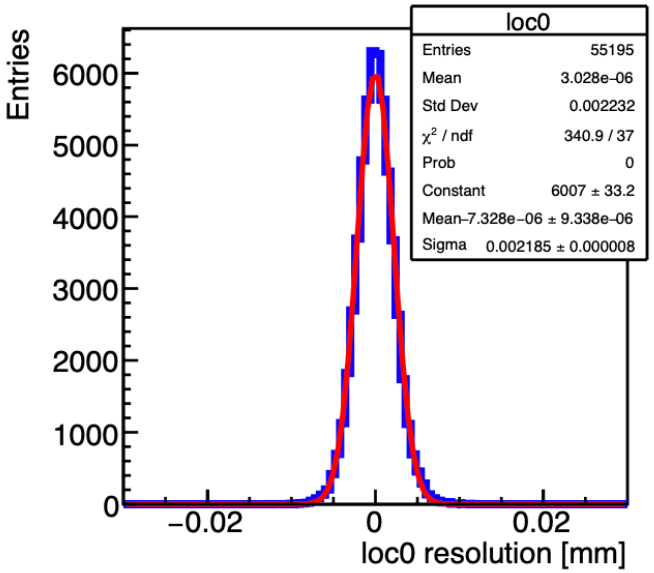
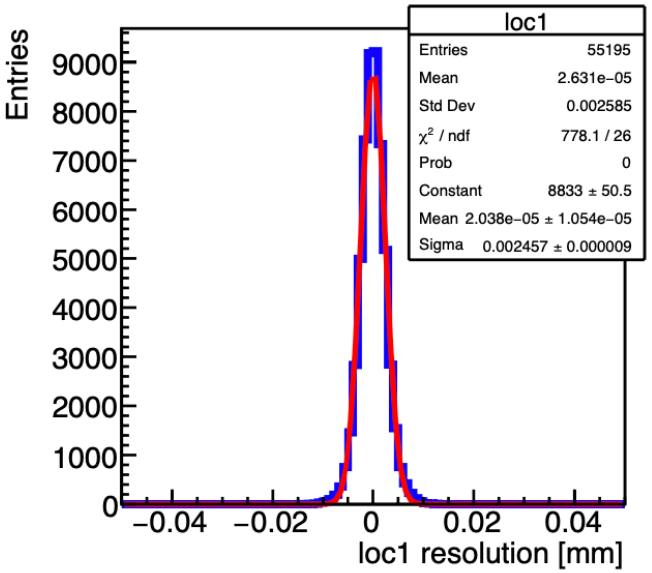
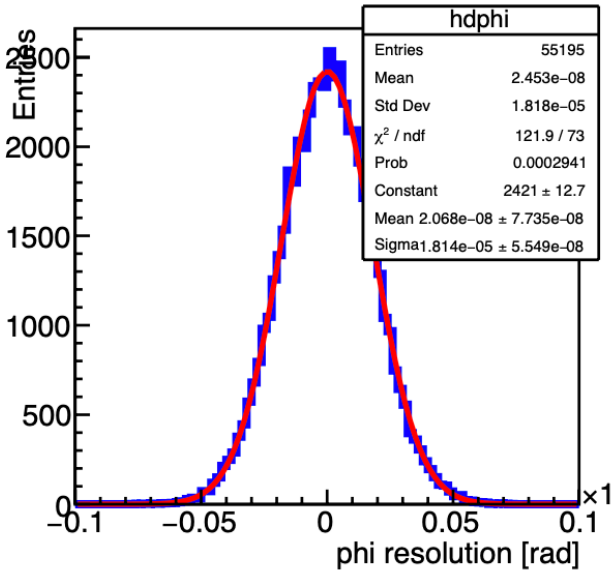
Smoothing state check

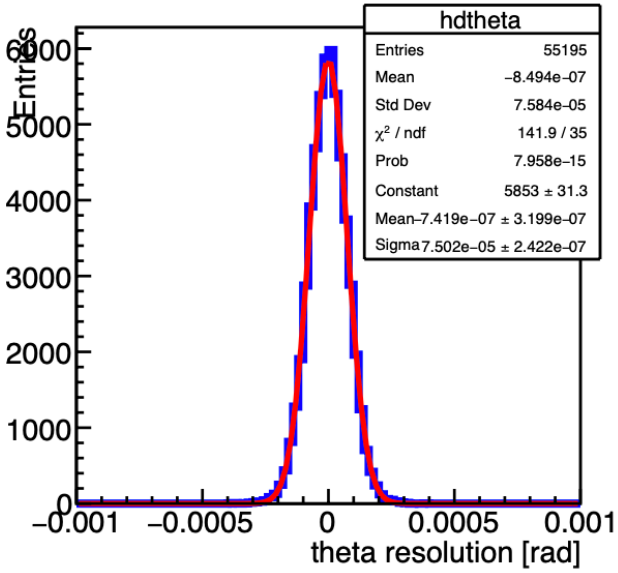
- Track parameters
- Smooth state - truth parameter

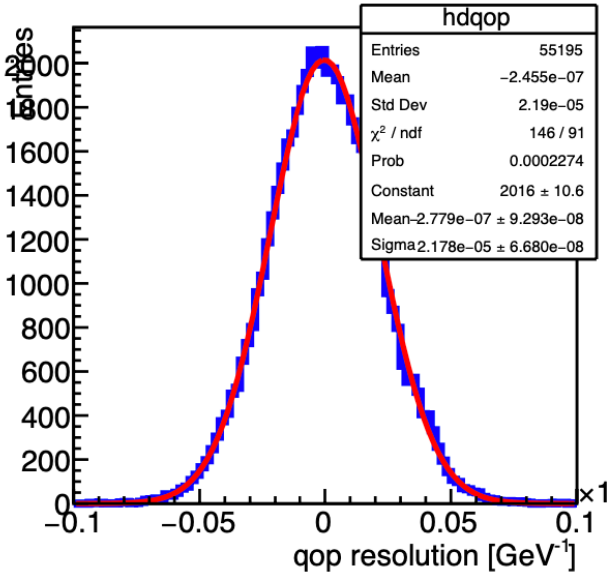
VTX


loc0
Entries 55195
Mean 3.028e-06
Std Dev 0.002232
χ² / ndf 340.9 / 37
Prob 0
Constant 6007 ± 33.2
Mean -7.328e-06 ± 9.338e-06
Sigma 0.002185 ± 0.000008
Entries
loc0 resolution [mm]

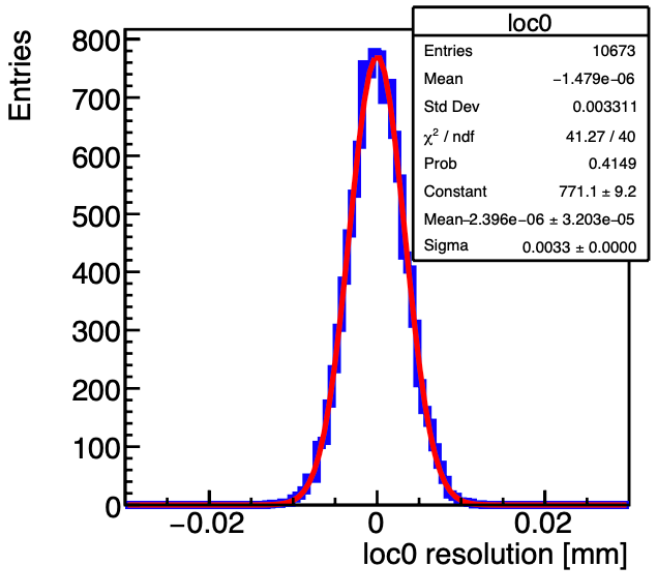

loc1
Entries 55195
Mean 2.631e-05
Std Dev 0.002585
χ² / ndf 778.1 / 26
Prob 0
Constant 8833 ± 50.5
Mean 2.038e-05 ± 1.054e-05
Sigma 0.002457 ± 0.000009
Entries
loc1 resolution [mm]

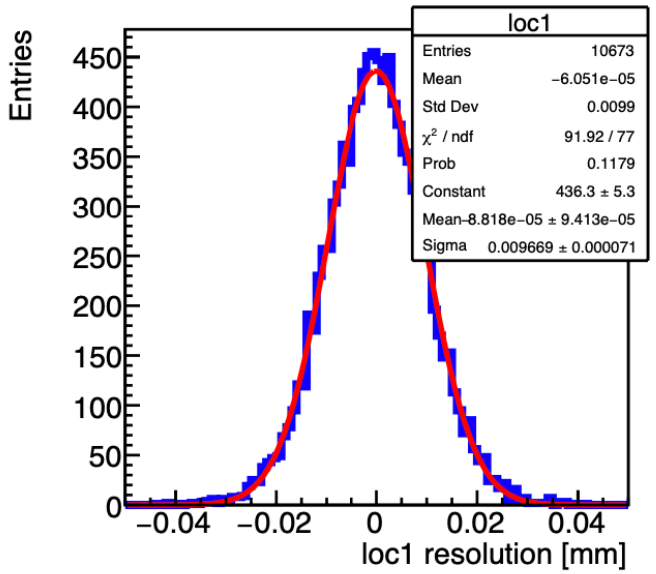

hdphi
Entries 55195
Mean 2.453e-08
Std Dev 1.818e-05
χ² / ndf 121.9 / 73
Prob 0.0002941
Constant 2421 ± 12.7
Mean 2.068e-08 ± 7.735e-08
Sigma 1.814e-05 ± 5.549e-08
Entries
×1
phi resolution [rad]

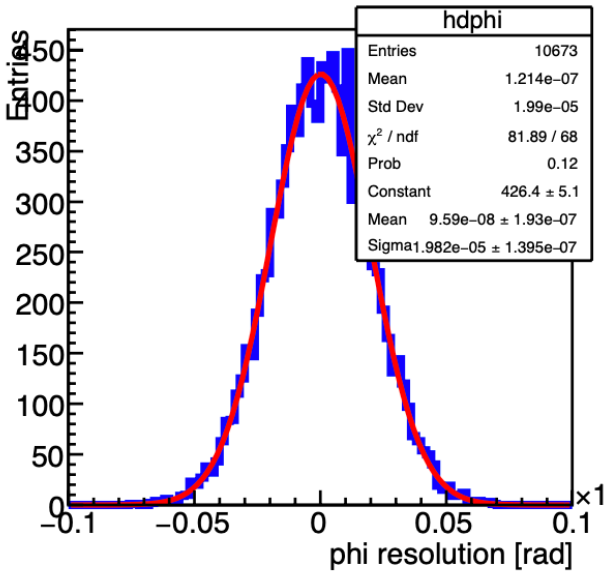

hdtheta
Entries 55195
Mean -8.494e-07
Std Dev 7.584e-05
χ² / ndf 141.9 / 35
Prob 7.958e-15
Constant 5853 ± 31.3
Mean -7.419e-07 ± 3.199e-07
Sigma 7.502e-05 ± 2.422e-07
Entries
theta resolution [rad]

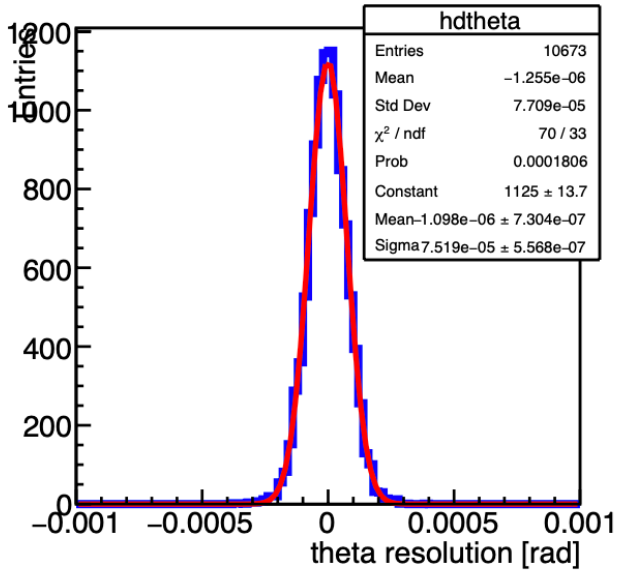

hdqop
Entries 55195
Mean -2.455e-07
Std Dev 2.19e-05
χ² / ndf 146 / 91
Prob 0.0002274
Constant 2016 ± 10.6
Mean -2.779e-07 ± 9.293e-08
Sigma 2.178e-05 ± 6.680e-08
Entries
×1
qop resolution [GeV⁻¹]

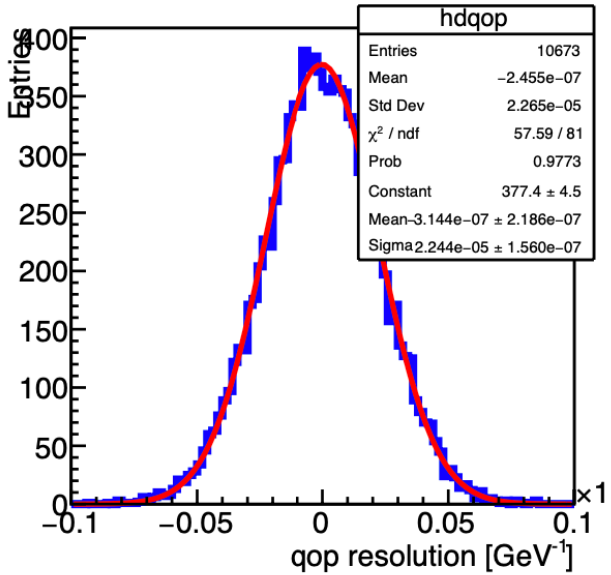
SIT1


loc0
Entries 10673
Mean −1.479e−06
Std Dev 0.003311
χ² / ndf 41.27 / 40
Prob 0.4149
Constant 771.1 ± 9.2
Mean −2.396e−06 ± 3.203e−05
Sigma 0.0033 ± 0.0000
Entries
loc0 resolution [mm]

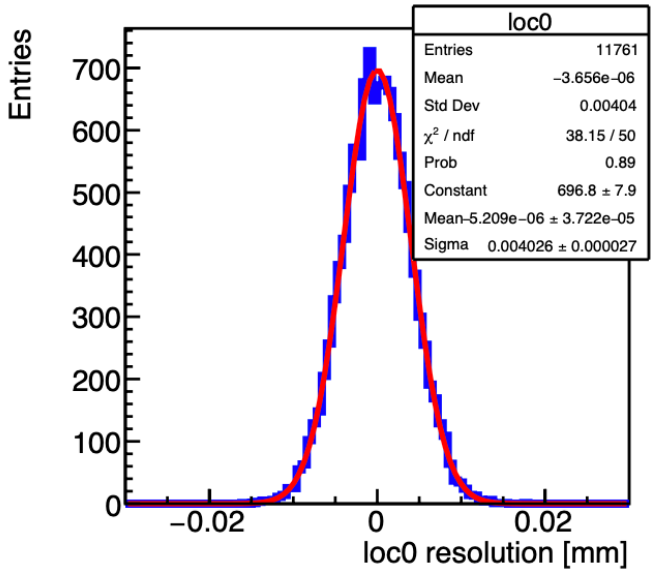

loc1
Entries 10673
Mean −6.051e−05
Std Dev 0.0099
χ² / ndf 91.92 / 77
Prob 0.1179
Constant 436.3 ± 5.3
Mean −8.818e−05 ± 9.413e−05
Sigma 0.009669 ± 0.000071
Entries
loc1 resolution [mm]

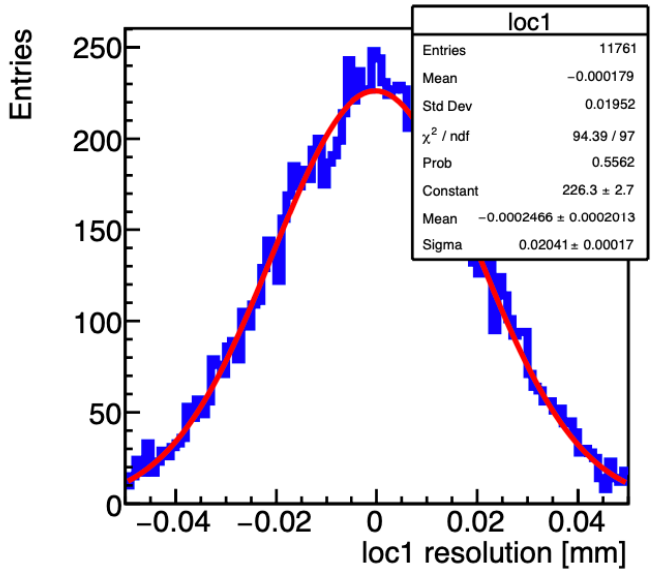

hdphi
Entries 10673
Mean 1.214e−07
Std Dev 1.99e−05
χ² / ndf 81.89 / 68
Prob 0.12
Constant 426.4 ± 5.1
Mean 9.59e−08 ± 1.93e−07
Sigma 1.982e−05 ± 1.395e−07
Entries
phi resolution [rad]

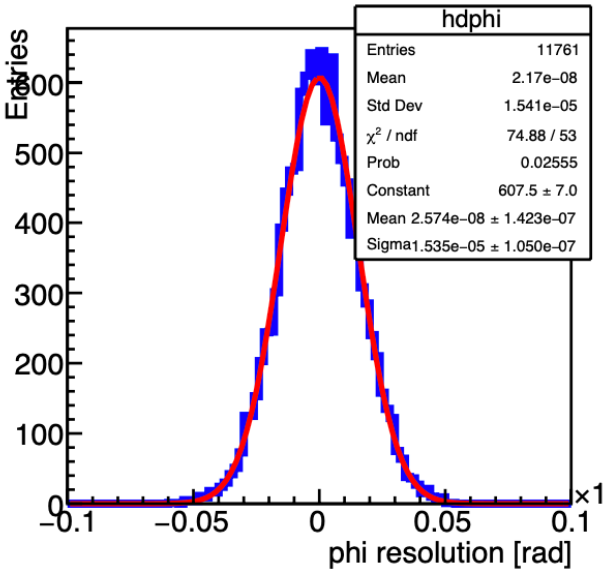

hdtheta
Entries 10673
Mean −1.255e−06
Std Dev 7.709e−05
χ² / ndf 70 / 33
Prob 0.0001806
Constant 1125 ± 13.7
Mean −1.098e−06 ± 7.304e−07
Sigma 7.519e−05 ± 5.568e−07
Entries
theta resolution [rad]

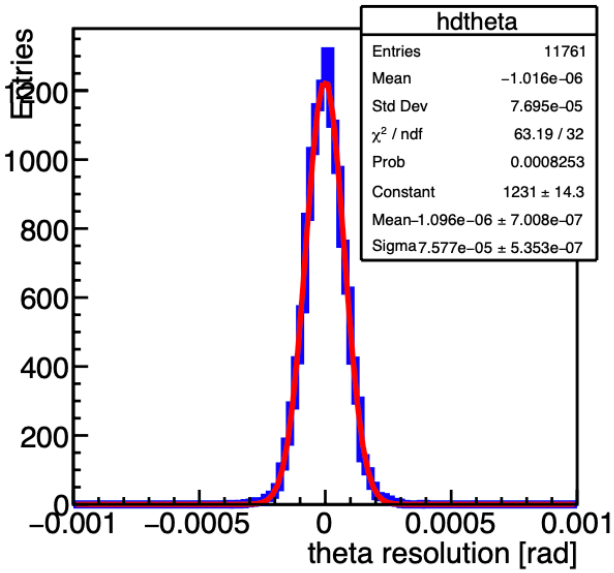

hdqop
Entries 10673
Mean −2.455e−07
Std Dev 2.265e−05
χ² / ndf 57.59 / 81
Prob 0.9773
Constant 377.4 ± 4.5
Mean −3.144e−07 ± 2.186e−07
Sigma 2.244e−05 ± 1.560e−07
Entries
qop resolution [GeV⁻¹]

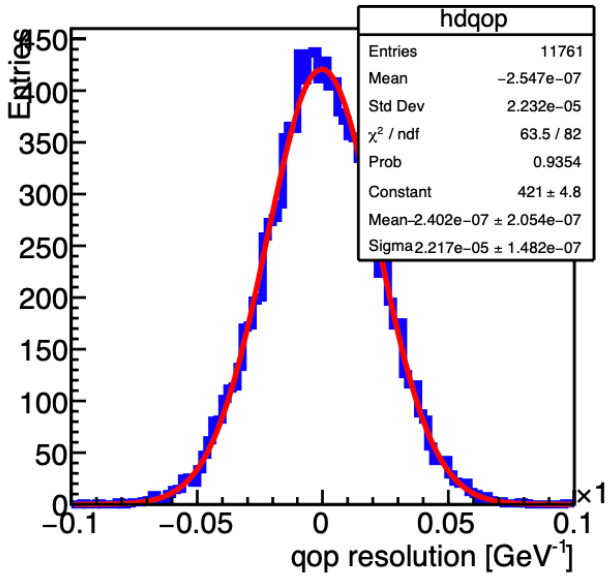
SIT2


loc0
Entries 11761
Mean −3.656e−06
Std Dev 0.00404
χ² / ndf 38.15 / 50
Prob 0.89
Constant 696.8 ± 7.9
Mean −5.209e−06 ± 3.722e−05
Sigma 0.004026 ± 0.000027
Entries
loc0 resolution [mm]

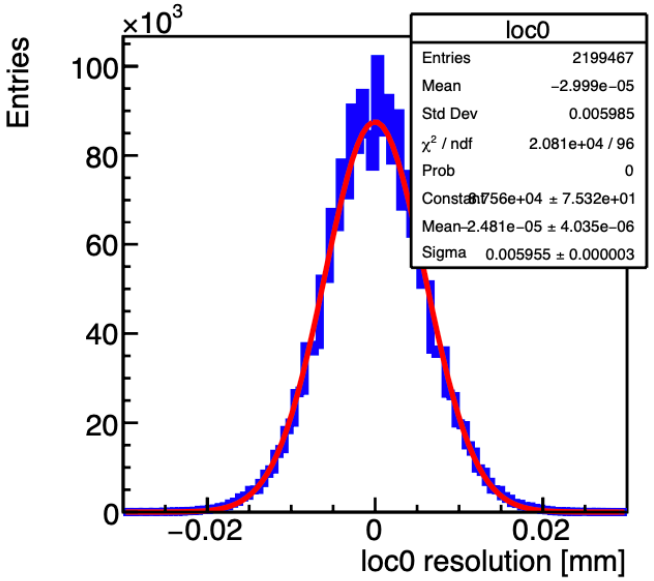

loc1
Entries 11761
Mean −0.000179
Std Dev 0.01952
χ² / ndf 94.39 / 97
Prob 0.5562
Constant 226.3 ± 2.7
Mean −0.0002466 ± 0.0002013
Sigma 0.02041 ± 0.00017
Entries
loc1 resolution [mm]

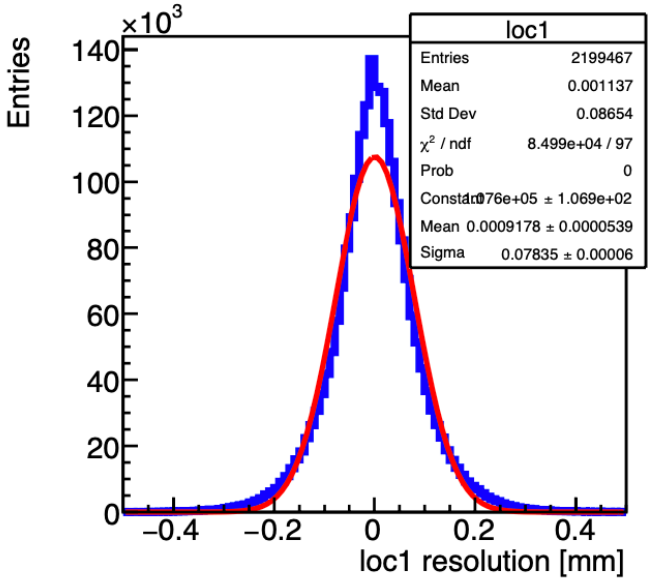

hdphi
Entries 11761
Mean 2.17e−08
Std Dev 1.541e−05
χ² / ndf 74.88 / 53
Prob 0.02555
Constant 607.5 ± 7.0
Mean 2.574e−08 ± 1.423e−07
Sigma 1.535e−05 ± 1.050e−07
Entries
×1
phi resolution [rad]

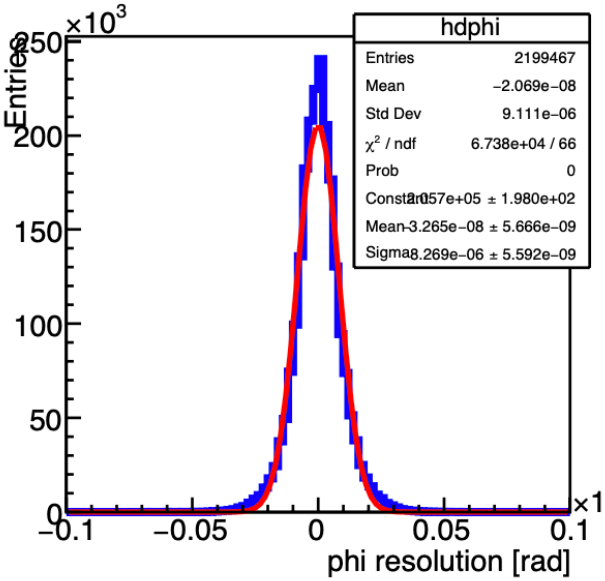

hdtheta
Entries 11761
Mean −1.016e−06
Std Dev 7.695e−05
χ² / ndf 63.19 / 32
Prob 0.0008253
Constant 1231 ± 14.3
Mean −1.096e−06 ± 7.008e−07
Sigma 7.577e−05 ± 5.353e−07
Entries
theta resolution [rad]

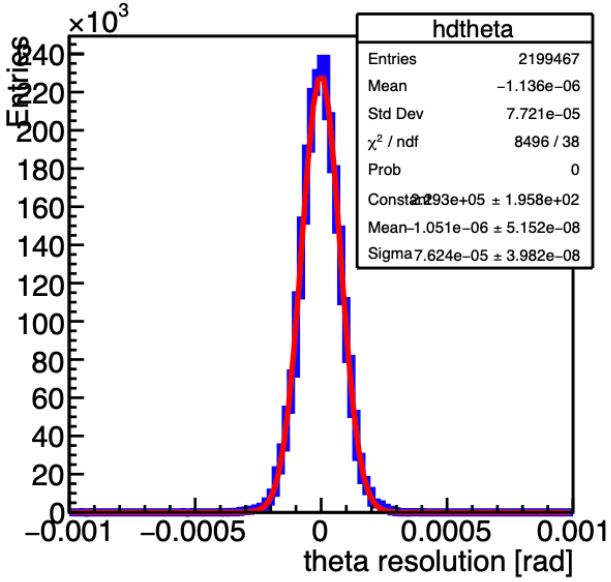

hdqop
Entries 11761
Mean −2.547e−07
Std Dev 2.232e−05
χ² / ndf 63.5 / 82
Prob 0.9354
Constant 421 ± 4.8
Mean −2.402e−07 ± 2.054e−07
Sigma 2.217e−05 ± 1.482e−07
Entries
×1
qop resolution [GeV⁻¹]

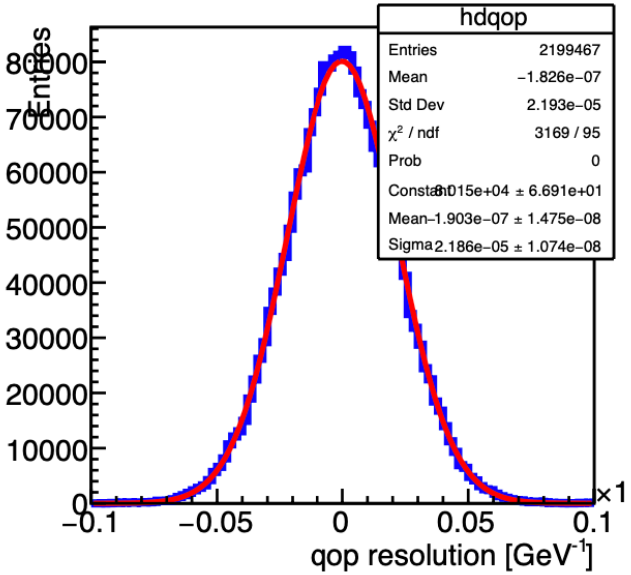
TPC


loc0
Entries 2199467
Mean −2.999e−05
Std Dev 0.005985
χ² / ndf 2.081e+04 / 96
Prob 0
Constant 8.756e+04 ± 7.532e+01
Mean −2.481e−05 ± 4.035e−06
Sigma 0.005955 ± 0.000003
×10³
Entries
loc0 resolution [mm]

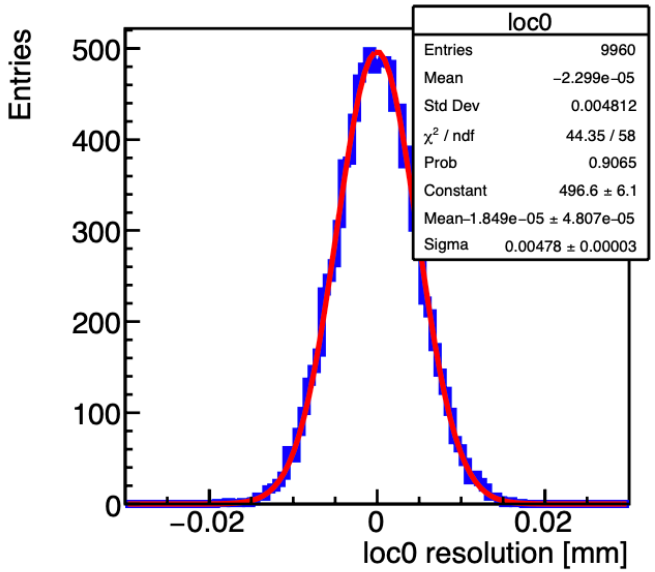

loc1
Entries 2199467
Mean 0.001137
Std Dev 0.08654
χ² / ndf 8.499e+04 / 97
Prob 0
Constant 1.076e+05 ± 1.069e+02
Mean 0.0009178 ± 0.0000539
Sigma 0.07835 ± 0.00006
×10³
Entries
loc1 resolution [mm]

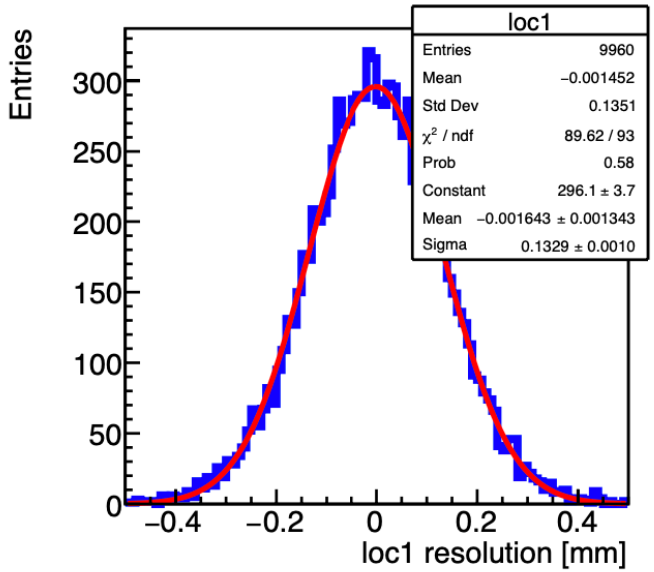

hdphi
Entries 2199467
Mean −2.069e−08
Std Dev 9.111e−06
χ² / ndf 6.738e+04 / 66
Prob 0
Constant 2.057e+05 ± 1.980e+02
Mean −3.265e−08 ± 5.666e−09
Sigma 8.269e−06 ± 5.592e−09
×10³
Entries
phi resolution [rad]
×1

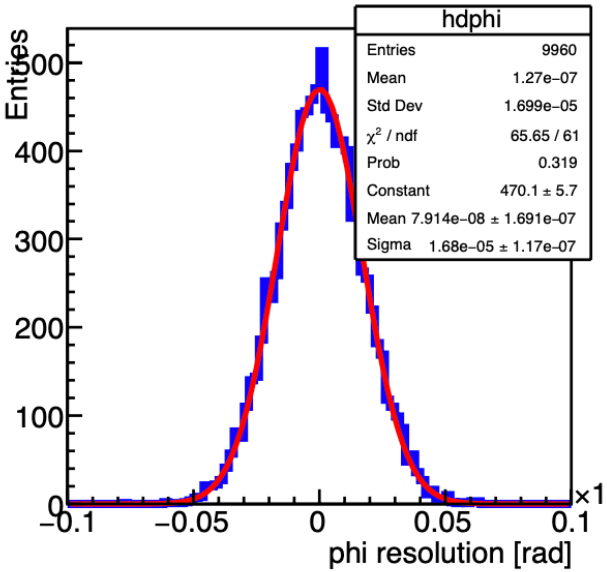

hdtheta
Entries 2199467
Mean −1.136e−06
Std Dev 7.721e−05
χ² / ndf 8496 / 38
Prob 0
Constant 2.293e+05 ± 1.958e+02
Mean −1.051e−06 ± 5.152e−08
Sigma 7.624e−05 ± 3.982e−08
×10³
Entries
theta resolution [rad]

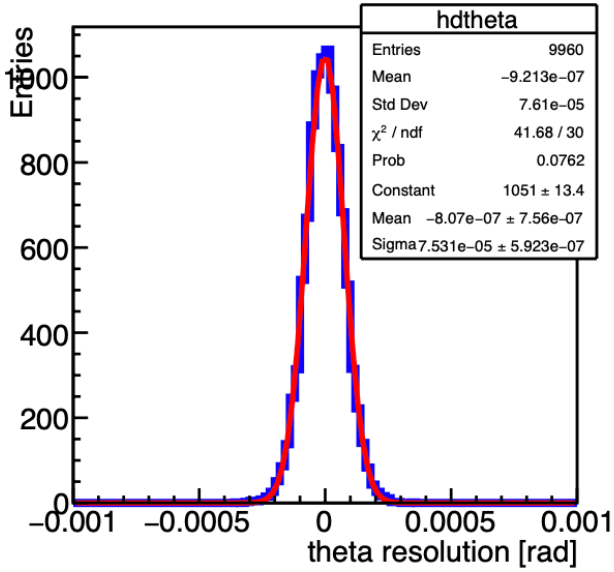

hdqop
Entries 2199467
Mean −1.826e−07
Std Dev 2.193e−05
χ² / ndf 3169 / 95
Prob 0
Constant 8.015e+04 ± 6.691e+01
Mean −1.903e−07 ± 1.475e−08
Sigma 2.186e−05 ± 1.074e−08
Entries
qop resolution [GeV⁻¹]
×1

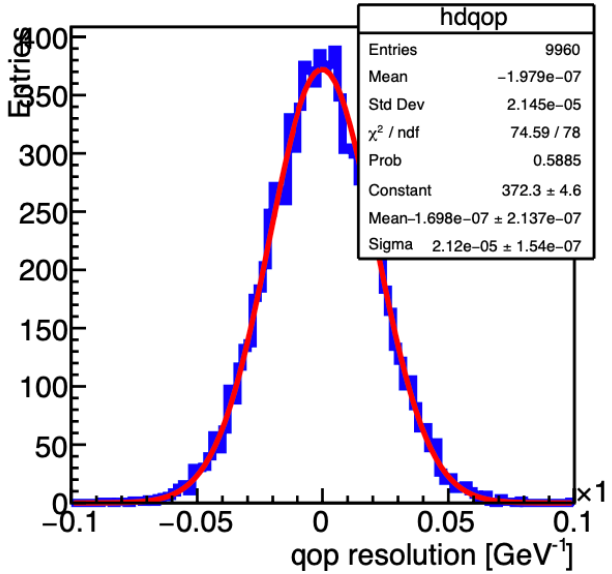
SET


loc0
Entries 9960
Mean −2.299e−05
Std Dev 0.004812
χ² / ndf 44.35 / 58
Prob 0.9065
Constant 496.6 ± 6.1
Mean −1.849e−05 ± 4.807e−05
Sigma 0.00478 ± 0.00003
Entries
loc0 resolution [mm]


loc1
Entries 9960
Mean −0.001452
Std Dev 0.1351
χ² / ndf 89.62 / 93
Prob 0.58
Constant 296.1 ± 3.7
Mean −0.001643 ± 0.001343
Sigma 0.1329 ± 0.0010
Entries
loc1 resolution [mm]

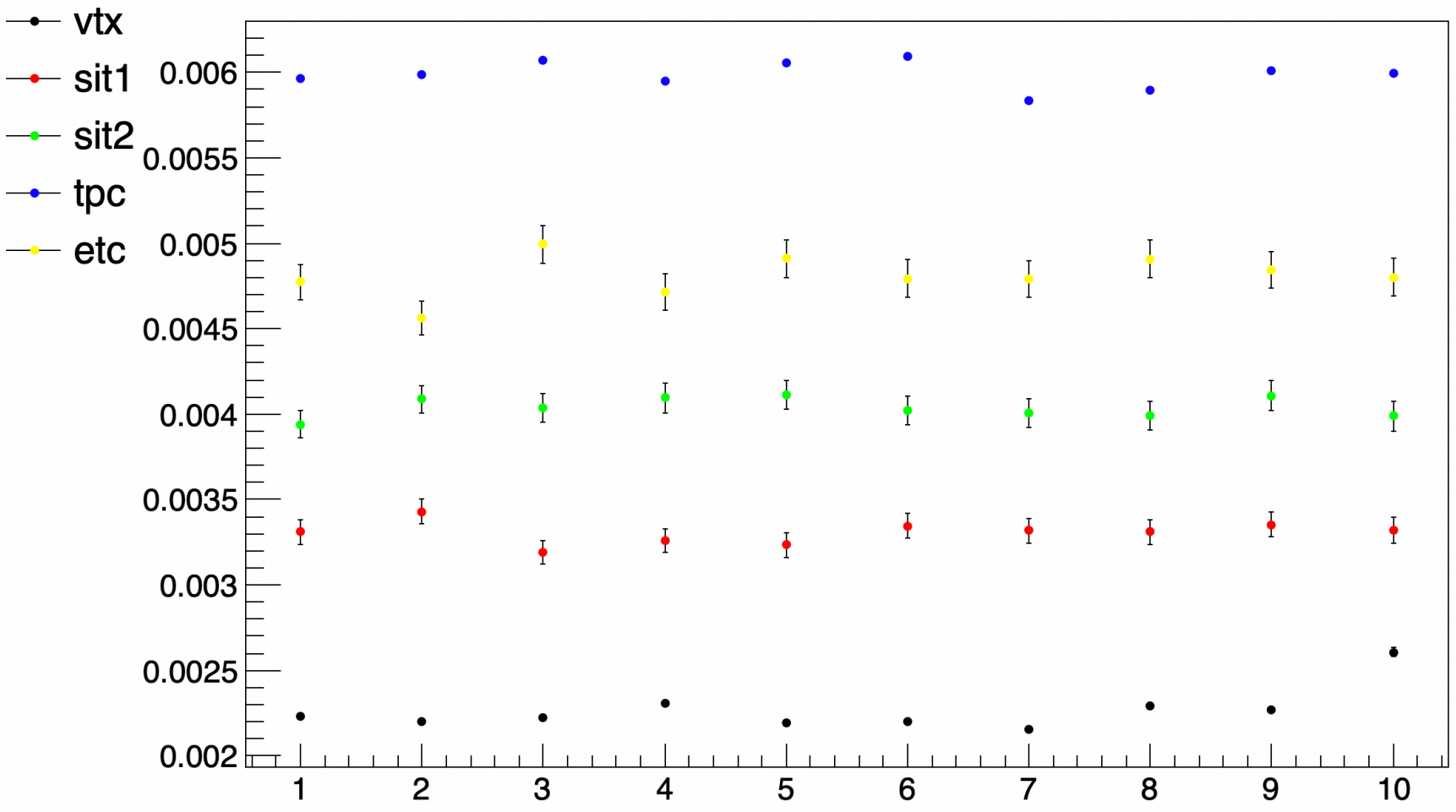

hdphi
Entries 9960
Mean 1.27e−07
Std Dev 1.699e−05
χ² / ndf 65.65 / 61
Prob 0.319
Constant 470.1 ± 5.7
Mean 7.914e−08 ± 1.691e−07
Sigma 1.68e−05 ± 1.17e−07
Entries
×1
phi resolution [rad]


hdtheta
Entries 9960
Mean −9.213e−07
Std Dev 7.61e−05
χ² / ndf 41.68 / 30
Prob 0.0762
Constant 1051 ± 13.4
Mean −8.07e−07 ± 7.56e−07
Sigma 7.531e−05 ± 5.923e−07
Entries
theta resolution [rad]


hdqop
Entries 9960
Mean −1.979e−07
Std Dev 2.145e−05
χ² / ndf 74.59 / 78
Prob 0.5885
Constant 372.3 ± 4.6
Mean −1.698e−07 ± 2.137e−07
Sigma 2.12e−05 ± 1.54e−07
Entries
×1
qop resolution [GeV⁻¹]

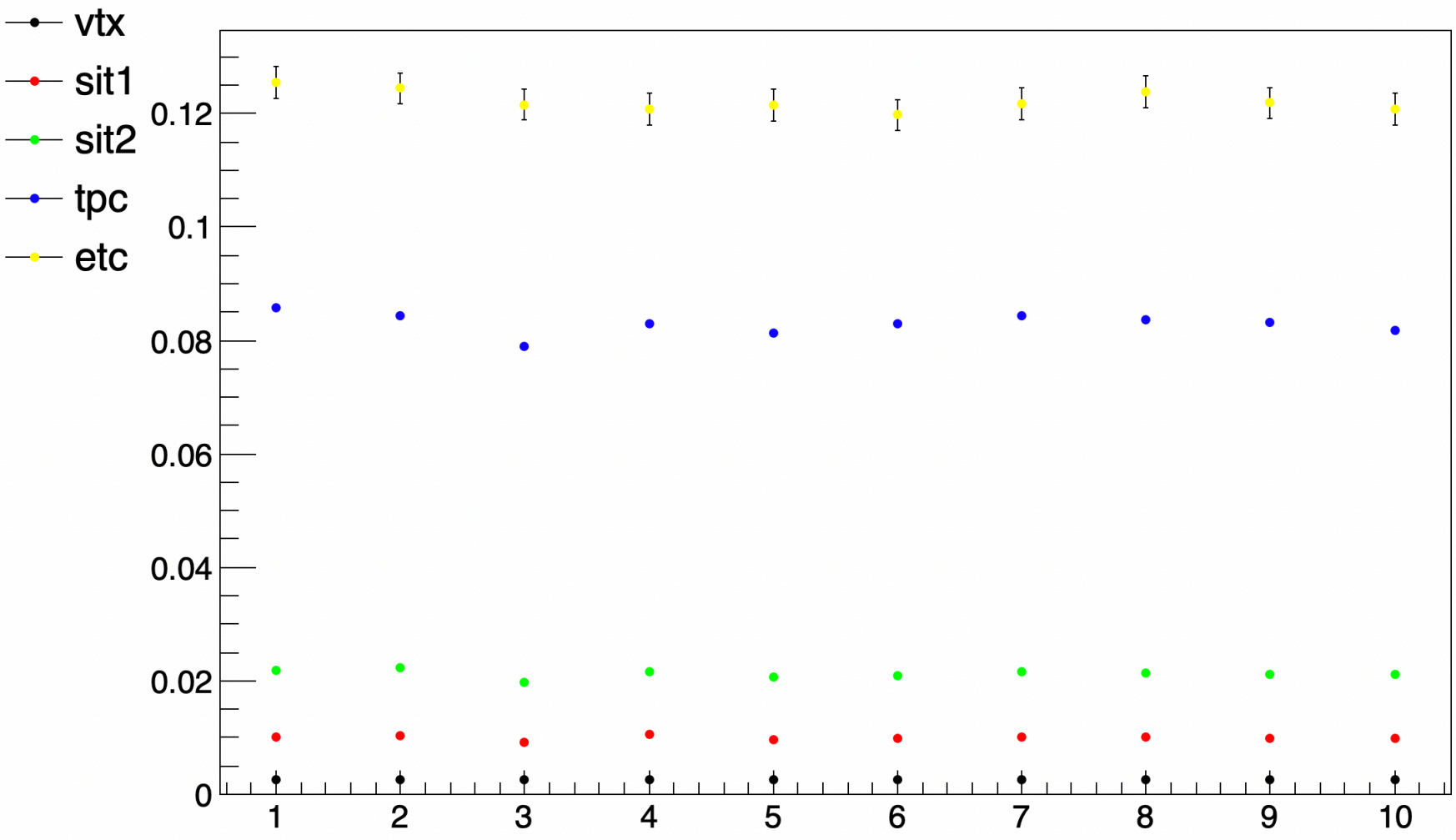
Phibins - Loc0

From -pi to pi , 10 bins



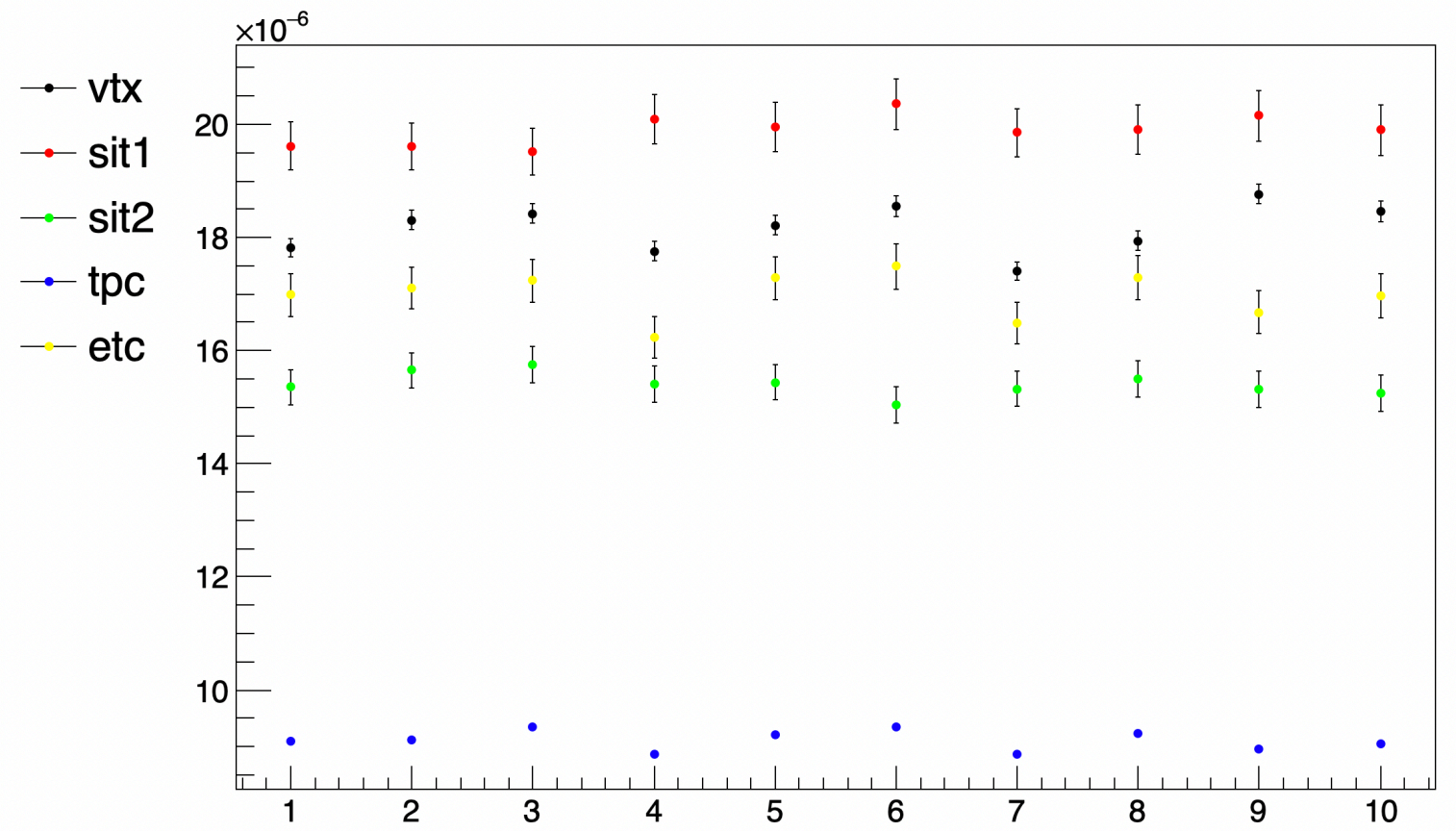
Phibins - Loc1

From -pi to pi , 10 bins



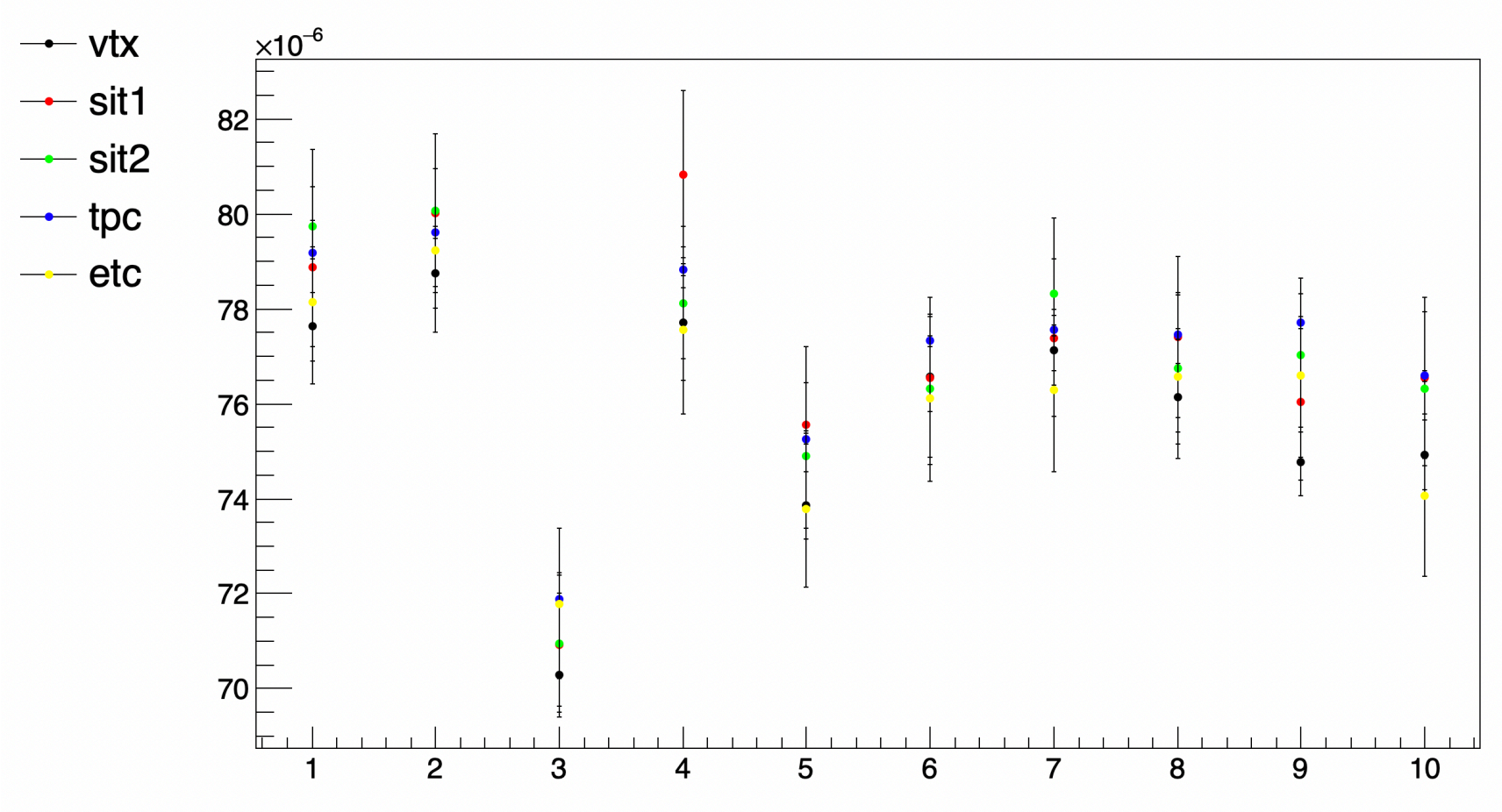
Phibins - ePHI

From -pi to pi , 10 bins



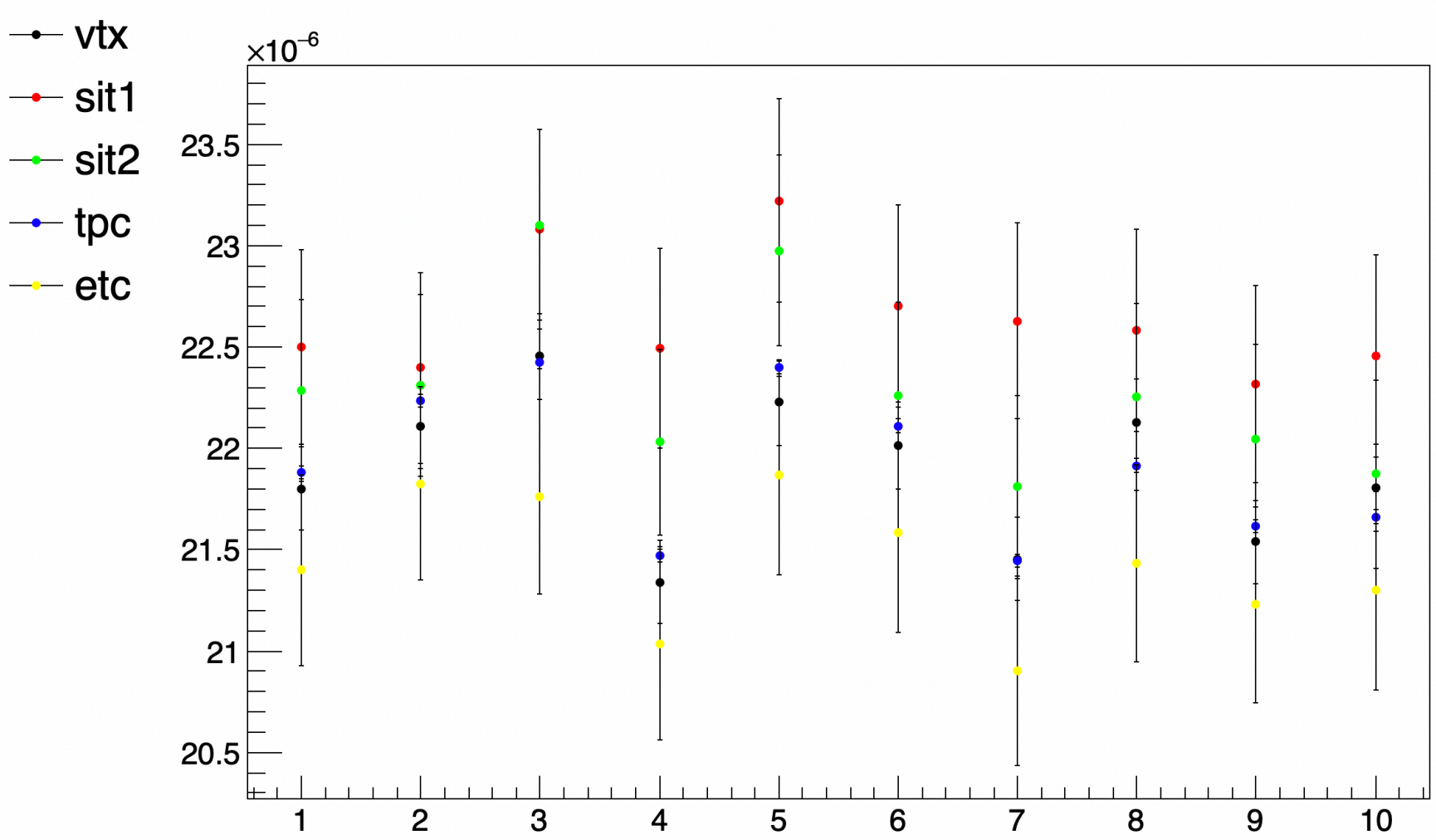
Phibins - eTHETA

From -pi to pi , 10 bins



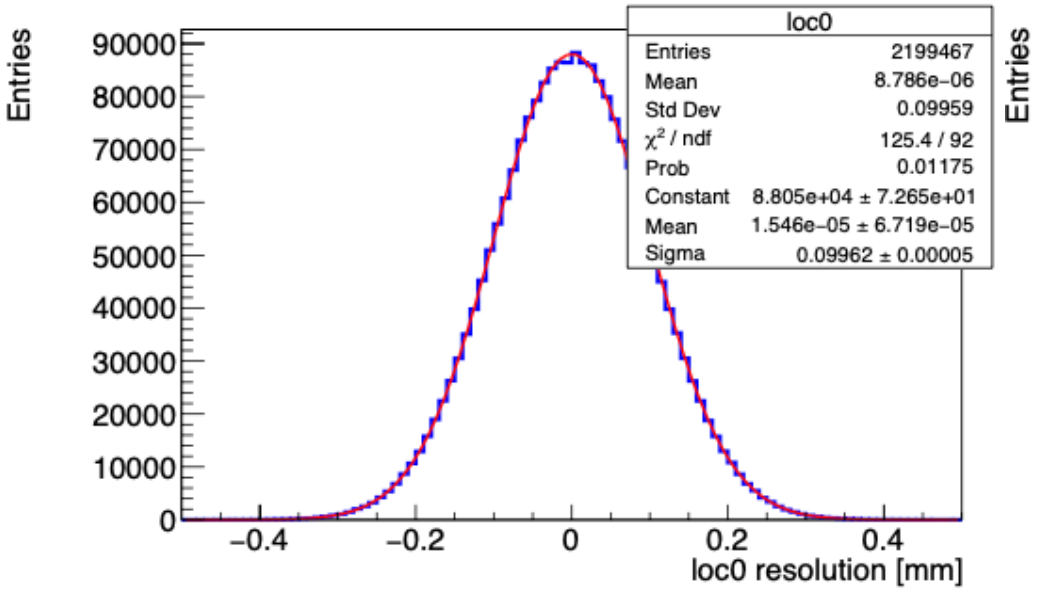
Phibins - eQOP

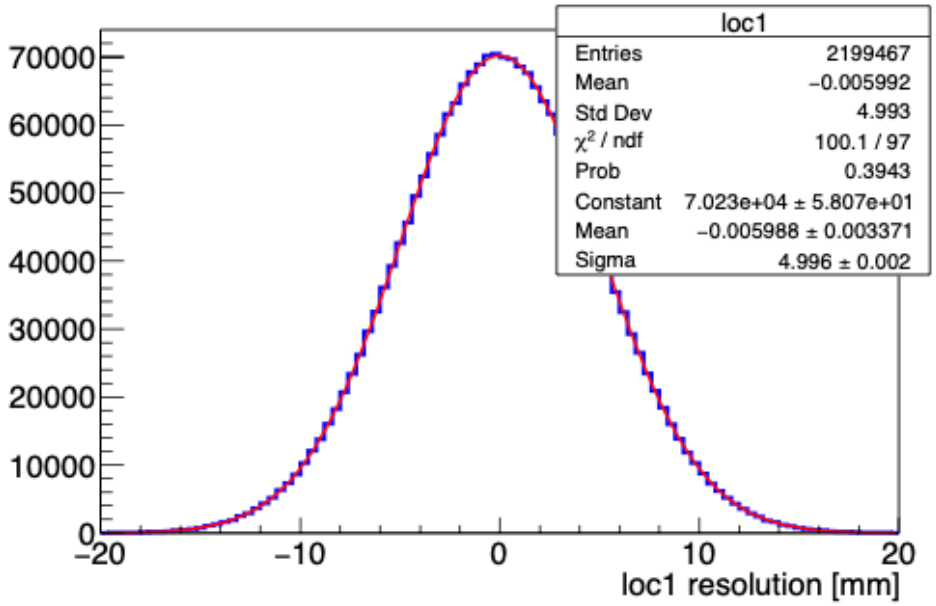
From -pi to pi , 10 bins



- Measurement resolution
- Smooth state - measurement

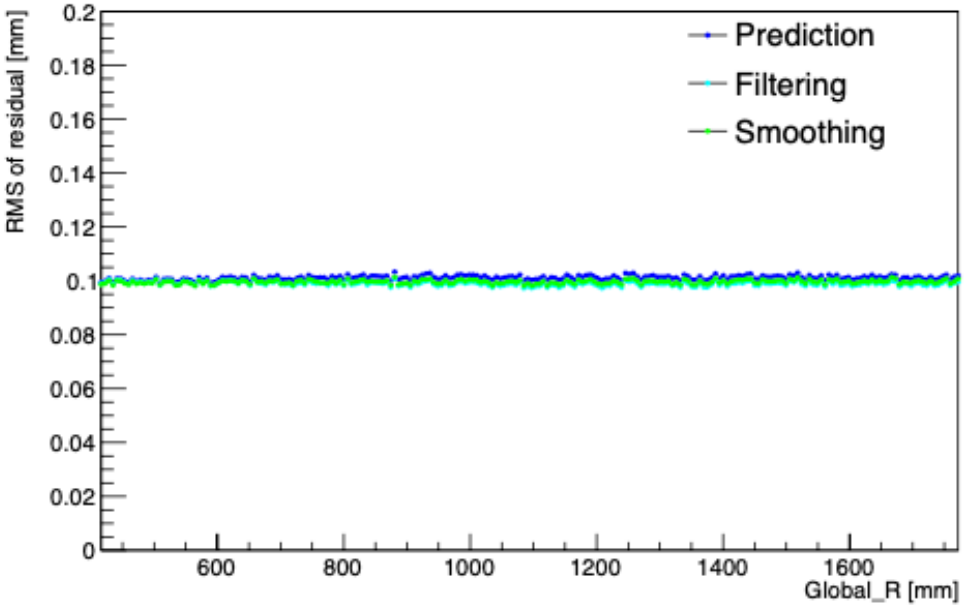
TPC

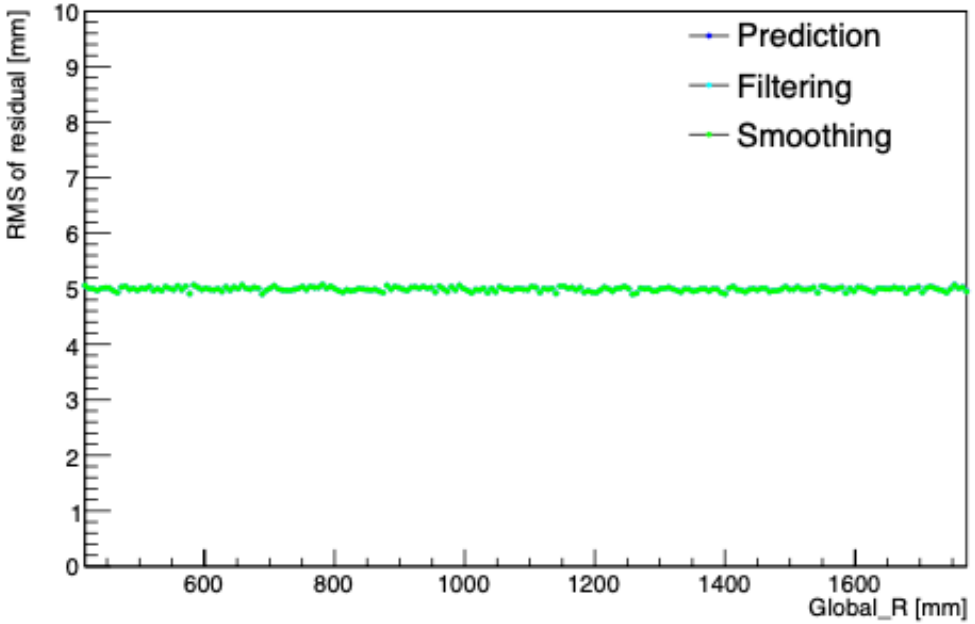

loc0
Entries 2199467
Mean 8.786e−06
Std Dev 0.09959
χ² / ndf 125.4 / 92
Prob 0.01175
Constant 8.805e+04 ± 7.265e+01
Mean 1.546e−05 ± 6.719e−05
Sigma 0.09962 ± 0.00005
Entries
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
−0.4
−0.2
0
0.2
0.4
loc0 resolution [mm]


loc1
Entries 2199467
Mean −0.005992
Std Dev 4.993
χ² / ndf 100.1 / 97
Prob 0.3943
Constant 7.023e+04 ± 5.807e+01
Mean −0.005988 ± 0.003371
Sigma 4.996 ± 0.002
Entries
70000
60000
50000
40000
30000
20000
10000
0
−20
−10
0
10
20
loc1 resolution [mm]

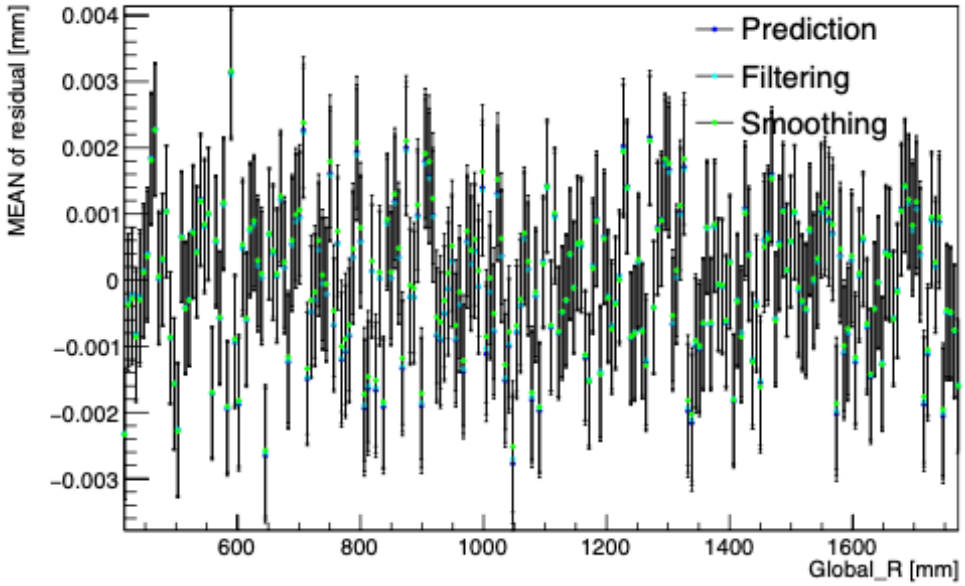
TPC

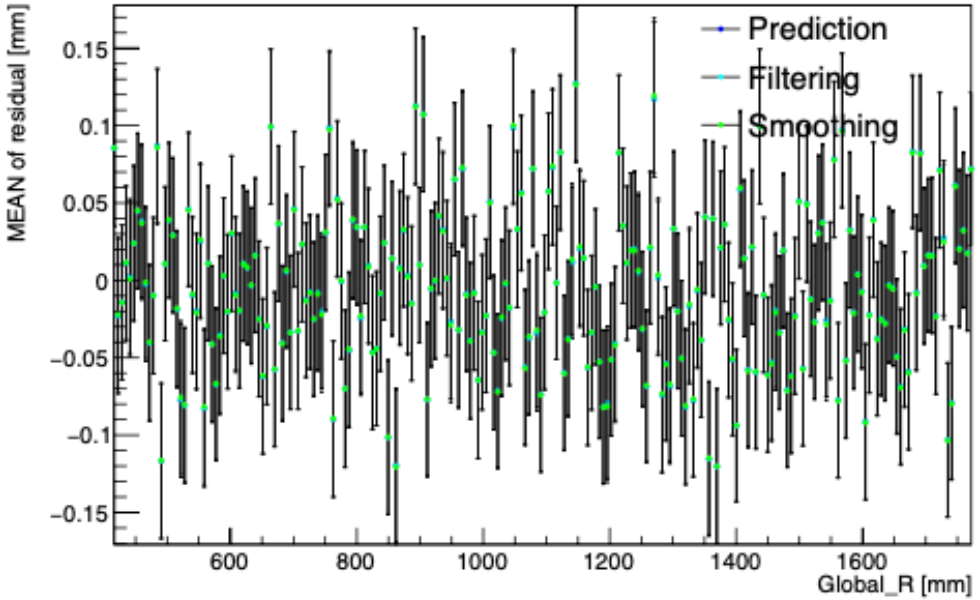
Resolution VS R

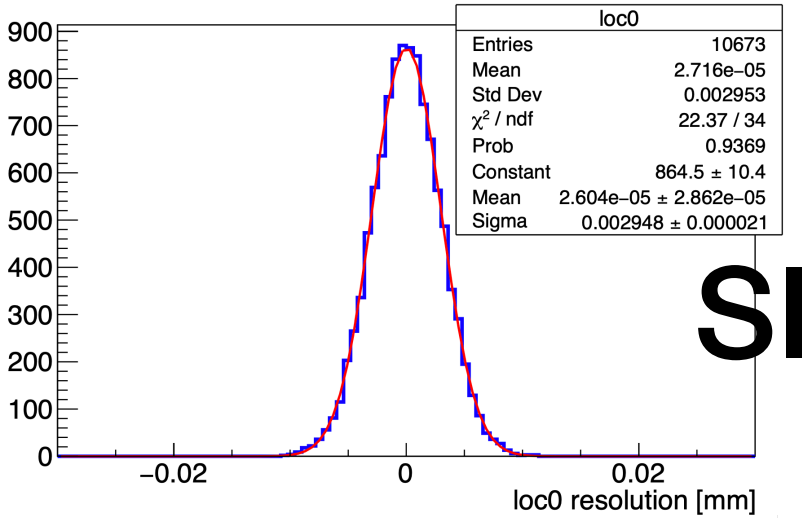




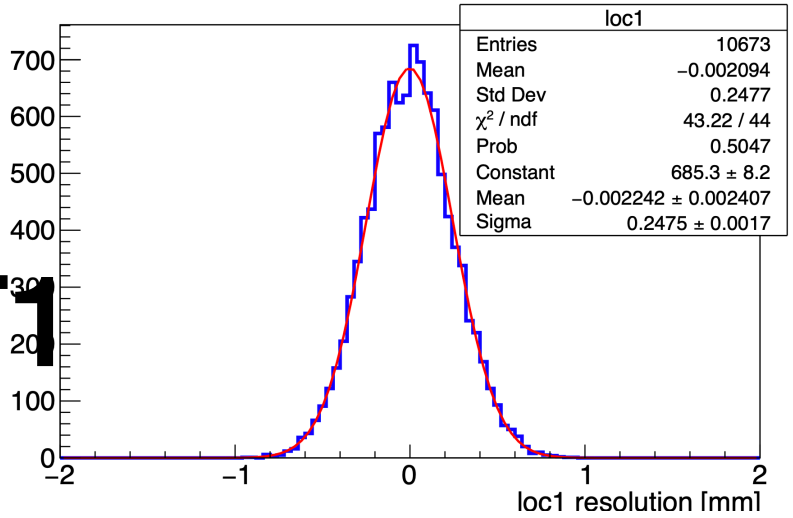
MEAN VS R

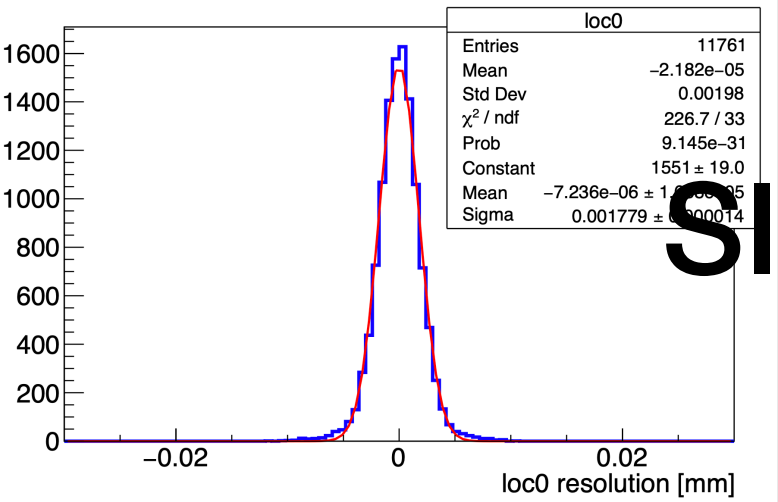




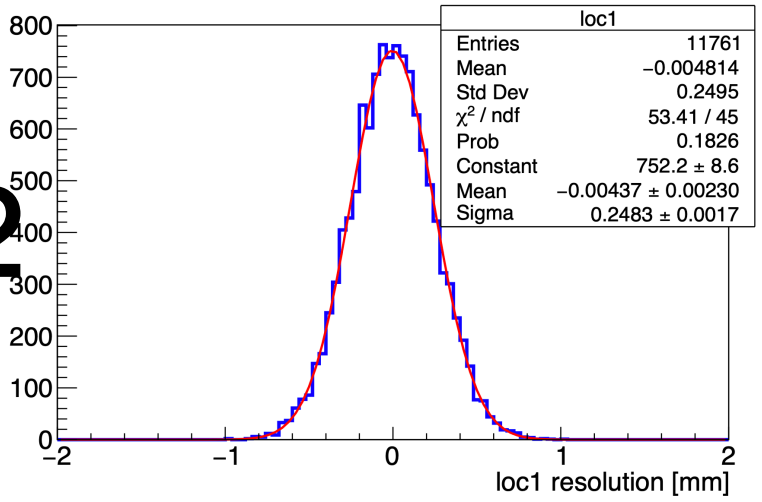


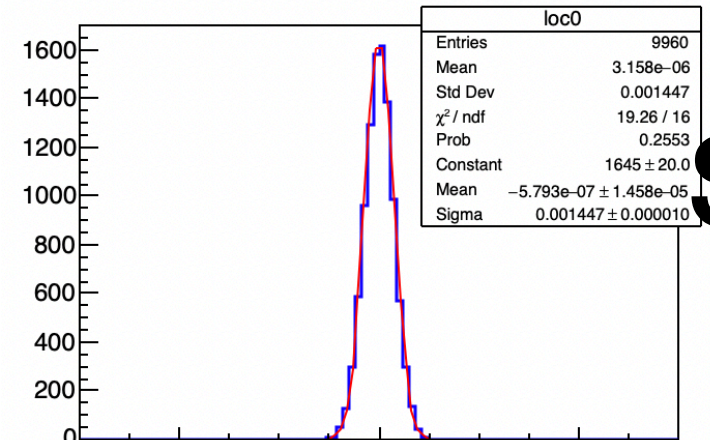
SIT1



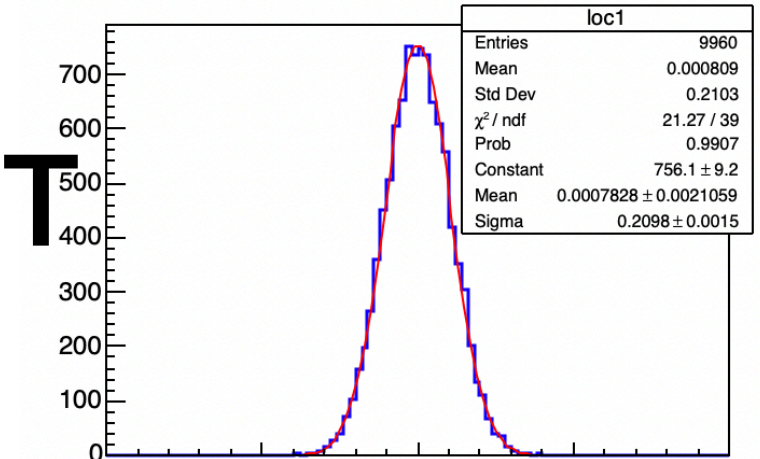


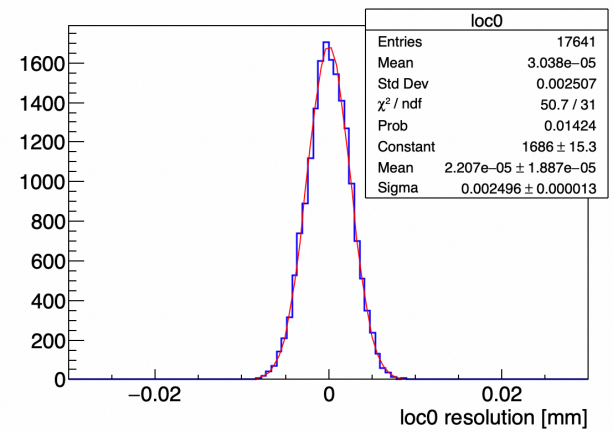
SIT2



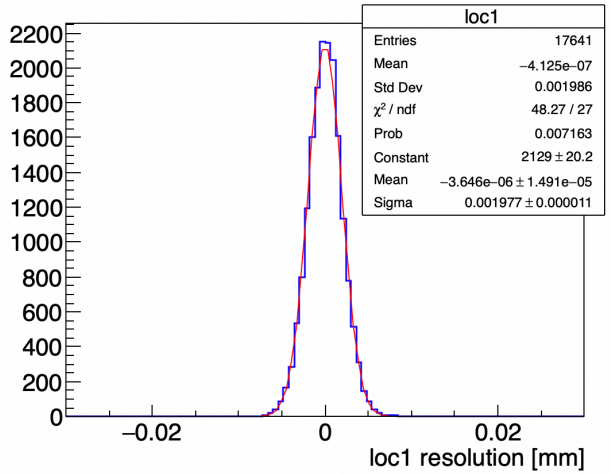


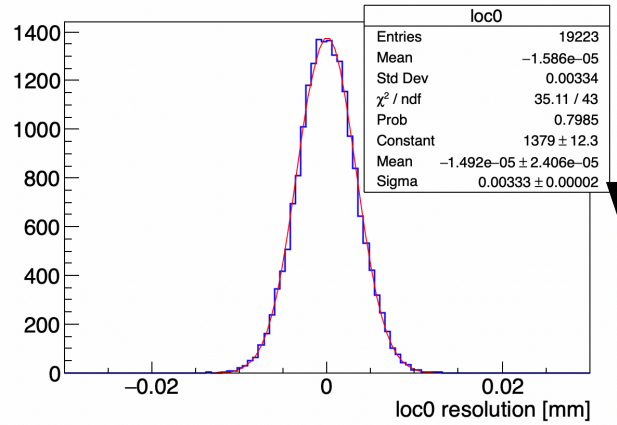
SET



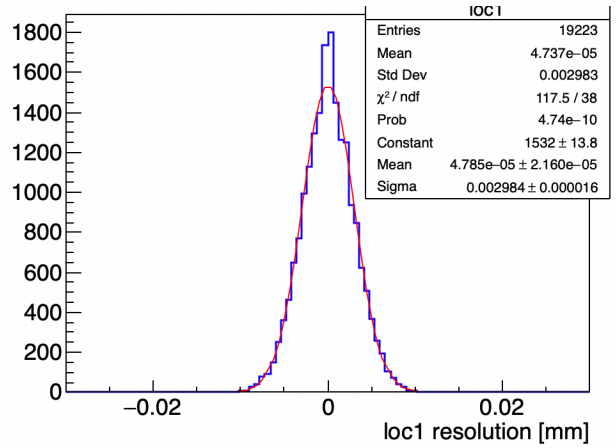


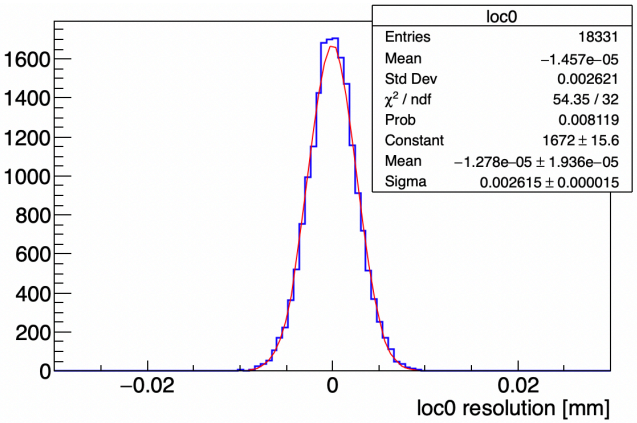
VTX1



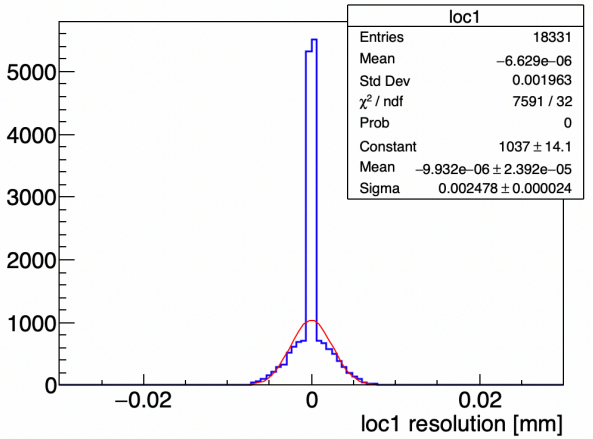


VTX2

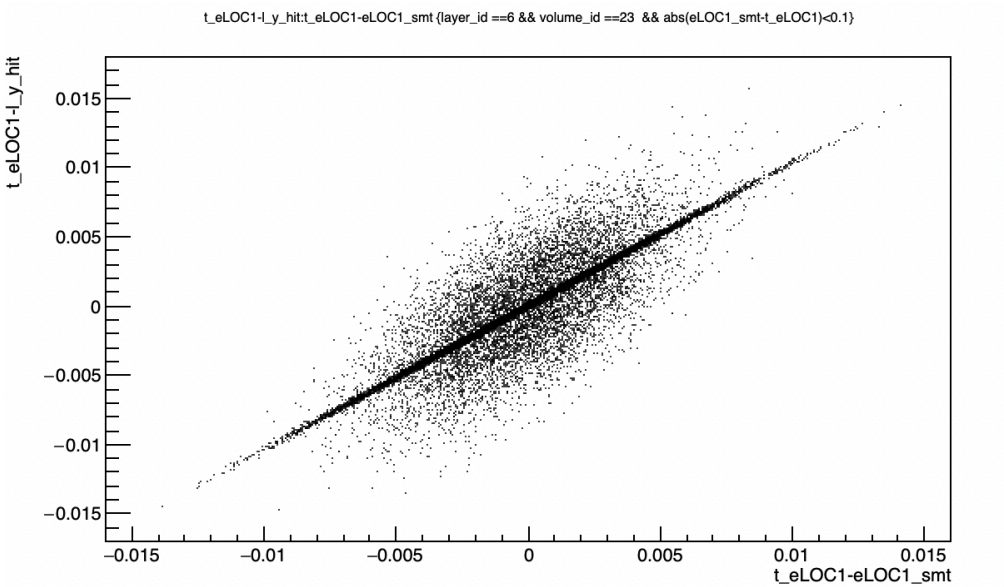


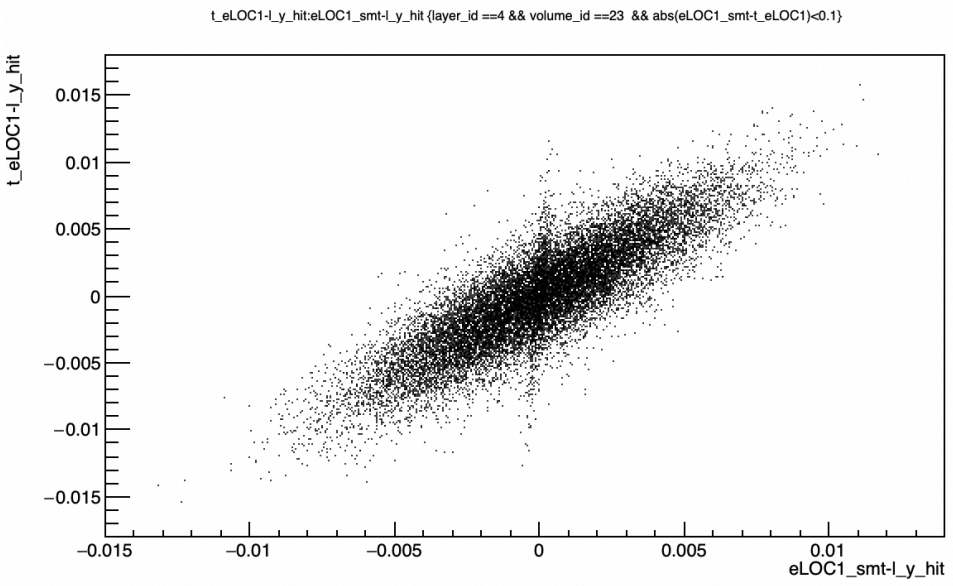


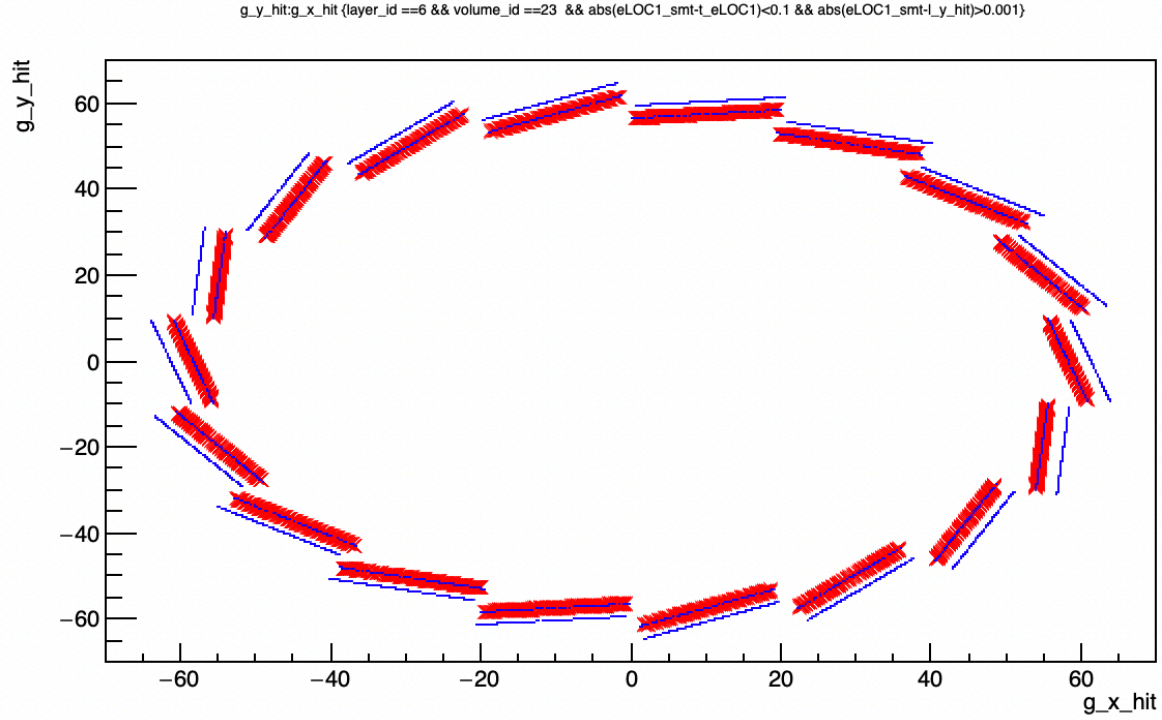
VTX3



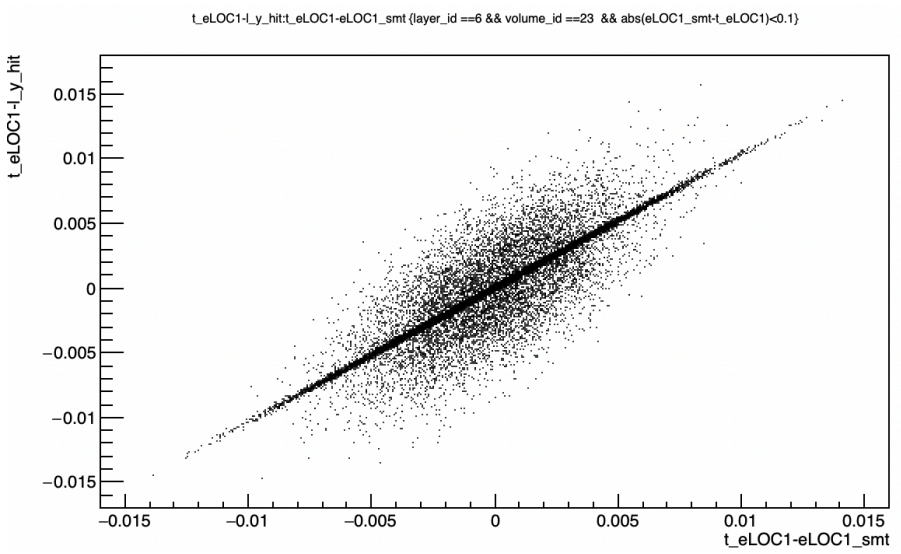
BACKUP

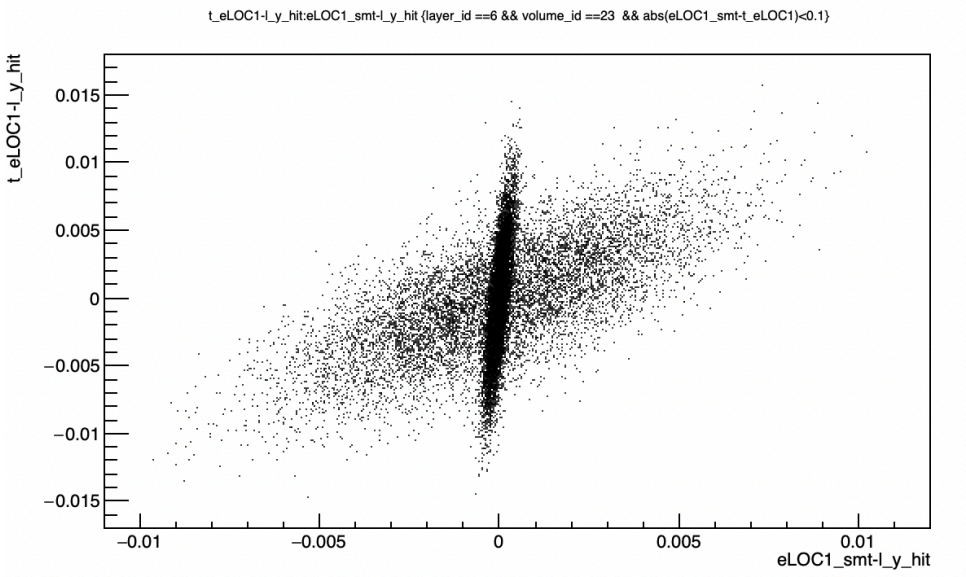

t_eLOC1-l_y_hit:t_eLOC1-eLOC1_smt {layer_id ==6 && volume_id ==23 && abs(eLOC1_smt-t_eLOC1)<0.1}
t_eLOC1-l_y_hit
t_eLOC1-eLOC1_smt

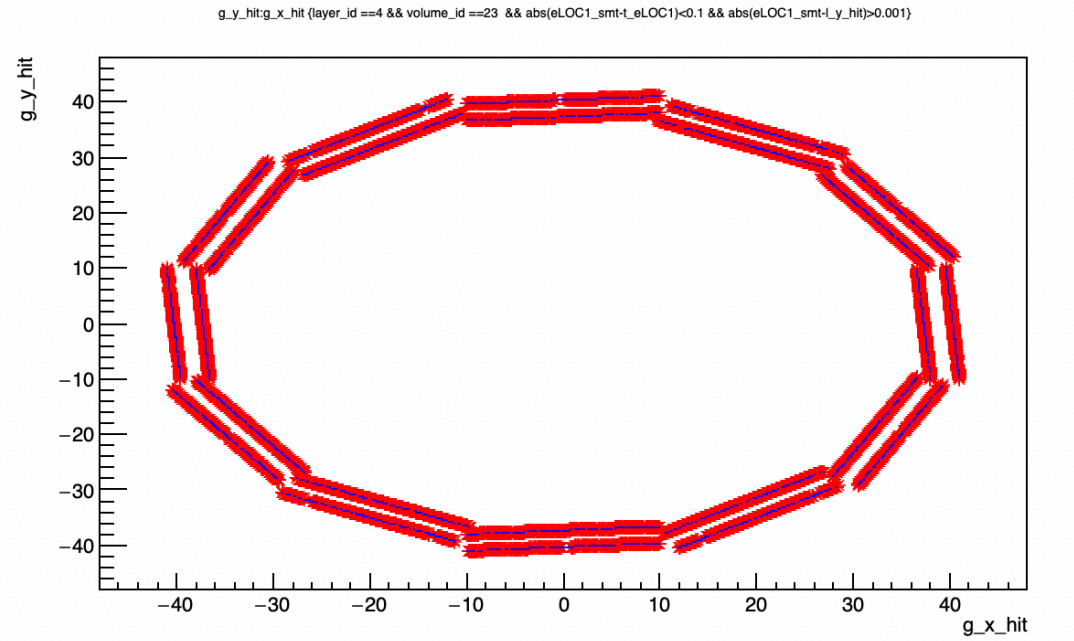

t_eLOC1-l_y_hit:eLOC1_smt-l_y_hit {layer_id ==4 && volume_id ==23 && abs(eLOC1_smt-t_eLOC1)<0.1}
t_eLOC1-l_y_hit
eLOC1_smt-l_y_hit

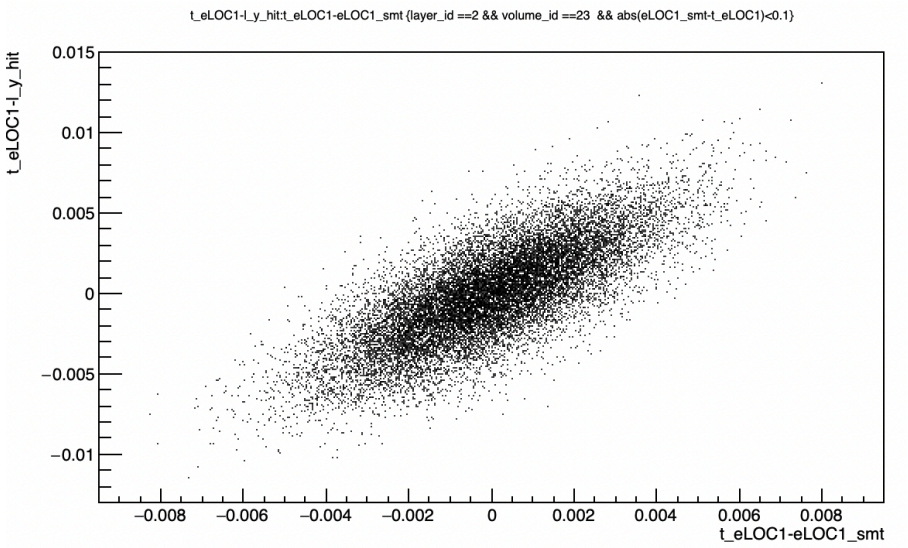

g_y_hit:g_x_hit {layer_id ==6 && volume_id ==23 && abs(eLOC1_smt-t_eLOC1)<0.1 && abs(eLOC1_smt-l_y_hit)>0.001}
g_y_hit
g_x_hit

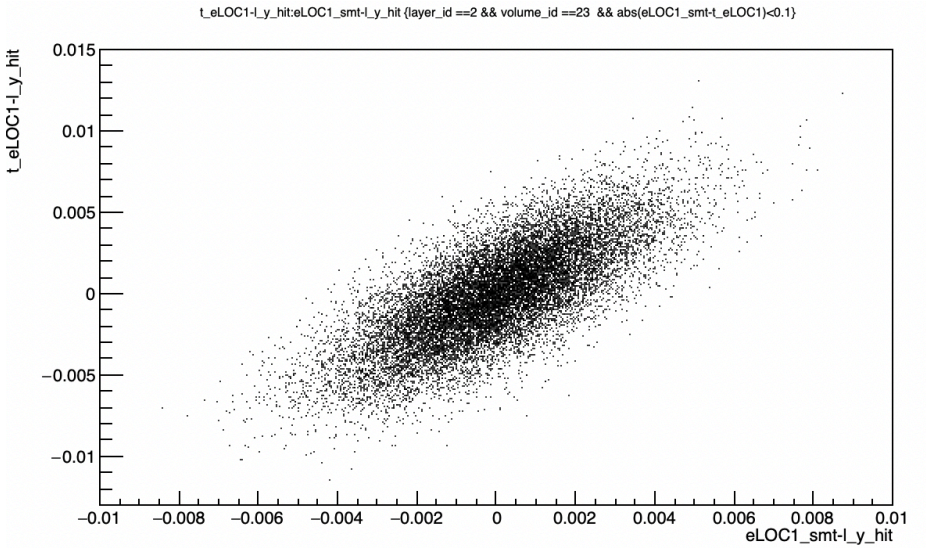
>0.001 都在内层


t_eLOC1-l_y_hit:t_eLOC1-eLOC1_smt {layer_id ==6 && volume_id ==23 && abs(eLOC1_smt-t_eLOC1)<0.1}
t_eLOC1-l_y_hit
t_eLOC1-eLOC1_smt


t_eLOC1-l_y_hit:eLOC1_smt-l_y_hit {layer_id ==6 && volume_id ==23 && abs(eLOC1_smt-t_eLOC1)<0.1}
t_eLOC1-l_y_hit
eLOC1_smt-l_y_hit

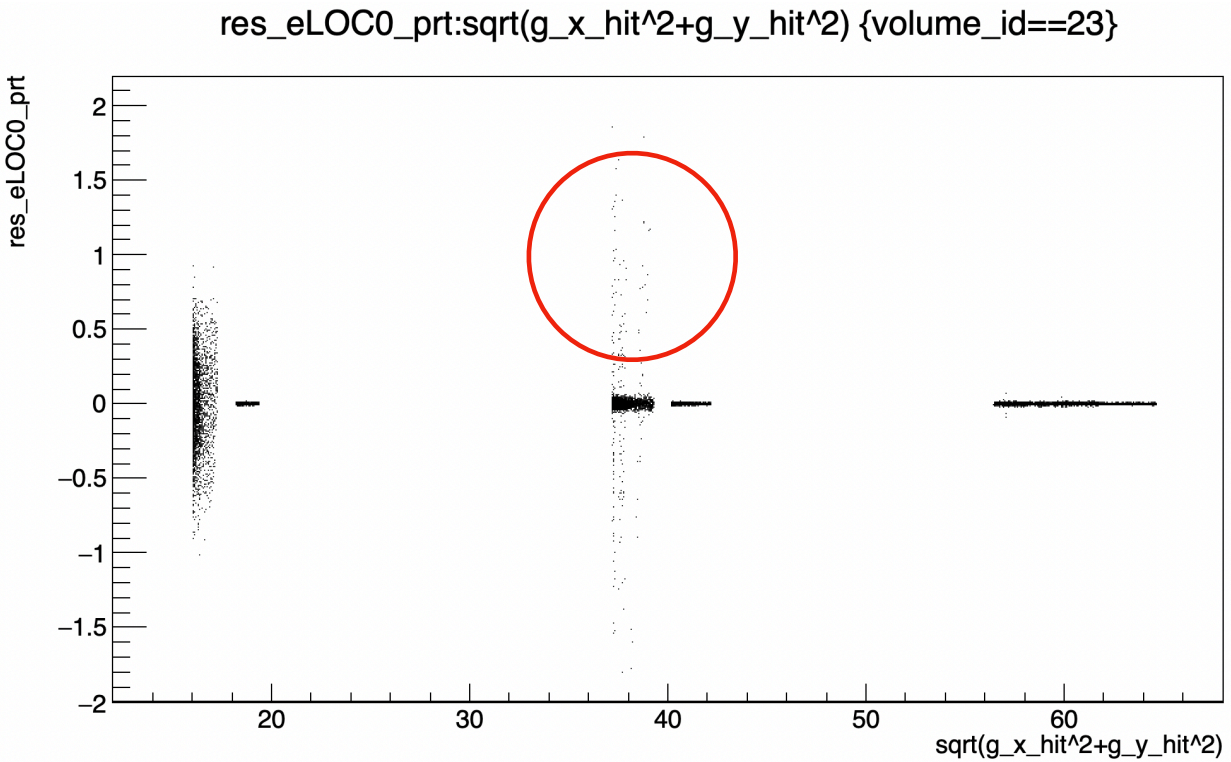

g_y_hit:g_x_hit {layer_id ==4 && volume_id ==23 && abs(eLOC1_smt-t_eLOC1)<0.1 && abs(eLOC1_smt-l_y_hit)>0.001}
g_y_hit
g_x_hit


t_eLOC1-l_y_hit:t_eLOC1-eLOC1_smt {layer_id ==2 && volume_id ==23 && abs(eLOC1_smt-t_eLOC1)<0.1}
t_eLOC1-l_y_hit
0.015
0.01
0.005
0
−0.005
−0.01
−0.008
−0.006
−0.004
−0.002
0
0.002
0.004
0.006
0.008
t_eLOC1-eLOC1_smt

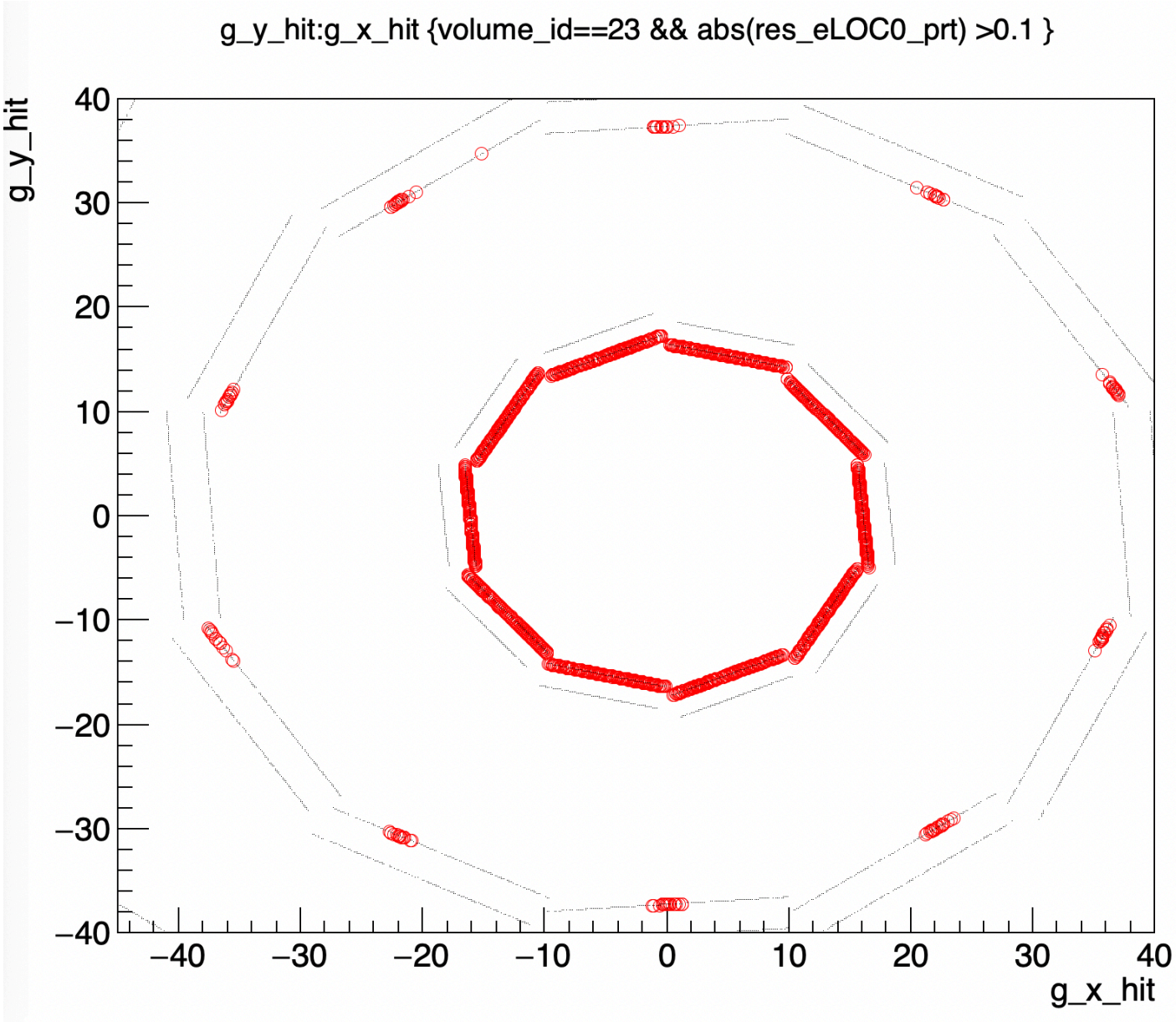

t_eLOC1-l_y_hit:eLOC1_smt-l_y_hit {layer_id ==2 && volume_id ==23 && abs(eLOC1_smt-t_eLOC1)<0.1}
t_eLOC1-l_y_hit
0.015
0.01
0.005
0
−0.005
−0.01
−0.01
−0.008
−0.006
−0.004
−0.002
0
0.002
0.004
0.006
0.008
0.01
eLOC1_smt-l_y_hit

Issue 1

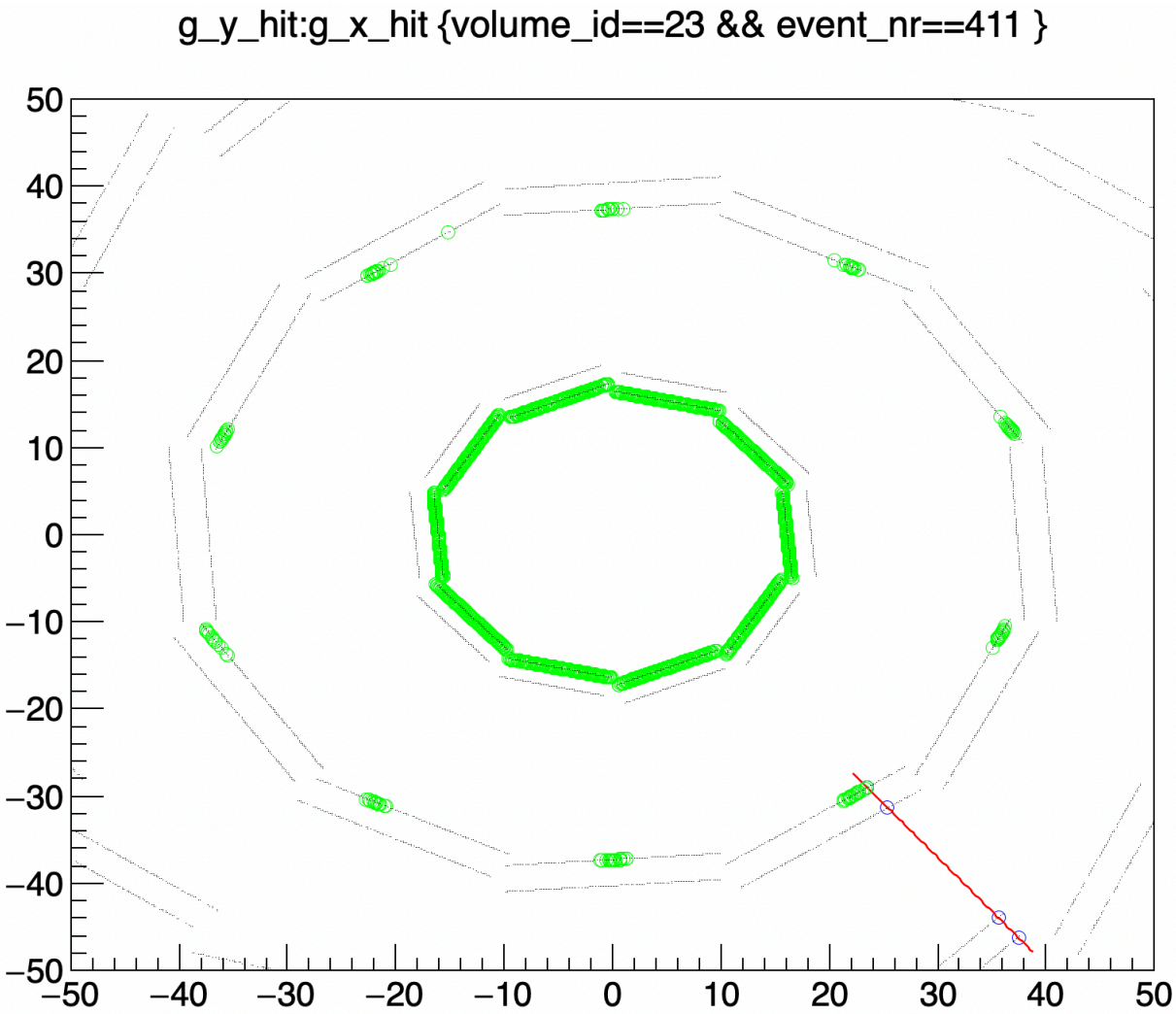
- Some bad resolution points

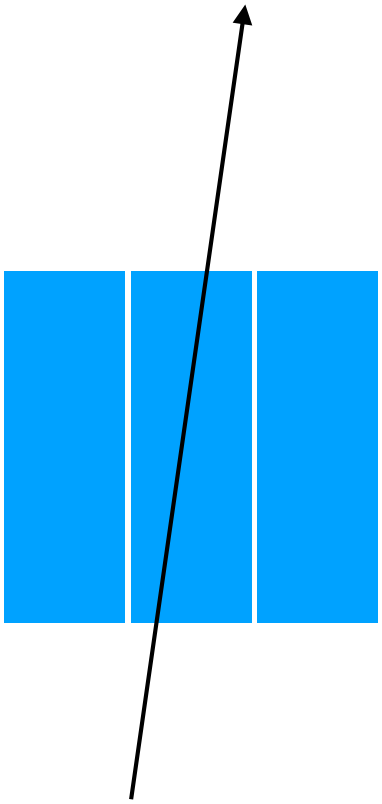


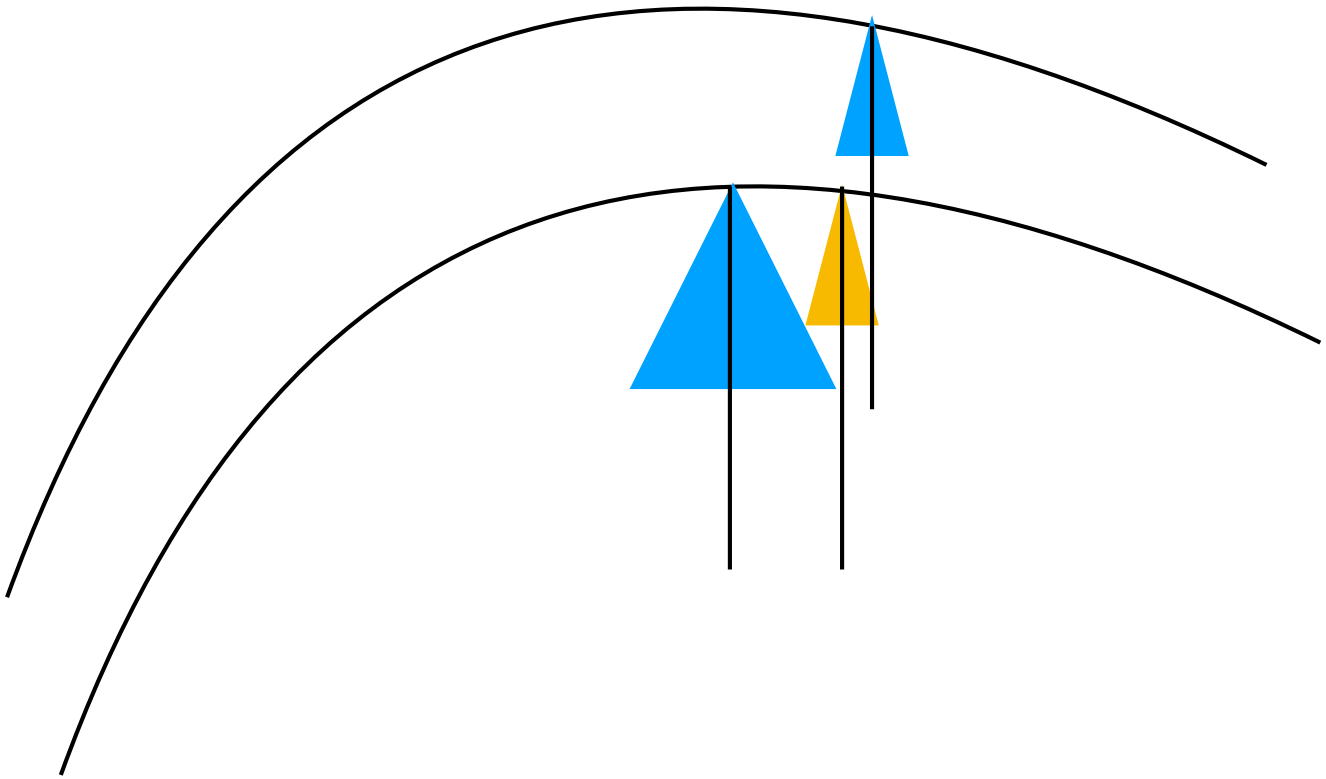
Periodic


g_y_hit:g_x_hit {volume_id==23 && abs(res_eLOC0_prt) >0.1 }
g_y_hit
g_x_hit
40
30
20
10
0
−10
−20
−30
−40
−40
−30
−20
−10
0
10
20
30
40

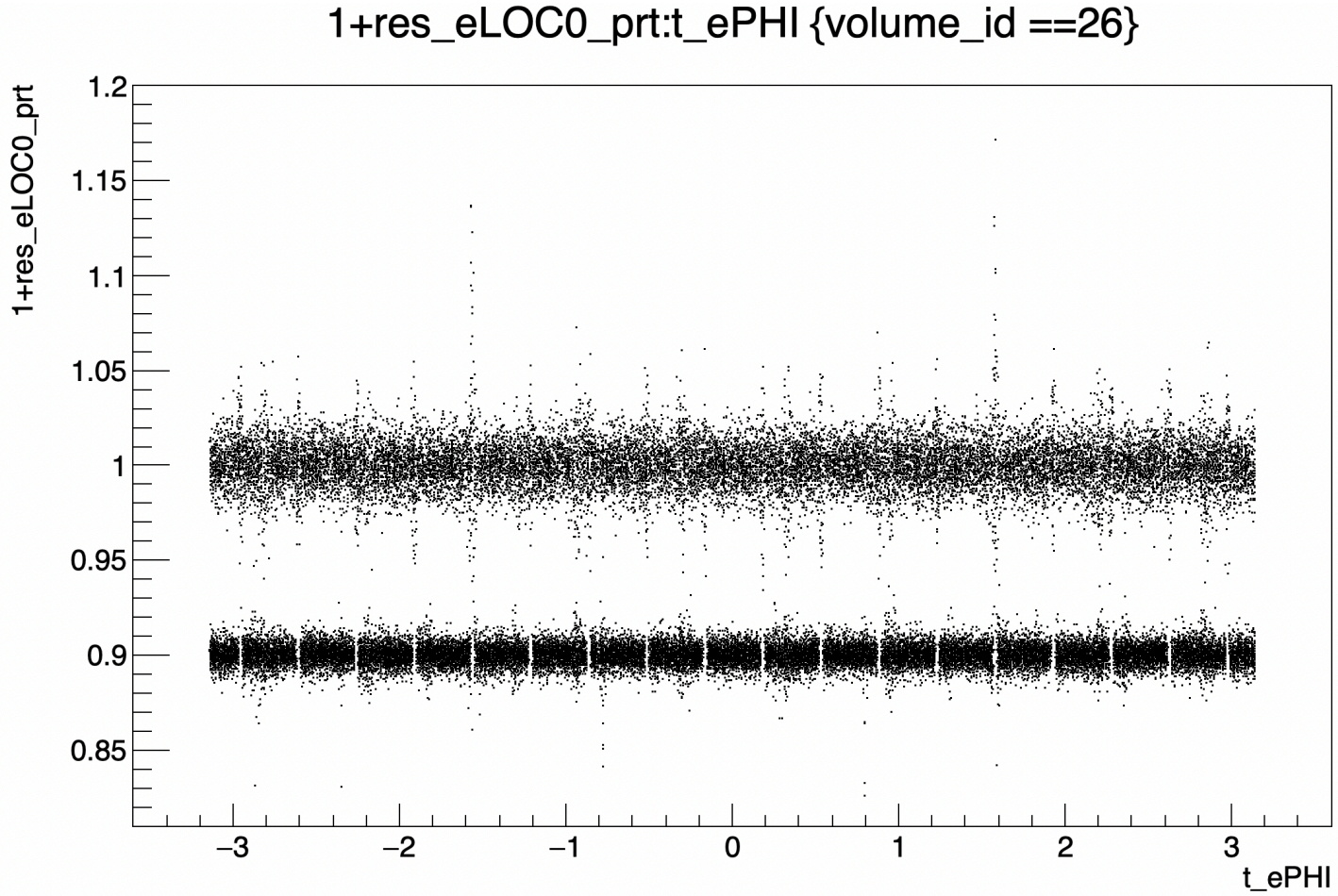
Missing 1st layer







SIT1: res_prt+1
VTX3: res_prt+0.9

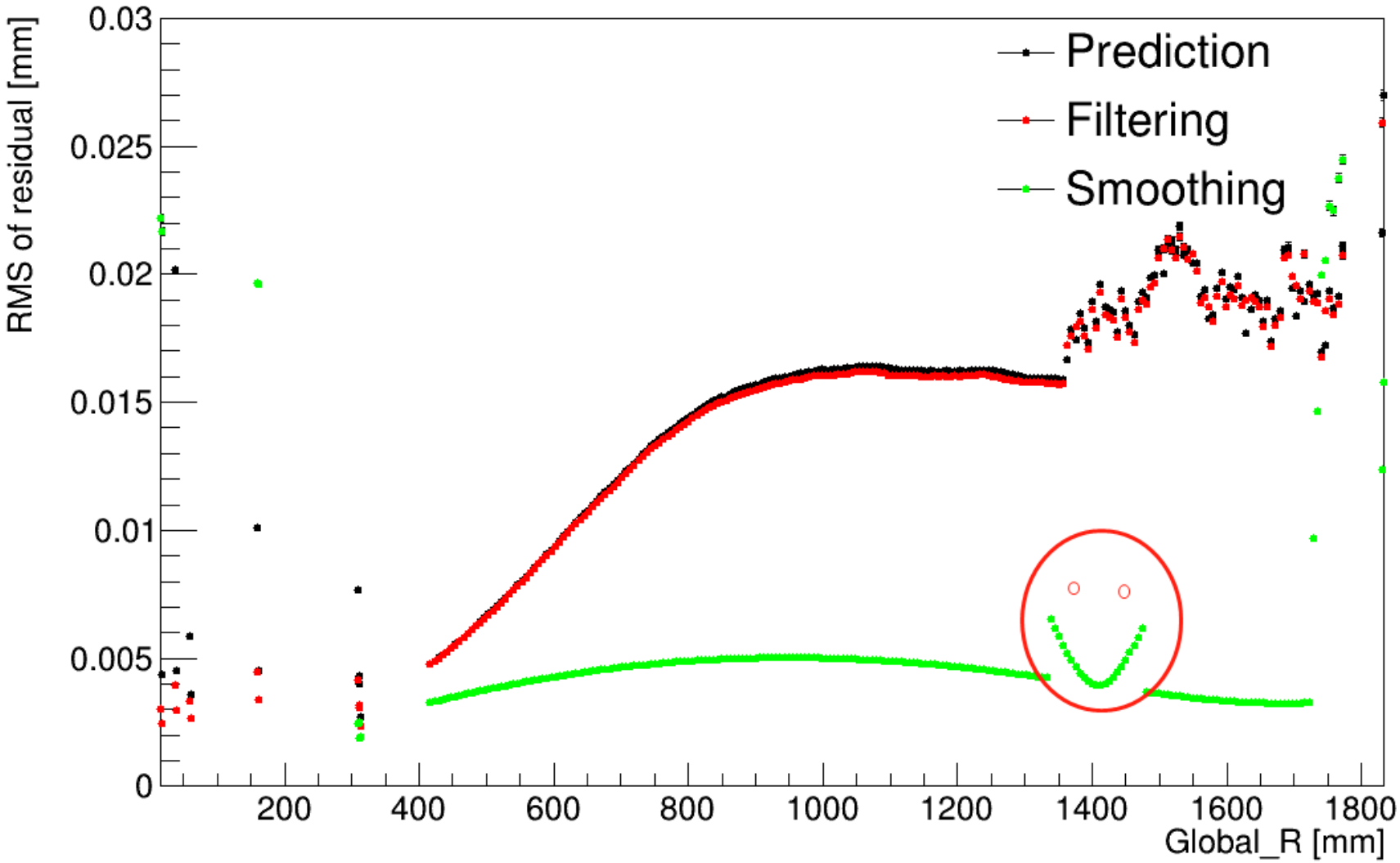


结果总结

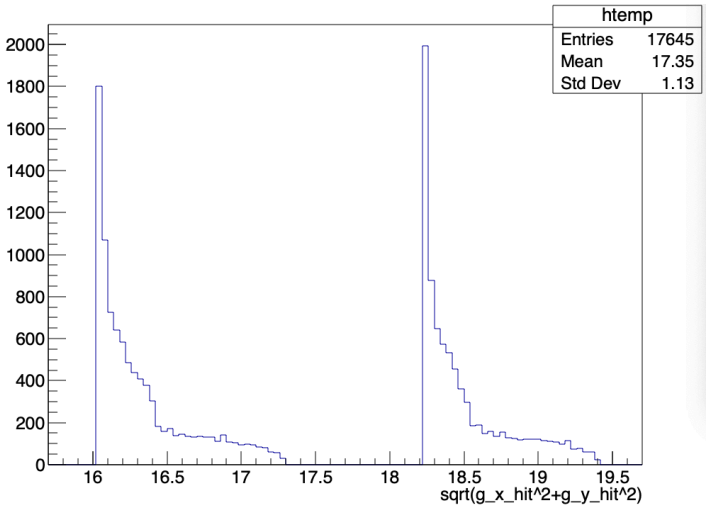
- 加上material 的情况
- Res vs r - gang
    - Understand the curve
    - Loc0, loc1 … hop
- smt State - different detector. -jin
    - Phi 均匀/pull值合理
- Fit (back to 000). - shuiting
    - 顶点/动量分辨随p的变化曲线 （注意加上material）
    - Phi 是否均匀

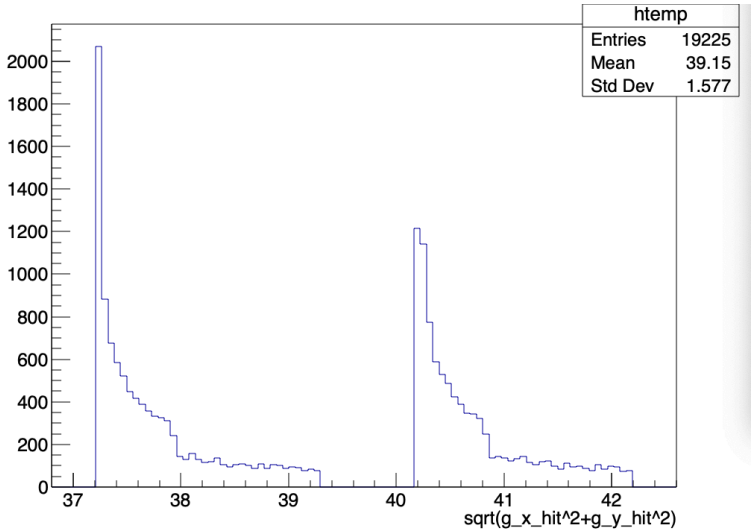
- 几何调整问题 yubo
    - (1) silicon geometry
    - (2) tpc geometry - ladder based

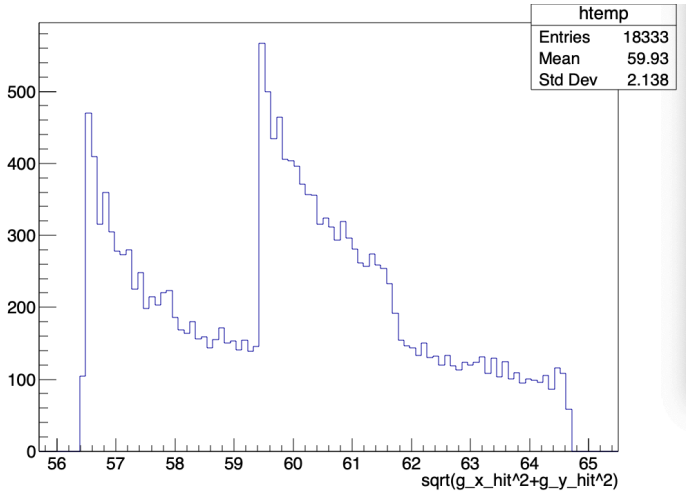
- Anything else
    - +- pi test - yebo


RMS of residual [mm]
0.03
0.025
0.02
0.015
0.01
0.005
0
200
400
600
800
1000
1200
1400
1600
1800
Global_R [mm]
Prediction
Filtering
Smoothing

Layer1


htemp
Entries 17645
Mean 17.35
Std Dev 1.13
2000
1800
1600
1400
1200
1000
800
600
400
200
0
16
16.5
17
17.5
18
18.5
19
19.5
sqrt(g_x_hit^2+g_y_hit^2)


htemp
Entries 19225
Mean 39.15
Std Dev 1.577
2000
1800
1600
1400
1200
1000
800
600
400
200
0
37
38
39
40
41
42
sqrt(g_x_hit^2+g_y_hit^2)


htemp
Entries 18333
Mean 59.93
Std Dev 2.138
500
400
300
200
100
0
56
57
58
59
60
61
62
63
64
65
sqrt(g_x_hit^2+g_y_hit^2)