Issues and Parameters for Phase Rotation

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The Phase Rotation Channel

1) 18 m – 20 T to 1.25 T Taper

2) 18 m – Drift

3) 100 m – Induction Linac I

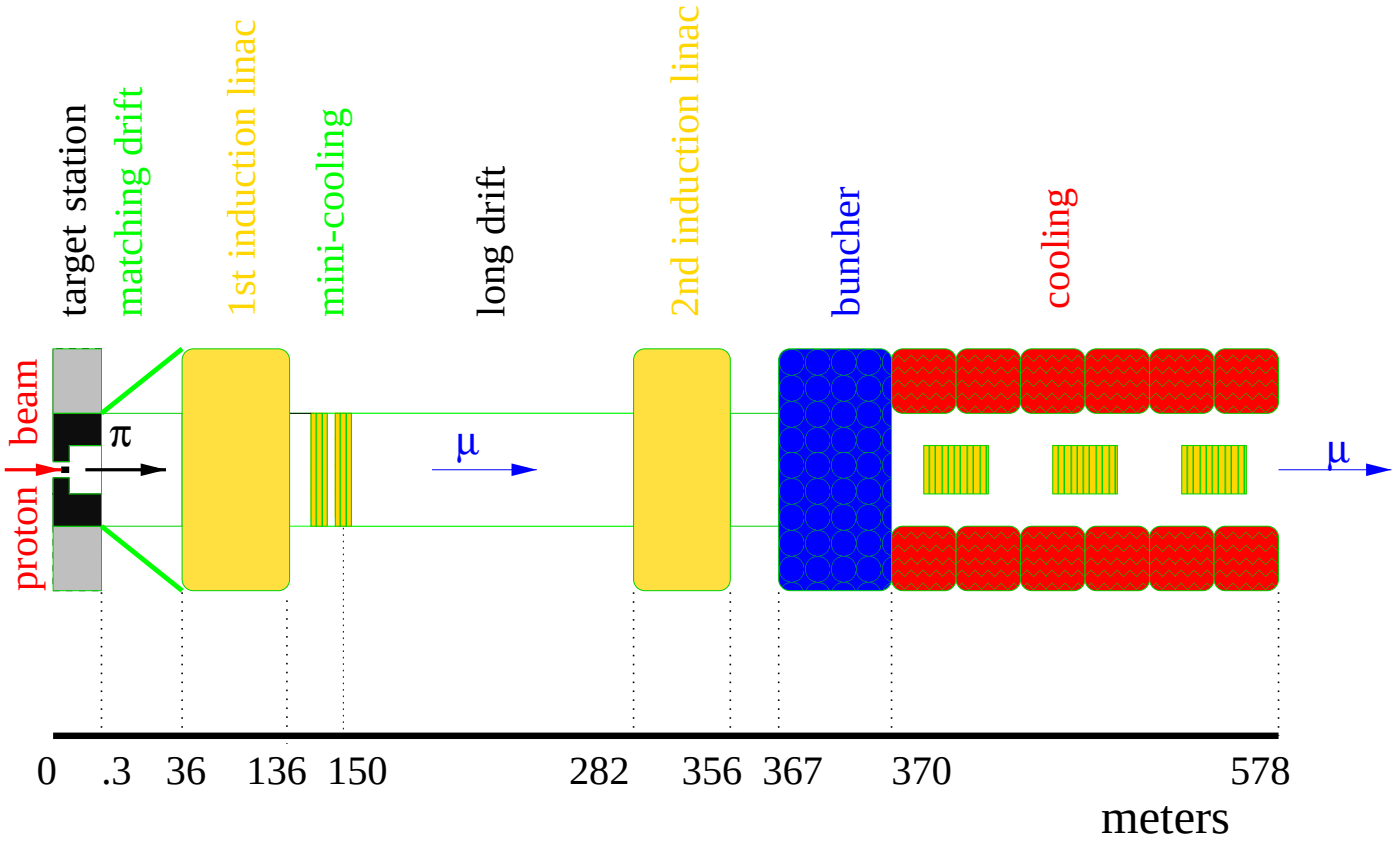
4) 20 m – Mini-Cool

   - 2 1.8m LH absorbers
   - 2 Alternating Solenoids

5) 120 m – Drift

6) 80 m – Induction Linac II

The Double Induction Linac
Phase Rotation Scenario



Key Induction Linac Parameters

Induction Linac 1

Total Length, m	100
Aperture, cm	60
Solenoid Field, T	1.25
Minimum Gradient, MV/m	-0.06
Maximum Gradient, MV/m	1.4
Pulse Length, ns	125
Micro Pulse separation , ms	≈20

Induction Linac 2

Total Length, m	80
Aperture, cm	60
Solenoid Field, T	1.25
Minimum Gradient, MV/m	-1.1
Maximum Gradient, MV/m	1.03
Pulse Length, ns	350
Micro Pulse separation , ms	≈20

Key Mini-Cool Parameters

Total Length, m	20
Liquid Hydrogen Cells	
Total Length, m	2×1.75
Aperture, cm	60
Solenoid Field, T	1.25
Solenoids	
Total Length, m	$2 \times \approx 5$
Aperture, cm	60
Solenoid Field, T	1.25

Phase Rotation Issues

1) 18 m – Taper

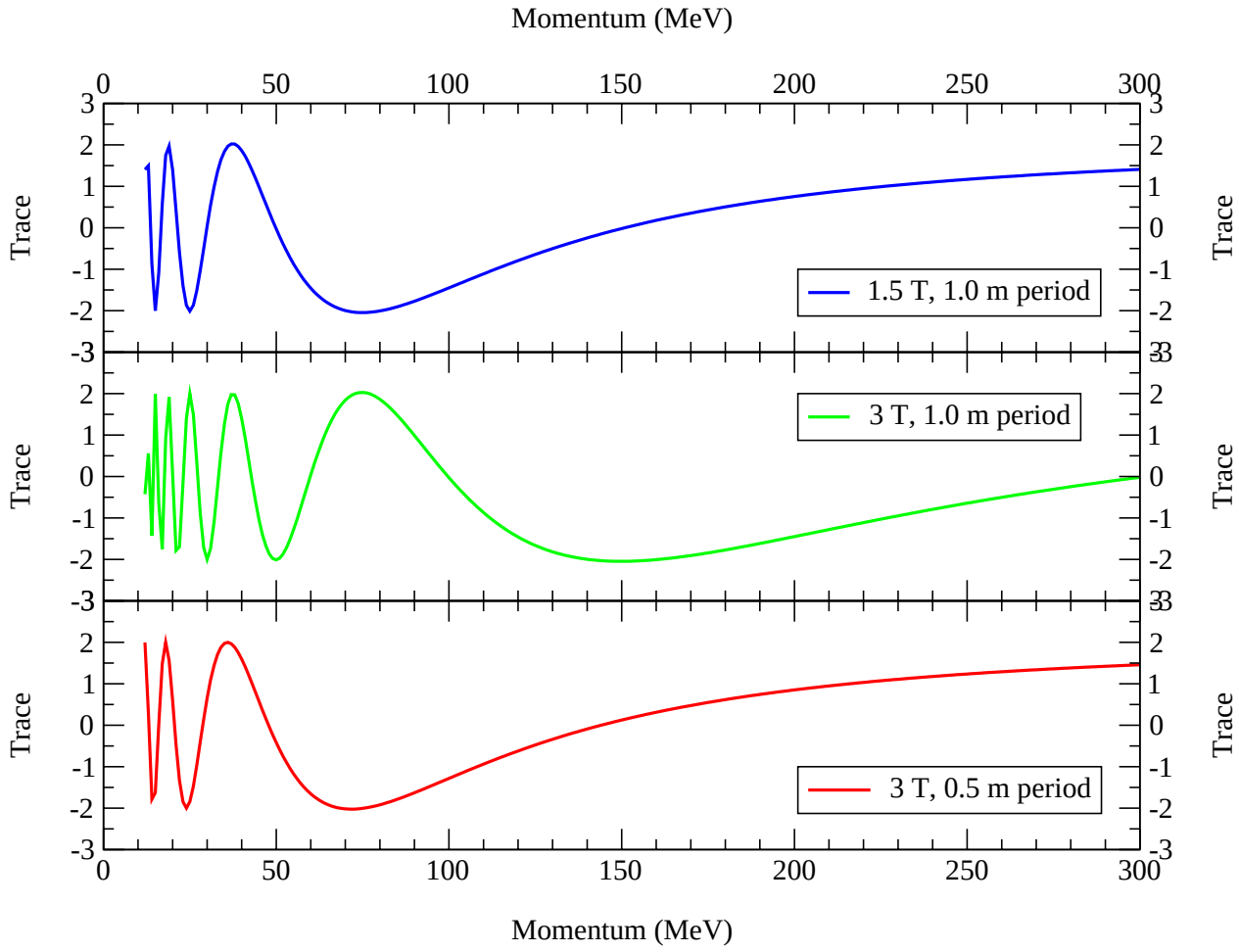
- Are neutron traps feasible?
- Is 18 m necessary?
- Is 18 m optimal?
- Radiation tolerance?

2) 18 m – Drift

- Placement of sc coils

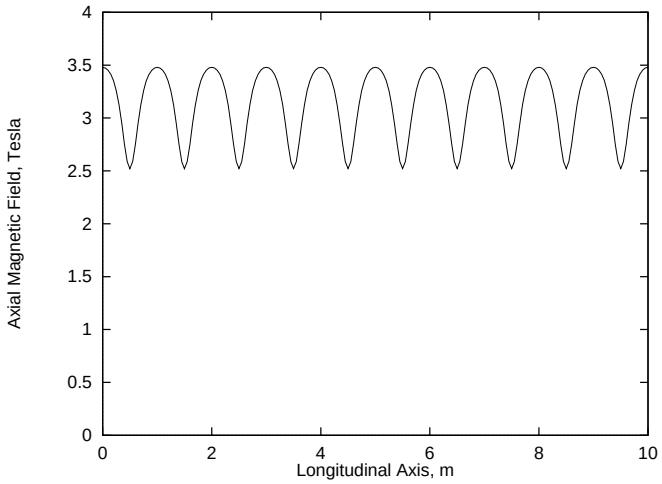
S. Berg

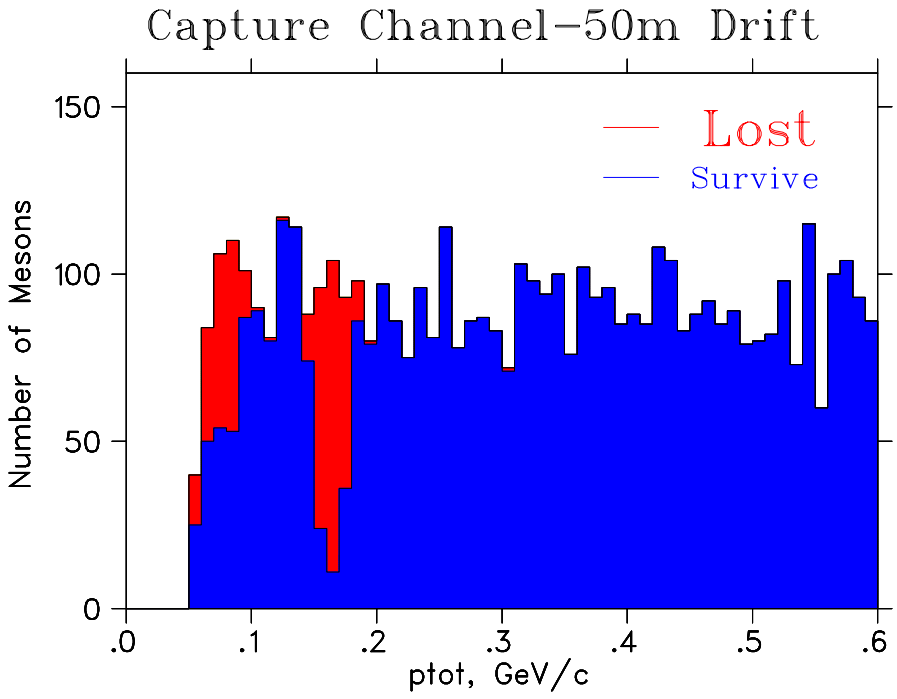
Resonance Stop Bands



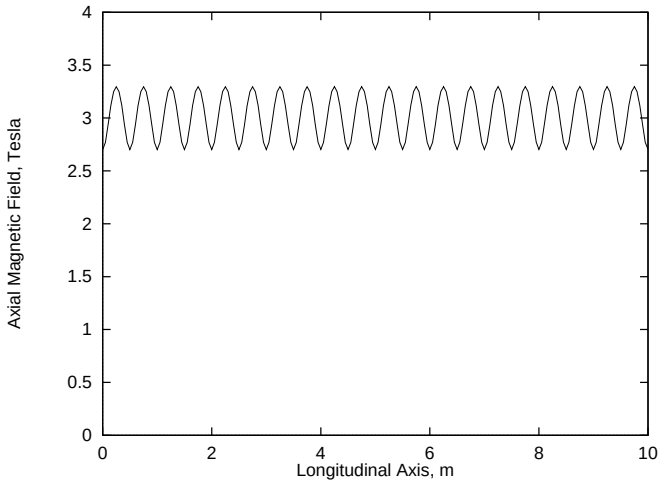
$$pc = \frac{qBc}{2\pi n} \times period$$

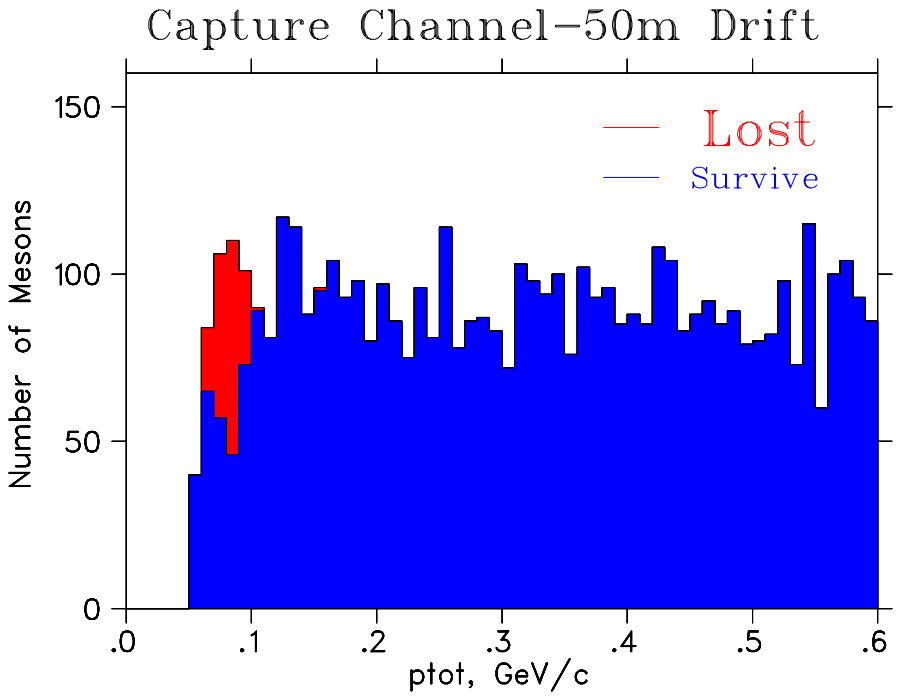
3T channel with single 14cm gap



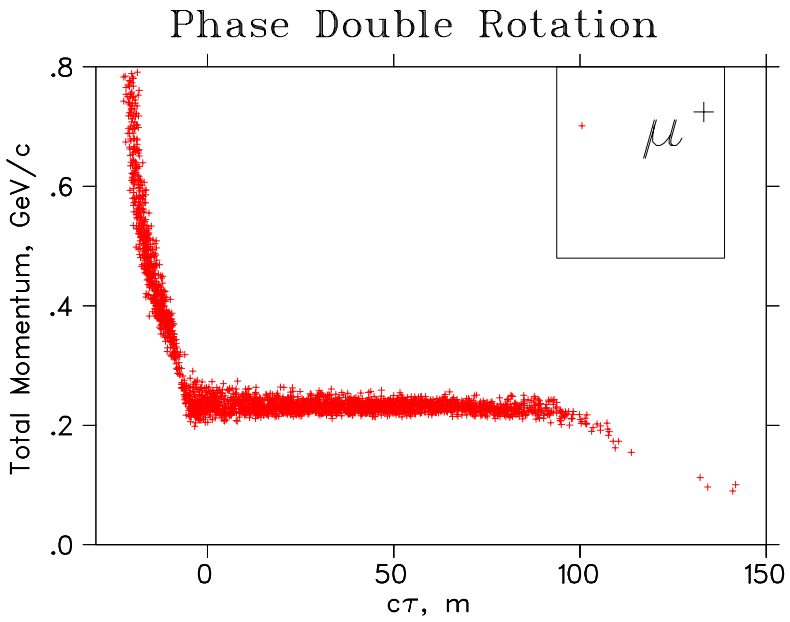


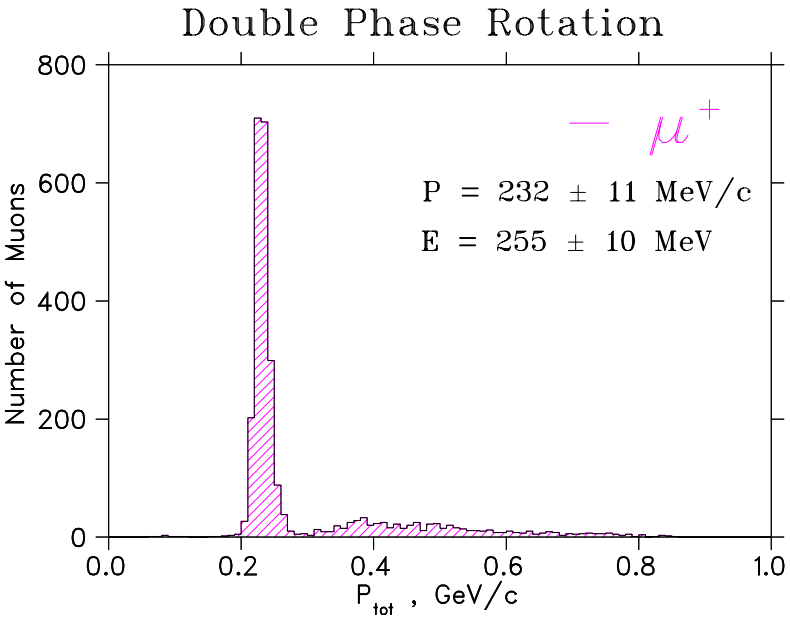
3 T channel with two 14cm gaps



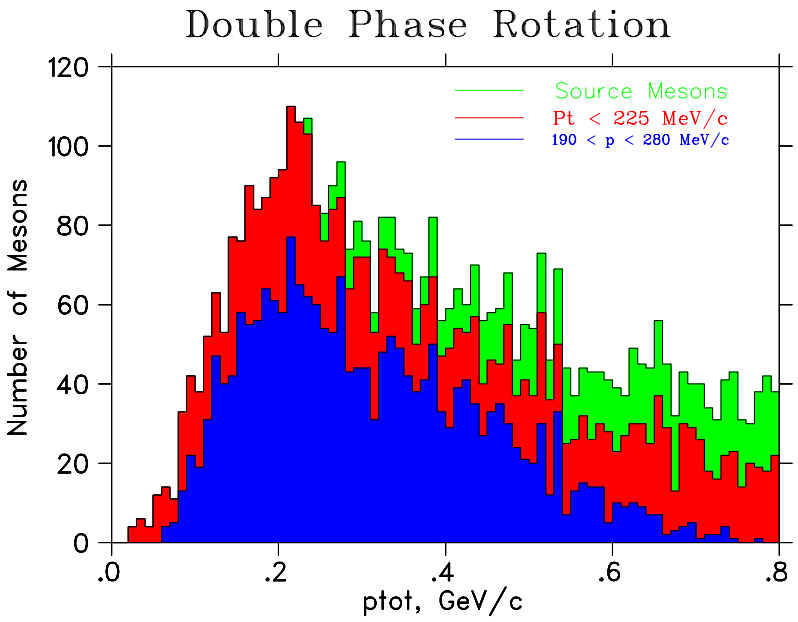


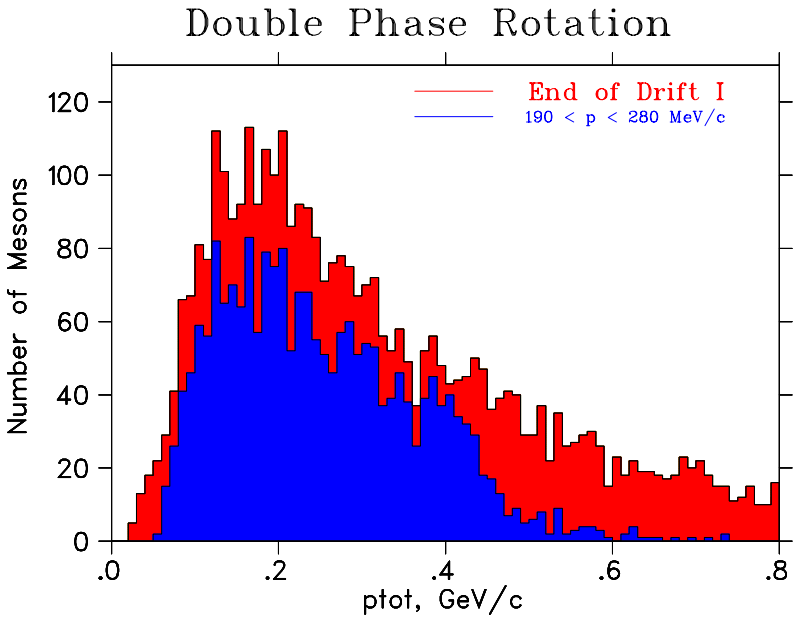
Captured Muons



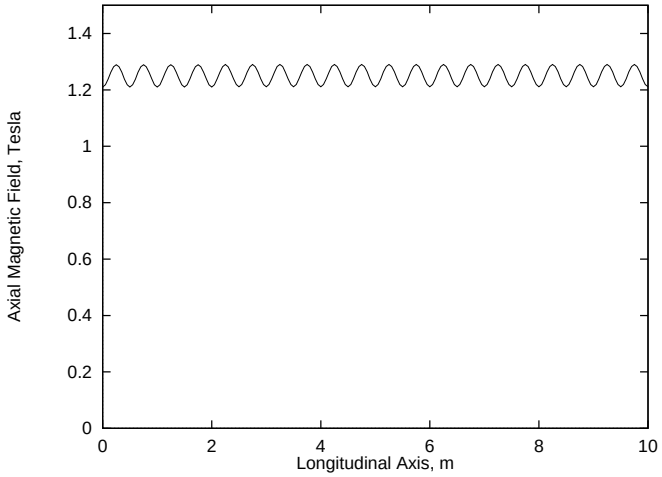


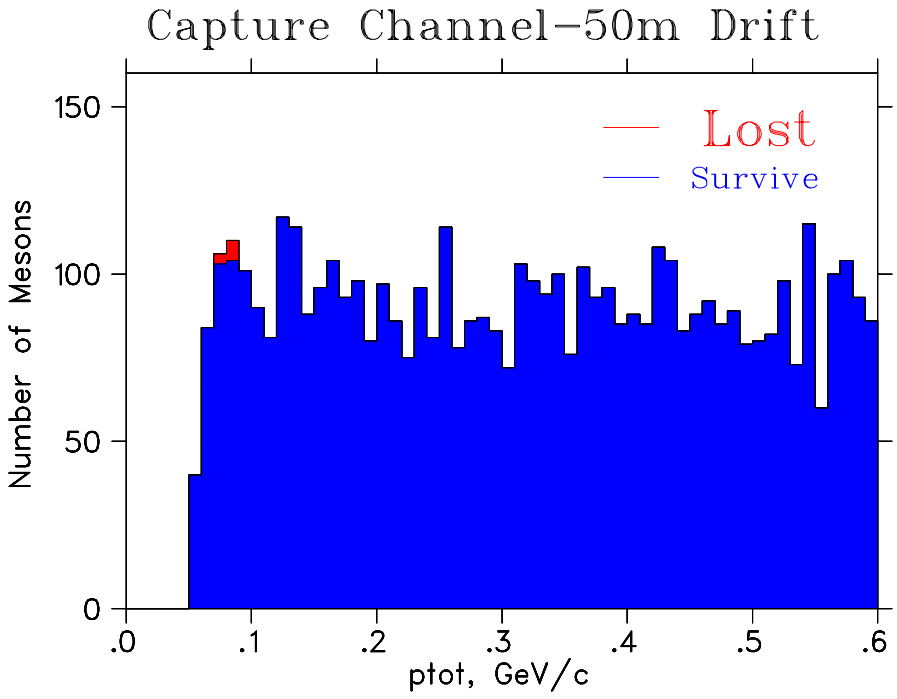
Captured Muons





1.25 T channel with two 14cm gaps



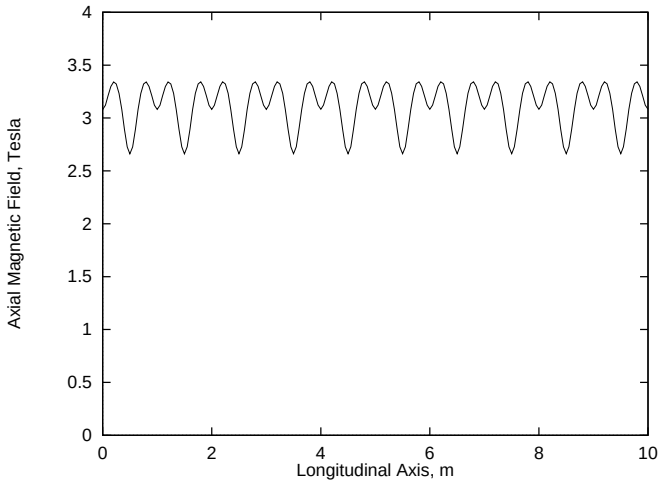


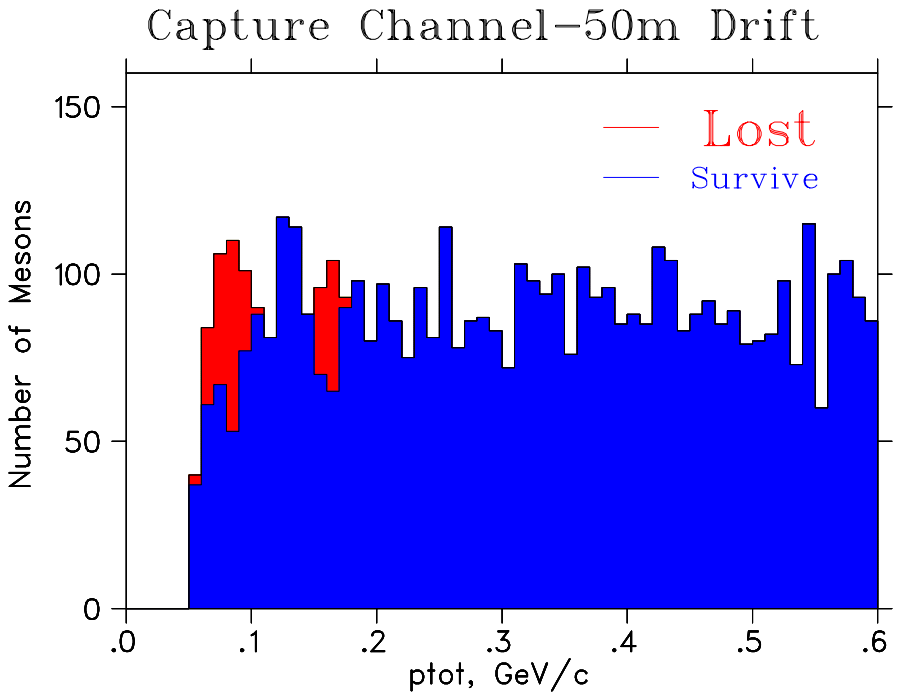
Phase Rotation Issues
(continued)

3) 100 m – Induction Linac I

- Placement of sc coils
  - Momentum stop bands
  - Integration reliability
  - Cost optimization
- Choice of magnetic cores
  - Radiation tolerance
  - Expected neutron flux
  - Cost optimization

3T channel with 8 cm and 14cm gaps





Phase Rotation Issues
(continued)

4) 20 m – Mini-Cool

- Opposite-sign pion flux
- Proton flux
- On-axis neutron flux

5) 120 m – Drift

- Placement of sc coils

6) 80 m – Induction Linac II

- Placement of sc coils
- Choice of magnetic cores
- Cost optimization

Captured Muons