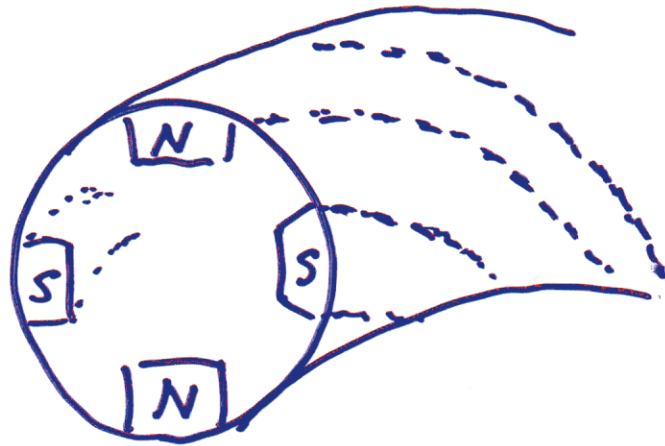


Helical Quadrupole option for pion capture

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1. Introduction
2. characteristics
3. Tracking
4. Future task.

Helical-quadrupole channel



Helical quadrupole magnet has ...

(1) axial symmetry (x-y coupling)

(2) strong focusing

$$B' \sim \frac{B \rho}{L_p}$$

$$\beta \sim \frac{L_p}{\phi}$$

* L_p : Pitch length
 ϕ : Phase advance

ex. PRISM beam

$$p \sim 0.1 \text{ GeV}/c$$

$$\varepsilon \sim 10000 \pi \text{ mm} \cdot \text{mradian}$$

$$\downarrow L_p = 0.1 \text{ m}, \phi = \frac{\pi}{2}$$

$$r \sim 3 \text{ cm}, B' \sim 30 \text{ T/m}$$

cf Permanent magnet

Summary

Helical quadrupole channel has various interesting characteristics.

- Large acceptance**
- Strong focusing (sharp beam)**
- Momentum separation**
- Momentum independence of node position**

Helical quadrupole channel is a promising option for the pion capture & transport section

Helical quadrupole channel offers various applications in the field of beam handling