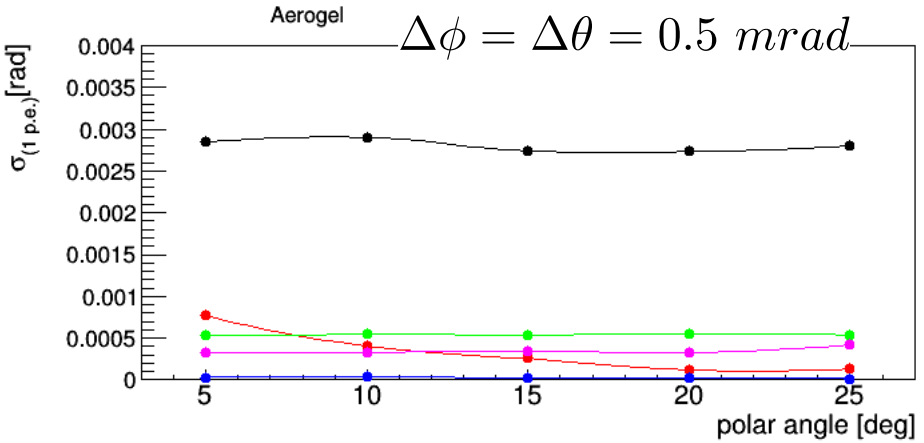
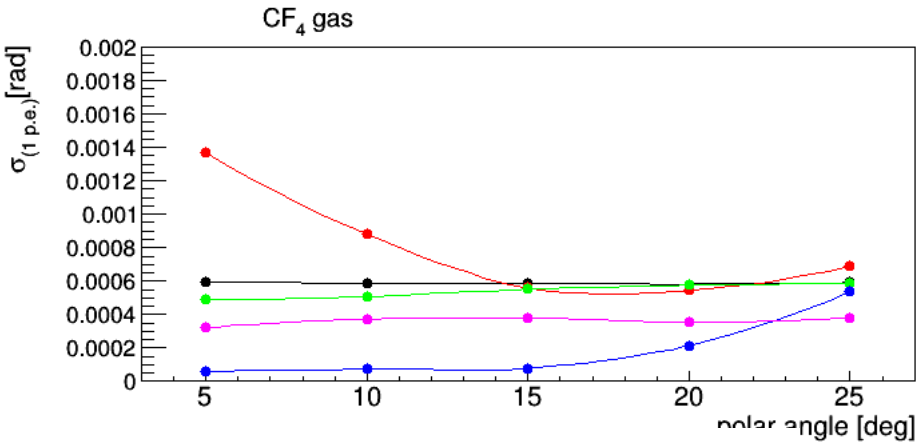
Dual-radiator RICH: update

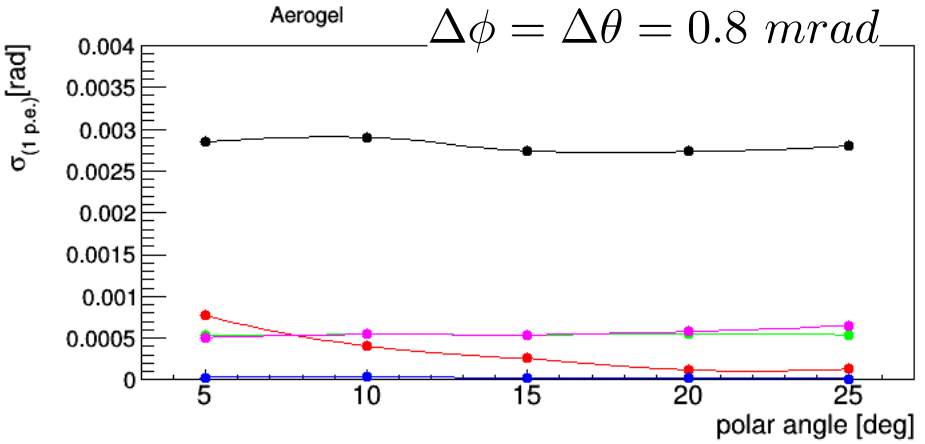
Alessio Del Dotto for the EIC PID/RICH collaboration
July 18, 2016

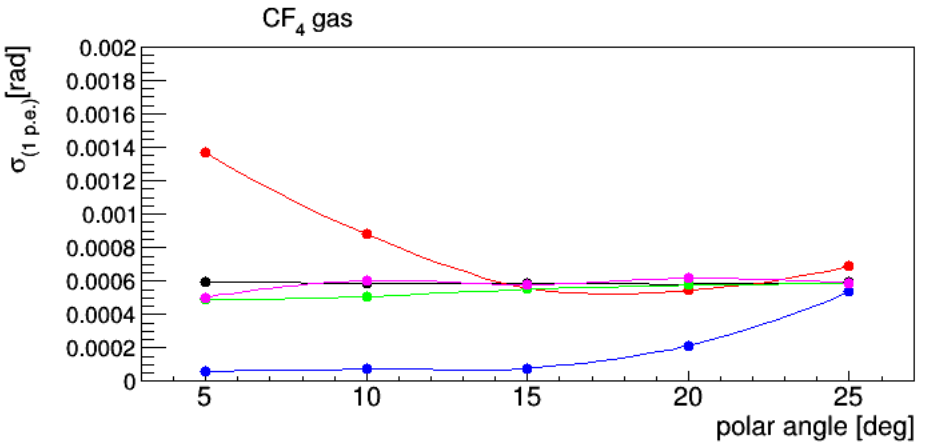
1 p.e. errors comparison (p = 30 GeV/c)

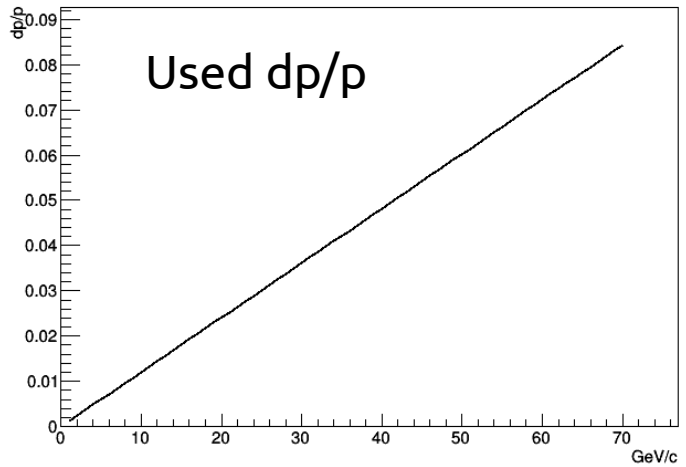




Chromatic
Emission
Pixel 3mm
Field
Track



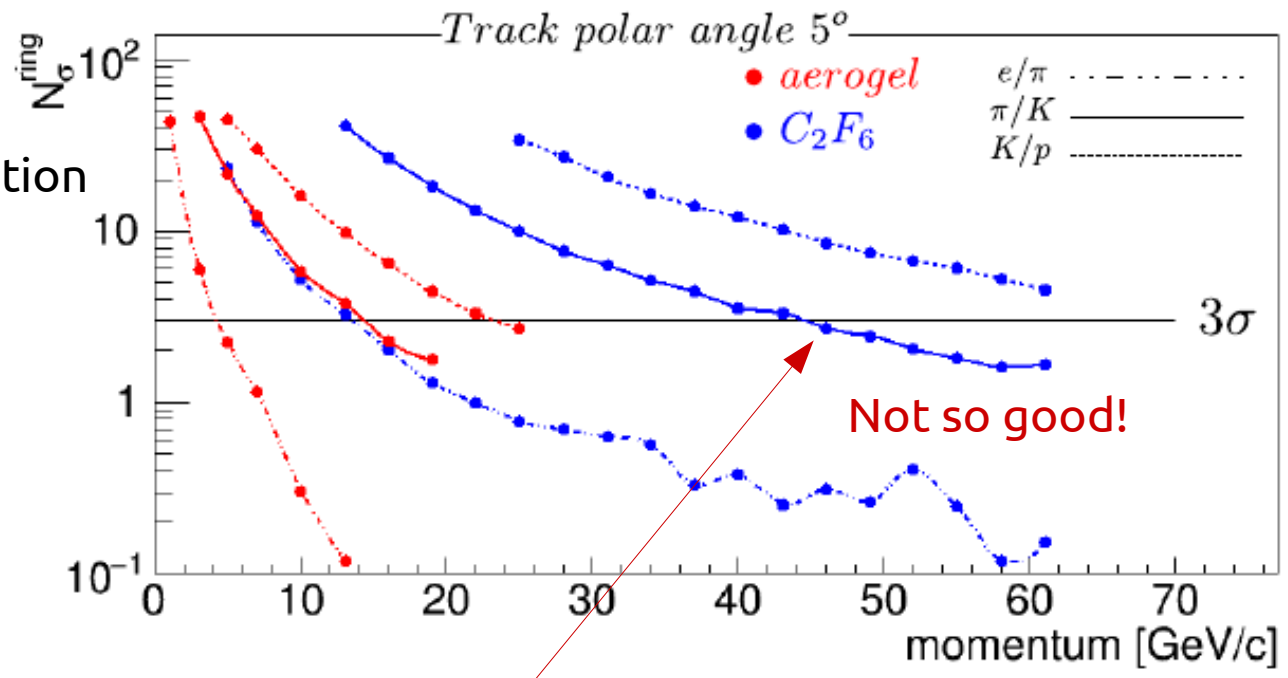


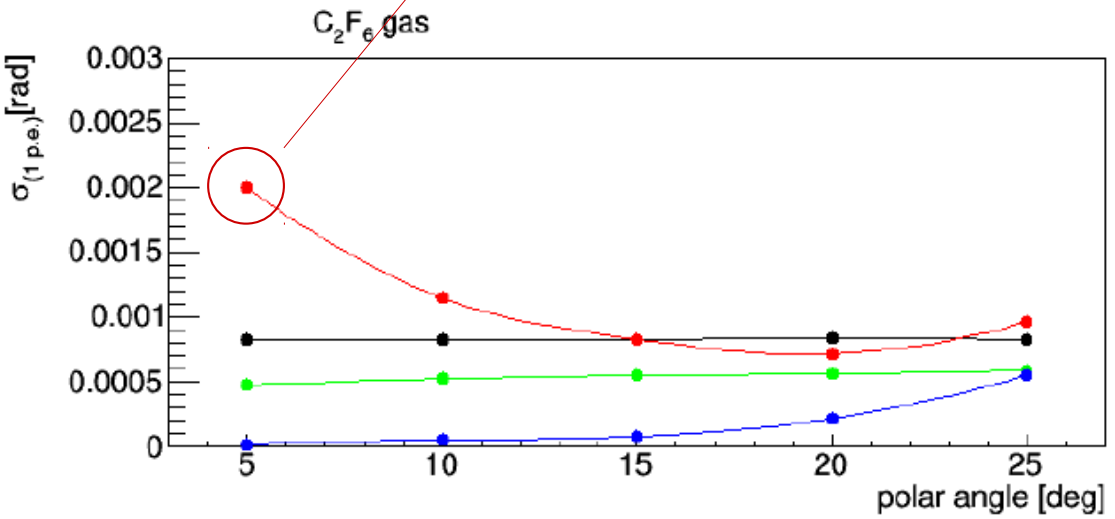


For sure we can tolerate up to 0.8 mrad with CF_4

Let us skip to C_2F_6 at 5°

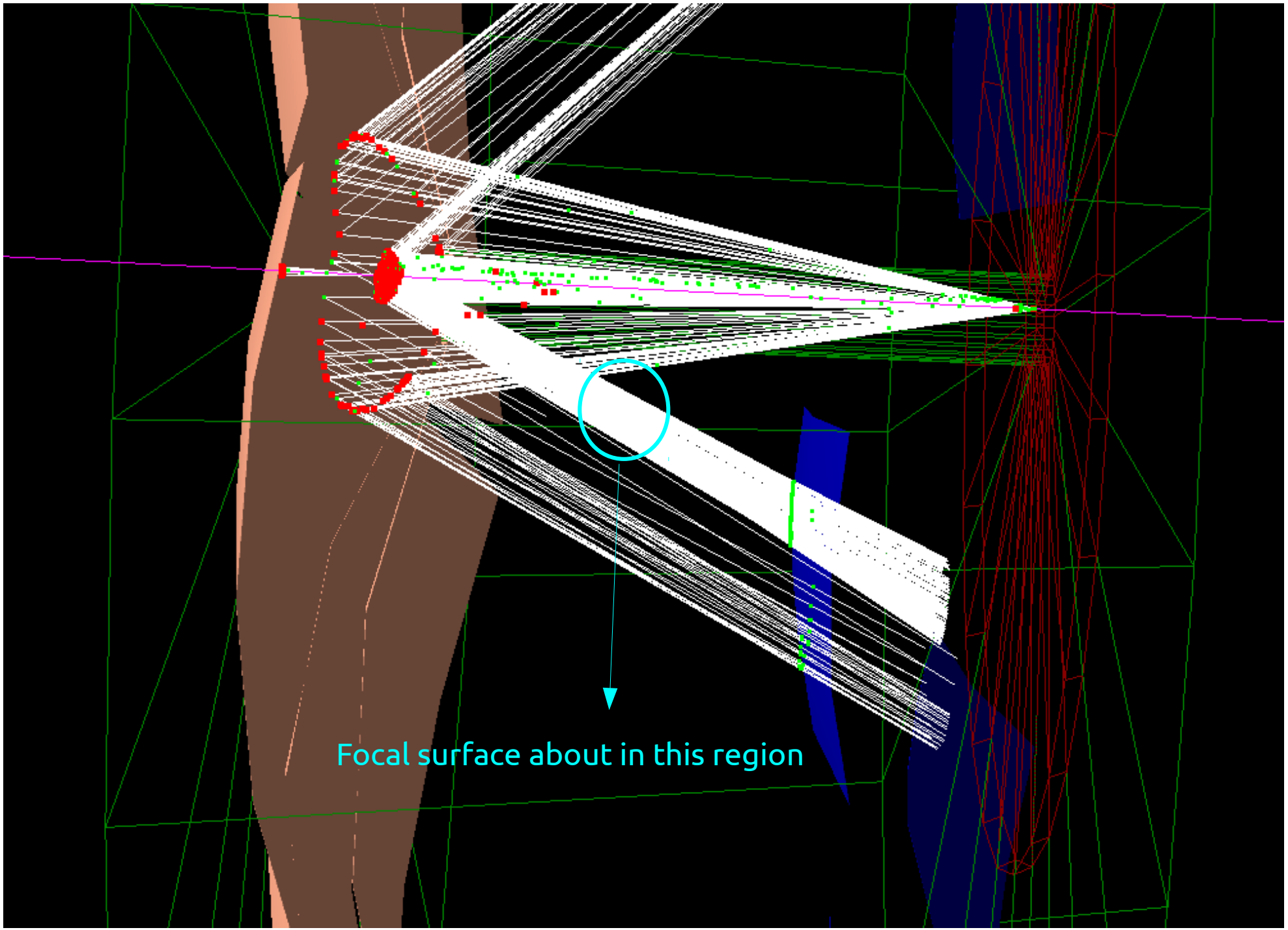
With the same configuration used for CF_4



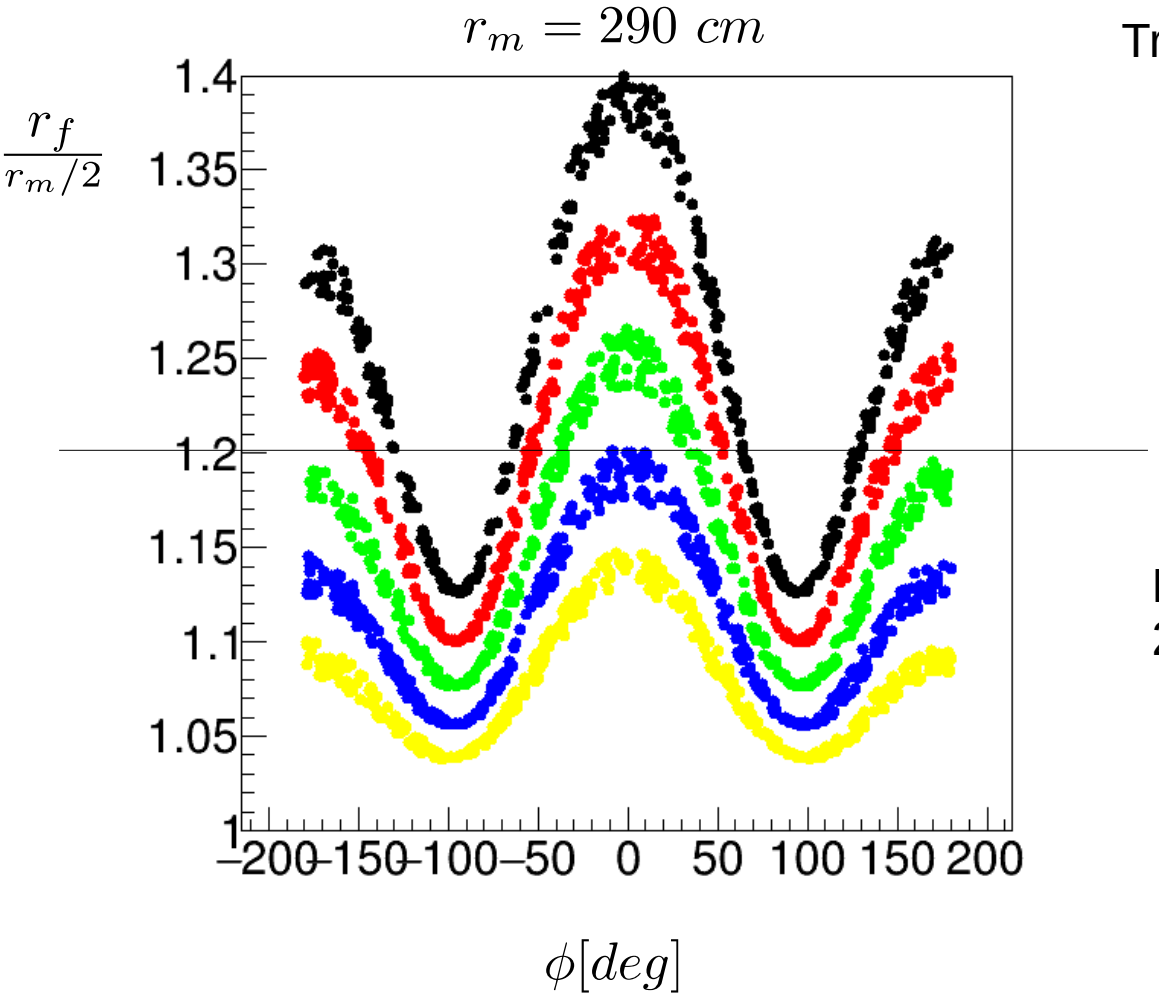


The focal plane at 5° is far iside the angular acceptance region

At 5°



New configuration – C_2F_6 gas



Position of the focal r_f with respect to the "naive" sphere $r_m/2$

Track polar angle

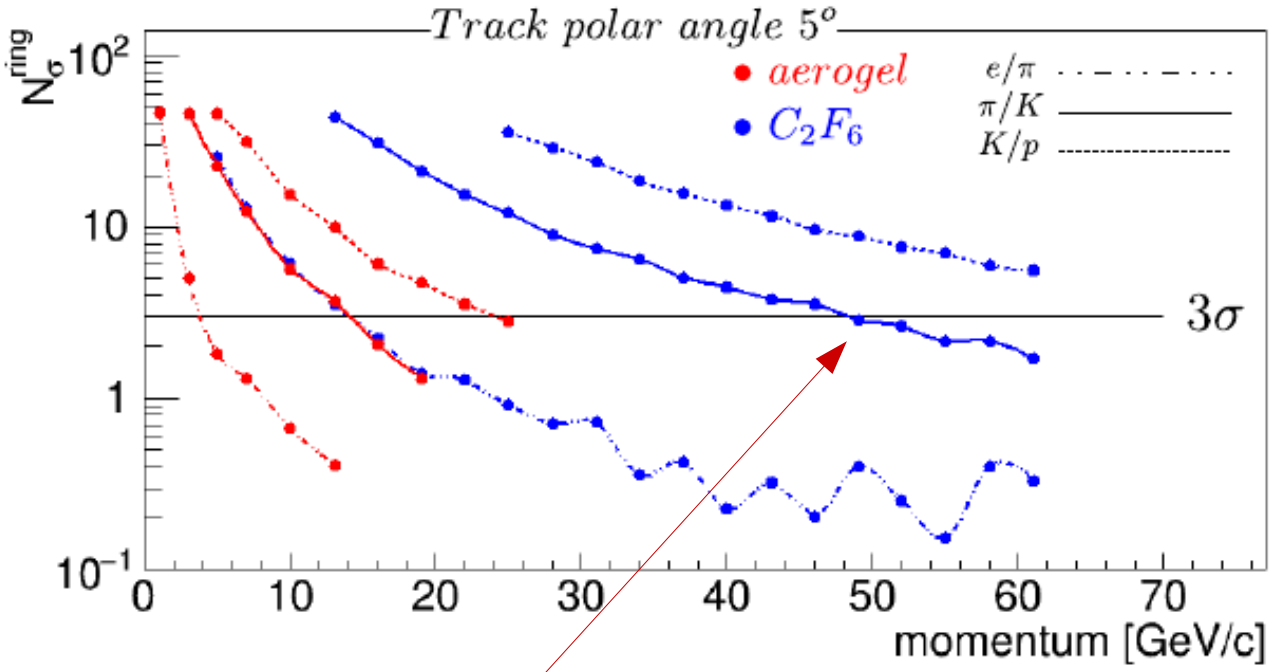
θ = 5°
θ = 10°
θ = 15°
θ = 20°
θ = 25°

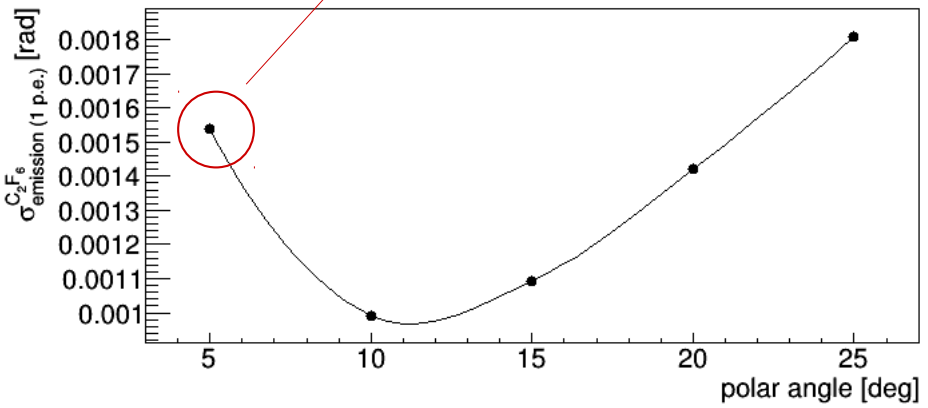
Detector position

Mirror tilt angle: 28°

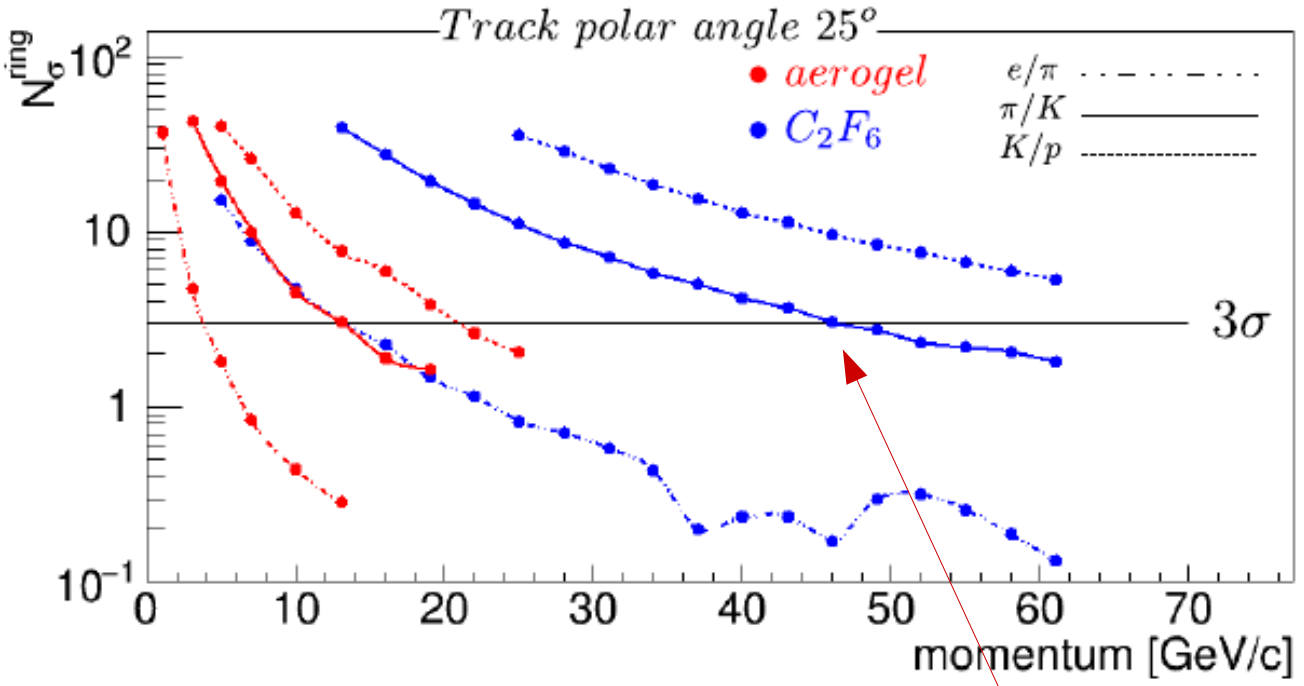
Azhimutal angle of the photons with respect to the track direction

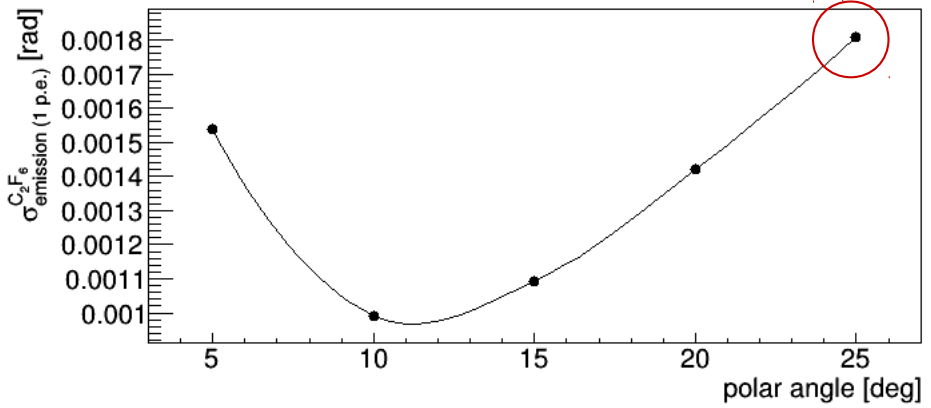
C_2F_6 at 5° - new configuration





C_2F_6 at 25° - new configuration

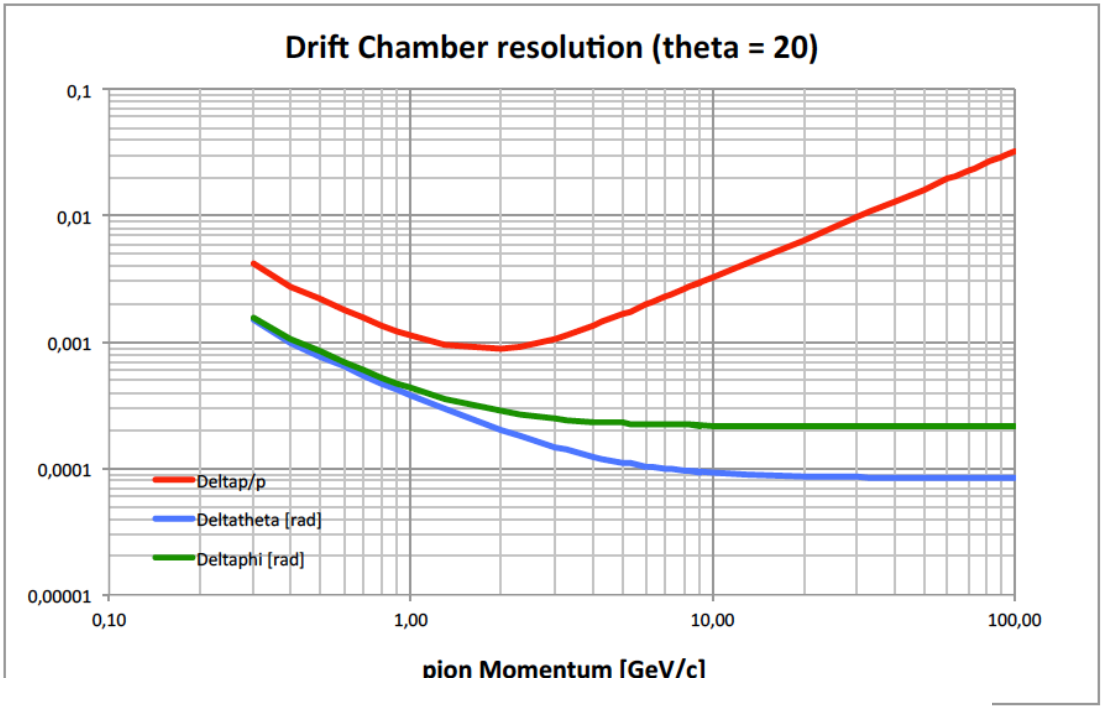




Comments

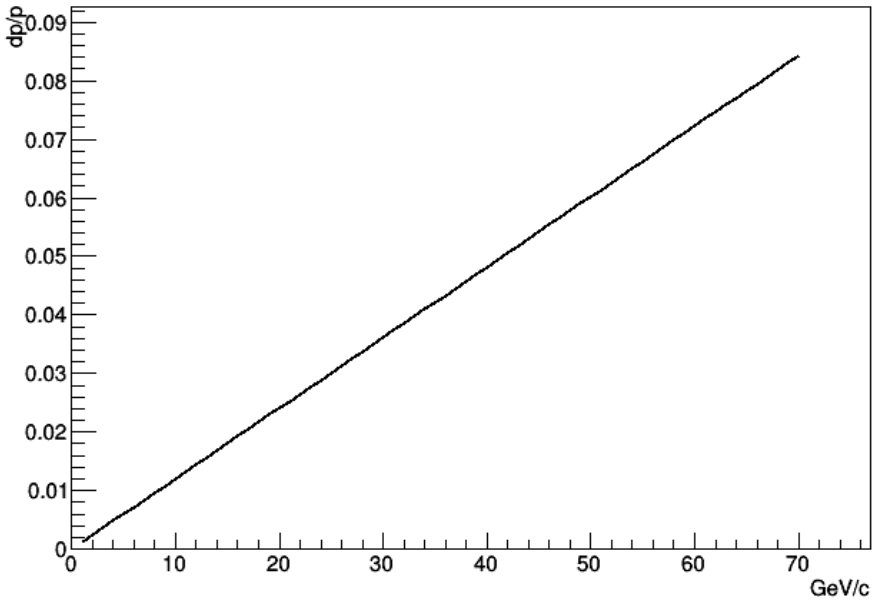
- C_2F_6 not so simple to manage in the given small space, with this baseline configuration
- A trade-off between small and large angles may be necessary using C_2F_6, i.e. preferring small angle region

Particle track resolution effects on RICH



Plot by the INFN Lecce group

$$\Delta\phi = \Delta\theta = 0.8\ mrad$$



I have assumed this error for dp/p at 15°

And a constant error of 0.5 mrad for the angular resolution