Progress Report

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Outline

- Analysis general details
- Plots of total momentum resolution (p_{rec} - p_{mc}) vs truth total momentum (p_{mc})
- Plots of resolution of radius (r_{rec} - r_{mc}) & z component (z_{rec} - z_{mc})

Simulation/Analysis General Details

- Particle Thrown: Muon
- Number of Events: 1000
- Gun Multiplicity i.e. Muons thrown per event: 10
- Distribution used: uniform, so it will be flat in theta
- Min. Muon Momentum: 0 GeV
- Max. Muon Momentum: 10 GeV
- Gun Direction: (0.000 0.000 1.000) //default
- Compact File: $DETECTOR_PATH/$DETECTOR_CONFIG.xml

Simulation/Analysis General Details

Simulation was run for 10 different Gun Positions i.e. vertices (1000 events each):

1. Gun Position: (0.0 0.0 0.0) // r = 0 mm, z = 0 mm (default)
2. Gun Position: (0.0 0.0 0.5) //r = 0 mm, z = 0.5 mm
3. Gun Position: (0.5 0.0 0.0) //r = 0.5 mm, z = 0 mm
4. Gun Position: (0.3 0.4 0.5) //r = 0.5 mm, z = 0.5 mm
5. Gun Position: (0.0 0.0 2.0) //r = 0 mm, z = 2 mm
6. Gun Position: (2.0 0.0 0.0) //r = 2 mm, z = 0 mm
7. Gun Position: (1.0 1.732 2.0) //r = 2 mm, z = 2 mm
8. Gun Position: (0.0 0.0 5.0) //r = 0 mm, z = 5 mm
9. Gun Position: (5.0 0.0 0.0) //r = 5 mm, z = 0 mm
10. Gun Position: (3.0 4.0 5.0) //r = 5 mm, z = 5 mm

Variables Details:

The analysis is done using associated particles from *MCRecoParticleAssociationCollection*

And,

p_{rec} : Reconstructed total momentum

p_{mc} : Truth(MC) total momentum

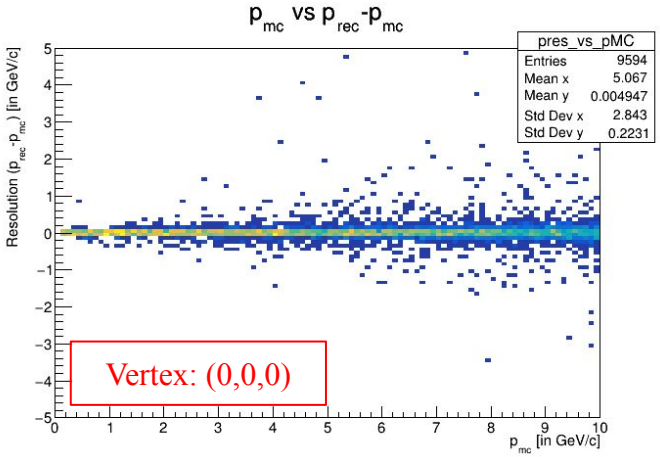
r_{rec} : Reconstructed vertex position r (accessed as *CentralCKFTrackParameters.getLoc().a*)

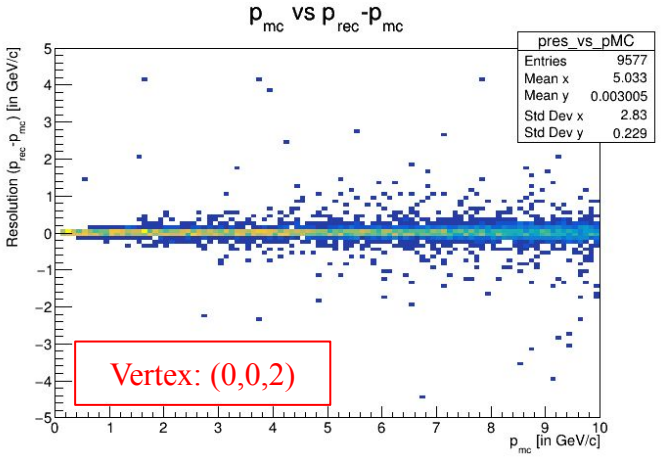
r_{mc} : Truth(MC) vertex position r

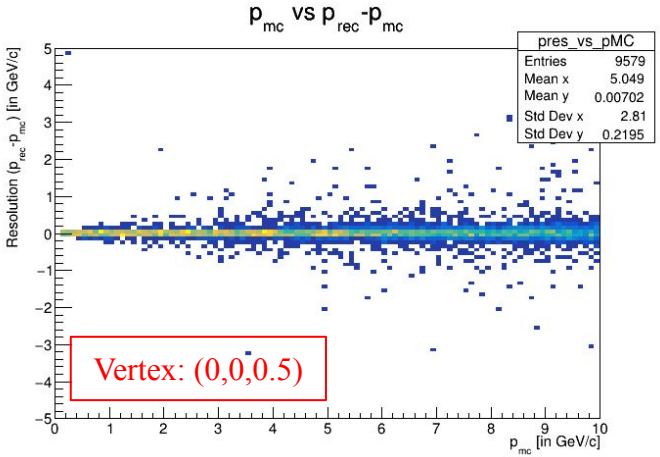
z_{rec} : Reconstructed vertex position z (accessed as *CentralCKFTrackParameters.getLoc().b*)

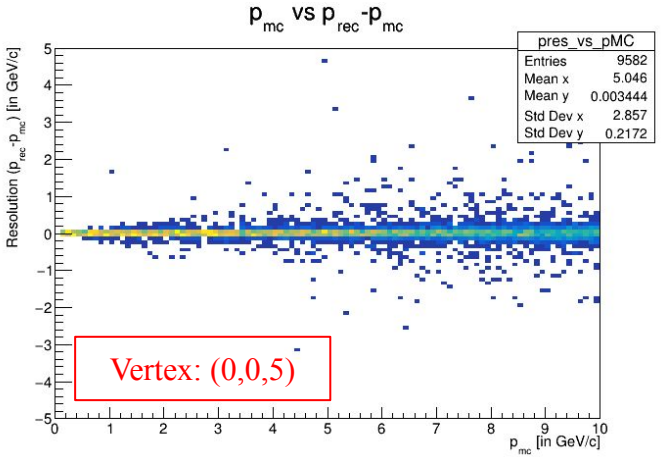
z_{mc} : Truth(MC) vertex position z

Resolution vs Momentum: vertex shifting along z axis

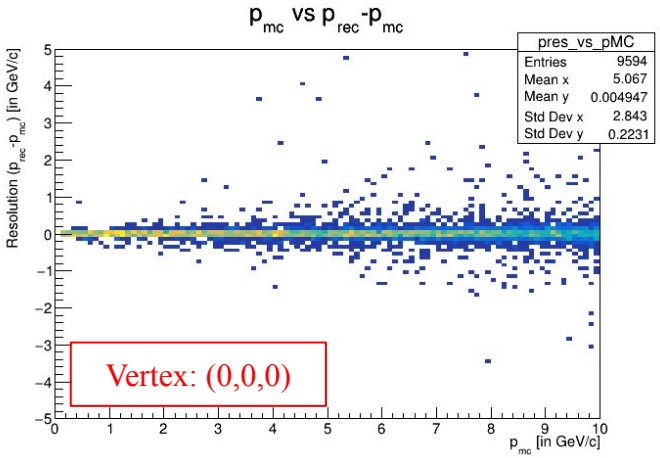


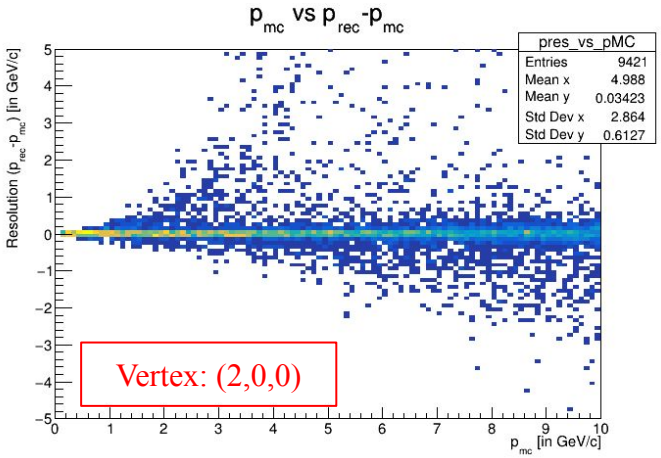


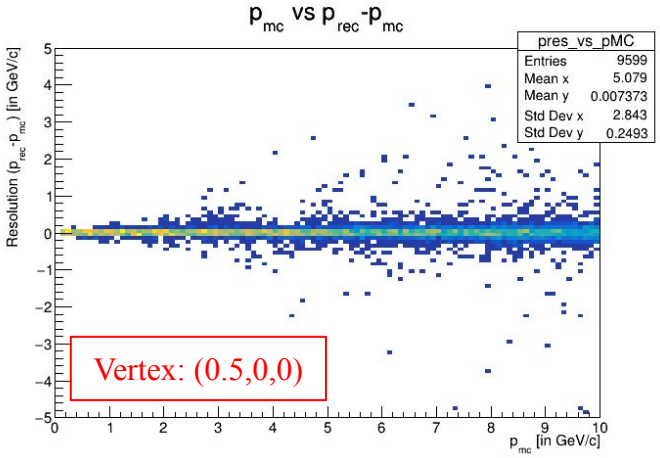


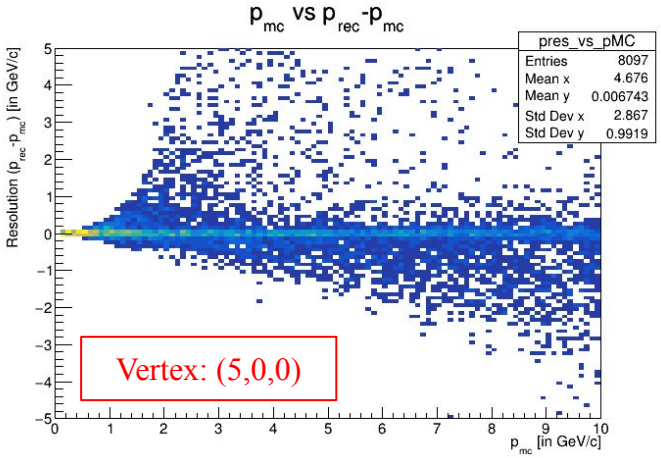


Resolution vs Momentum: vertex shifting along x axis

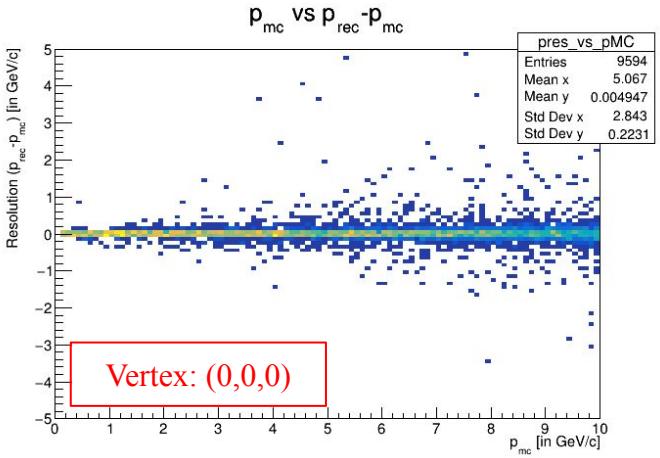


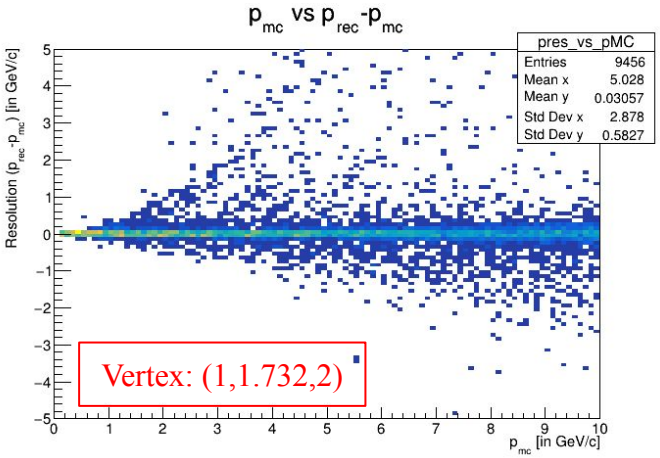


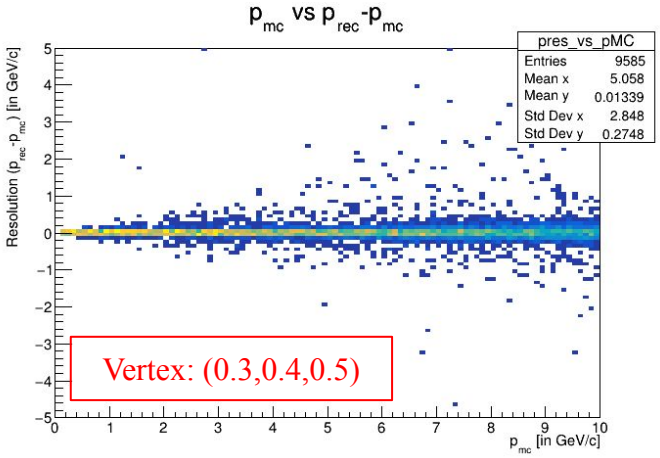


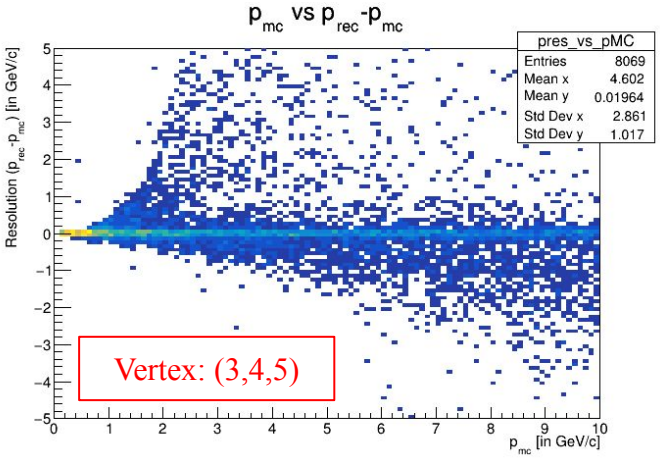


Resolution vs Momentum: vertex shifting on both rad. and z axis

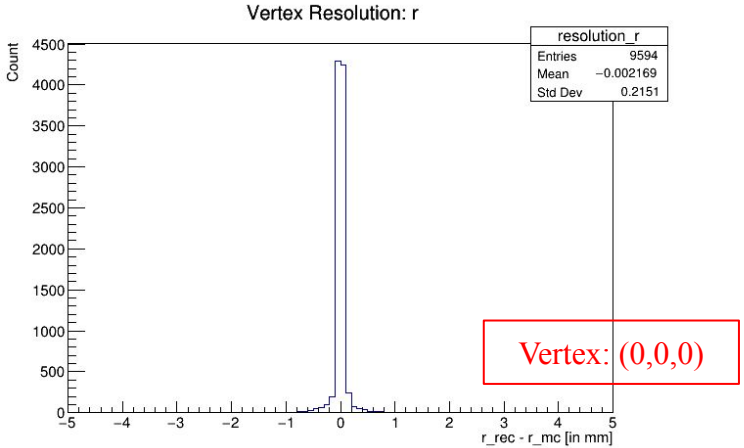


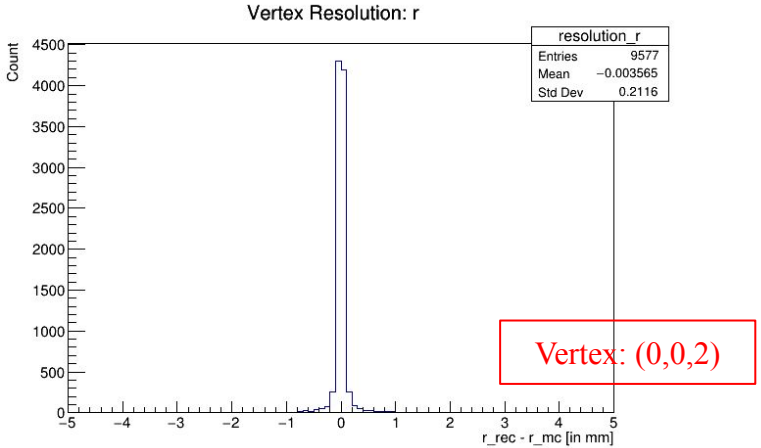


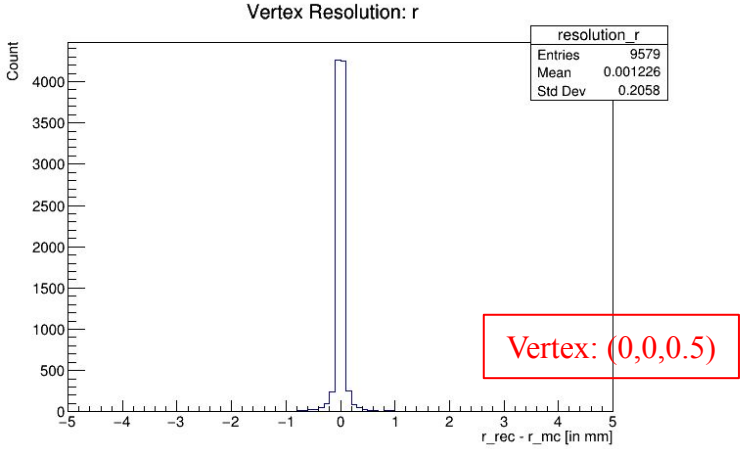


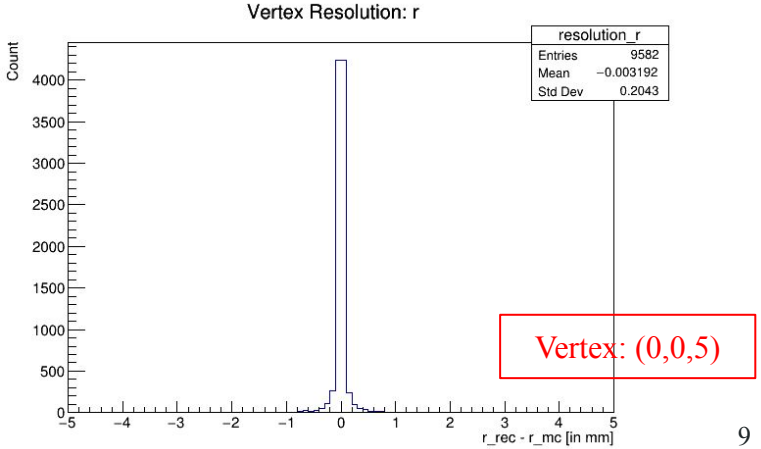


Plots: Resolution r: vertex shifting along z axis

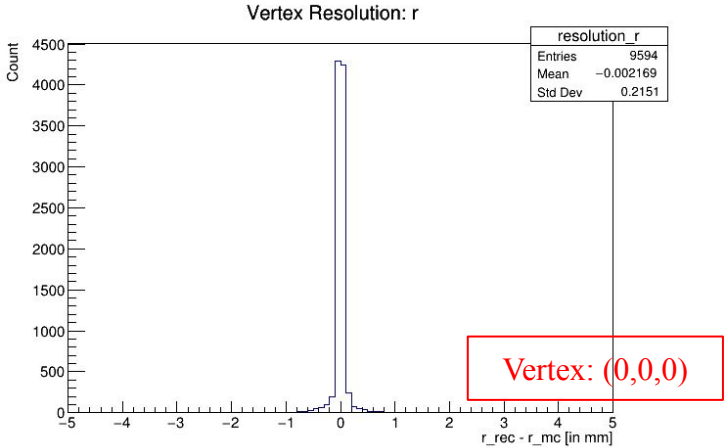


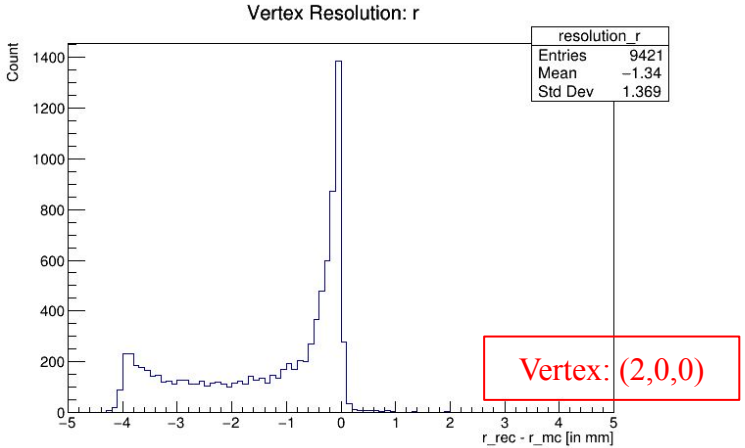


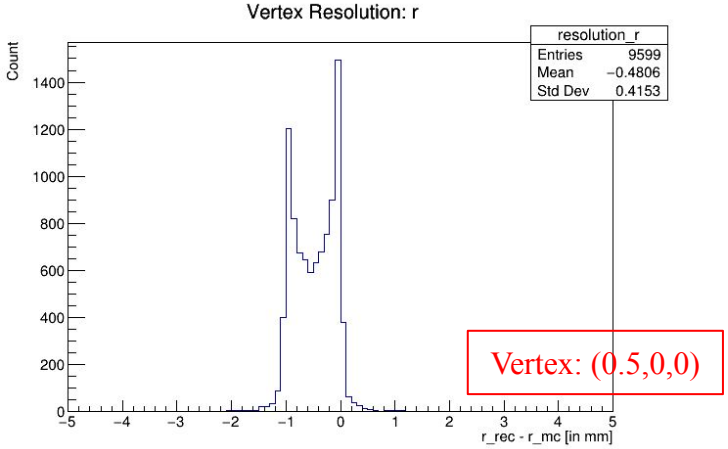


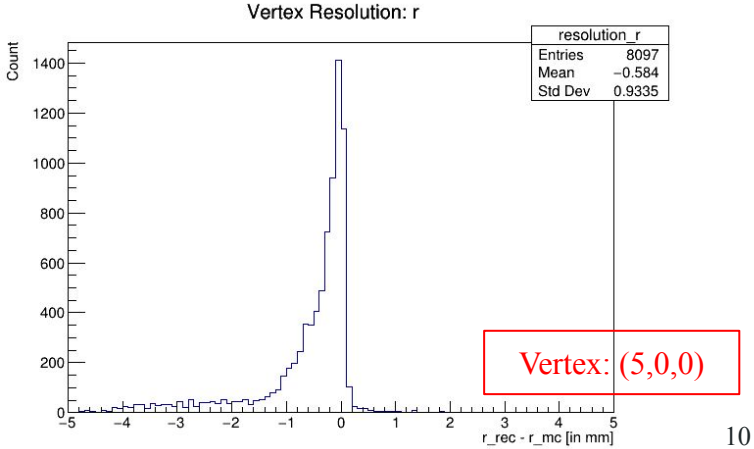


Plots: Resolution r: vertex shifting along x axis

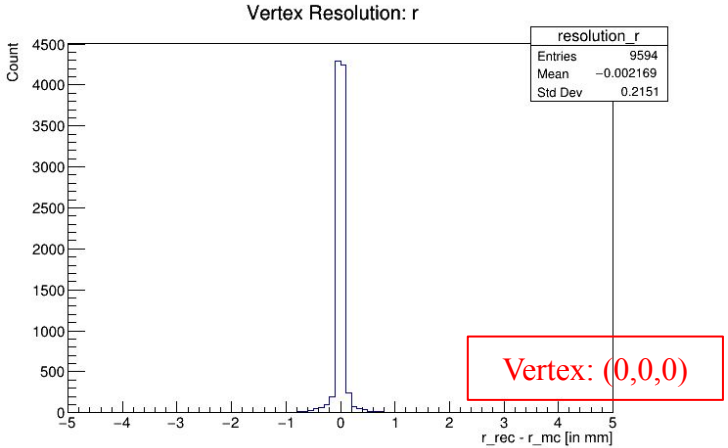


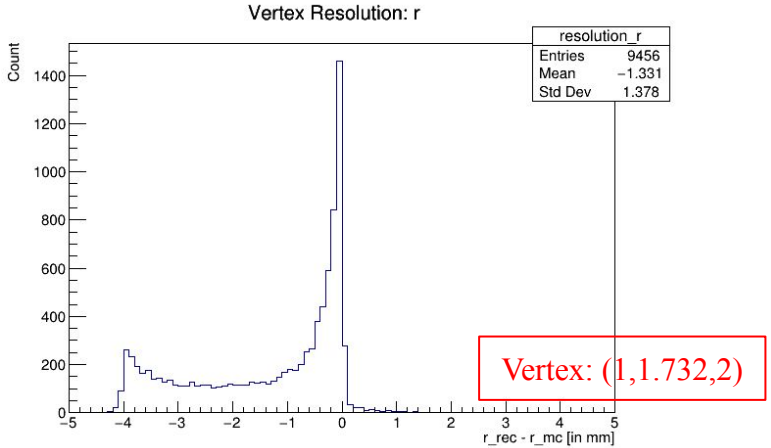


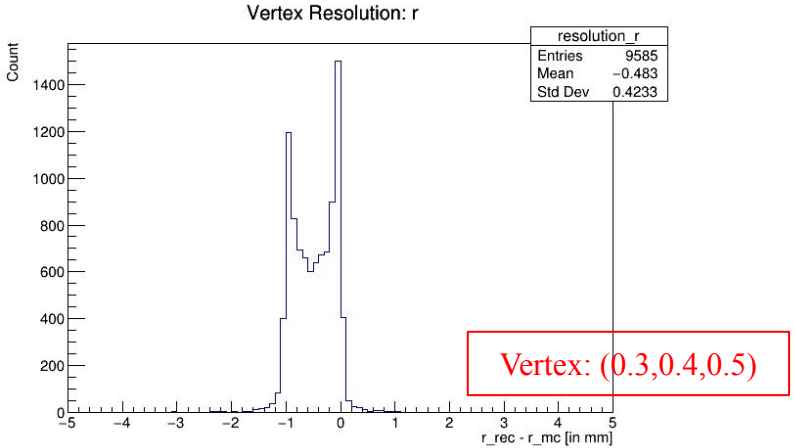


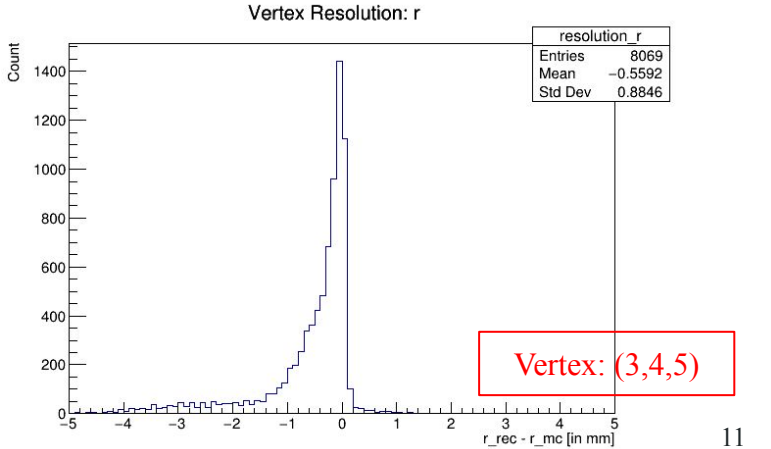


Plots: Resolution r: vertex shifting on both radial and z axis

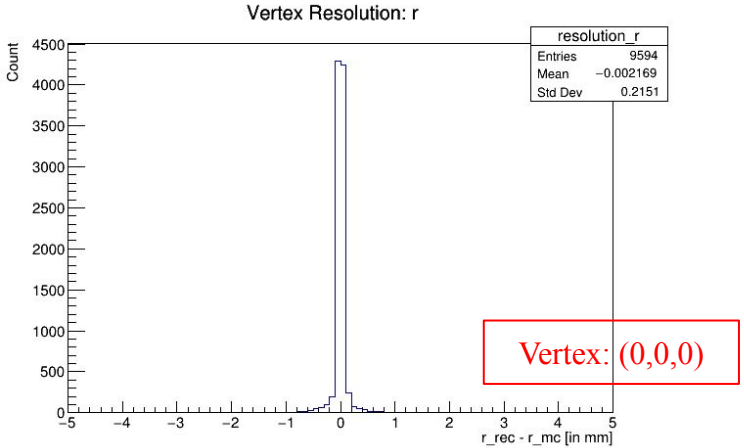




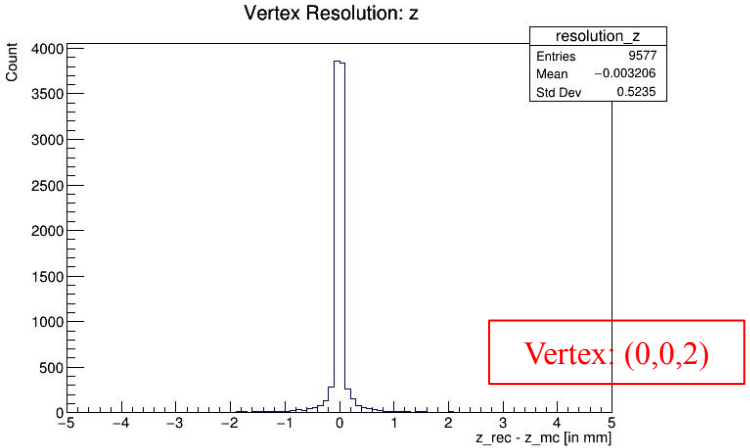




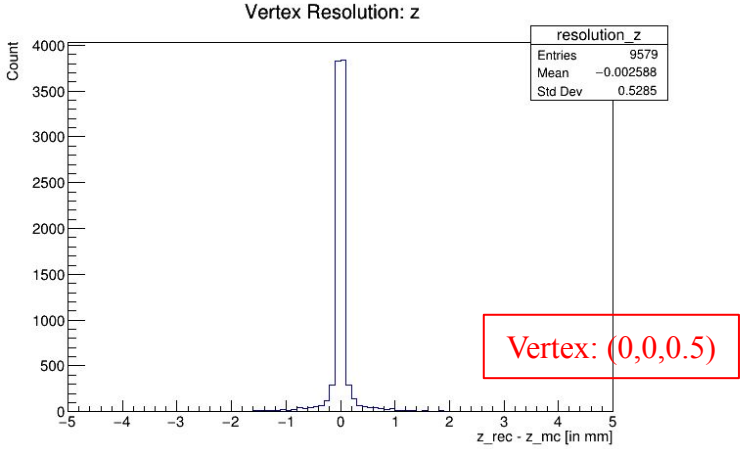
Plots: Resolution z: vertex shifting along z axis



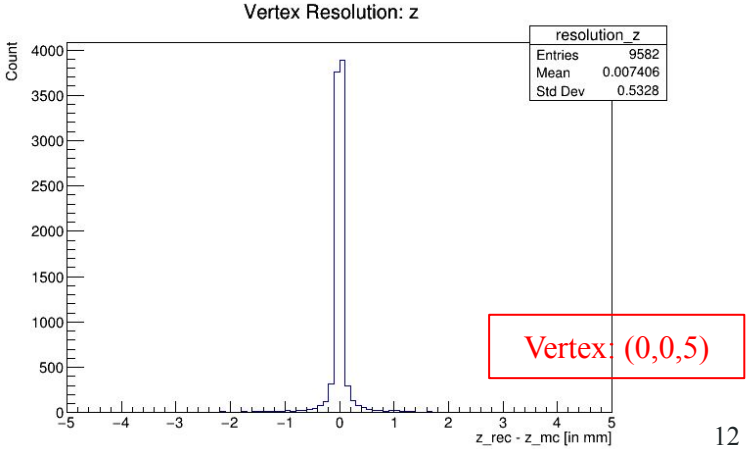
Vertex: (0,0,0)



Vertex: (0,0,2)

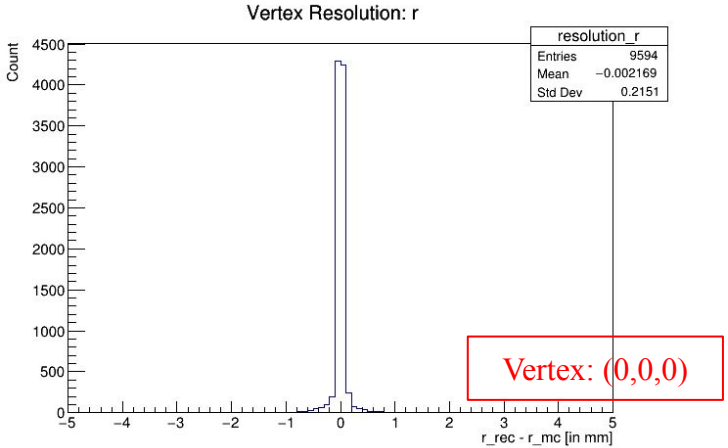


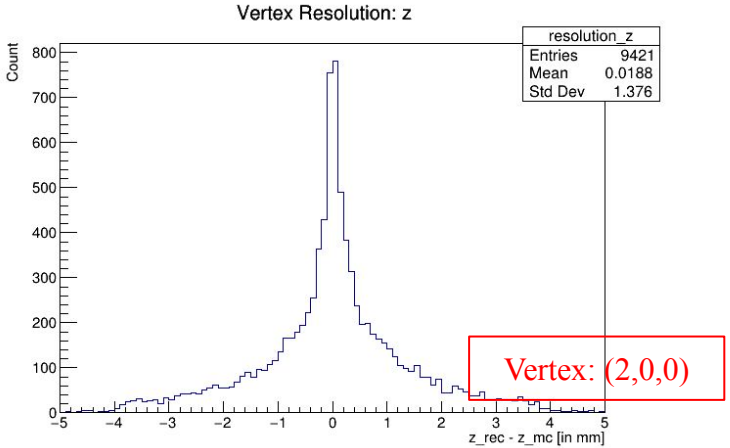
Vertex: (0,0,0.5)

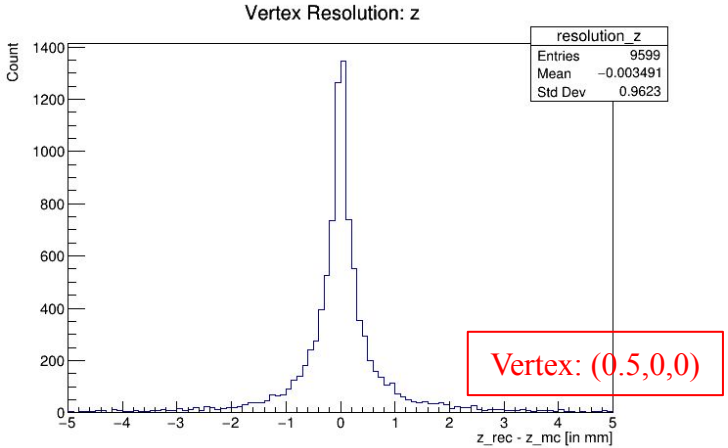


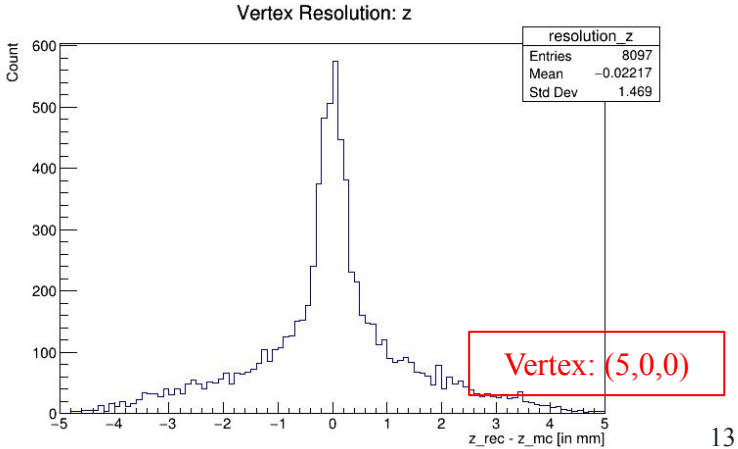
Vertex: (0,0,5)

Plots: Resolution z: vertex shifting along x axis

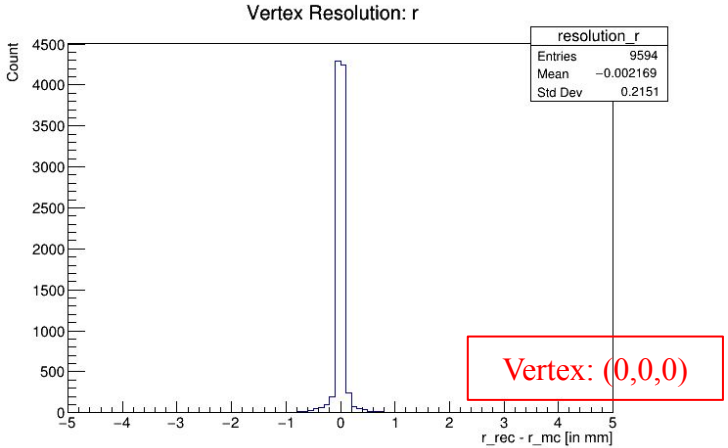




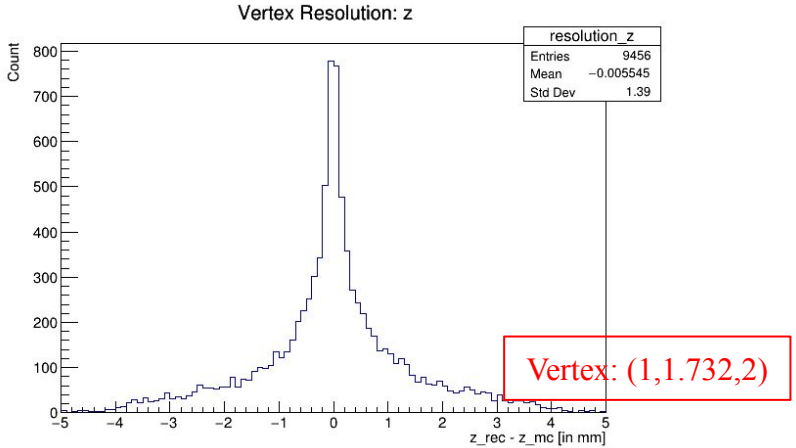




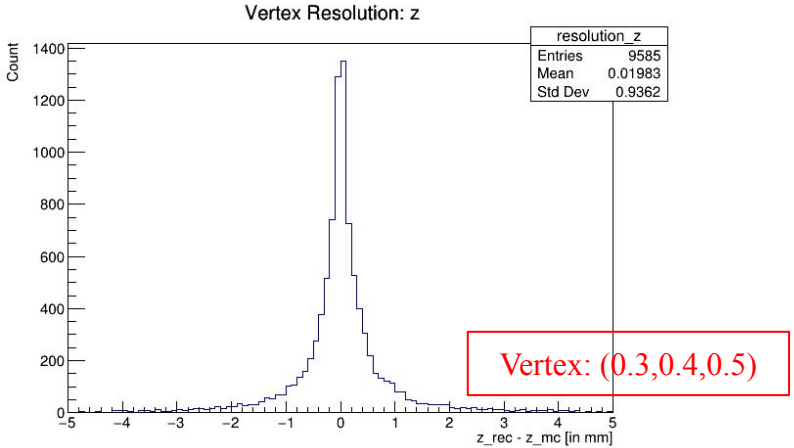
Plots: Resolution z: vertex shifting on both radial and z axis



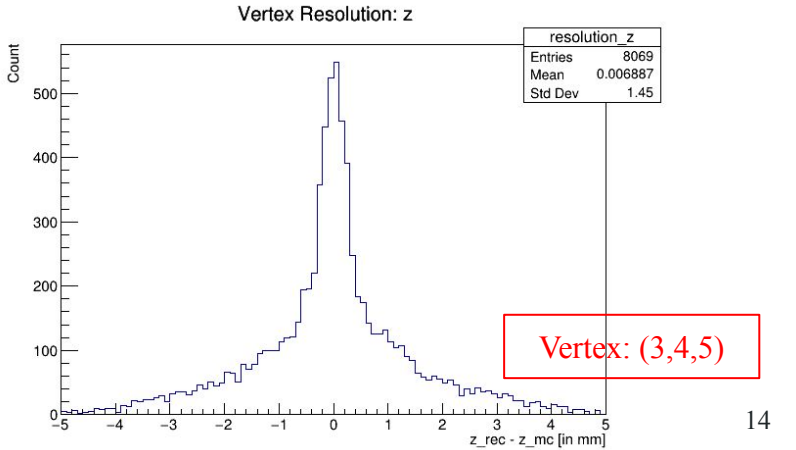
Vertex: (0,0,0)



Vertex: (1,1.732,2)



Vertex: (0.3,0.4,0.5)



Vertex: (3,4,5)

Further Plans

- As Xin suggested that use *FitSlicesY()* analyze the mean and sigma of momentum resolution (p_{rec} - p_{mc}) for each MC momentum (p_{mc}) bin.
- As Sooraj suggested, explore the *CentralTrackVertices* collection and try to get reconstructed vertices from there.

Comments & Suggestions

Please provide your views and suggest what we should explore further