\( \pi, \mu \) Yields for Upstream Geometry

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Introduction

- Simulations of $\pi$, $\mu$ accepted yields for W target cylindrical rods for an “upstream” geometry, 10 GeV parabolic proton beam:
  - Large Cu magnet before target rod, Helmholtz gap, then Study II SC coils & shielding
- As before, radius of beam = radius of rod, tilt of beam = tilt of rod
  Try out different lengths of the target rods: 15 – 30 cm
- Yields are charge-averaged number of accepted $\pi$ and $\mu$ per proton per GeV
Upstream Target Geometry

Colour scheme:

- Cu solenoid (magenta)
- Target rod (black)
- Shielding (brown)
- SC coils (yellow)

Downstream SC coils and shielding as in Study 2, with minimum shielding aperture radius increased from 7.5 cm to 11.5 cm (+4 cm shift radially)

No Cu coil downstream of the target rod

Large Cu coil upstream of the target: 11.5 cm ≤ r ≤ 138 cm

Cu current density 30 A mm$^{-2}$
Study 2 Geometry

Upstream Geometry

Dotted lines: rod $z$ position range

Target rod positions: $-30 \leq z \leq 0$ cm for Study 2
$-95 \leq z \leq -65$ cm for Upstream Geom
Charge averaged $\pi, \mu$ accepted yield per proton for $r_{\text{beam}} = 0.25 \text{ cm}$

Dotted line is Hg jet yield for 10 GeV beam (using StudyII optimal tilt, radii)
Charge averaged $\pi, \mu$ accepted yield per proton for $r_{\text{beam}} = 0.50 \text{ cm}$

Dotted line is Hg jet yield for 10 GeV beam (using StudyII optimal tilt, radii)
Charge averaged $\pi, \mu$ accepted yield per proton for $r_{\text{beam}} = 0.75 \text{ cm}$

Dotted line is Hg jet yield for 10 GeV beam (using StudyII optimal tilt, radii)
Charge averaged $\pi, \mu$ accepted yield per proton for $r_{\text{beam}} = 1 \text{ cm}$

Dotted line is Hg jet yield for 10 GeV beam (using StudyII optimal tilt, radii)
Charge averaged $\pi, \mu$ accepted yield per proton for $r_{\text{beam}} = 1.5 \text{ cm}$

Dotted line is Hg jet yield for 10 GeV beam (using StudyII optimal tilt, radii)