Analysis updates

Calibration (SHMS), HGC

Run Numbers:

7882
7883
7884

March 22, 2019 (Part - 4)

E_beam = 6.19 GeV

P_shms = 3.48 GeV/c

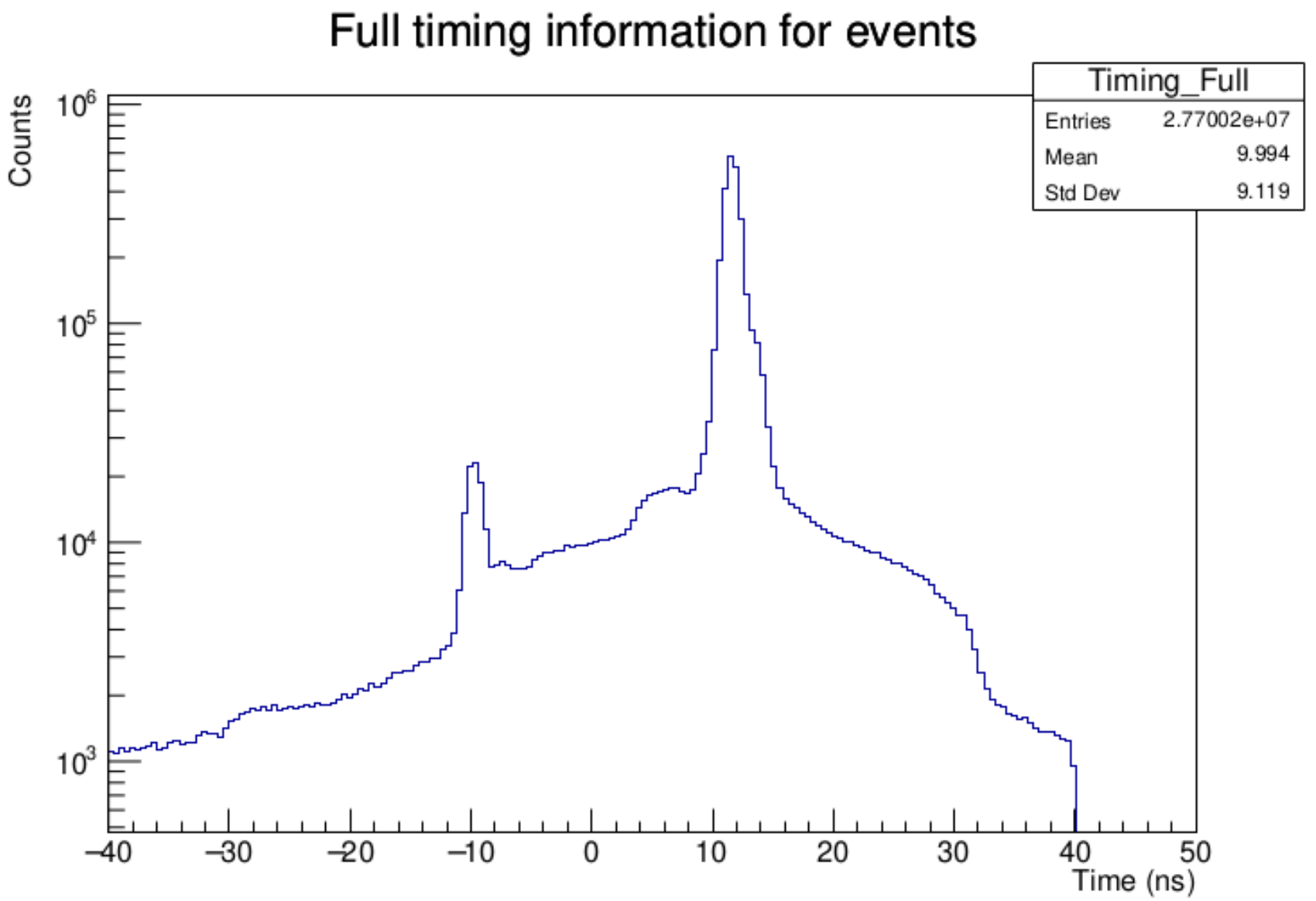
Run Numbers:

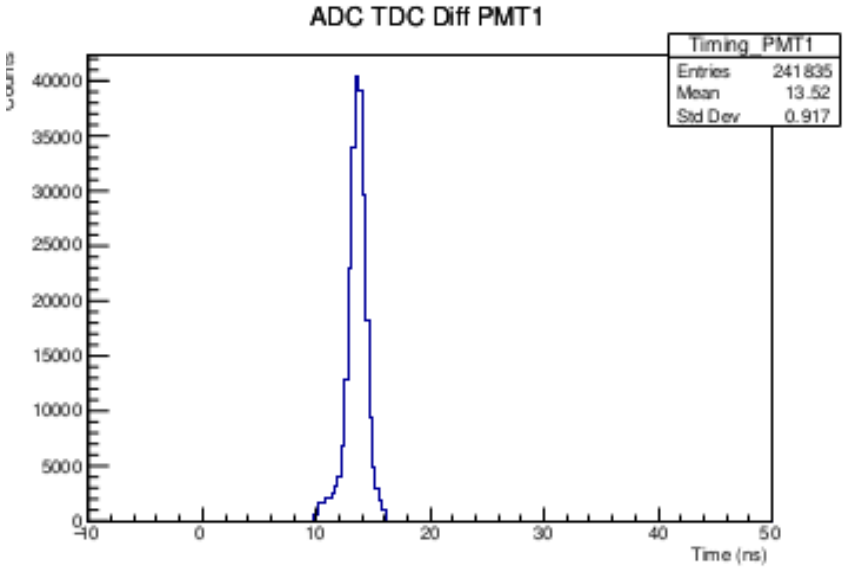
4865
4866
4867

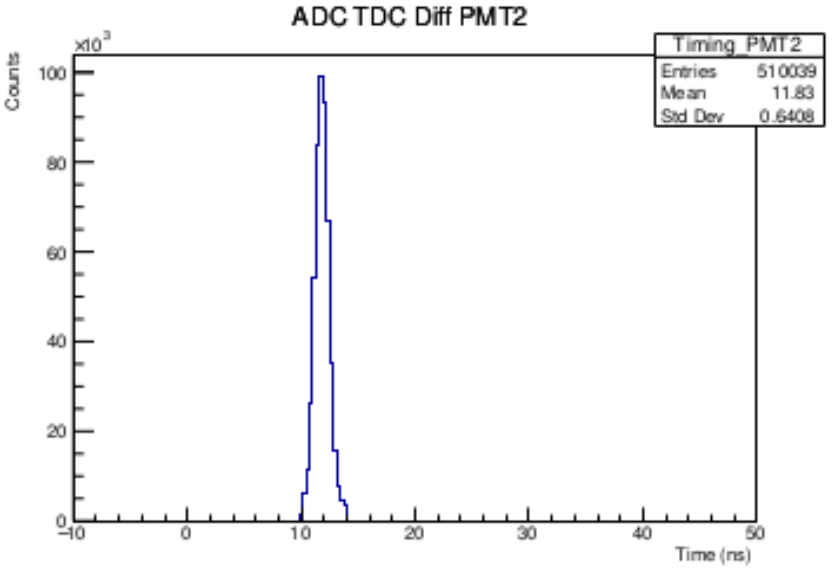
September 21, 2018 (Part - 1)

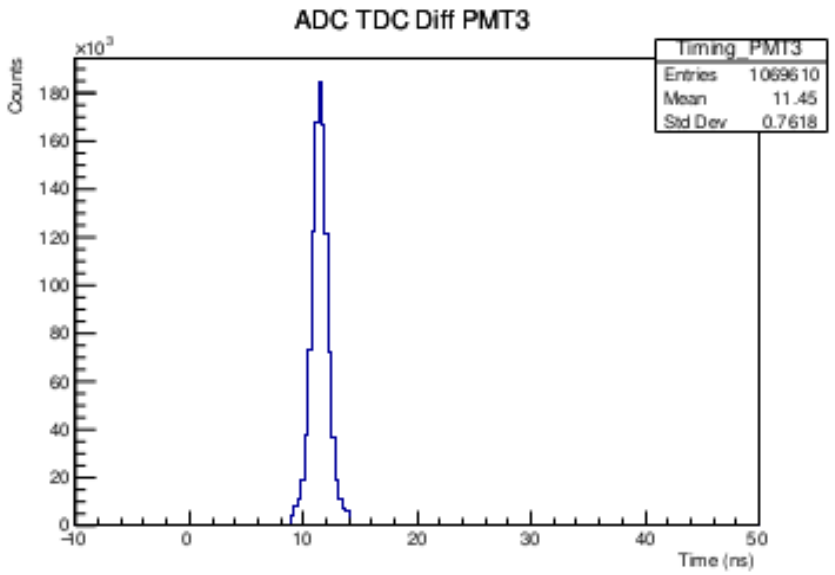
E_beam = 10.6 GeV

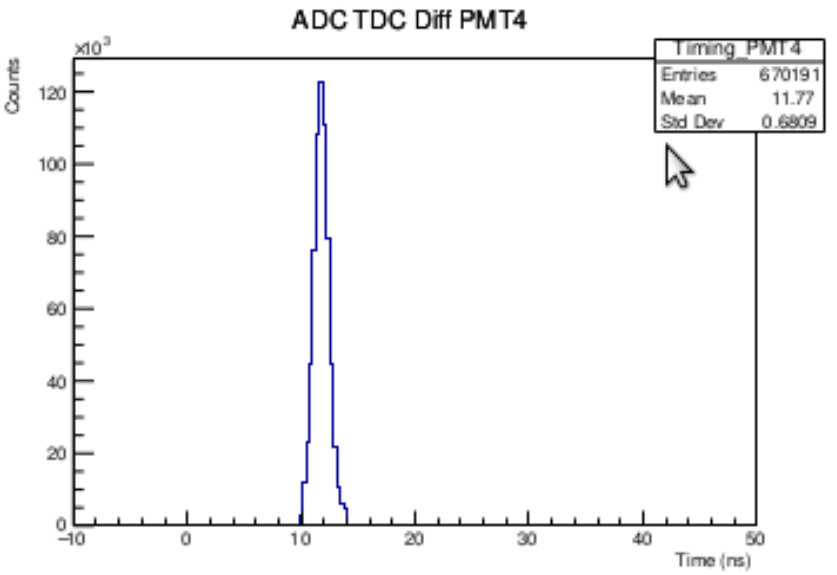
P_shms = 3.48 GeV/c

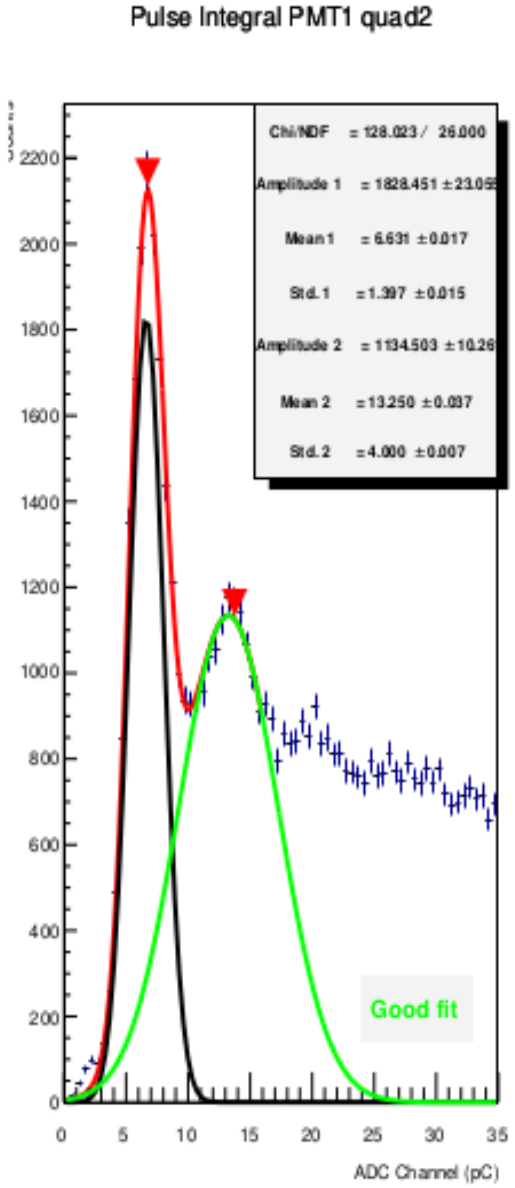

Full timing information for events
Timing_Full
Entries 2.77002e+07
Mean 9.994
Std Dev 9.119
Counts
10^6
10^5
10^4
10^3
−40 −30 −20 −10 0 10 20 30 40 50
Time (ns)

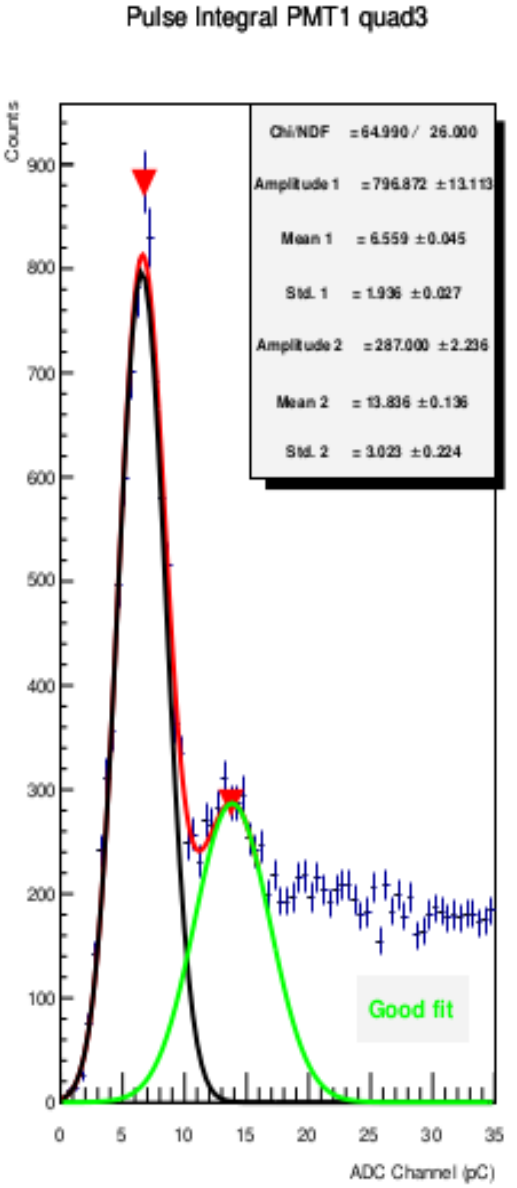

ADC TDC Diff PMT1
Timing_PMT1
Entries 241835
Mean 13.52
Std Dev 0.917
Counts
Time (ns)

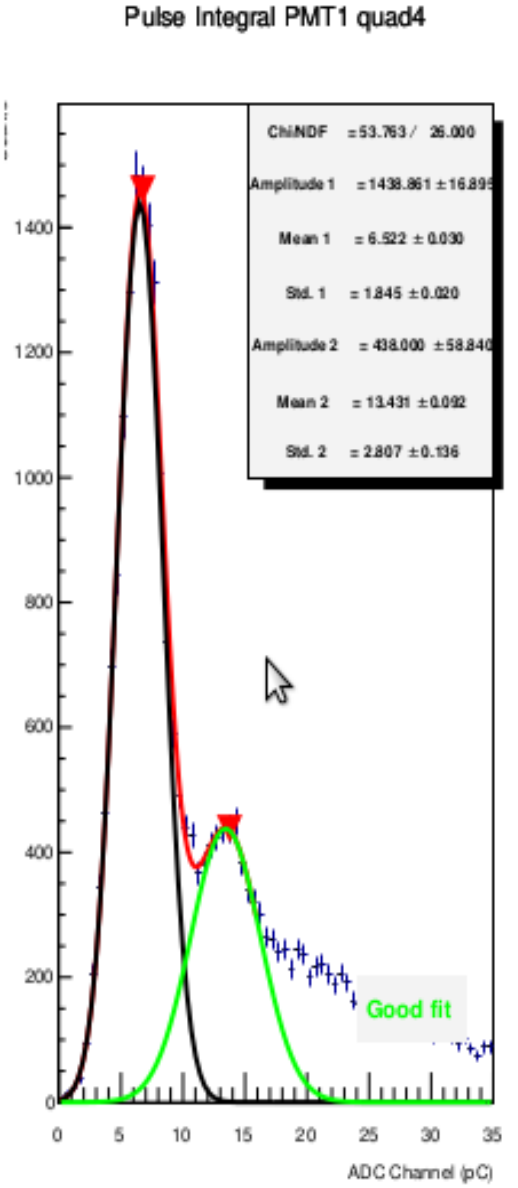

ADC TDC Diff PMT2
Timing_PMT2
Entries 510039
Mean 11.83
Std Dev 0.6408
x10^3
Counts
Time (ns)


ADC TDC Diff PMT3
Timing_PMT3
Entries 1069610
Mean 11.45
Std Dev 0.7618
x10^3
Counts
Time (ns)

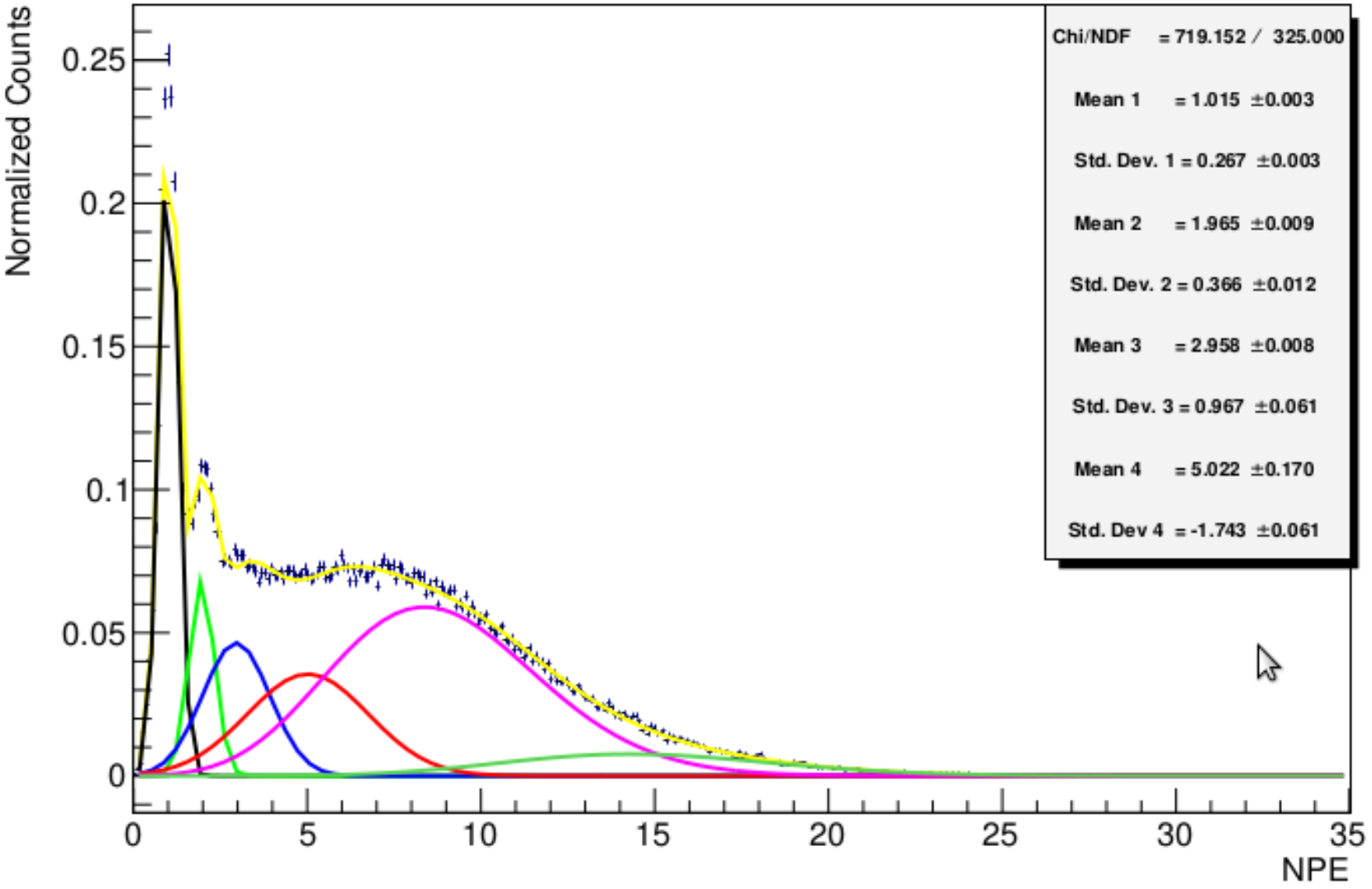

ADC TDC Diff PMT4
Timing_PMT4
Entries 670191
Mean 11.77
Std Dev 0.6809
x10^3
Counts
Time (ns)

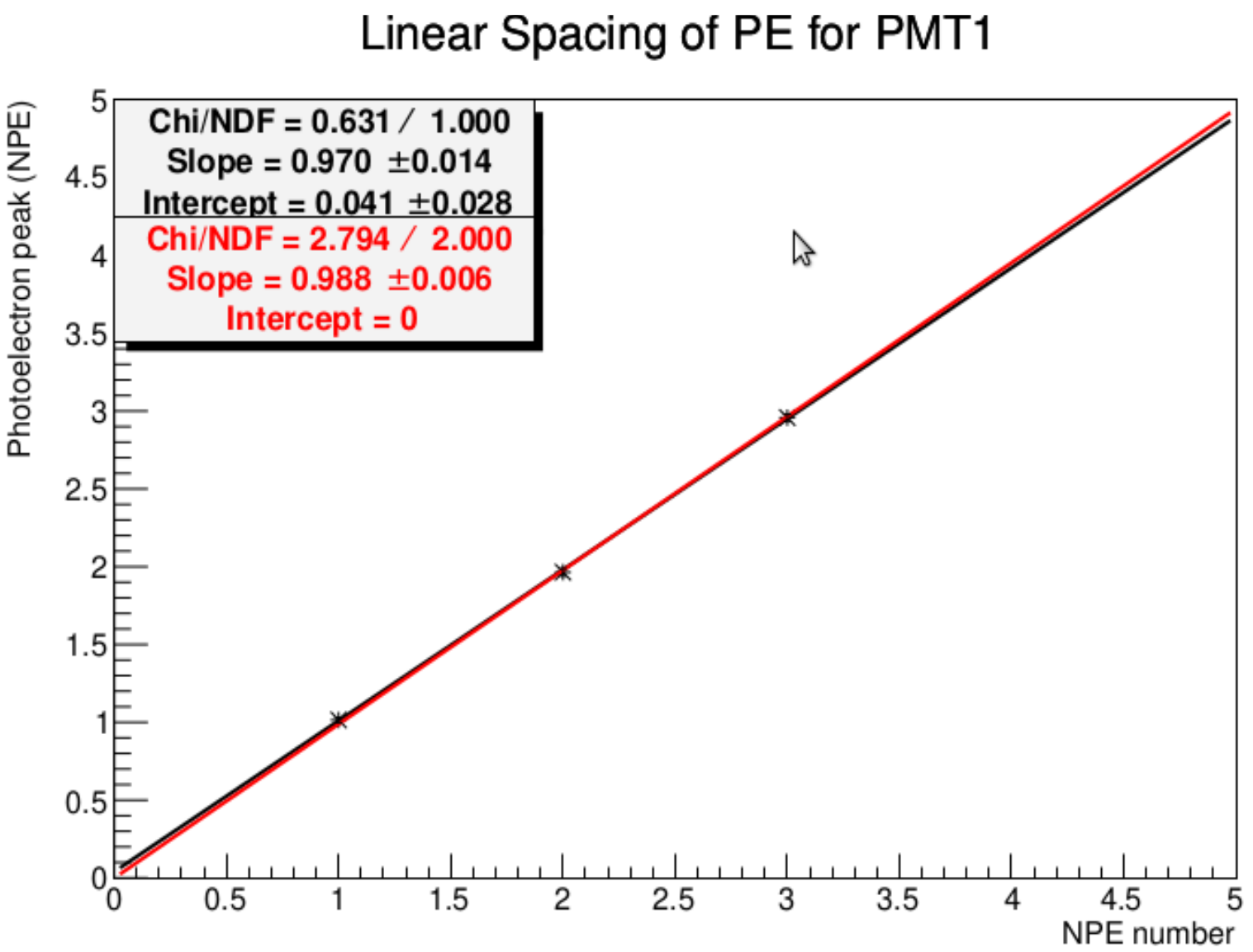

Pulse Integral PMT1 quad2
Chi/NDF = 128.023 / 26.000
Amplitude 1 = 1828.451 ±23.05
Mean 1 = 6.631 ±0.017
Std. 1 = 1.397 ±0.015
Amplitude 2 = 1134.503 ±10.26
Mean 2 = 13.250 ±0.037
Std. 2 = 4.000 ±0.007
Good fit
ADC Channel (pC)


Pulse Integral PMT1 quad3
Counts
Chi/NDF = 64.990 / 26.000
Amplitude 1 = 796.872 ±13.113
Mean 1 = 6.559 ±0.045
Std. 1 = 1.936 ±0.027
Amplitude 2 = 287.000 ±2.236
Mean 2 = 13.836 ±0.136
Std. 2 = 3.023 ±0.224
Good fit
ADC Channel (pC)


Pulse Integral PMT1 quad4
Chi/NDF = 53.763 / 26.000
Amplitude 1 = 1438.861 ±16.89
Mean 1 = 6.522 ±0.030
Std. 1 = 1.845 ±0.020
Amplitude 2 = 438.000 ±58.840
Mean 2 = 13.431 ±0.092
Std. 2 = 2.807 ±0.136
Good fit
ADC Channel (pC)

Scaled ADC spectra for PMT1




Linear Spacing of PE for PMT1
Chi/NDF = 0.631 / 1.000
Slope = 0.970 ±0.014
Intercept = 0.041 ±0.028
Chi/NDF = 2.794 / 2.000
Slope = 0.988 ±0.006
Intercept = 0
Photoelectron peak (NPE)
NPE number
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5

Calibration Parameters

7882, 7883, 7884

4865, 4866, 4867

Online calibration constants: Garth H. gain calibration from 4721, Sept 27 2018

PMT No.	First Guess	Second Guess	Online Parameters
1	6.112 +/- 0.029 6.600 +/- 0.014	6.075 +/- 0.042 6.698 +/- 0.024	6.26
2	6.750 +/- 0.067 7.474 +/- 0.047	6.700 +/- 0.088 7.418 +/- 0.056	7.30
3	5.603 +/- 0.039 5.957 +/- 0.021	5.446 +/- 0.046 6.039 +/- 0.025	5.85
4	7.052 +/- 0.113 6.931 +/- 0.078	6.962 +/- 0.117 6.996 +/- 0.083	6.98

Outlook

- The next task is to check the consistency of the calibration. I have to run the calibration code for other sets of runs and make plot between run numbers and calibration constants.

- From the consistency plot, we will decide which guess is more suitable for use.

- Once we are happy with the calibration constants then I will update them for the hcana.