

Simulation Results for the Baseline 2 Tracker

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Fast Simulation

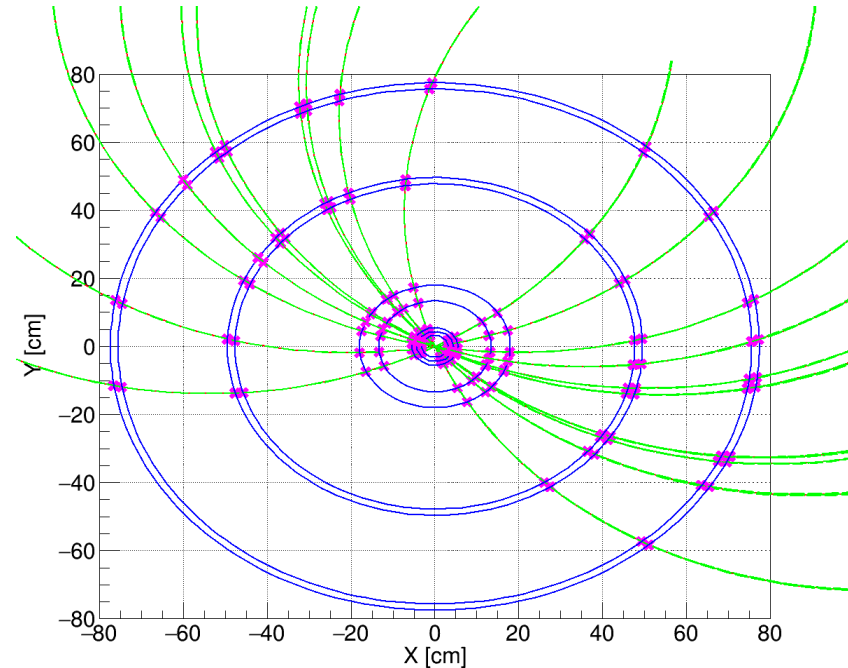
// Vertexing 3 layers Material Budget = 0.05%

```
double si_vtx_r_pos[] = {3.3,4.35,5.4};
```

```
double si_z_vtxlength[] = {28, 28, 28};
```

```
double si_thick_vtx = 0.05/100.*9.37;
```

$$\sigma_{r\phi} = \sigma_z = 10./\sqrt{(12)} \mu m$$



// Barrel Material Budget 0.55 %

```
double si_r_pos[] = {13.34, 17.96};
```

```
double si_z_length[] = {34.34, 46.68};
```

```
double si_thick_bar = 0.55/100.*9.37;
```

$$\sigma_{r\phi} = \sigma_z = 10./\sqrt{(12)} \mu m$$

// Micromegas: Material Budget 0.4 %

```
double BMT_r[4] = {47.72, 49.57, 75.61, 77.46};
```

$$\sigma_{r\phi} = \sigma_z = 150 \mu m$$

Original code

<https://github.com/alismw/AlRoot/tree/master/ITSMFT/ITS/FT1>

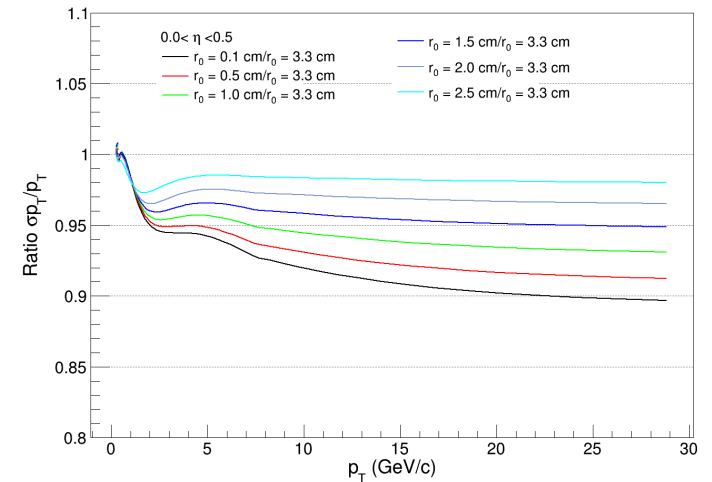
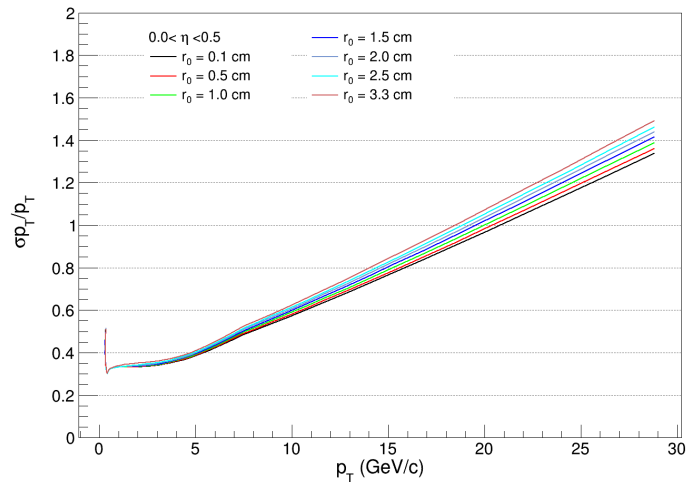
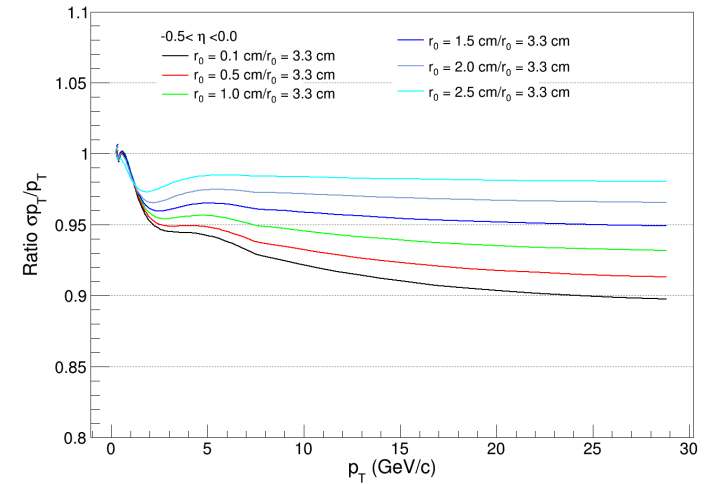
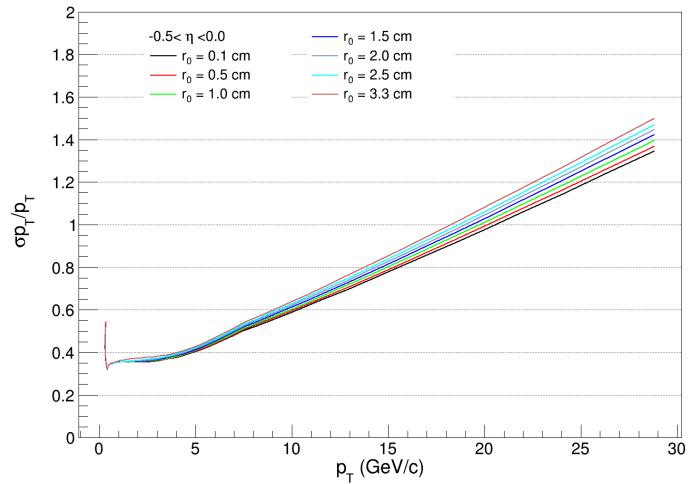
Baseline-2.0

**B: Barrel,
P: Positive,
N: Negative**

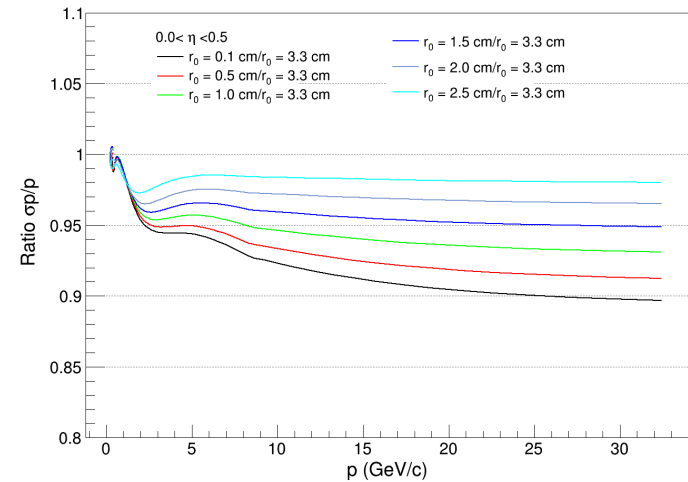
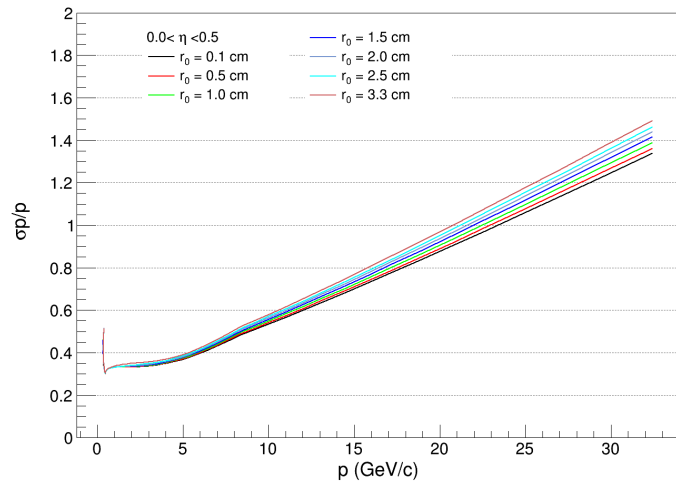
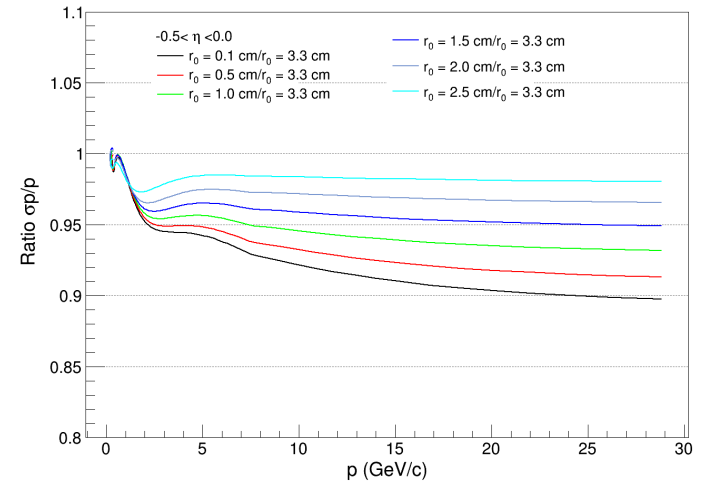
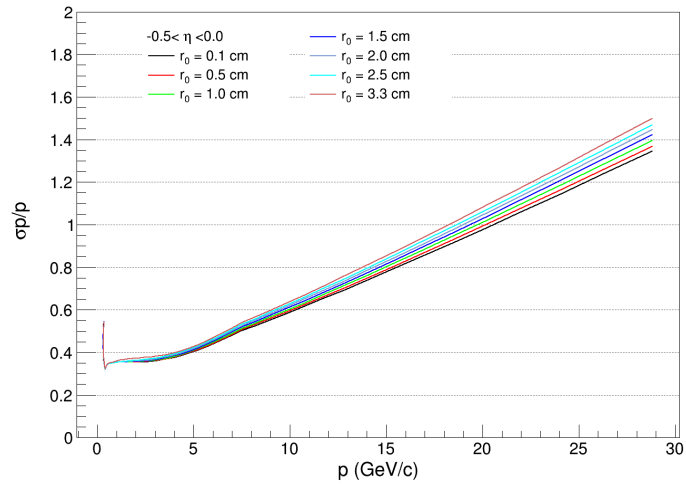
https://github.com/Shyam-Uniba/Shyam-Uniba/blob/main/Fun4All_G4_Baseline2_p.C

<https://github.com/Shyam-Uniba/Shyam-Uniba/blob/main/TrackerFastSim/mychanged/DetectorK.cxx>

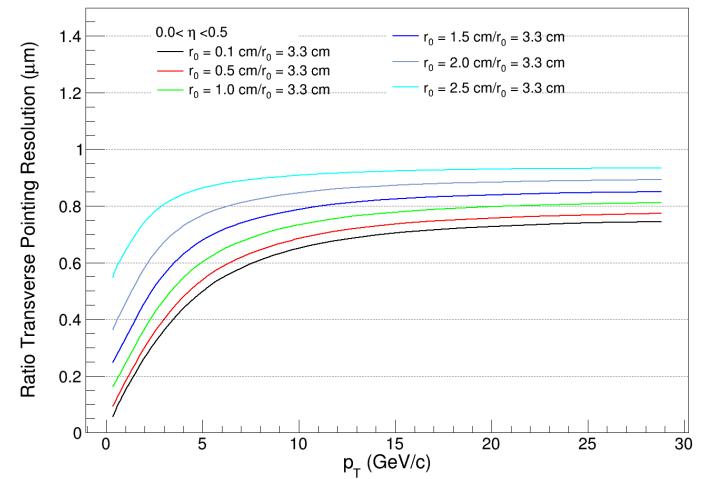
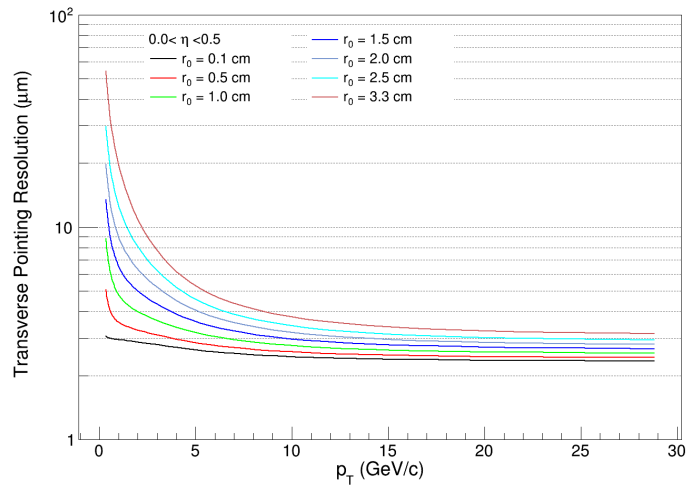
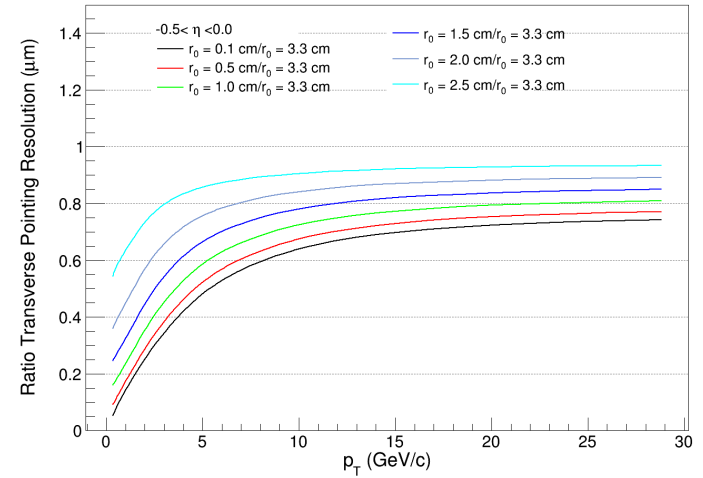
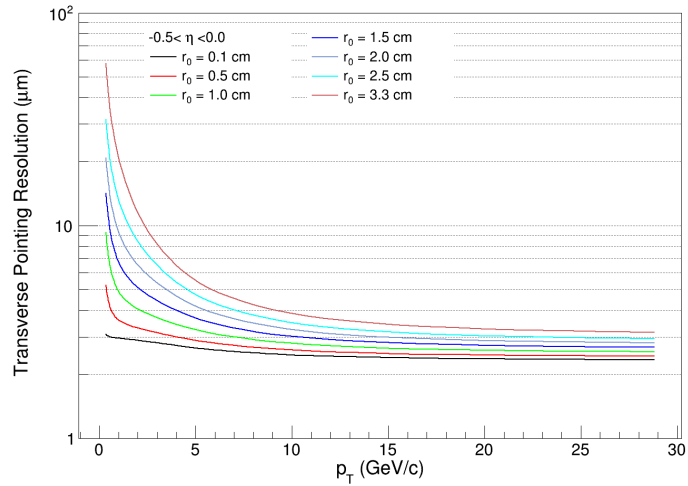
First Layer at different Positions from Vertex



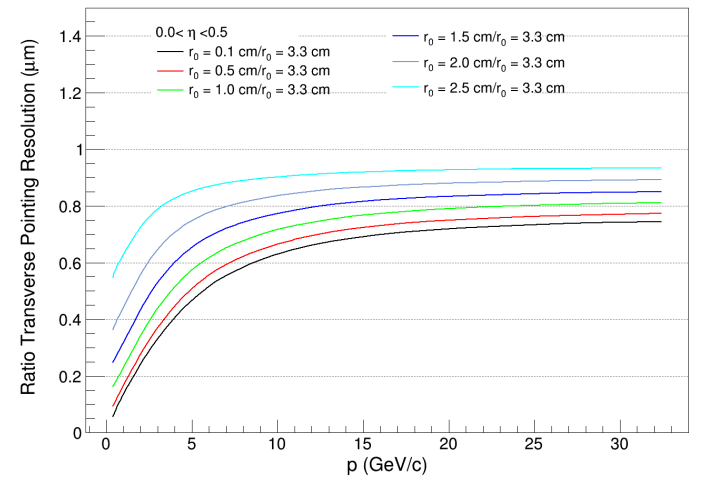
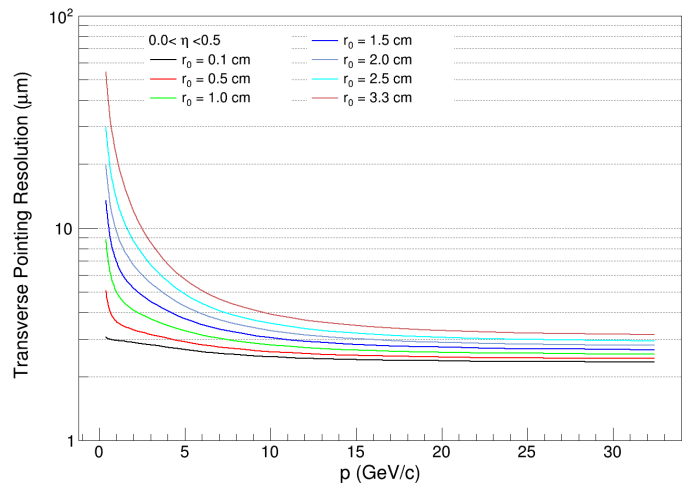
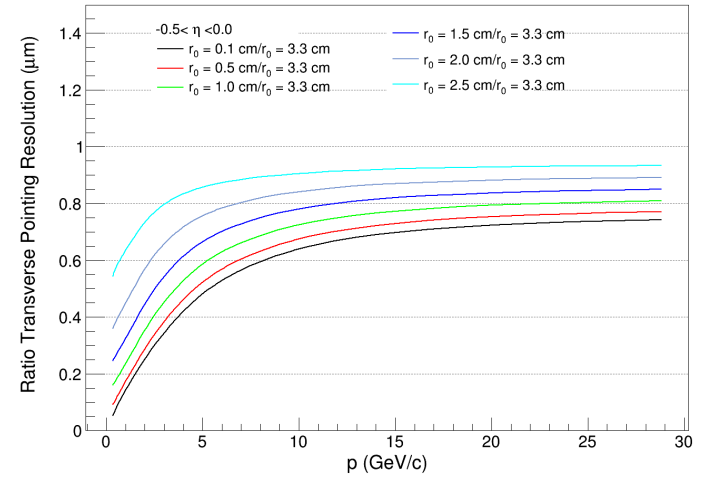
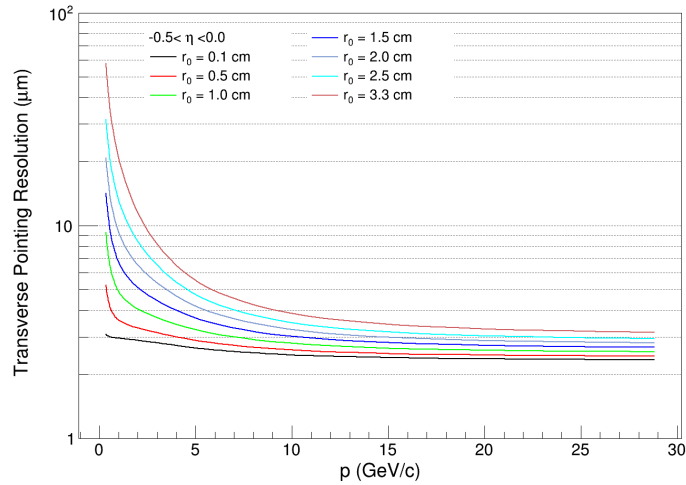
First Layer at different Positions from Vertex



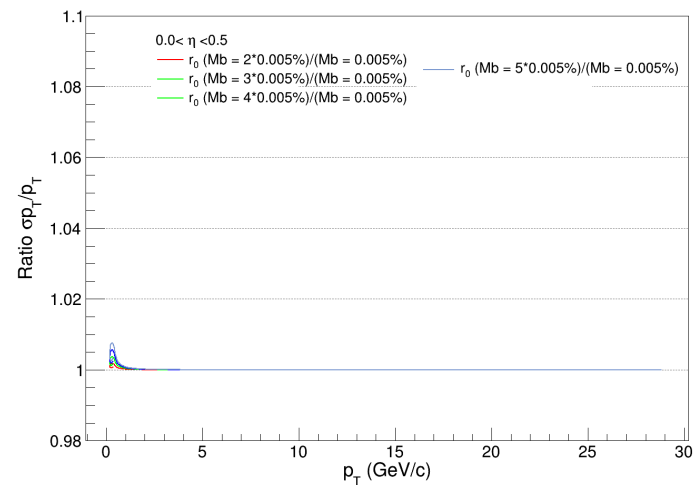
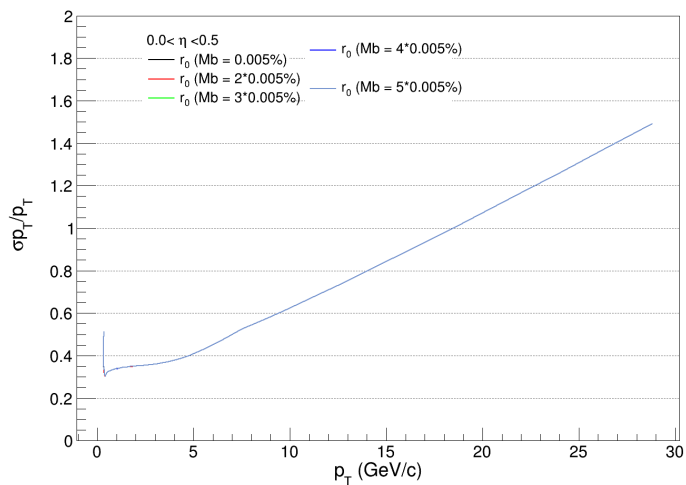
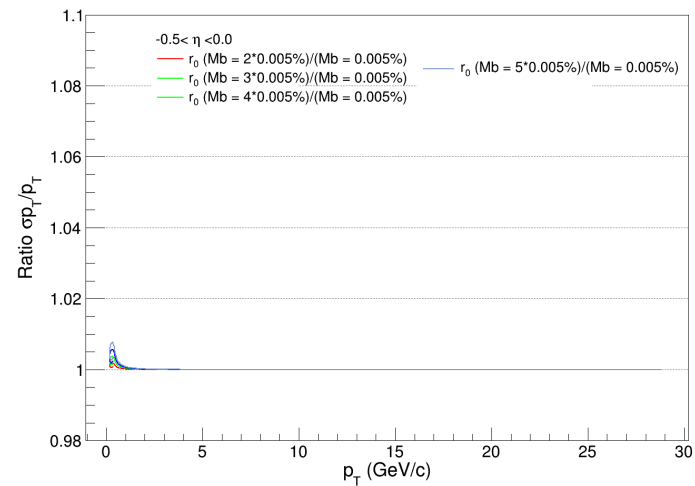
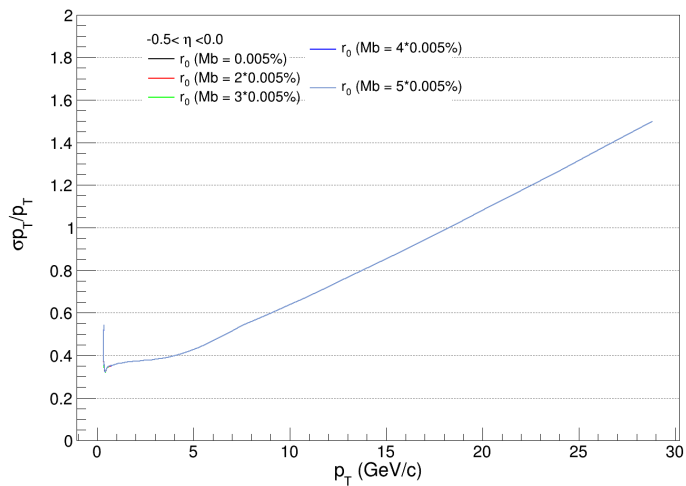
First Layer at different Positions from Vertex



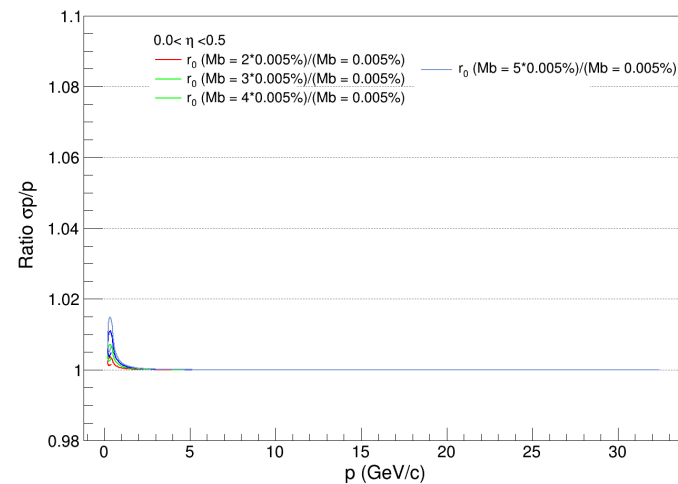
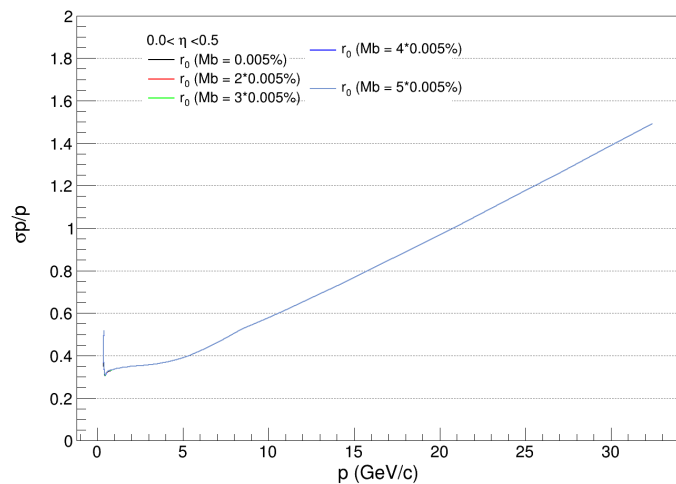
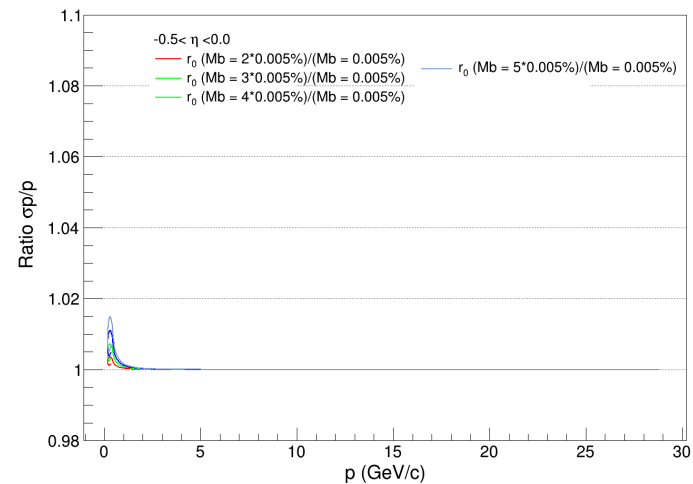
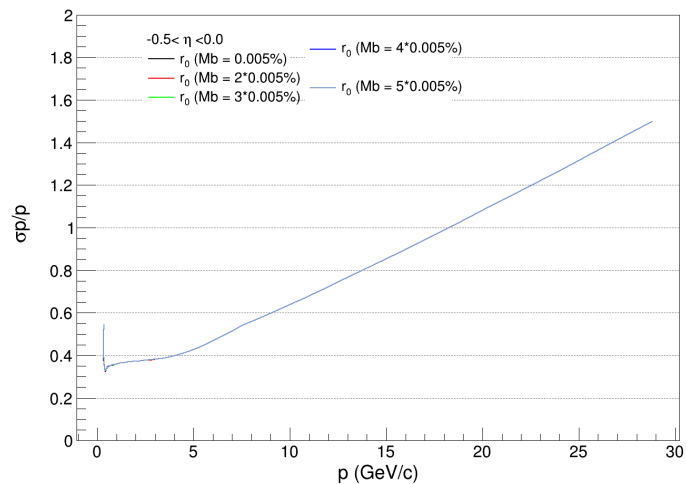
First Layer at different Positions from Vertex



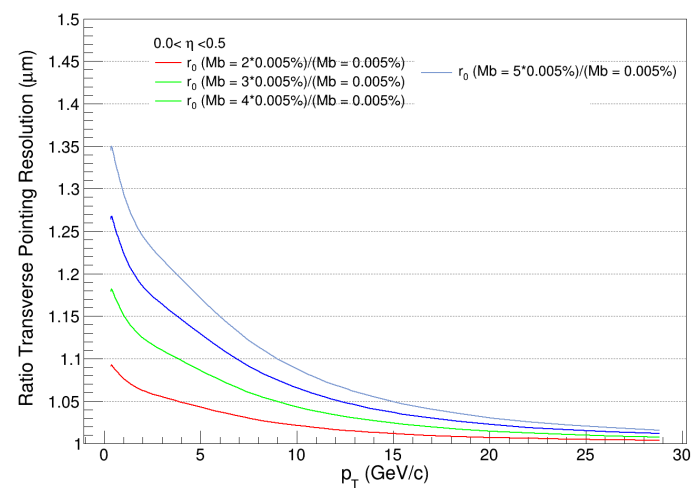
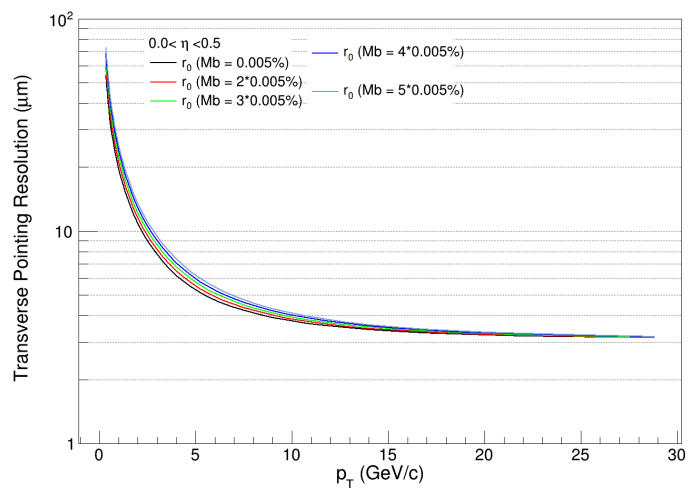
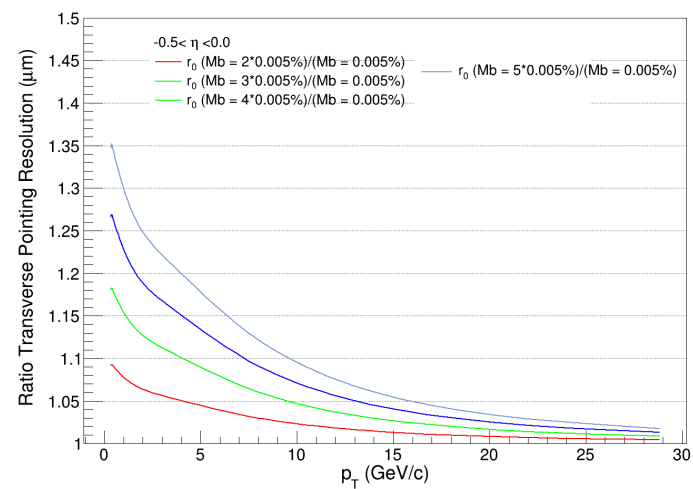
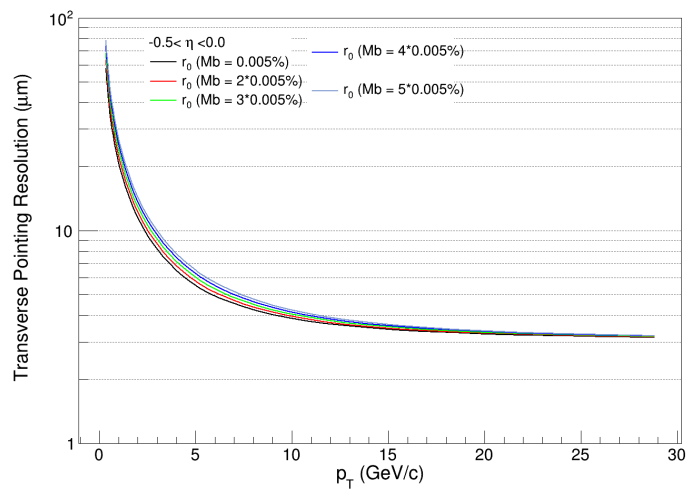
First Layer with Different Material Budget ($r_0 = 3.3$ cm fixed)



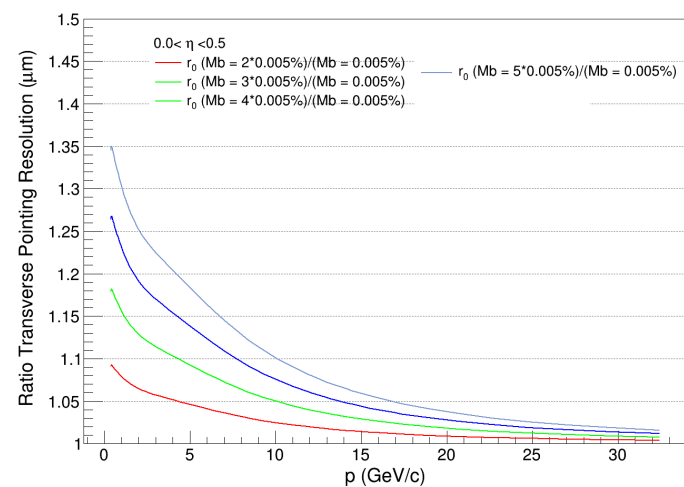
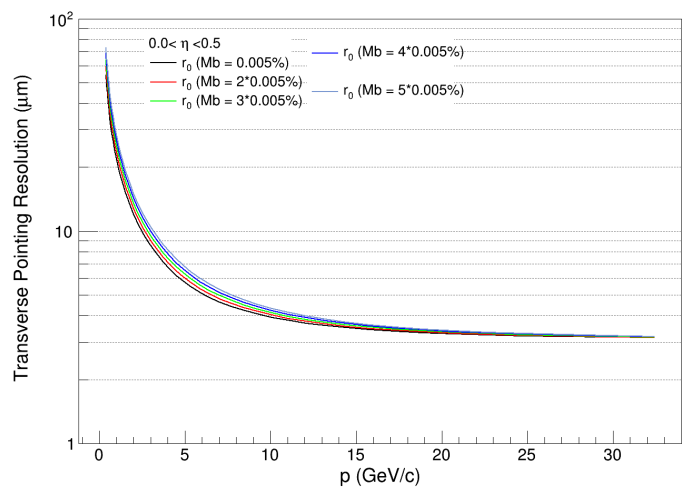
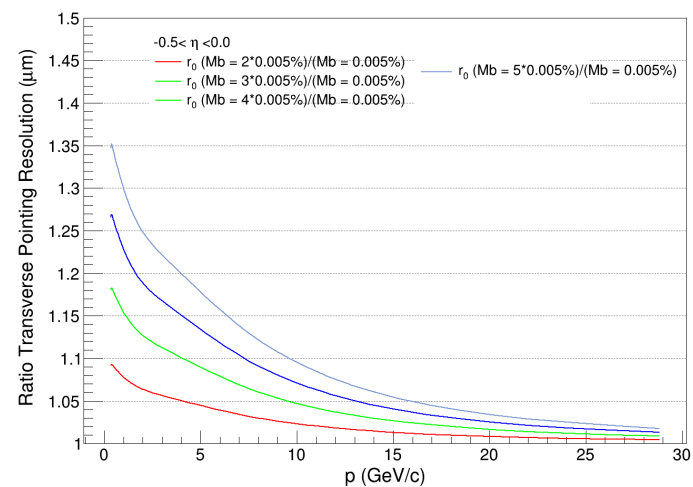
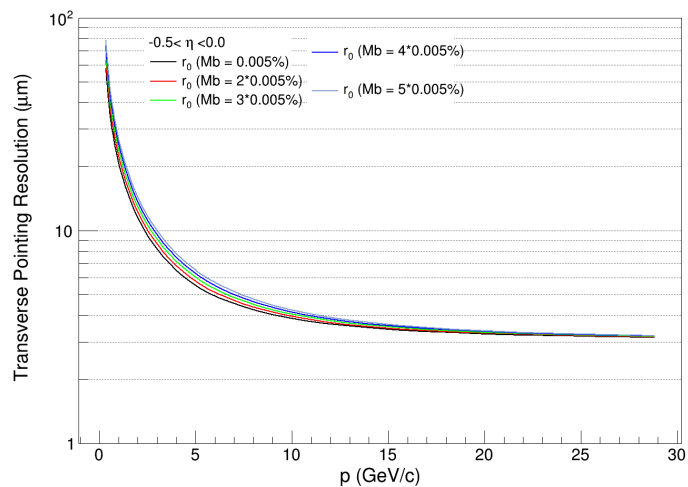
First Layer with Different Material Budget ($r_0 = 3.3$ cm fixed)



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DCA Evaluation

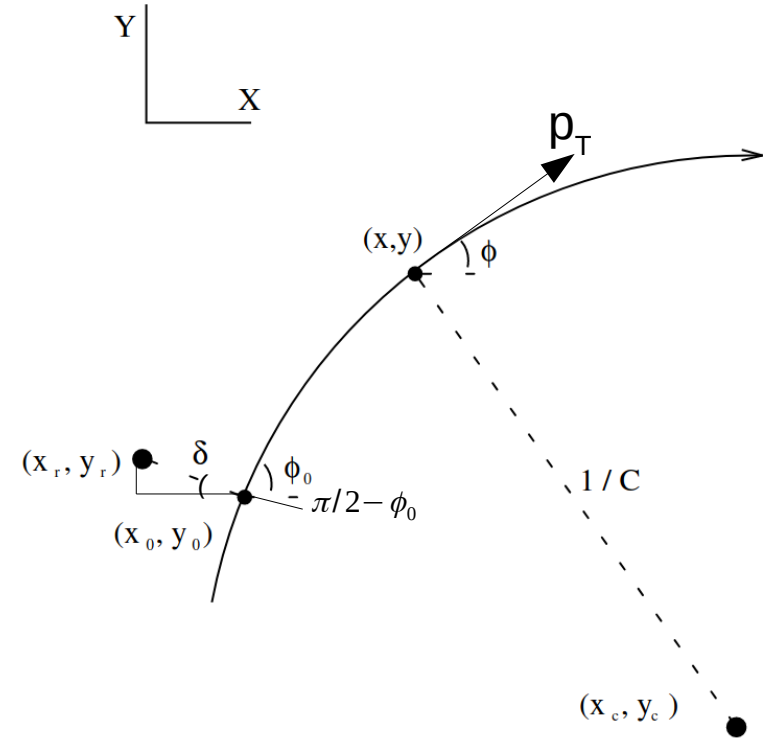
Reference point (primary vertex in our case), DCA point (x_0, y_0) and (x_c, y_c) are not in straight line

$$\sin \phi_0 = \frac{-(x_0 - x_r)}{\delta}$$

$$\cos \phi_0 = \frac{(y_0 - y_r)}{\delta}$$

Signed DCA = δ

$$\phi_0 = \tan^{-1} \left(\frac{p_y}{p_x} \right)$$



In ALICE local y is rotated by $\alpha (= \phi_0)$ w.r.t Global hence local y is simply the DCA_{xy} (Slide 6)

$$y_l = -x_g \sin \alpha + y_g \cos \alpha = -x_g \sin \phi_0 + y_g \cos \phi_0$$

https://desy.de/~fedorch/L3_helix.pdf