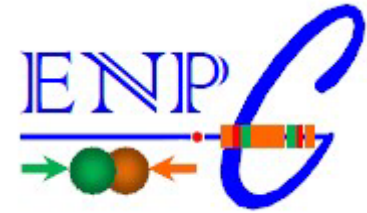




清华大学
物理系

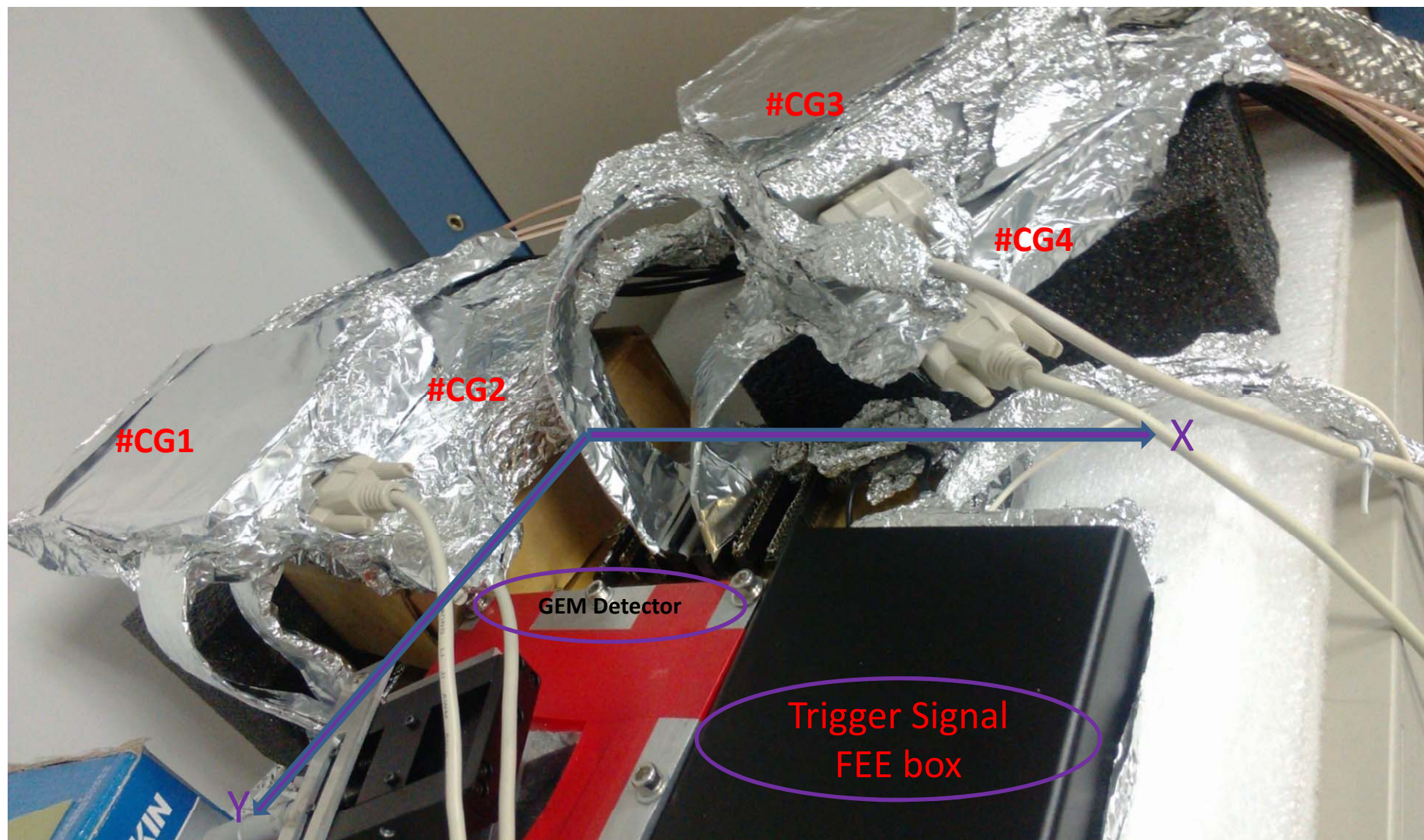


Progress of the GEM test with CASAGEM electronics at THU

Yan Huang, Zhigang Xiao, Zhi Deng, Haiyan Gao (THU)

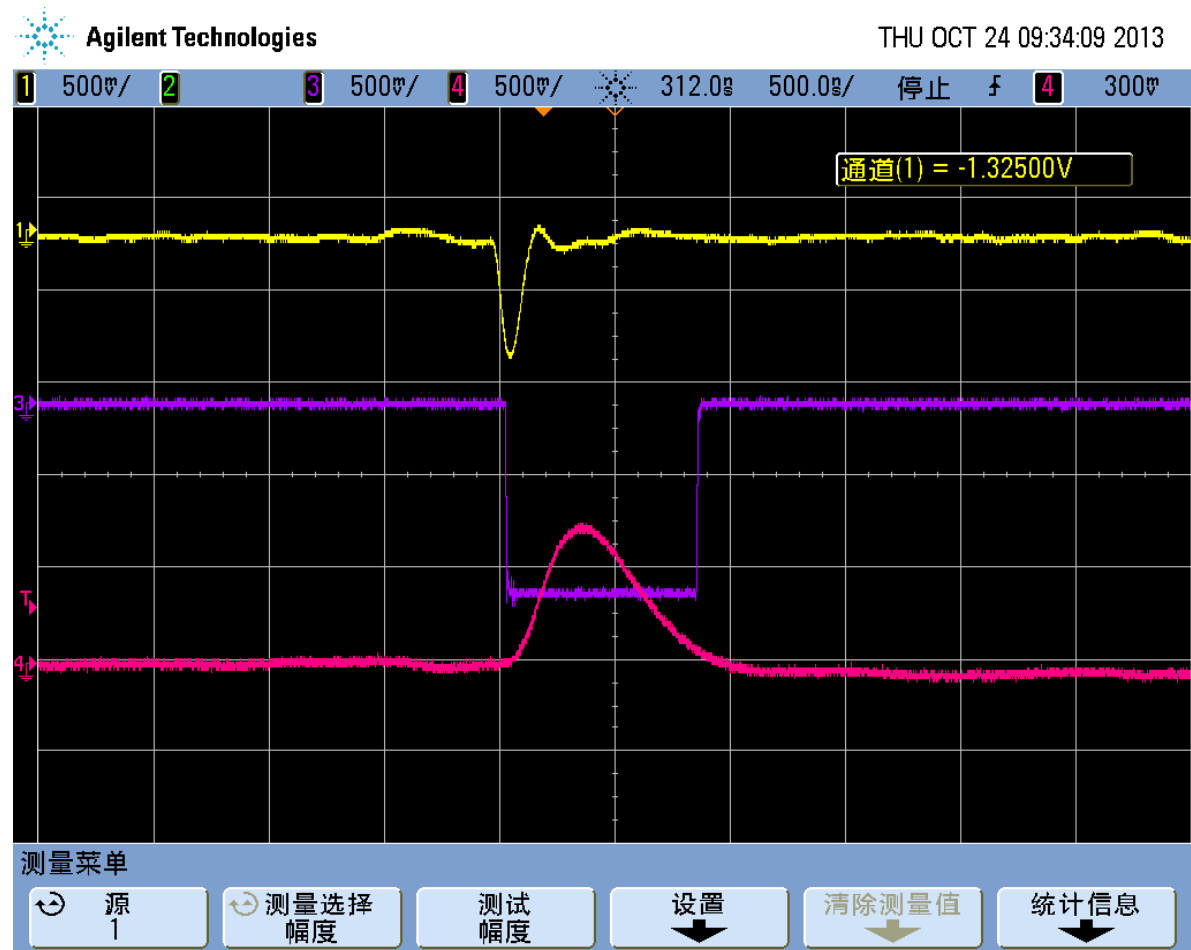
Limin Duan, Chenggui Lu, Helun Yang, Rongjiang Hu, Peng Ma (IMP)

1. 4CASAGEM system
2. Data Analysis
3. Spatial Resolution
4. A word about the large GEM
5. Summary



Ps: CG is short for CASAGEM

GEM signal(Fe55)

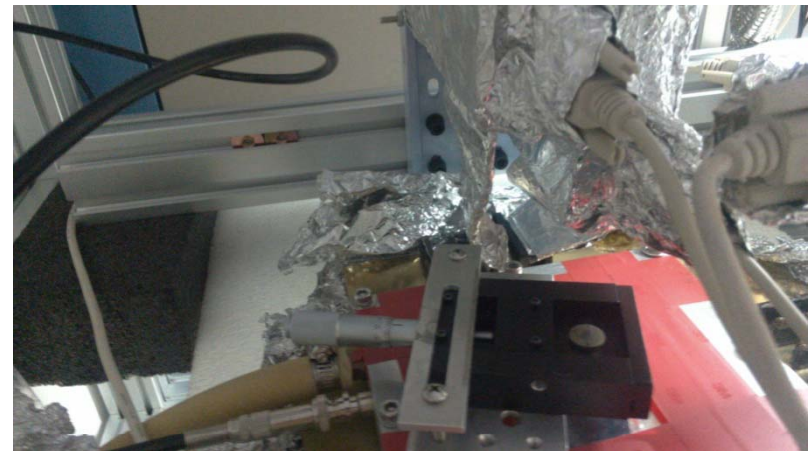


Yellow: signal from foil(trigger)

Purple: gate signal

Pink: signal from the CASAGEM

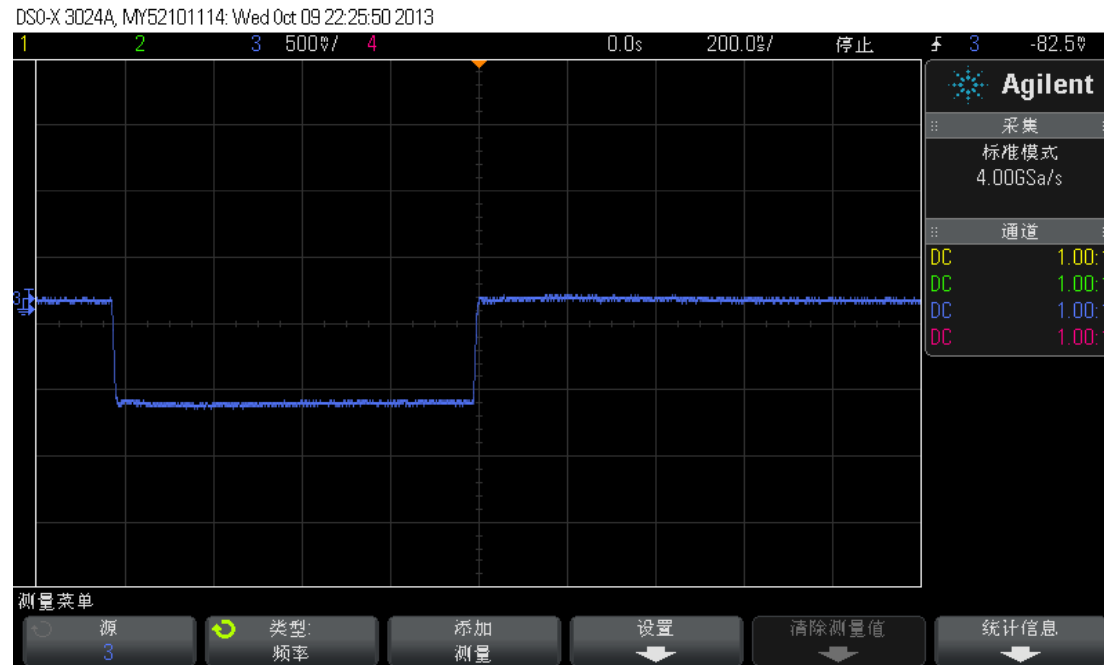
New home



Now, there is a more comfortable and stable home for our GEM and CASAGEM. 4

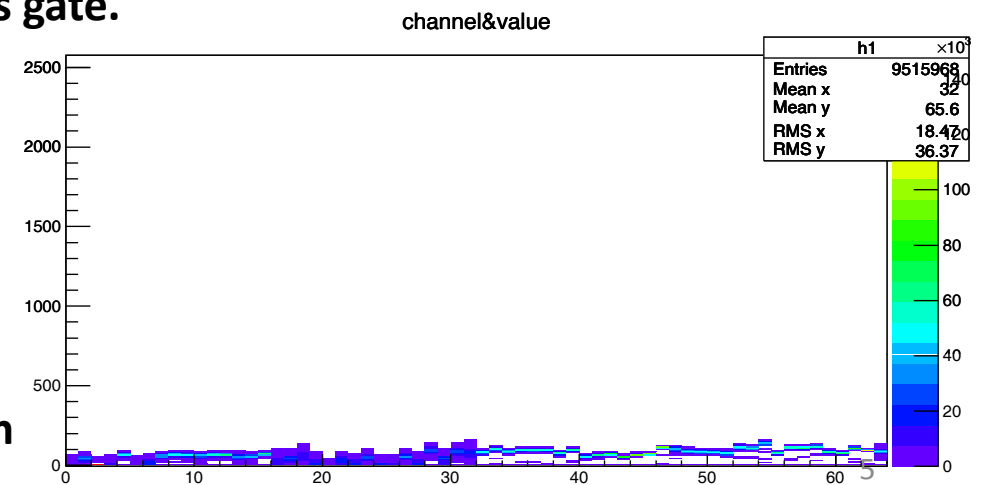
Data Analysis

Noise cut

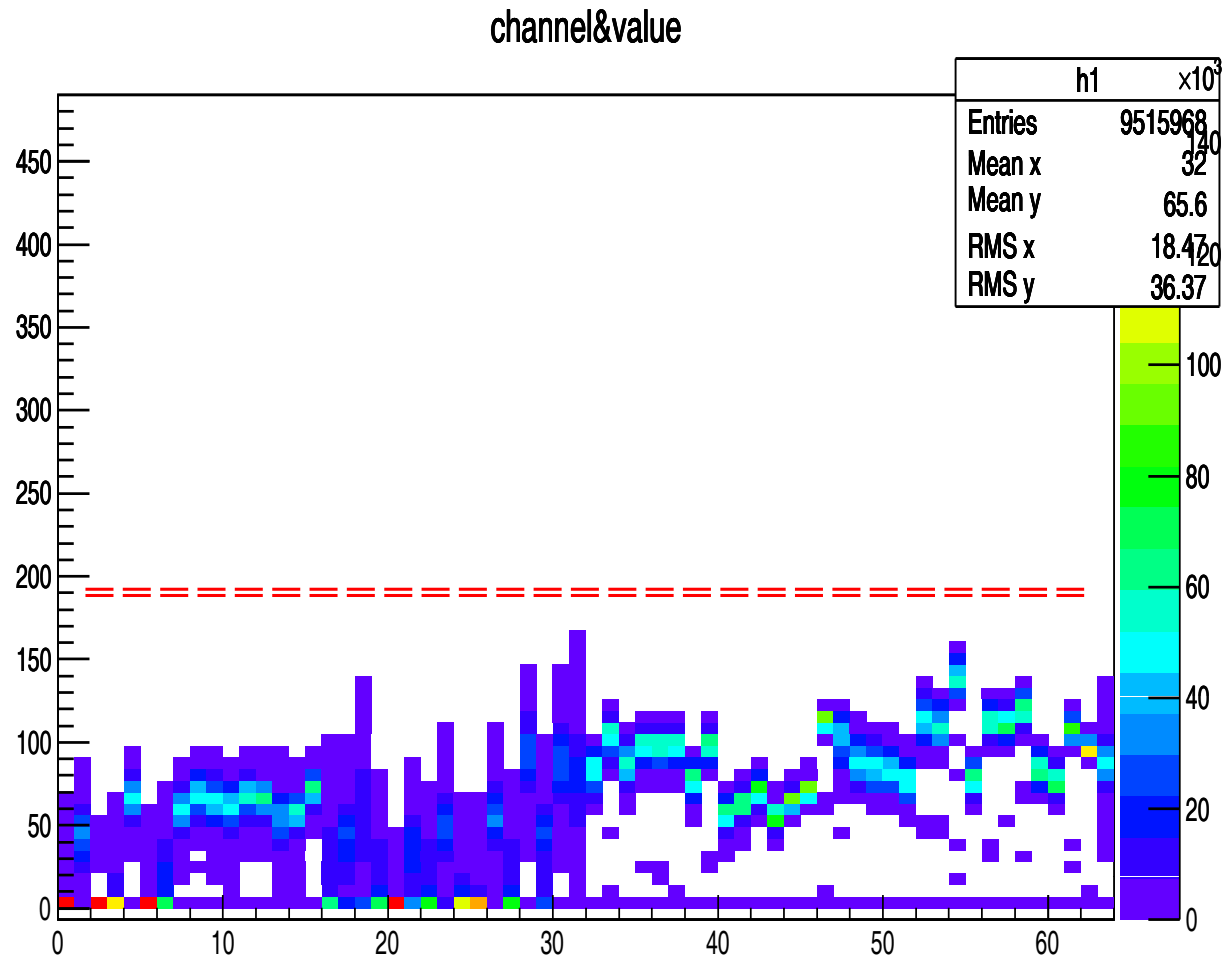


Signal from waveform generator as gate.

Noise spectrum



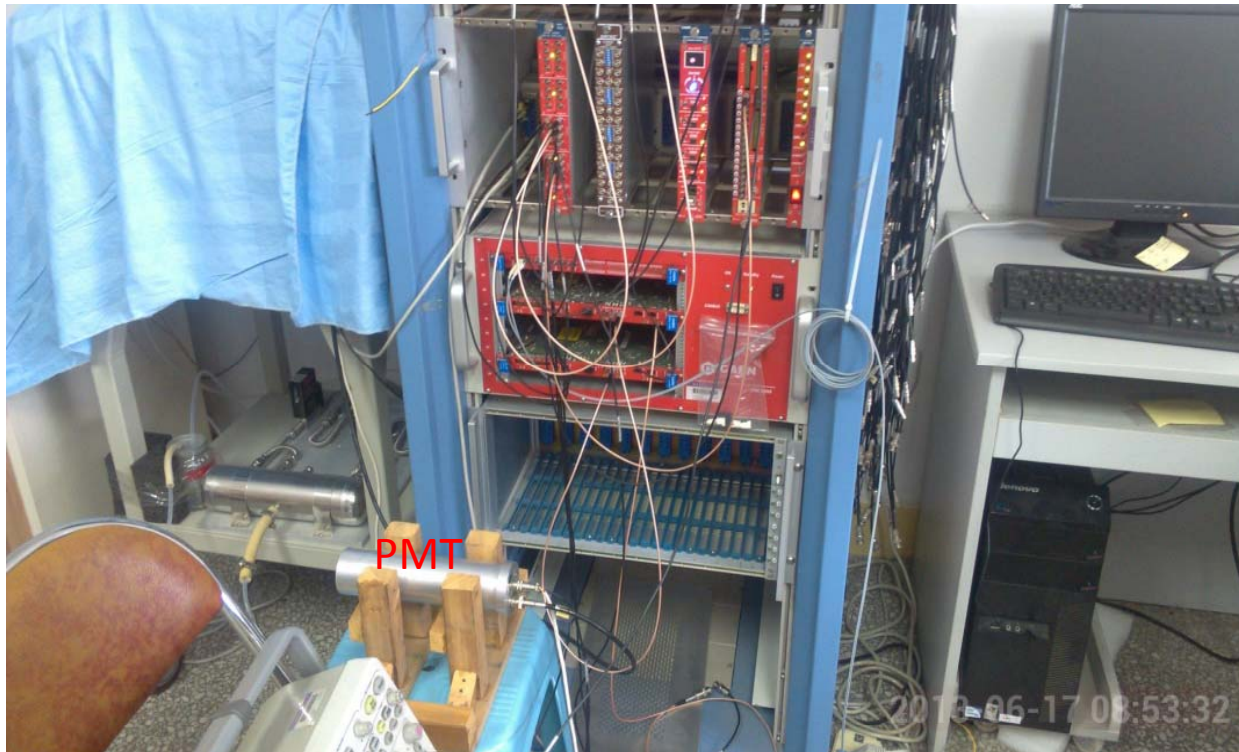
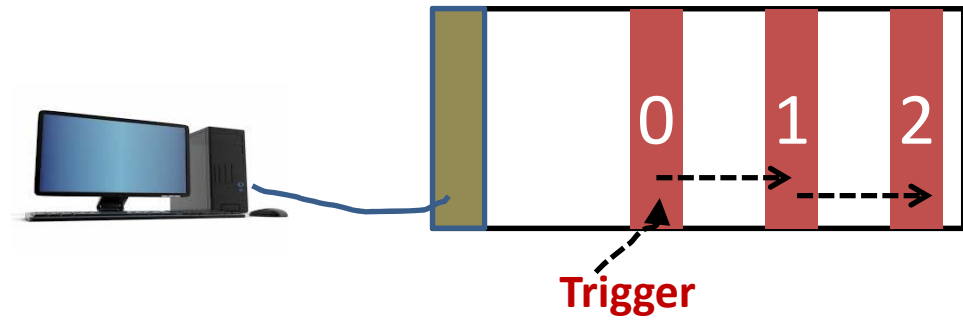
Noise spectrum in detail



For each channel, 200 as the threshold.

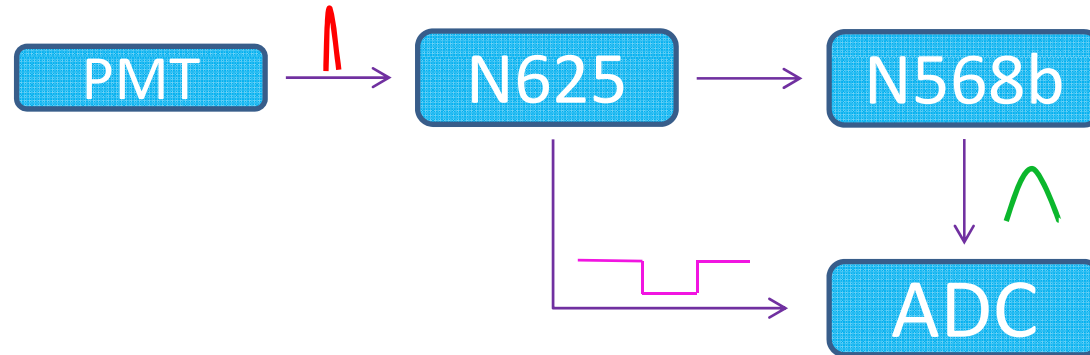
ADC Normalization

ADC scheme

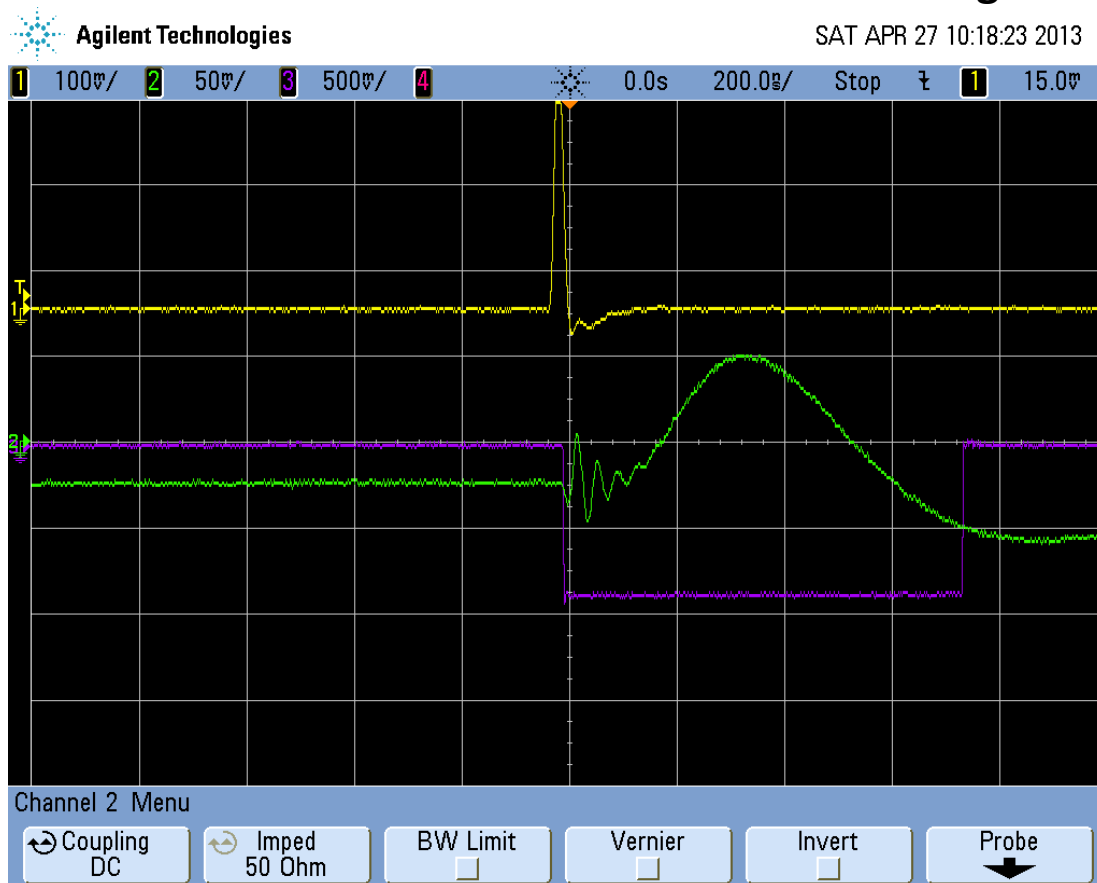


Installation

PMT Signal (cosmic ray)



Logical Diagram

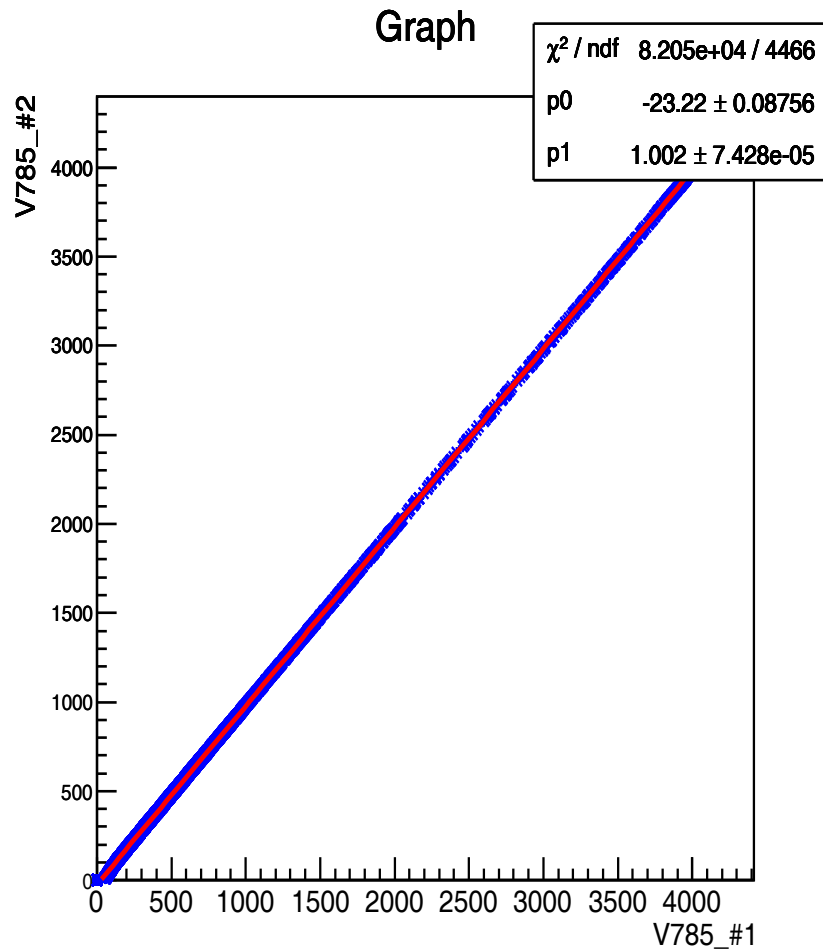


Yellow: signal from PMT

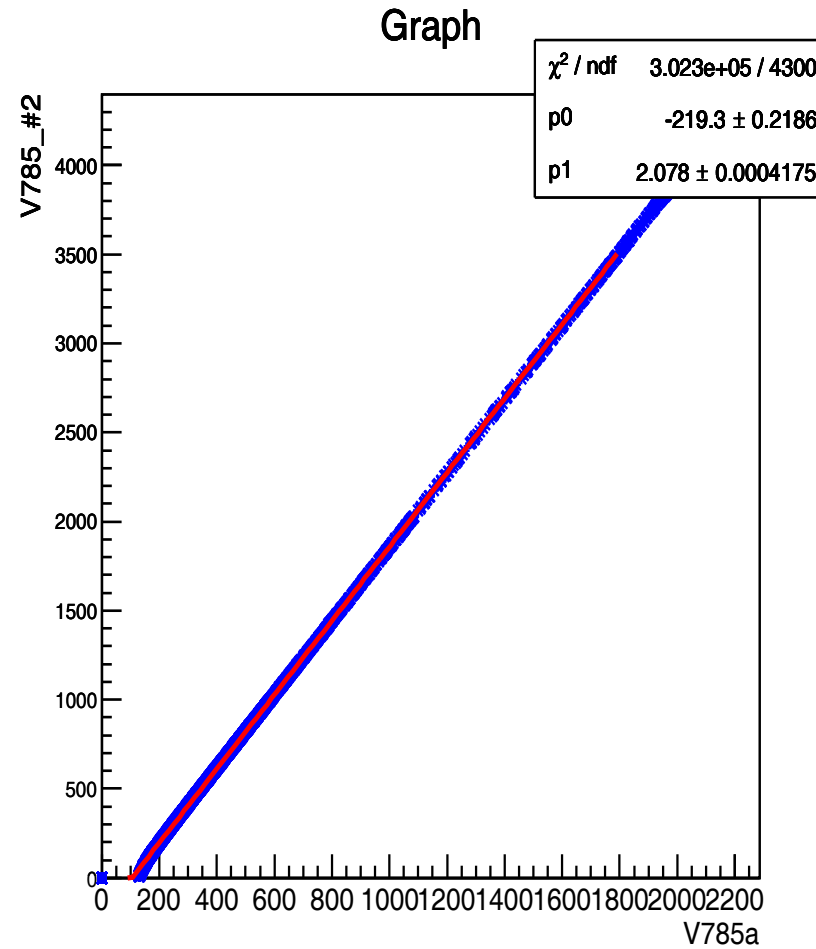
Purple: gate signal

Green: signal from main amplifier

ADC calibration

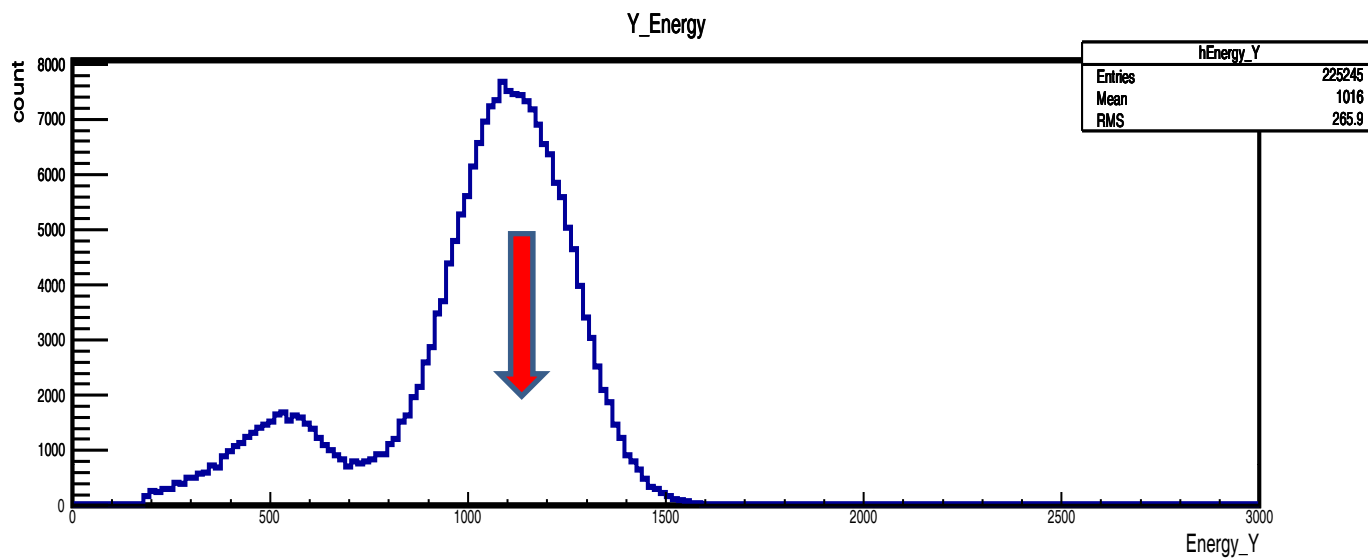
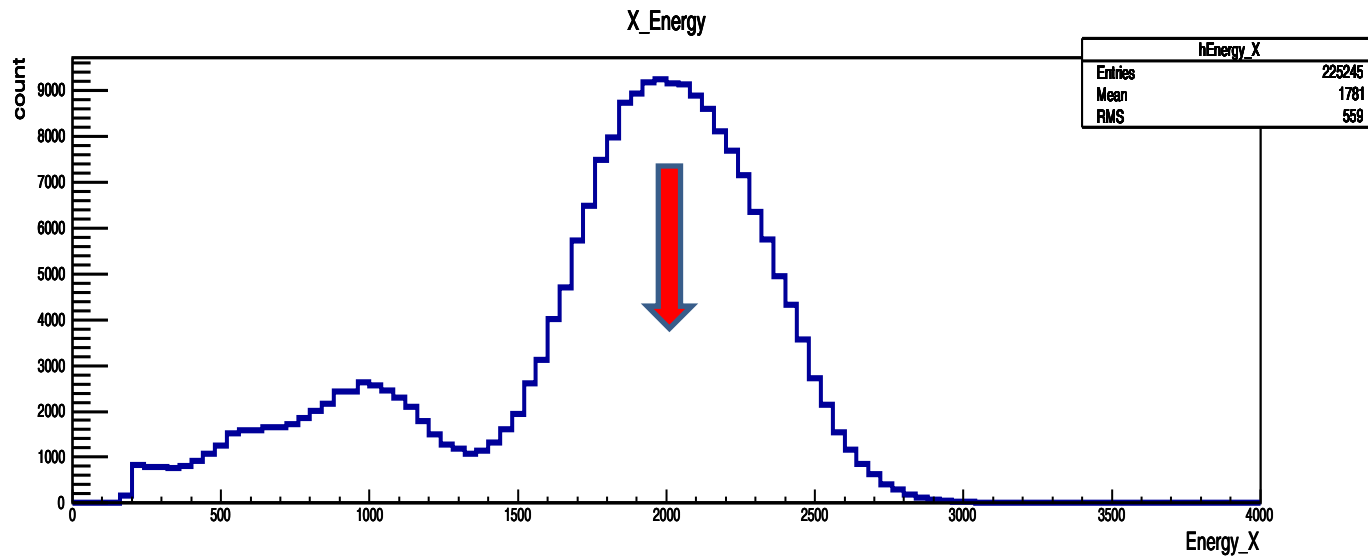


$$\text{Value}(1) = \text{Value}(0) - 23$$

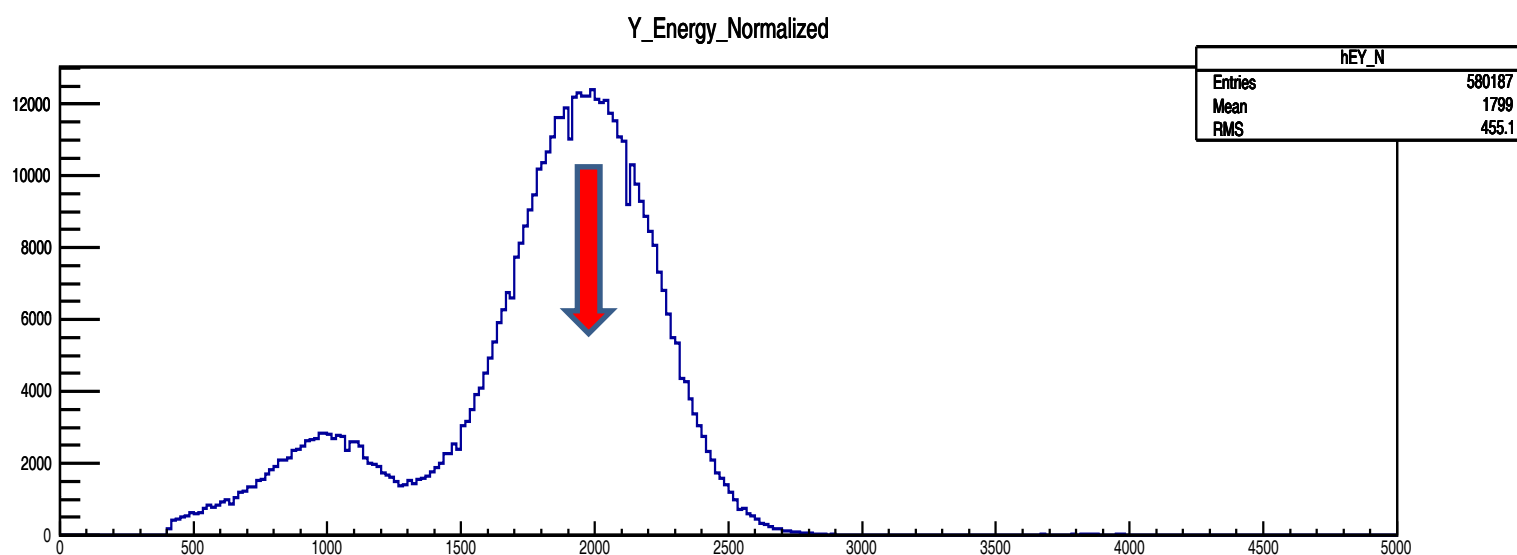
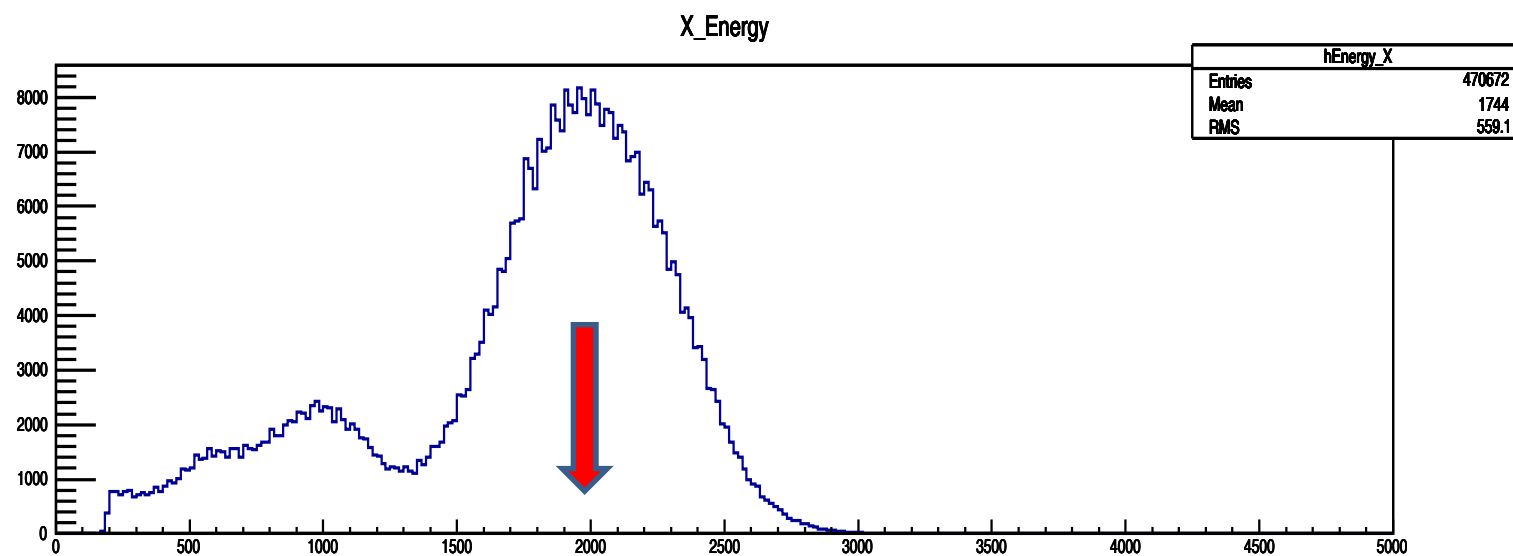


$$\text{Value}(1) = \text{Value}(2) * 2 - 219$$

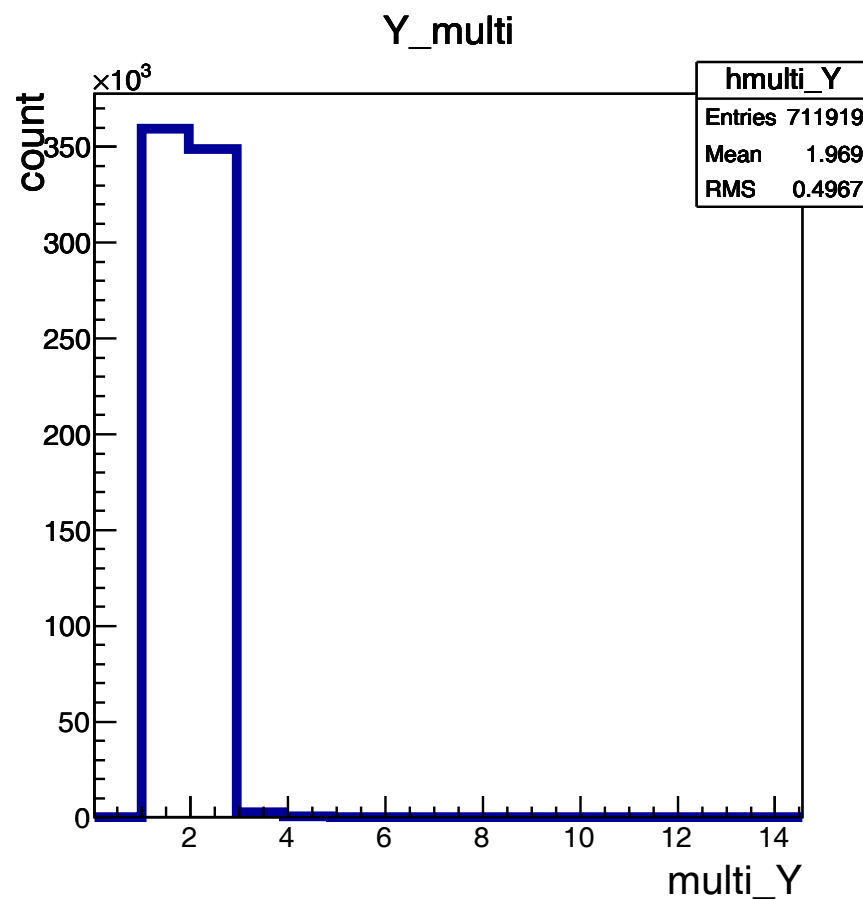
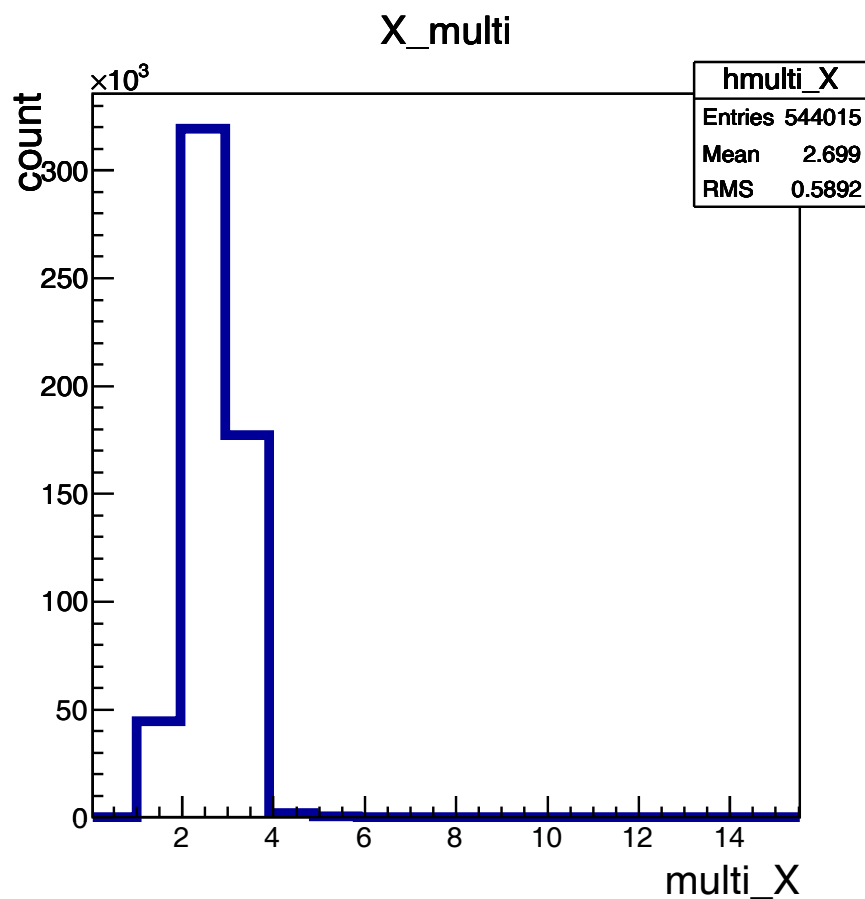
Energy normalization for X and Y dimension



With Normalization



Multiplicity

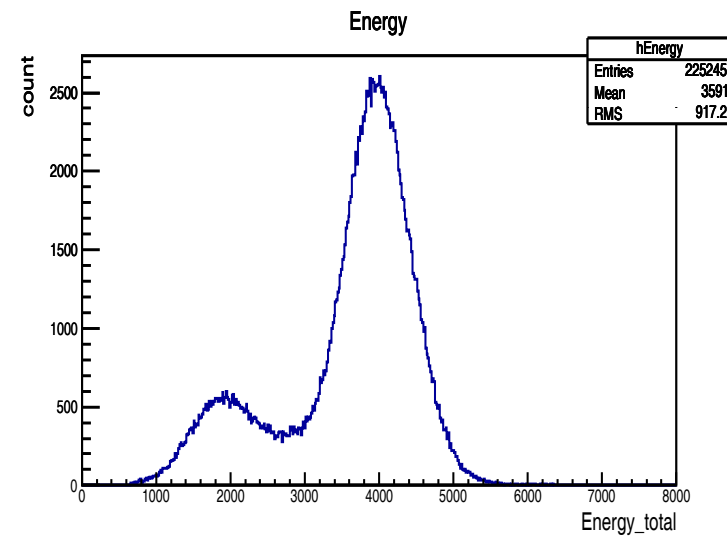
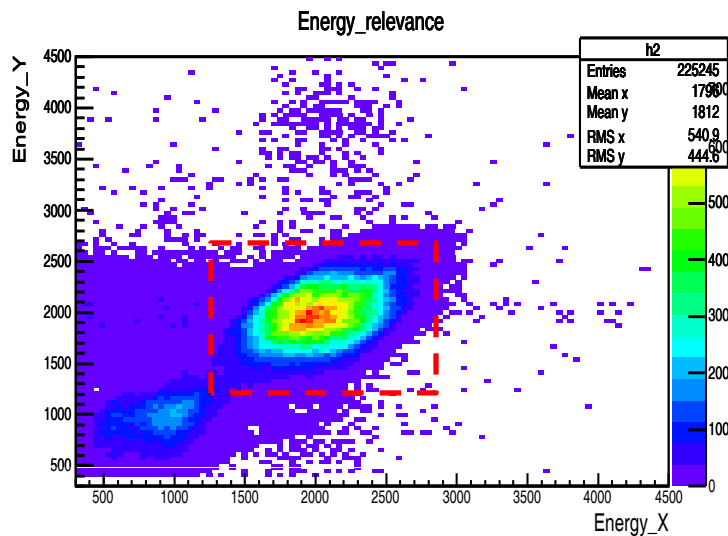
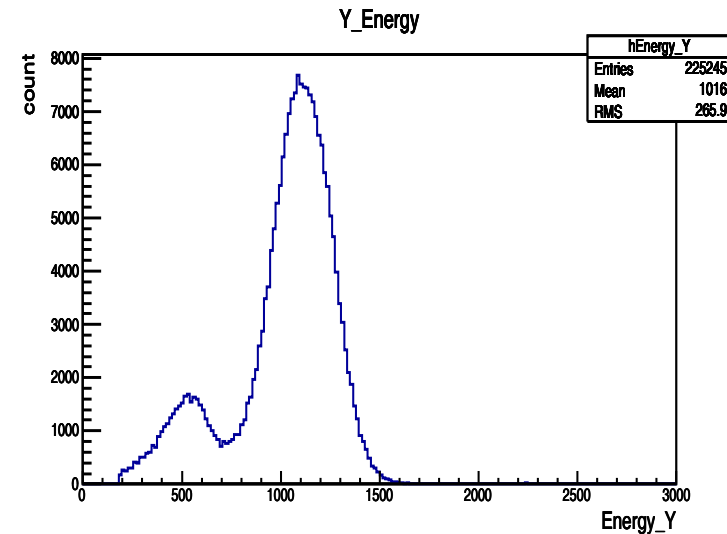
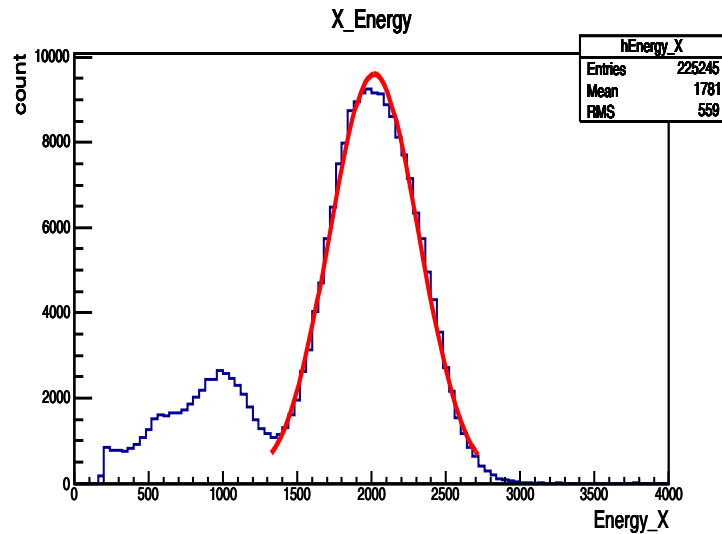


The multi is mainly 1-3.

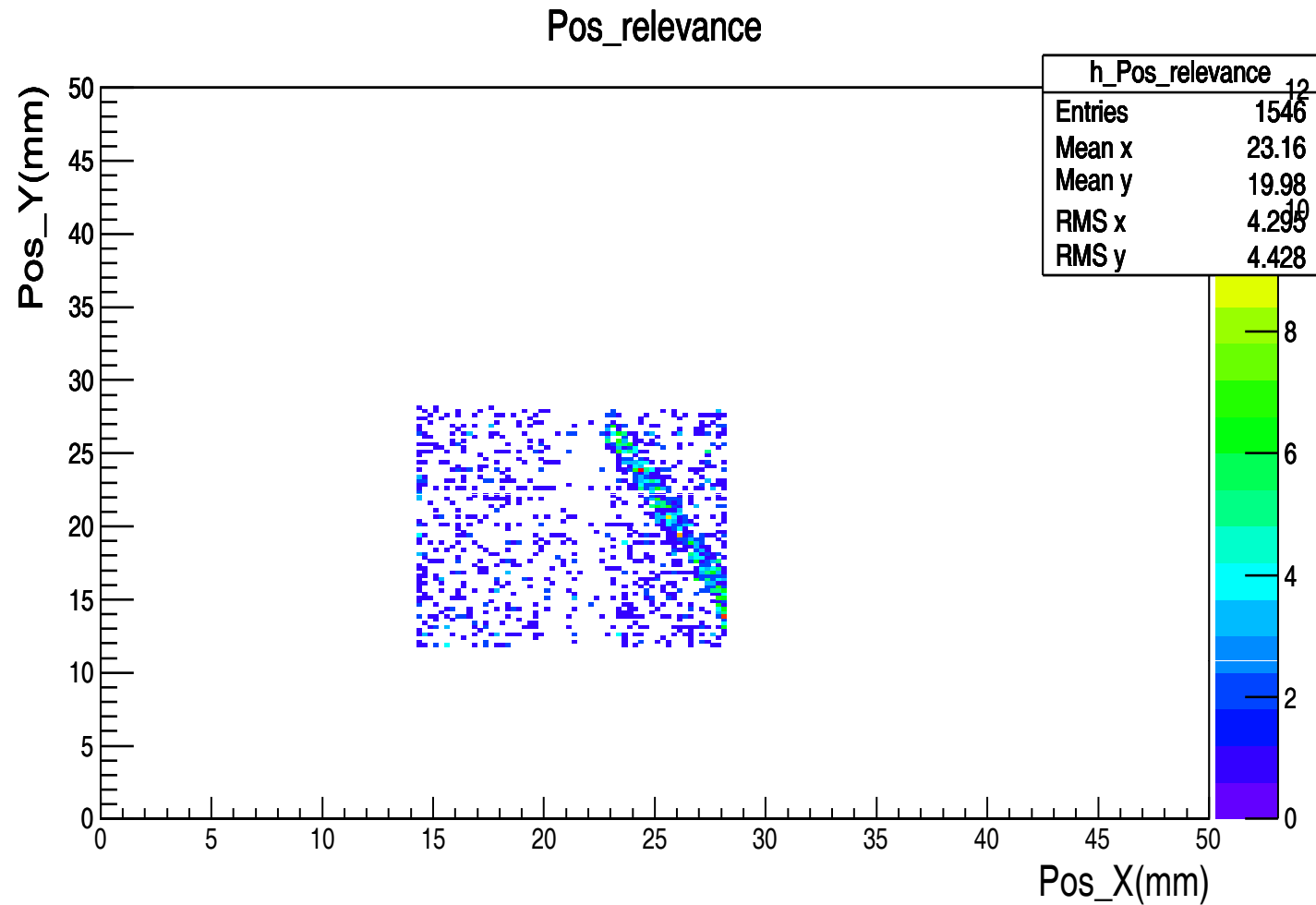
Energy Resolution

Without any cut: FWHM: 28%

Cut out the background: FWHM: 25.7%

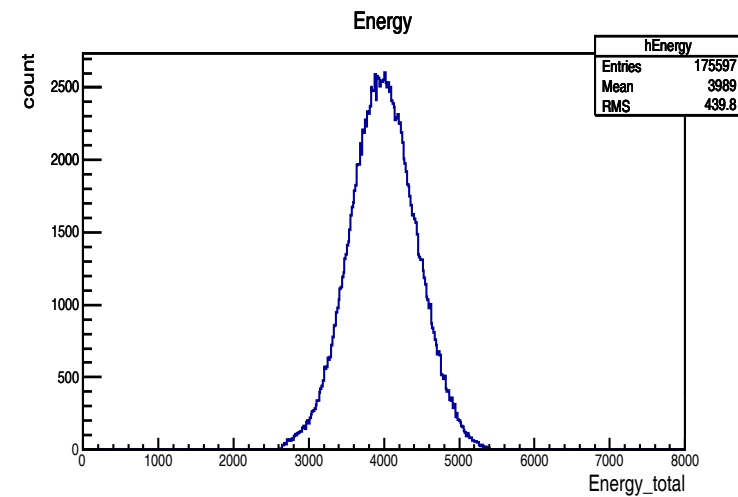
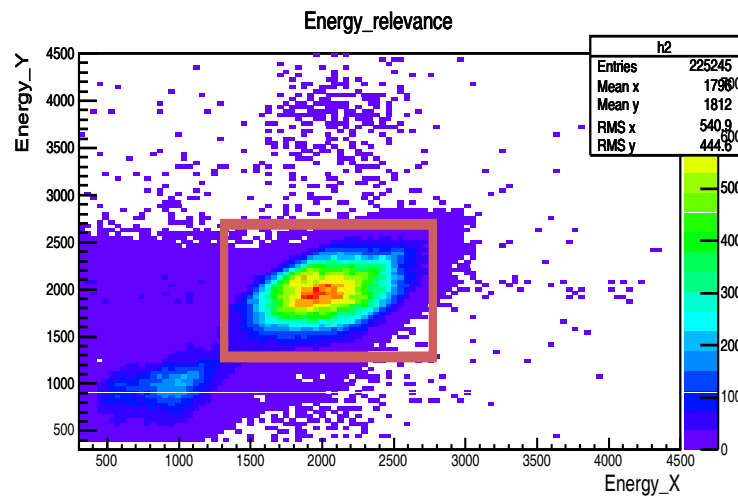
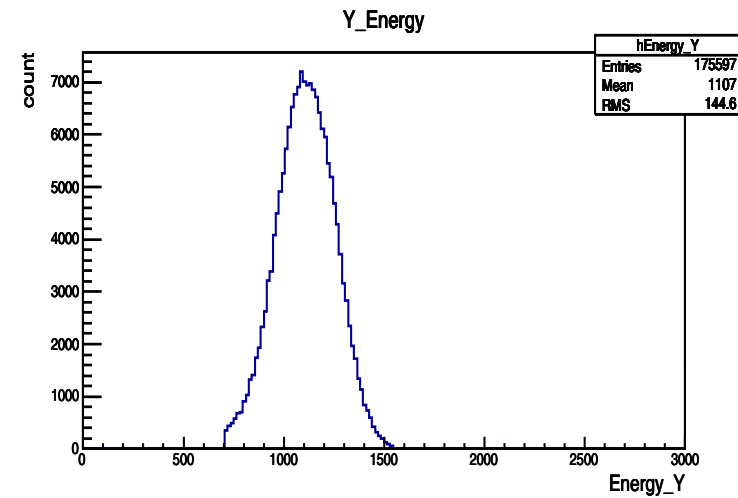
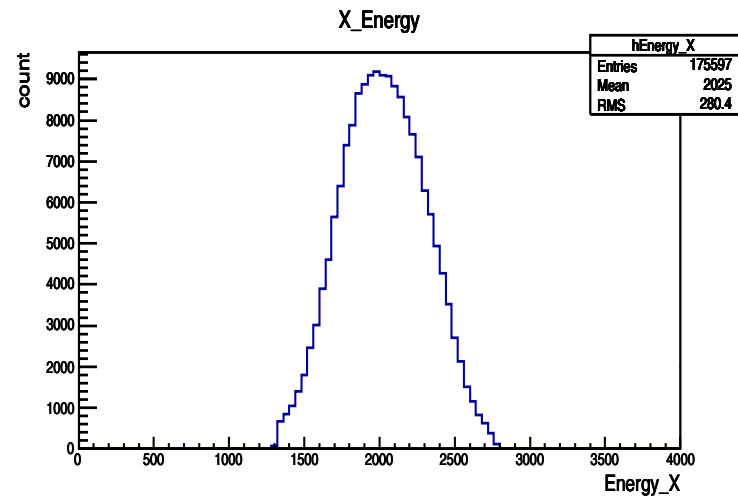


Position Resolution test with a narrow slit

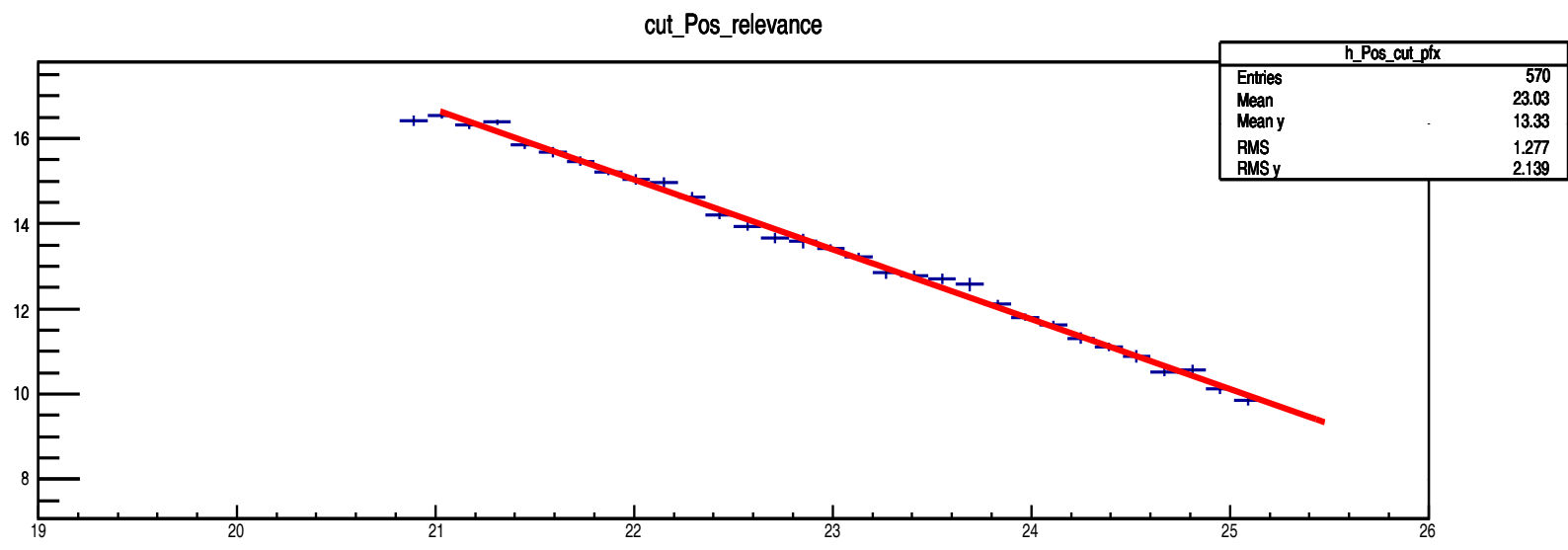
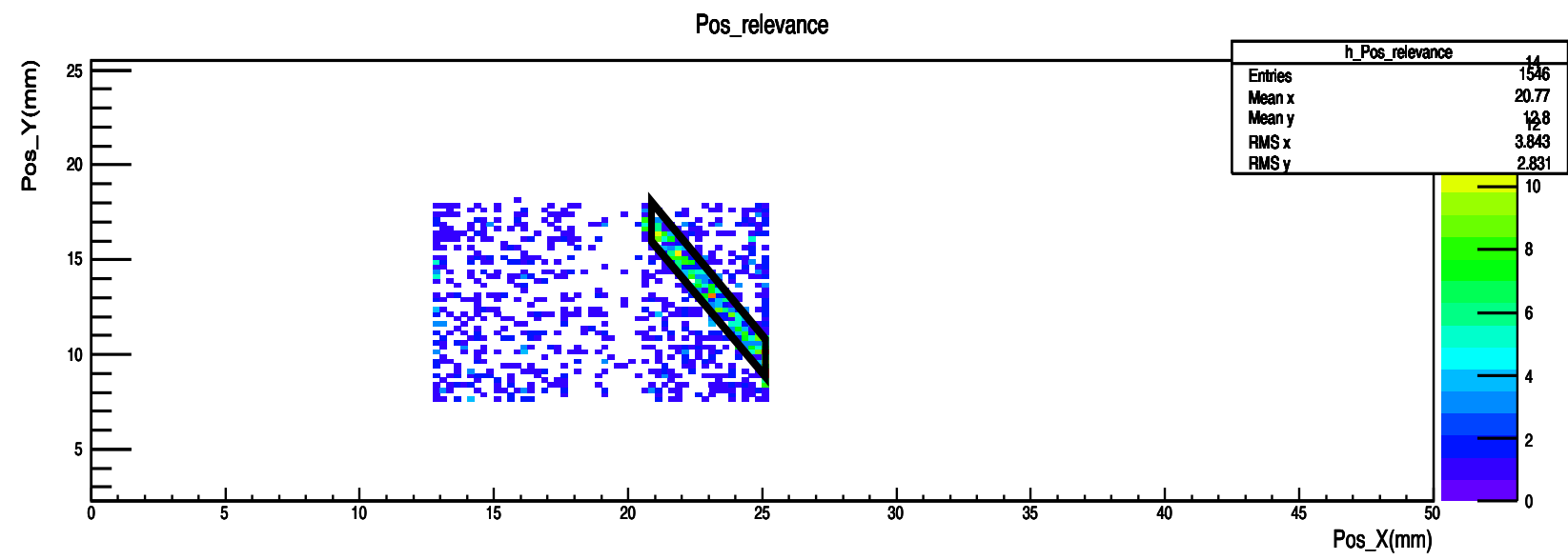


Spatial Resolution

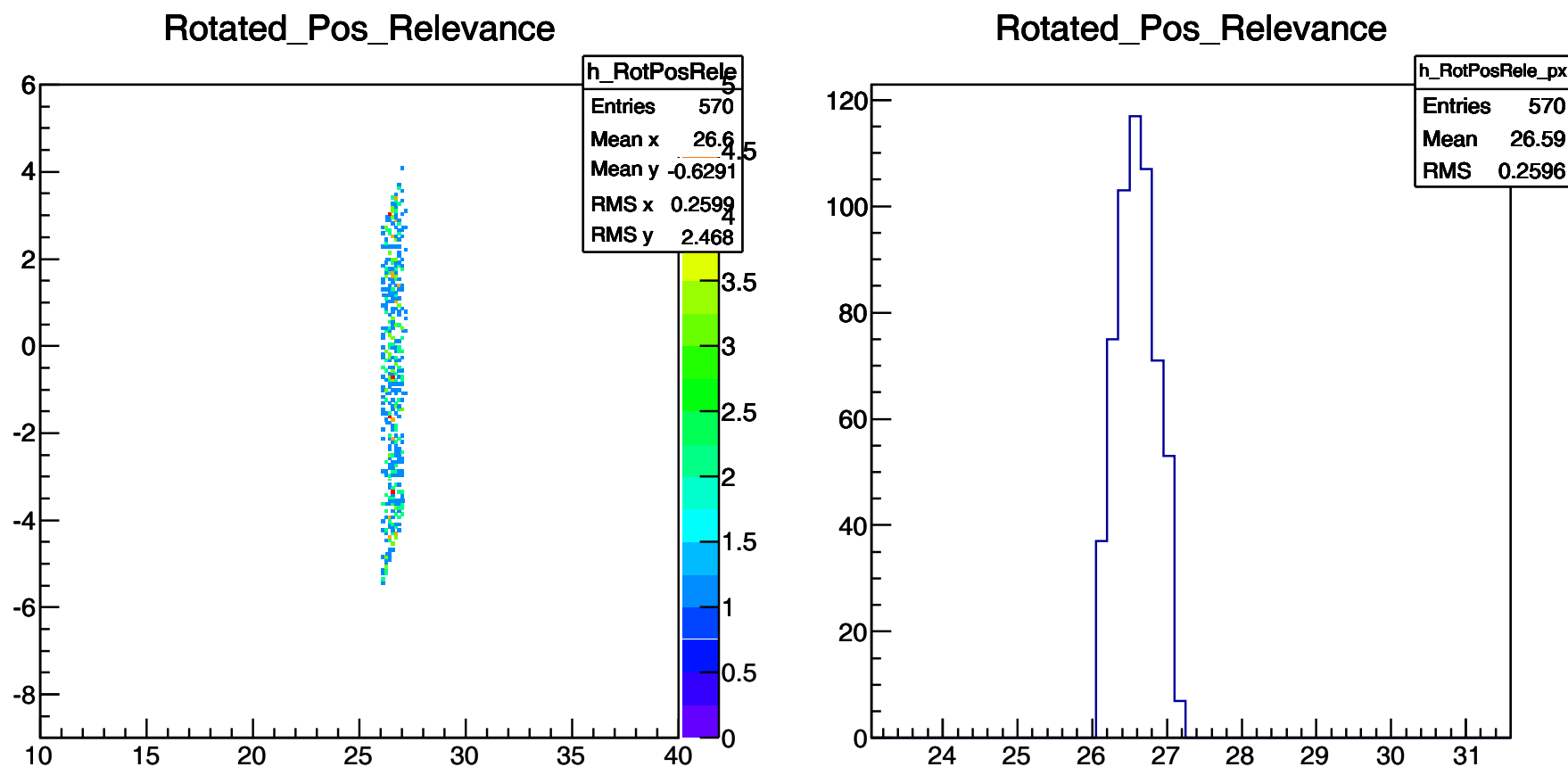
Energy Cut



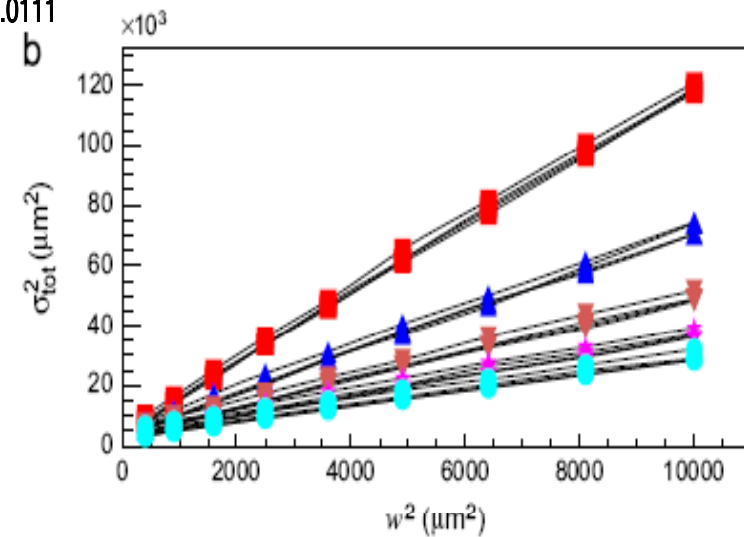
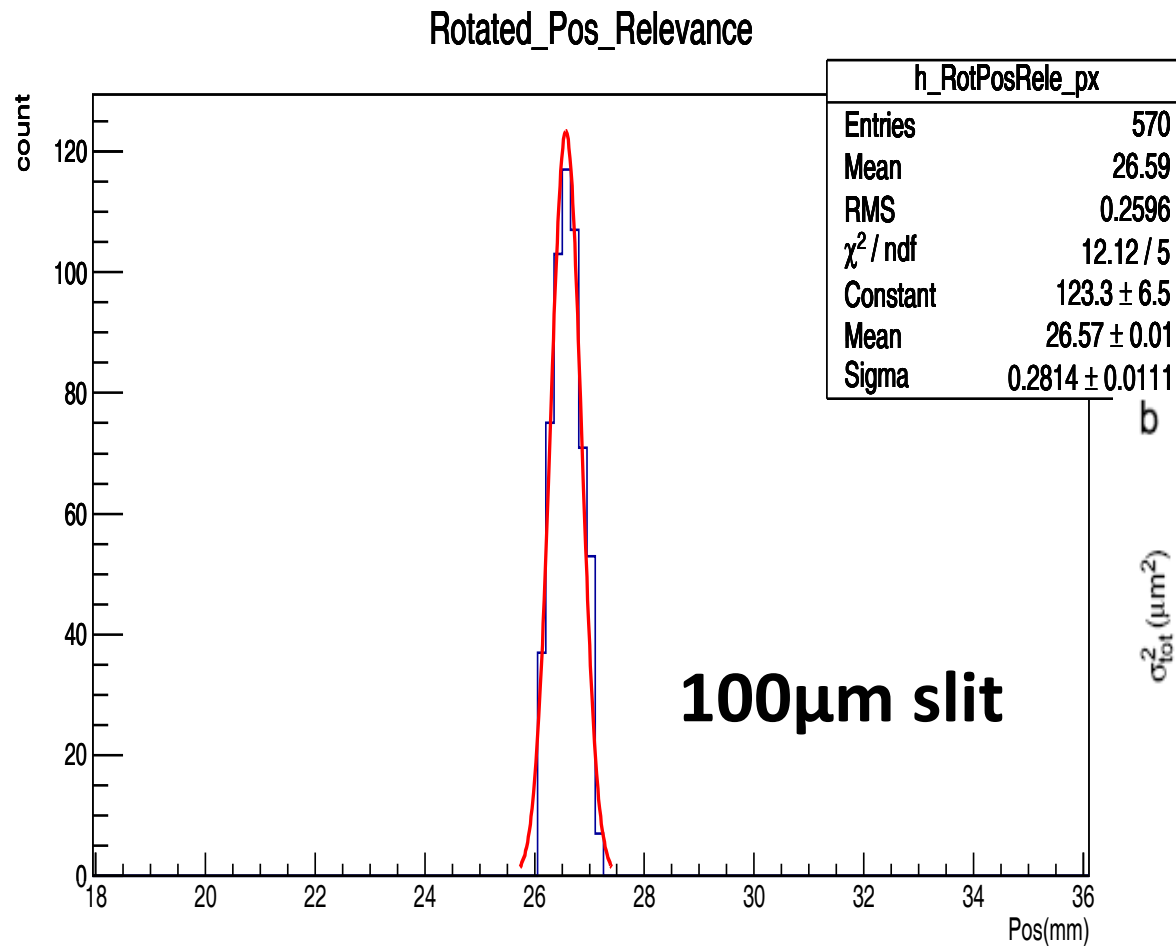
Cut



Projection along the slit-cut profile



Preliminary Results

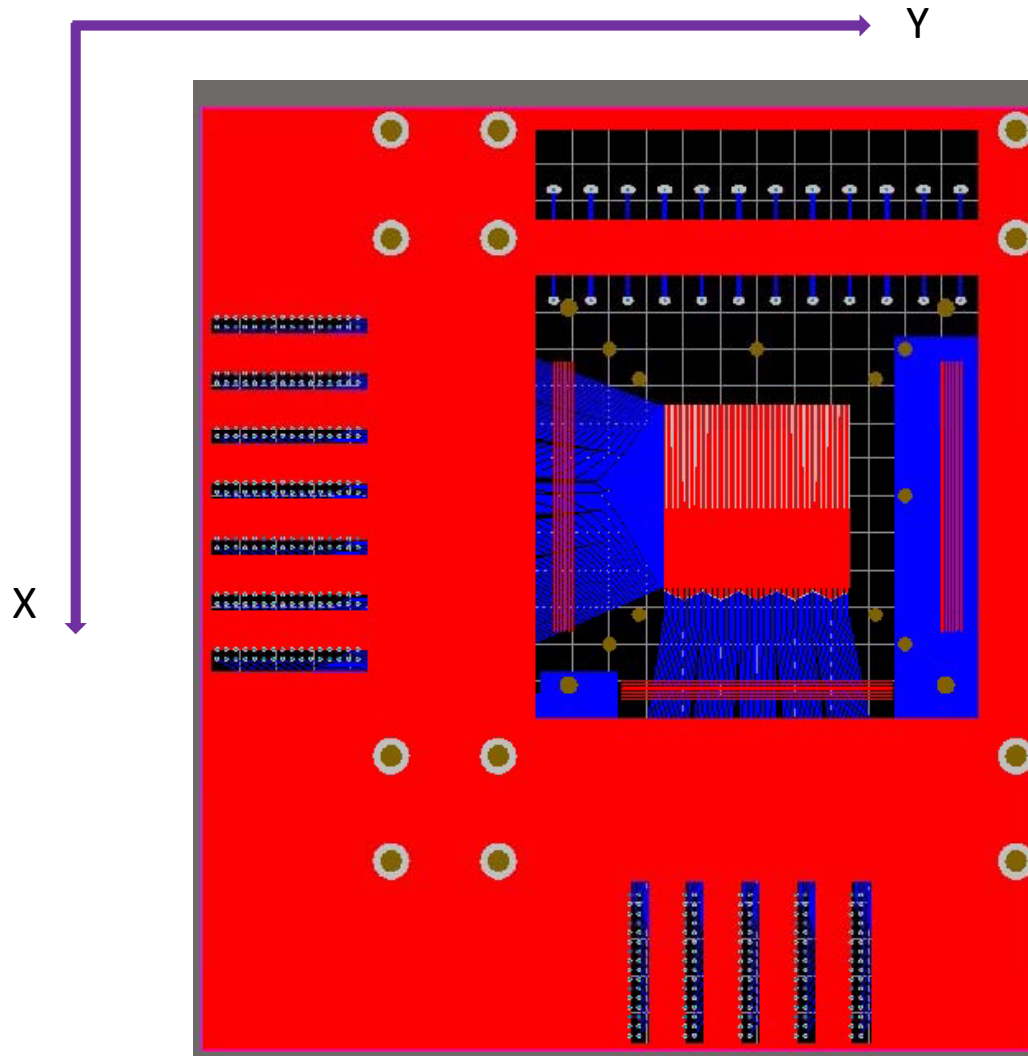


$$281 * 281 - 190 * 190 = 42561$$

Corresponding to a resolution of 206 μm

Spatial Resolution in estimation

(when Multi = 2)



$$\delta_x = \frac{50000}{16 \times 7} \div \sqrt{12} = 129\mu m$$

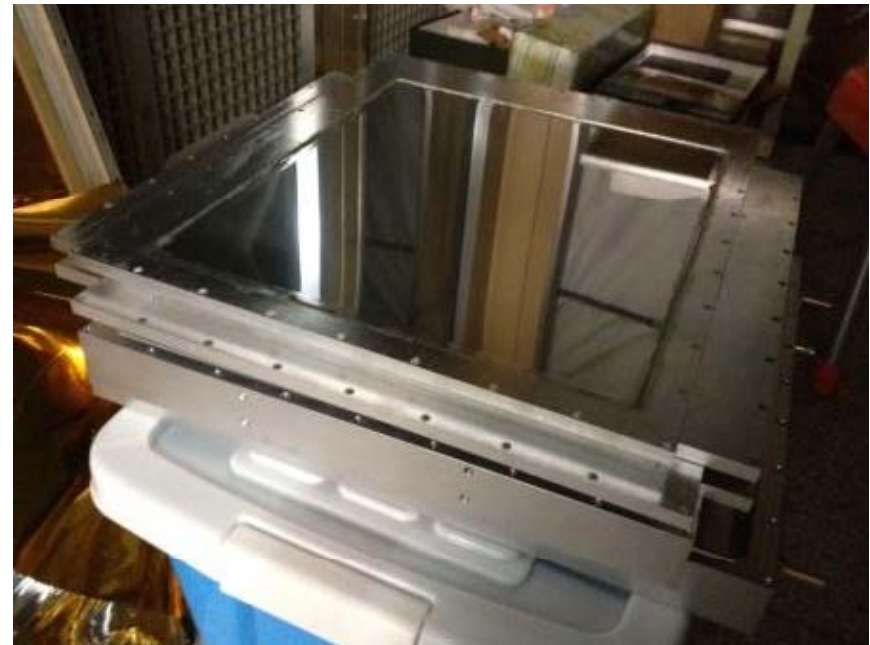
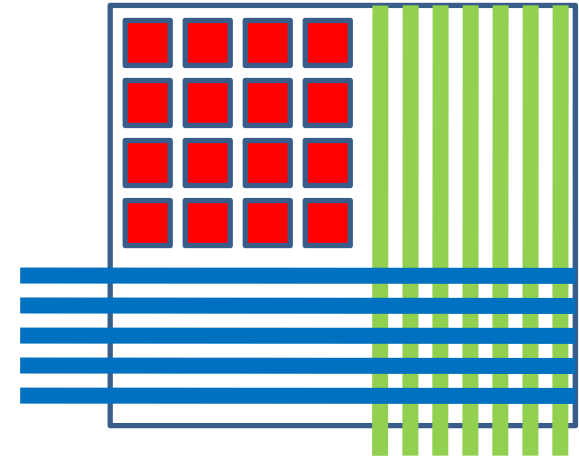
$$\delta_y = \frac{50000}{16 \times 5} \div \sqrt{12} = 180\mu m$$

$$\delta = \sqrt{\delta_x^2 + \delta_y^2} = 221\mu m$$

Large GEM prototype

1. Frames and gas vessel are all ready.
- 2 The Readout Plane being redesigned.

Inter-strip distance extended, paddle readout included.



Summary

- 1 The CASAGEM system works well.**
- 2. FWHM of energy resolution of the 2D small GEM: 28%.**
- 3. With a slit about 100 μm , the spatial resolution is about 200 μm , very preliminary. More precise determination is coming soon.**

Next Plan

1. Determine the intrinsic spatial resolution of the 2D small GEM.
- 2 To make a better collimation and a better optical platform.
3. Produce more about 10 CASAGEM, with our 4 new V785 we can have 192 electronic channels, which cover our 50×50 mm GEM Sell, which is reasonably sufficient for the large GEM test.
- 4 In parallel with the assembling of the Large GEM , we will make some further tests using the current 2D GEM of smaller size.

Thank you!

