

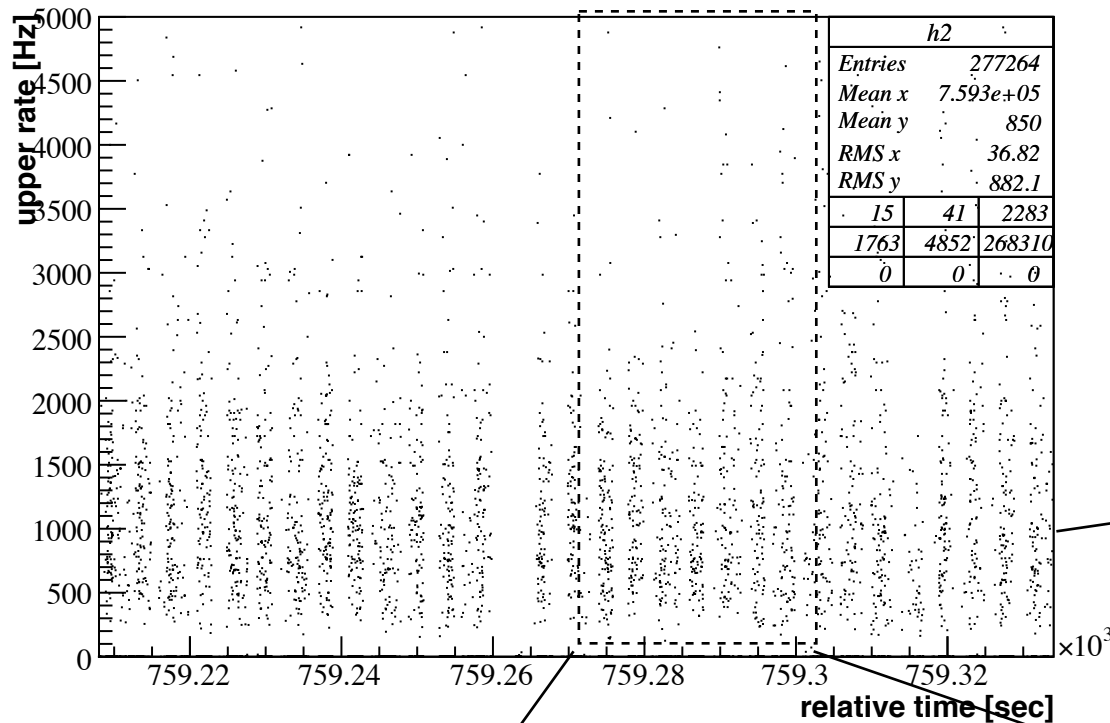
upper rate dependence

upper rate = (accidental coincidence of upper with signal) / (clock / 100k [Hz])

conclusion

- the excess between K_a and k_b depends on the “accidental” upper rate
- the gaussian mean moves about 5 eV with upper rate > 1 kHz
 - sdd5 (upper rate > 1 kHz) has $\sim 1/2$ statistics of (upper rate < 1 kHz)
- for sdd1, the lower side tail of N_i influences the fit parameters.

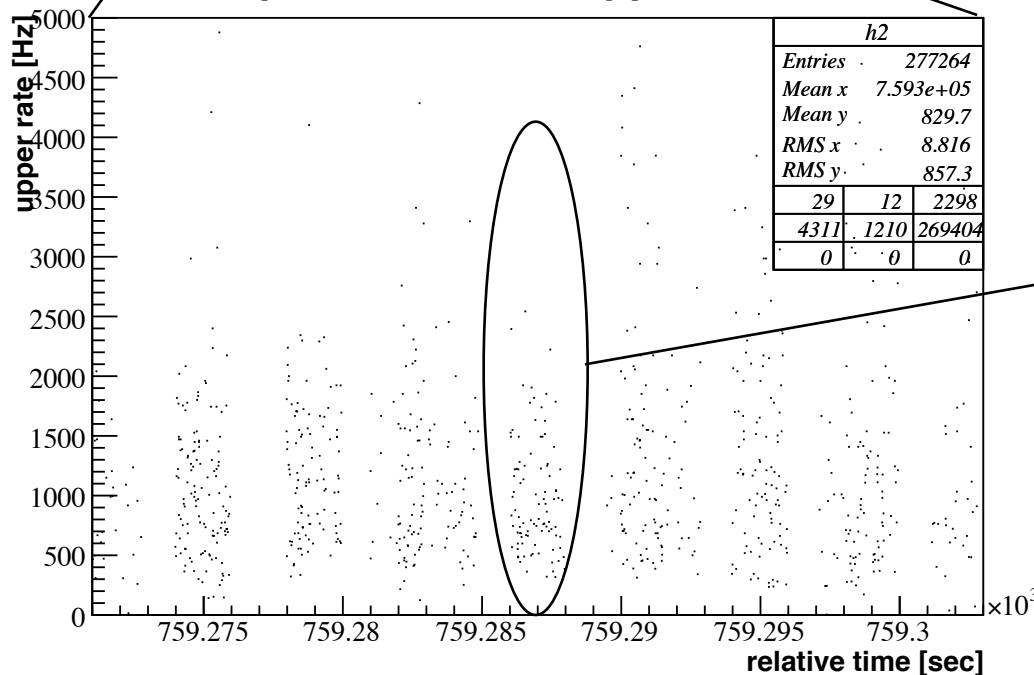
spill structure of upper rate



(accidental) upper rate [Hz]
vs
relative time [sec]

spill structure
can be seen

spill structure of upper rate



micro structure ?

self trigger
run 520 sdd5

upper rate dependence of a simple fit (sdd I)

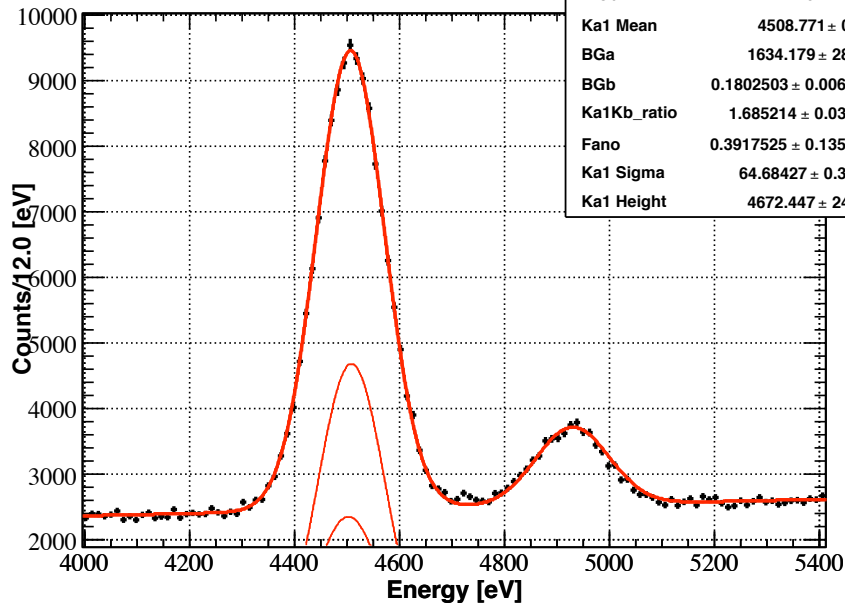
	upper < 1 kHz	upper > 1 kHz	total	
Ti	mean [eV]	4508.7 ± 0.3	4511.6 ± 0.8	4509.1 ± 0.2
	sigma [eV]	64.7 ± 0.3	67.9 ± 0.8	65.0 ± 0.2
	chi ² /ndf	1.08	1.50	1.45
Ni	mean [eV]	7476.3 ± 0.3	7481.1 ± 1.0	7476.9 ± 0.3
	sigma [eV]	75.4 ± 0.3	80.3 ± 1.1	75.9 ± 0.3
	chi ² /ndf	1.60	1.18	1.65

← lower side tail influences

upper rate dependence of a simple fit (sdd5)

	upper < 1 kHz	upper > 1 kHz	total	
Ti	mean [eV]	4507.7 ± 0.3	4511.2 ± 0.6	4508.6 ± 0.3
	sigma [eV]	78.0 ± 0.3	84.0 ± 0.6	79.8 ± 0.3
	chi ² /ndf	1.59	2.28	2.53
Ni	mean [eV]	7475.4 ± 0.4	7480.9 ± 0.6	7476.9 ± 0.3
	sigma [eV]	88.0 ± 0.4	94.5 ± 0.7	89.8 ± 0.3
	chi ² /ndf	1.57	2.06	2.34

out_calib_part_sdd1



upper rate < 1 kHz

Ti local fit

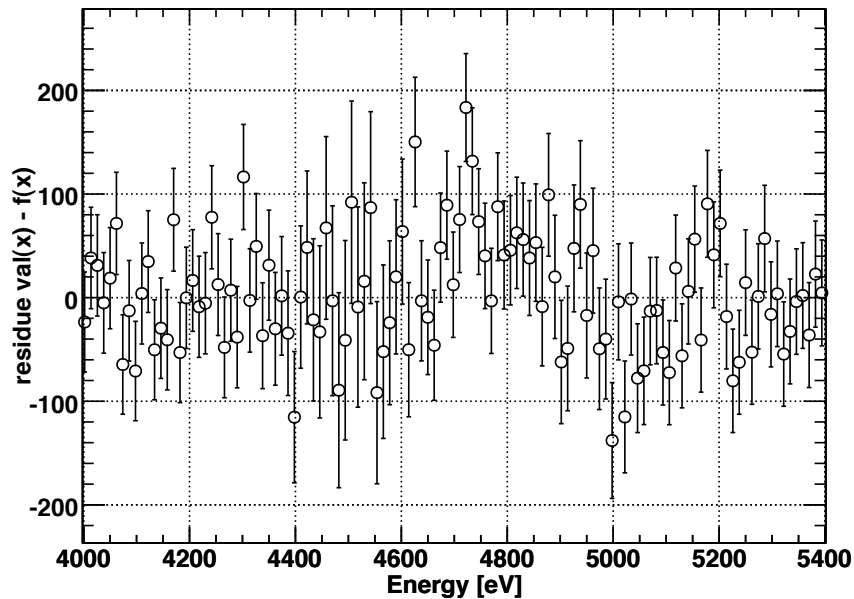
linear background + 3 Gaussians

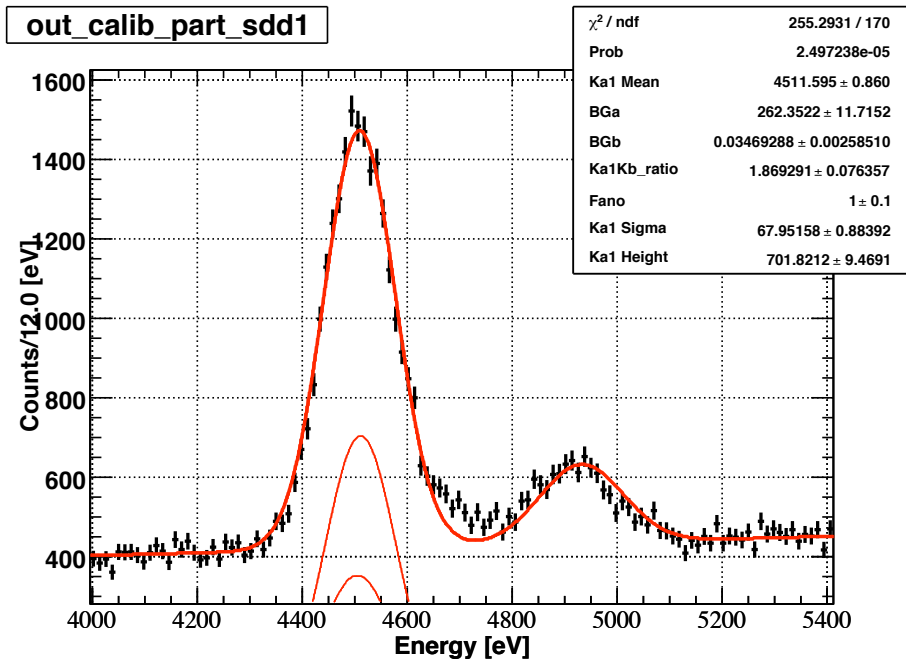
mean = 4508.7 ± 0.3 eV

sigma = 64.7 ± 0.3 eV

$\chi^2/\text{ndf} = 1.08$

fit residue





upper rate > 1 kHz

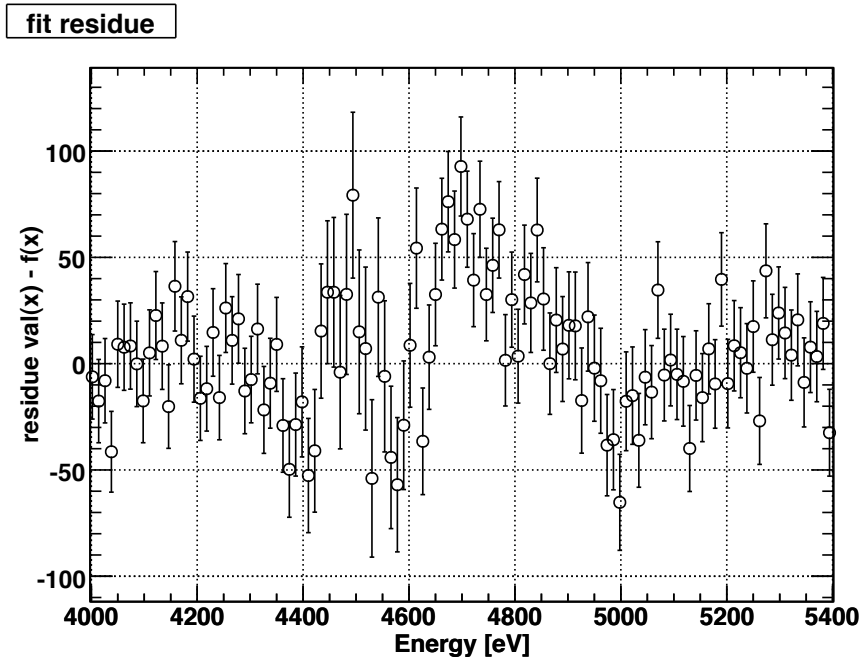
Ti local fit

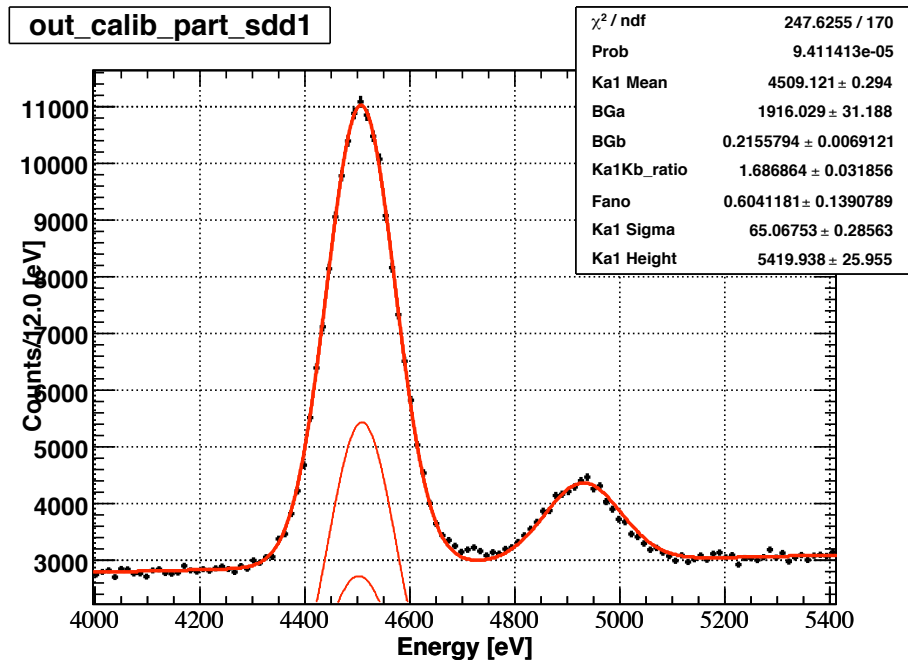
linear background + 3 Gaussians

mean = 4511.6 ± 0.8 eV

sigma = 67.9 ± 0.8 eV

$\chi^2/\text{ndf} = 1.50$





total histogram

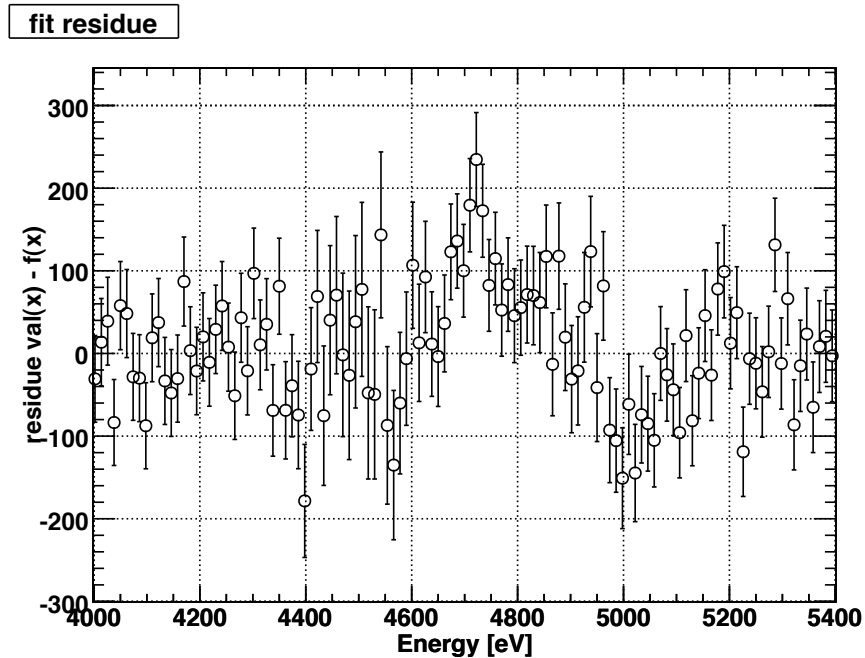
Ti local fit

linear background + 3 Gaussians

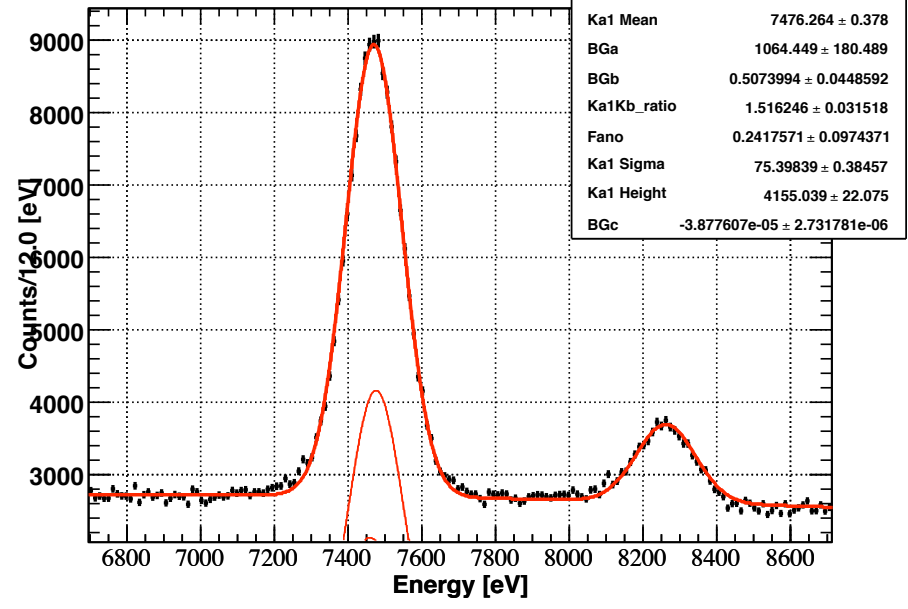
mean = 4509.1 ± 0.2 eV

sigma = 65.0 ± 0.2 eV

$\chi^2/\text{ndf} = 1.45$



out_calib_part_sdd1



upper rate < 1 kHz

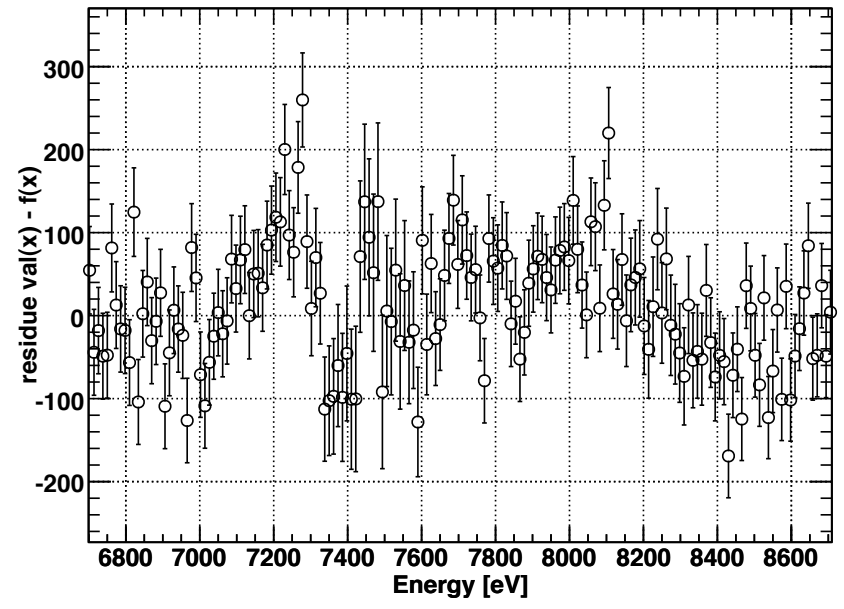
Ni local fit
linear background + 3 Gaussians

mean = 7476.3 \pm 0.3 eV

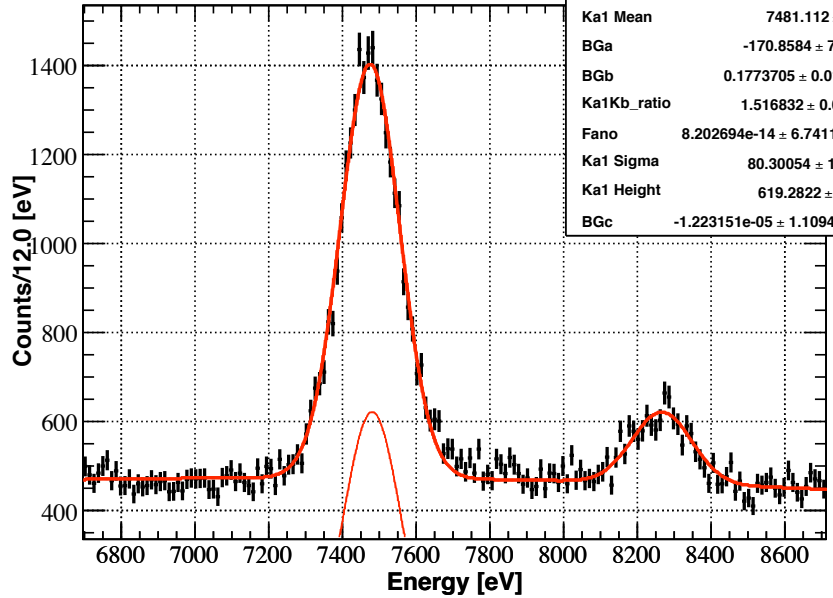
sigma = 75.4 \pm 0.3 eV

chi²/ndf = 1.60

fit residue



out_calib_part_sdd1



χ^2 / ndf	377.181 / 320
Prob	0.01522721
Ka1 Mean	7481.112 ± 1.052
BGa	-170.8584 ± 73.3023
BGb	0.1773705 ± 0.0182153
Ka1Kb_ratio	1.516832 ± 0.073769
Fano	8.202694e-14 ± 6.741107e-01
Ka1 Sigma	80.30054 ± 1.10646
Ka1 Height	619.2822 ± 8.5038
BGc	-1.223151e-05 ± 1.109484e-06

upper rate > 1 kHz

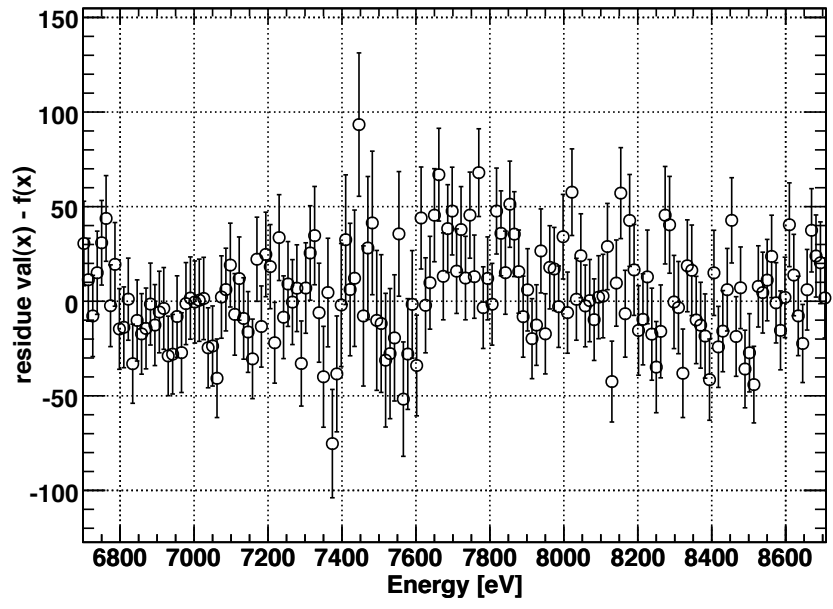
Ni local fit
linear background + 3 Gaussians

mean = 7481.1 ± 1.0 eV

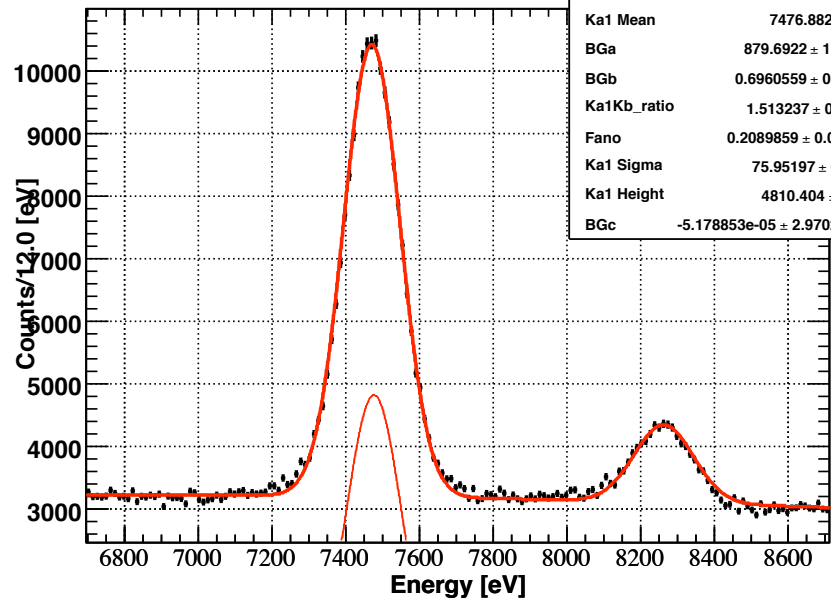
sigma = 80.3 ± 1.1 eV

chi²/ndf = 1.18

fit residue



out_calib_part_sdd1



χ^2 / ndf	527.6128 / 320
Prob	2.885474e-13
Ka1 Mean	7476.882 ± 0.354
BGa	879.6922 ± 196.2377
BGb	0.6960559 ± 0.048775
Ka1Kb_ratio	1.513237 ± 0.029491
Fano	0.2089859 ± 0.0908730
Ka1 Sigma	75.95197 ± 0.36267
Ka1 Height	4810.404 ± 23.801
BGc	-5.178853e-05 ± 2.970241e-06

total histogram

Ni local fit

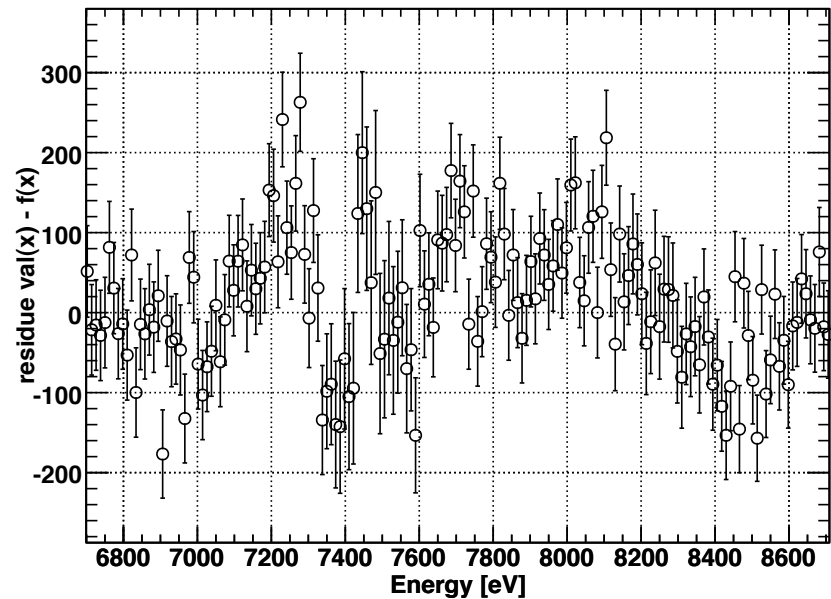
linear background + 3 Gaussians

mean = 7476.9 ± 0.3 eV

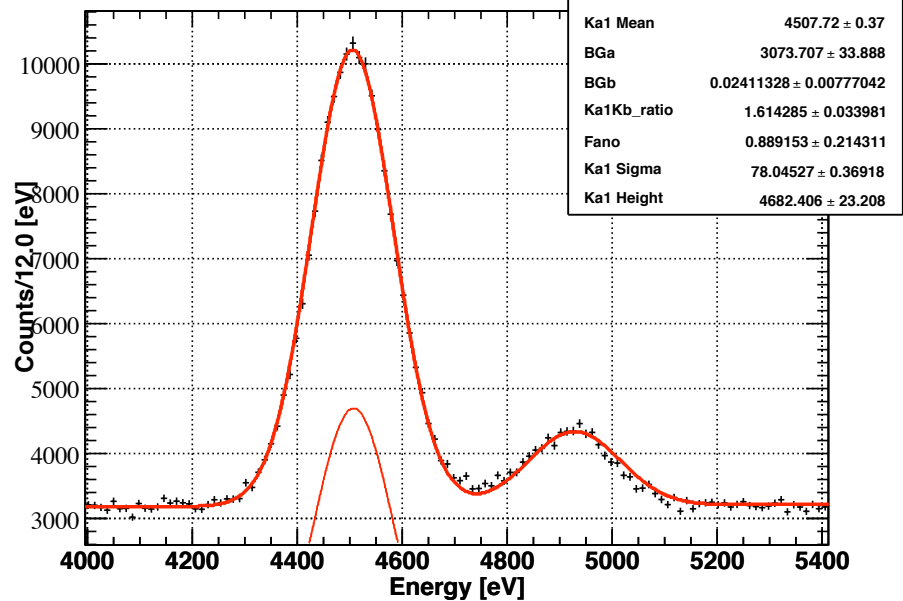
sigma = 75.9 ± 0.3 eV

$\chi^2/\text{ndf} = 1.65$

fit residue



out_calib_part_sdd5



upper rate < 1 kHz

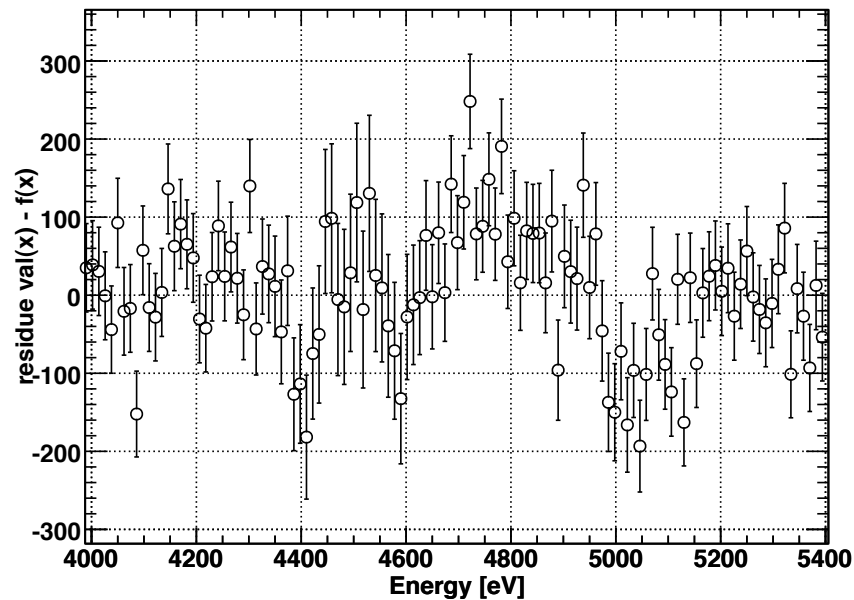
Ti local fit
linear background + 3 Gaussians

mean = 4507.7 \pm 0.3 eV

sigma = 78.0 \pm 0.3 eV

chi²/ndf = 1.59

fit residue



upper rate > 1 kHz

Ti local fit

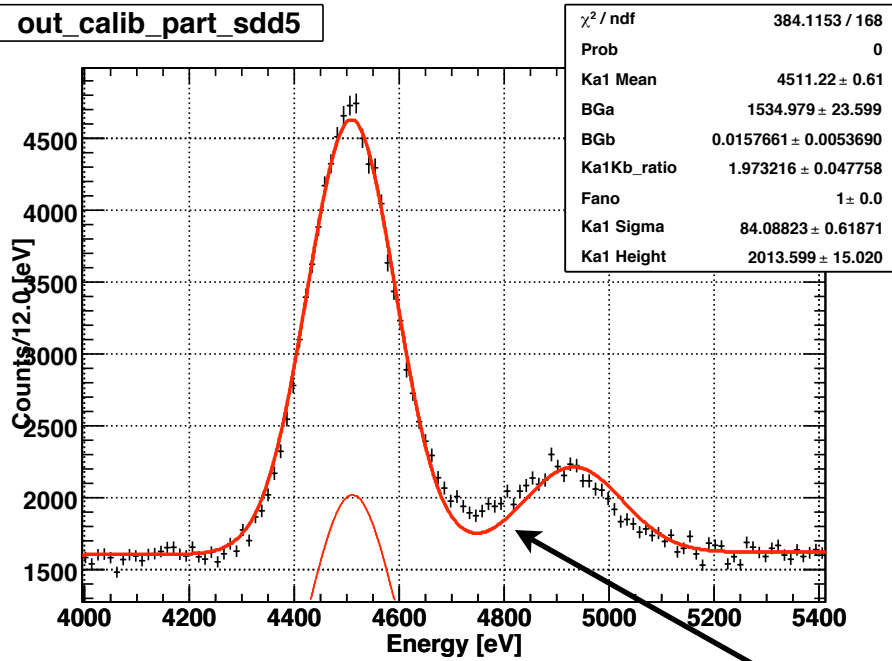
linear background + 3 Gaussians

mean = 4511.2 ± 0.6 eV

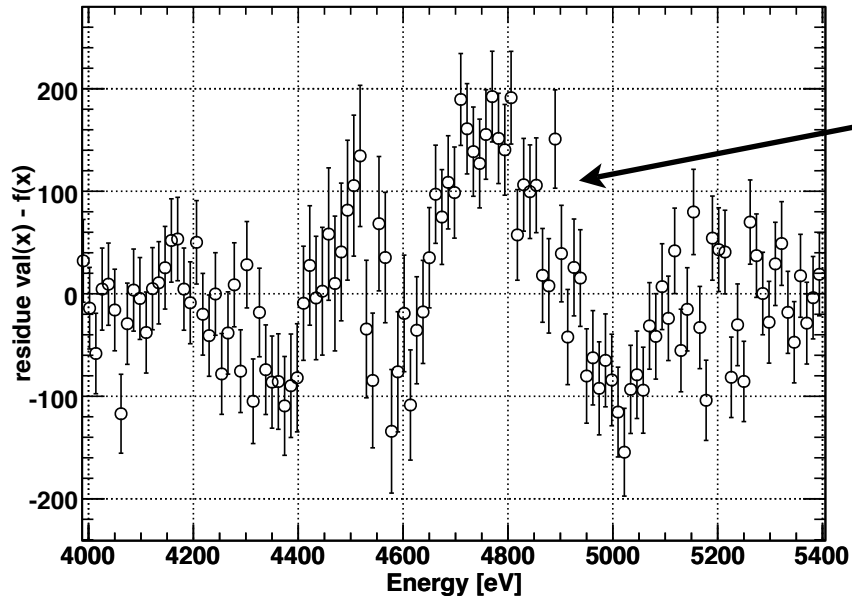
sigma = 84.0 ± 0.6 eV

chi²/ndf = 2.28

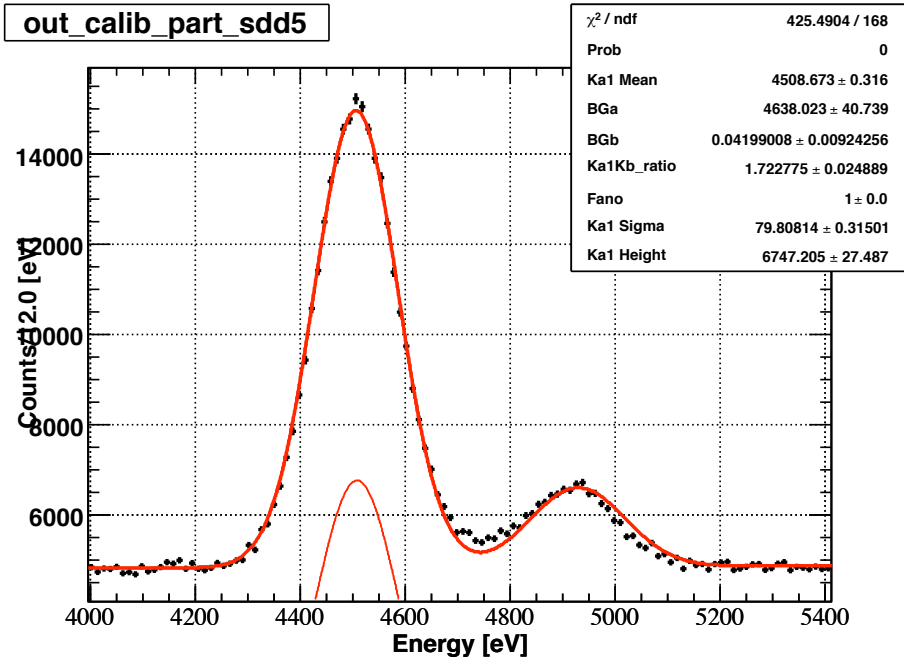
out_calib_part_sdd5



fit residue



excess between Ka and Kb



total histogram

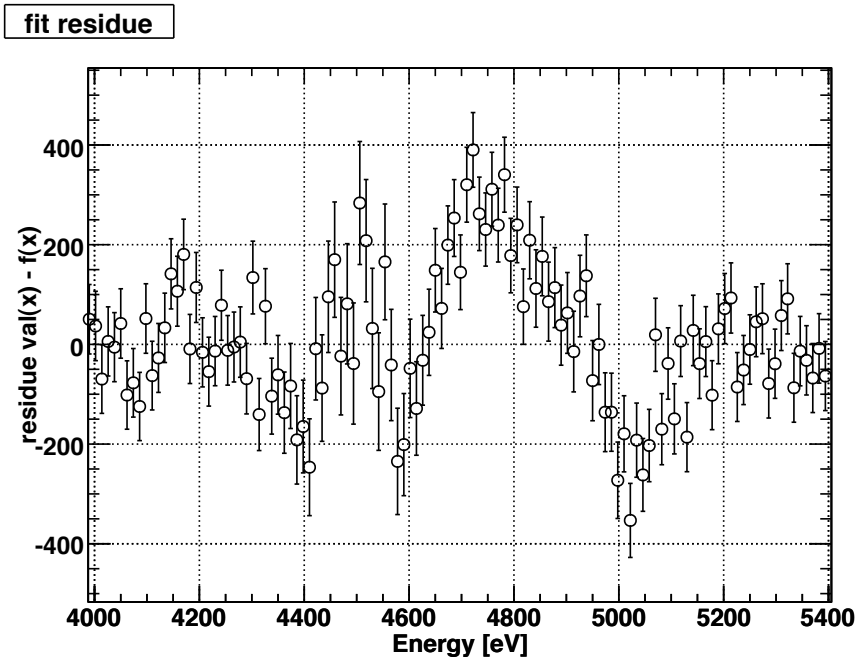
Ti local fit

linear background + 3 Gaussians

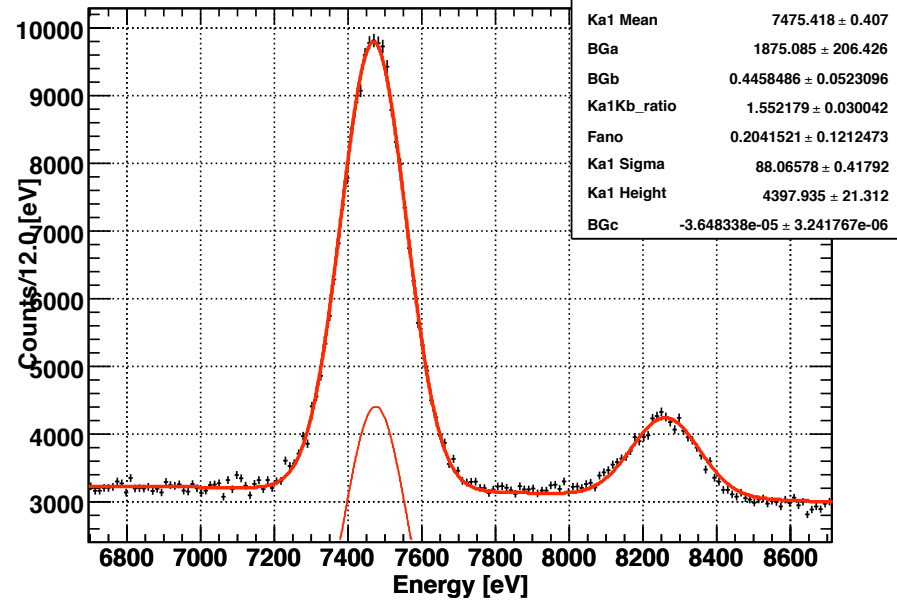
mean = 4508.6 \pm 0.3 eV

sigma = 79.8 \pm 0.3 eV

chi²/ndf = 2.53



out_calib_part_sdd5



upper rate < 1 kHz

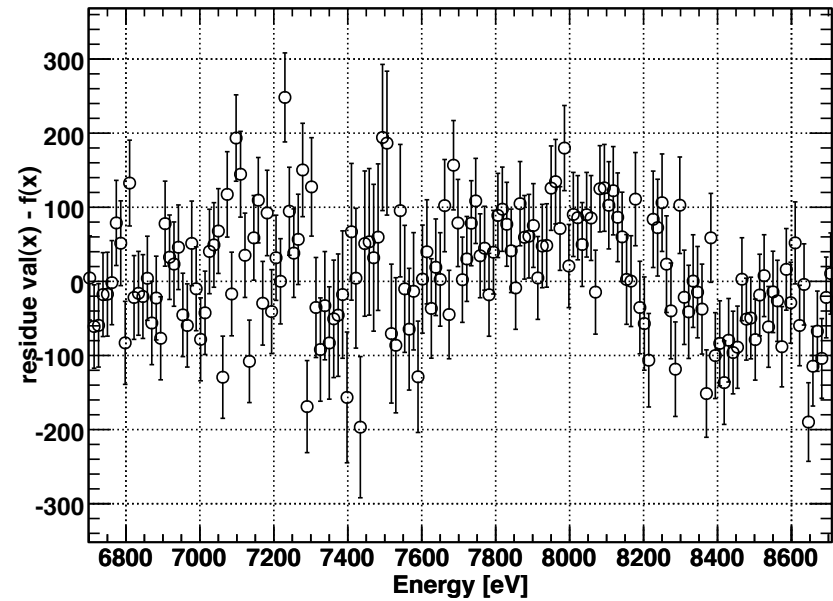
Ni local fit
linear background + 3 Gaussians

mean = 7475.4 \pm 0.4 eV

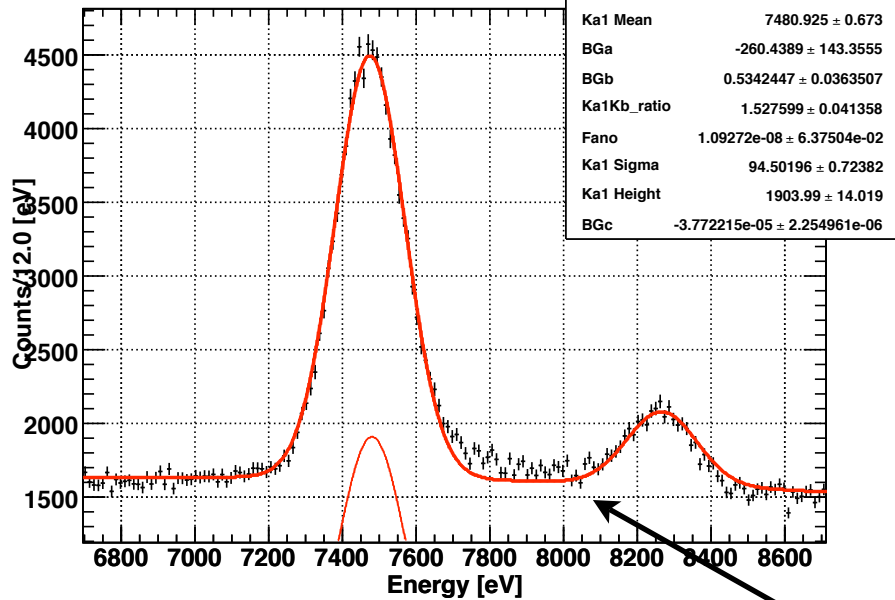
sigma = 88.0 \pm 0.4 eV

chi²/ndf = 1.57

fit residue



out_calib_part_sdd5



upper rate > 1 kHz

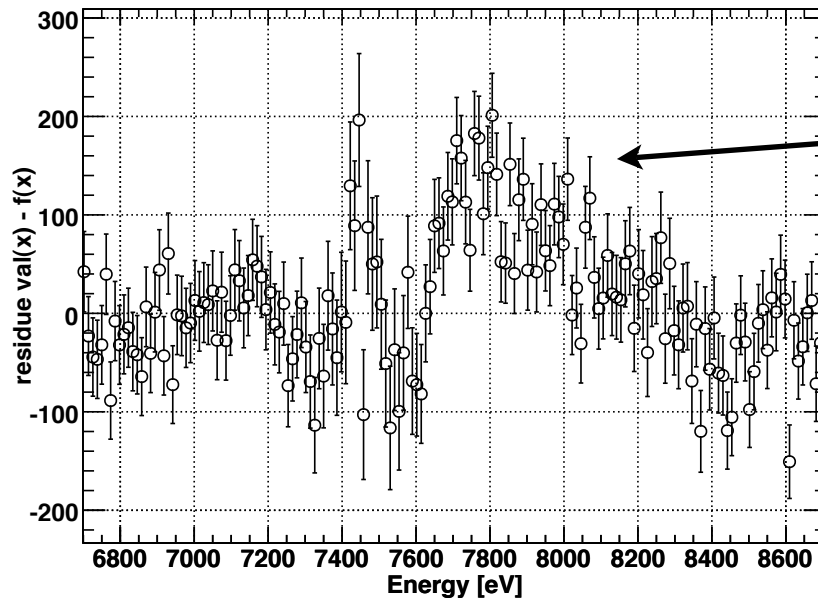
Ni local fit
linear background + 3 Gaussians

mean = 7480.9 ± 0.6 eV

sigma = 94.5 ± 0.7 eV

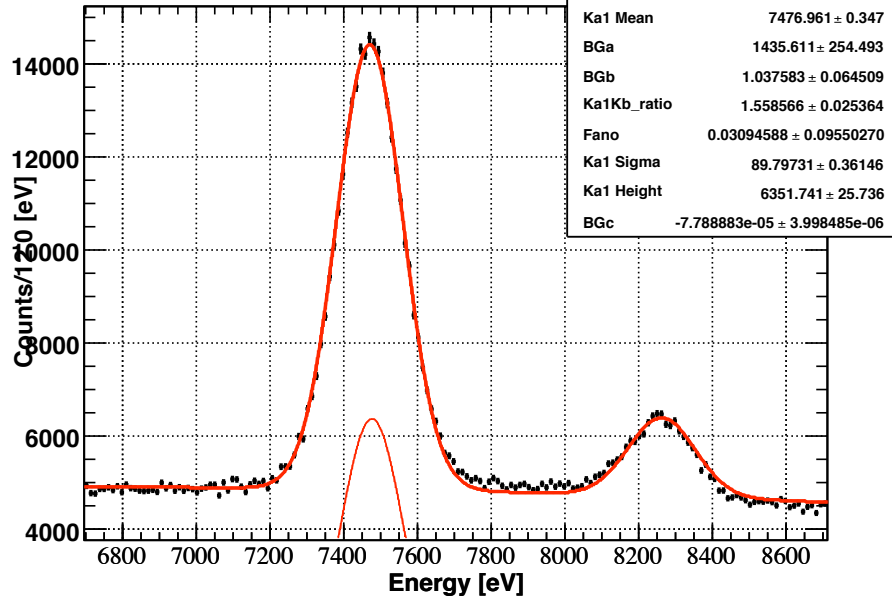
$\chi^2/\text{ndf} = 2.06$

fit residue



excess between Ka and Kb

out_calib_part_sdd5



total histogram

Ni local fit

linear background + 3 Gaussians

mean = 7476.9 ± 0.3 eV

sigma = 89.8 ± 0.3 eV

chi²/ndf = 2.34

fit residue

