Double n aerogel radiator

Samo Korpar
University of Maribor and Institut Jožef Stefan

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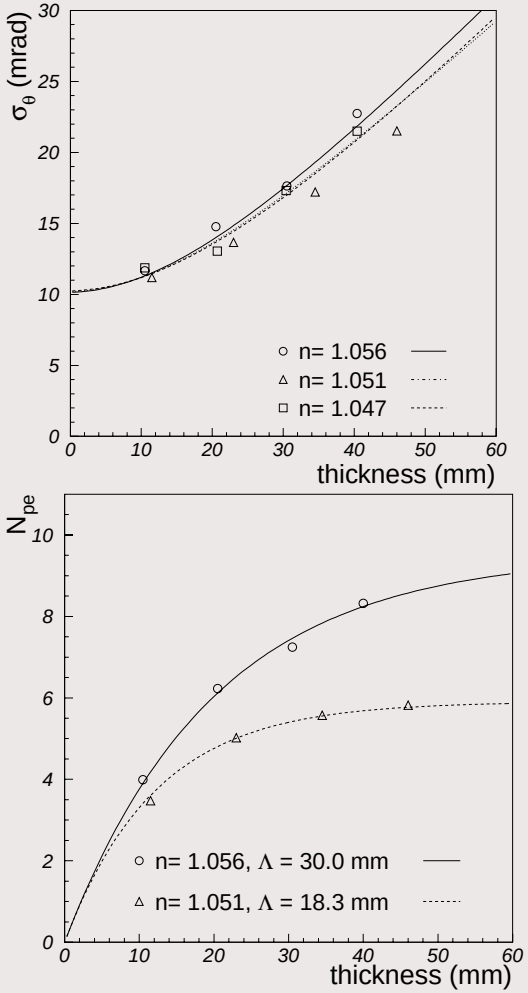
1. Optimal thickness of the aerogel
2. Possible scenarios with double aerogel layer
3. Rings at low momentum and different angles

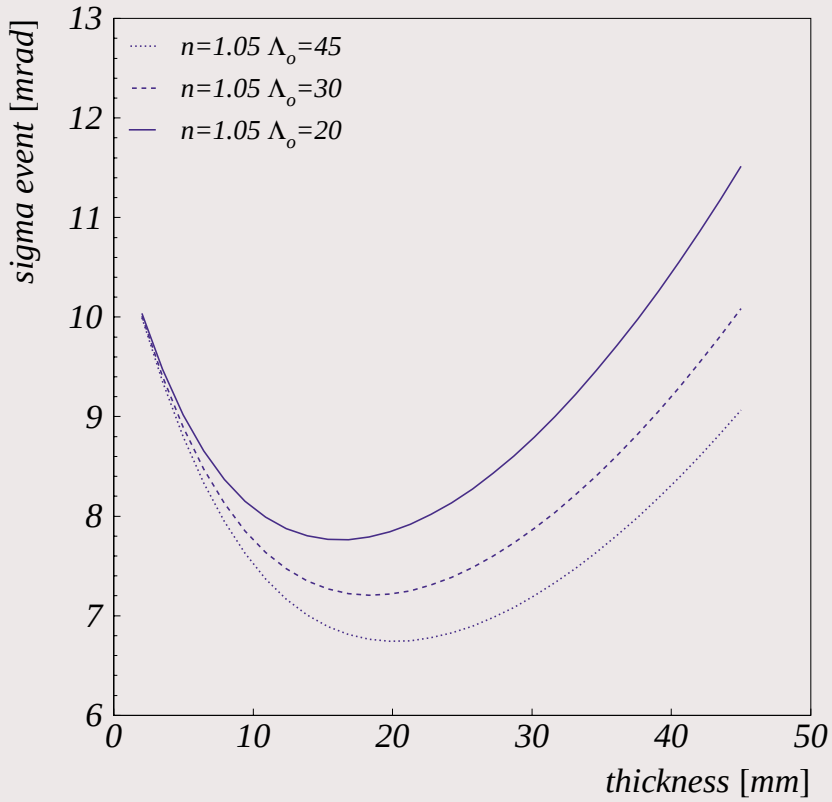
Optimal aerogel thickness

What is the optimal radiator thickness?

Use beam data on N_{pe}, σ_θ vs radiator thickness



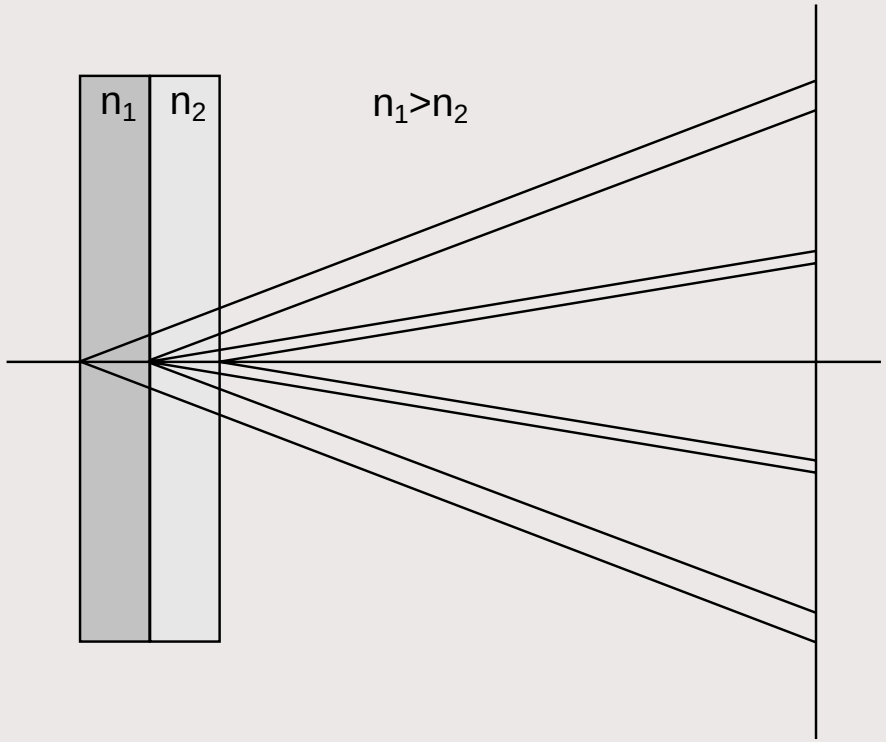
Relevant: resolution per track, $\sigma_\theta^{\rm track} = \frac{\sigma_\theta}{\sqrt{N_{pe}}}$



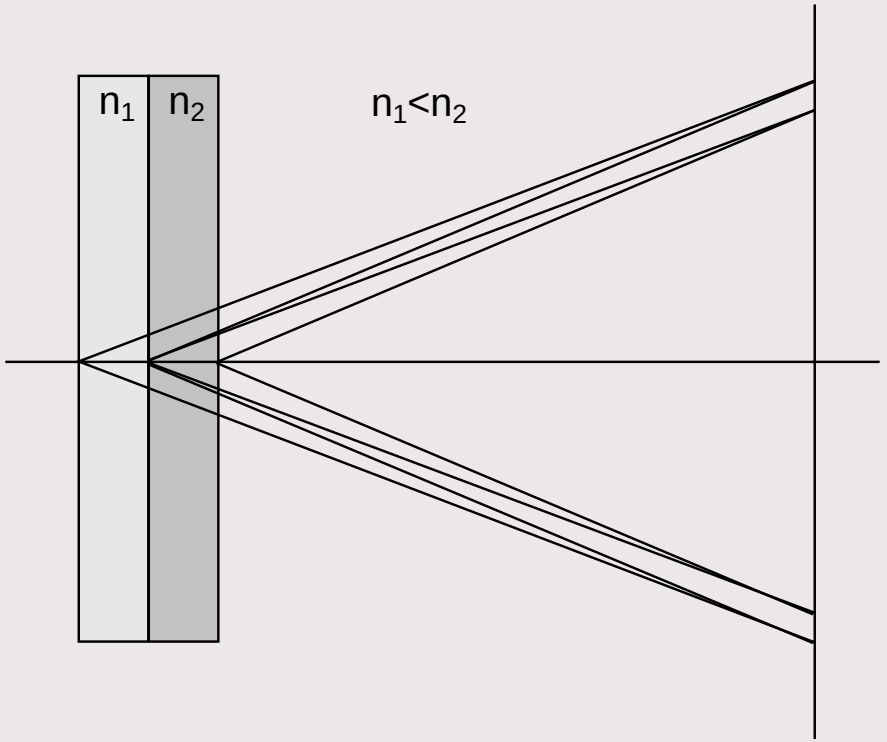
→ 2 cm is close to optimal

Possible combinations of n

- ring splitting



- "focusing"

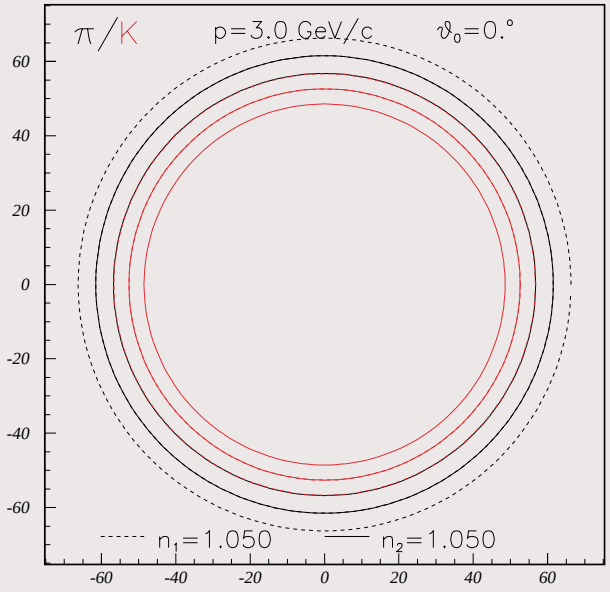


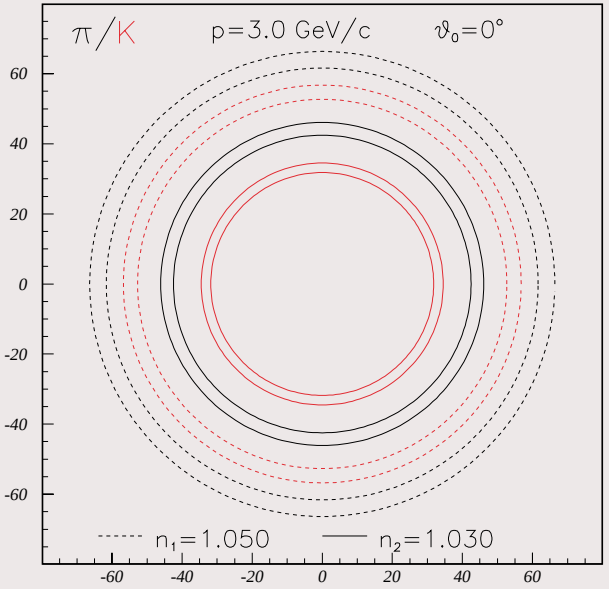
Dimensions used in following plots:

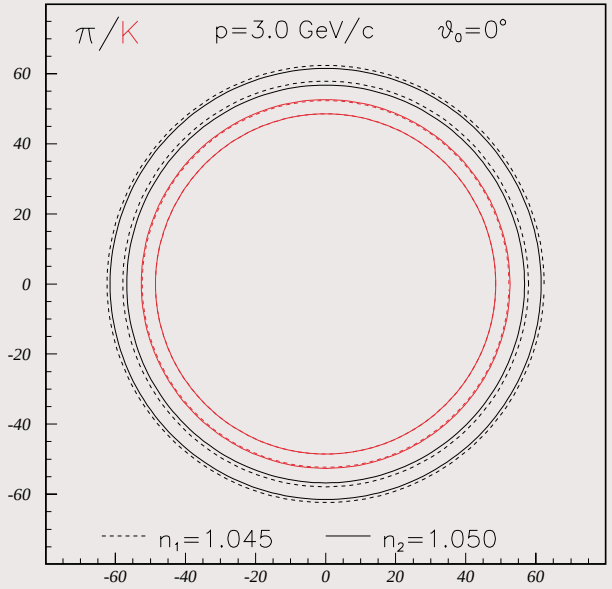
- single layer thickness $\rightarrow$ 15mm
- incident surface to photon detector $\rightarrow$ 200mm

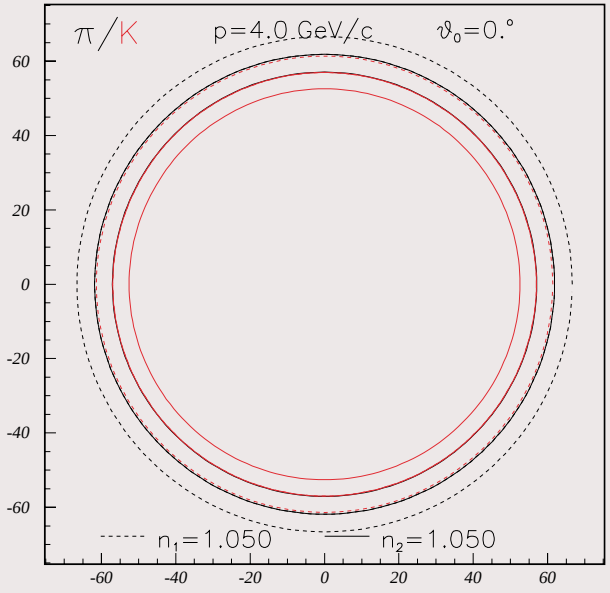
Rings of different scenarios

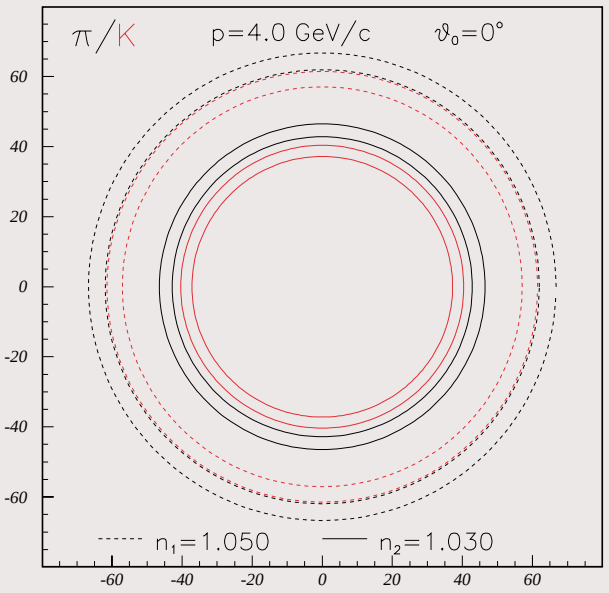
$n_1 = n_2$ | $n_1 > n_2$ | $n_1 < n_2$

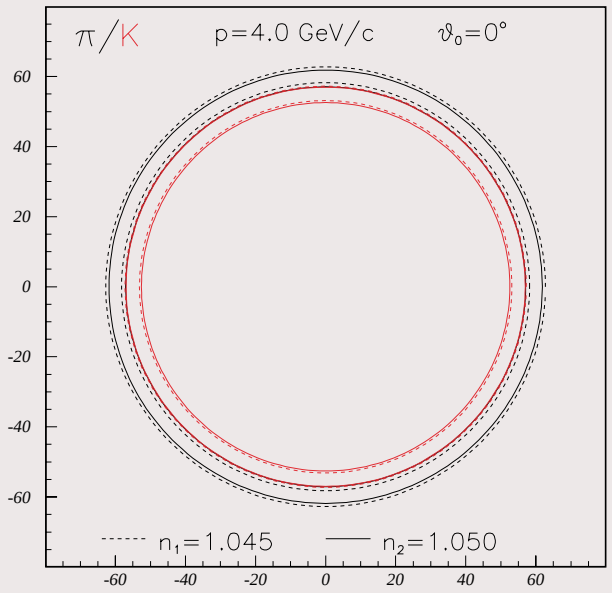




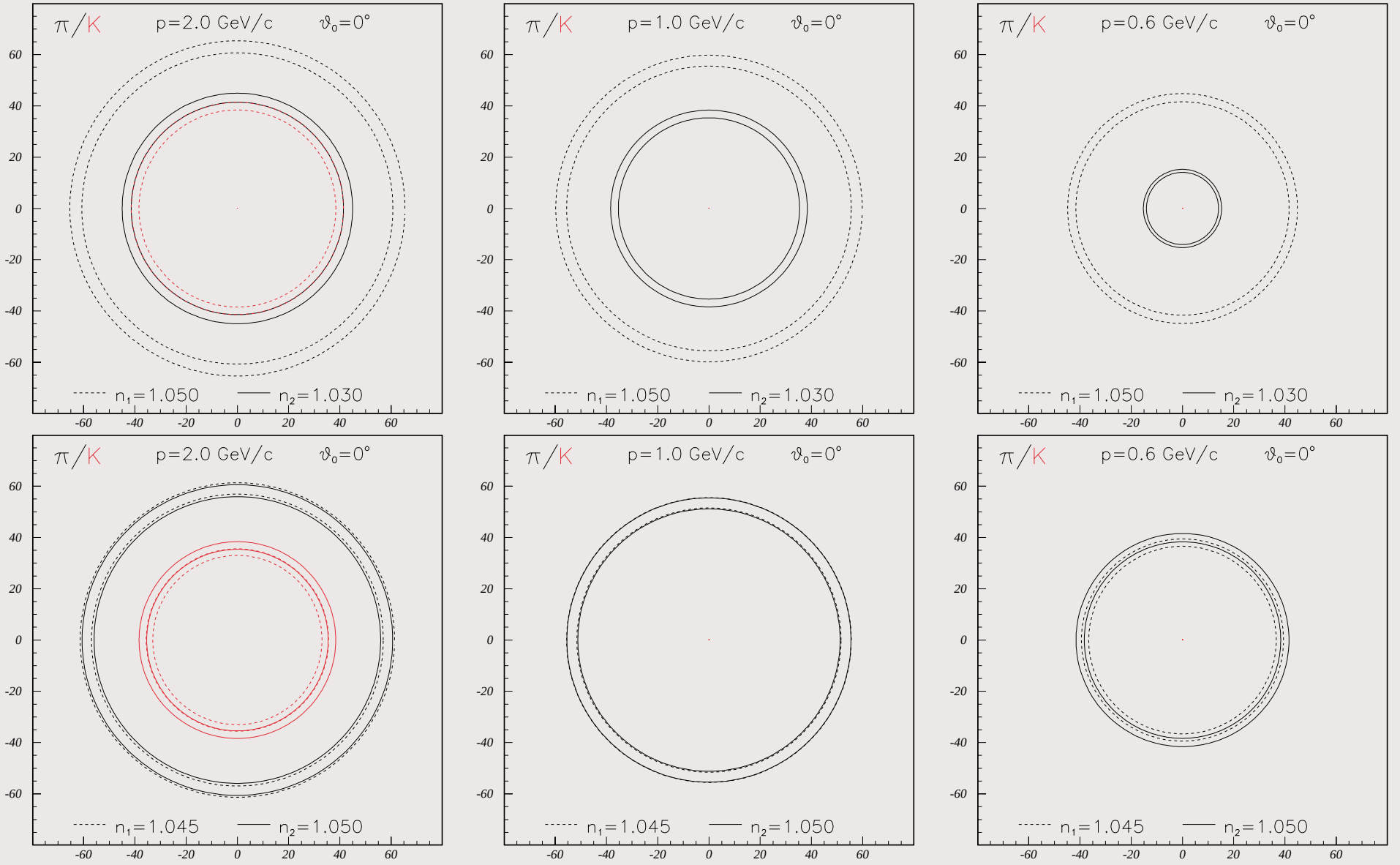




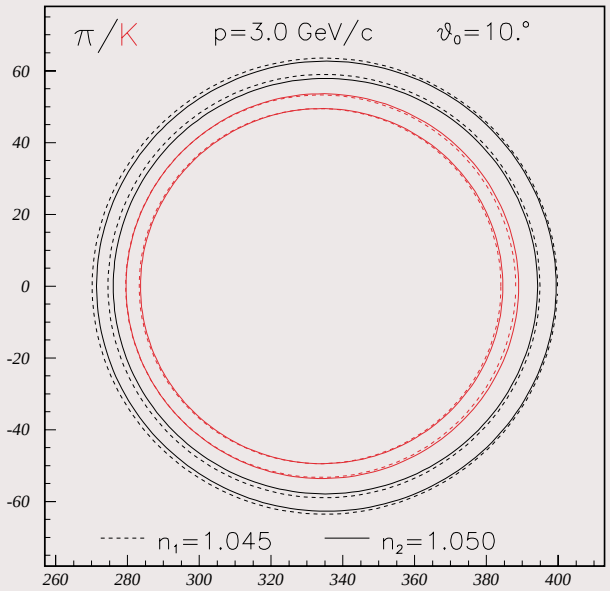


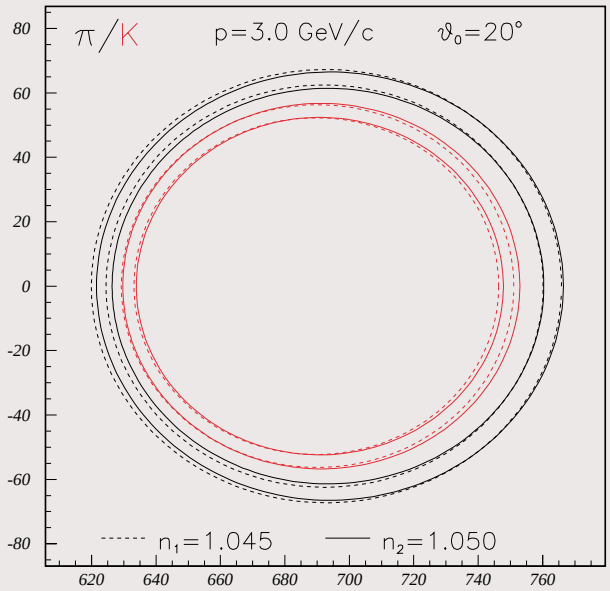


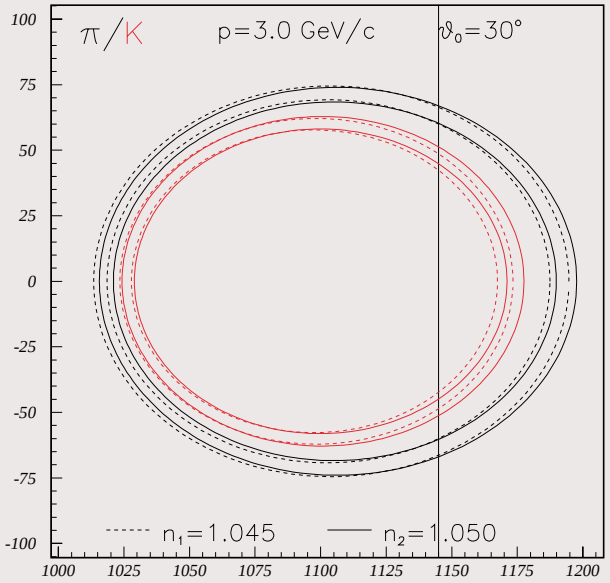
Lower momentum



Incident angle



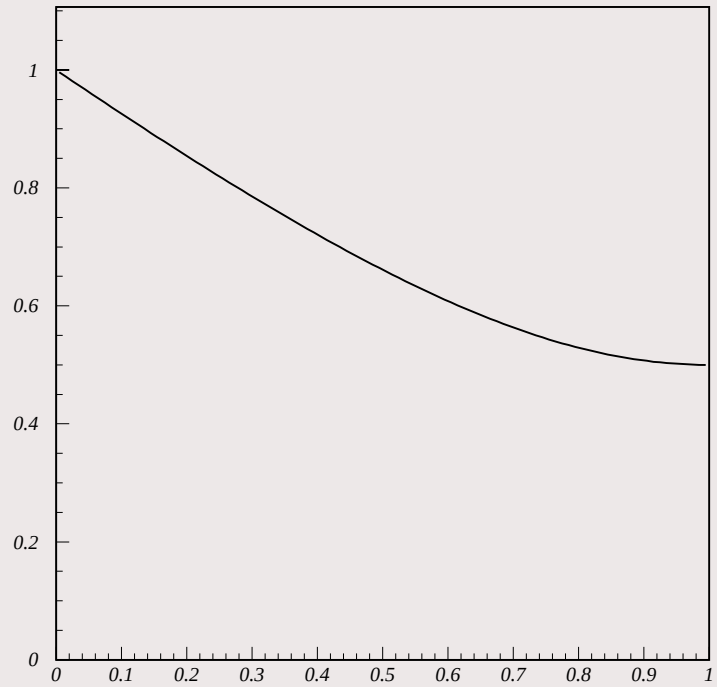




Resolution improvement - simple model

Overlaping of two uniform distributions:

$$\sigma^2 = \frac{a^2}{3}(1 - \frac{3}{2}\frac{x}{a} + \frac{3}{4}(\frac{x}{a})^2)$$



*sqrt(1.-3.*x/2.+3.*(x**2)/4.)*