Pion / Kaon separation with the ToP-Endcap-Dirc-Design

July 2007

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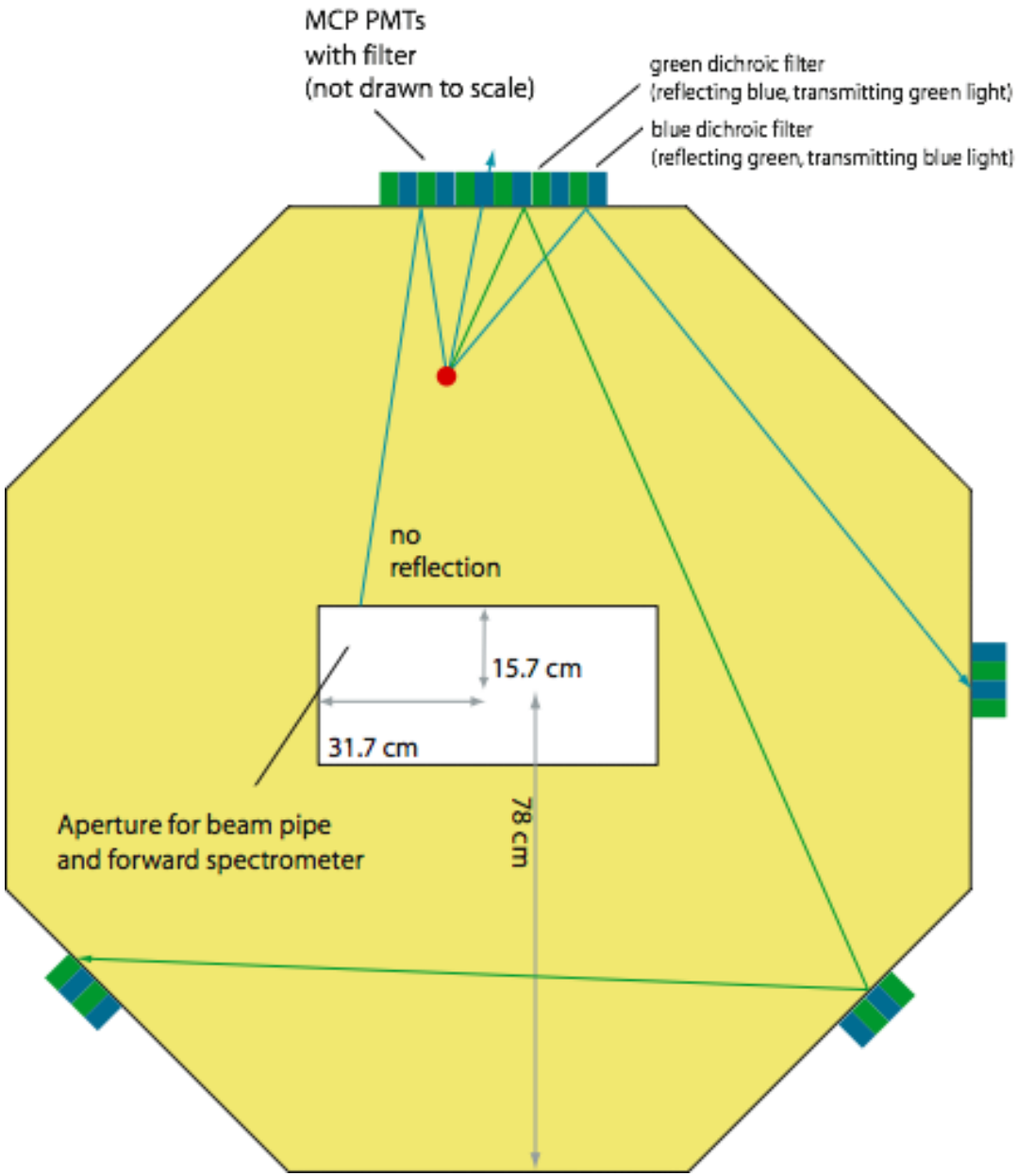
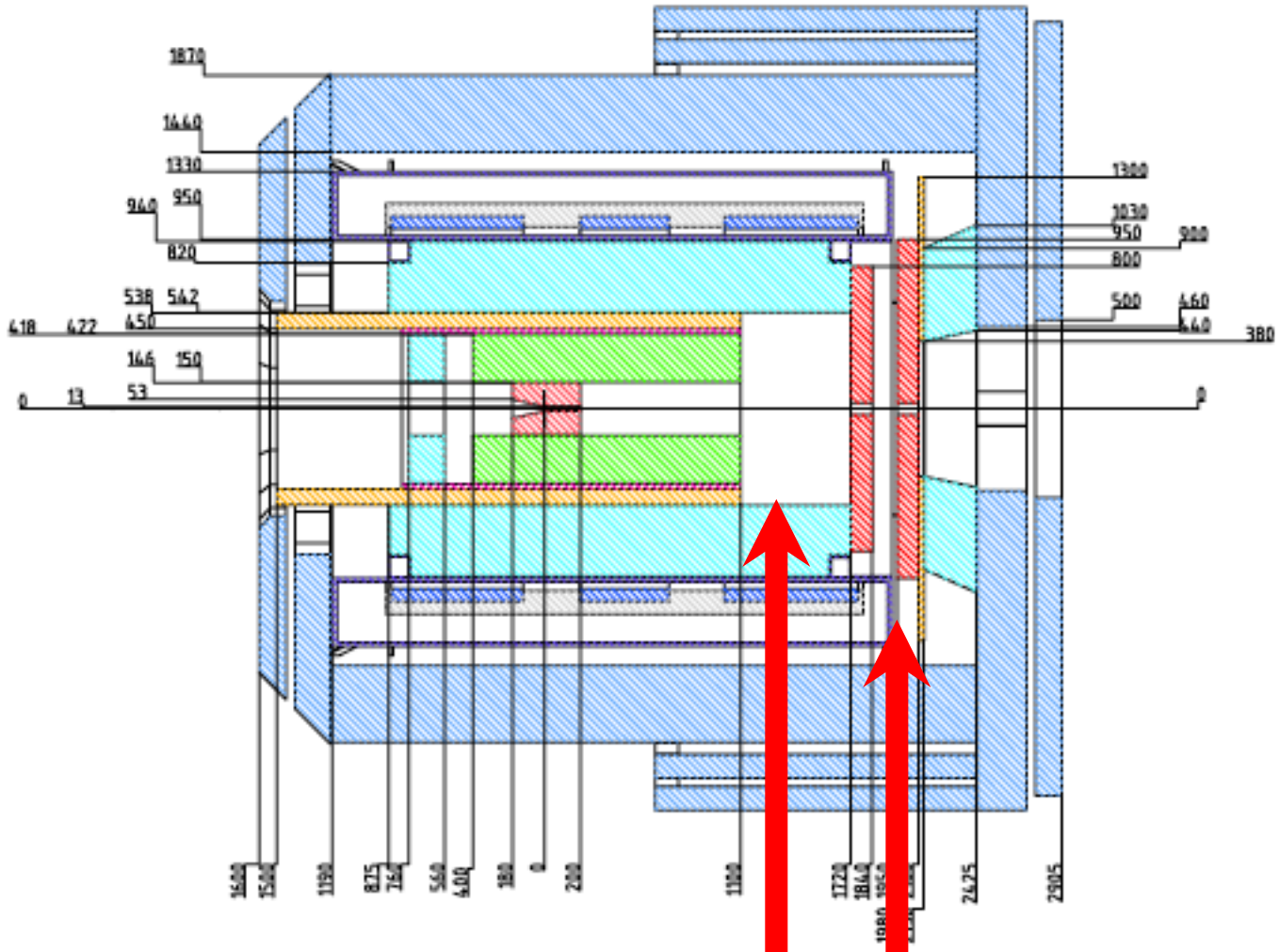
NEW: Smaller Endcap DIRC Disk

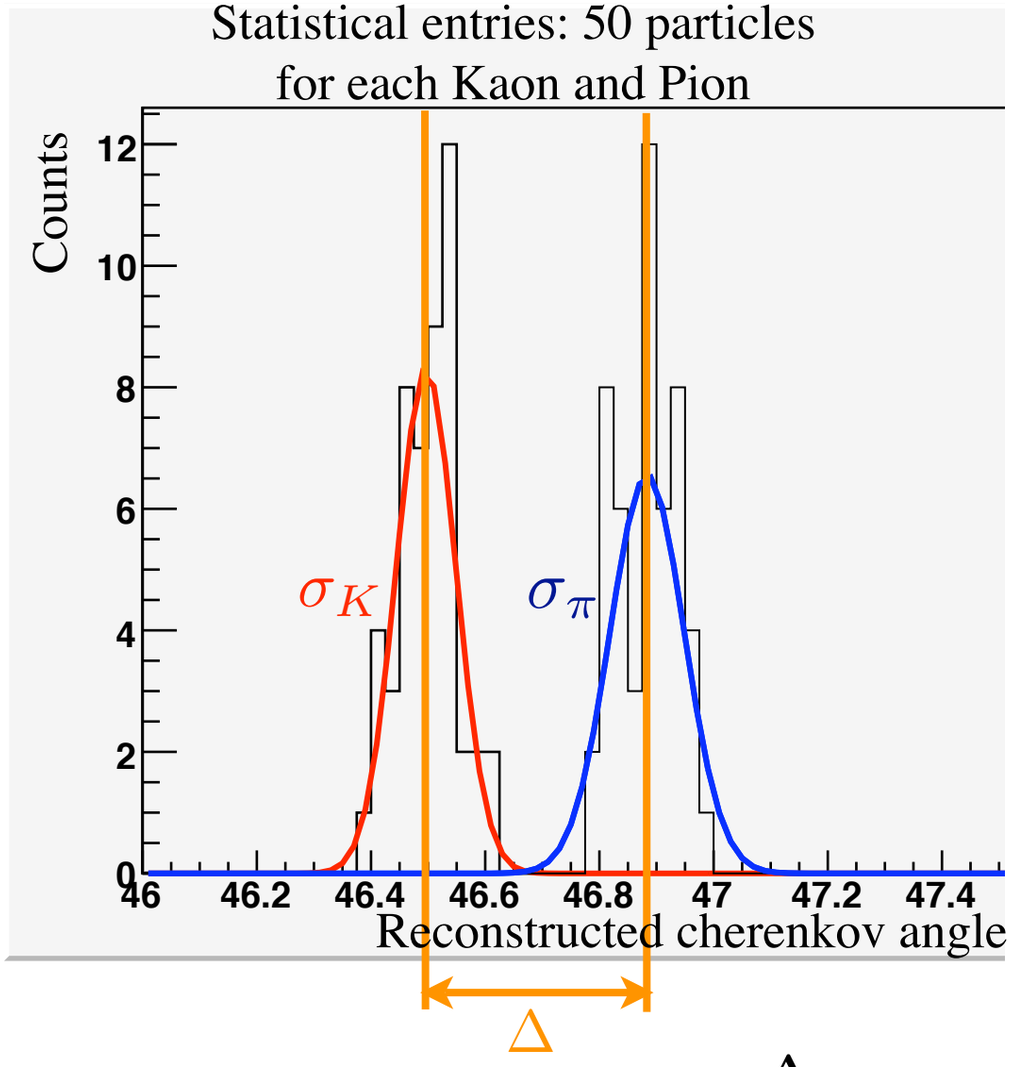


- Disk placed **inside** the magnet, 1.8 m downstream of IP
- Space constrain: max. 94 cm radial space from beam axis availabe!
- 120 MCP PMT pixels per edge; 960 in total
- Octagonal shape to match magnet geometry
- B-Field may reach values of up to 2.4 T - studies on photon readout under these conditions needed!

Possible Endcap DIRC Position



Standard conditions



$$seperation(\sigma) = \frac{\Delta}{\sqrt{\sigma_K^2 + \sigma_\pi^2}}$$

$$\Delta = \left| Mean_K - Mean_\pi \right|$$

Standard conditions:

- 50 ps TDC resolution
- 4 GeV momentum
- 30% Quantum efficiency
- 400-700 nm wave length
- 2 cm thickness of disk

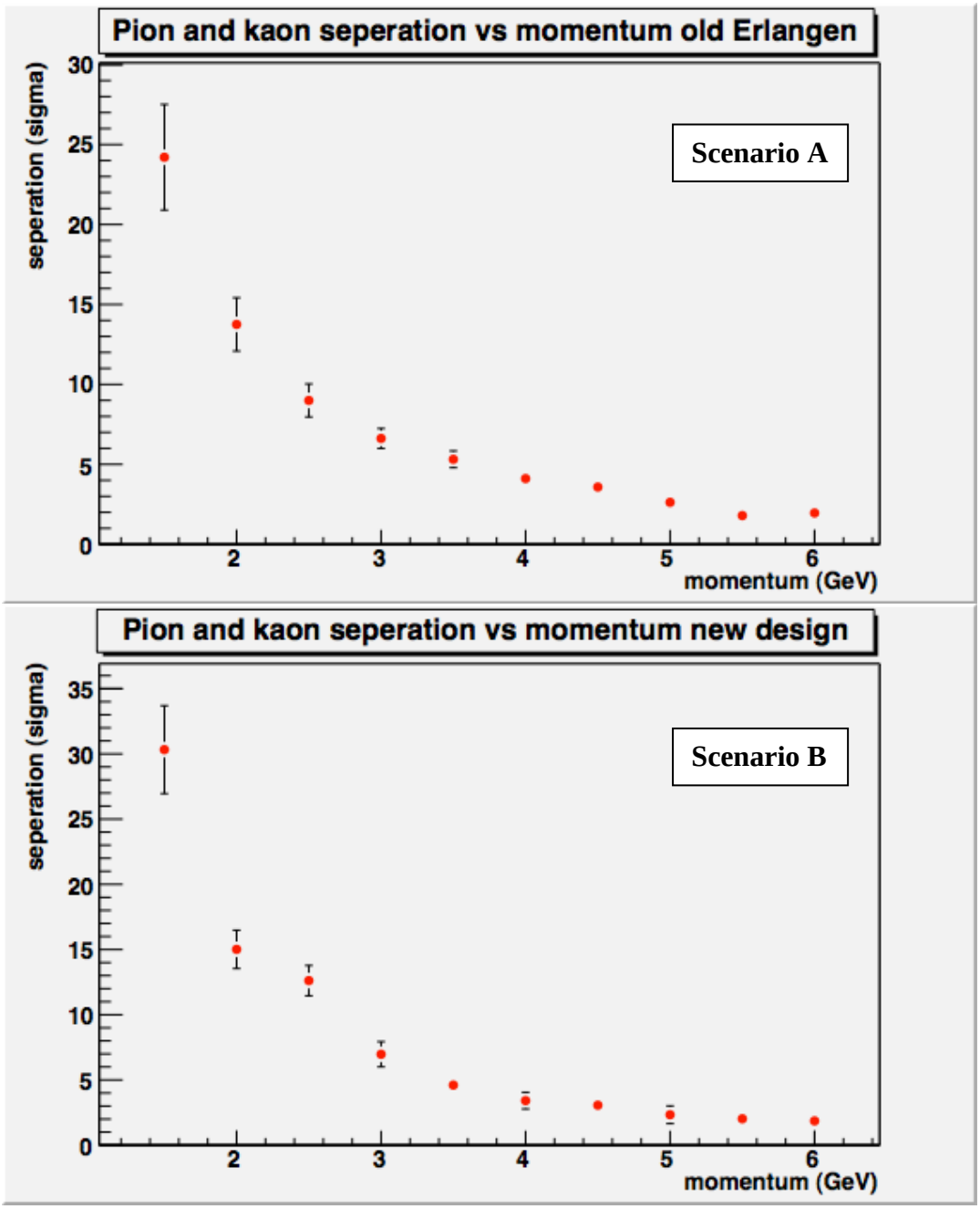


Fig. 7: *Kaon / pion separation as a function of the particle's momentum.*

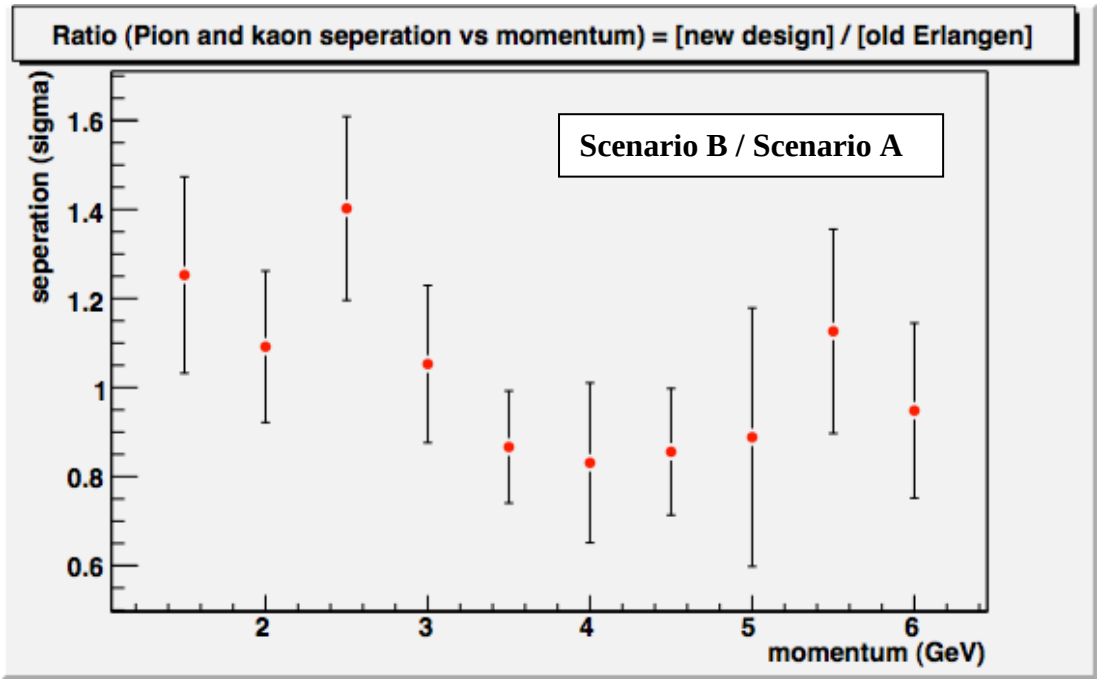


Fig. 8: *Ratio of momentum dependent kaon / pion separation depicted in Fig. 7. Within uncertainty both scenarios deliver a very similar performance with a slight advantage for the smaller radiator disk in the low momentum region.*