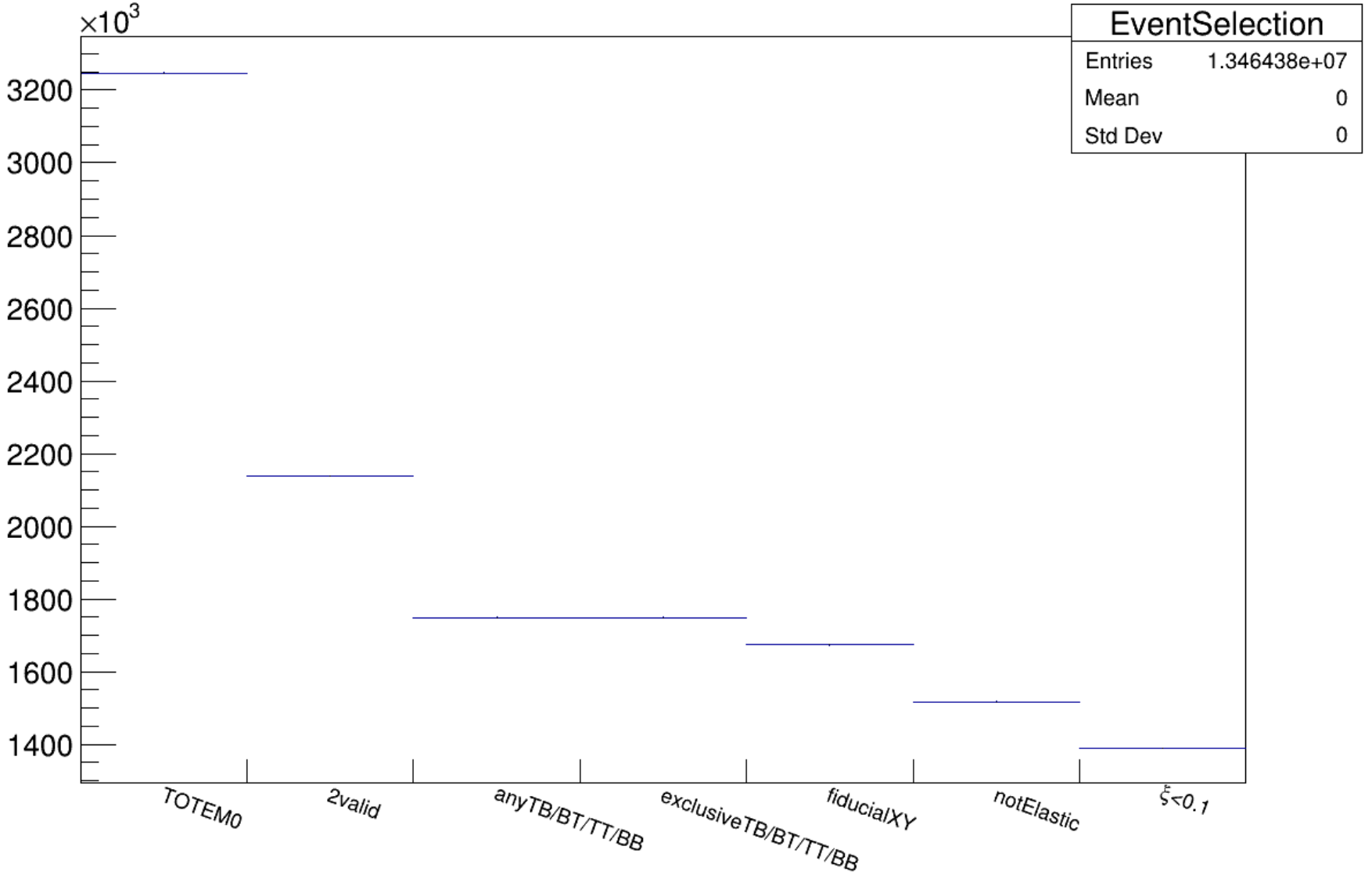
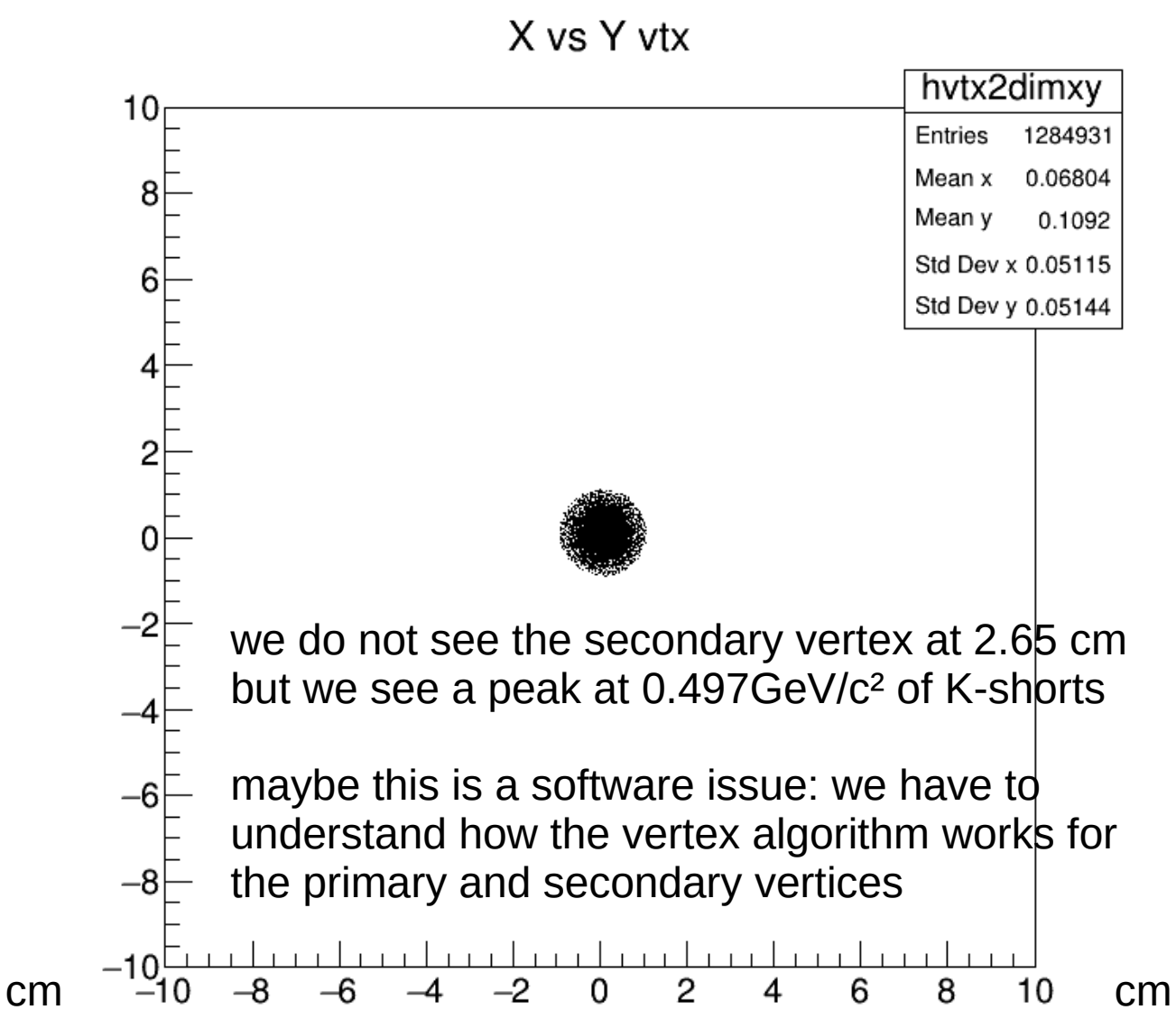
these plots have:

1. no PID

2. no CTpycut < 0.06

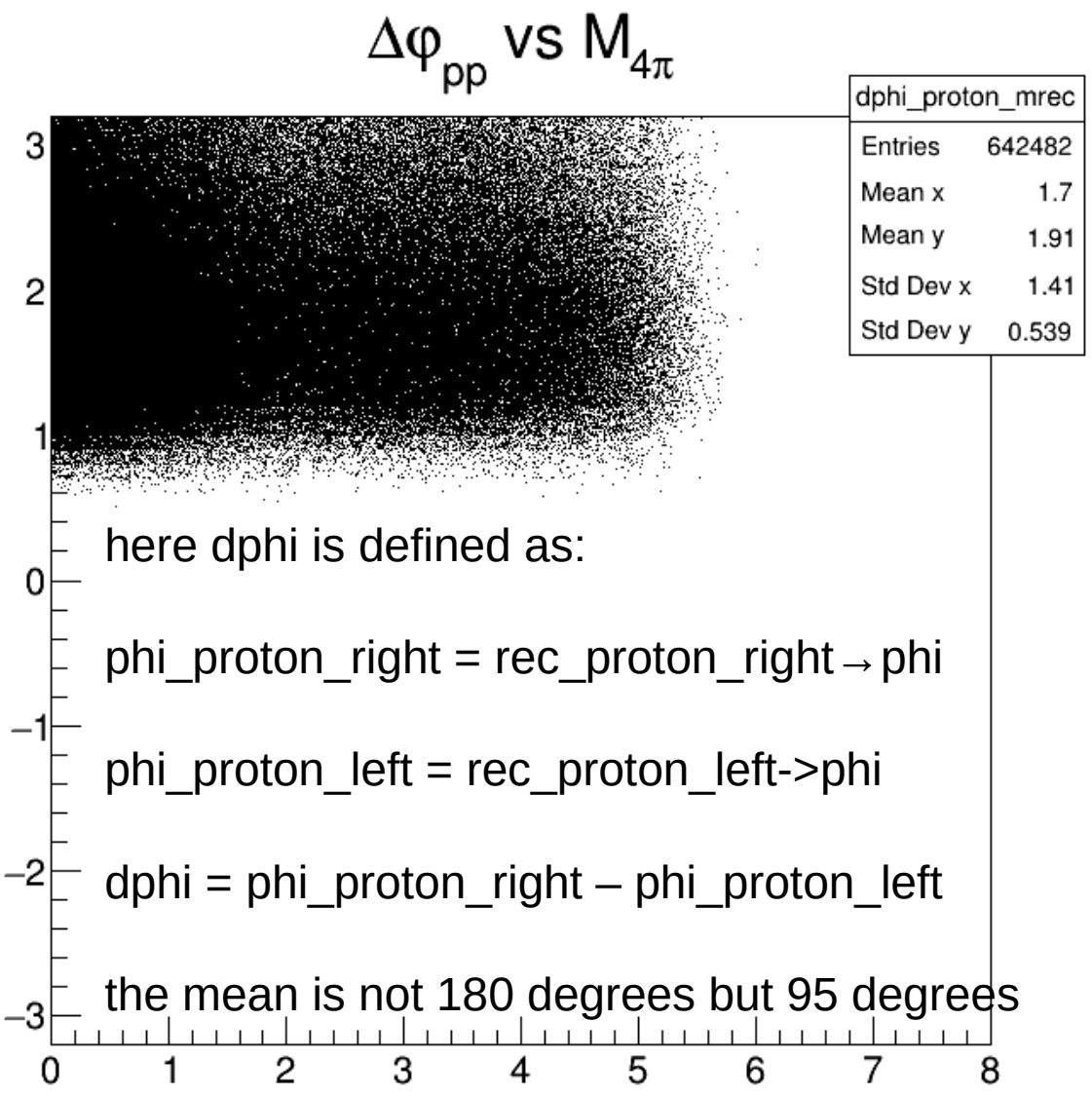
3. no CTpxcut < 0.03


EventSelection
Entries 1.346438e+07
Mean 0
Std Dev 0
×10^3
3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
TOTEM0
2valid
anyTB/BT/TT/BB
exclusiveTB/BT/TT/BB
fiducialXY
notElastic
ξ<0.1



we do not see the secondary vertex at 2.65 cm
but we see a peak at 0.497GeV/c^2 of K-shorts

maybe this is a software issue: we have to understand how the vertex algorithm works for the primary and secondary vertices



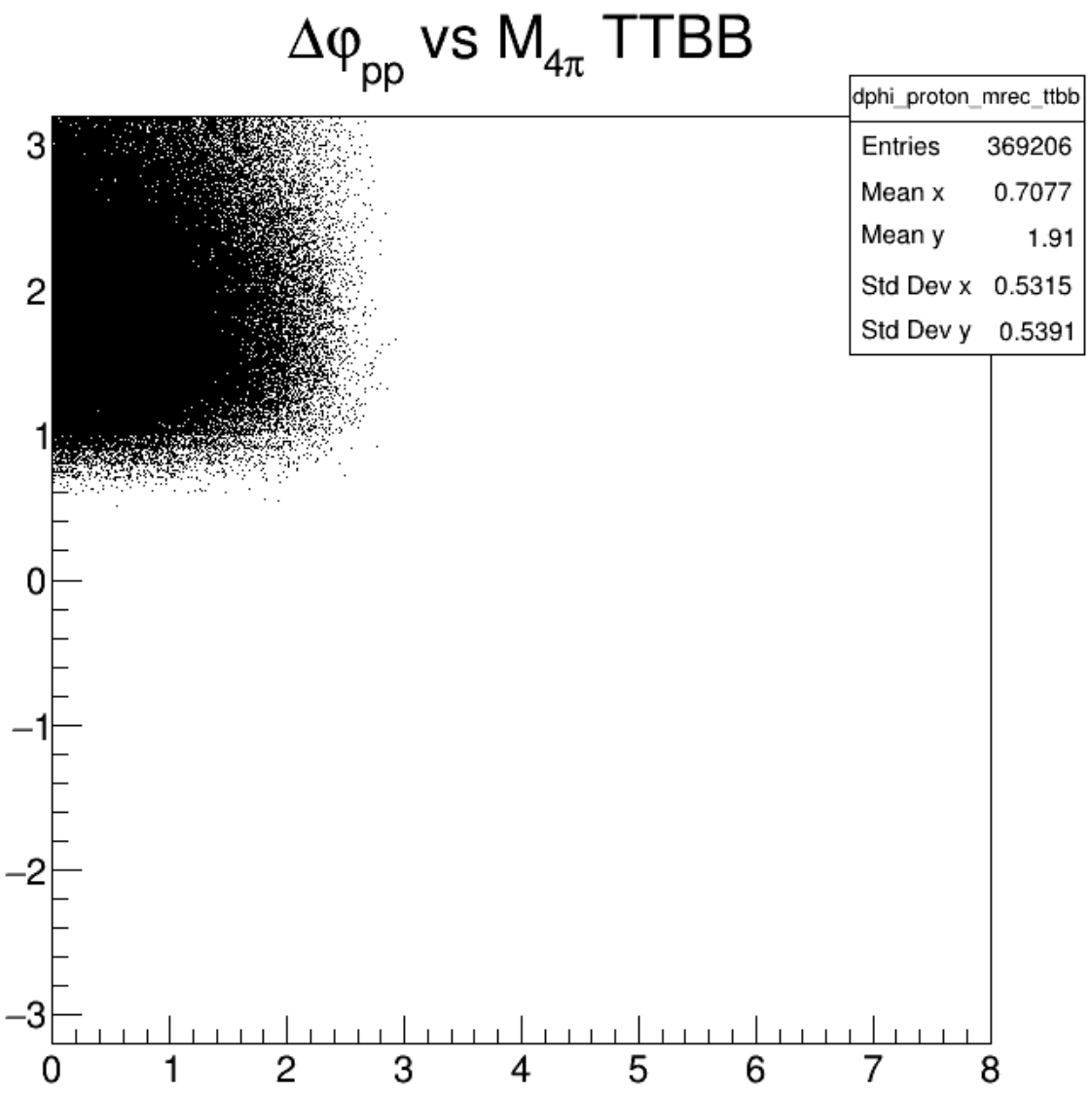
here dphi is defined as:

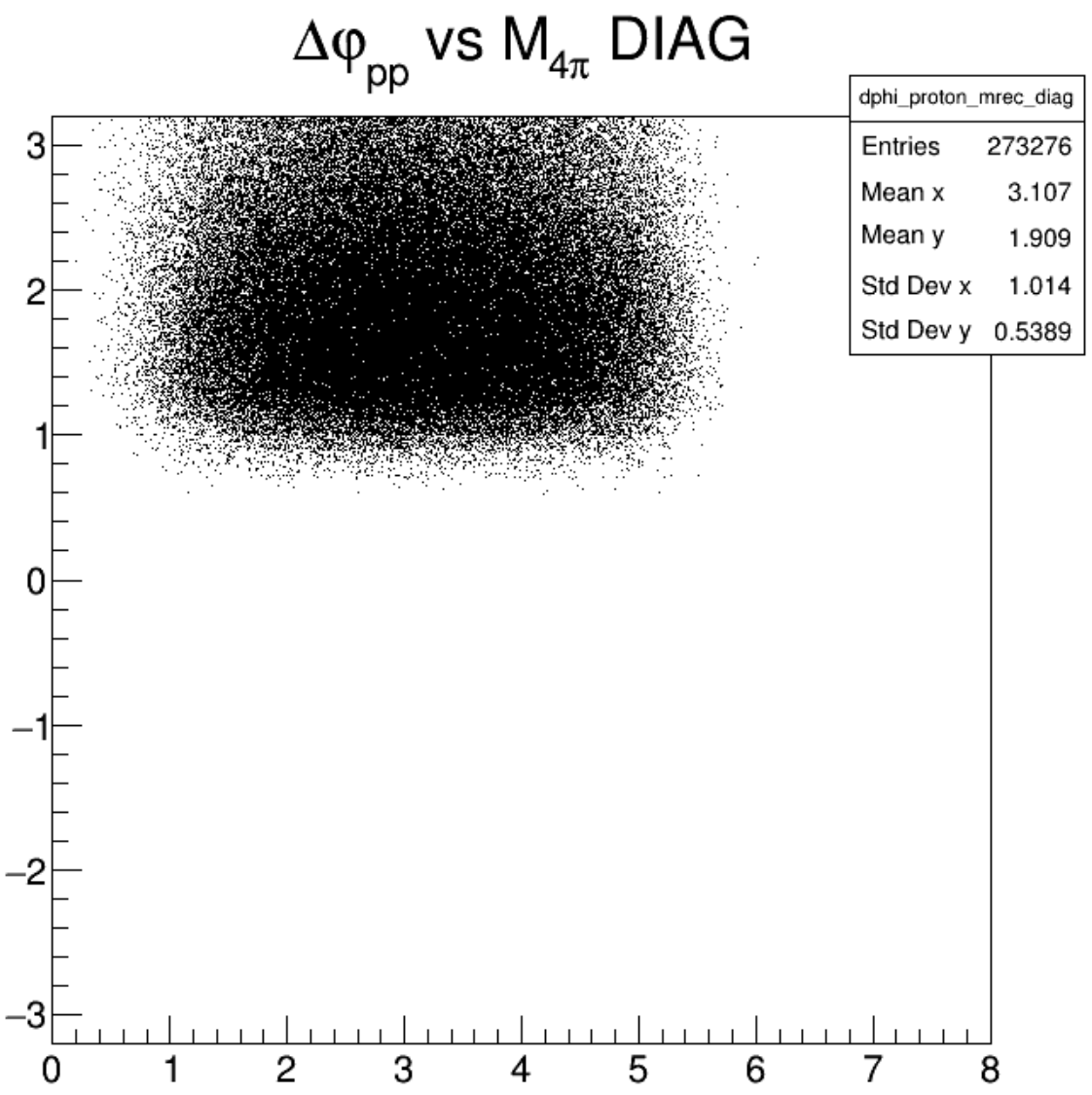
phi_proton_right = rec_proton_right→phi

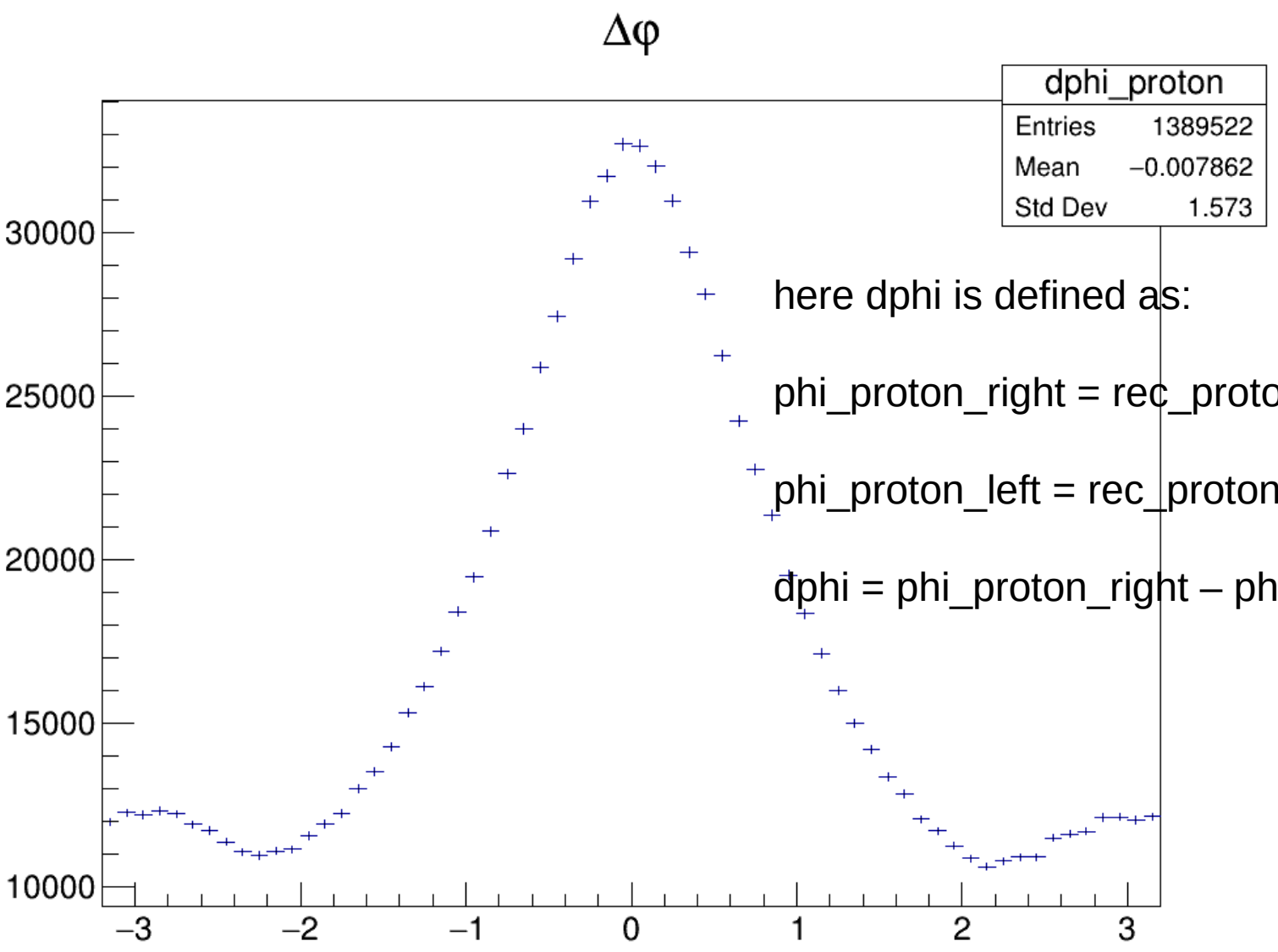
phi_proton_left = rec_proton_left->phi

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

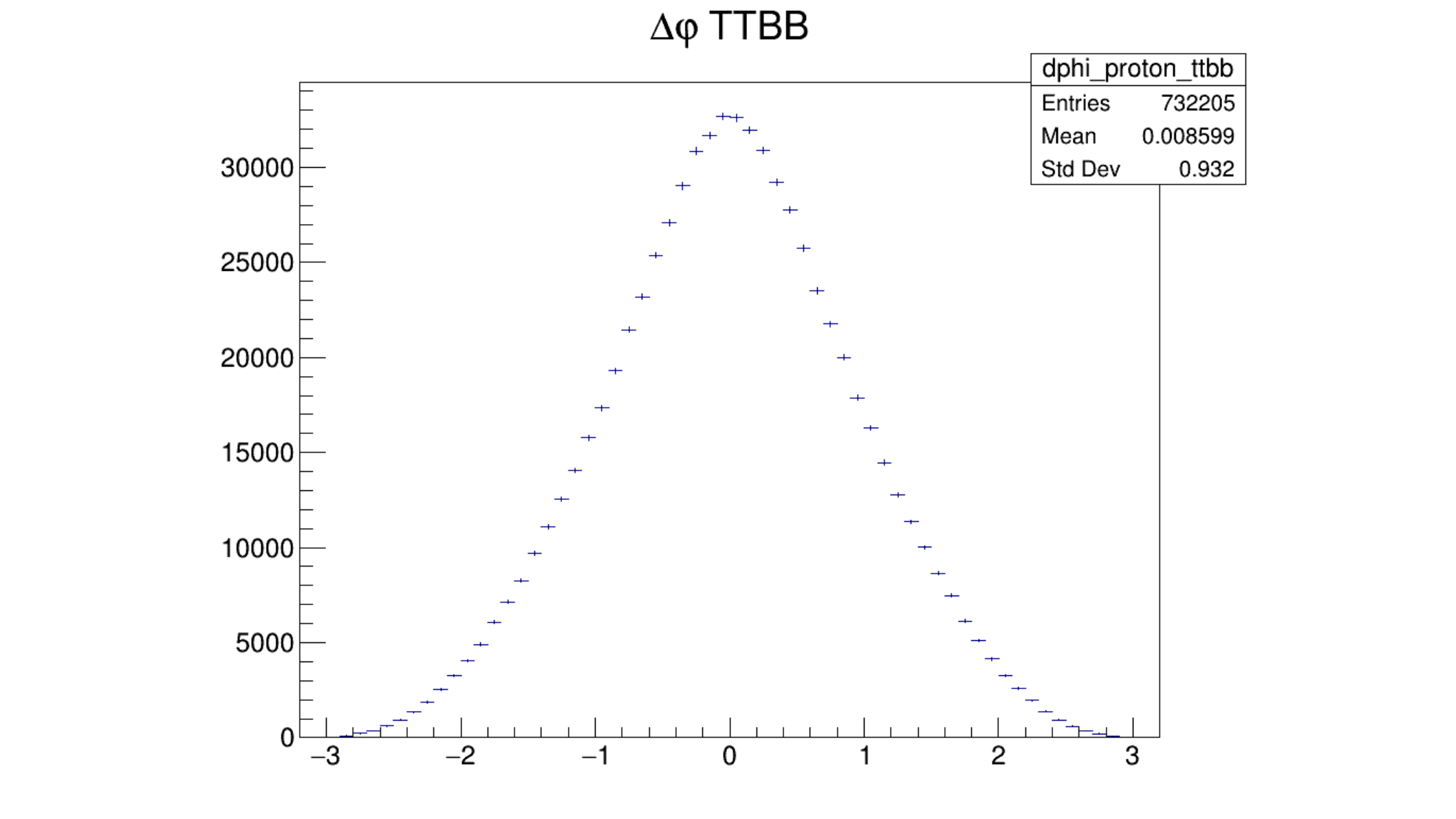


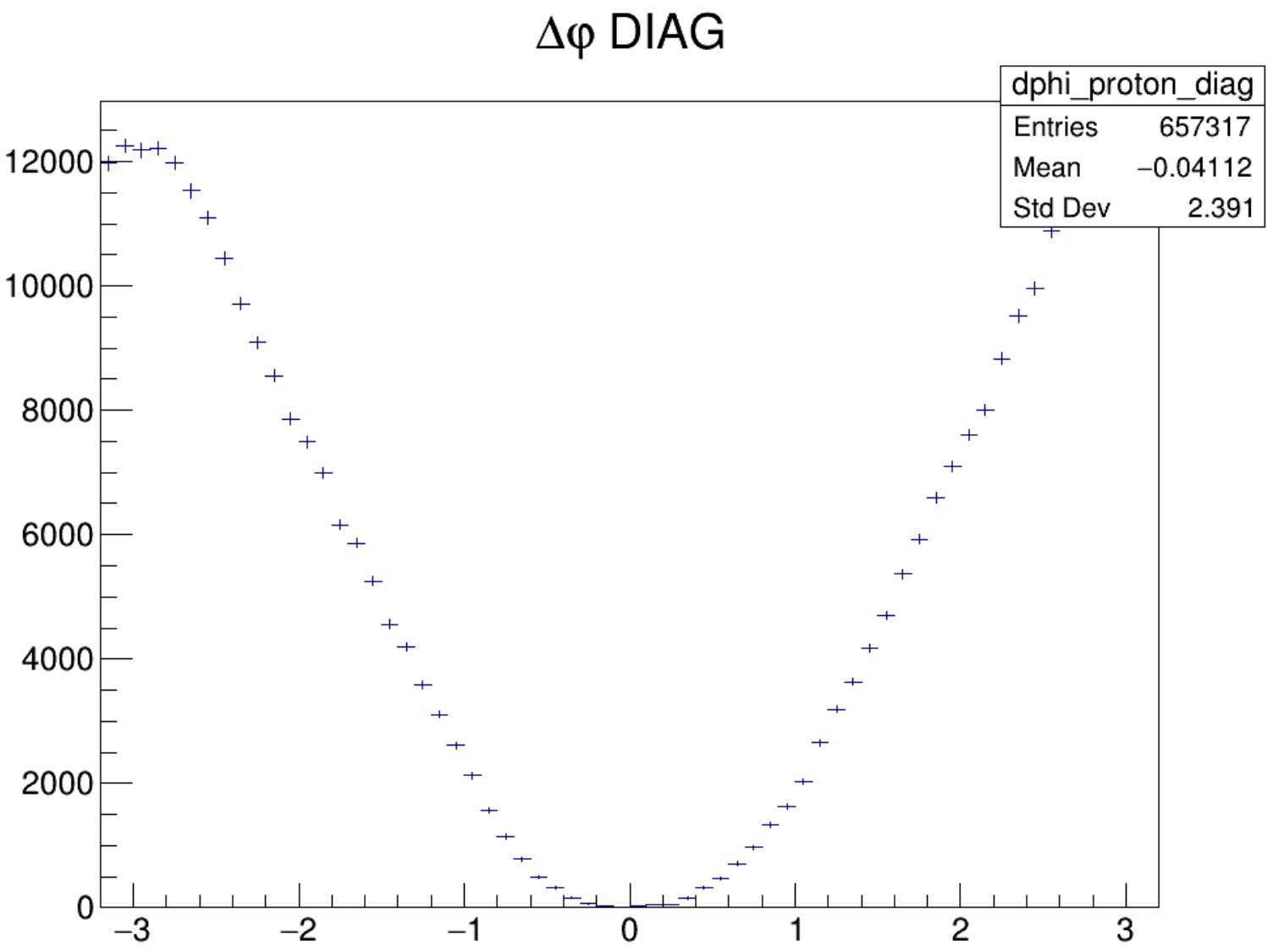
here dphi is defined as:

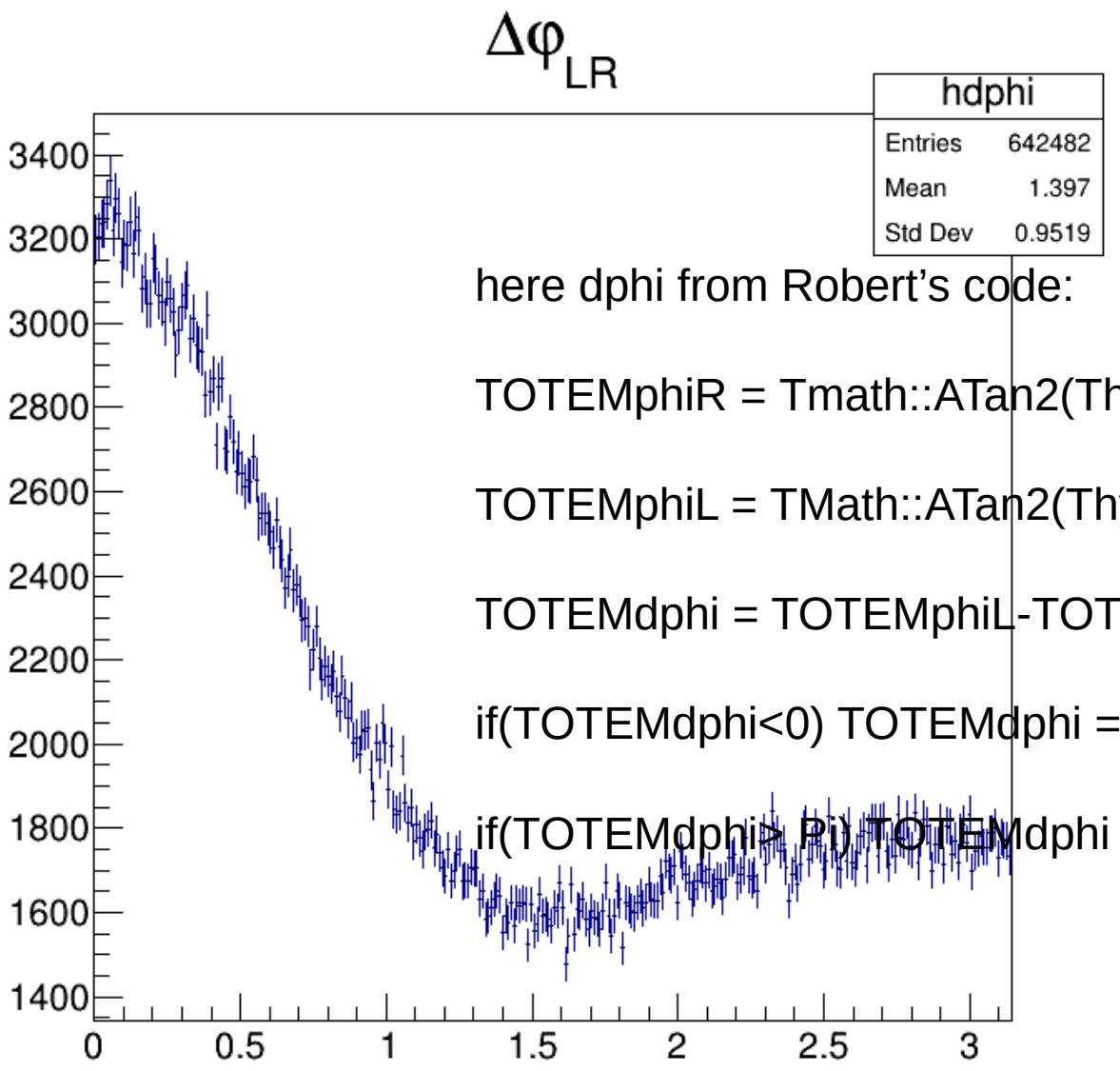
phi_proton_right = rec_proton_right→phi

phi_proton_left = rec_proton_left->phi

dphi = phi_proton_right – phi_proton_left


Δφ TTBB
dphi_proton_ttbb
Entries 732205
Mean 0.008599
Std Dev 0.932
30000
25000
20000
15000
10000
5000
0
−3
−2
−1
0
1
2
3


Δφ DIAG
dphi_proton_diag
Entries 657317
Mean −0.04112
Std Dev 2.391
12000
10000
8000
6000
4000
2000
0
−3
−2
−1
0
1
2
3



here dphi from Robert's code:

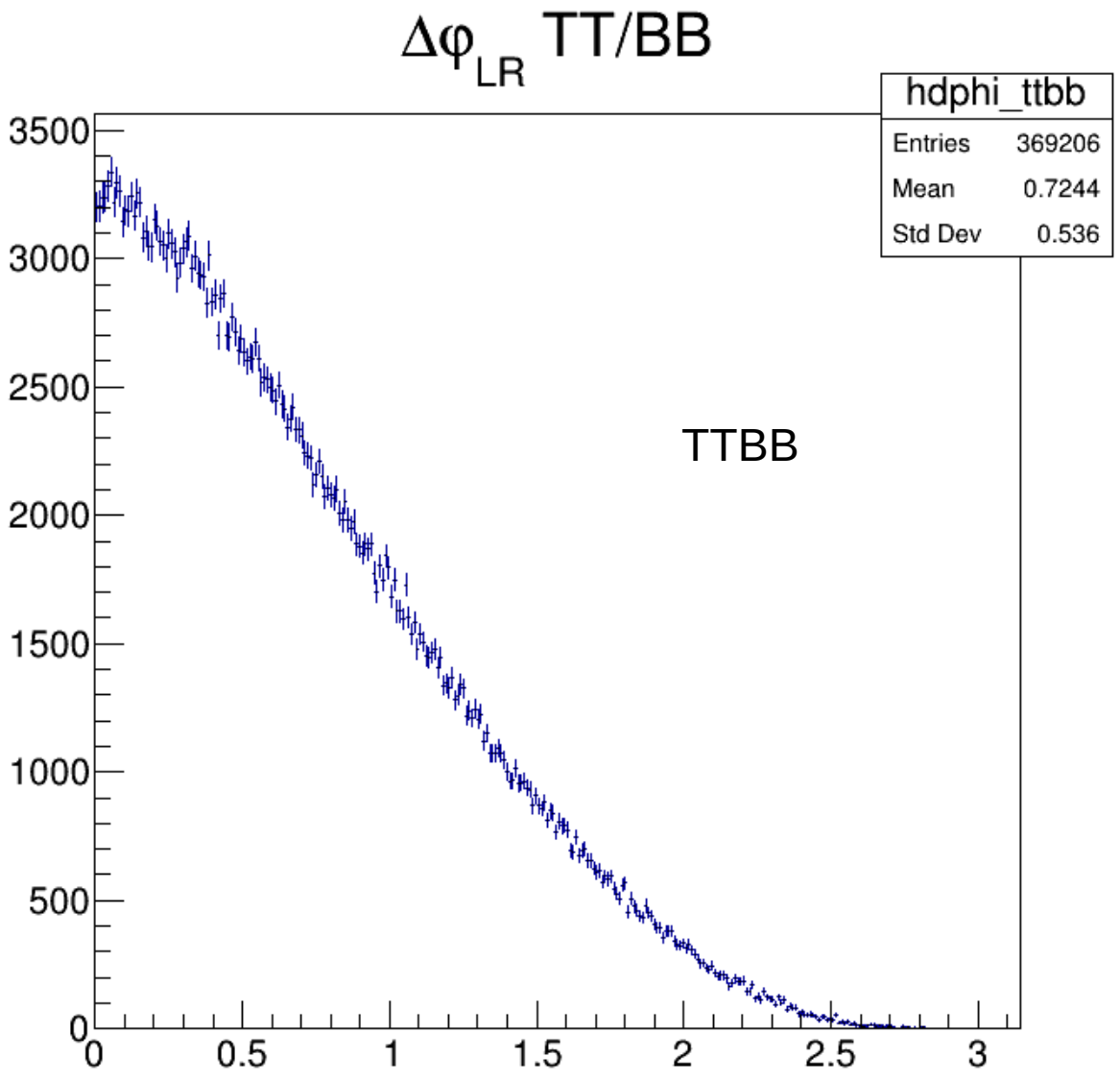
TOTEMphiR = Tmath::ATan2(ThyR,ThxR)

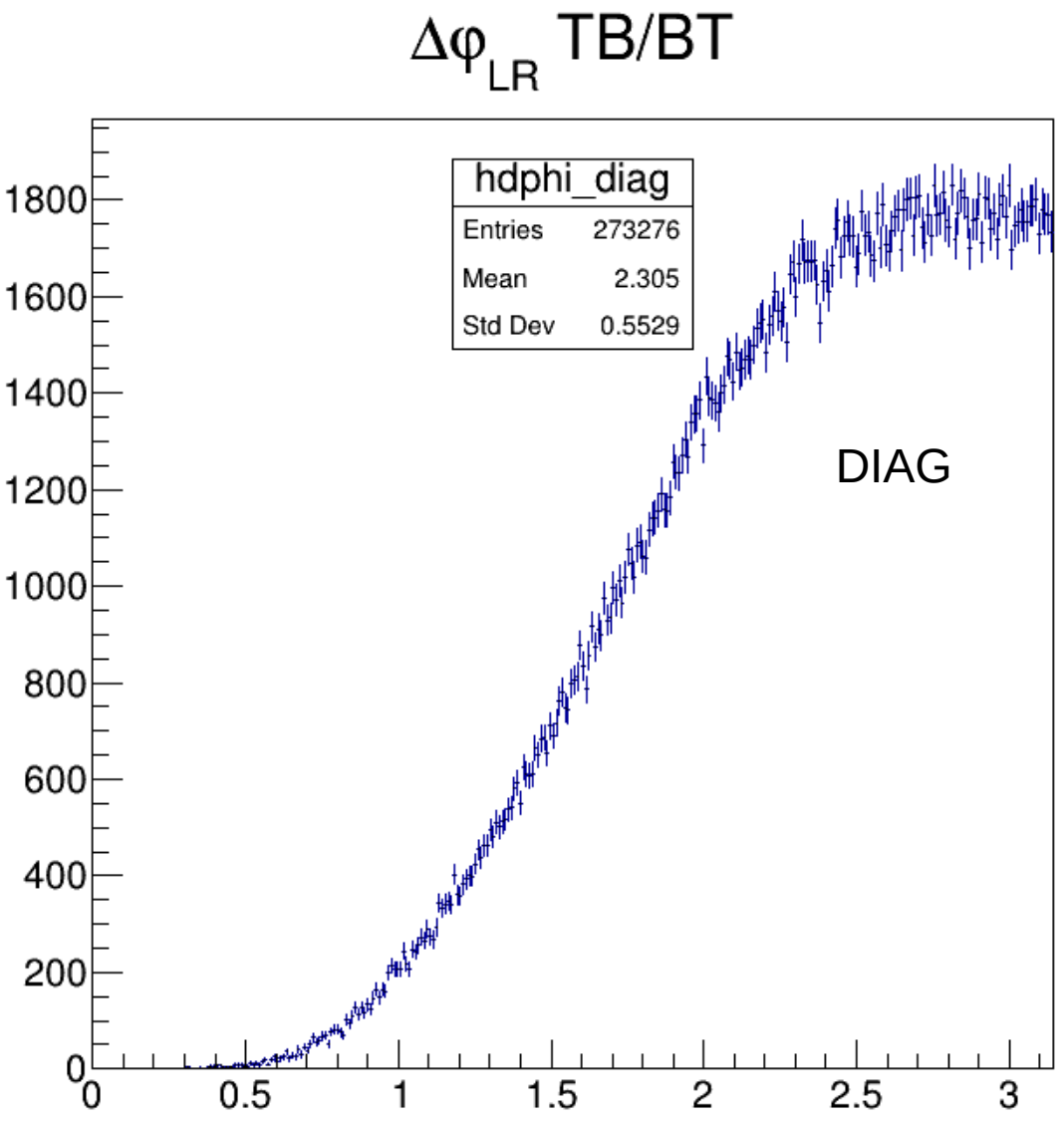
TOTEMphiL = TMath::ATan2(ThyL,ThxL)

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