MPI Oct 8-th 1999

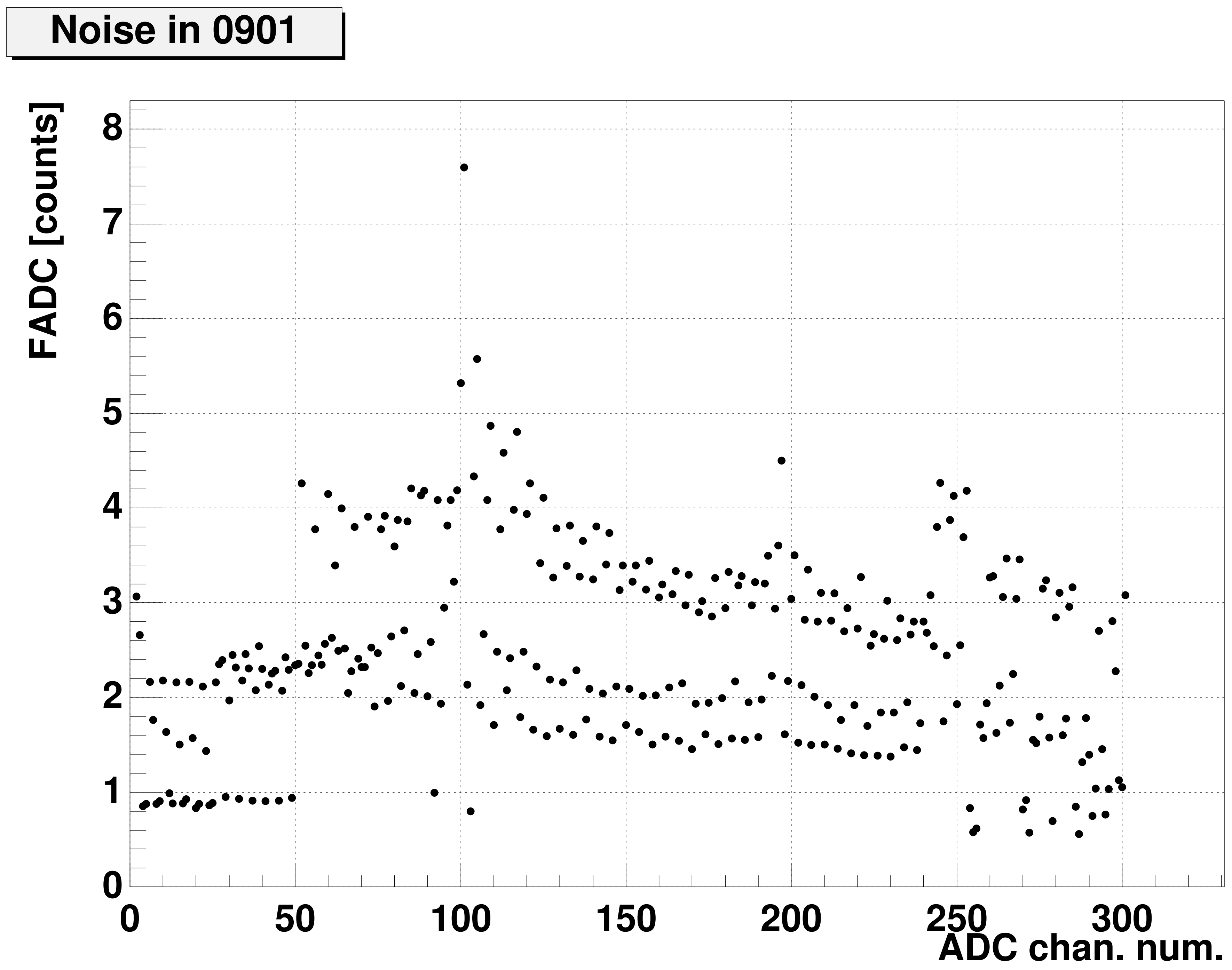
HEC Group meeting

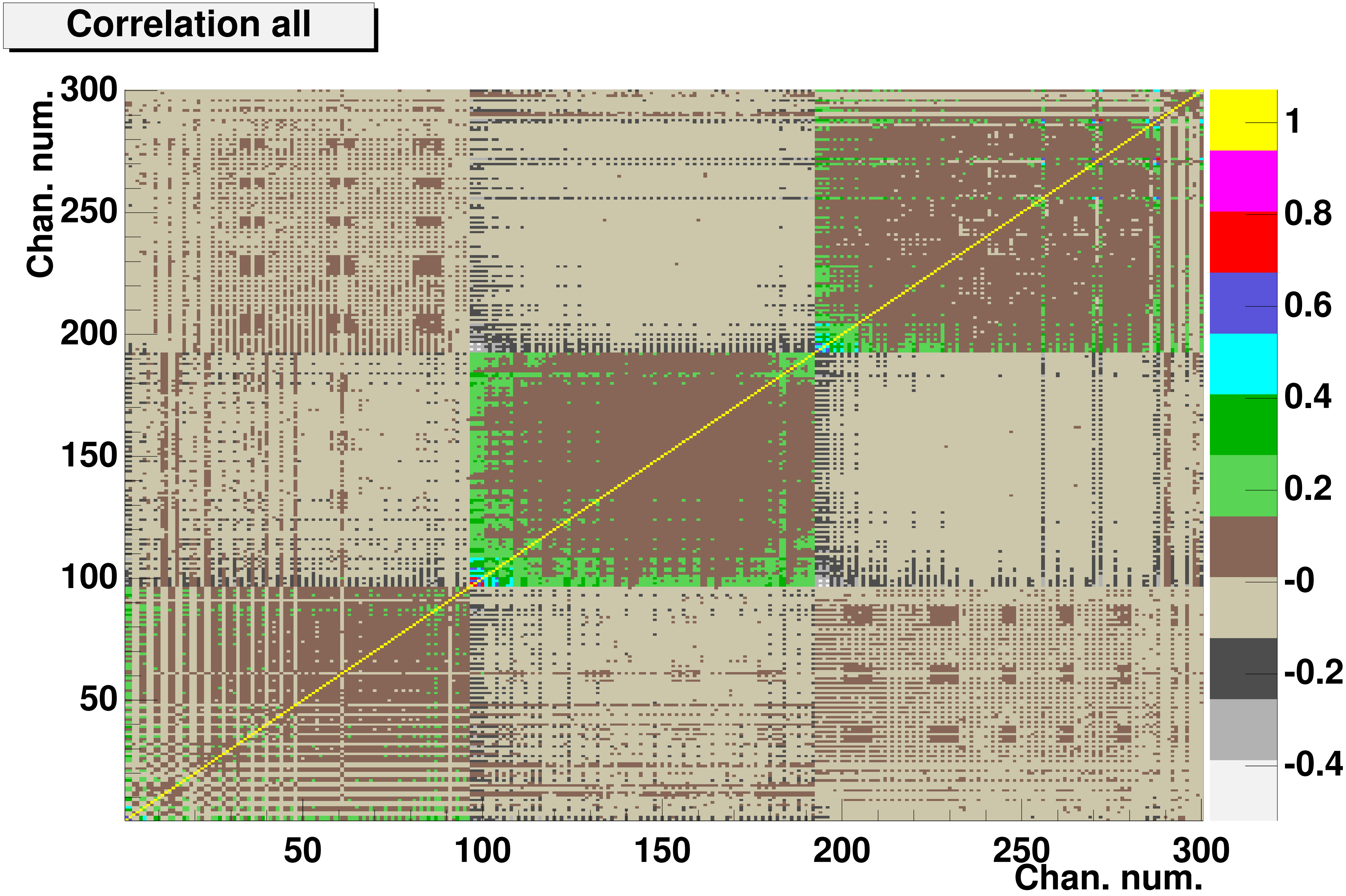
P. Strizenec

August run: Status of calibration

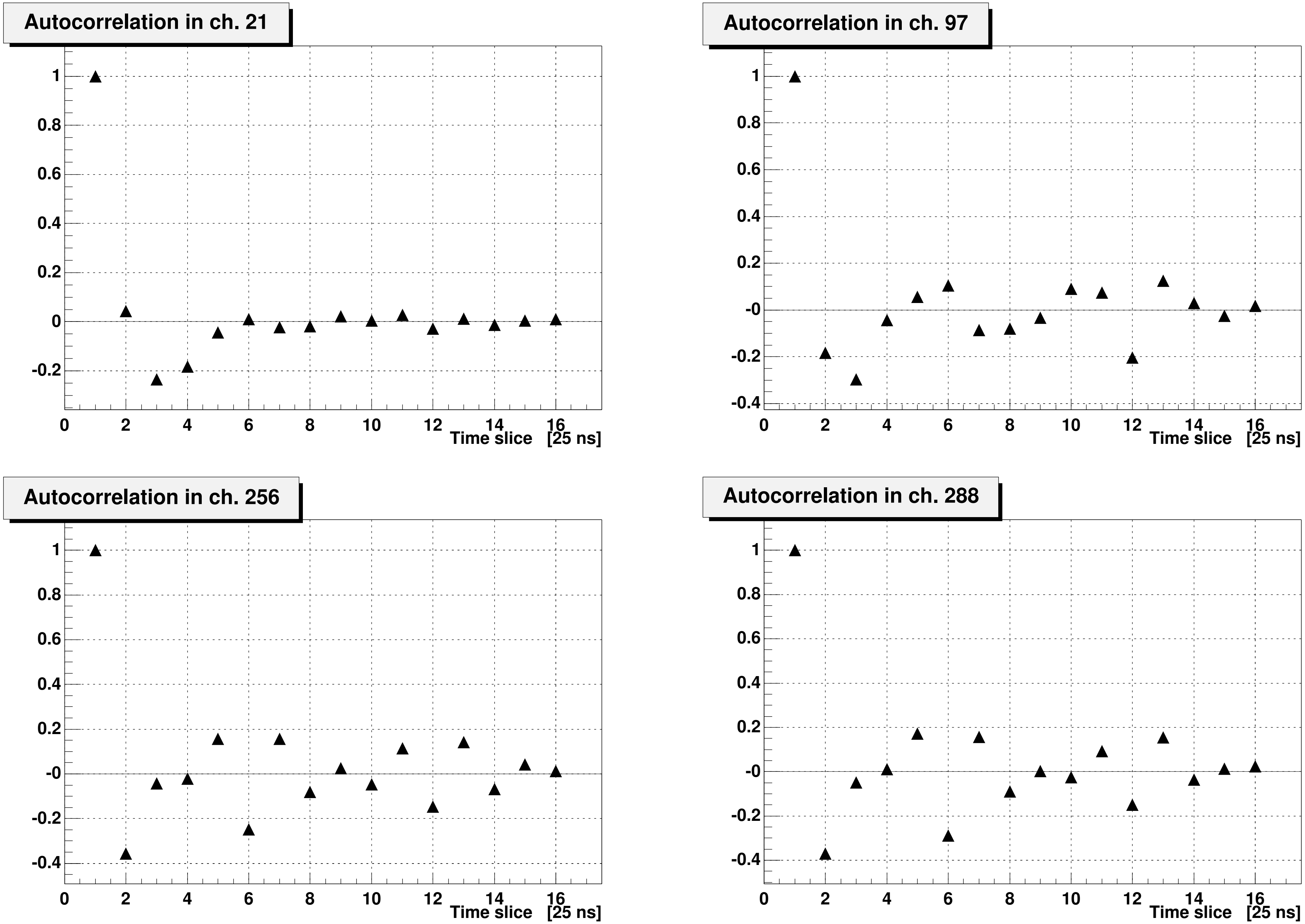
- Improvements from last run
- New shape description
- Noise figures
- Open problems
- To be done

- Improvements from last run:
  - response function with full description of the electronics chain adopted
  - analysis tested as stand-alone programs (ROOT & C++), allows the semi-automatic run of full analysis
  - jitter in the cal. board cured
  - noise figures much better
  - new method for T_0 information transfer from calib. to part. data


Noise in 0901
FADC [counts]
ADC chan. num.
0
1
2
3
4
5
6
7
8
0
50
100
150
200
250
300



Correlation all
Chan. num.
300
250
200
150
100
50
50
100
150
200
250
300
Chan. num.
1
0.8
0.6
0.4
0.2
-0
-0.2
-0.4

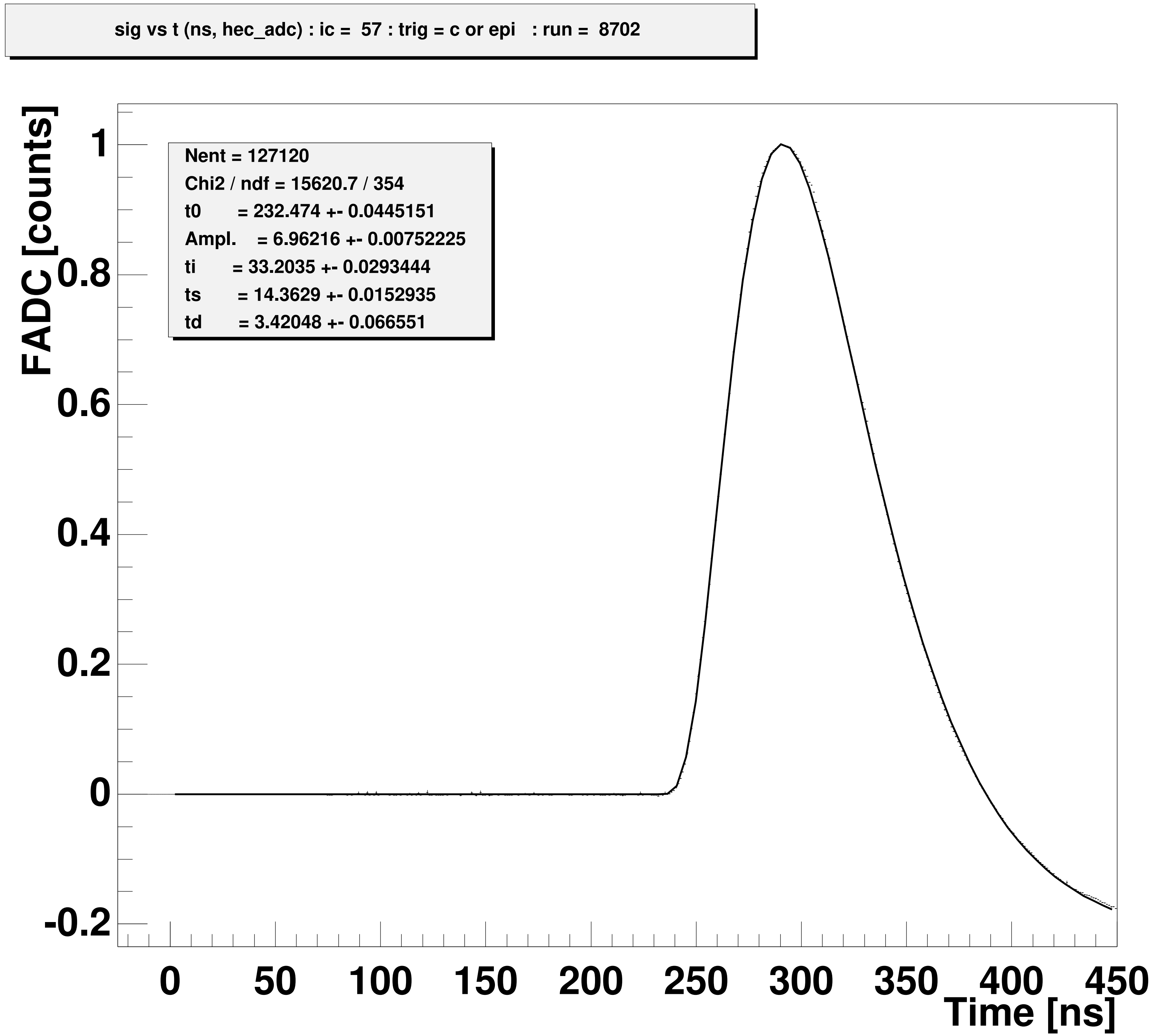

Autocorrelation in ch. 21
Autocorrelation in ch. 97
Autocorrelation in ch. 256
Autocorrelation in ch. 288
Time slice [25 ns]

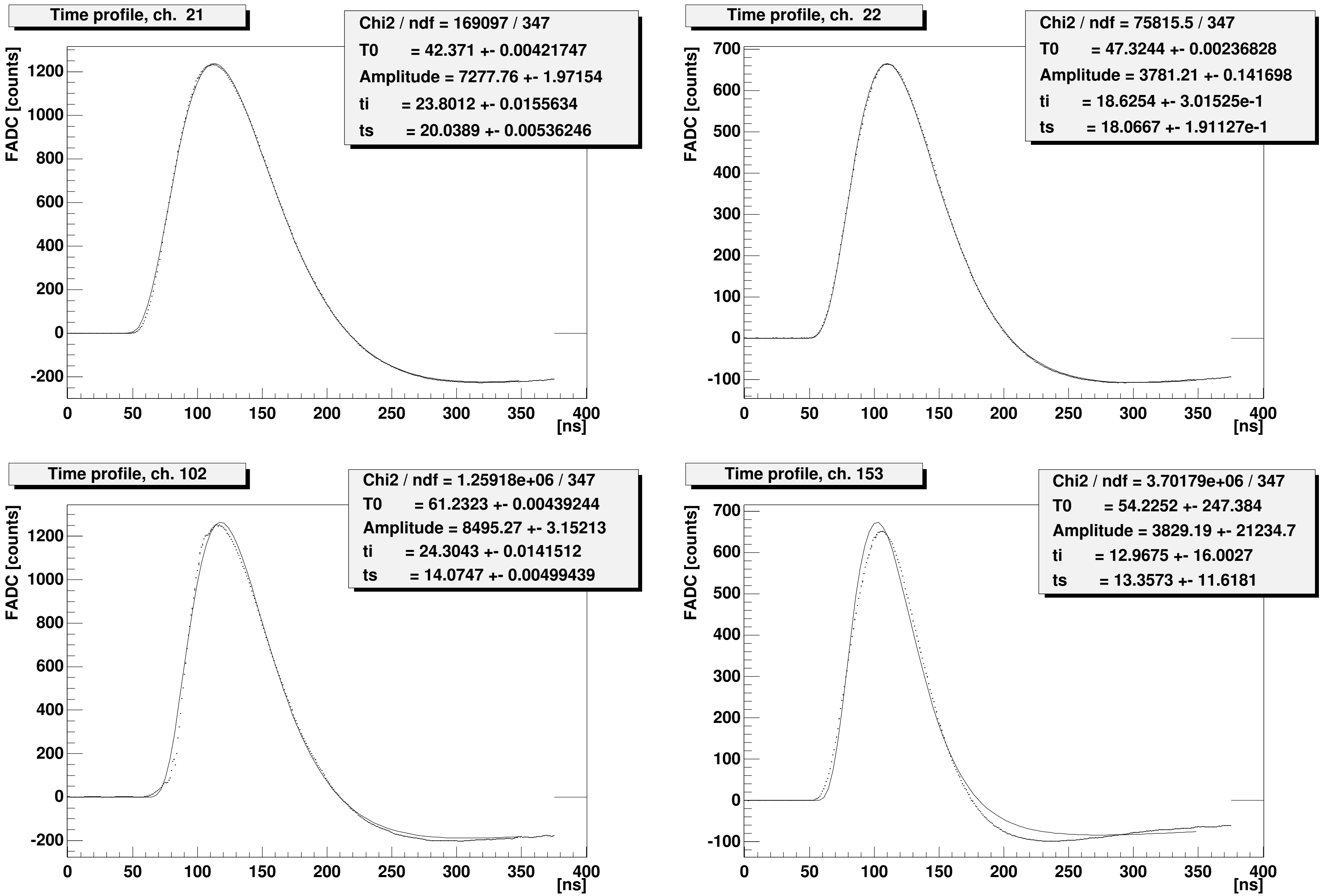
- Shape description
  - response function in Laplace domain (HEC-Note-076):

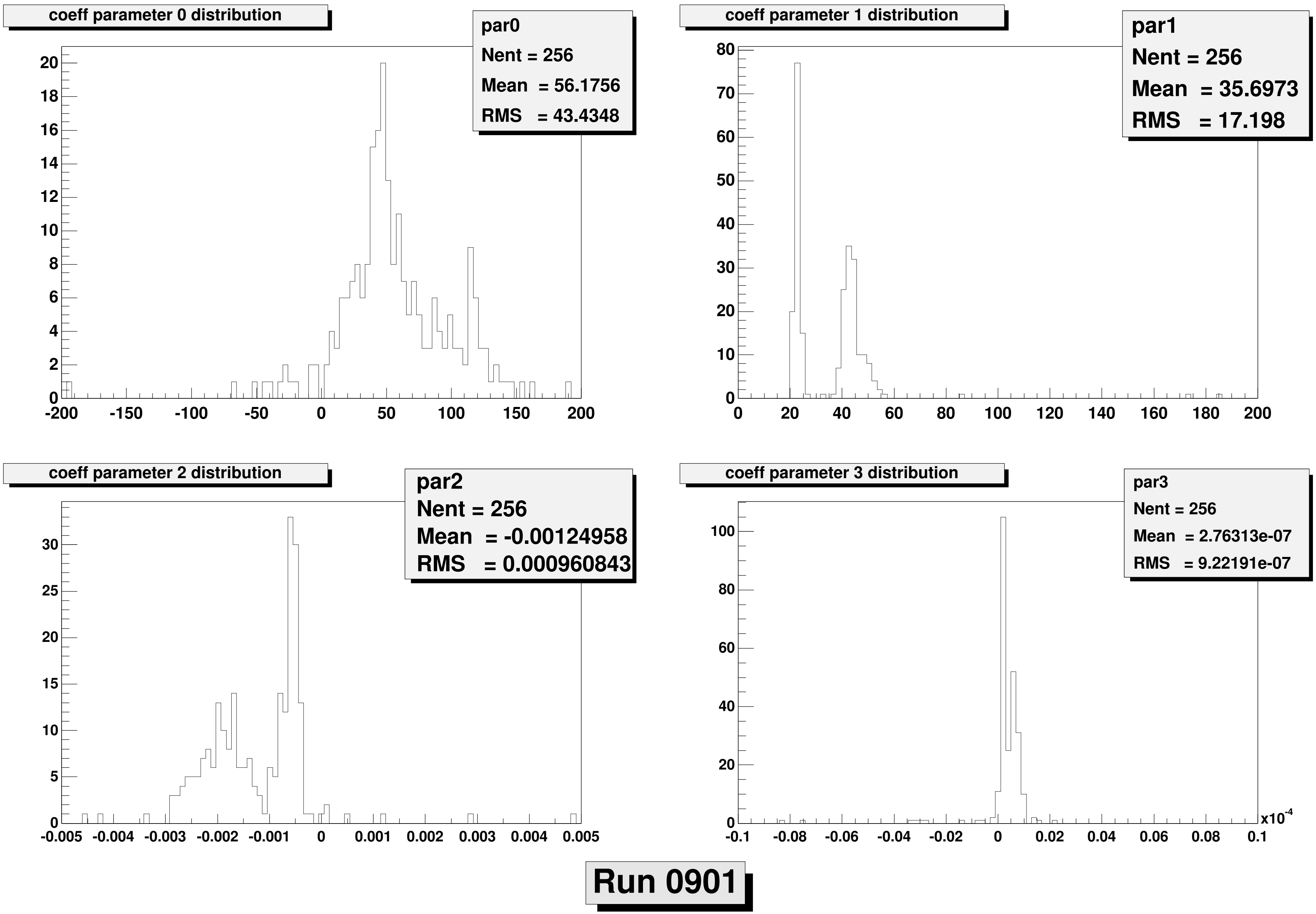
$$h(s) = \frac{a \cdot (1 + s \cdot \tau_Z)}{(1 + s \cdot \tau_p)(1 + s \cdot \tau_0)} \cdot \cdot \frac{1}{(1 + s \cdot \tau_D)(1 + s \cdot \tau_I)} \cdot \cdot \frac{s \cdot \tau_s}{(i + s \cdot \tau_s)^3}$$

    with free parameters τ_I and τ_s, convoluted with the calibration exponenta with 350. ns constant and triangle with 440. ns drift time worked quite good

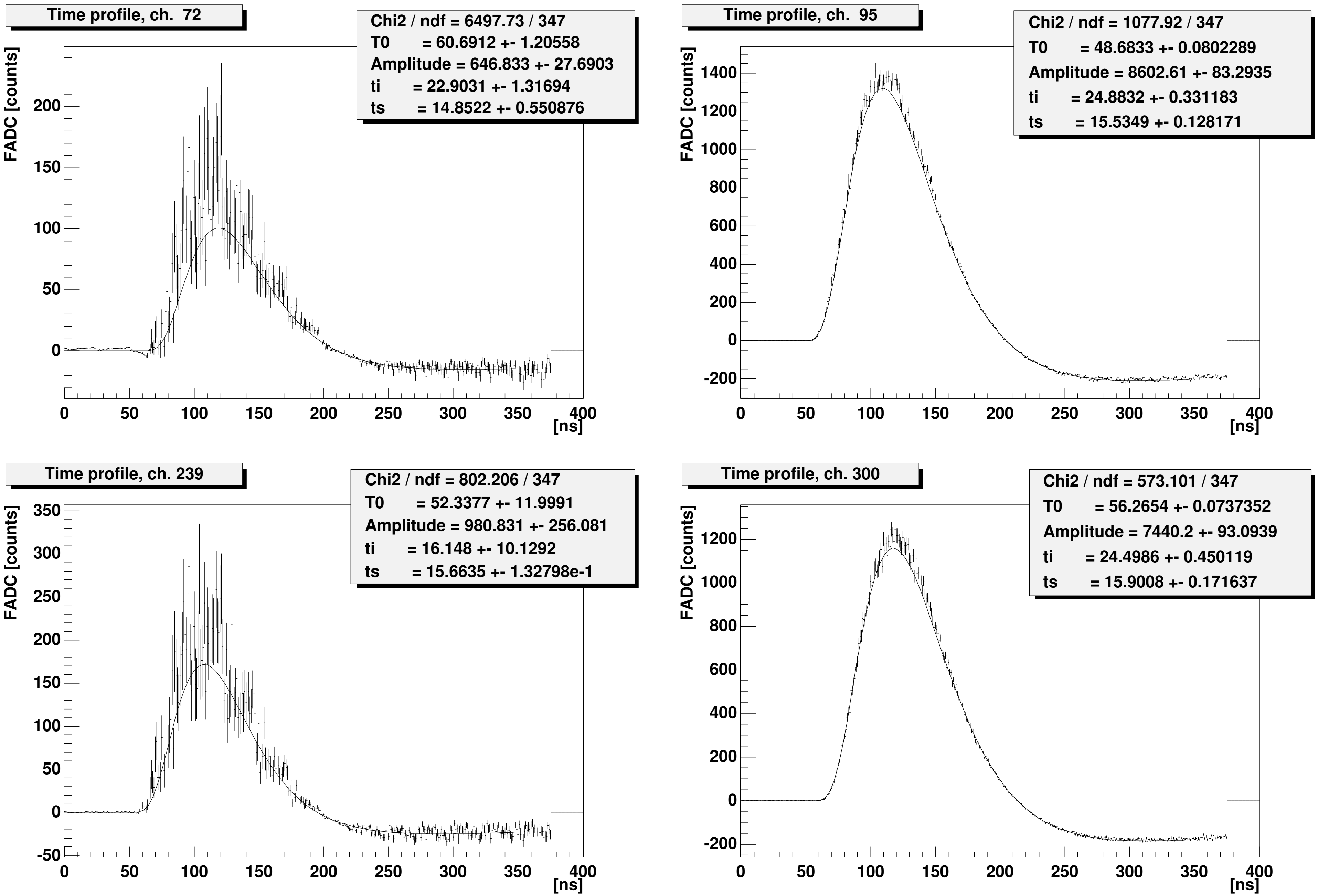
  - first version of the optimal filter weights and calibration constats based on this function released, done for TDC c.c. 18.16 ps/count

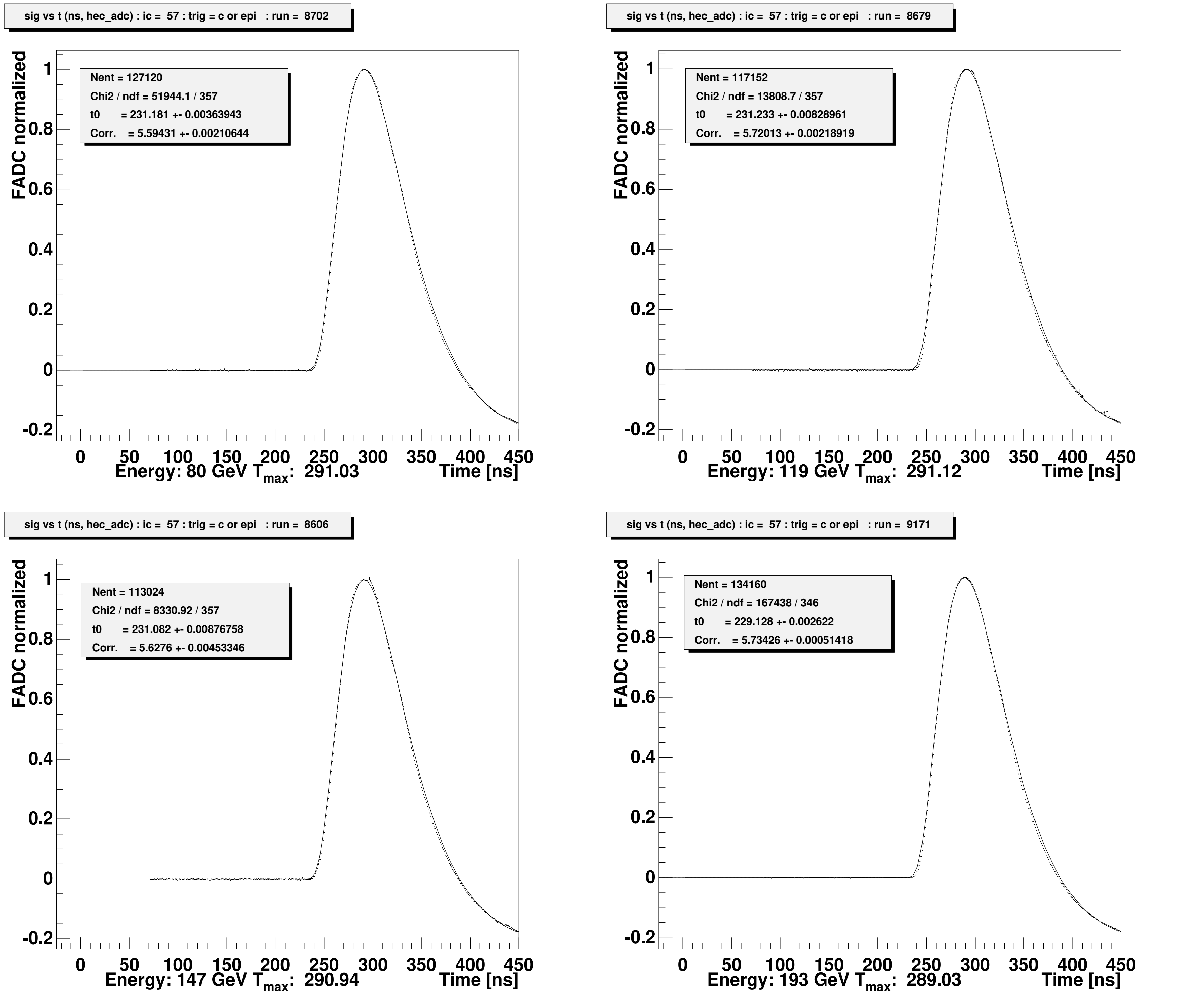

sig vs t (ns, hec_adc) : ic = 57 : trig = c or epi : run = 8702
Nent = 127120
Chi2 / ndf = 15620.7 / 354
t0 = 232.474 +- 0.0445151
Ampl. = 6.96216 +- 0.00752225
ti = 33.2035 +- 0.0293444
ts = 14.3629 +- 0.0152935
td = 3.42048 +- 0.066551
FADC [counts]
1
0.8
0.6
0.4
0.2
0
-0.2
0
50
100
150
200
250
300
350
400
450
Time [ns]

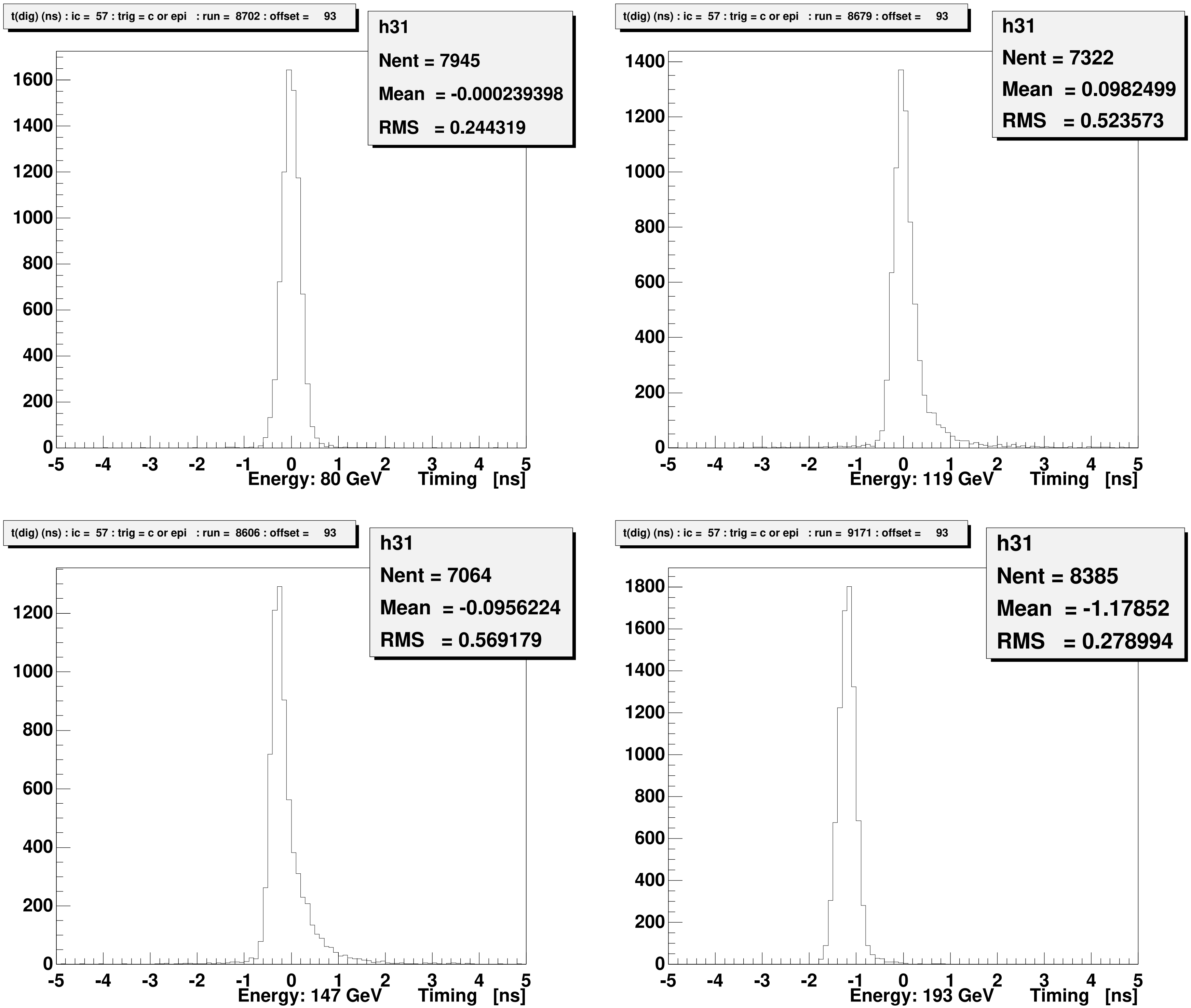

Time profile, ch. 21
Chi2 / ndf = 169097 / 347
T0 = 42.371 +- 0.00421747
Amplitude = 7277.76 +- 1.97154
ti = 23.8012 +- 0.0155634
ts = 20.0389 +- 0.00536246
FADC [counts]
[ns]
Time profile, ch. 22
Chi2 / ndf = 75815.5 / 347
T0 = 47.3244 +- 0.00236828
Amplitude = 3781.21 +- 0.141698
ti = 18.6254 +- 3.01525e-1
ts = 18.0667 +- 1.91127e-1
FADC [counts]
[ns]
Time profile, ch. 102
Chi2 / ndf = 1.25918e+06 / 347
T0 = 61.2323 +- 0.00439244
Amplitude = 8495.27 +- 3.15213
ti = 24.3043 +- 0.0141512
ts = 14.0747 +- 0.00499439
FADC [counts]
[ns]
Time profile, ch. 153
Chi2 / ndf = 3.70179e+06 / 347
T0 = 54.2252 +- 247.384
Amplitude = 3829.19 +- 21234.7
ti = 12.9675 +- 16.0027
ts = 13.3573 +- 11.6181
FADC [counts]
[ns]

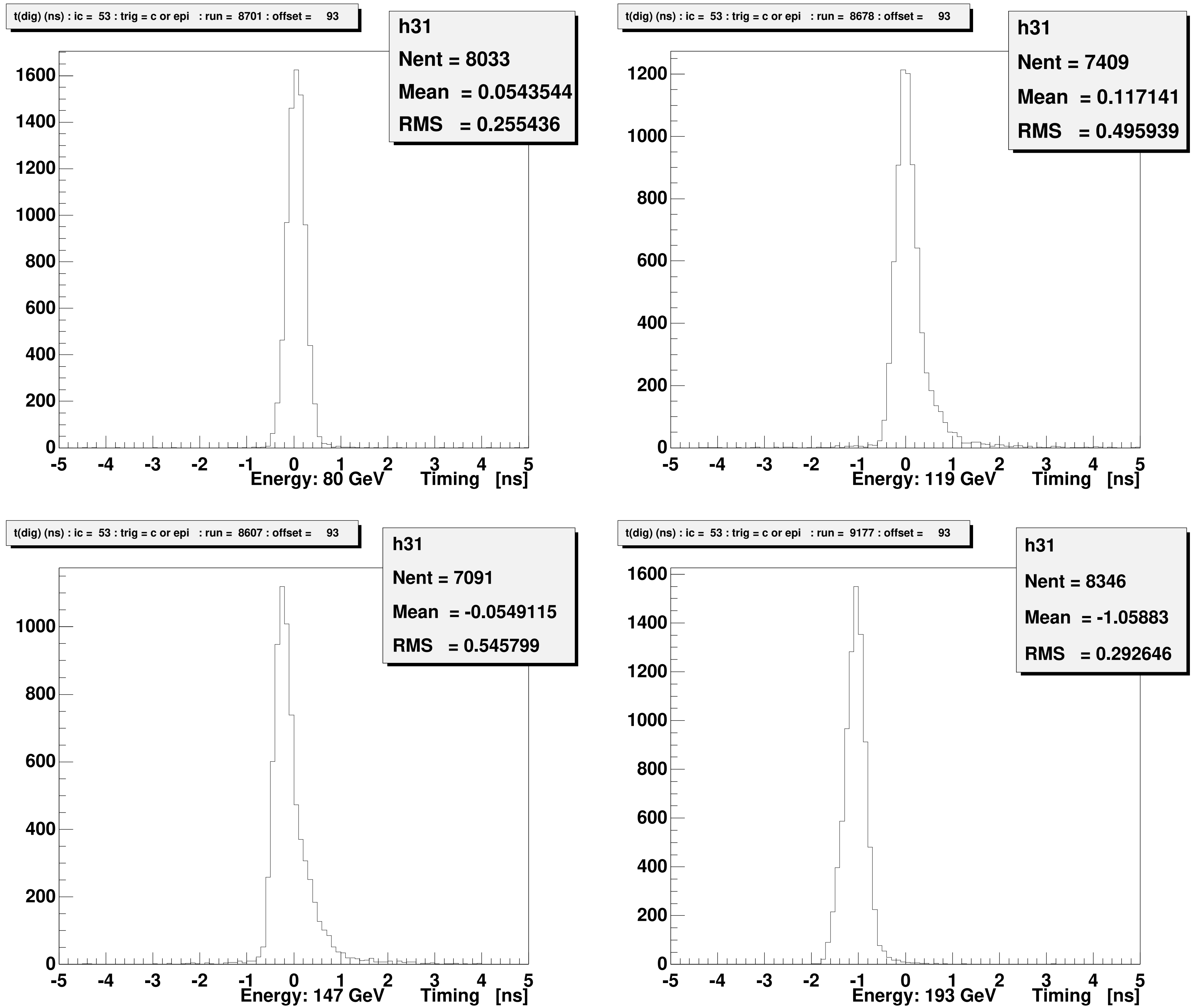

coeff parameter 0 distribution
par0
Nent = 256
Mean = 56.1756
RMS = 43.4348
coeff parameter 1 distribution
par1
Nent = 256
Mean = 35.6973
RMS = 17.198
coeff parameter 2 distribution
par2
Nent = 256
Mean = -0.00124958
RMS = 0.000960843
coeff parameter 3 distribution
par3
Nent = 256
Mean = 2.76313e-07
RMS = 9.22191e-07
x10^-4
Run 0901

- Open problems
  - "Bad" channels (do not appear in July 99)
  - Correction in calib. shape $\rightarrow$ part. shape transition
  - Timing for 193 GeV e^-

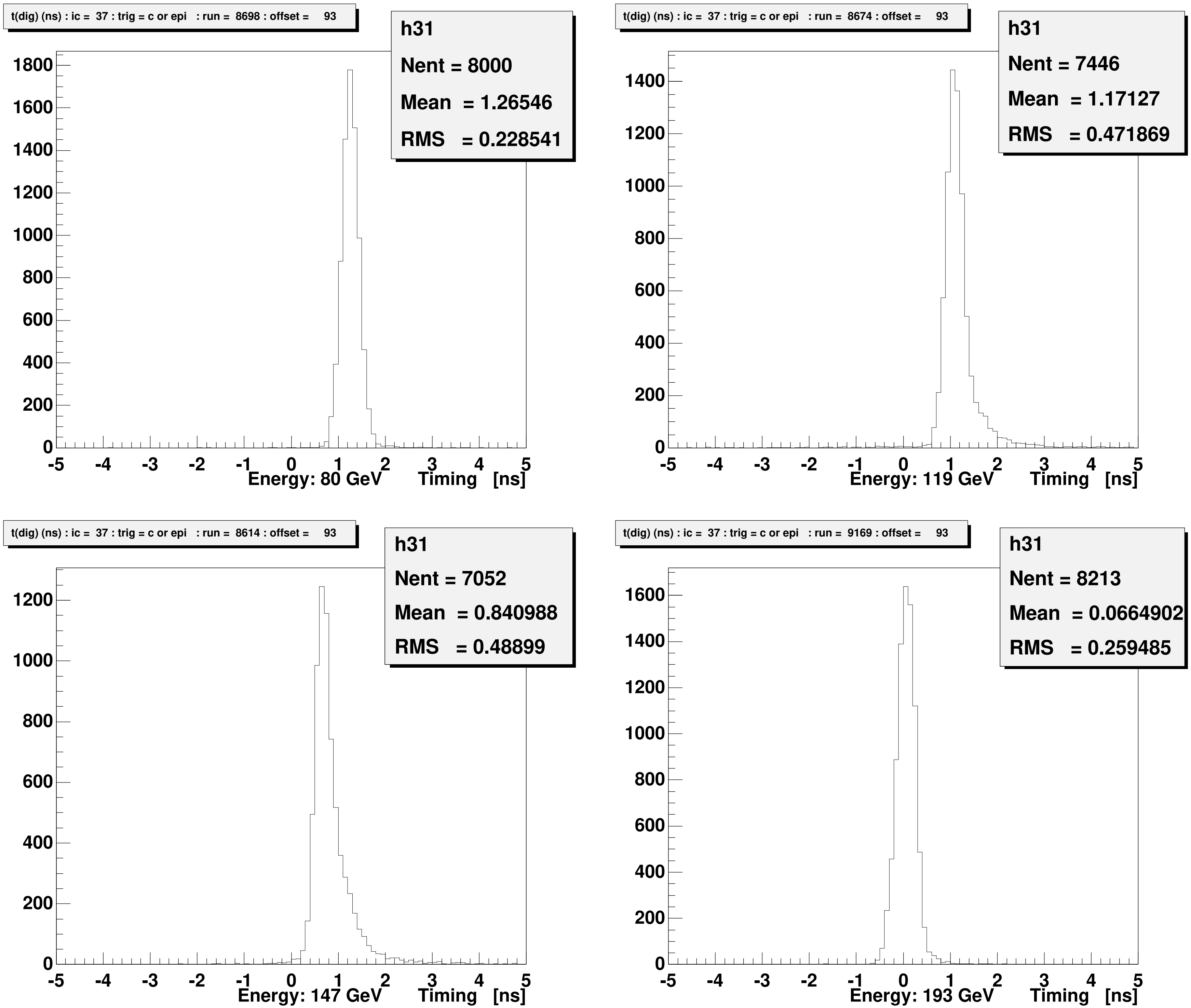

Time profile, ch. 72
Chi2 / ndf = 6497.73 / 347
T0 = 60.6912 +- 1.20558
Amplitude = 646.833 +- 27.6903
ti = 22.9031 +- 1.31694
ts = 14.8522 +- 0.550876
FADC [counts]
[ns]
Time profile, ch. 95
Chi2 / ndf = 1077.92 / 347
T0 = 48.6833 +- 0.0802289
Amplitude = 8602.61 +- 83.2935
ti = 24.8832 +- 0.331183
ts = 15.5349 +- 0.128171
FADC [counts]
[ns]
Time profile, ch. 239
Chi2 / ndf = 802.206 / 347
T0 = 52.3377 +- 11.9991
Amplitude = 980.831 +- 256.081
ti = 16.148 +- 10.1292
ts = 15.6635 +- 1.32798e-1
FADC [counts]
[ns]
Time profile, ch. 300
Chi2 / ndf = 573.101 / 347
T0 = 56.2654 +- 0.0737352
Amplitude = 7440.2 +- 93.0939
ti = 24.4986 +- 0.450119
ts = 15.9008 +- 0.171637
FADC [counts]
[ns]

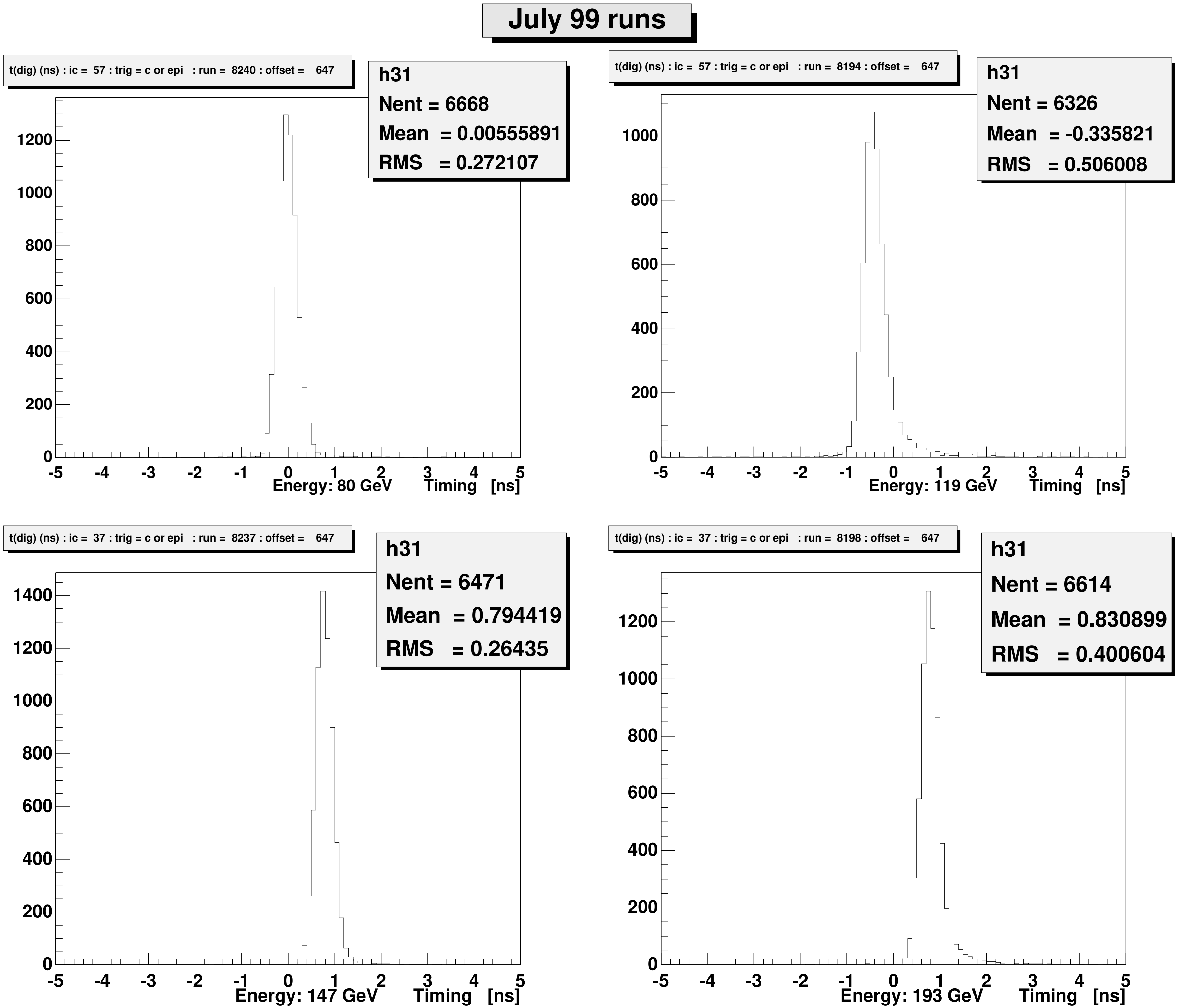

sig vs t (ns, hec_adc) : ic = 57 : trig = c or epi : run = 8702
Nent = 127120
Chi2 / ndf = 51944.1 / 357
t0 = 231.181 +- 0.00363943
Corr. = 5.59431 +- 0.00210644
FADC normalized
Energy: 80 GeV T_max: 291.03
Time [ns]
sig vs t (ns, hec_adc) : ic = 57 : trig = c or epi : run = 8679
Nent = 117152
Chi2 / ndf = 13808.7 / 357
t0 = 231.233 +- 0.00828961
Corr. = 5.72013 +- 0.00218919
FADC normalized
Energy: 119 GeV T_max: 291.12
Time [ns]
sig vs t (ns, hec_adc) : ic = 57 : trig = c or epi : run = 8606
Nent = 113024
Chi2 / ndf = 8330.92 / 357
t0 = 231.082 +- 0.00876758
Corr. = 5.6276 +- 0.00453346
FADC normalized
Energy: 147 GeV T_max: 290.94
Time [ns]
sig vs t (ns, hec_adc) : ic = 57 : trig = c or epi : run = 9171
Nent = 134160
Chi2 / ndf = 167438 / 346
t0 = 229.128 +- 0.002622
Corr. = 5.73426 +- 0.00051418
FADC normalized
Energy: 193 GeV T_max: 289.03
Time [ns]

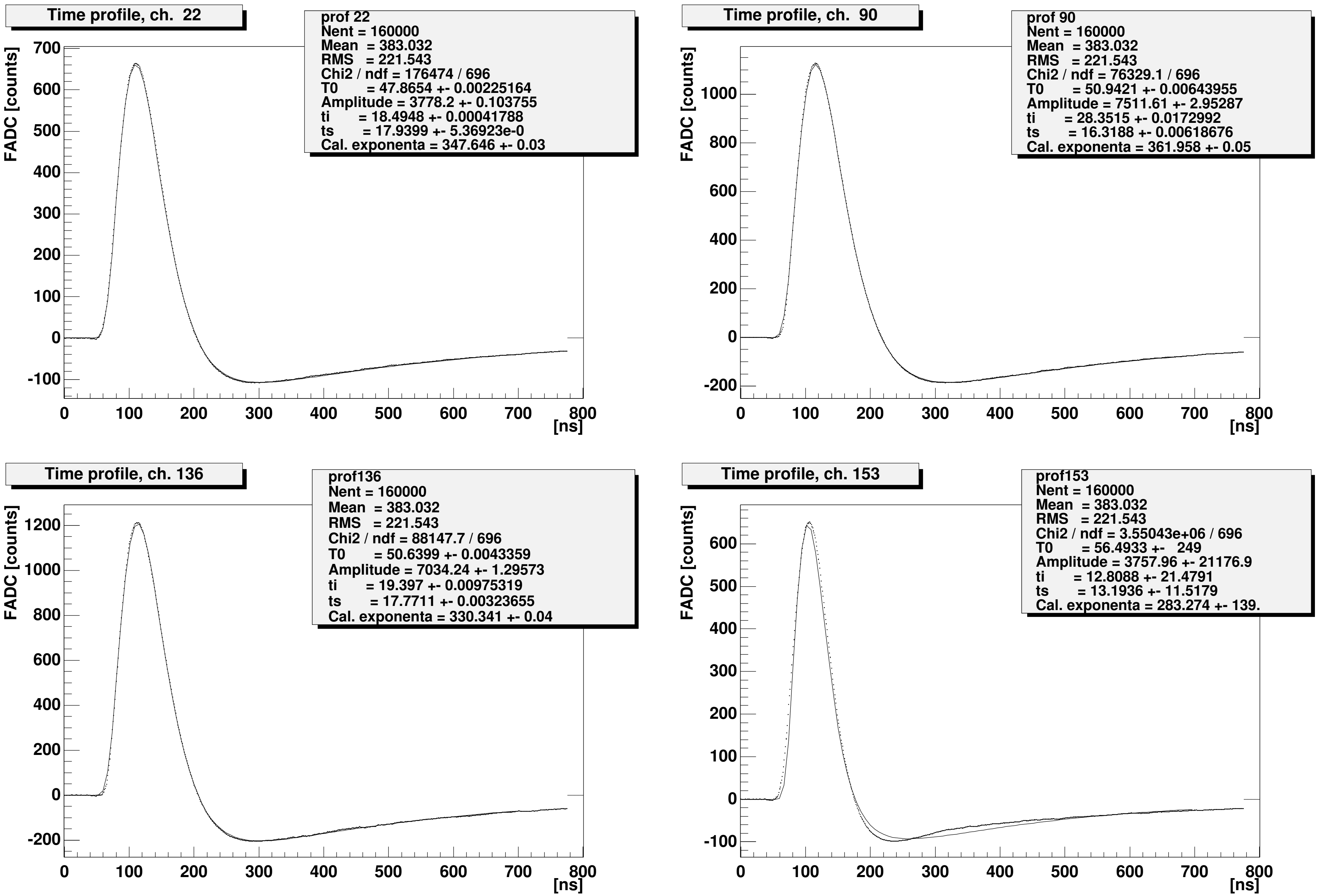

t(dig) (ns) : ic = 57 : trig = c or epi : run = 8702 : offset = 93
h31
Nent = 7945
Mean = -0.000239398
RMS = 0.244319
Energy: 80 GeV
Timing [ns]
t(dig) (ns) : ic = 57 : trig = c or epi : run = 8679 : offset = 93
h31
Nent = 7322
Mean = 0.0982499
RMS = 0.523573
Energy: 119 GeV
Timing [ns]
t(dig) (ns) : ic = 57 : trig = c or epi : run = 8606 : offset = 93
h31
Nent = 7064
Mean = -0.0956224
RMS = 0.569179
Energy: 147 GeV
Timing [ns]
t(dig) (ns) : ic = 57 : trig = c or epi : run = 9171 : offset = 93
h31
Nent = 8385
Mean = -1.17852
RMS = 0.278994
Energy: 193 GeV
Timing [ns]



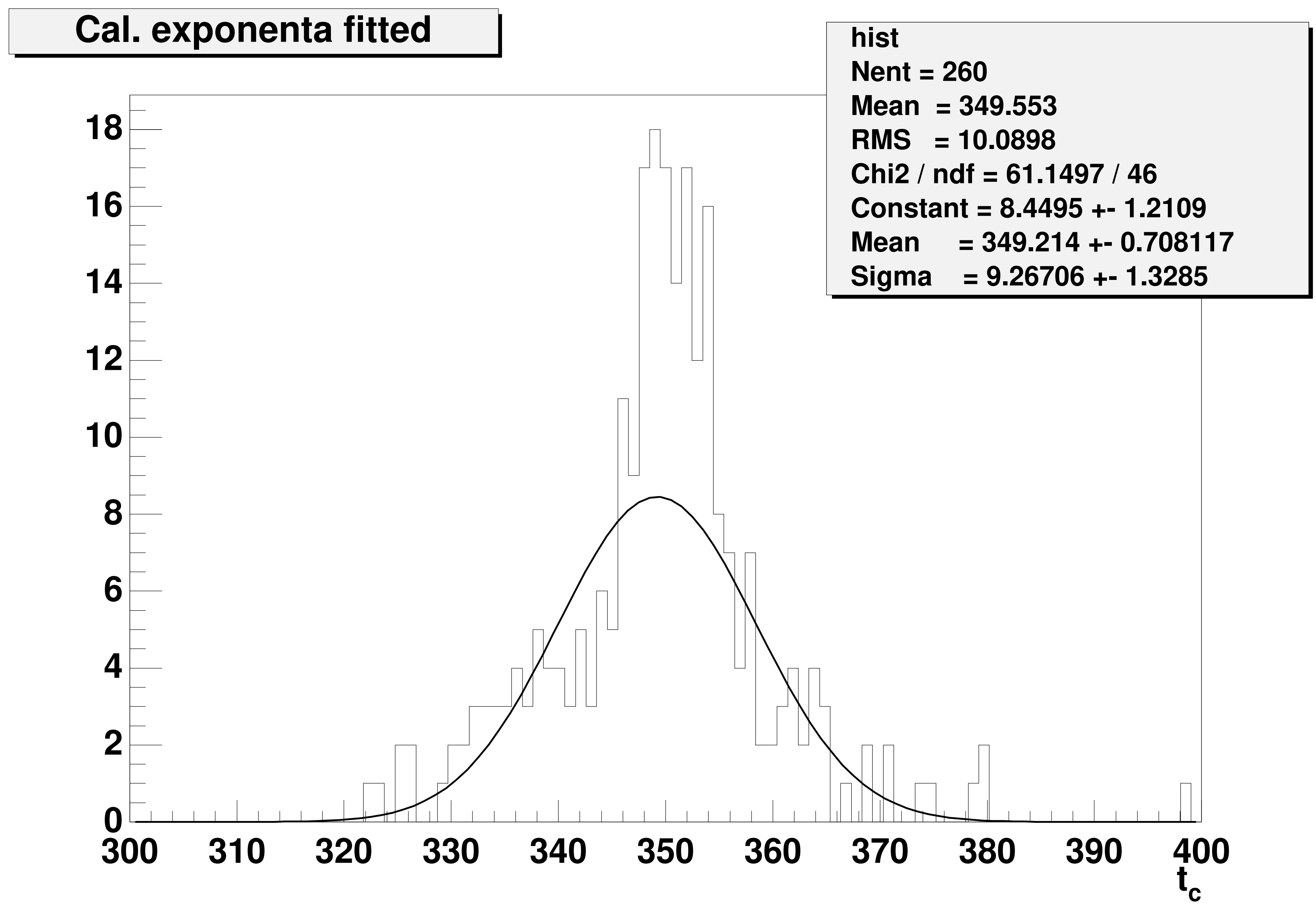
t(dig) (ns) : ic = 53 : trig = c or epi : run = 8701 : offset = 93
h31
Nent = 8033
Mean = 0.0543544
RMS = 0.255436
Energy: 80 GeV
Timing [ns]
t(dig) (ns) : ic = 53 : trig = c or epi : run = 8678 : offset = 93
h31
Nent = 7409
Mean = 0.117141
RMS = 0.495939
Energy: 119 GeV
Timing [ns]
t(dig) (ns) : ic = 53 : trig = c or epi : run = 8607 : offset = 93
h31
Nent = 7091
Mean = -0.0549115
RMS = 0.545799
Energy: 147 GeV
Timing [ns]
t(dig) (ns) : ic = 53 : trig = c or epi : run = 9177 : offset = 93
h31
Nent = 8346
Mean = -1.05883
RMS = 0.292646
Energy: 193 GeV
Timing [ns]


t(dig) (ns) : ic = 37 : trig = c or epi : run = 8698 : offset = 93
h31
Nent = 8000
Mean = 1.26546
RMS = 0.228541
Energy: 80 GeV
Timing [ns]
t(dig) (ns) : ic = 37 : trig = c or epi : run = 8674 : offset = 93
h31
Nent = 7446
Mean = 1.17127
RMS = 0.471869
Energy: 119 GeV
Timing [ns]
t(dig) (ns) : ic = 37 : trig = c or epi : run = 8614 : offset = 93
h31
Nent = 7052
Mean = 0.840988
RMS = 0.48899
Energy: 147 GeV
Timing [ns]
t(dig) (ns) : ic = 37 : trig = c or epi : run = 9169 : offset = 93
h31
Nent = 8213
Mean = 0.0664902
RMS = 0.259485
Energy: 193 GeV
Timing [ns]


July 99 runs
t(dig) (ns) : ic = 57 : trig = c or epi : run = 8240 : offset = 647
h31
Nent = 6668
Mean = 0.00555891
RMS = 0.272107
Energy: 80 GeV Timing [ns]
t(dig) (ns) : ic = 57 : trig = c or epi : run = 8194 : offset = 647
h31
Nent = 6326
Mean = -0.335821
RMS = 0.506008
Energy: 119 GeV Timing [ns]
t(dig) (ns) : ic = 37 : trig = c or epi : run = 8237 : offset = 647
h31
Nent = 6471
Mean = 0.794419
RMS = 0.26435
Energy: 147 GeV Timing [ns]
t(dig) (ns) : ic = 37 : trig = c or epi : run = 8198 : offset = 647
h31
Nent = 6614
Mean = 0.830899
RMS = 0.400604
Energy: 193 GeV Timing [ns]



Time profile, ch. 22
prof 22
Nent = 160000
Mean = 383.032
RMS = 221.543
Chi2 / ndf = 176474 / 696
T0 = 47.8654 +- 0.00225164
Amplitude = 3778.2 +- 0.103755
ti = 18.4948 +- 0.00041788
ts = 17.9399 +- 5.36923e-0
Cal. exponenta = 347.646 +- 0.03
FADC [counts]
[ns]
Time profile, ch. 90
prof 90
Nent = 160000
Mean = 383.032
RMS = 221.543
Chi2 / ndf = 76329.1 / 696
T0 = 50.9421 +- 0.00643955
Amplitude = 7511.61 +- 2.95287
ti = 28.3515 +- 0.0172992
ts = 16.3188 +- 0.00618676
Cal. exponenta = 361.958 +- 0.05
FADC [counts]
[ns]
Time profile, ch. 136
prof136
Nent = 160000
Mean = 383.032
RMS = 221.543
Chi2 / ndf = 88147.7 / 696
T0 = 50.6399 +- 0.0043359
Amplitude = 7034.24 +- 1.29573
ti = 19.397 +- 0.00975319
ts = 17.7711 +- 0.00323655
Cal. exponenta = 330.341 +- 0.04
FADC [counts]
[ns]
Time profile, ch. 153
prof153
Nent = 160000
Mean = 383.032
RMS = 221.543
Chi2 / ndf = 3.55043e+06 / 696
T0 = 56.4933 +- 249
Amplitude = 3757.96 +- 21176.9
ti = 12.8088 +- 21.4791
ts = 13.1936 +- 11.5179
Cal. exponenta = 283.274 +- 139.
FADC [counts]
[ns]


Cal. exponenta fitted
hist
Nent = 260
Mean = 349.553
RMS = 10.0898
Chi2 / ndf = 61.1497 / 46
Constant = 8.4495 +- 1.2109
Mean = 349.214 +- 0.708117
Sigma = 9.26706 +- 1.3285
0
2
4
6
8
10
12
14
16
18
300
310
320
330
340
350
360
370
380
390
400
t_c

- To be done
  - Shape fixed parameters fine tuning
  - Check of misstiming influence to physics result
  - Complete the program for cold tests measurement and analysis (probably full delay scan)
  - ???