$\sigma_{\Delta\theta}$ vs. p_{tot} vs. θ

March. 17, 2008 DL
svn revision: 3355+1mm vertex const.
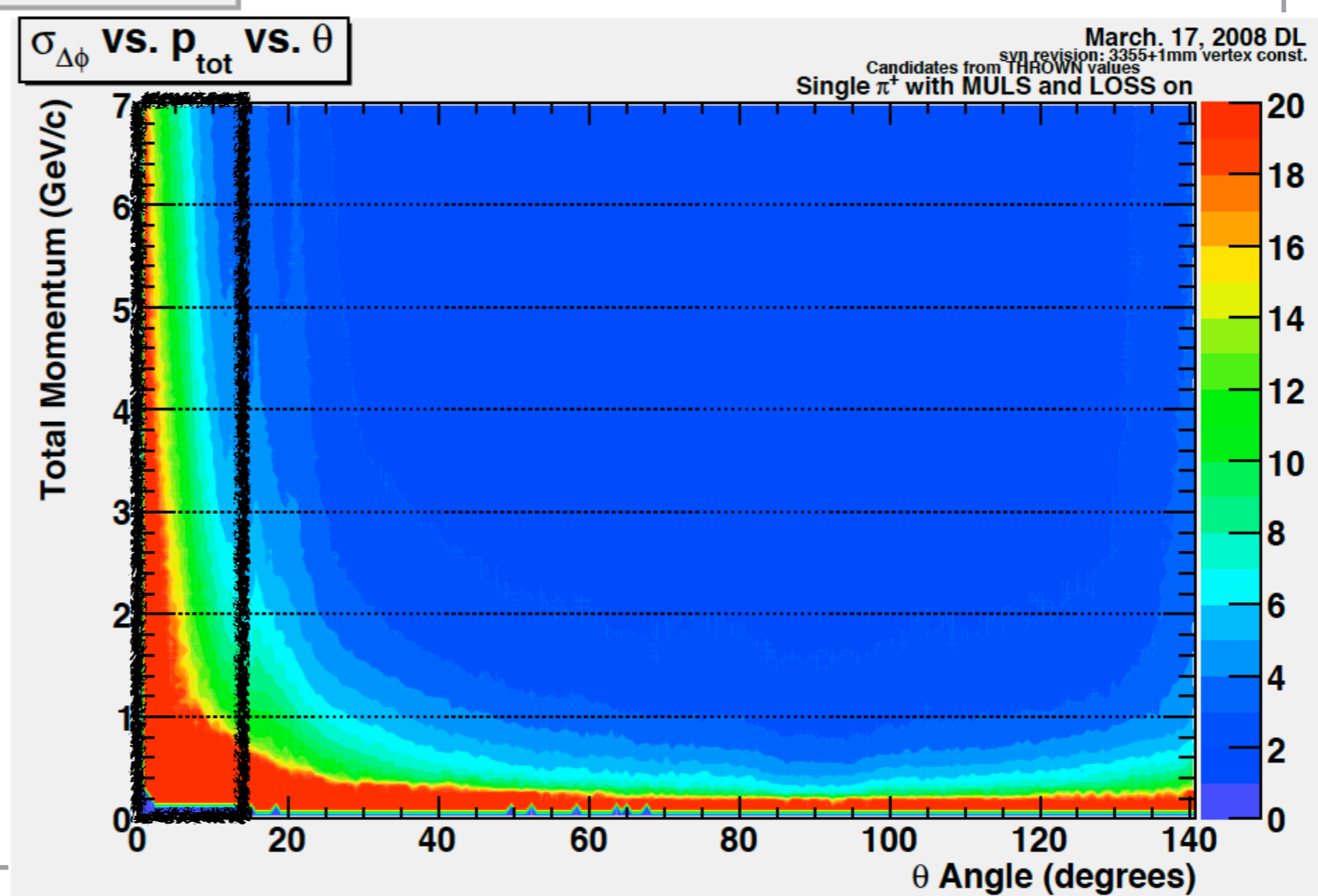Candidates from THROWN values
Single π^+ with MULS and LOSS on

What impact does tracking resolution have on DIRC PID?
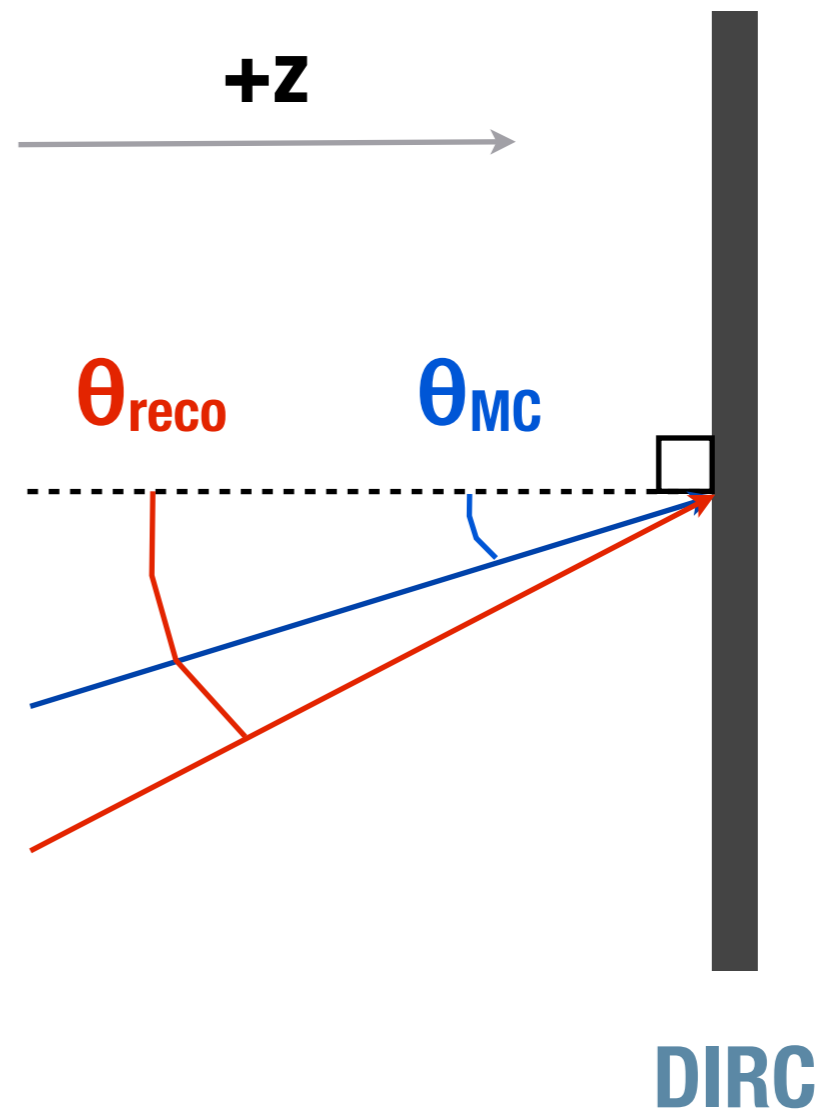
Tracking resolutions at the primary vertex

GlueX-doc-1004-v5

$\sigma_{\Delta\phi}$ vs. p_{tot} vs. θ

March. 17, 2008 DL
svn revision: 3355+1mm vertex const.
Candidates from THROWN values
Single π^+ with MULS and LOSS on

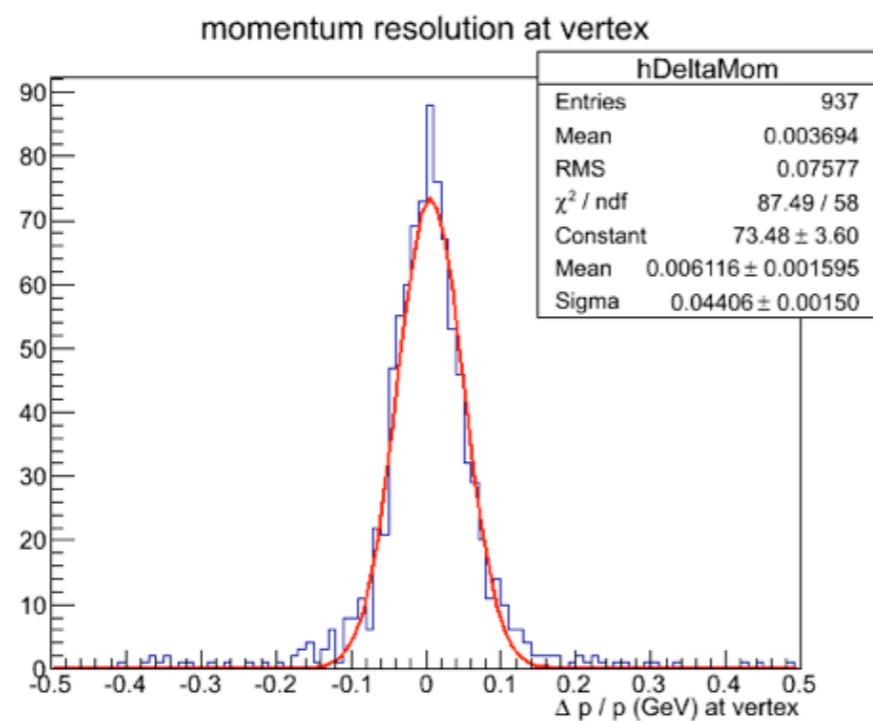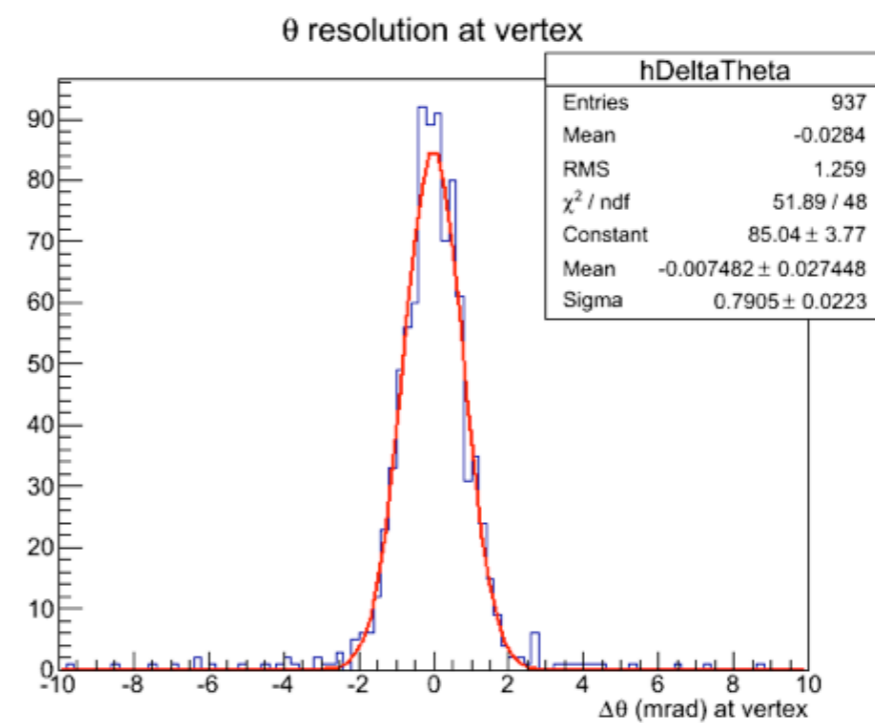Tracking Resolution: 10.15.13
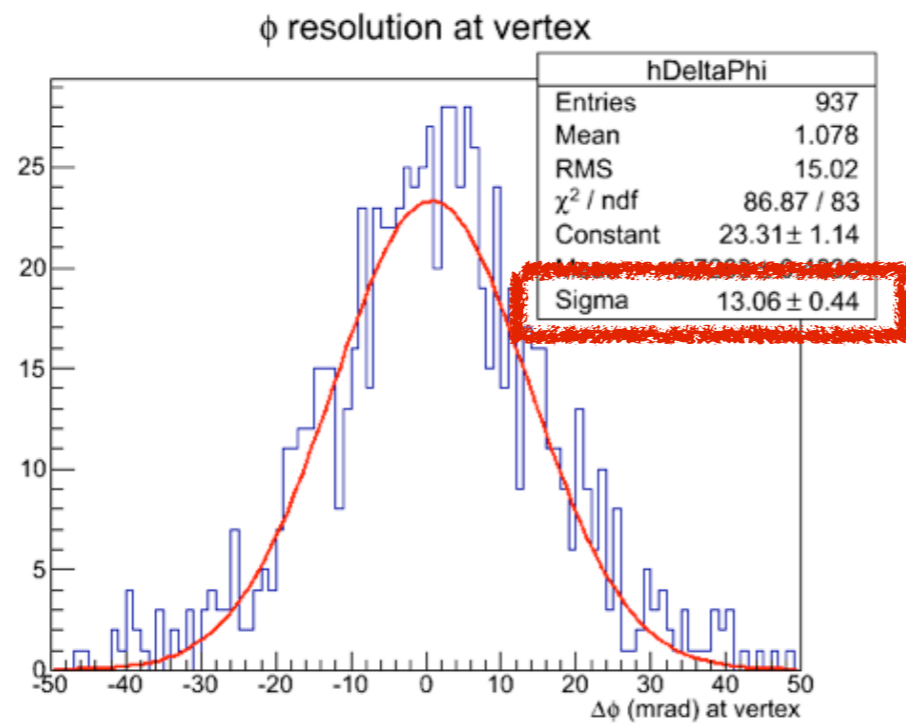
Tracking Resolution at the DIRC

Reconstructed Trajectory

MC Truth Trajectory
(ie. DMCTrajectory)

* Look at "usual" θ and ϕ coordinates for tracking resolution

* Compare momentum vector angle of incidence in θ and ϕ when entering the DIRC and at primary vertex between MC and reconstructed trajectories

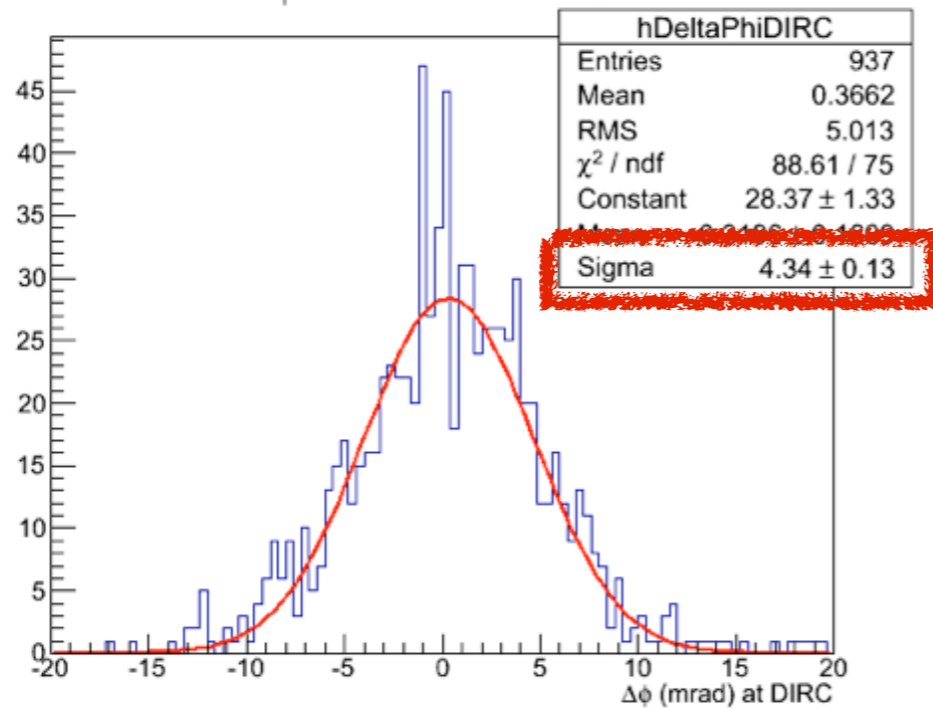* All particles thrown at 5 degrees from the production vertex
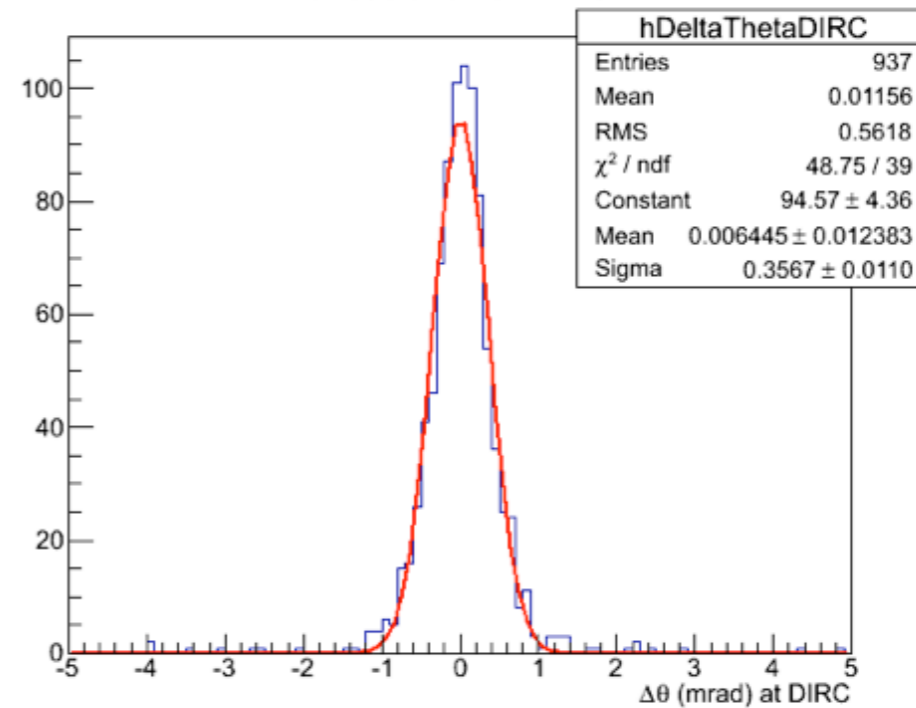
5 GeV Pion at **primary vertex**

φ resolution at vertex

hDeltaPhi	
Entries	937
Mean	1.078
RMS	15.02
χ² / ndf	86.87 / 83
Constant	23.31 ± 1.14
Sigma	13.06 ± 0.44

θ resolution at vertex

hDeltaTheta	
Entries	937
Mean	-0.0284
RMS	1.259
χ² / ndf	51.89 / 48
Constant	85.04 ± 3.77
Mean	-0.007482 ± 0.027448
Sigma	0.7905 ± 0.0223

momentum resolution at vertex

hDeltaMom	
Entries	937
Mean	0.003694
RMS	0.07577
χ² / ndf	87.49 / 58
Constant	73.48 ± 3.60
Mean	0.006116 ± 0.001595
Sigma	0.04406 ± 0.00150

Similar to what was seen in previous studies (See slide 1)

5 GeV Pion at **DIRC**

φ resolution at DIRC

hDeltaPhiDIRC	
Entries	937
Mean	0.3662
RMS	5.013
χ^2 / ndf	88.61 / 75
Constant	28.37 ± 1.33
Mean	0.2106 ± 0.1...
Sigma	4.34 ± 0.13

θ resolution at DIRC

hDeltaThetaDIRC	
Entries	937
Mean	0.01156
RMS	0.5618
χ^2 / ndf	48.75 / 39
Constant	94.57 ± 4.36
Mean	0.006445 ± 0.012383
Sigma	0.3567 ± 0.0110

momentum resolution at DIRC

hDeltaMomDIRC	
Entries	937
Mean	0.00629
RMS	0.07345
χ^2 / ndf	73.71 / 55
Constant	72.38 ± 3.45
Mean	0.006721 ± 0.001638
Sigma	0.0456 ± 0.0015
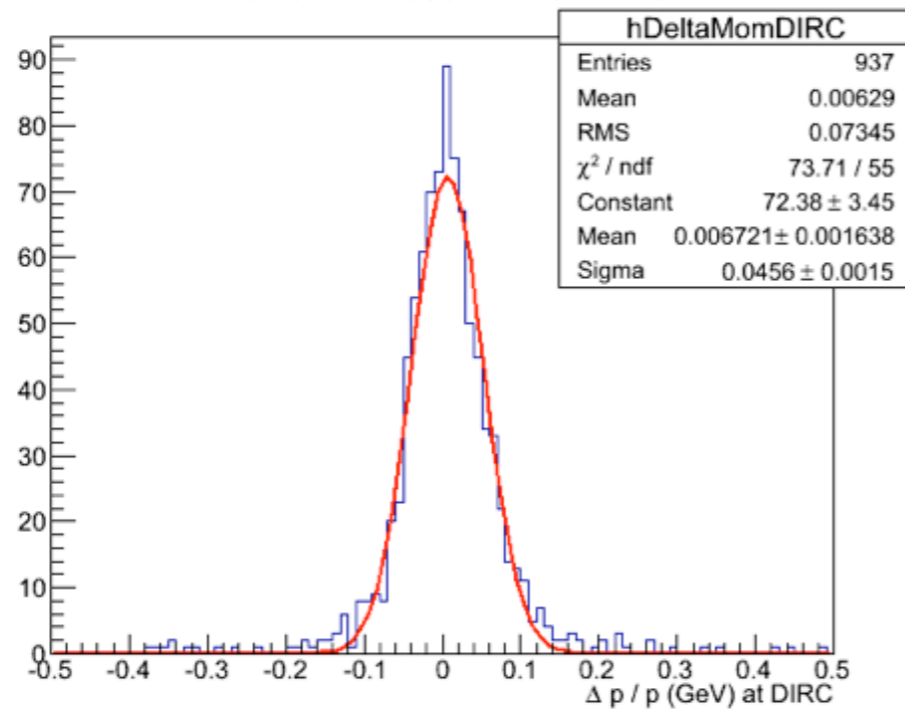
position resolution at DIRC

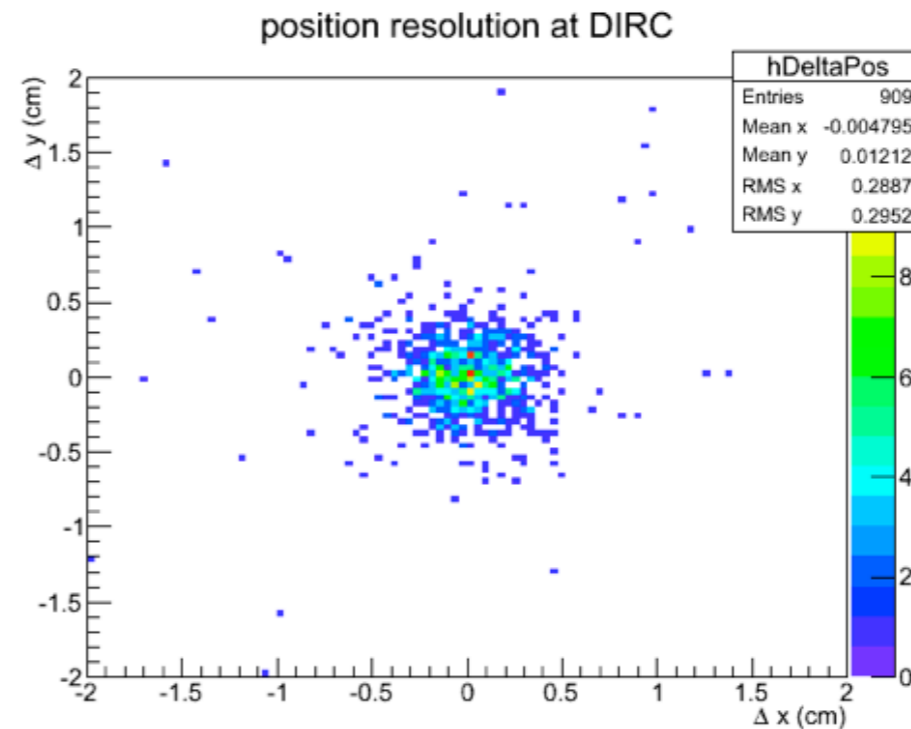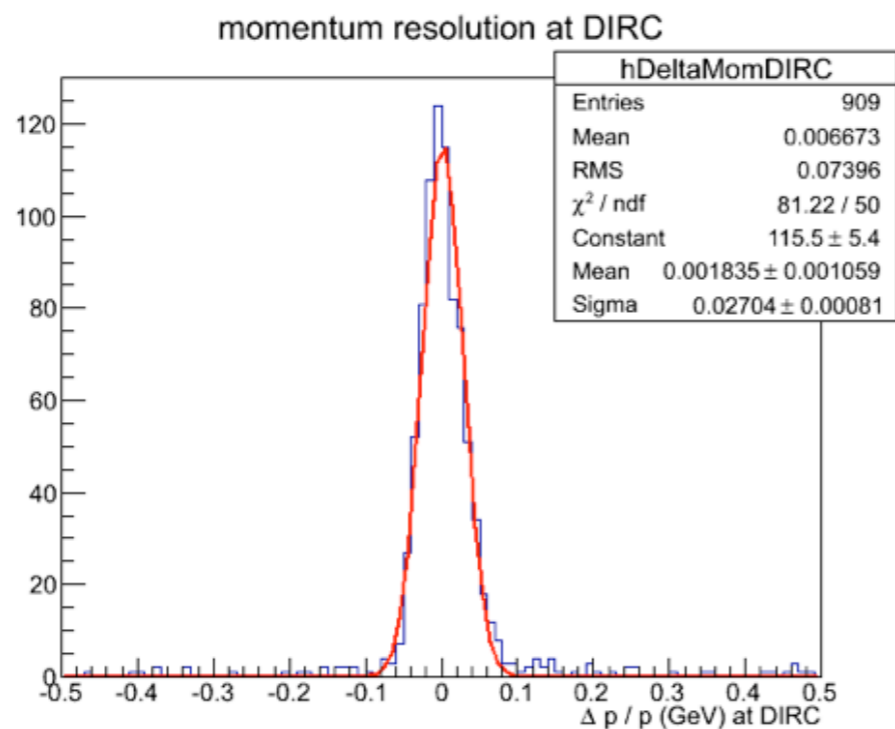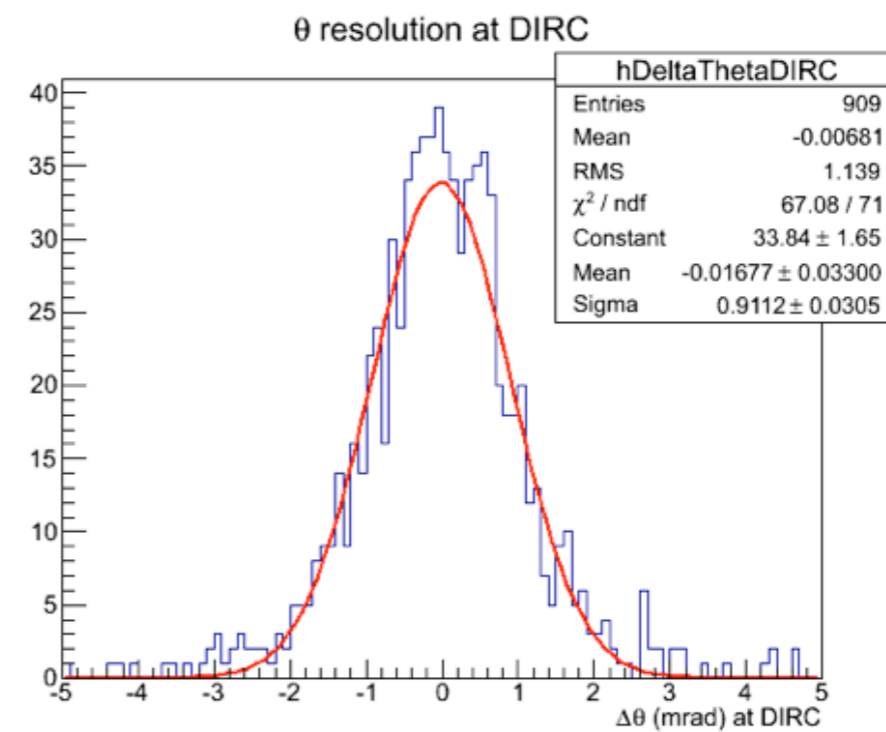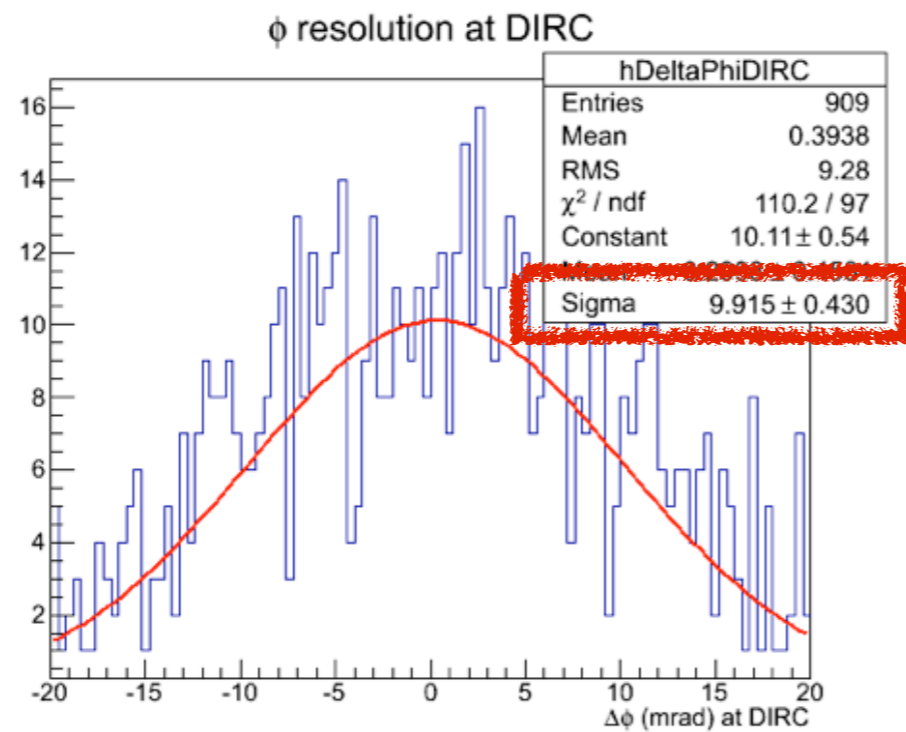| hDeltaPos	
Entries	937
Mean x	0.0108
Mean y	-0.008205
RMS x	0.1867
RMS y	0.1788
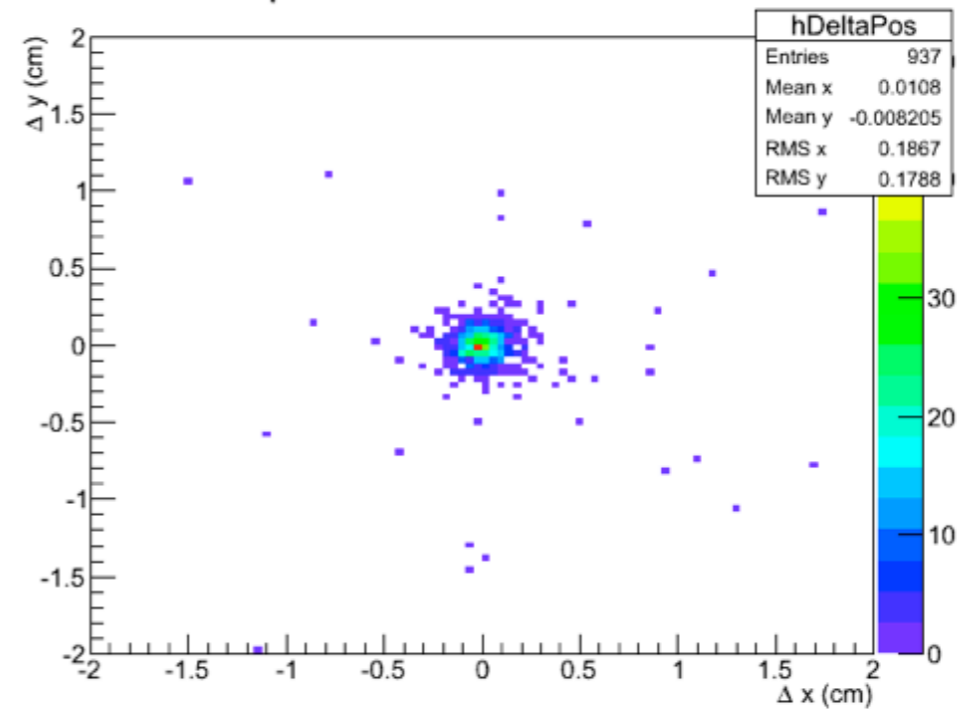
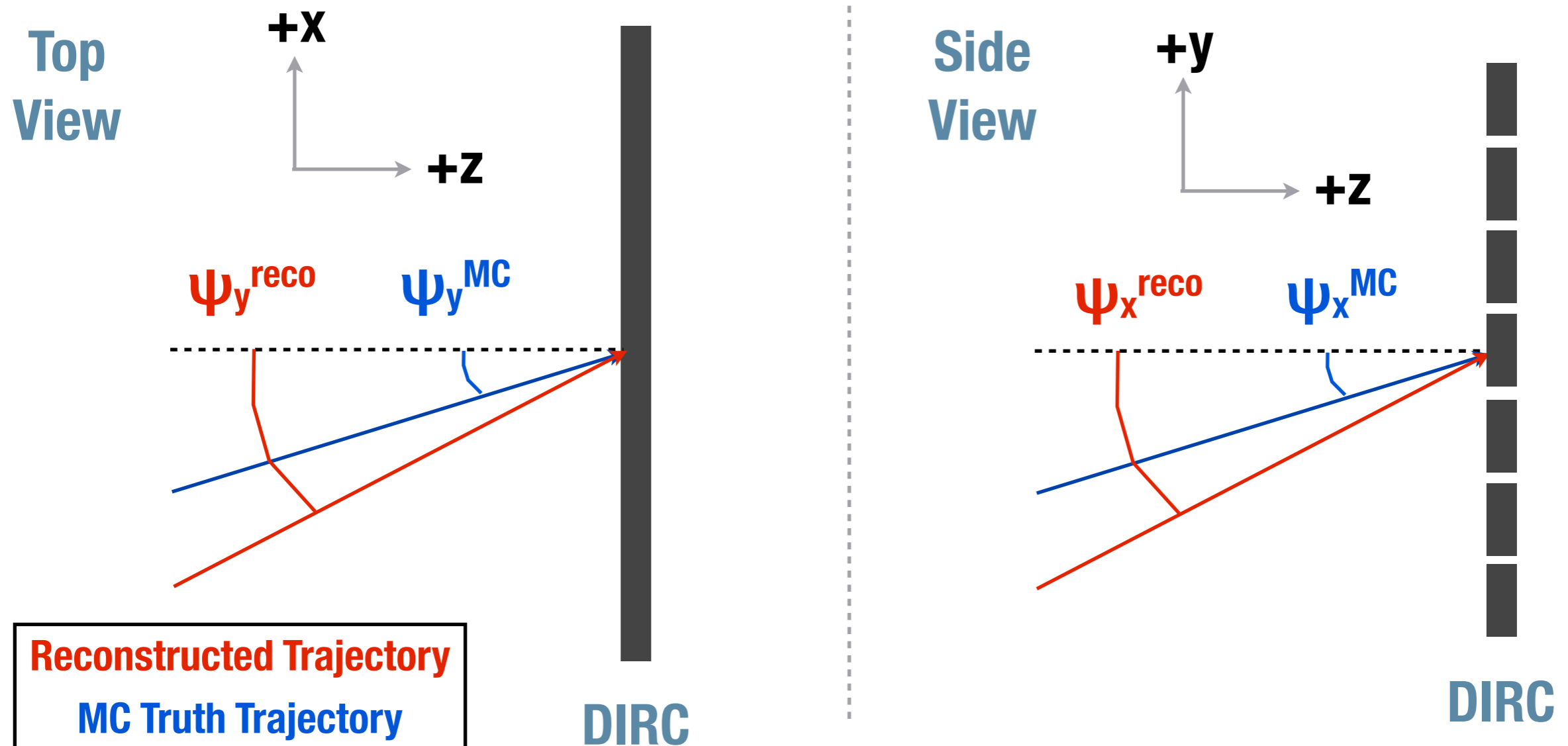# 2 GeV Pion at **primary vertex**
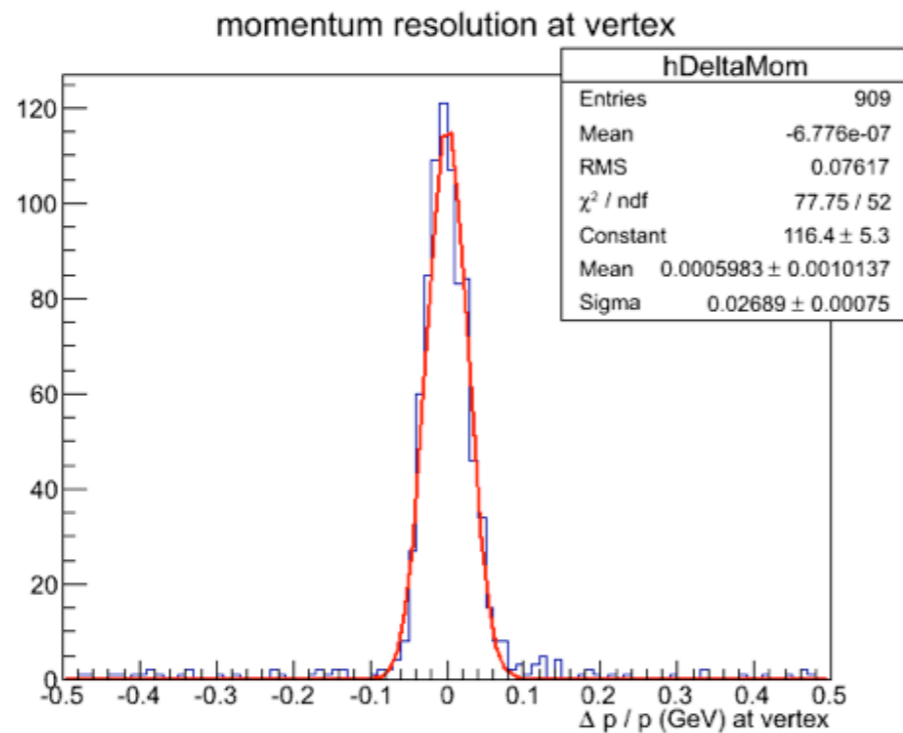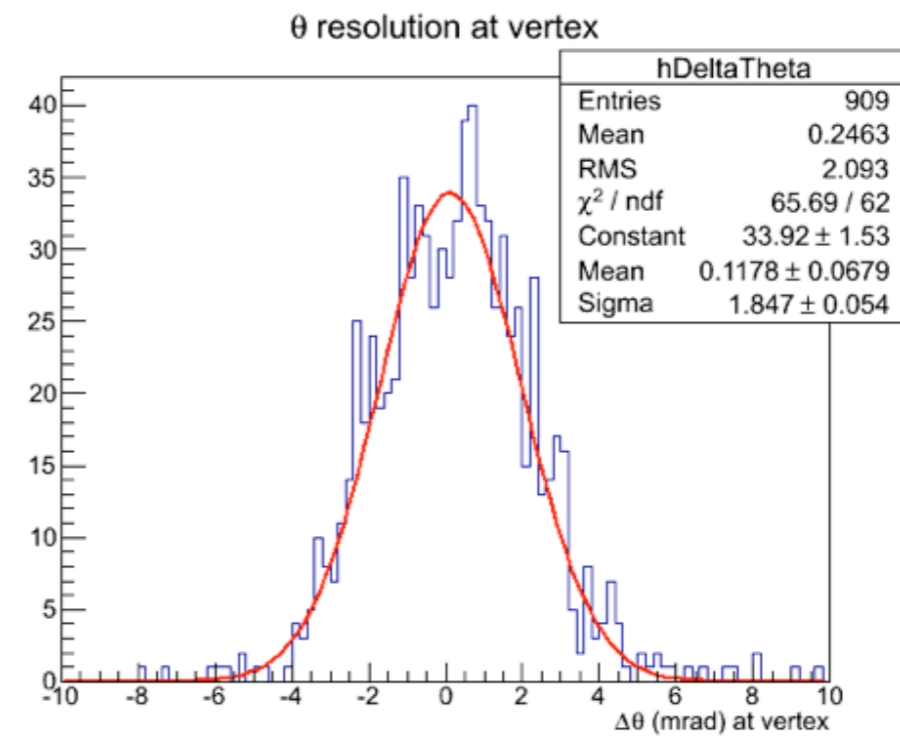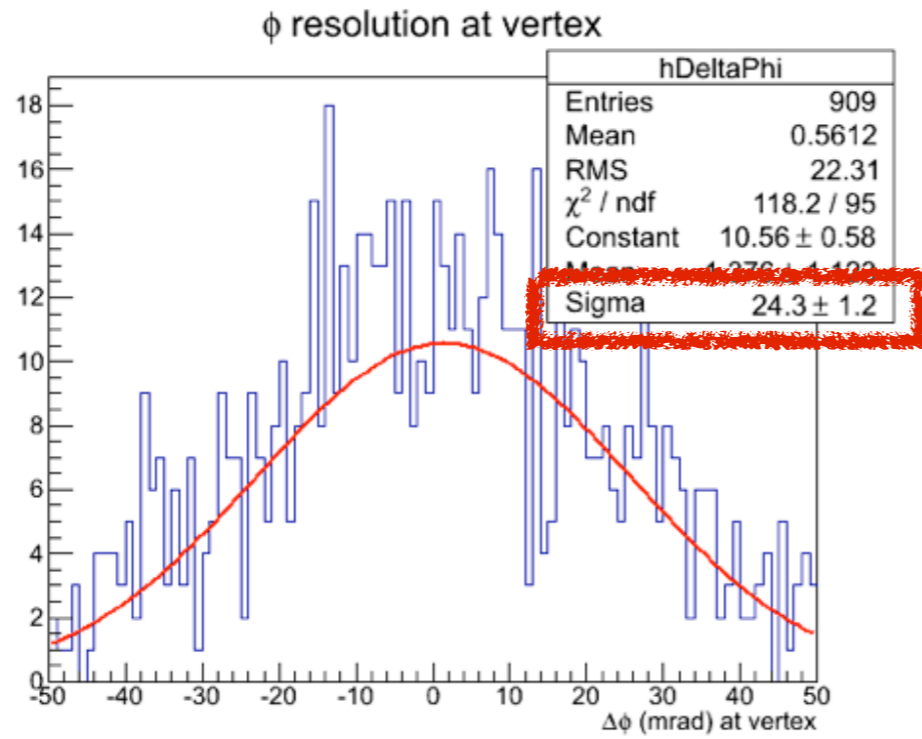
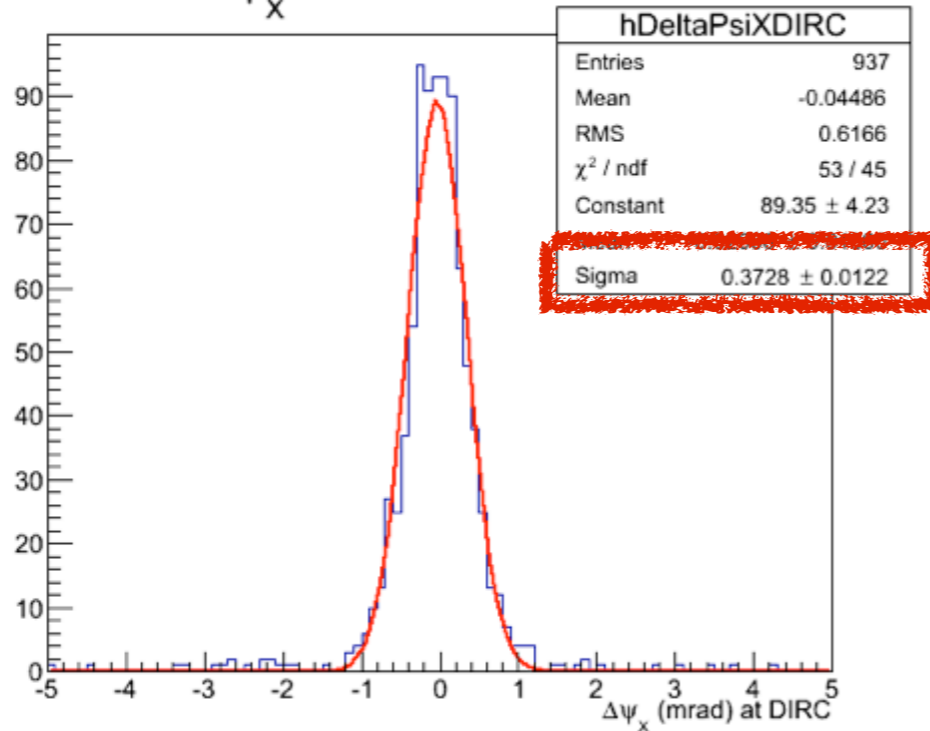**Similar to what was seen in previous studies (See slide 1)**

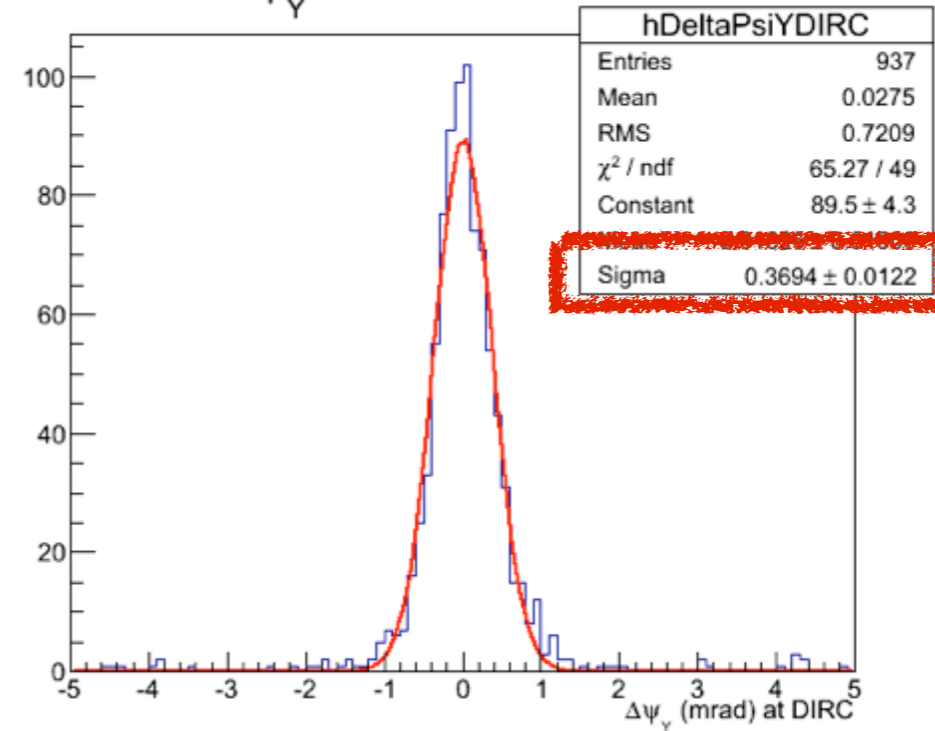# 2 GeV Pion at **DIRC**

Tracking Resolution at the DIRC

- Define new angles with respect to planes perpendicular (y) and parallel (x) to the bar's long axis (ie. equivalent to rotations about the y and x axes)

- Compare momentum vector angle of incidence in ψ_x and ψ_y when entering the DIRC between MC and reconstructed trajectories
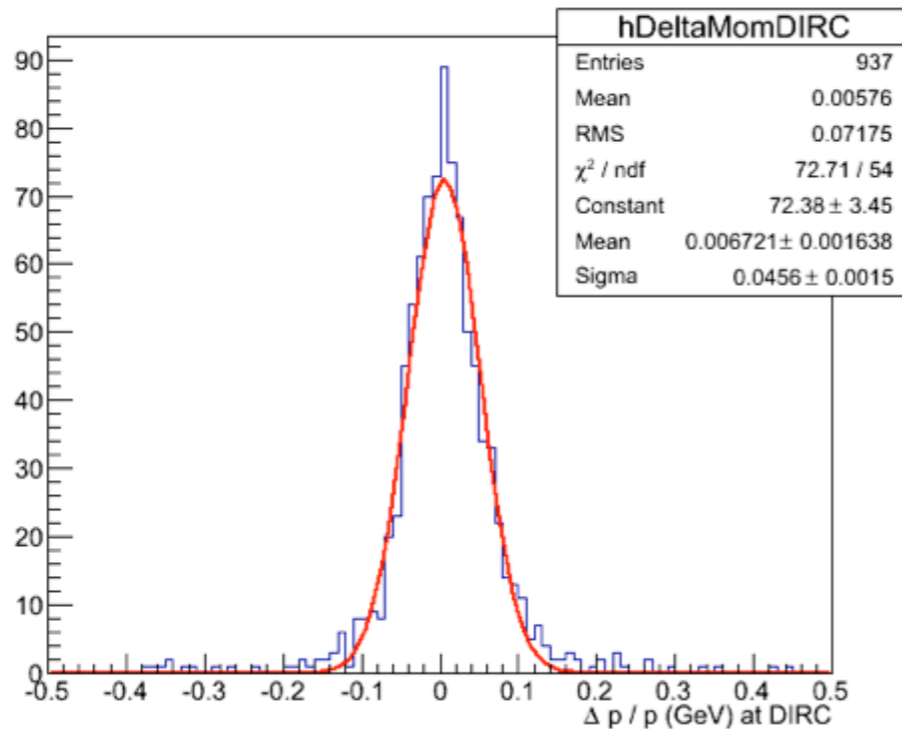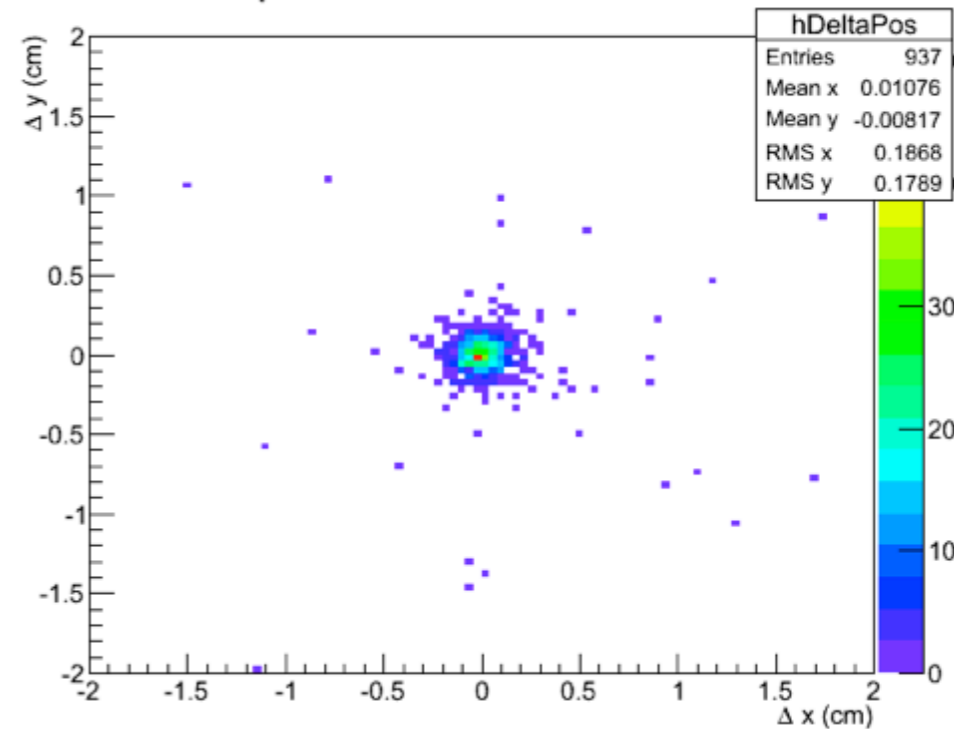
5 GeV Pion at **DIRC**

2 GeV Pion at **DIRC**