



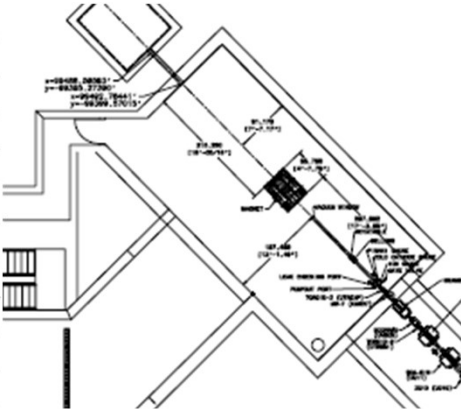
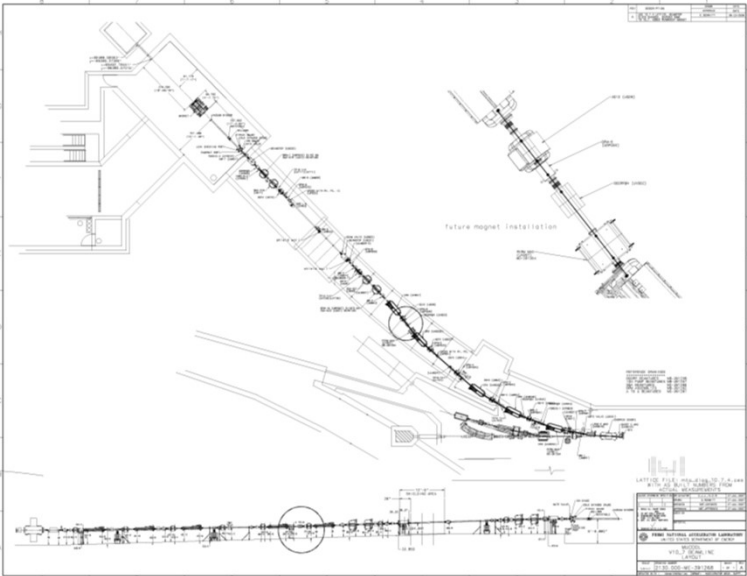
MTA Reconfiguration -- Overview

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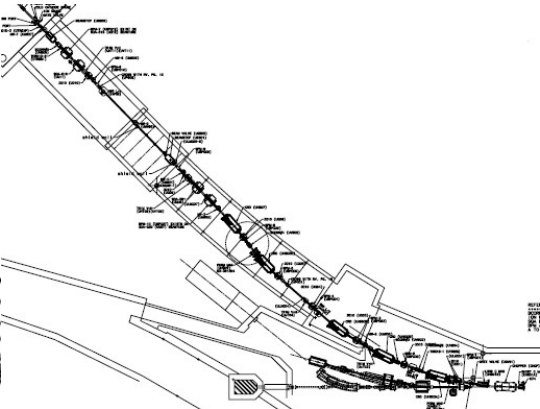
Accelerator Readiness Review for the 400 MeV Test Area

09 September 2020

MeV Test Area (MTA)



Irradiation Test Area (ITA)



400 MeV beam line

The 400 MeV beam line transports ions from the Linac to the experimental area (ITA).

A Brief History of MTA

Originally installed 2003-2007 in order to test ionization cooling (MuCool Program/MICE experiment). There was also a zero dispersion section, instrumented with three multiwires, which could be used to calculate the emittance. (This section is still present, but the tune is not compatible with transporting beam to the absorber.)

The experimental hall was used to test an RF cavity in a high magnetic field, both with and without beam.

Mid-2016, MuCool program came to an end.

Mid 2017, began investigation of beamline cleanup, and additional (internal) shielding, for a 400 MeV test area.

Modifications to the 400 MeV Beam Line

Added a movable striping foil before the final bend.

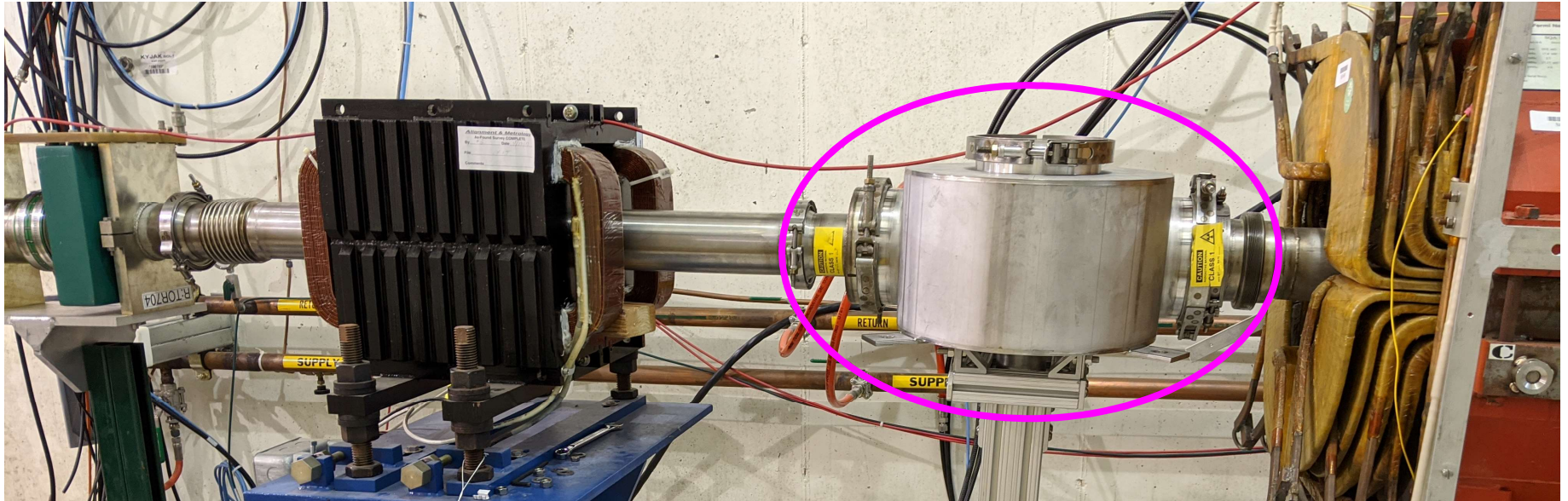
- Users prefer to take protons, not H⁻.
- Movable foil retains capability of taking H⁻. Electrons would still be stripped at the beam window, but would remain on same trajectory as protons.

Adjusted location of final focusing triplet by approximately 45 cm upstream to allow for stripping foil.

Upgraded multiwire hardware to allow reading both planes simultaneously.

Extended beam pipe further into ITA in order to reduce air interaction.

The Stripping Foil

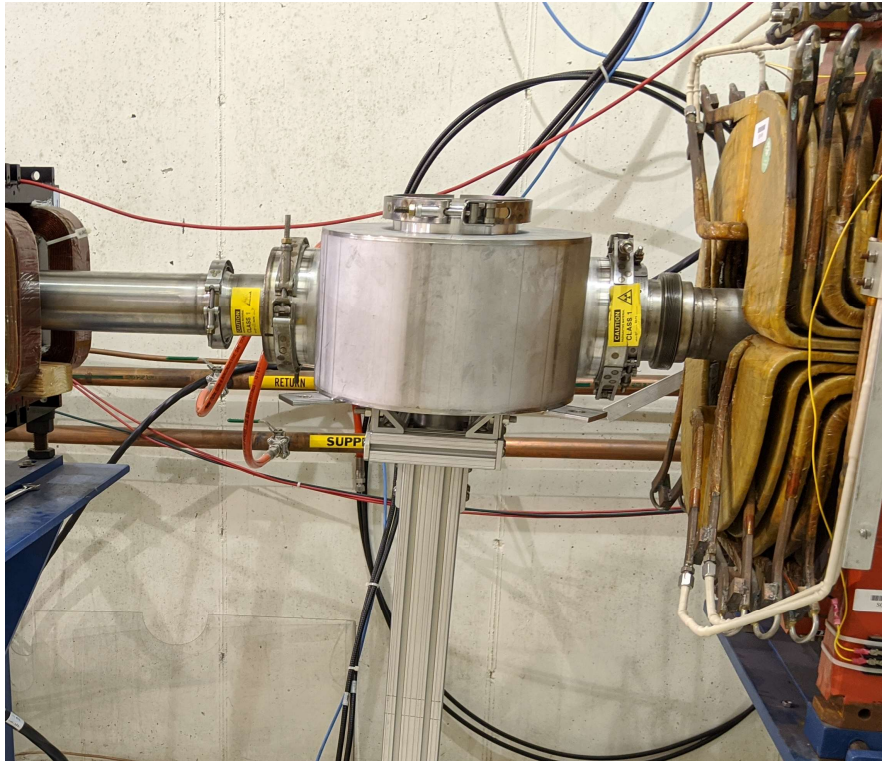


Stripping foil (inside vacuum vessel) located between final focusing quadrupole and vertical dipole.

Updated Shielding Assessment

A new shielding assessment was performed using updated tenth-layer values and the new facility layout for use as the 400 MeV Test Area. The present assessment allows MTA to run at 2.7×10^{15} protons per hour.

Conclusion



The existing beamline was cleared of beryllium contamination.

A stripping foil was added to allow exposure to protons.

The locations of some components were adjusted to make room for the foil.

A new shielding assessment was performed using updated tenth-layer values.

END

BACKUP

Key Definitions

MeV Test Area (MTA) – Beam enclosure containing the 400 MeV beam line and the experimental area.

Irradiation Test Area (ITA) – The experimental shielding cave and associated infrastructure located at the end of the MTA beam line. The ITA covers the broad experimental program taking place within the MTA enclosure.

Counting House – Service building adjacent to beam enclosure entrance for experimental monitoring. Formerly known as the MuCool Refrigeration Room.

