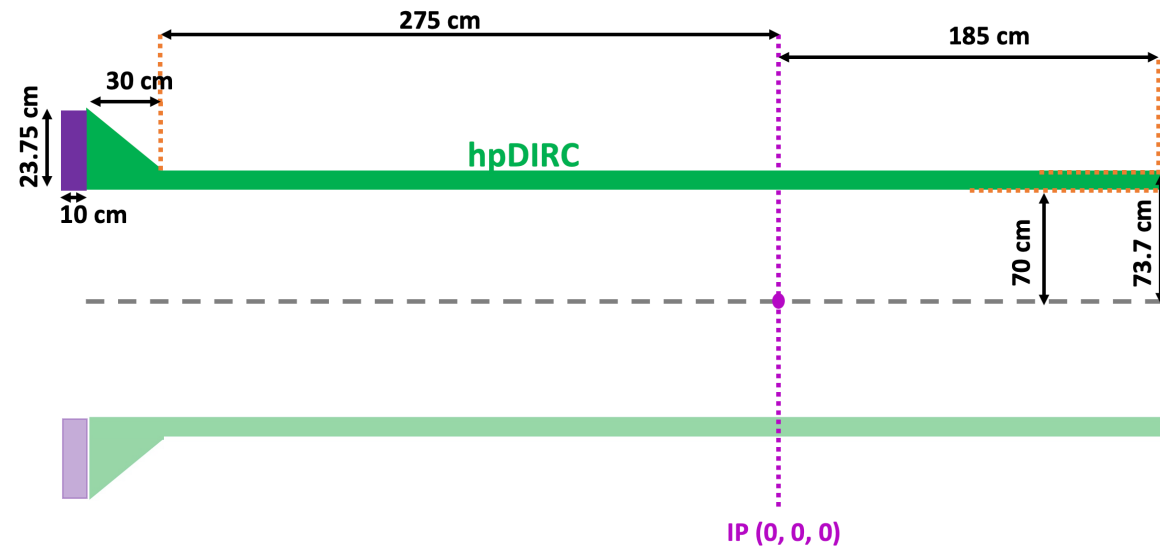
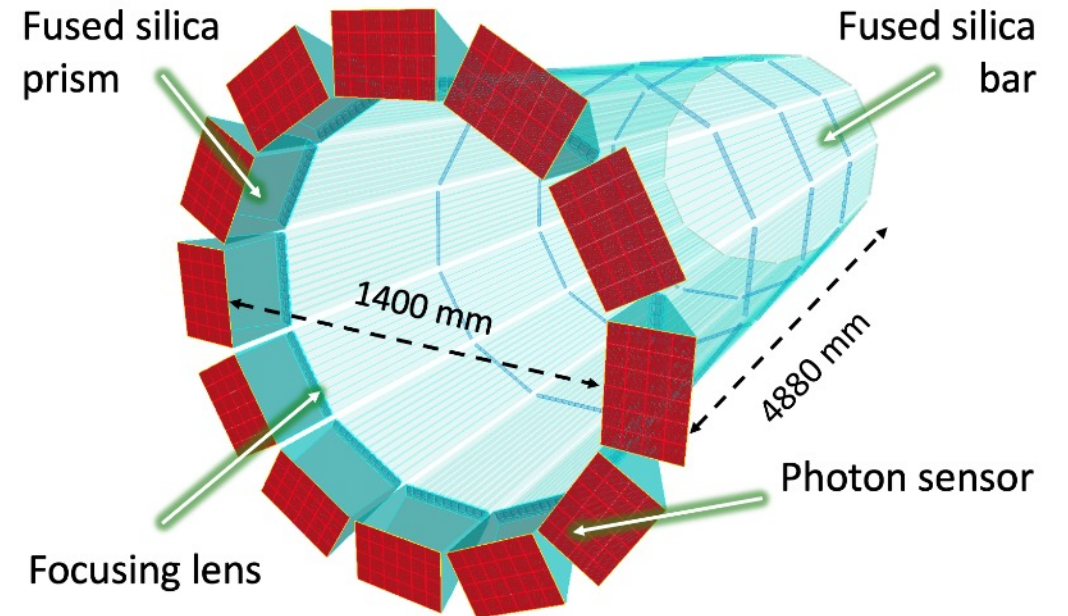
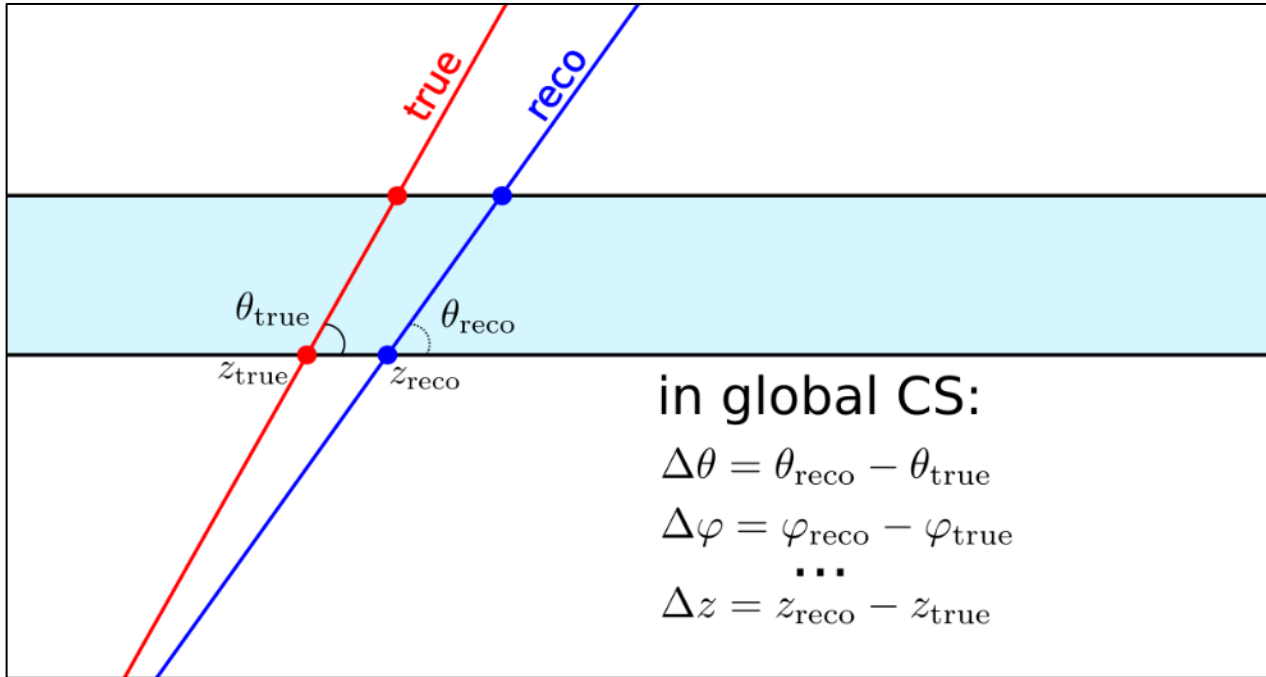


HPDIRC TRACKING DEFINITION



HPDIRC RESOLUTION

π/K Cherenkov angle difference at 6 GeV/c in fused silica: $\Delta\theta_c = 2.9$ mrad

→ required Cherenkov angle resolution per particle < 1mrad

DIRC hit pattern not a “ring” → much more difficult to reliably fit for “ring center”

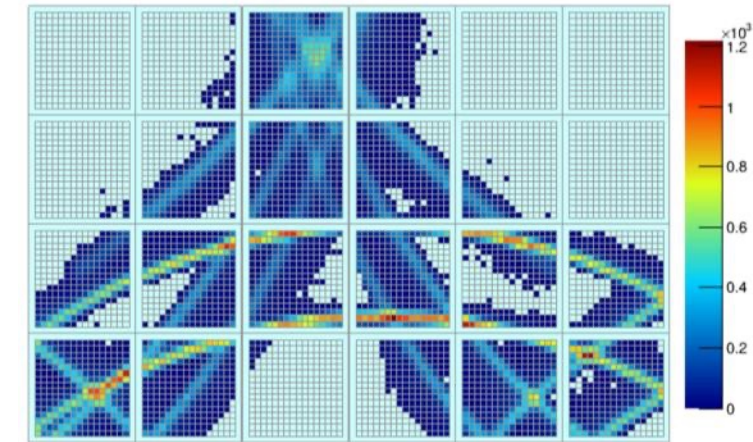
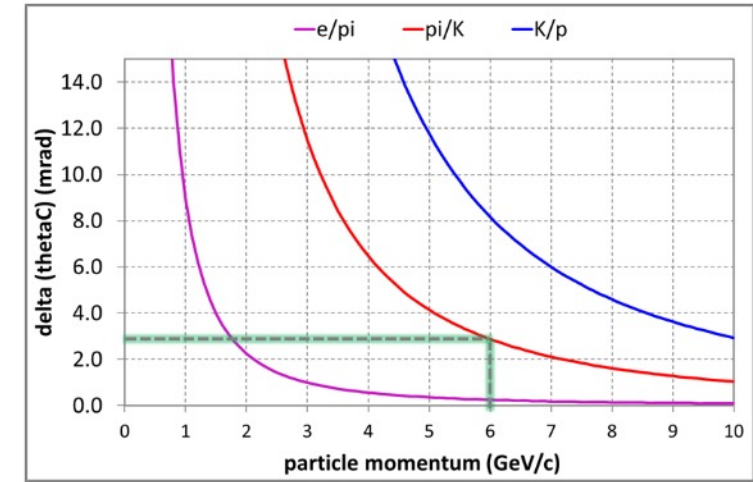
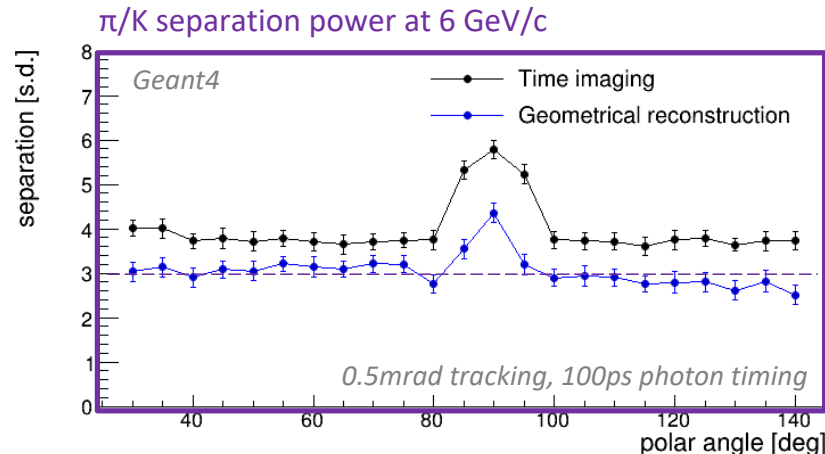
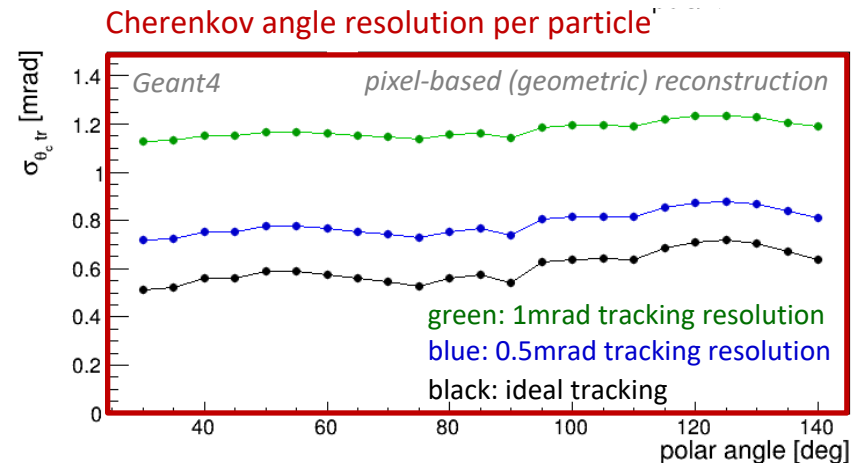
than for other RICHes, more sensitivity to angular tracking resolution

Angular resolution of tracking system enters Cherenkov angle resolution

per particle as “correlated term” (just like multiple scattering in bar, etc)

Yellow Report: “this places a restriction on the tracking performance at the level of 0.5 mrad”

$$\sigma_{\theta_c}^2(\text{particle}) = \sigma_{\theta_c}^2(\text{photon}) / N_\gamma + \sigma_{\text{correlated}}^2$$



HPDIRC PERFORMANCE

$$\sigma_{\theta_c}^2(\text{particle}) = \sigma_{\theta_c}^2(\text{photon}) / N_\gamma + \sigma_{\text{correlated}}^2$$

$\sigma_{\theta_c}(\text{particle})$ Cherenkov angle resolution per particle

$\sigma_{\theta_c}(\text{photon})$ Cherenkov angle resolution per photon

N_γ Number of detected photons per particle

$\sigma_{\text{correlated}}$ Contribution from external sources (tracking, multiple scattering, etc.)

Maximum allowed contribution from *correlated term* while keeping hpDIRC π/K separation power at 3 s.d.

