An ultra-light drift chamber with particle identification capabilities

corrections

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Expected spatial resolution

Expected Performance: Track parameters resolutions

n = 112, B = 2.0 T, R_{out} = 2.05 m, L = 3.0 m or 5.43x10^{-3} X_0, σ_{xy} = 100 μm, σ_z = 1.0 mm

measurement

$$\frac{\Delta p_\perp}{p_\perp} = \frac{8\sqrt{5}\sigma}{.3BR_{out}^2\sqrt{n}} p_\perp = 6.7\times10^{-5}\, p_\perp [GeV/c]$$

$$\Delta\phi_0 = \frac{4\sqrt{3}\sigma}{R_{out}\sqrt{n}} = 3.2\times10^{-5}$$

$$\Delta\theta = \frac{\sqrt{12}\sigma_z}{R_{out}\sqrt{n}} \frac{1+\tan^2\theta}{\tan^2\theta} = 1.6\times10^{-4} \frac{1+\tan^2\theta}{\tan^2\theta}$$

multiple scattering (gas + wires)

$$\frac{\Delta p_\perp}{p_\perp} = \frac{0.0523[GeV/c]}{\beta BL}\sin\theta\sqrt{\frac{L}{X_0}} = \frac{6.4\times10^{-4}[GeV/c]}{\beta}\sin\theta$$

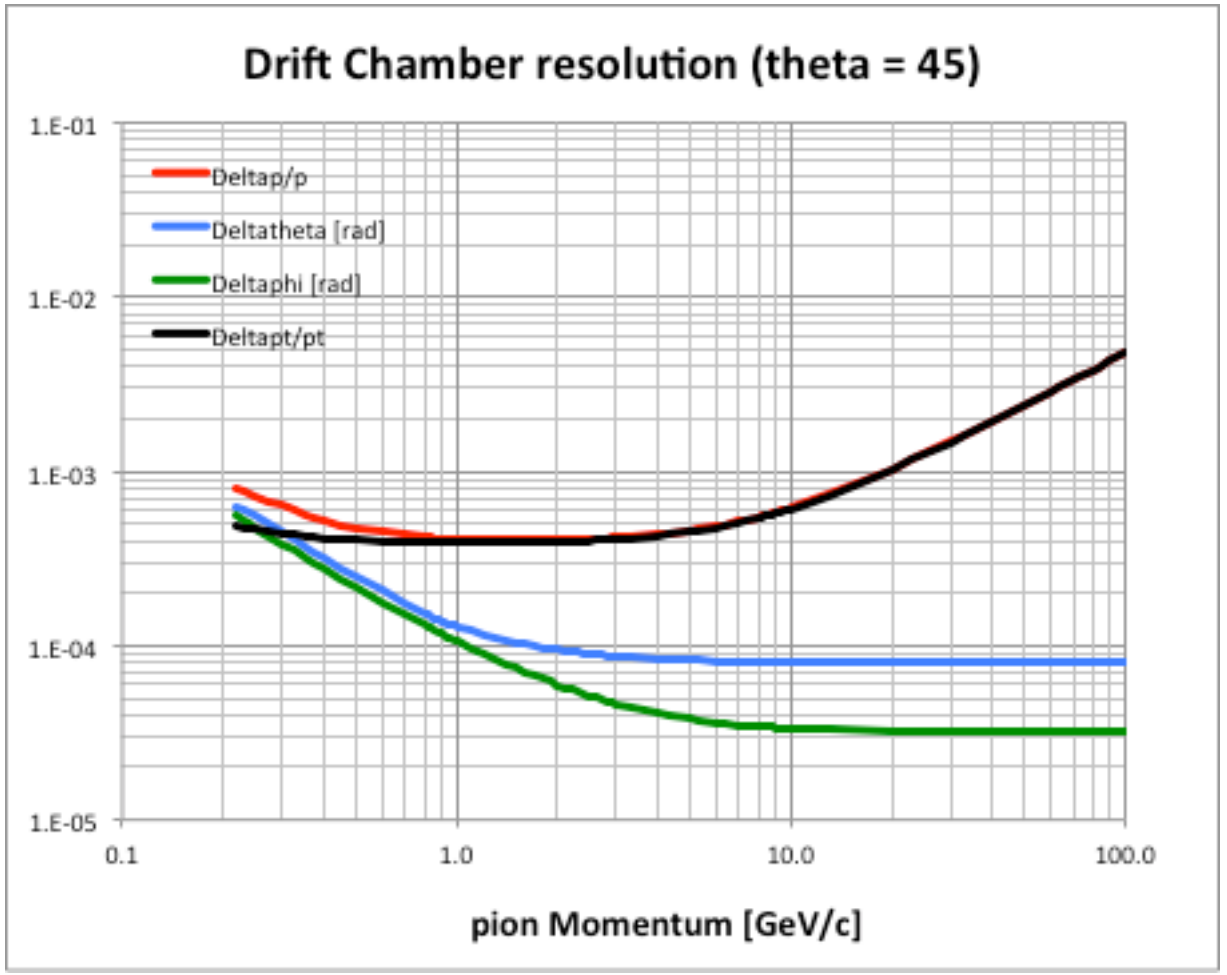
$$\Delta\phi_0 = \frac{13.6\times10^{-3}[GeV/c]}{\beta p}\sqrt{\frac{L}{X_0}} = \frac{1.0\times10^{-3}[GeV/c]}{\beta p}$$

$$\Delta\theta = \frac{13.6\times10^{-3}[GeV/c]}{\beta p}\sqrt{\frac{L}{X_0}} = \frac{1.0\times10^{-3}[GeV/c]}{\beta p}$$

$$\frac{\Delta p_\perp}{p_\perp} = 6.4\times10^{-4}; \quad \frac{\Delta p}{p} = \frac{\Delta p_\perp}{p_\perp} \oplus \frac{\Delta\theta}{\tan\theta} = 7.2\times10^{-4}$$

for $p = 10$ GeV/c and $\theta = 45°$

Expected spatial resolution



Expected spatial resolution