University
Mohammed I

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Matter and Radiation

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Oujda

ATLAS Forward Calorimeter Analysis

KTH/ FSO meeting
21 / 10/ 2015

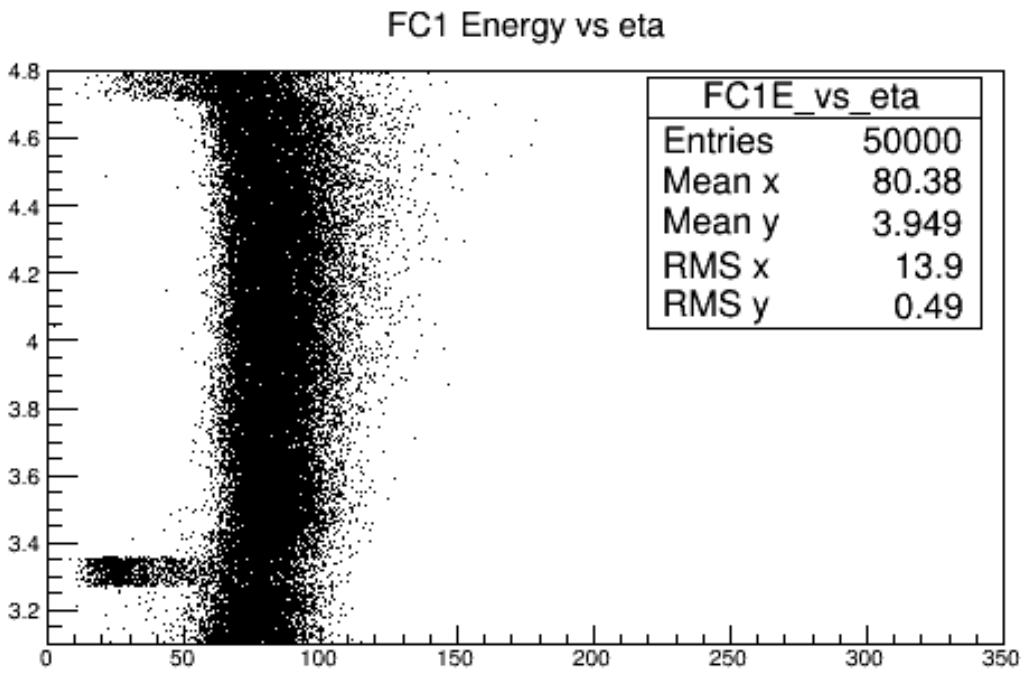
Malika TOUIL – Yahya TAYALATI

Electrons Analysis

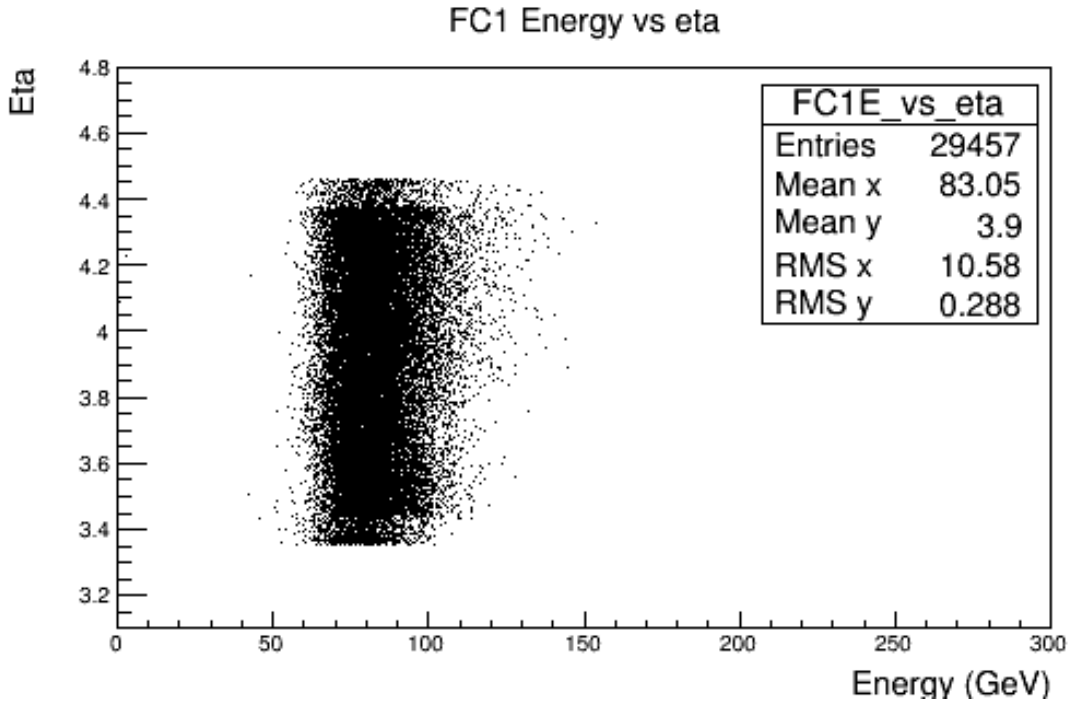
- Reconstruction of energy in Fcal considering only the energy deposited in FC1.
- Cut of Eta between 3.4 & 4.4 .
- Cluster energy with a radius of 8cm fitted by double gaussian .
- Energy resolution.

Electrons Analysis

5 GeV Scatter plots



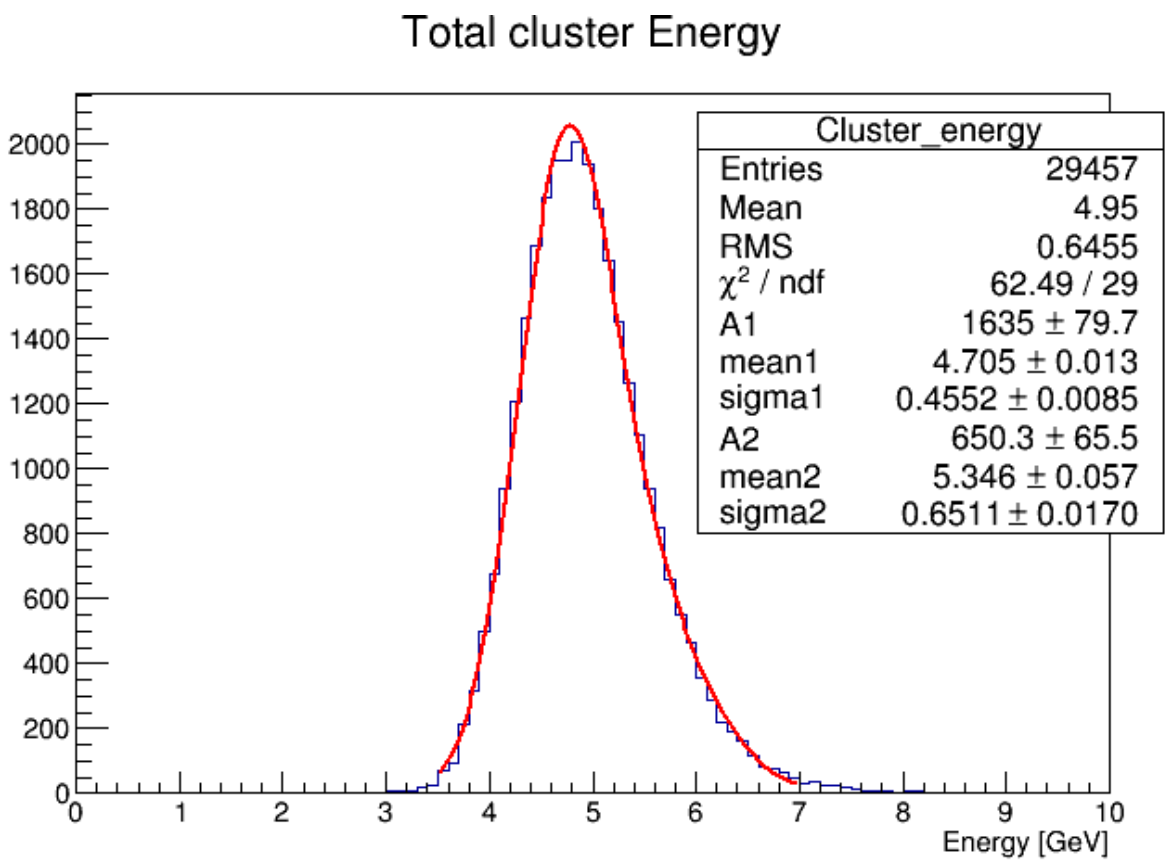
Without Eta cuts



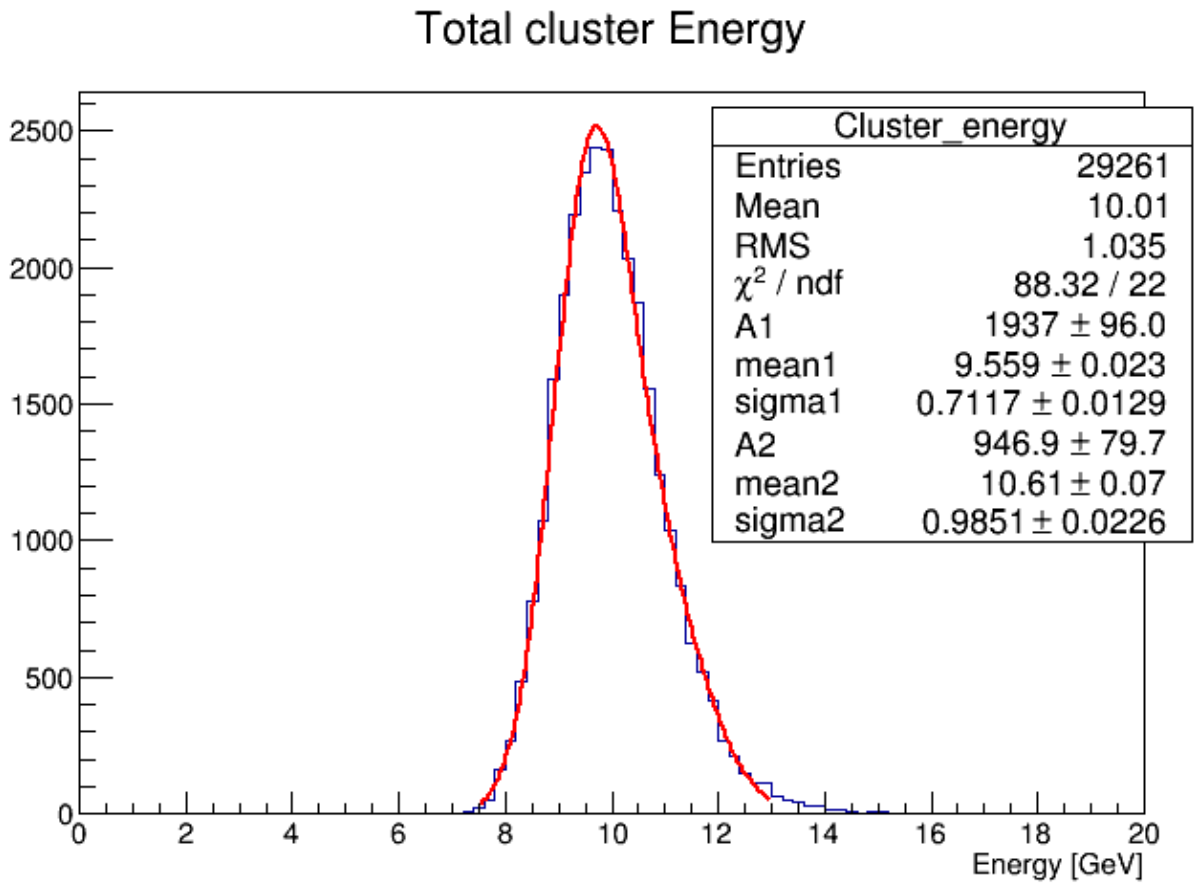
3.4 < Eta < 4.4

Electrons – Energy Reconstruction

- **Total cluster energy in FCal with a radius of 8cm .**
- **Fit with Double gaussian.**



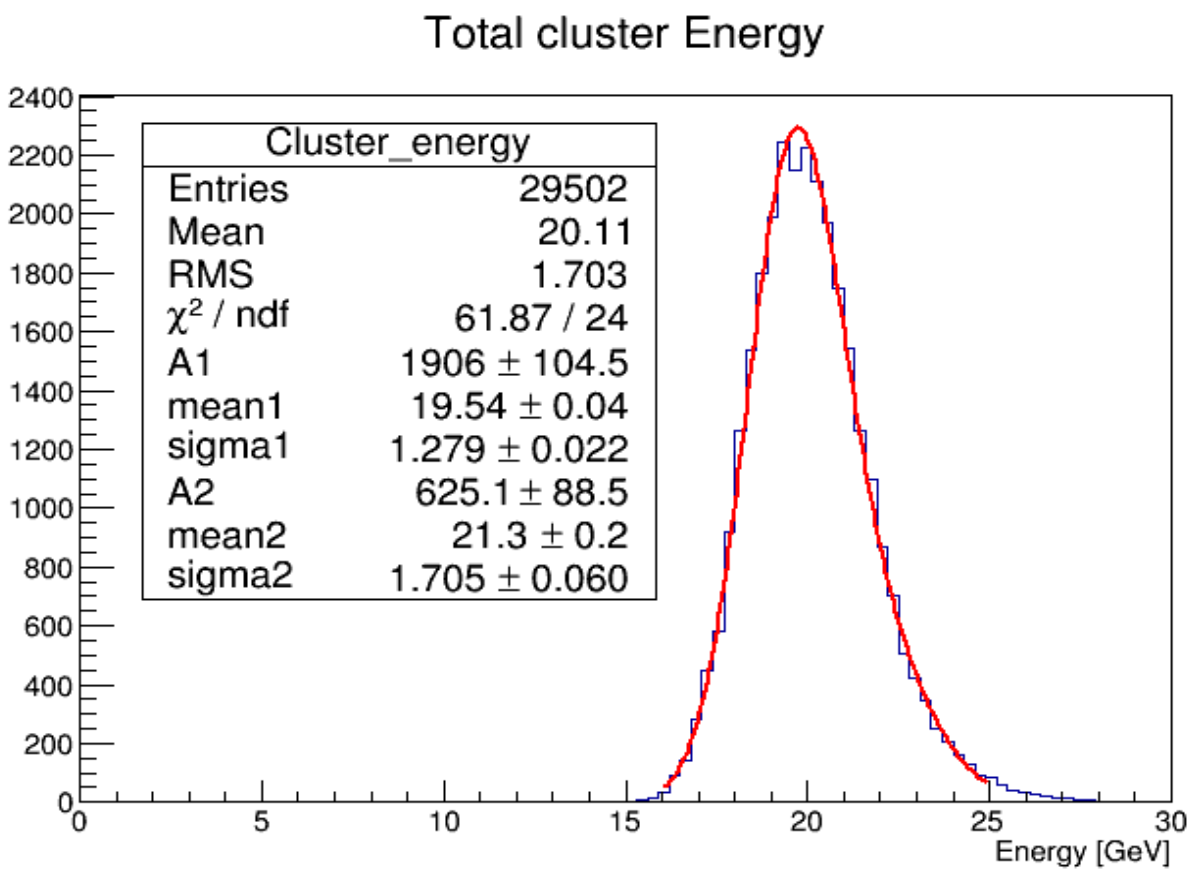
5 GeV



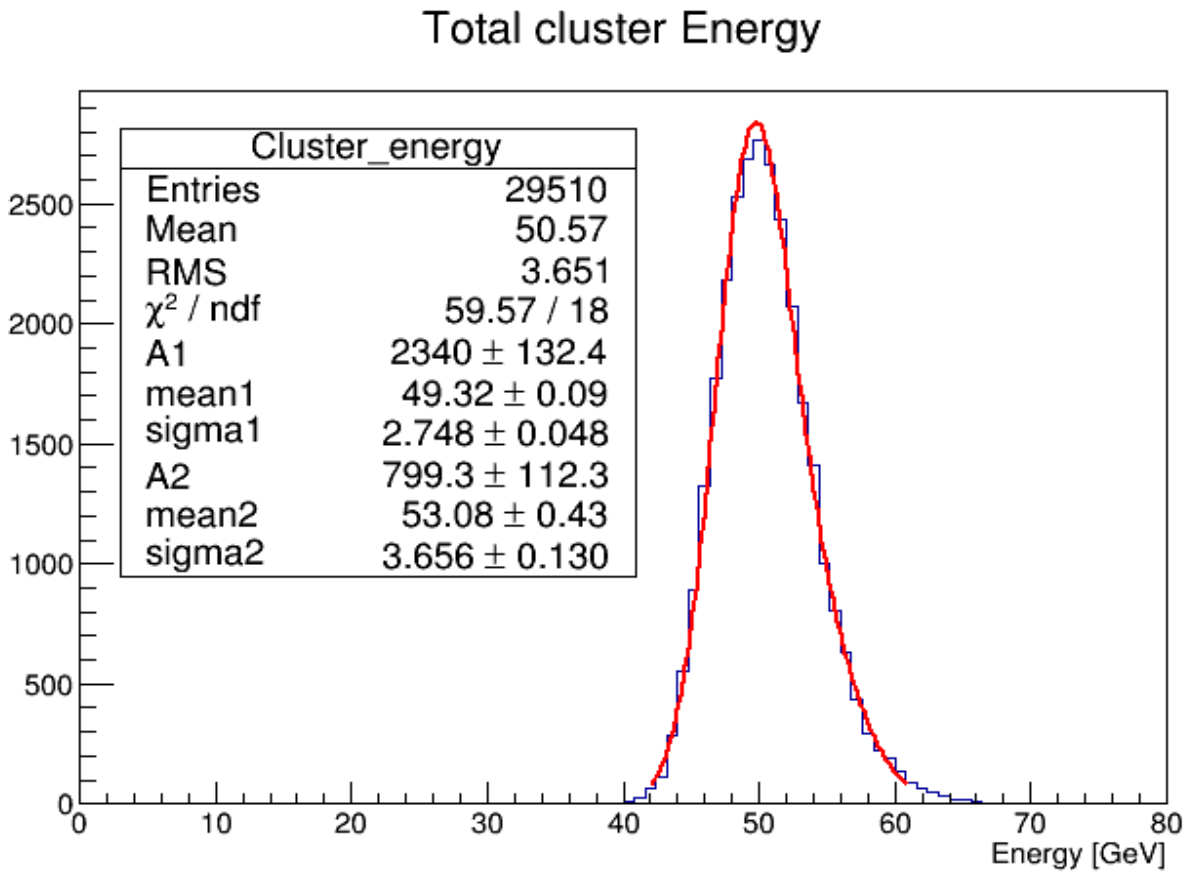
10 GeV

Electrons – Reconstruction of energy

- Total cluster energy in FCal with a radius of 8cm .
- Fit with Double gaussian.



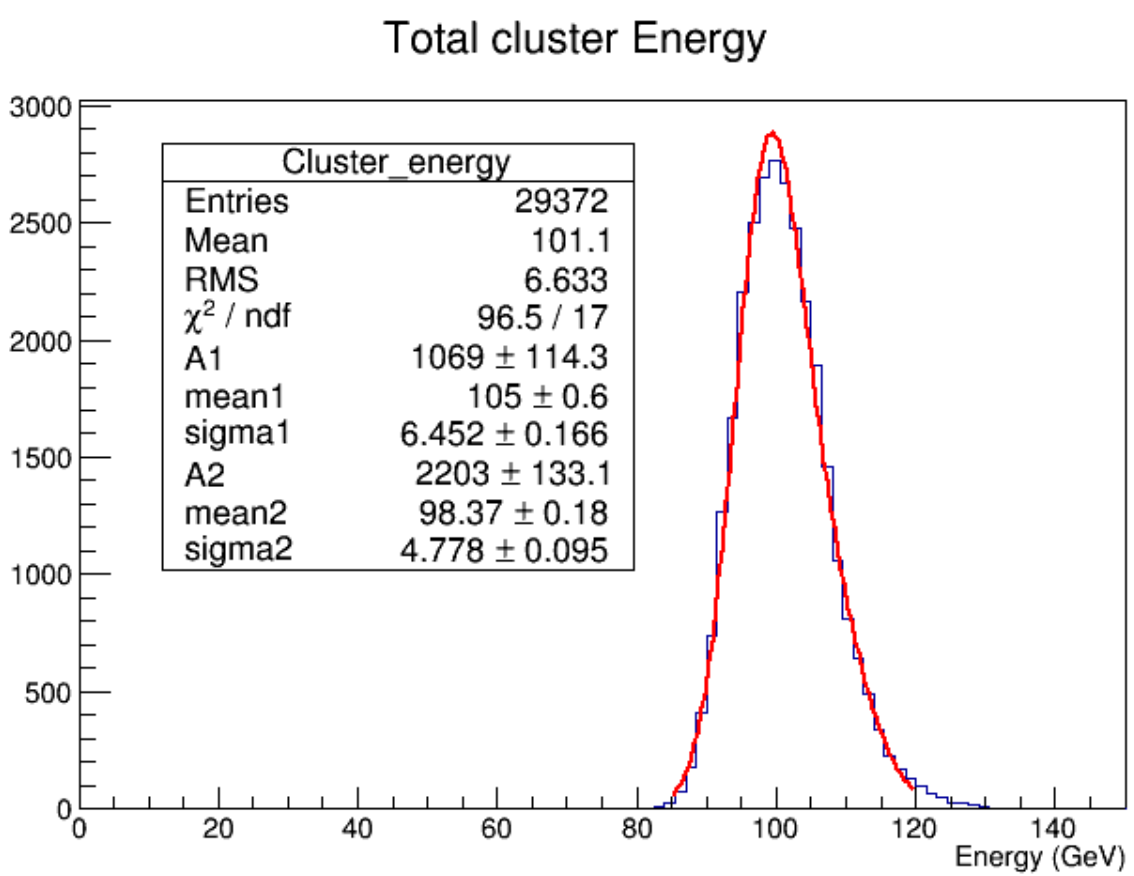
20 GeV



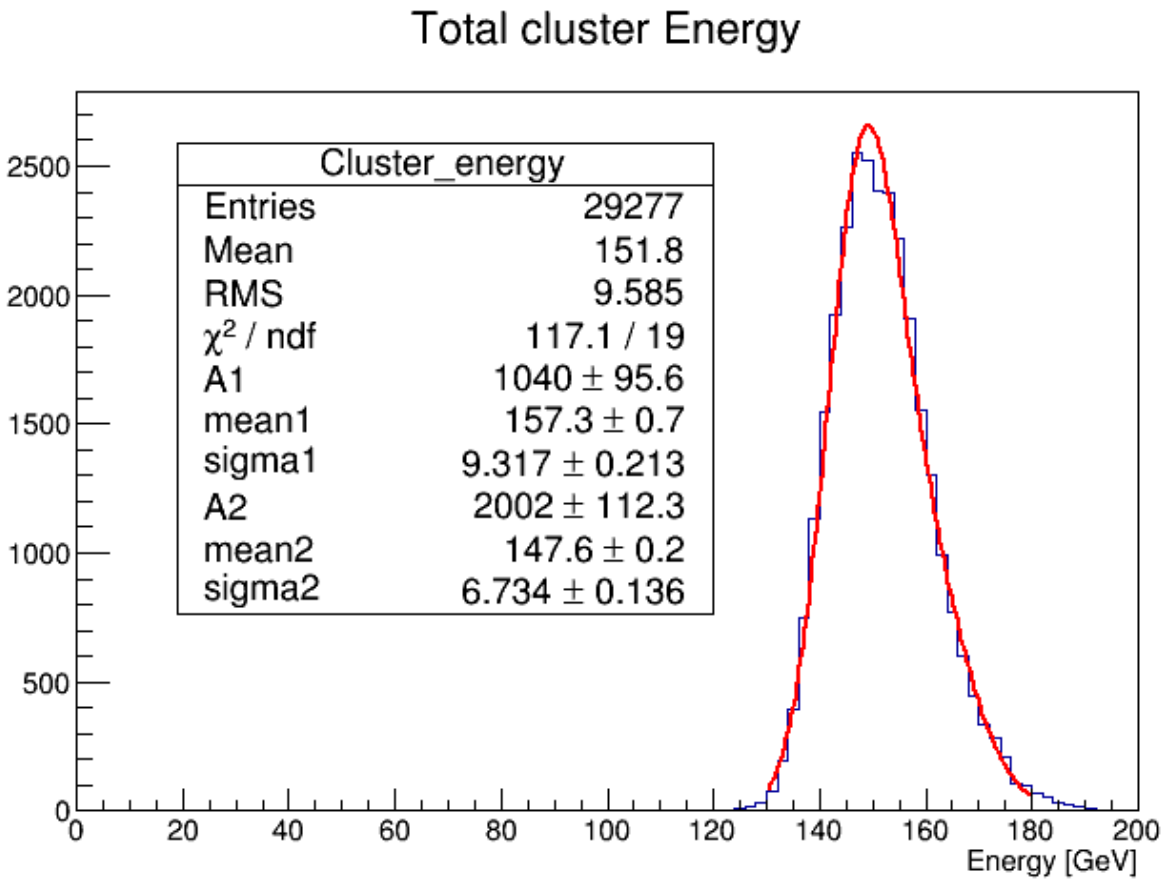
50 GeV

Electrons – Reconstruction of energy

- Total cluster energy in FCal with a radius of 8cm .
- Fit with Double gaussian.



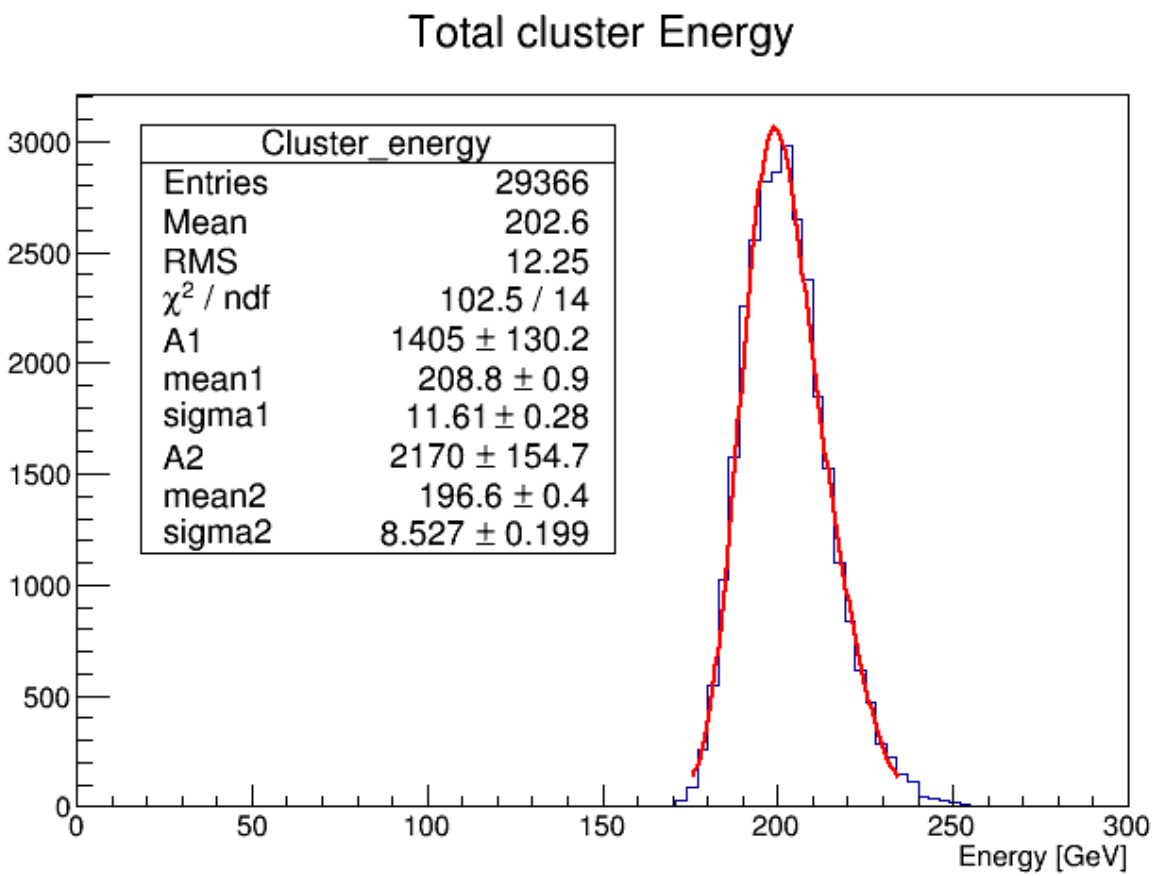
100 GeV



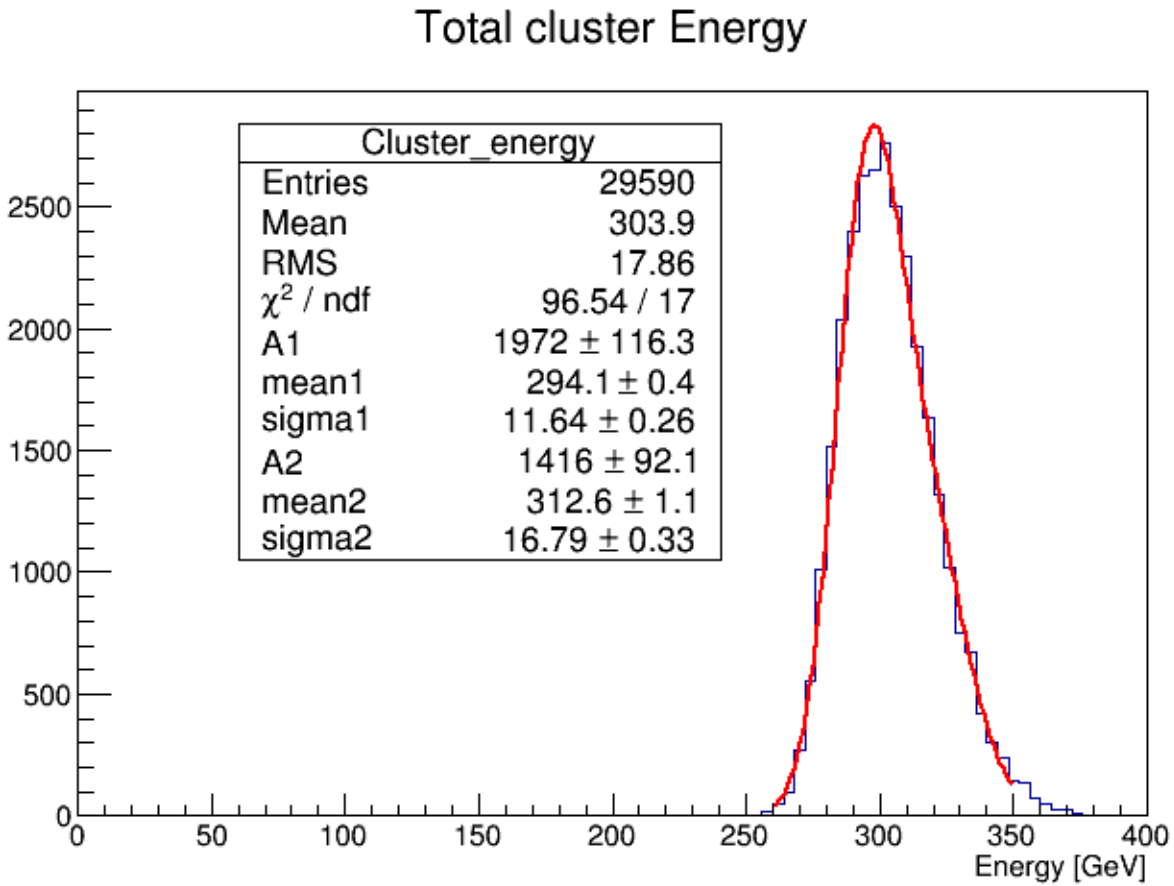
150 GeV

Electrons – Reconstruction of energy

- **Total cluster energy in FCal with a radius of 8cm .**
- **Fit with Double gaussian.**

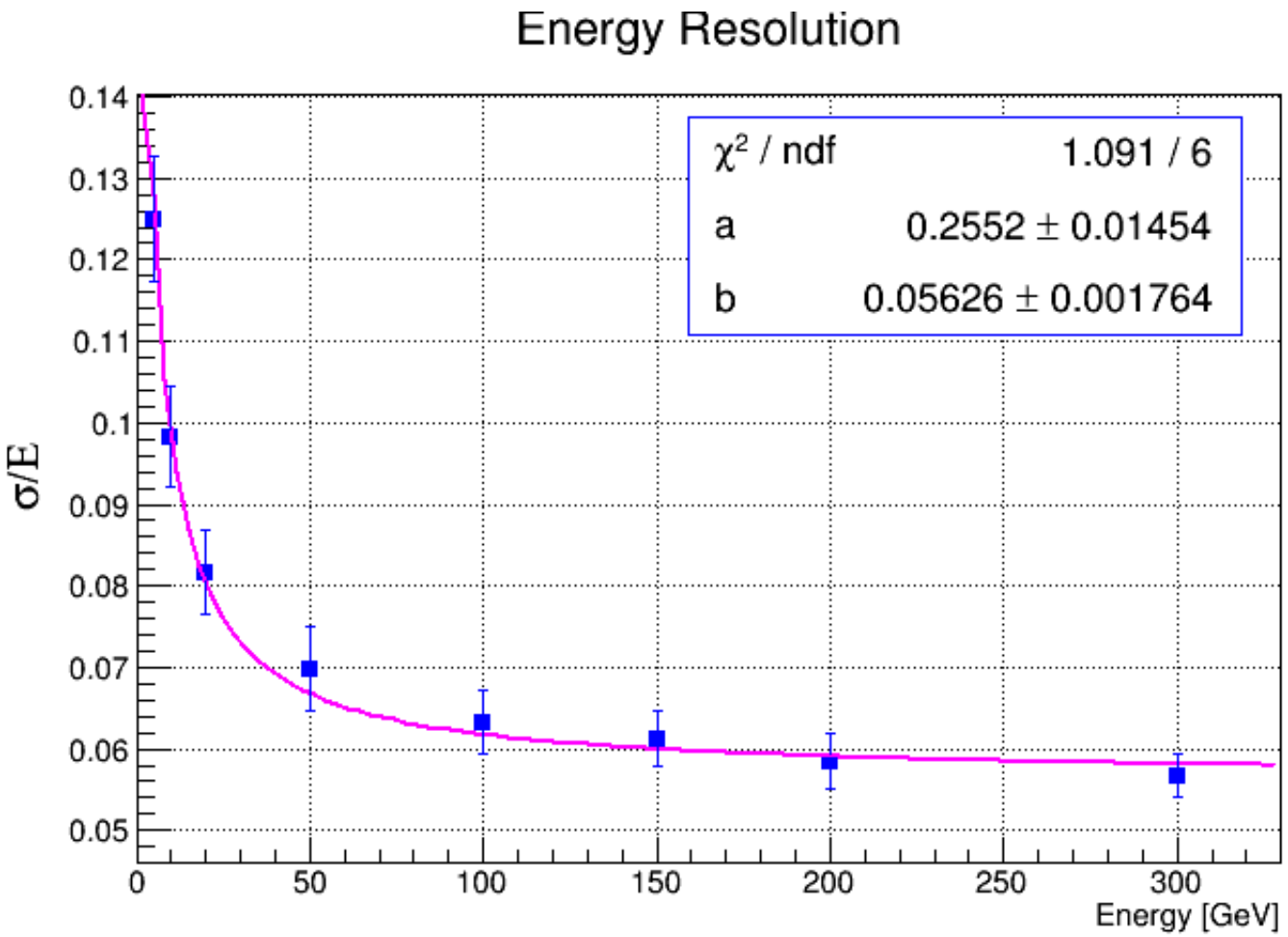


200 GeV



300 GeV

Electrons – Resolution of energy



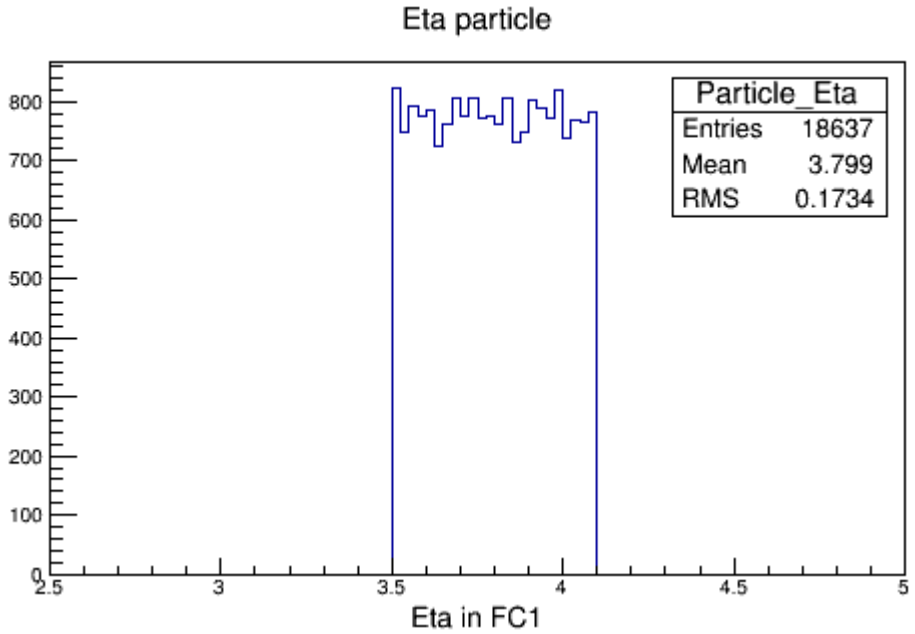
a= (25.52 ± 0.01) % $\sqrt{GeV}$

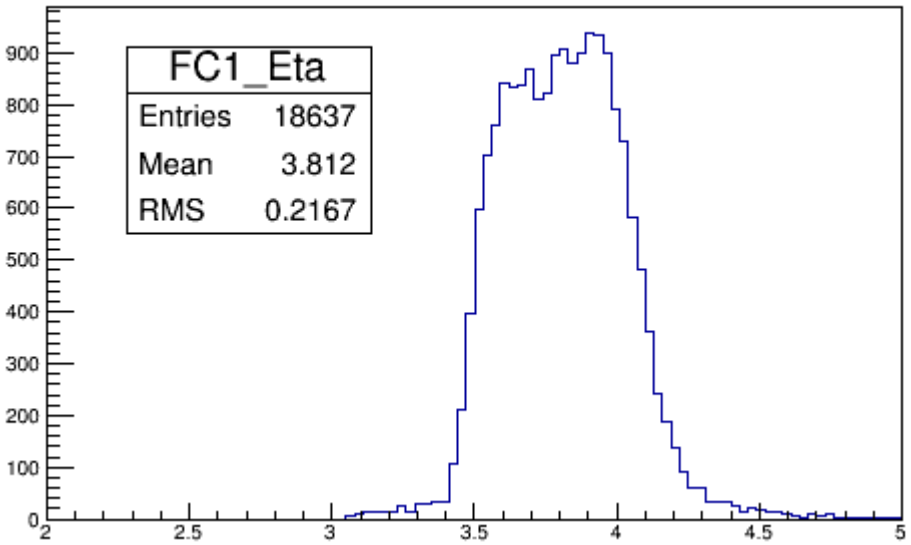
b= (5.6 ± 0.001) %

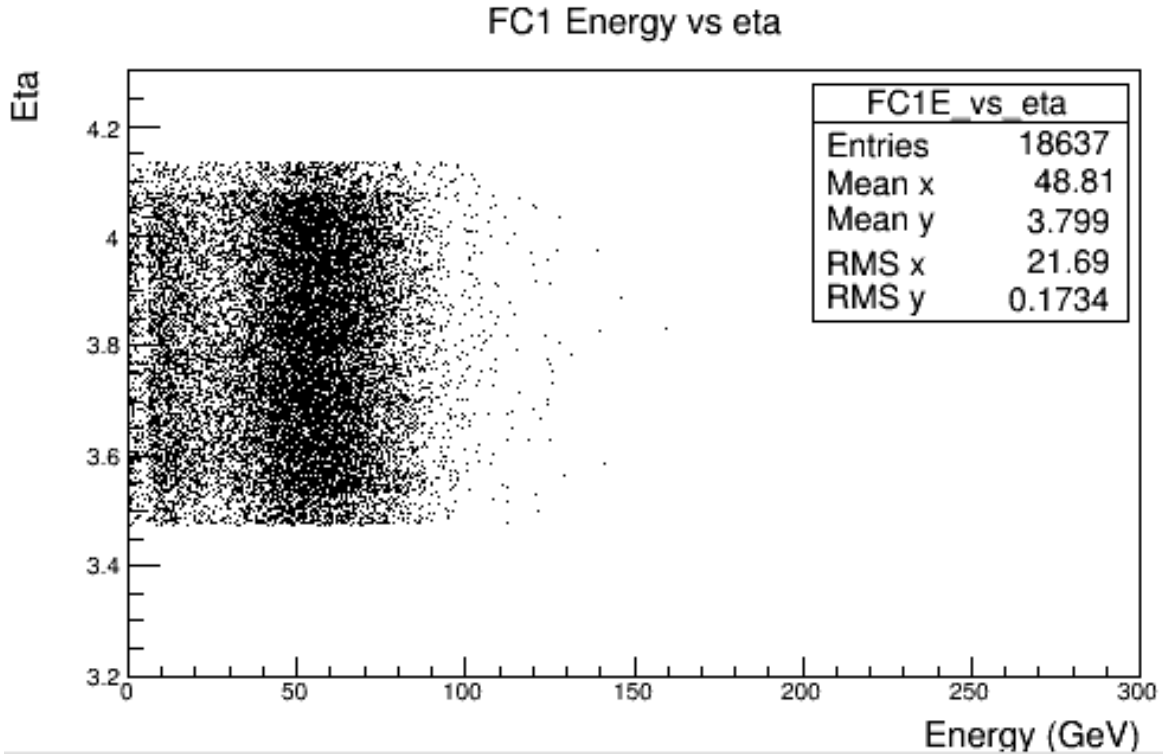
Pions Analysis

- Reconstruction of energy in Fcal .
- Cut of Eta between 3.5 & 4.1 .
- Cluster energy with a radius of 16cm fitted by double gaussian .
- Energy resolution.

Pions – Reconstruction of energy







5 GeV

3.5 < Eta < 4.1

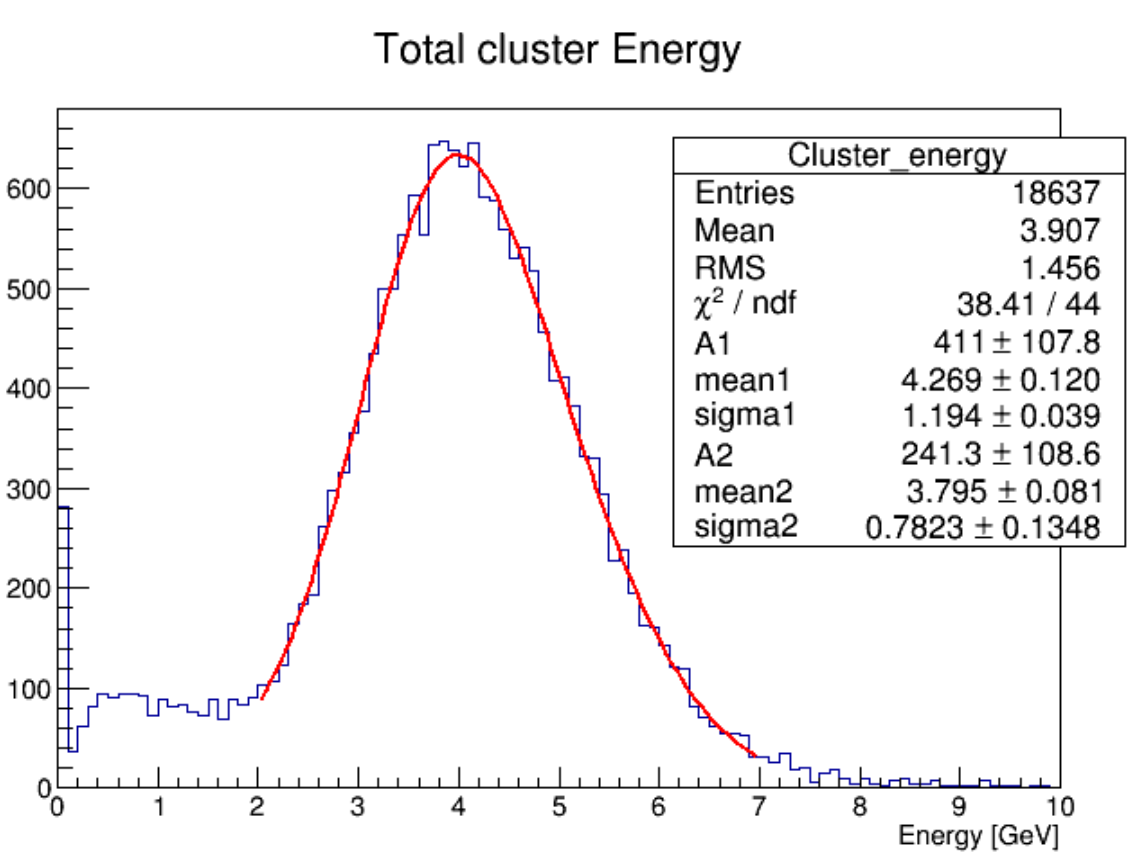
Pions – Reconstruction of energy

200 GeV Minos minimization

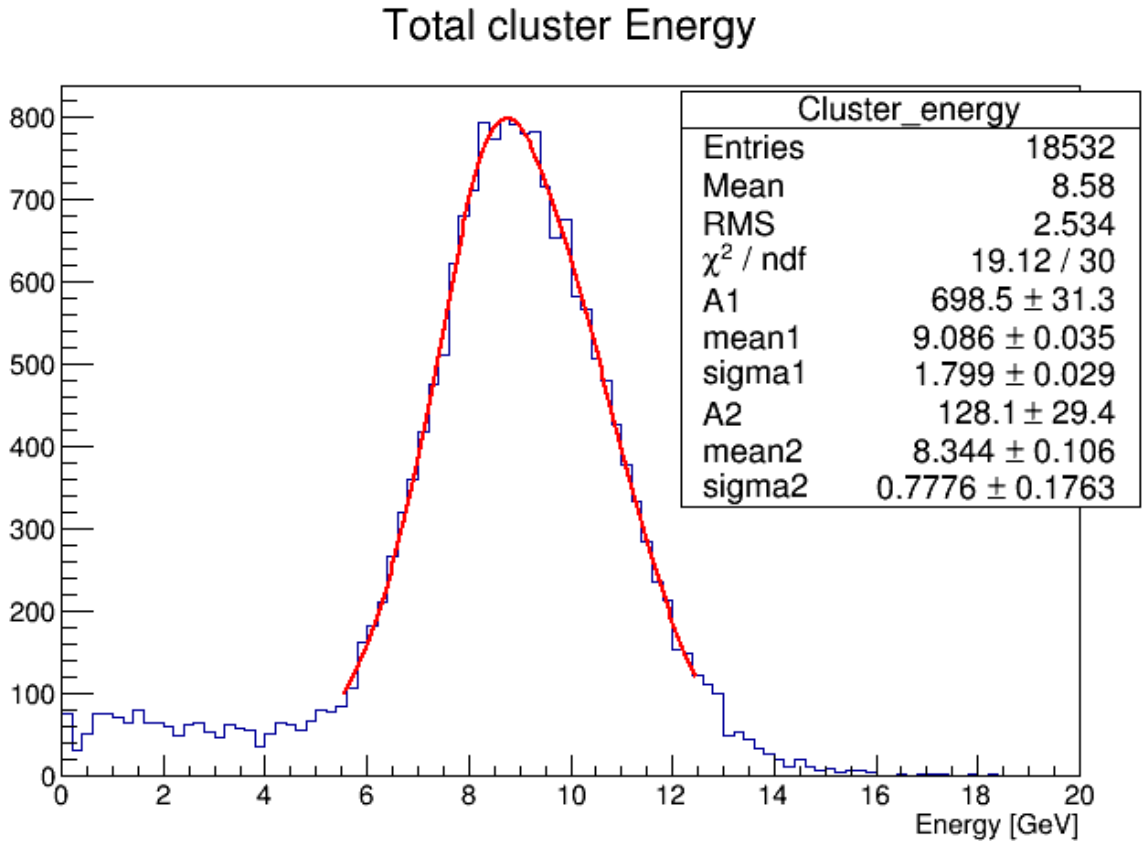
```
**********
**    3 **MINOS         500           1
**********
FUNCTION MUST BE MINIMIZED BEFORE CALLING MINOs
MIGRAD MINIMIZATION HAS CONVERGED.
MIGRAD WILL VERIFY CONVERGENCE AND ERROR MATRIX.
FCN=7.28995e+07 FROM MIGRAD    STATUS=CONVERGED      66 CALLS          67 TOTAL
                     EDM=1.28465e-13    STRATEGY= 1      ERROR MATRIX ACCURATE
 EXT PARAMETER                                   STEP         FIRST
 NO.   NAME      VALUE            ERROR          SIZE      DERIVATIVE
  1  a1           7.22899e-02   2.91942e-06   1.08131e-05  -1.75703e-01
  2  a2           9.22191e-02   5.54291e-06   1.87299e-05  -1.98896e-02
  3  a3           8.78638e-02   1.54974e-05   5.81438e-05   1.02513e-02
FCN=7.28995e+07 FROM MINOS     STATUS=SUCCESSFUL     20 CALLS          87 TOTAL
                     EDM=1.28465e-13    STRATEGY= 1      ERROR MATRIX ACCURATE
 EXT PARAMETER                     PARABOLIC         MINOS ERRORS
 NO.   NAME      VALUE            ERROR      NEGATIVE      POSITIVE
  1  a1           7.22899e-02   2.91942e-06  -2.91942e-06   2.91942e-06
  2  a2           9.22191e-02   5.54291e-06
  3  a3           8.78638e-02   1.54974e-05

Print results from minuit
a1=0.0722899
a2=0.0922191
a3=0.0878638
chi2 / ndf = 7.28995e+07/4349997 = 16.7585
root [2]
```

Pions – Reconstruction of energy

- Total cluster energy in FCal with a radius of 16cm .
- Fit with Double gaussian.



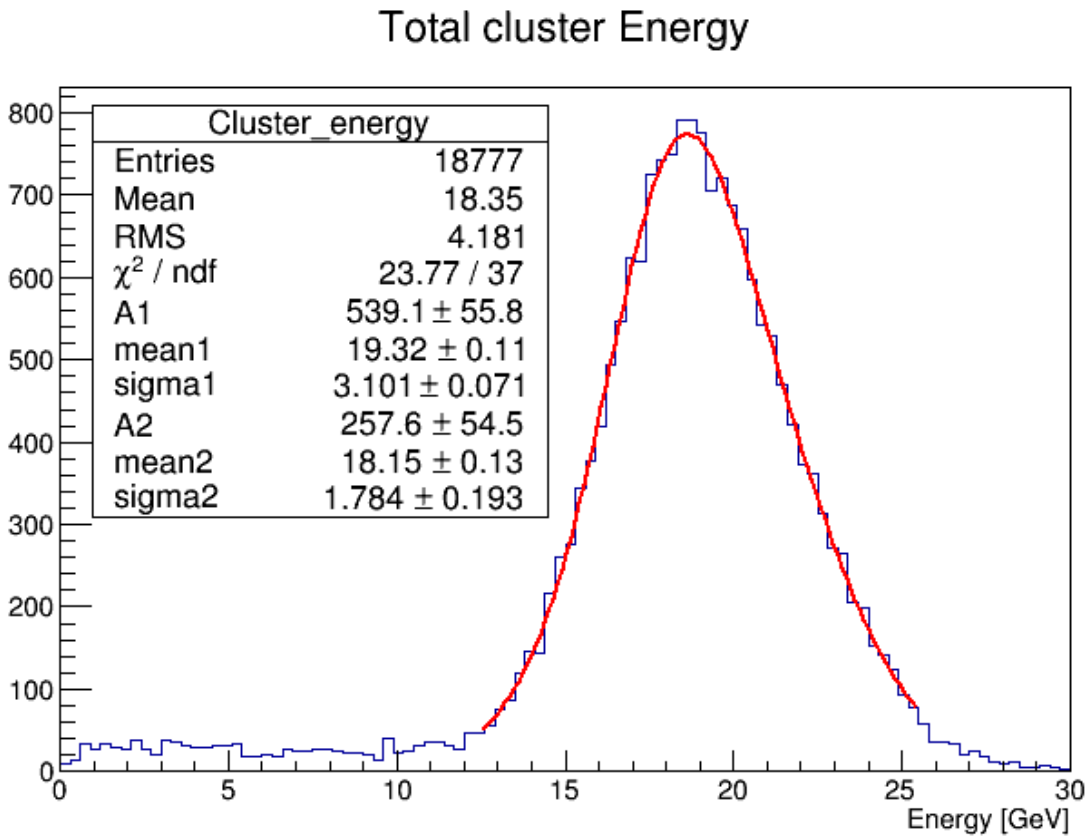
5 GeV



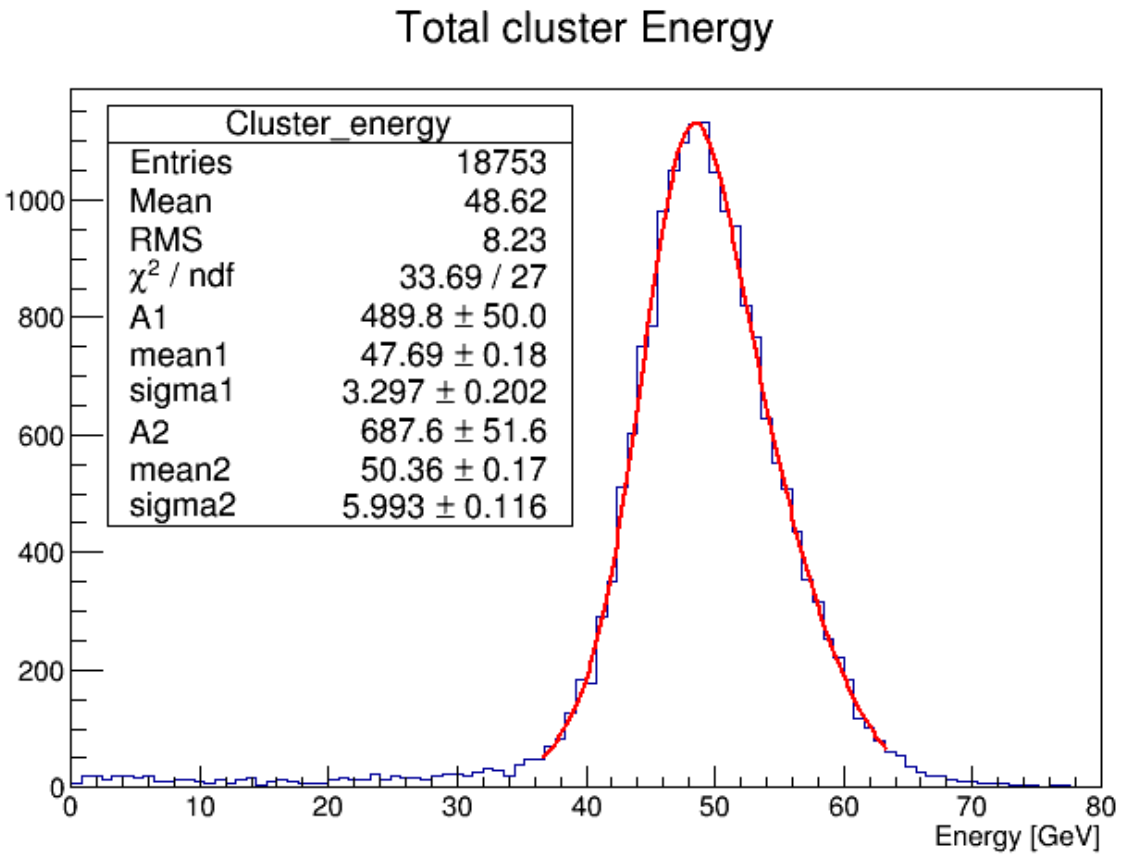
10 GeV

Pions – Reconstruction of energy

- Total cluster energy in FCal with a radius of 16cm .
- Fit with Double gaussian.



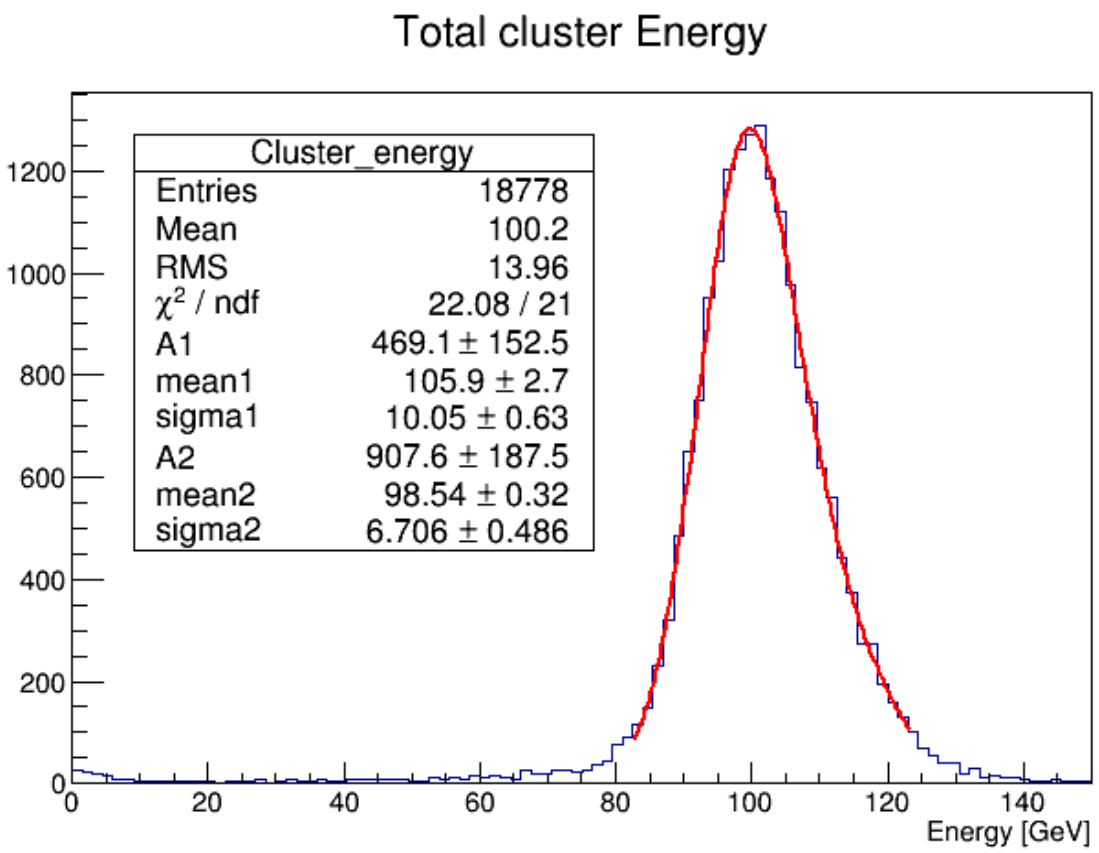
20 GeV



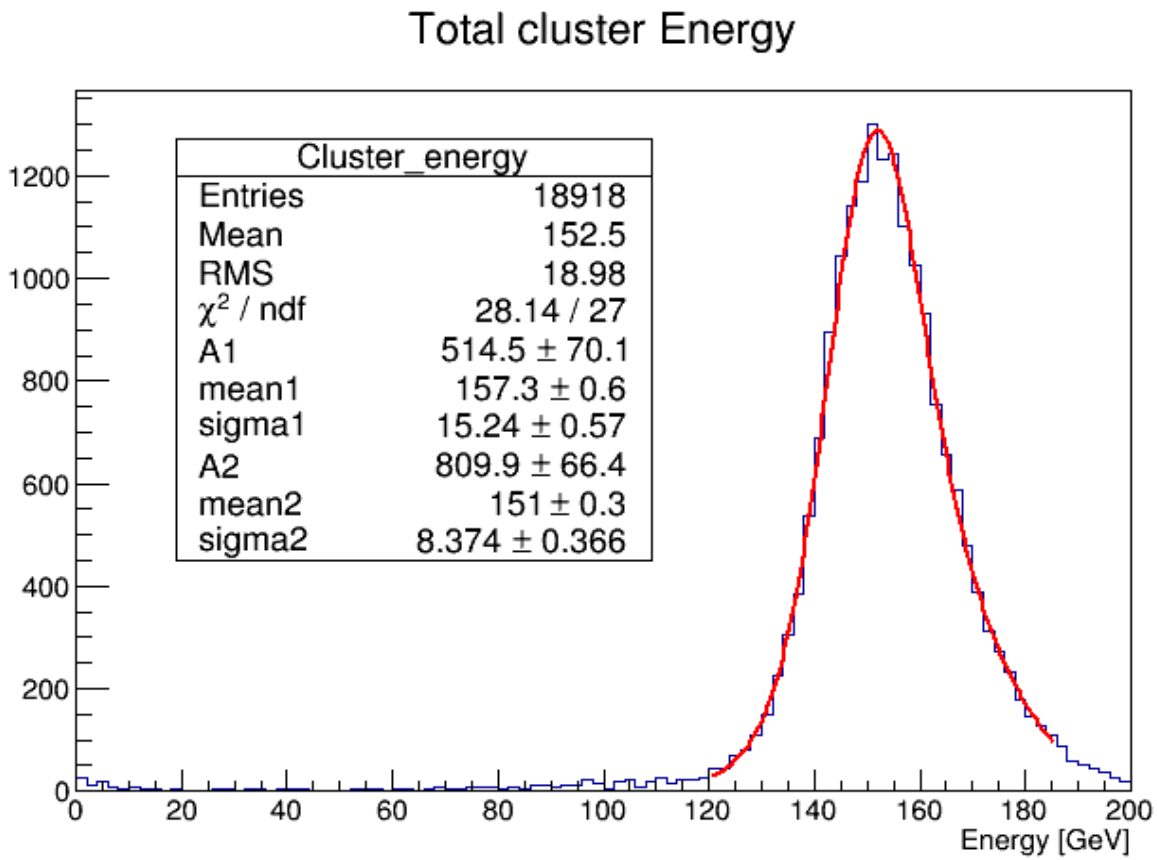
50 GeV

Pions – Reconstruction of energy

- Total cluster energy in FCal with a radius of 16cm .
- Fit with Double gaussian.



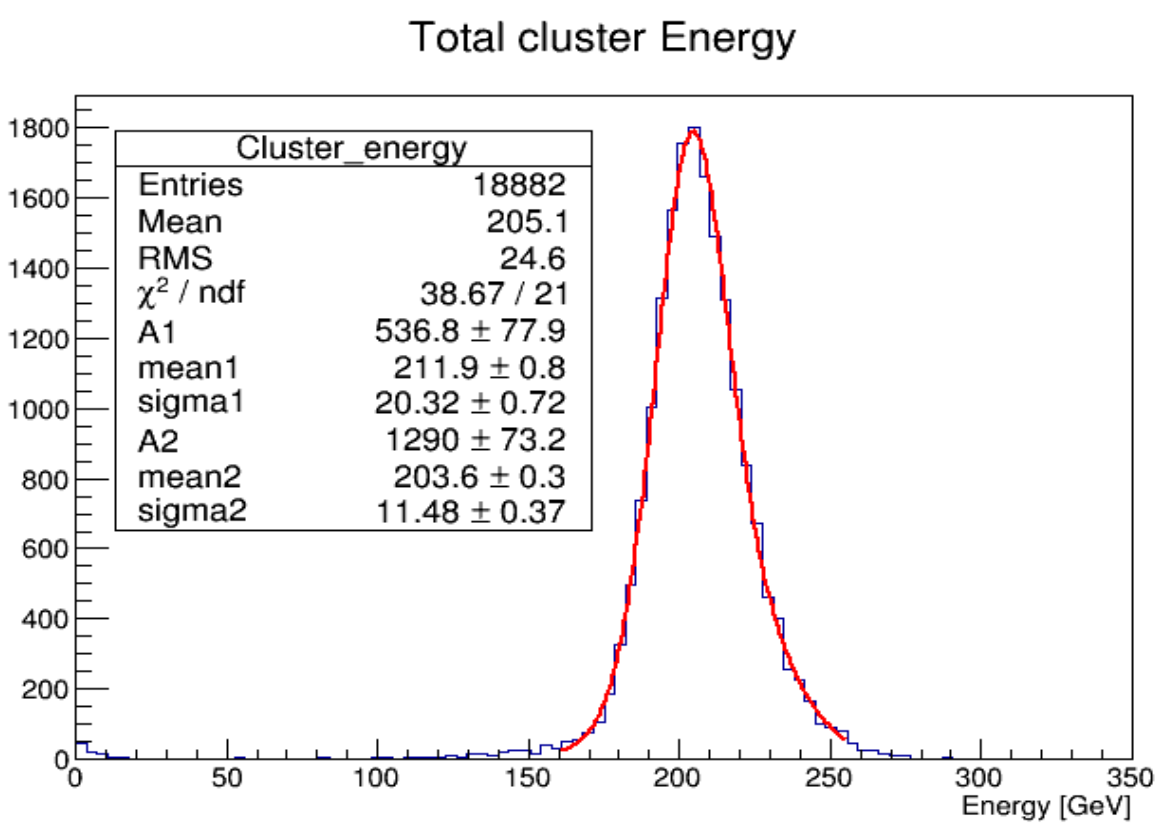
100 GeV



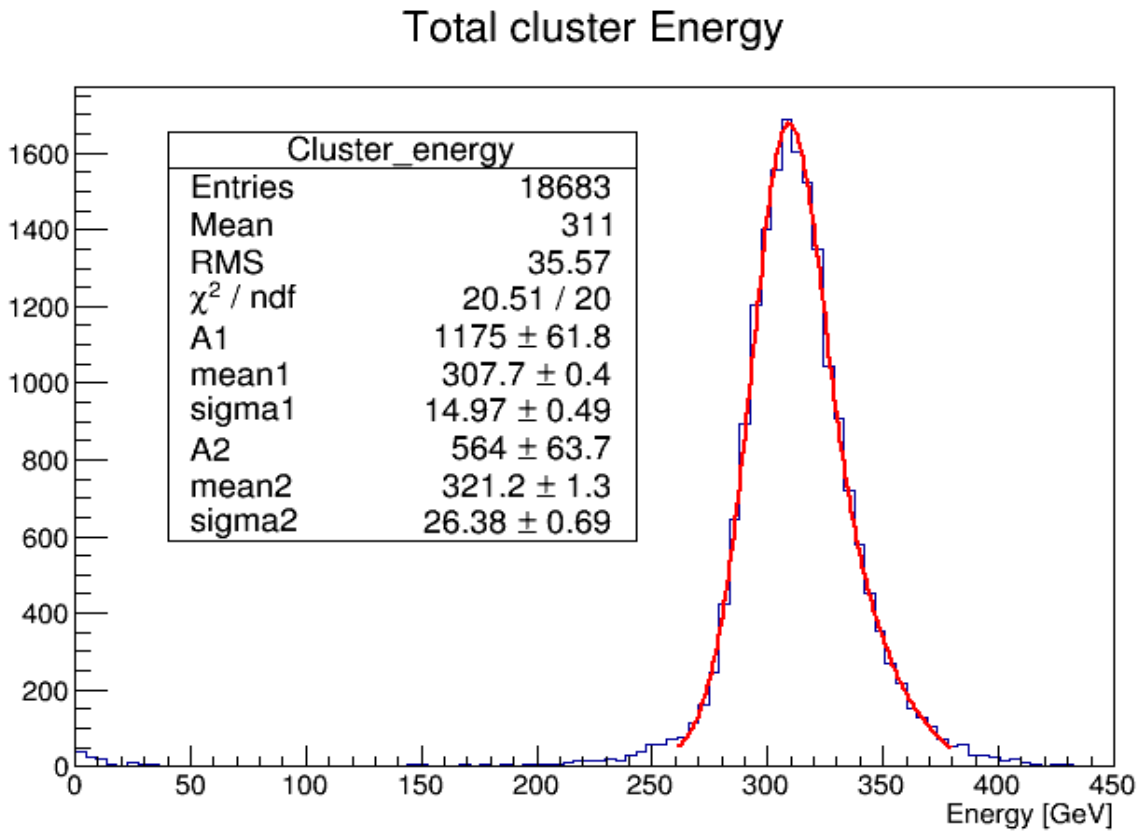
150 GeV

Pions – Reconstruction of energy

- Total cluster energy in FCal with a radius of 16cm .
- Fit with Double gaussian.

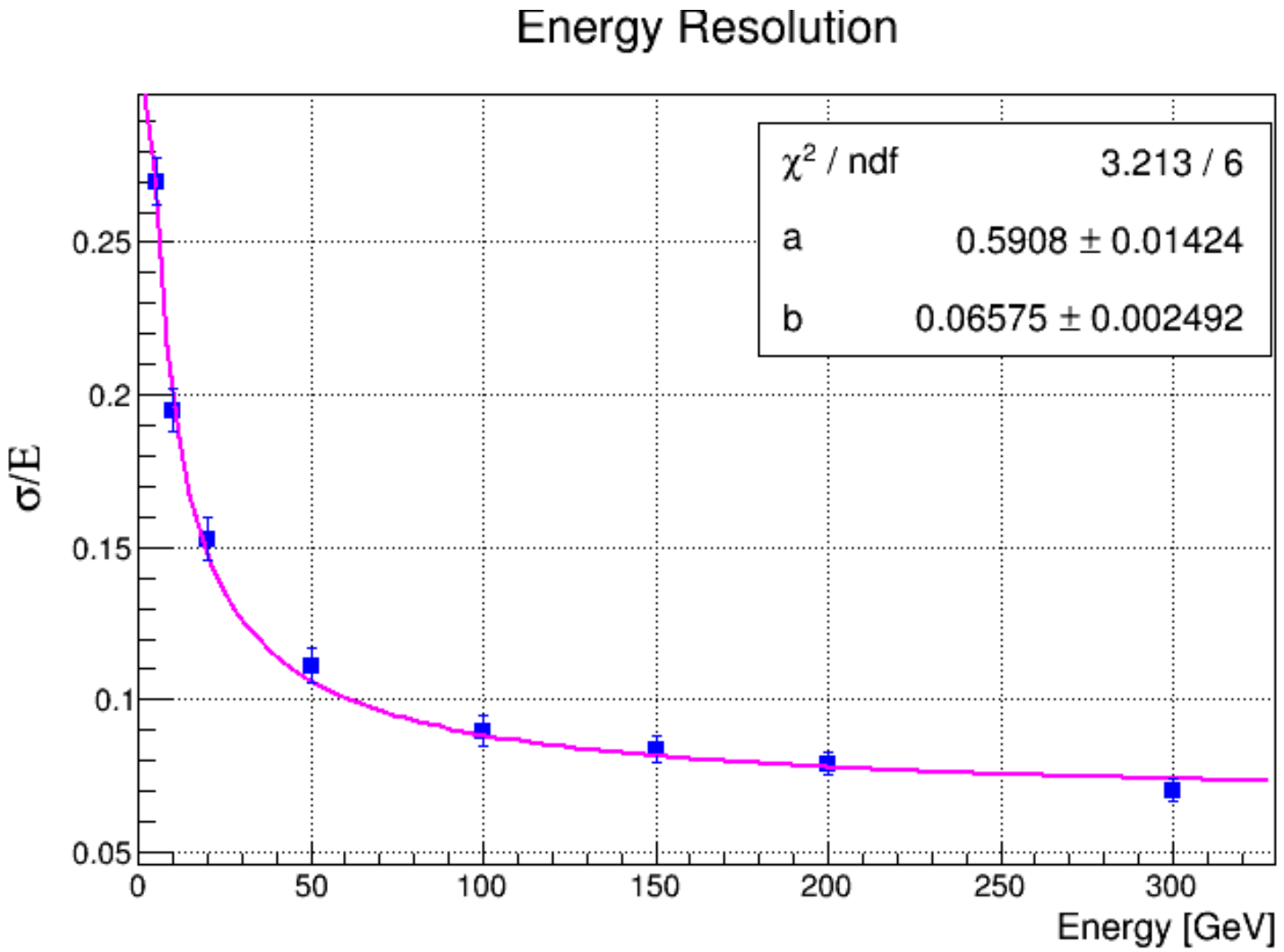


200 GeV



300 GeV

Pions – Resolution of energy



a= (59 ± 0.01) % $\sqrt{GeV}$

b= (6.6 ± 0.002) %