K-Koto Meeting

2020/05/20

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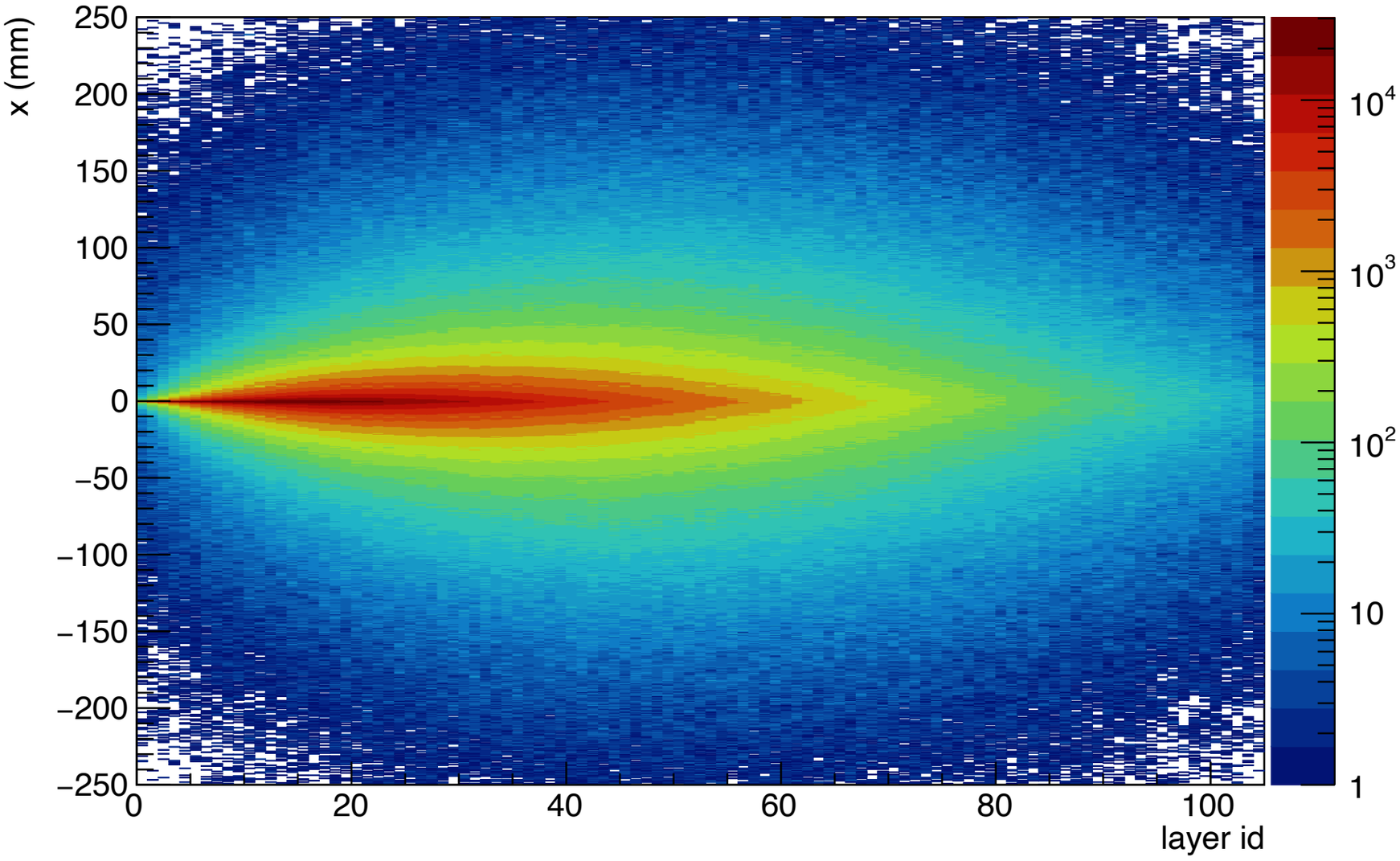
Hadron & Nuclear Physics Lab

Shower Shape Fit



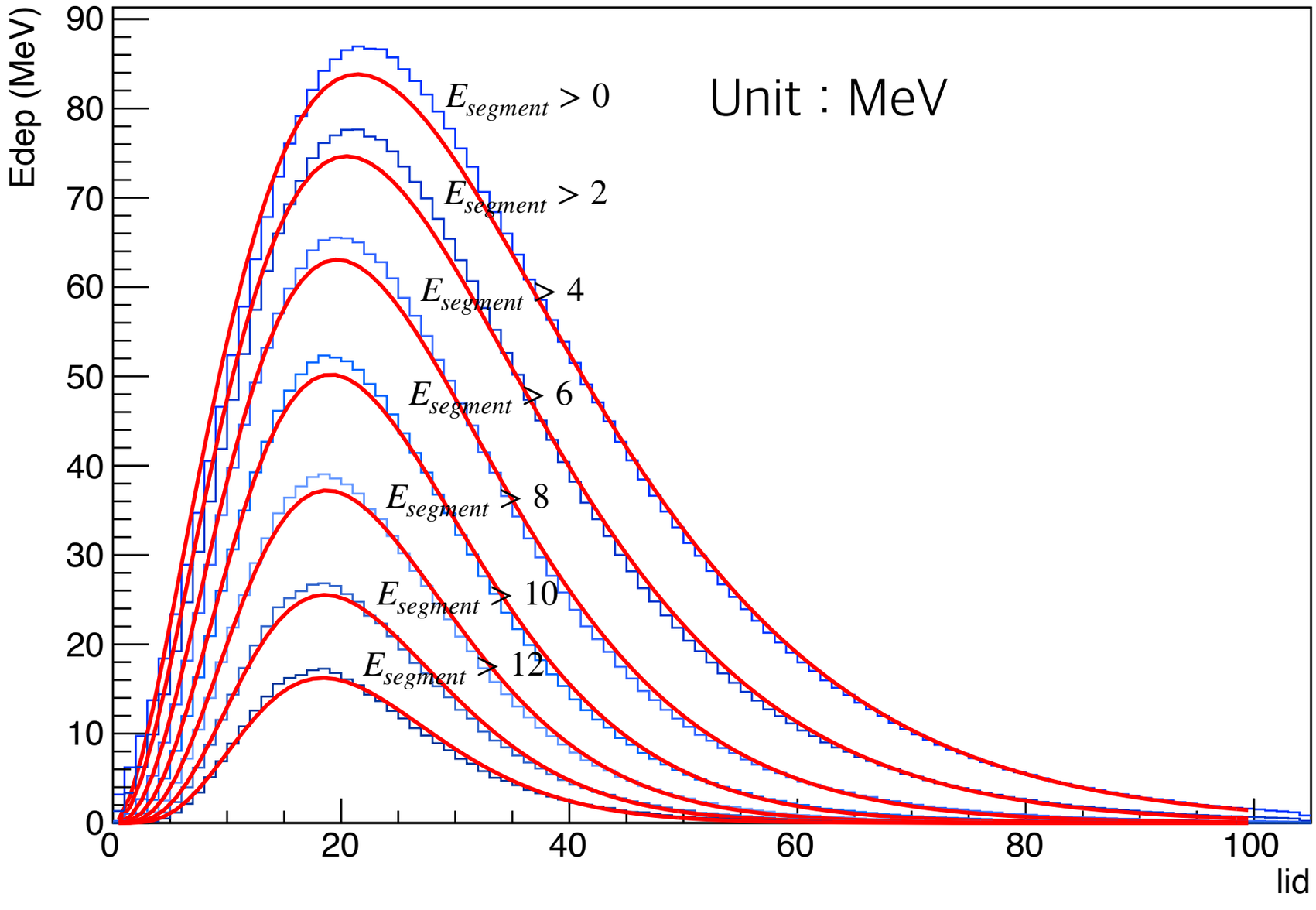
Longitudinal shower shape : $f(t) = E_{tot} b \frac{(bt)^{a-1} e^{-bt}}{\Gamma(a)}, \ (t = z/X_0)$

Transverse shower shape : $f(x) = E_0 \frac{\beta}{2\alpha\Gamma(1/\beta)} e^{-(|x-m|/\alpha)^{\beta}}$

$PDF(x,t) = f_x(x) f_t(t)$

Longitudinal shower profile

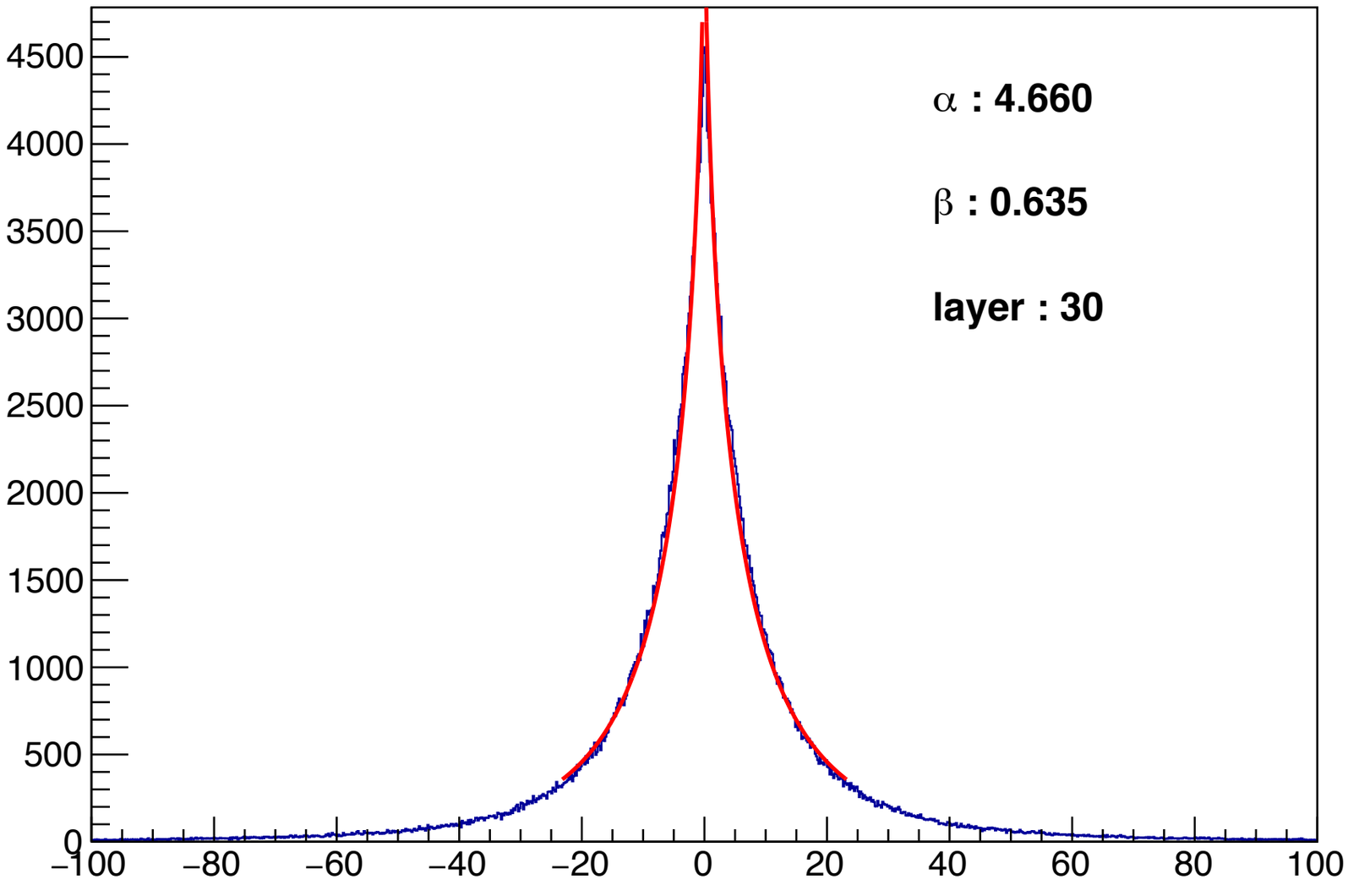
$$f(t) = E_{tot} b \frac{(bt)^{a-1} e^{-bt}}{\Gamma(a)}$$



Transverse shower profile

Generalized Normal Distribution

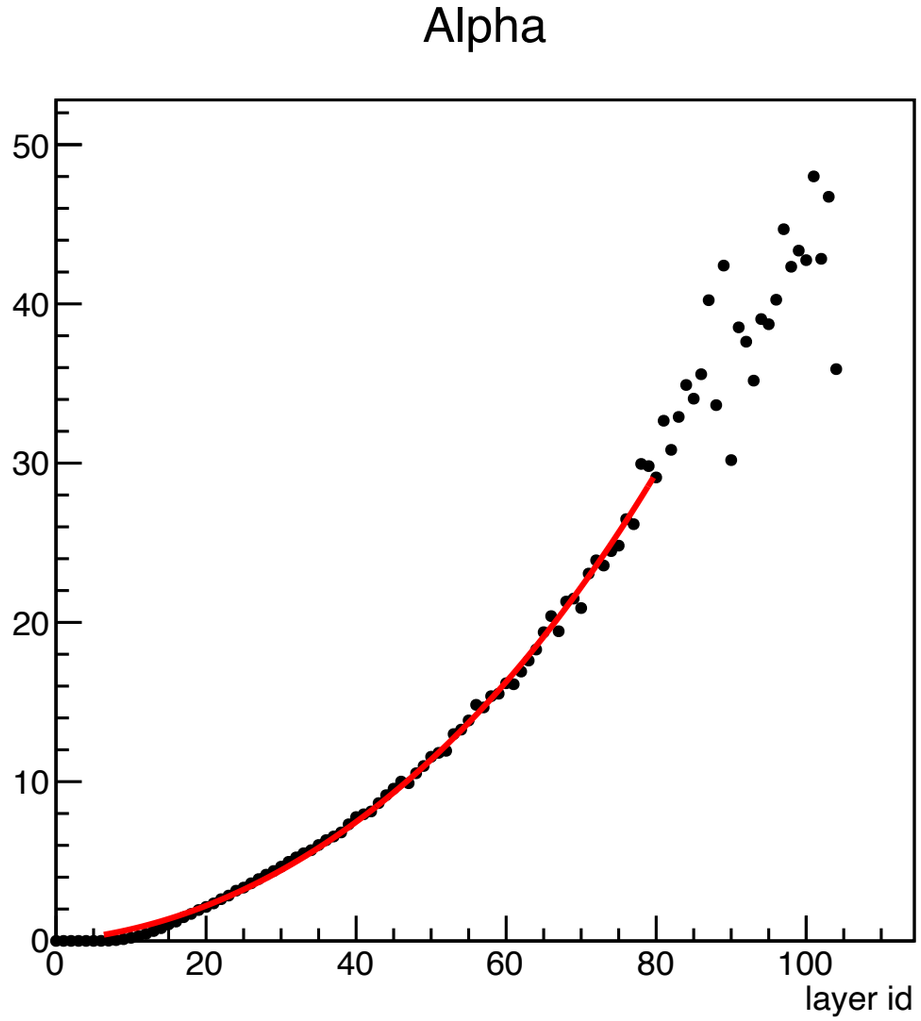
$$f(x) = E_0 \frac{\beta}{2\alpha\Gamma(1/\beta)} e^{-(|x-m|/\alpha)^{\beta}}$$

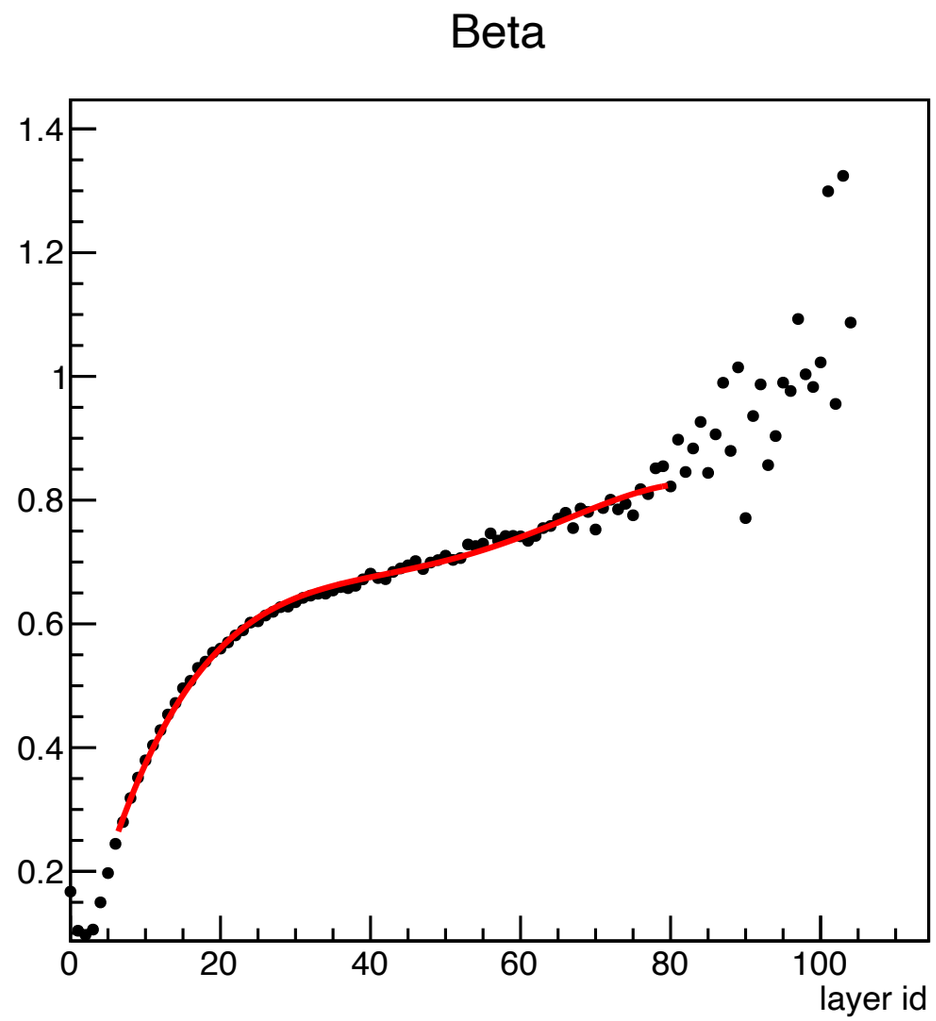


Transverse shower profile

Generalized Normal Distribution

$$f(x) = E_0 \frac{\beta}{2\alpha\Gamma(1/\beta)} e^{-(|x-m|/\alpha)^{\beta}}$$

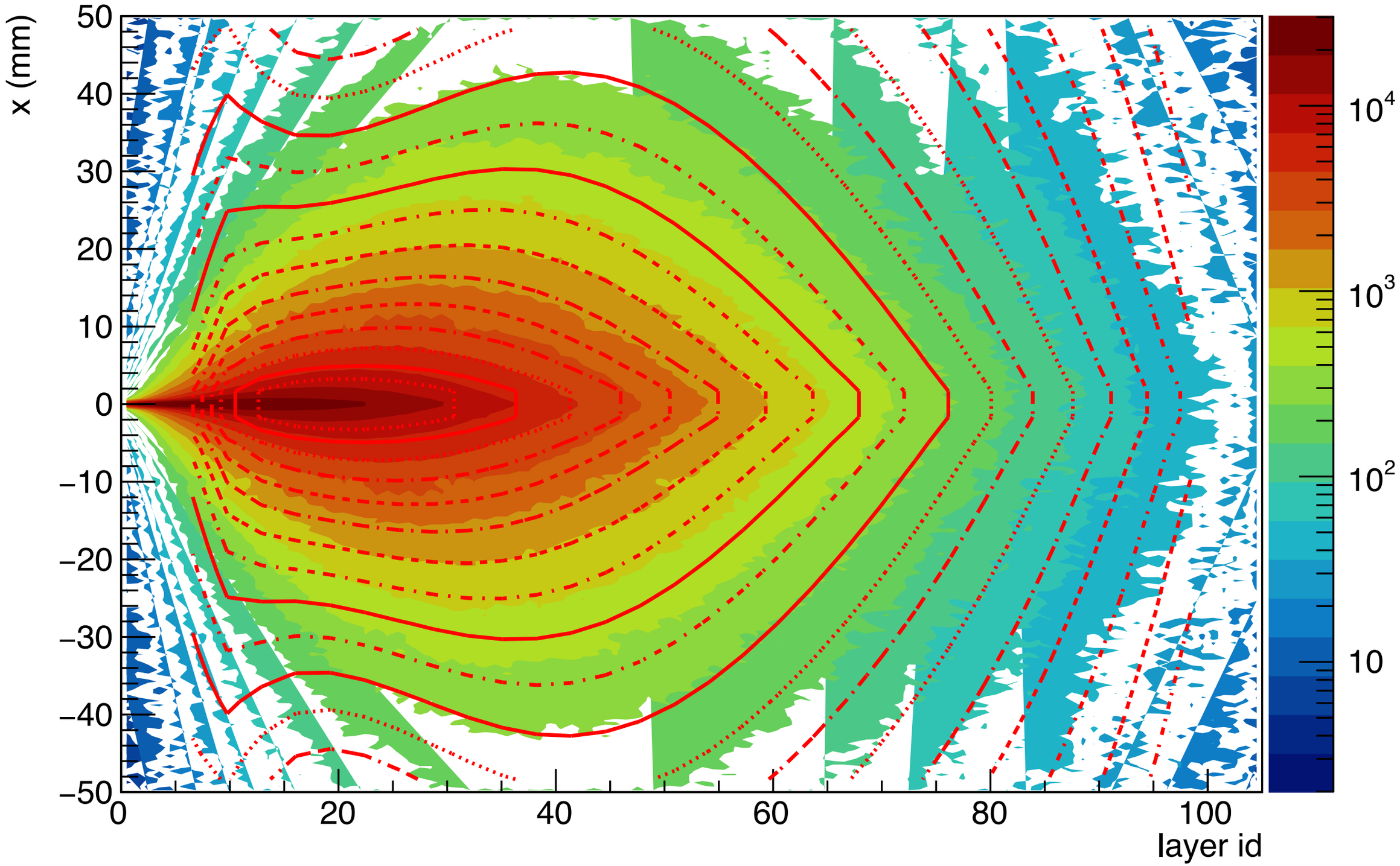




$$\alpha(t) = p_0 t + p_0 t^2 + p_0 t^3 + p_0 t^4$$

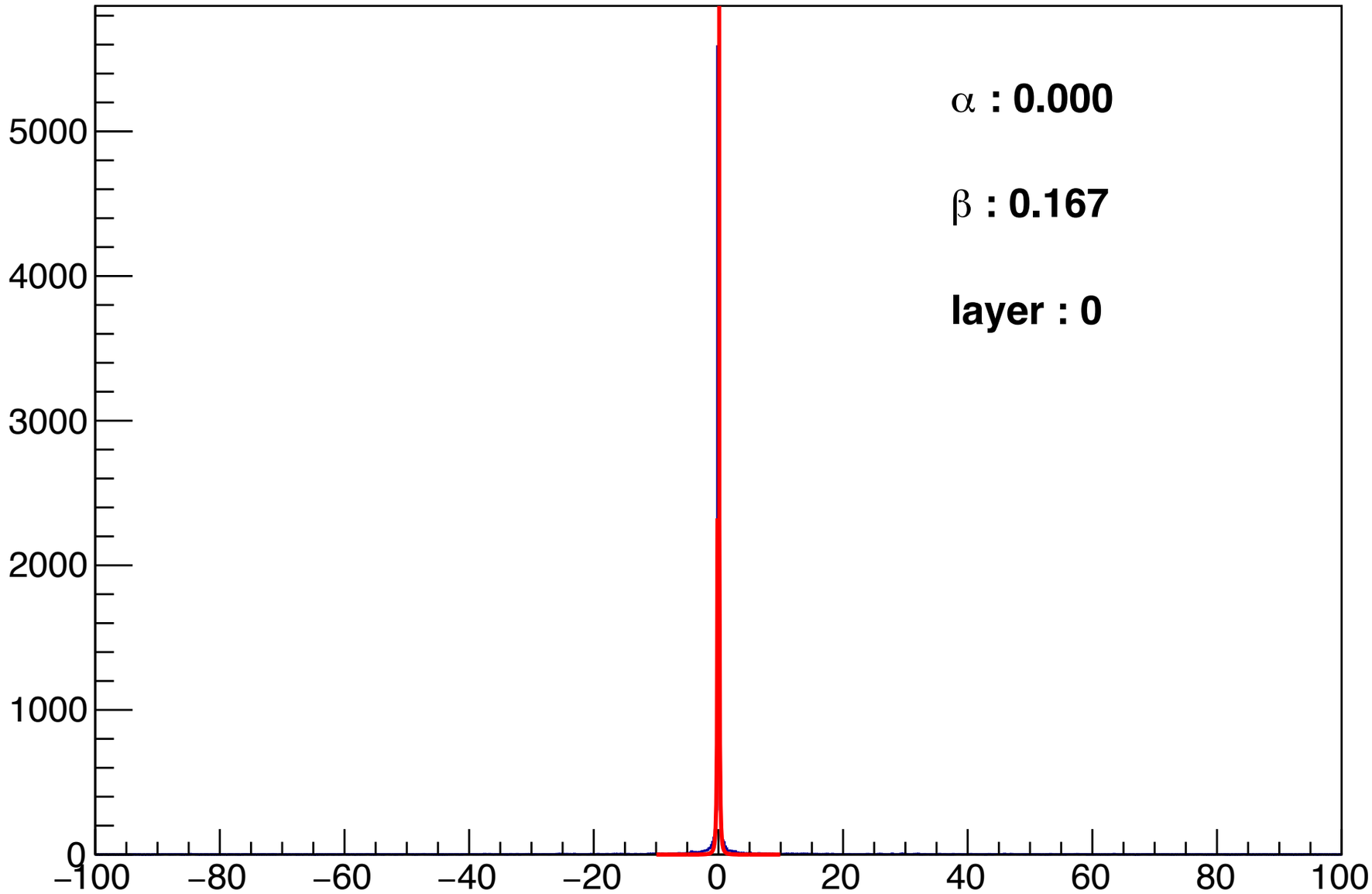
$$\beta(t) = p_0 t + p_0 t^2 + p_0 t^3 + p_0 t^4$$

2D Fit

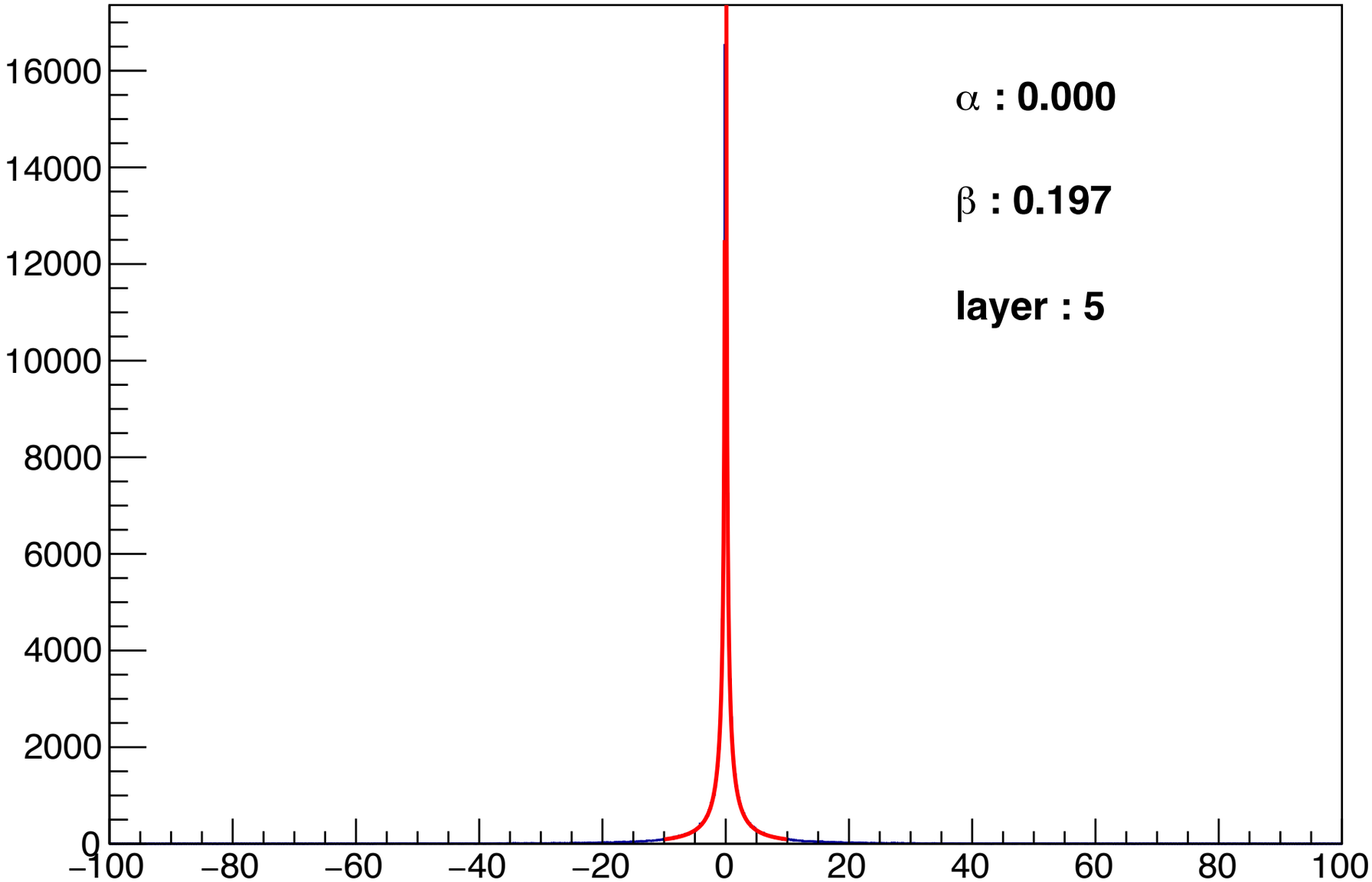

x (mm)
50
40
30
20
10
0
−10
−20
−30
−40
−50
0
20
40
60
80
100
layer id
10^4
10^3
10^2
10

back up

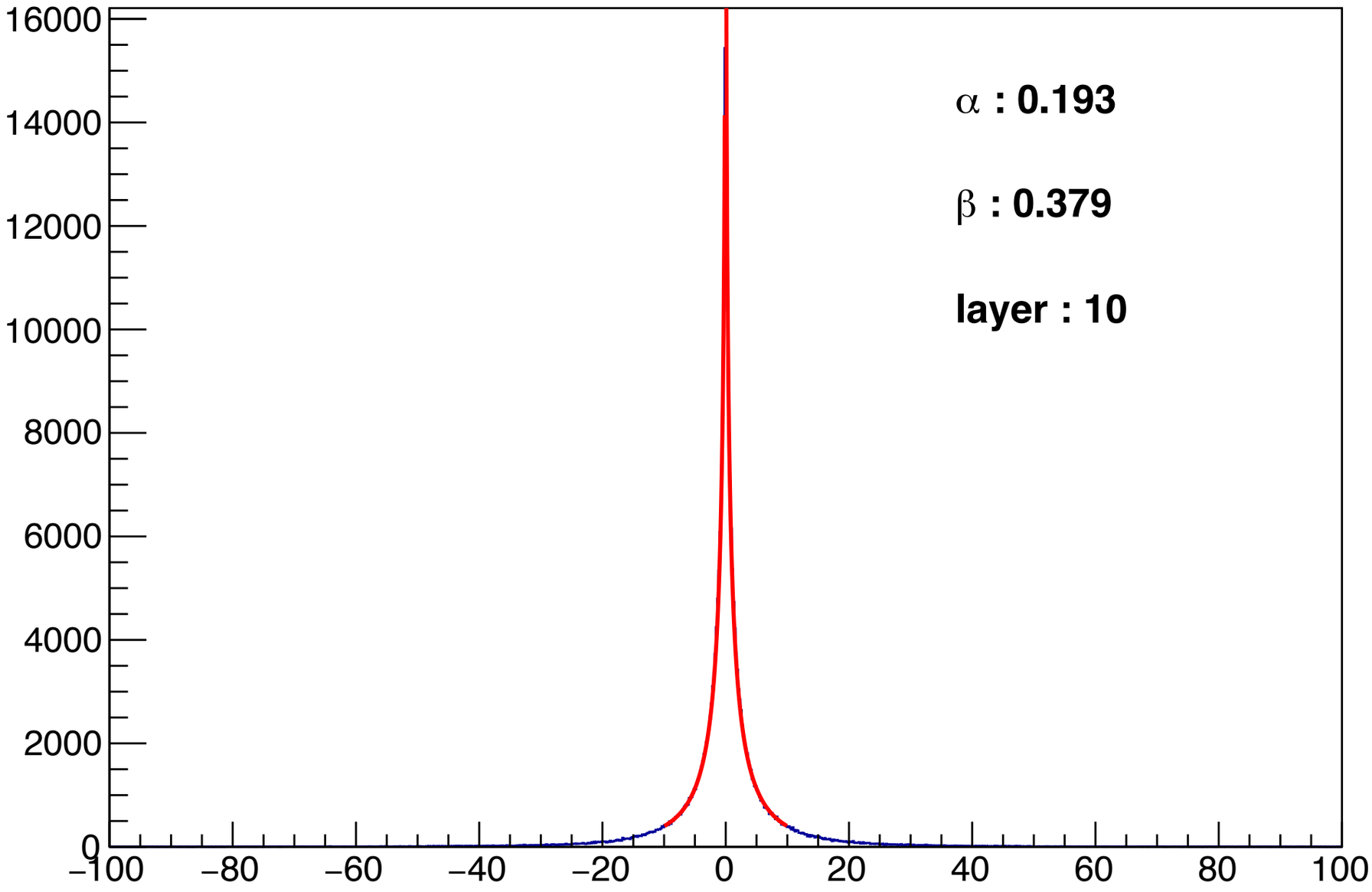
Transverse shower profile



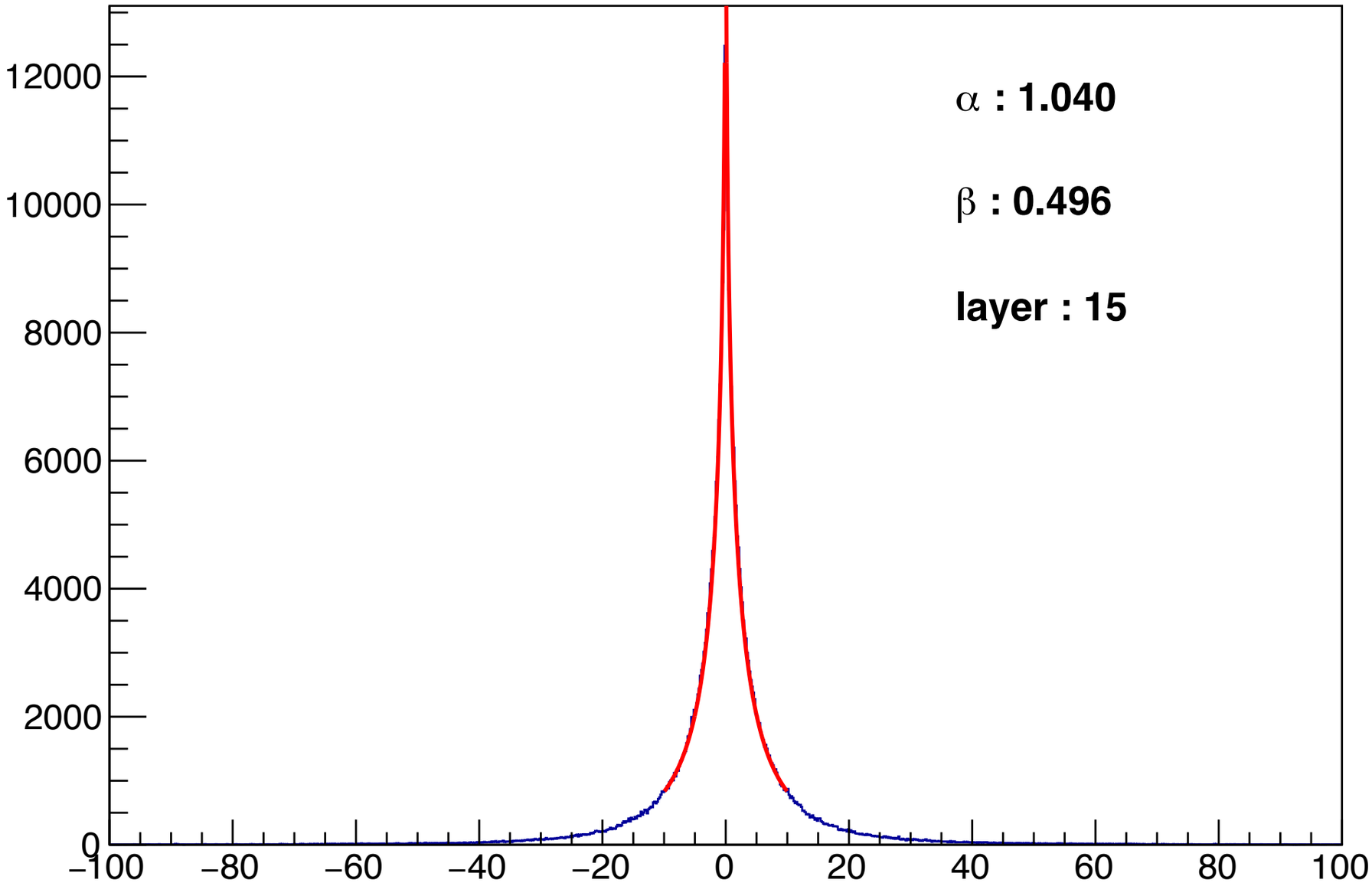
Transverse shower profile



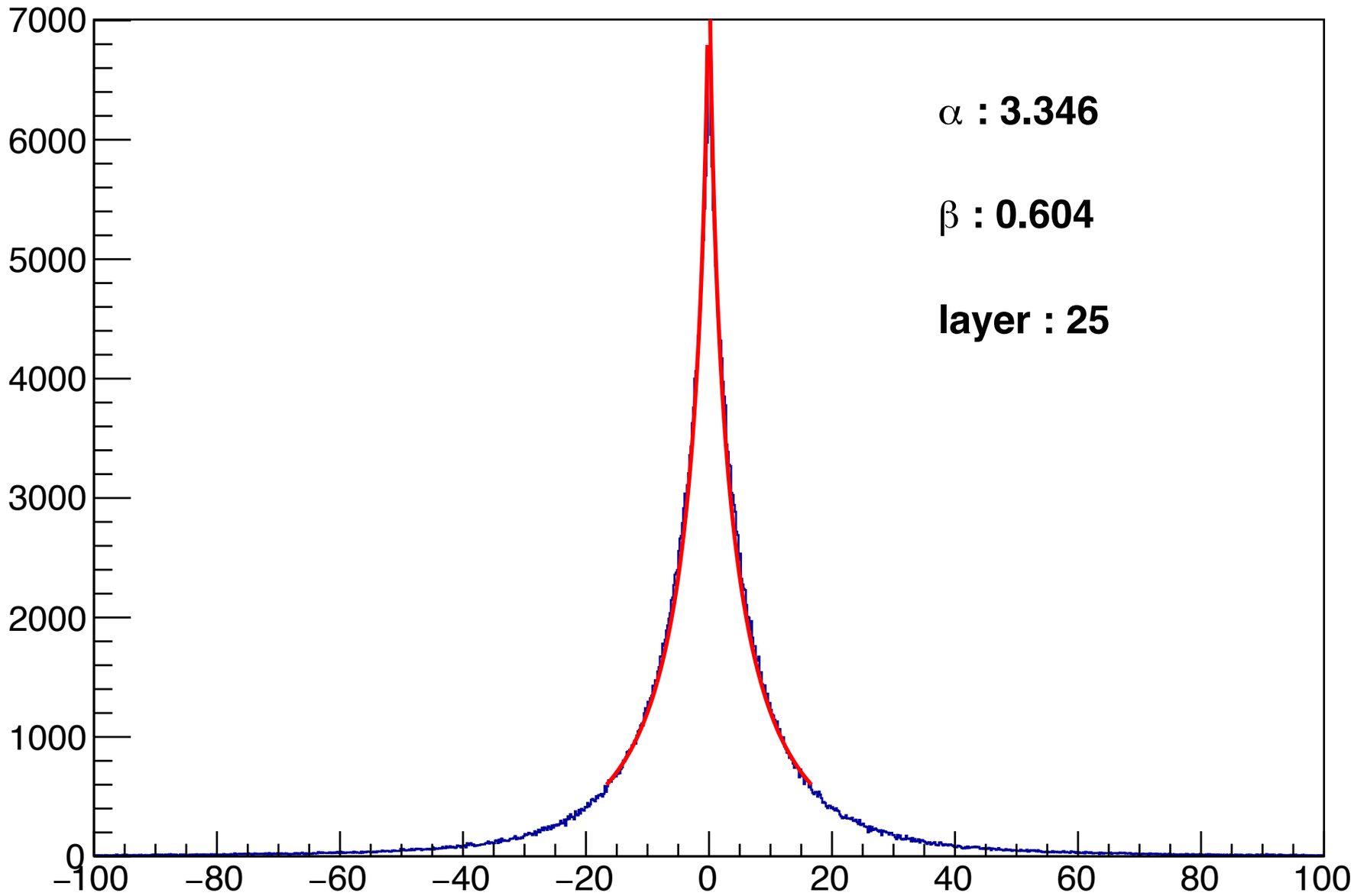
Transverse shower profile



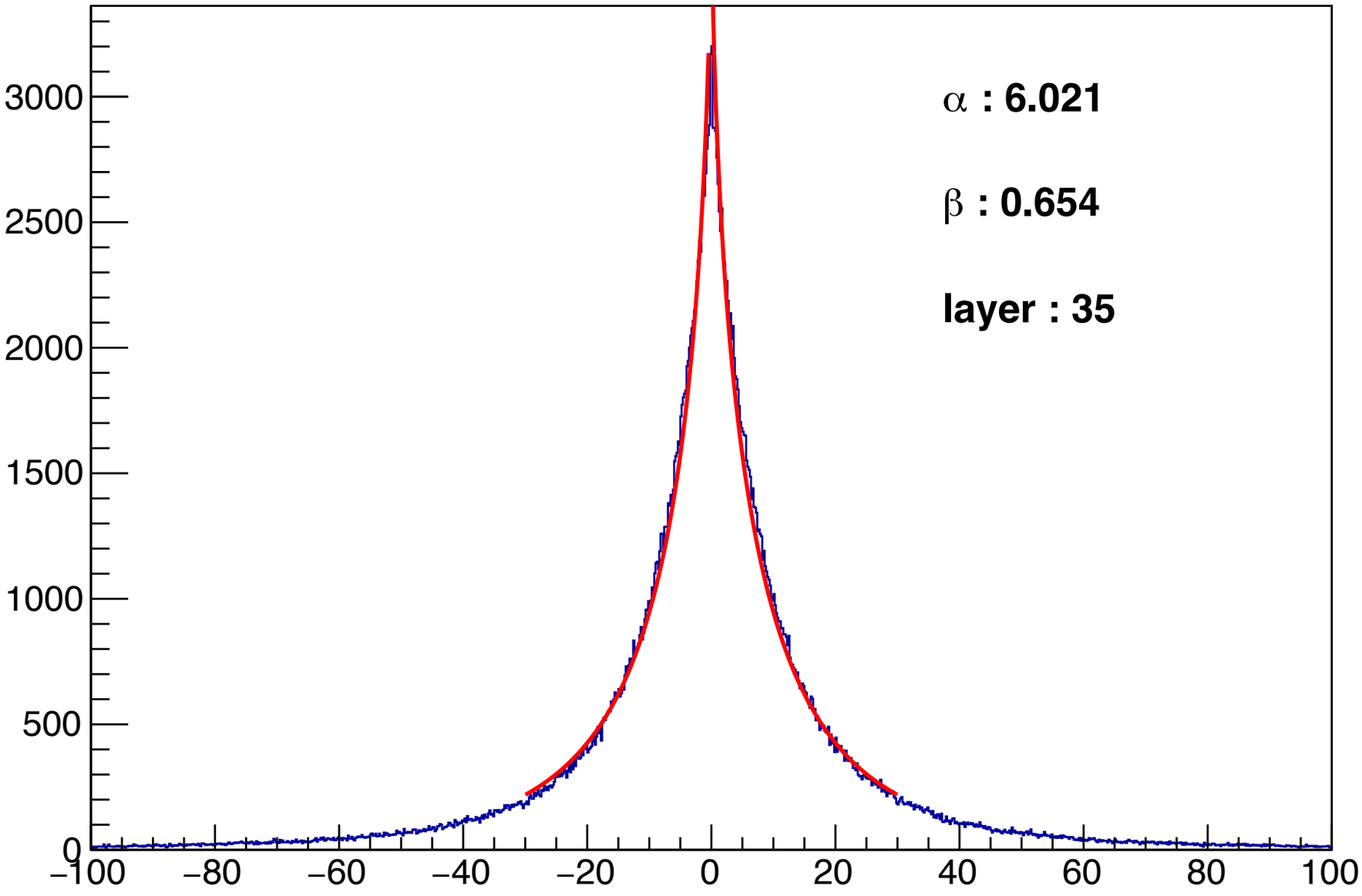
Transverse shower profile



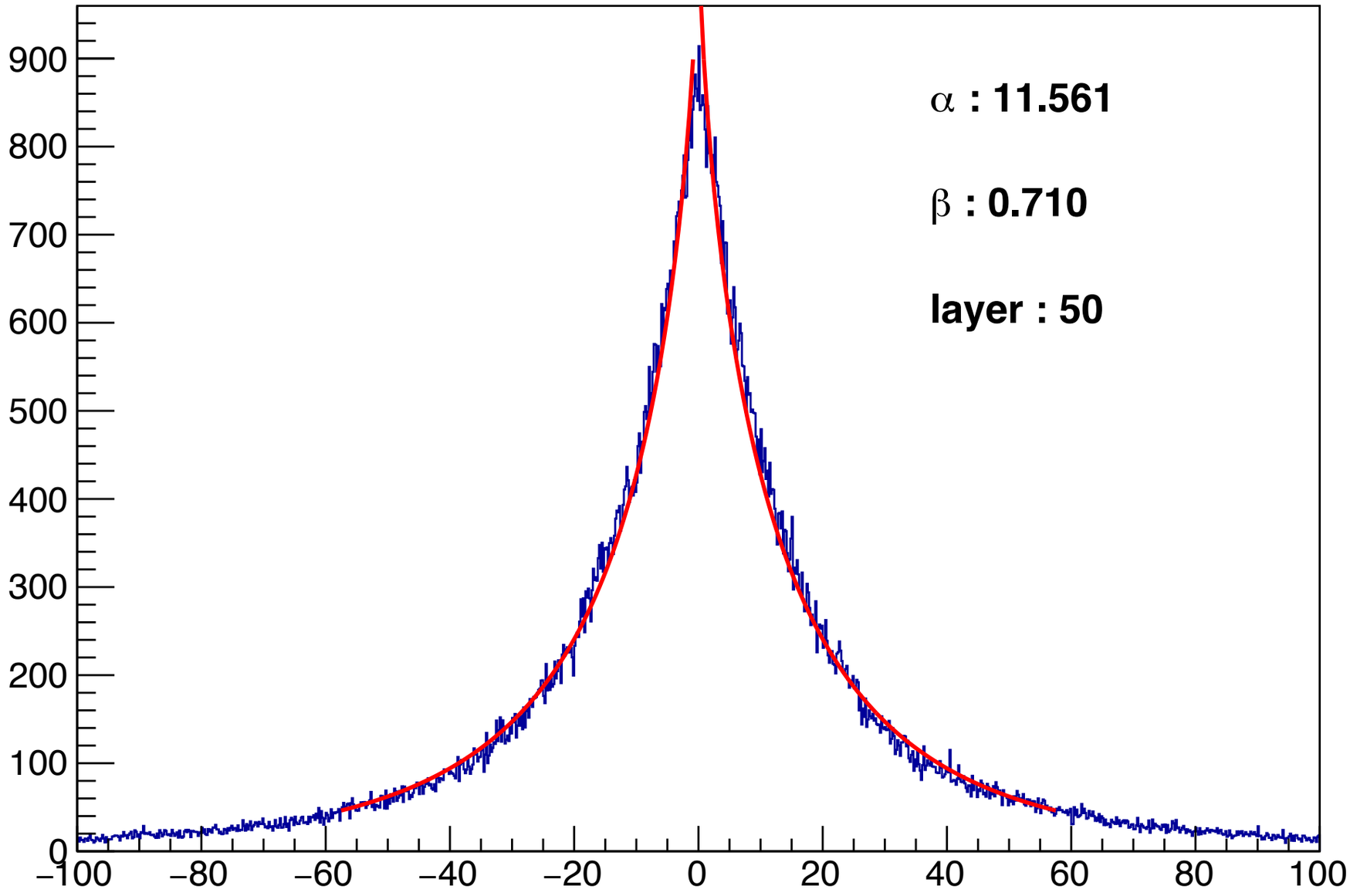
Transverse shower profile



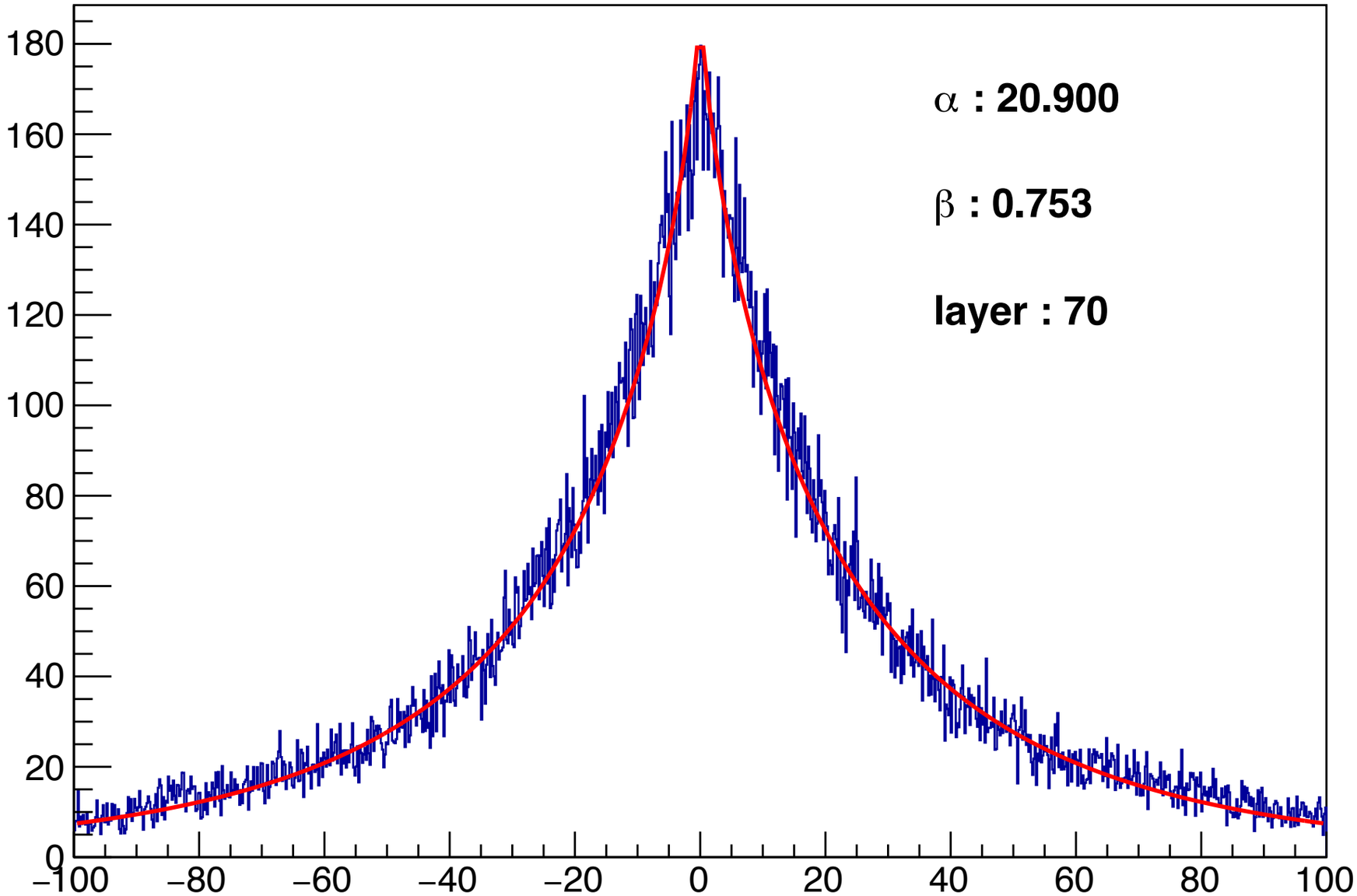
Transverse shower profile



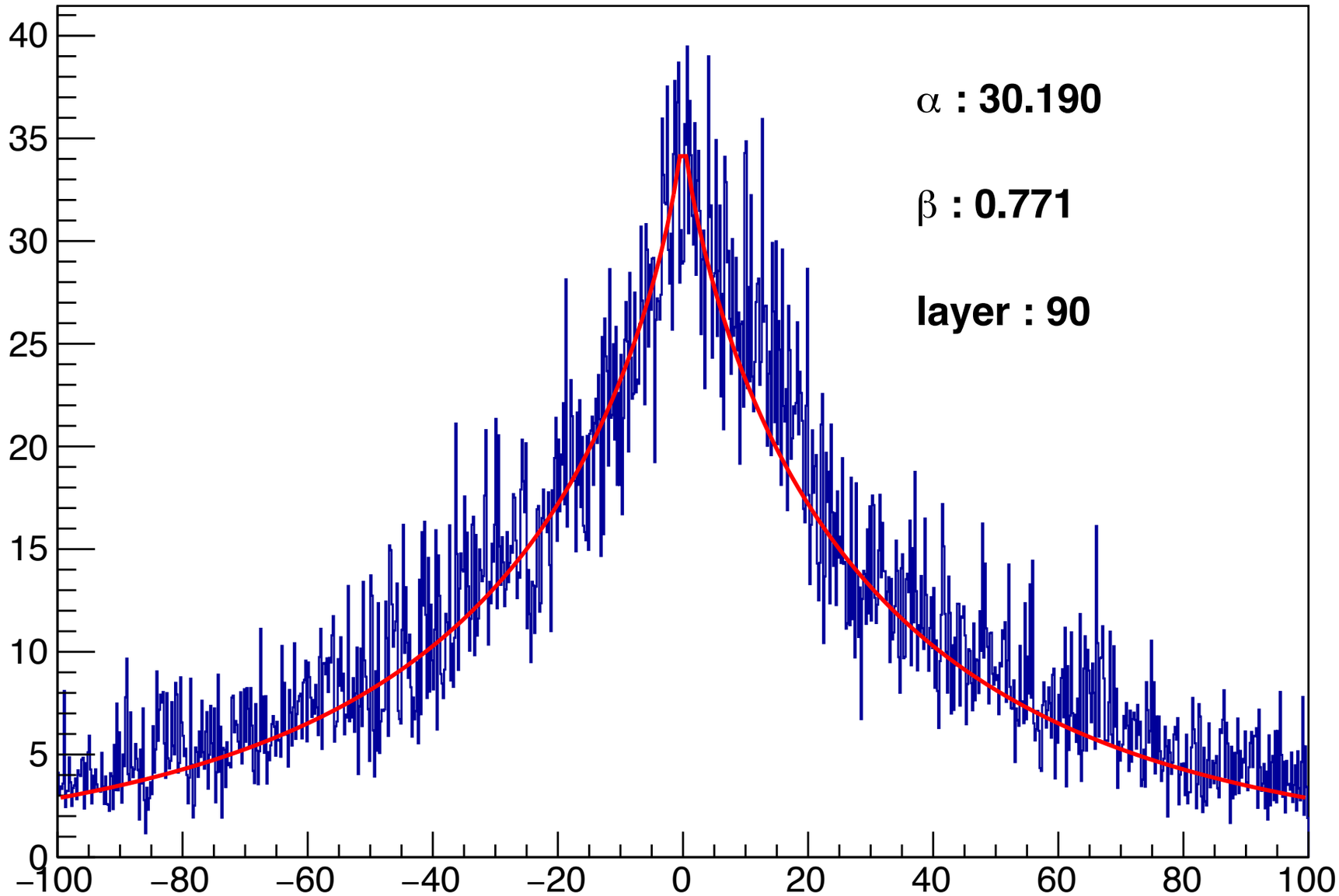
Transverse shower profile



Transverse shower profile



Transverse shower profile



Transverse shower profile