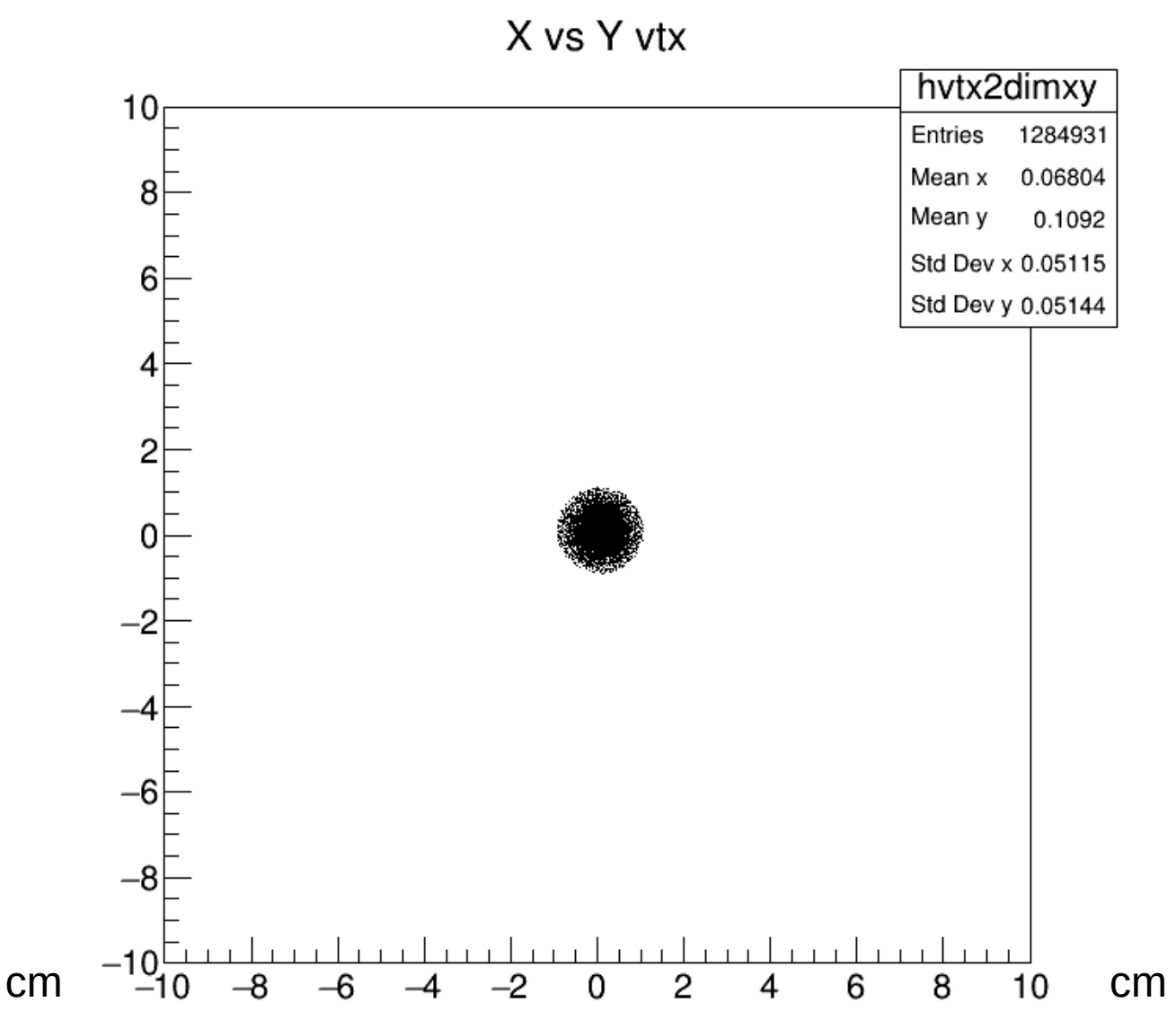
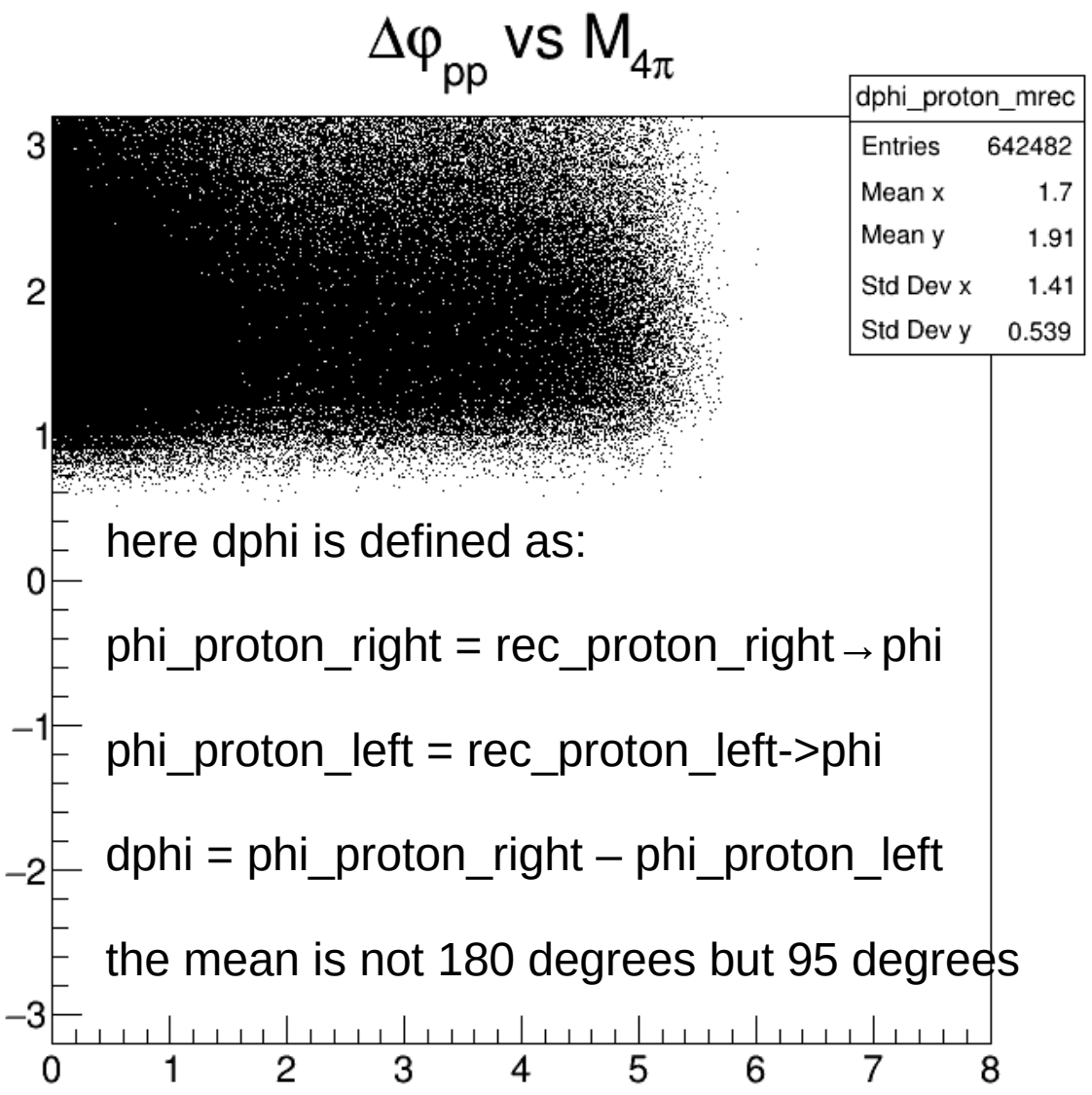
I have removed the following in the code:

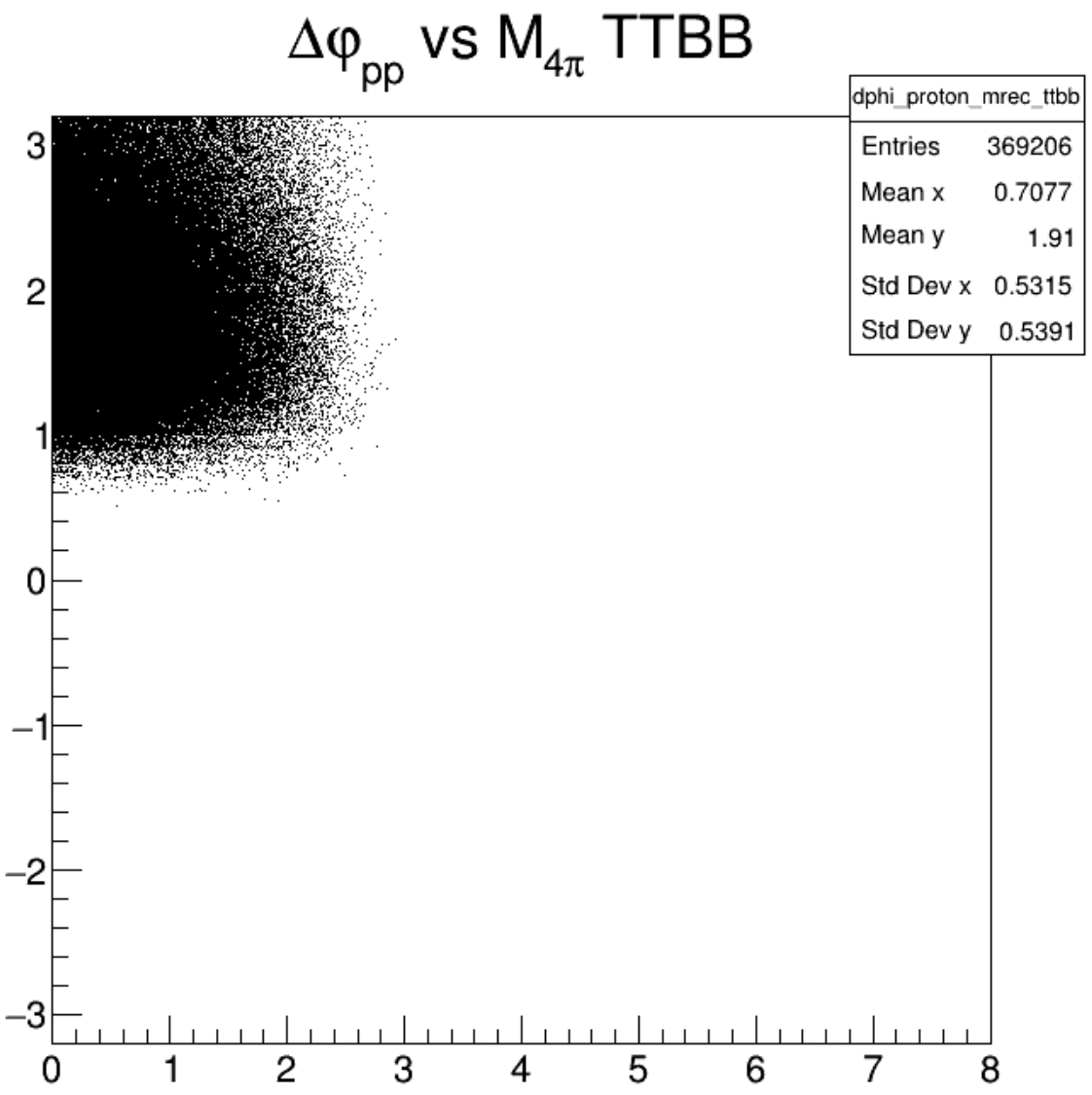
1. PID

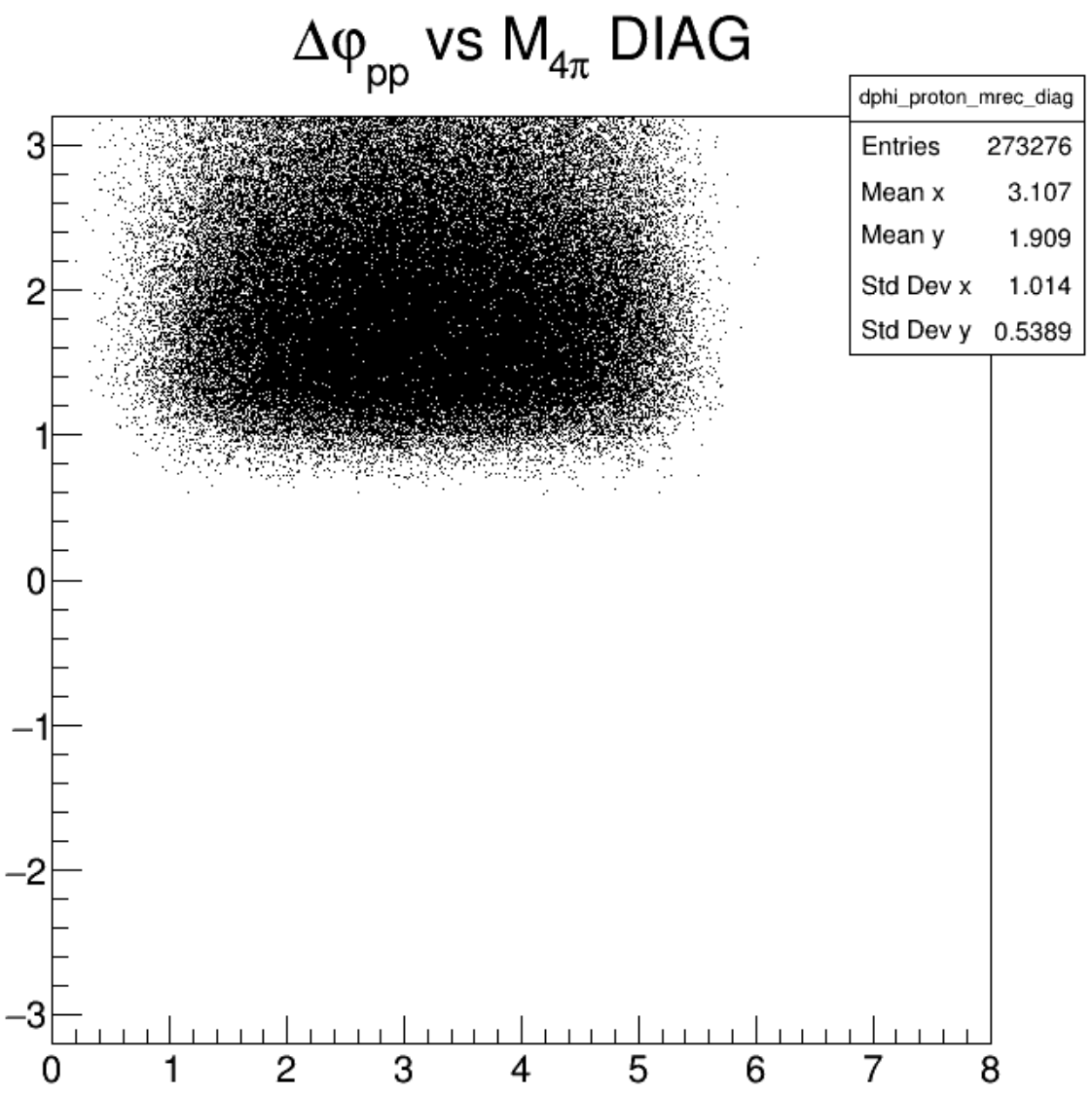
2. CTpycut < 0.06

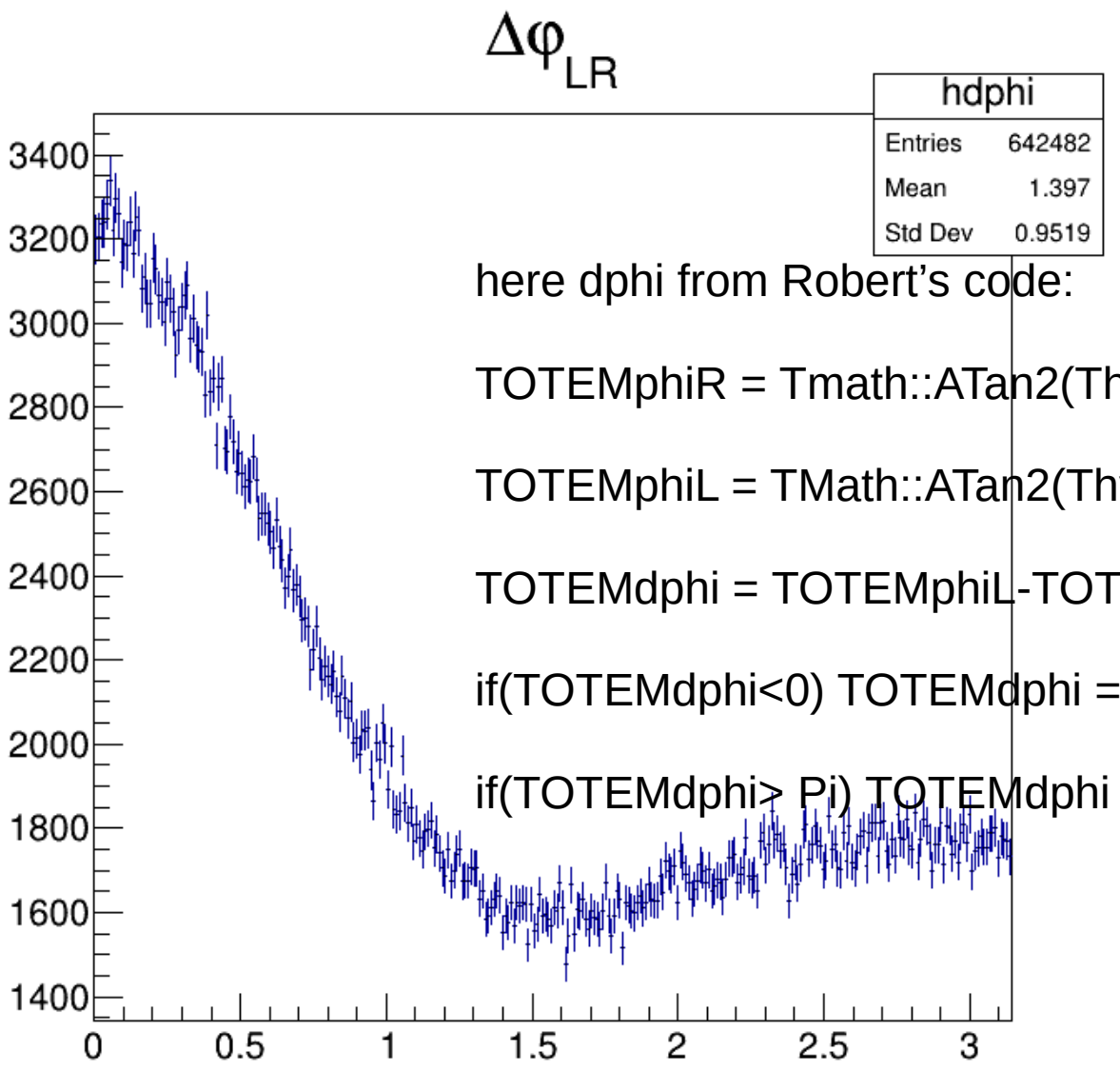
3. CTpxcut < 0.03


X vs Y vtx
hvtx2dimxy
Entries 1284931
Mean x 0.06804
Mean y 0.1092
Std Dev x 0.05115
Std Dev y 0.05144
10
8
6
4
2
0
−2
−4
−6
−8
−10
−10
−8
−6
−4
−2
0
2
4
6
8
10
cm
cm


$\Delta\varphi_{pp}$ vs $M_{4\pi}$
dphi_proton_mrec
Entries 642482
Mean x 1.7
Mean y 1.91
Std Dev x 1.41
Std Dev y 0.539
3
2
1
0
−1
−2
−3
0
1
2
3
4
5
6
7
8
here dphi is defined as:
phi_proton_right = rec_proton_right→phi
phi_proton_left = rec_proton_left->phi
dphi = phi_proton_right – phi_proton_left
the mean is not 180 degrees but 95 degrees


$\Delta\varphi_{pp}$ vs $M_{4\pi}$ TTBB
dphi_proton_mrec_ttbb
Entries 369206
Mean x 0.7077
Mean y 1.91
Std Dev x 0.5315
Std Dev y 0.5391
3
2
1
0
−1
−2
−3
0
1
2
3
4
5
6
7
8


Δφpp vs M4π DIAG
dphi_proton_mrec_diag
Entries 273276
Mean x 3.107
Mean y 1.909
Std Dev x 1.014
Std Dev y 0.5389
3
2
1
0
−1
−2
−3
0
1
2
3
4
5
6
7
8



here dphi from Robert's code:

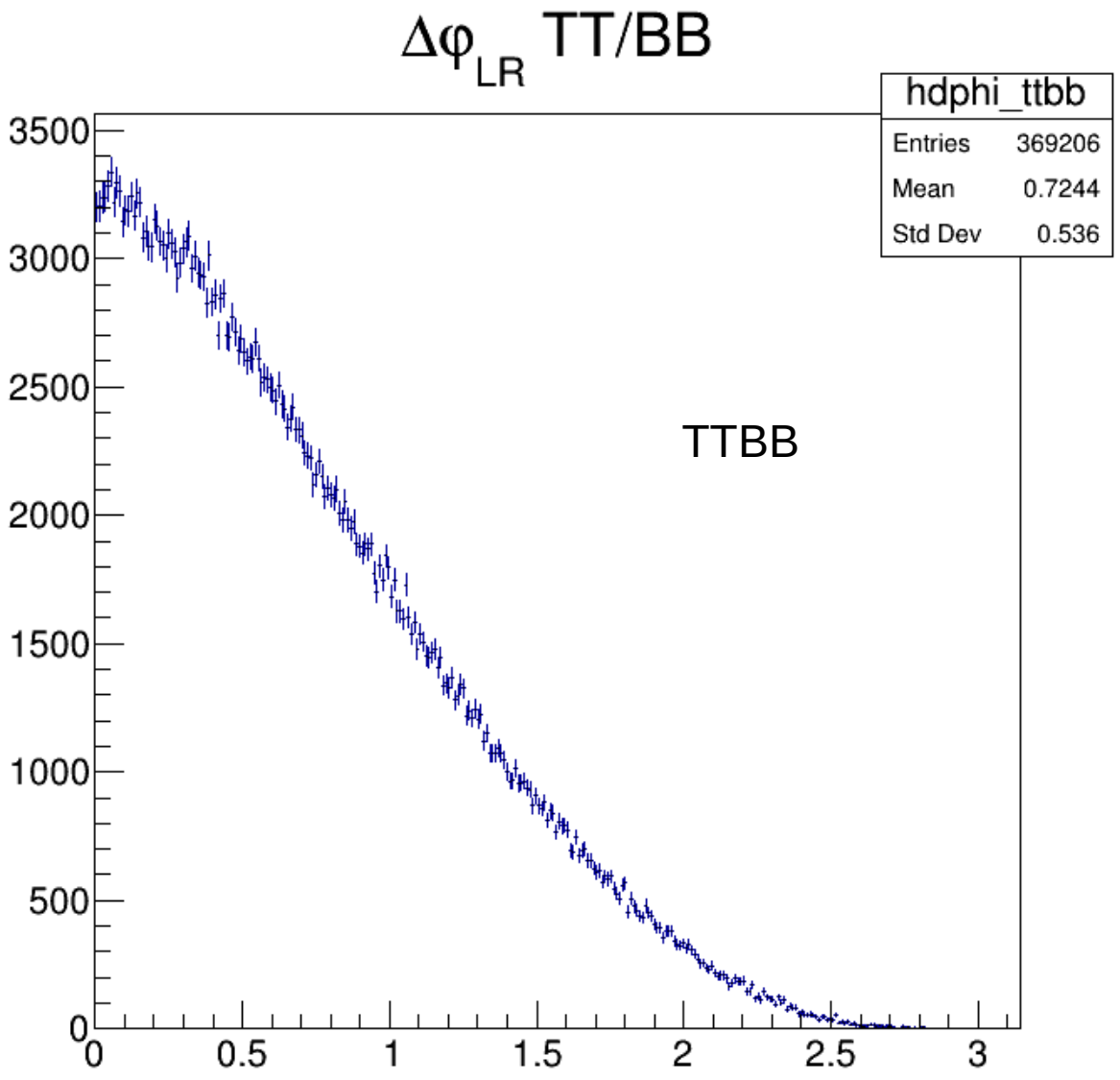
TOTEMphiR = Tmath::ATan2(ThyR,ThxR)

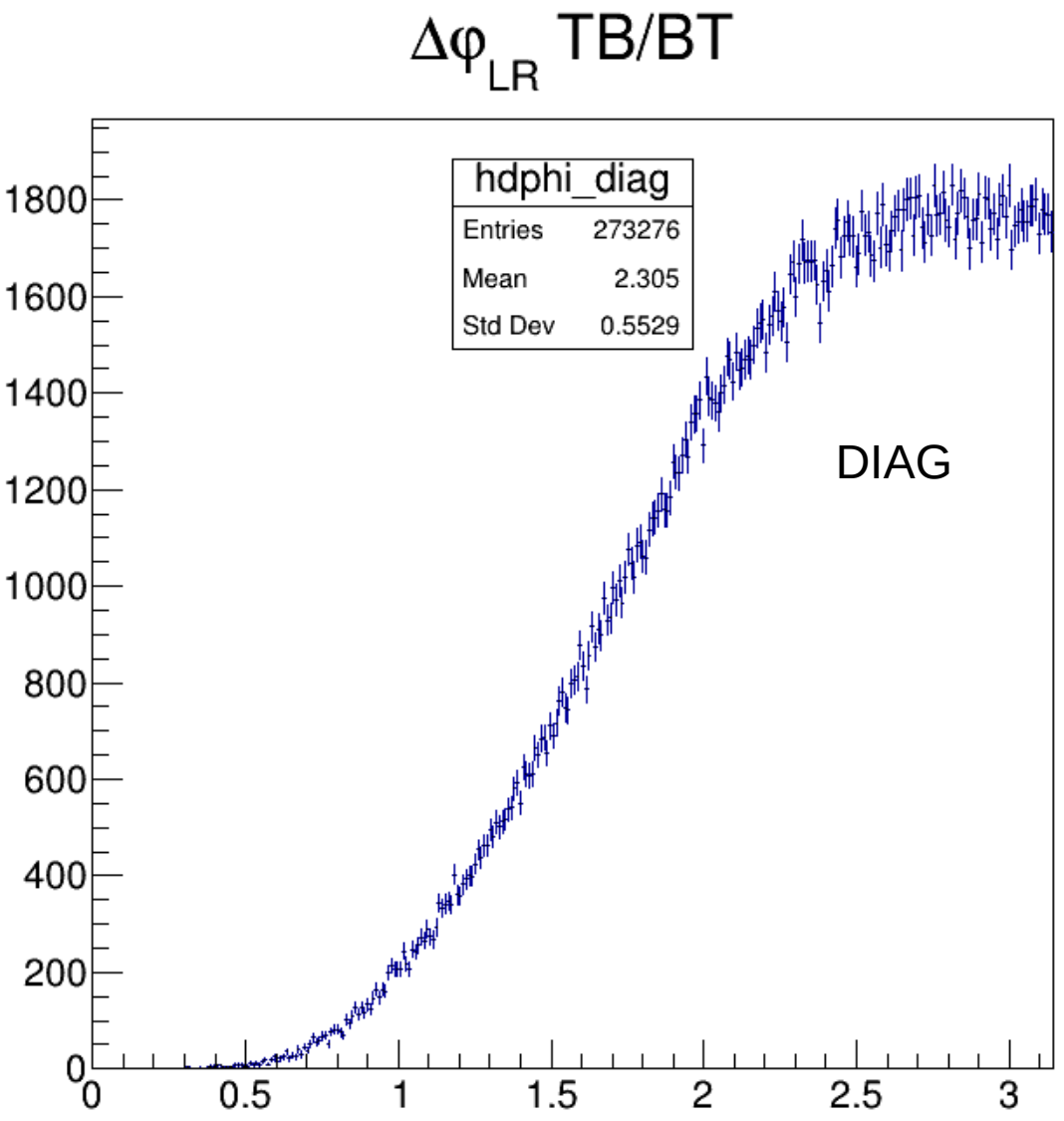
TOTEMphiL = TMath::ATan2(ThyL,ThxL)

TOTEMdphi = TOTEMphiL-TOTEMphiR

if(TOTEMdphi<0) TOTEMdphi = TOTEMdphi + 2*Pi

if(TOTEMdphi> Pi) TOTEMdphi = 2*Pi - TOTEMdphi


$\Delta\varphi_{LR}$ TT/BB
hdphi_ttbb
Entries 369206
Mean 0.7244
Std Dev 0.536
TTBB
3500
3000
2500
2000
1500
1000
500
0
0
0.5
1
1.5
2
2.5
3


$\Delta\varphi_{LR}$ TB/BT
hdphi_diag
Entries 273276
Mean 2.305
Std Dev 0.5529
DIAG
1800
1600
1400
1200
1000
800
600
400
200
0
0
0.5
1
1.5
2
2.5
3