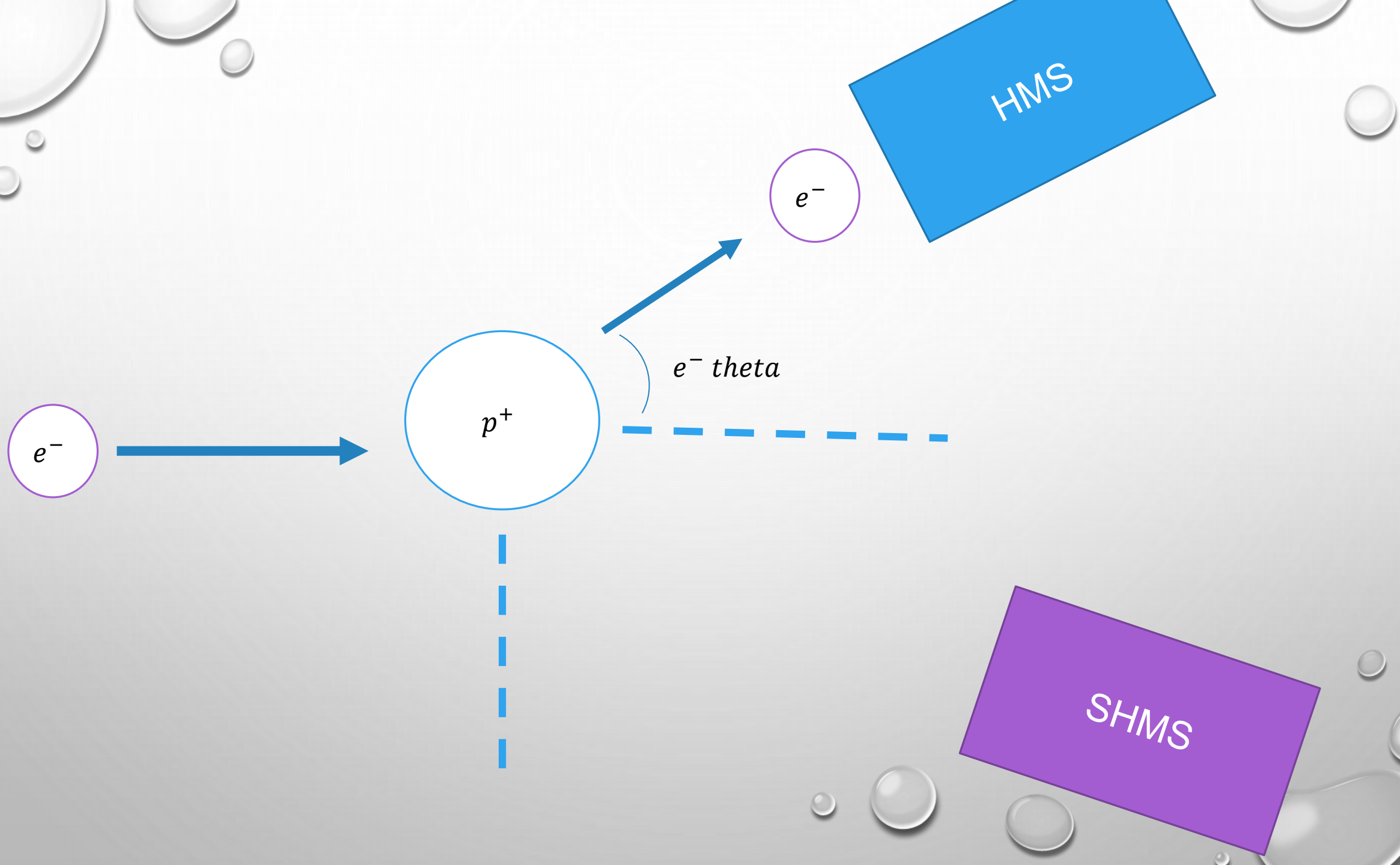
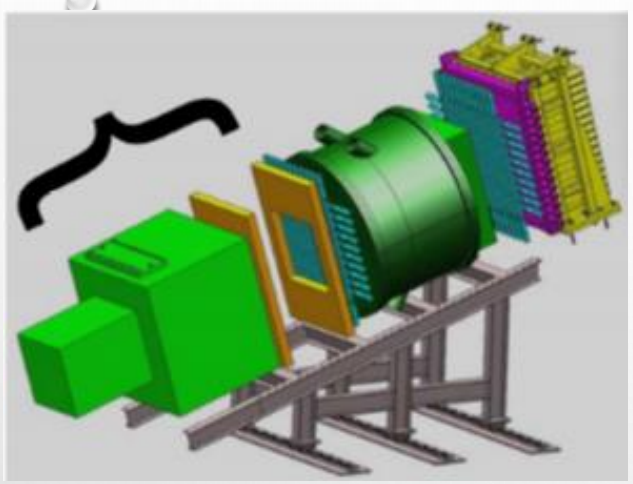
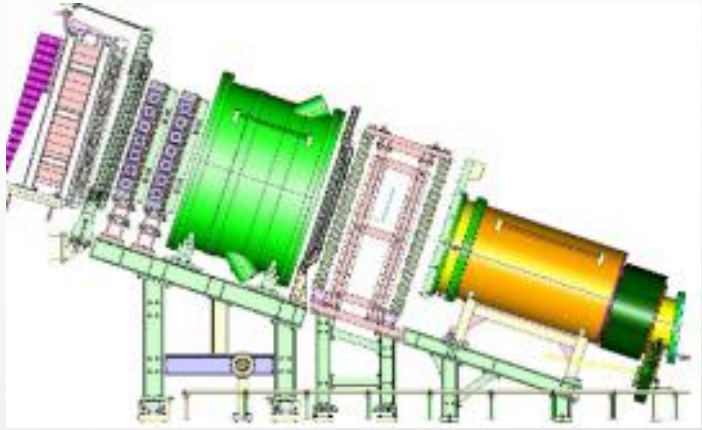
WEEK 2

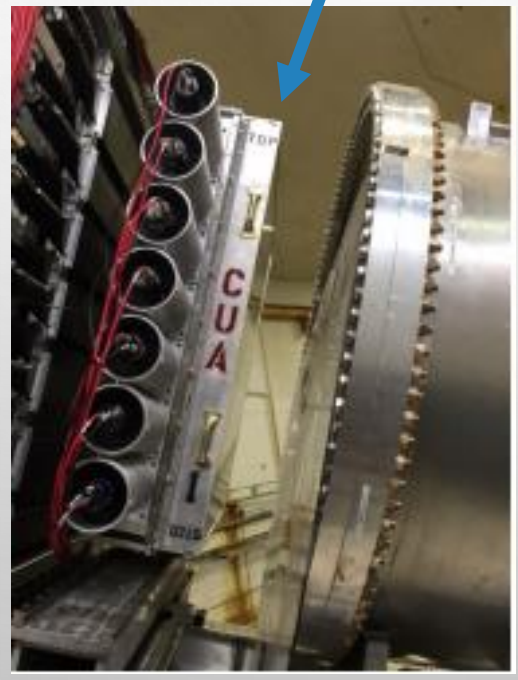

HMS
e^-
e^- $theta$
p^+
e^-
SHMS

GAS CHERKONOV DETECTOR

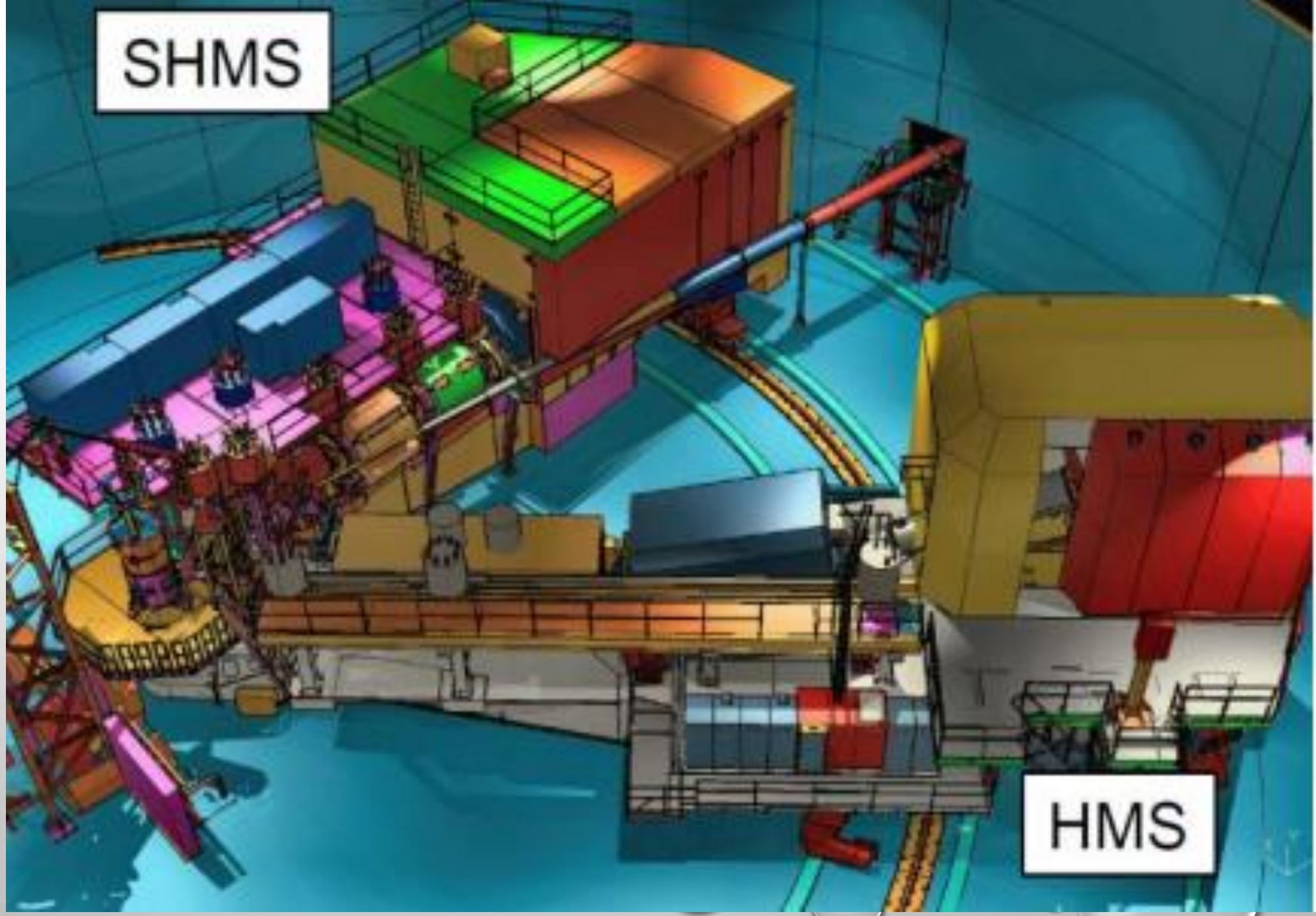


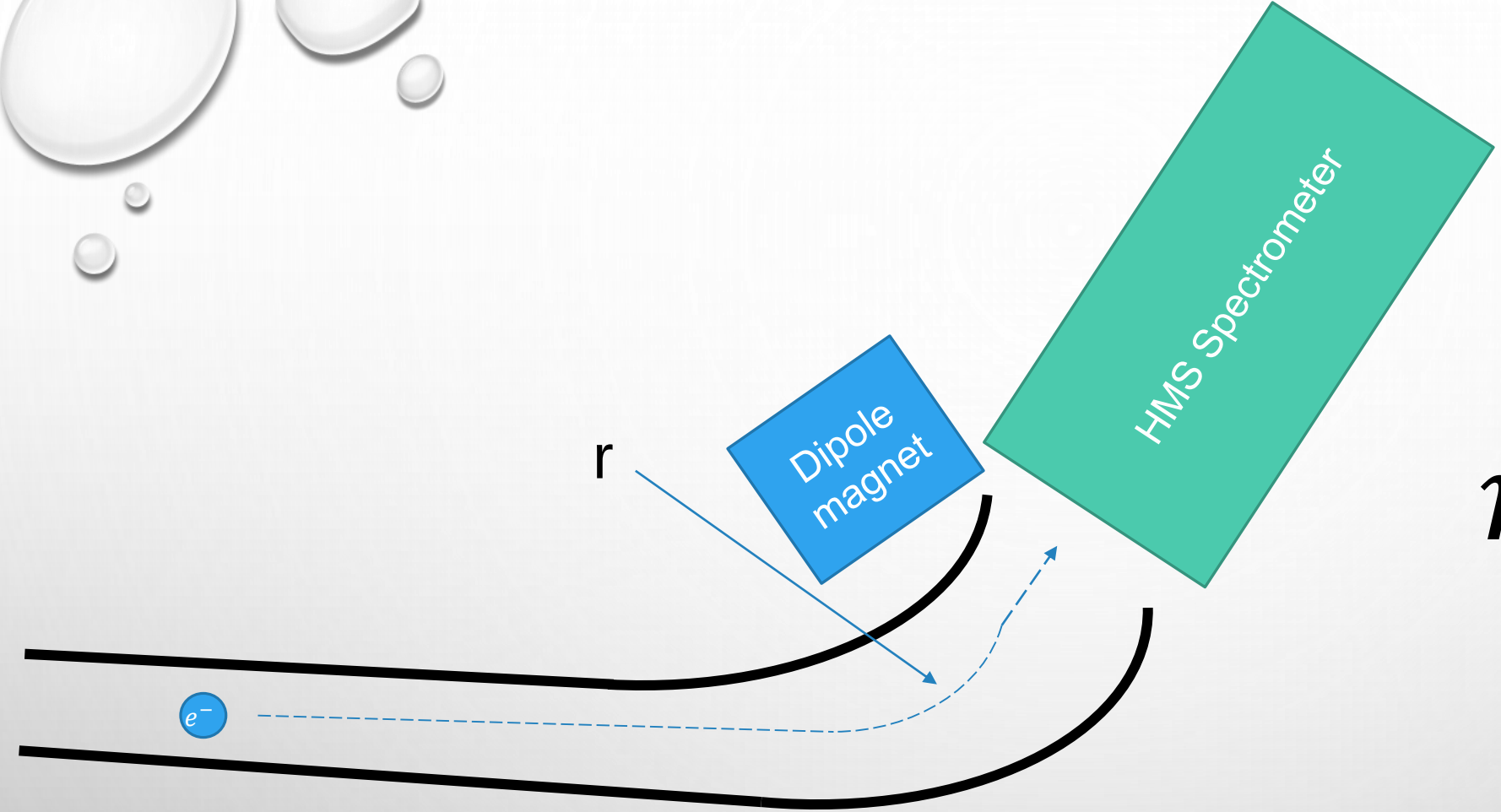


Aerogel tray



Hall C





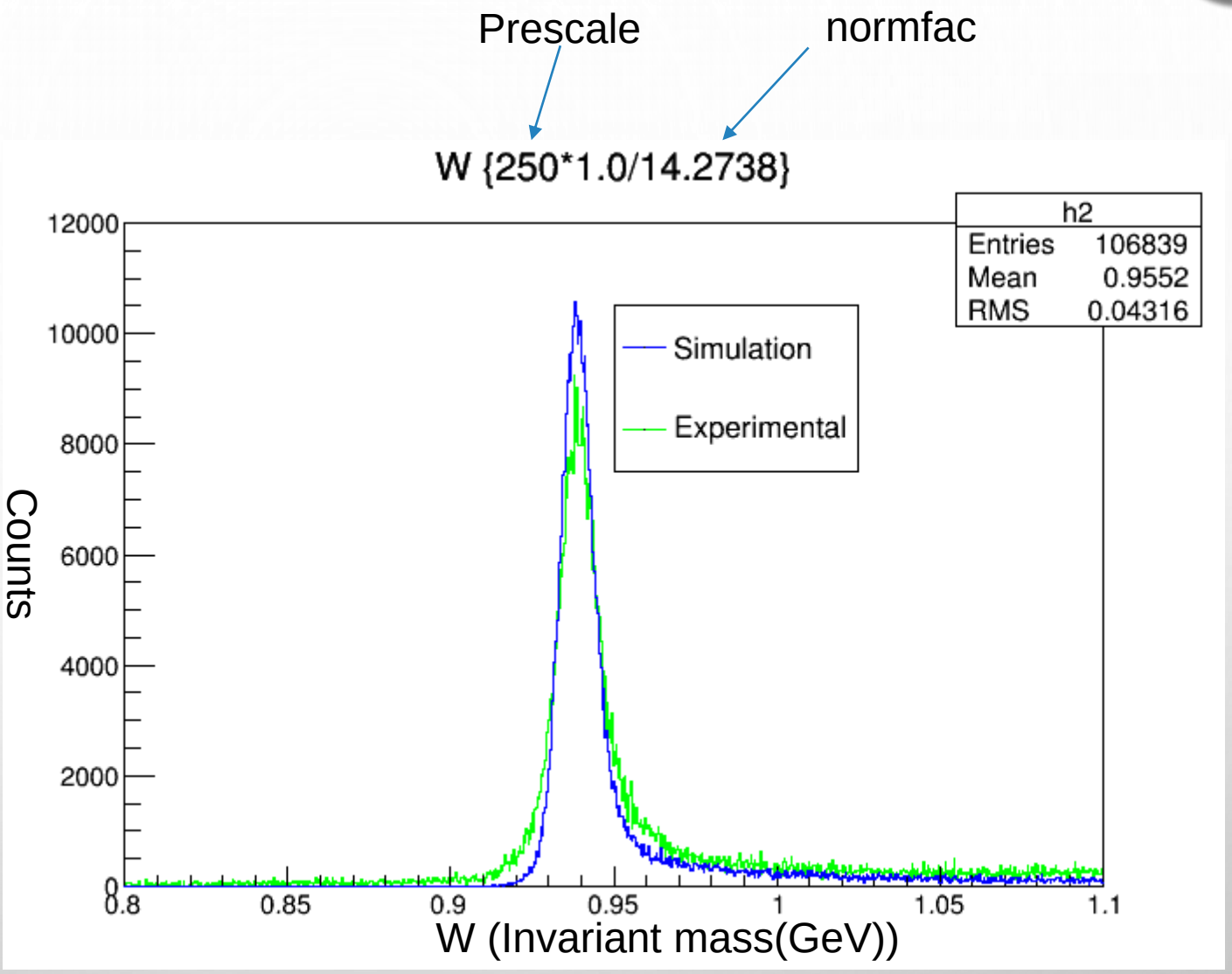
$$r = \frac{mv}{qB}$$

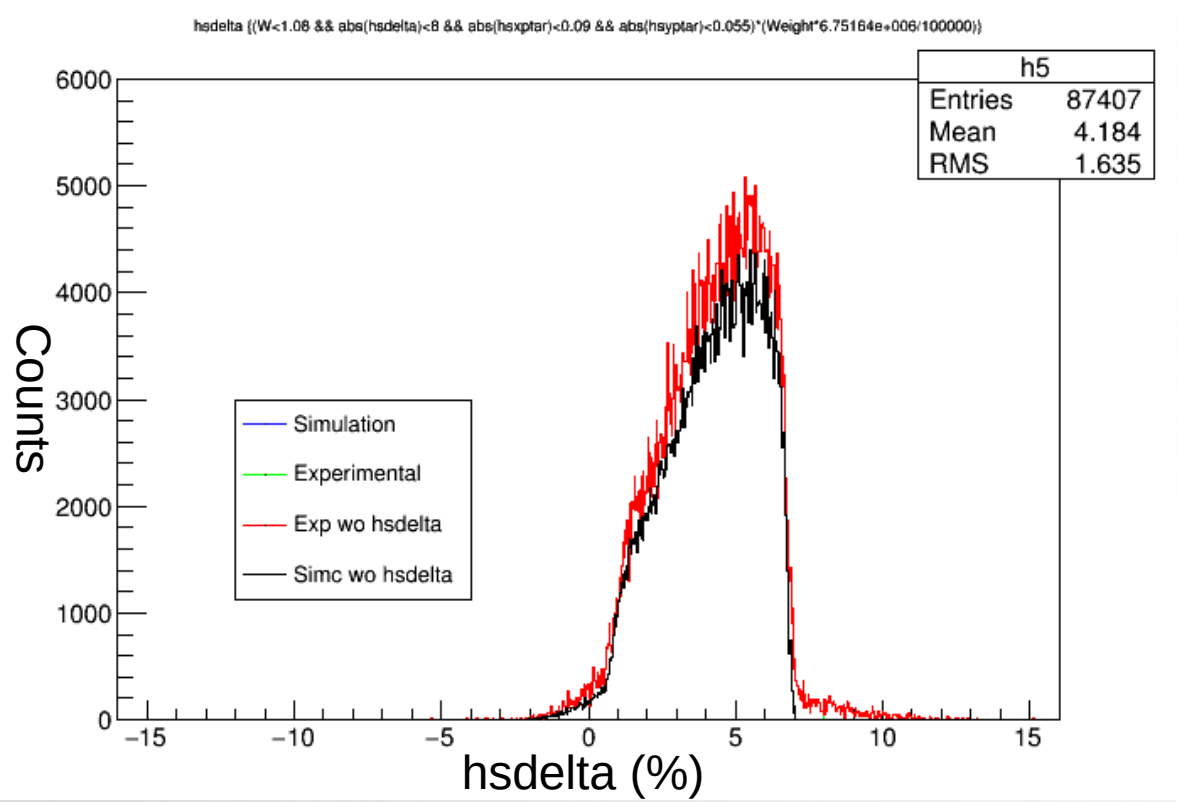
Electric Charge

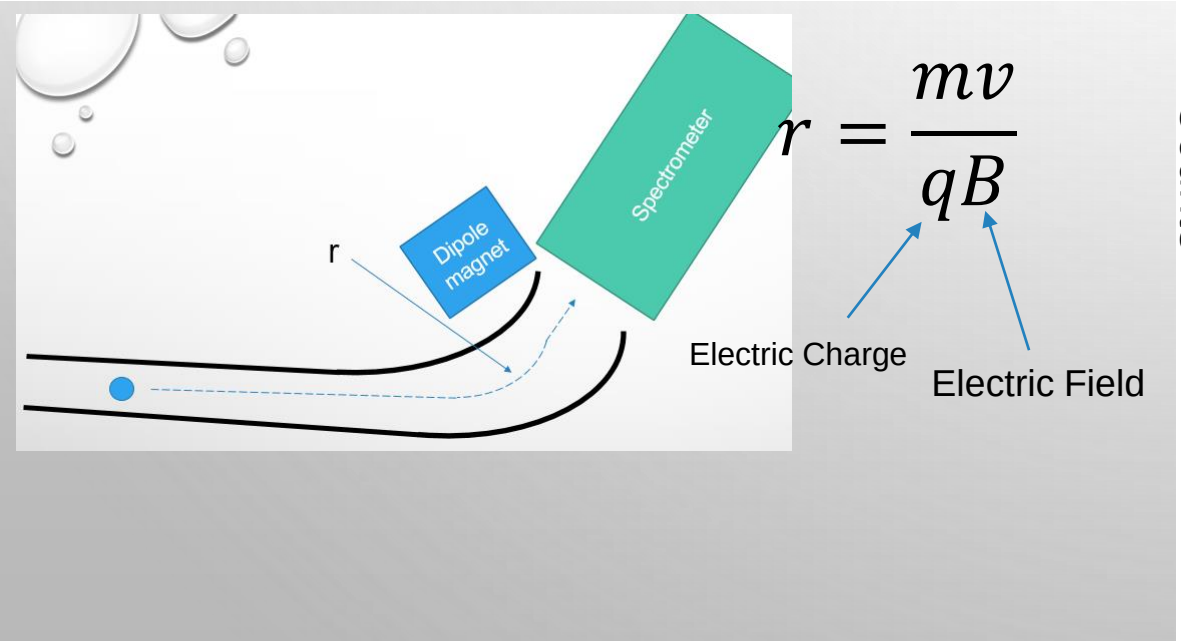
Electric Field

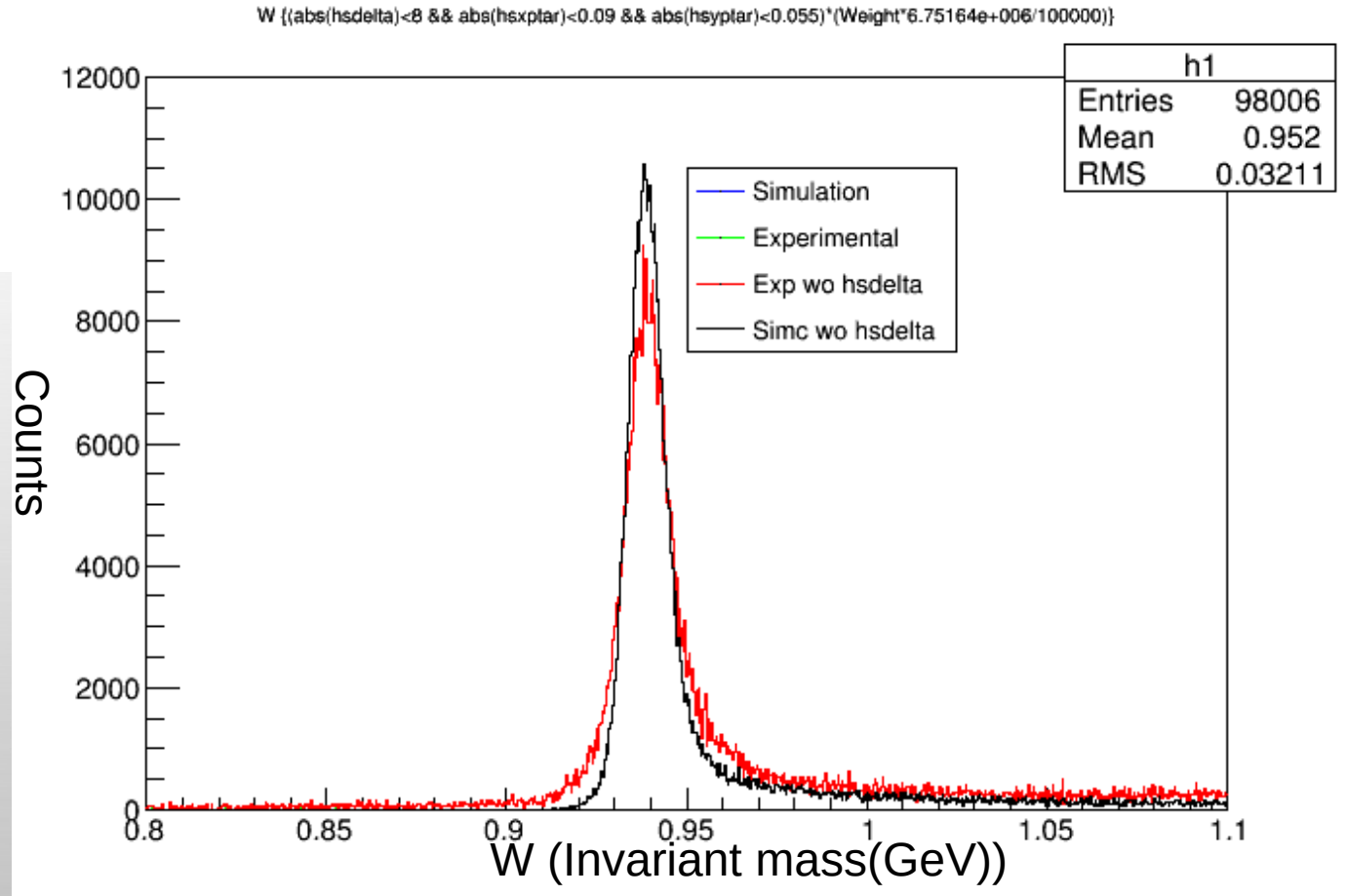
47339

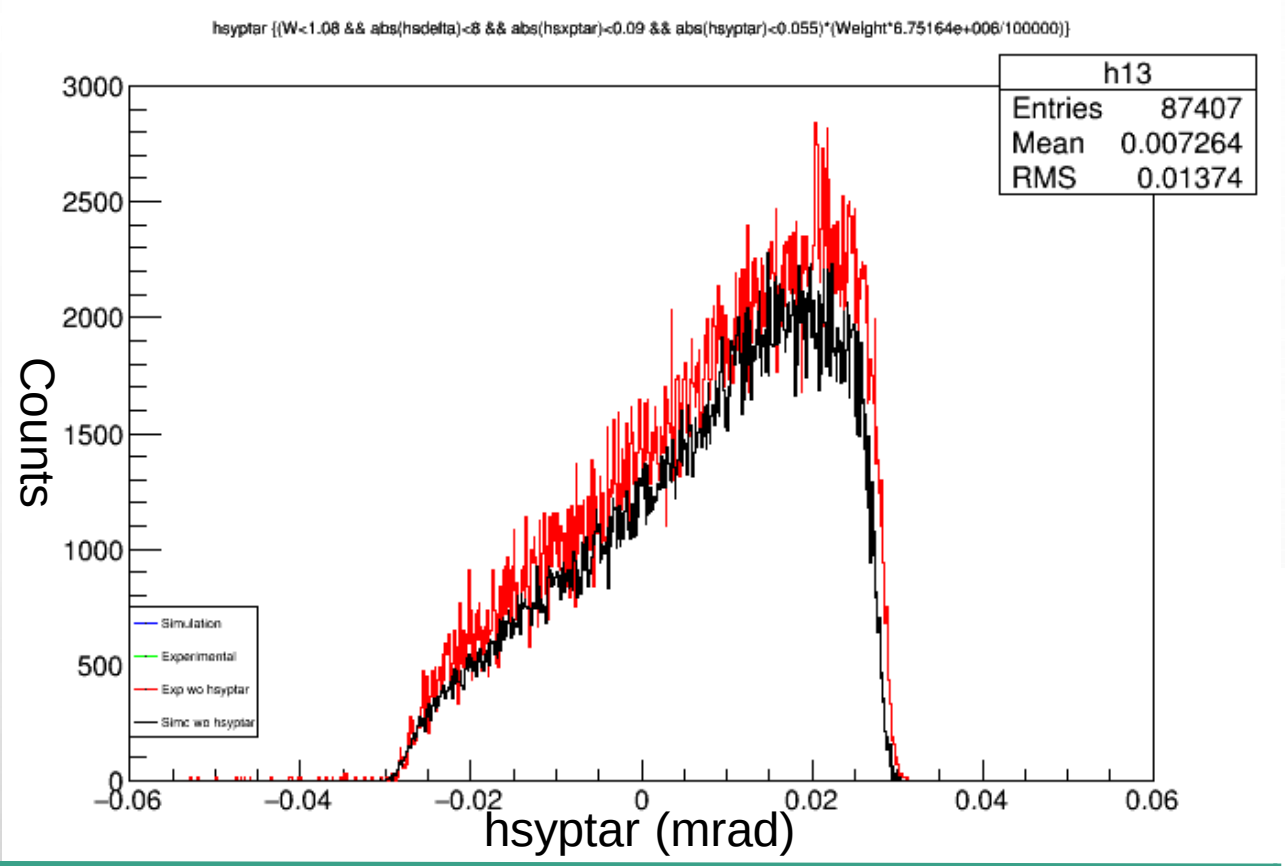
Input values	
Run	47339
Beam Energy	5246.5
e^- p	4494.4
e^- $theta$	12.0

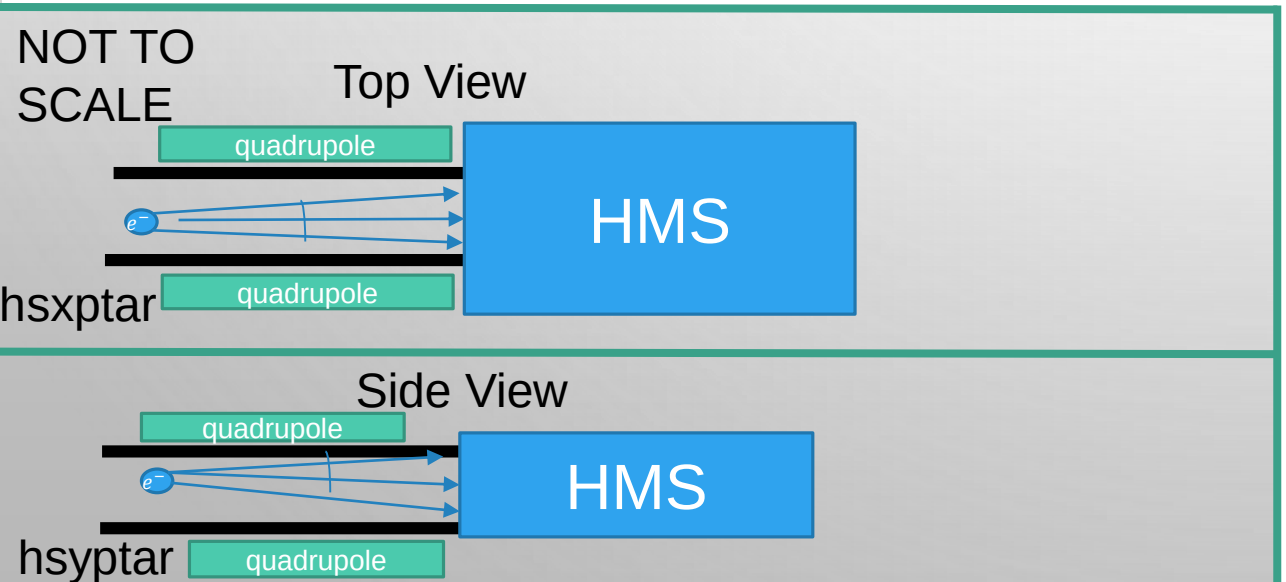


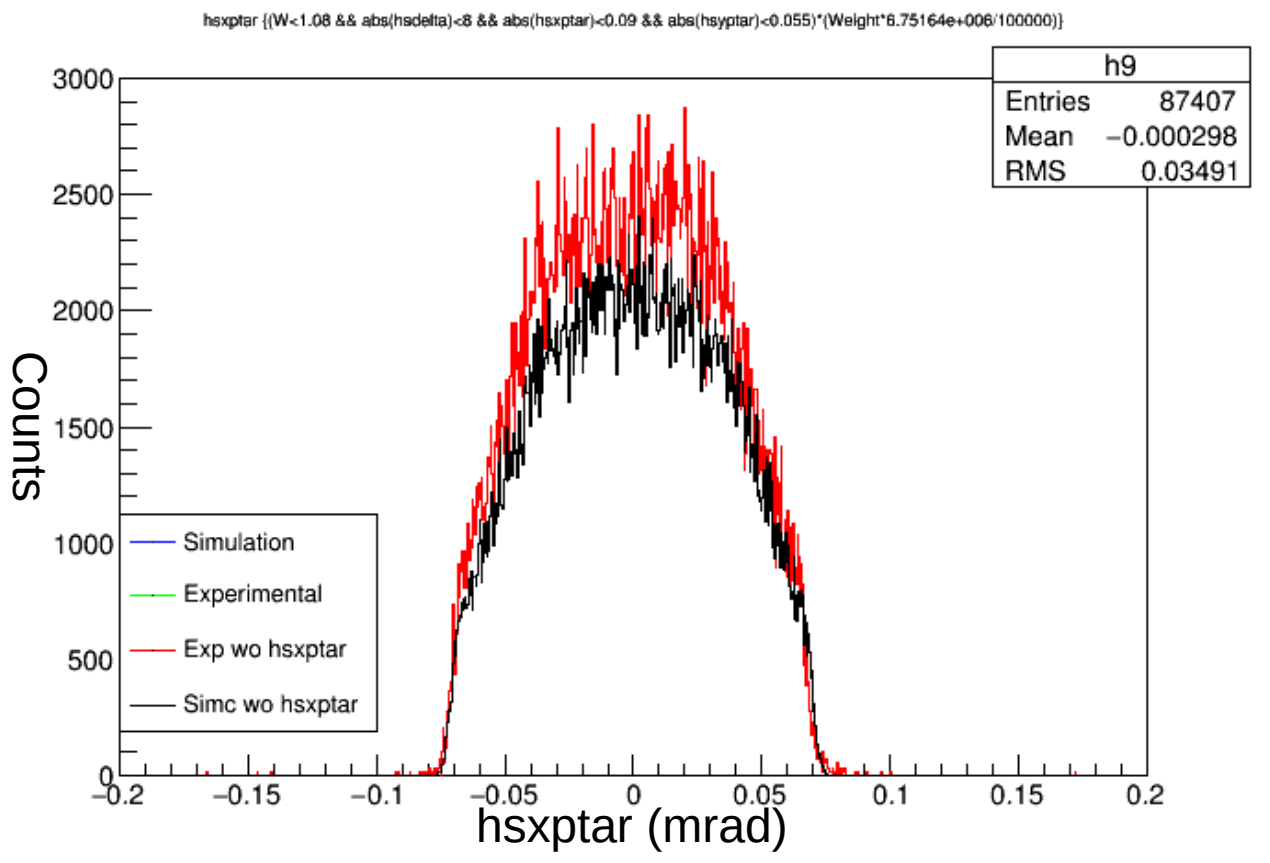

hsdelta {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.75164e+006/100000)}
h5
Entries 87407
Mean 4.184
RMS 1.635
Simulation
Experimental
Exp wo hsdelta
Simc wo hsdelta
Counts
hsdelta (%)

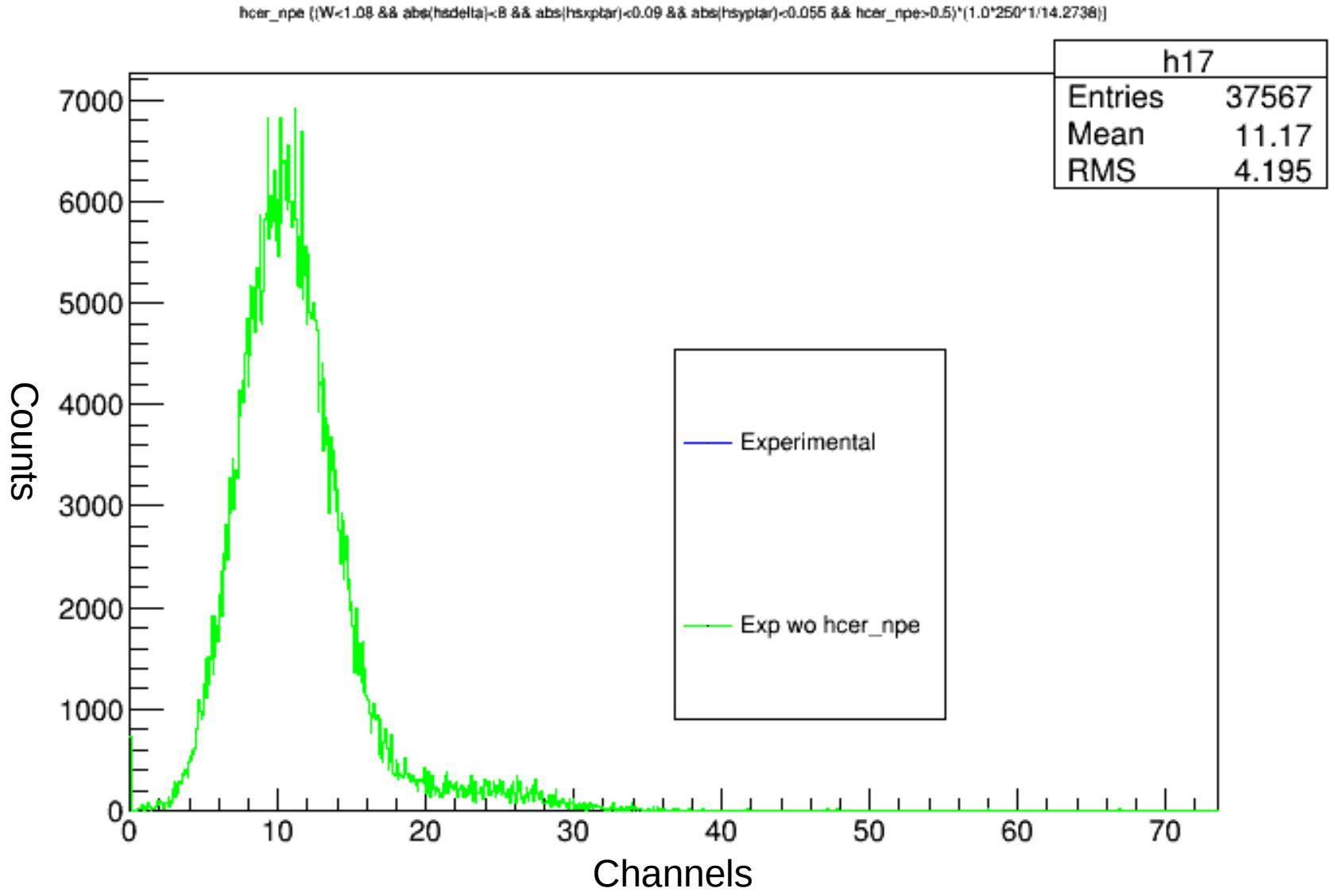

Spectrometer
Dipole magnet
r
$r = \frac{mv}{qB}$
Electric Charge
Electric Field


W {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.75164e+006/100000)}
h1
Entries 98006
Mean 0.952
RMS 0.03211
Simulation
Experimental
Exp wo hsdelta
Simc wo hsdelta
Counts
W (Invariant mass(GeV))

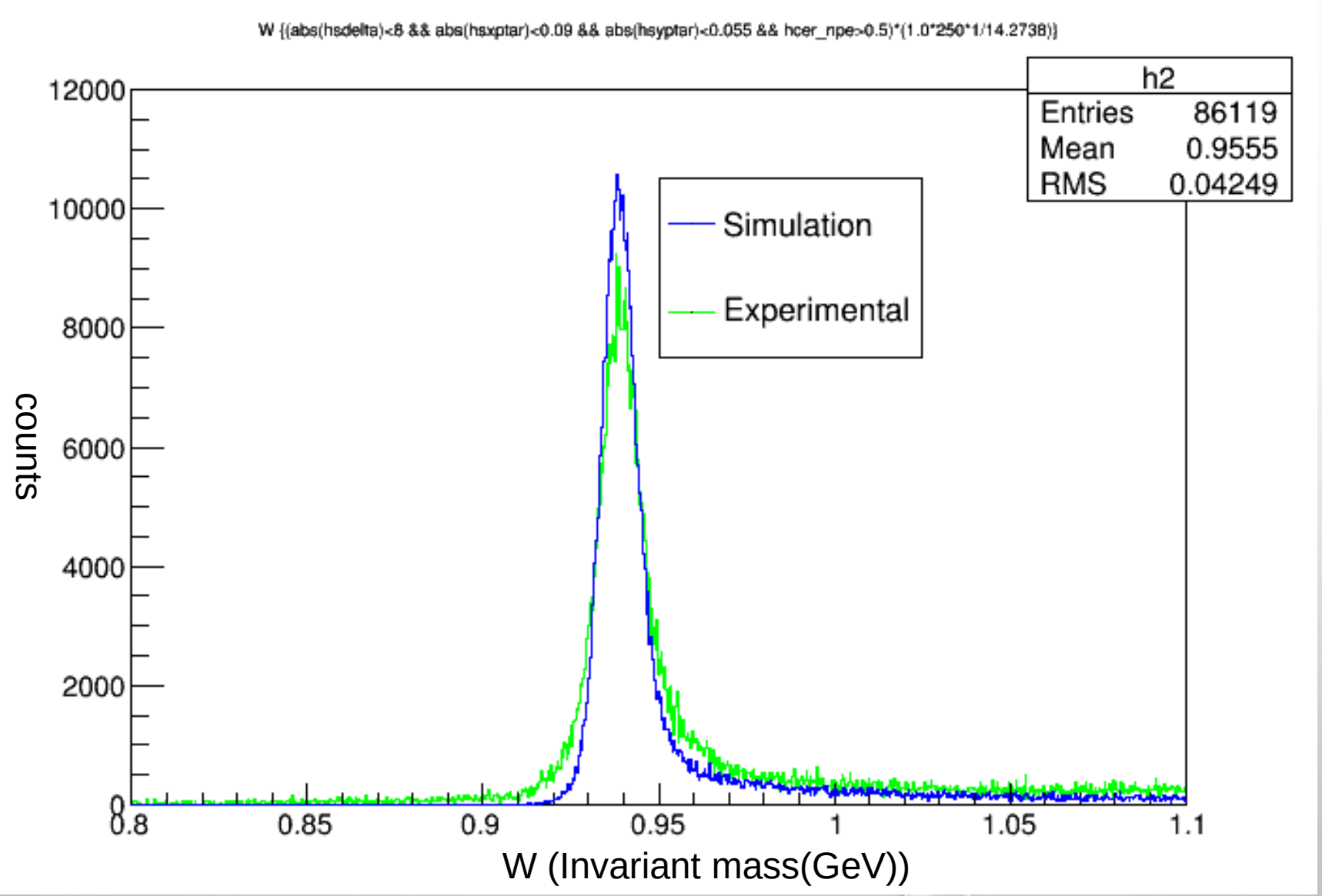

hsyptar {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.75164e+006/100000)}
h13
Entries 87407
Mean 0.007264
RMS 0.01374
Counts
hsyptar (mrad)
Simulation
Experimental
Exp wo hsyptar
Simc wo hsyptar


NOT TO SCALE
Top View
quadrupole
HMS
quadrupole
hsxptar
Side View
quadrupole
HMS
hsyptar
quadrupole


hsxptar {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.75164e+006/100000)}
h9
Entries 87407
Mean −0.000298
RMS 0.03491
Counts
hsxptar (mrad)
Simulation
Experimental
Exp wo hsxptar
Simc wo hsxptar


hcer_npe {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && hcer_npe>0.5)*(1.0*250*1/14.2738)}
h17
Entries 37567
Mean 11.17
RMS 4.195
Experimental
Exp wo hcer_npe
Counts
Channels
0
1000
2000
3000
4000
5000
6000
7000
0
10
20
30
40
50
60
70

ALL CUTS APPLIED



Input values	
Run	47339
Beam Energy	5246.5
e^- p	4494.4
e^- *theta*	12.0

Input values	
Run	47345
Beam Energy	5246.4
e^- p	4494.2
e^- theta	14.0

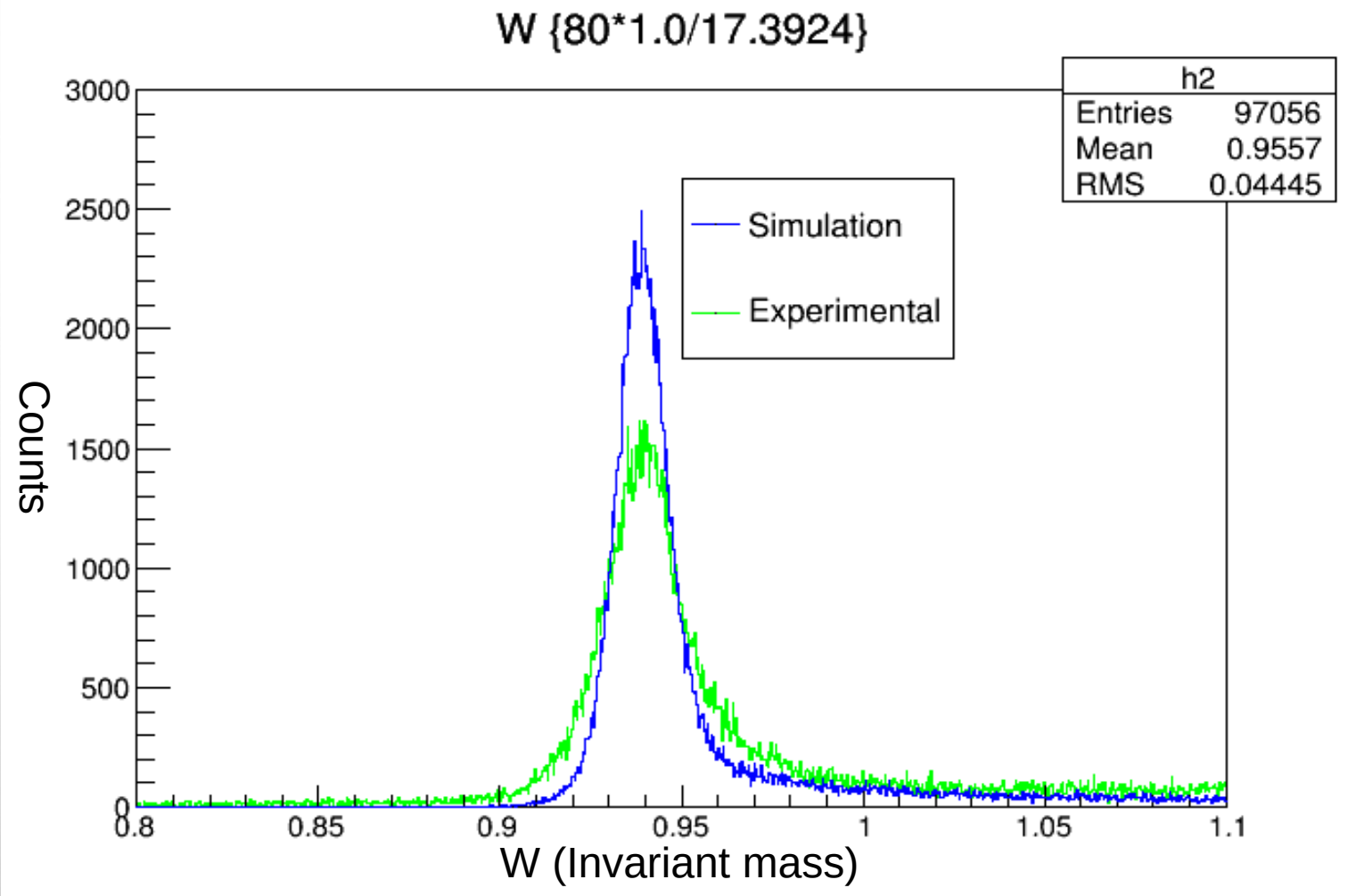
Input values	
Run	47350
Beam Energy	5246.4
e^- p	3724.4
e^- *theta*	22.0

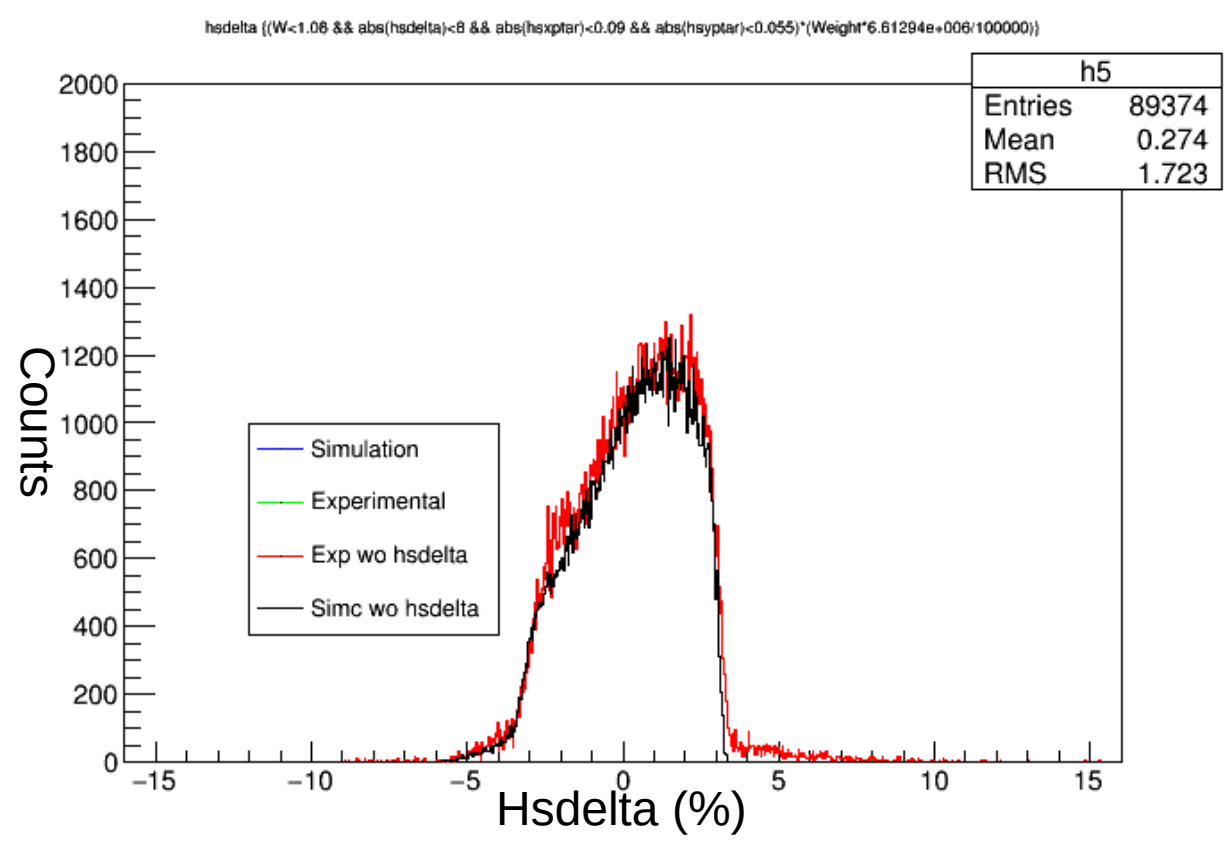
Input values	
Run	47347
Beam Energy	5246.4
e^- p	43724.4
e^- thet	19.985

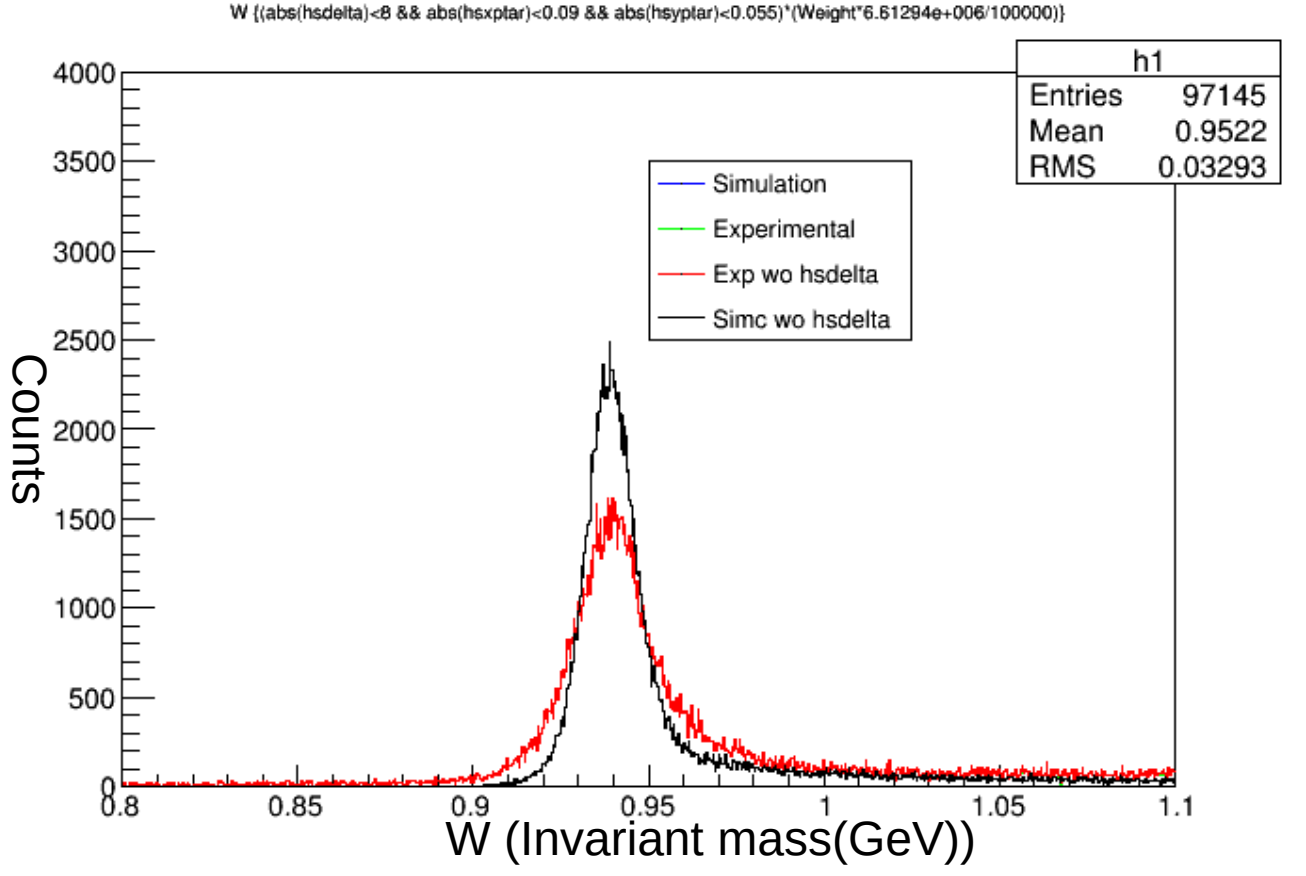
R-VALUE

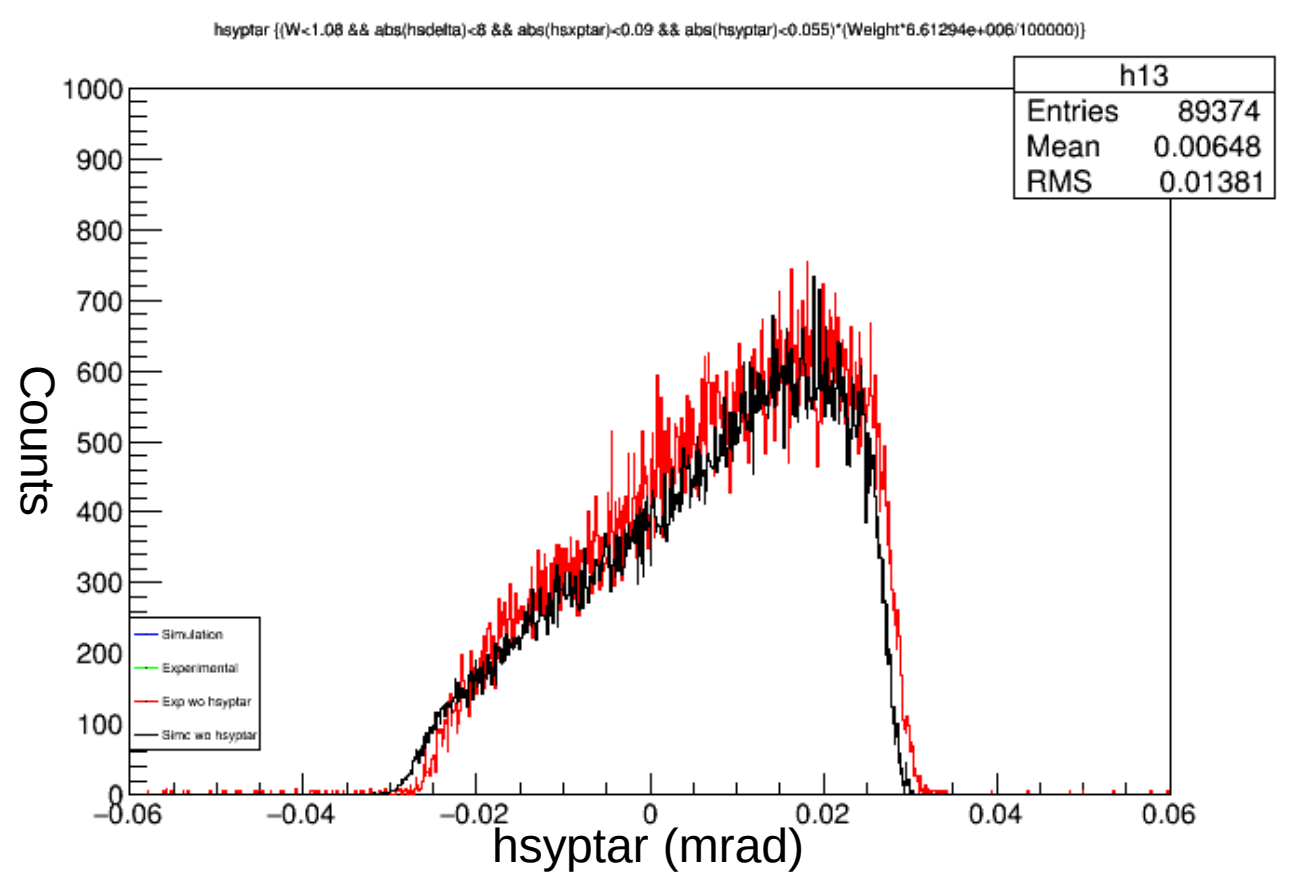
47345

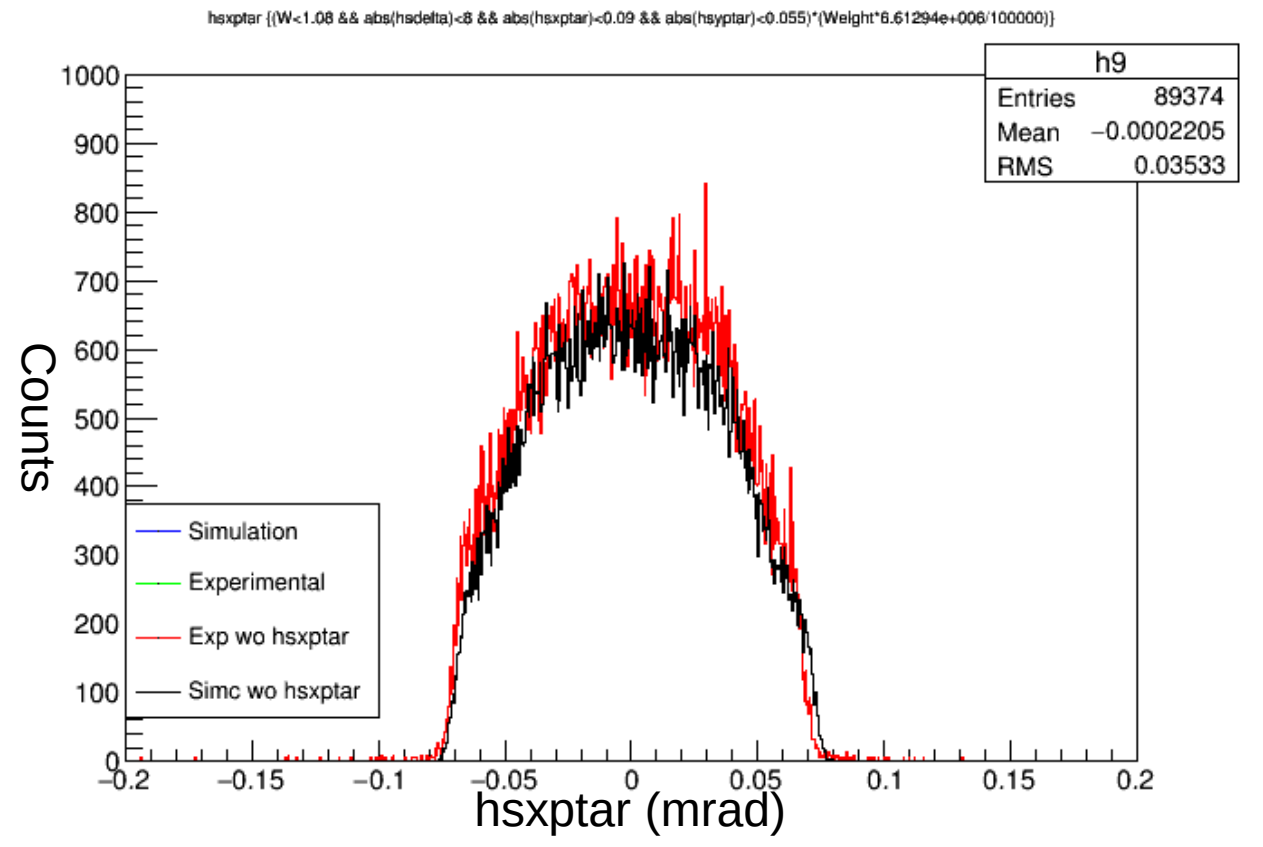
Input values	
Run	47345
Beam Energy	5246.4
e^- p	4494.2
e^- theta	14.0

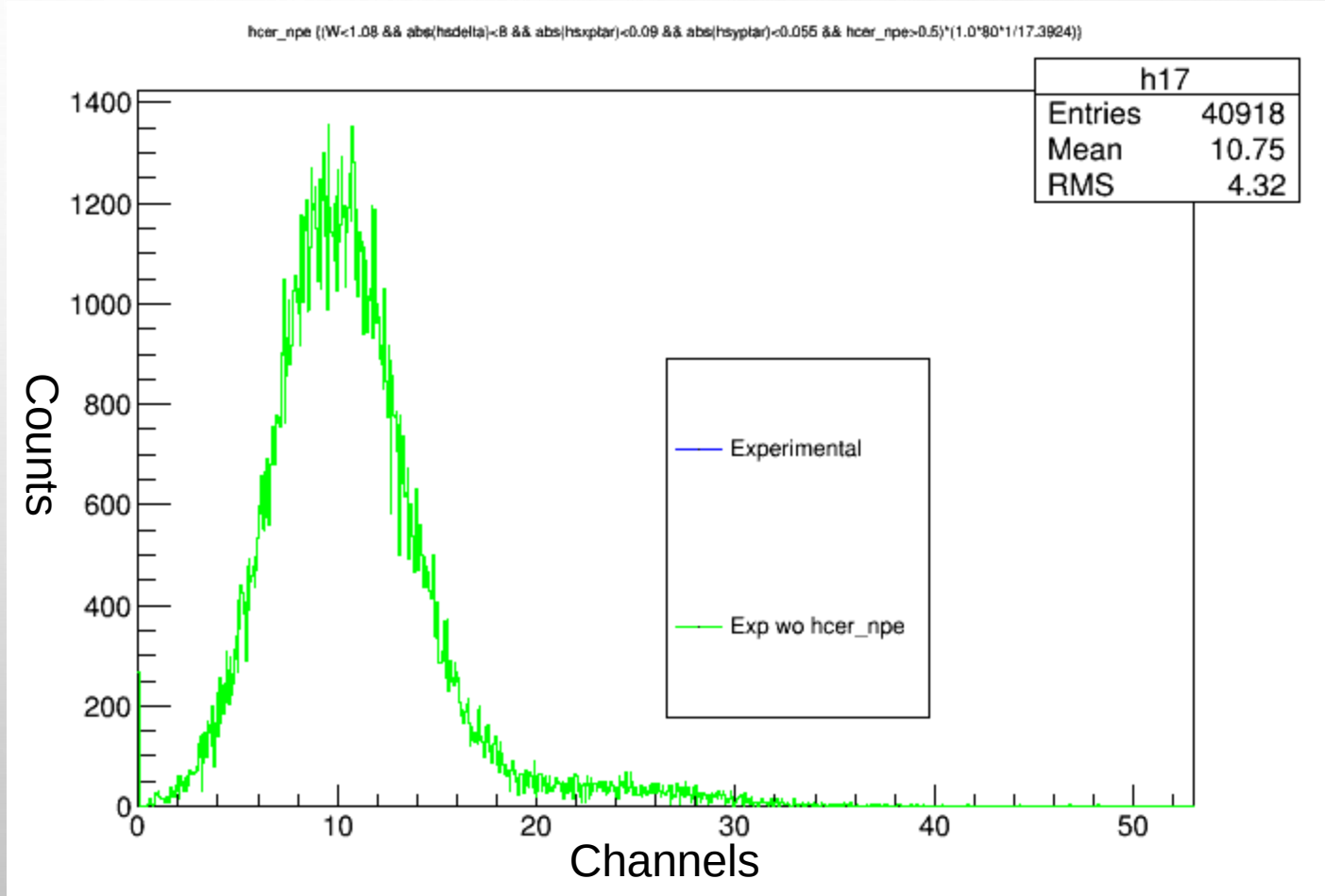


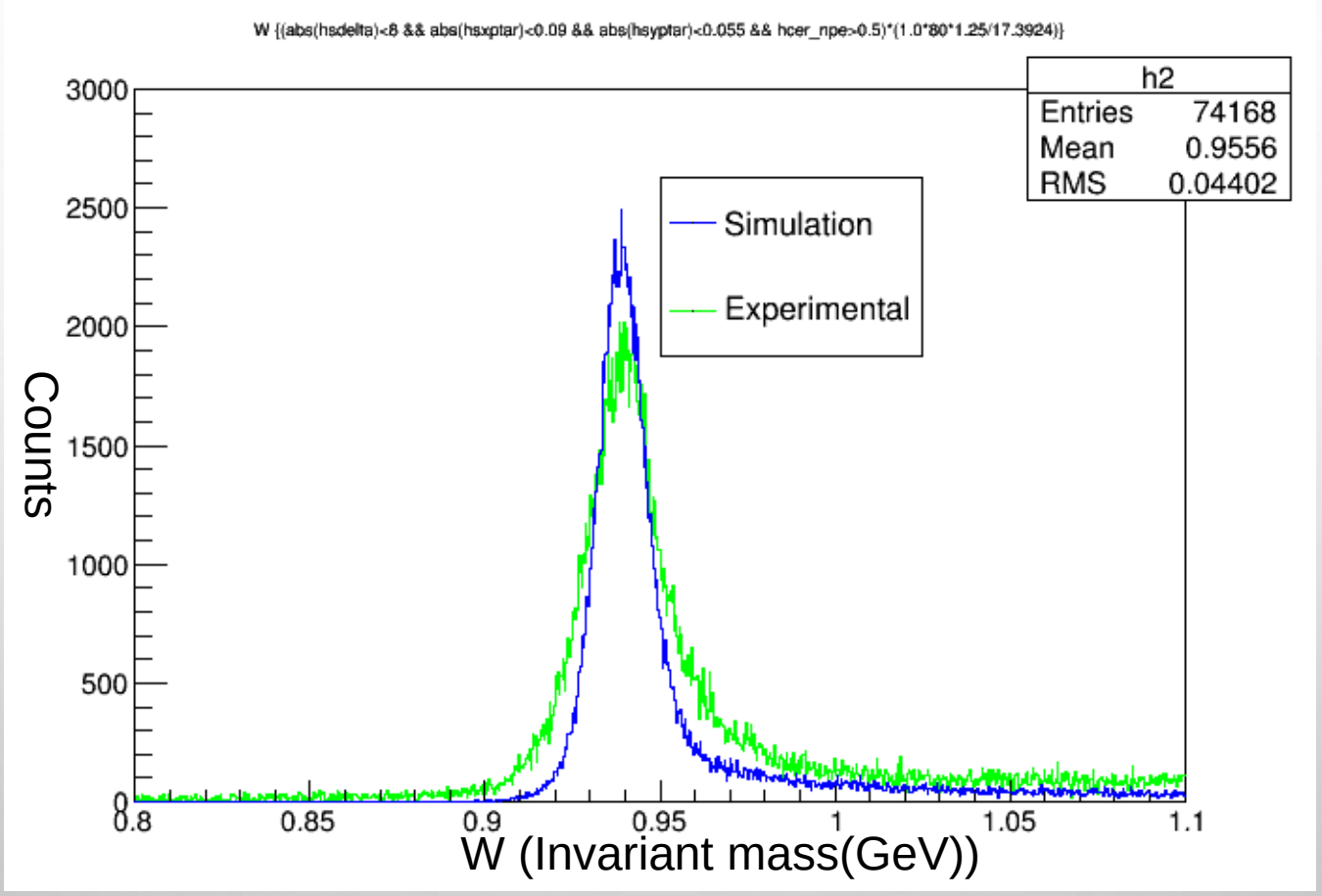

hsdelta {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.61294e+006/100000)}
h5
Entries 89374
Mean 0.274
RMS 1.723
Simulation
Experimental
Exp wo hsdelta
Simc wo hsdelta
Counts
Hsdelta (%)


W {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.61294e+006/100000)}
h1
Entries 97145
Mean 0.9522
RMS 0.03293
Simulation
Experimental
Exp wo hsdelta
Simc wo hsdelta
Counts
W (Invariant mass(GeV))


hsyptar {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.61294e+006/100000)}
h13
Entries 89374
Mean 0.00648
RMS 0.01381
Simulation
Experimental
Exp wo hsyptar
Simc wo hsyptar
Counts
hsyptar (mrad)

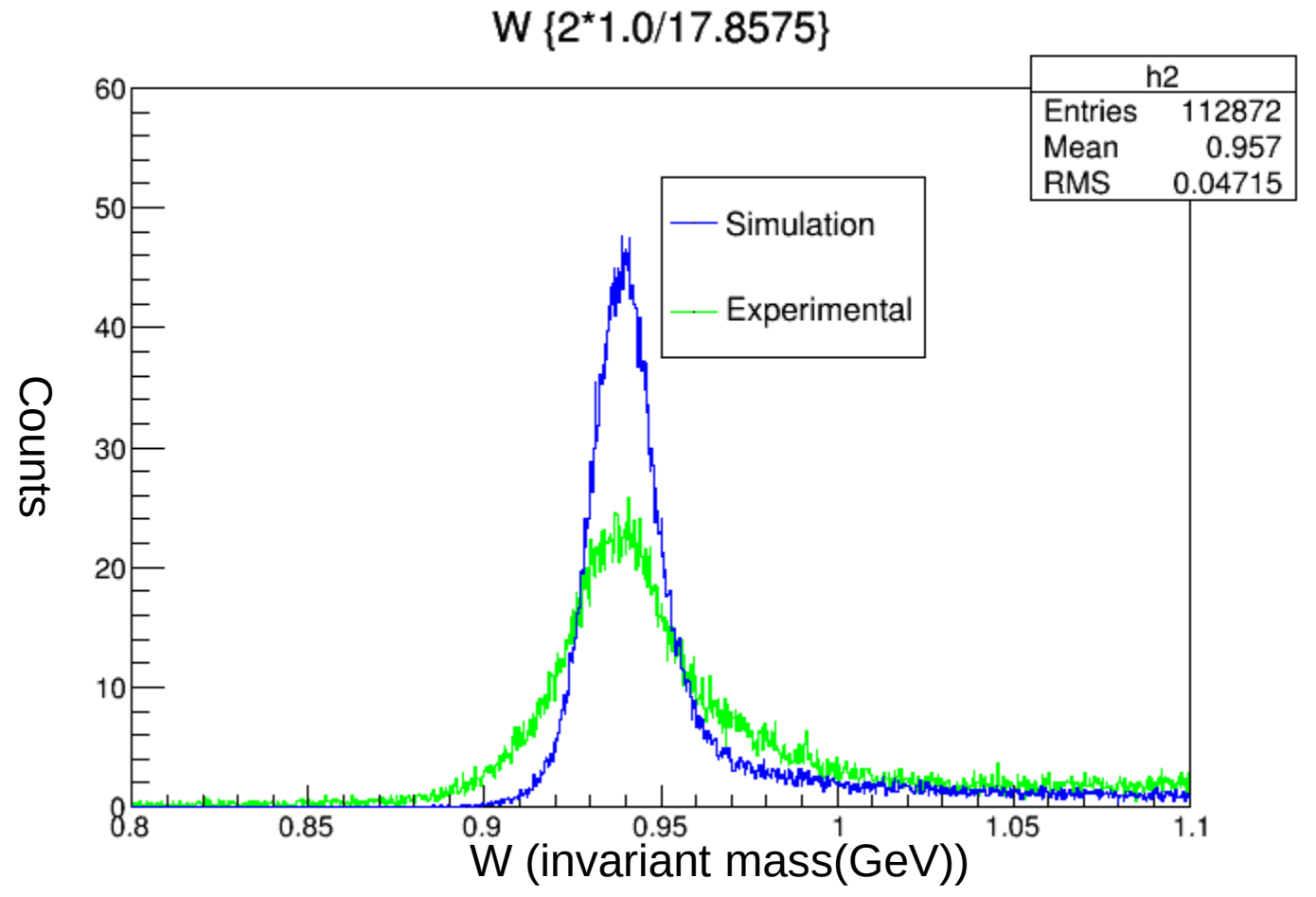

hsxptar {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.61294e+006/100000)}
h9
Entries 89374
Mean −0.0002205
RMS 0.03533
Simulation
Experimental
Exp wo hsxptar
Simc wo hsxptar
Counts
hsxptar (mrad)

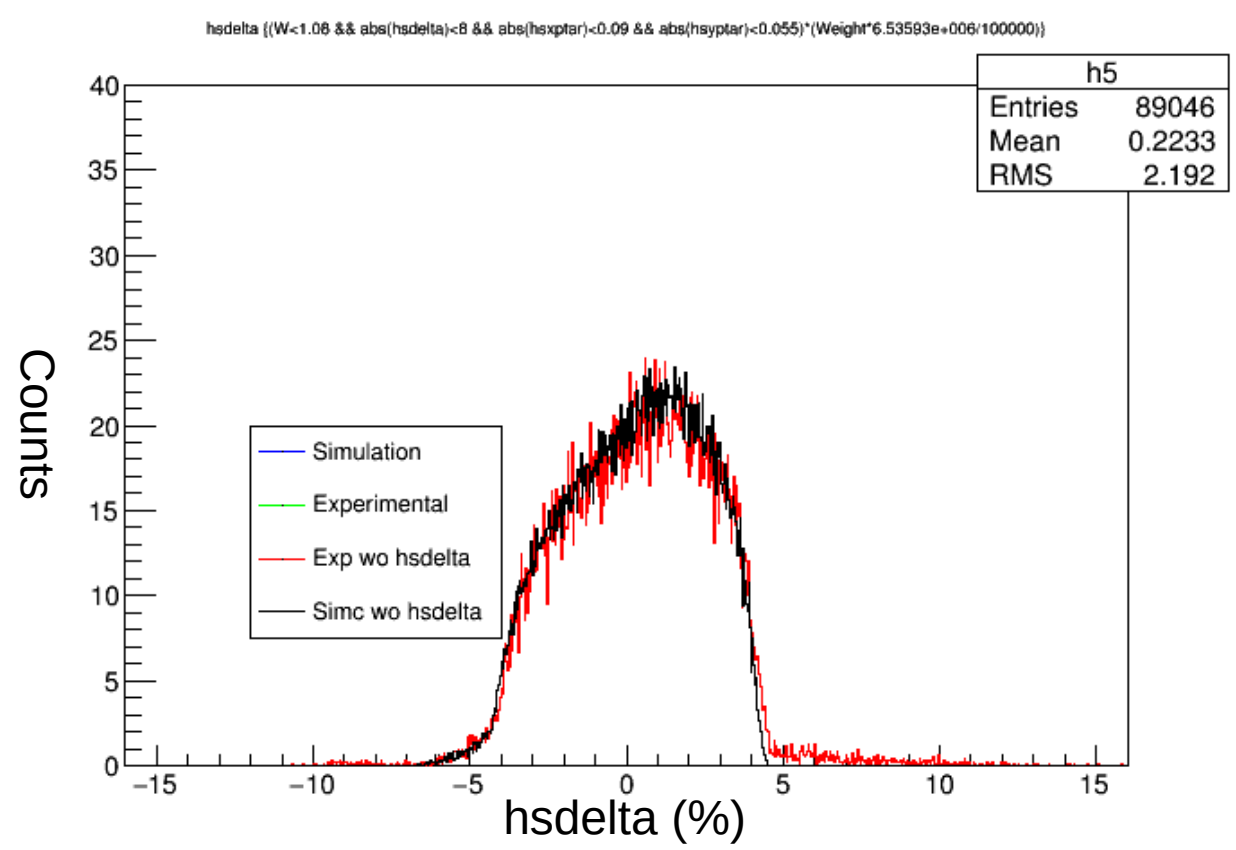

hcer_npe {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && hcer_npe>0.5)*(1.0*80*1/17.3924)}
h17
Entries 40918
Mean 10.75
RMS 4.32
Experimental
Exp wo hcer_npe
Counts
Channels
0
200
400
600
800
1000
1200
1400
0
10
20
30
40
50

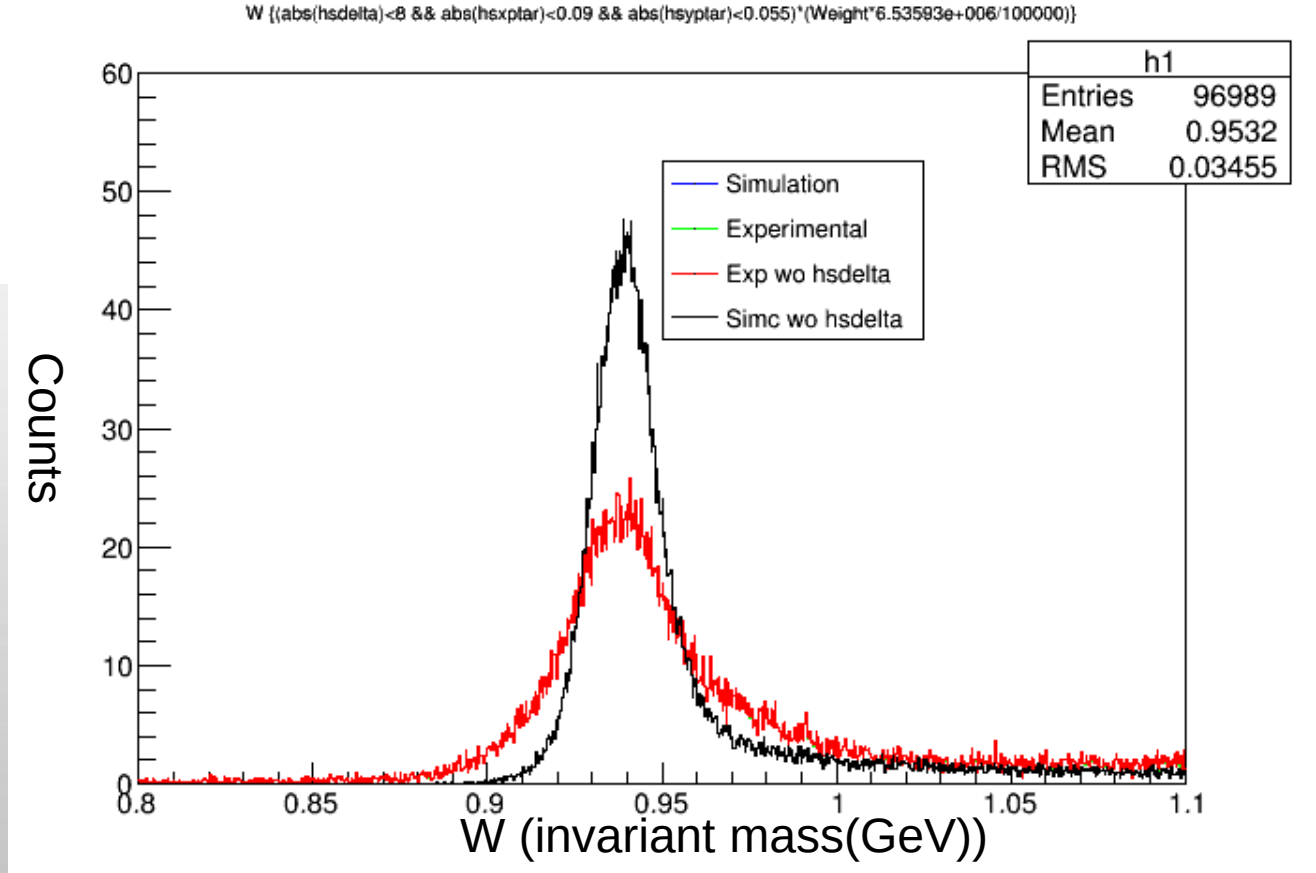

W {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && hcer_npe>0.5)*(1.0*80*1.25/17.3924)}
h2
Entries 74168
Mean 0.9556
RMS 0.04402
Simulation
Experimental
Counts
W (Invariant mass(GeV))
3000
2500
2000
1500
1000
500
0
0.8
0.85
0.9
0.95
1
1.05
1.1

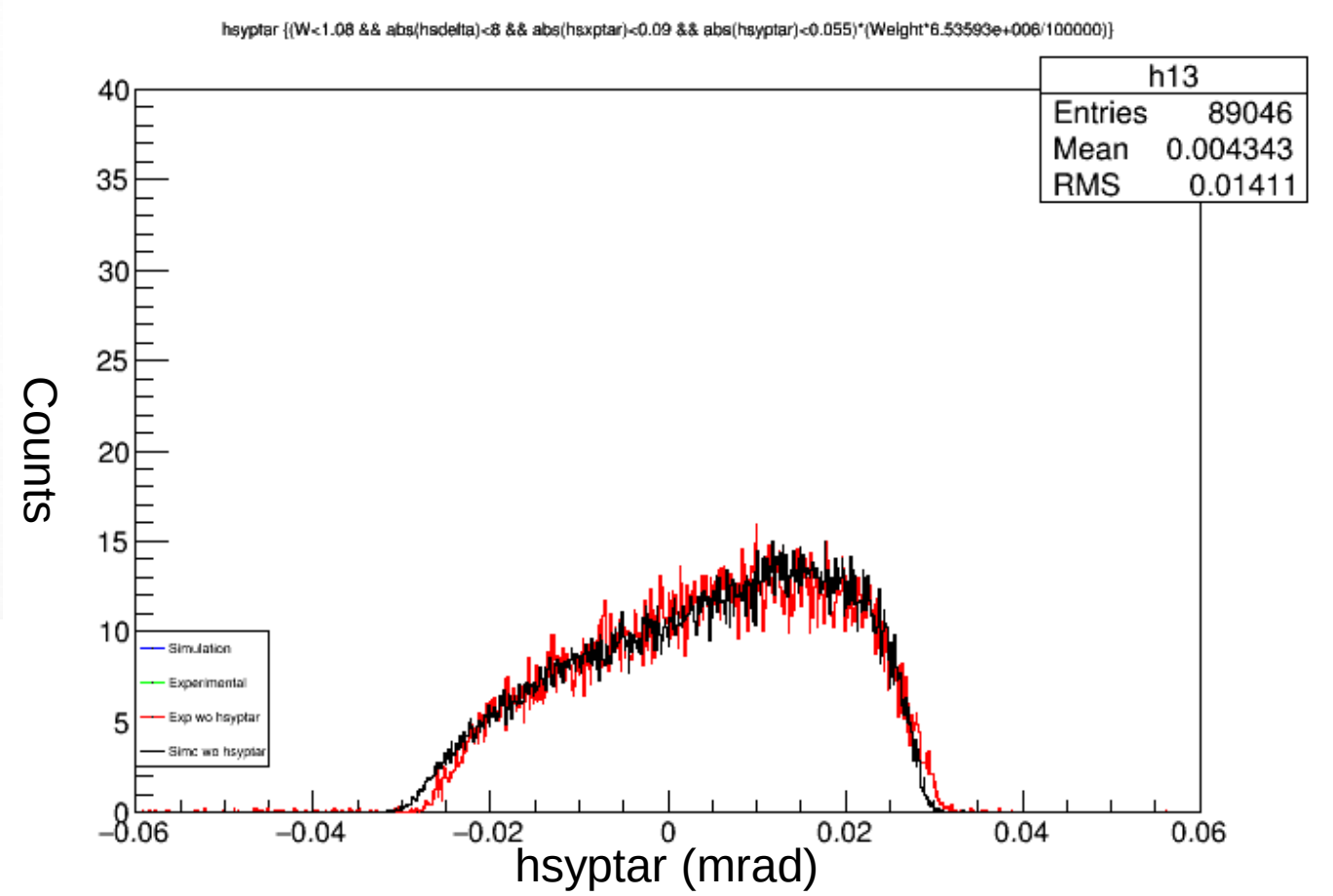
47350

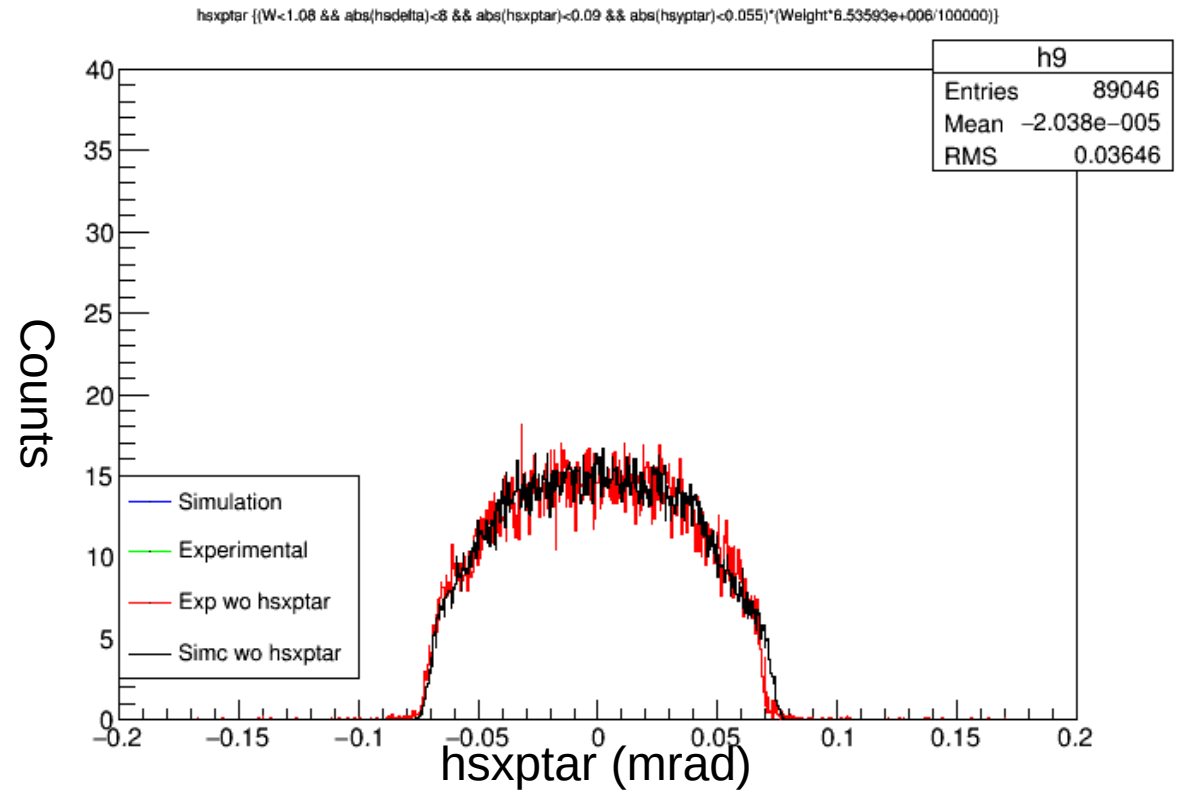
Input values	
Run	47350
Beam Energy	5246.4
e^- p	3724.4
e^- $theta$	22.00

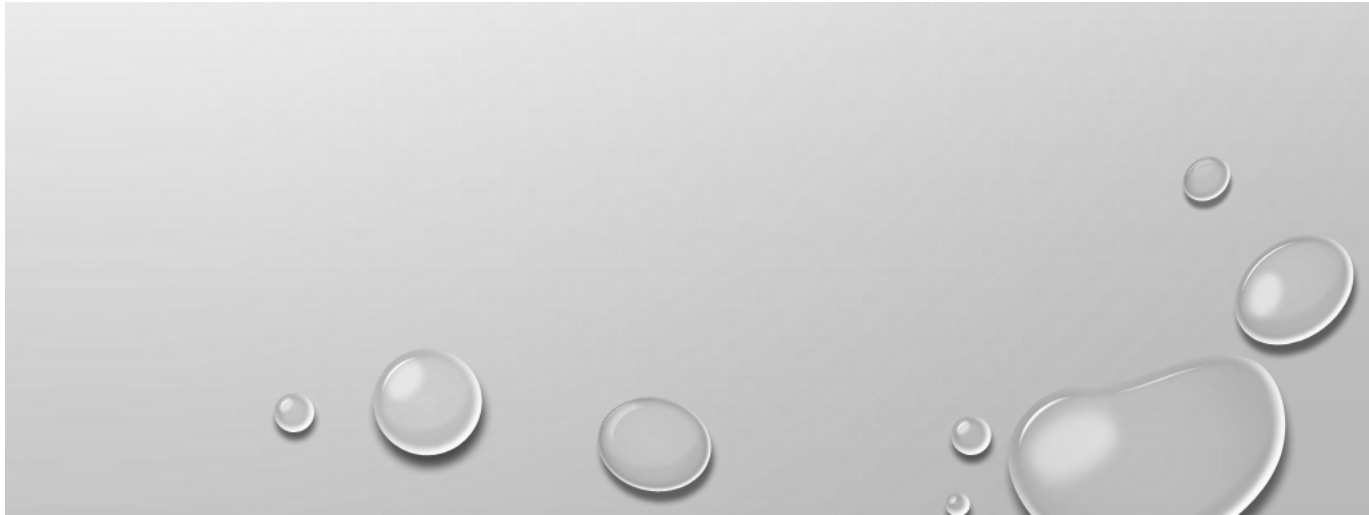


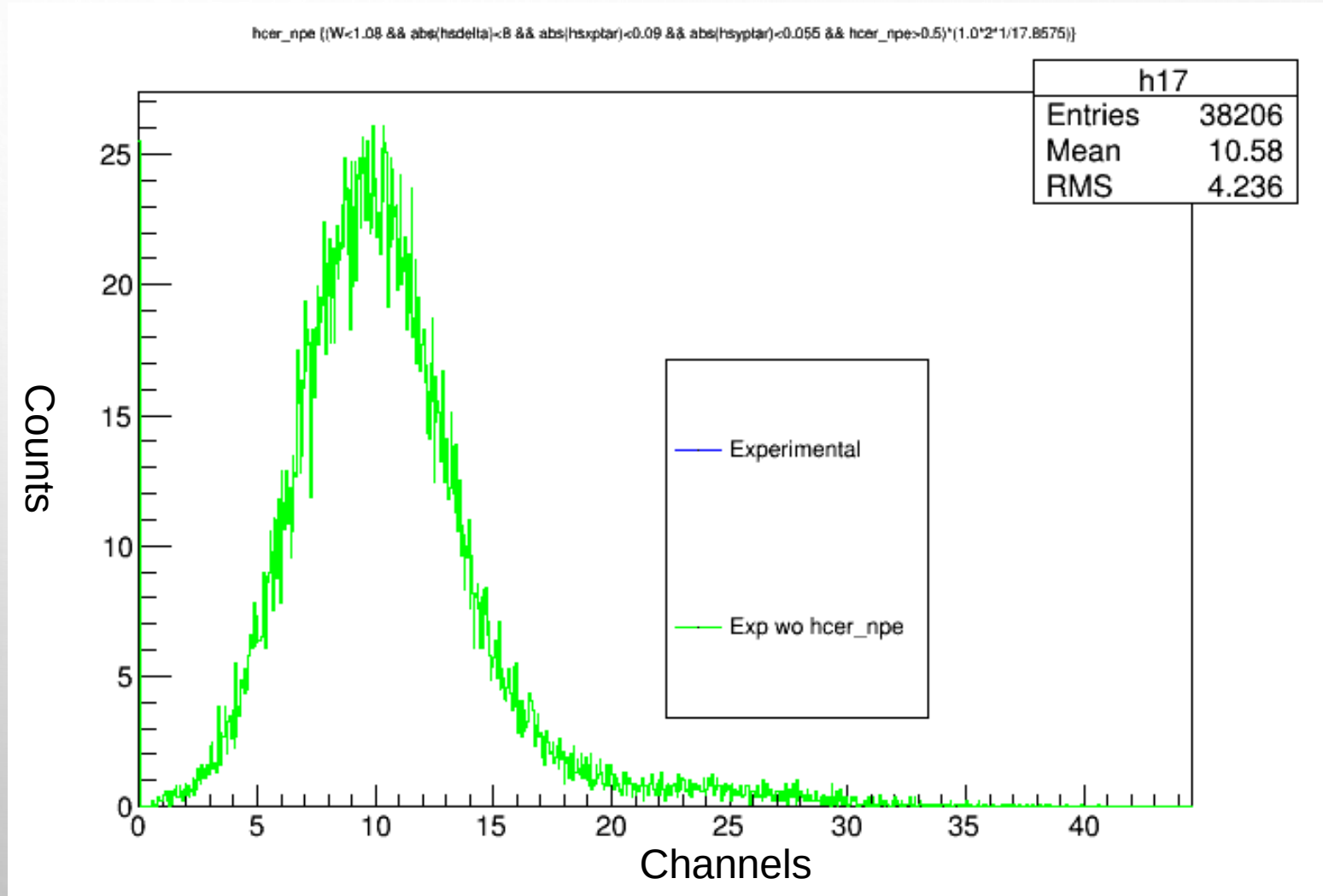

hsdelta {(W<1.06 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.53593e+006/100000)}
h5
Entries 89046
Mean 0.2233
RMS 2.192
Simulation
Experimental
Exp wo hsdelta
Simc wo hsdelta
Counts
hsdelta (%)

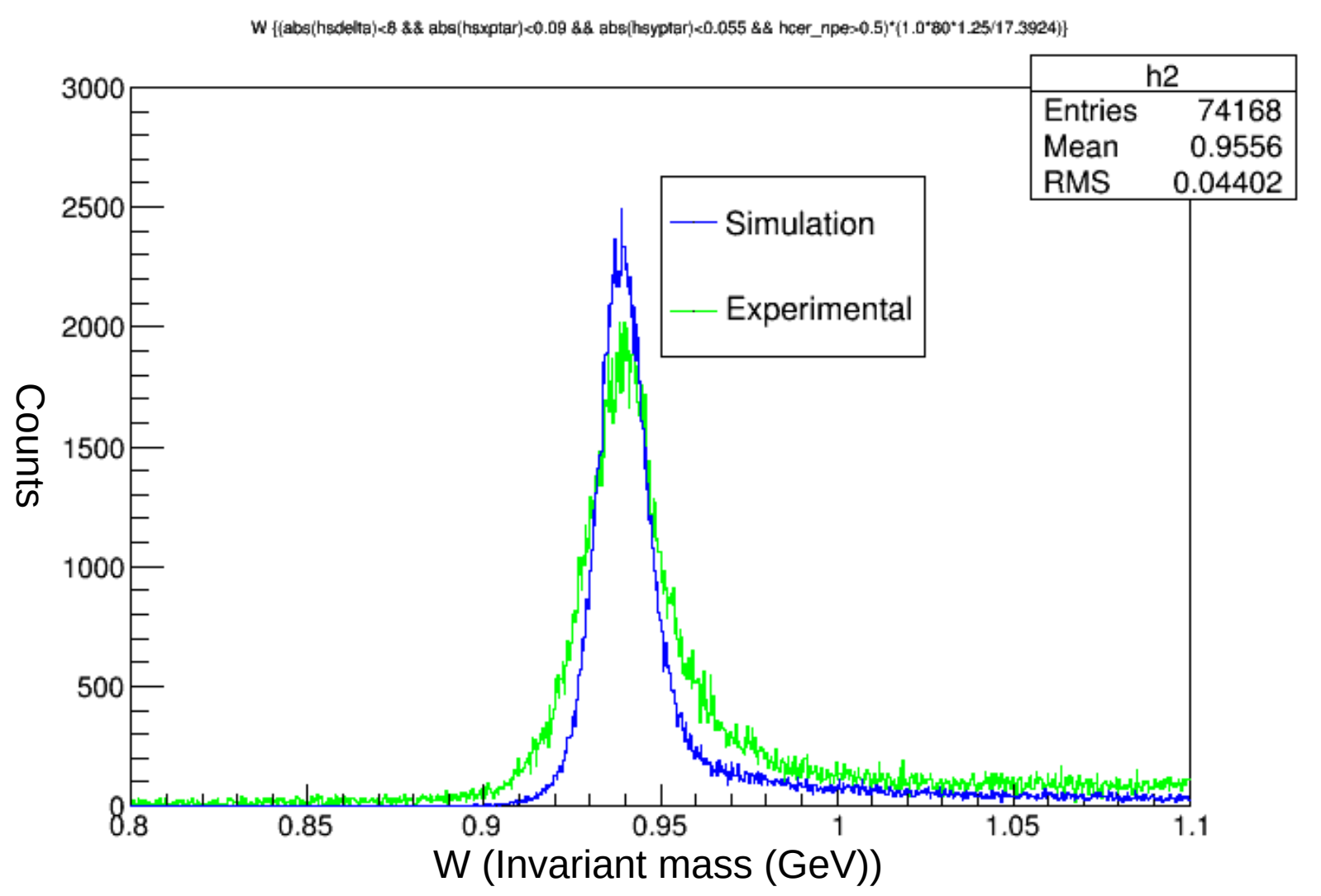

W {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.53593e+006/100000)}
h1
Entries 96989
Mean 0.9532
RMS 0.03455
Simulation
Experimental
Exp wo hsdelta
Simc wo hsdelta
Counts
W (invariant mass(GeV))


hsyptar {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.53593e+006/100000)}
h13
Entries 89046
Mean 0.004343
RMS 0.01411
Simulation
Experimental
Exp wo hsyptar
Simc wo hsyptar
Counts
hsyptar (mrad)


hsxptar {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.53593e+006/100000)}
h9
Entries 89046
Mean −2.038e−005
RMS 0.03646
Simulation
Experimental
Exp wo hsxptar
Simc wo hsxptar
Counts
hsxptar (mrad)

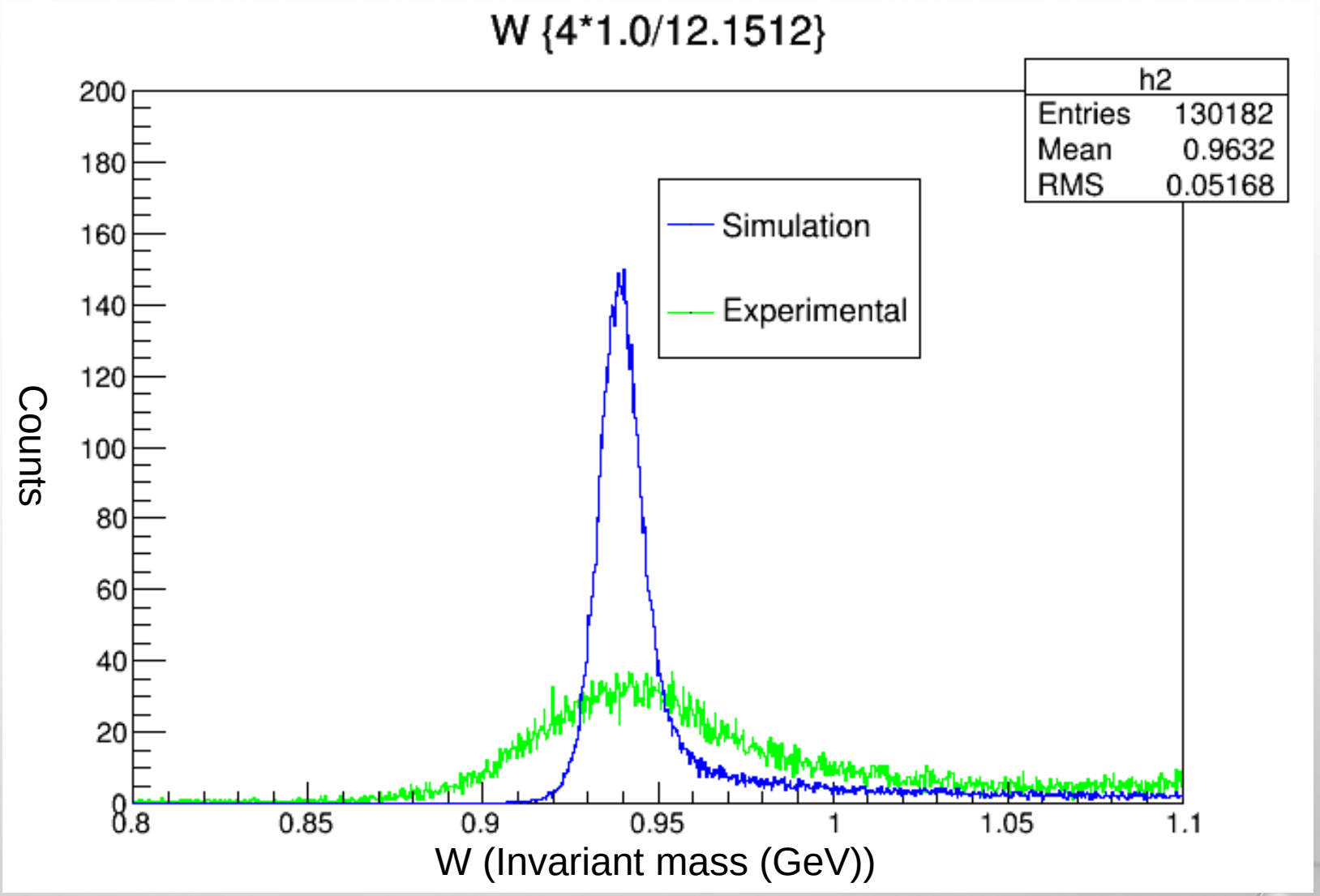


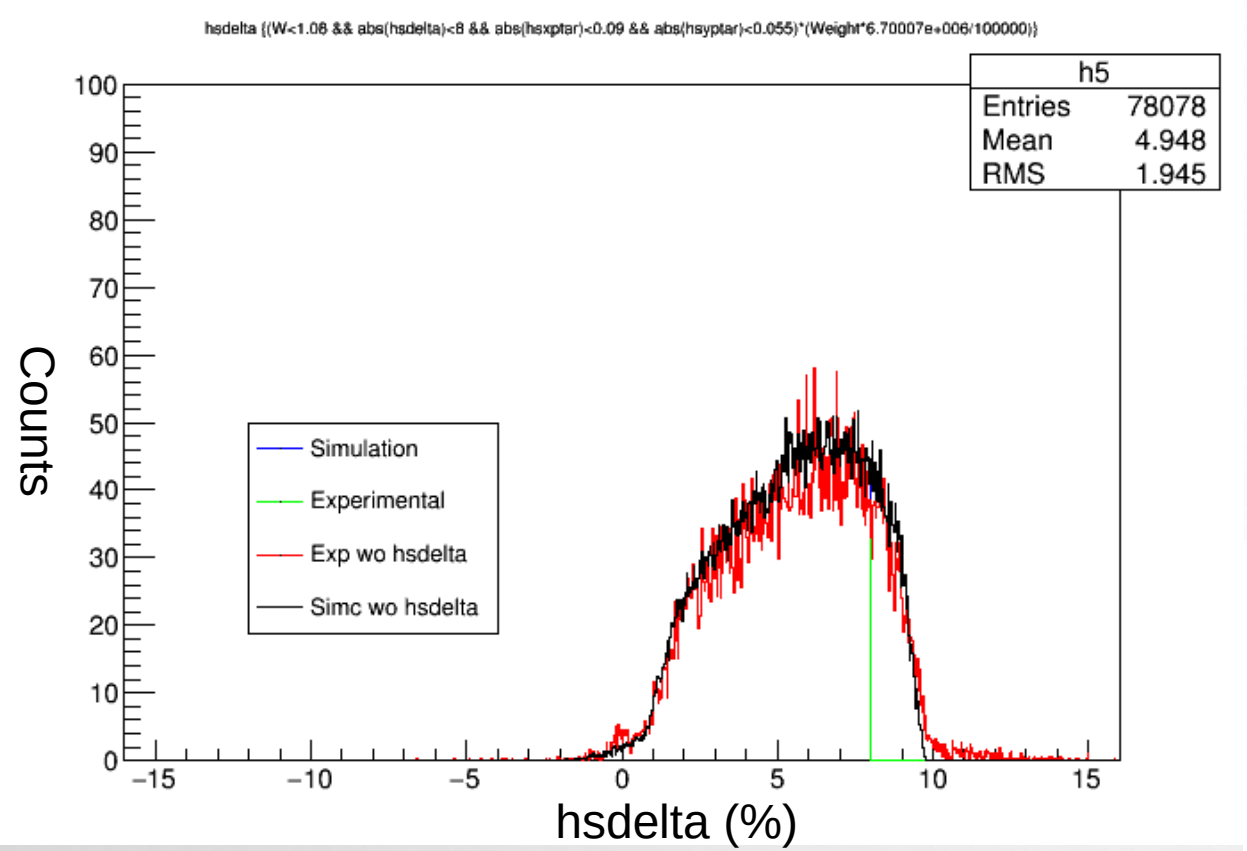

hcer_npe {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && hcer_npe>0.5)*(1.0*2*1/17.8575)}
h17
Entries 38206
Mean 10.58
RMS 4.236
Experimental
Exp wo hcer_npe
Counts
Channels
0
5
10
15
20
25
30
35
40

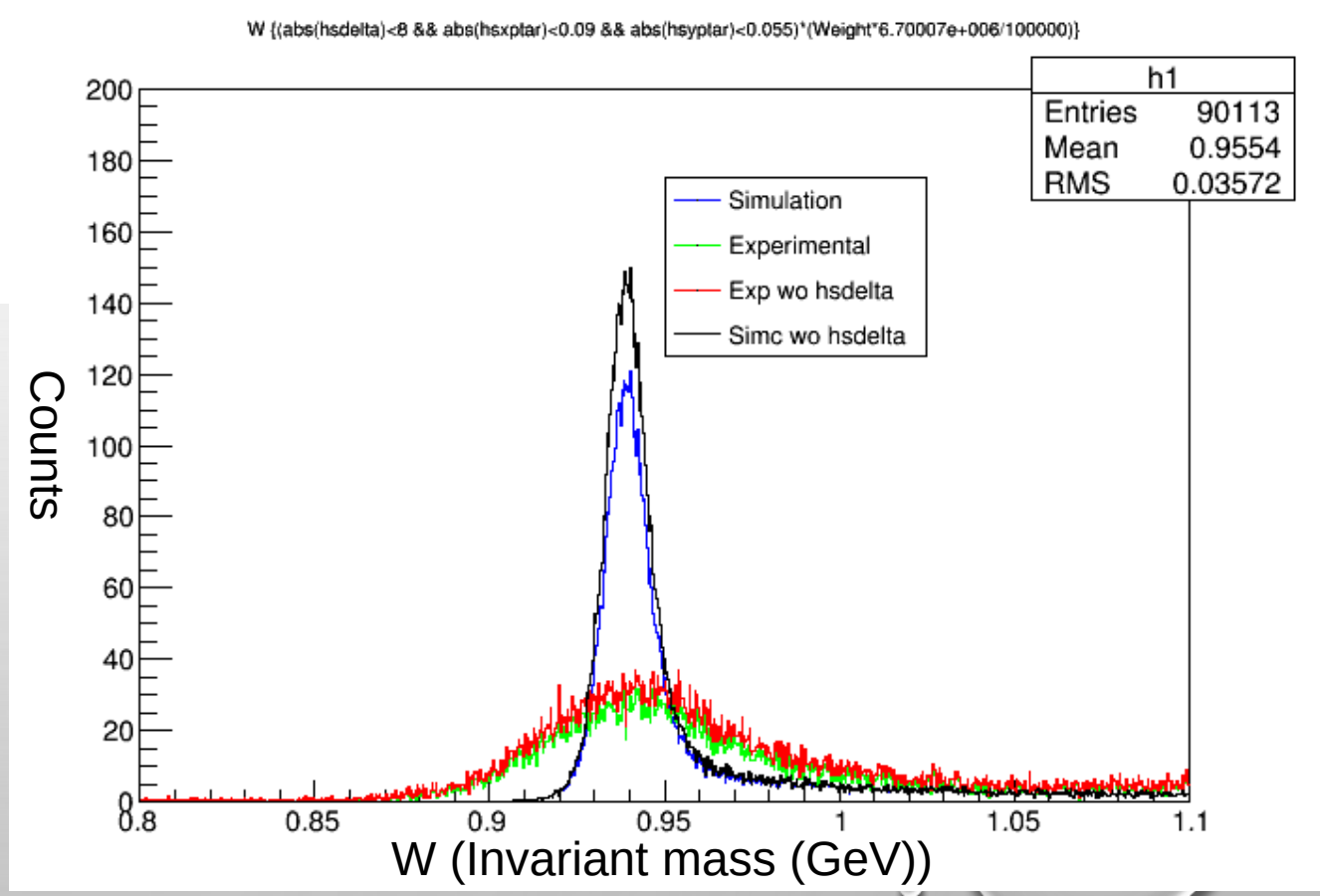

W {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && hcer_npe>0.5)*(1.0*80*1.25/17.3924)}
h2
Entries 74168
Mean 0.9556
RMS 0.04402
Simulation
Experimental
Counts
W (Invariant mass (GeV))
3000
2500
2000
1500
1000
500
0
0.8
0.85
0.9
0.95
1
1.05
1.1

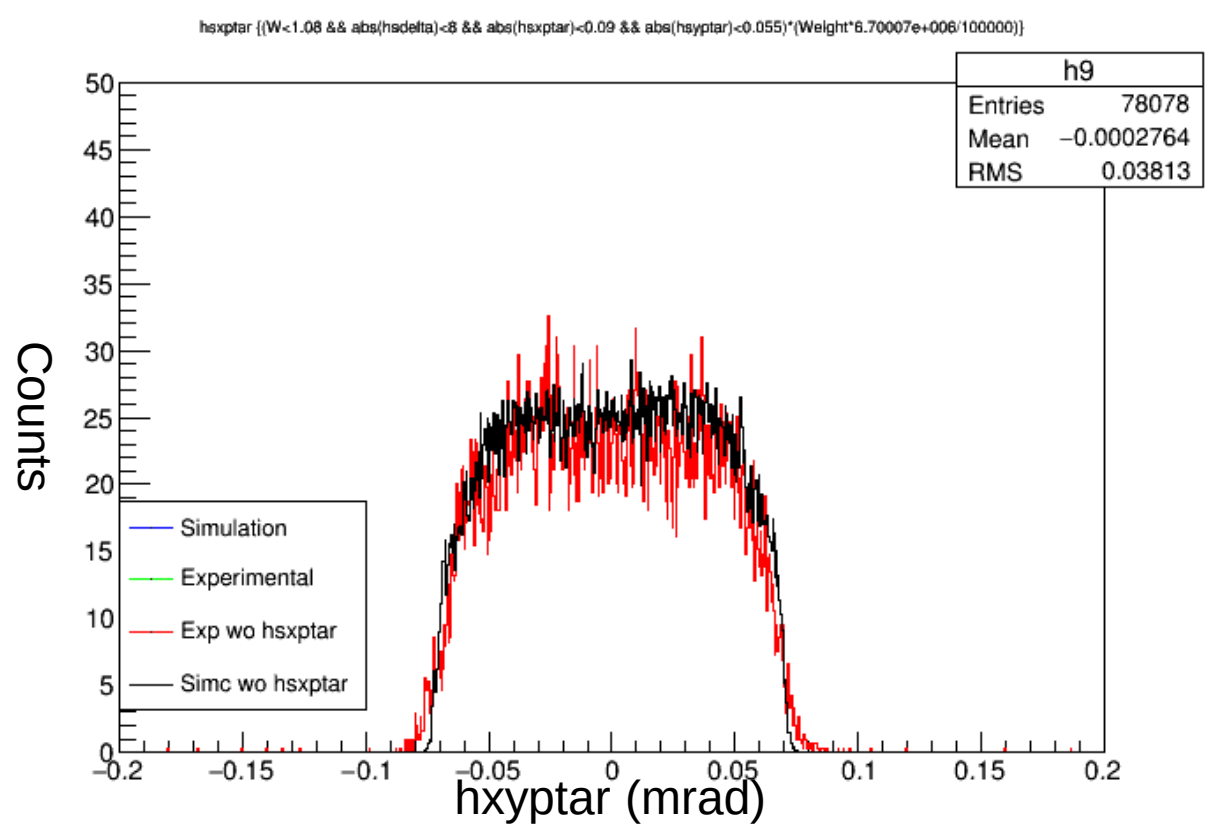
47347

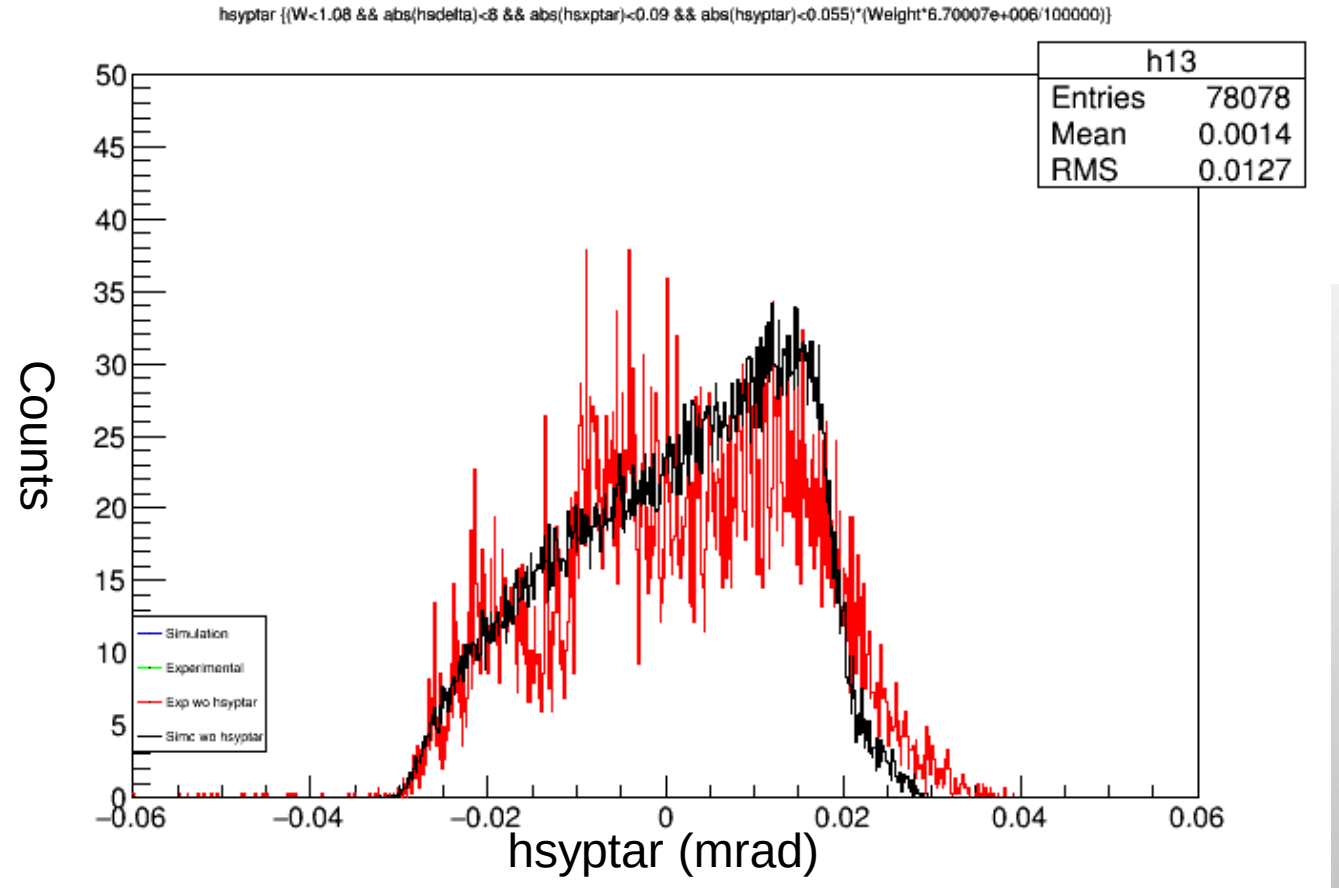
Input values	
Run	47347
Beam Energy	5246.4
e^- p	43724.4
e^- theta	19.985

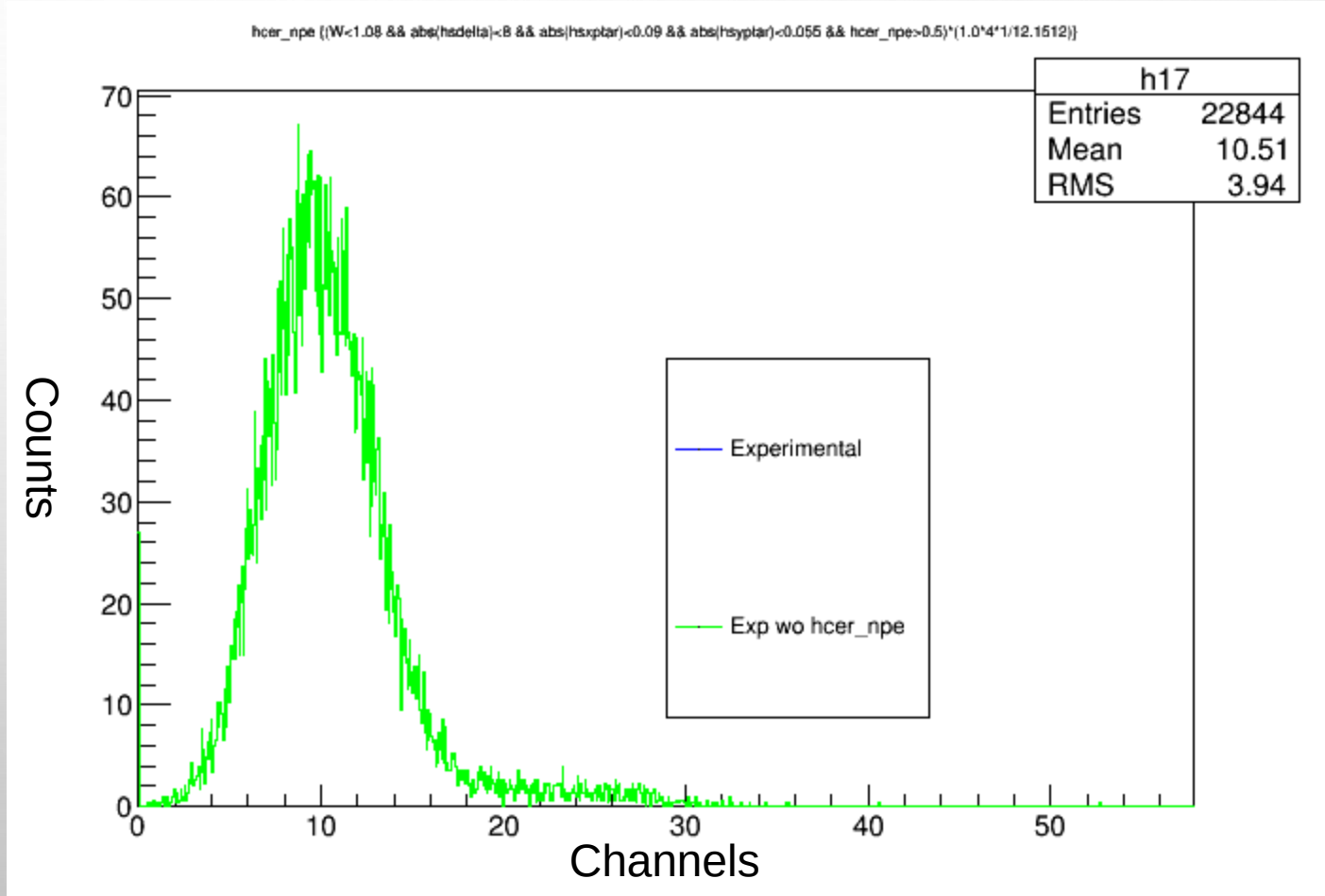


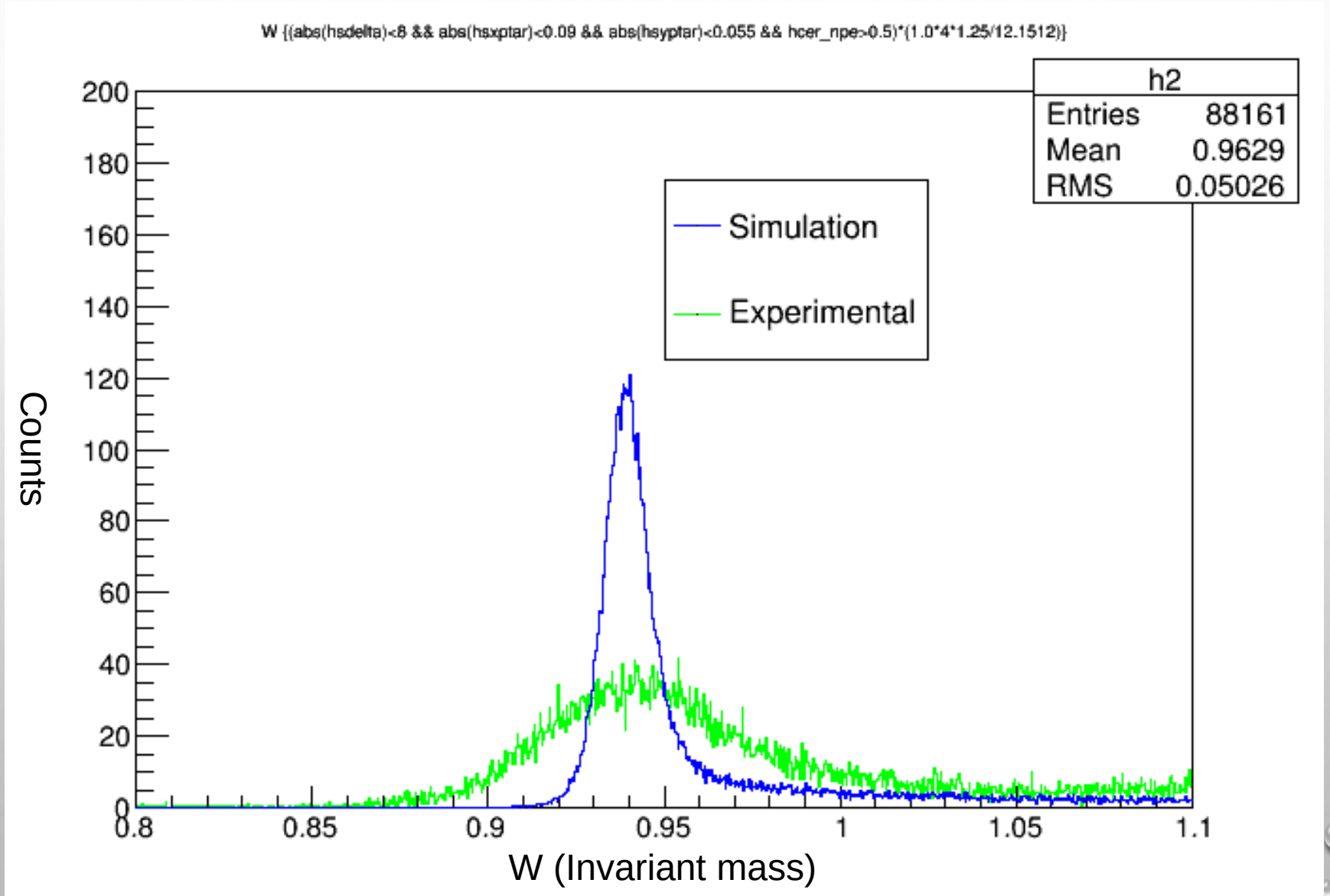

hsdelta {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.70007e+006/100000)}
h5
Entries 78078
Mean 4.948
RMS 1.945
Simulation
Experimental
Exp wo hsdelta
Simc wo hsdelta
Counts
hsdelta (%)


W {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.70007e+006/100000)}
h1
Entries 90113
Mean 0.9554
RMS 0.03572
Simulation
Experimental
Exp wo hsdelta
Simc wo hsdelta
Counts
W (Invariant mass (GeV))

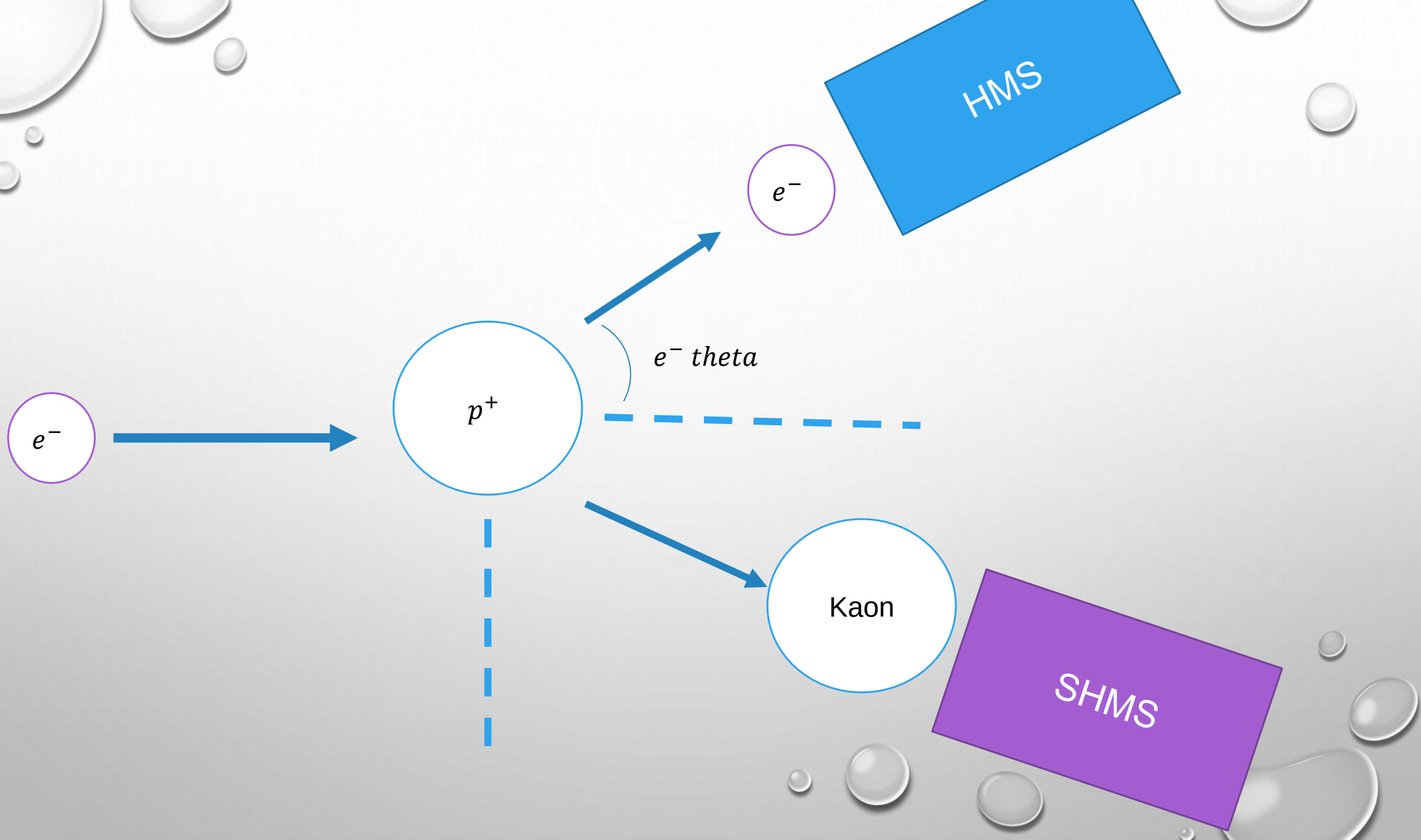

hsxptar {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.70007e+006/100000)}
h9
Entries 78078
Mean −0.0002764
RMS 0.03813
Simulation
Experimental
Exp wo hsxptar
Simc wo hsxptar
Counts
hxyptar (mrad)

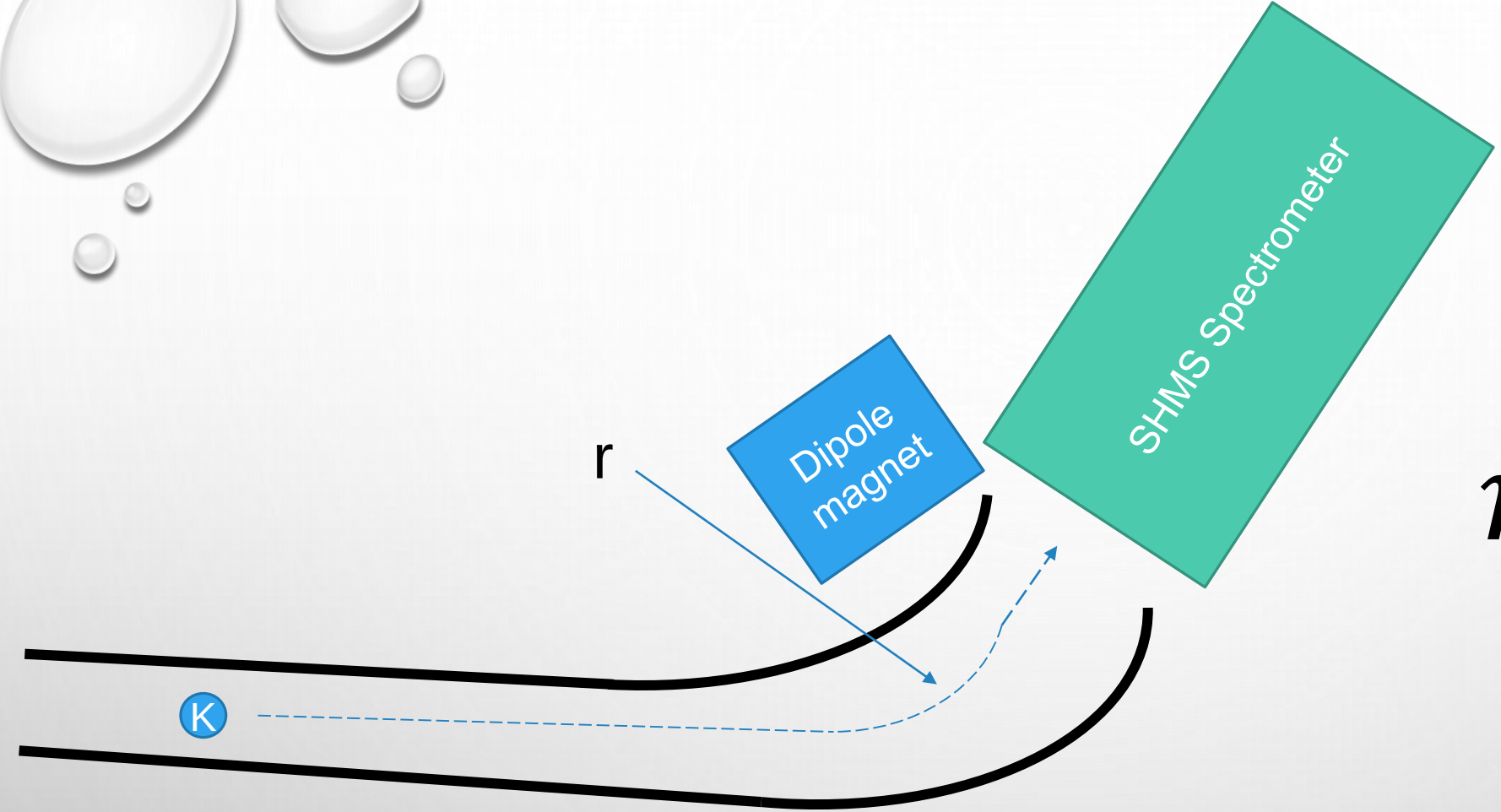

hsyptar {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055)*(Weight*6.70007e+006/100000)}
h13
Entries 78078
Mean 0.0014
RMS 0.0127
Simulation
Experimental
Exp wo hsyptar
Simc wo hsyptar
Counts
hsyptar (mrad)


hcer_npe {(W<1.08 && abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && hcer_npe>0.5)*(1.0*4*1/12.1512)}
h17
Entries 22844
Mean 10.51
RMS 3.94
Experimental
Exp wo hcer_npe
Counts
Channels
0
10
20
30
40
50
60
70


W {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && hcer_npe>0.5)*(1.0*4*1.25/12.1512)}
h2
Entries 88161
Mean 0.9629
RMS 0.05026
Simulation
Experimental
Counts
W (Invariant mass)
0
20
40
60
80
100
120
140
160
180
200
0.8
0.85
0.9
0.95
1
1.05
1.1

Kaon production analysis


HMS
e^-
e^- $theta$
e^-
p^+
Kaon
SHMS



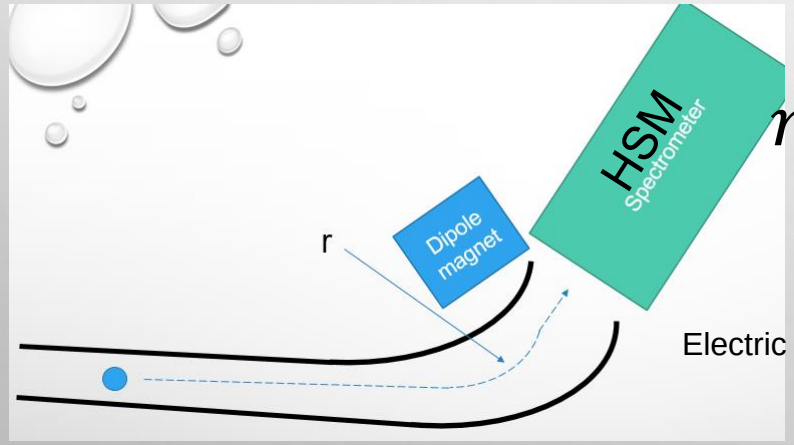
$$r = \frac{mv}{qB}$$

Electric Charge

Electric Field

Q2 1.7 GEV RUN

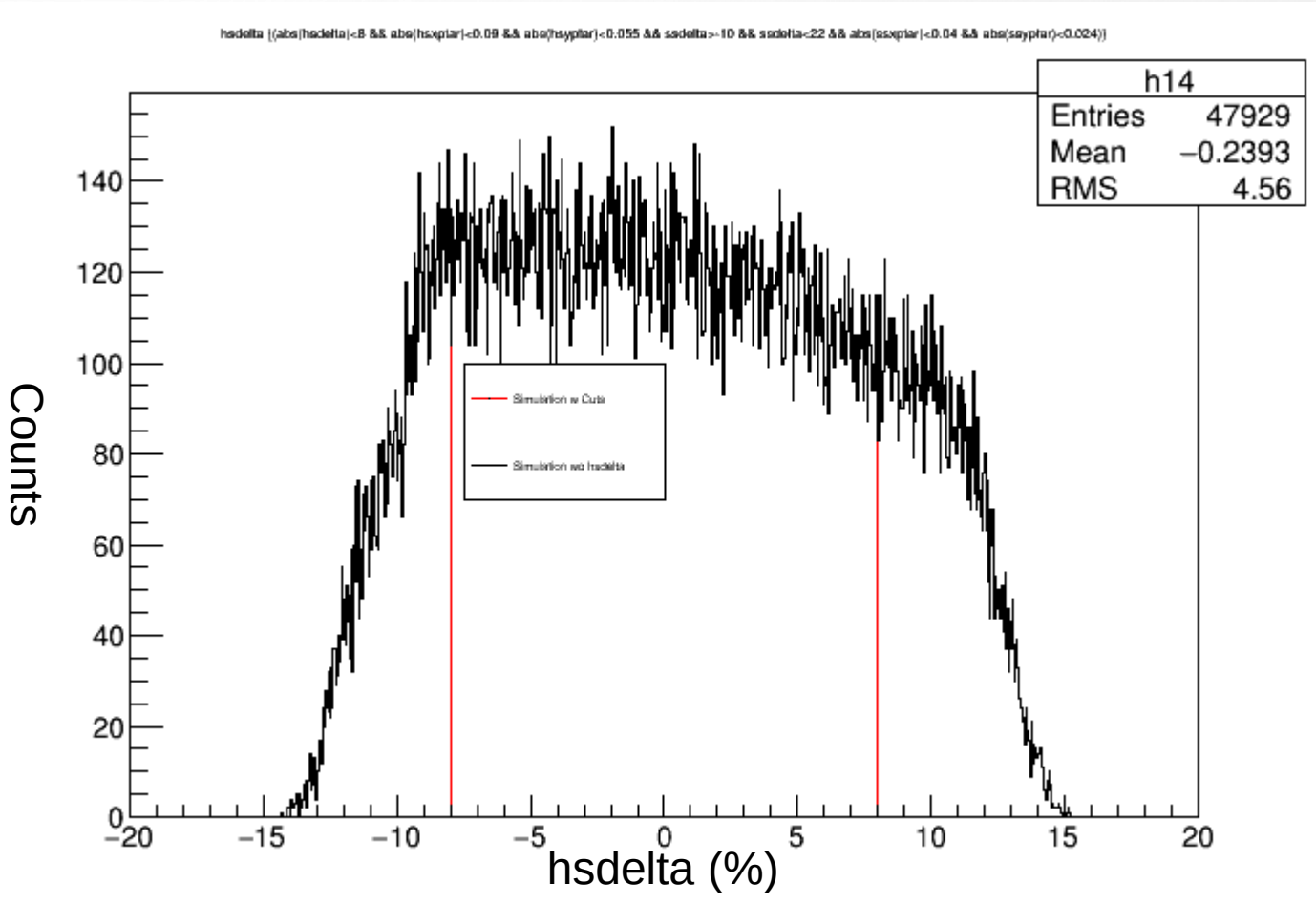
Input values	
Run	Q2 1.7
Beam Energy	5647
e^- p	2012
e^- theta	22.30
$ctua$	371.3
$Kaon$	1

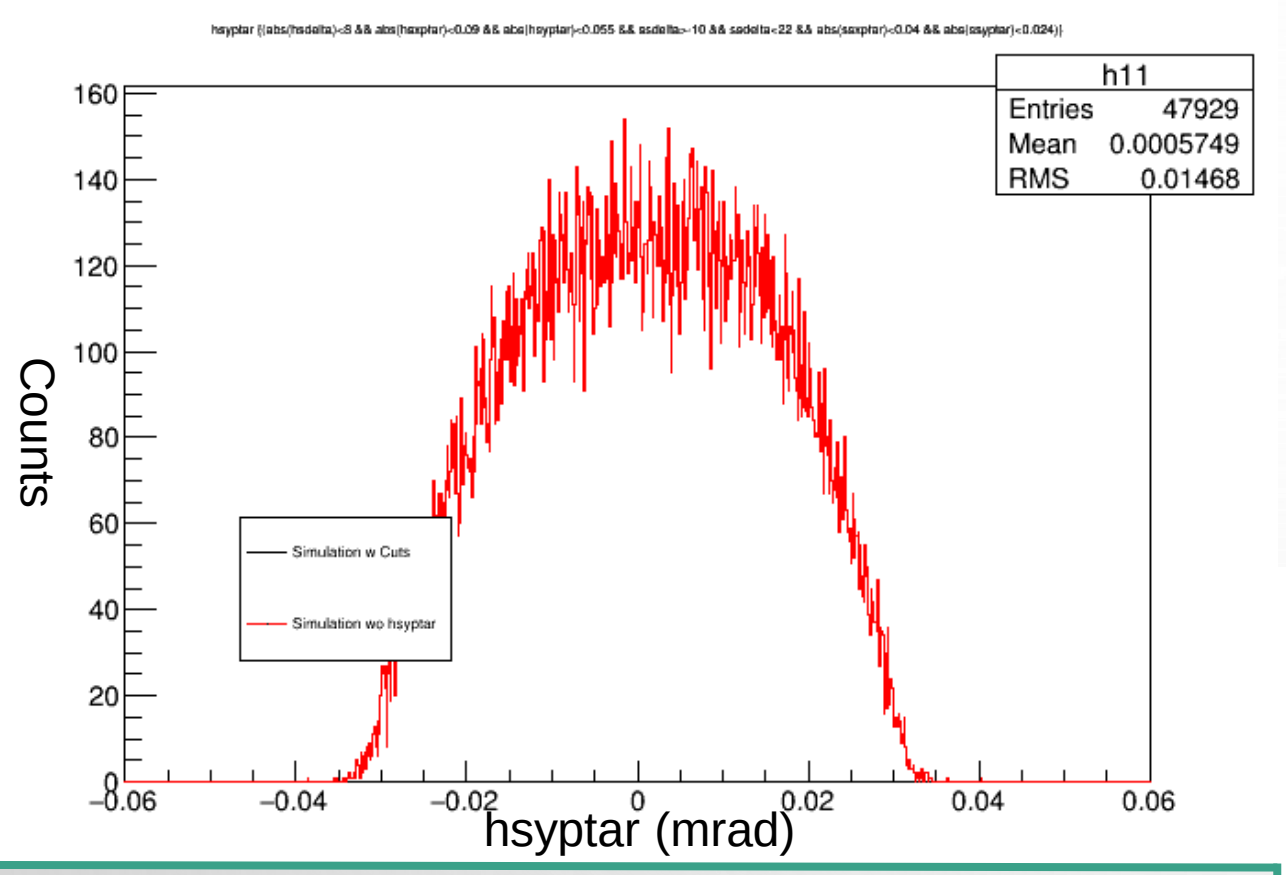


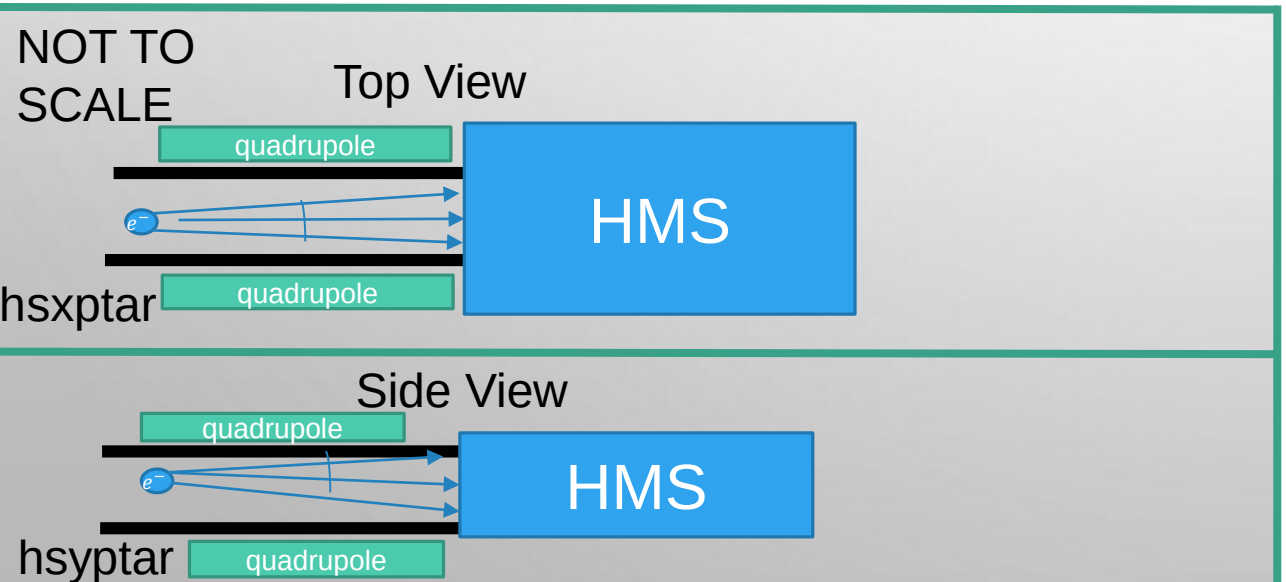
$$r = \frac{mv}{qB}$$

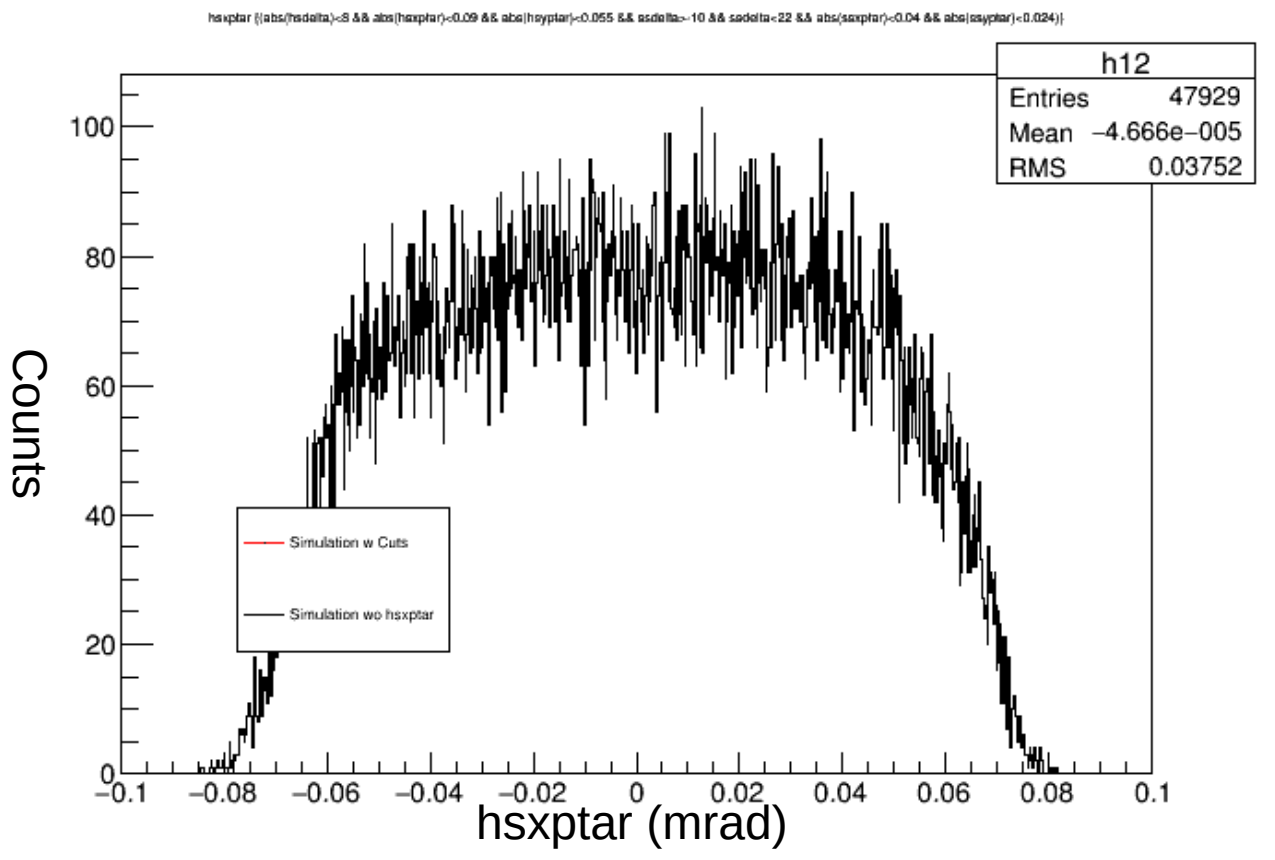
Electric Charge

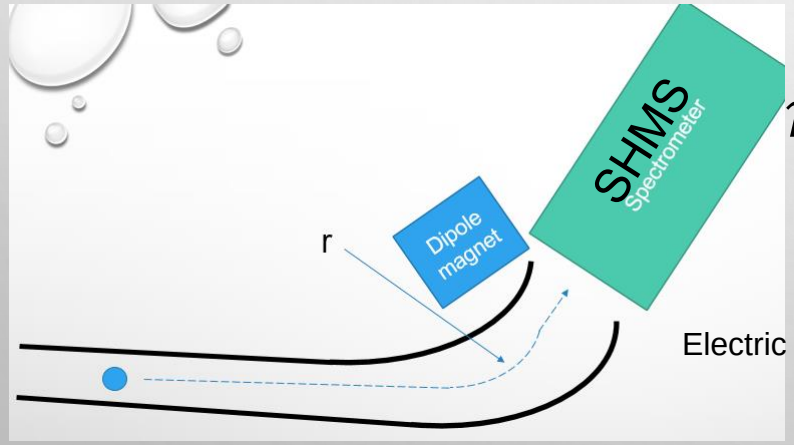
Electric Field




hsyptar {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && ssdelta>-10 && ssdelta<22 && abs(ssxptar)<0.04 && abs(ssyptar)<0.024)}
h11
Entries 47929
Mean 0.0005749
RMS 0.01468
Simulation w Cuts
Simulation wo hsyptar
Counts
hsyptar (mrad)


NOT TO SCALE
Top View
quadrupole
HMS
quadrupole
hsxptar
Side View
quadrupole
HMS
hsyptar
quadrupole

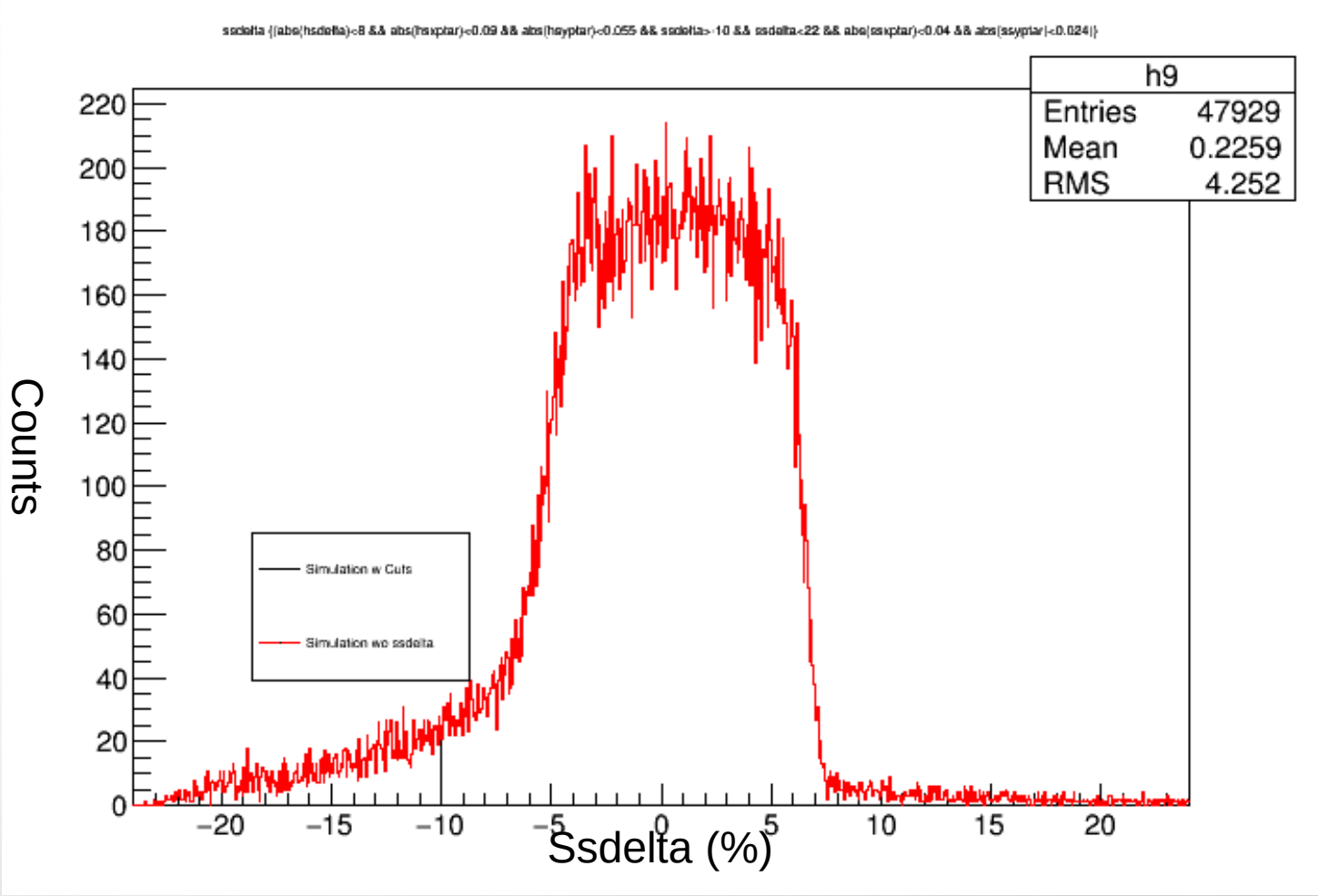

hsxptar {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && ssdelta>-10 && ssdelta<22 && abs(ssxptar)<0.04 && abs(ssyptar)<0.024)}
h12
Entries 47929
Mean −4.666e−005
RMS 0.03752
Simulation w Cuts
Simulation wo hsxptar
Counts
hsxptar (mrad)

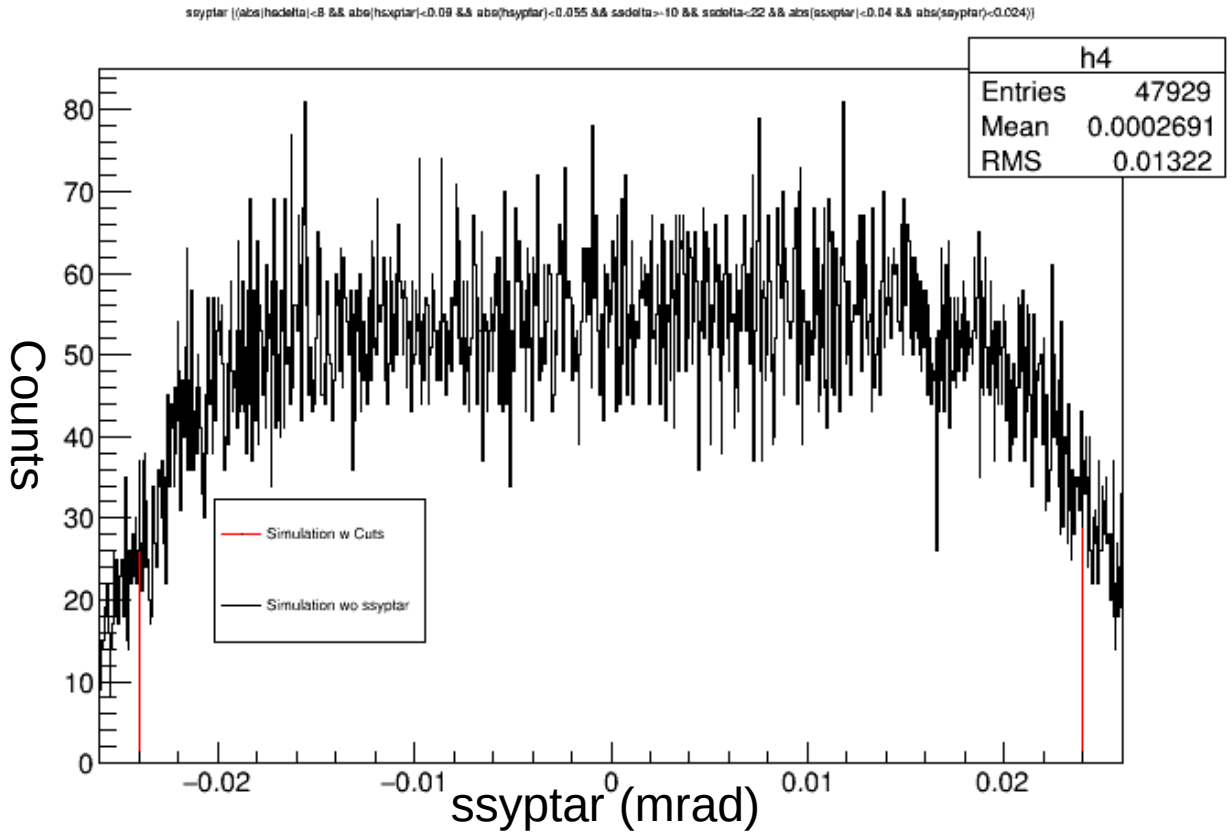


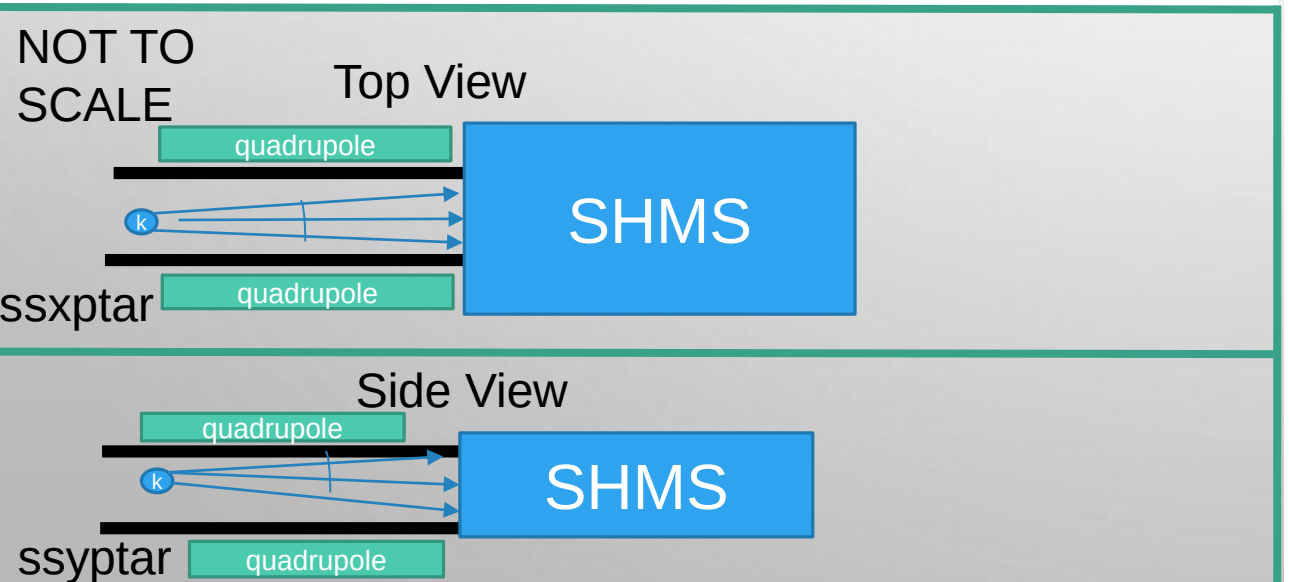
$$r = \frac{mv}{qB}$$

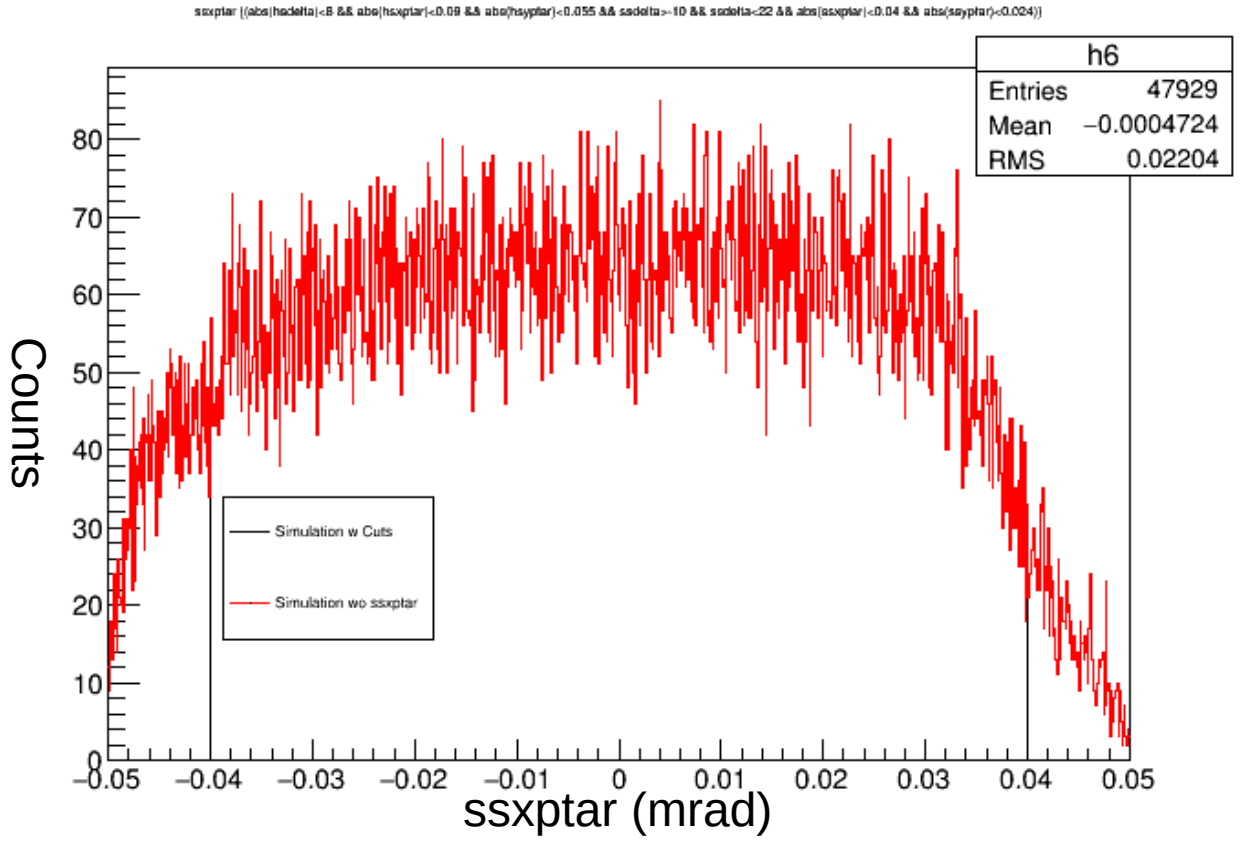
Electric Charge

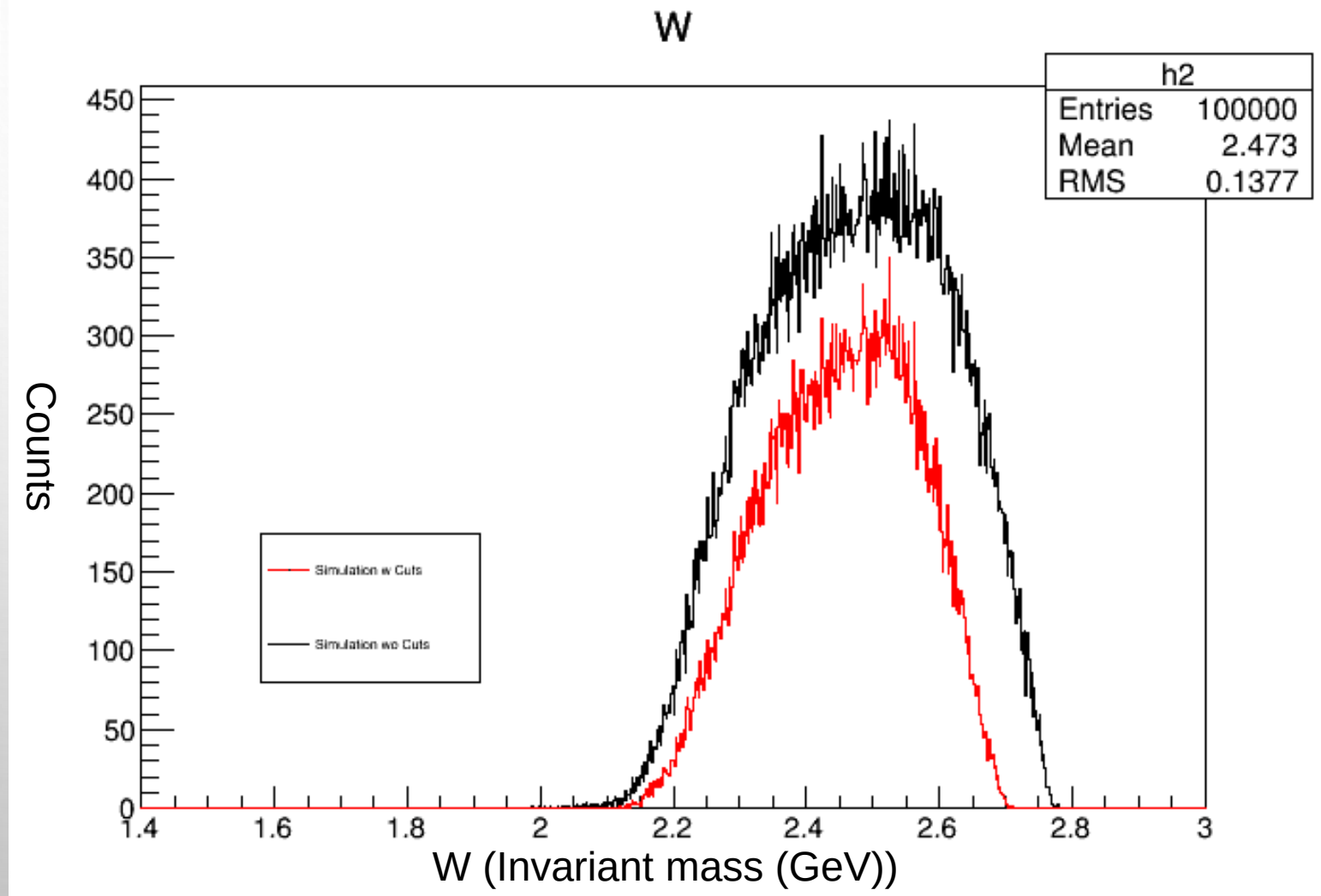
Electric Field

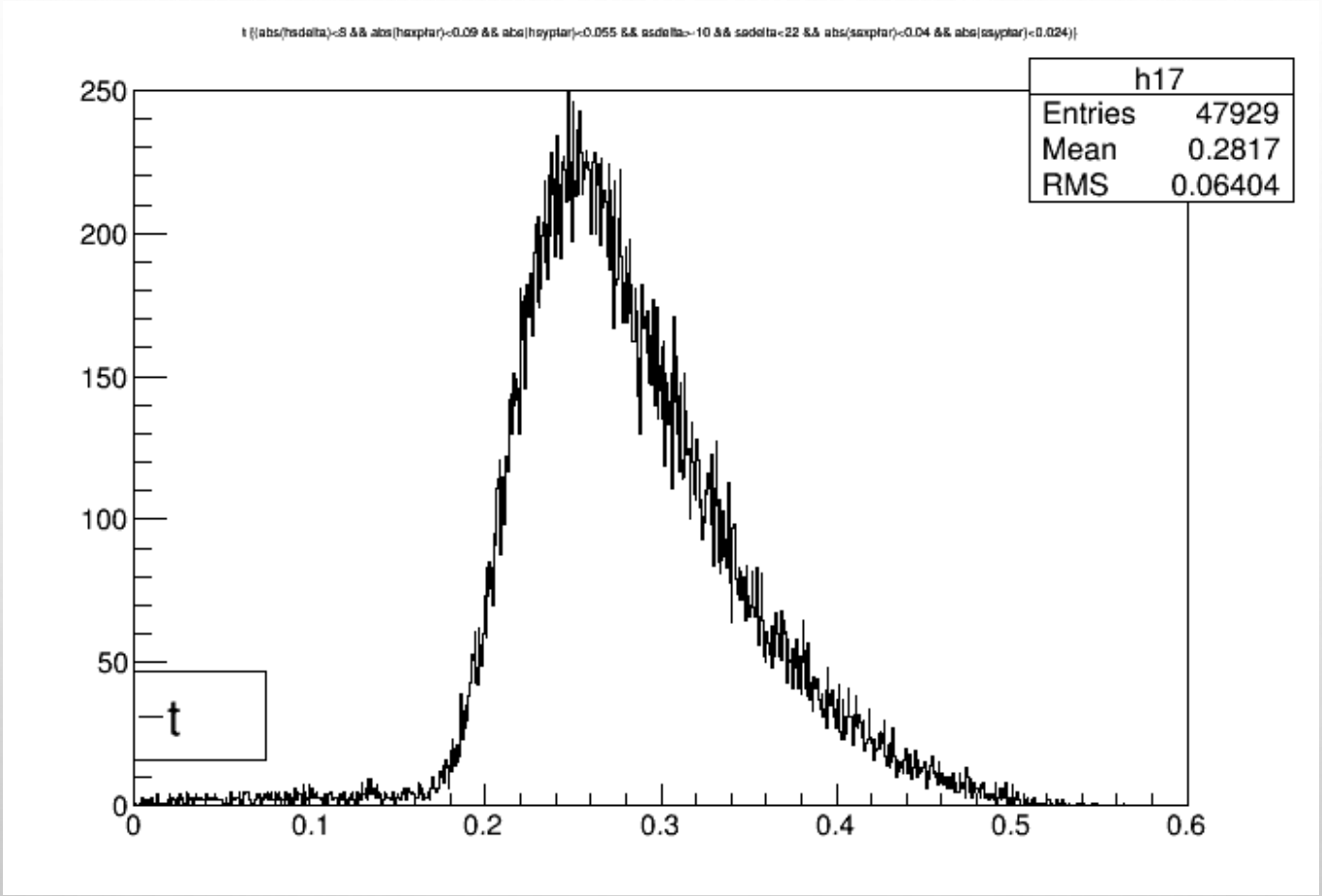


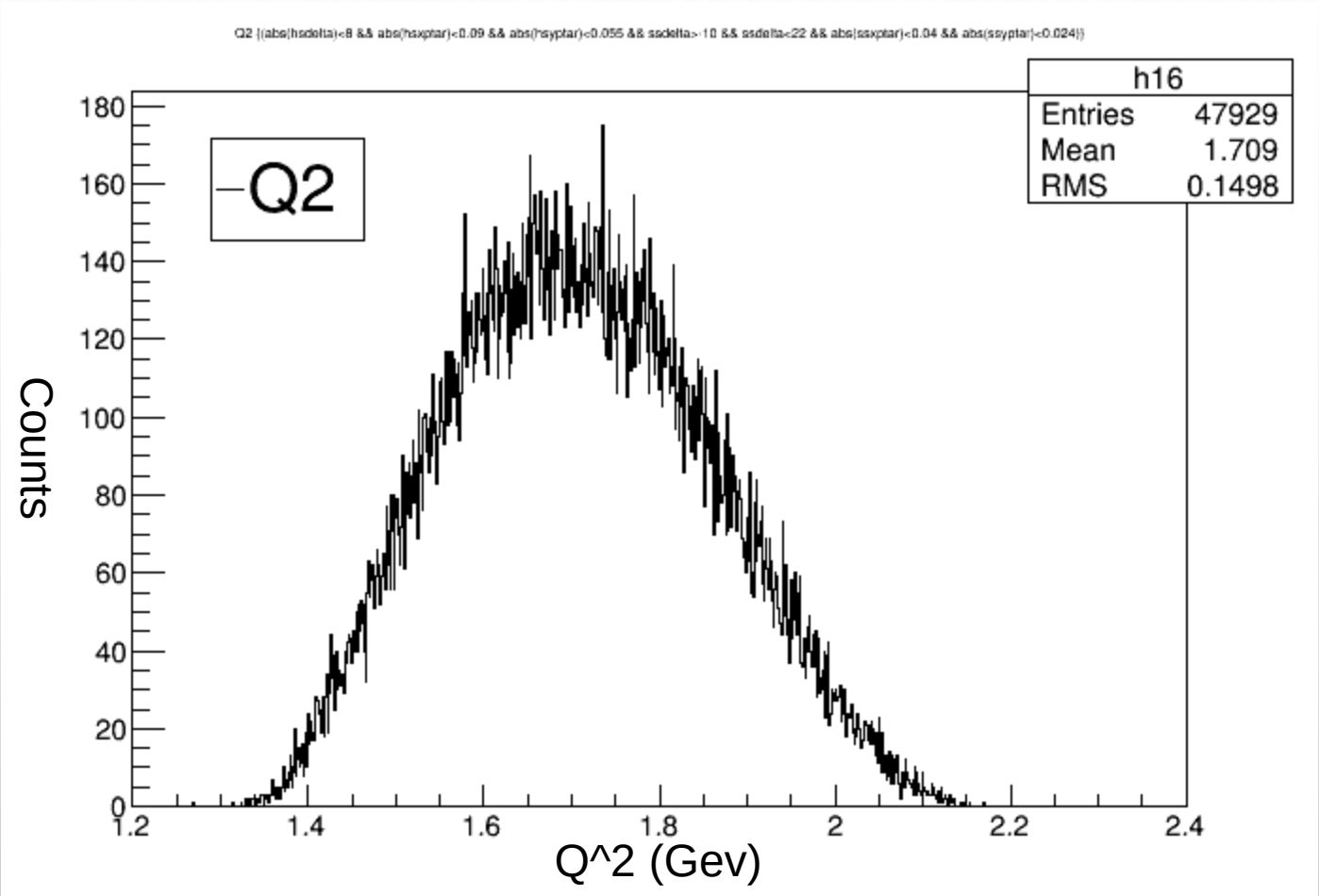

ssyptar |(abs(hdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && sdelta>-10 && sdelta<22 && abs(ssxptar)<0.04 && abs(ssyptar)<0.024)|
h4
Entries 47929
Mean 0.0002691
RMS 0.01322
Counts
ssyptar (mrad)
Simulation w Cuts
Simulation wo ssyptar


NOT TO SCALE
Top View
quadrupole
SHMS
quadrupole
ssxptar
Side View
quadrupole
SHMS
quadrupole
ssyptar


ssxptar |(abs(hdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && sdelta>-10 && sdelta<22 && abs(ssxptar)<0.04 && abs(ssyptar)<0.024)|
h6
Entries 47929
Mean −0.0004724
RMS 0.02204
Counts
ssxptar (mrad)
Simulation w Cuts
Simulation wo ssxptar


W
h2
Entries 100000
Mean 2.473
RMS 0.1377
Counts
W (Invariant mass (GeV))
Simulation w Cuts
Simulation wo Cuts
0
50
100
150
200
250
300
350
400
450
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3


t (abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && ssdelta>-10 && ssdelta<22 && abs(ssxptar)<0.04 && abs(ssyptar)<0.024)
h17
Entries 47929
Mean 0.2817
RMS 0.06404
t
250
200
150
100
50
0
0
0.1
0.2
0.3
0.4
0.5
0.6

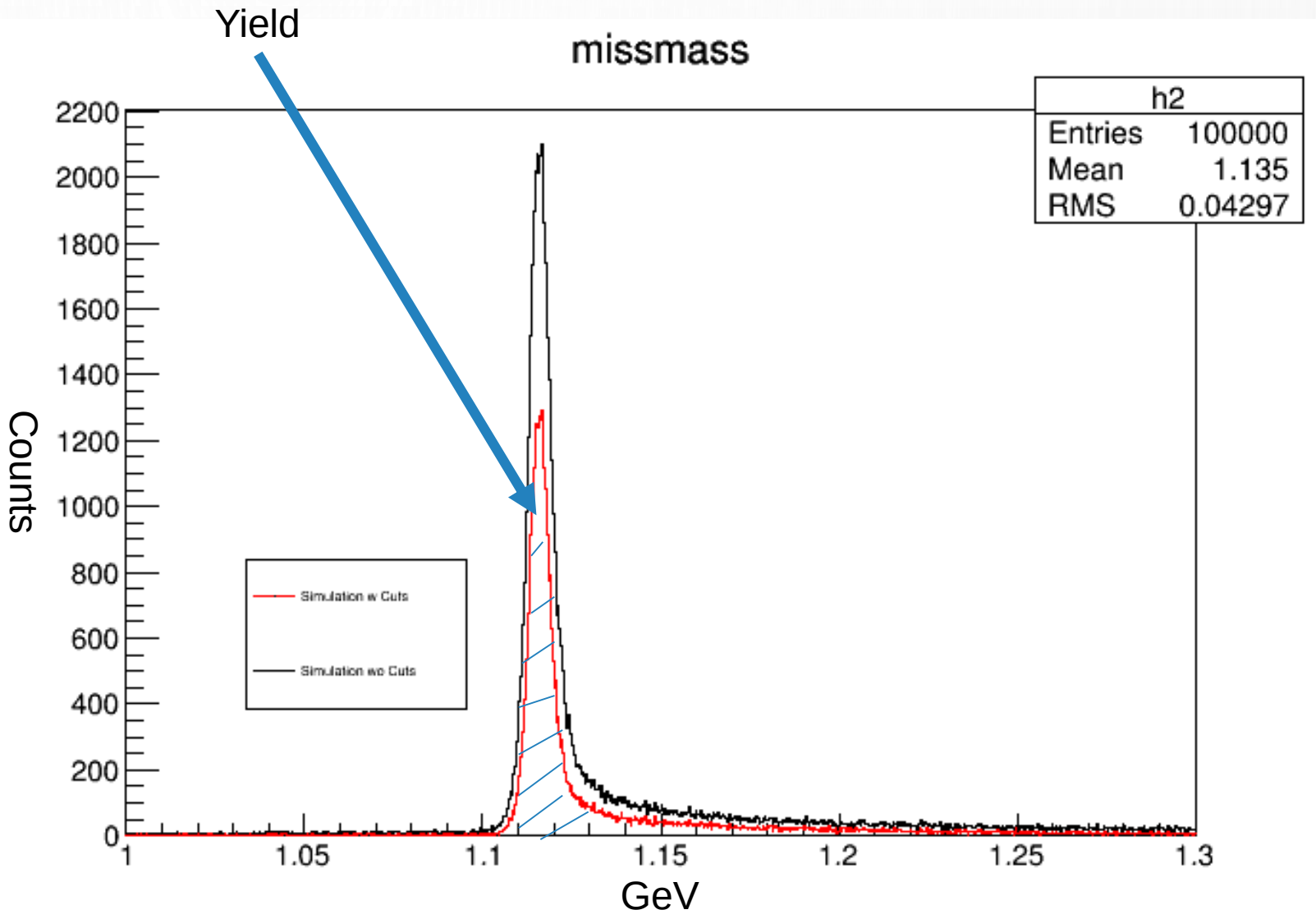

Q2 {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && ssdelta>-10 && ssdelta<22 && abs(ssxptar)<0.04 && abs(ssyptar)<0.024)}
h16
Entries 47929
Mean 1.709
RMS 0.1498
Q2
Counts
Q^2 (Gev)
0
20
40
60
80
100
120
140
160
180
1.2
1.4
1.6
1.8
2
2.2
2.4

KAON & PION PREDICTION

```
BEGIN Time: Wed Jul 27 12:28:46 2016
END Time:   Wed Jul 27 12:38:50 2016
```

$$\frac{k}{s} = Yield/\text{time}$$

46273/851secs=54.3748 k/s



Input values	
Run	Q2 1.7
Beam Energy	5647
e^- p	2012
e^- theta	22.30
$ctua$	371.3
$Kaon$	1

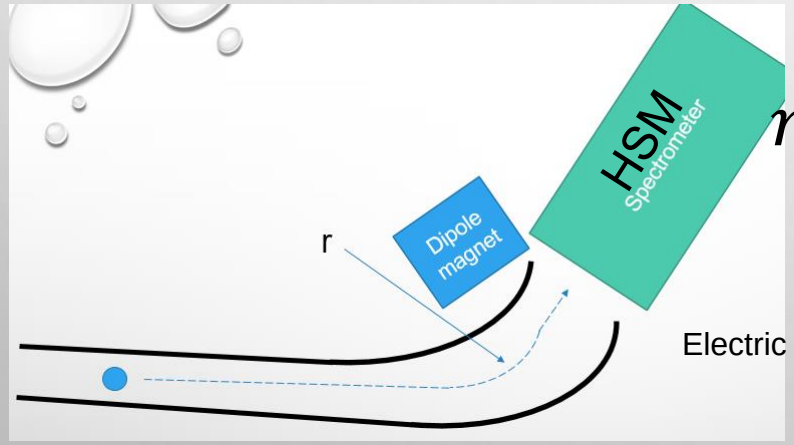
Stop for Prez

Input values	
Run	Q2 1.7 (r2)
Beam Energy	8761
e^- p	5125
e^- theta	11.16
$ctua$	371.3
$Kaon$	1

Input values	
Run	Q2 5.5
Beam Energy	10921
e^- p	3599
e^- theta	21.56
$ctua$	371.3
$Kaon$	1

Input values	
Run	Q2 5.5 (r2)
Beam Energy	9343
e^- p	2021
e^- theta	31.30
$ctua$	371.3
$Kaon$	1

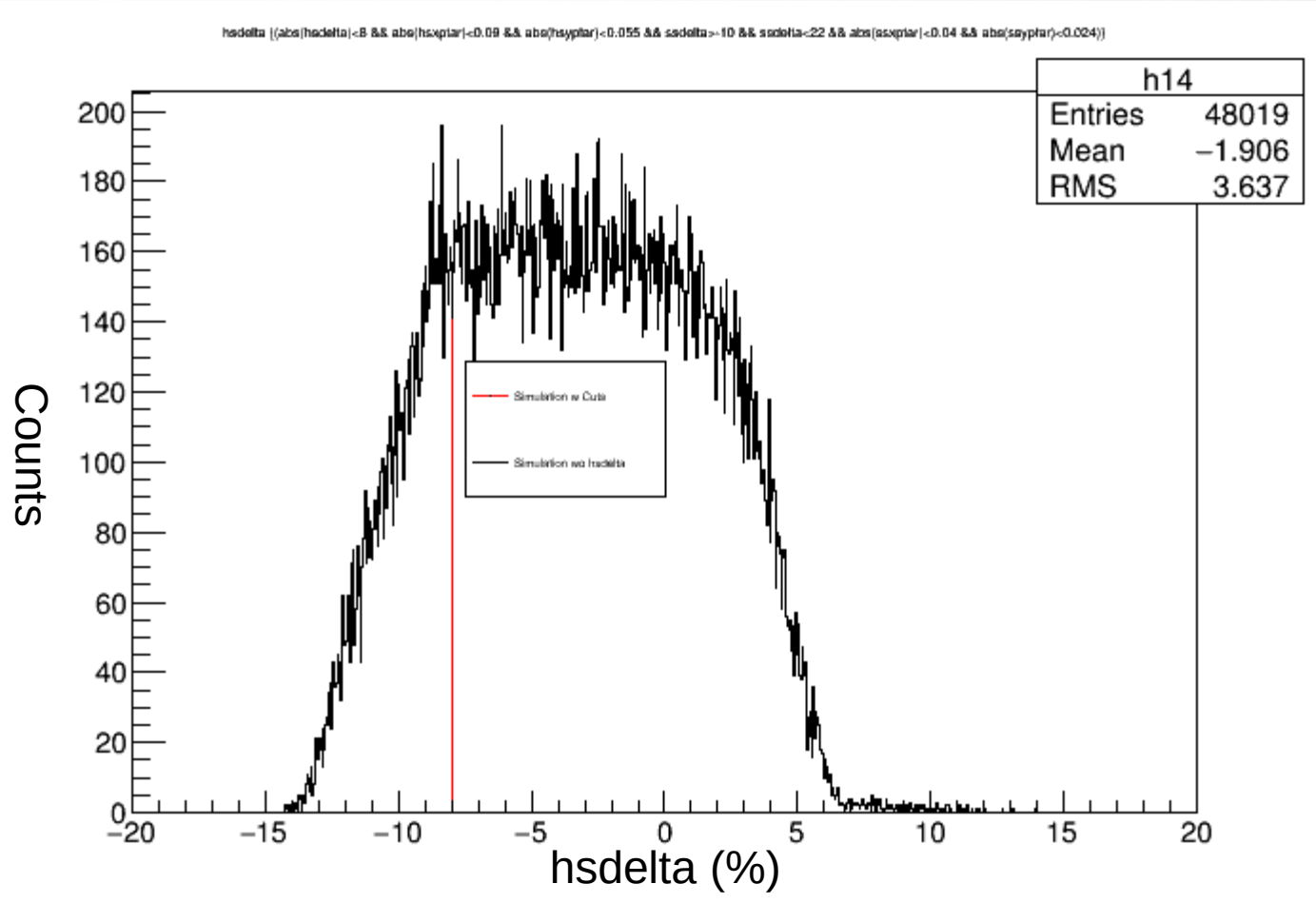
Input values	
Run	Q2 1.7 (r2)
Beam Energy	8761
e^- p	5125
e^- theta	11.16
$ctua$	371.3
$Kaon$	1

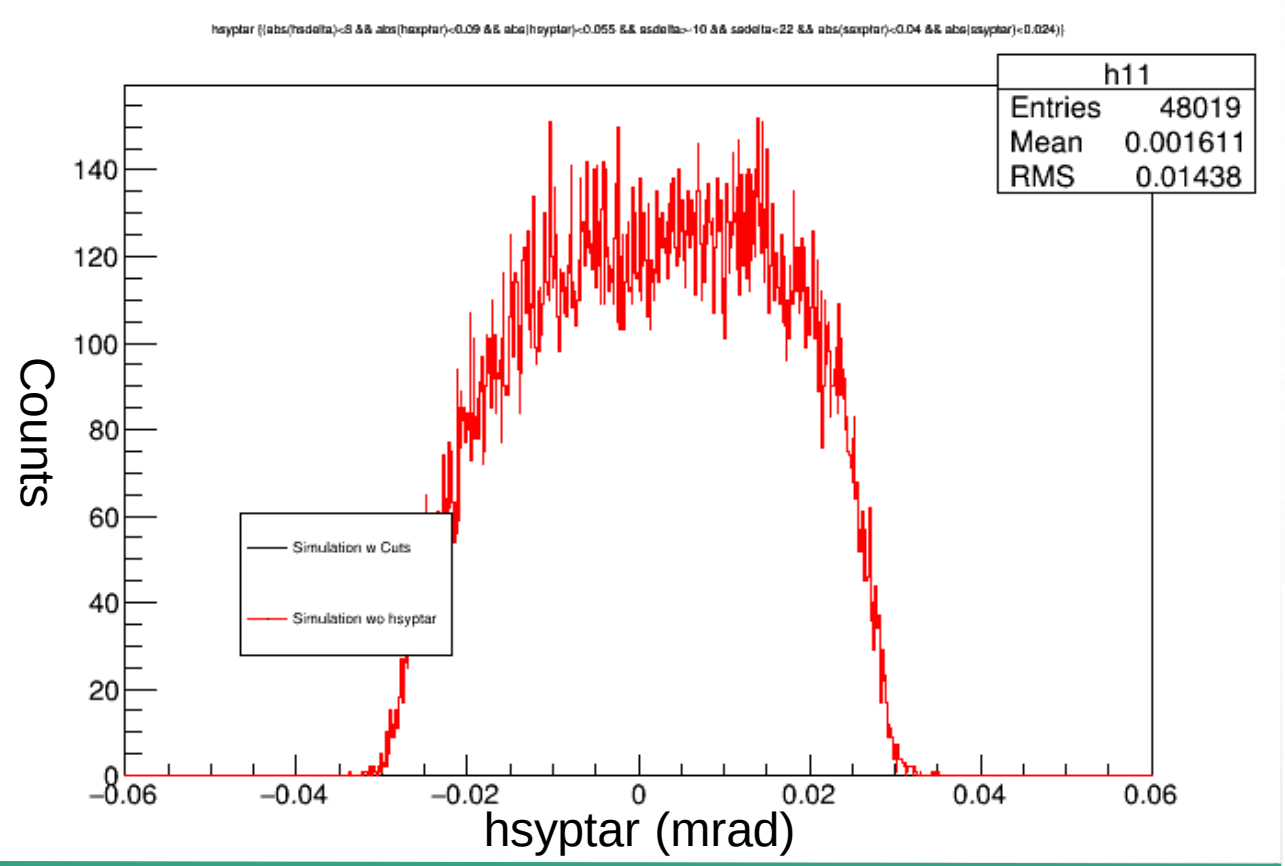


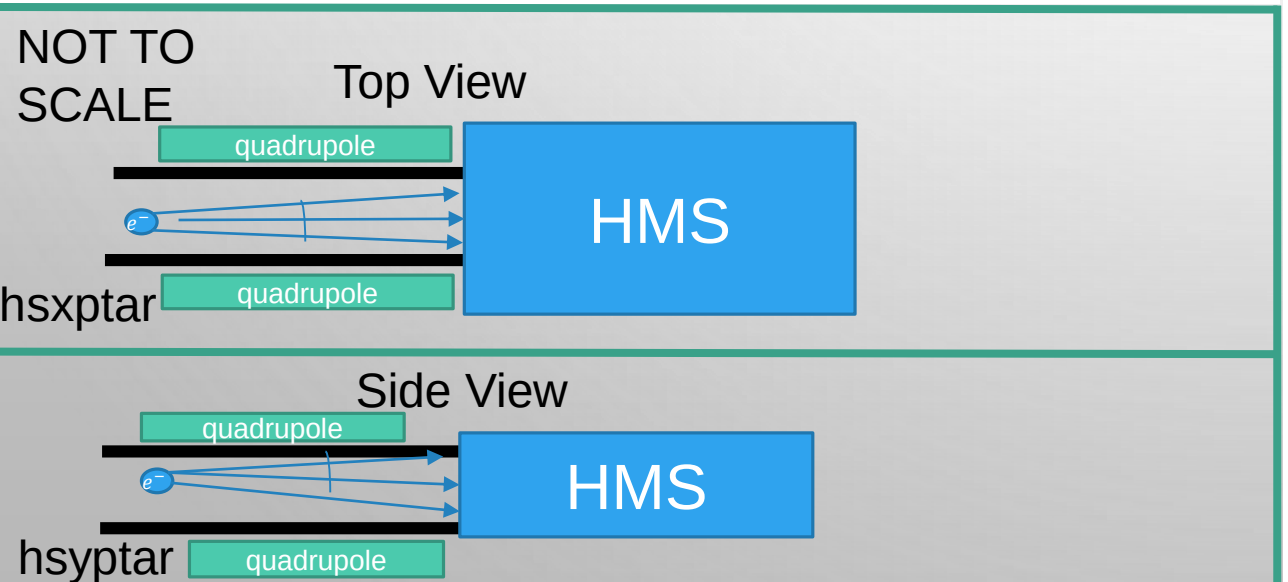
$$r = \frac{mv}{qB}$$

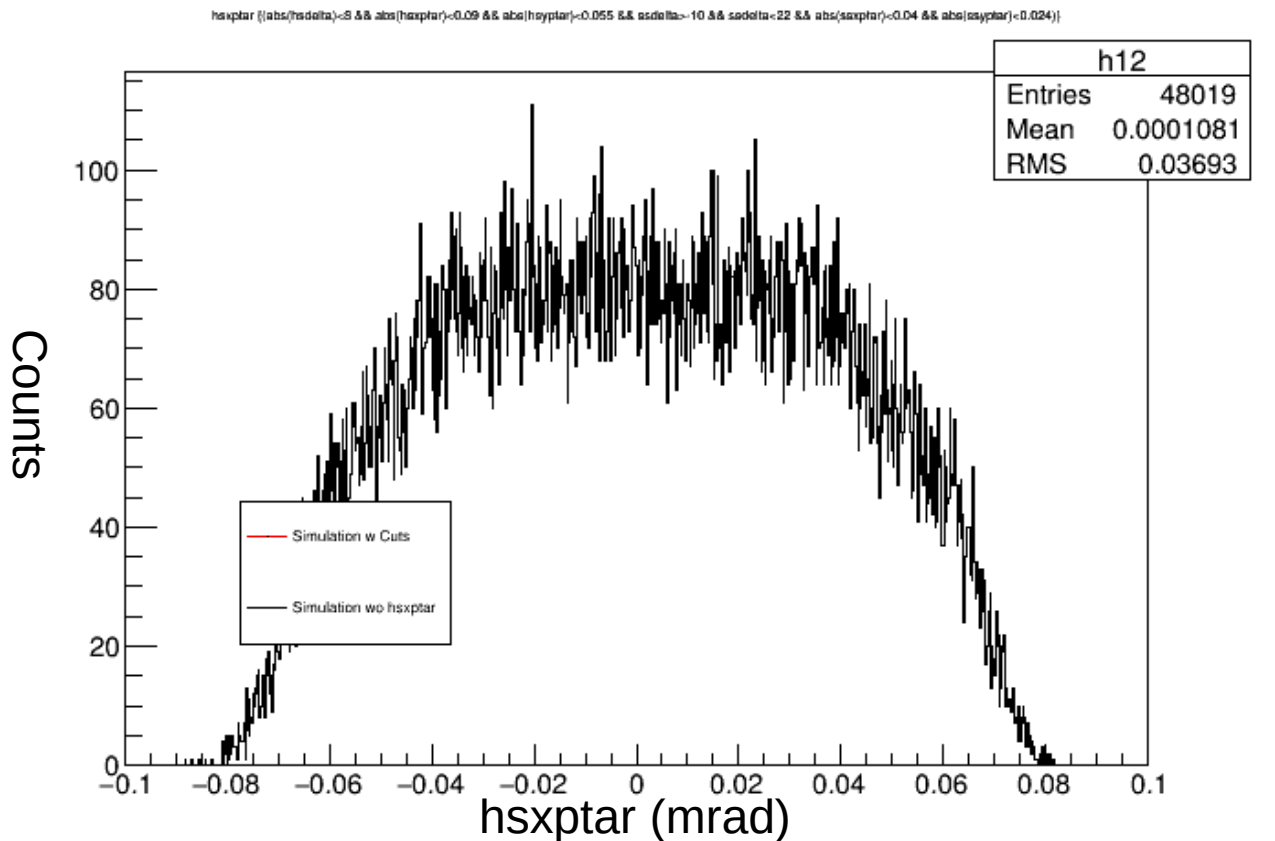
Electric Charge

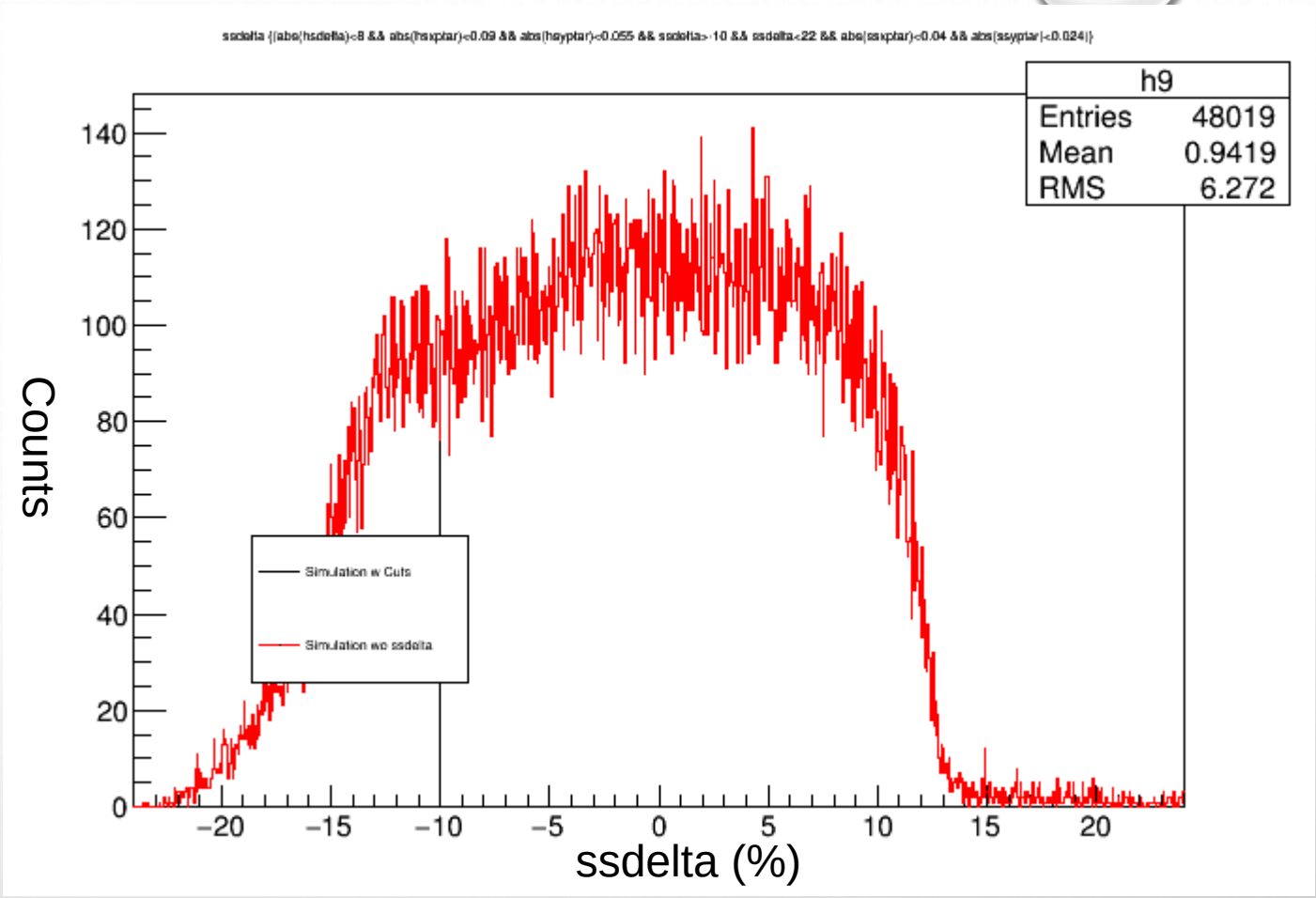
Electric Field

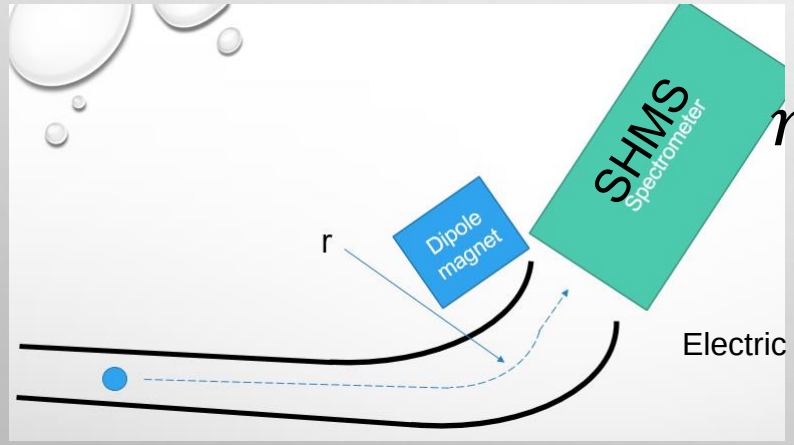



h11
Entries 48019
Mean 0.001611
RMS 0.01438
Simulation w Cuts
Simulation wo hsyptar
Counts
hsyptar (mrad)


NOT TO SCALE
Top View
quadrupole
HMS
hsxptar
quadrupole
Side View
quadrupole
HMS
hsyptar
quadrupole


h12
Entries 48019
Mean 0.0001081
RMS 0.03693
Simulation w Cuts
Simulation wo hsxptar
Counts
hsxptar (mrad)

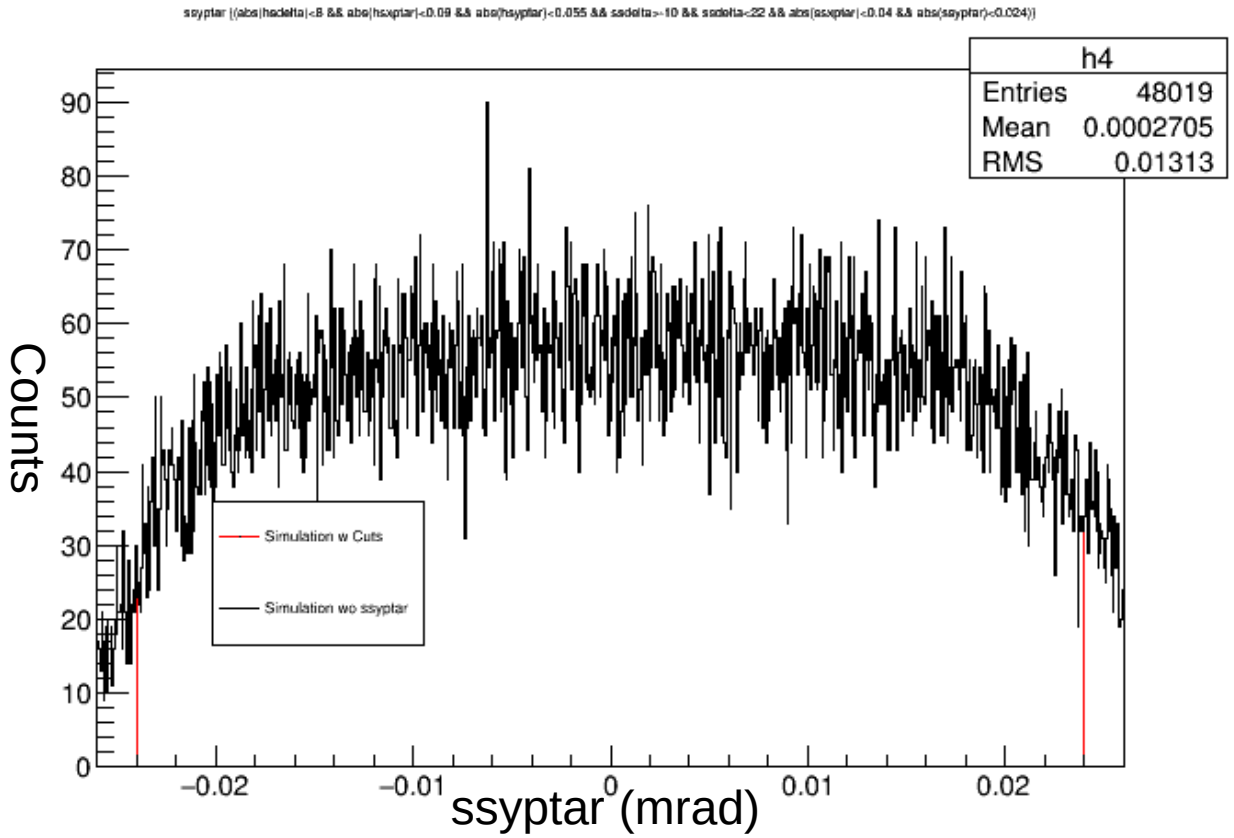


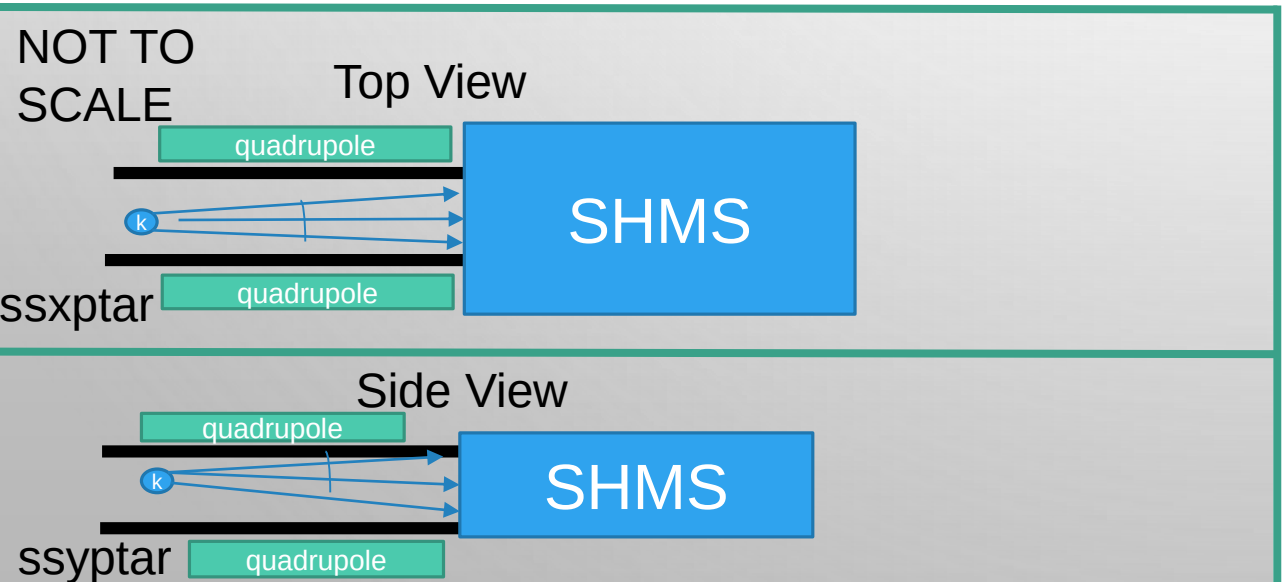


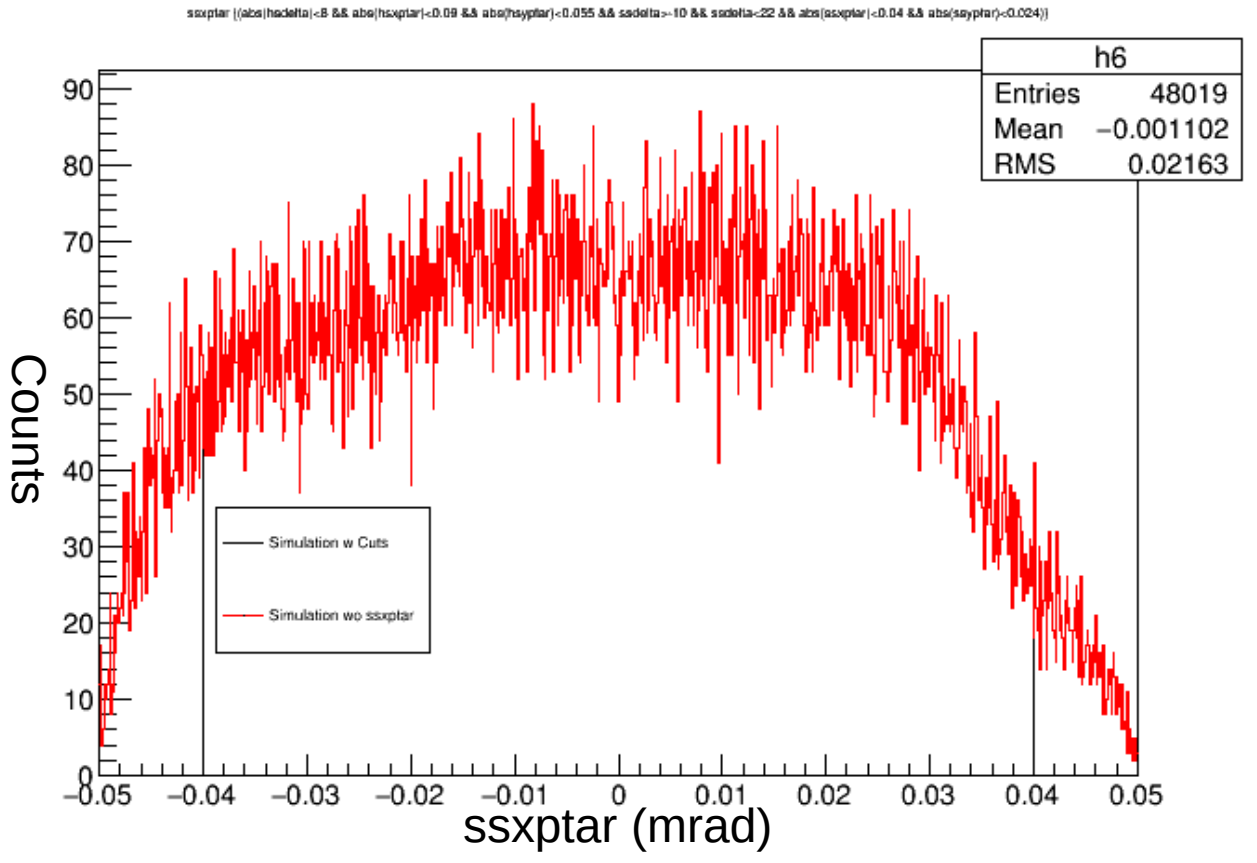
$$r = \frac{mv}{qB}$$

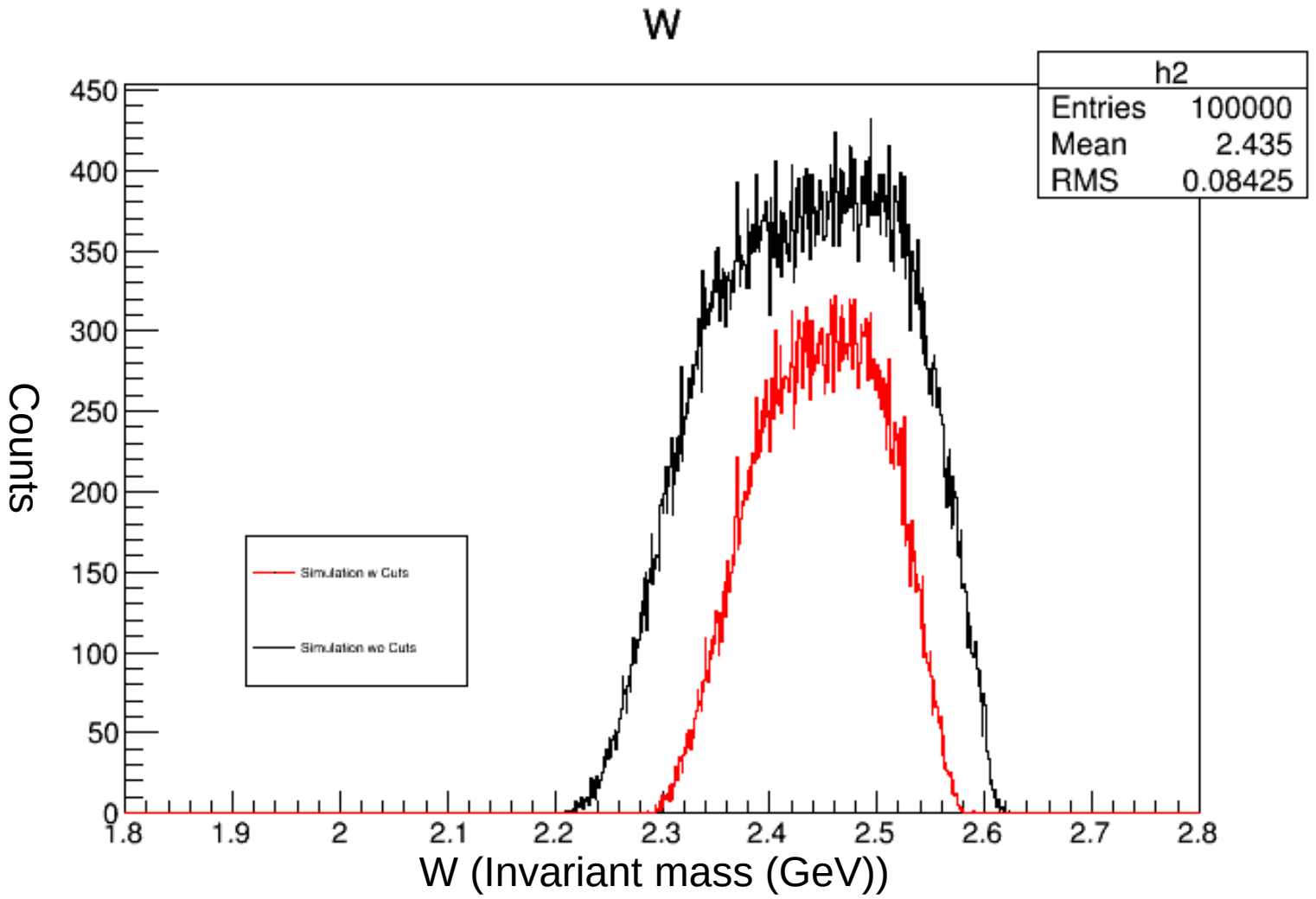
Electric Charge

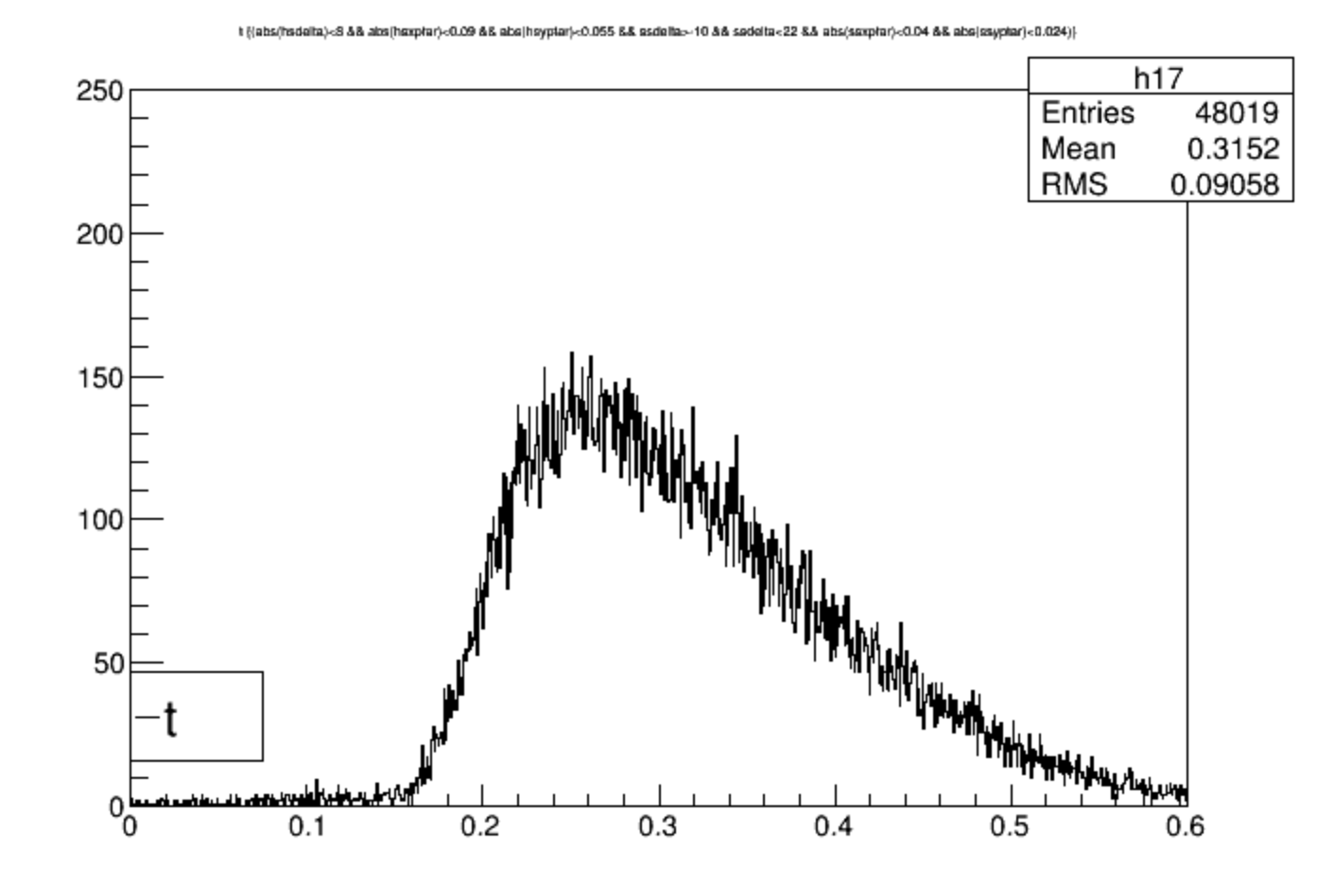
Electric Field

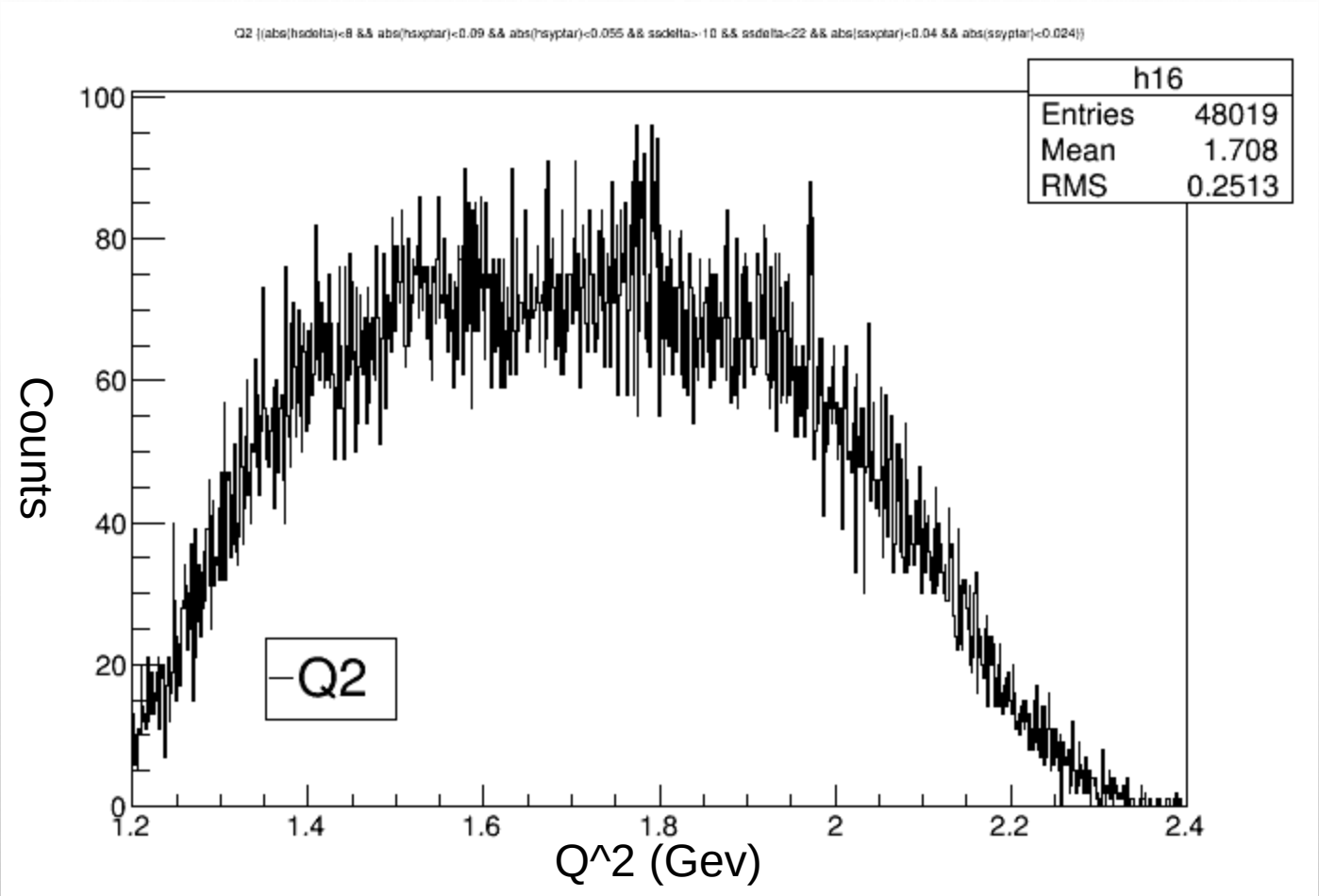

ssyptar (abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && sdelta>-10 && sdelta<22 && abs(ssxptar)<0.04 && abs(sayptar)<0.024))
h4
Entries 48019
Mean 0.0002705
RMS 0.01313
Simulation w Cuts
Simulation wo ssyptar
Counts
ssyptar (mrad)


NOT TO SCALE
Top View
quadrupole
SHMS
quadrupole
ssxptar
Side View
quadrupole
SHMS
quadrupole
ssyptar


ssxptar (abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && sdelta>-10 && sdelta<22 && abs(ssxptar)<0.04 && abs(sayptar)<0.024))
h6
Entries 48019
Mean −0.001102
RMS 0.02163
Simulation w Cuts
Simulation wo ssxptar
Counts
ssxptar (mrad)


W
h2
Entries 100000
Mean 2.435
RMS 0.08425
Simulation w Cuts
Simulation wo Cuts
Counts
W (Invariant mass (GeV))
0
50
100
150
200
250
300
350
400
450
1.8
1.9
2
2.1
2.2
2.3
2.4
2.5
2.6
2.7
2.8

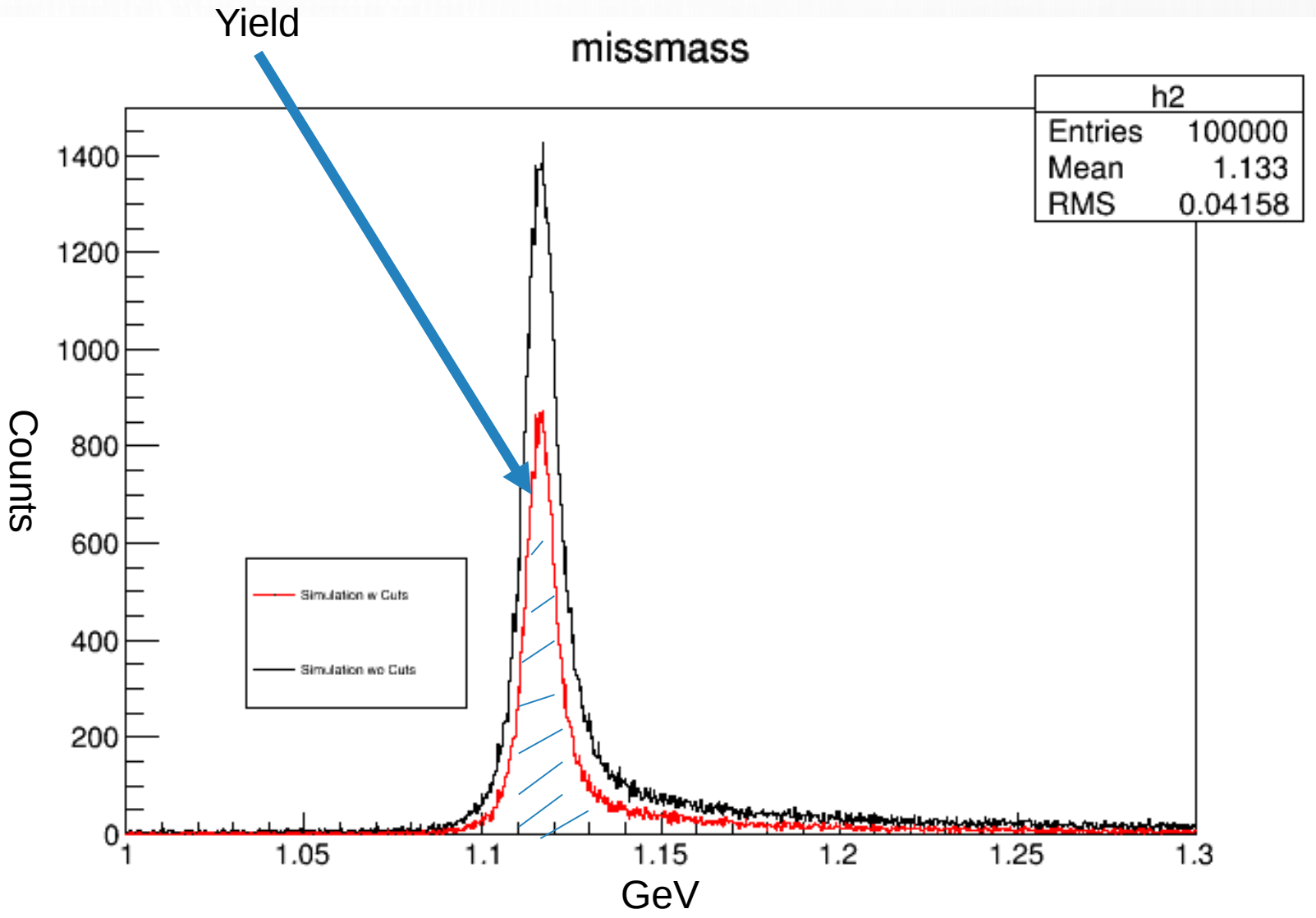

t (|abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && ssdelta>-10 && ssdelta<22 && abs(ssxptar)<0.04 && abs(ssyptar)<0.024)|
h17
Entries 48019
Mean 0.3152
RMS 0.09058
t
250
200
150
100
50
0
0
0.1
0.2
0.3
0.4
0.5
0.6


Q2 {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && ssdelta>-10 && ssdelta<22 && abs(ssxptar)<0.04 && abs(ssyptar)<0.024)}
h16
Entries 48019
Mean 1.708
RMS 0.2513
Q2
Counts
Q^2 (Gev)
0
20
40
60
80
100
1.2
1.4
1.6
1.8
2
2.2
2.4

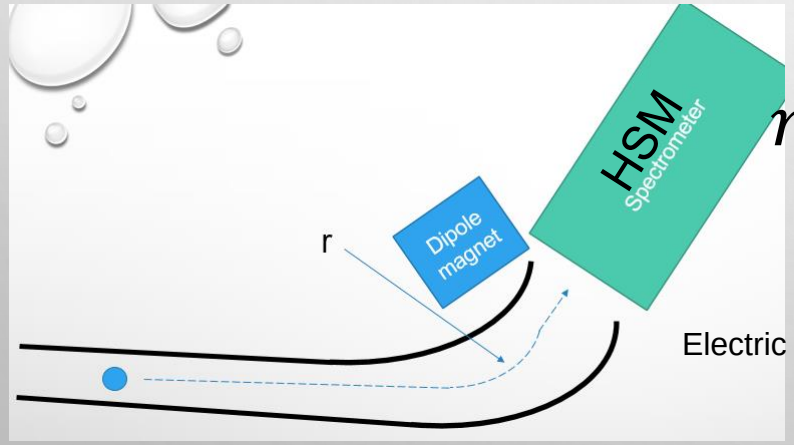
KAON & PION PREDICTION

$$\frac{k}{s} = Yield/\text{time}$$

45641/621secs=73.4960 k/s



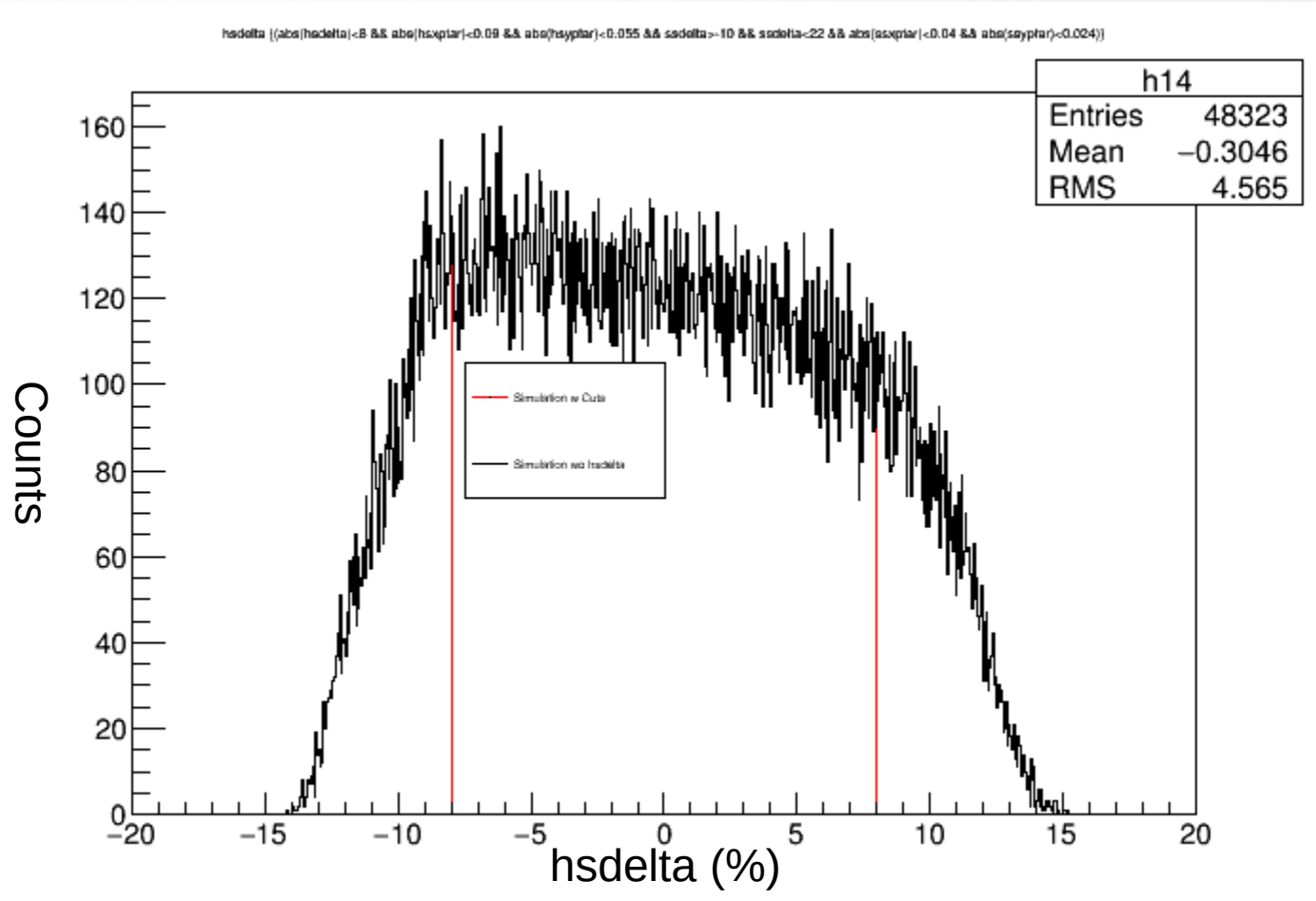
Input values	
Run	Q2 5.5
Beam Energy	10921
e^- p	3599
e^- theta	21.56
$ctua$	371.3
$Kaon$	1

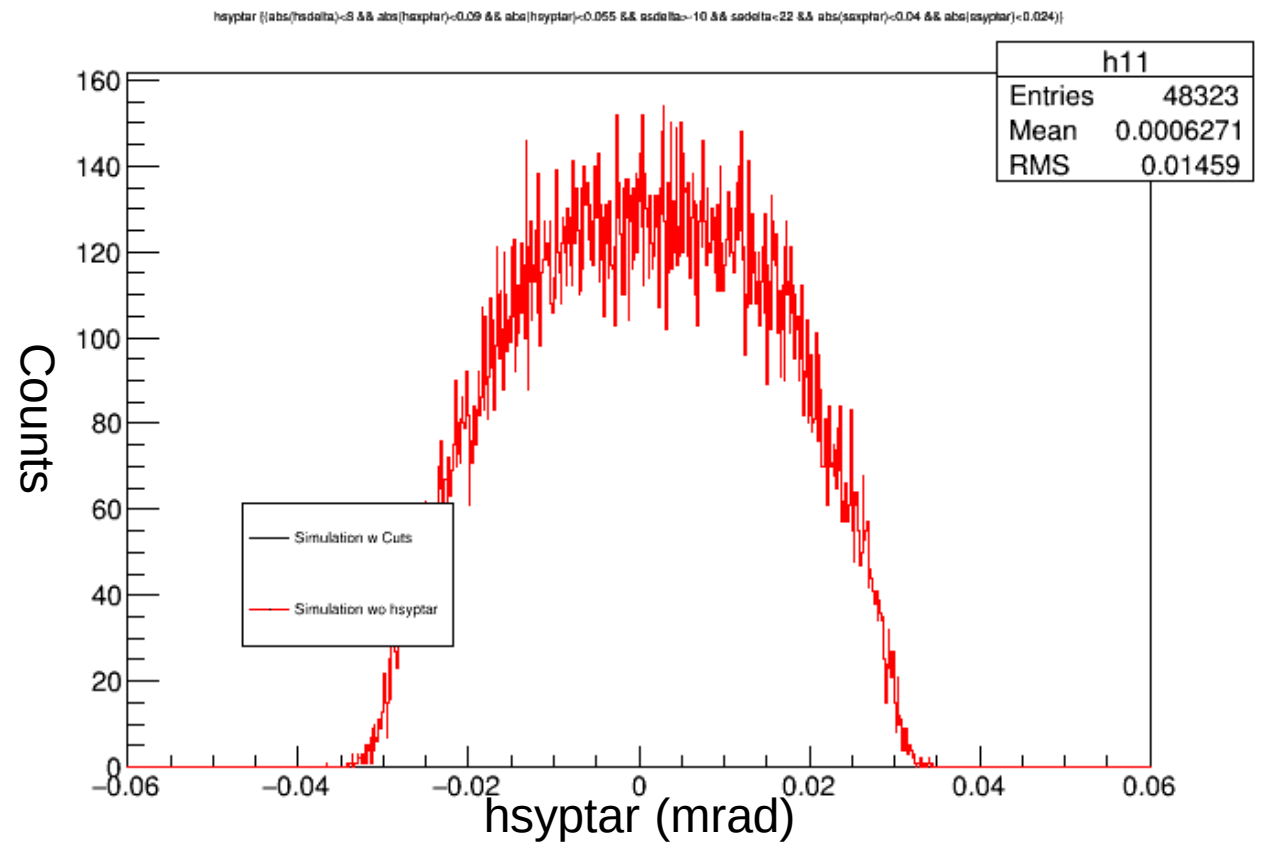


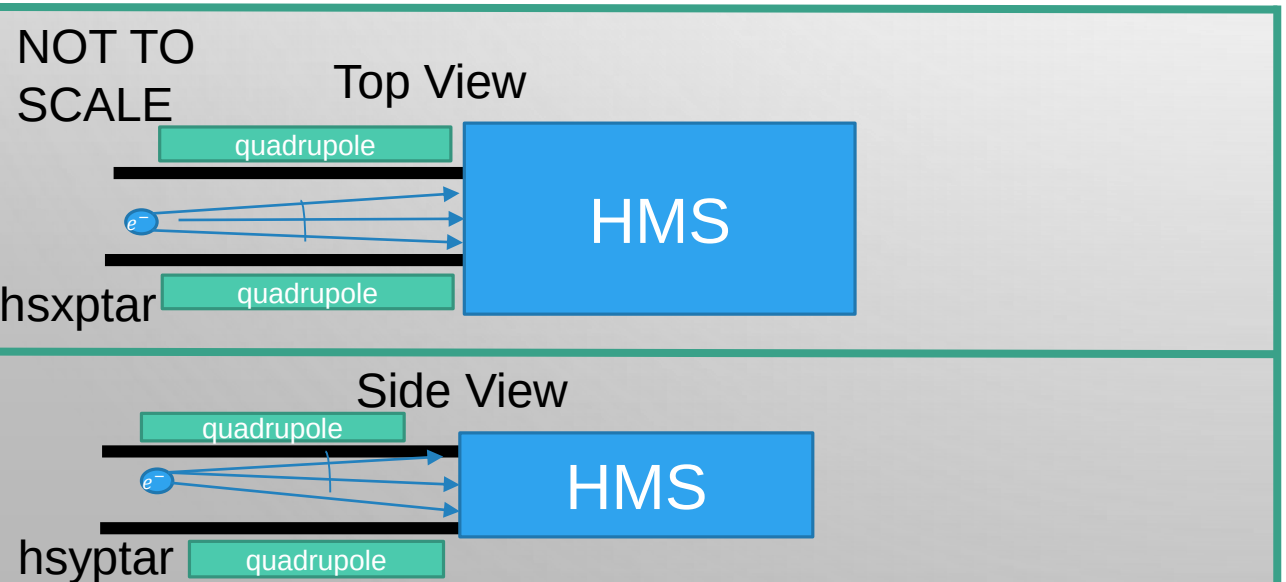
$$r = \frac{mv}{qB}$$

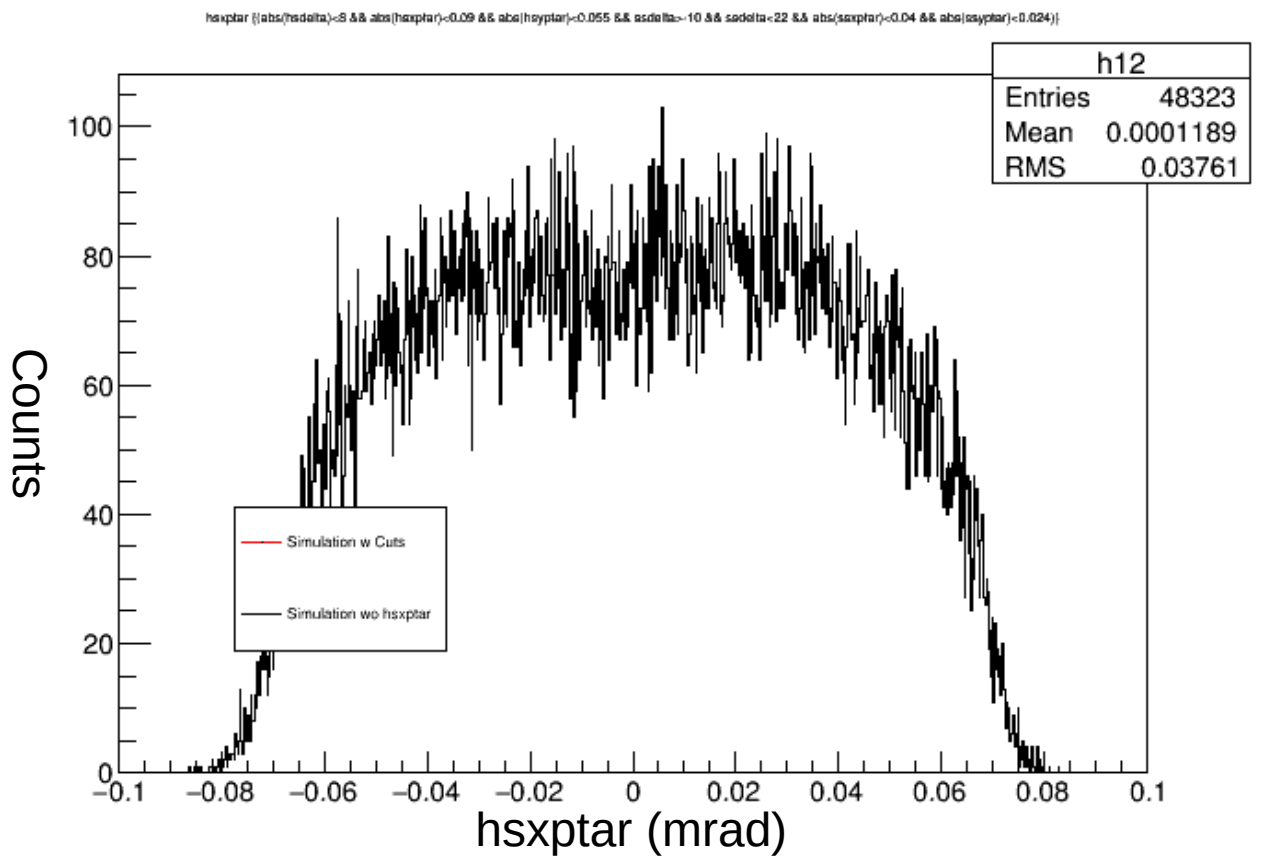
Electric Charge

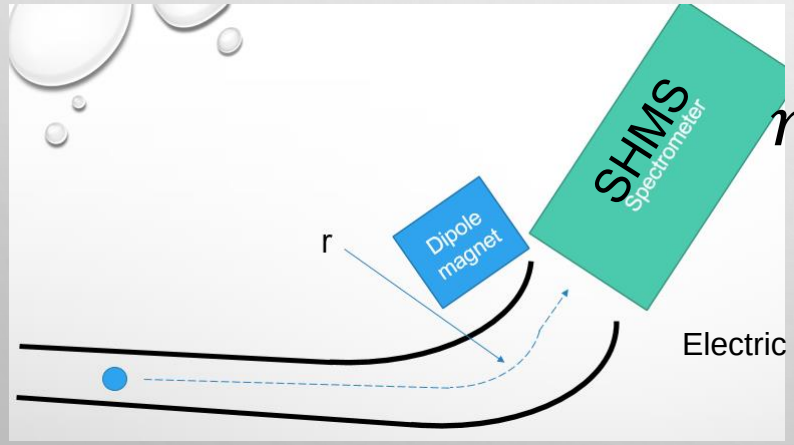
Electric Field




hsyptar {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && ssdelta>-10 && ssdelta<22 && abs(ssxptar)<0.04 && abs(ssyptar)<0.024)}
h11
Entries 48323
Mean 0.0006271
RMS 0.01459
Simulation w Cuts
Simulation wo hsyptar
Counts
hsyptar (mrad)


NOT TO SCALE
Top View
quadrupole
HMS
quadrupole
hsxptar
Side View
quadrupole
HMS
hsyptar
quadrupole

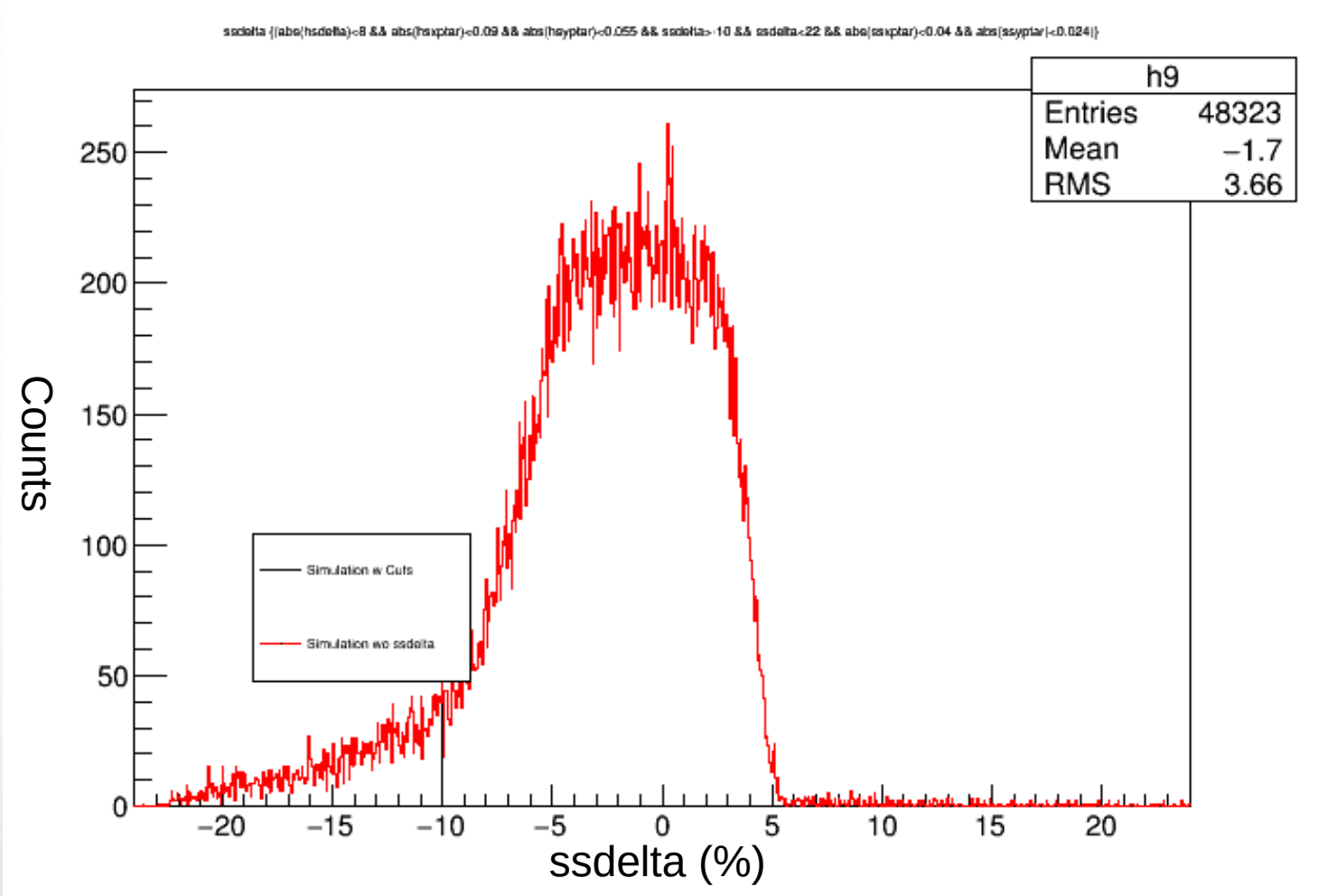

hsxptar {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && ssdelta>-10 && ssdelta<22 && abs(ssxptar)<0.04 && abs(ssyptar)<0.024)}
h12
Entries 48323
Mean 0.0001189
RMS 0.03761
Simulation w Cuts
Simulation wo hsxptar
Counts
hsxptar (mrad)

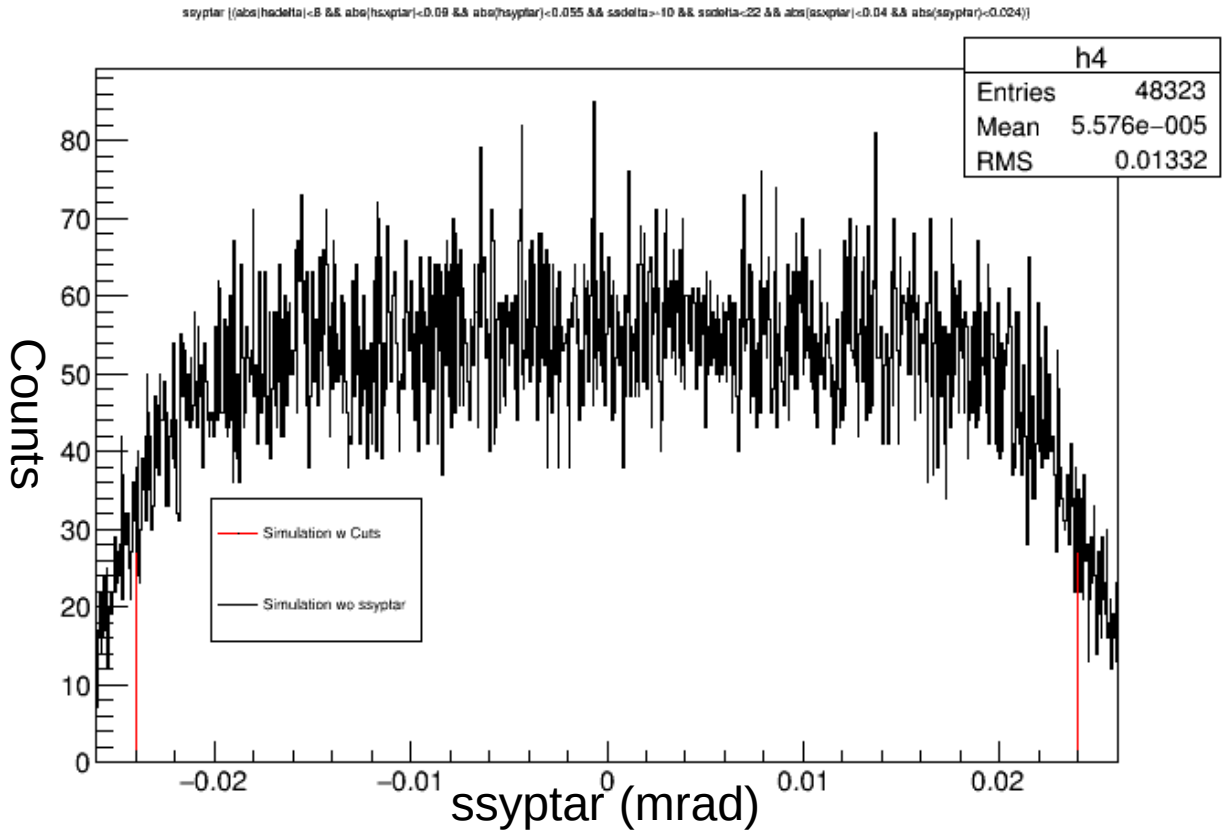


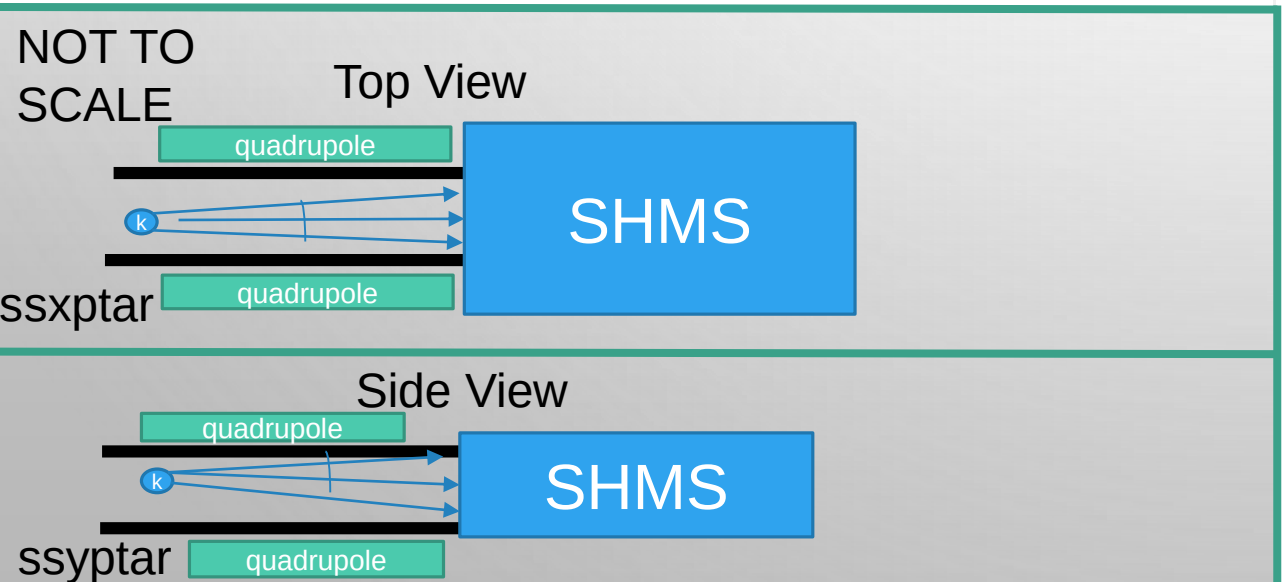
$$r = \frac{mv}{qB}$$

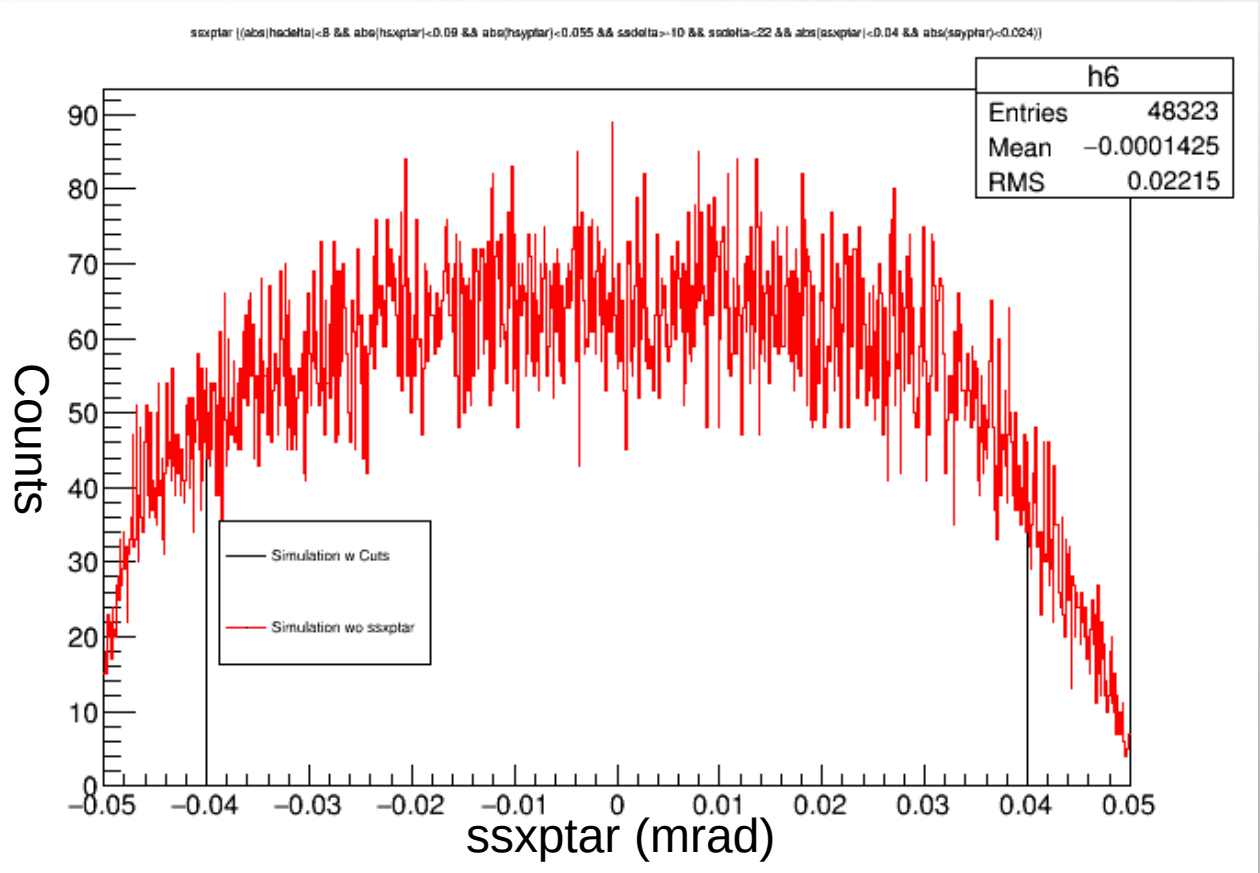
Electric Charge

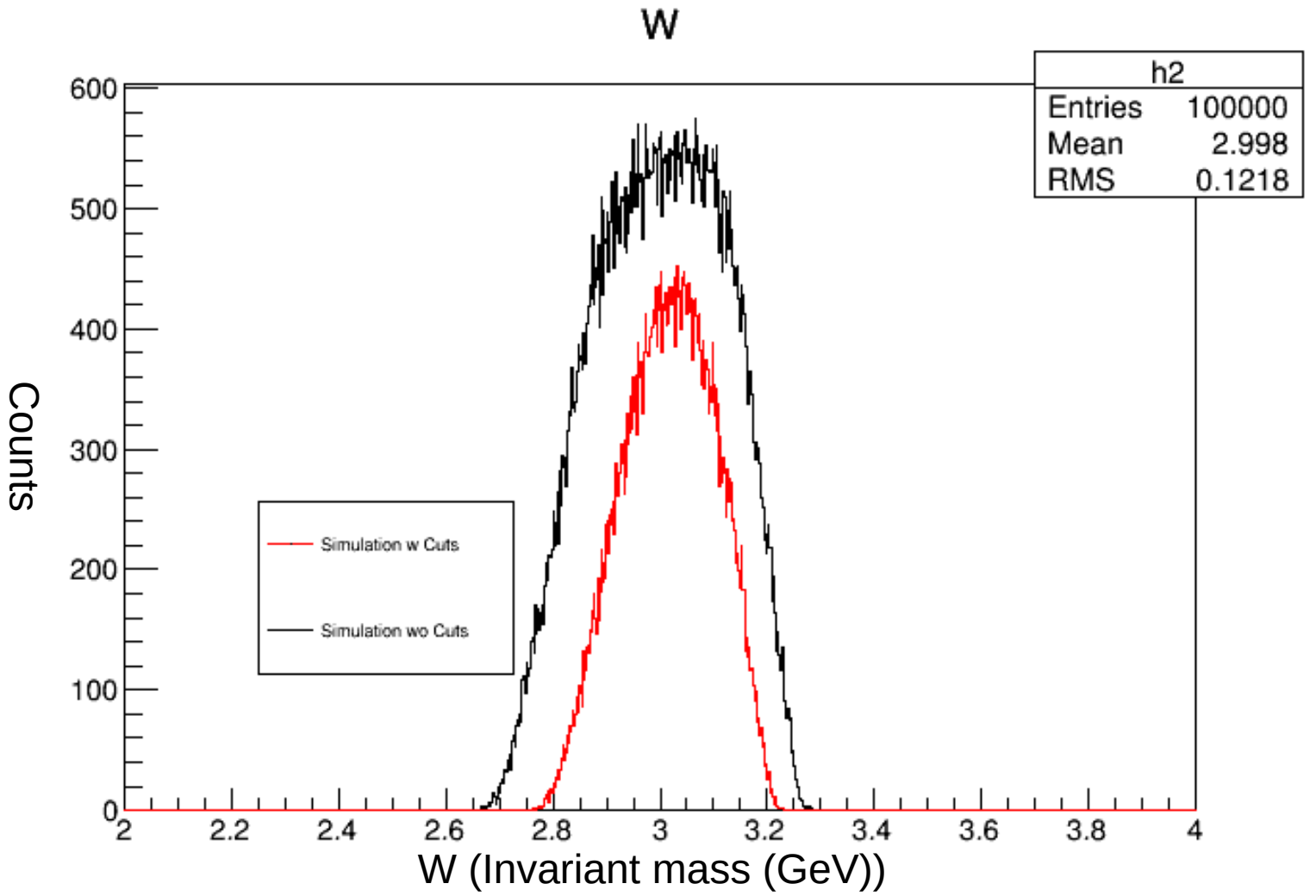
Electric Field

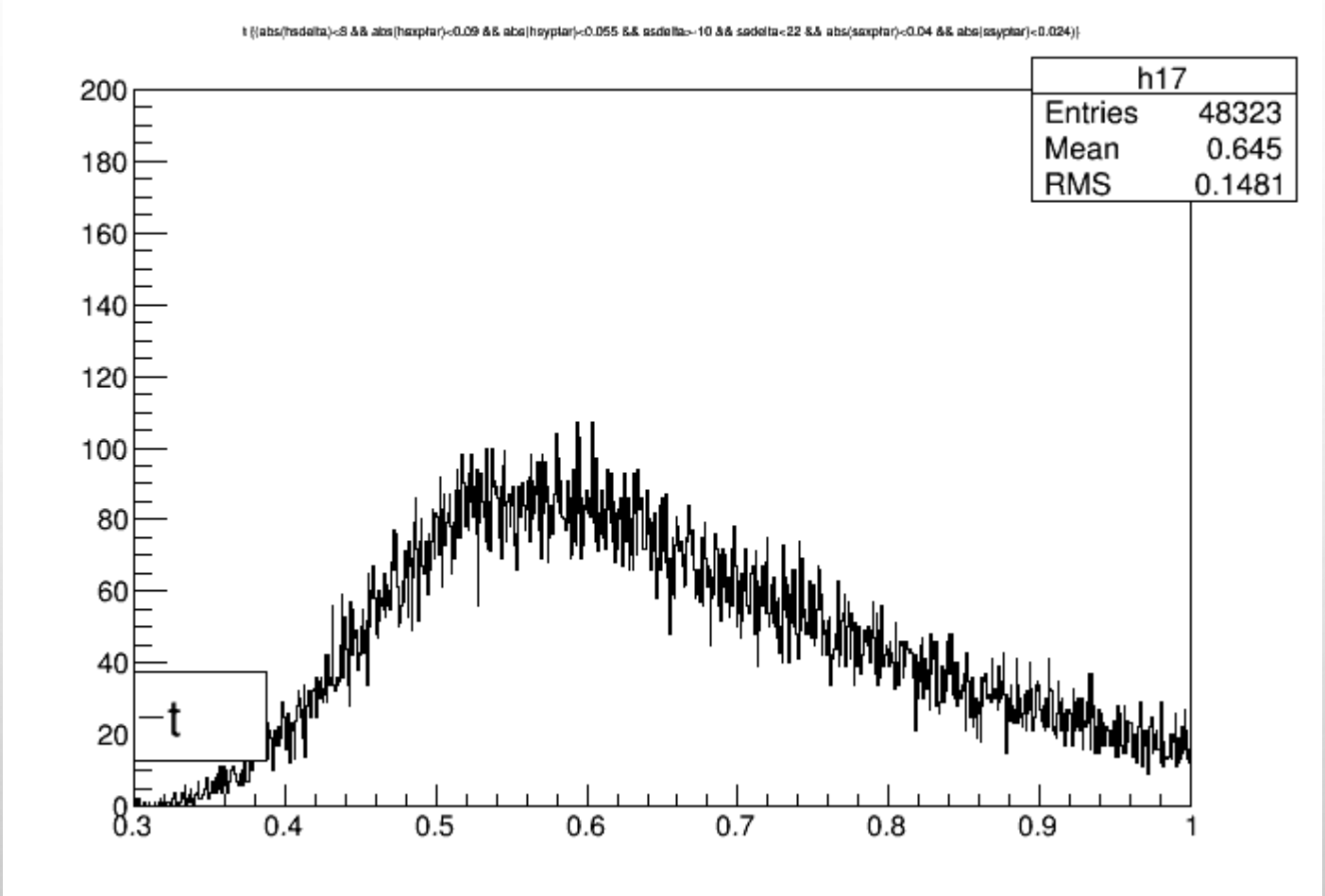


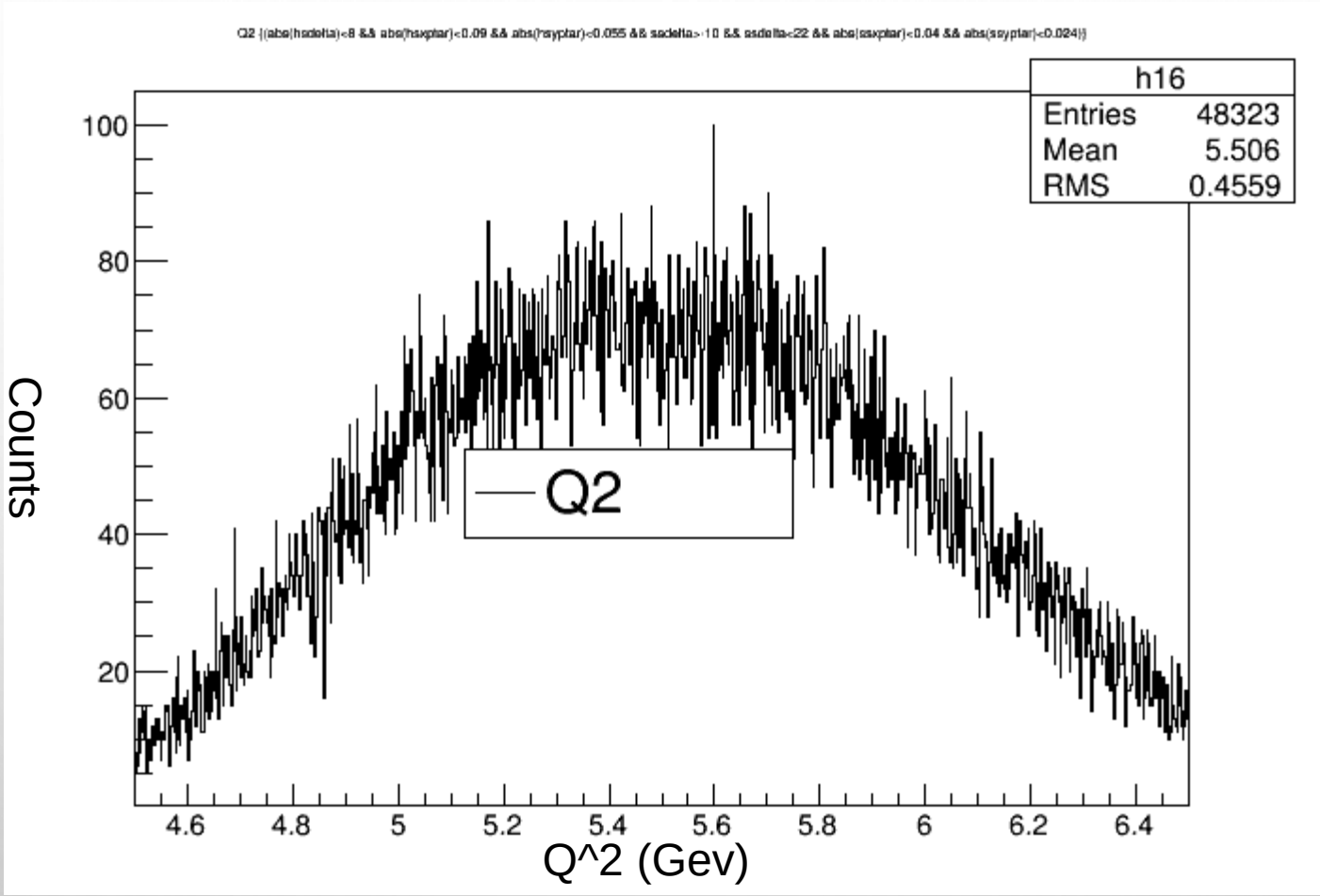

ssyptar (mrad)
Counts
h4
Entries 48323
Mean 5.576e−005
RMS 0.01332
Simulation w Cuts
Simulation wo ssyptar


NOT TO SCALE
Top View
quadrupole
SHMS
ssxptar
quadrupole
Side View
quadrupole
SHMS
ssyptar
quadrupole


ssxptar (mrad)
Counts
h6
Entries 48323
Mean −0.0001425
RMS 0.02215
Simulation w Cuts
Simulation wo ssxptar


W
h2
Entries 100000
Mean 2.998
RMS 0.1218
Simulation w Cuts
Simulation wo Cuts
Counts
W (Invariant mass (GeV))
0
100
200
300
400
500
600
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4

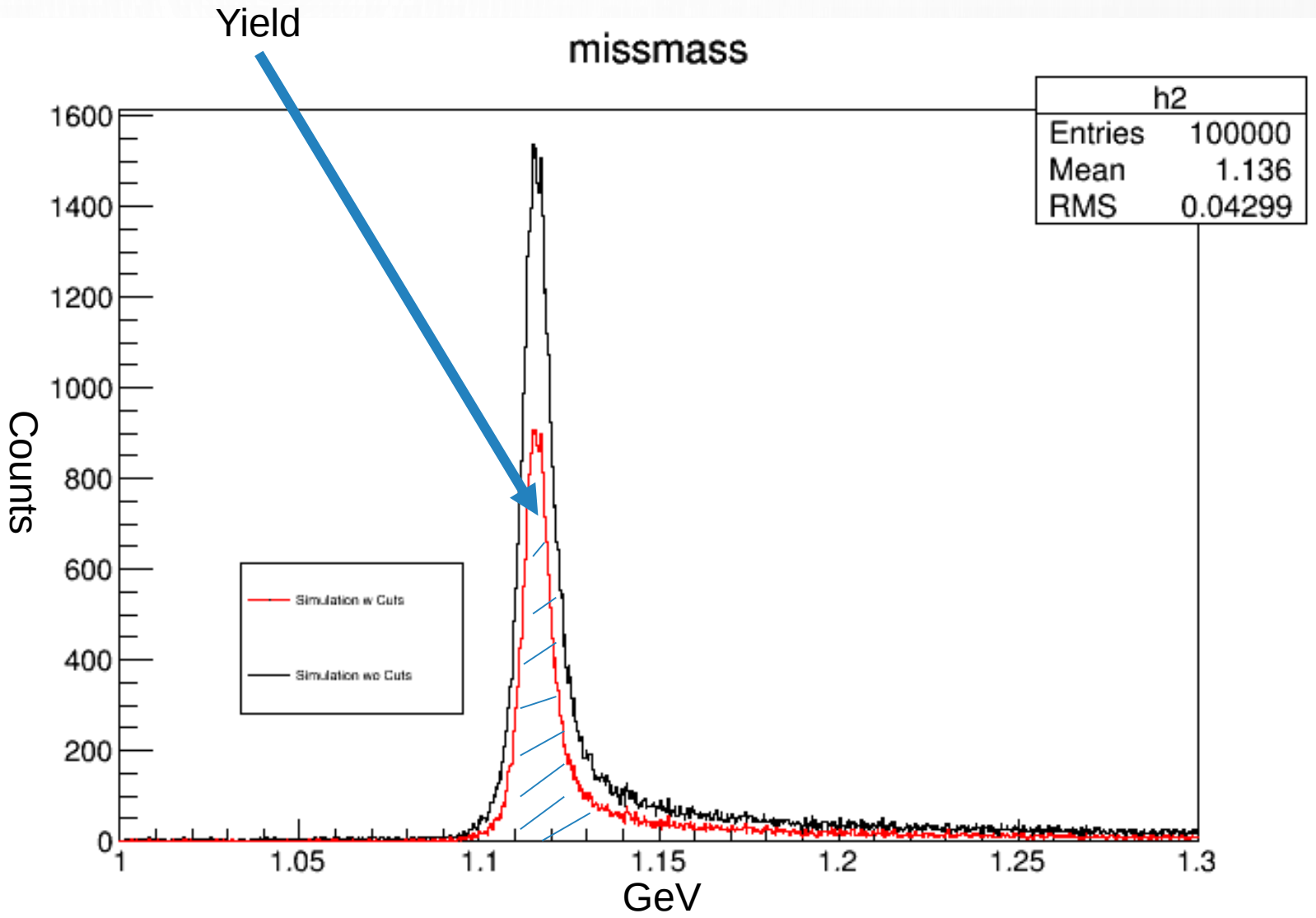

t (((abs(hsdelta)<.8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && sdelta>-10 && sdelta<22 && abs(sxptar)<0.04 && abs(syptar)<0.024))
h17
Entries 48323
Mean 0.645
RMS 0.1481
t
200
180
160
140
120
100
80
60
40
20
0
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1


Q2 ((abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && sdelta>-10 && sdelta<22 && abs(ssxptar)<0.04 && abs(ssyptar)<0.024))
h16
Entries 48323
Mean 5.506
RMS 0.4559
Q2
Counts
Q^2 (Gev)
100
80
60
40
20
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4

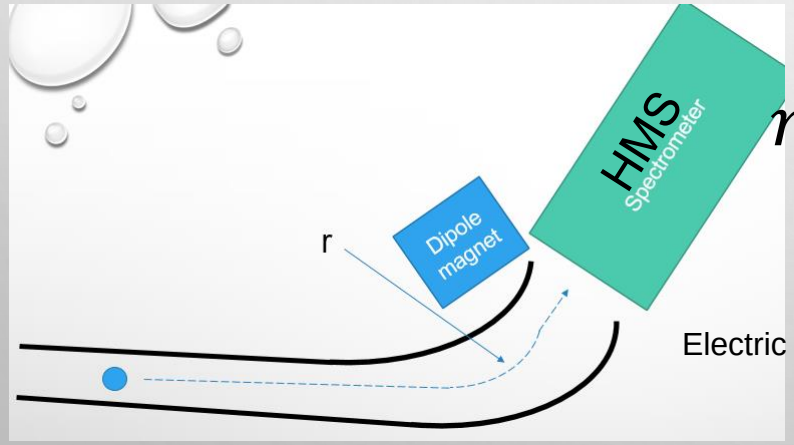
KAON & PION PREDICTION

$$\frac{k}{s} = Yield/\text{time}$$

45522/604secs=75.3675 k/s



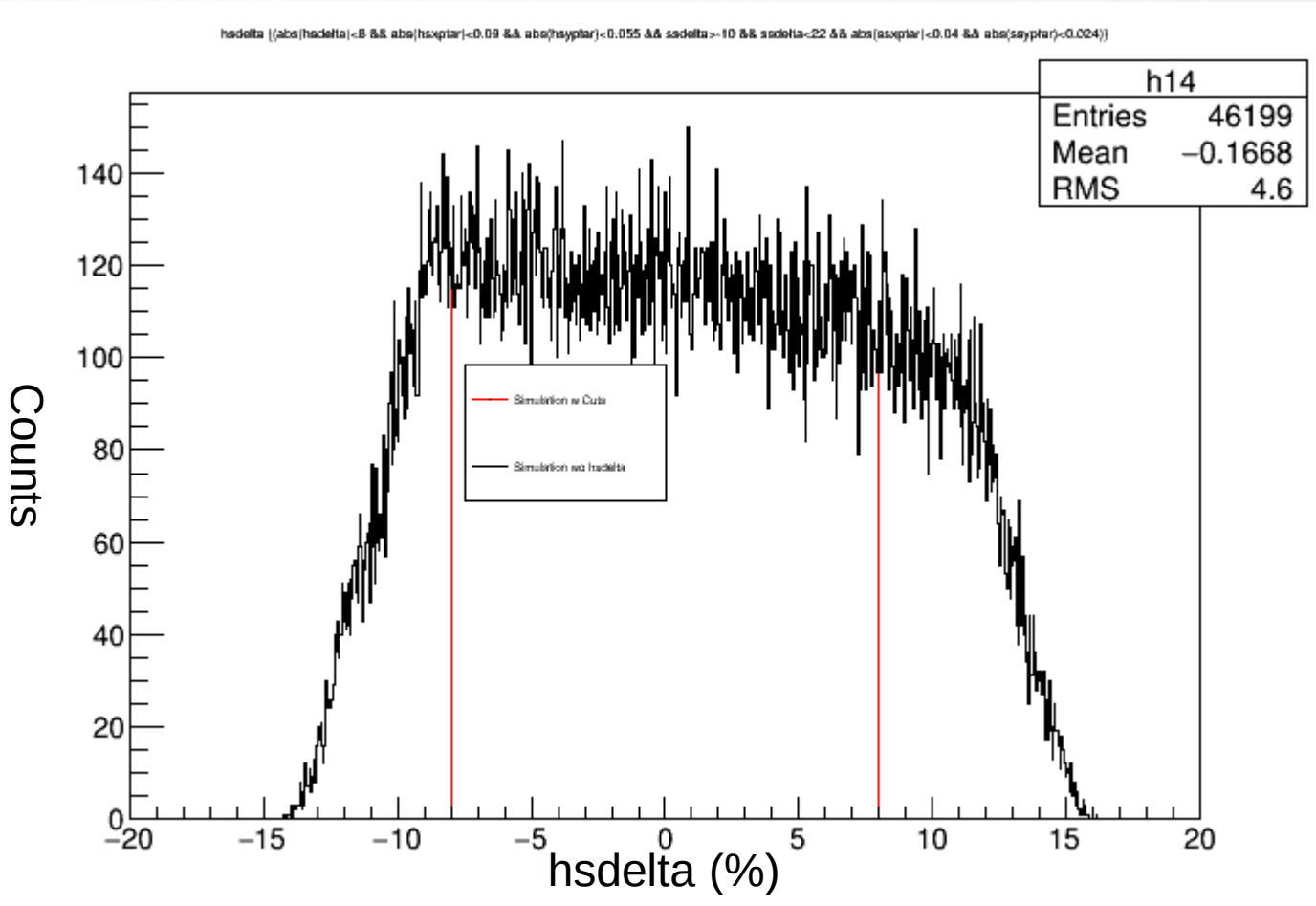
Input values	
Run	Q2 5.5 (r2)
Beam Energy	9343
e^- p	2021
e^- theta	31.30
$ctua$	371.3
$Kaon$	1

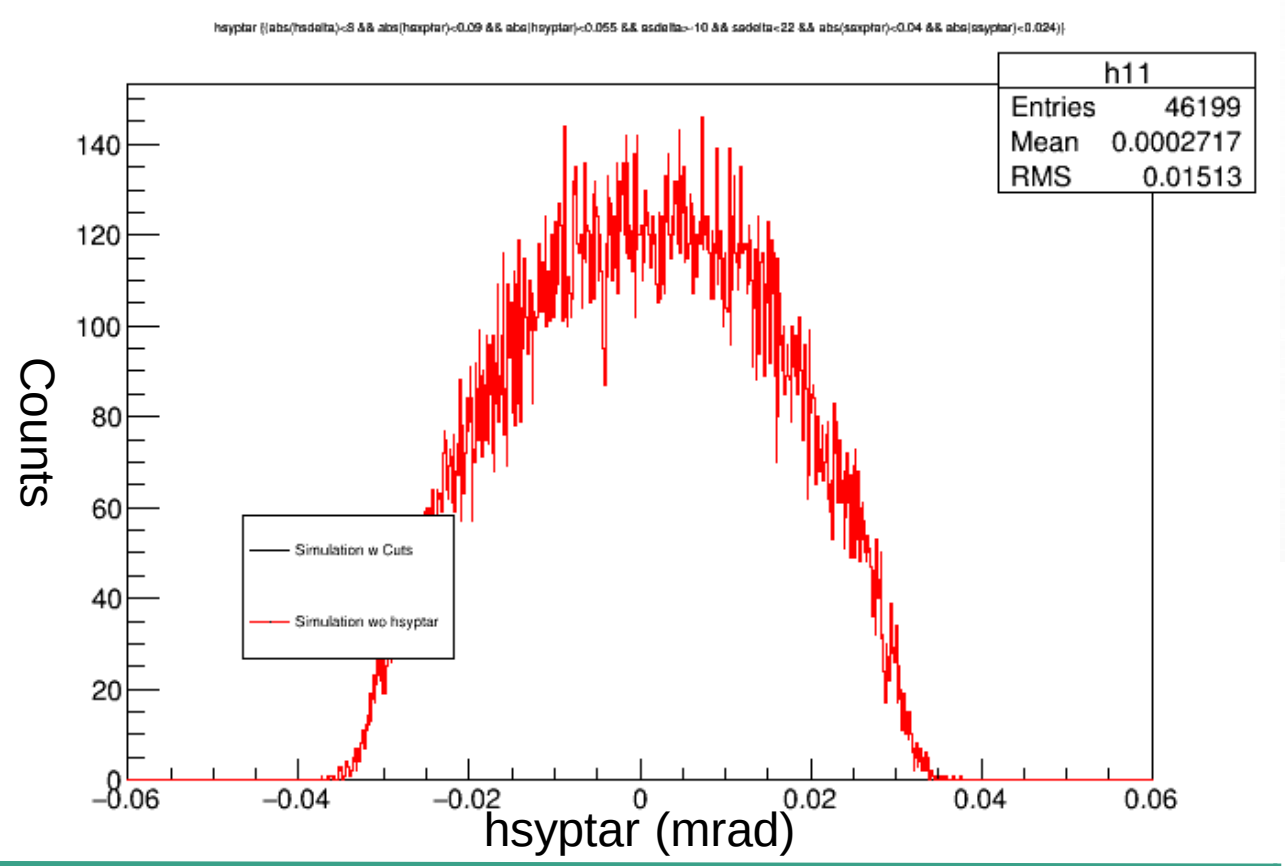


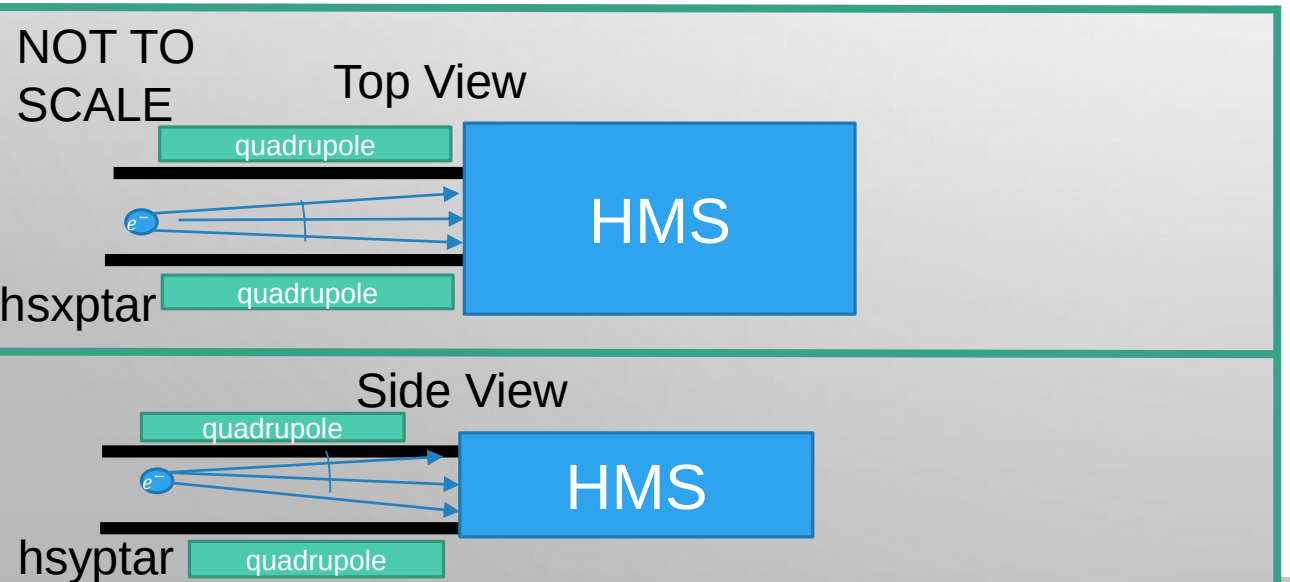
$$r = \frac{mv}{qB}$$

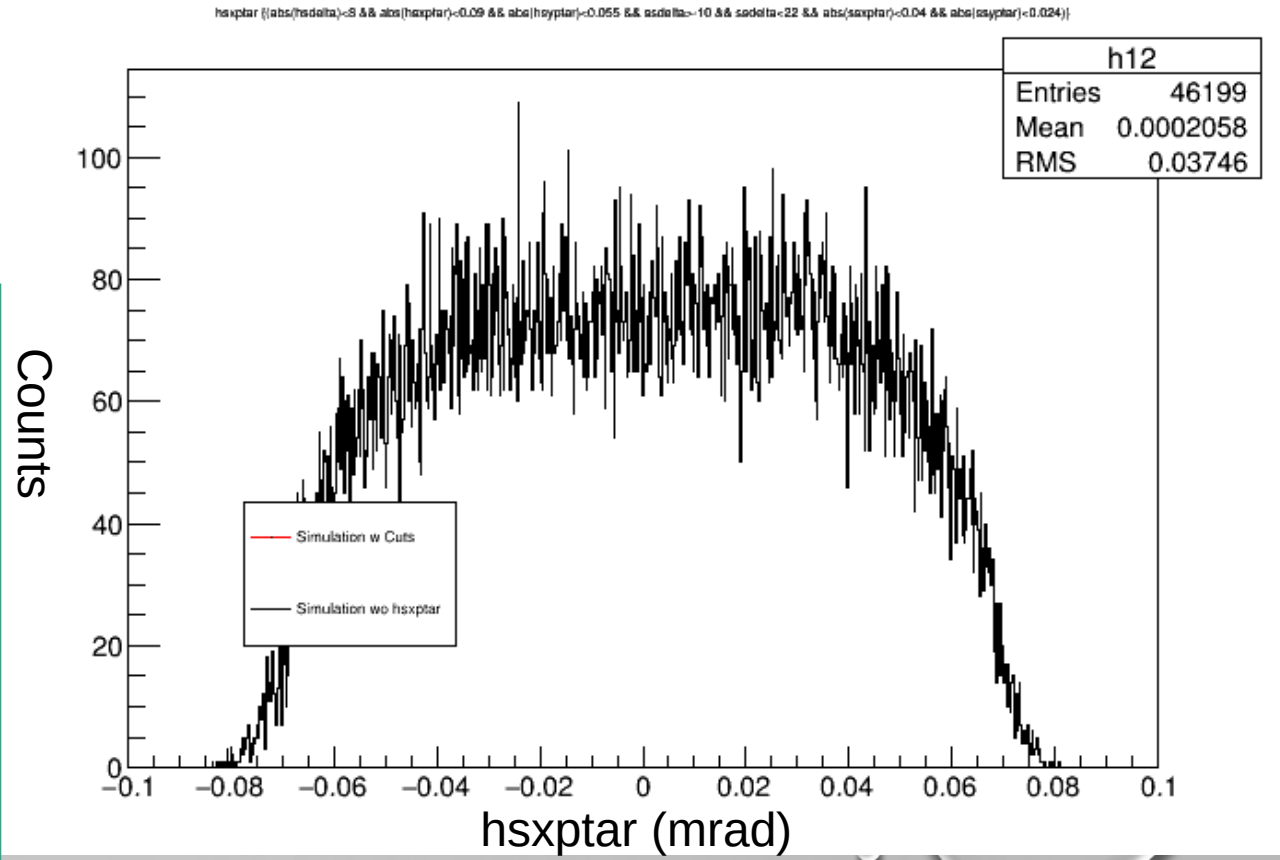
Electric Charge

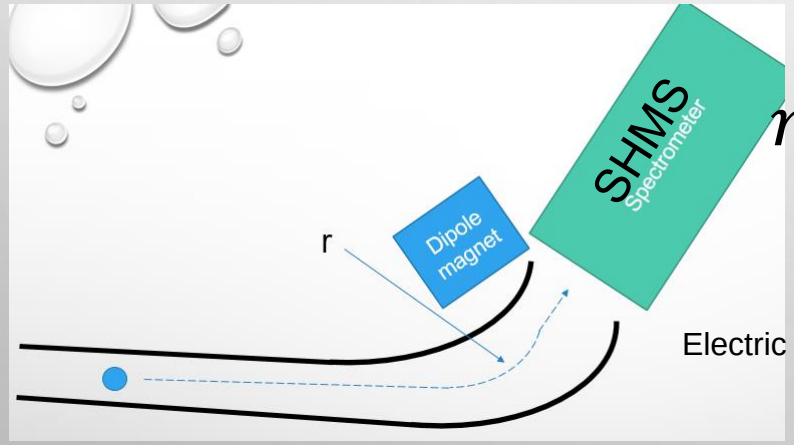
Electric Field




hsyptar {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && hsdelta>-10 && hsdelta<22 && abs(sxptar)<0.04 && abs(syptar)<0.024)}
h11
Entries 46199
Mean 0.0002717
RMS 0.01513
Simulation w Cuts
Simulation wo hsyptar
Counts
hsyptar (mrad)


NOT TO SCALE
Top View
quadrupole
HMS
hsxptar
quadrupole
Side View
quadrupole
HMS
hsyptar
quadrupole

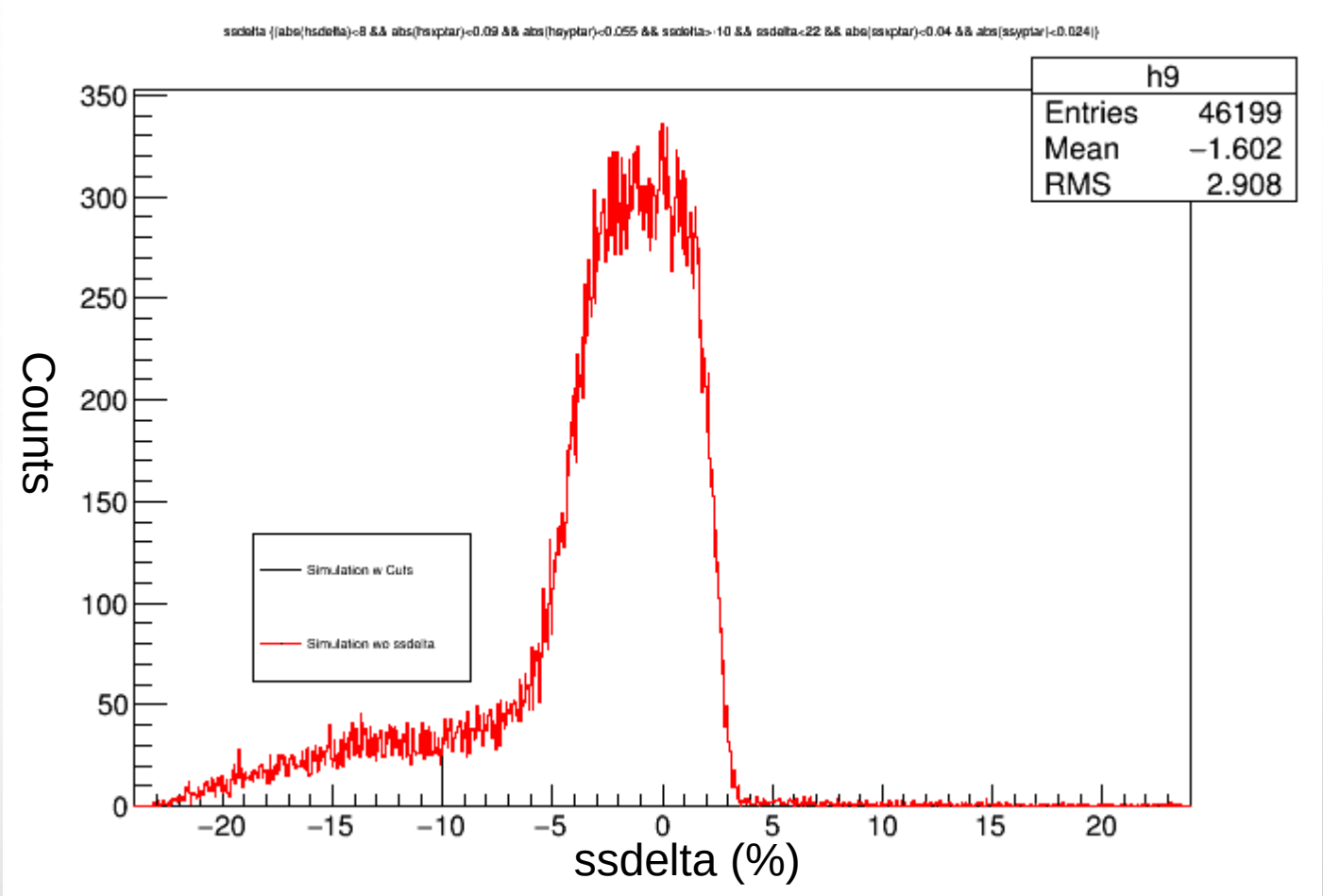

hsxptar {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && hsdelta>-10 && hsdelta<22 && abs(sxptar)<0.04 && abs(syptar)<0.024)}
h12
Entries 46199
Mean 0.0002058
RMS 0.03746
Simulation w Cuts
Simulation wo hsxptar
Counts
hsxptar (mrad)

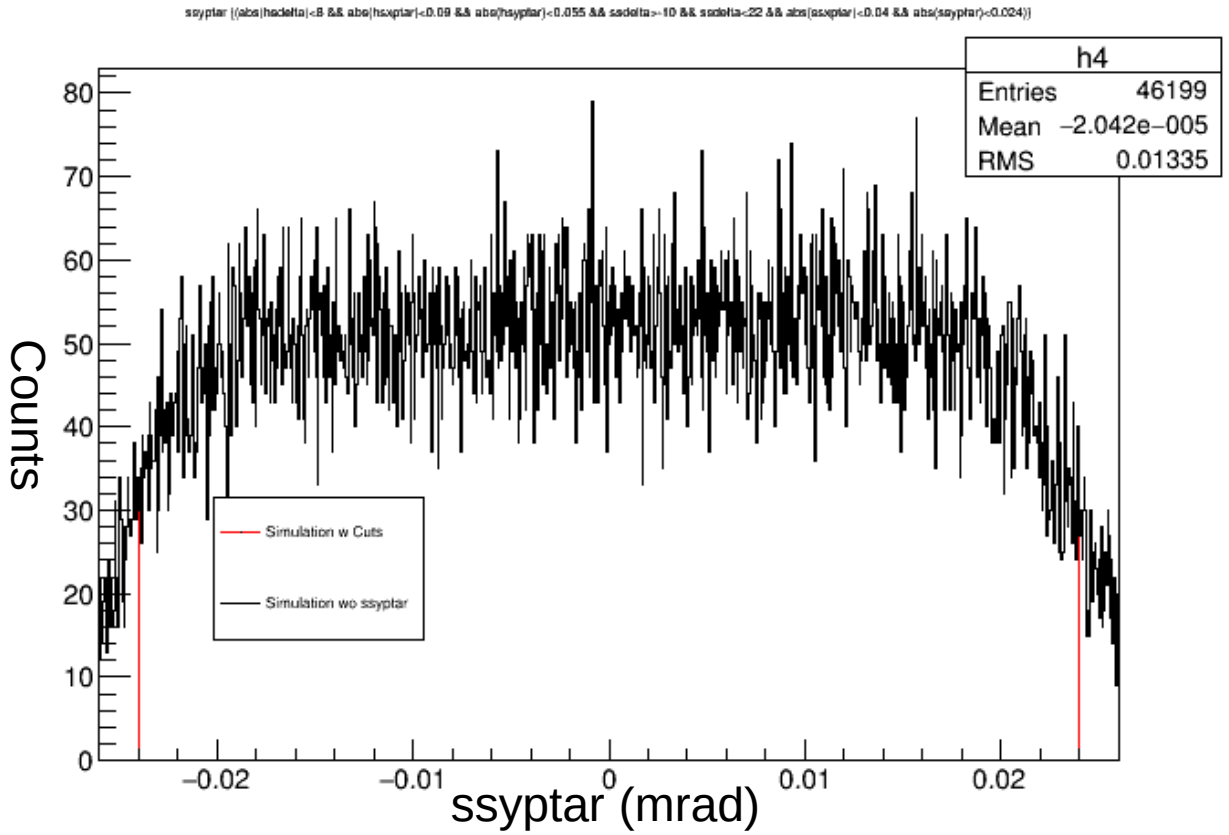


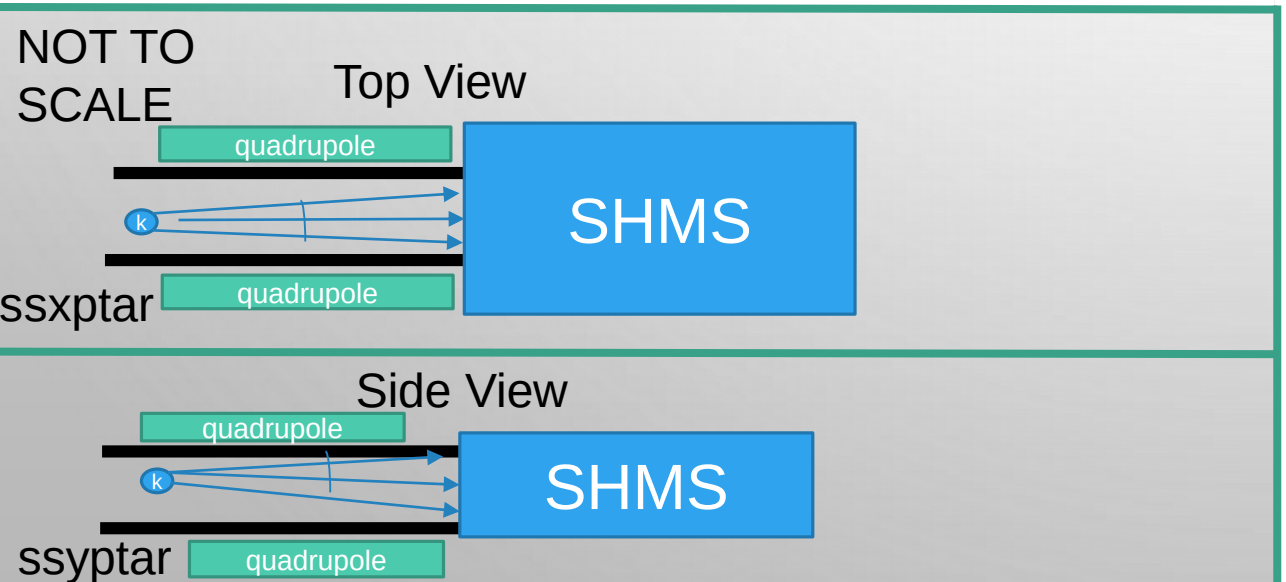
$$r = \frac{mv}{qB}$$

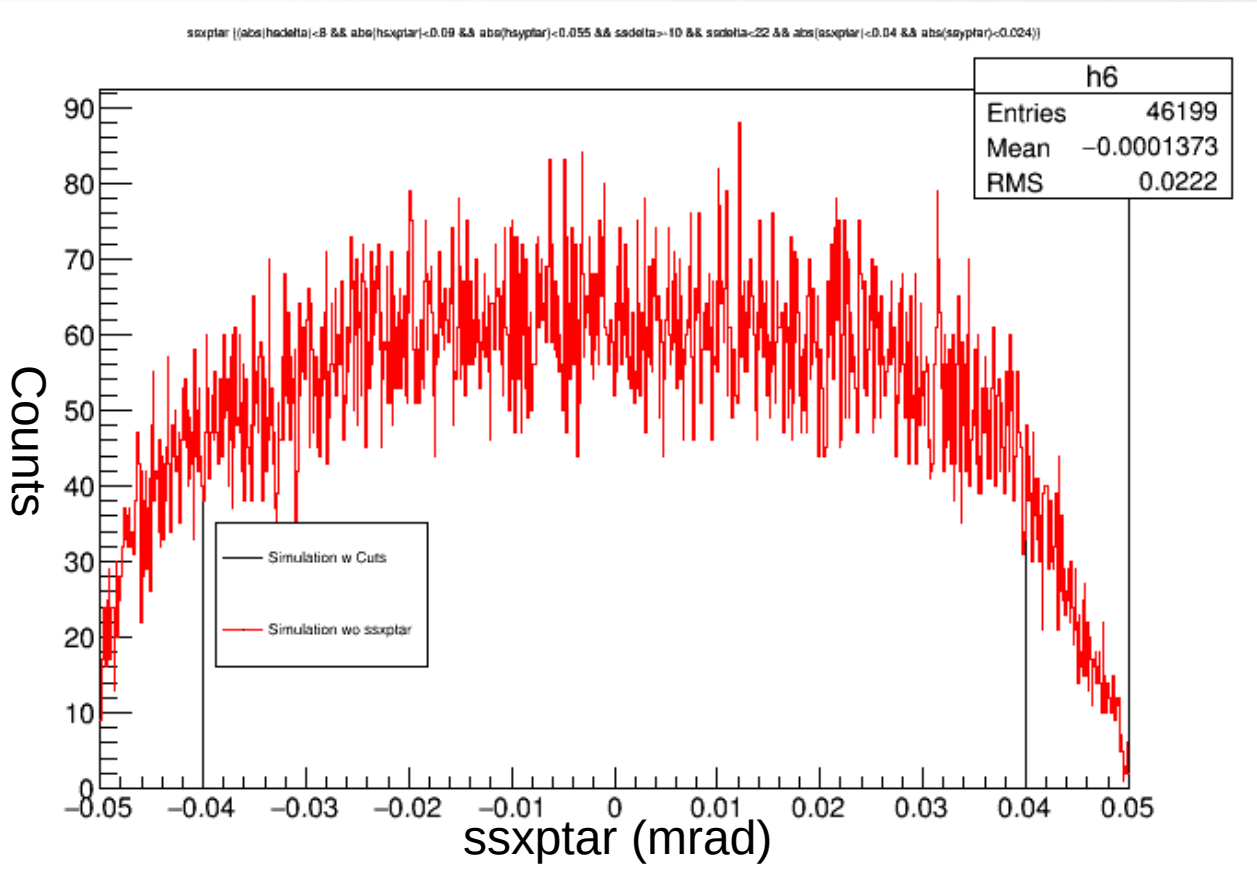
Electric Charge

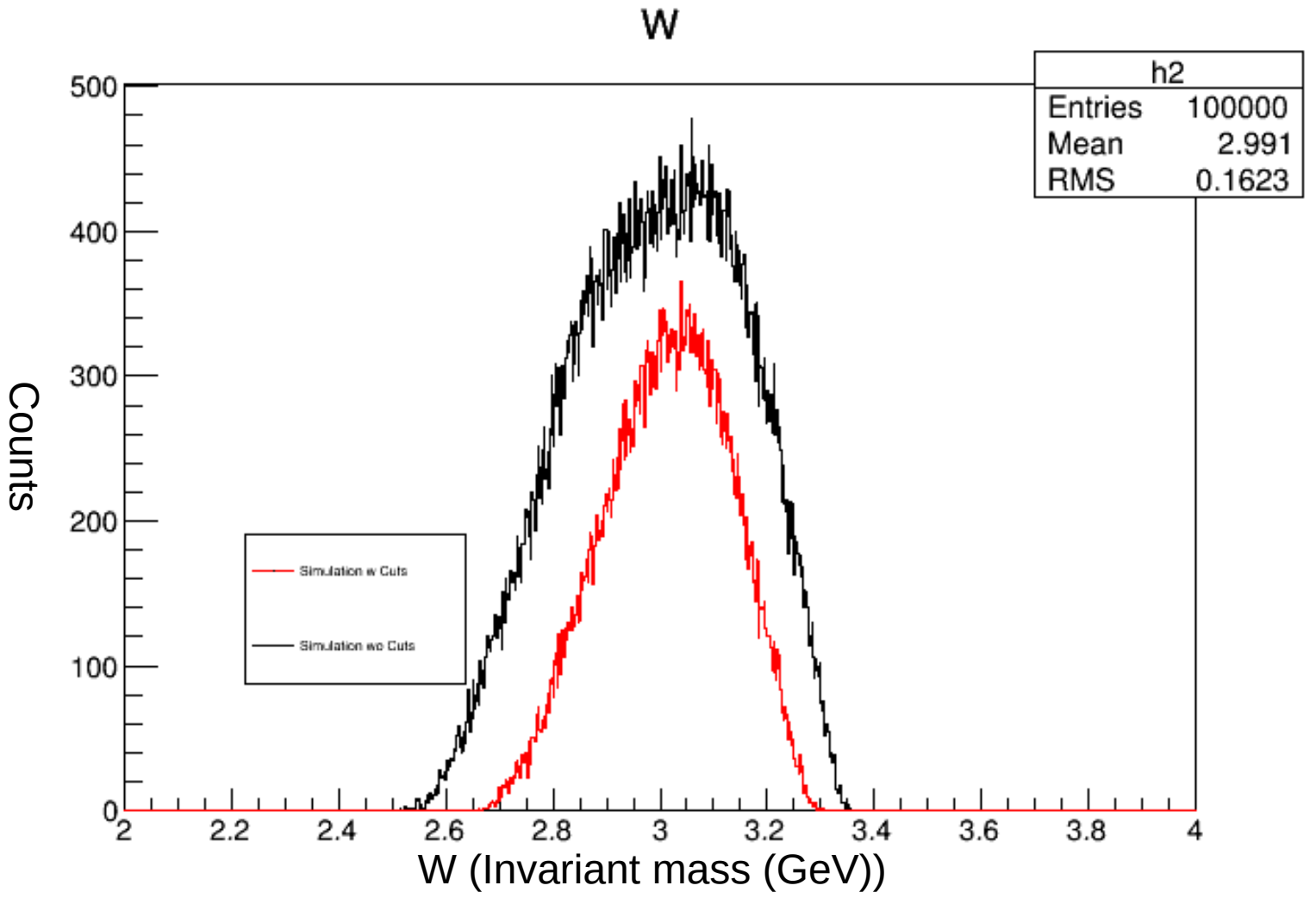
Electric Field

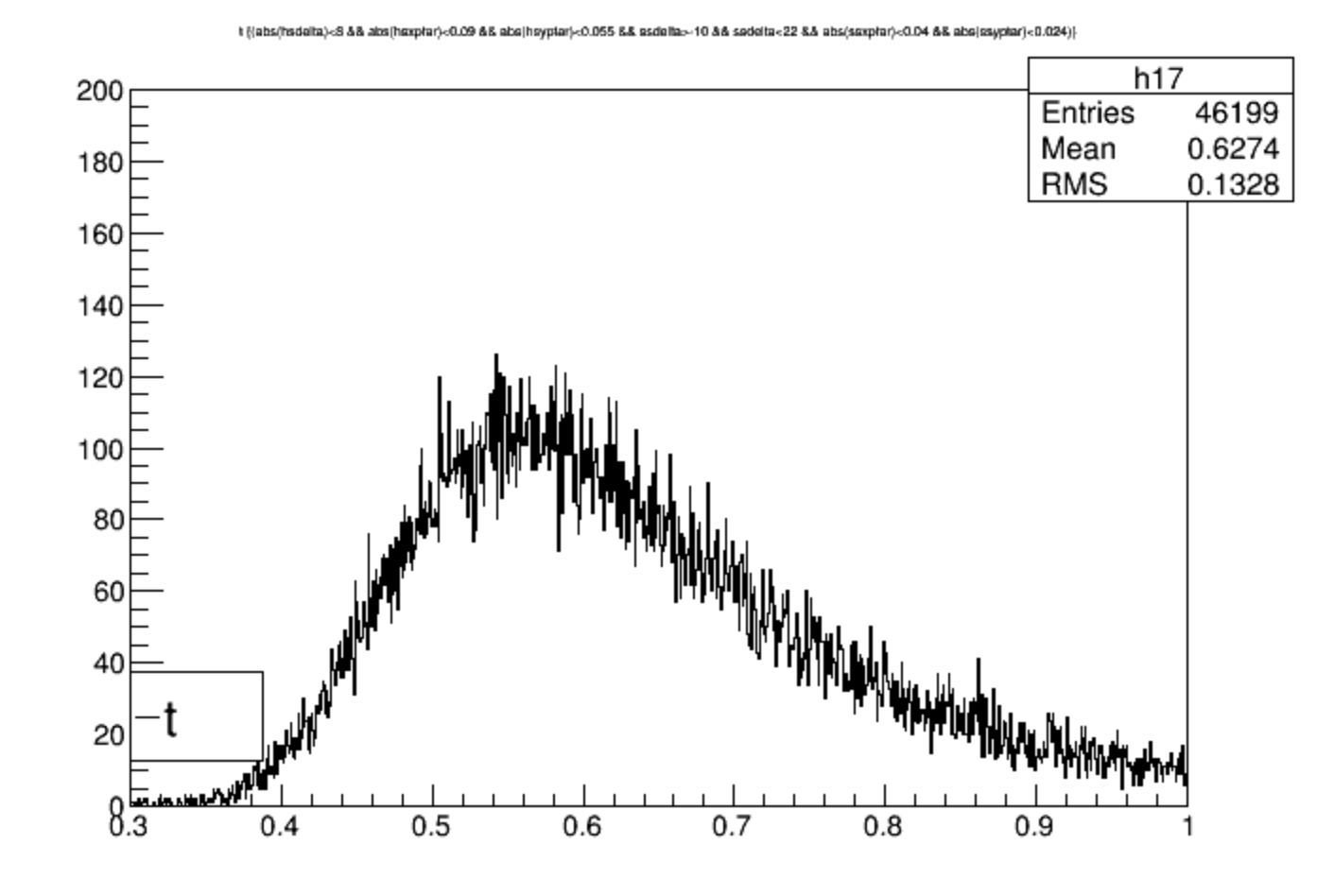


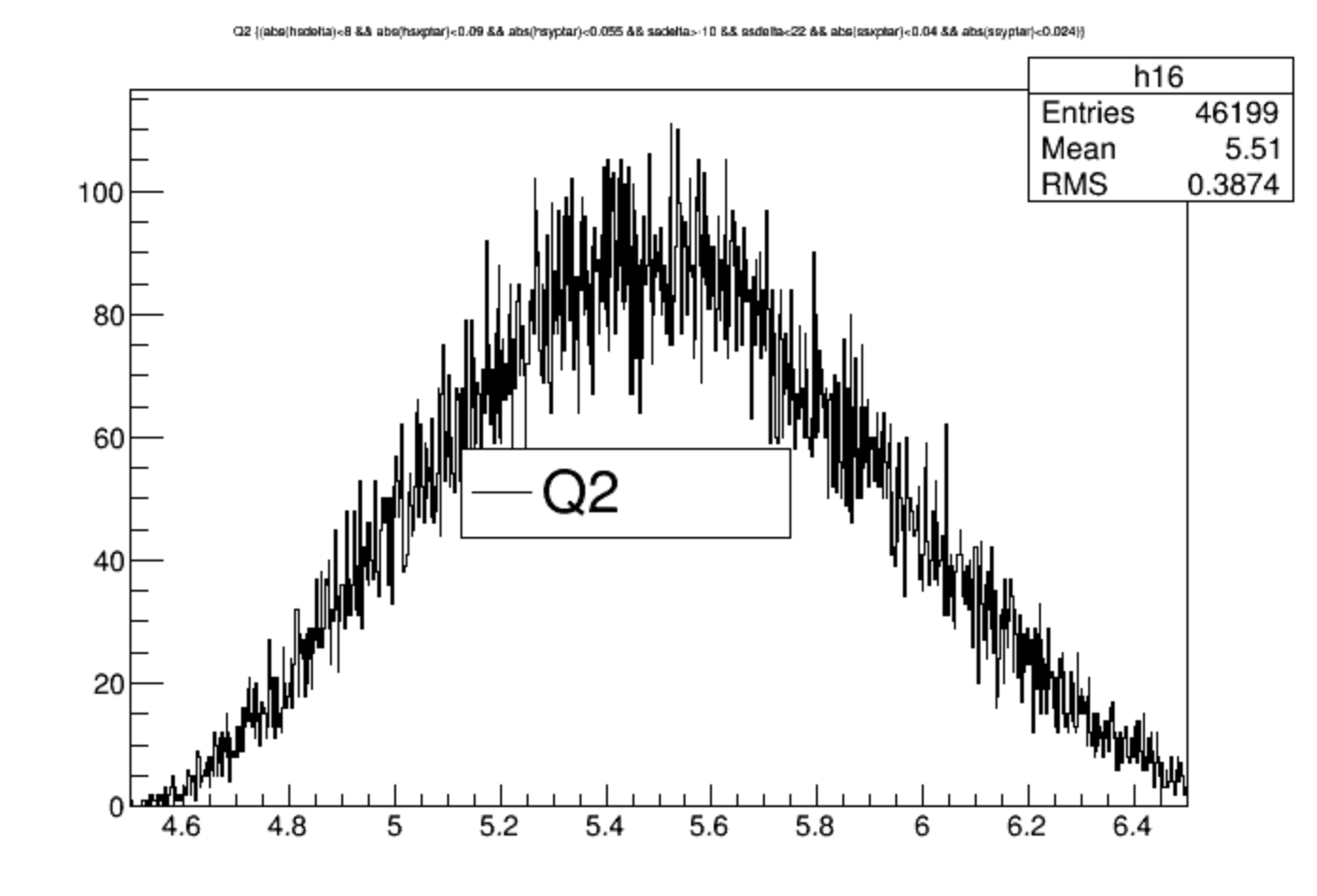

ssyptar (abs(hdelta)<.8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && sdelta>-10 && sdelta<22 && abs(sxptar)<0.04 && abs(syptar)<0.024))
h4
Entries 46199
Mean −2.042e−005
RMS 0.01335
Counts
ssyptar (mrad)
Simulation w Cuts
Simulation wo ssyptar


NOT TO SCALE
Top View
quadrupole
SHMS
ssxptar
quadrupole
Side View
quadrupole
SHMS
ssyptar
quadrupole


ssxptar (abs(hdelta)<.8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && sdelta>-10 && sdelta<22 && abs(sxptar)<0.04 && abs(syptar)<0.024))
h6
Entries 46199
Mean −0.0001373
RMS 0.0222
Counts
ssxptar (mrad)
Simulation w Cuts
Simulation wo ssxptar


W
h2
Entries 100000
Mean 2.991
RMS 0.1623
Simulation w Cuts
Simulation wo Cuts
Counts
W (Invariant mass (GeV))
0
100
200
300
400
500
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4


t (|abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && ssdelta>-10 && ssdelta<22 && abs(ssxptar)<0.04 && abs(ssyptar)<0.024)|
h17
Entries 46199
Mean 0.6274
RMS 0.1328
t
200
180
160
140
120
100
80
60
40
20
0
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1


Q2 {(abs(hsdelta)<8 && abs(hsxptar)<0.09 && abs(hsyptar)<0.055 && ssdelta>-10 && ssdelta<22 && abs(ssxptar)<0.04 && abs(ssyptar)<0.024)}
h16
Entries 46199
Mean 5.51
RMS 0.3874
Q2
100
80
60
40
20
0
4.6
4.8
5
5.2
5.4
5.6
5.8
6
6.2
6.4

KAON & PION PREDICTION

$$\frac{k}{s} = Yield/\text{time}$$

43364/815secs=53.2074 k/s