Update about fitting

Two parallel approaches

06/02/2025

Overview

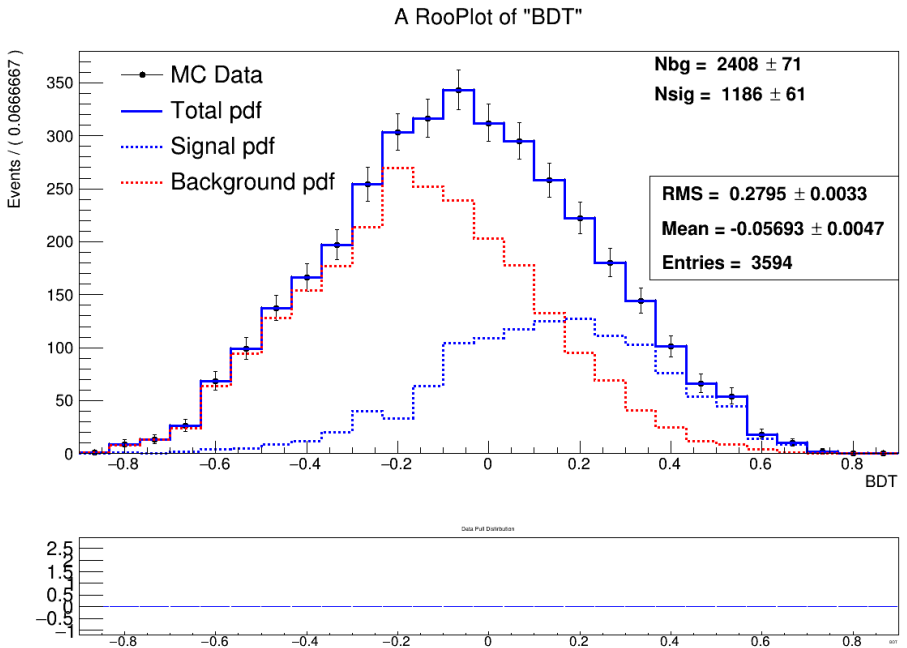
Approach 1

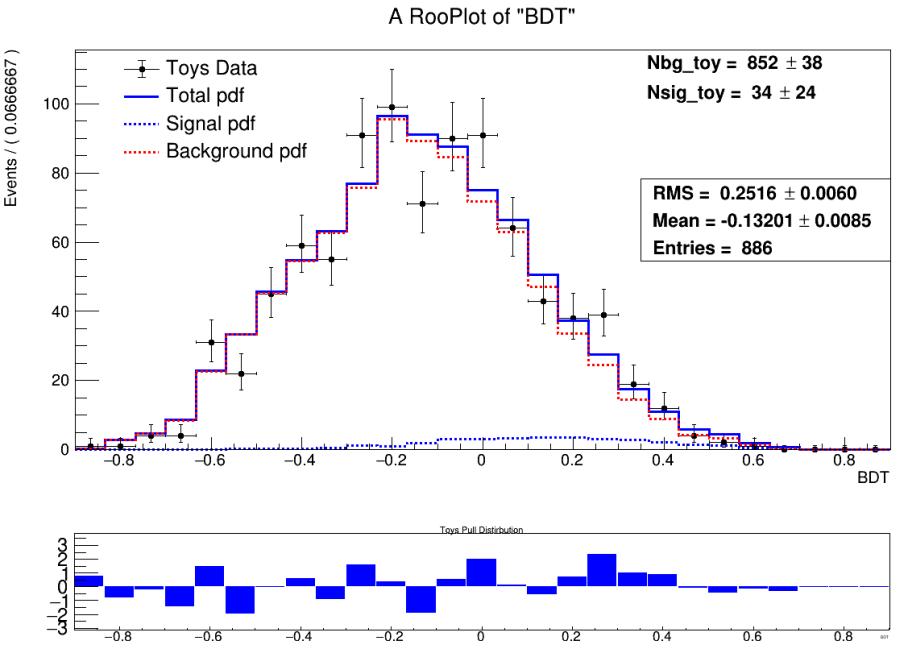
- Template fit in full BDT range **without smoothing** histograms.
- One toy with N_{sig} = 46 & N_{bg} = 803 generated.
- 1000 Toys study to check the fit stability.
- NLL and PLL distribution of a single random toy.

Approach 2

- Template fit in full BDT range **with smoothing** histograms.
- One toy with N_{sig} = 46 & N_{bg} = 803 generated.
- 1000 Toys study to check the fit stability.
- NLL and PLL distribution of a single random toy.

Approach 1



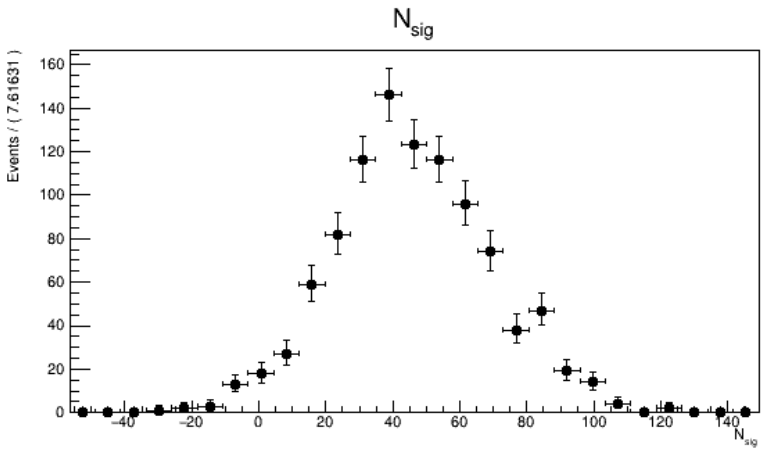


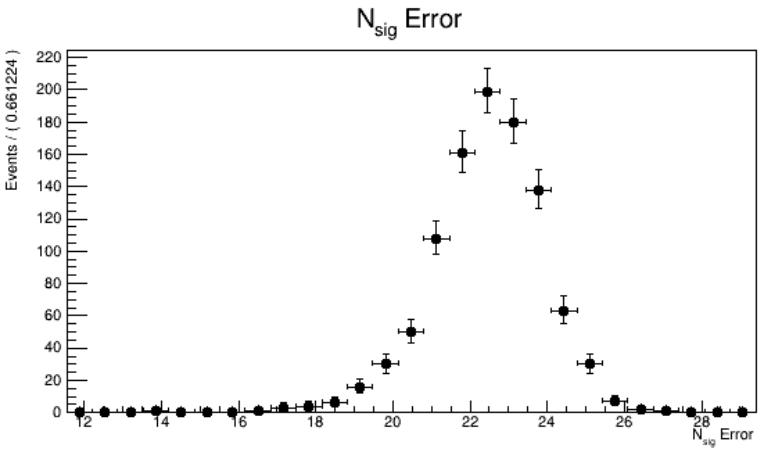
Quality of fit (chi square/bin)

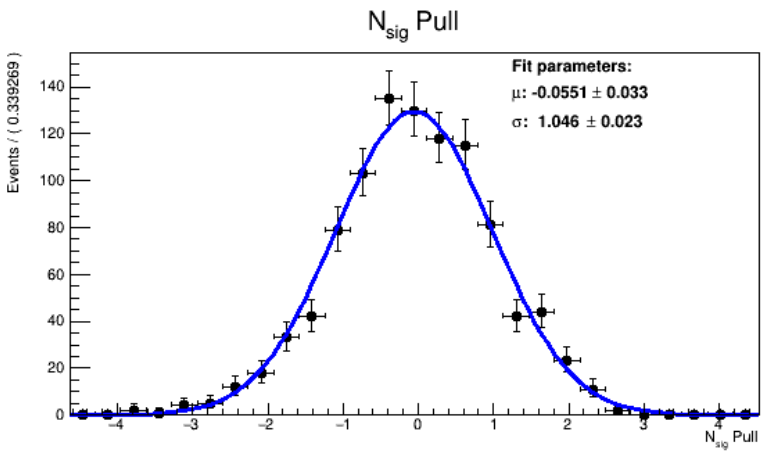
MC data = 6.9e-8

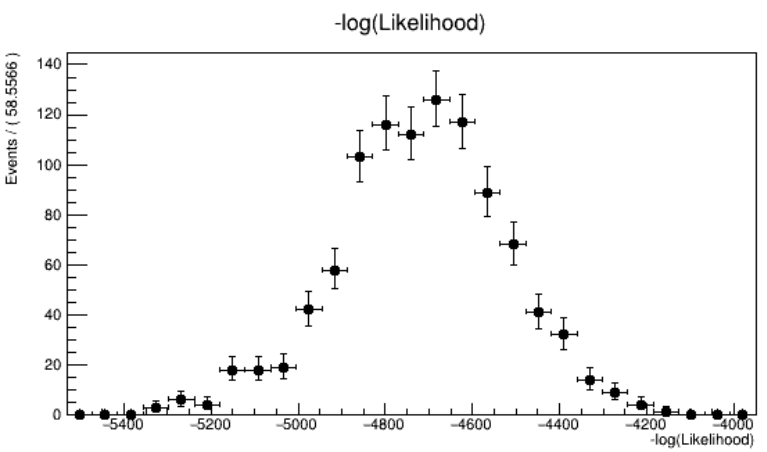
Toy data = 1.3

1000 Toys for $N_{sig} = 46$

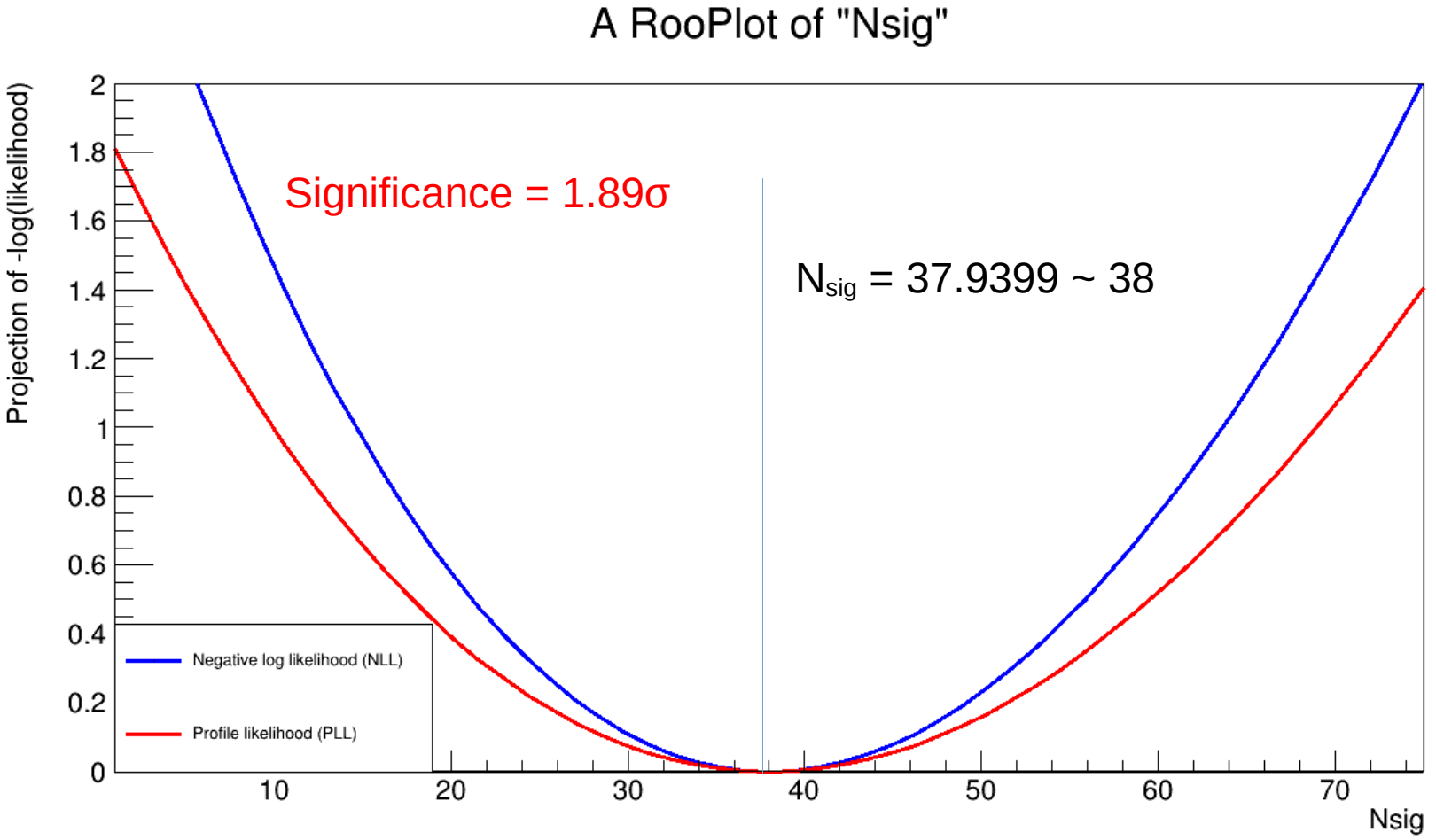




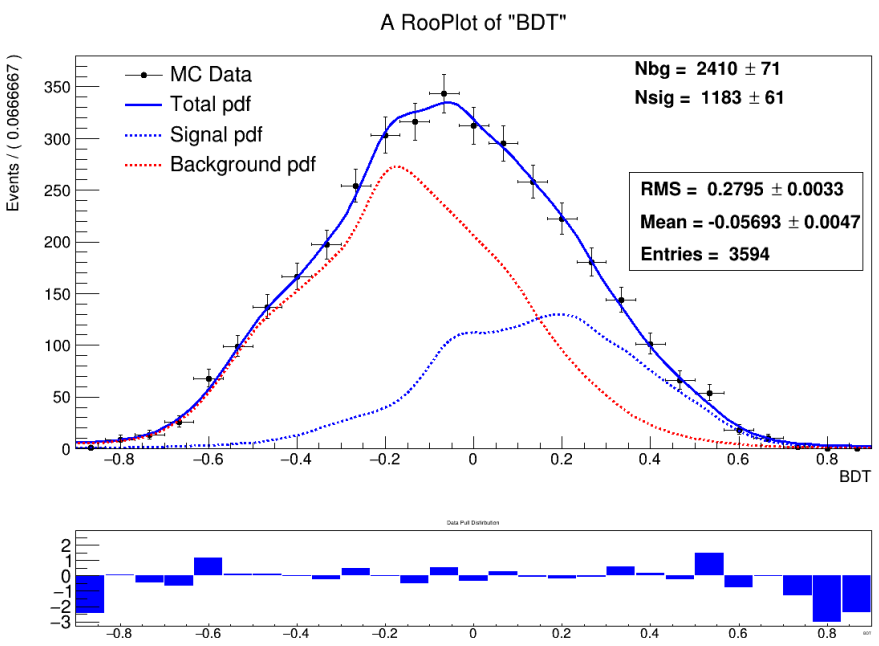


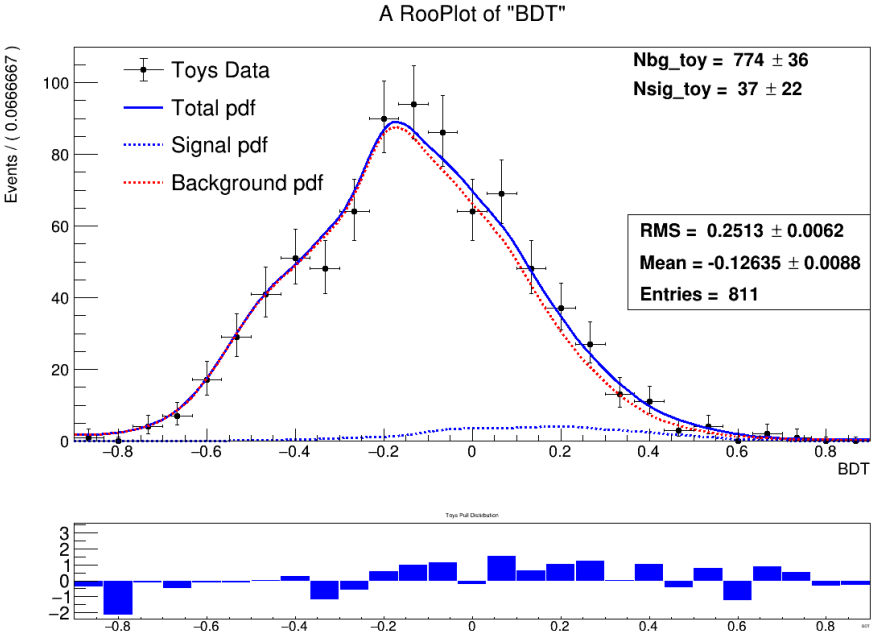


NLL,PLL for the 3rd toy dataset



Approach 2



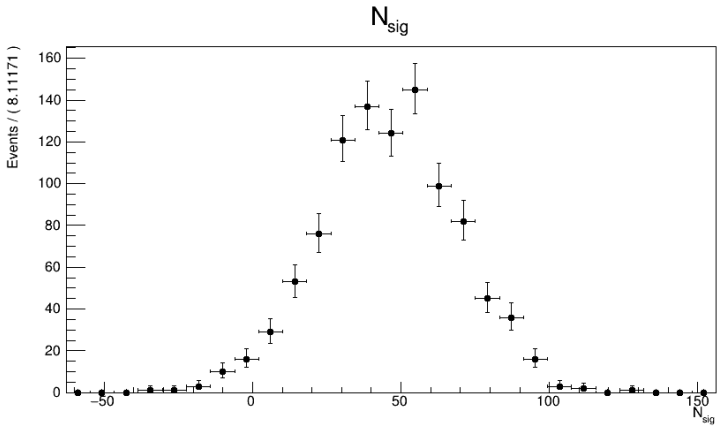


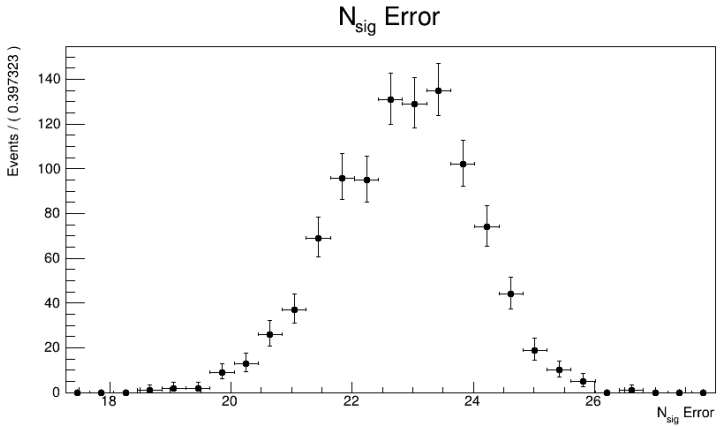
Quality of fit (chi square/bin)

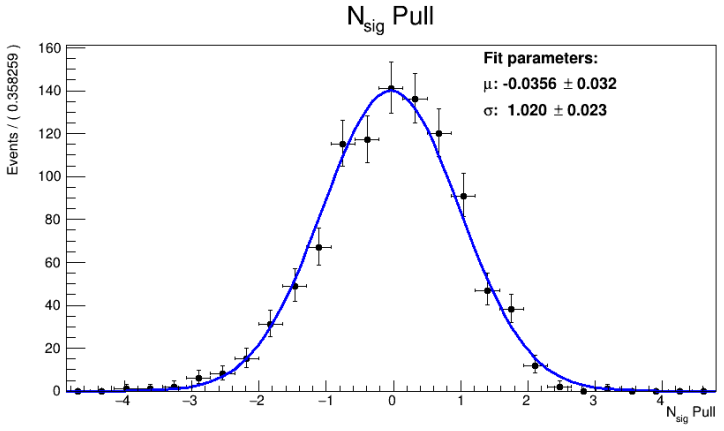
MC data = 0.56

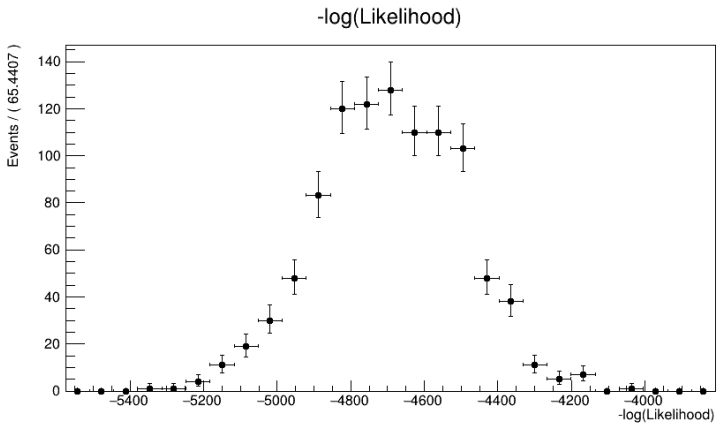
Toy data = 0.59

1000 Toys for $N_{sig} = 46$

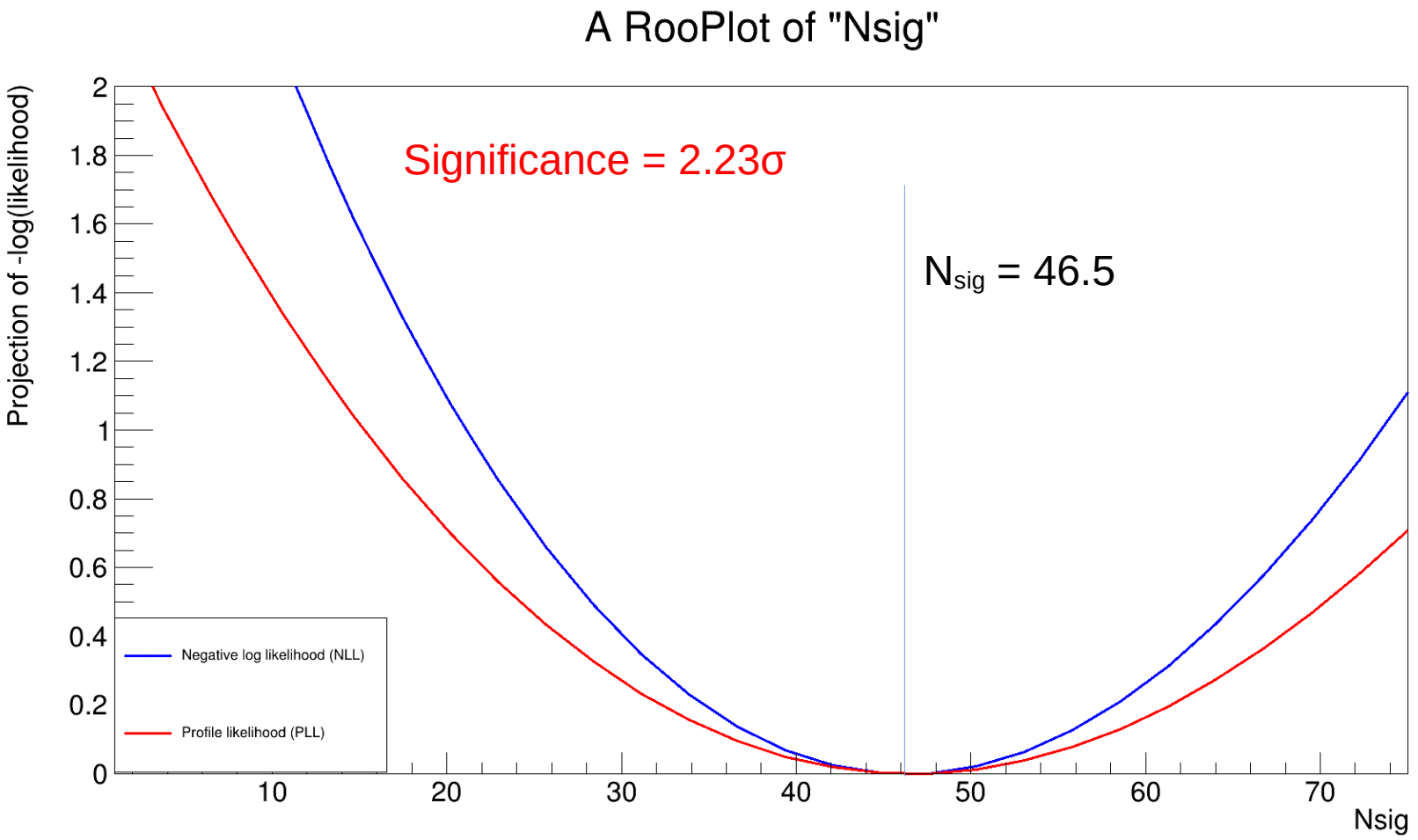






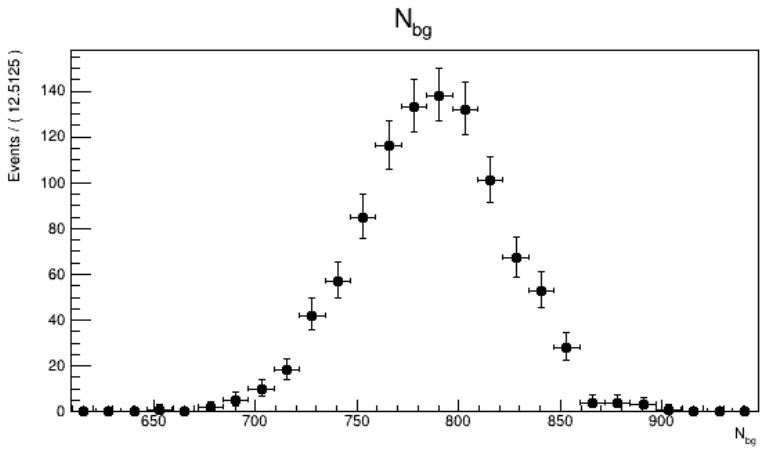


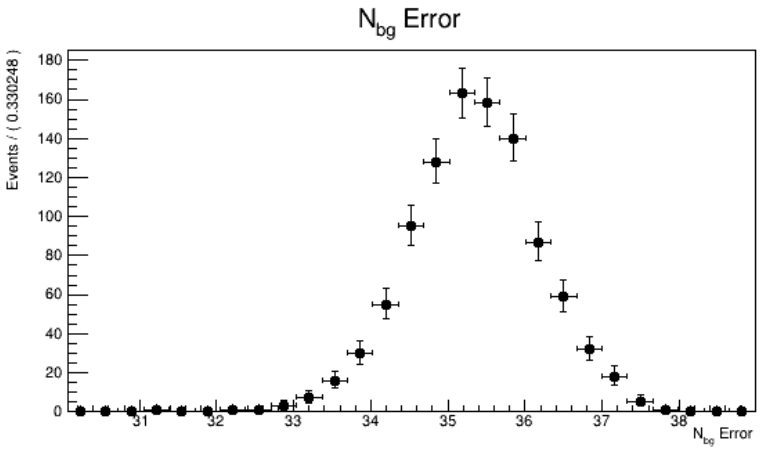
NLL,PLL for the 3rd toy dataset

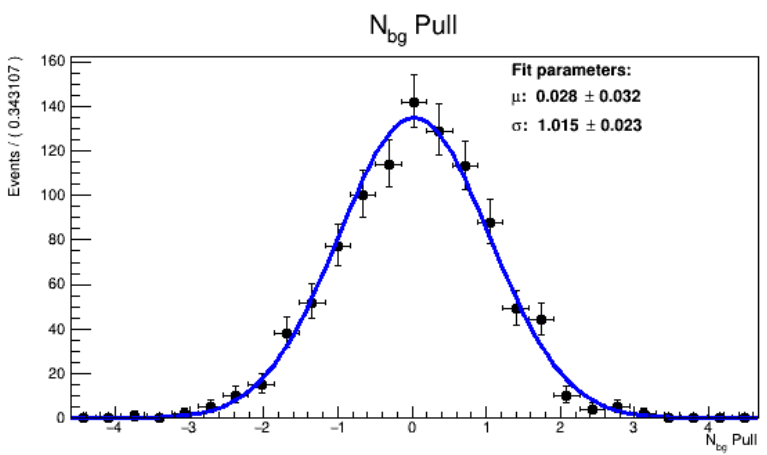


Back up

1000 Toys for N_{bg} = 785

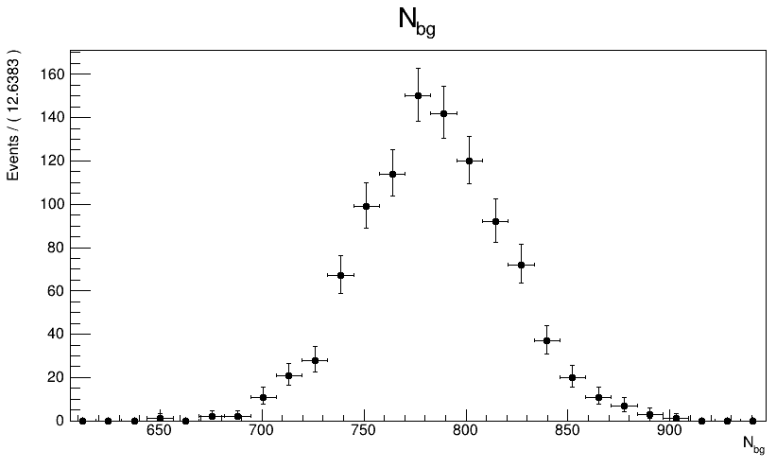


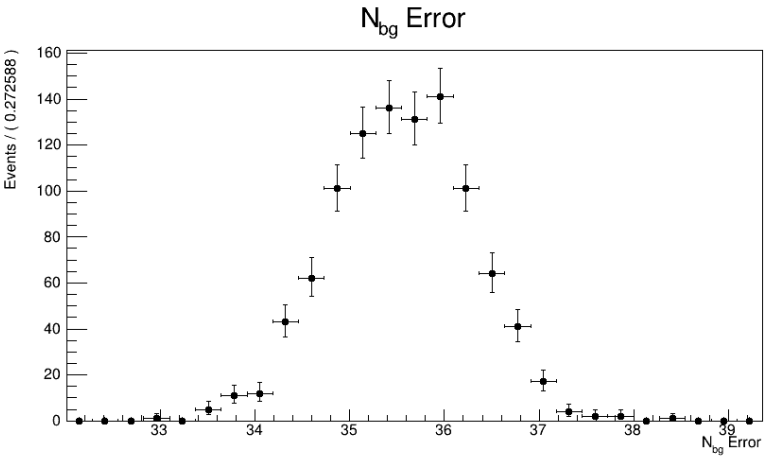


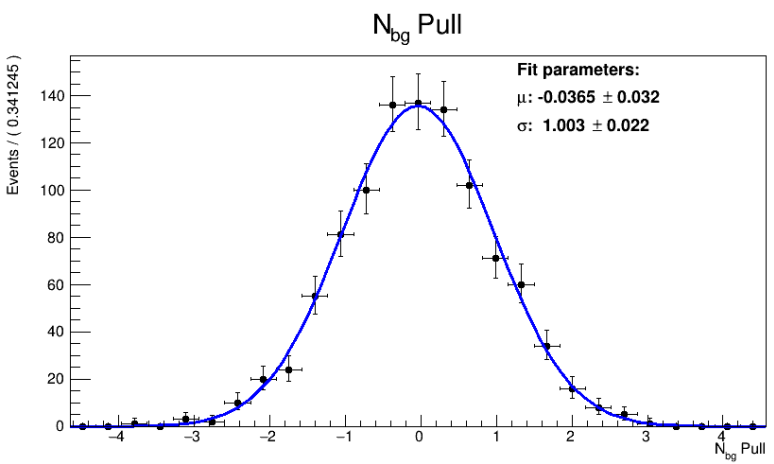


Approach 1

1000 Toys for N_{bg} = 785







Approach 2

Significance calculation

Approach 1

$\Delta\log L = 1.8 - 0 = 1.8$

$Z = \mathrm{sqrt}(2\Delta\log L) = 1.89\ \sigma$

Approach 2

$\Delta\log L = 2.5 - 0 = 2.5$

$Z = \mathrm{sqrt}(2\Delta\log L) = 2.23\ \sigma$