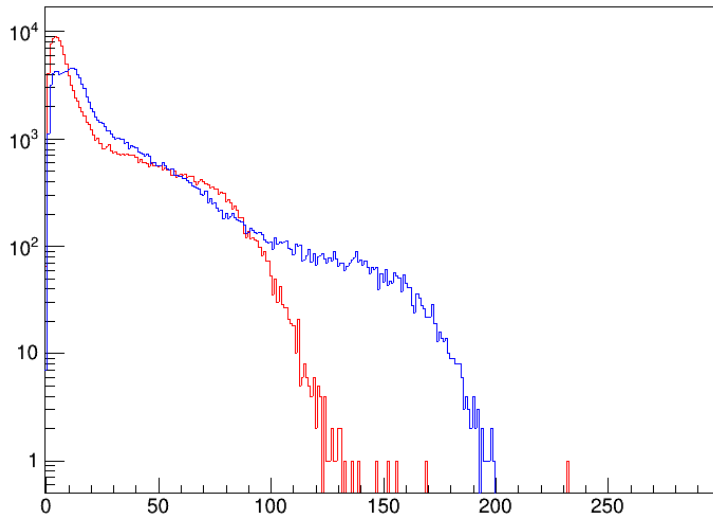
- No improvement after including the common-mode-noise correction

# Without

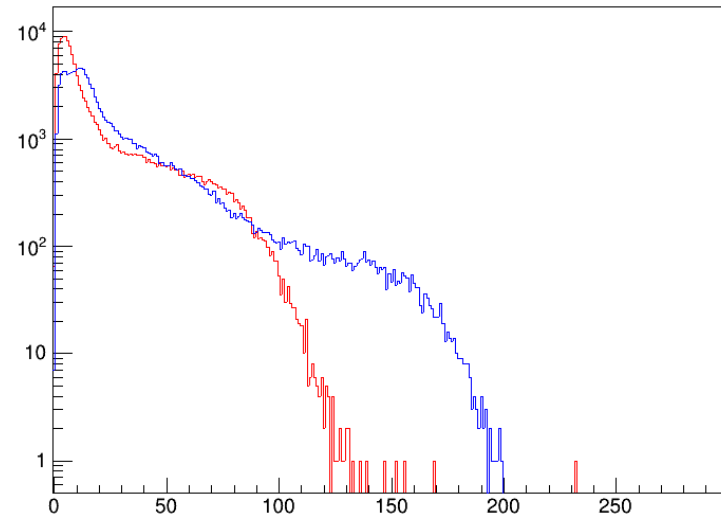
# Chi-square with CMN correction

Ndf = 21

h\_chisqY



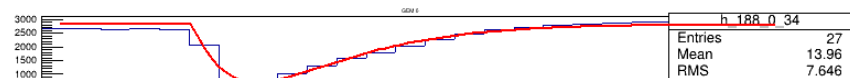
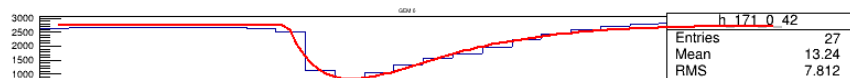
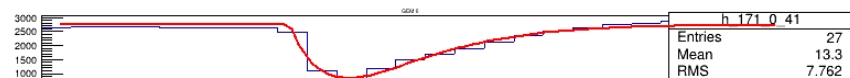
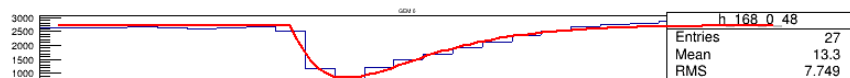
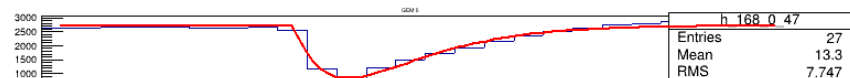
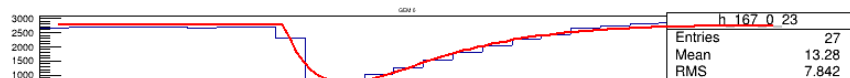
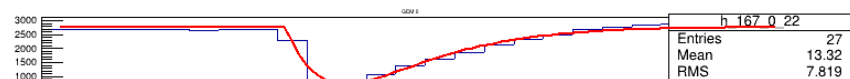
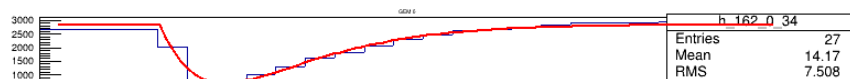
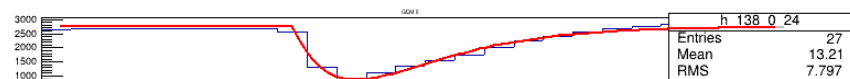
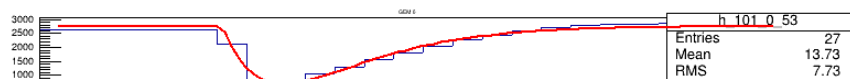
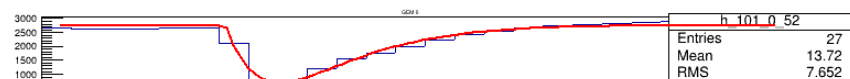
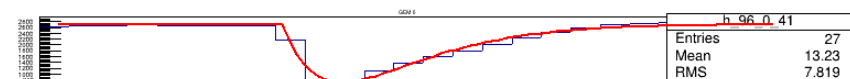
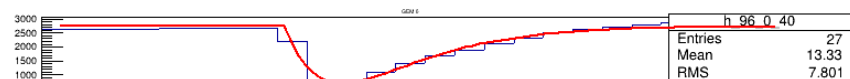
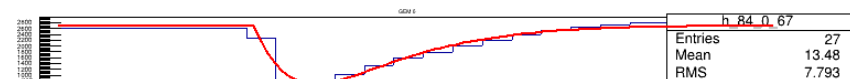
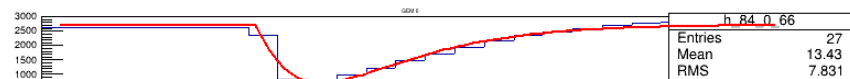
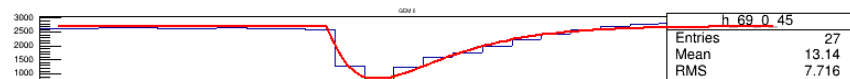
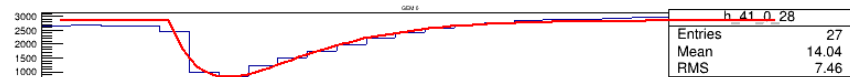
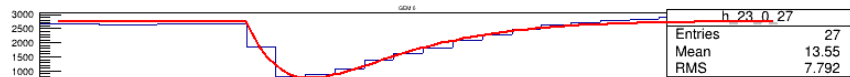
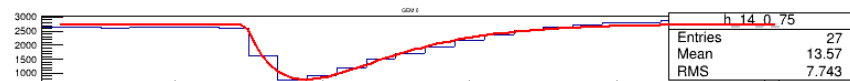
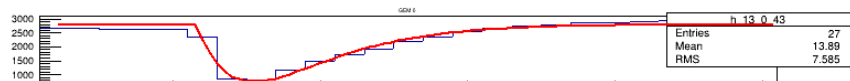
h\_chisqY



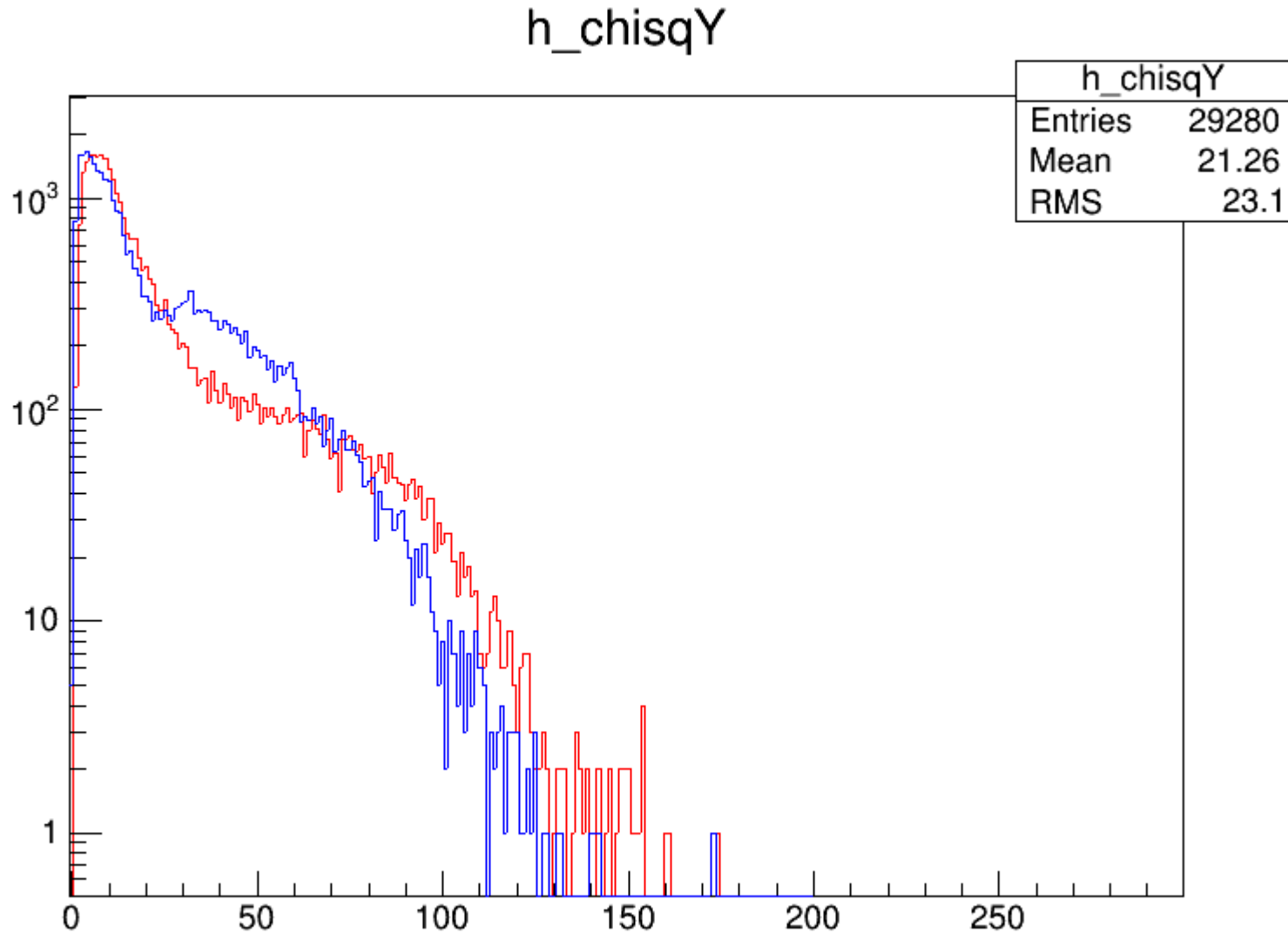
- No improvement after including the common-mode-noise correction



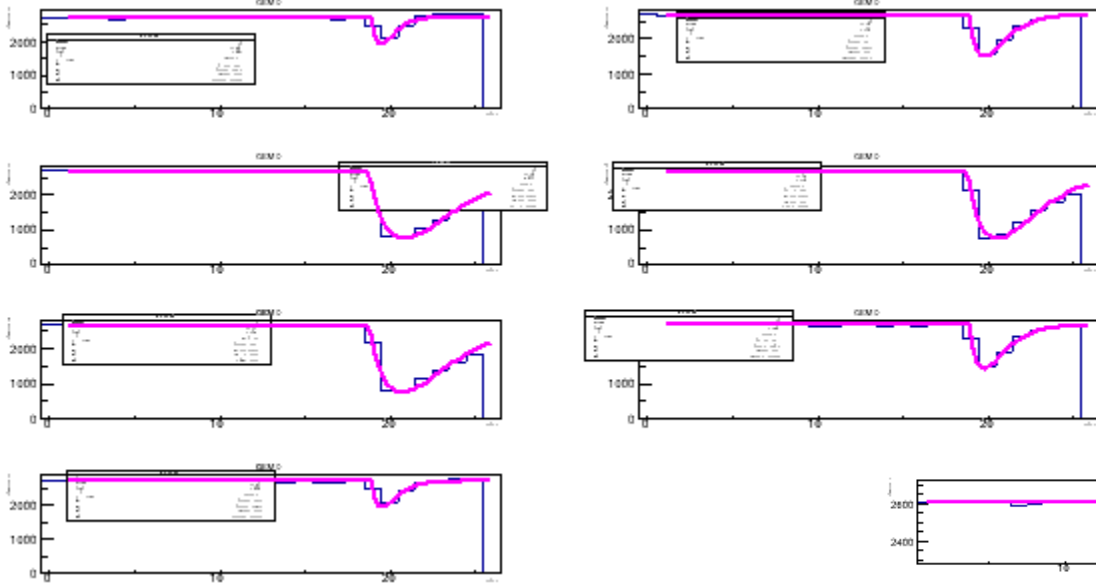
# Events having Chi-square > 120



# Chi-square for another run (899)



# Concern about the pulse selection & Fitting



⇒ No pulses from Y-strip!!!

Few Y-strip pulses!!!

Pulse fitting issues: (on slide 4)  
– The wrong amplitudes for small pulses!!!

