THU2 cosmic test results

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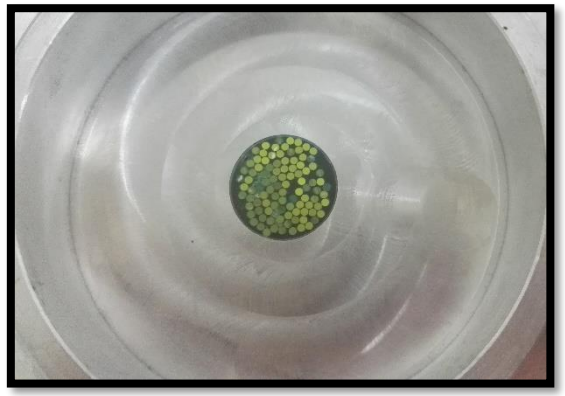
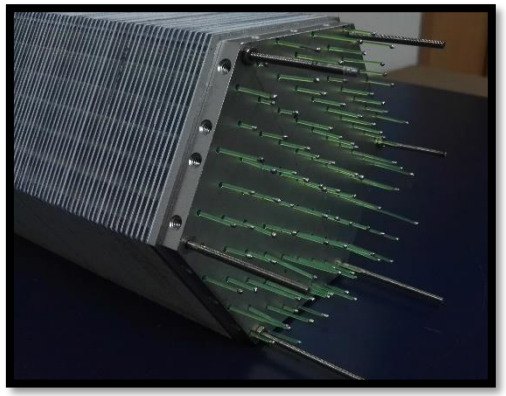
2017.8.10

materials of THU #1 and THU #2

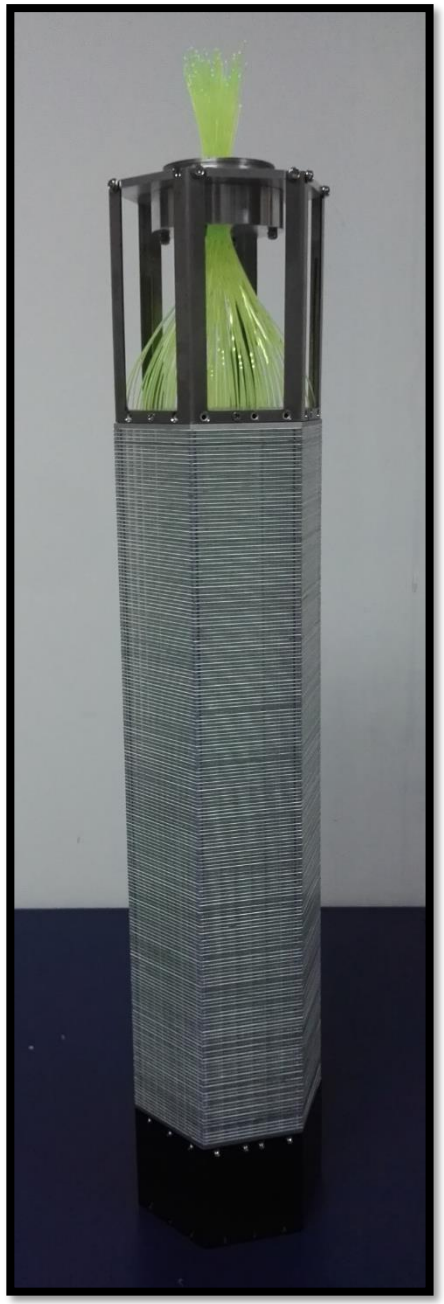
Material	THU #1	THU #2
Lead plate	Beijing, China	
Reflective materials (WLS fiber)	Silver ink from Italy (THU1 isn't polished very well)	
Scintillator plate	Kedi #1	Kedi #2
Reflective materials (between scin and lead)	Sliver paper (Mirror reflection)	Powder painting (Diffuse reflection)
Reflective materials (outside of the ECal)	TiO_2	Tyvek (will be replaced with TiO_2)
WLS fiber	Kurrary Y11	Saint Gobain BCF91A



Top of the WLS fiber (connect to the PMT)

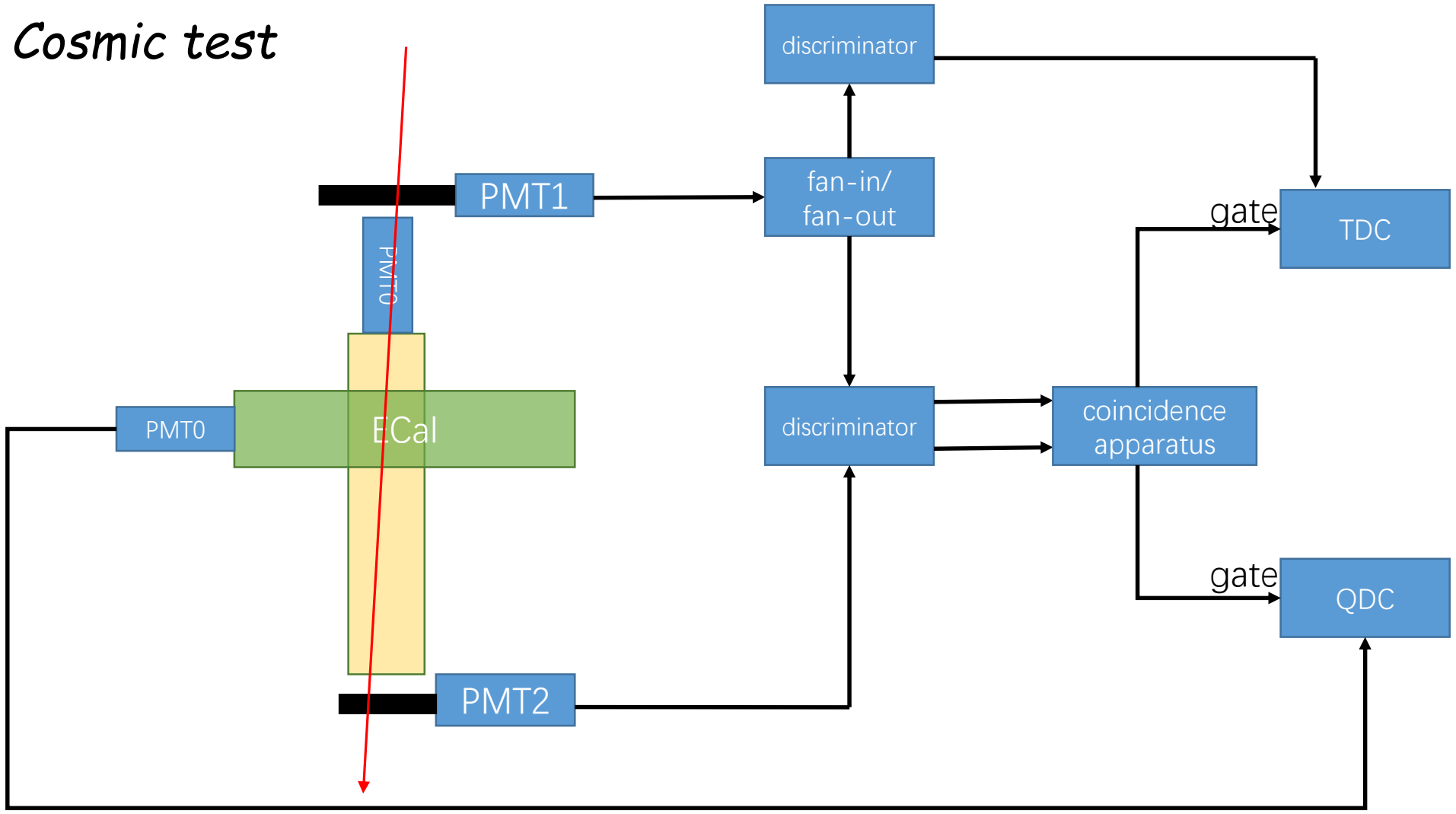


End of the WLS fiber (mirror painting)



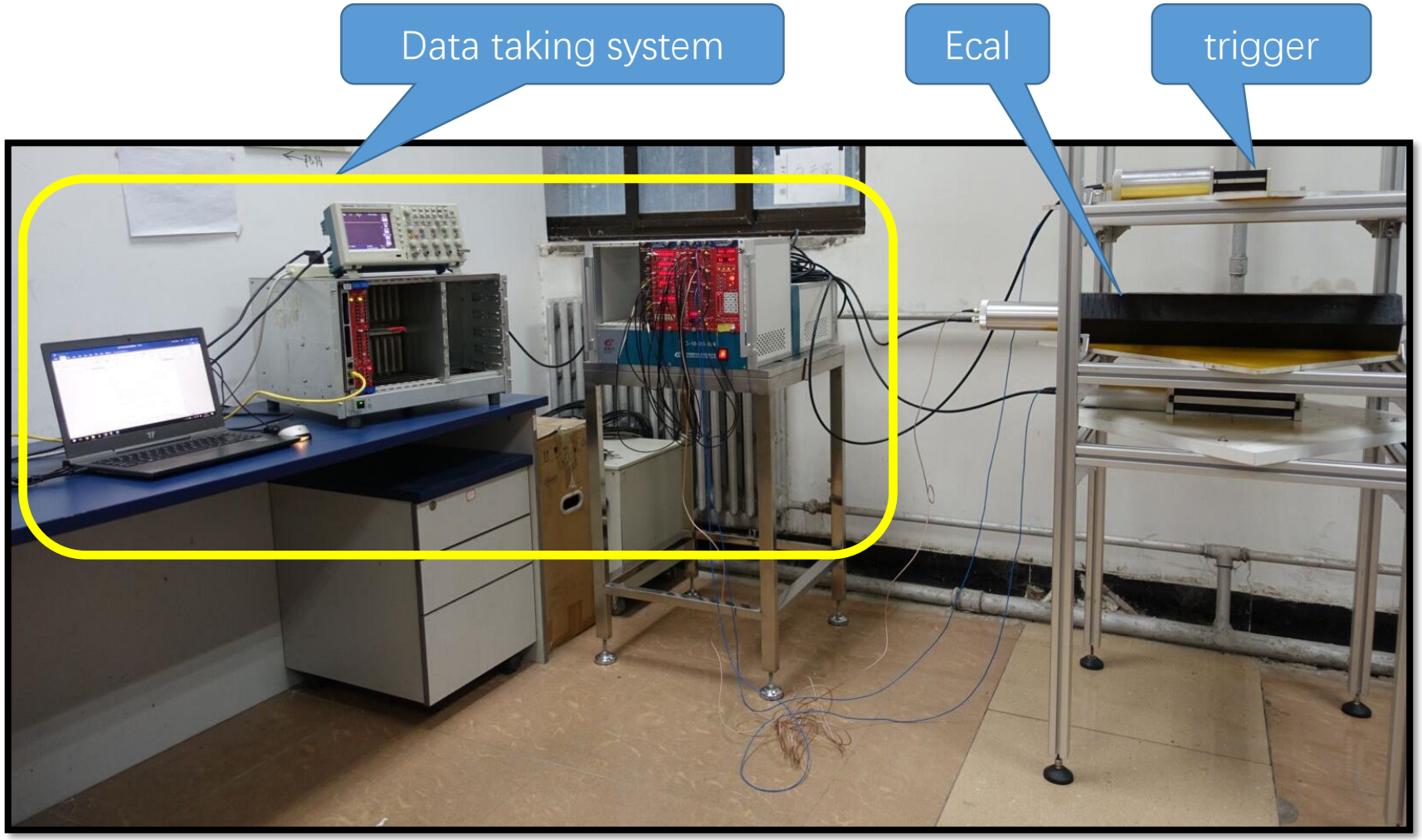
THU #2

Cosmic test



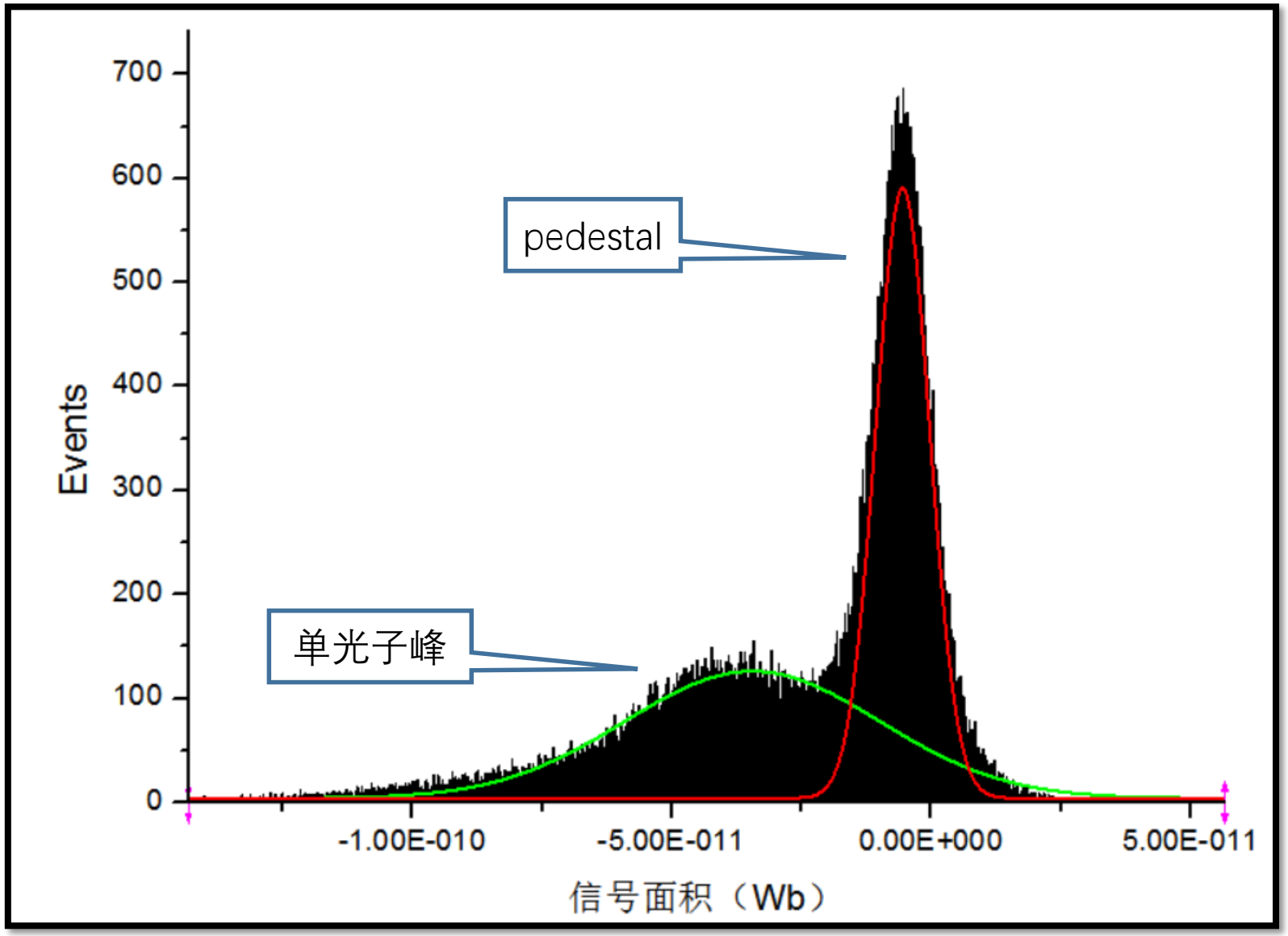
Schematic diagram of cosmic ray experiment setup

Horizontal cosmic test



cosmic ray test setup

Gain of PMT1 (1100V)



Multipeaks Fit (2017/3/15 15:39:33)

Notes

X-Function	fitPeaks
User Name	chendi
Time	2017/3/15 15:39:33
Peak Type	Gauss

Input Data

	Input X Data Source	Input Y Data Source	Range
B	[Book1]Sheet1!A	[Book1]Sheet1!B	[1:1000]

Parameters

	Value	Error
y0	4.05344	0.56681
xc1	-5.51226E-12	1.91328E-14
w1	1.03737E-11	4.90741E-14
A1	7.62585E-9	4.60748E-11
sigma1	5.18683E-12	
FWHM1	1.22141E-11	
Height1	586.53785	
xc2	-3.45168E-11	3.0292E-13
w2	4.90964E-11	6.49769E-13
A2	7.51286E-9	1.17653E-10
sigma2	2.45482E-11	
FWHM2	5.78066E-11	
Height2	122.09442	

Peaks

	Area	Center	Width	Height
1	7.62585E-9	-5.51226E-12	1.03737E-11	586.53785
2	7.51286E-9	-3.45168E-11	4.90964E-11	122.09442

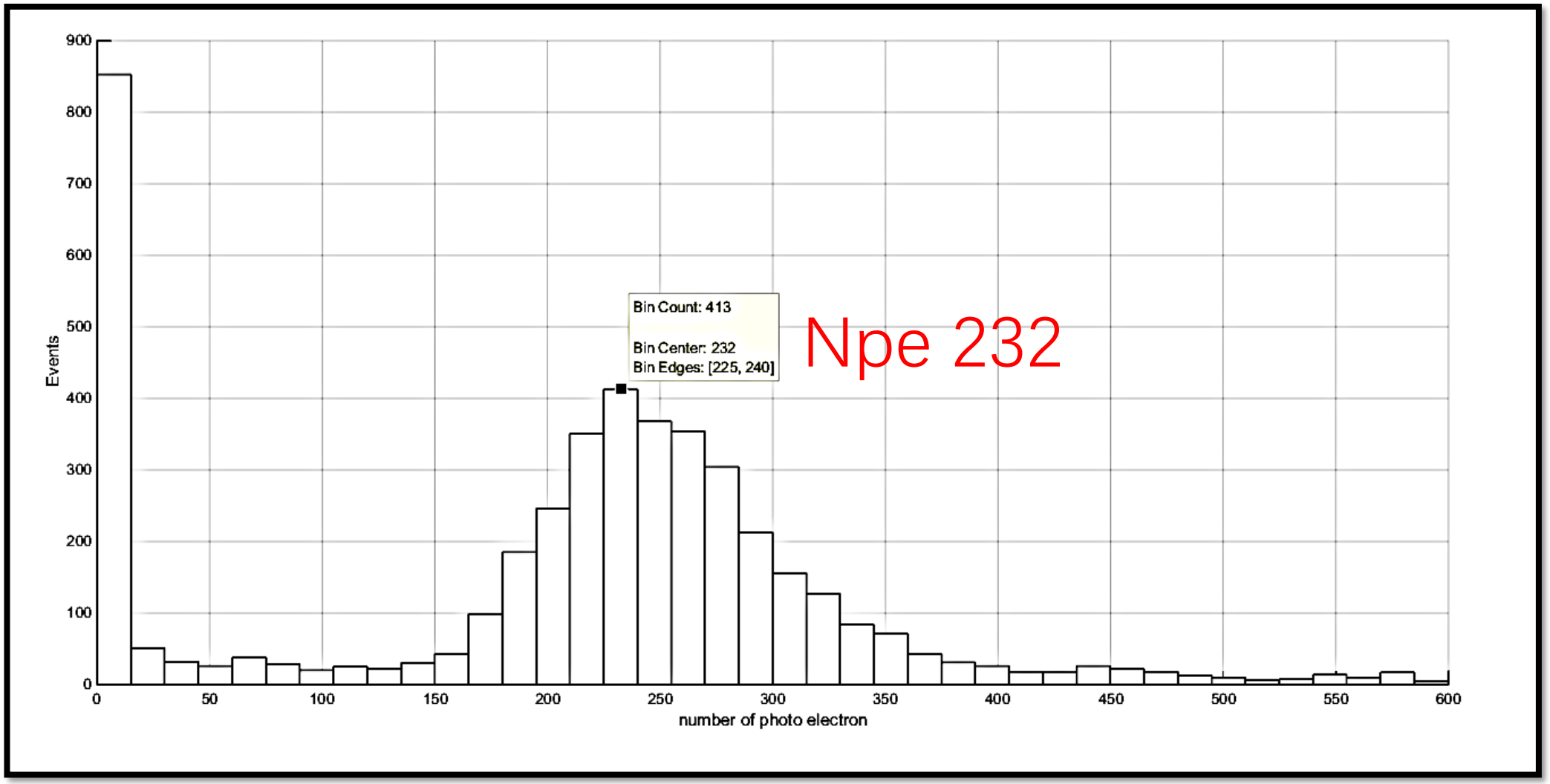
Statistics

DF	993
COD (R^2)	0.99435
ReducedChiSq	102.92383

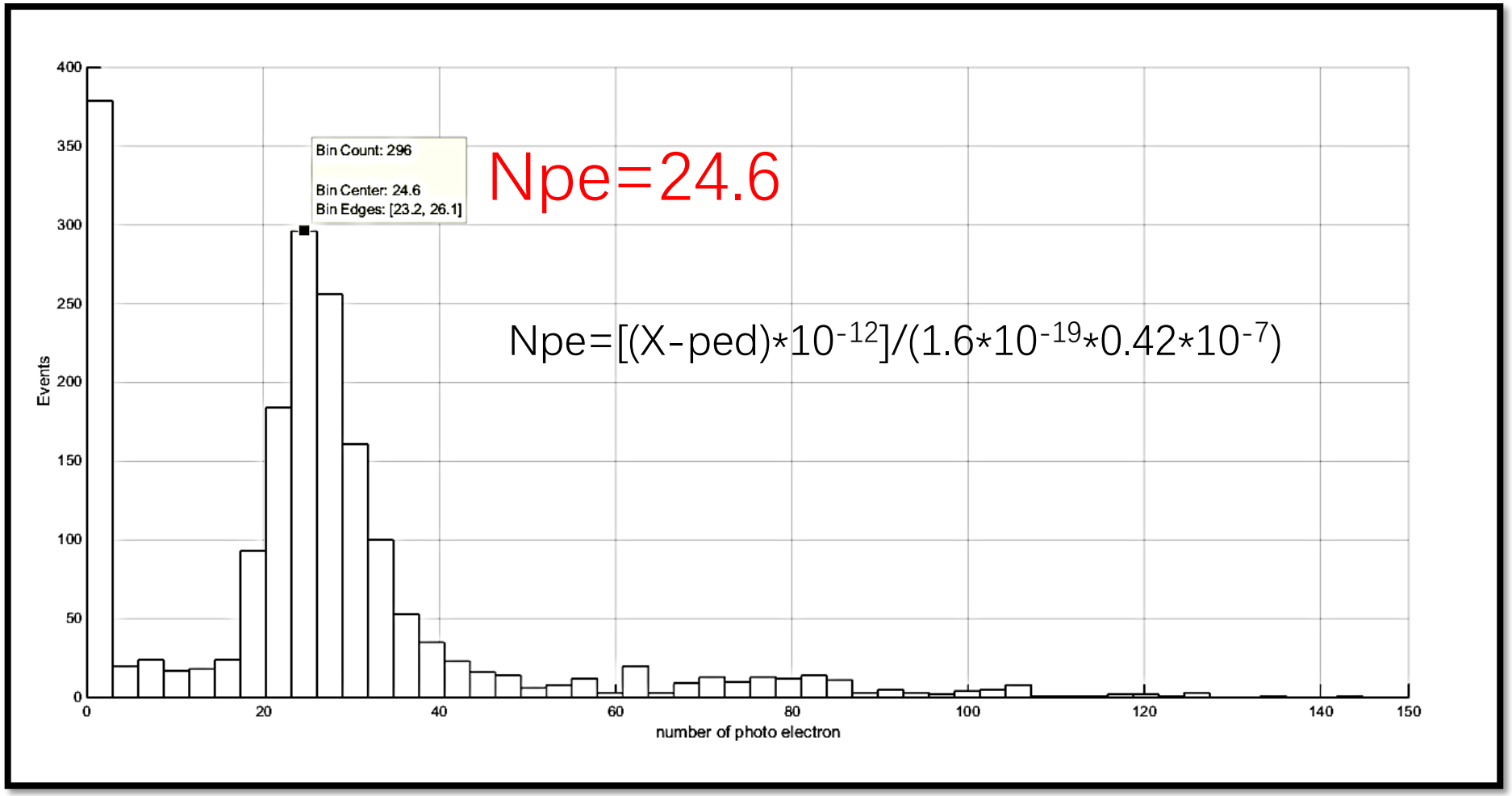
$$\text{Gain}=\frac{Peak2-Peak1}{R\cdot e}=4.2\times10^{6}$$

Horizontal cosmic test

$Npe=[(X-ped)*10^{-12}]/(1.6*10^{-19}*0.42*10^{-7})$



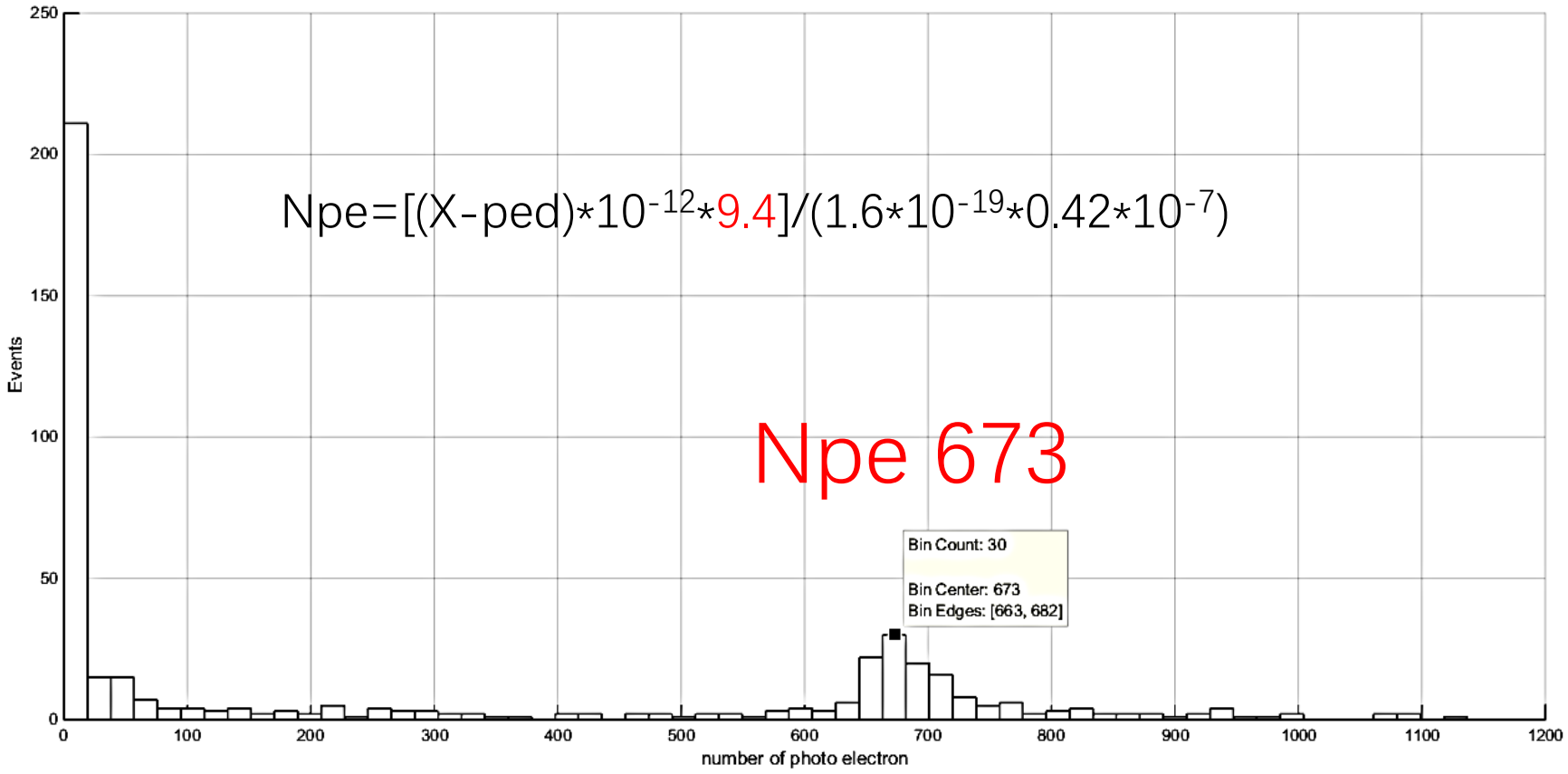
■ Horizontal cosmic test (Calibration of attenuation)



$$time\ of\ attenuation = \frac{232}{24.6} = 9.4$$

The amount of signal charge will exceed the ADC's range when vertical testing, so we need to use the attenuator. This test is for Calibration of attenuation

■ *vertical cosmic test*



- ✓ We will continue the vertical test to get more events
- ✓ we will replace Tevek with TiO_2 and the performance will be better than 673