

Update muX meeting 01/12

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Timing optimization



ELET improvement

- Why does the naïve formula work better sometimes?

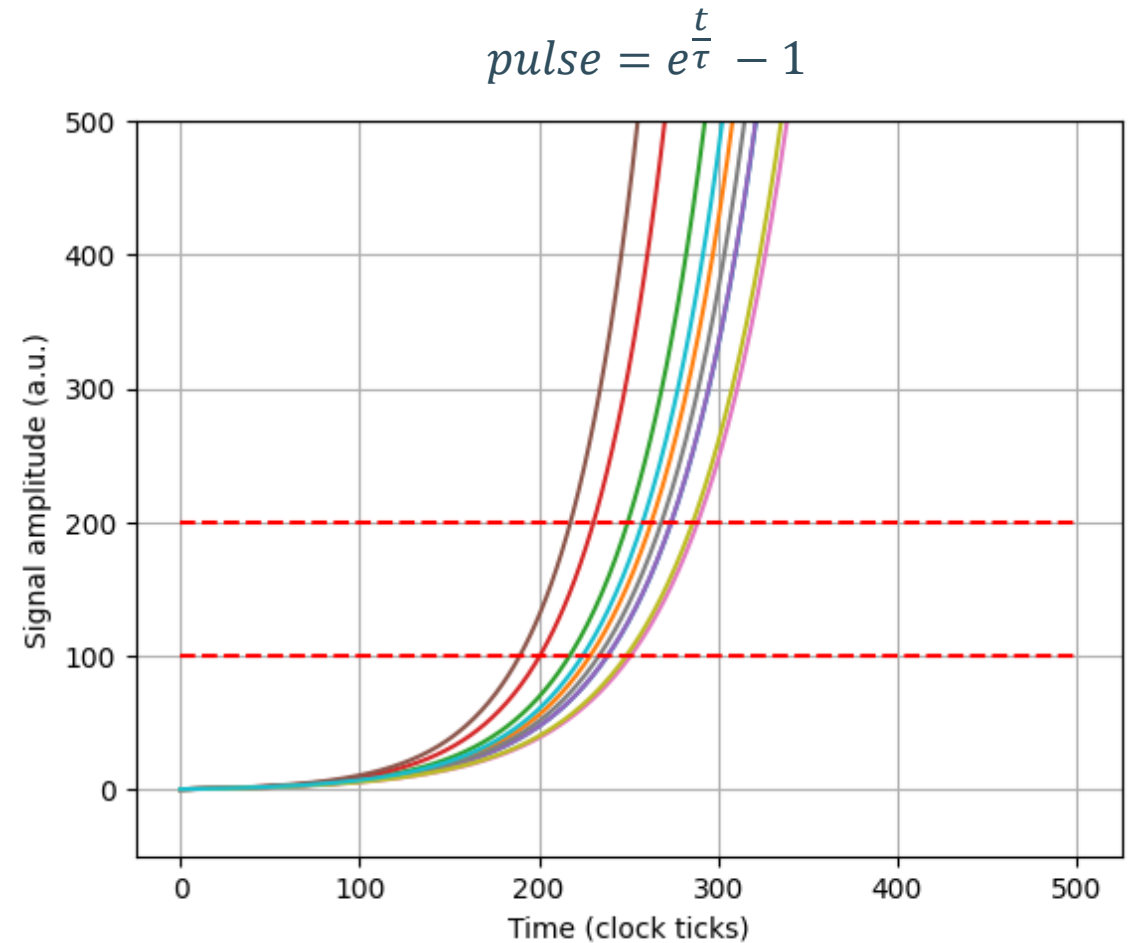
- $t_{ELET} = 2 t_L - t_U$

- Extrapolate to 0:

- $t_{ELET} = \frac{f t_L - t_U}{f-1}$

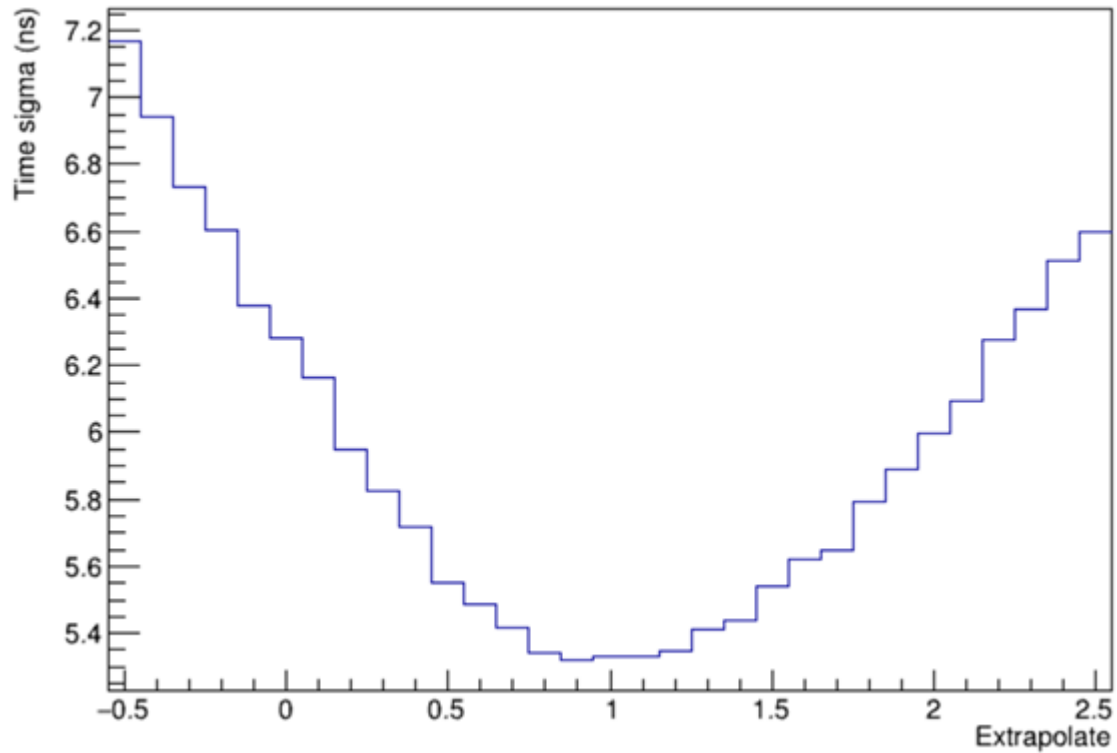
- Extrapolate to $-Ex \times Th$:

- $t_{ELET} = \frac{1}{f-1} [t_L (Ex + f) - t_U(1 + Ex)]$

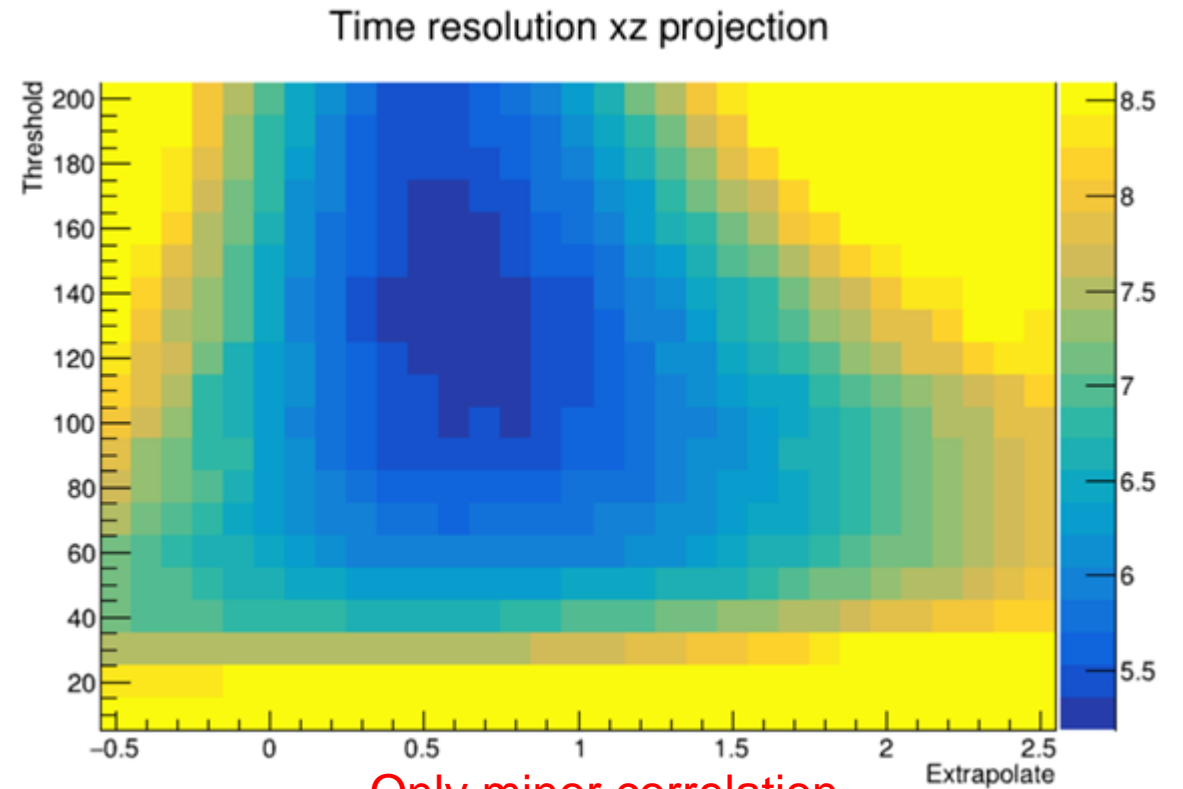


Any changes?

- Fixed threshold and factor



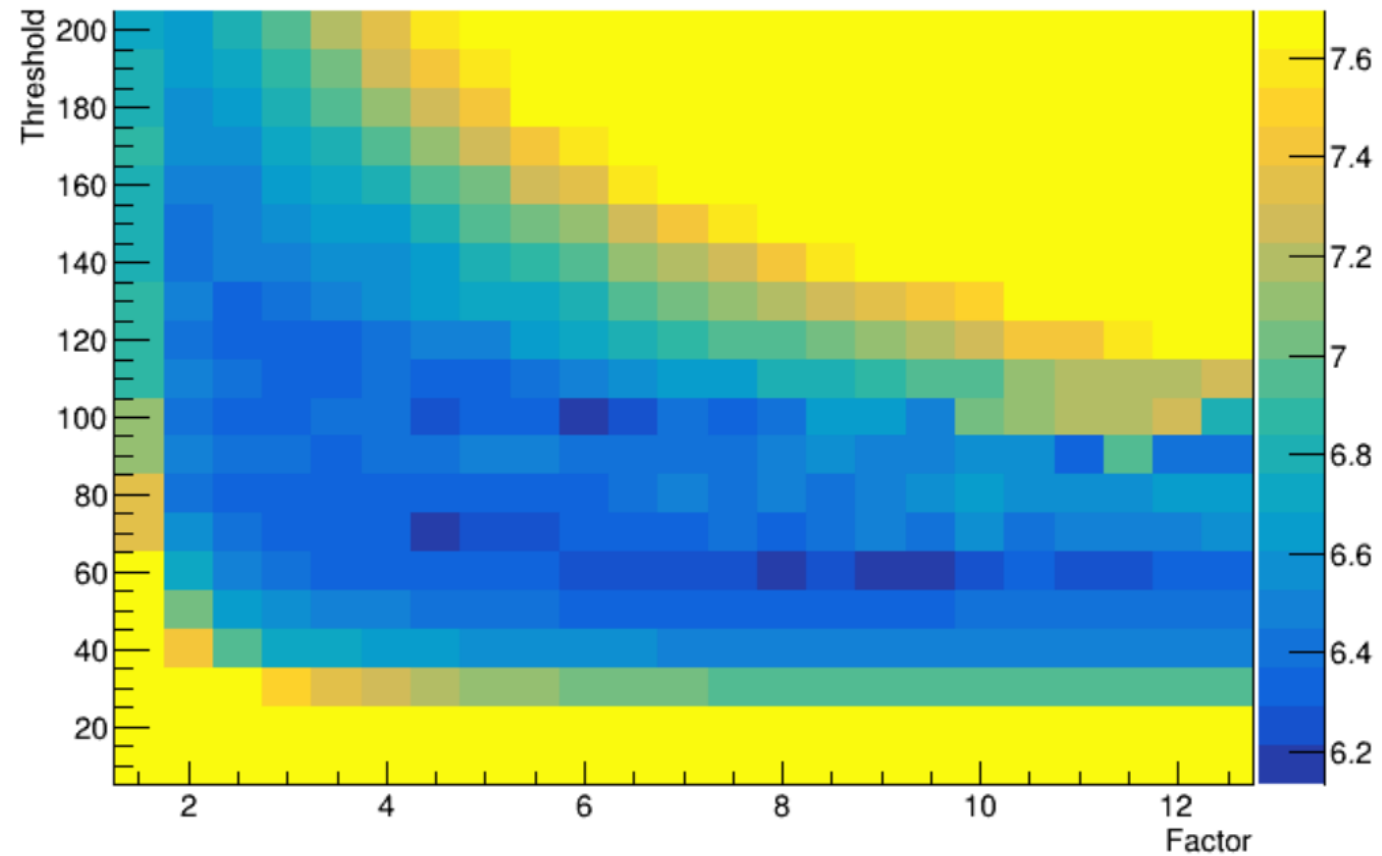
- Fixed factor



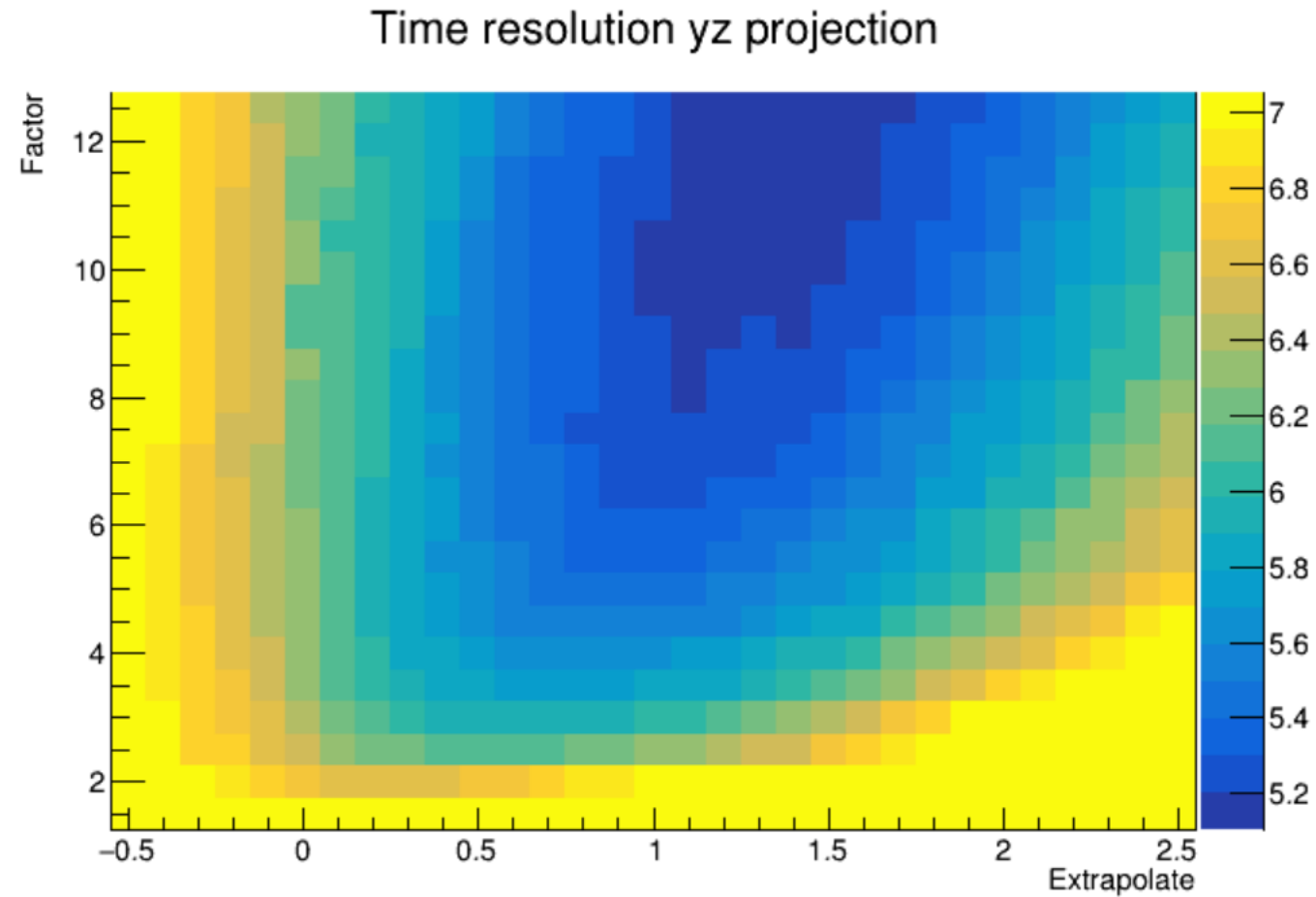
Only minor correlation

Step 1: Threshold with Extrapolate = 0

Time resolution xy projection



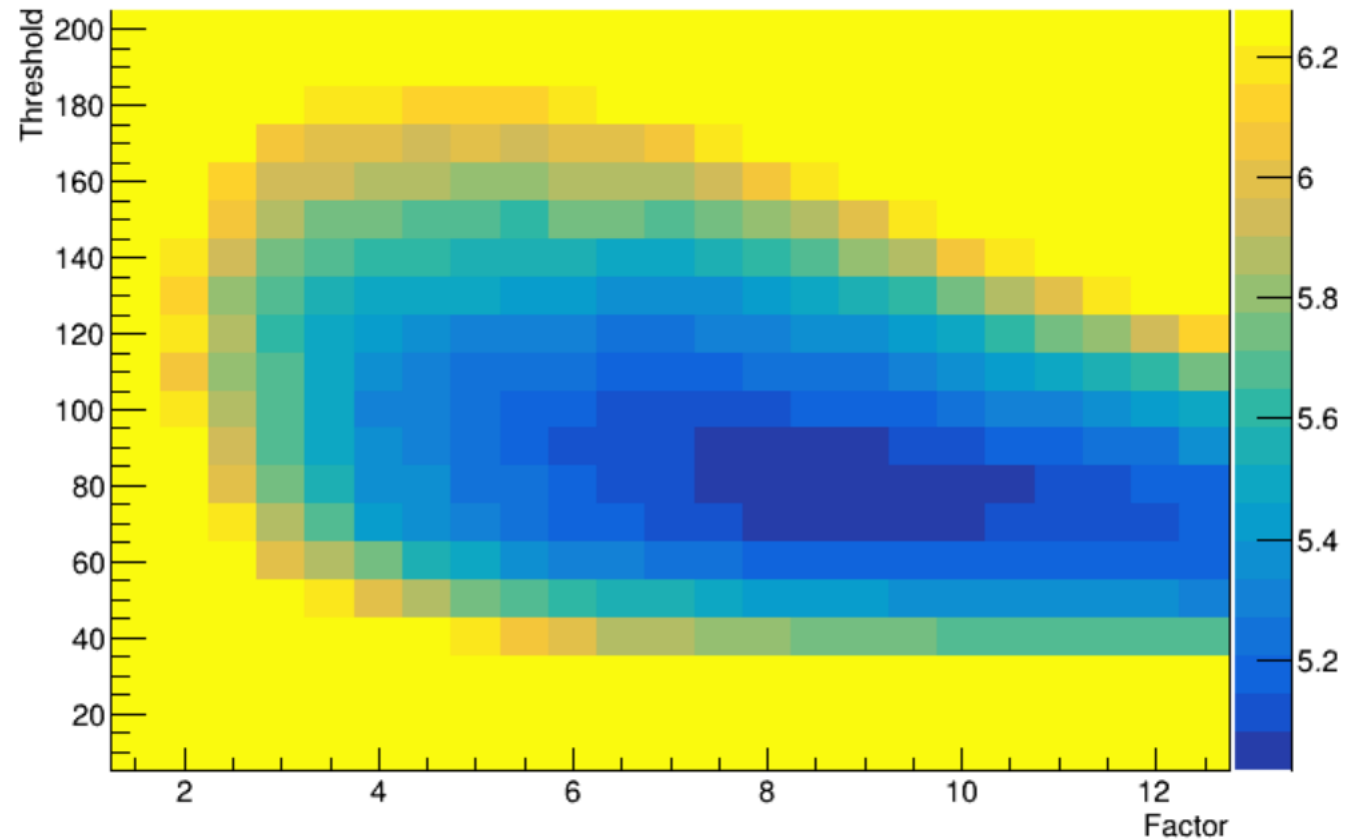
Step 2: Extrapolate with fixed Threshold



Ex = 1.1

Step 3: Finalize Threshold and Factor

Time resolution xy projection



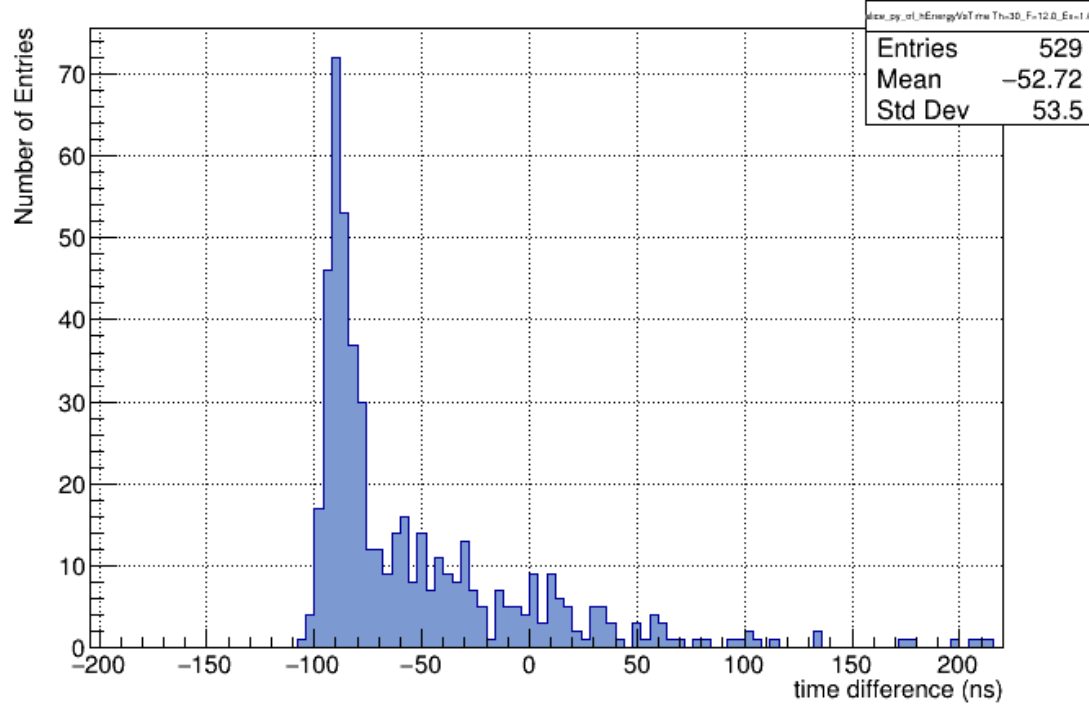
Th = 60 \rightarrow Th = 80
f = 8.0

Optimal parameters

Detector	Th (Ex=0)	Ex	Th	F	Sigma simple	Sigma exact	Sigma 3par	Improvement over simple (%)	Improvement over exact (%)
Ge01	30	1.0	30	12.0	/	/	8.4	/	/
Ge02	60	1.1	80	8.0	5.4	6.5	5.0	7.4	23
Ge03	30	0.3	30	10.0	/	9.2	8.2	/	/
Ge04	60	1.7	100	6.0	6.8	9.4	6.7	1.47	29
Ge05	60	0.0	70	8.0	5.2	4.7	4.7	9.6	0
Ge06A	40	0.6	40	6.0	4.2	4.2	3.9	7.1	7.1
Ge06B	30	1.0	40	6.0	4.3	4.5	4.1	4.7	8.9
Ge06C	30	0.8	30	7.0	4.4	4.5	4.1	6.8	8.9
Ge06D	30	1.1	30	7.0	4.3	4.6	4.1	4.7	10.9
MB07A	80	0.2	60	6.0	4.5	4.4	4.3	4.4	2.3
MB07B	50	0.0	50	7.0	4.9	4.1	4.1	16.3	0
MB07C	60	0.0	60	6.0	4.7	4.2	4.2	10.6	0
Ge08	40	1.2	50	6.0	5.2	6.4	5.0	3.8	22
Ge09	20	0.3	20	8.0	/	19.2	18.3	/	/
Ge10	30	1.2	60	6.0	5.5	7.1	5.2	5.5	26.8
Ge11	20	2.5	30	8.0	8.4	10.0	8.0	4.8	20
Ge12	50	0.3	40	8.0	5.0	4.9	4.7	6.0	4.1
Ge13	30	2.5	40	8.0	7.9	11.0	7.5	5.1	32
Ge14	20	1.7	40	8.0	7.5	11.5	6.9	8.0	40

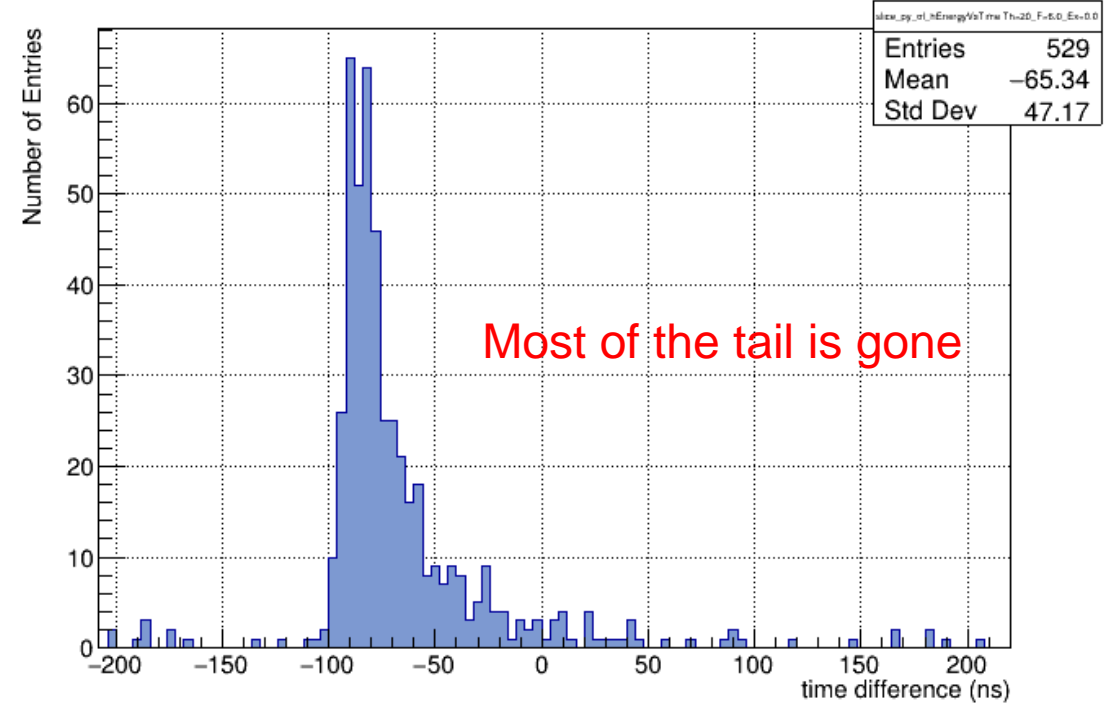
BEGEs will be BEGEs

ProjectionY of binx=[710,719] [x=709.0..719.0]



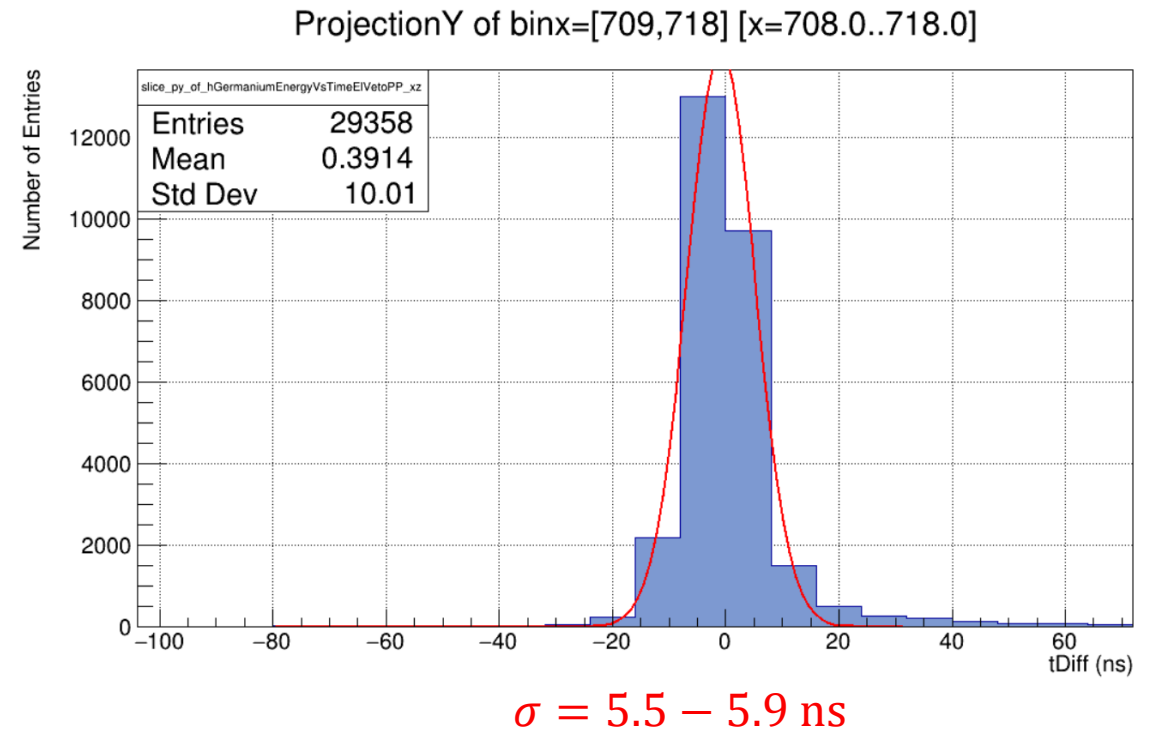
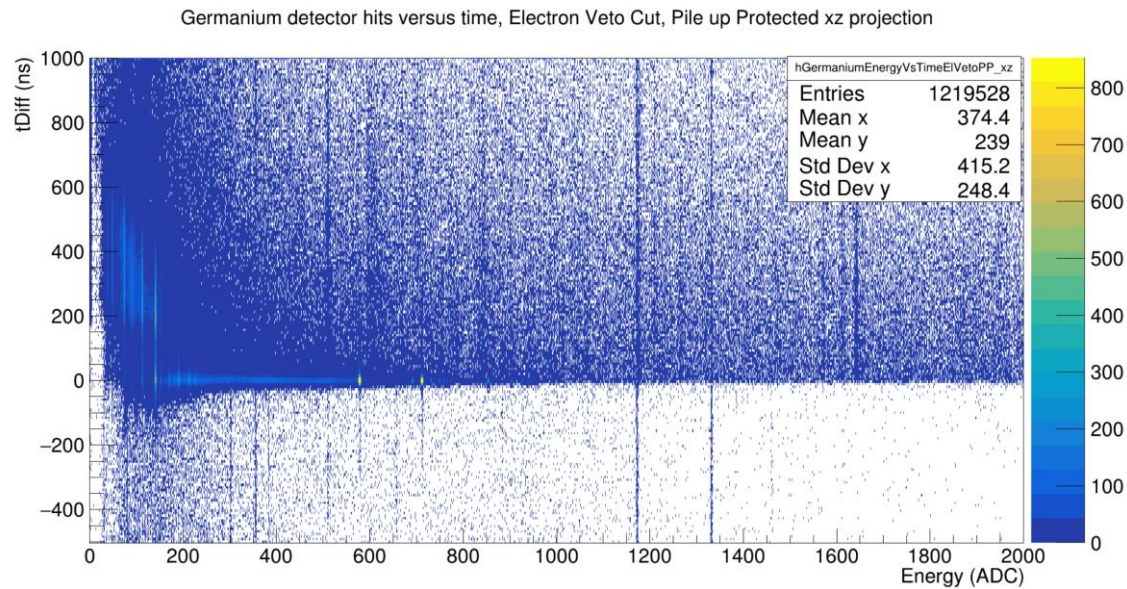
Detector	Th (Ex=0)	Ex	Th	F	Sigma simple	Sigma exact	Sigma 3par
Ge01	30	1.0	30	12.0	/	/	8.4
Ge03	30	0.3	30	10.0	/	9.2	8.2
Ge09	20	0.3	20	8.0	/	19.2	18.3

ProjectionY of binx=[710,719] [x=709.0..719.0]



Detector	Ex	Th	F	Sigma
Ge01	0.0	20	6.0	11.6
Ge03	0.0	30	7.0	8.7
Ge09	0.0	20	4.5	20.0

Back to 1 ELET algorithm?

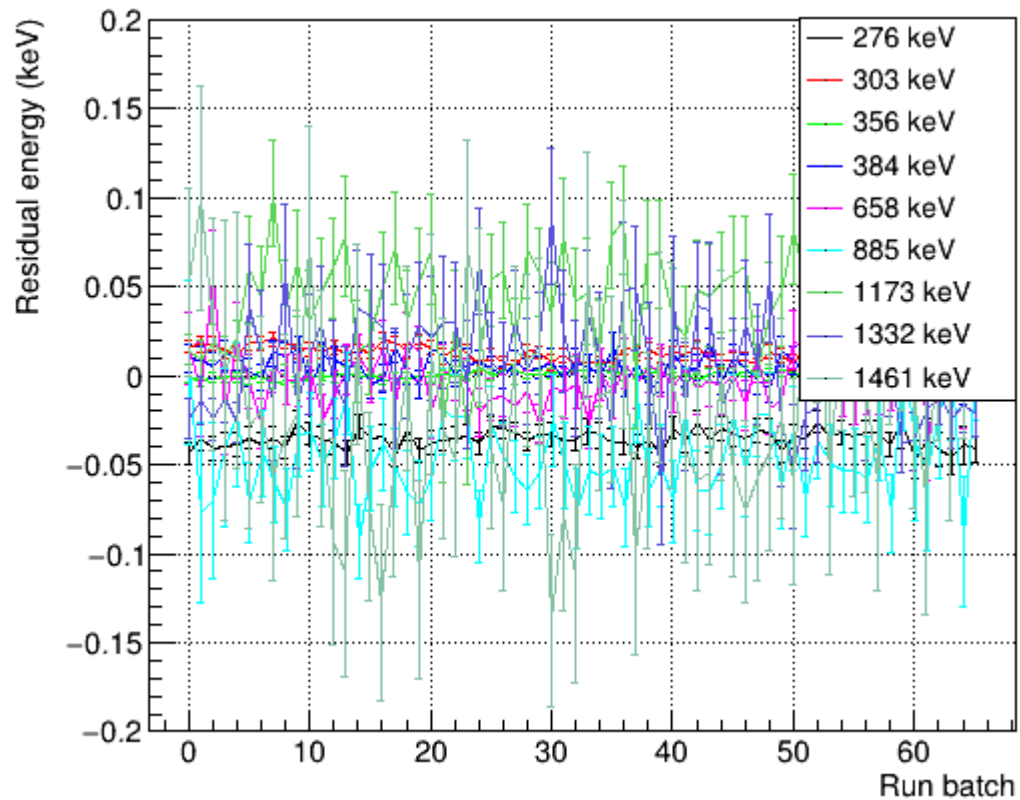


Calibration

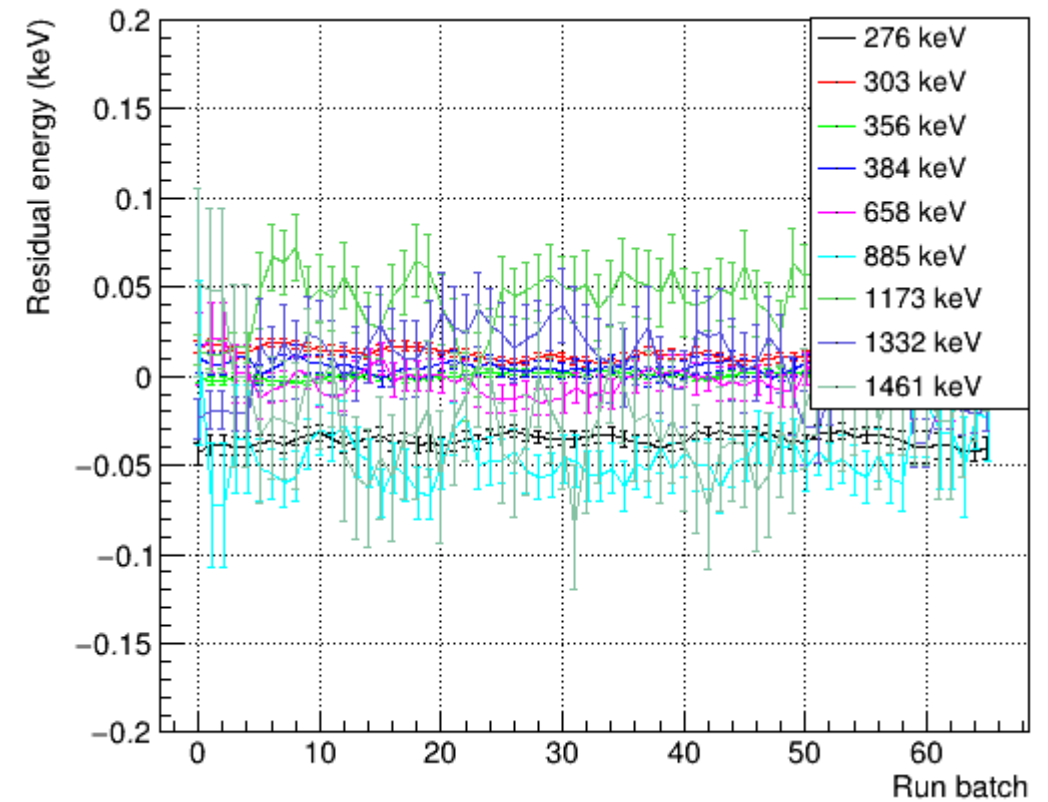


Using moving average

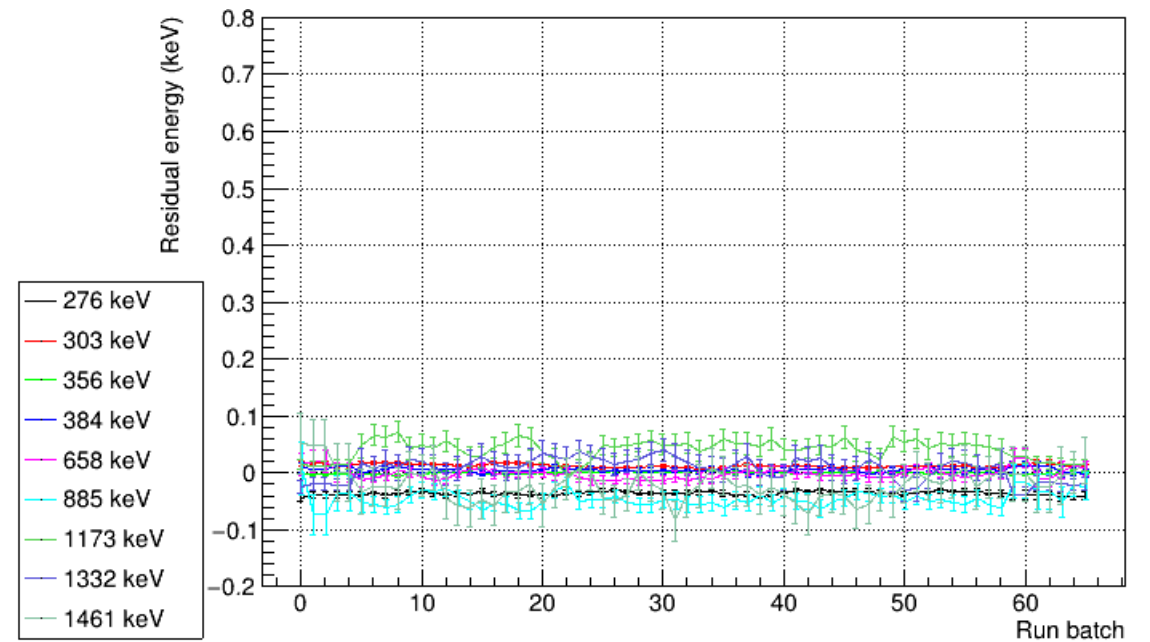
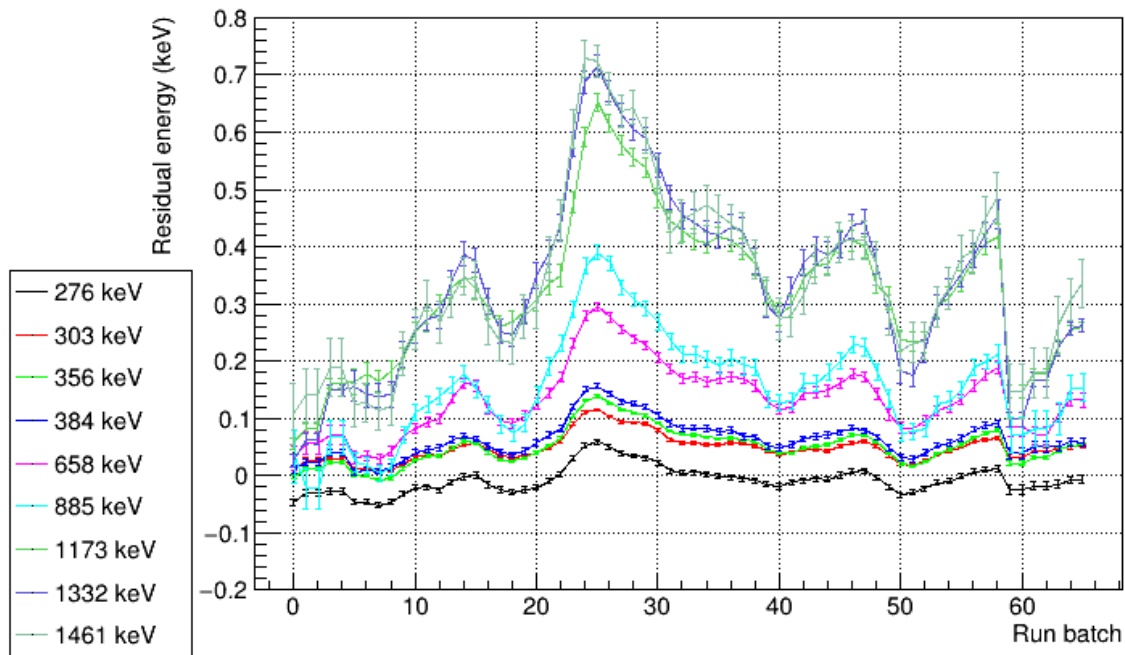
- 2h batches



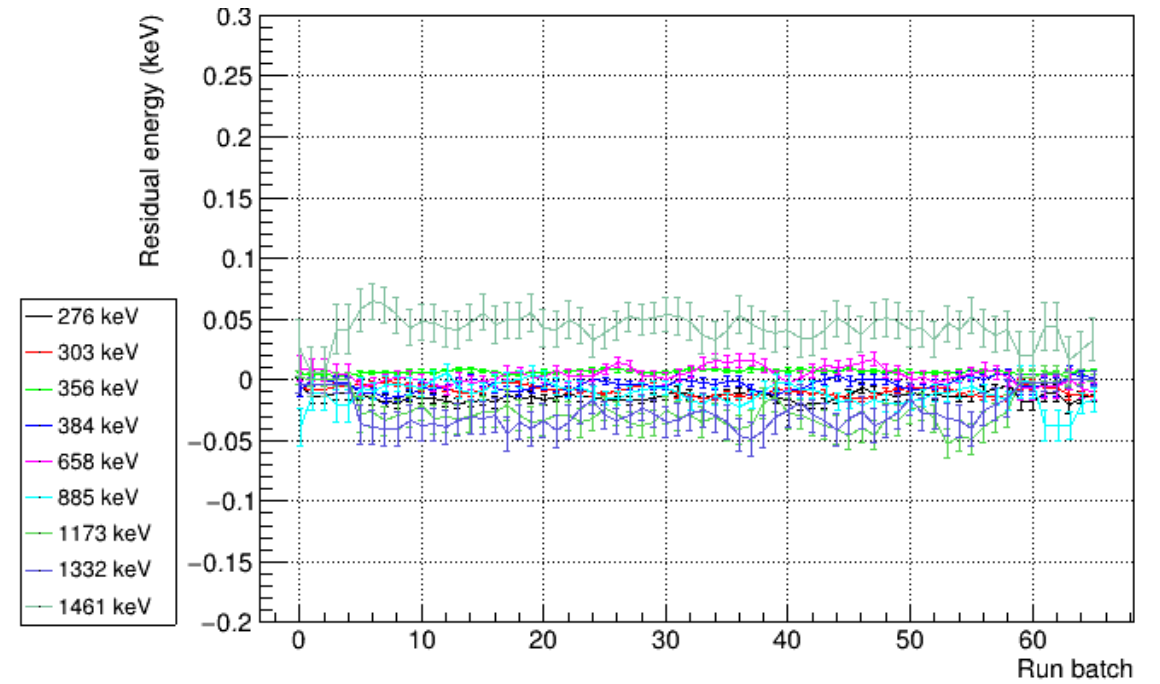
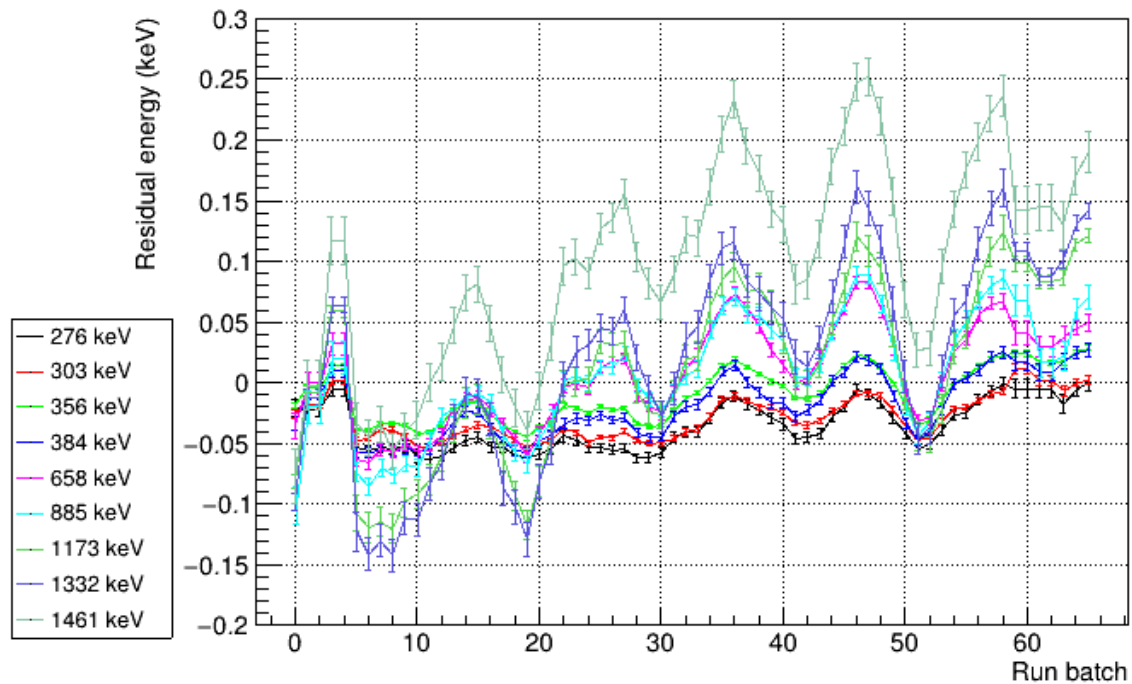
- 2h batches with 3-batch moving average



Gain drift – Ge01

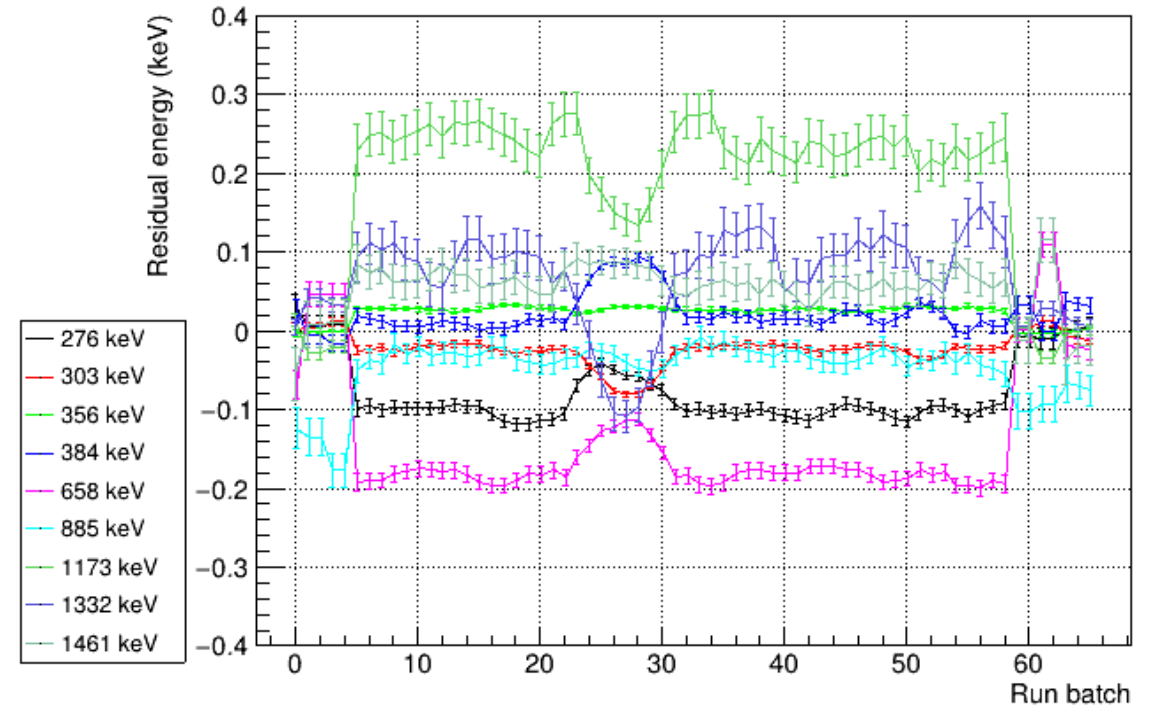
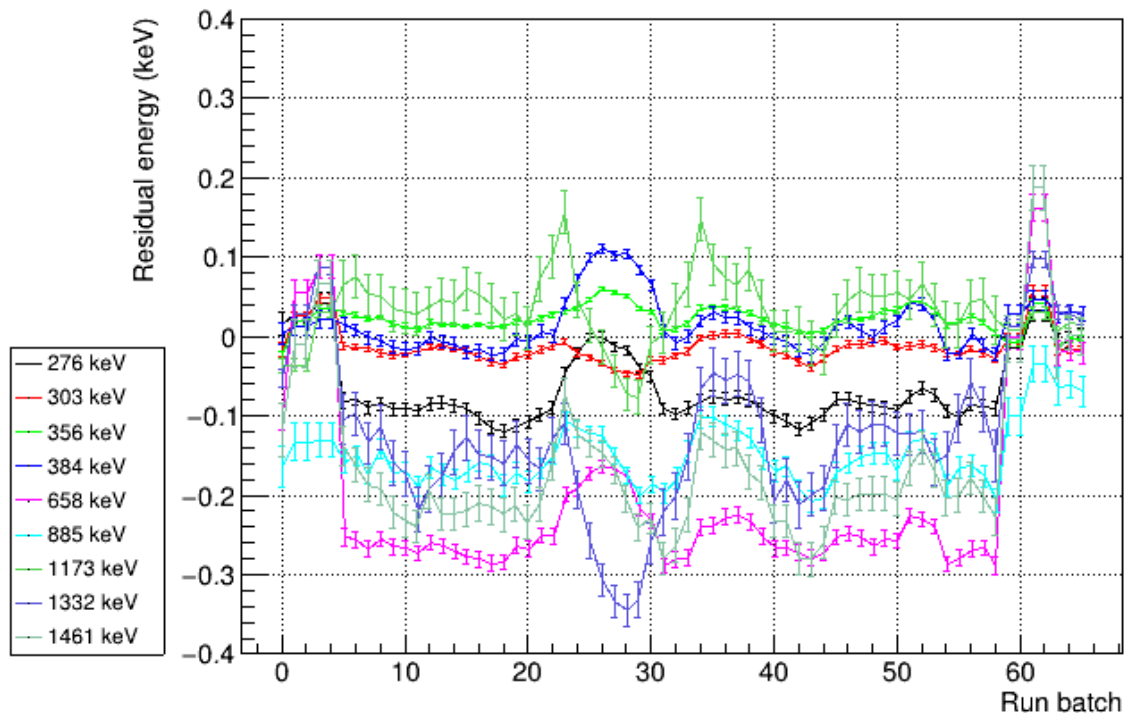


Gain drift – Ge02



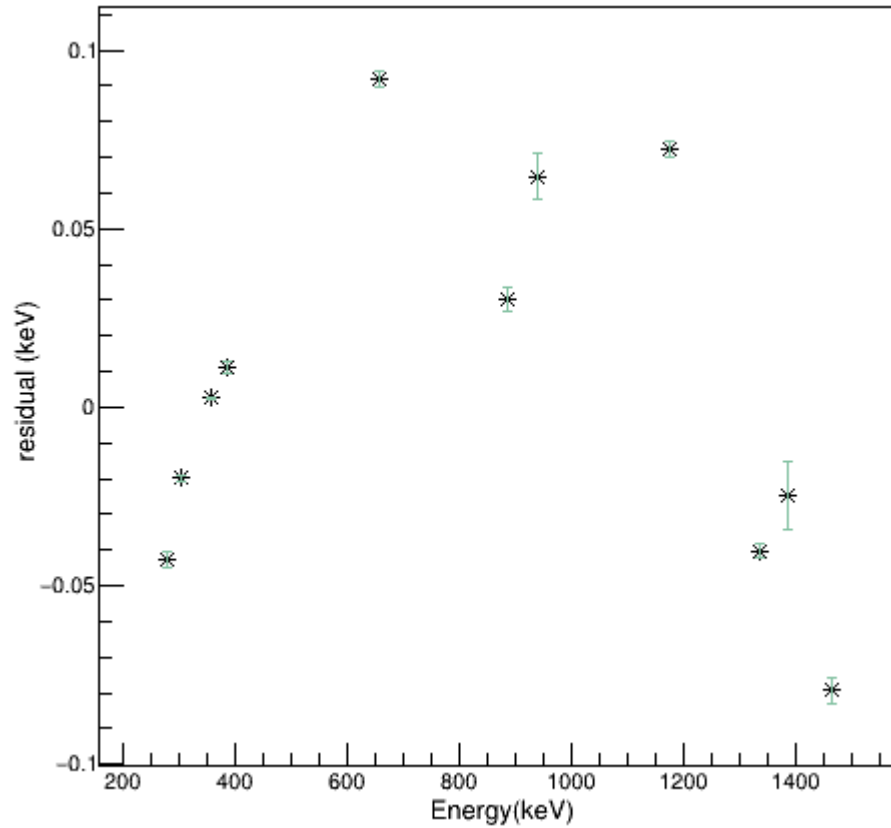
Gain drift – Ge06A

Why still a trend? Why do macroscopic measurements have better residuals?

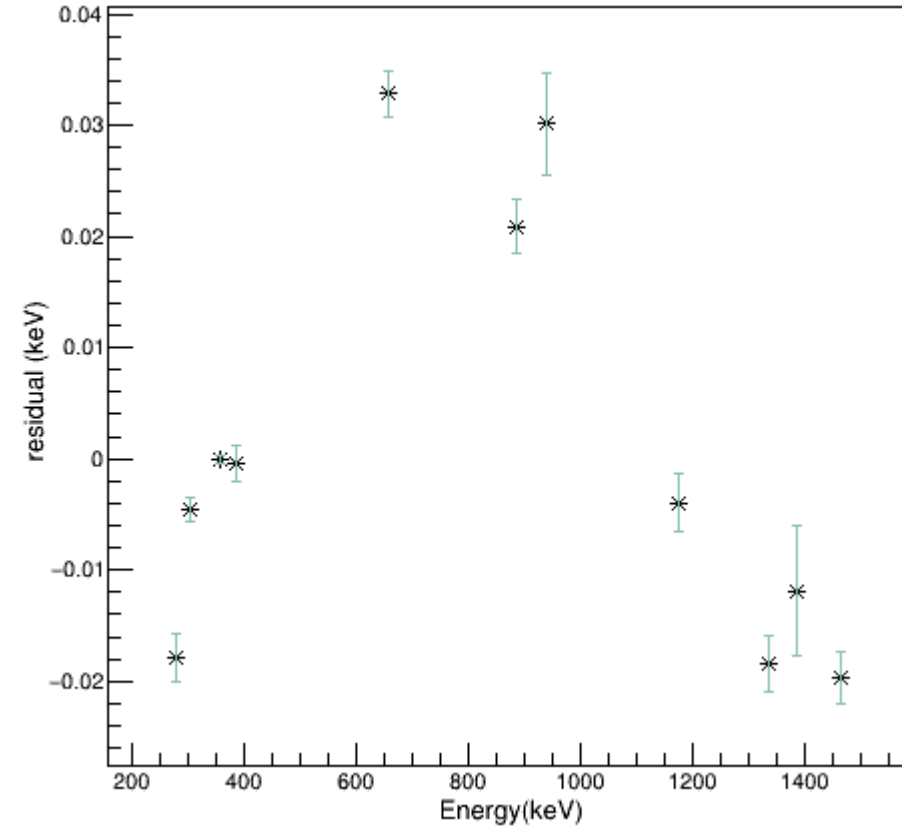


Beyond gain drift

Ge14

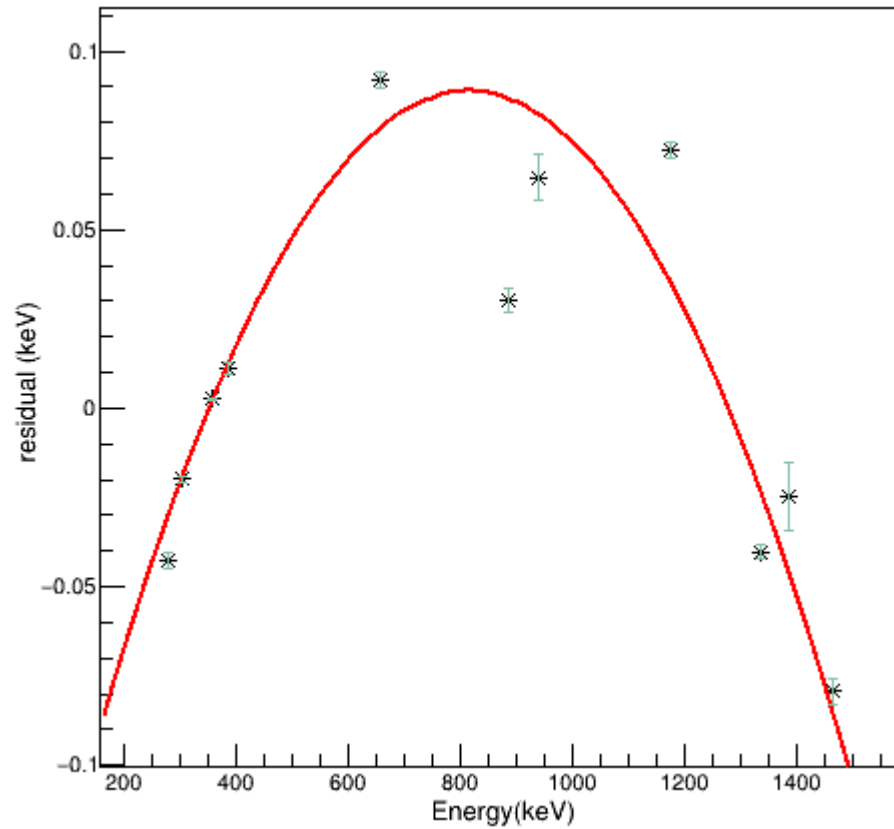


Ge05

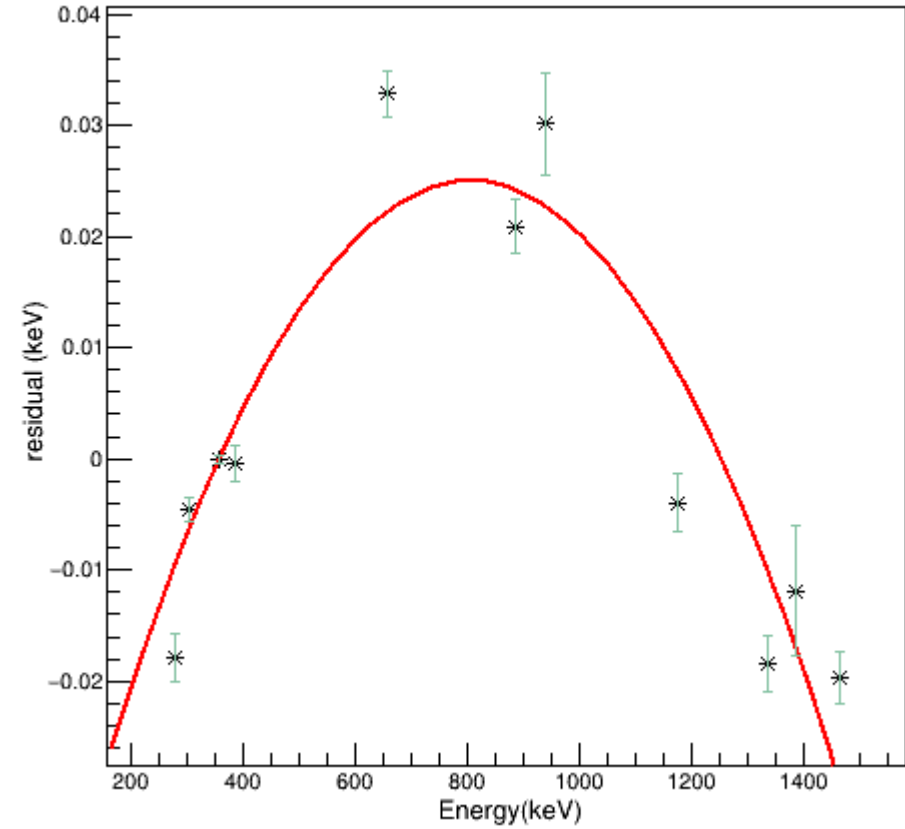


Beyond gain drift

Ge14

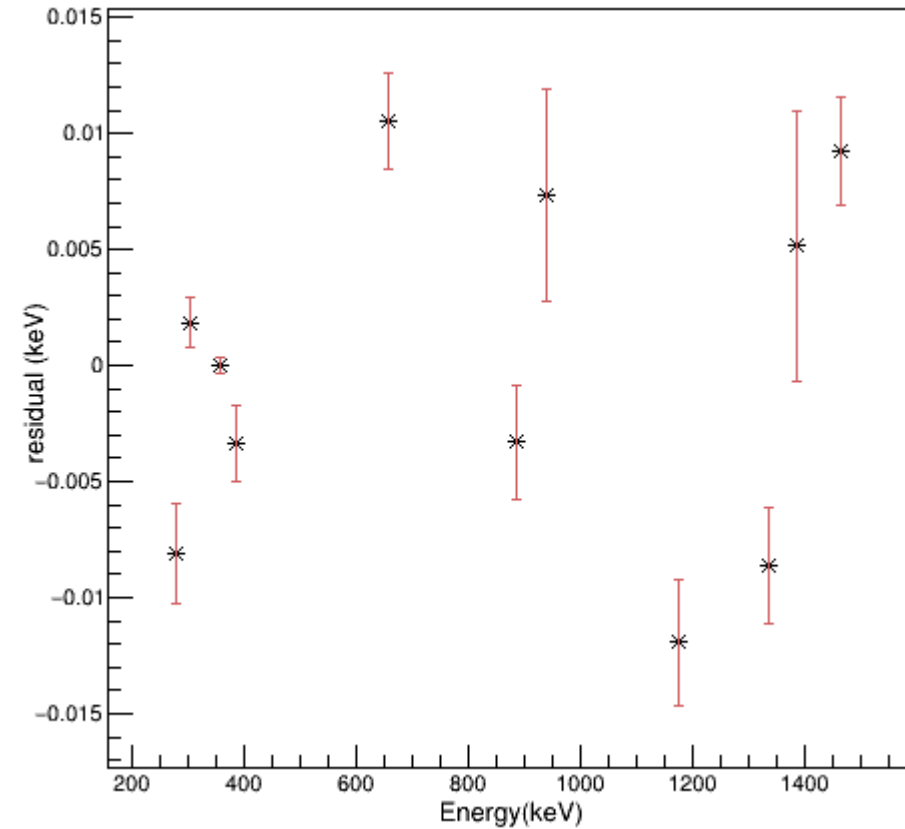
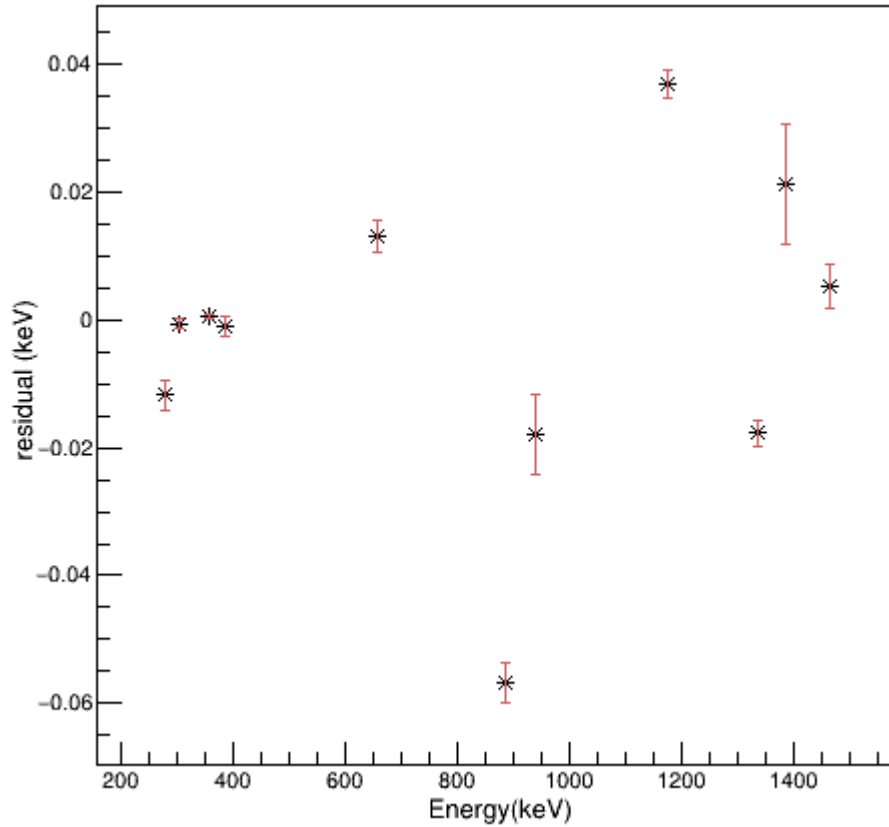


Ge05



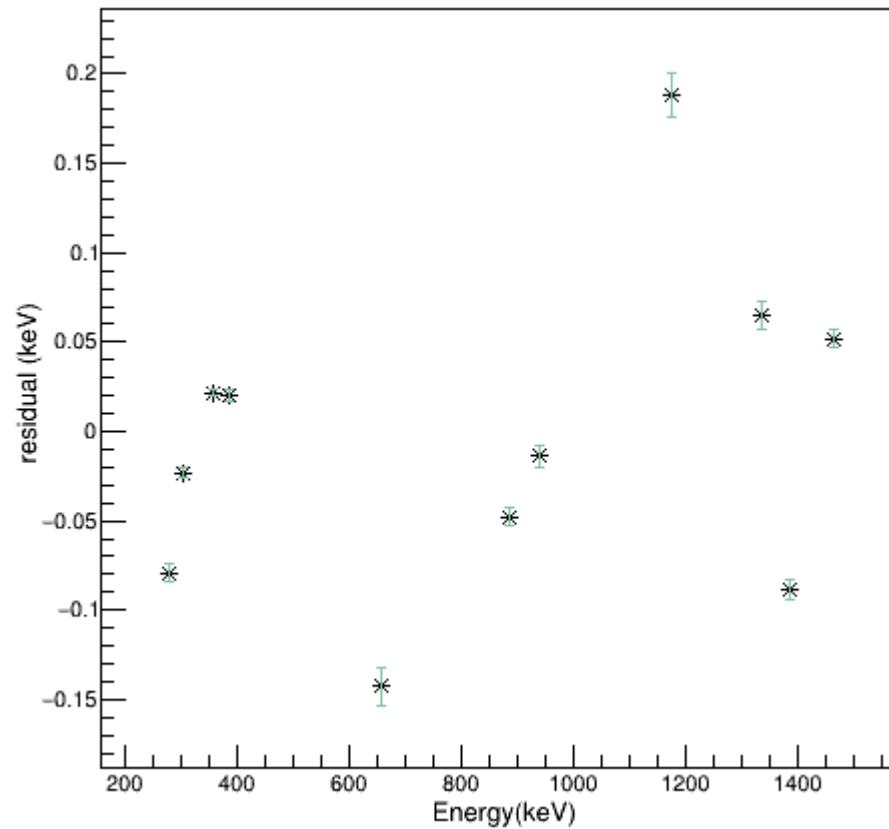
Adjusted residuals (just a check)

Ge05

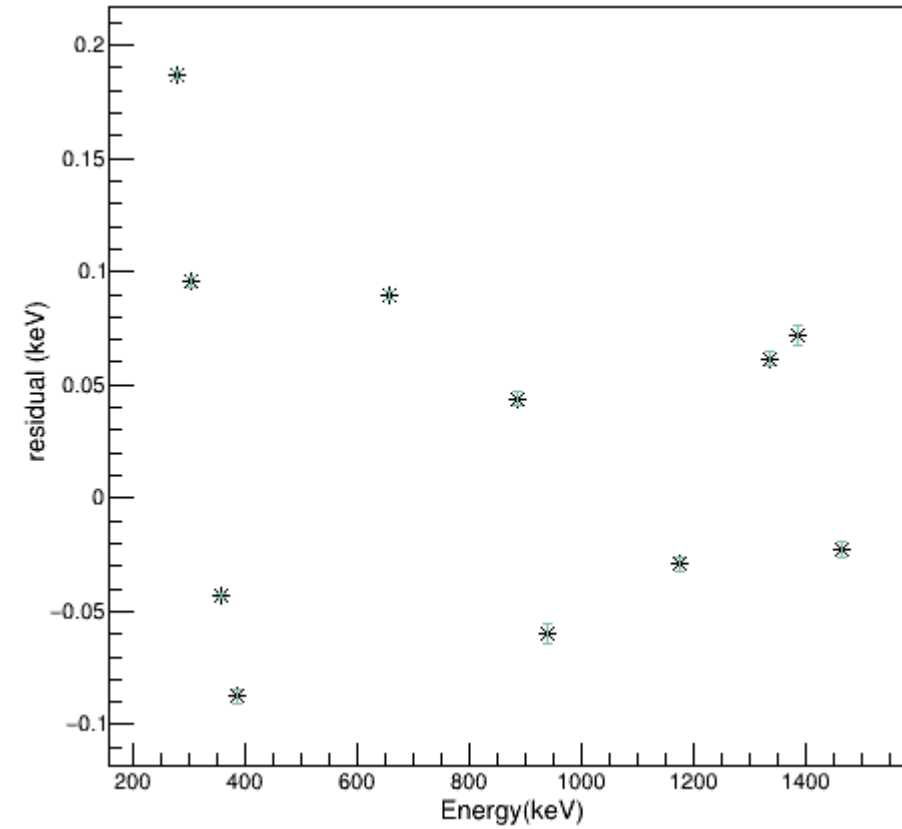


Beyond gain drift

Ge06A



Ge11



Summary

- ELET parameters optimized → New algorithm works
- Gain drift on anticoincidence spectrum → Seems good for all but a few detectors

- What's next:
 - Push new ELET algorithm to bitbucket (if everyone agrees)
 - Ideas for trend after gain drift?

