TESTING THE NEW LOW ENERGY GERMANIUM DETECTORS (LEGE)

SETTING UP/ PARAMETERS

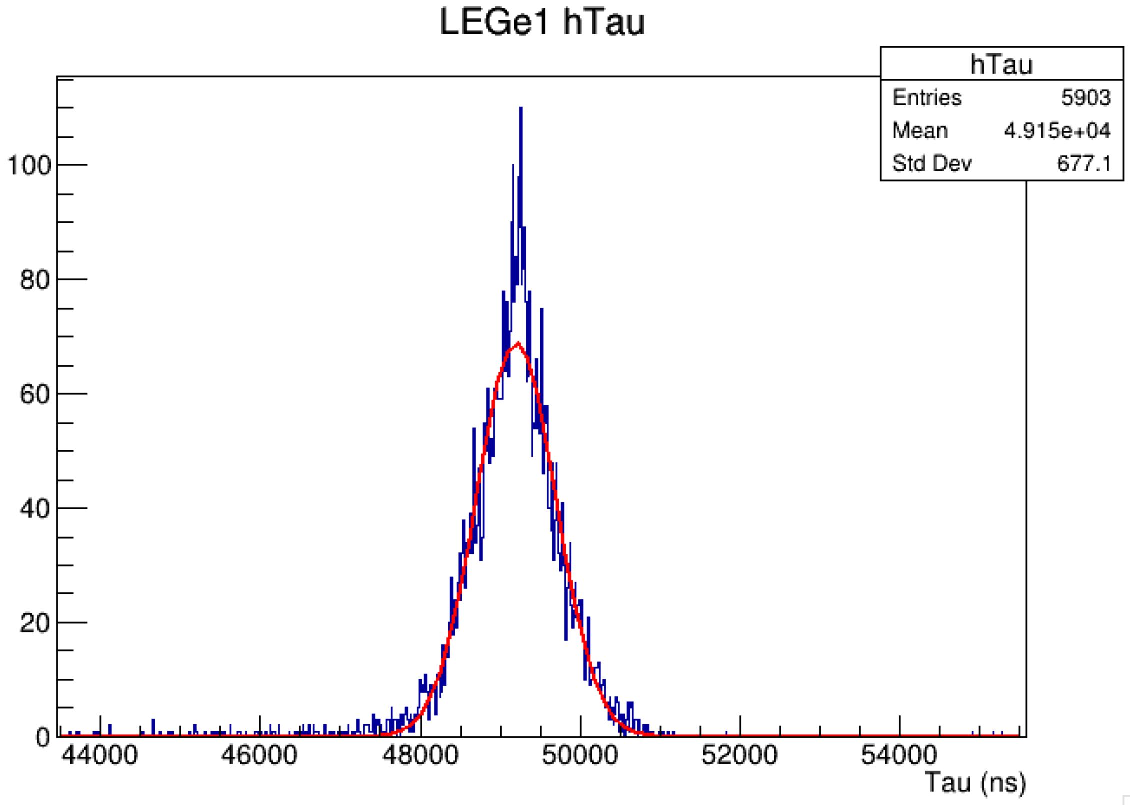
- Set the gain of the Intelligent Preamplifier at its maximum option: x10
- Trapezoid filter Parameters

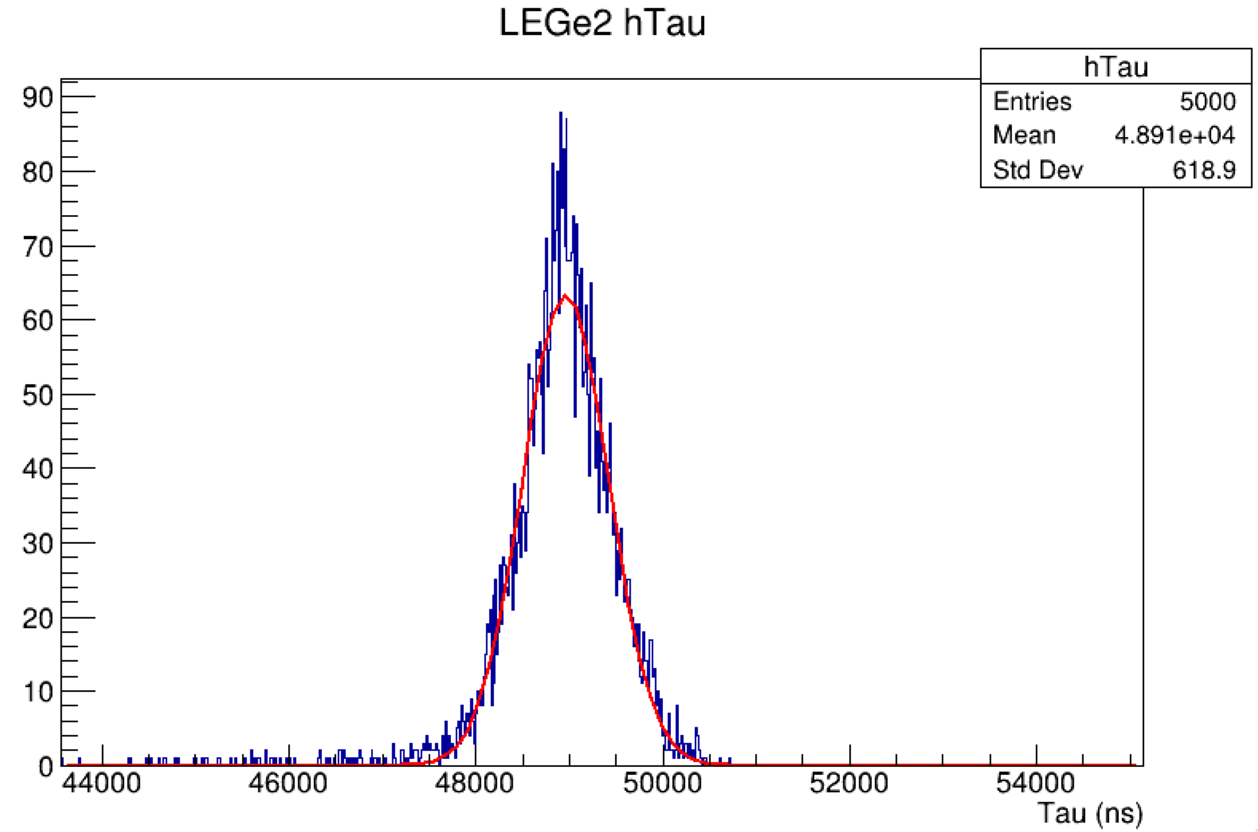
LEGe 1			
Trapezoid Parameters	Tau (ns)	Gap	Peaking
Used	49.19	300	2600
Manufacturer		200	1800

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

TAU PARAMETER

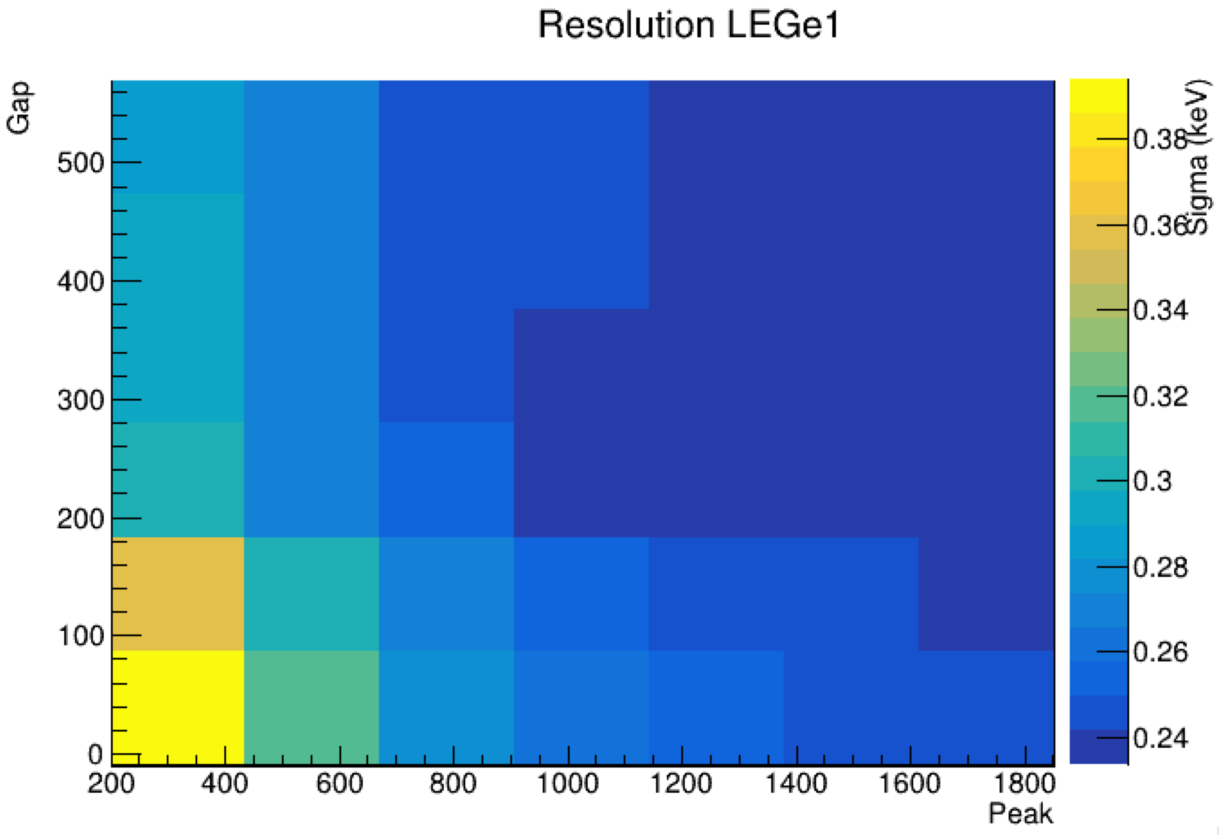
- Taking long traces with 25000 buffer length

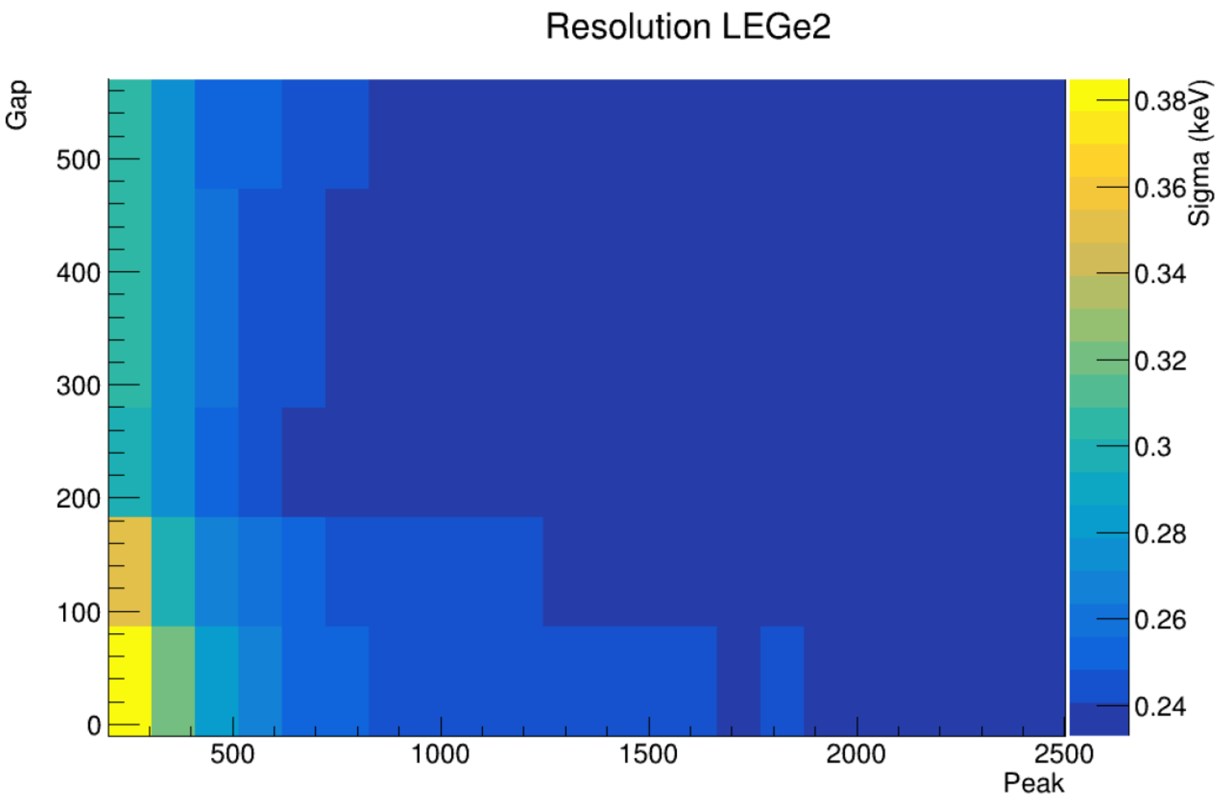




GAP AND PEAKING

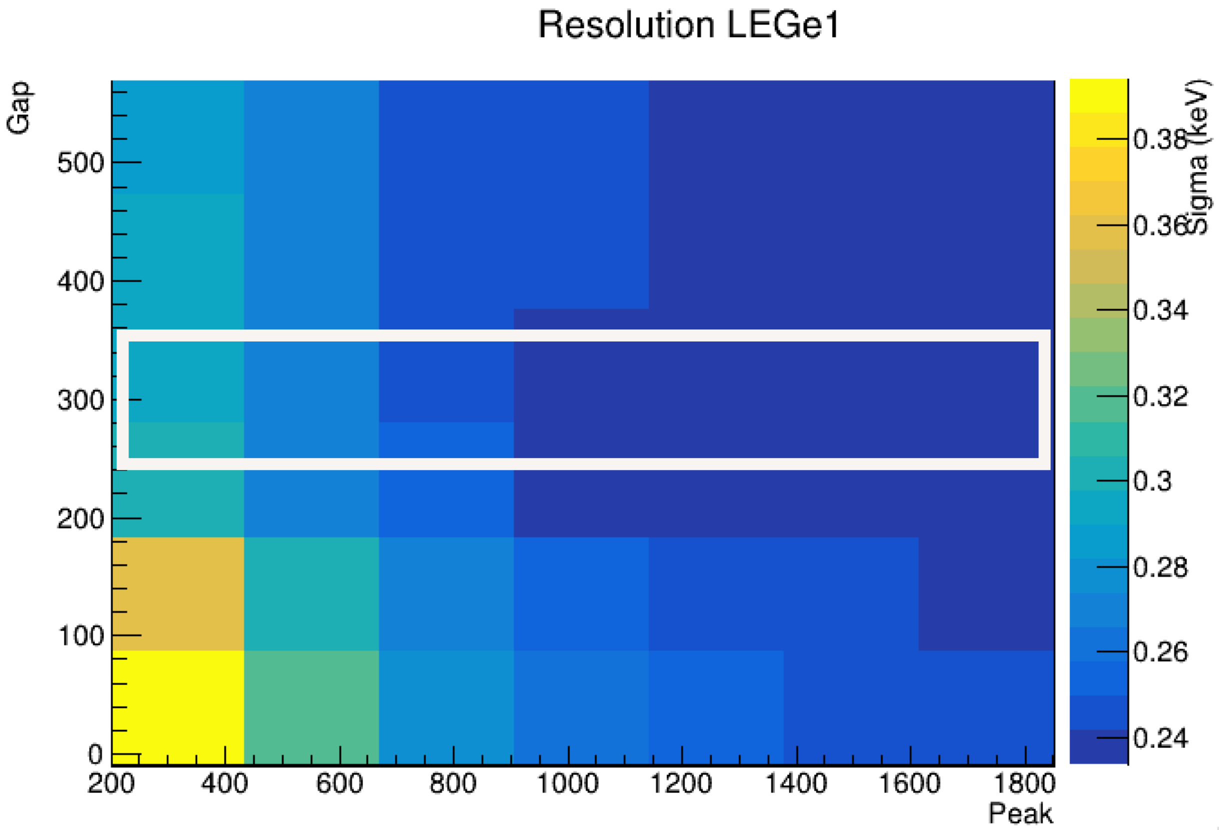
- Running the trapezoid filter with Michaels Trapezoidal Optimization code.

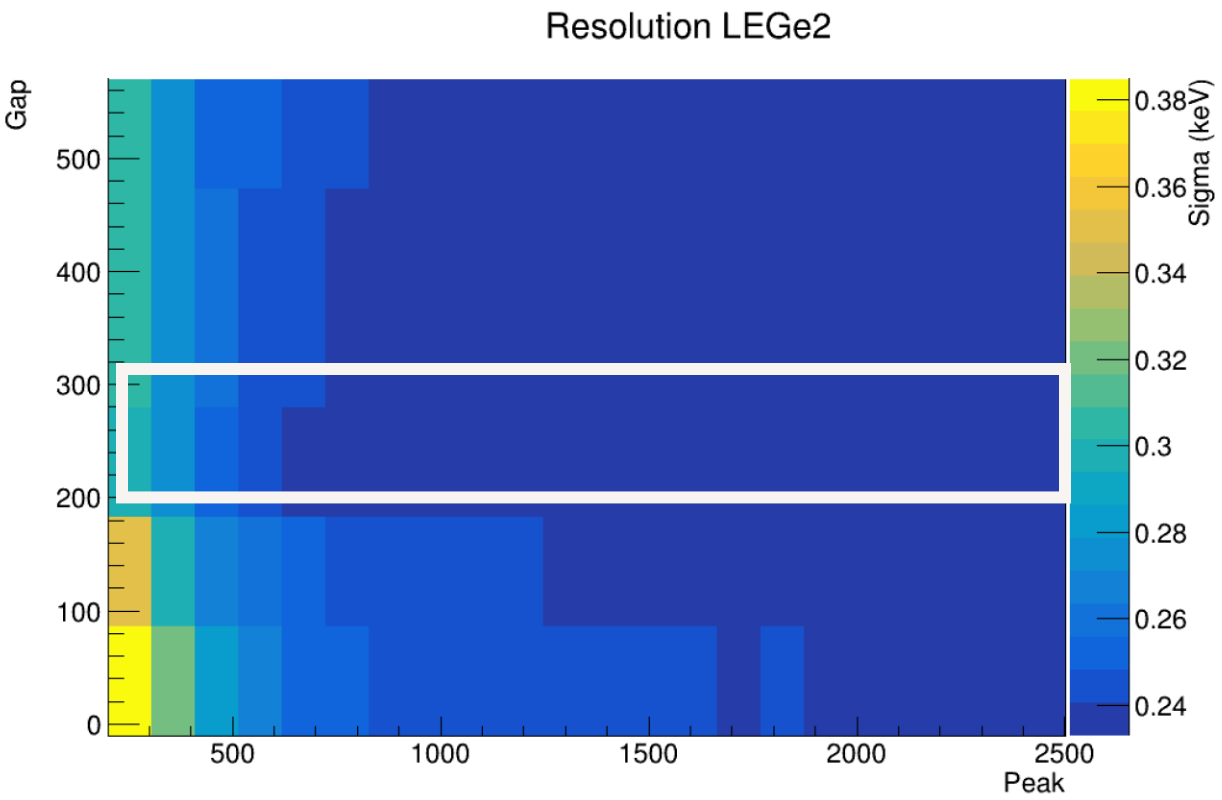




GAP AND PEAKING

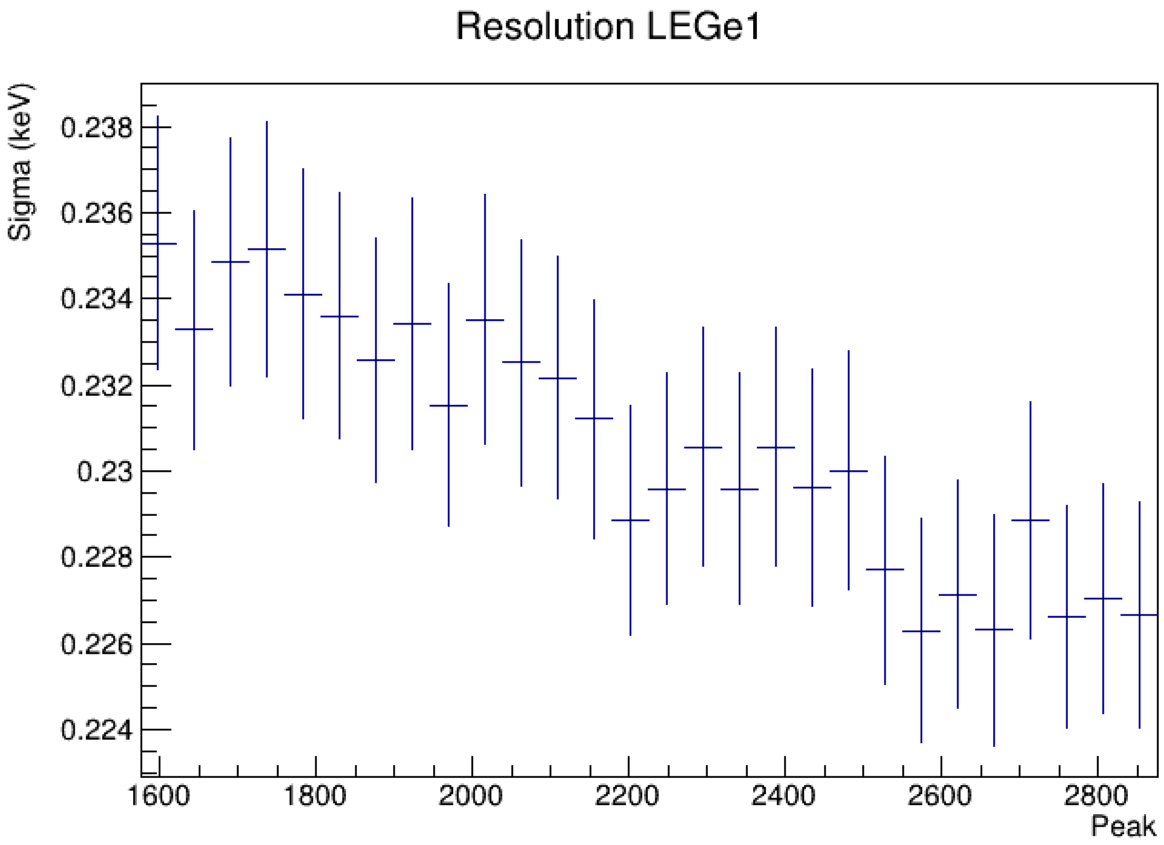
- Choosing gap at 300 for LEGe1 and 250 for LEGE2.

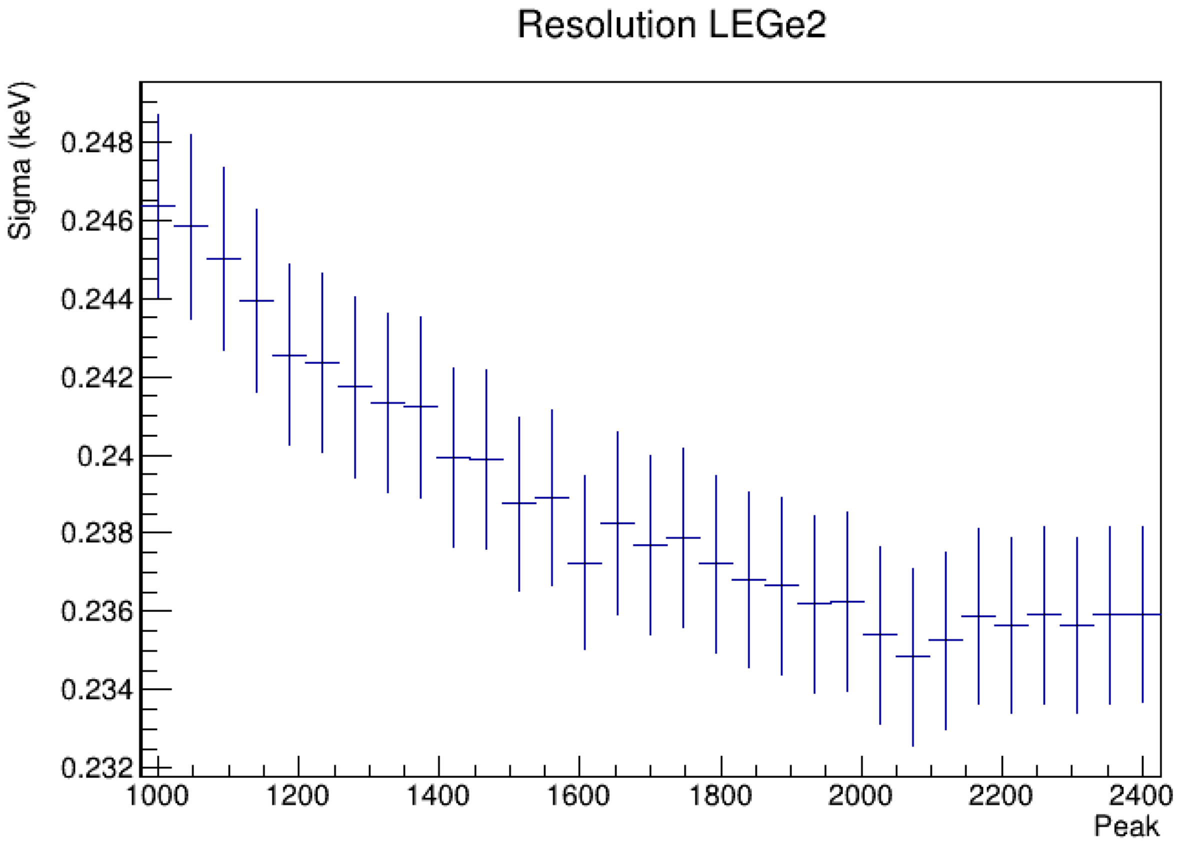




GAP AND PEAKING

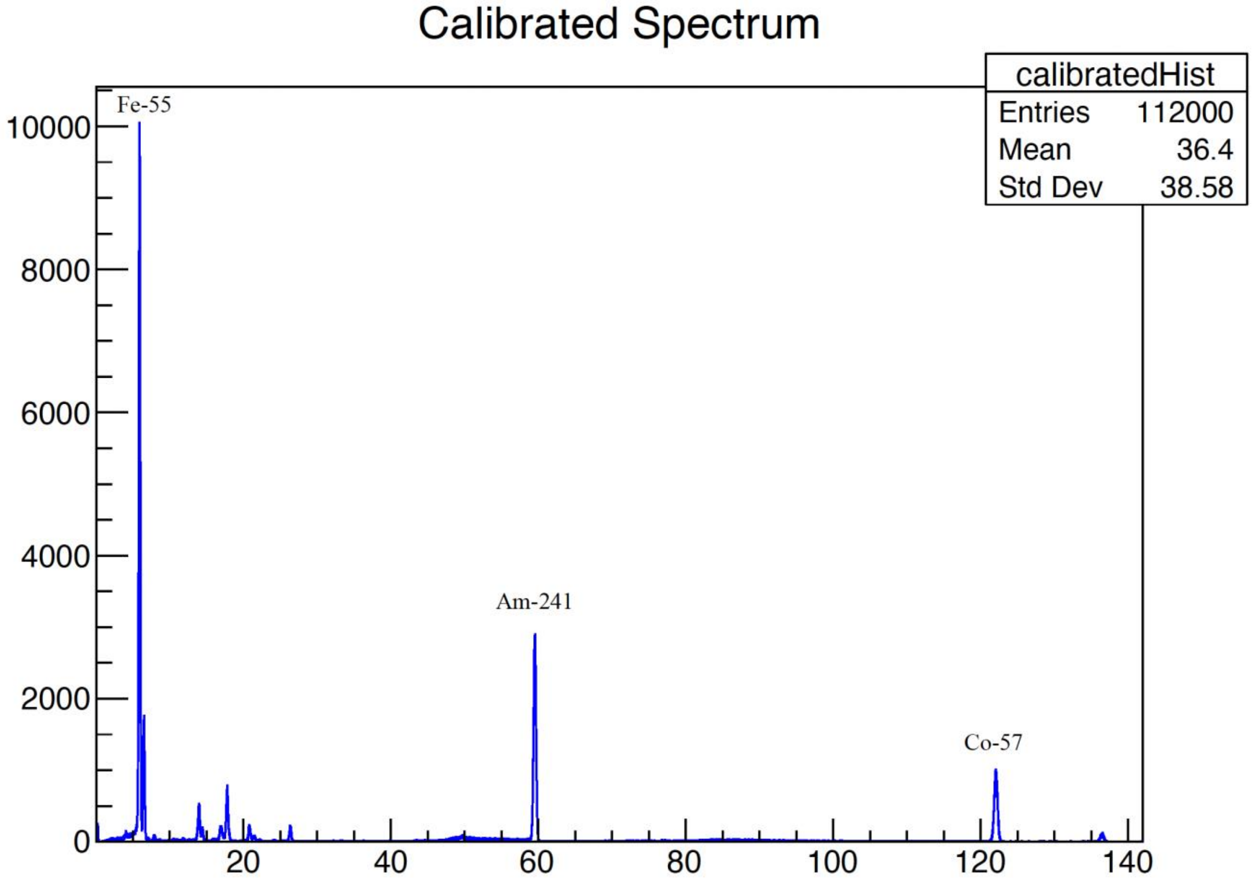
- Fixing the Gap we study the minimum resolution for the Peak parameter



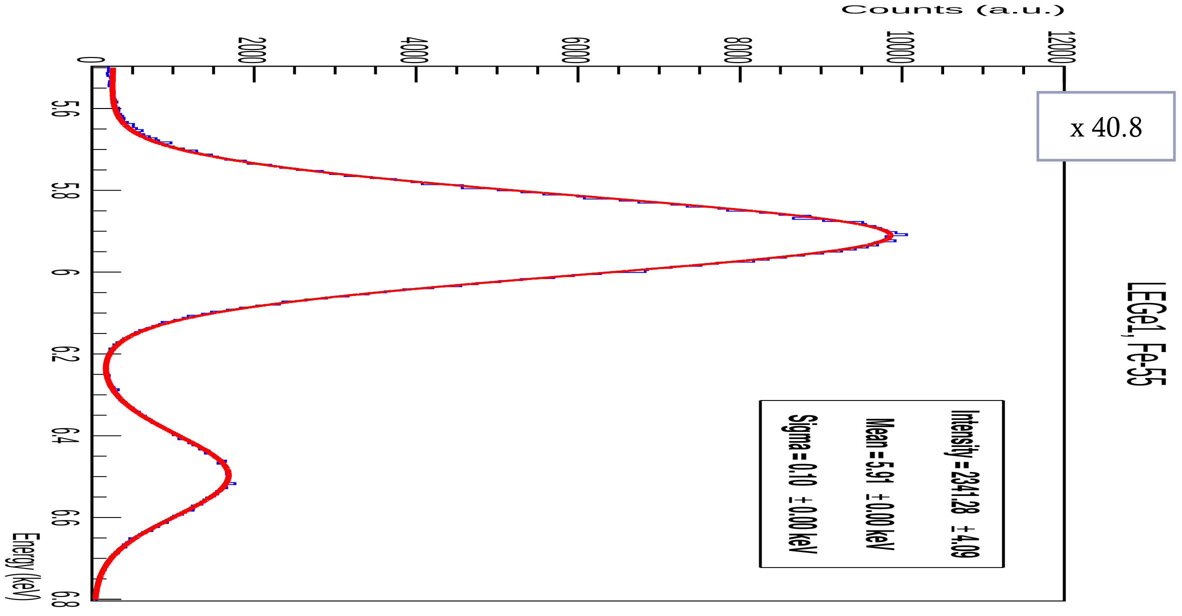


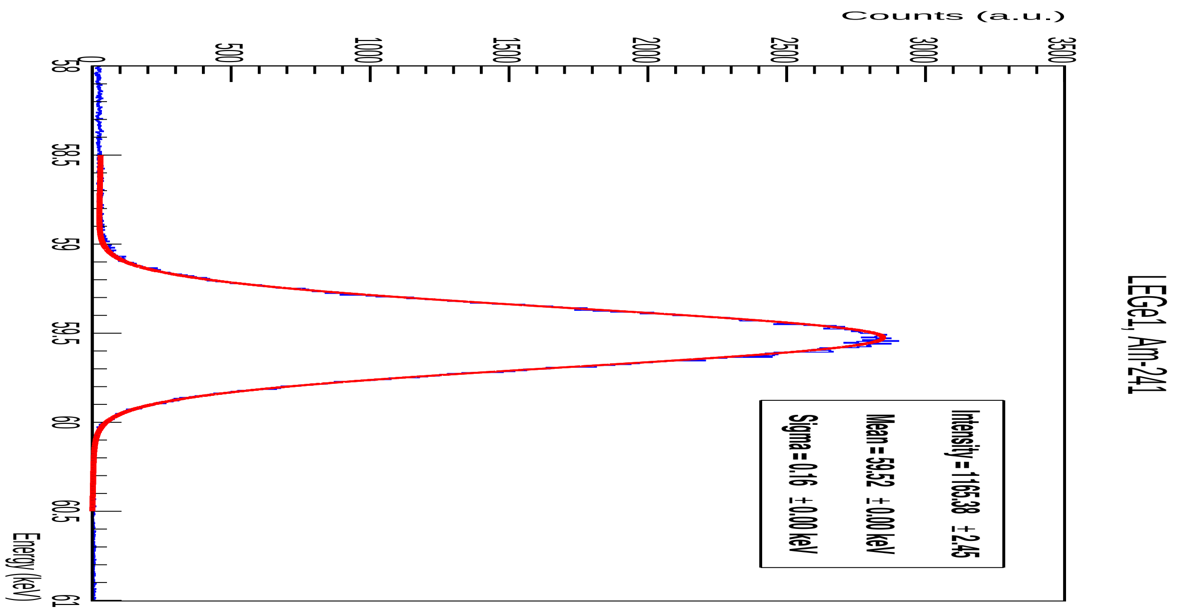
SPECTRA

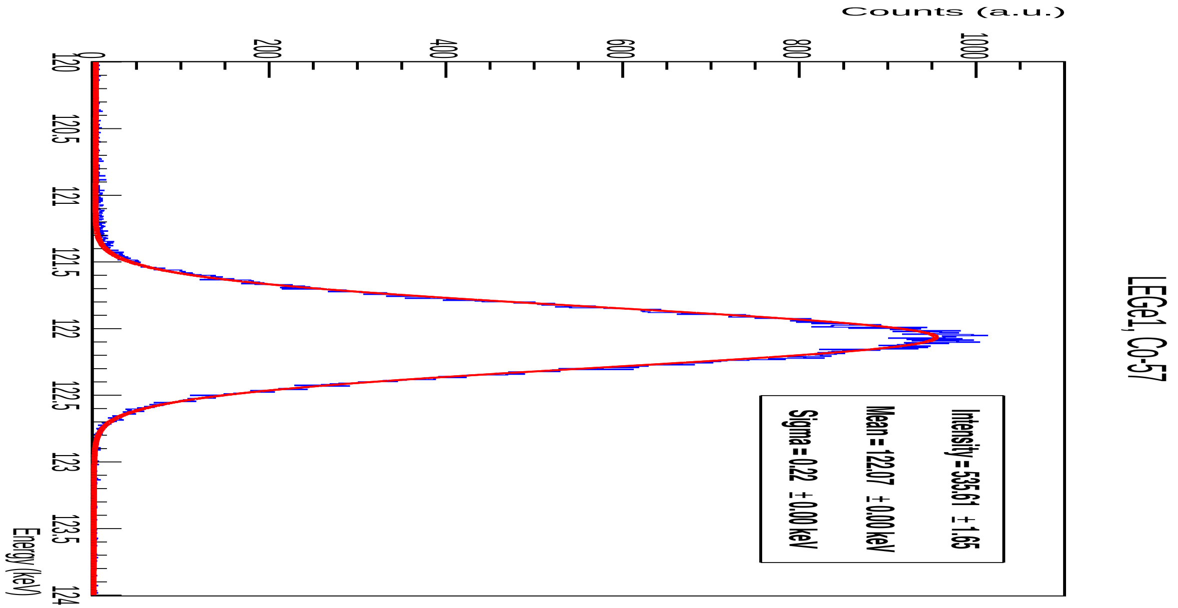
- Using three sources at the same time: Fe-55, Co-57 and Am-241



FITTING THE PEAKS





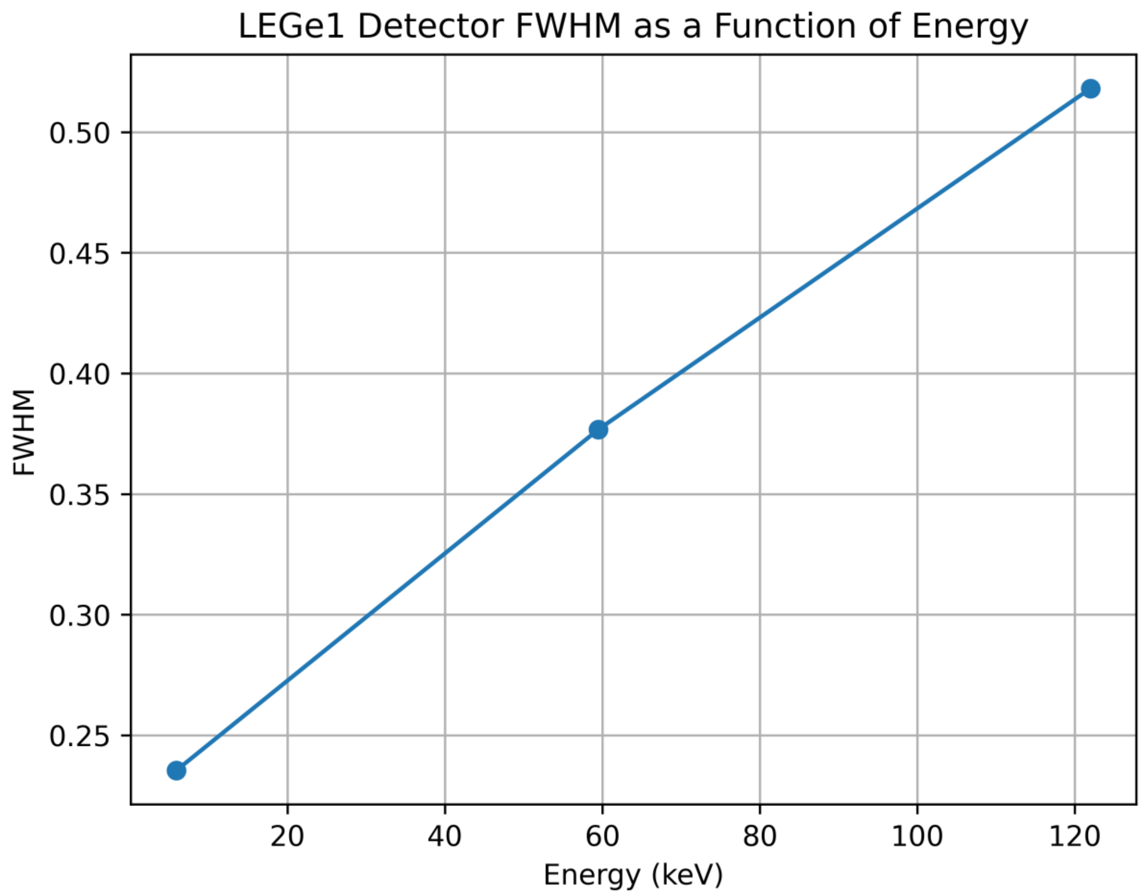


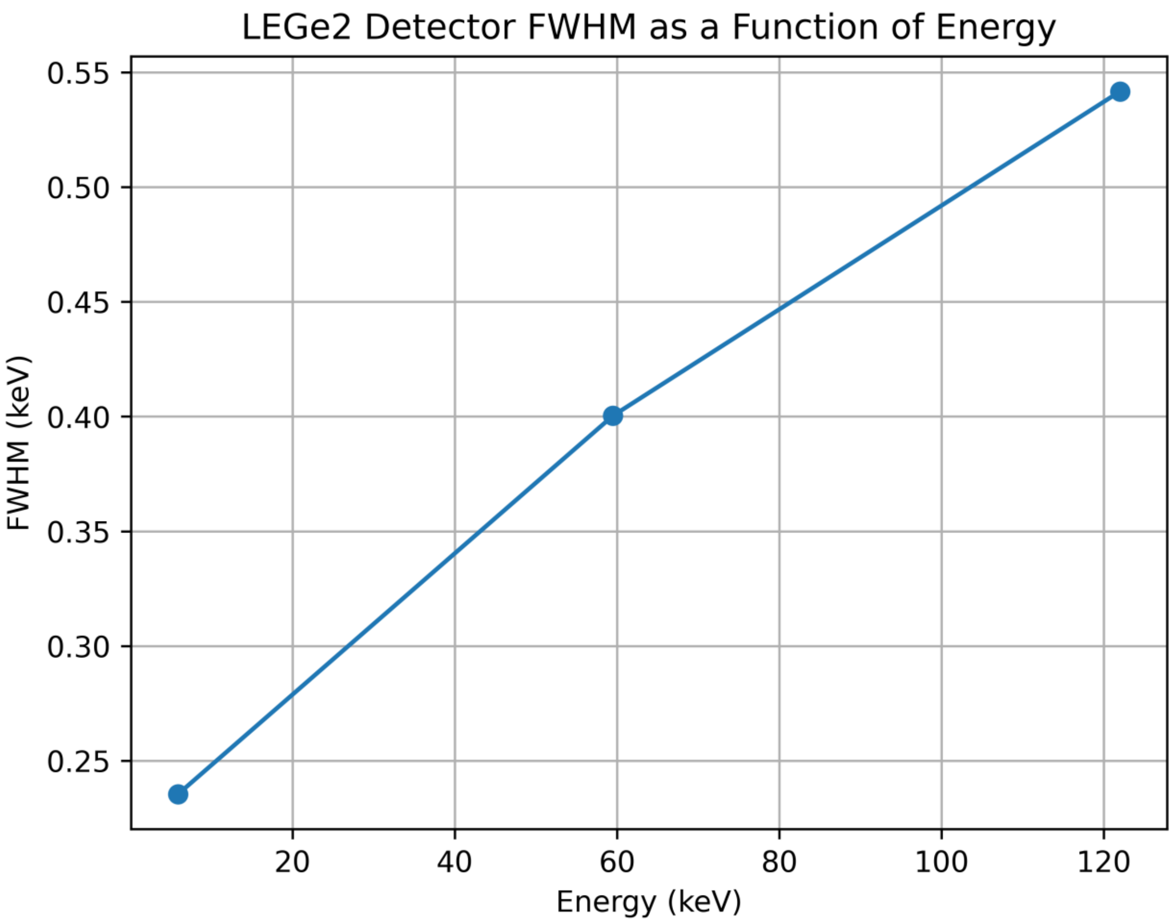
RESOLUTION

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
FWHM
0.25
0.30
0.35
0.40
0.45
0.50
20
40
60
80
100
120
Energy (keV)


LEGe2 Detector FWHM as a Function of Energy
FWHM (keV)
0.25
0.30
0.35
0.40
0.45
0.50
0.55
20
40
60
80
100
120
Energy (keV)

EFFICIENCY

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

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

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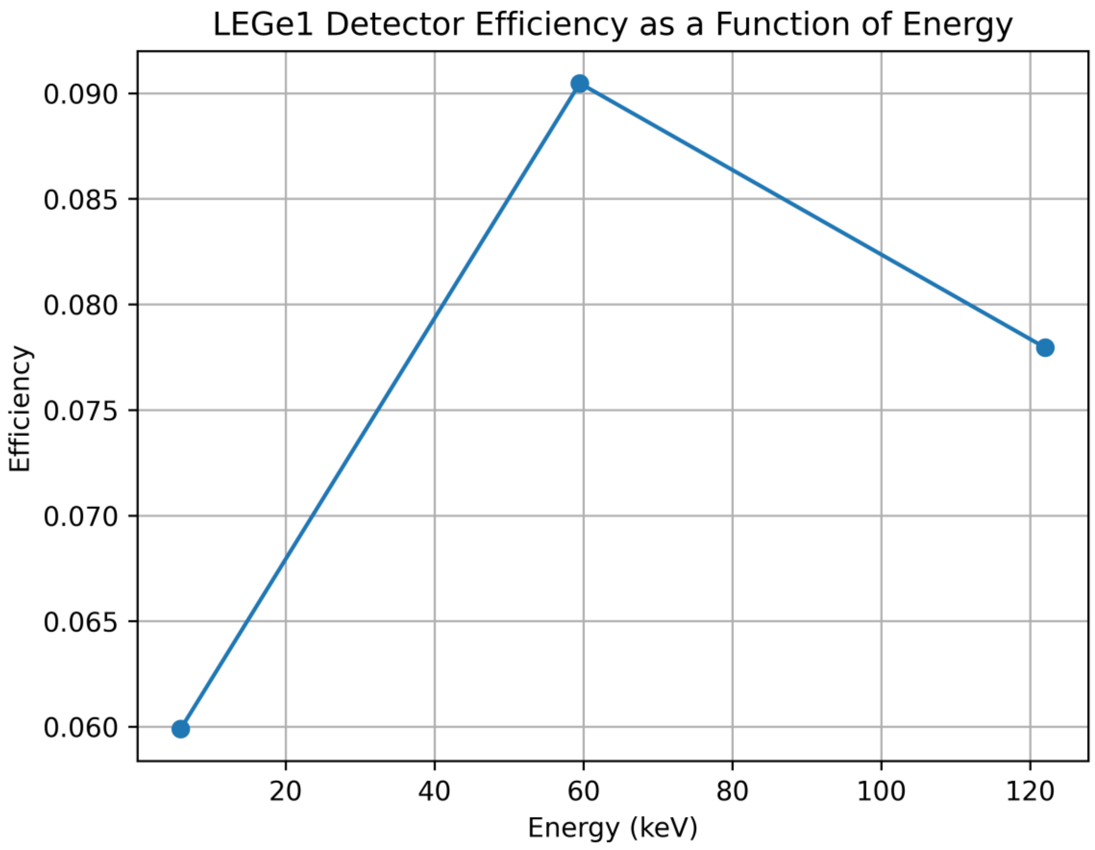

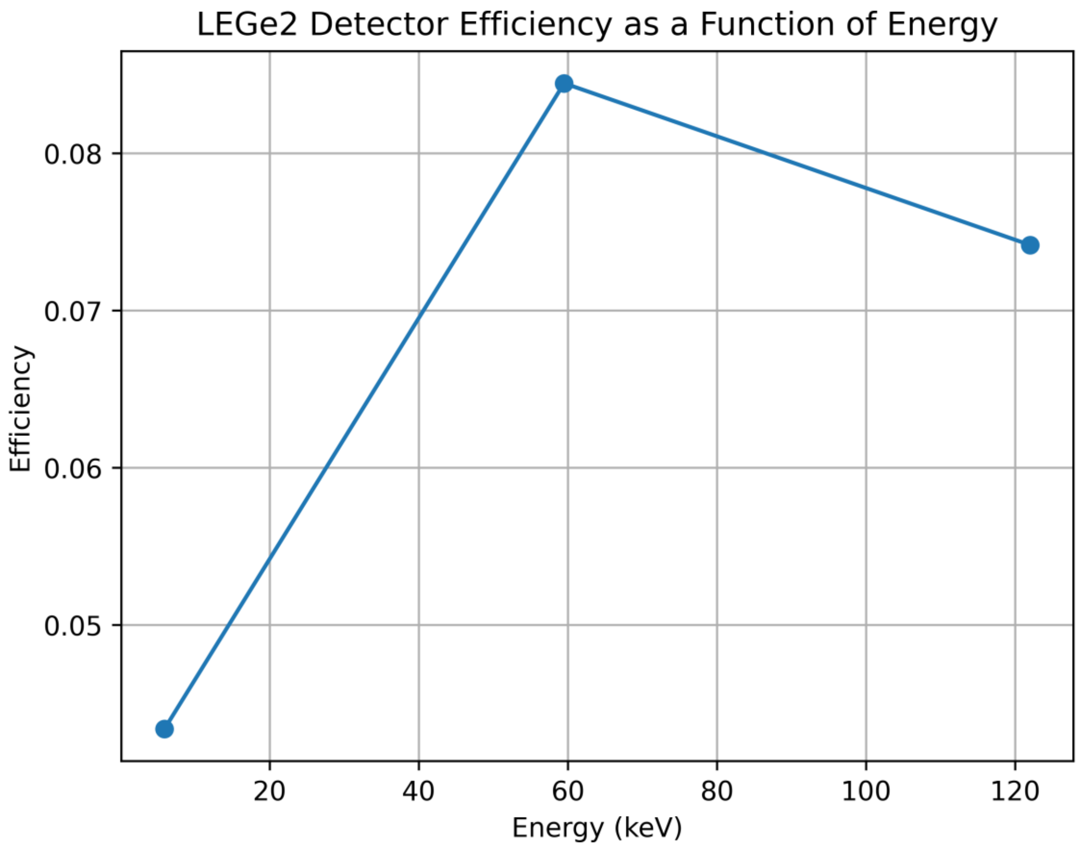

DISCUSSION TOPIC: THE PEAKING NORMALIZATION

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

```
        //trigger.energy   =  ( (float) pdata[counter+13] ) /  peaking;
        trigger.energy   =  ( (float) pdata[counter+13] );
```

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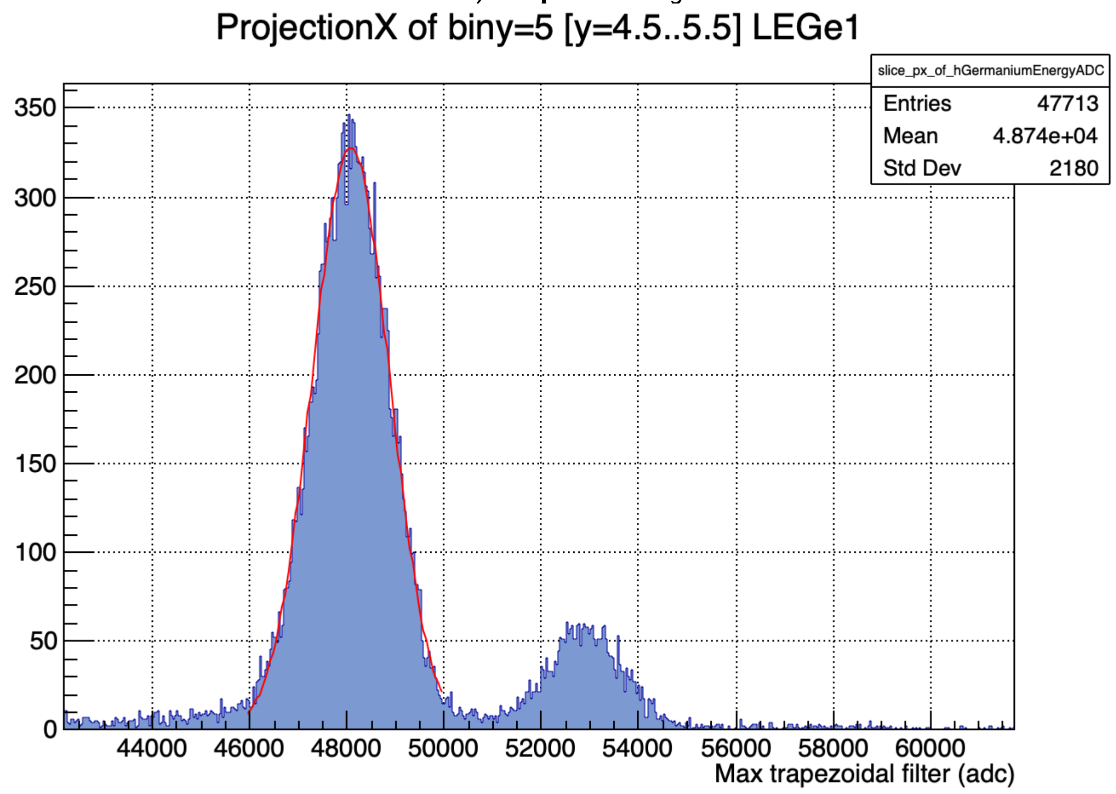
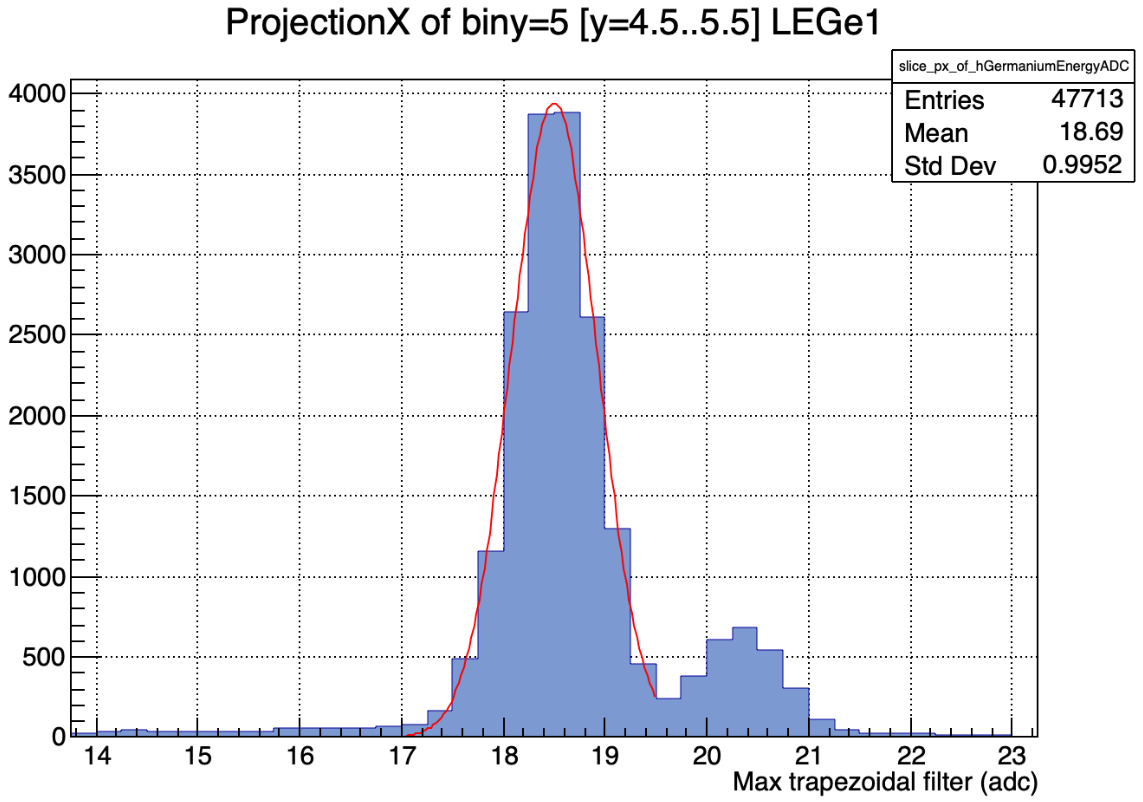
- When we removed at the BankDecoder.cpp the peaking normalization from trigger.energy we got a much better resolution, especially for Fe-55 source





No peaking normalization: FWHM(eV): 0.228

Peaking normalization: FWHM(eV): 0.314