

# Stopping Muon Beams

(Description of our plans and ideas)

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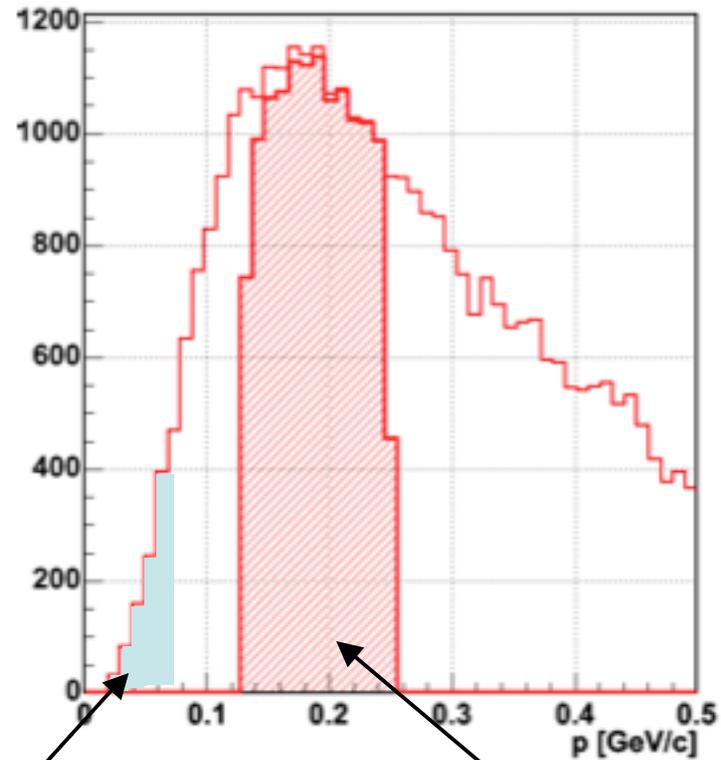
# Background

- Muons, Inc. has been awarded a DoE Phase I SBIR grant to investigate stopping muon beams, with Fermilab as our research partner.
- This Phase I award is \$100k, and an important part of its work is to prepare a Phase II proposal by April 2008; that could be \$750k.
- While our interest is a general improvement in such beams, we will concentrate on a beam for the mu-e conversion experiment.

# The Basic Idea

- Recent advances in muon cooling are applicable to stopping muon beams.
- The helical cooling channel (HCC) we have been developing has the ability to cool a beam in all 6 dimensions, and is easily configured to cause the beam to lose energy.
- That provides the ability to move the peak of the muon production spectrum down to the energy where more muons can be stopped.
- By cooling the beam longitudinally, a larger momentum interval of the production spectrum can be captured and then stopped in a given target.
- By cooling the beam transversely, a larger angle spread of the production can be captured and then stopped in a given target.

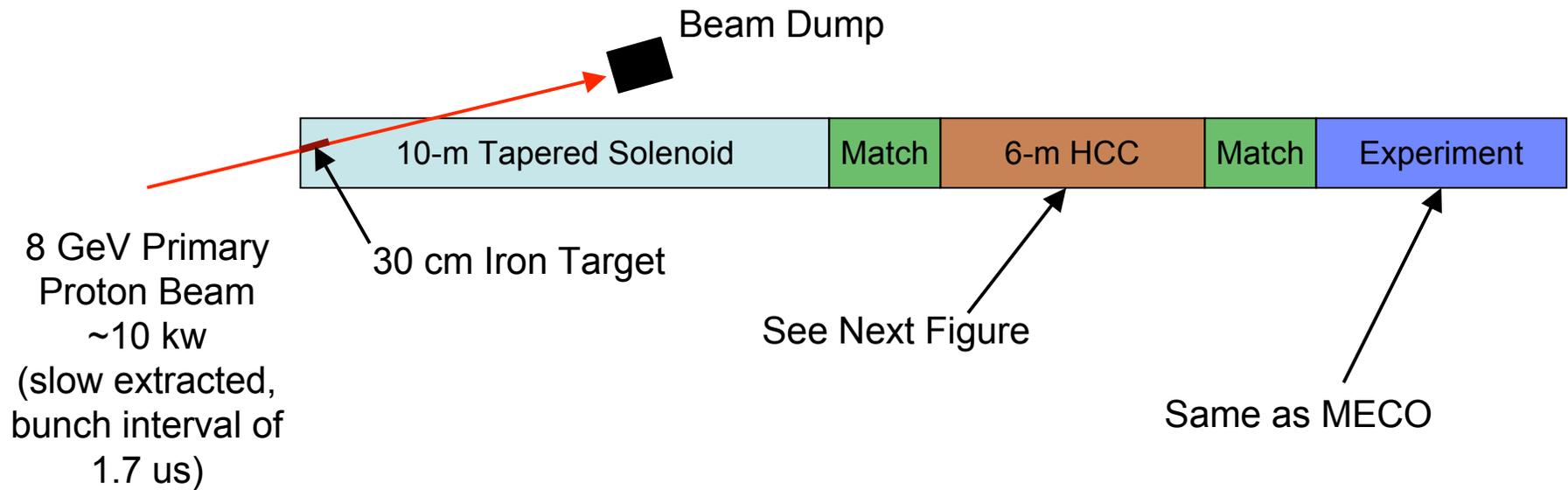
# Pi / Mu Production from Target



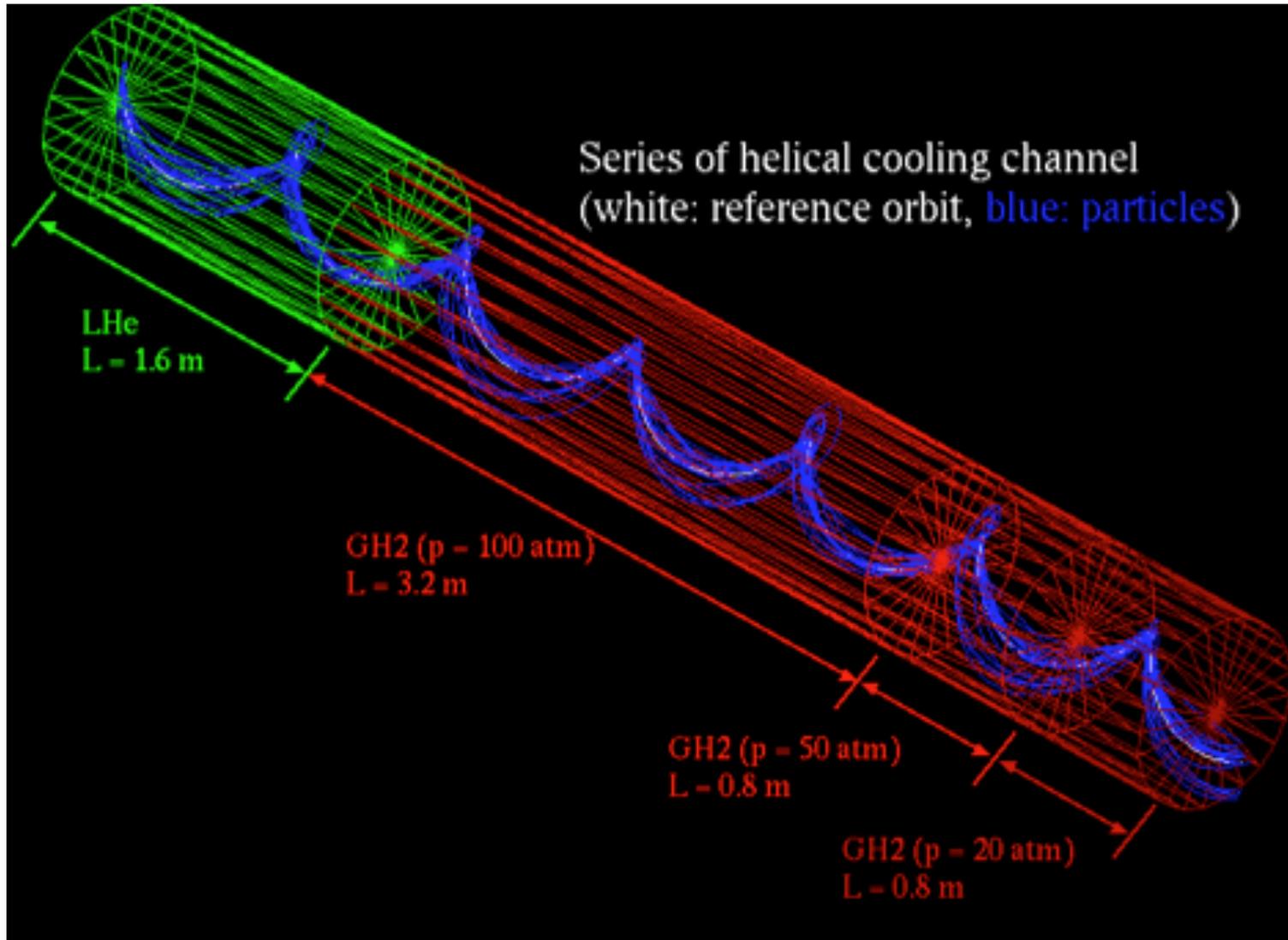
~ Acceptance of  
MECO design

Acceptance of HCC

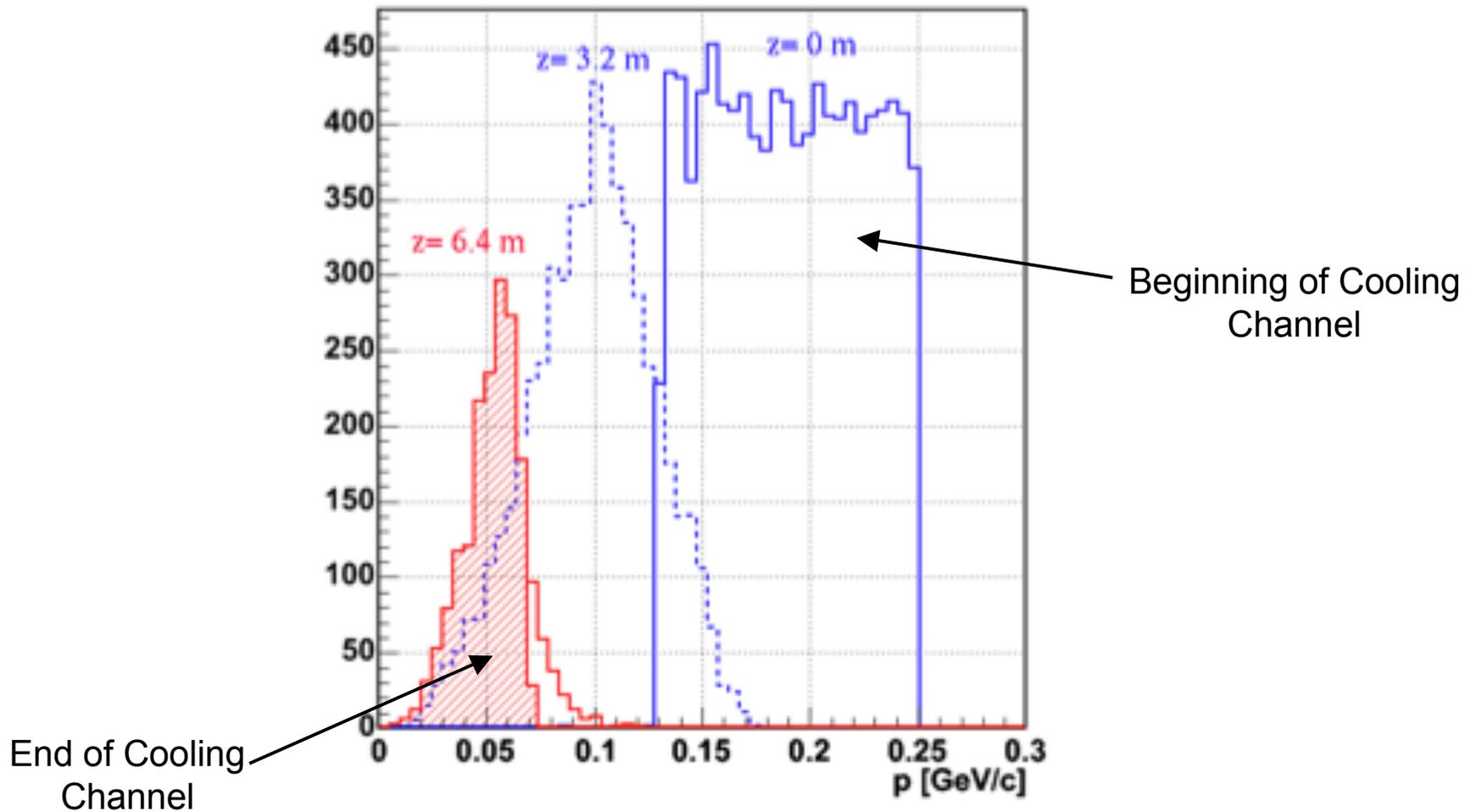
# Quick First Concept (Scaled-down front end of Neutrino Factory)



# Quick First Concept - Cooling



# Evolution of Muon Momenta in the HCC



# Many Open Issues

- Rates
- Backgrounds
- Extinction between proton pulses
- Matching
- Realistic design and engineering
- Methods of reducing the density of the absorber
- Optimization
- Relationship to the MANX HCC
- Cost
- ... more

# Summary

- Muons, Inc. will investigate ways to increase the stopping  $\mu/p$  ratio for this mu-e conversion experiment.
- We are interested in participating in all aspects of the experiment.
- We have initial funding to investigate such stopping muon beams, and will pursue other funding opportunities.
- We are intrigued by the synergy of using the same HCC magnet and absorber for both MANX and this experiment.