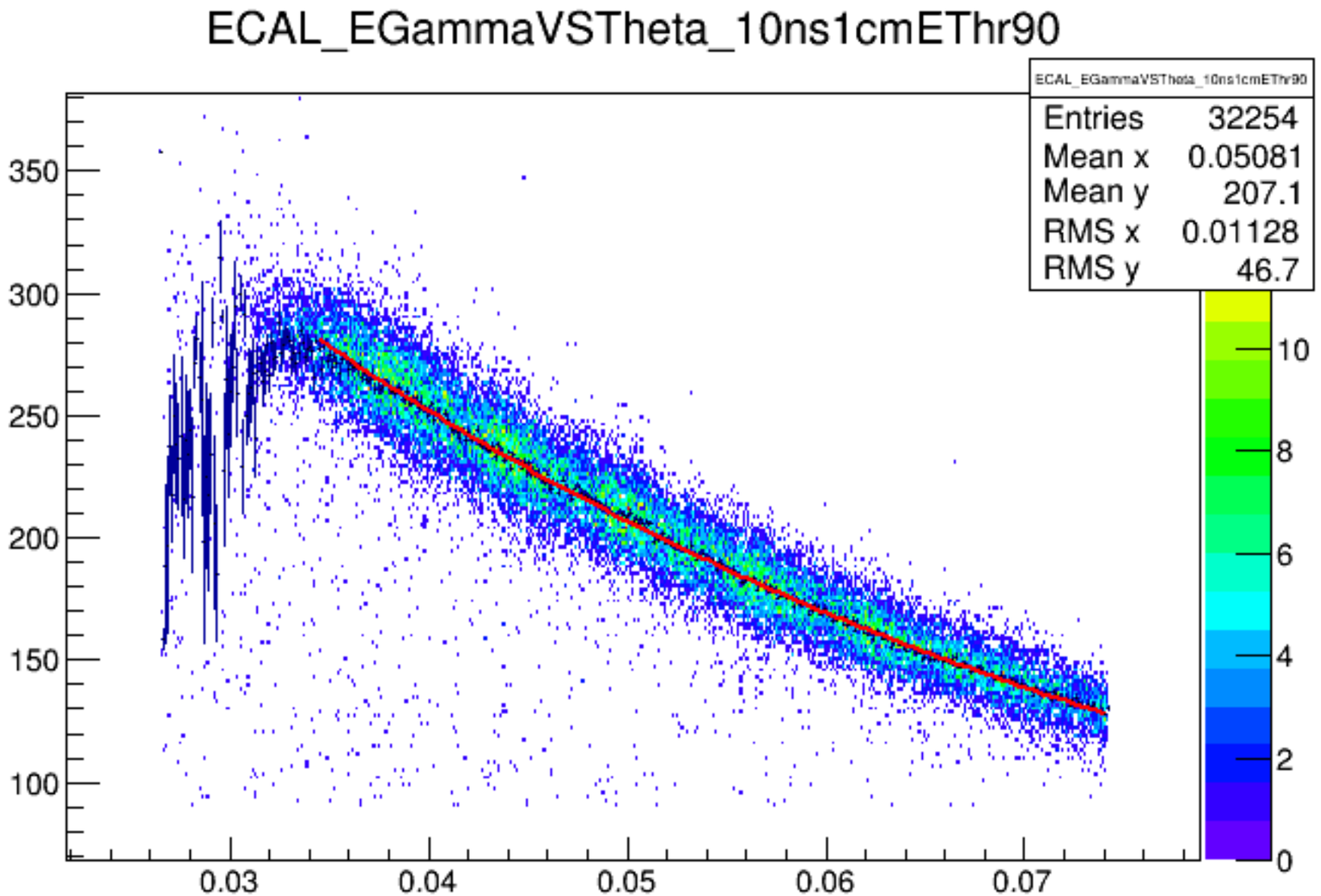
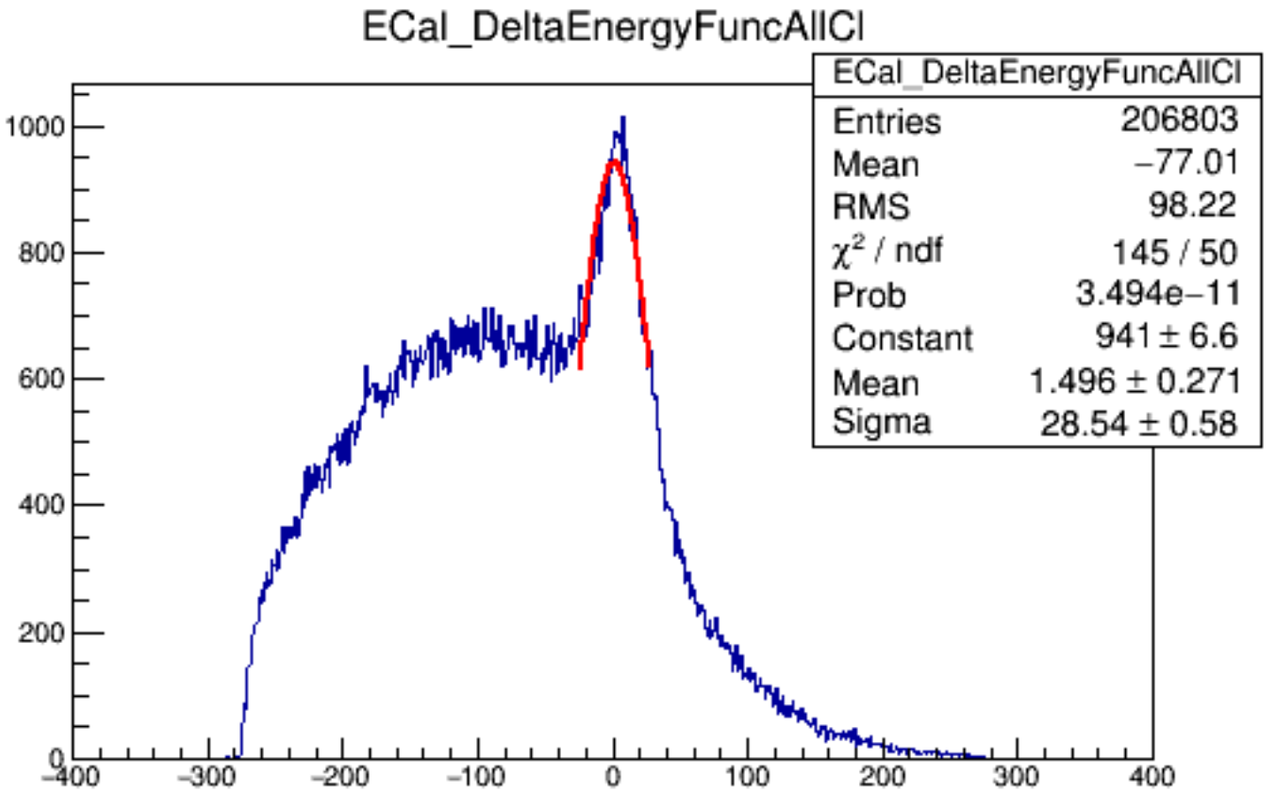
# TAG&PROBE

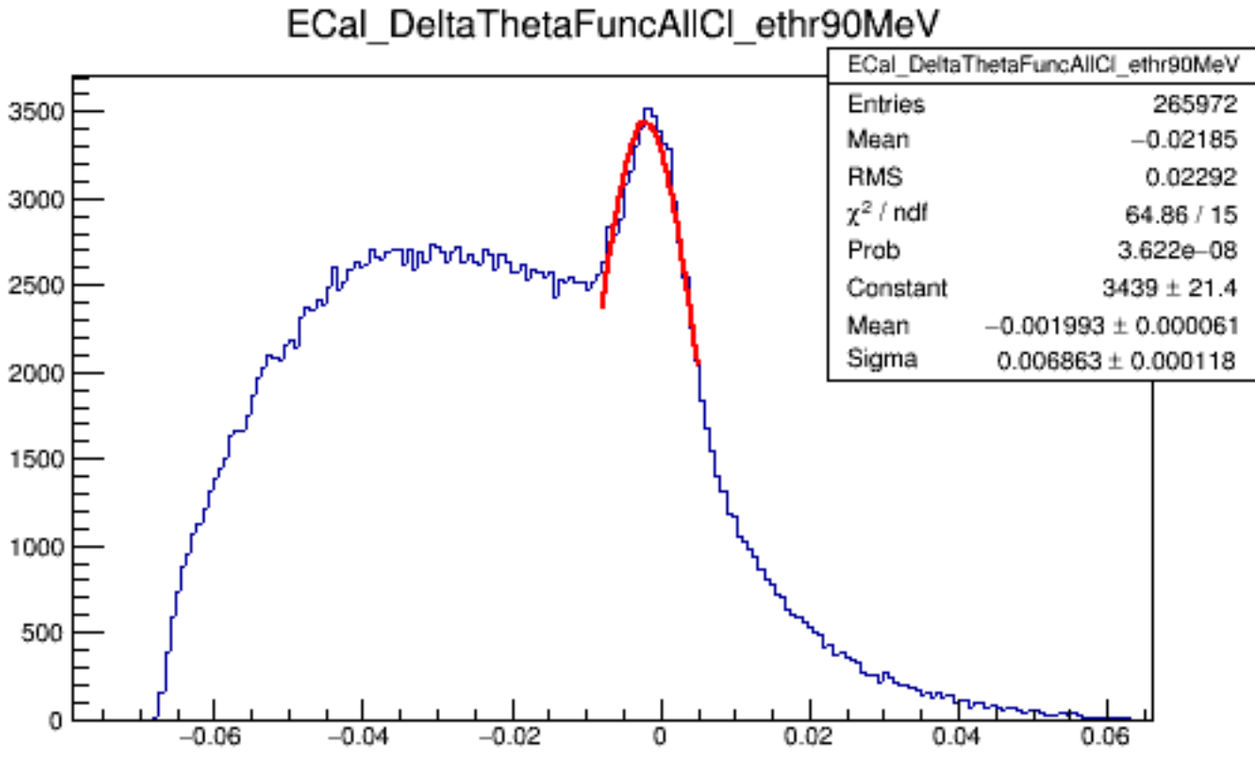
I.Oceano

# USED FUNCTION

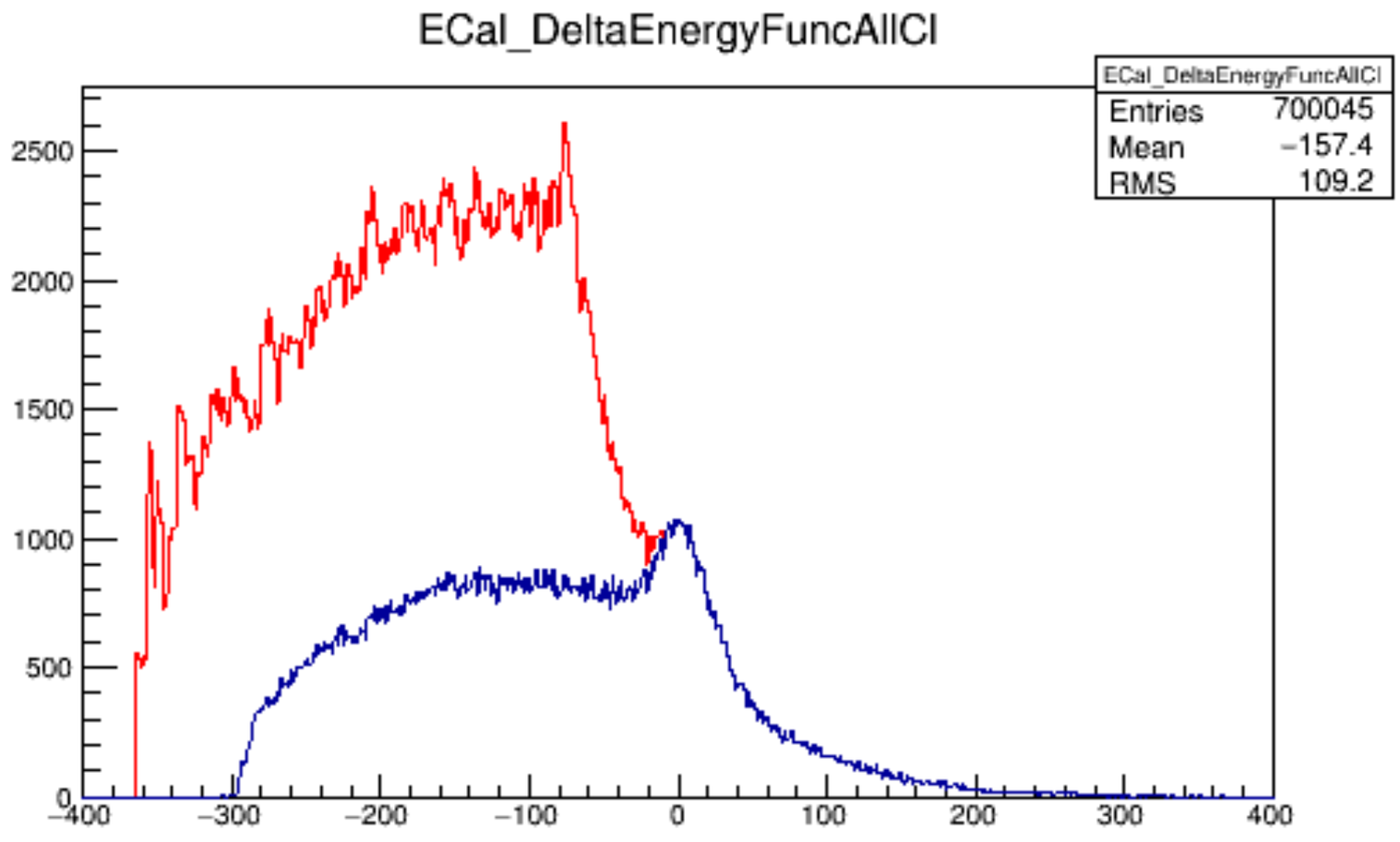
| | | | | |
|---|---|---|---|---|
| Constant | 6.32430e+00 | 1.87140e-03 | 4.07708e-06 | 8.40911e-01 |
| Slope | -1.98595e+01 | 3.46688e-02 | 7.55296e-05 | 4.58508e-02 |



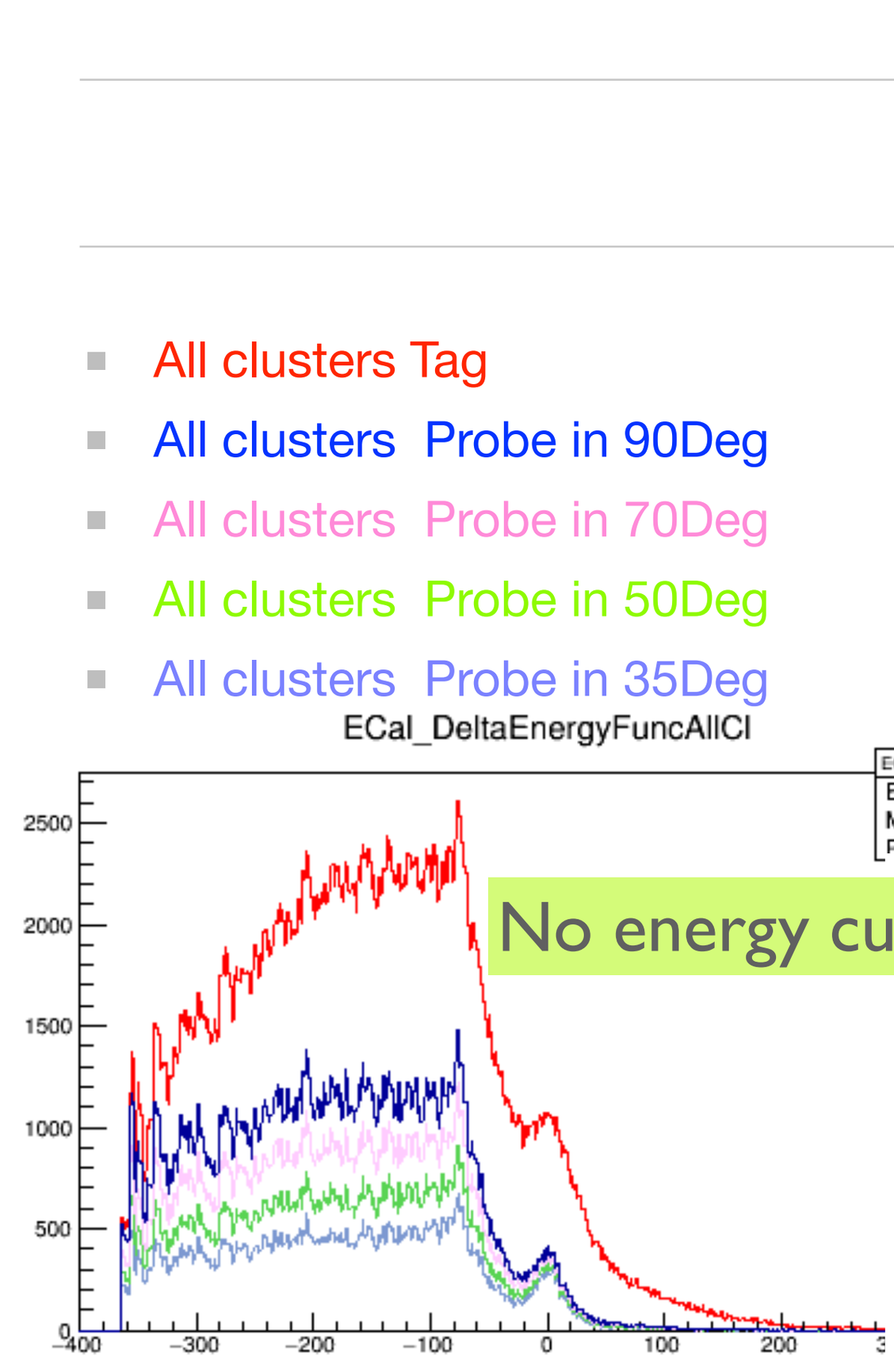

ECal_DeltaEnergyFuncAllCl
ECal_DeltaEnergyFuncAllCl
Entries 206803
Mean −77.01
RMS 98.22
χ² / ndf 145 / 50
Prob 3.494e−11
Constant 941 ± 6.6
Mean 1.496 ± 0.271
Sigma 28.54 ± 0.58
1000
800
600
400
200
0
−400
−300
−200
−100
0
100
200
300
400

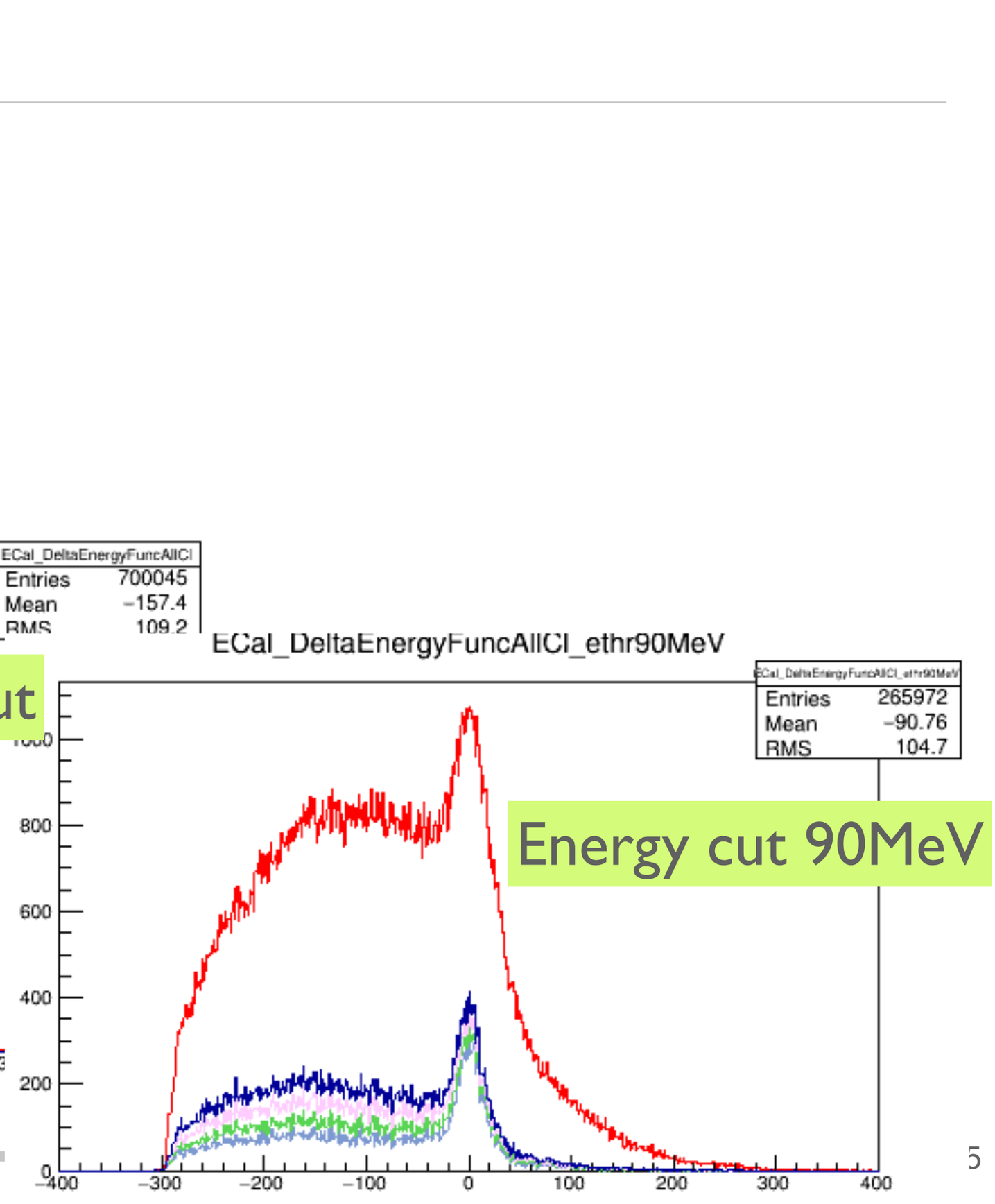

ECal_DeltaThetaFuncAllCl_ethr90MeV
ECal_DeltaThetaFuncAllCl_ethr90MeV
Entries 265972
Mean −0.02185
RMS 0.02292
χ² / ndf 64.86 / 15
Prob 3.622e−08
Constant 3439 ± 21.4
Mean −0.001993 ± 0.000061
Sigma 0.006863 ± 0.000118
3500
3000
2500
2000
1500
1000
500
0
−0.06
−0.04
−0.02
0
0.02
0.04
0.06

- All clusters
- All clusters ethr 90MeV

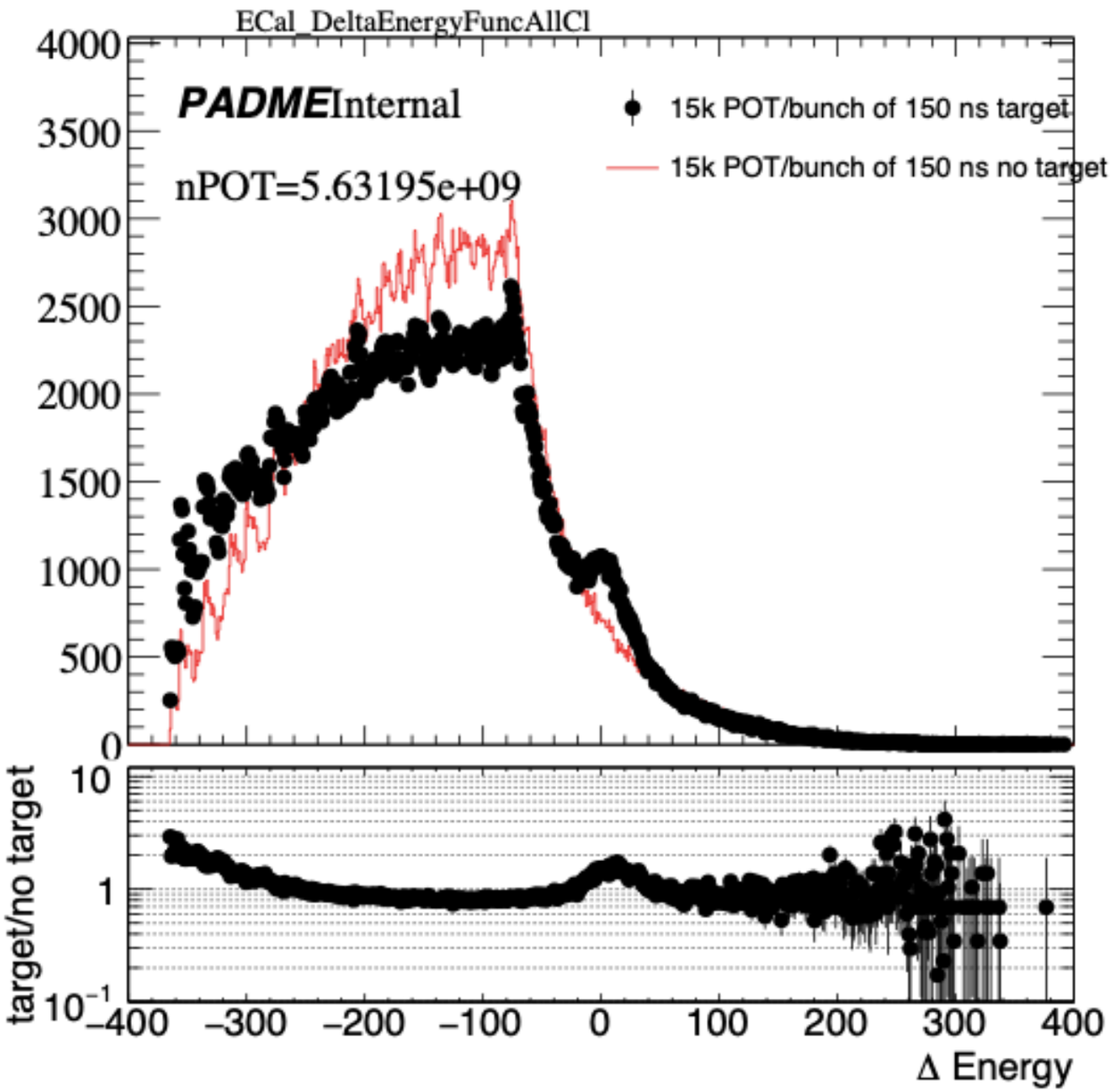


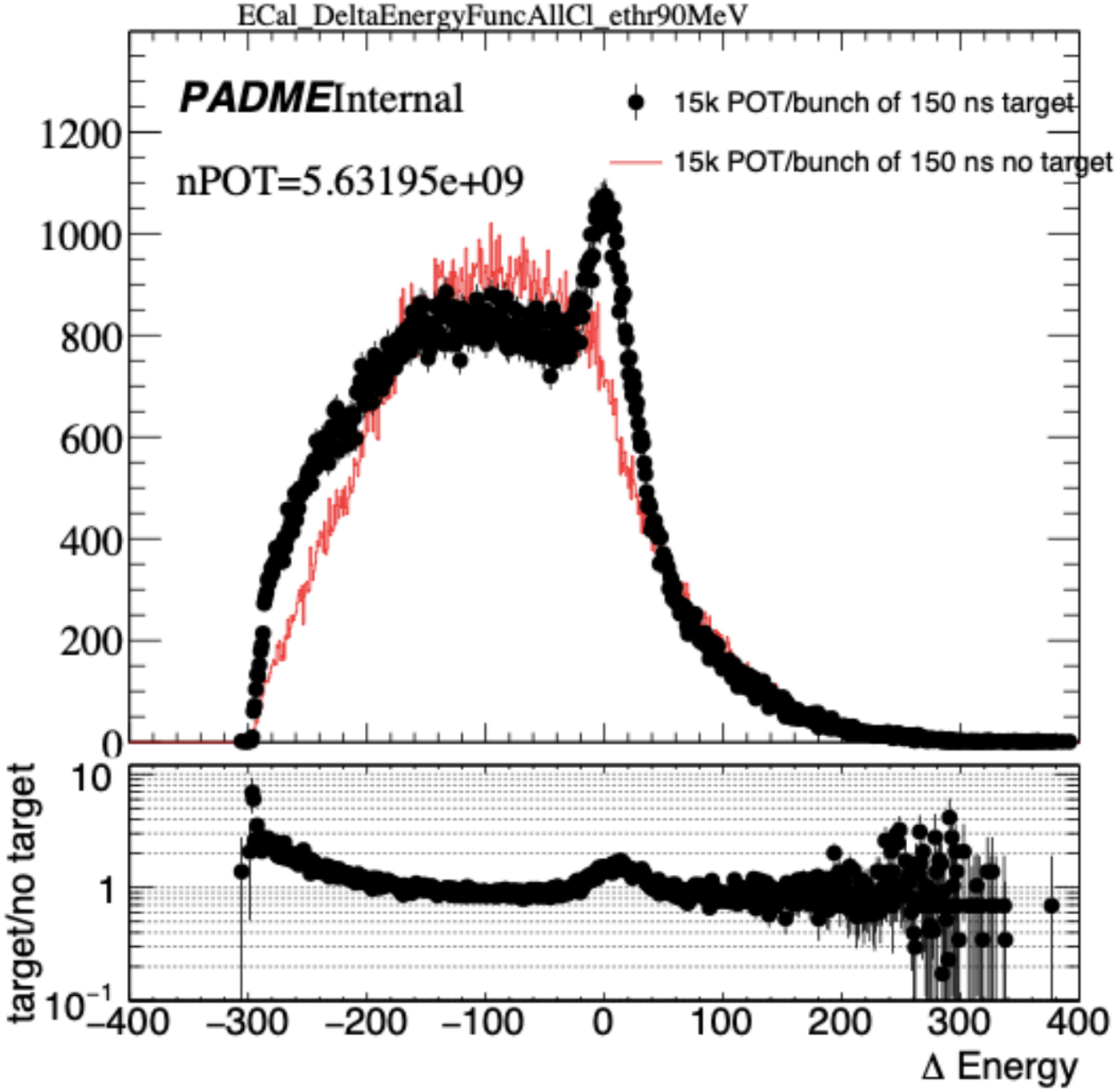
- All clusters Tag
- All clusters  Probe in 90Deg
- All clusters  Probe in 70Deg
- All clusters  Probe in 50Deg
- All clusters  Probe in 35Deg



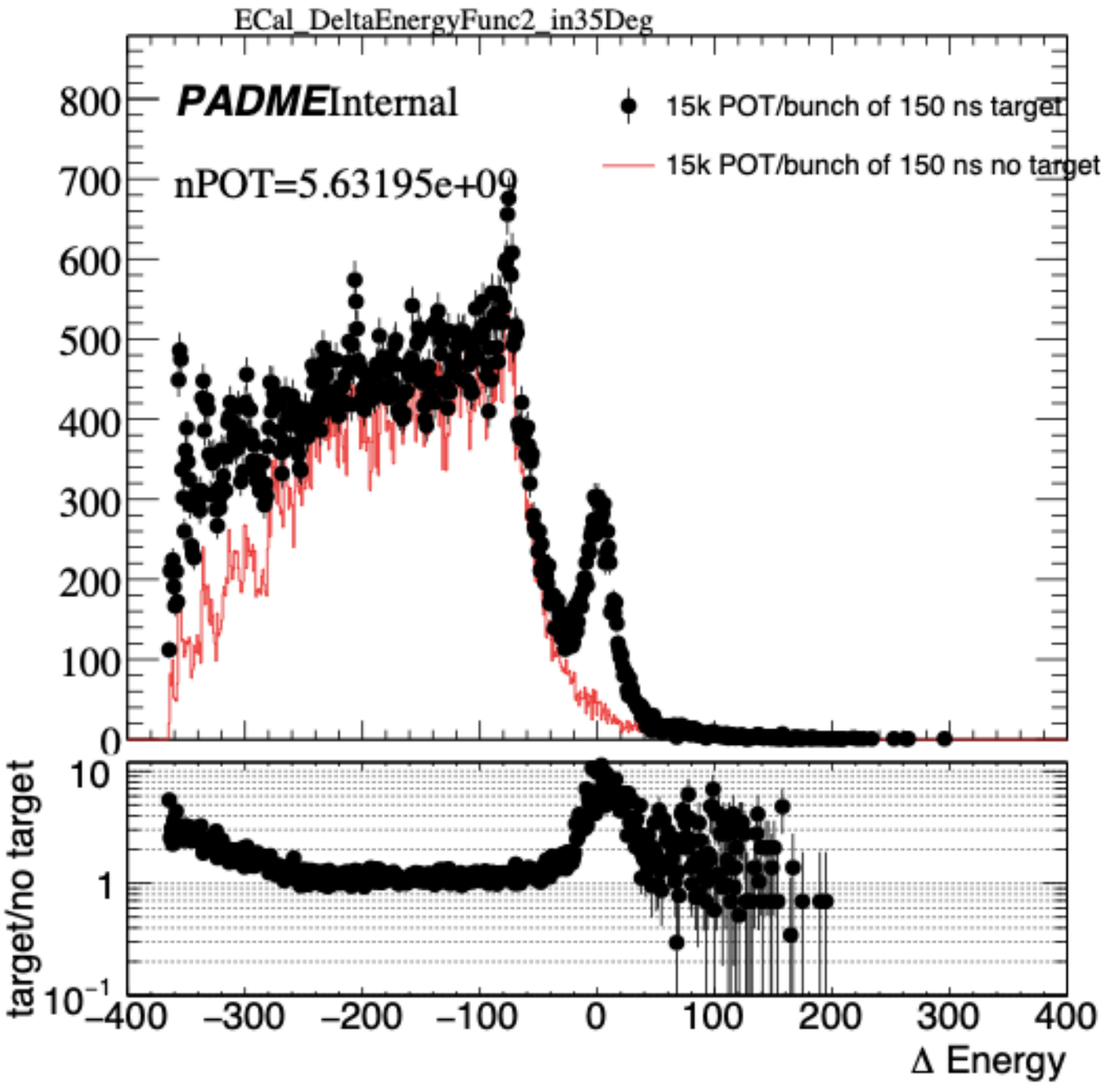



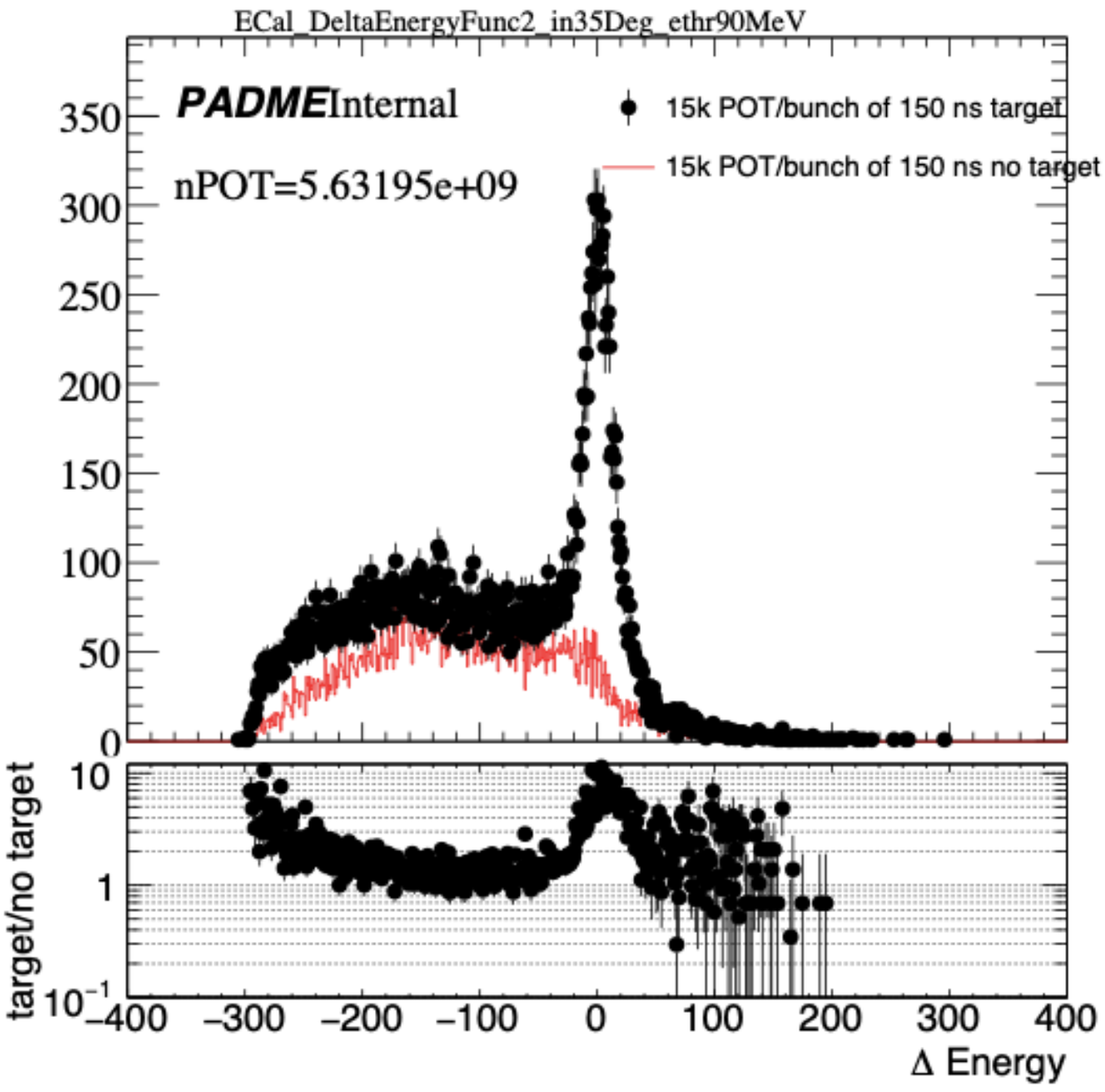
# TAG TARGET - NO TARGET



# PROBE TARGET - NO TARGET IN 35DEG



# EXTRACTION OF #GG I

$$N_{\gamma\gamma}^{tot} = \sigma(e^+e^- \to \gamma\gamma) \times \alpha_{geom} \times \epsilon \times N_{POT} \times \frac{N_{e^-}}{S_{target}}$$

$$\frac{N_{e^-}}{S_{target}} = 0.0105 \text{ b}^{-1}$$

$$\sigma(e^+e^- \to \gamma\gamma) = 1.81 \text{ mb}$$

$$\alpha_{geom} \times \epsilon = 0.068$$

$$N_{POT} = 5.63 \times 10^9$$

$$N_{\gamma\gamma} = 7276$$

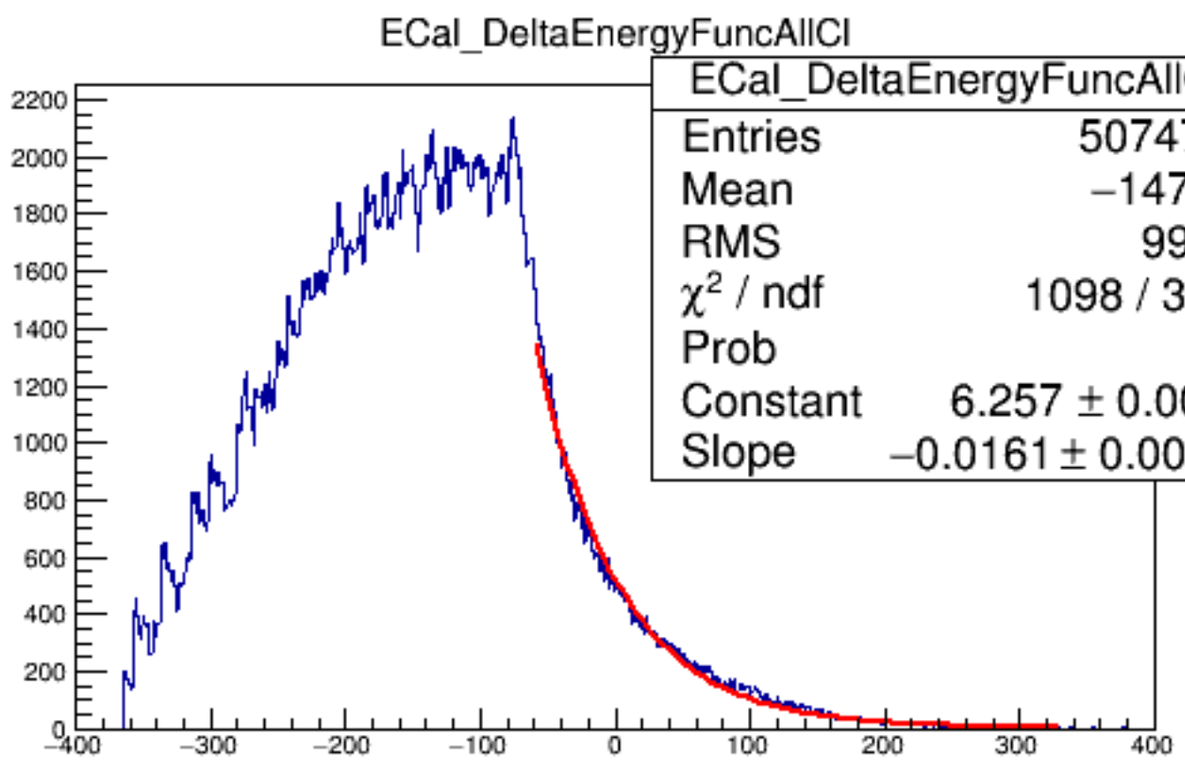
# GG YIELD FROM TARGET-NO TARGET

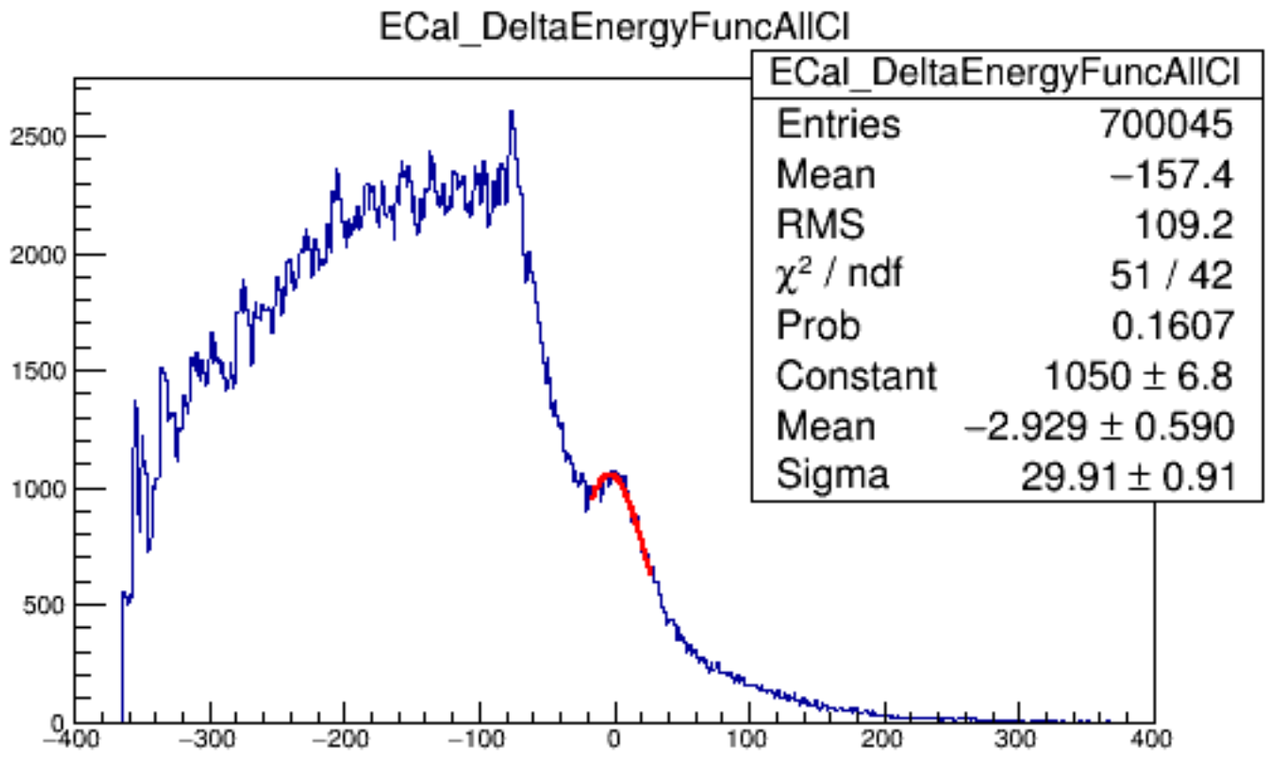
- ECal_DeltaEnergyTag 12881
- ECal_DeltaEnergyTag_ethr90MeV 12917
- ECal_DeltaEnergyProbe_in35Deg 7671
- ECal_DeltaEnergyProbe_in35Deg_ethr90MeV 7562
- ECal_DeltaEnergyProbe_in50Deg 8171
- ECal_DeltaEnergyProbe_in50Deg_ethr90MeV 8042
- ECal_DeltaEnergyProbe_in70Deg 8842
- ECal_DeltaEnergyProbe_in70Deg_ethr90MeV 8694
- ECal_DeltaEnergyProbe_in90Deg 9564
- ECal_DeltaEnergyProbe_in90Deg_ethr90MeV 9407

Higer dependency on integration integral!!

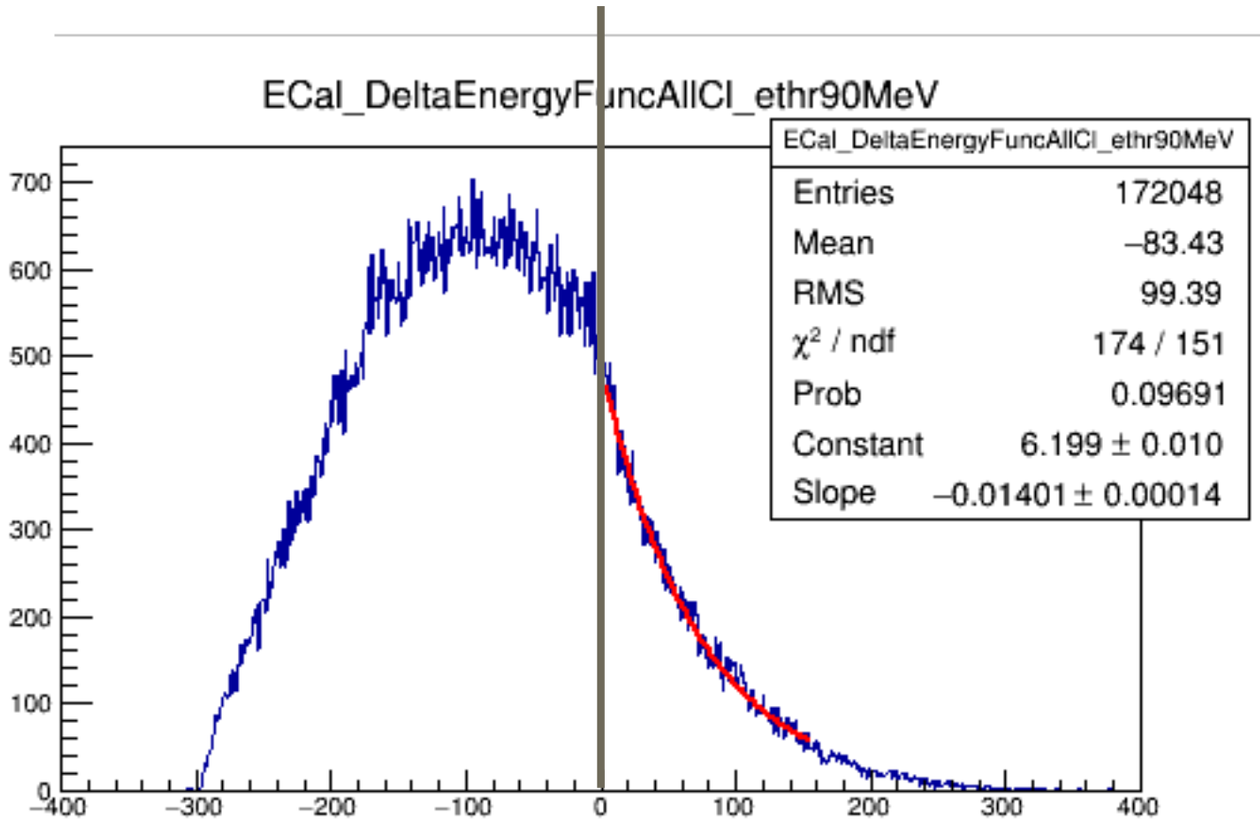
$$\frac{N_{\gamma\gamma}^{obs}}{N_{\gamma\gamma}} = \frac{12881/2}{7276} = \frac{6441}{7276} = 0.885$$

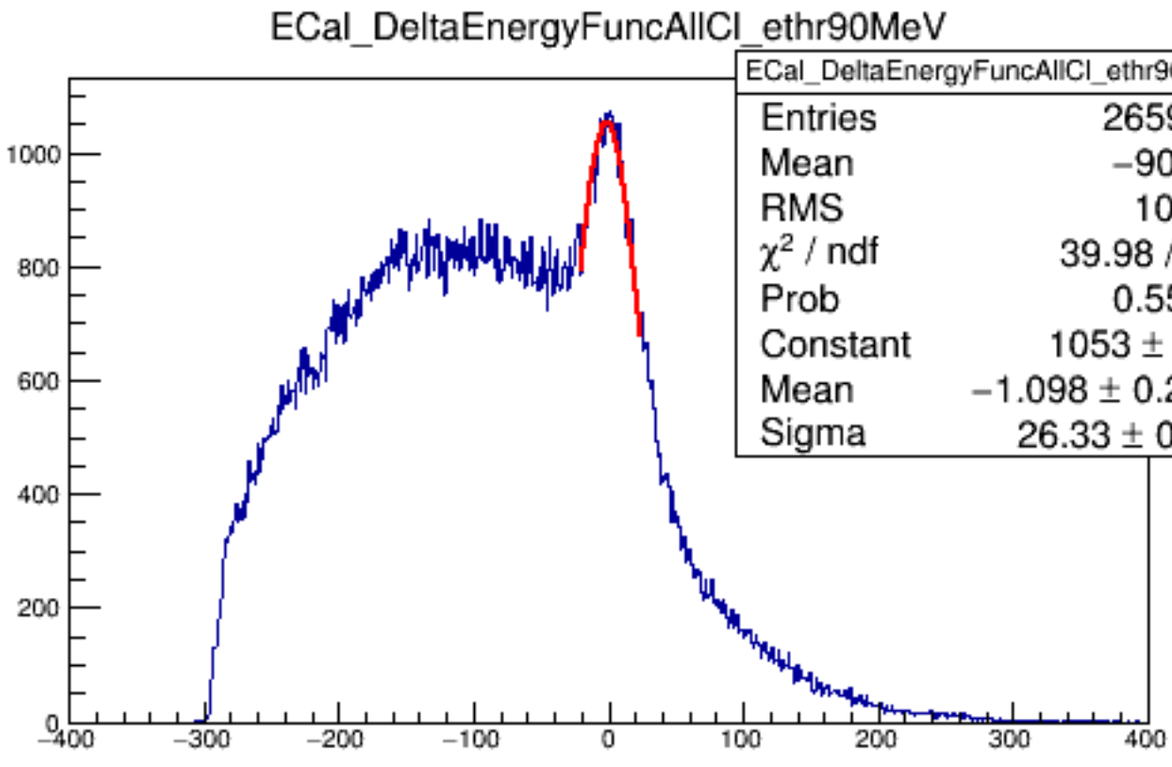
# PRELIMINARY FIT I

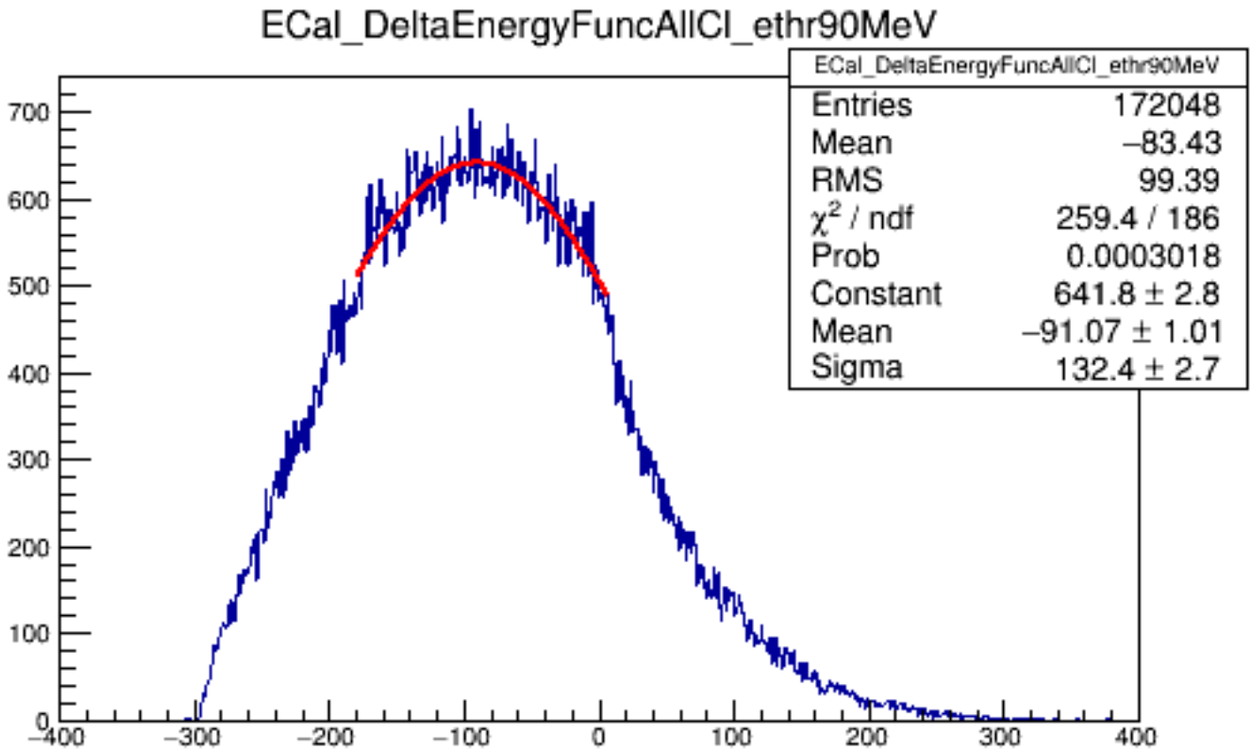


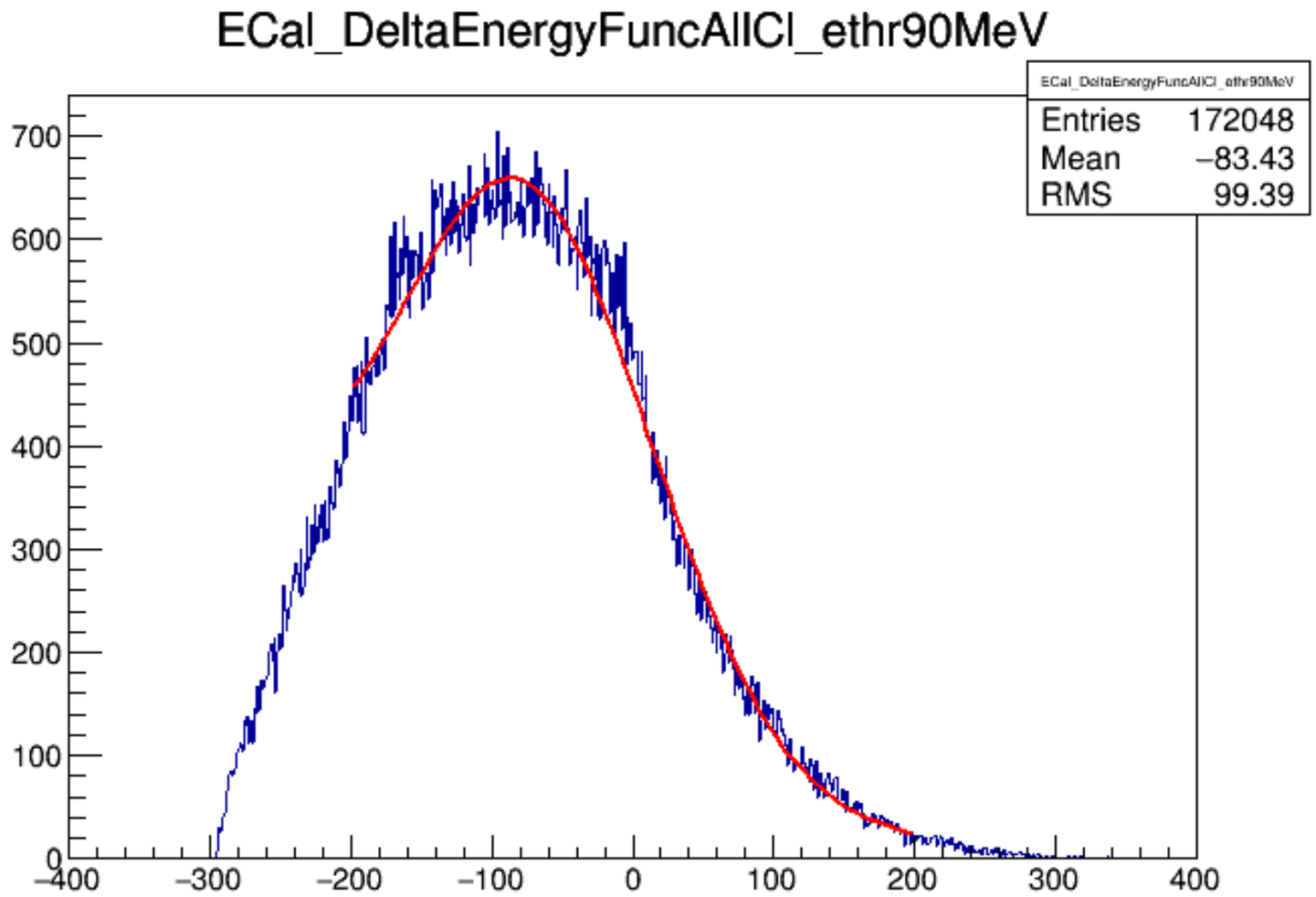
# PRELIMINARY FIT II



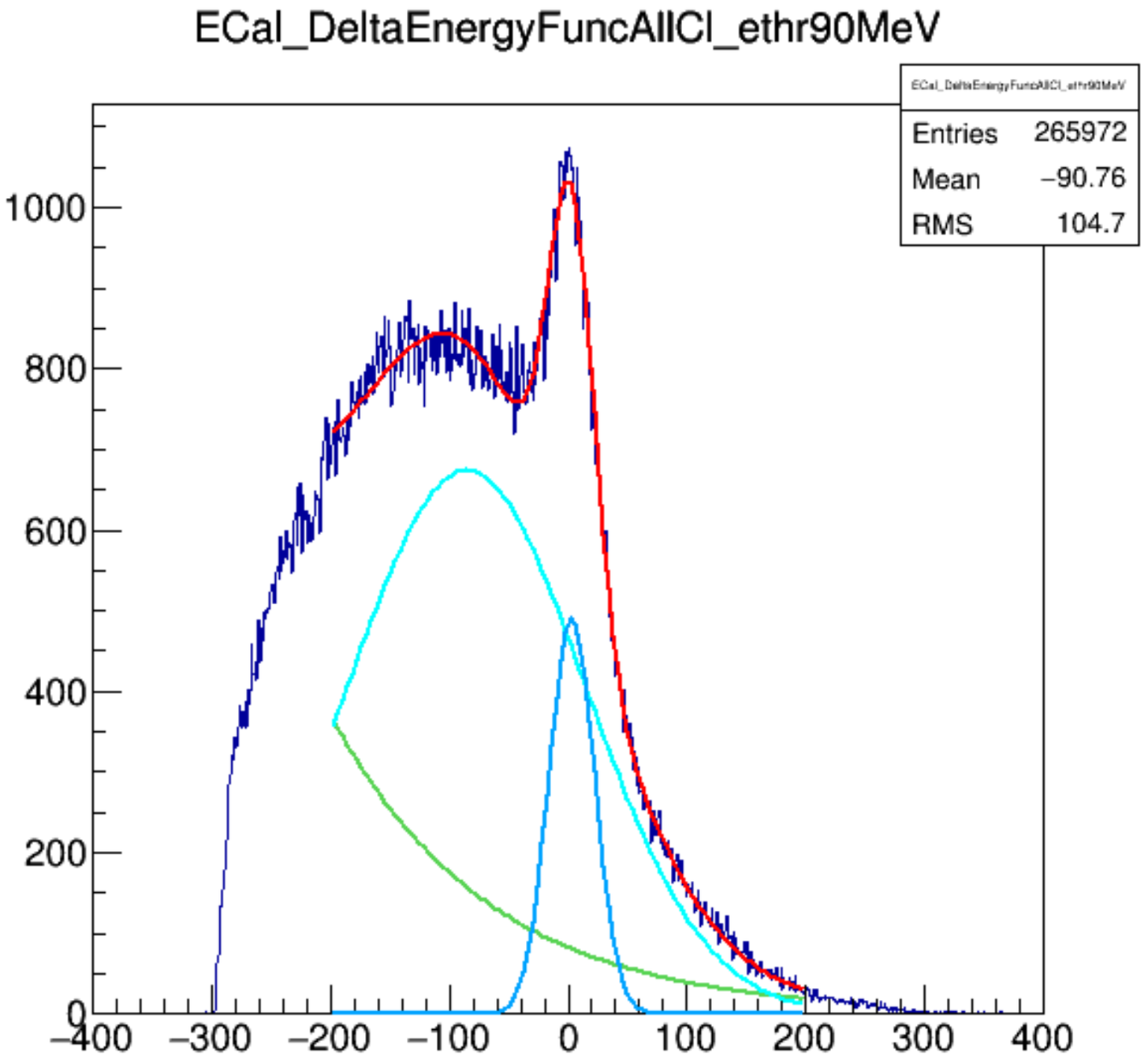
# BACKGROUND FIT. ->OK



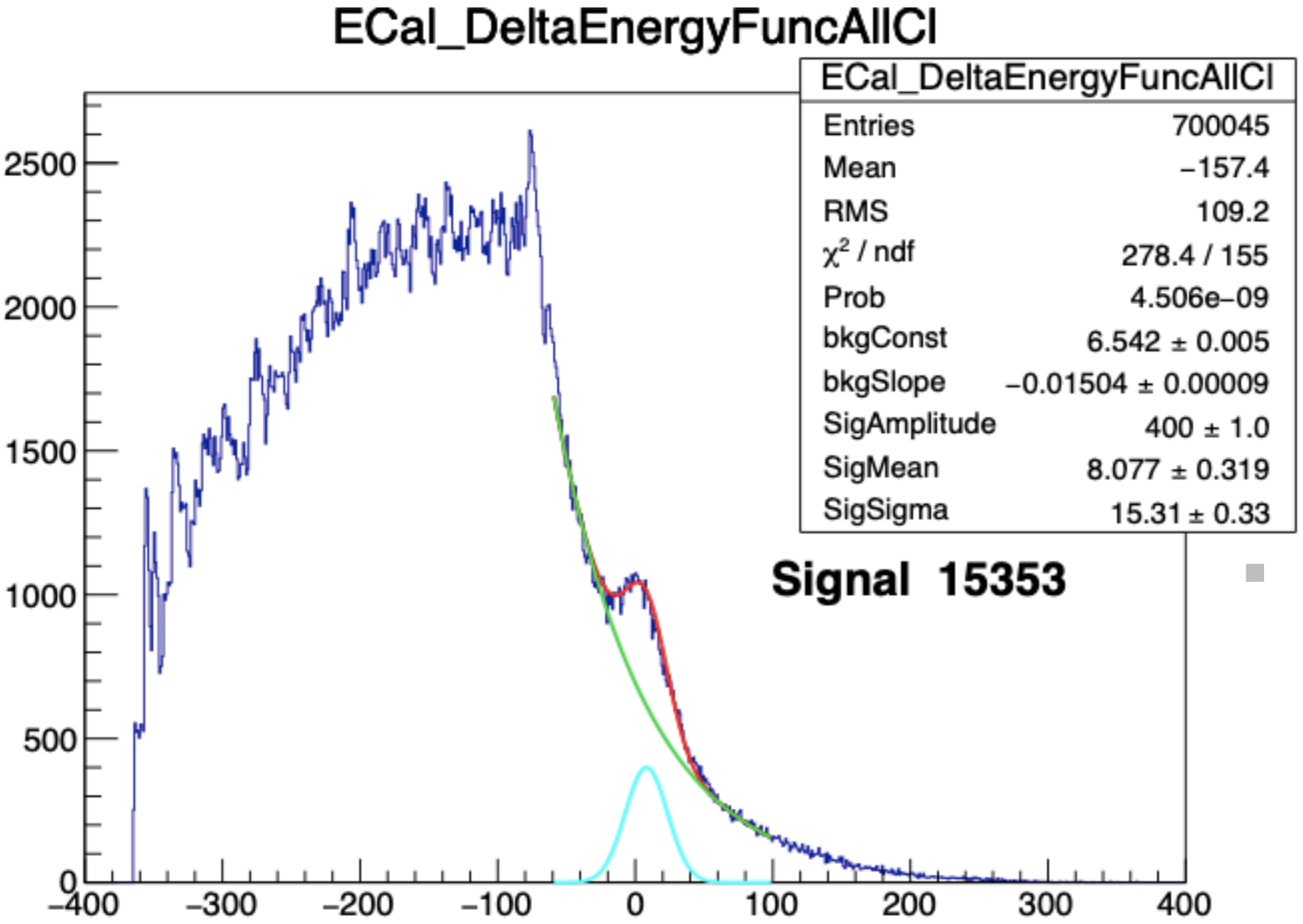

| EXT NO. | PARAMETER NAME | VALUE | ERROR | STEP SIZE | FIRST DERIVATIVE |
|---|---|---|---|---|---|
| 1 | p0 | 4.16538e+00 | 6.63640e-02 | 1.57065e-04 | -1.32522e-02 |
| 2 | p1 | -6.37622e-03 | 1.58294e-04 | -1.45438e-07 | 4.89363e-01 |
| 3 | p2 | 5.51168e+02 | 7.38725e+00 | -1.70568e-02 | 6.11194e-06 |
| 4 | p3 | -7.62139e+01 | 1.58667e+00 | 3.62704e-03 | -9.64725e-05 |
| 5 | p4 | 9.20261e+01 | 1.25045e+00 | -2.79826e-03 | -9.66978e-04 |

# But…..

- The fit is a good fit? The integral under the peak >> the same distribution w/o the energy cut!!!

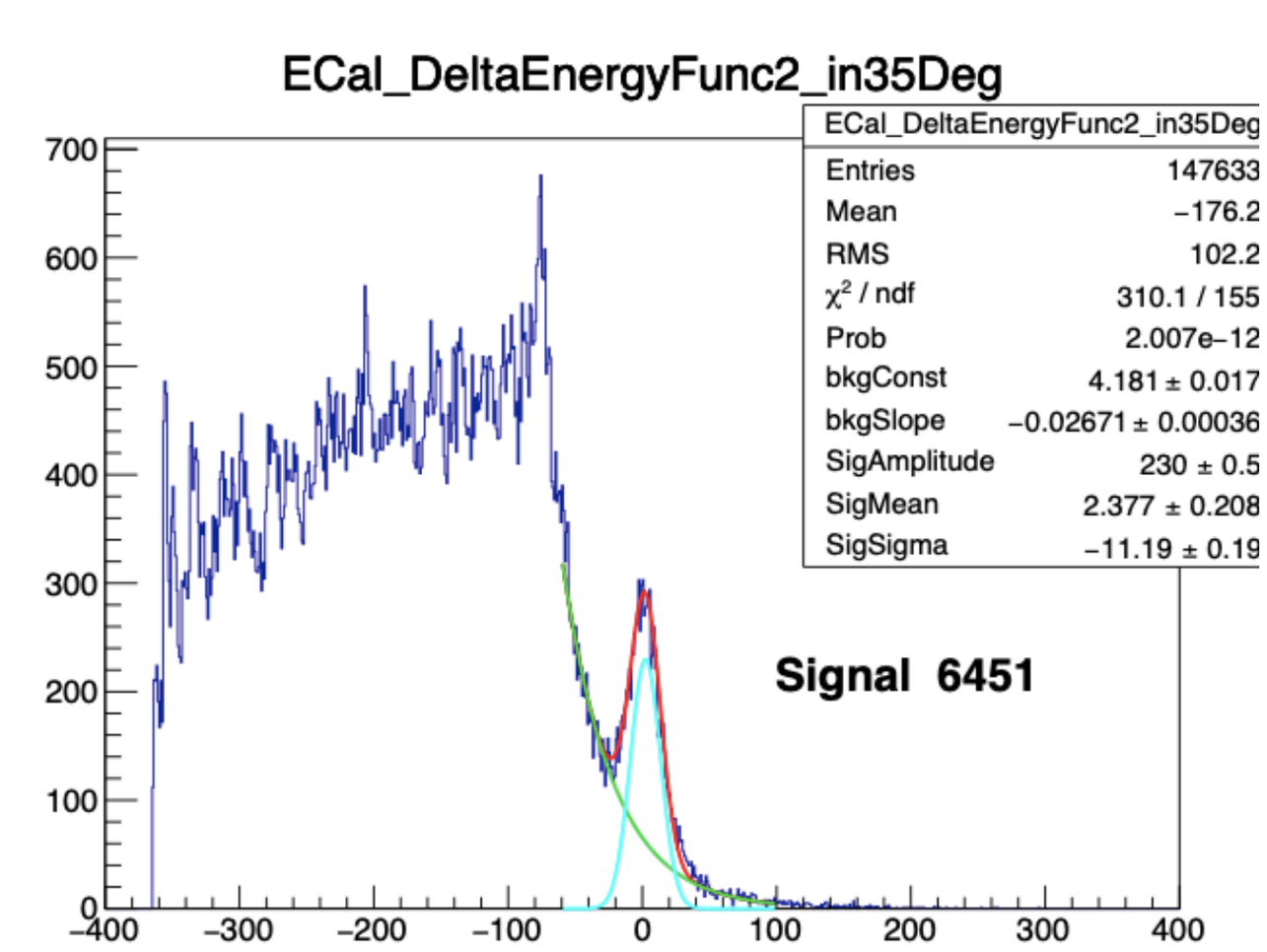


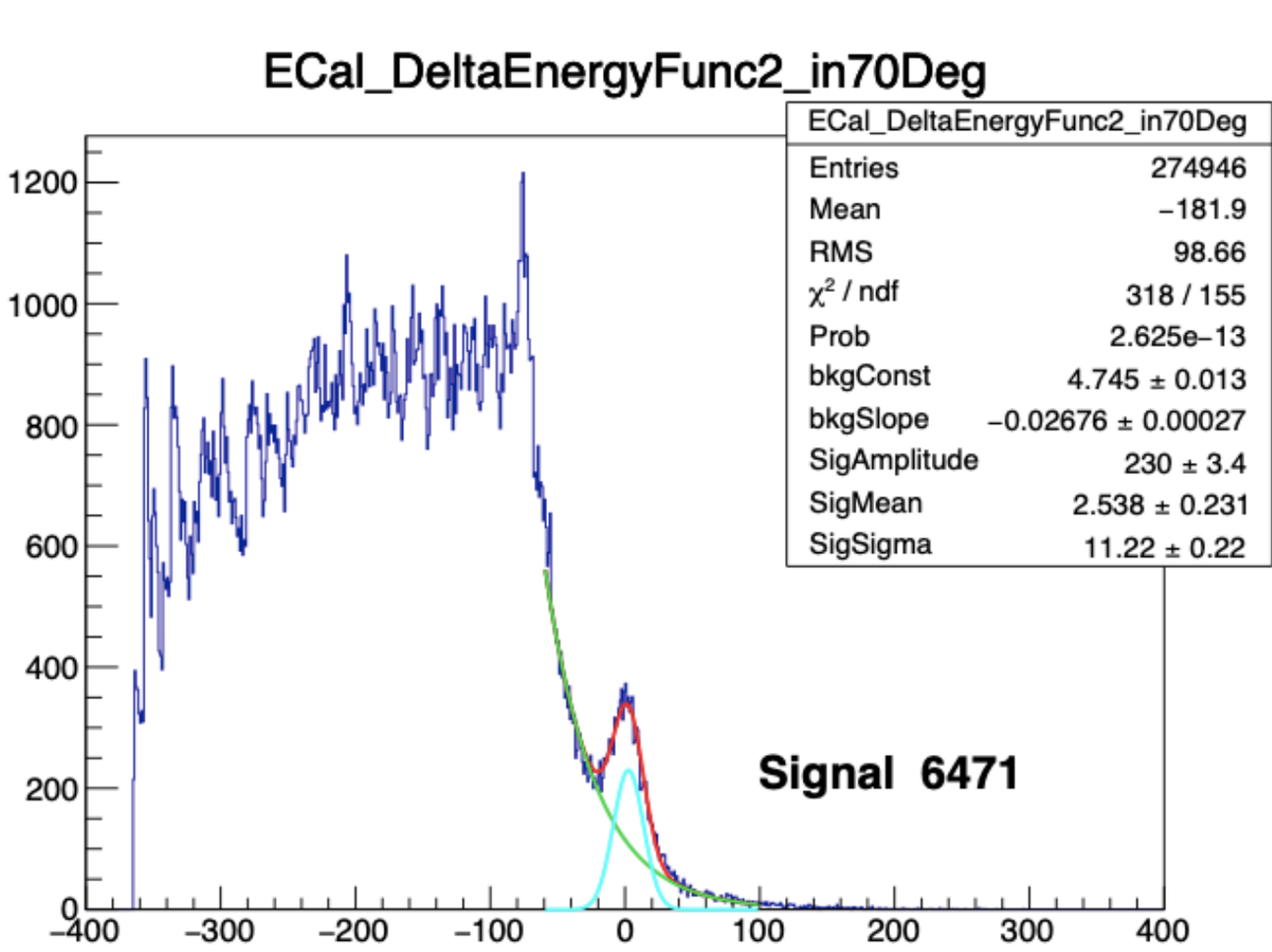
# FIT OF DELTAENERGY IN **TAG** (W/O ENERGY CUT)

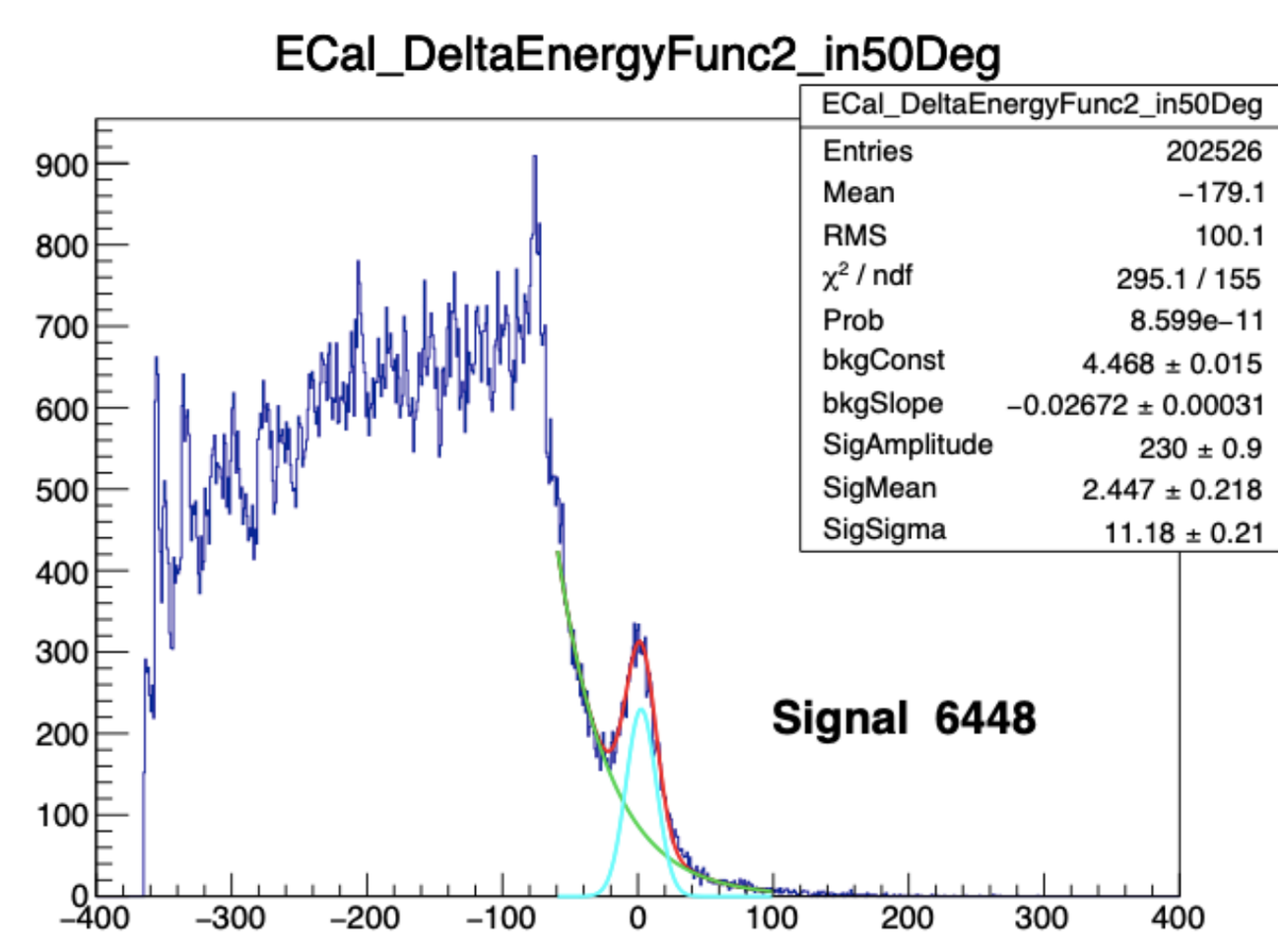


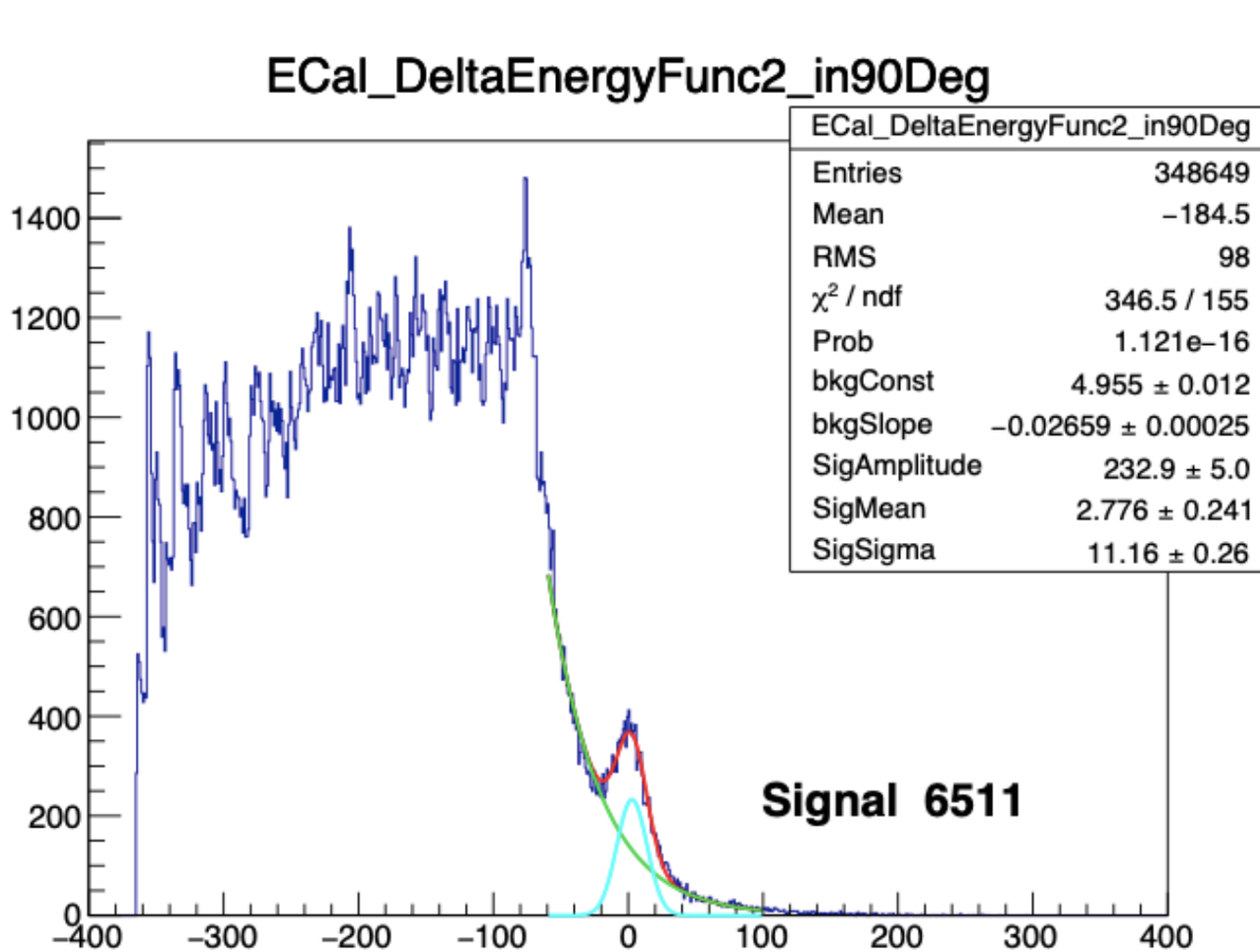

- ggYield = 15353/2 = 7677

# Fit of DeltaEnergy in **PROBE** (w/o energy cut)


ECal_DeltaEnergyFunc2_in35Deg
ECal_DeltaEnergyFunc2_in35Deg
Entries 147633
Mean −176.2
RMS 102.2
χ² / ndf 310.1 / 155
Prob 2.007e−12
bkgConst 4.181 ± 0.017
bkgSlope −0.02671 ± 0.00036
SigAmplitude 230 ± 0.5
SigMean 2.377 ± 0.208
SigSigma −11.19 ± 0.19
Signal 6451


ECal_DeltaEnergyFunc2_in70Deg
ECal_DeltaEnergyFunc2_in70Deg
Entries 274946
Mean −181.9
RMS 98.66
χ² / ndf 318 / 155
Prob 2.625e−13
bkgConst 4.745 ± 0.013
bkgSlope −0.02676 ± 0.00027
SigAmplitude 230 ± 3.4
SigMean 2.538 ± 0.231
SigSigma 11.22 ± 0.22
Signal 6471


ECal_DeltaEnergyFunc2_in50Deg
ECal_DeltaEnergyFunc2_in50Deg
Entries 202526
Mean −179.1
RMS 100.1
χ² / ndf 295.1 / 155
Prob 8.599e−11
bkgConst 4.468 ± 0.015
bkgSlope −0.02672 ± 0.00031
SigAmplitude 230 ± 0.9
SigMean 2.447 ± 0.218
SigSigma 11.18 ± 0.21
Signal 6448


ECal_DeltaEnergyFunc2_in90Deg
ECal_DeltaEnergyFunc2_in90Deg
Entries 348649
Mean −184.5
RMS 98
χ² / ndf 346.5 / 155
Prob 1.121e−16
bkgConst 4.955 ± 0.012
bkgSlope −0.02659 ± 0.00025
SigAmplitude 232.9 ± 5.0
SigMean 2.776 ± 0.241
SigSigma 11.16 ± 0.26
Signal 6511

# SOME NUMBERS

- Using cross section formulae $N_{\gamma\gamma} = 7276$
- Tag count (15353/2) 7677
- Probe in 35Deg 6451
- Probe in 50Deg 6448
- Probe in 70Deg 6471
- Probe in 35Deg 6511