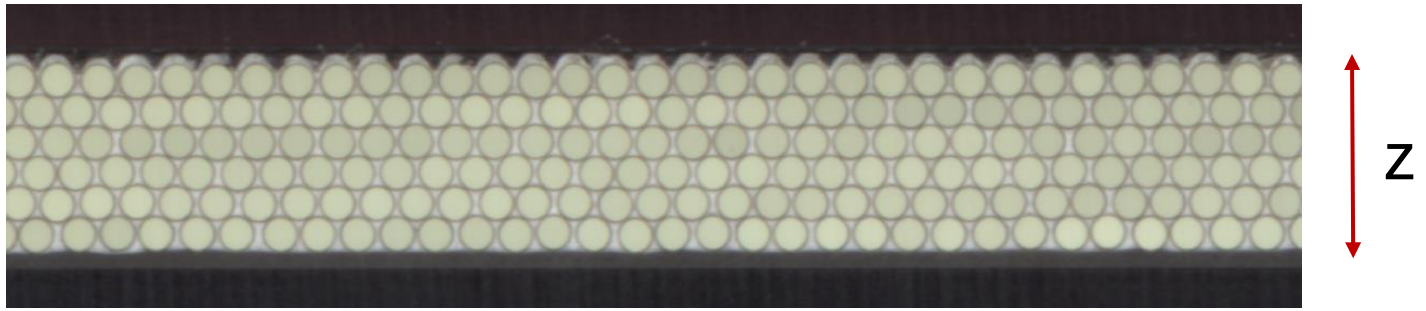
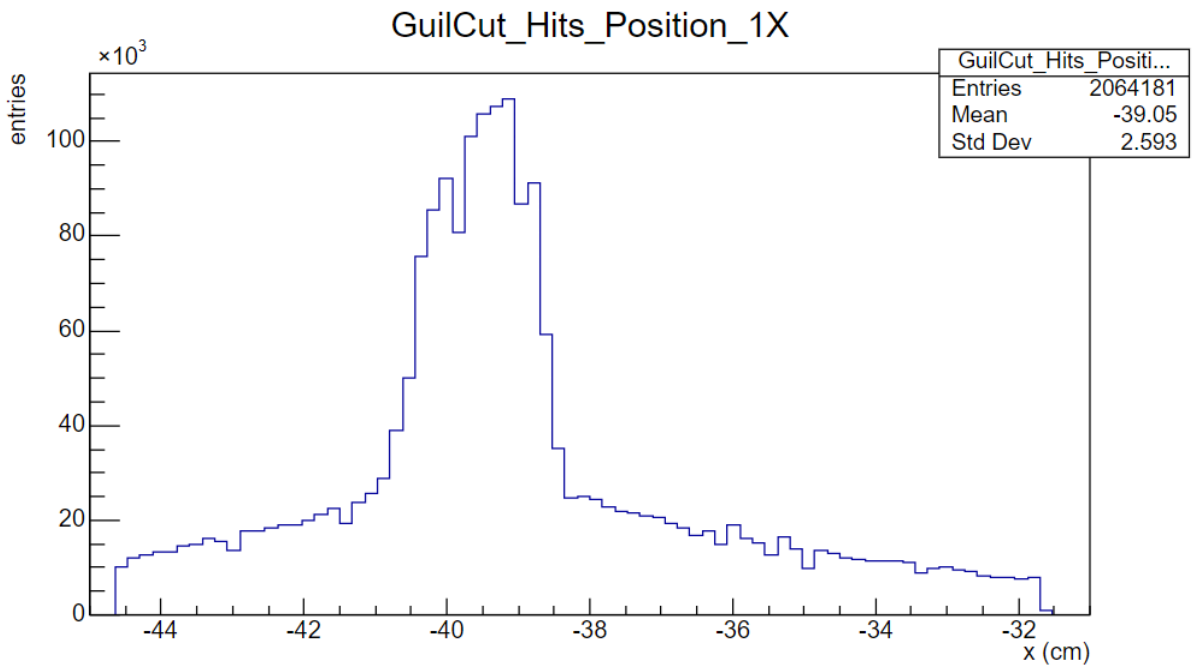
Viene calcolata la posizione media delle hit per ogni evento. L'intercetta, del centroide, nel primo piano, associata allo stesso evento viene sottratta per vedere di quanto si discosta il valore ricostruito dal valore "vero".

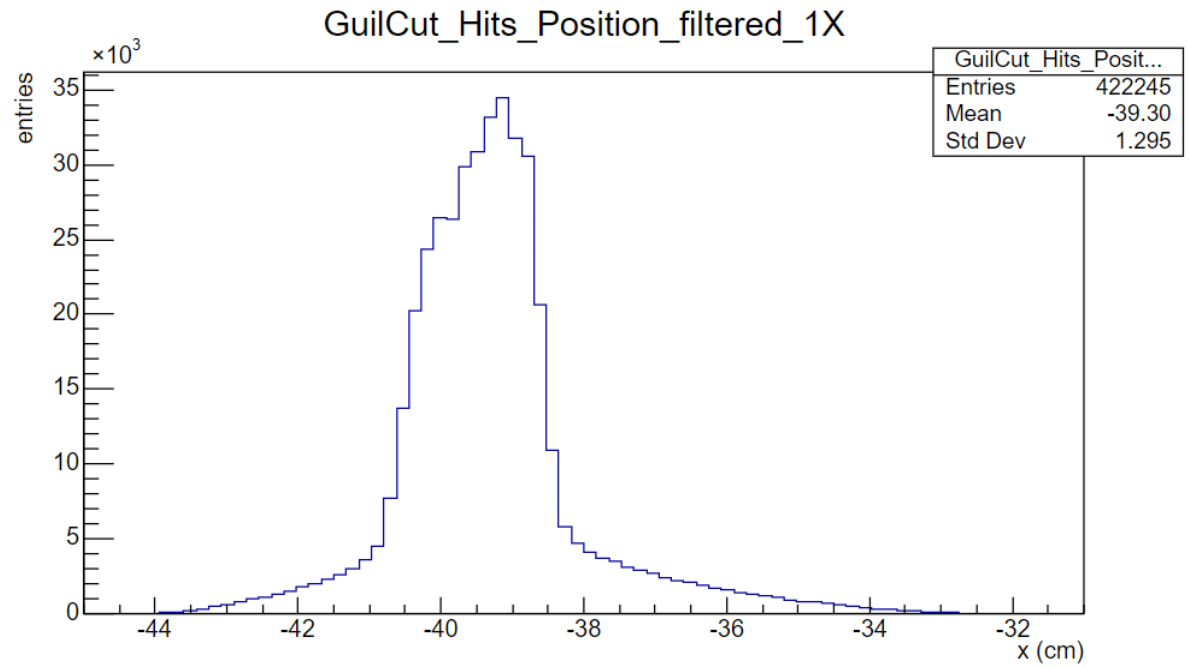
Sono stati aggiunti errori in x e y pari a 0.025cm, in z questo valore è stato moltiplicato per 6.

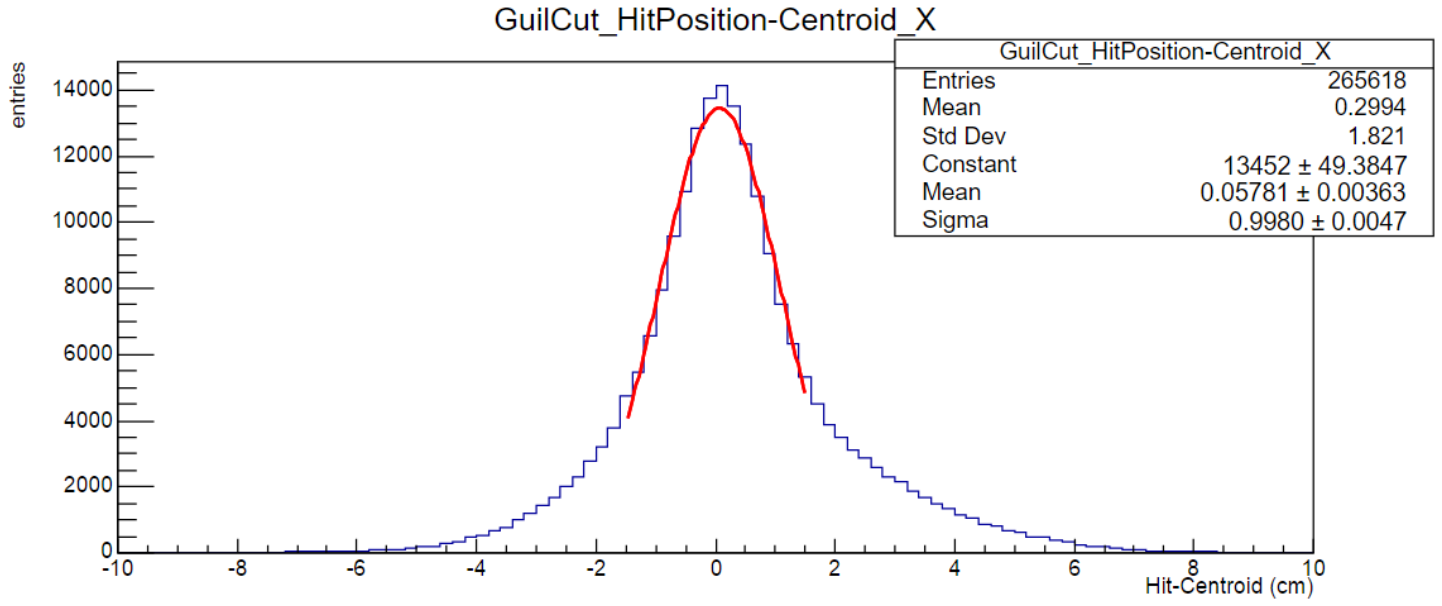


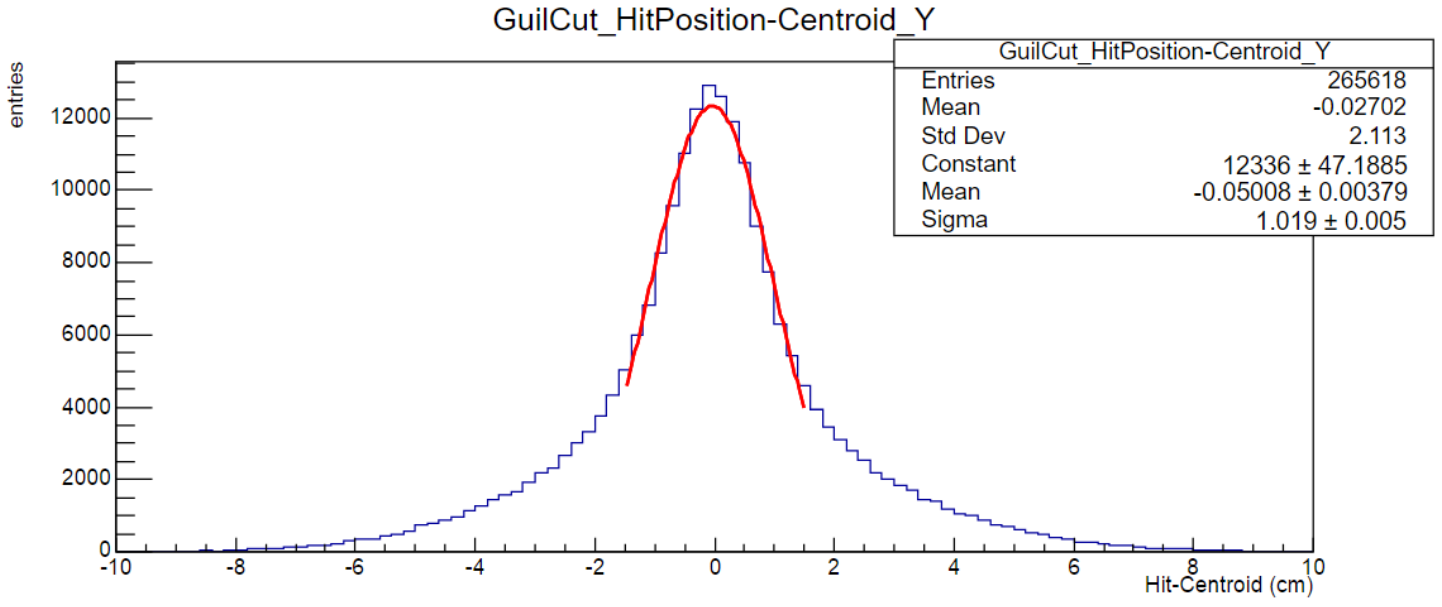
Inoltre i dati sono sono stati filtrati per eliminare eventuali fonti di background:

- Presi dati con QDC positiva
- Presa la posizione media del cluster più grande

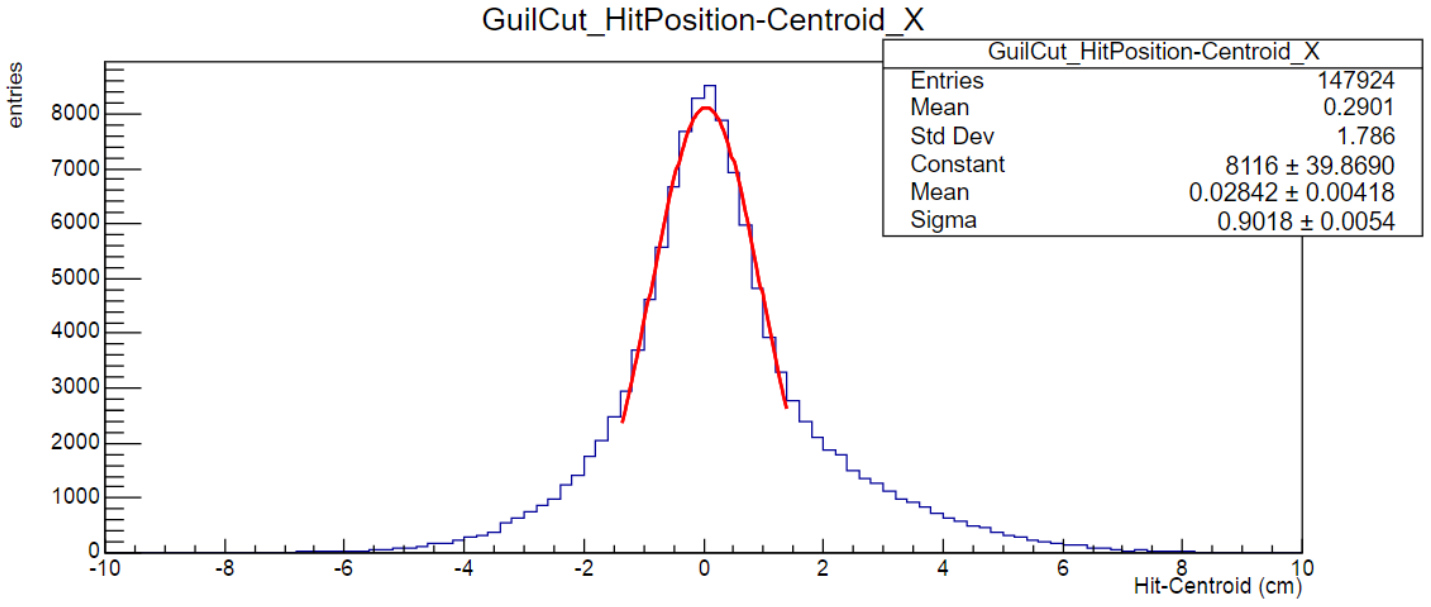

GuilCut_Hits_Position_1X
×10^3
entries
GuilCut_Hits_Positi...
Entries 2064181
Mean -39.05
Std Dev 2.593
100
80
60
40
20
0
-44
-42
-40
-38
-36
-34
-32
x (cm)

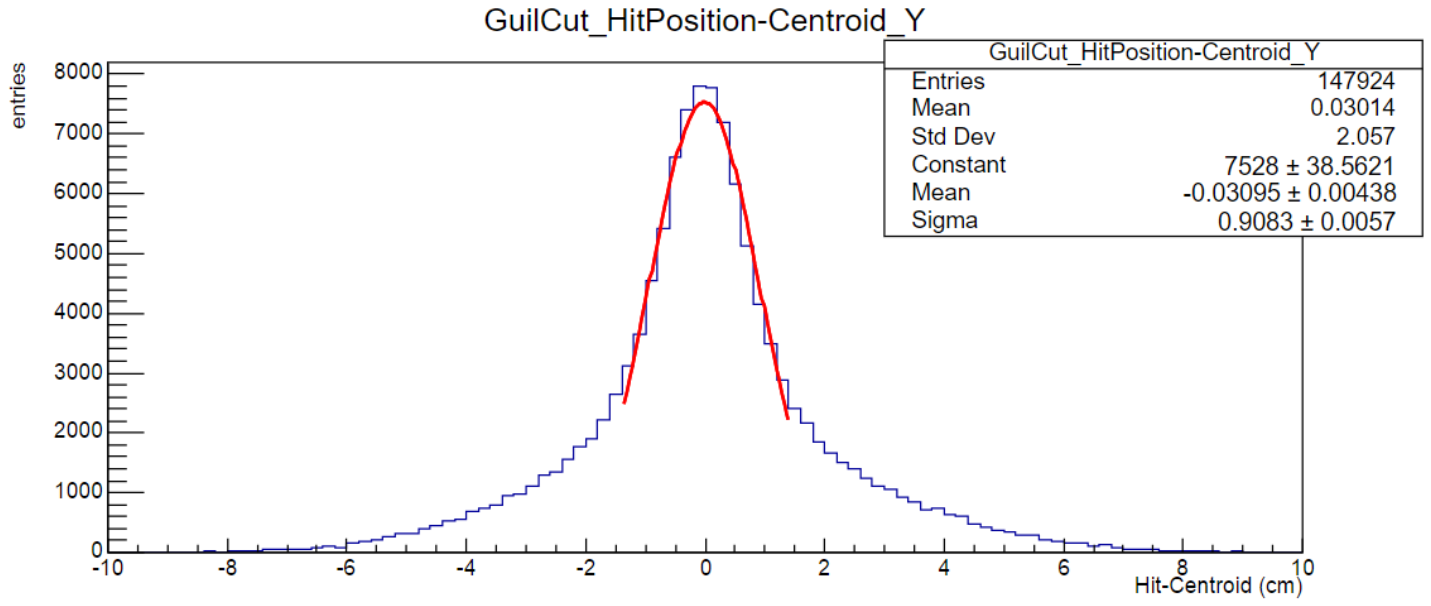

GuilCut_Hits_Position_filtered_1X
×10^3
entries
GuilCut_Hits_Posit...
Entries 422245
Mean -39.30
Std Dev 1.295
35
30
25
20
15
10
5
0
-44
-42
-40
-38
-36
-34
-32
x (cm)


GuilCut_HitPosition-Centroid_X
entries
Hit-Centroid (cm)
GuilCut_HitPosition-Centroid_X
Entries 265618
Mean 0.2994
Std Dev 1.821
Constant 13452 ± 49.3847
Mean 0.05781 ± 0.00363
Sigma 0.9980 ± 0.0047

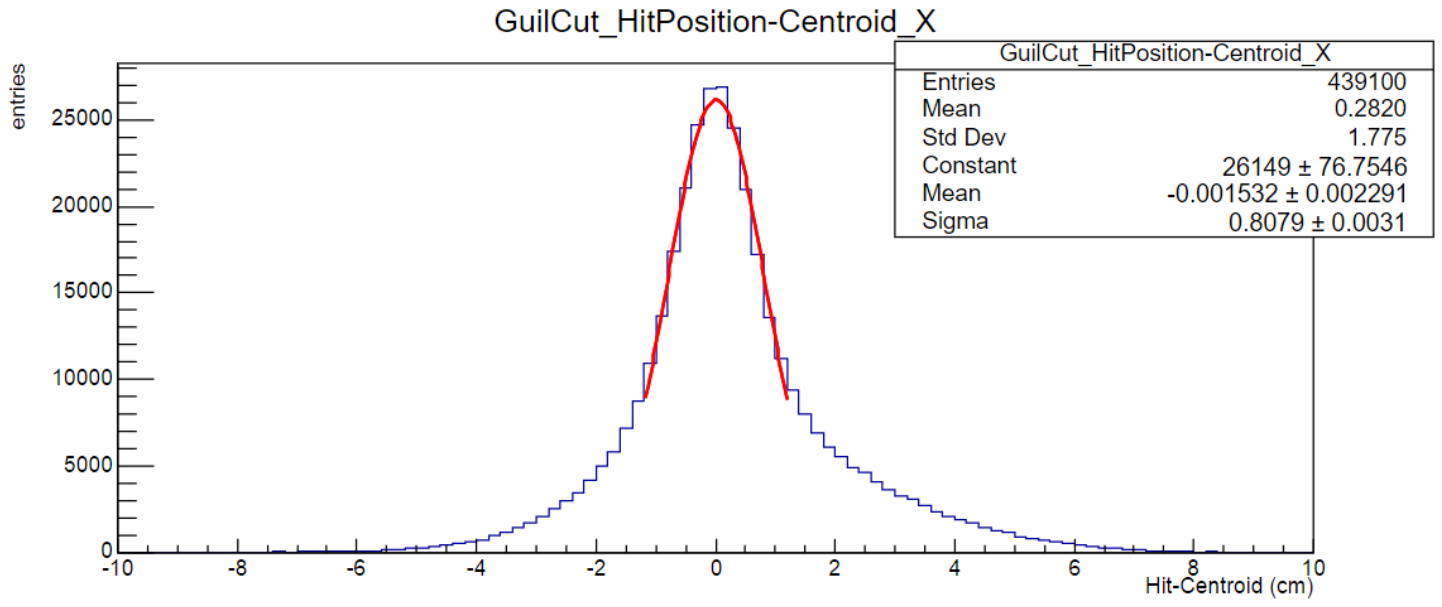

GuilCut_HitPosition-Centroid_Y
entries
Hit-Centroid (cm)
GuilCut_HitPosition-Centroid_Y
Entries 265618
Mean -0.02702
Std Dev 2.113
Constant 12336 ± 47.1885
Mean -0.05008 ± 0.00379
Sigma 1.019 ± 0.005

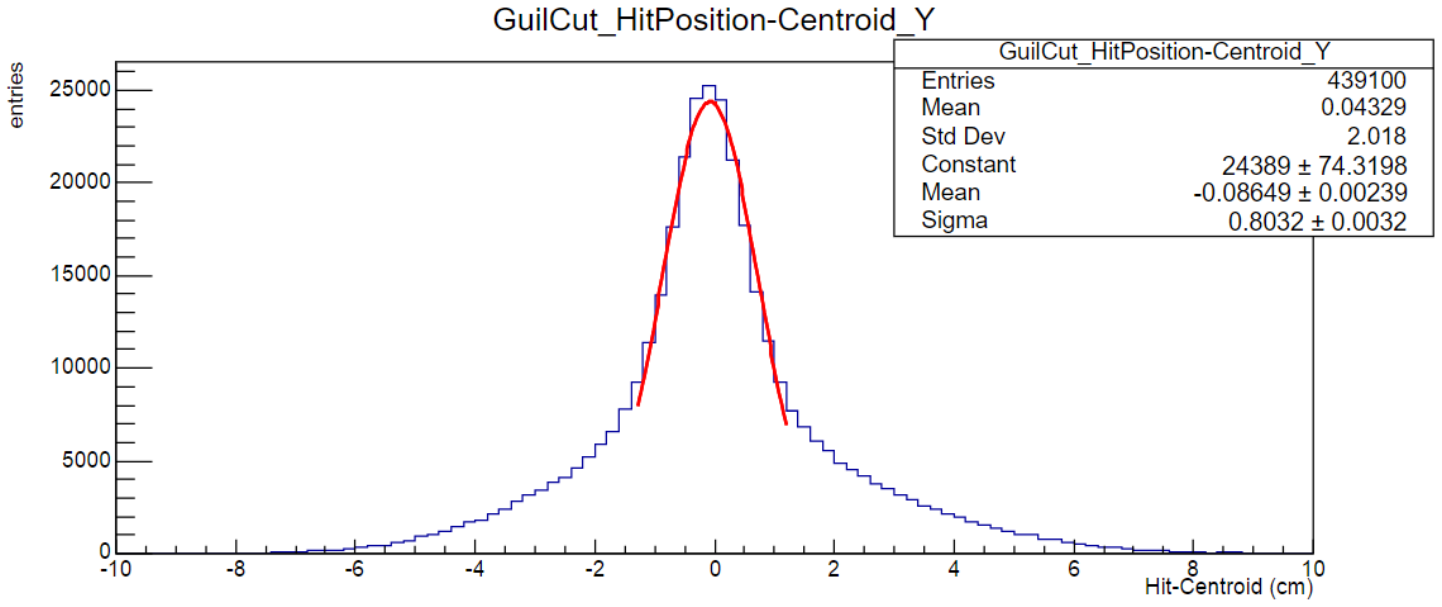
100 GeV


GuilCut_HitPosition-Centroid_X
GuilCut_HitPosition-Centroid_X
Entries 147924
Mean 0.2901
Std Dev 1.786
Constant 8116 ± 39.8690
Mean 0.02842 ± 0.00418
Sigma 0.9018 ± 0.0054
entries
Hit-Centroid (cm)

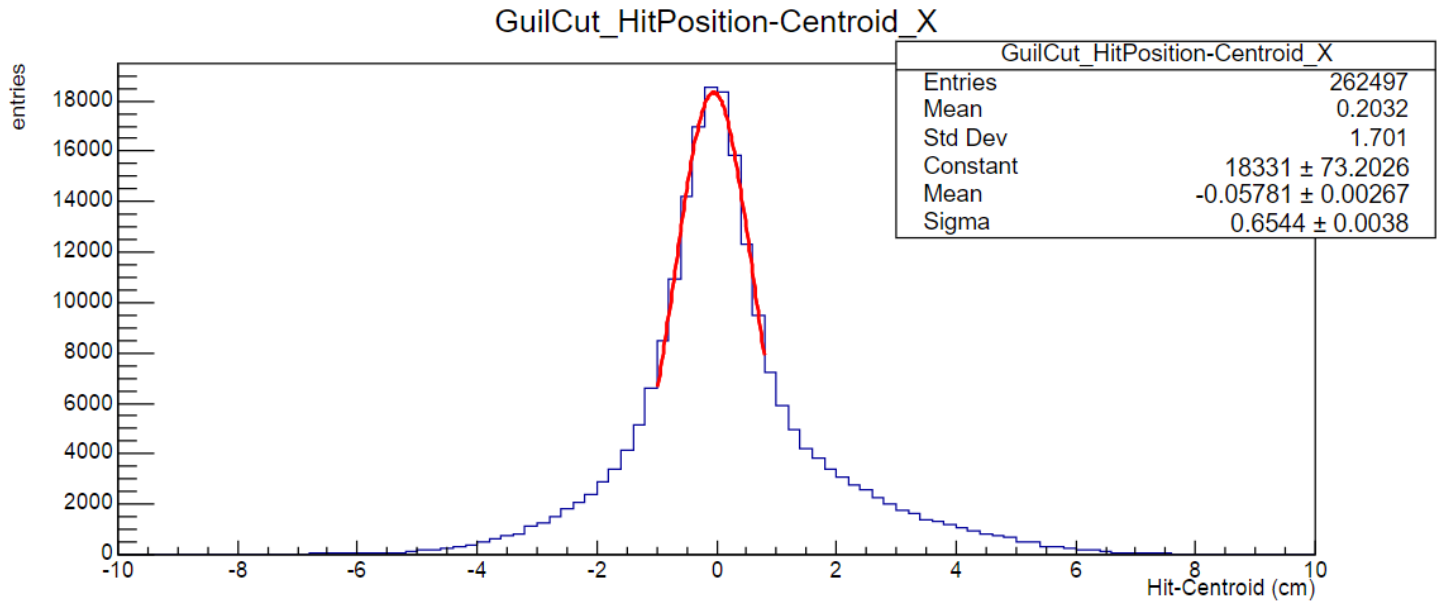

GuilCut_HitPosition-Centroid_Y
GuilCut_HitPosition-Centroid_Y
Entries 147924
Mean 0.03014
Std Dev 2.057
Constant 7528 ± 38.5621
Mean -0.03095 ± 0.00438
Sigma 0.9083 ± 0.0057
entries
Hit-Centroid (cm)

140 GeV

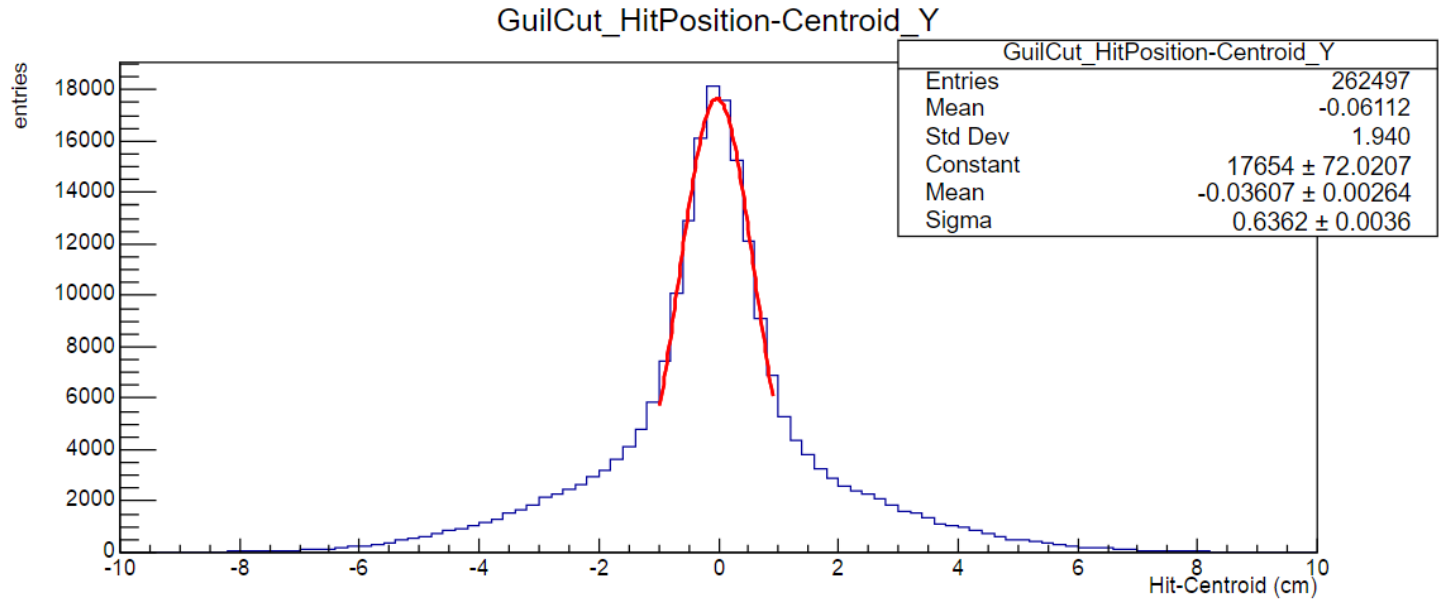

GuilCut_HitPosition-Centroid_X
entries
25000
20000
15000
10000
5000
0
-10
-8
-6
-4
-2
0
2
4
6
8
10
Hit-Centroid (cm)
GuilCut_HitPosition-Centroid_X
Entries 439100
Mean 0.2820
Std Dev 1.775
Constant 26149 ± 76.7546
Mean -0.001532 ± 0.002291
Sigma 0.8079 ± 0.0031

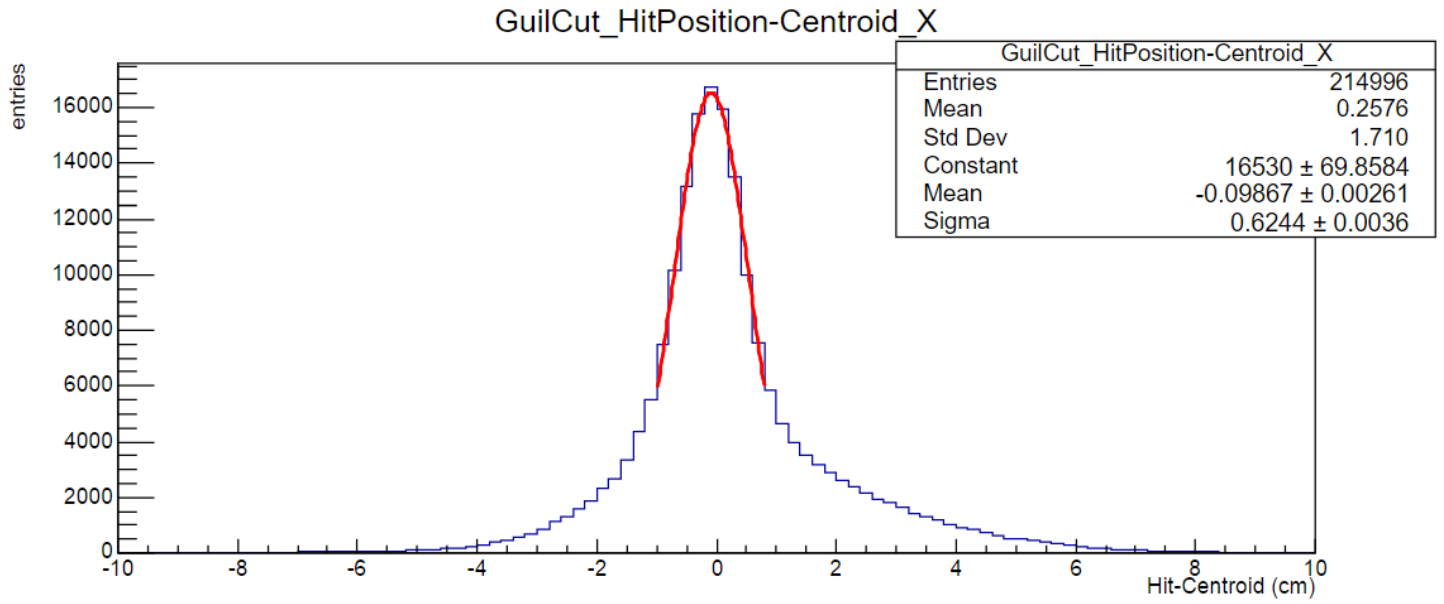

GuilCut_HitPosition-Centroid_Y
entries
25000
20000
15000
10000
5000
0
-10
-8
-6
-4
-2
0
2
4
6
8
10
Hit-Centroid (cm)
GuilCut_HitPosition-Centroid_Y
Entries 439100
Mean 0.04329
Std Dev 2.018
Constant 24389 ± 74.3198
Mean -0.08649 ± 0.00239
Sigma 0.8032 ± 0.0032

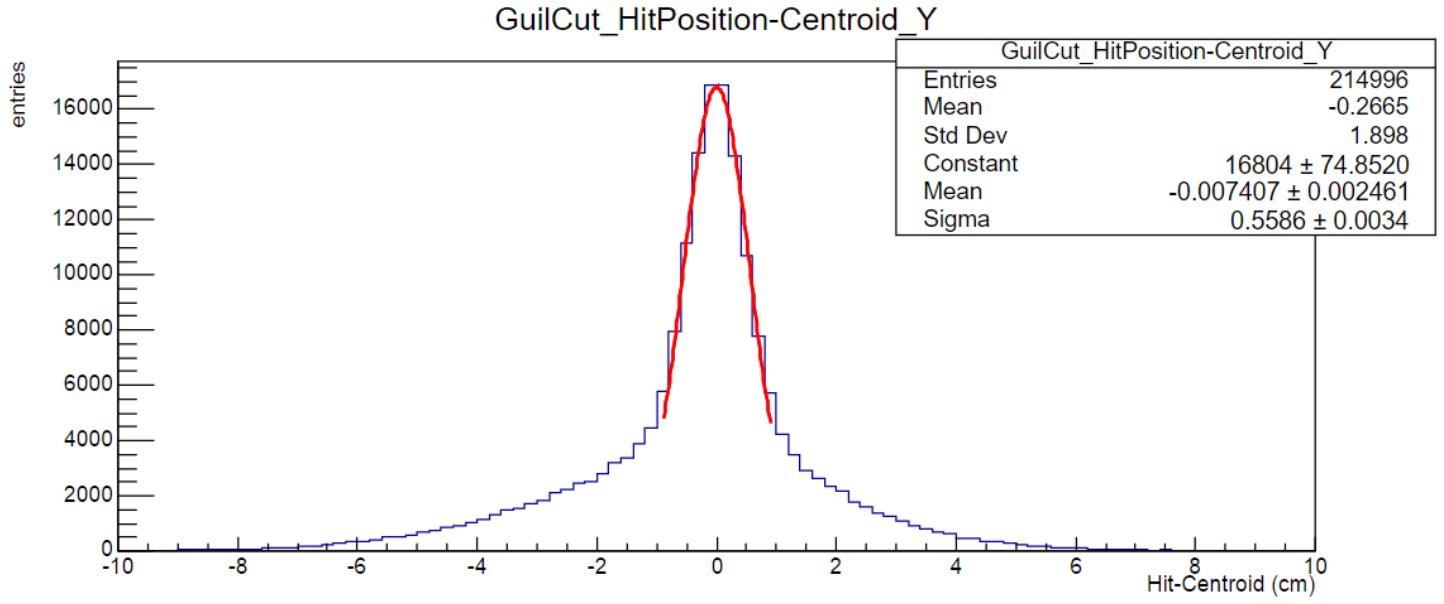
180 GeV


GuilCut_HitPosition-Centroid_X
entries
Hit-Centroid (cm)
GuilCut_HitPosition-Centroid_X
Entries 262497
Mean 0.2032
Std Dev 1.701
Constant 18331 ± 73.2026
Mean -0.05781 ± 0.00267
Sigma 0.6544 ± 0.0038

240 GeV

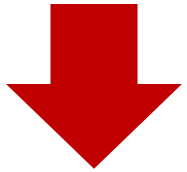

GuilCut_HitPosition-Centroid_Y
entries
Hit-Centroid (cm)
GuilCut_HitPosition-Centroid_Y
Entries 262497
Mean -0.06112
Std Dev 1.940
Constant 17654 ± 72.0207
Mean -0.03607 ± 0.00264
Sigma 0.6362 ± 0.0036


GuilCut_HitPosition-Centroid_X
entries
Hit-Centroid (cm)
GuilCut_HitPosition-Centroid_X
Entries 214996
Mean 0.2576
Std Dev 1.710
Constant 16530 ± 69.8584
Mean -0.09867 ± 0.00261
Sigma 0.6244 ± 0.0036


GuilCut_HitPosition-Centroid_Y
entries
Hit-Centroid (cm)
GuilCut_HitPosition-Centroid_Y
Entries 214996
Mean -0.2665
Std Dev 1.898
Constant 16804 ± 74.8520
Mean -0.007407 ± 0.002461
Sigma 0.5586 ± 0.0034

300 GeV

	Mean x	Sigma_x	Mean y	Sigma_y
100 Gev	0.6221 ± 0.0035	1.060 ± 0.004	-0.5851 ± 0.0041	1.054 ± 0.006
140 Gev	0.5731 ± 0.0045	0.9789 ± 0.0053	-0.5703 ± 0.0047	0.9835 ± 0.0061
180 Gev	0.5397 ± 0.0026	0.9209 ± 0.0030	-0.6255 ± 0.0027	0.8707 ± 0.0038
240 Gev	0.4834 ± 0.0029	0.8043 ± 0.0034	-0.5578 ± 0.0029	0.7567 ± 0.0039
300 Gev	0.4388 ± 0.0032	0.7578 ± 0.0036	-0.5503 ± 0.0030	0.7265 ± 0.0038

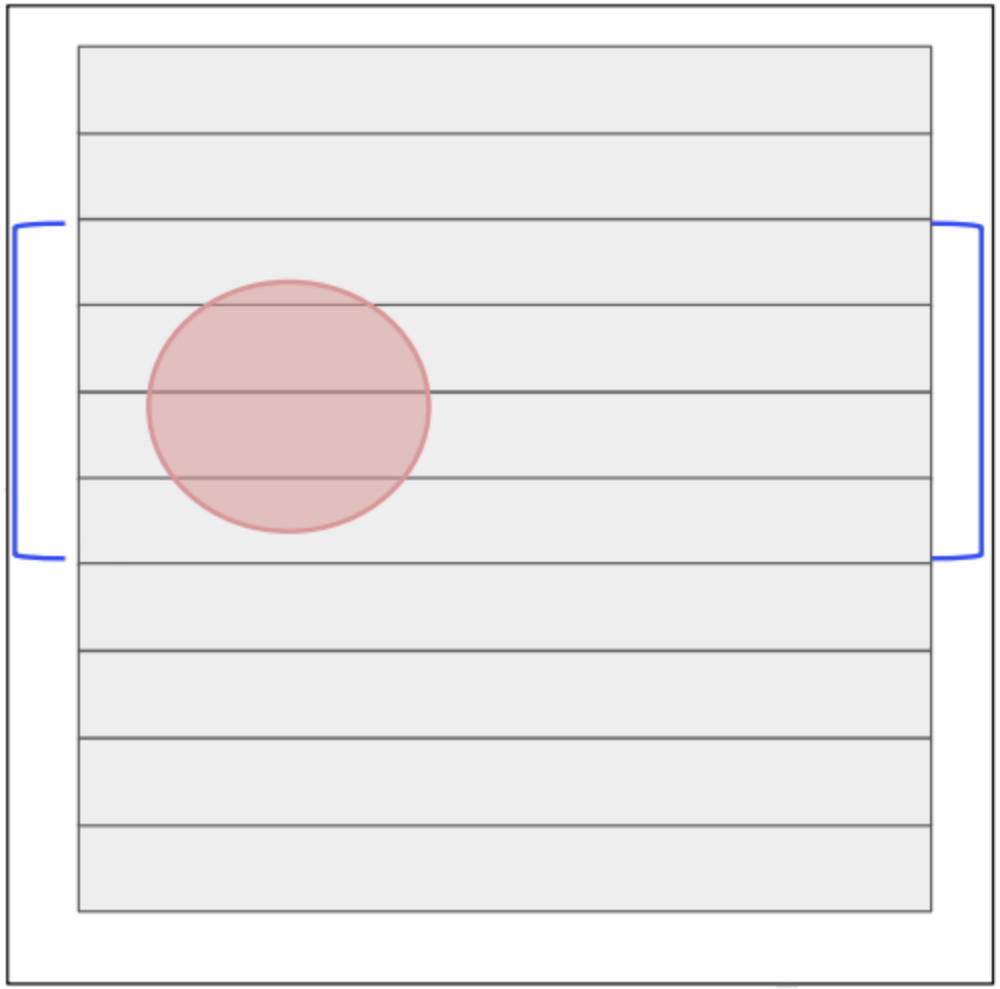


Filtered	Mean x	Sigma_x	Mean y	Sigma_y
100 Gev	0.05781 ± 0.00363	0.9980 ± 0.0047	-0.05008 ± 0.00379	1.019 ± 0.005
140 Gev	0.02842 ± 0.00418	0.9018 ± 0.0054	-0.03095 ± 0.0057	0.9083 ± 0.0057
180 Gev	0.001532 ± 0.002291	0.8079 ± 0.0031	-0.08649 ± 0.00239	0.8032 ± 0.0032
240 Gev	-0.05781 ± 0.00267	0.6544 ± 0.0038	-0.03607 ± 0.00264	0.6362 ± 0.0036
300 Gev	-0.09867 ± 0.00261	0.6244 ± 0.0036	-0.007407 ± 0.002461	0.5586 ± 0.0034

Sono stati inseriti i centroidi relativi alla direzione y nei fit, per il calcolo delle slope.
La formula utilizzata è quella riportata di seguito, ed è stata presa dalle slide di Andrew.

$$y_B = \sum^{N_{bars}} y_{bar} \frac{QDC_{bar}}{QDC_{total}}$$

Per quanto riguarda x invece è stata fatta una media pesata con la qdc_left e la qdc_right.



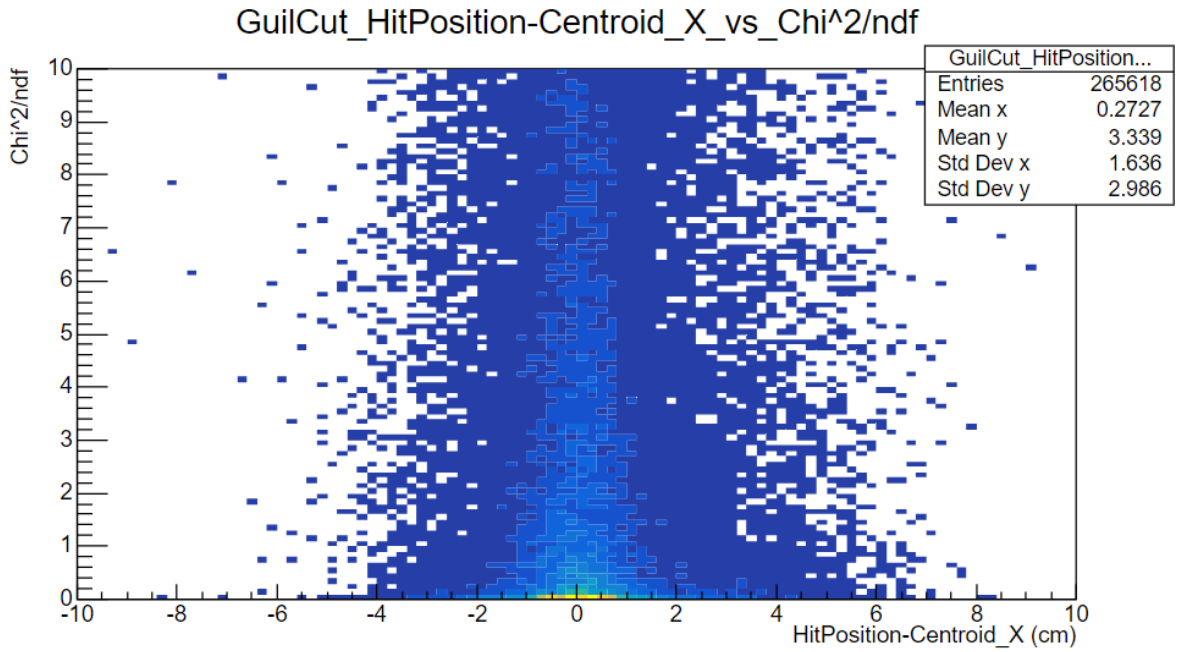
Inserito uno "Shower_end" che impone la posizione del centroide pari a DEFAULT se non si hanno almeno 15 hit.

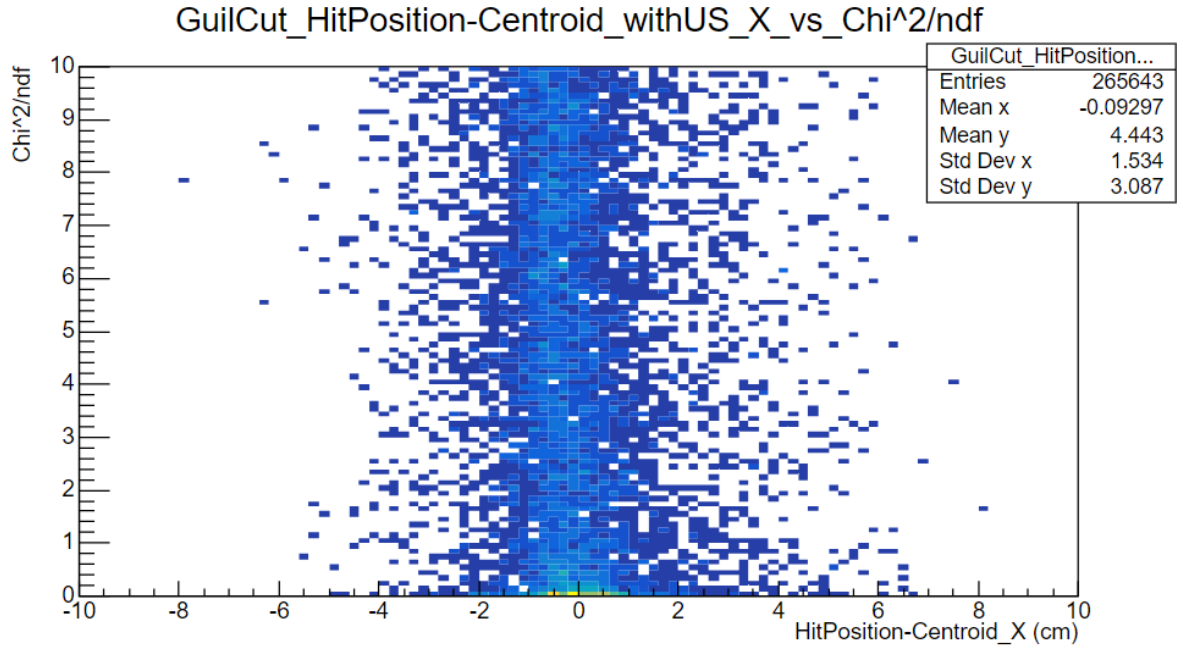
Start 2	Slope x	Std Dev_x	Slope y	Std Dev_y
100 Gev	0.02697	0.04792	0.002475	0.05417
140 Gev	0.02513	0.04230	0.003684	0.04526
180 Gev	0.02331	0.03815	0.002149	0.04005
240 Gev	0.01969	0.03256	0.0003727	0.03366
300 Gev	0.02045	0.03080	-0.003066	0.03066

Start 2	Slope x + US	Std Dev_x +US	Slope y + US	Std Dev_y + US
100 Gev	0.01806	0.04194	0.002475	0.05417
140 Gev	0.01763	0.03806	0.003591	0.03989
180 Gev	0.01767	0.03535	0.002315	0.03652
240 Gev	0.01637	0.03127	0.0005962	0.03185
300 Gev	0.01833	0.03014	-0.002730	0.02956

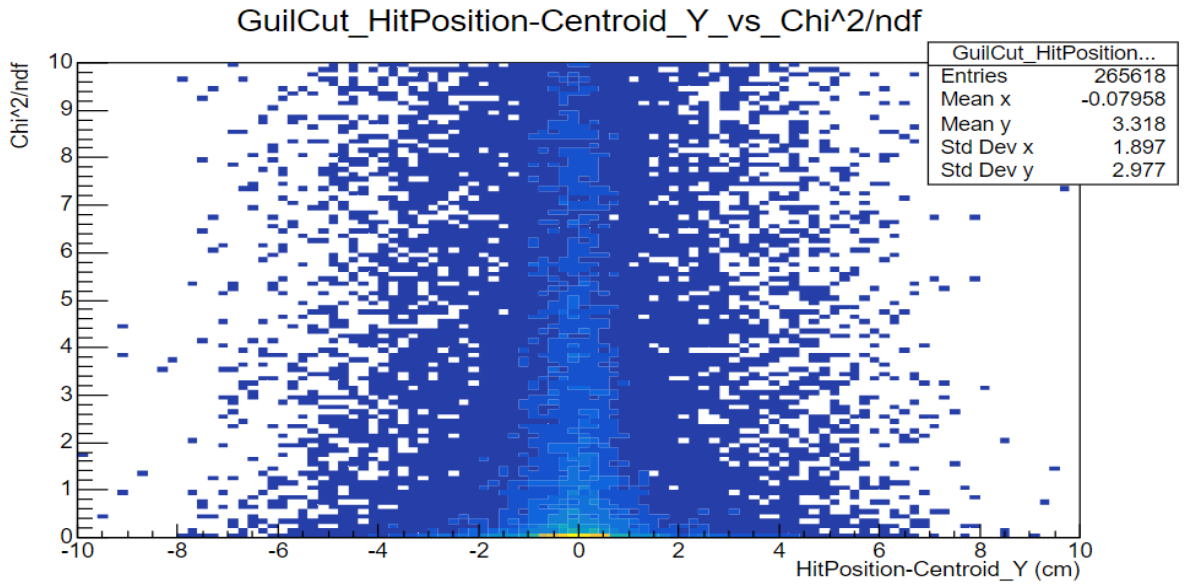
Start 3	Slope x	Std Dev_x	Slope y	Std Dev_y
100 Gev	0.02918	0.05956	0.005286	0.06531
140 Gev	0.02600	0.05381	0.001514	0.05680
180 Gev	0.02632	0.04884	-0.001855	0.05203
240 Gev	0.02527	0.04284	-0.001040	0.04466
300 Gev	0.02535	0.04071	-0.004263	0.04153

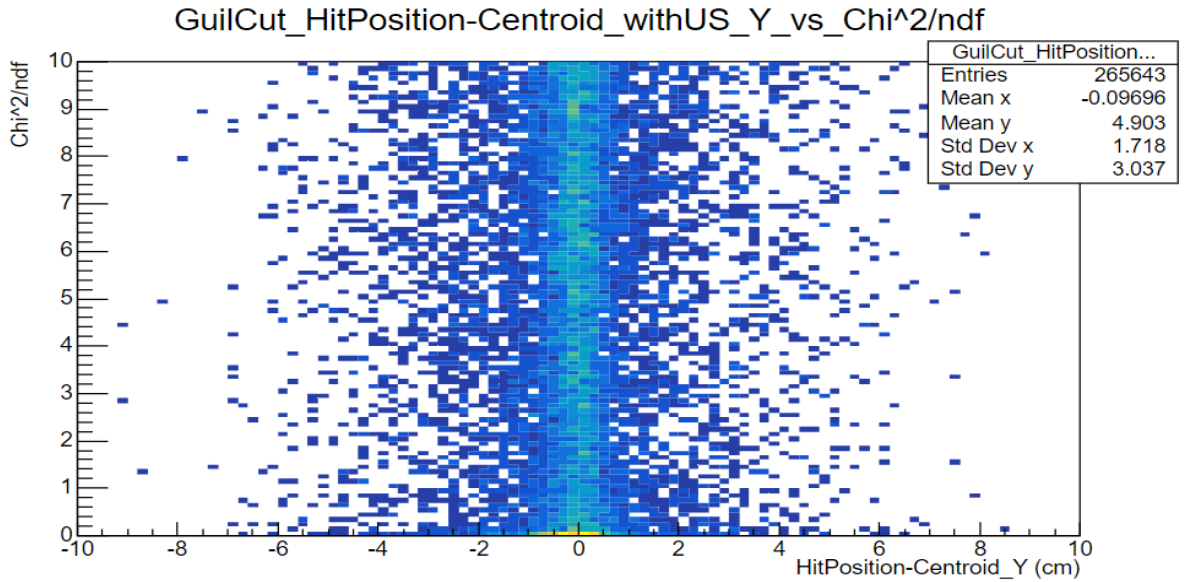
Start 3	Slope x + US	Std Dev_x +US	Slope y + US	Std Dev_y + US
100 Gev	0.009228	0.04630	0.004801	0.04693
140 Gev	0.01320	0.04707	0.002205	0.04688
180 Gev	0.01861	0.04534	-0.0008799	0.04640
240 Gev	0.02157	0.04156	-0.0006323	0.04224
300 Gev	0.02352	0.04003	-0.003981	0.04027


GuilCut_HitPosition-Centroid_X_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 265618
Mean x 0.2727
Mean y 3.339
Std Dev x 1.636
Std Dev y 2.986
Chi^2/ndf
HitPosition-Centroid_X (cm)

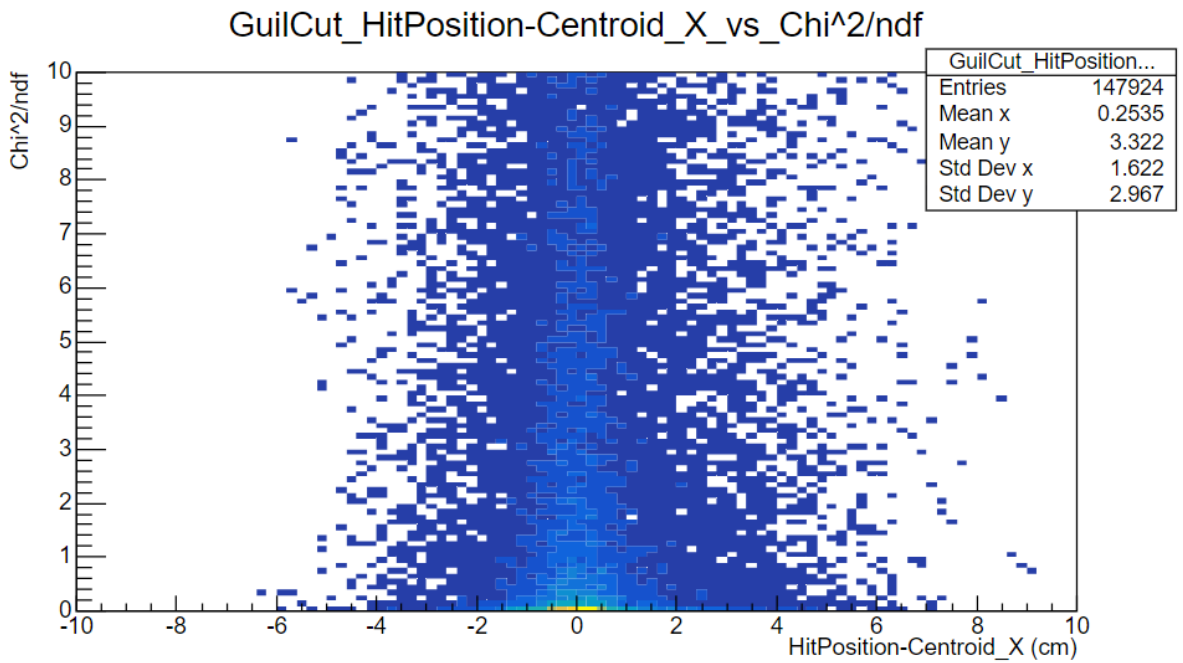

GuilCut_HitPosition-Centroid_withUS_X_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 265643
Mean x -0.09297
Mean y 4.443
Std Dev x 1.534
Std Dev y 3.087
Chi^2/ndf
HitPosition-Centroid_X (cm)

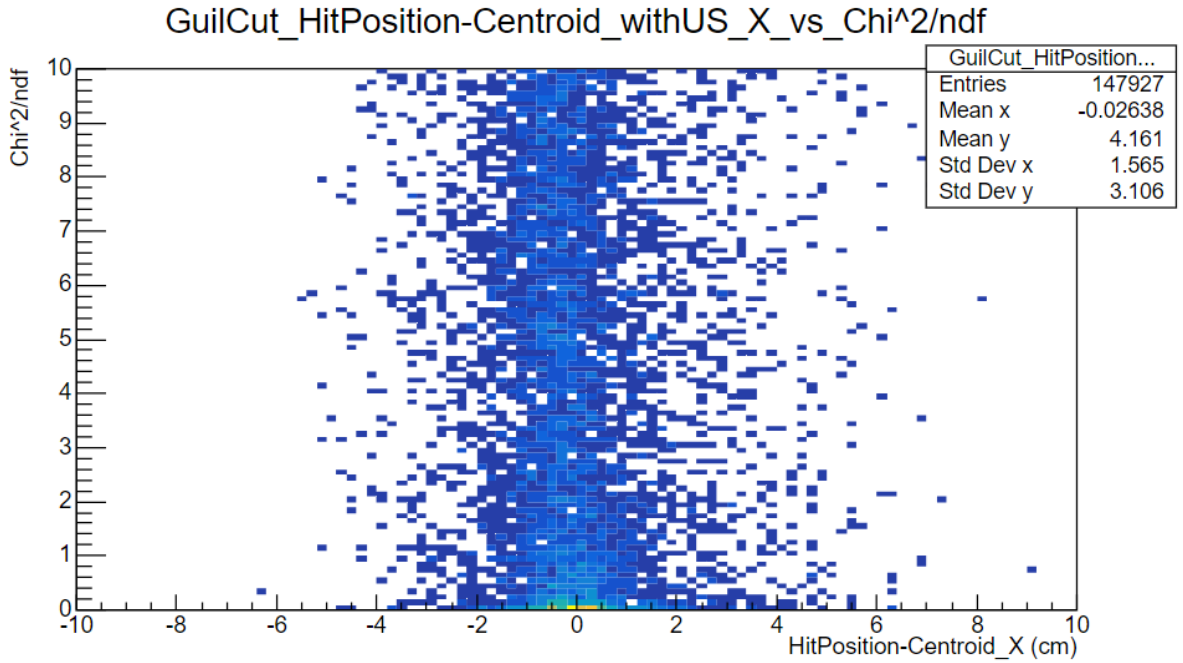
100 GeV


GuilCut_HitPosition-Centroid_Y_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 265618
Mean x -0.07958
Mean y 3.318
Std Dev x 1.897
Std Dev y 2.977
Chi^2/ndf
HitPosition-Centroid_Y (cm)

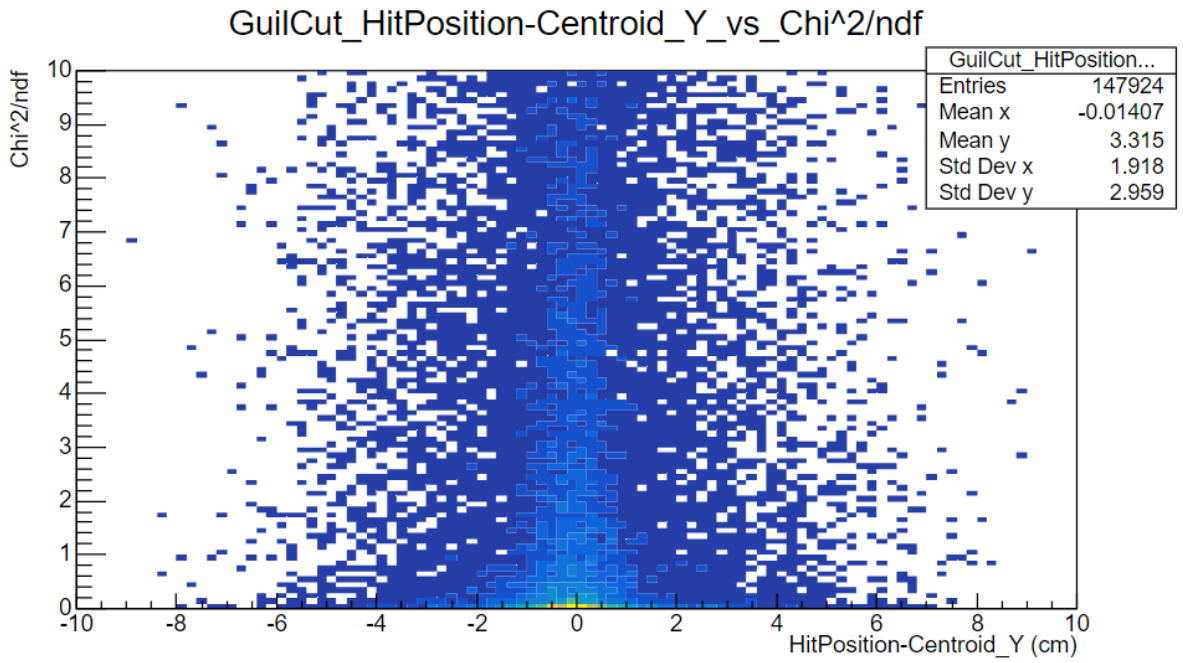

GuilCut_HitPosition-Centroid_withUS_Y_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 265643
Mean x -0.09696
Mean y 4.903
Std Dev x 1.718
Std Dev y 3.037
Chi^2/ndf
HitPosition-Centroid_Y (cm)

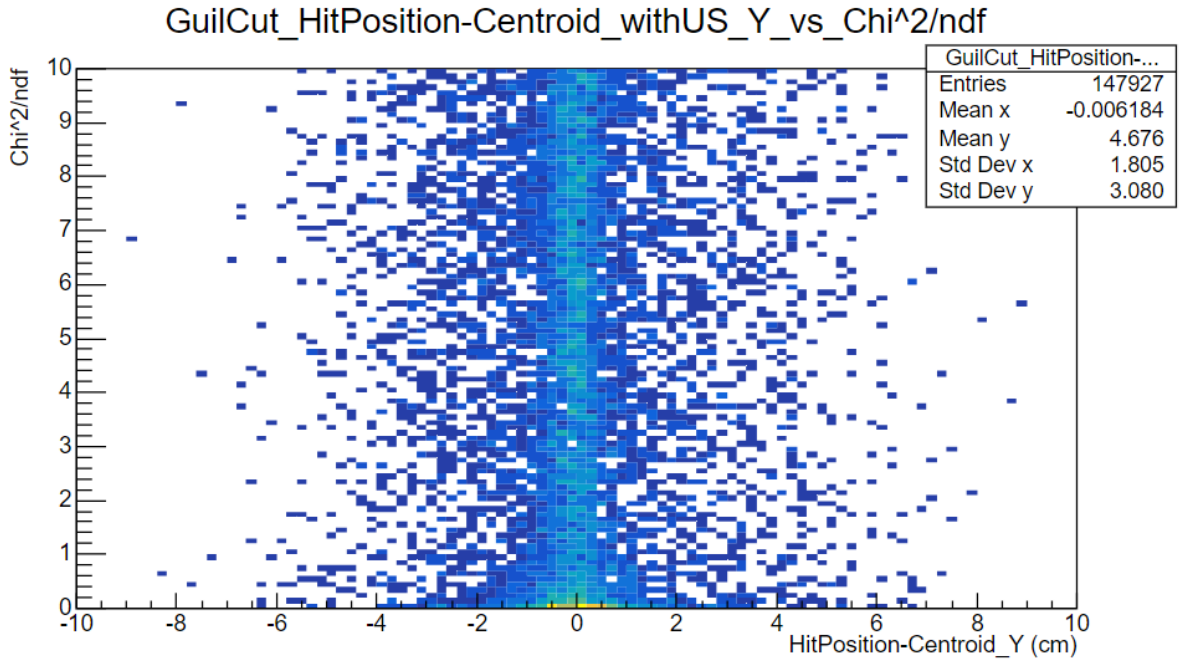
100 GeV


GuilCut_HitPosition-Centroid_X_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 147924
Mean x 0.2535
Mean y 3.322
Std Dev x 1.622
Std Dev y 2.967
Chi^2/ndf
HitPosition-Centroid_X (cm)

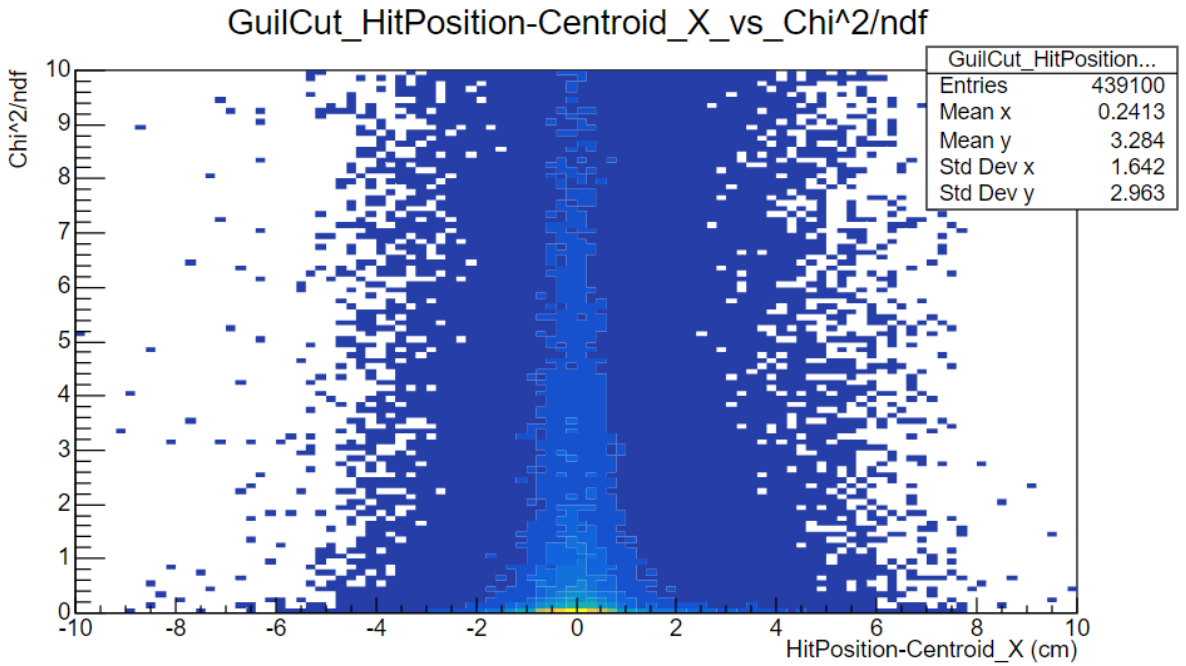

GuilCut_HitPosition-Centroid_withUS_X_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 147927
Mean x -0.02638
Mean y 4.161
Std Dev x 1.565
Std Dev y 3.106
Chi^2/ndf
HitPosition-Centroid_X (cm)

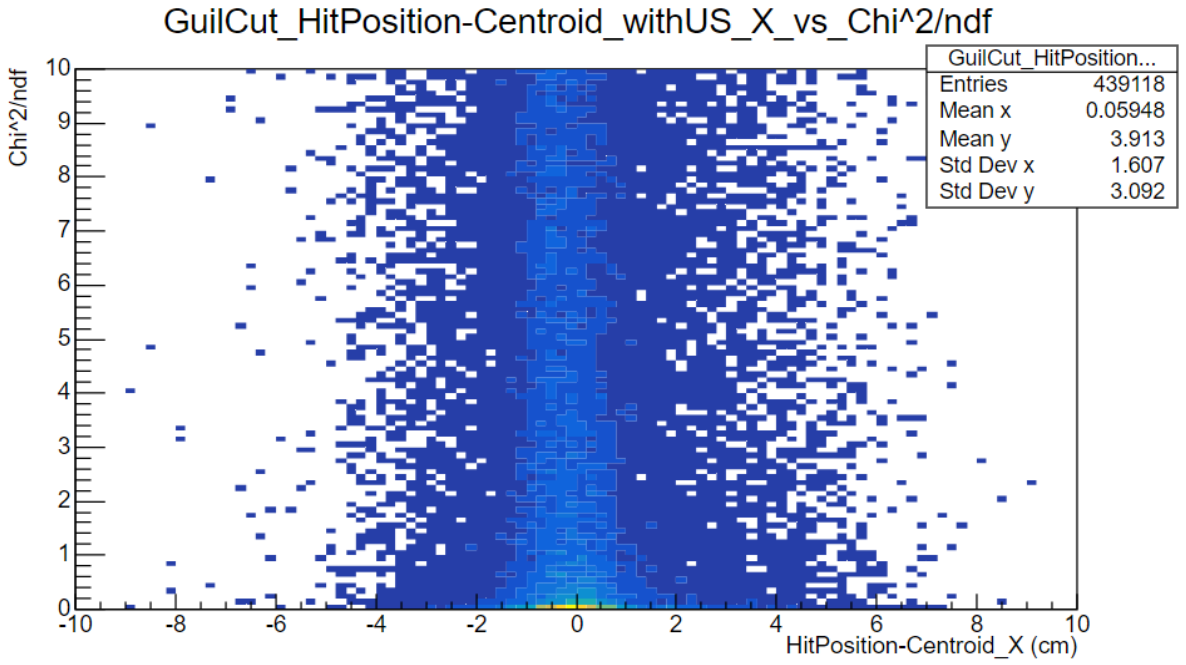
140 GeV


GuilCut_HitPosition-Centroid_Y_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 147924
Mean x -0.01407
Mean y 3.315
Std Dev x 1.918
Std Dev y 2.959
Chi^2/ndf
HitPosition-Centroid_Y (cm)

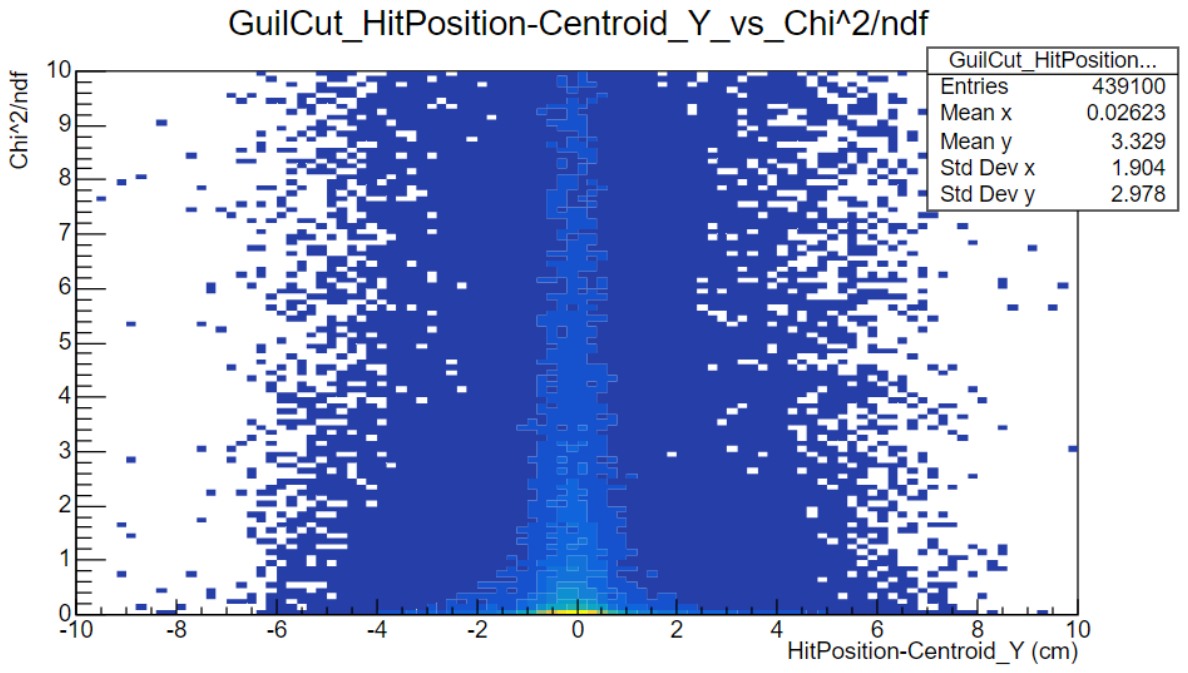

GuilCut_HitPosition-Centroid_withUS_Y_vs_Chi^2/ndf
GuilCut_HitPosition-...
Entries 147927
Mean x -0.006184
Mean y 4.676
Std Dev x 1.805
Std Dev y 3.080
Chi^2/ndf
HitPosition-Centroid_Y (cm)

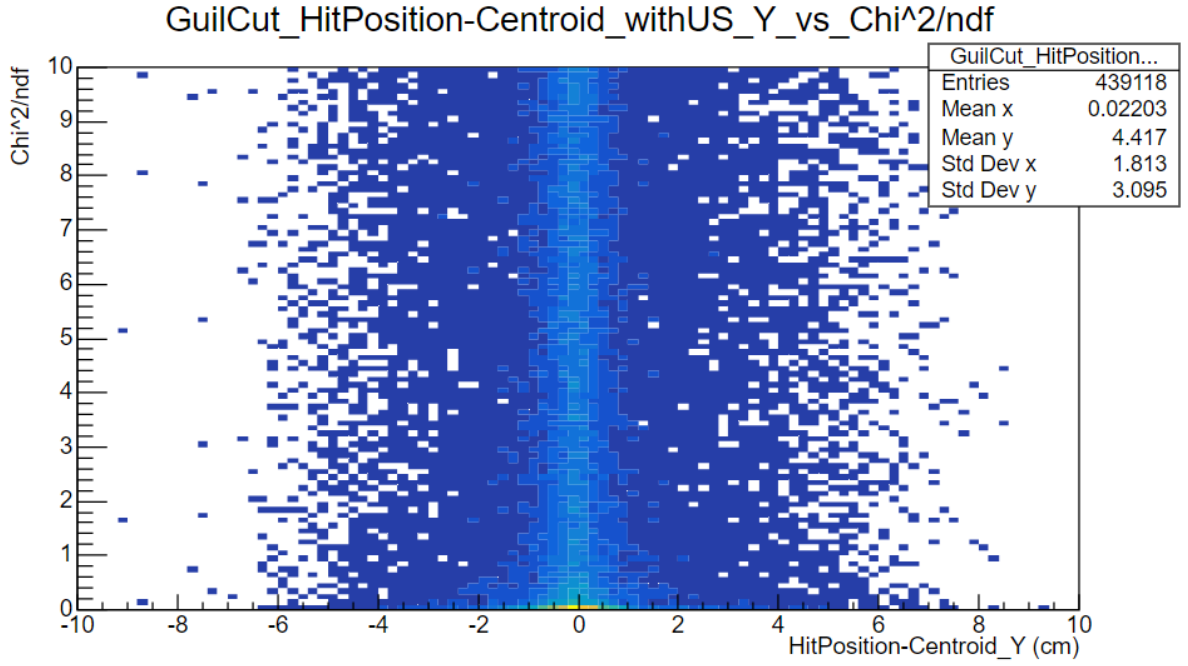
140 GeV


GuilCut_HitPosition-Centroid_X_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 439100
Mean x 0.2413
Mean y 3.284
Std Dev x 1.642
Std Dev y 2.963
Chi^2/ndf
HitPosition-Centroid_X (cm)

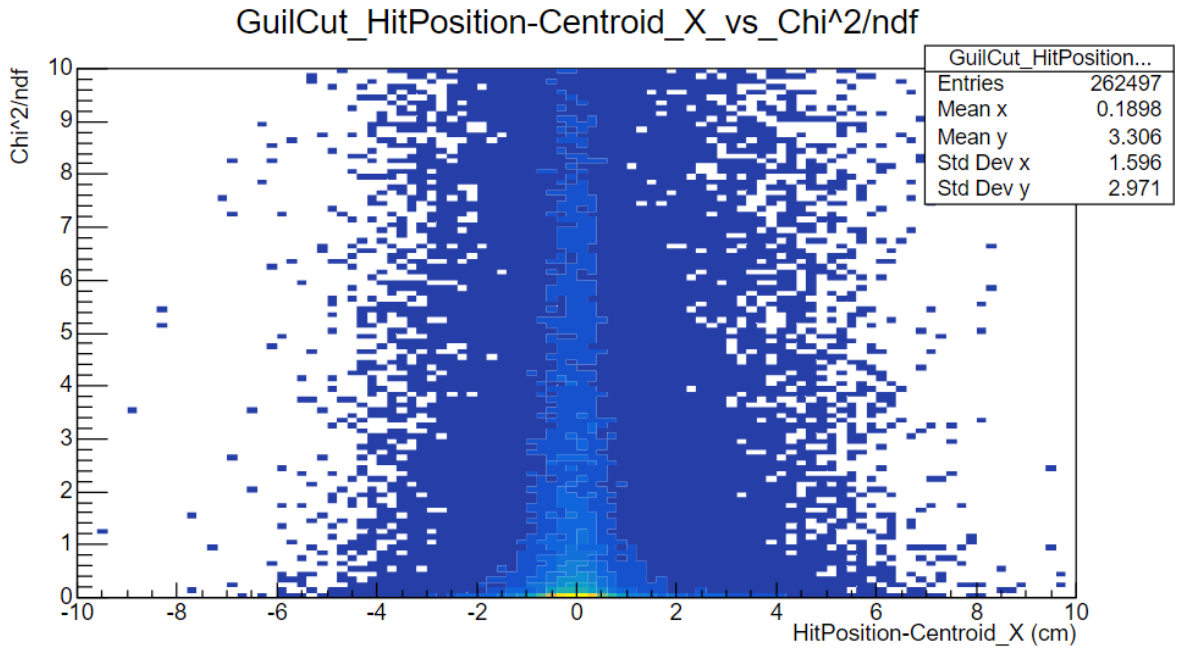

GuilCut_HitPosition-Centroid_withUS_X_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 439118
Mean x 0.05948
Mean y 3.913
Std Dev x 1.607
Std Dev y 3.092
Chi^2/ndf
HitPosition-Centroid_X (cm)

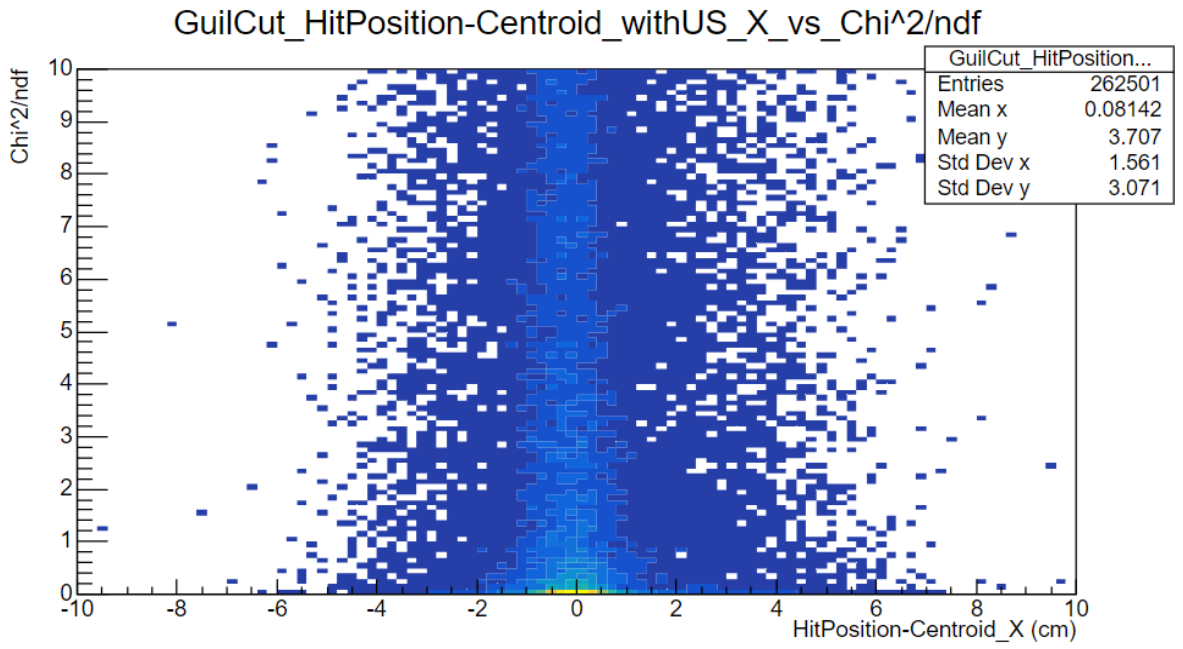
180 GeV


GuilCut_HitPosition-Centroid_Y_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 439100
Mean x 0.02623
Mean y 3.329
Std Dev x 1.904
Std Dev y 2.978
Chi^2/ndf
HitPosition-Centroid_Y (cm)

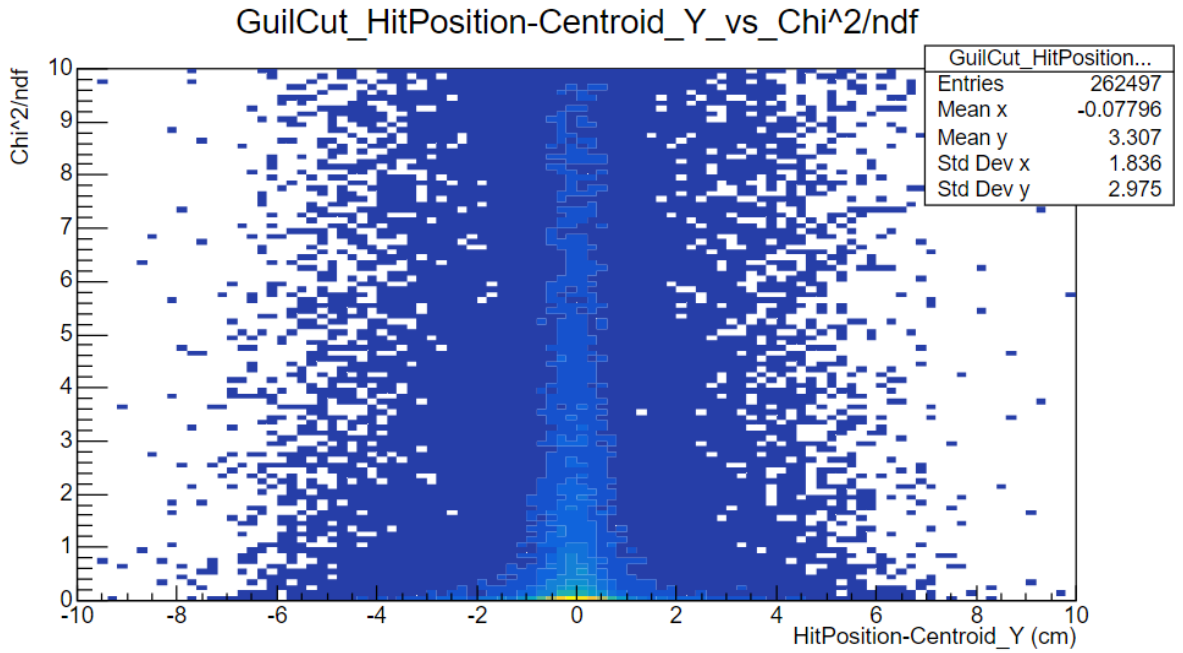

GuilCut_HitPosition-Centroid_withUS_Y_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 439118
Mean x 0.02203
Mean y 4.417
Std Dev x 1.813
Std Dev y 3.095
Chi^2/ndf
HitPosition-Centroid_Y (cm)

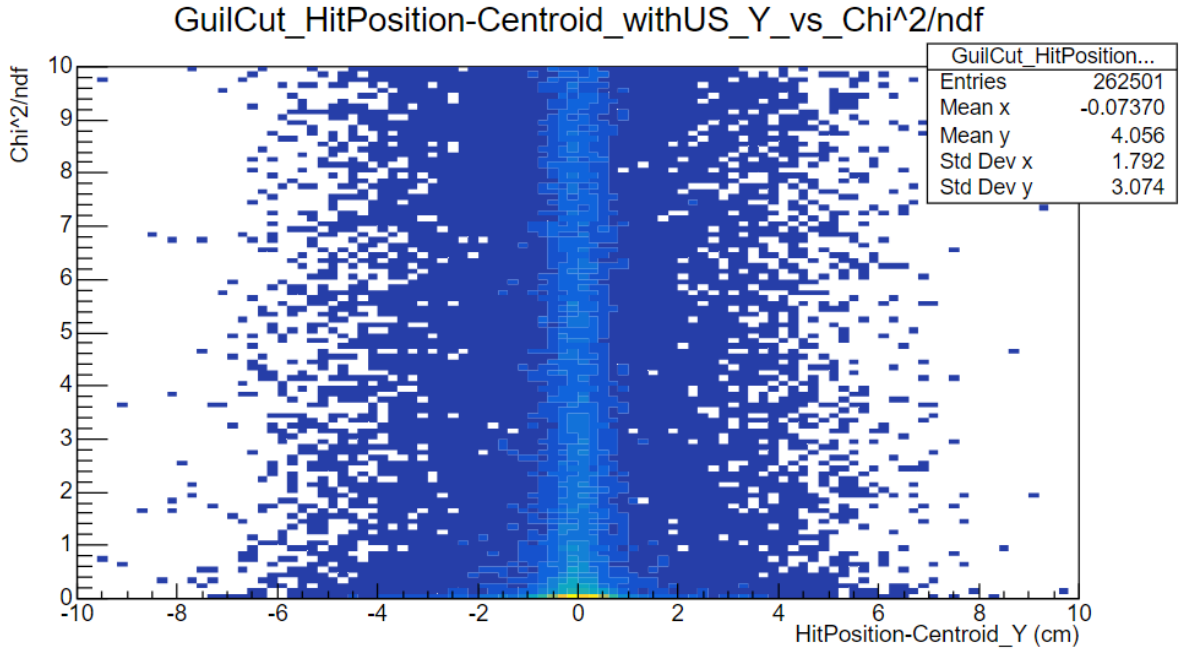
180 GeV


GuilCut_HitPosition-Centroid_X_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 262497
Mean x 0.1898
Mean y 3.306
Std Dev x 1.596
Std Dev y 2.971
Chi^2/ndf
HitPosition-Centroid_X (cm)

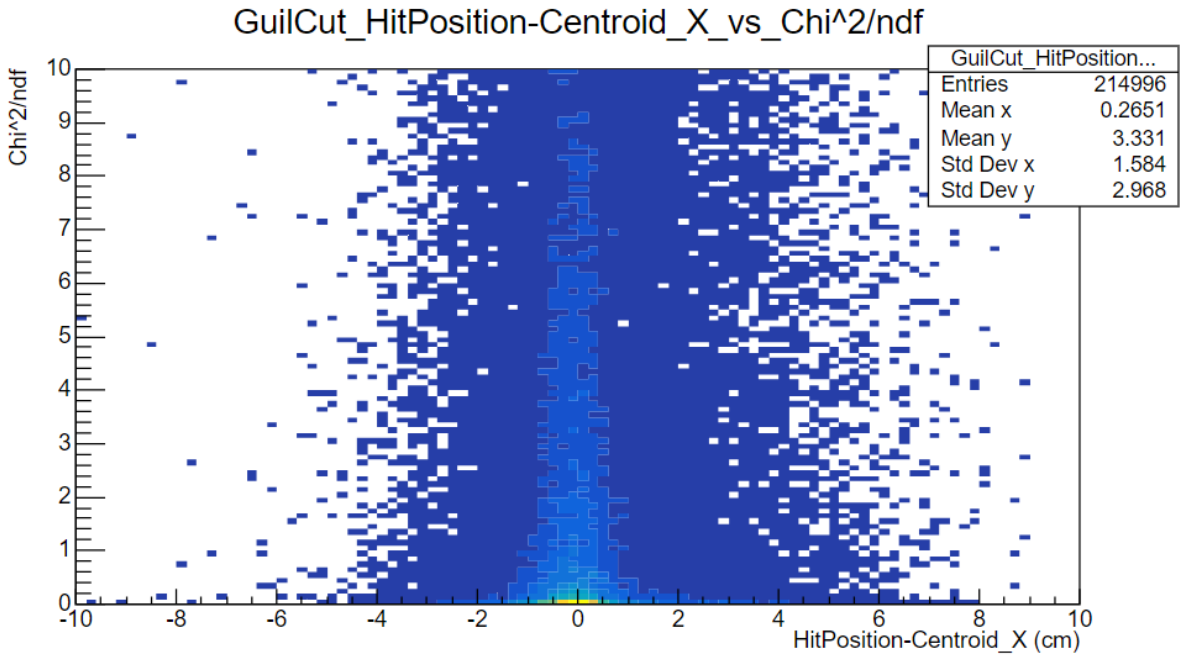

GuilCut_HitPosition-Centroid_withUS_X_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 262501
Mean x 0.08142
Mean y 3.707
Std Dev x 1.561
Std Dev y 3.071
Chi^2/ndf
HitPosition-Centroid_X (cm)

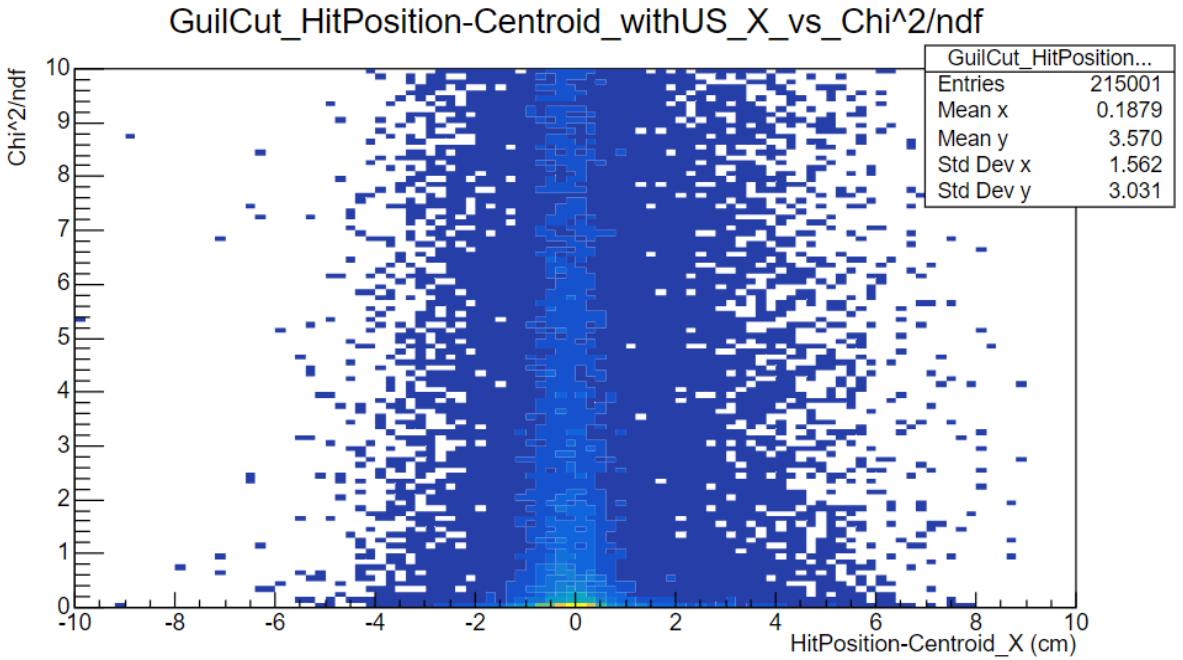
240 GeV


GuilCut_HitPosition-Centroid_Y_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 262497
Mean x -0.07796
Mean y 3.307
Std Dev x 1.836
Std Dev y 2.975
Chi^2/ndf
HitPosition-Centroid_Y (cm)

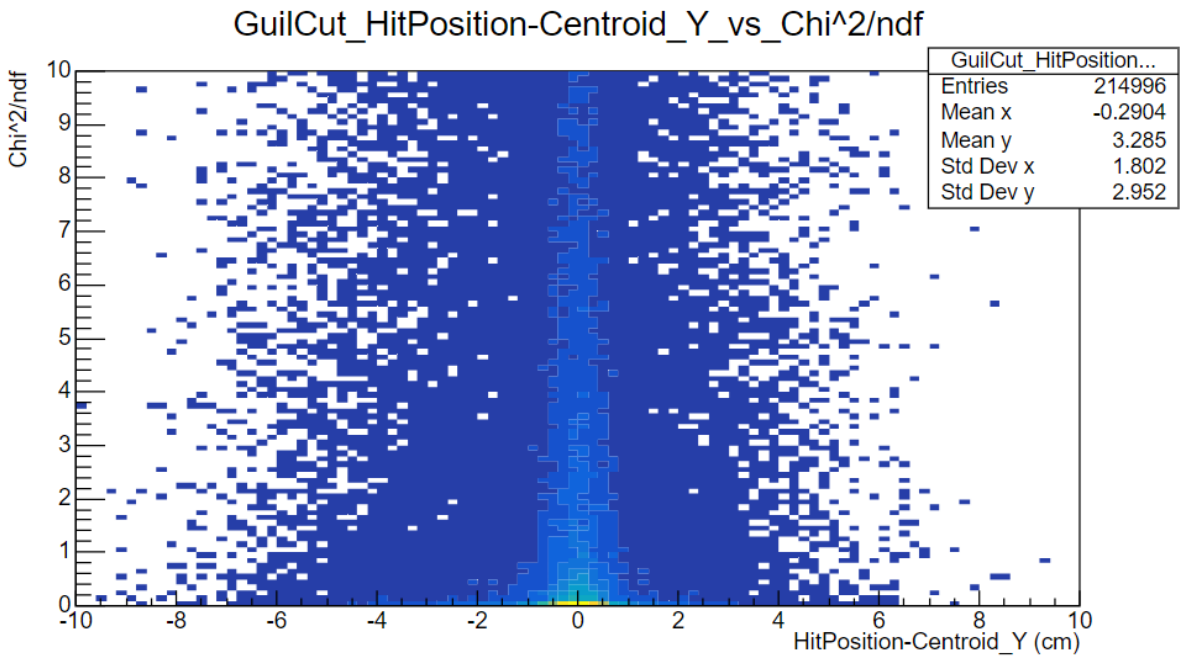

GuilCut_HitPosition-Centroid_withUS_Y_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 262501
Mean x -0.07370
Mean y 4.056
Std Dev x 1.792
Std Dev y 3.074
Chi^2/ndf
HitPosition-Centroid_Y (cm)

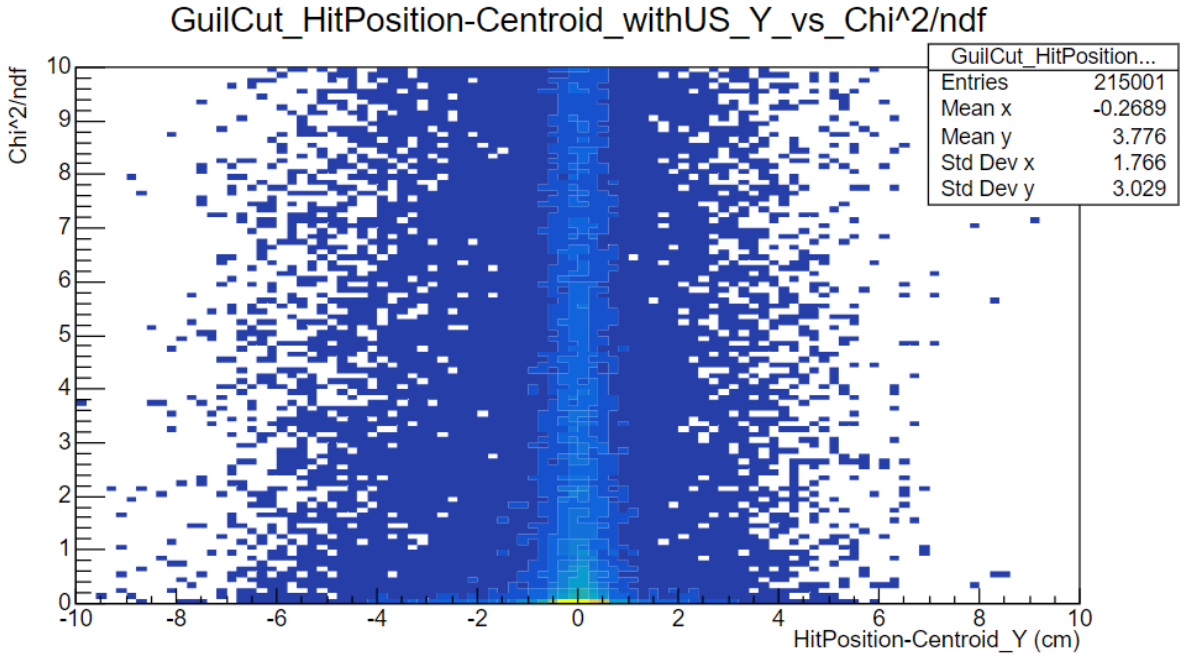
240 GeV


GuilCut_HitPosition-Centroid_X_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 214996
Mean x 0.2651
Mean y 3.331
Std Dev x 1.584
Std Dev y 2.968
Chi^2/ndf
HitPosition-Centroid_X (cm)


GuilCut_HitPosition-Centroid_withUS_X_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 215001
Mean x 0.1879
Mean y 3.570
Std Dev x 1.562
Std Dev y 3.031
Chi^2/ndf
HitPosition-Centroid_X (cm)

300 GeV


GuilCut_HitPosition-Centroid_Y_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 214996
Mean x -0.2904
Mean y 3.285
Std Dev x 1.802
Std Dev y 2.952
Chi^2/ndf
HitPosition-Centroid_Y (cm)


GuilCut_HitPosition-Centroid_withUS_Y_vs_Chi^2/ndf
GuilCut_HitPosition...
Entries 215001
Mean x -0.2689
Mean y 3.776
Std Dev x 1.766
Std Dev y 3.029
Chi^2/ndf
HitPosition-Centroid_Y (cm)

300 GeV