THU module test

Ye Tian

Shandong University

4-20-2017

SDU #2 module horizontal cosmic ray test in JLab

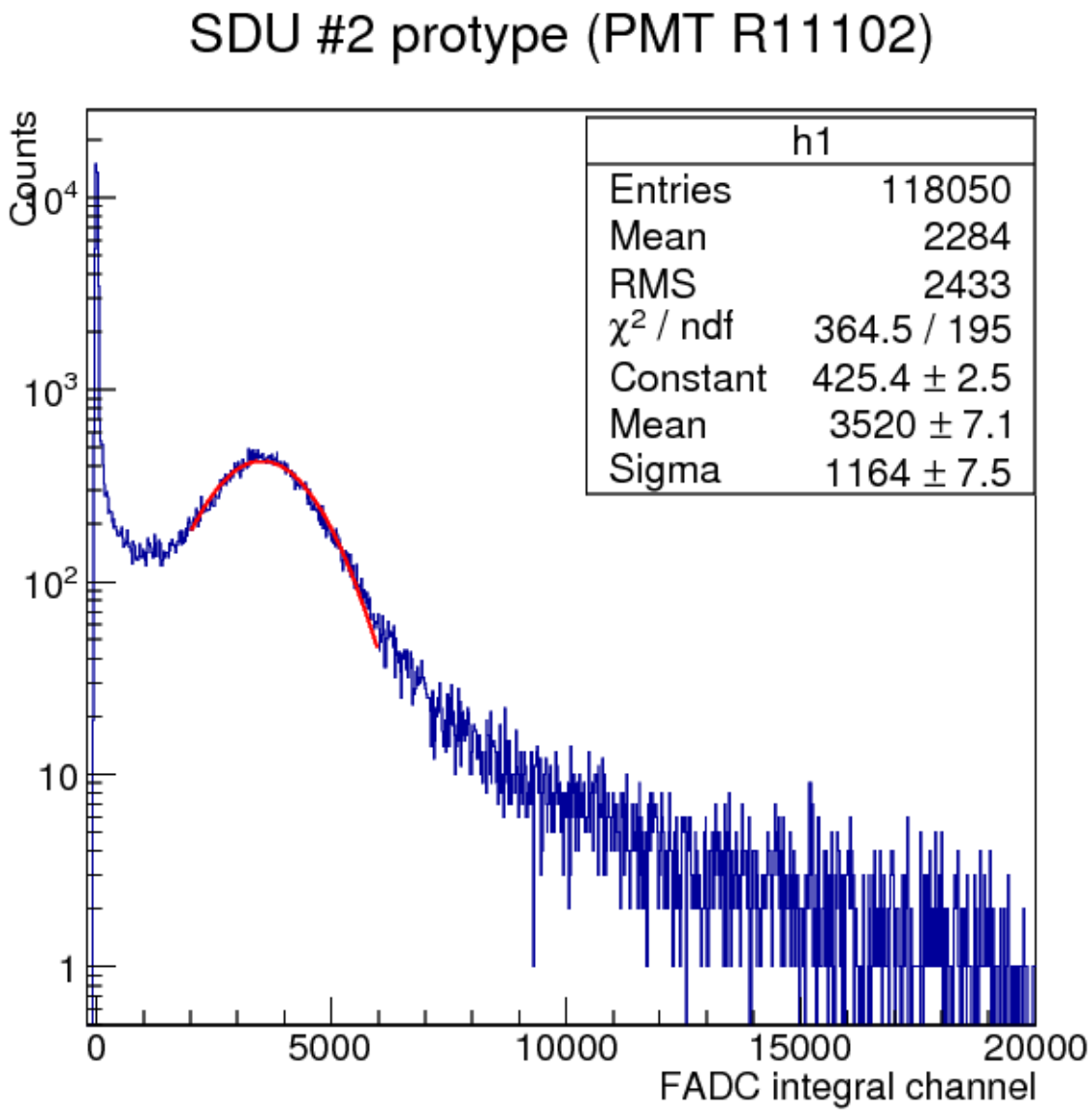
Specification of test

- Horizontal cosmic ray test
- Triggered by two scintillator bar on module
- PMT: original PMT in SDU #2(R11102, Gain:5.1 *10^6)

Result

- Peak:3520
- Npe=$\frac{3520*0.02pC}{e*5.1*10^6}$=86.25

(reference value from previous result: 77 Npe,)



SDU#2 cosmic test result in SDU

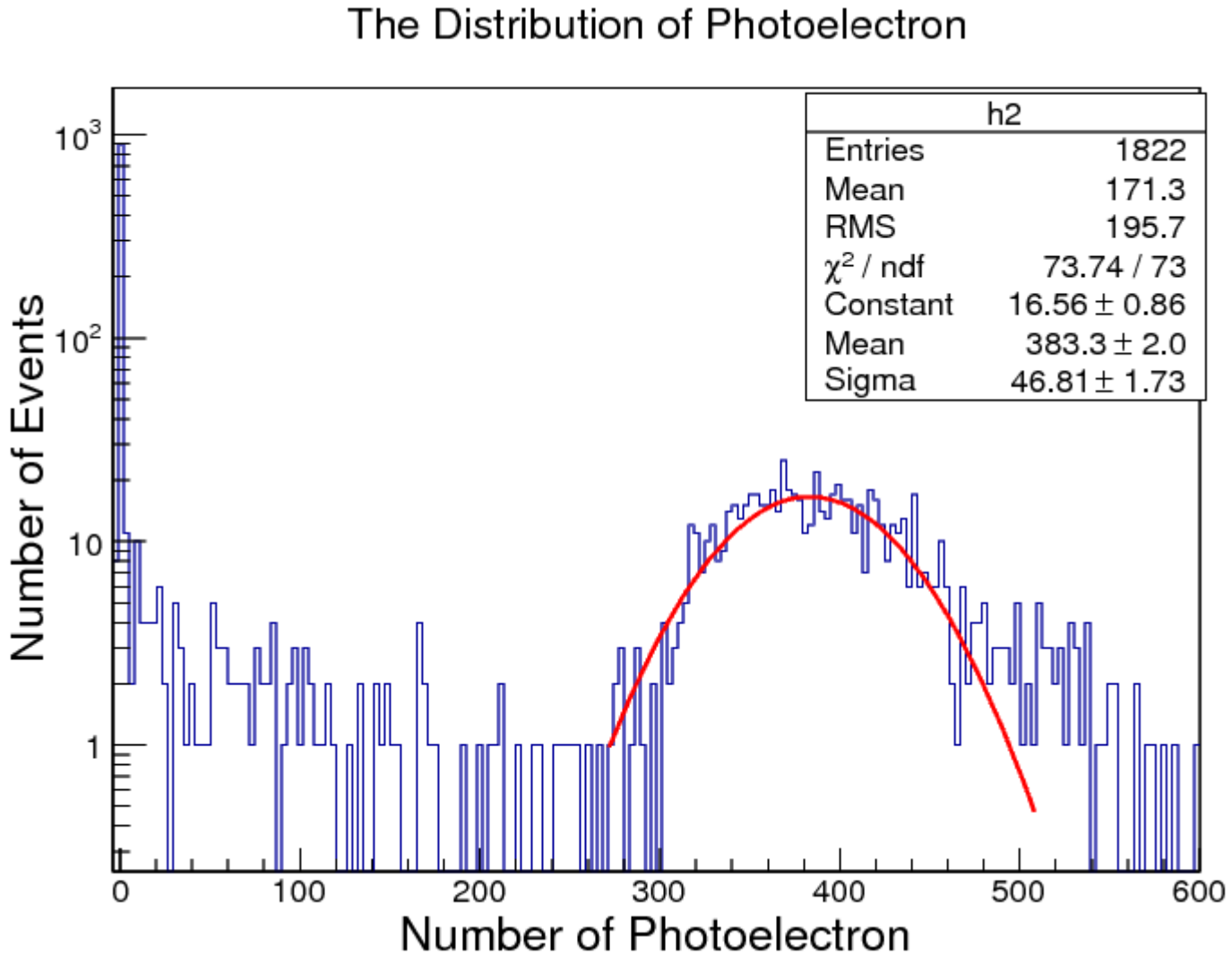
- Npe: 383
- Here is the SDU#2 vertical result with TiO2 coating, the result is covered by Tyvek is(which is better)

module	Vertical (resolution)	Horizontal
SDU #2	426.5(10.25%)	83

I suppose horizontal is 1/5 of vertical result, and get the evaluation value: 77

Difference compared with JLab test

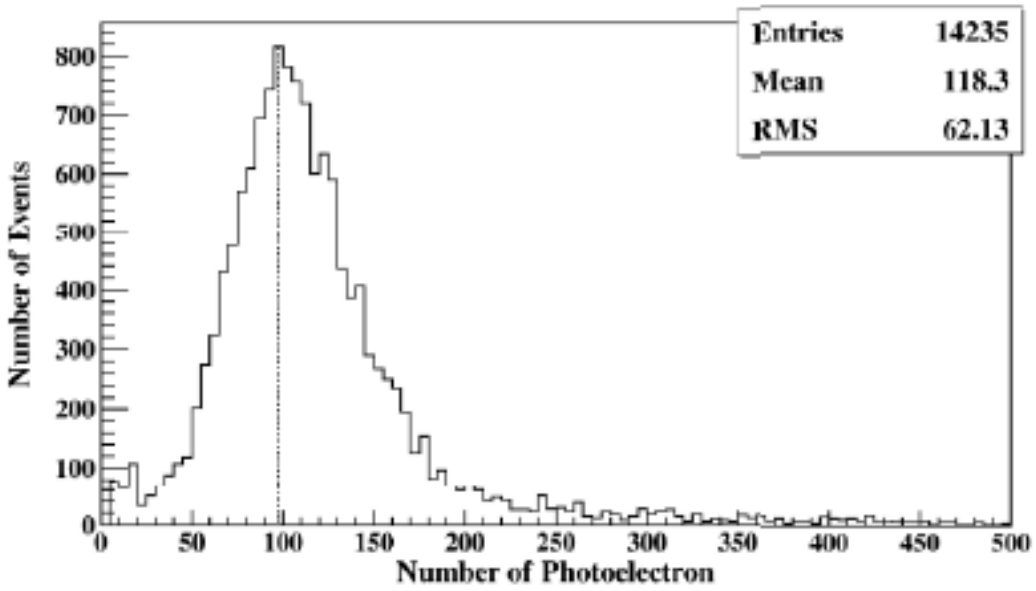
- Triggered by two preshower scintillators(average track is shorter than test in JLab)
- Attenuation from delay cable: 3% (No delay in JLab test)

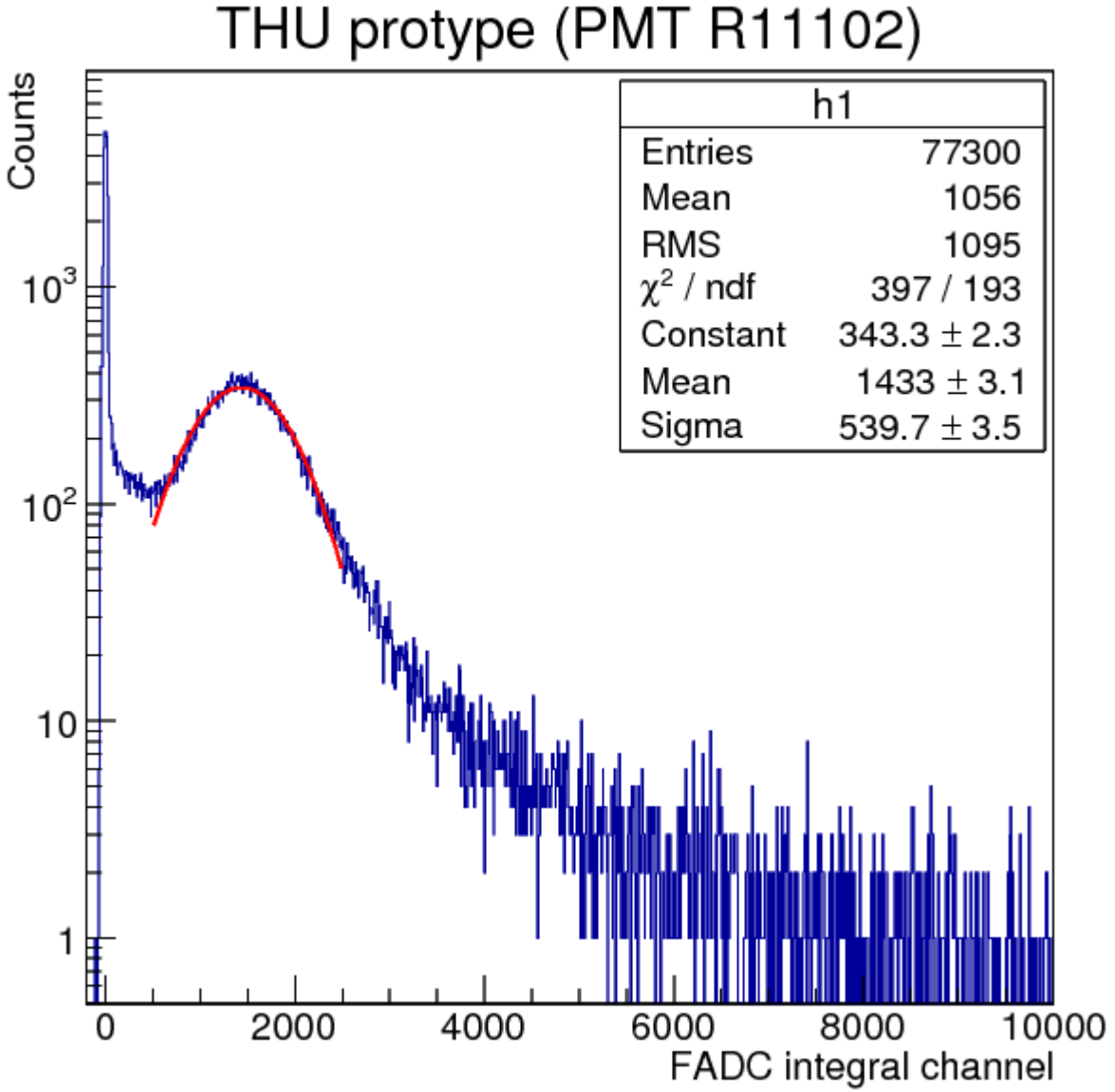


THU module horizontal cosmic ray test(SDU #2 PMT)

- Same test method as SDU #2 module
- Peak: 1433
- Npe=$\frac{1433*0.02pC}{e*5.1*10^6}$ =35.12

(Previous test in THU shows horizontal result nearly 100 Npe)



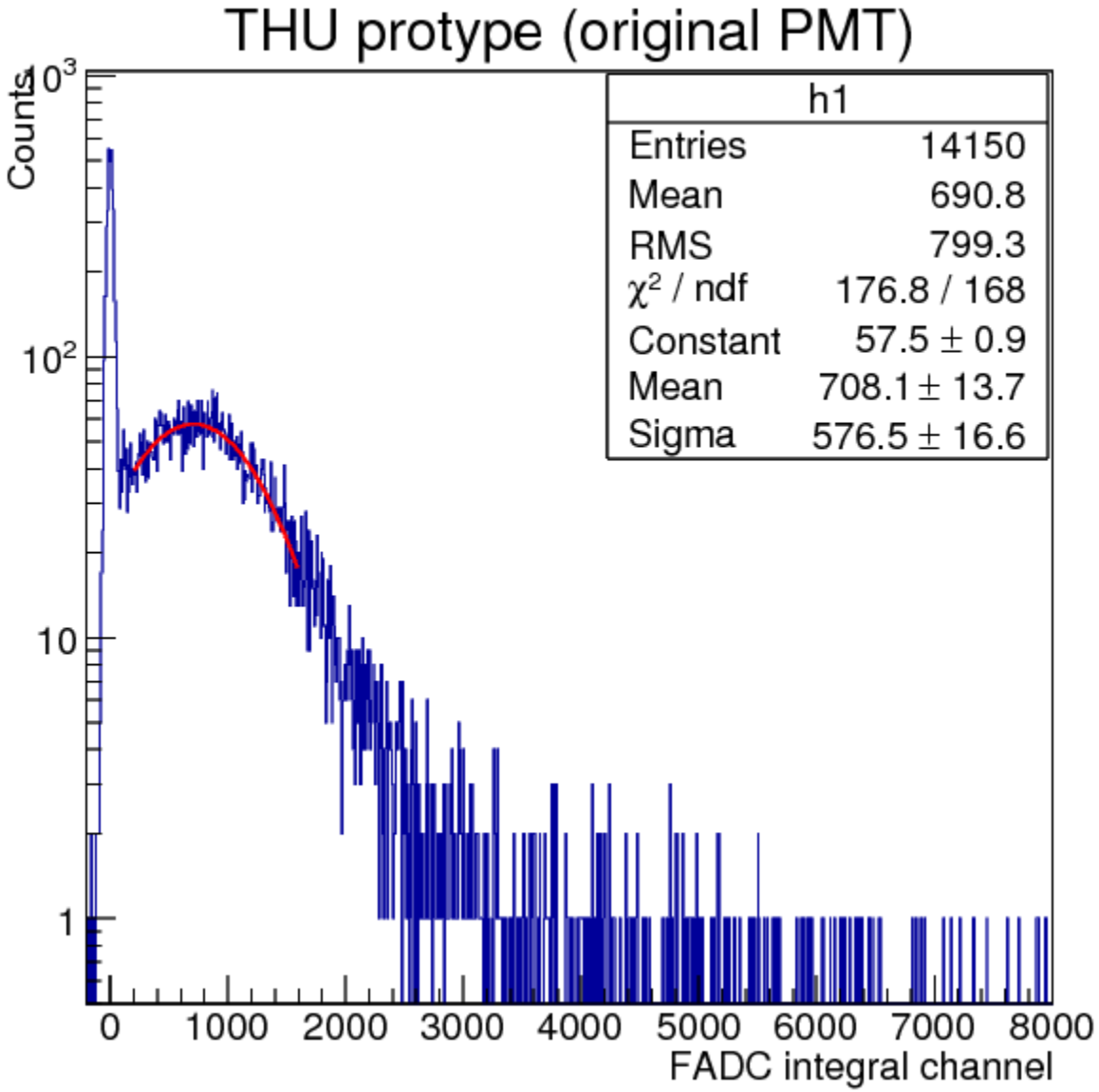


THU module horizontal cosmic ray test(Original PMT)

- Peak: 708
- Supposing the two test of THU module have same Npe, and only difference is PMT gain. We could get
- THU PMT Gain=$\frac{708*0.02pC}{e*35.12(Npe)}$=2.52*$10^6$

Which match the gain value got from THU report.

(The two PMTs are test independently, may use different methods, but it matches well.)



Test setup and THU module