

update
E465 HPGe TN

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Group Meeting
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E465 HPGe (High Purity Germanium) TN (T2K Technical Note)

Repeating analysis

- scripts, instead of manual analysis
- comparing rates of runs
- improving combination of runs
- improving energy calibration
- improving resolution calibration
- will improve peak area selection
- will improve FLUKA efficiency simulation
- will calculate de-excitation gamma limits

TN-xxx-ver1.0

RCNP E465 HPGe detector

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8 types of run

blk	beam off
beam70cmlow	beam on, water, 70 cm distance, lower height
beam60cmlow	beam on, water, 60 cm distance, lower height
beam60cmlownowater	beam on, no water, 60 cm distance, lower height
beam30cmlow	beam on, water, 30 cm distance, lower height
Co	^{60}Co calibration source
AmBe	AmBe calibration source
AmBeFe	AmBe source and iron plate

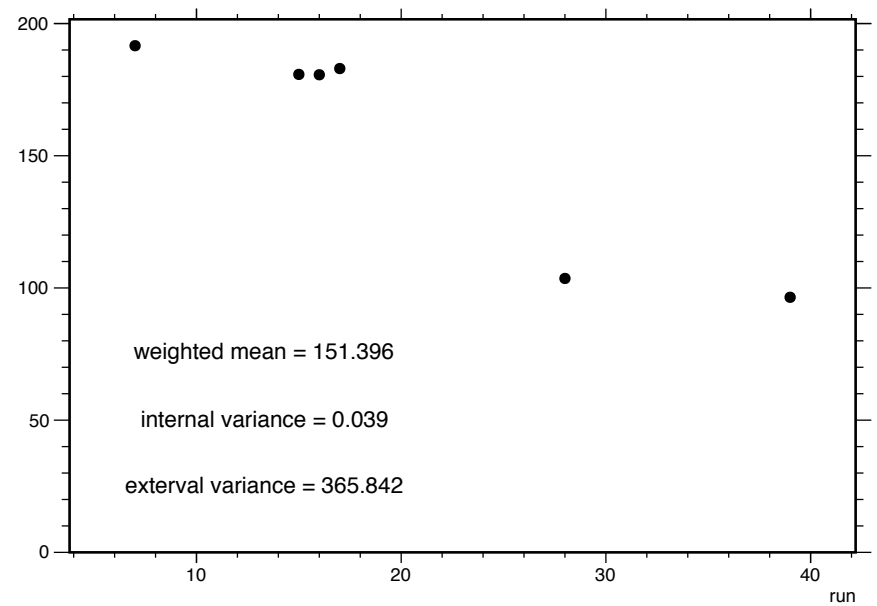
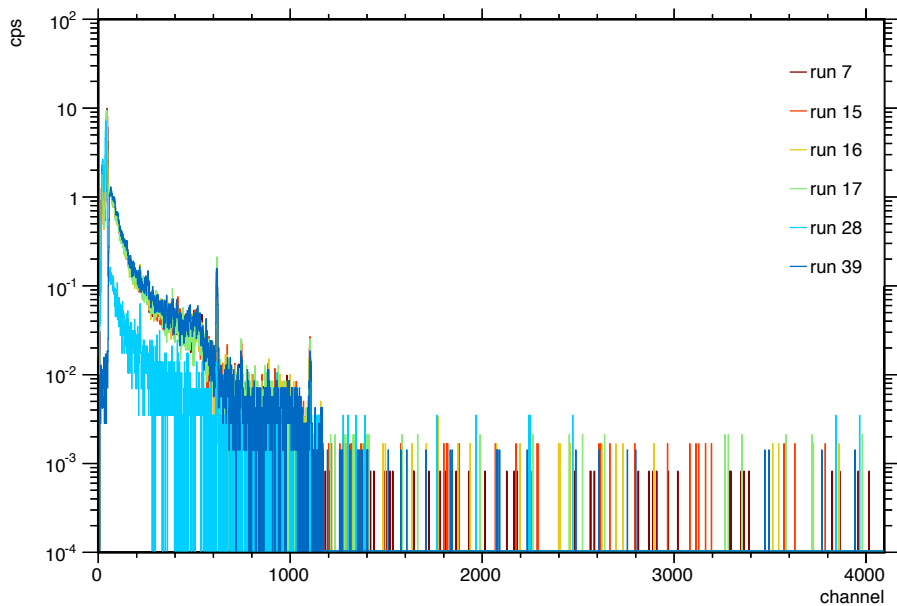
12 peaks

ann	511 keV annihilation
Co1173	1173 keV ^{60}Co
Co1332	1332 keV ^{60}Co
K	1461 keV ^{40}K
H	2223 $^1\text{H}(n,\text{gamma})$
Tl	2615 keV ^{208}Tl
AmBe peaks	AmBe (DE, SE, 4440 keV)
Fe peaks	$^{56}\text{Fe}(n,\text{gamma})$ (DE, SE, 7631 keV)

bkg

(ann, K, TI)

- remove run 28 due to Pb shielding (lower rate)
- discard run 39 due to lower threshold? (lower rate)

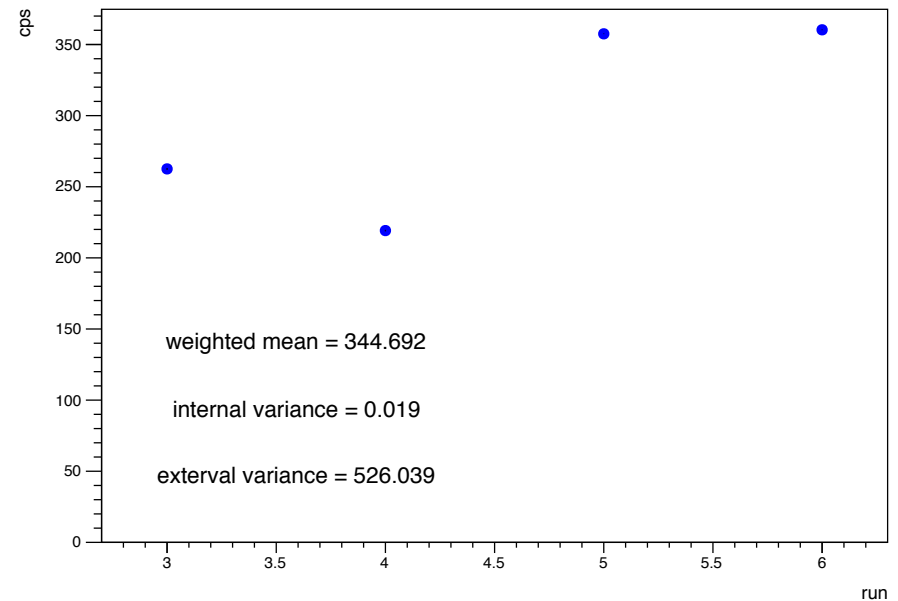
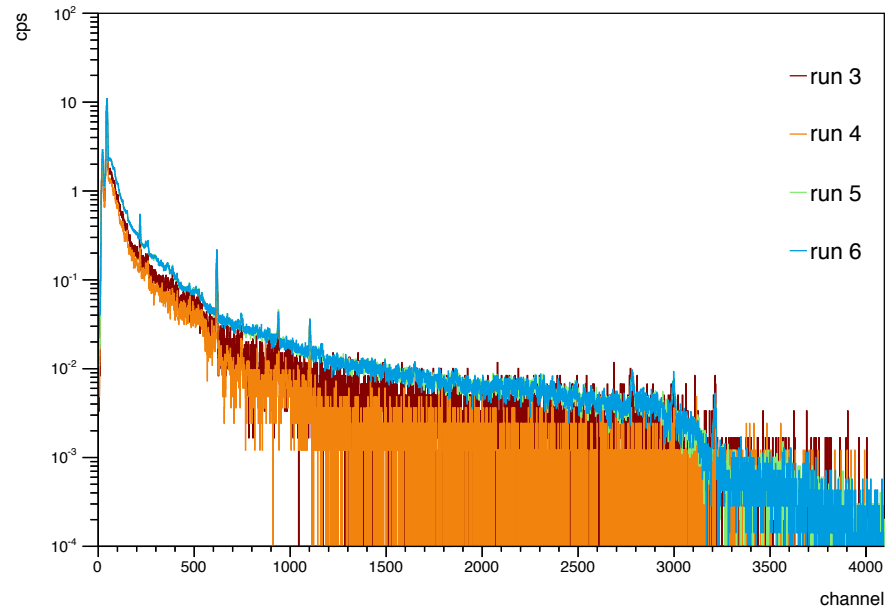


beam70cmlow

(ann, K, TI)

add (H, Fe peaks) when fitting combined spectrum

- discard 3–4 due to low rate

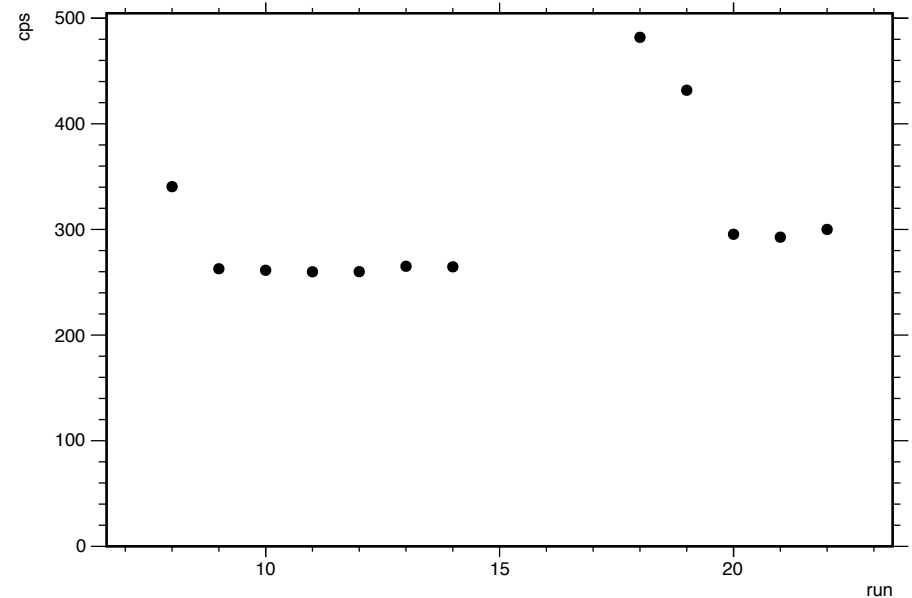


beam60cmlow

(ann, K, Tl, (H, Fe peaks))

- runs 9–14, 20–22 (10 nA)
- run 8 (20 nA?)
- runs 18–19 (40 nA)

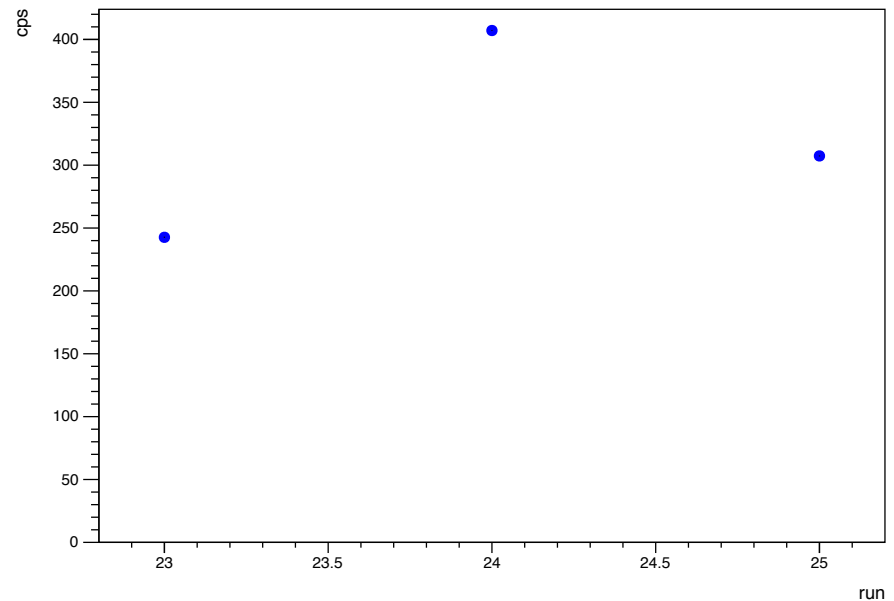
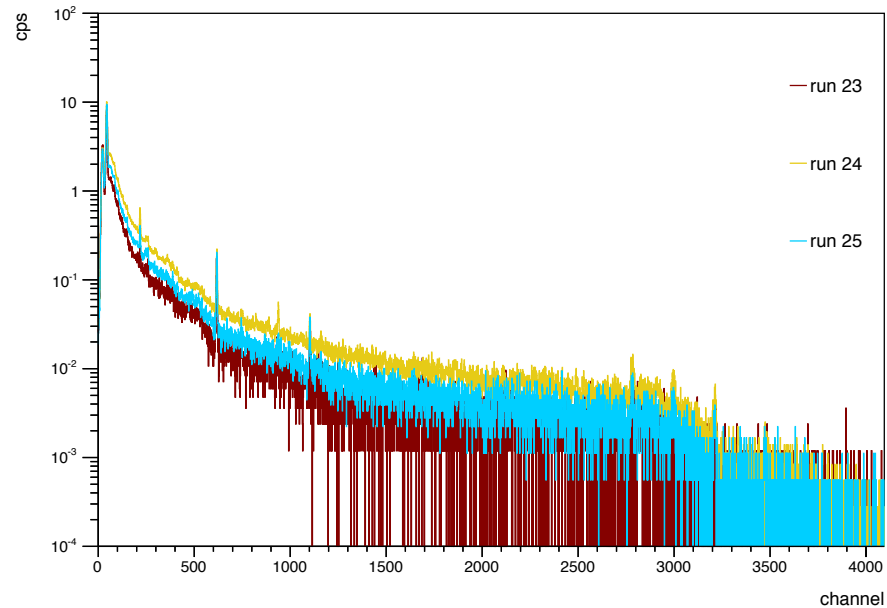
runs 20–22 higher rate
uncertainty in nA? activation?
I think it's ok



beam60cmlownowater

(ann, K, Tl, (H, Fe peaks))

- discard run 25 (20 nA) due to low rate
- run 23 (10 nA)
- run 24 (20 nA)



Co

(Co1173, Co1332, K, TI)

- no annihilation due to pileup?
- use sumpeak?

AmBe

(ann, Tl, AmBe peaks)

- no K due to pileup?

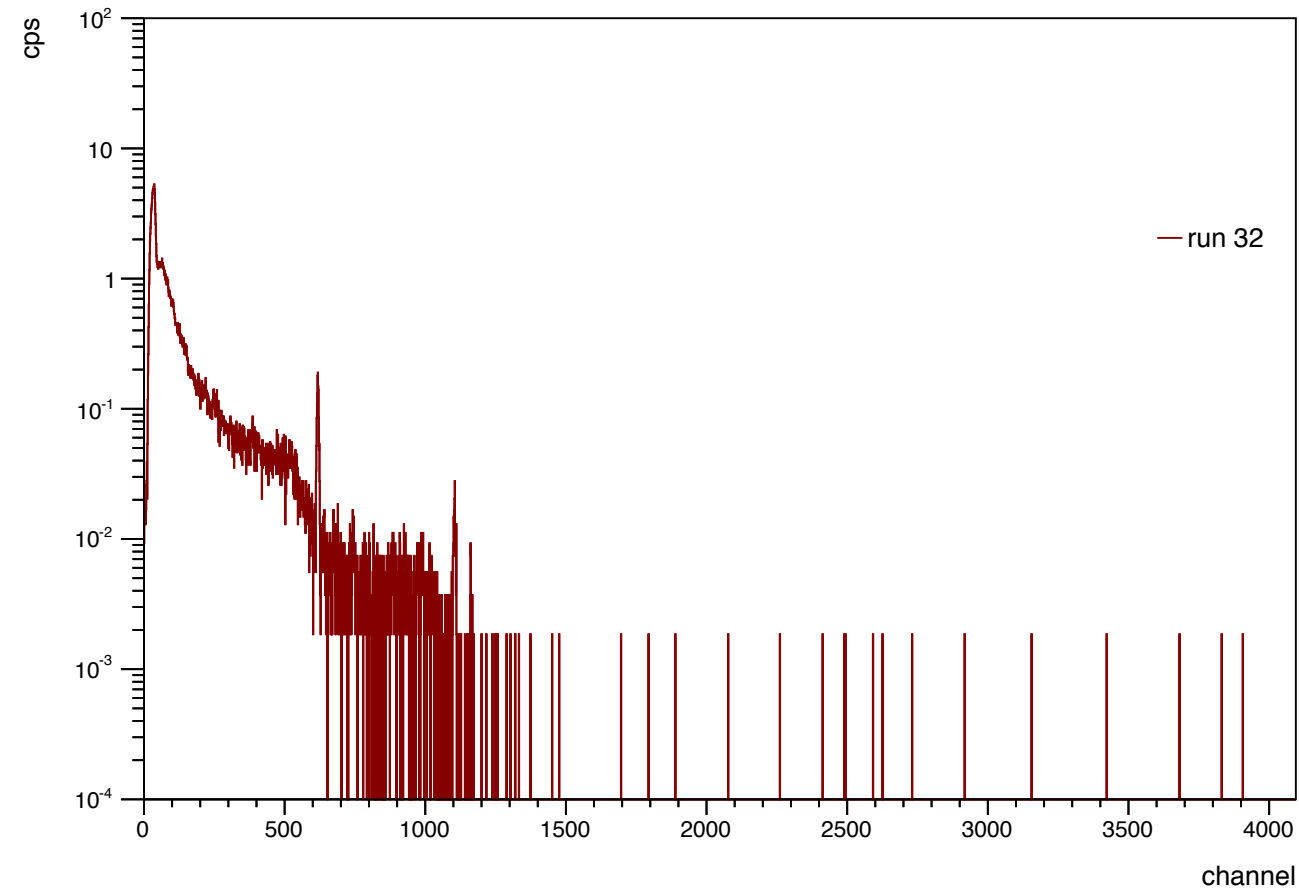
AmBeFe

(ann, H, AmBe peaks, Fe peaks)

- no TI due to pileup?

Na

- discard only run, no peak at 1274 keV (~540 channel)



Energy calibration

each run:

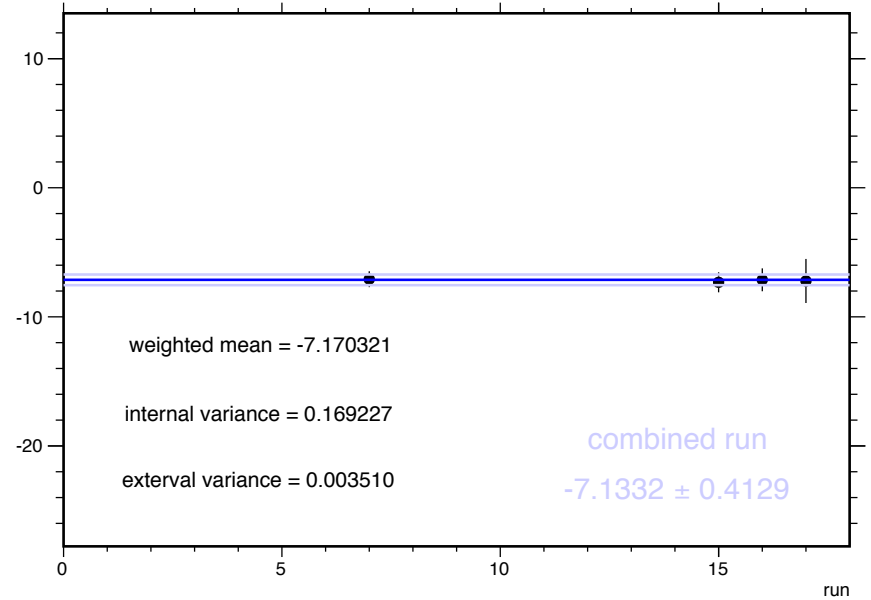
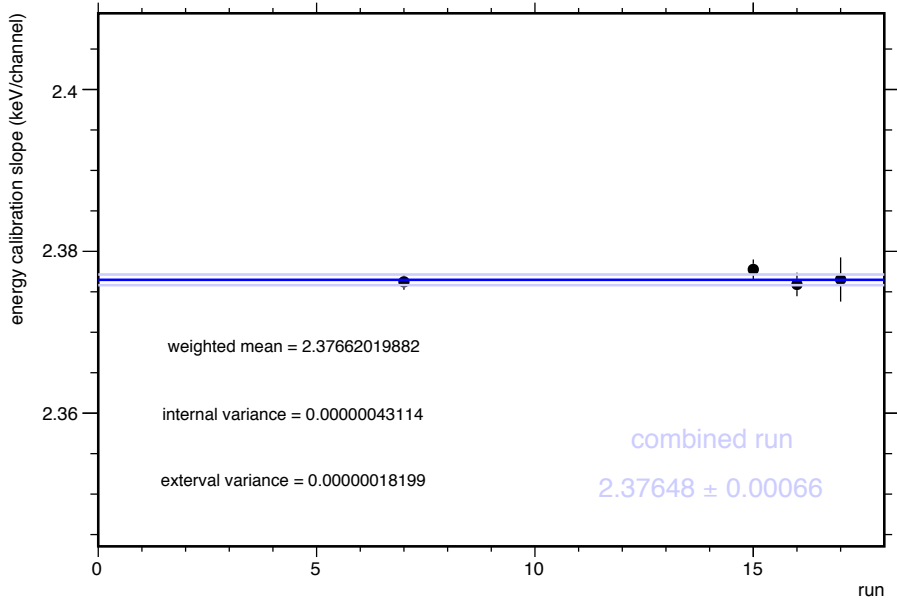
- Gaussian fit each peak
- energy calibration

combined spectrum:

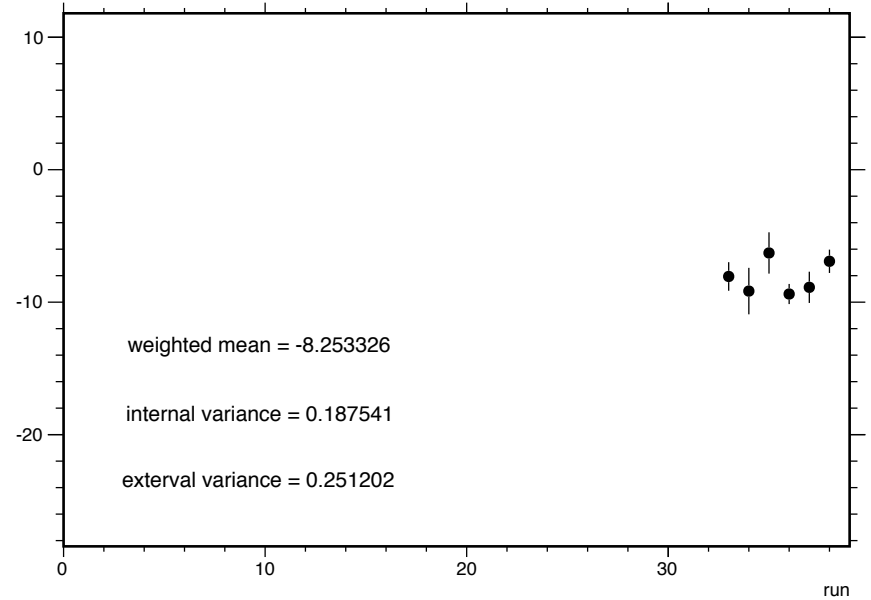
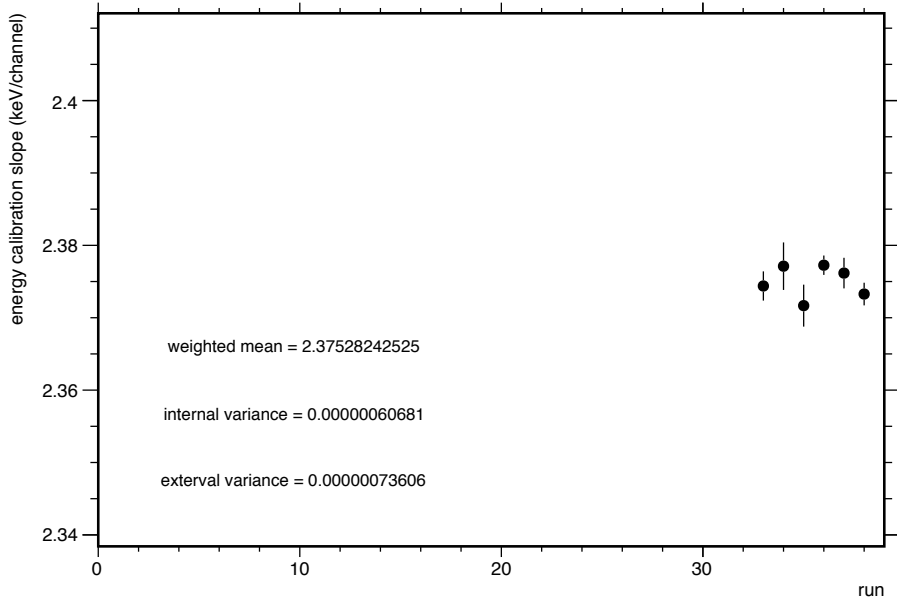
- Gaussian fit each peak
- energy calibration

- compare energy calibrations

For example, bkg

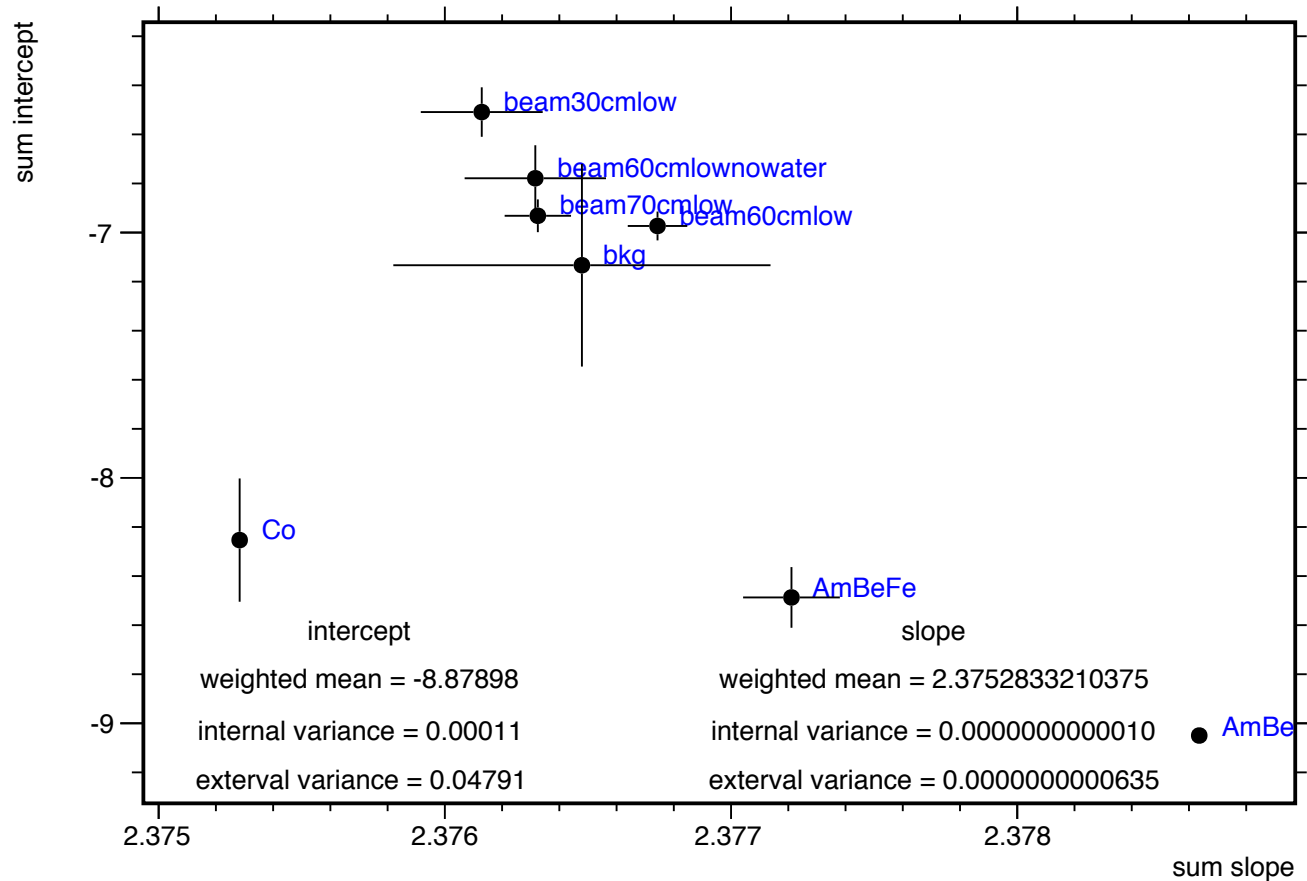


For example, Co



Method #1: average of combined spectra energy calibrations

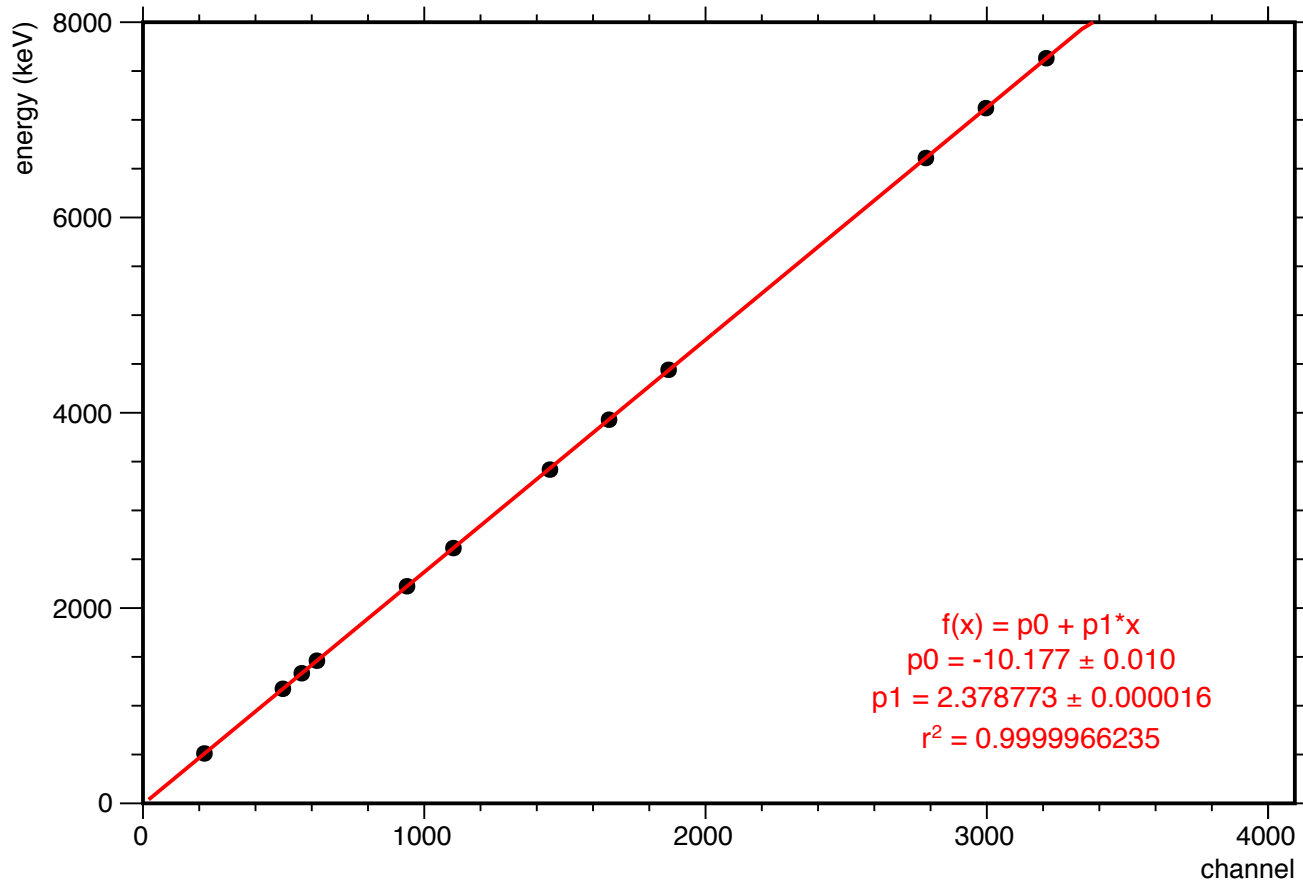
- no combined spectra for Co and AmBe, so average energy calibrations, but uncertainties are so small...



Method #2: Linear fit on average combined spectra peaks

PROBLEM - AmBe peaks don't include AmBeFe run

And I need to check that there's not another problem...



Also, rootlogon.C