GENEVA MEETING

25/01/2006

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- Efficiency studies
- Hit Resolution studies
- Momentum studies
- Vertex studies

Layer Efficiency and Hit Resolution

Momentum Resolution

Photon Energy and Angular Resolution

Data Sample

(files with last code version)

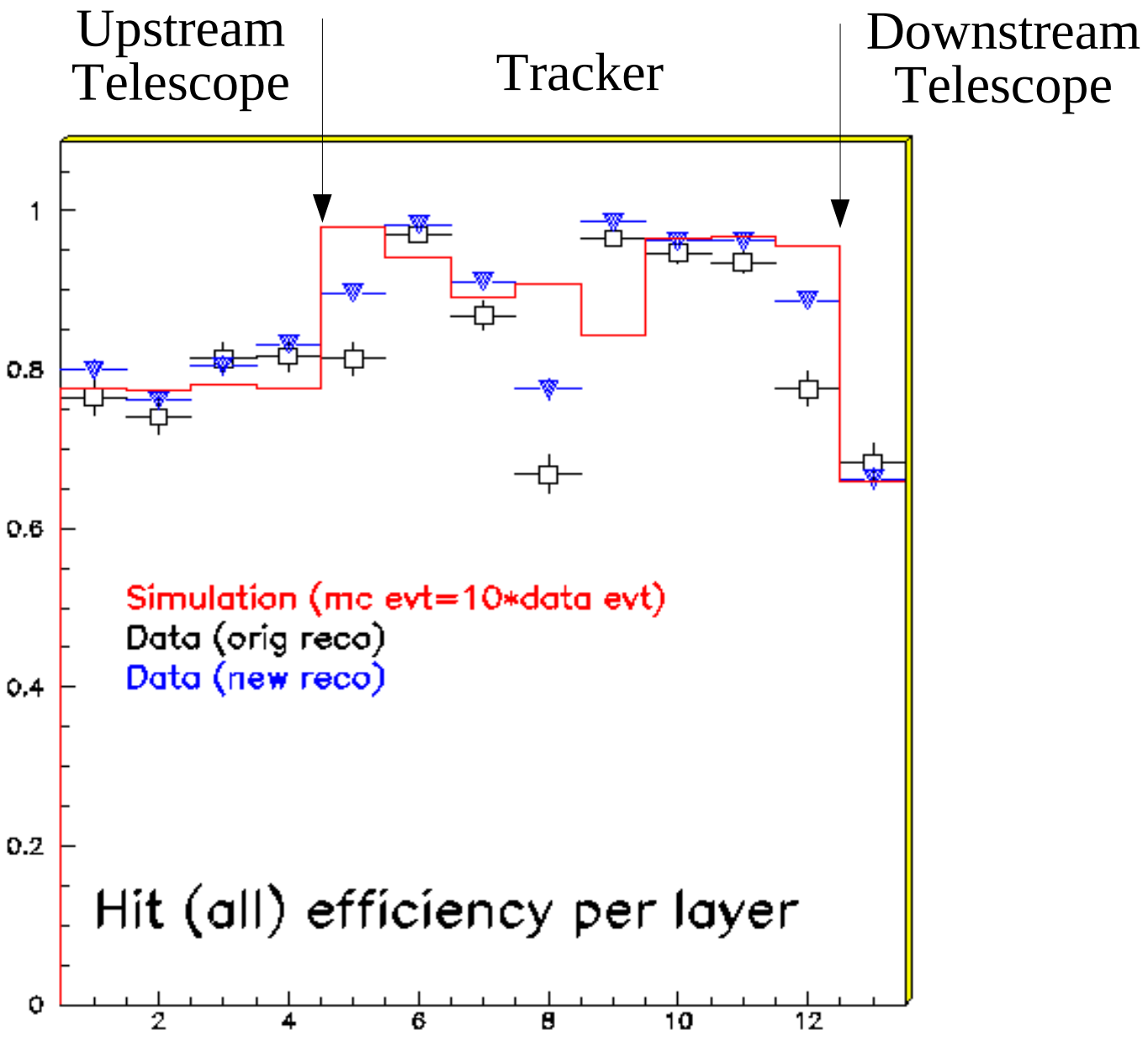
Run	Energy	Trigger	Magnet	Converter	S/N cut	# Events
1210	5 GeV	BC1C2	OFF	OFF	4	20000
1461	7 GeV	BC1C2	ON	OFF	4	19000
1470	5 GeV	BC1C2	ON	ON	4	19000

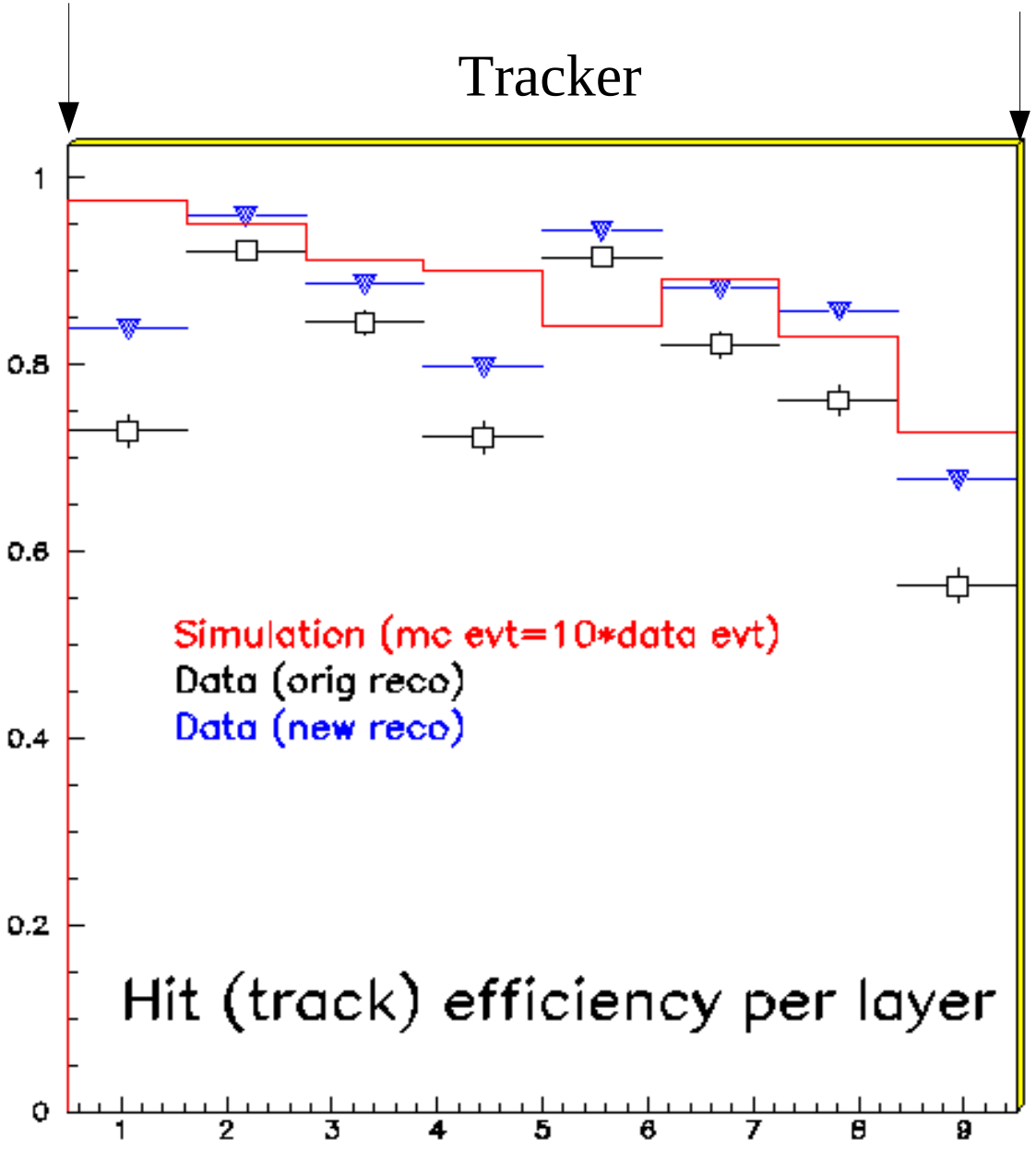
Montecarlo Sample

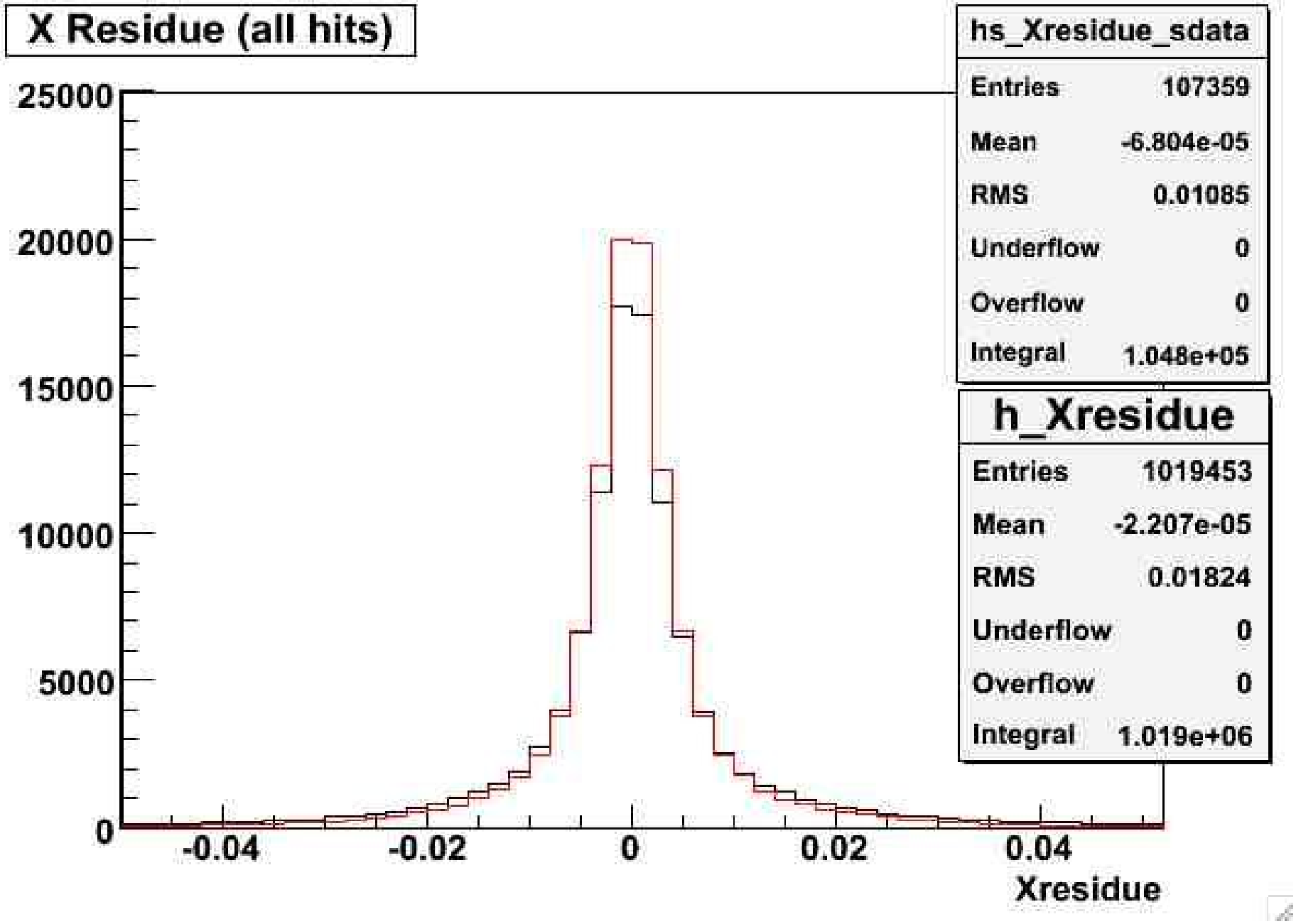
(files with last code version *)

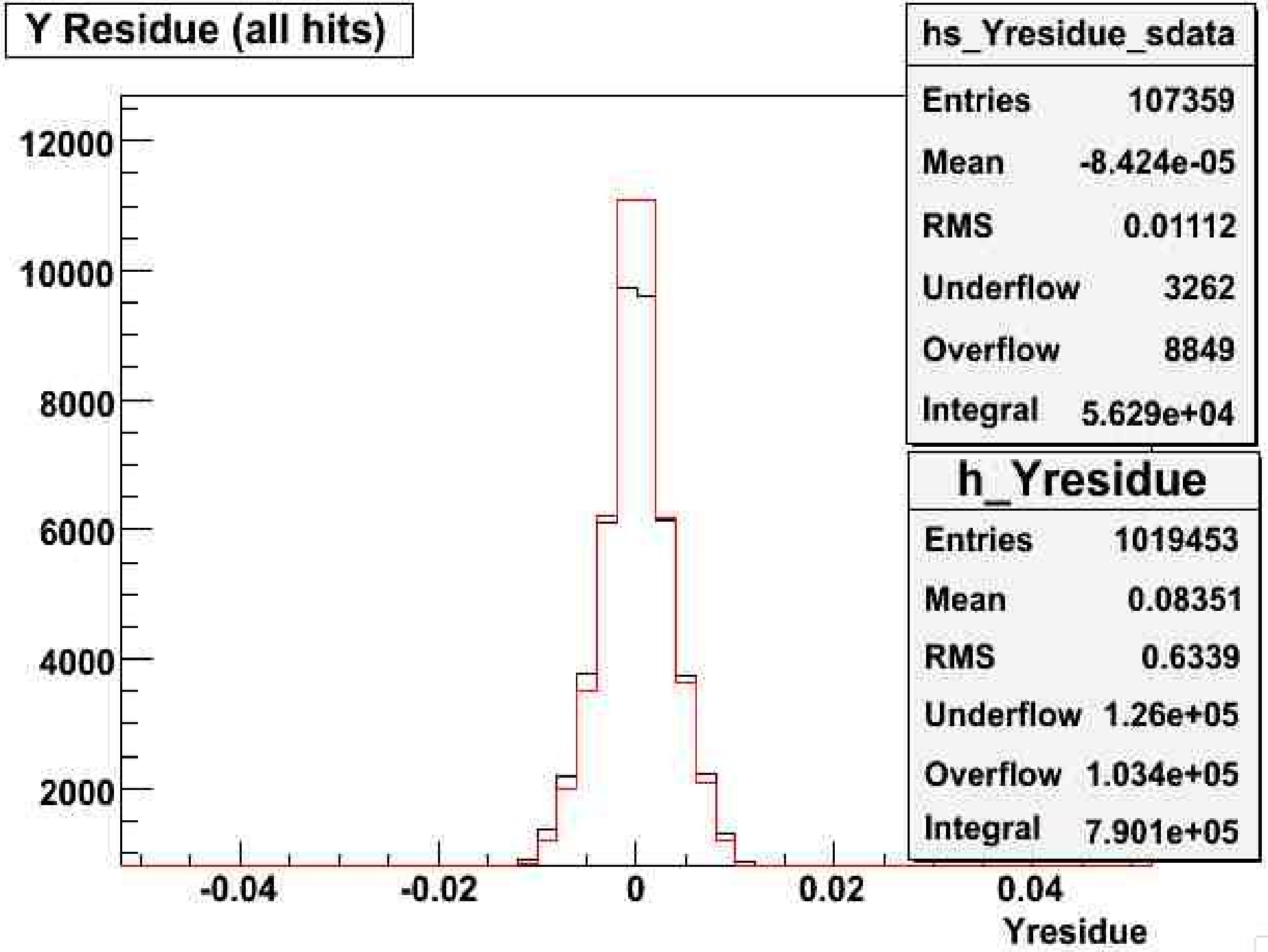
Energy	Trigger	Magnet	Converter	# Events
5 GeV	BC1C2	OFF	OFF	200000
7 GeV	BC1C2	ON	OFF	20000
7 GeV	BC1C2	ON	ON	20000 *

Efficiency and *X*, *Y* Residue


Upstream Telescope
Tracker
Downstream Telescope
Simulation (mc evt=10*data evt)
Data (orig reco)
Data (new reco)
Hit (all) efficiency per layer
0
0.2
0.4
0.6
0.8
1
2
4
6
8
10
12

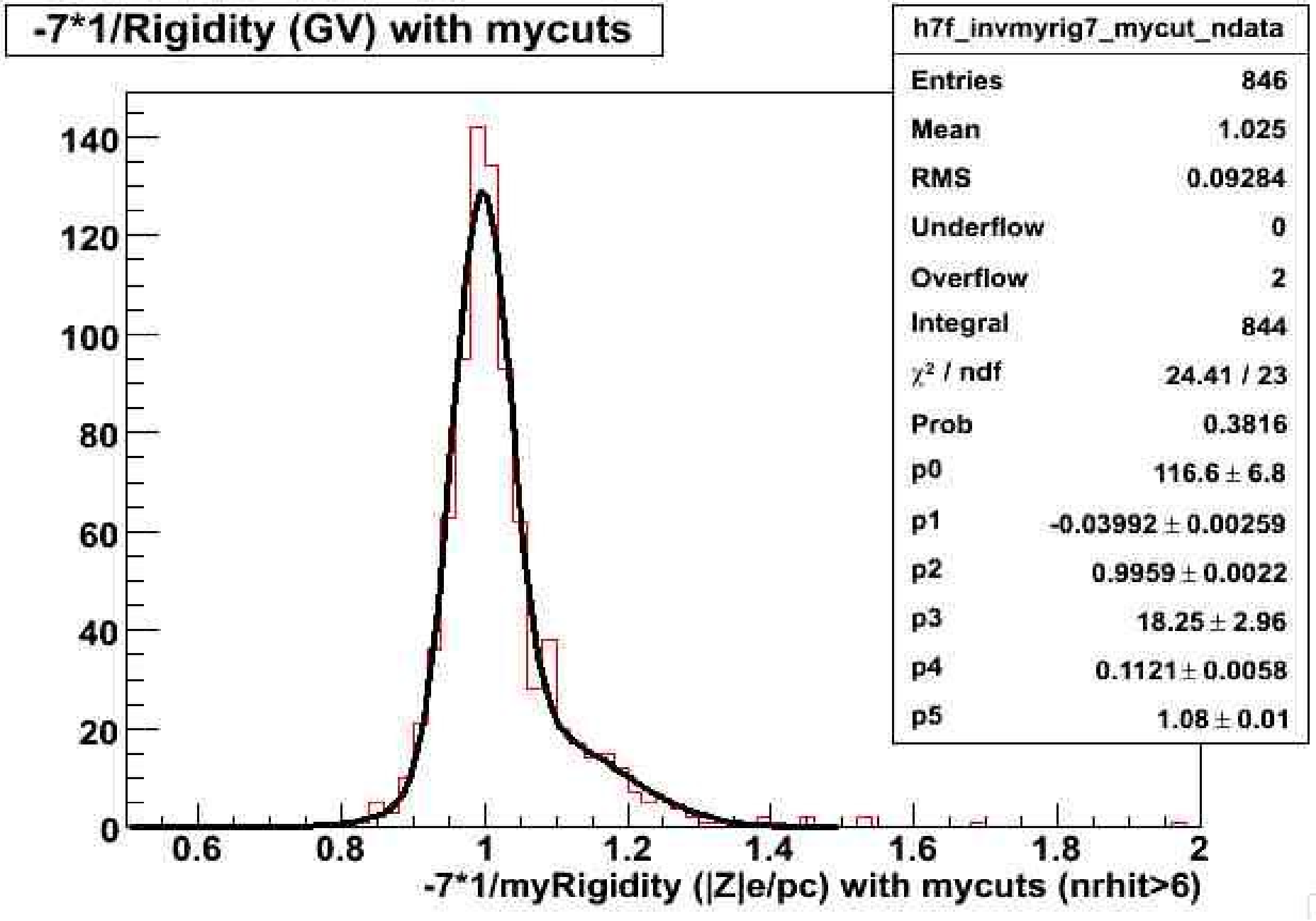

Tracker
1
0.8
0.6
0.4
0.2
0
1
2
3
4
5
6
7
8
9
Simulation (mc evt=10*data evt)
Data (orig reco)
Data (new reco)
Hit (track) efficiency per layer


X Residue (all hits)
hs_Xresidue_sdata
Entries 107359
Mean -6.804e-05
RMS 0.01085
Underflow 0
Overflow 0
Integral 1.048e+05
h_Xresidue
Entries 1019453
Mean -2.207e-05
RMS 0.01824
Underflow 0
Overflow 0
Integral 1.019e+06
25000
20000
15000
10000
5000
0
-0.04
-0.02
0
0.02
0.04
Xresidue

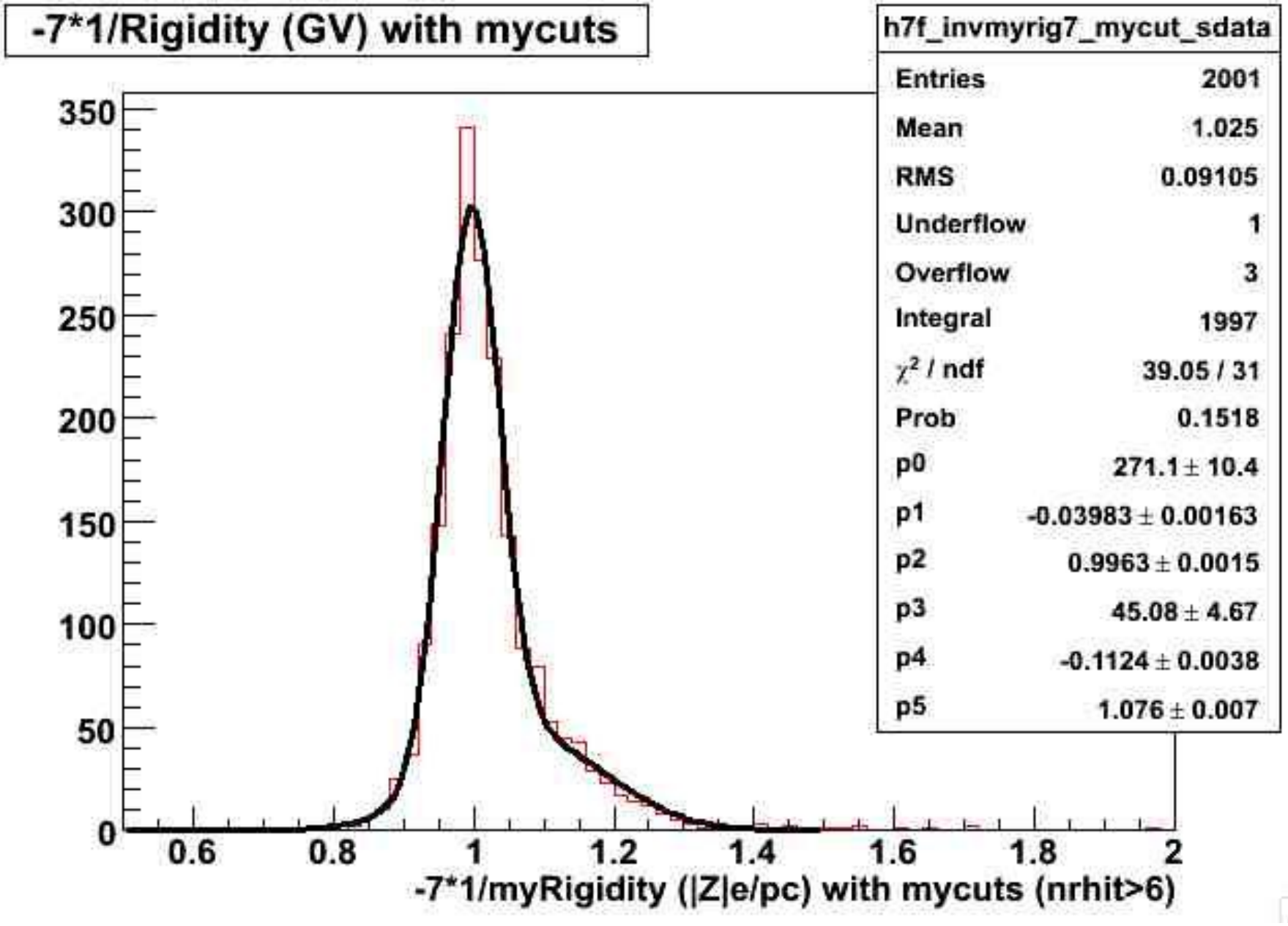

Y Residue (all hits)
hs_Yresidue_sdata
Entries 107359
Mean -8.424e-05
RMS 0.01112
Underflow 3262
Overflow 8849
Integral 5.629e+04
h_Yresidue
Entries 1019453
Mean 0.08351
RMS 0.6339
Underflow 1.26e+05
Overflow 1.034e+05
Integral 7.901e+05
12000
10000
8000
6000
4000
2000
-0.04
-0.02
0
0.02
0.04
Yresidue

Momentum Resolution

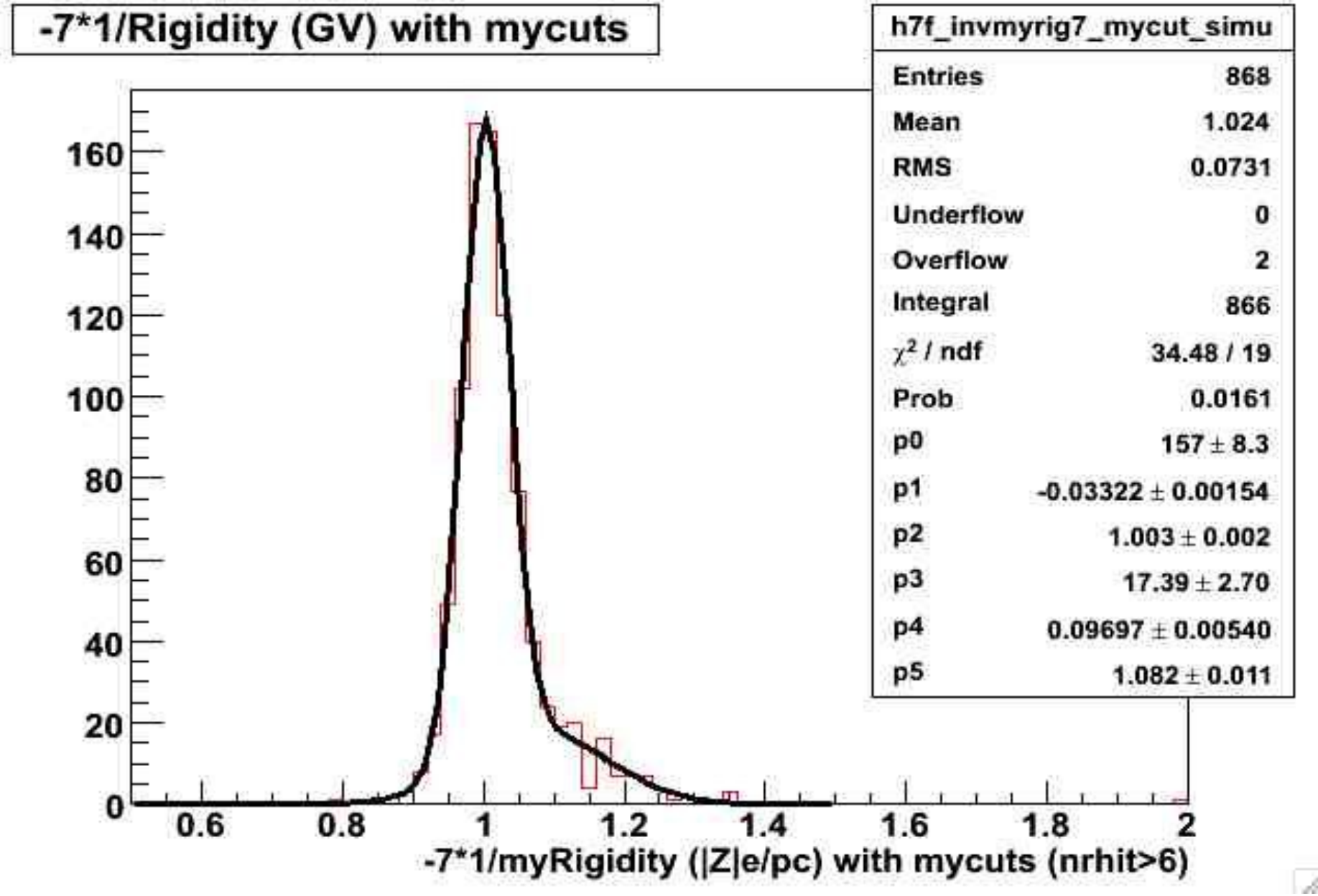
Old Reco


-7*1/Rigidity (GV) with mycuts
h7f_invmyrig7_mycut_ndata
Entries 846
Mean 1.025
RMS 0.09284
Underflow 0
Overflow 2
Integral 844
χ² / ndf 24.41 / 23
Prob 0.3816
p0 116.6 ± 6.8
p1 -0.03992 ± 0.00259
p2 0.9959 ± 0.0022
p3 18.25 ± 2.96
p4 0.1121 ± 0.0058
p5 1.08 ± 0.01
140
120
100
80
60
40
20
0
0.6
0.8
1
1.2
1.4
1.6
1.8
2
-7*1/myRigidity (|Z|e/pc) with mycuts (nrhit>6)

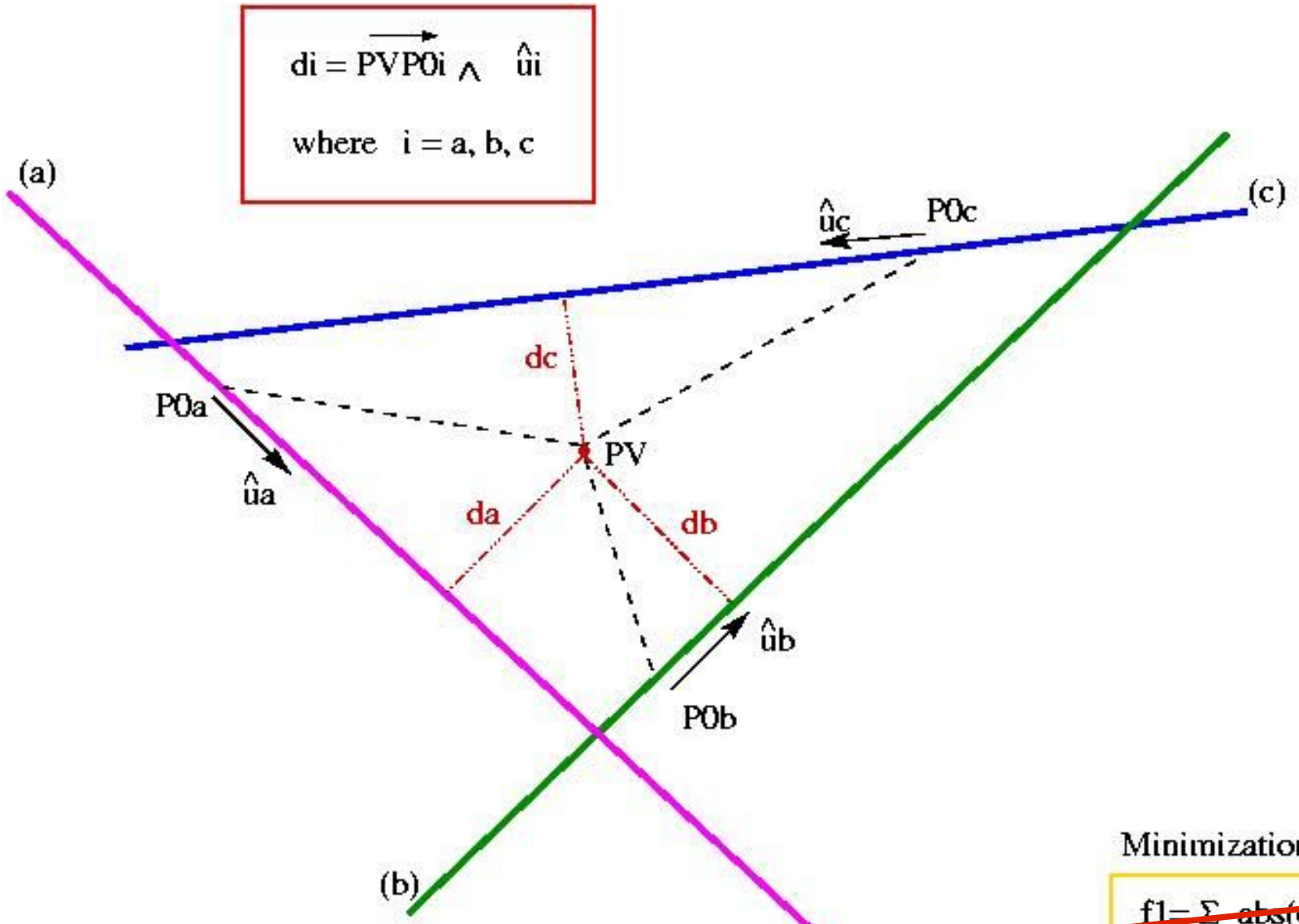
New Reco


-7*1/Rigidity (GV) with mycuts
h7f_invmyrig7_mycut_sdata
Entries 2001
Mean 1.025
RMS 0.09105
Underflow 1
Overflow 3
Integral 1997
χ² / ndf 39.05 / 31
Prob 0.1518
p0 271.1 ± 10.4
p1 -0.03983 ± 0.00163
p2 0.9963 ± 0.0015
p3 45.08 ± 4.67
p4 -0.1124 ± 0.0038
p5 1.076 ± 0.007
350
300
250
200
150
100
50
0
0.6
0.8
1
1.2
1.4
1.6
1.8
2
-7*1/myRigidity (|Z|e/pc) with mycuts (nrhit>6)

Simulation (new reco)



New Vertex Algorithm



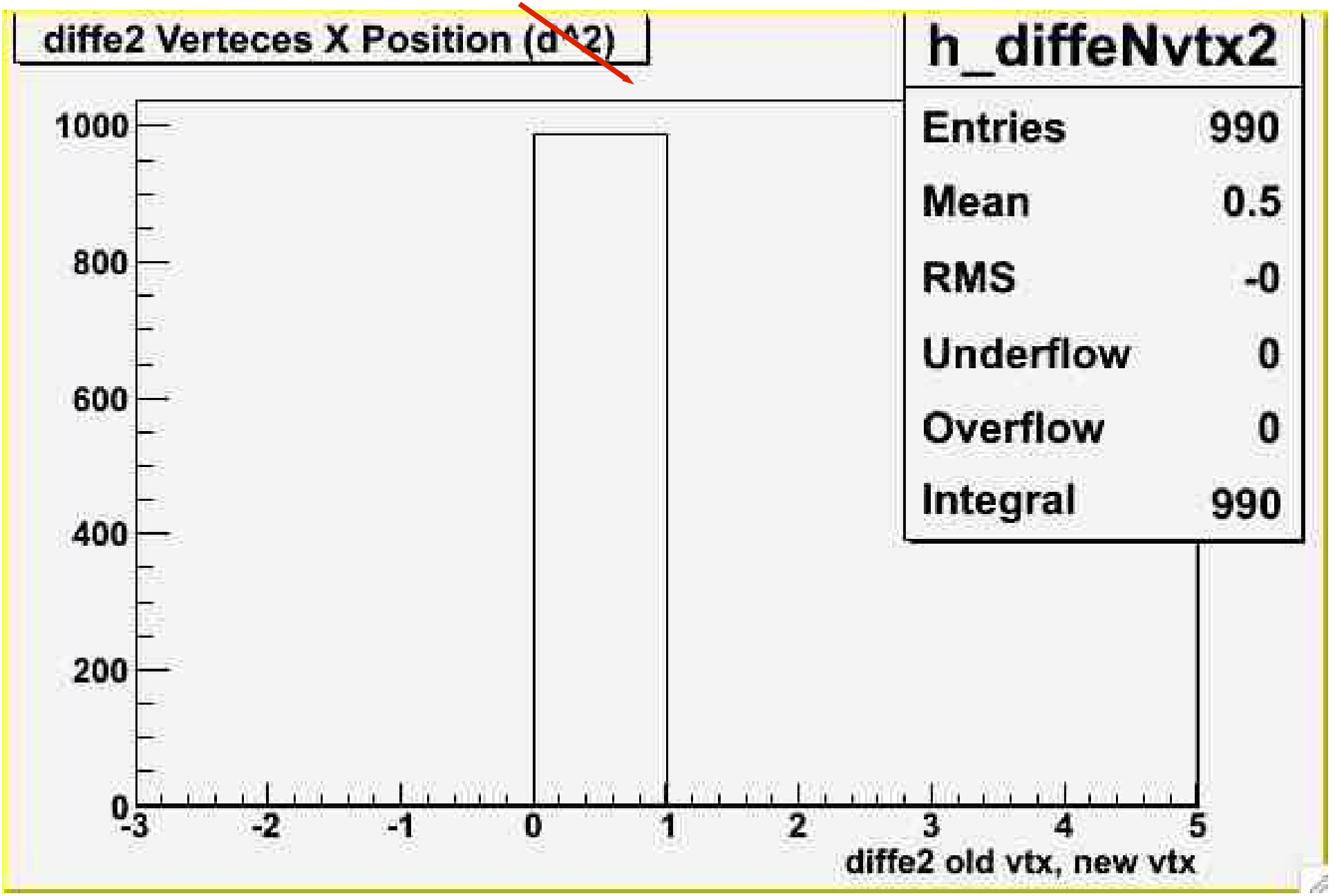
Minimization of:

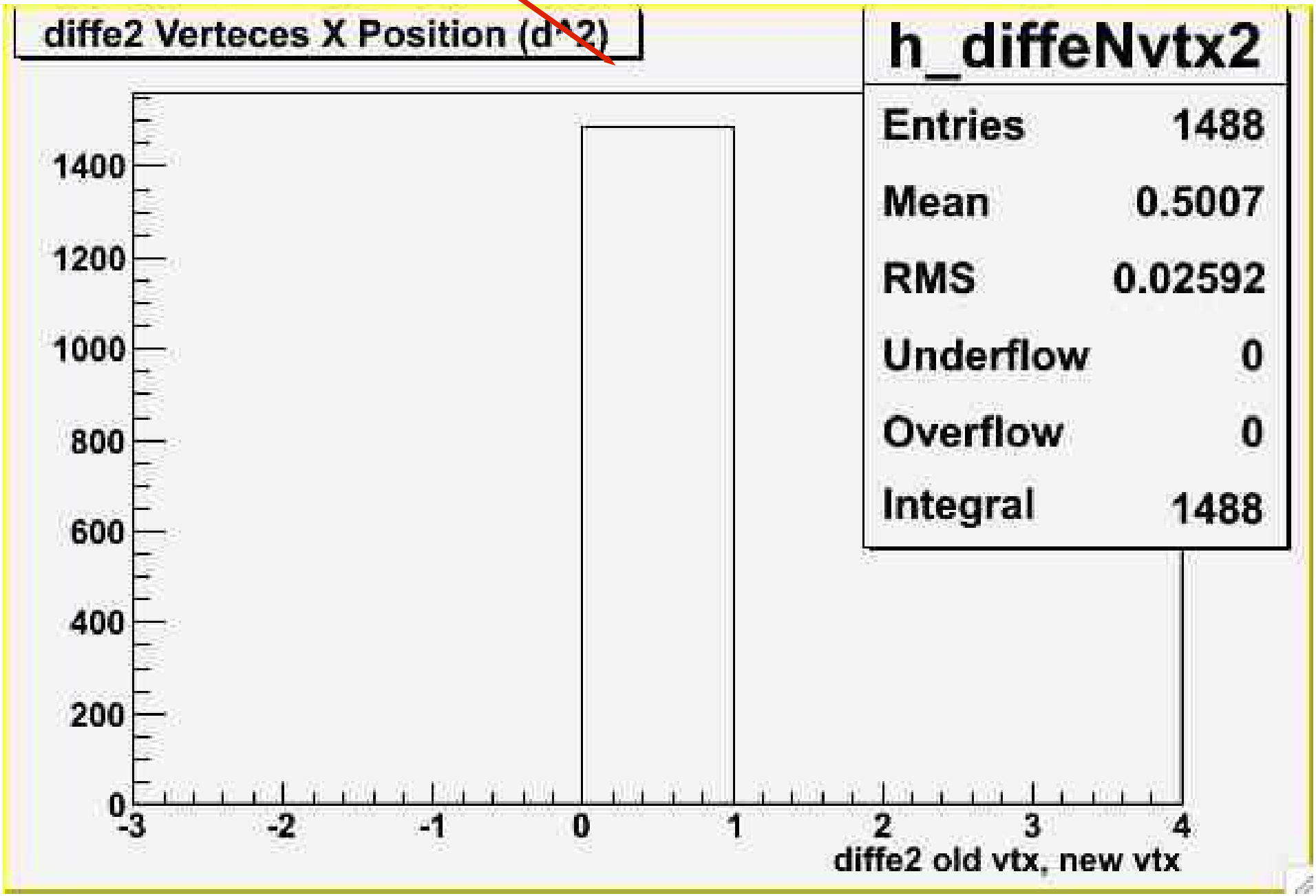
~~f1= Σ abs(di)~~

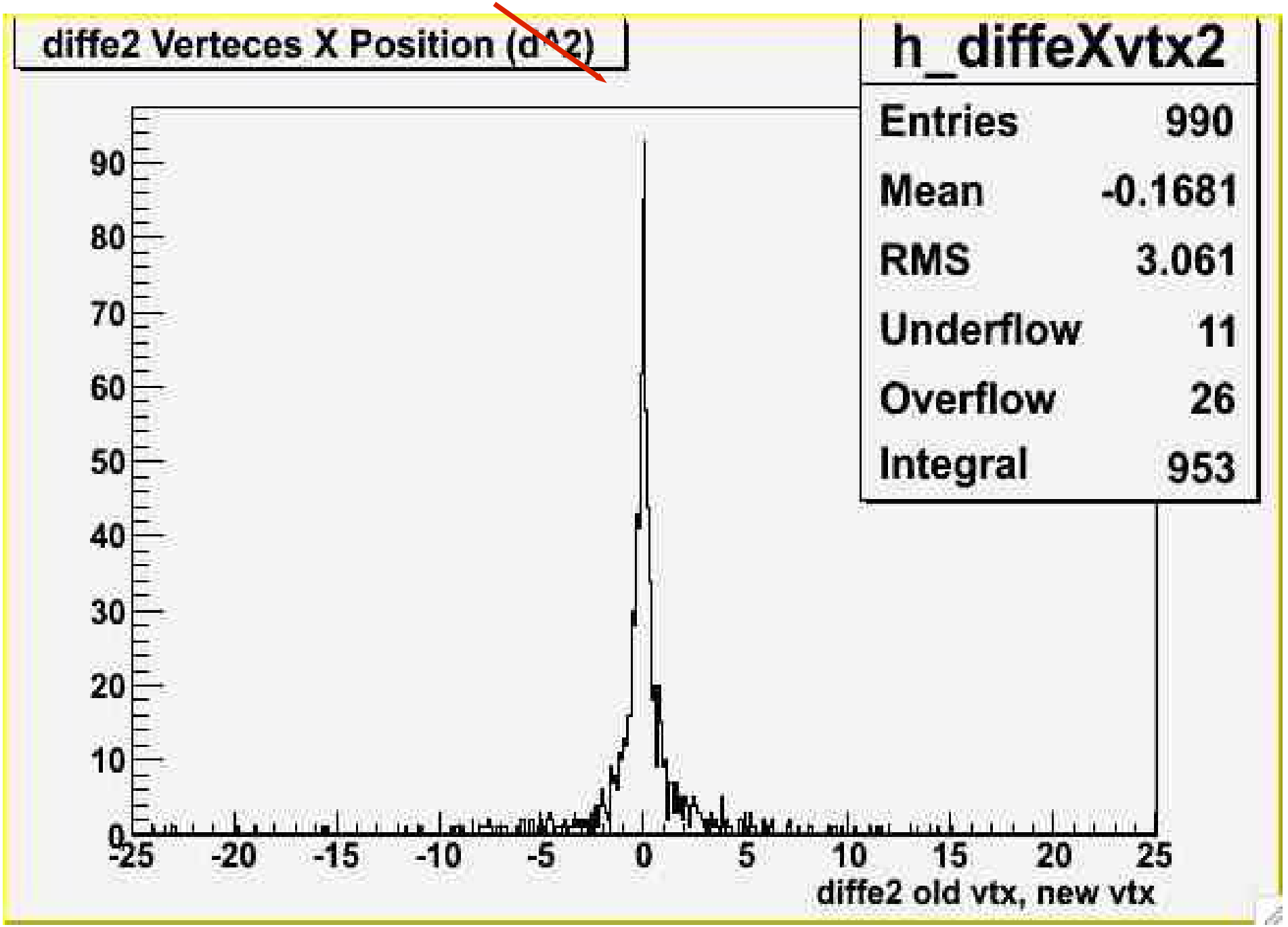
f2= Σ (di) ^2

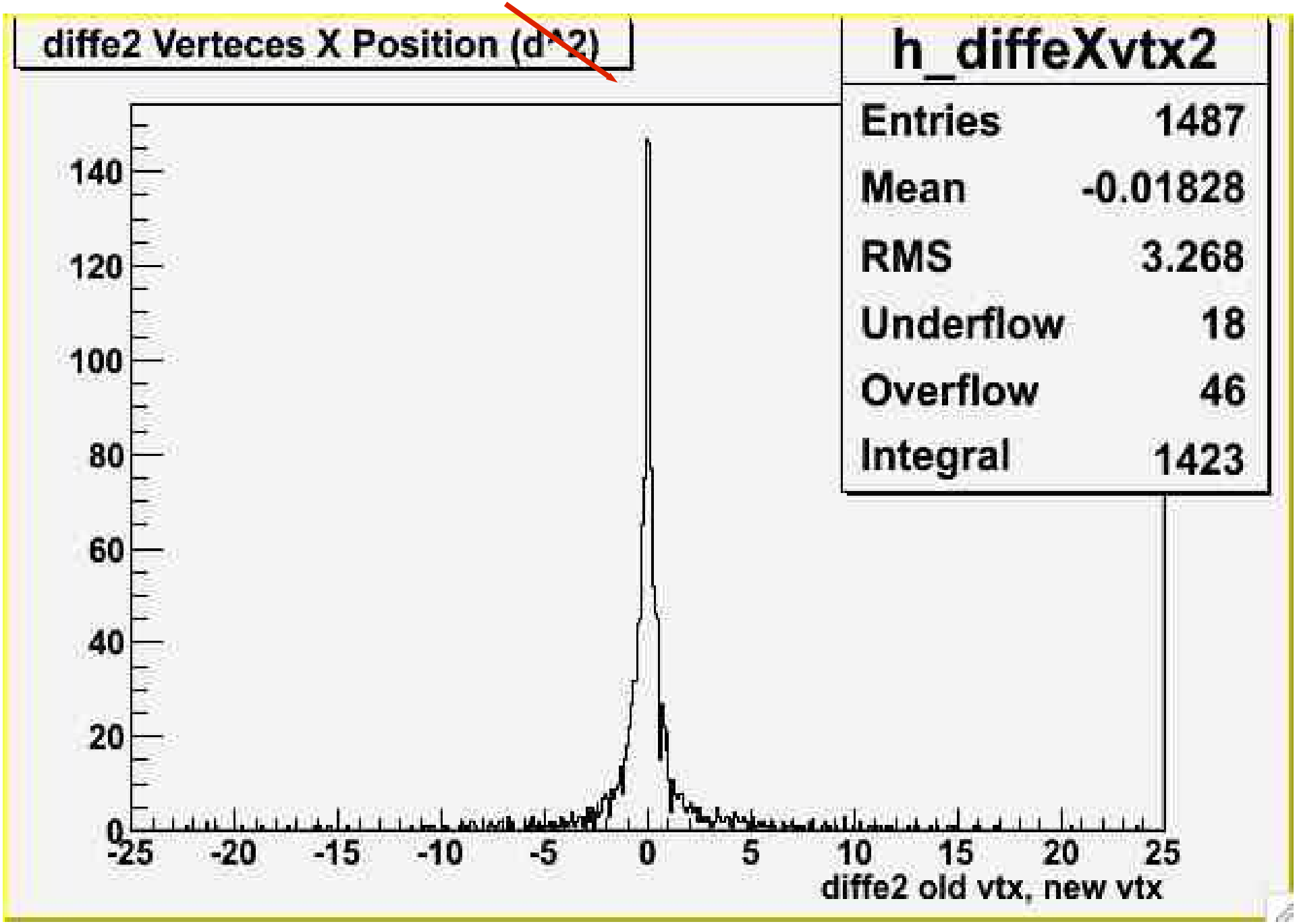
f3= Σ (di/sigma)^2

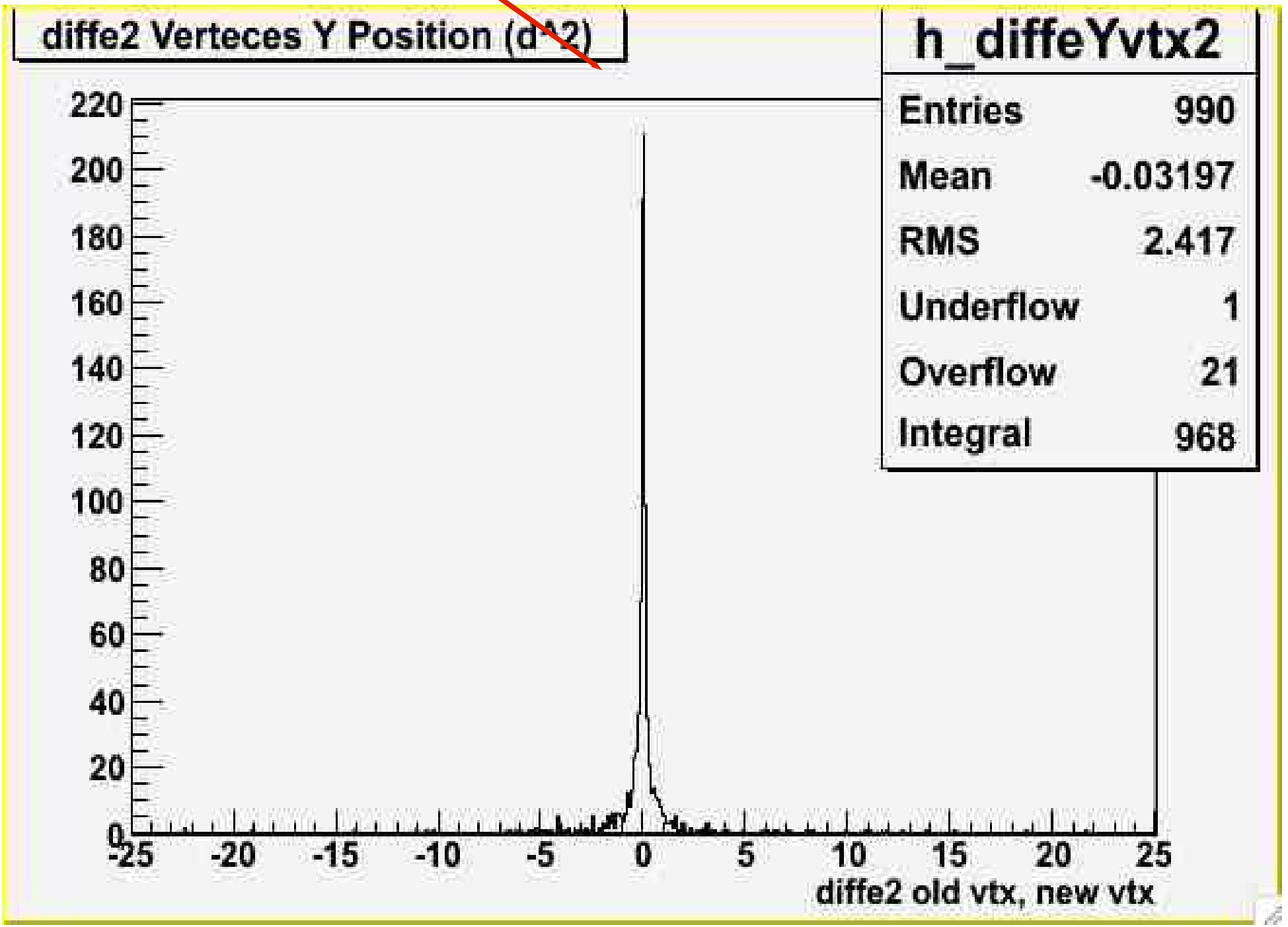
Used function in the following results

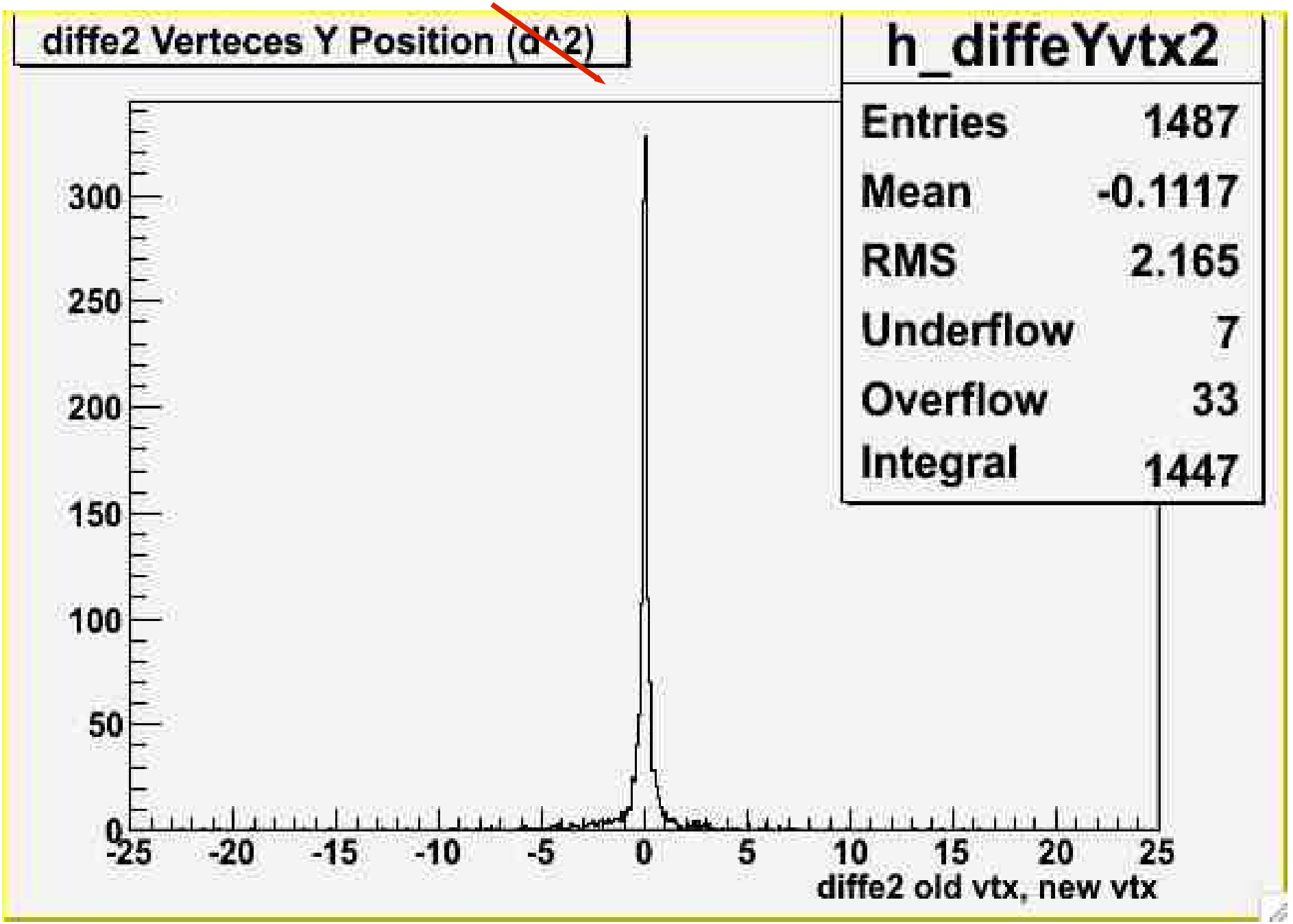

diffe2 Verteces X Position (d^2)
h_diffeNvtx2
Entries 990
Mean 0.5
RMS -0
Underflow 0
Overflow 0
Integral 990
1000
800
600
400
200
0
-3
-2
-1
0
1
2
3
4
5
diffe2 old vtx, new vtx

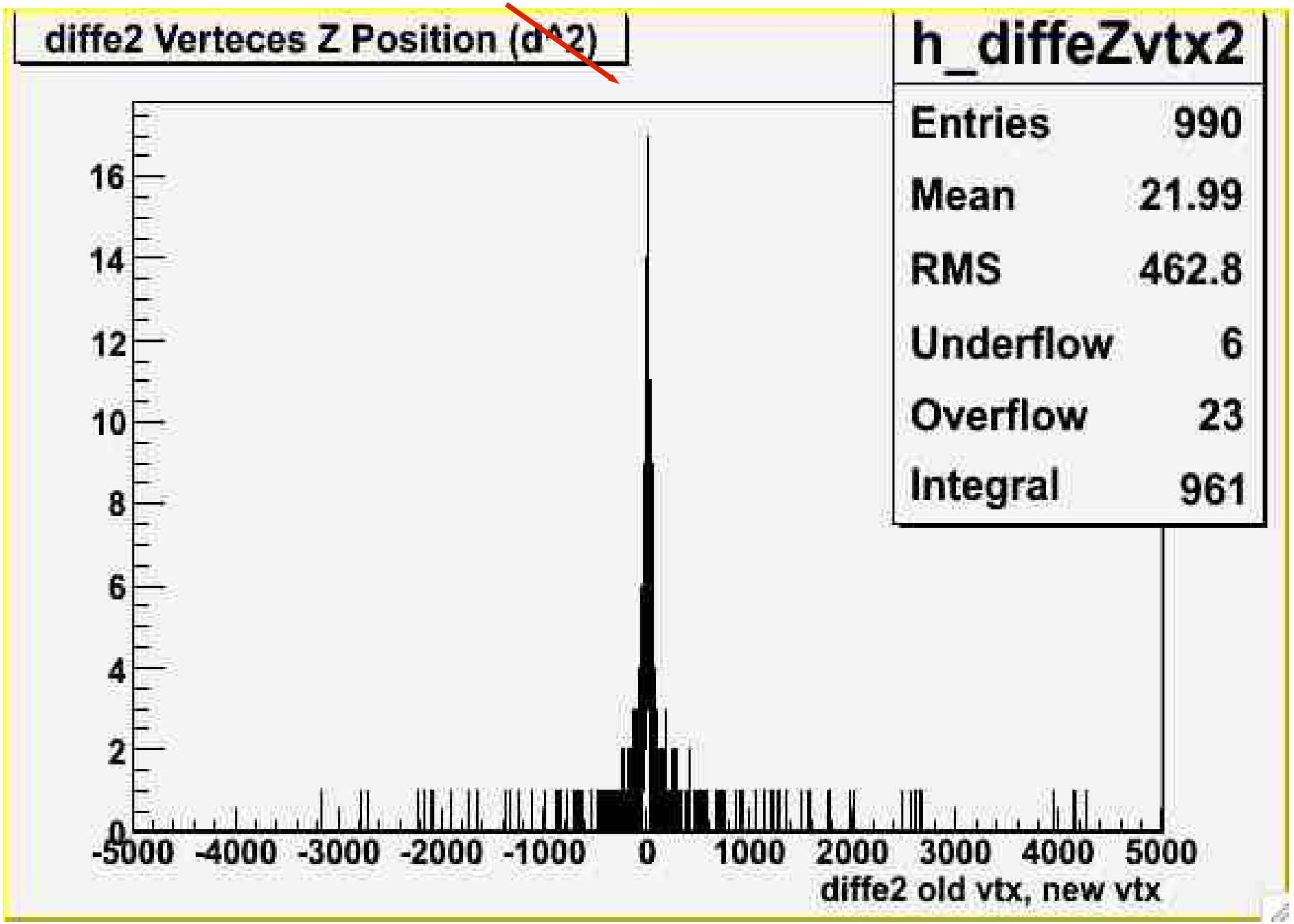

diffe2 Verteces X Position (d^2)
h_diffeNvtx2
Entries 1488
Mean 0.5007
RMS 0.02592
Underflow 0
Overflow 0
Integral 1488
1400
1200
1000
800
600
400
200
0
-3
-2
-1
0
1
2
3
4
diffe2 old vtx, new vtx

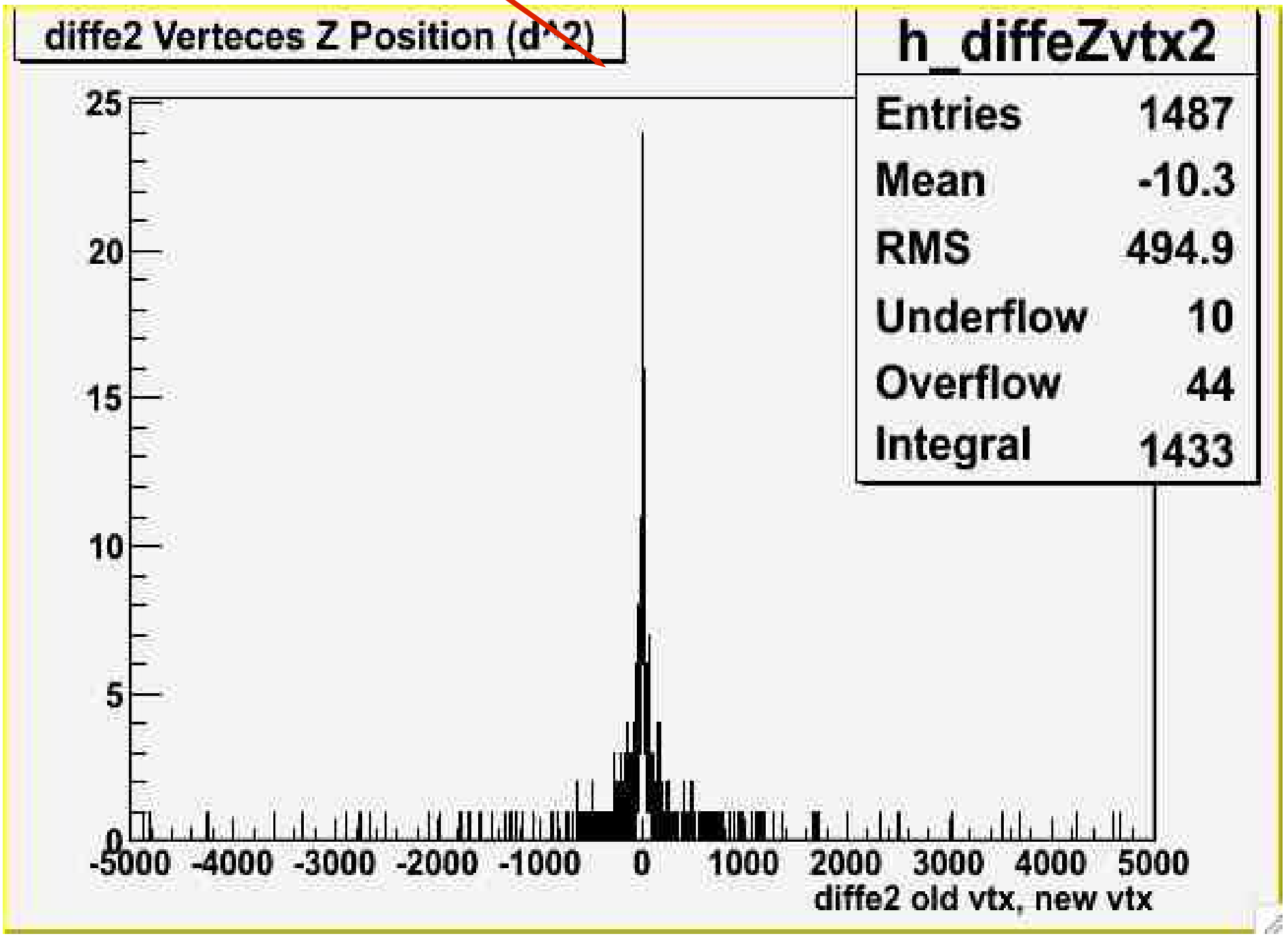

diffe2 Verteces X Position (d^2)
h_diffeXvtx2
Entries 990
Mean -0.1681
RMS 3.061
Underflow 11
Overflow 26
Integral 953
90
80
70
60
50
40
30
20
10
0
-25
-20
-15
-10
-5
0
5
10
15
20
25
diffe2 old vtx, new vtx


diffe2 Verteces X Position (d^2)
h_diffeXvtx2
Entries 1487
Mean -0.01828
RMS 3.268
Underflow 18
Overflow 46
Integral 1423
140
120
100
80
60
40
20
0
-25
-20
-15
-10
-5
0
5
10
15
20
25
diffe2 old vtx, new vtx


diffe2 Verteces Y Position (d^2)
h_diffeYvtx2
Entries 990
Mean -0.03197
RMS 2.417
Underflow 1
Overflow 21
Integral 968
220
200
180
160
140
120
100
80
60
40
20
0
-25
-20
-15
-10
-5
0
5
10
15
20
25
diffe2 old vtx, new vtx

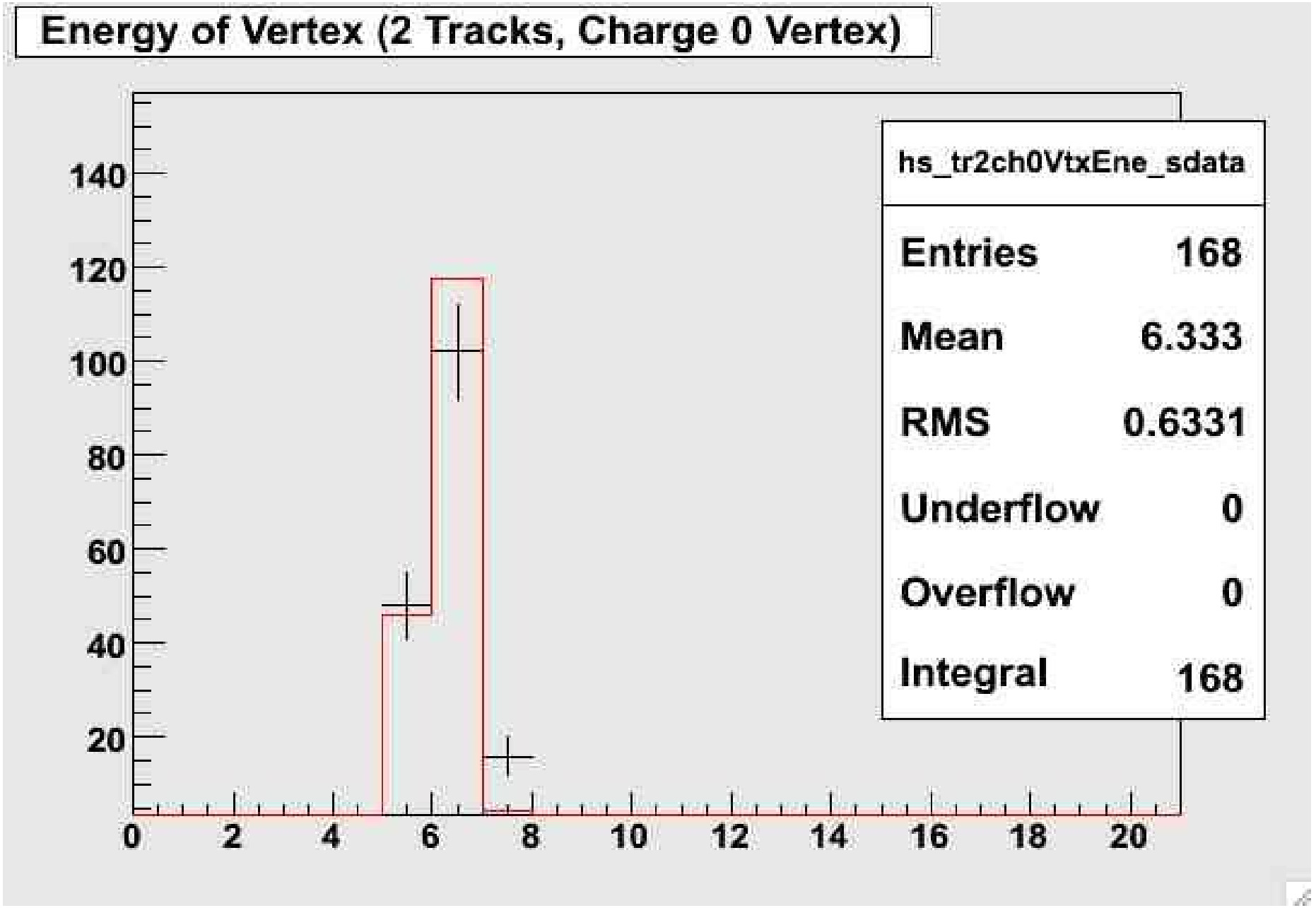

diffe2 Verteces Y Position (d^2)
h_diffeYvtx2
Entries 1487
Mean -0.1117
RMS 2.165
Underflow 7
Overflow 33
Integral 1447
300
250
200
150
100
50
0
-25
-20
-15
-10
-5
0
5
10
15
20
25
diffe2 old vtx, new vtx


diffe2 Verteces Z Position (d^2)
h_diffeZvtx2
Entries 990
Mean 21.99
RMS 462.8
Underflow 6
Overflow 23
Integral 961
16
14
12
10
8
6
4
2
0
-5000 -4000 -3000 -2000 -1000 0 1000 2000 3000 4000 5000
diffe2 old vtx, new vtx

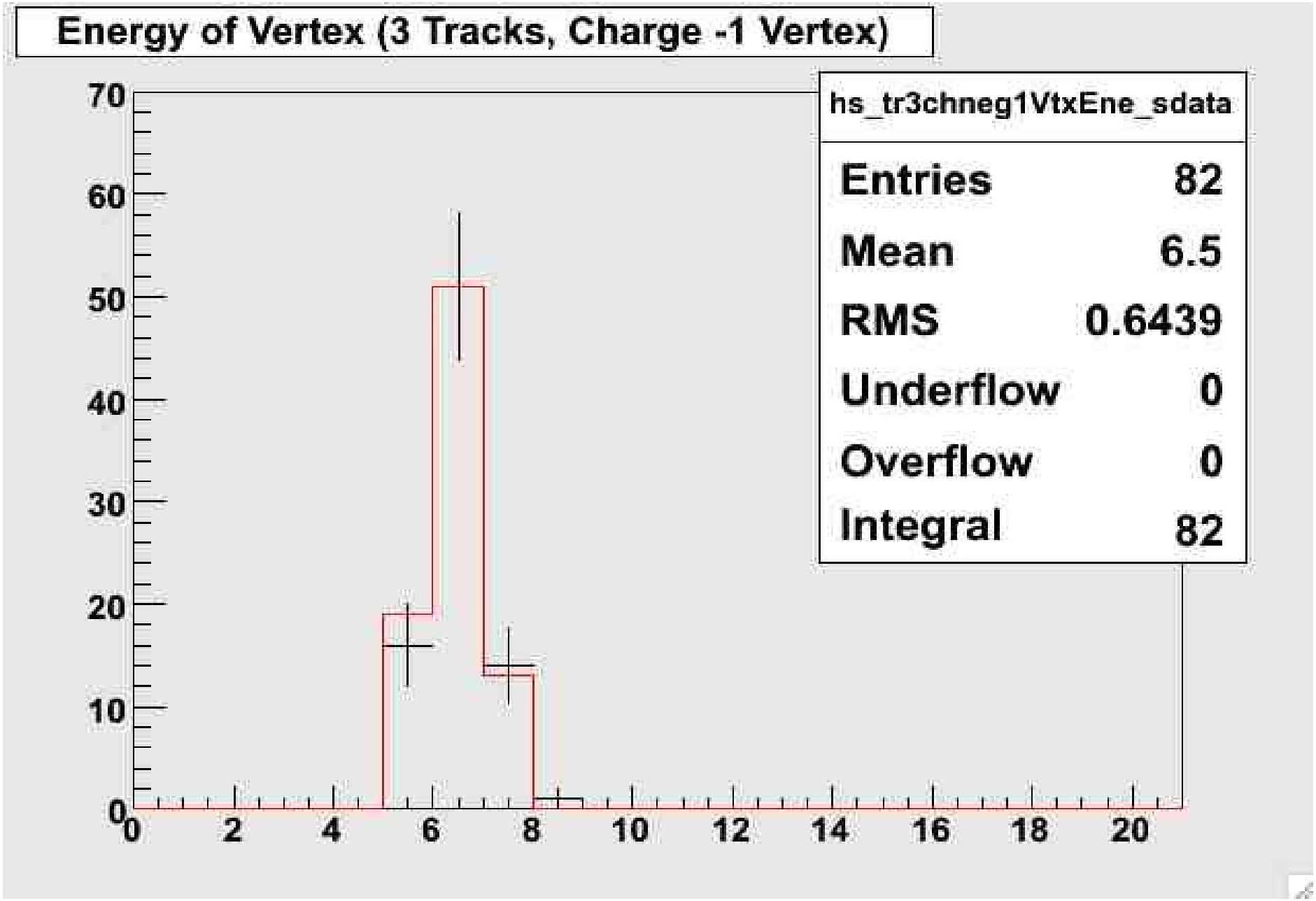

diffe2 Verteces Z Position (d^2)
h_diffeZvtx2
Entries 1487
Mean -10.3
RMS 494.9
Underflow 10
Overflow 44
Integral 1433
25
20
15
10
5
0
-5000 -4000 -3000 -2000 -1000 0 1000 2000 3000 4000 5000
diffe2 old vtx, new vtx

Vertex distributions

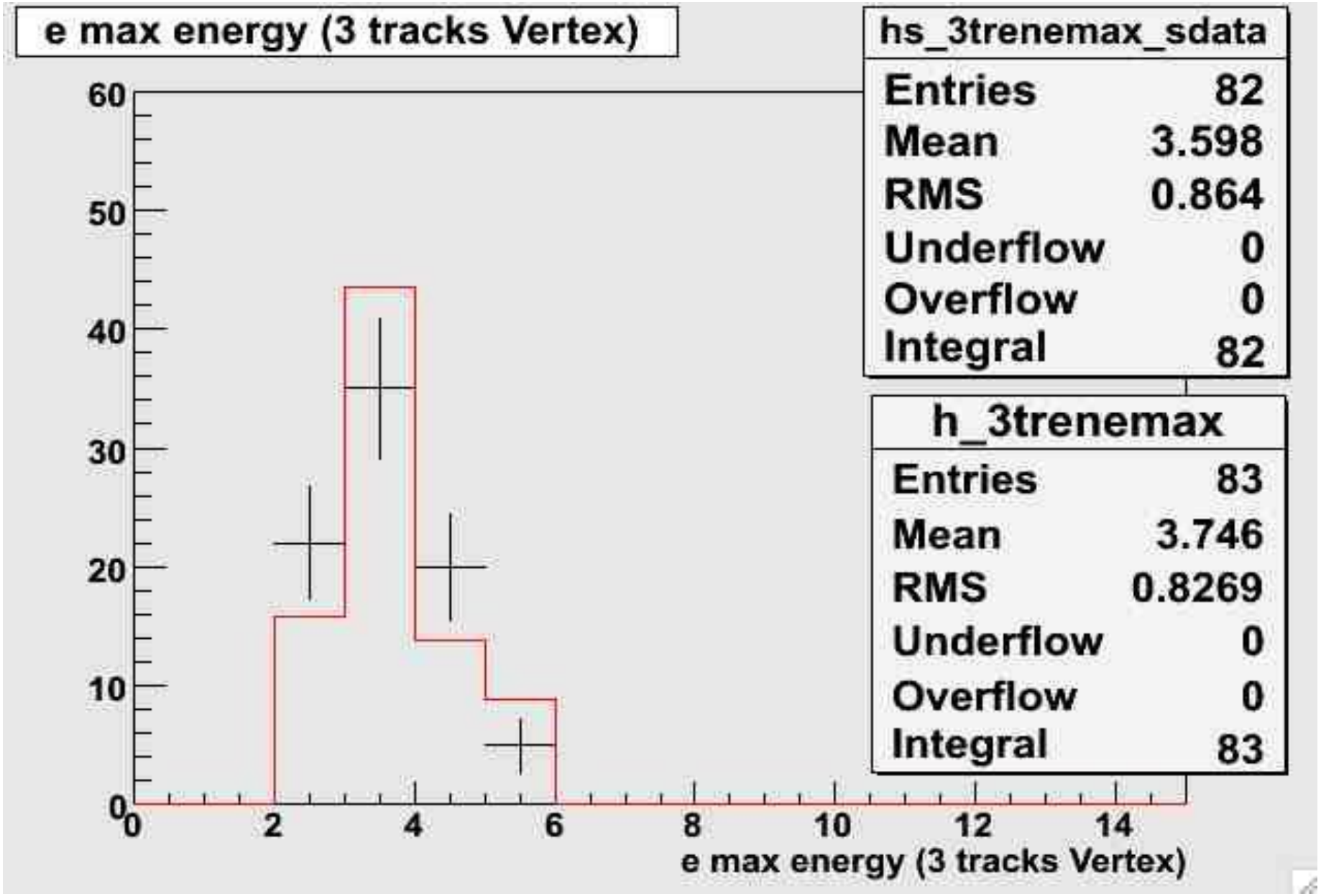
2 tracks & Ch=0 Vtx Energy



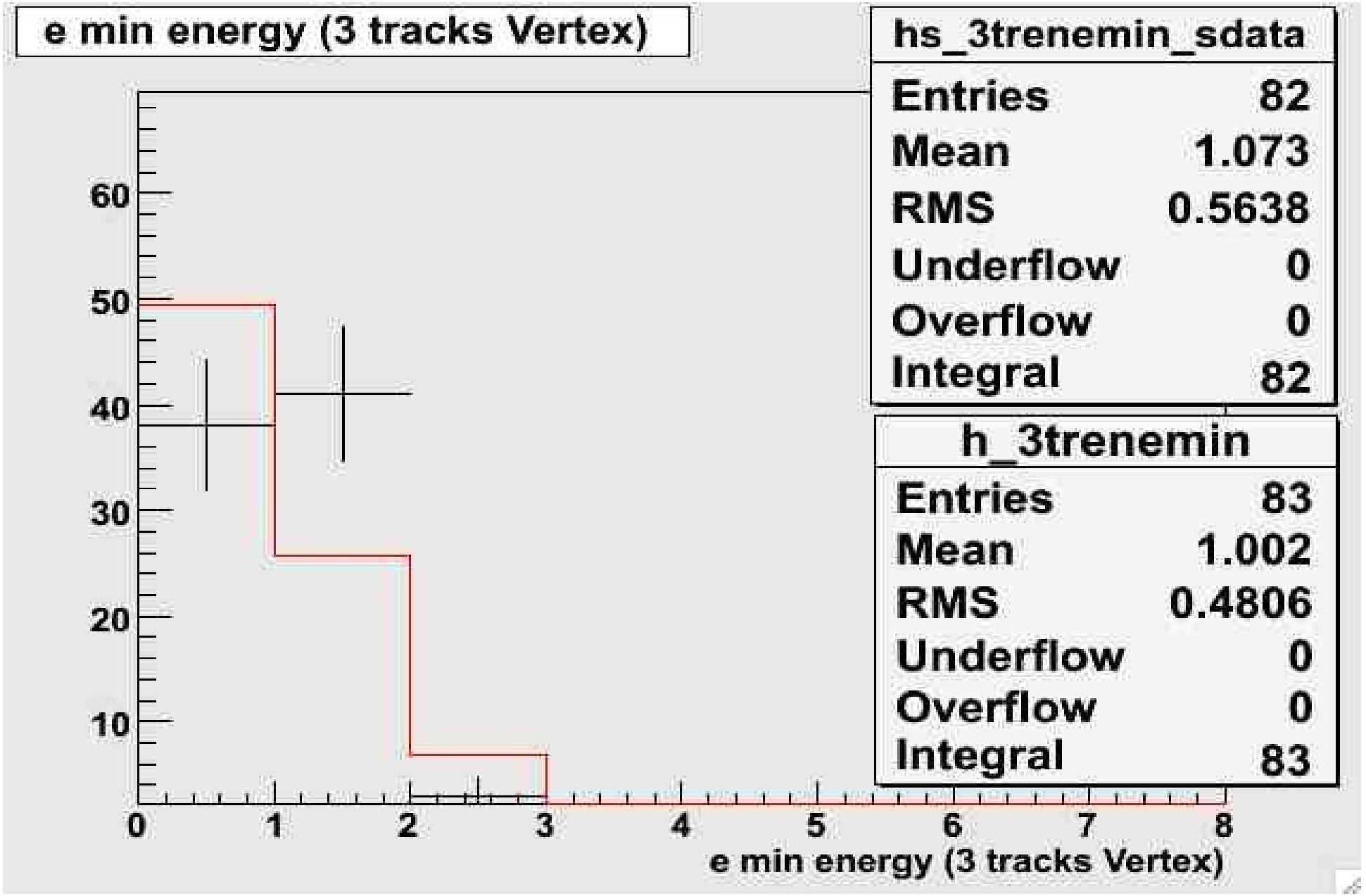
3 tracks & Ch=-1 Vtx Energy



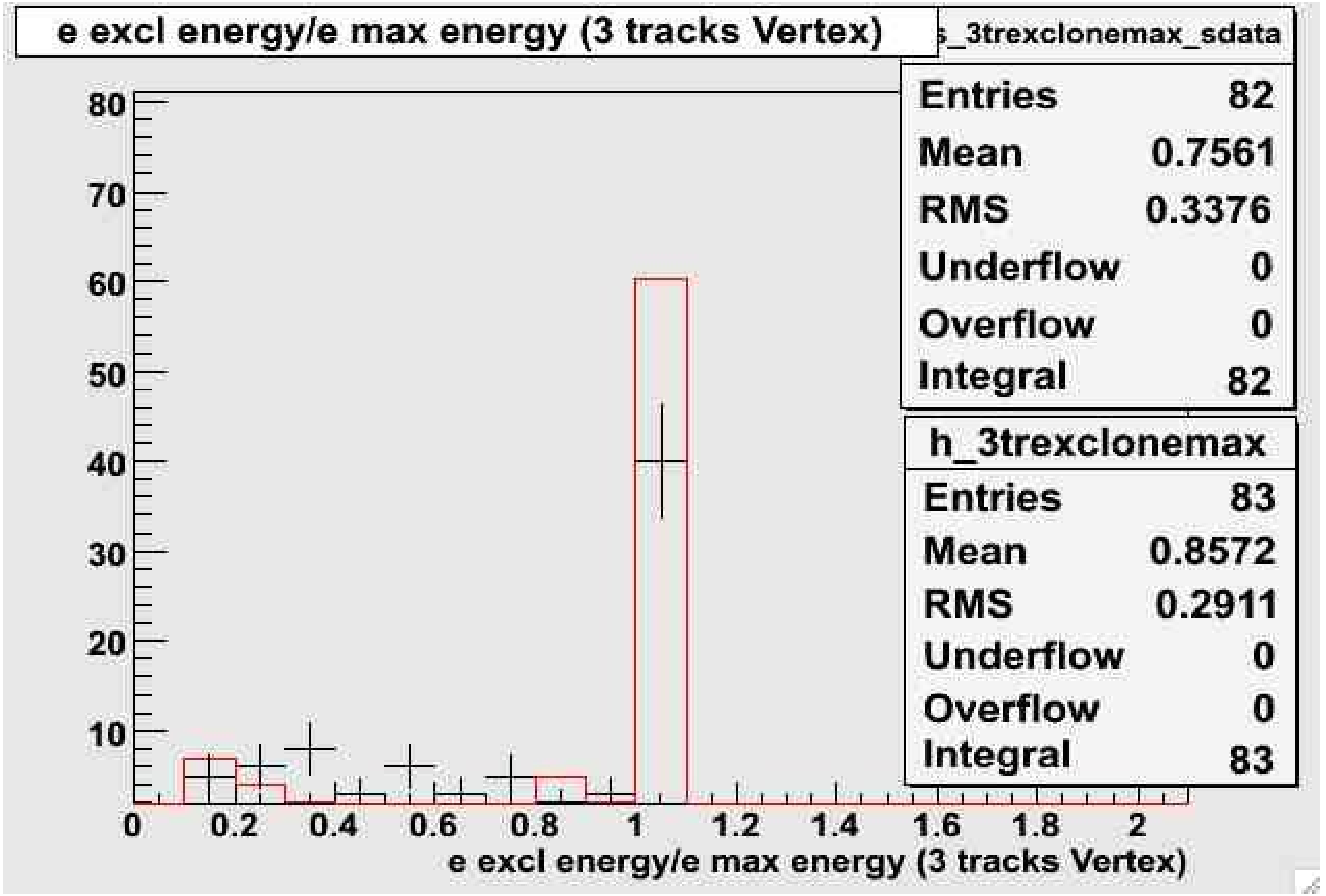
3 tracks & Ch=-1 Vtx most energetic electron

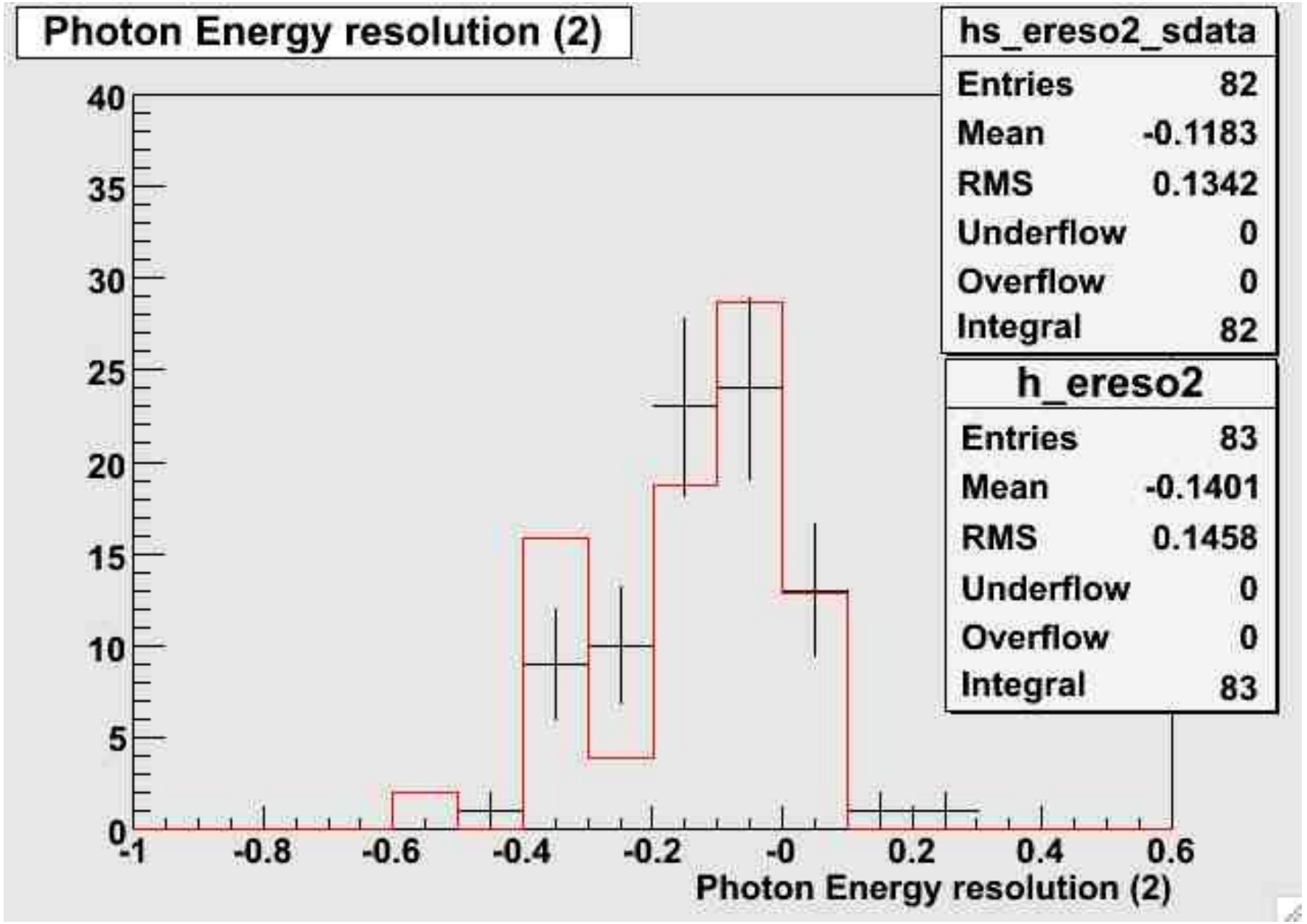


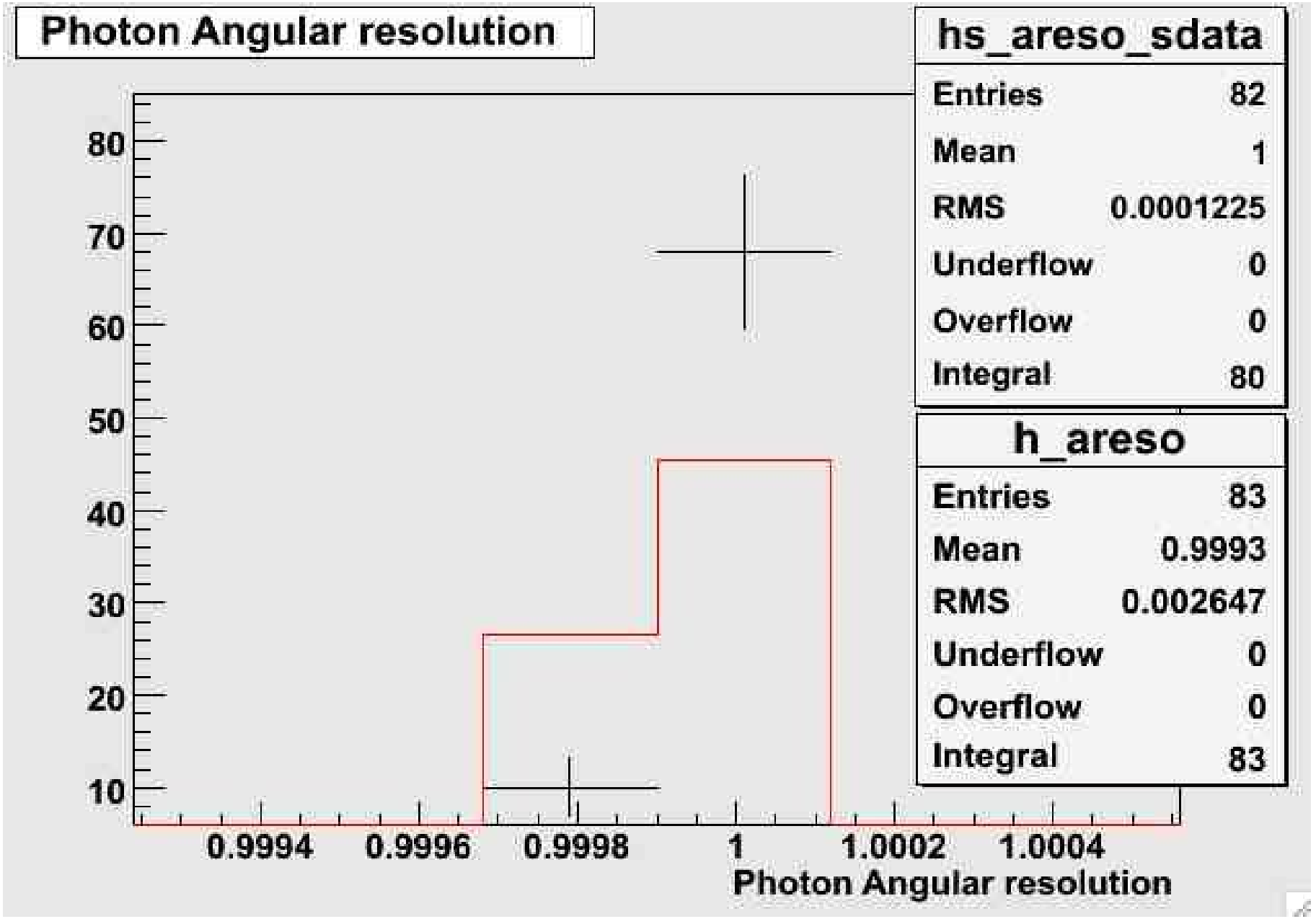
3 tracks & Ch=-1 Vtx most energetic electron



3 tracks & Ch=-1 Vtx excl particle /most energetic elec




Photon Energy resolution (2)
hs_ereso2_sdata
Entries 82
Mean -0.1183
RMS 0.1342
Underflow 0
Overflow 0
Integral 82
h_ereso2
Entries 83
Mean -0.1401
RMS 0.1458
Underflow 0
Overflow 0
Integral 83
40
35
30
25
20
15
10
5
0
-1
-0.8
-0.6
-0.4
-0.2
-0
0.2
0.4
0.6
Photon Energy resolution (2)


Photon Angular resolution
hs_areso_sdata
Entries 82
Mean 1
RMS 0.0001225
Underflow 0
Overflow 0
Integral 80
h_areso
Entries 83
Mean 0.9993
RMS 0.002647
Underflow 0
Overflow 0
Integral 83
80
70
60
50
40
30
20
10
0.9994
0.9996
0.9998
1
1.0002
1.0004
Photon Angular resolution