TESTING THE NEW LOW ENERGY GERMANIUM DETECTORS (LEGE)

SETTING UP/ PARAMETERS

- Set the gain of the Intelligent Preamplifier at its maximum option: x10

- <u>Trapezoid filter Parameters</u>

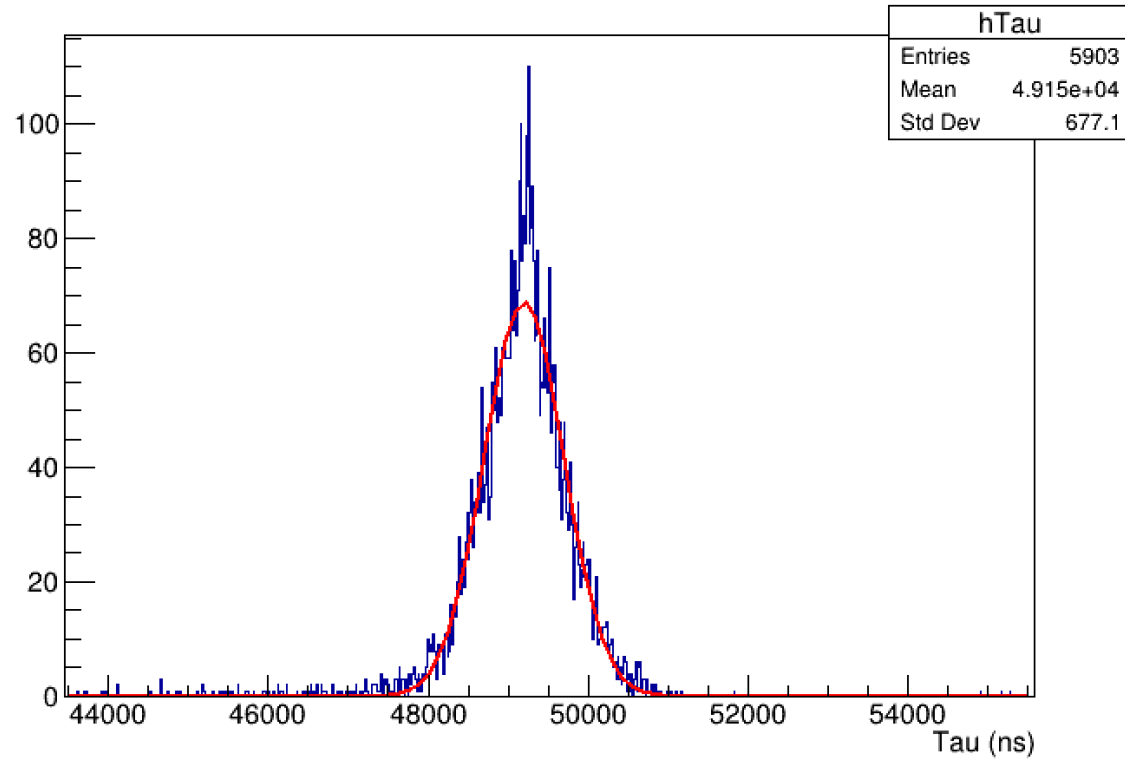| LEGe 1			
Trapezoid Parameters	Tau (ns)	Gap	Peaking
Used	49.19	300	2600
Manufacturer		200	1800

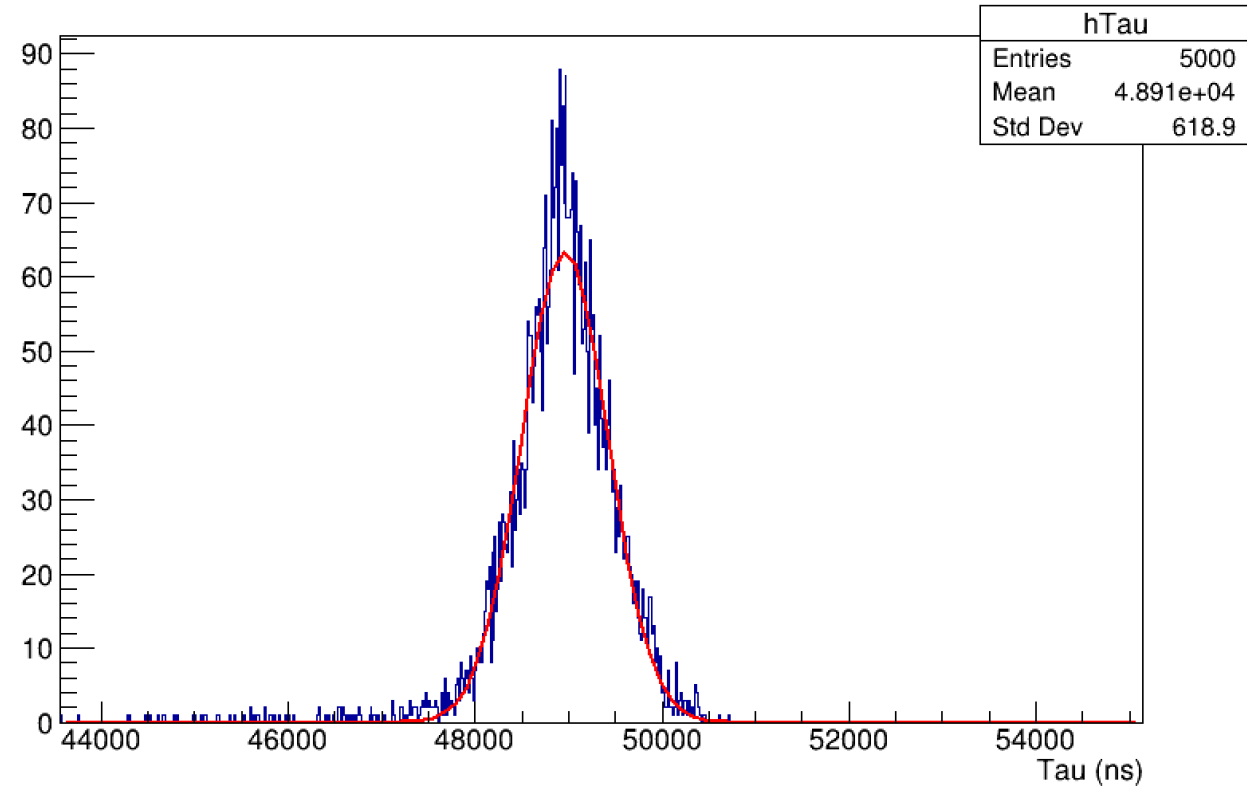| LEGe 2			
Trapezoid Parameters	Tau (ns)	Gap	Peaking
Used	48.96	250	2100
Manufacturer		200	1800

TAU PARAMETER

- Taking long traces with 25000 buffer length

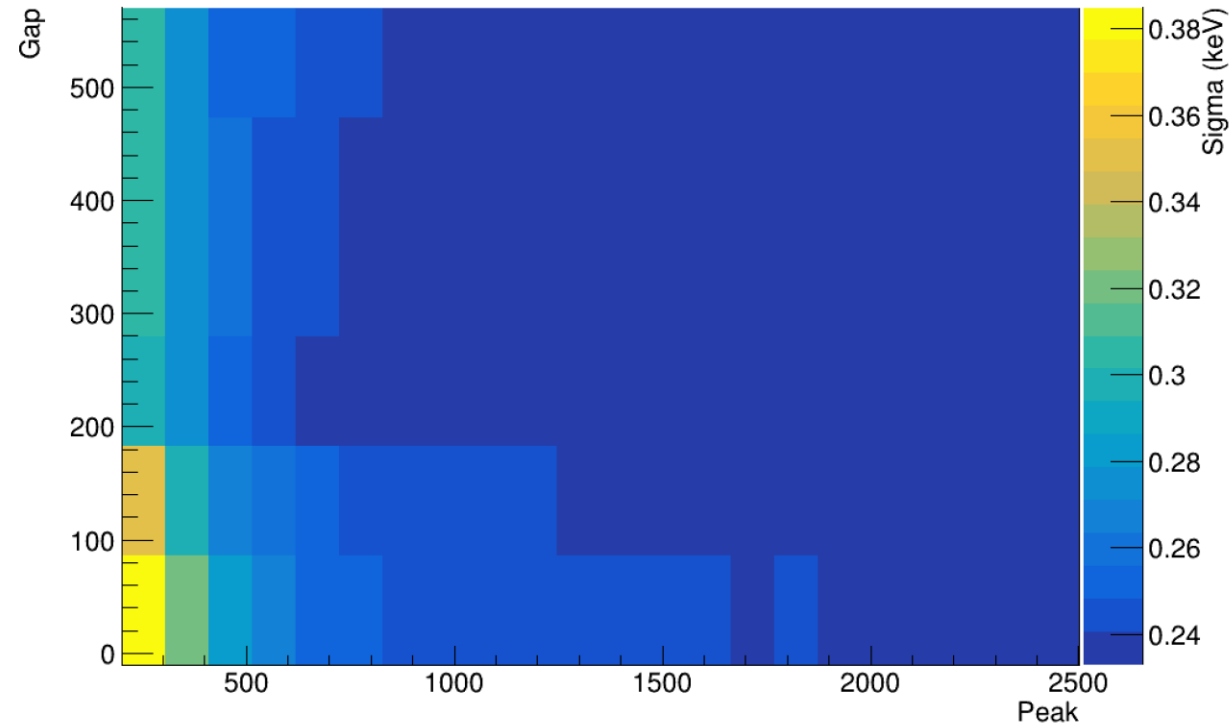# GAP AND PEAKING

- Running the trapezoid filter with Michaels Trapezoidal Optimization code.
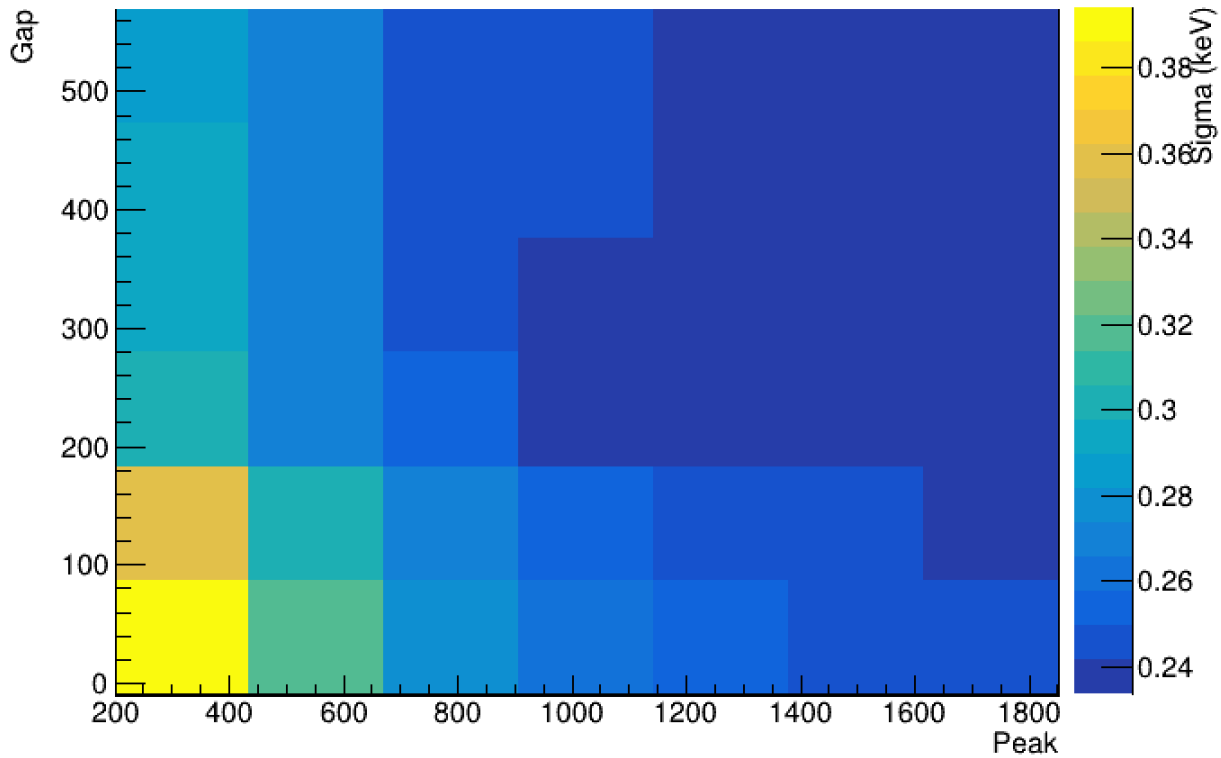
GAP AND PEAKING

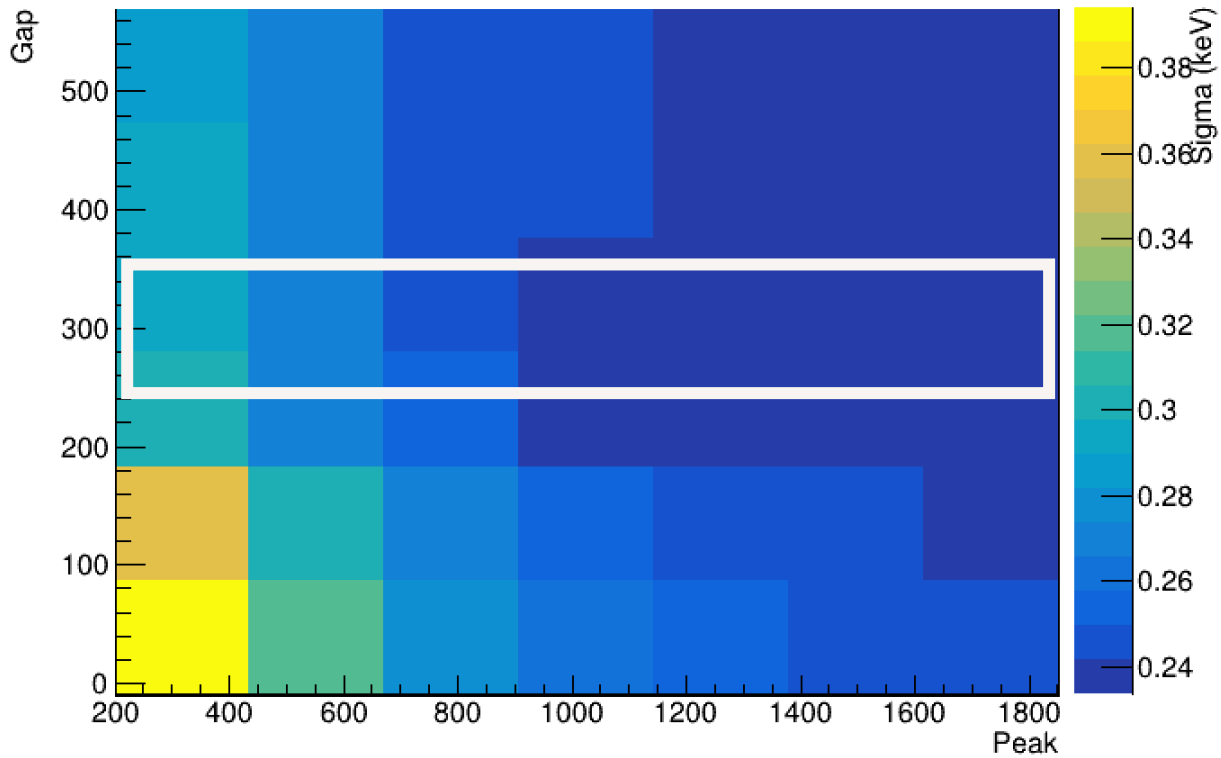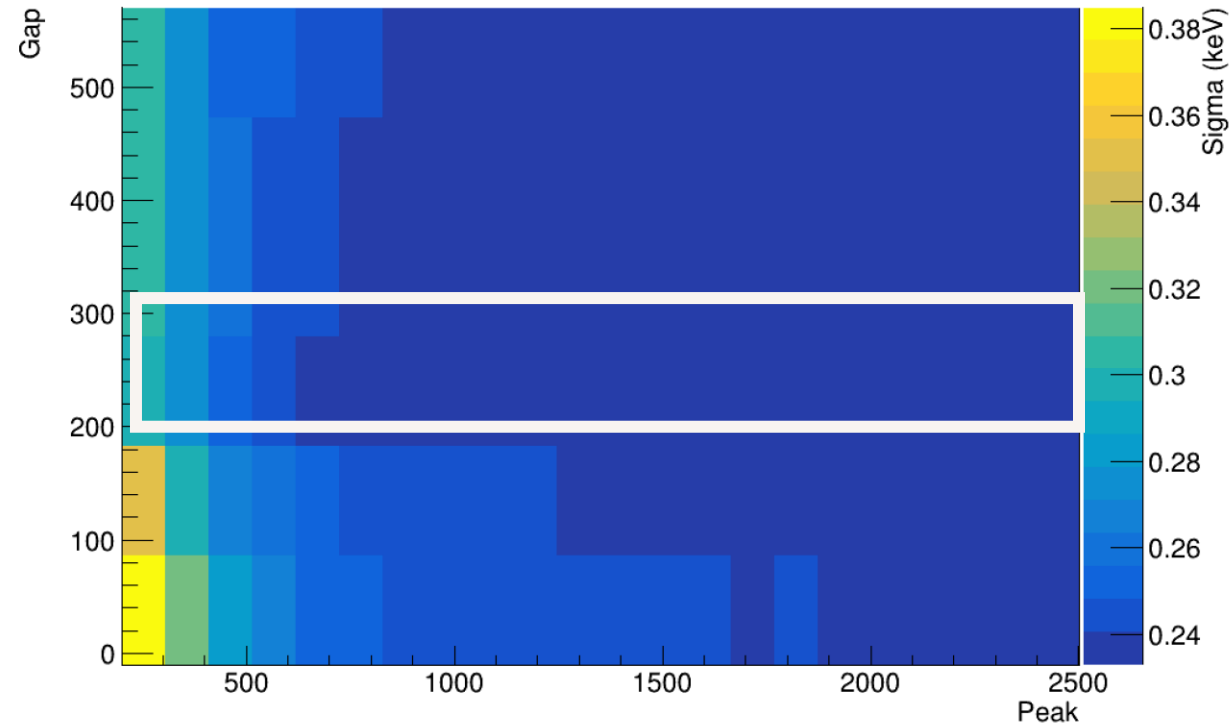- Choosing gap at 300 for LEGe1 and 250 for LEGE2.

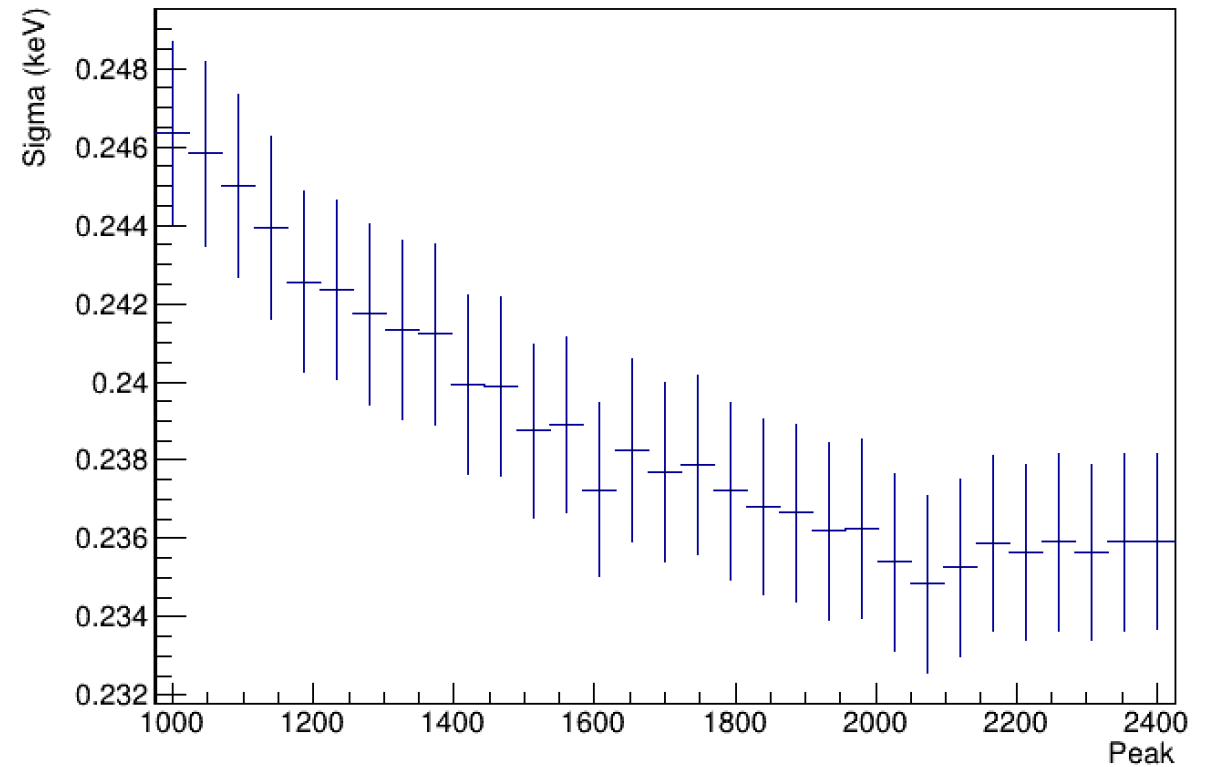# GAP AND PEAKING

- Fixing the Gap we study the minimum resolution for the Peak parameter
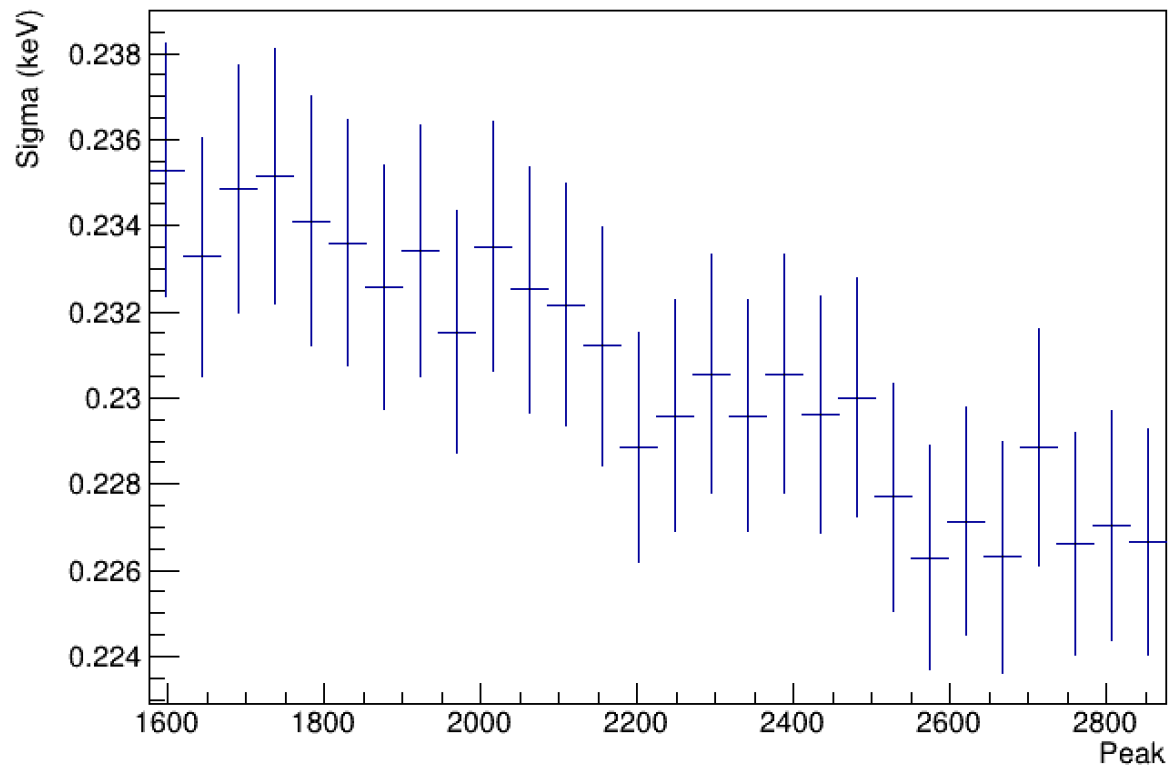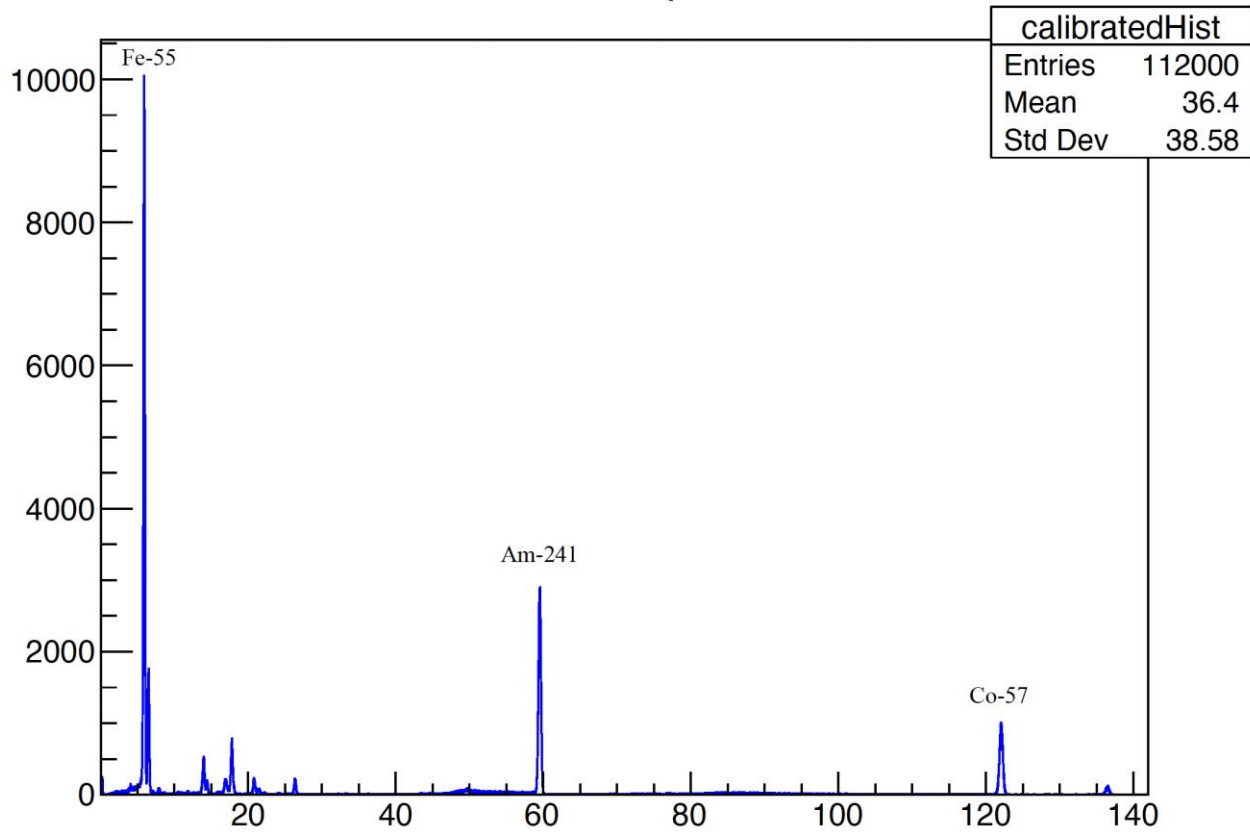
SPECTRA

- Using three sources at the same time: Fe-55, Co-57 and Am-241

Calibrated Spectrum

calibratedHist	
Entries	112000
Mean	36.4
Std Dev	38.58

FITTING THE PEAKS

LEGe1, Am-241

Intensity = 1165.33 ± 2.45
Mean = 59.52 ± 0.00 keV
Sigma = 0.16 ± 0.00 keV

LEGe1, Co-57

Intensity = 535.51 ± 1.65
Mean = 122.07 ± 0.00 keV
Sigma = 0.22 ± 0.00 keV

LEGe1, Fe-55

Intensity = 2341.29 ± 4.09
Mean = 5.91 ± 0.00 keV
Sigma = 0.10 ± 0.00 keV

x 40.8
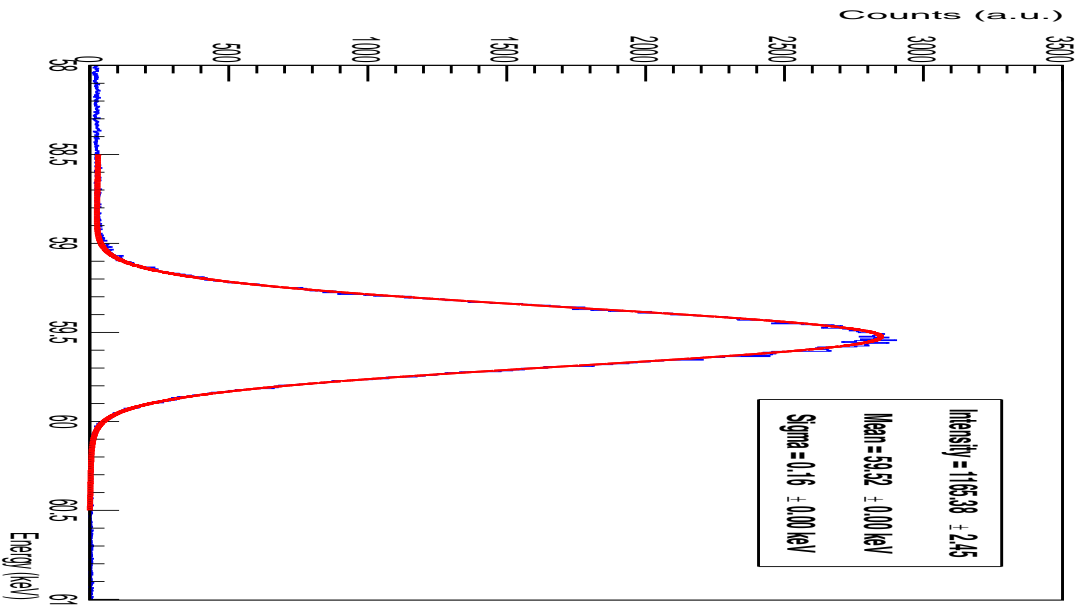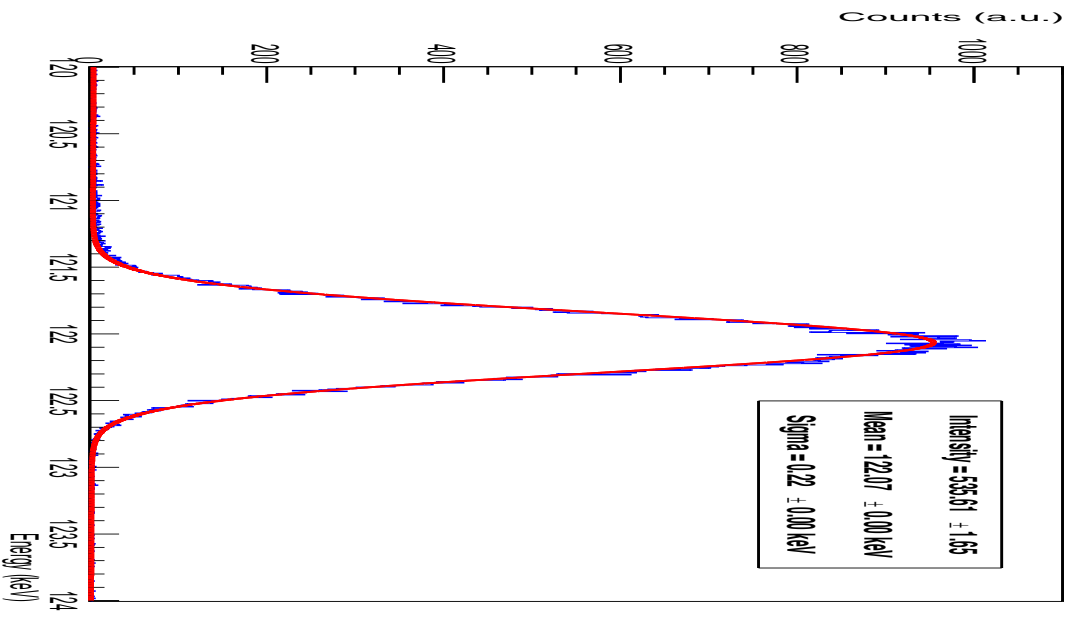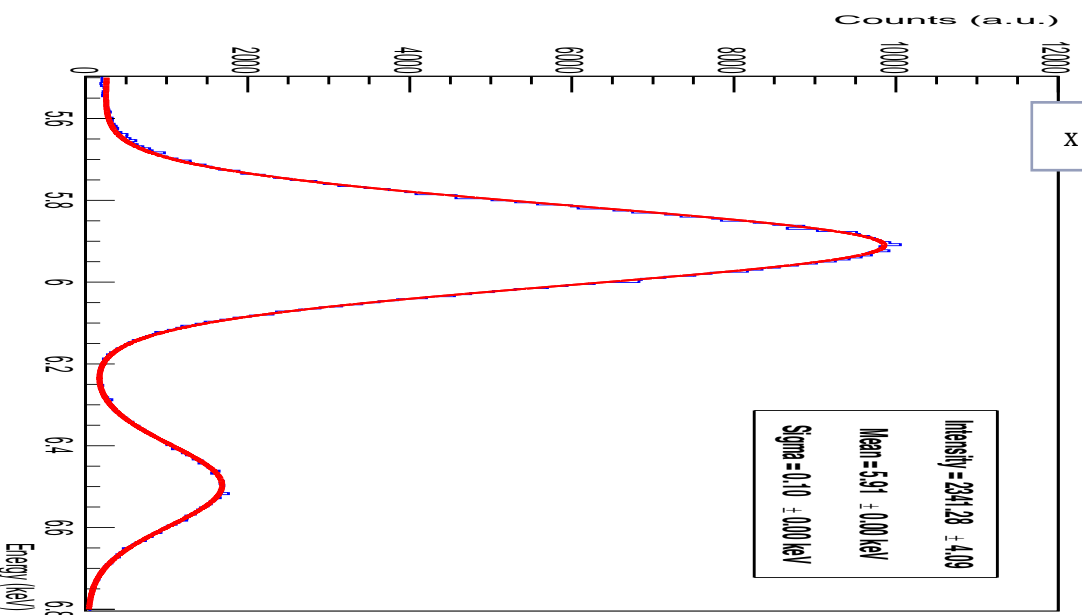
RESOLUTION

LEGe 1			
Isotopes	Fe-55	Am-241	Co-57
Energy (keV)	5.9	59.54	122
Calculated (eV)	235	377	517
Manufacturer (eV)	220	-	525

LEGe 2			
Isotopes	Fe-55	Am-241	Co-57
Energy (keV)	5.9	59.54	122
Calculated (eV)	235	400	542
Manufacturer (eV)	220	-	525

RESOLUTION

LEGe1 Detector FWHM as a Function of Energy
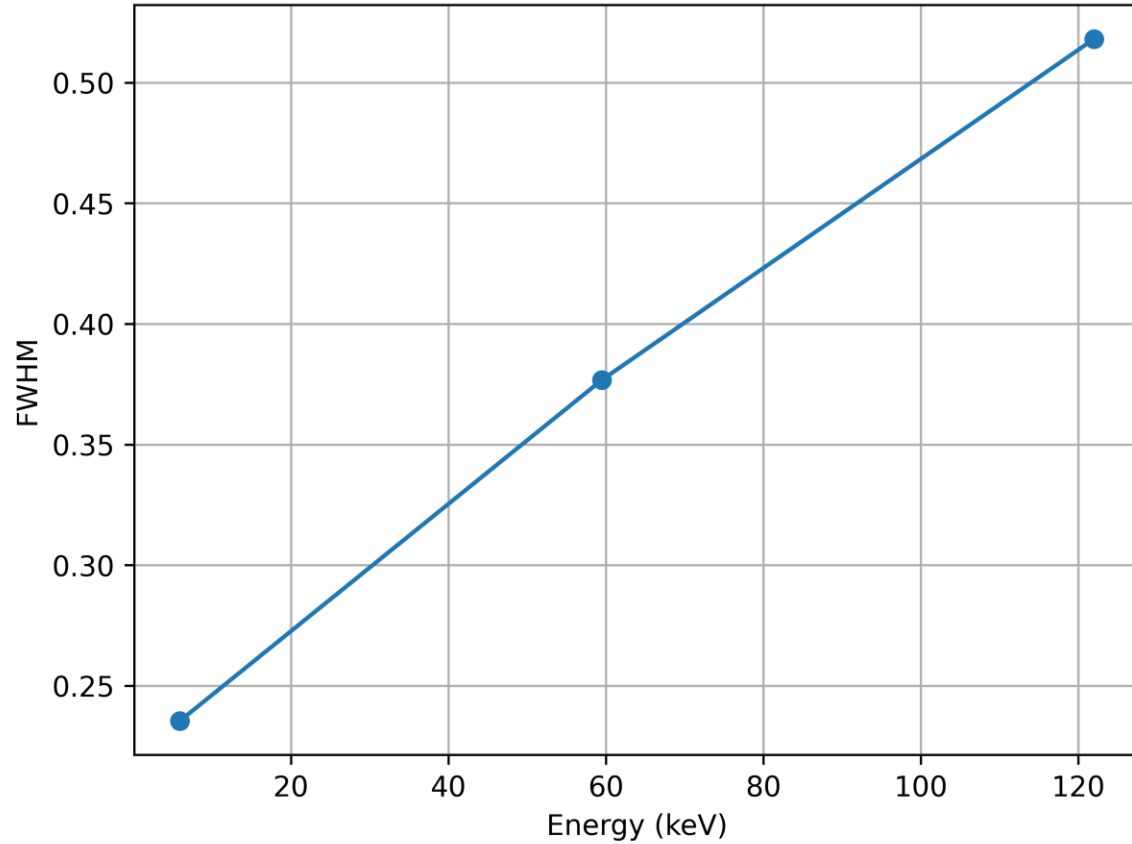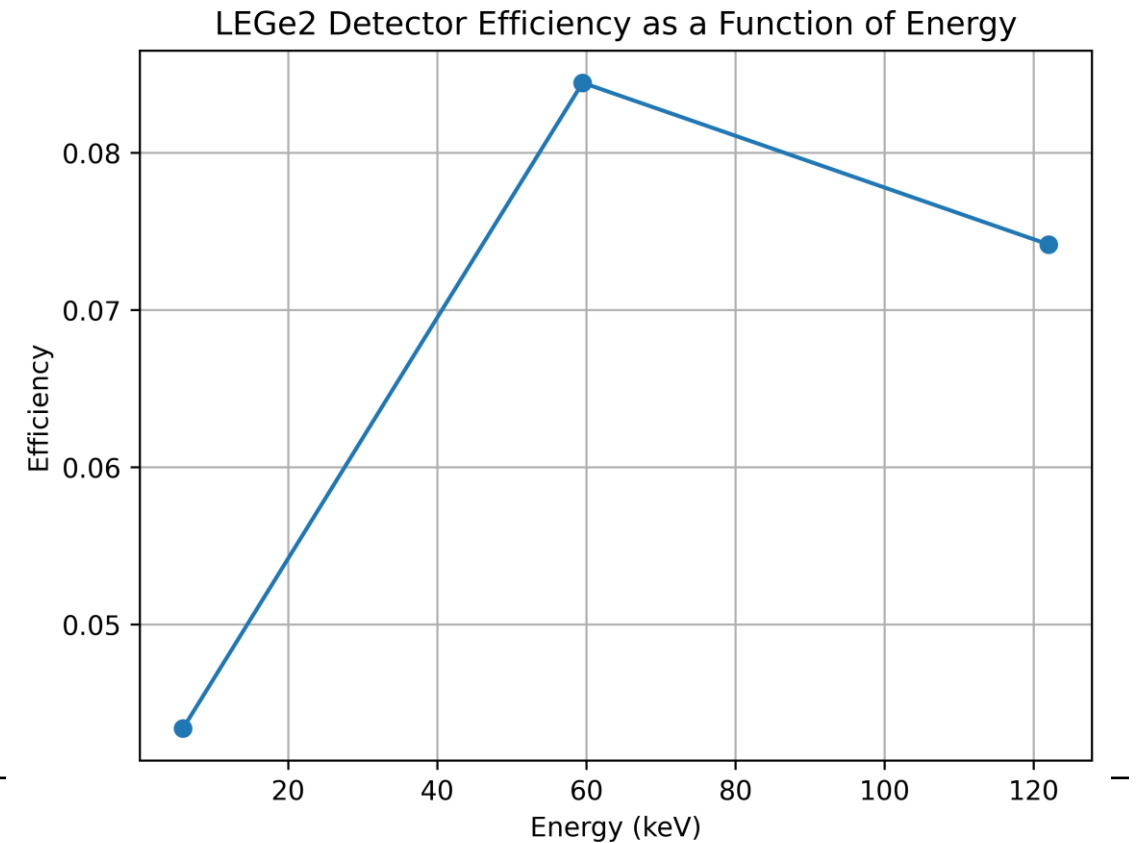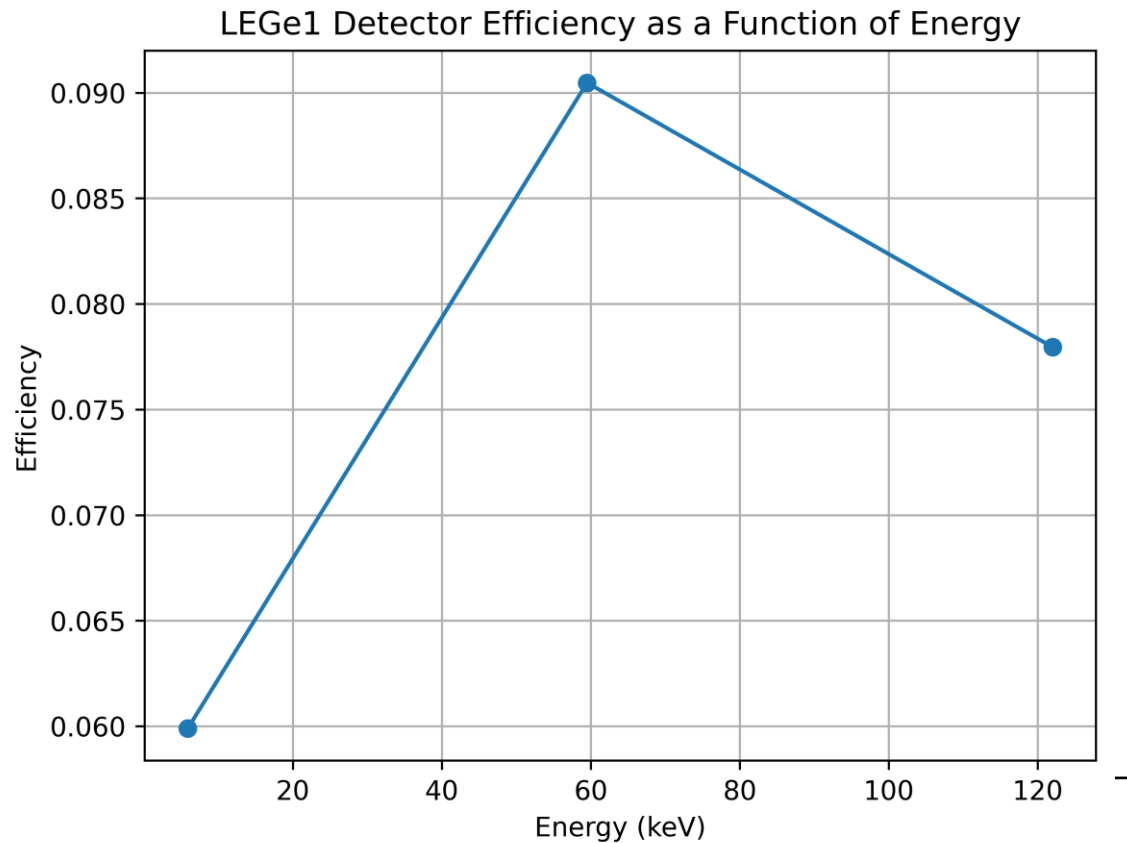
LEGe2 Detector FWHM as a Function of Energy
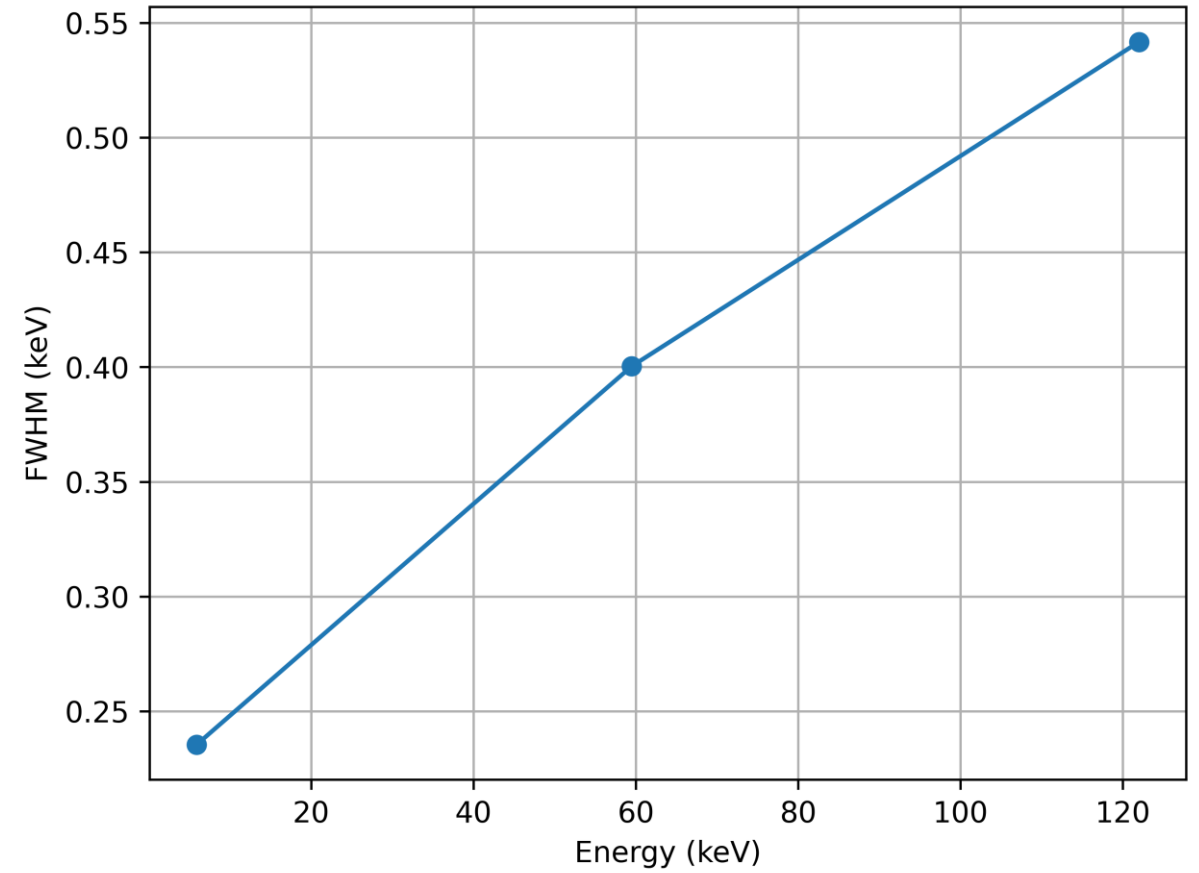
EFFICIENCY

Calculated intrinsic efficiency, considering the X-ray attenuation for Be window and plastic support around sources ~ 1mm.

$$\epsilon = \frac{Counts}{Activity * Time * Yield * \Omega * Attenuation}$$

EFFICIENCY

Calculated intrinsic efficiency, considering the X-ray attenuation for Be window and plastic support around sources ~ 1mm.

DISCUSSION TOPIC: THE PEAKING NORMALIZATION

- When we removed at the BankDecoder.cpp the peaking normalization from trigger.energy we got a much better resolution, especially for Fe-55 source

```
150
151          //trigger.energy    = ( (float) pdata[counter+13] ) / peaking;
152          trigger.energy    = ( (float) pdata[counter+13] );
153
```
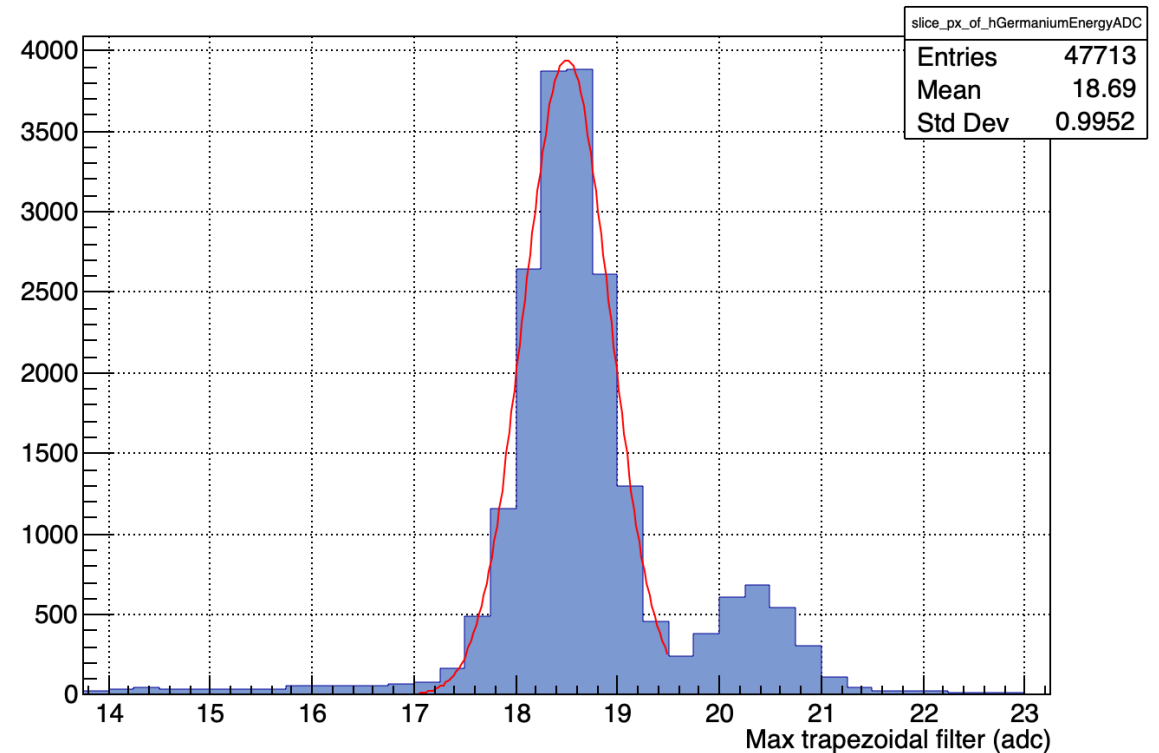
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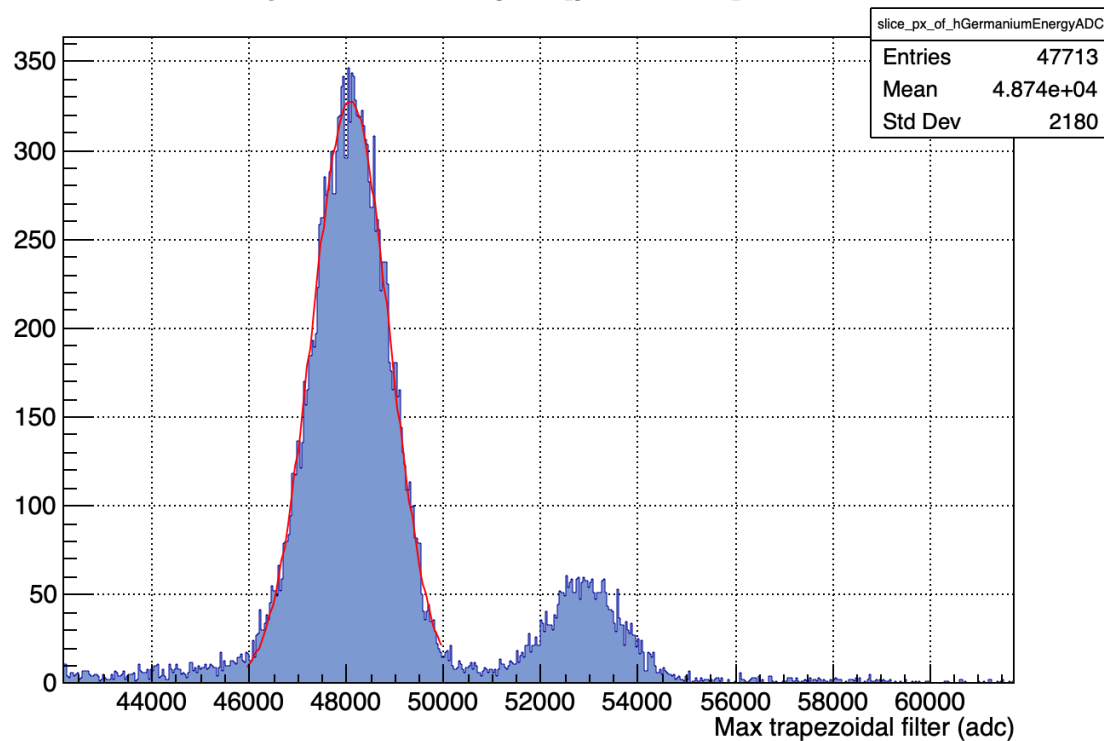
No peaking normalization: FWHM(eV): 0.228

Peaking normalization: FWHM(eV): 0.314