

## tail and pile-up study

pile-up : an exponential structure to fit the excess between Ka and Kb

tail : an exponential structure to fit the lower side tail especially Ni

### conclusion

$\chi^2$  with these structures is improved, but the exponential slope reaches a limit ( $3\sigma$  of gaussian standard deviation) so the fit is suspicious...

## tail and pile-up study (sdd I)

	tail & pile	pile	
Ti	mean [eV]	$4507.2 \pm 0.3$	$4505.7 \pm 0.5$
	chi <sup>2</sup> /ndf	1.06	1.08
	pile ratio	0.071	0.075
Ni	mean [eV]	$7476.2 \pm 0.8$	$7472.8 \pm 0.7$
	chi <sup>2</sup> /ndf	1.19	1.48
	pile ratio	0.085	0.074

with tail : mean value moves +2 eV at Ti, +4 eV at Ni

but the fit has some limit values, so this fit is suspicious...

# Ni

## fit result (with pile and tail)

```
FCN=376.998 FROM MINOS      STATUS=PROBLEMS      4053 CALLS      5766 TOTAL
                        EDM=5.88946e-05      STRATEGY= 1      ERROR MATRIX ACCURATE
EXT PARAMETER      PARABOLIC      MINOS ERRORS
NO.  NAME      VALUE      ERROR      NEGATIVE      POSITIVE
 1  Ka1 Mean      7.47623e+03      6.90156e-01      -6.01148e-01      1.18083e+00
 2  BGa      1.74777e+03      1.96160e+02      -1.95888e+02      1.96411e+02
 3  BGb      4.61722e-01      4.87377e-02      -4.88001e-02      4.86697e-02
 4  Ka1Kb_ratio      1.53948e+00      2.95878e-02      -2.94667e-02      2.96968e-02
 5  Fano      3.57041e-01      9.46766e-02      -9.34099e-02      9.72346e-02
 6  Ka1 Sigma      7.21712e+01      3.75352e-01      -3.73789e-01      3.76808e-01
 7  Ka1 Height      4.52273e+03      4.21539e+01      -3.74395e+01      7.26949e+01
 8  Pile Height      5.18384e+02      2.33053e+01      -2.10004e+01      at limit
      WARNING - - ABOVE PARAMETER IS AT LIMIT.
 9  Pile Beta      1.55515e+02      2.14908e+00      -2.09679e+00      at limit
      WARNING - - ABOVE PARAMETER IS AT LIMIT.
10  Pile Sigma      5.42557e+01      1.30849e+01      -1.09071e+01      at limit
11  BGc      -3.68216e-05      2.96706e-06      -2.96290e-06      2.97090e-06
12  Tail Height      5.18384e+02      1.47693e+01      -1.41595e+01      at limit
      WARNING - - ABOVE PARAMETER IS AT LIMIT.
13  Tail Beta      1.55515e+02      3.94309e+00      -3.49457e+00      at limit
      WARNING - - ABOVE PARAMETER IS AT LIMIT.

### integral of function ###
Xray (gauss) :      818190.284
Pile (expo) :      75856.726
ratio Pile/All :      0.085
```

pile and tail parameters reach upper limits

# Ni

## fit result (with only pile)

```
FCN=483.102 FROM MINOS      STATUS=PROBLEMS      2126 CALLS      2409 TOTAL
                        EDM=1.90783e-05      STRATEGY= 1      ERROR MATRIX ACCURATE
EXT PARAMETER
NO.  NAME      VALUE      PARABOLIC      MINOS ERRORS
      NAME      VALUE      ERROR      NEGATIVE      POSITIVE
 1 Ka1 Mean    7.47289e+03  7.13174e-01  -7.12142e-01  7.15135e-01
 2 BGa        1.49424e+03  2.15631e+02  -2.15250e+02  2.15661e+02
 3 BGb        5.37338e-01  5.39452e-02  -5.39526e-02  5.38506e-02
 4 Ka1Kb_ratio 1.52113e+00  2.93642e-02  -2.92549e-02  2.94700e-02
 5 Fano       3.07967e-01  9.53502e-02  -9.40763e-02  9.80705e-02
 6 Ka1 Sigma   7.45873e+01  4.11809e-01  -4.10711e-01  4.13005e-01
 7 Ka1 Height  4.65603e+03  3.39914e+01  -3.40412e+01  3.39610e+01
 8 Pile Height 4.58853e+02  6.33395e+01  -6.51651e+01  at limit
 9 Pile Beta   1.55515e+02  7.16479e+00  -7.24611e+00  at limit
10 Pile Sigma  3.32364e+01  6.53795e+00  -6.22914e+00  7.19951e+00
11 BGc        -4.19523e-05  3.29527e-06  -3.28956e-06  3.29569e-06

WARNING - - ABOVE PARAMETER IS AT LIMIT.

### integral of function ###
Xray (gauss) : 870503.351
Pile (expo) : 69747.395
ratio Pile/All : 0.074
```

# Ti

## fit result (with pile and tail)

```
FCN=174.741 FROM MINOS      STATUS=PROBLEMS      8985 CALLS      9293 TOTAL
                        EDM=7.36578e-05      STRATEGY= 1      ERROR MATRIX ACCURATE
EXT PARAMETER
NO.  NAME      VALUE      ERROR      NEGATIVE      POSITIVE
 1  Ka1 Mean    4.50720e+03  3.96484e-01 -1.20119e+00  5.30545e-01
 2  BGa        1.92226e+03  3.20556e+01 -3.22316e+01  3.18799e+01
 3  BGb        2.10694e-01  6.97914e-03 -6.94039e-03  7.01796e-03
 4  Ka1Kb_ratio 1.68724e+00  3.23825e-02 -3.23033e-02  3.24600e-02
 5  Fano       3.14062e-01  1.19483e-01 -1.18470e-01  1.23300e-01
 6  Ka1 Sigma  6.29969e+01  3.41878e-01 -3.58332e-01  3.42620e-01
 7  Ka1 Height 5.25468e+03  2.96400e+01 -8.50353e+01  2.96386e+01
 8  Pile Height 5.50033e+02  4.31718e+01 -3.35005e+01  at limit
      WARNING - - ABOVE PARAMETER IS AT LIMIT.
 9  Pile Beta  1.30655e+02  4.06388e+00 -3.59746e+00  at limit
      WARNING - - ABOVE PARAMETER IS AT LIMIT.
10  Pile Sigma 6.53275e+01  3.03644e+01 -2.59779e+01  at limit
      WARNING - - ABOVE PARAMETER IS AT LIMIT.
11  Tail Height 1.44991e+02  6.01483e+01 -6.12694e+01  3.96237e+02
12  Tail Beta  1.30655e+02  9.28669e+01 -6.01824e+01  at limit
      WARNING - - ABOVE PARAMETER IS AT LIMIT.

### integral of function ###
Xray (gauss) : 829765.786
Pile (expo) : 63407.559
ratio Pile/All : 0.071
```

pile and tail parameters reach upper limits

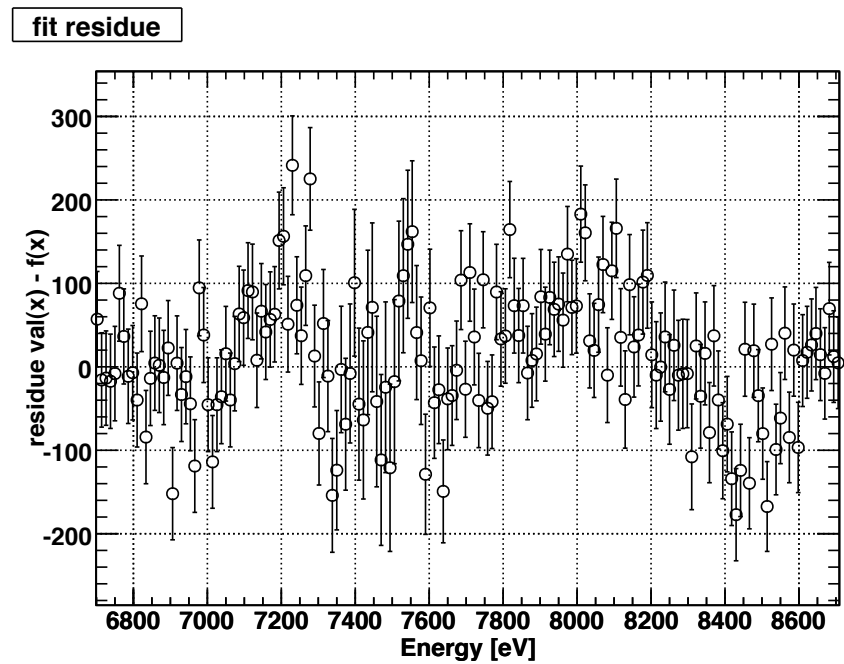
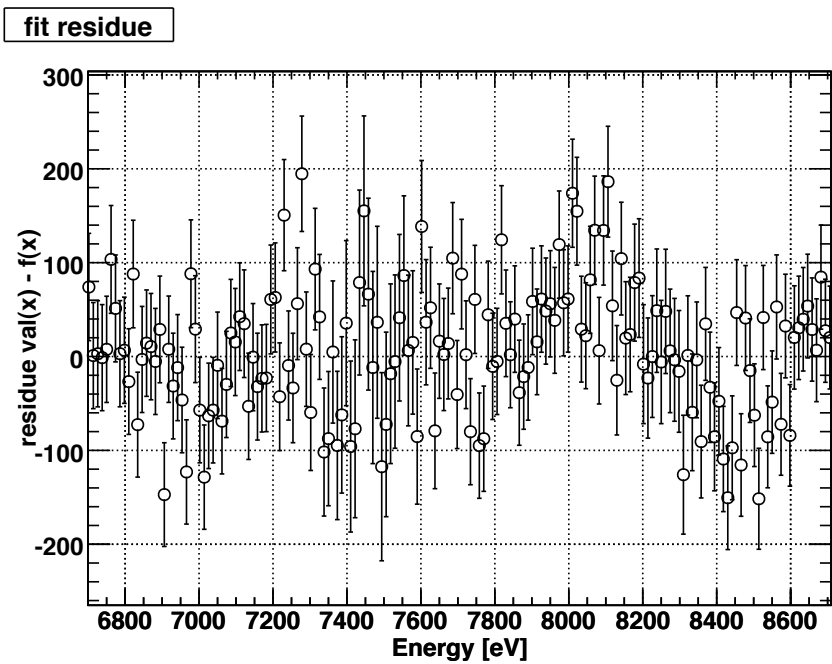
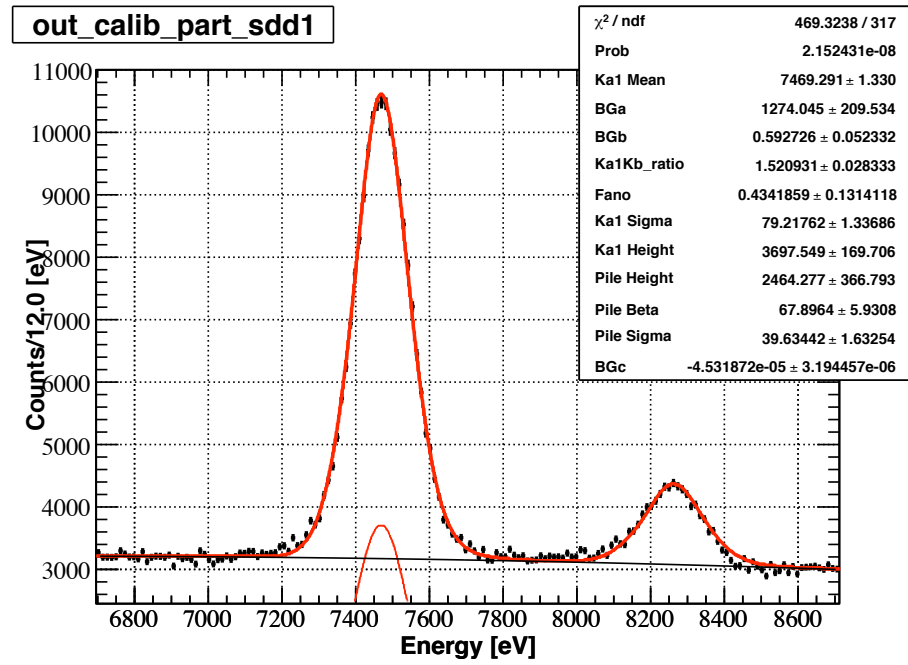
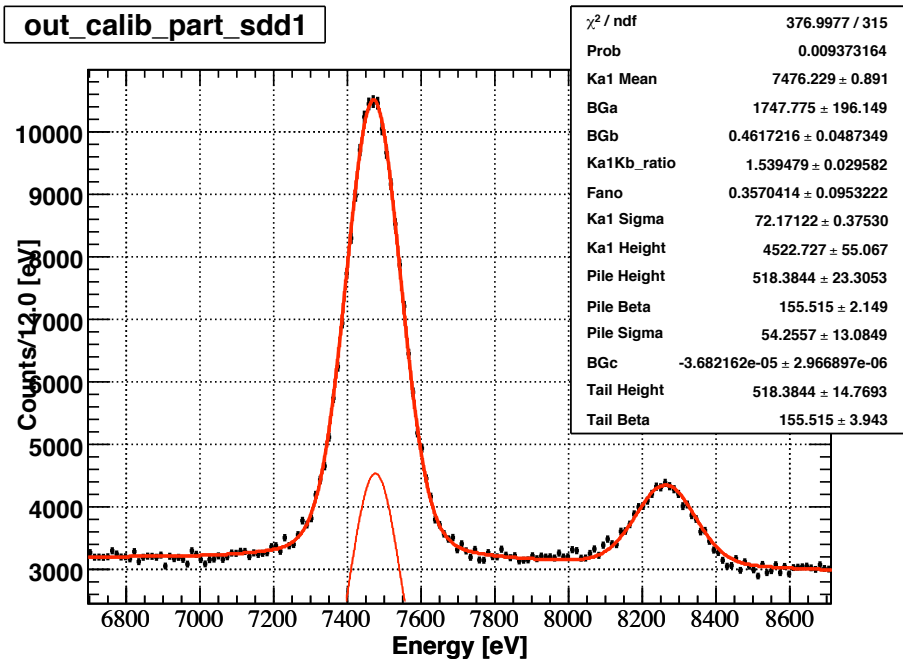
tail height is not optimized

# Ti

## fit result (with only pile)

```
FCN=179.452 FROM MINOS      STATUS=PROBLEMS      2941 CALLS      3177 TOTAL
                        EDM=1.2571e-08      STRATEGY= 1      ERROR MATRIX ACCURATE
EXT PARAMETER
NO.  NAME      VALUE      PARABOLIC      MINOS ERRORS
      NAME      VALUE      ERROR      NEGATIVE      POSITIVE
 1 Ka1 Mean    4.50571e+03  5.17715e-01  -4.66068e-01  9.58023e-01
 2 BGa        1.93932e+03  3.11081e+01  -3.11069e+01  3.11091e+01
 3 BGb        2.08126e-01  6.87528e-03  -6.87587e-03  6.87464e-03
 4 Ka1Kb_ratio 1.68471e+00  3.22888e-02  -3.21643e-02  3.24112e-02
 5 Fano       2.98758e-01  1.19618e-01  -1.18693e-01  1.23437e-01
 6 Ka1 Sigma  6.35182e+01  2.97560e-01  -2.97147e-01  2.97984e-01
 7 Ka1 Height 5.24953e+03  3.19840e+01  -3.08413e+01  4.62026e+01
 8 Pile Height 5.50033e+02  4.69232e+01  -3.61251e+01  at limit
      WARNING - - ABOVE PARAMETER IS AT LIMIT.
 9 Pile Beta  1.30655e+02  4.43441e+00  -3.86584e+00  at limit
      WARNING - - ABOVE PARAMETER IS AT LIMIT.
10 Pile Sigma 4.19939e+01  1.16593e+01  -1.03233e+01  at limit

### integral of function ###
Xray (gauss) : 835811.249
Pile (expo) : 68234.275
ratio Pile/All : 0.075
```



with lower side tail

pile fit (old result)