

E951 Safety Review

January 5, 2001

Agenda

1. Overview of Experiment
2. Target layouts
3. Beam Window Calculations
4. Activation Calculations

The Grand Goal

Intense Muon Beams

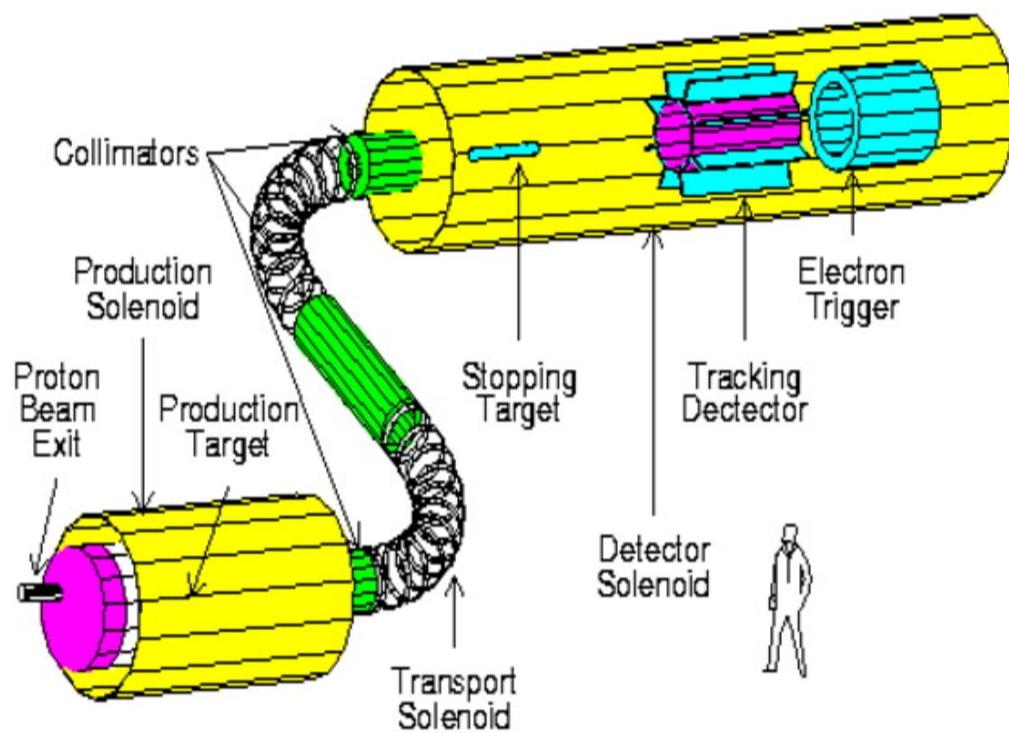
W. Marciano:

The 21st Century: Century of the Muon?
New York City, PAC'99

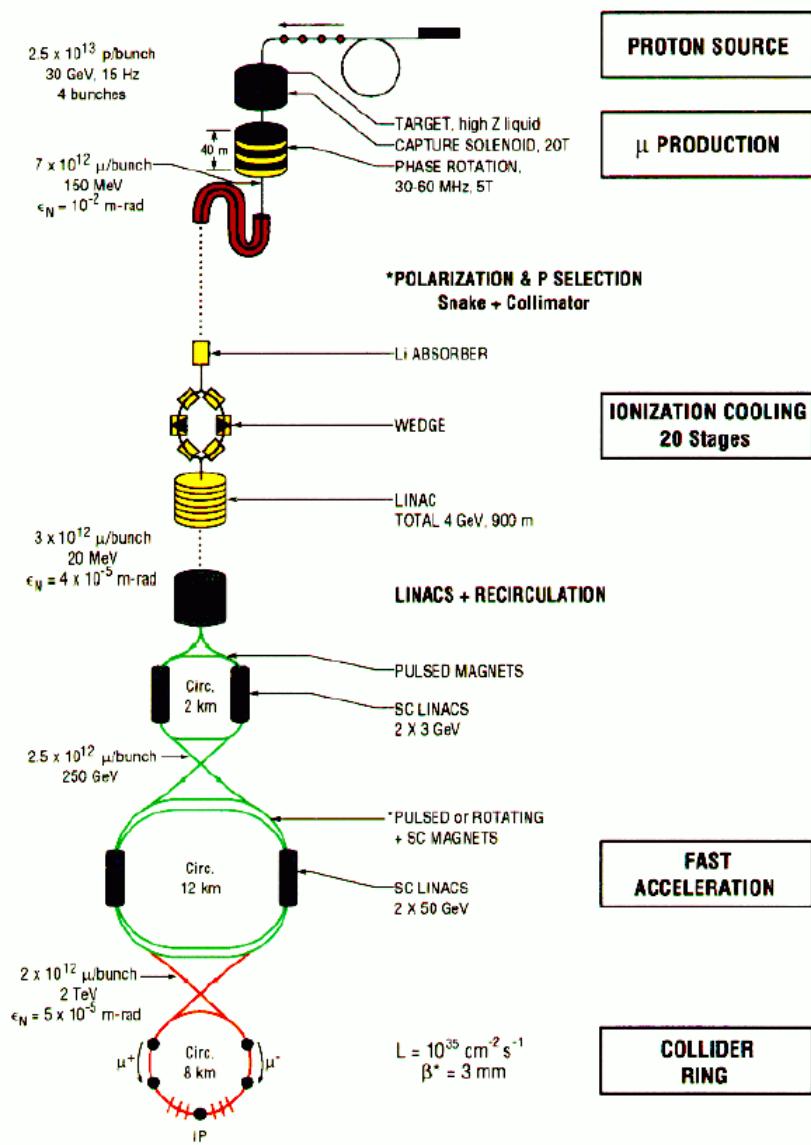
1. Muon Catalyzed Fusion
2. Discover new physics using heavy point-like particles.

- MECO at the AGS
- Muon Collider
- Neutrino Factory

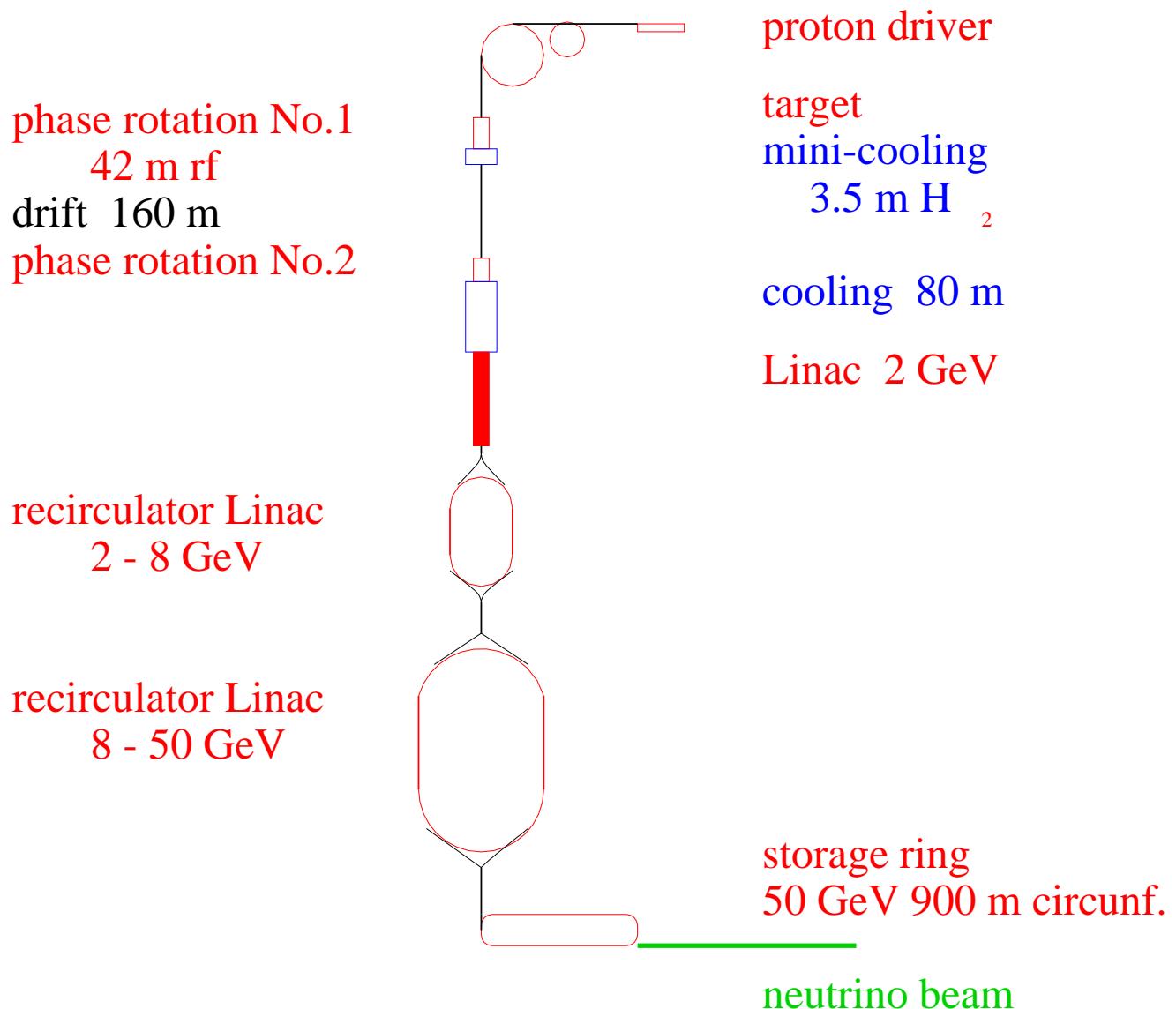
The MECO Proposal



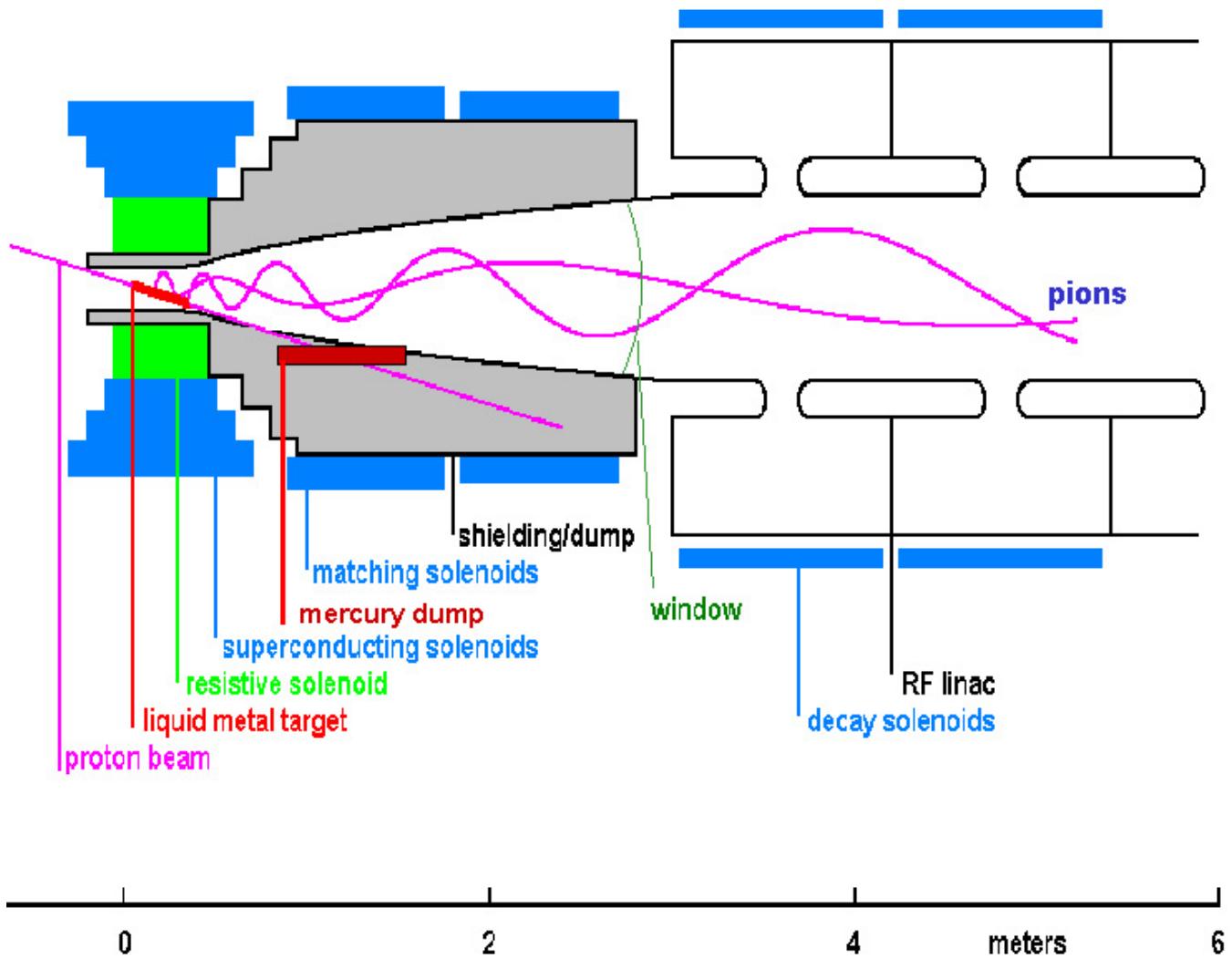
Muon Collider Scheme



A Neutrino Factory based on a Muon storage ring

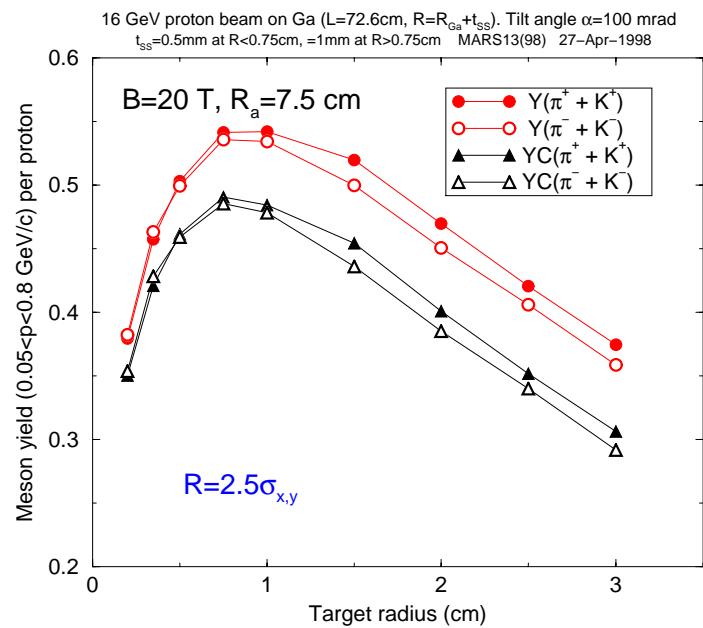
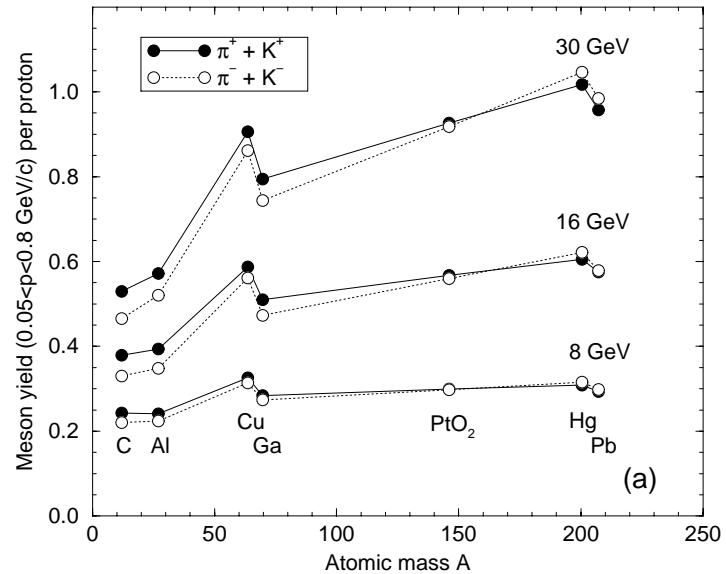


Overview of Targetry for a Muon Collider



- $1.2 \times 10^{14} \mu^\pm/\text{s}$ via π -decay from a 4-MW proton beam.
- Proton pulse $\approx 1 \text{ ns rms}$ for a muon collider.
- Mercury jet target.
- 20-T capture solenoid followed by a 1.25-T π -decay channel with phase-rotation via rf (to compress energy of the muon bunch).

Meson Yield



Targetry Challenges

Require $> 10^{15}$ protons/sec onto high-Z target

- Proton beam power ≈ 4 MW on target
- Need thermohydrodynamic modeling of target

Solid Target may not be feasible

Free Liquid Metal Jet Possible

- Contained liquids may explode

Capture in 20 T SC Solenoid

- Need magnetohydrodynamic modeling of target in 20T field

Operation of rf Cavity in High-radiation Environment

E951

R&D Plan

Tests of simple liquid/solid targets

Test of Liquid Metal Jet in 20 T solenoid

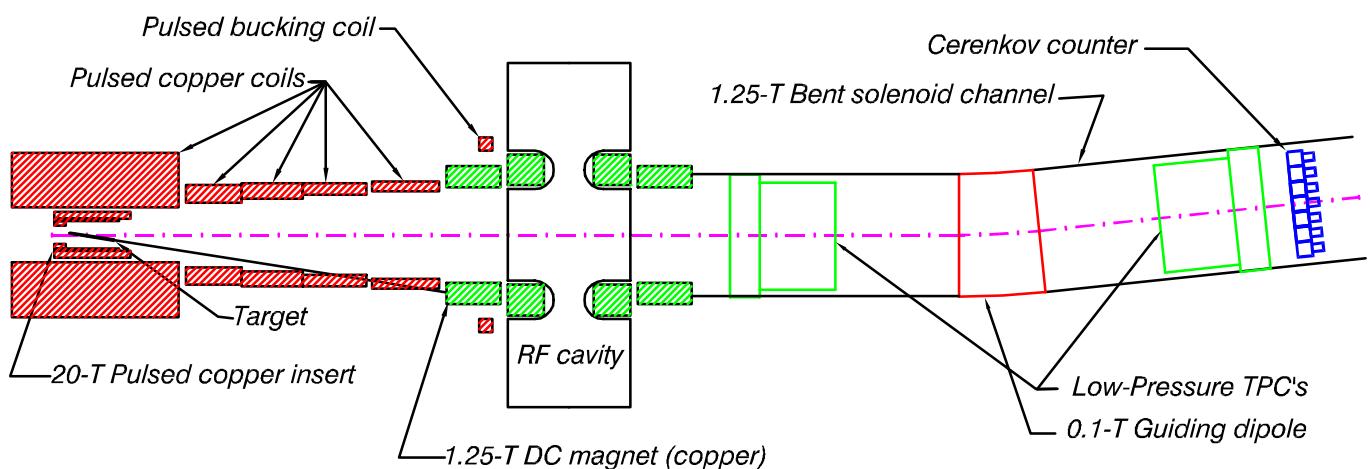
Tests with full-turn AGS extraction

Add 20 T pulsed solenoid

Add 70 MHz rf cavity

Characterize pion yield

The E951 Experiment



AGS E951
FY01 Run Plan

February-March-April, 2001

1. FEB commissioning into A3 area
2. Beam Window Tests
2. Solid Carbon Targets
4. Liquid Mercury Targets

Hg trough
Horizontal Hg jet

A3 Beamlne End Station



Plan View of the A3 Beamline

