Magnet Design for the Target System of a Muon Collider/Neutrino Factory

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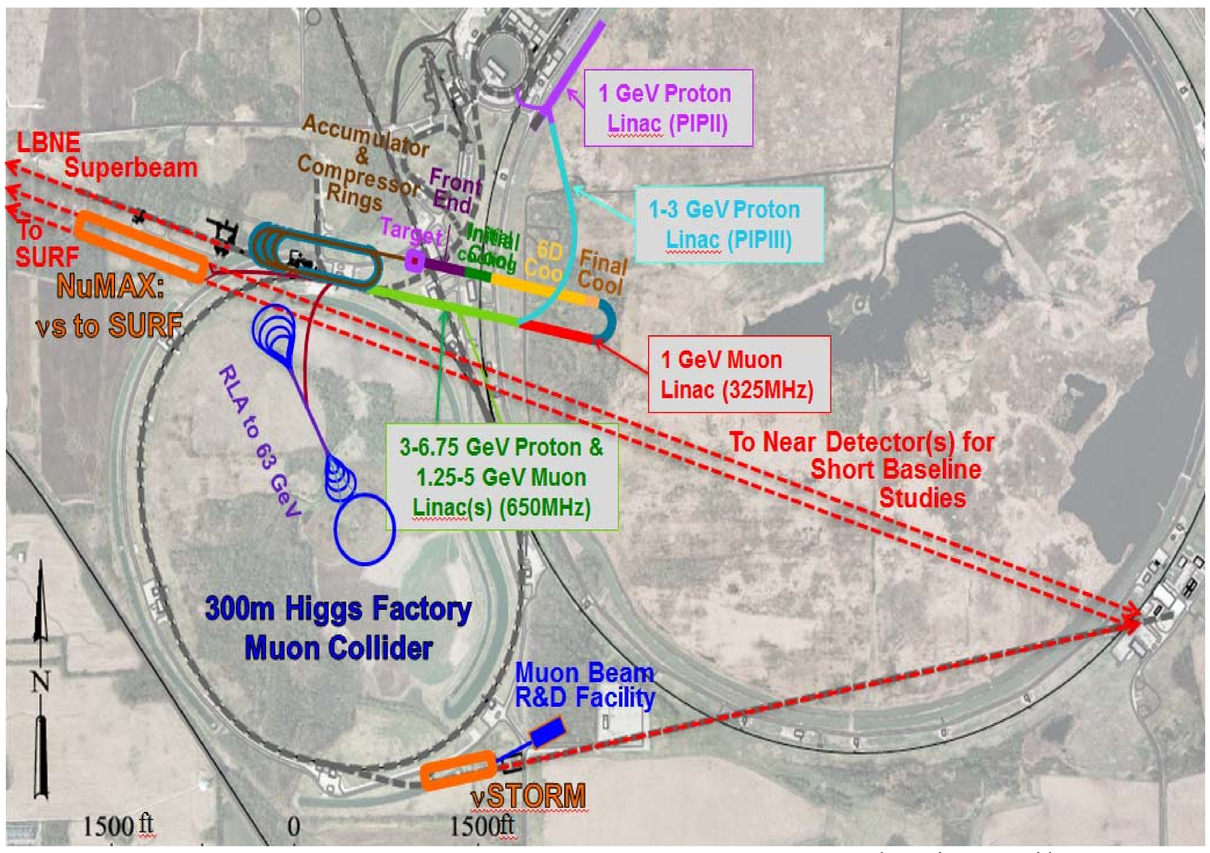
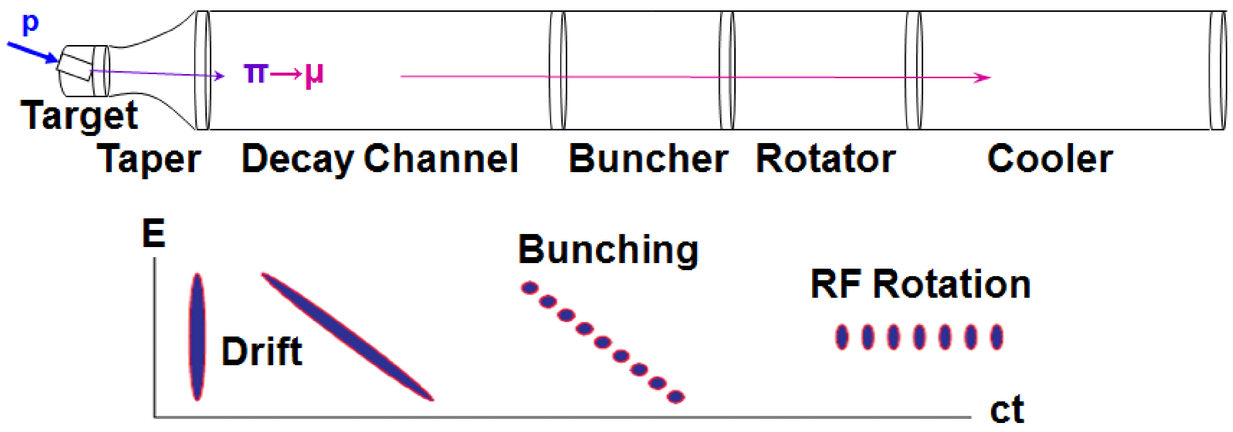
Possible Muon collider/Neutrino Factory Complex

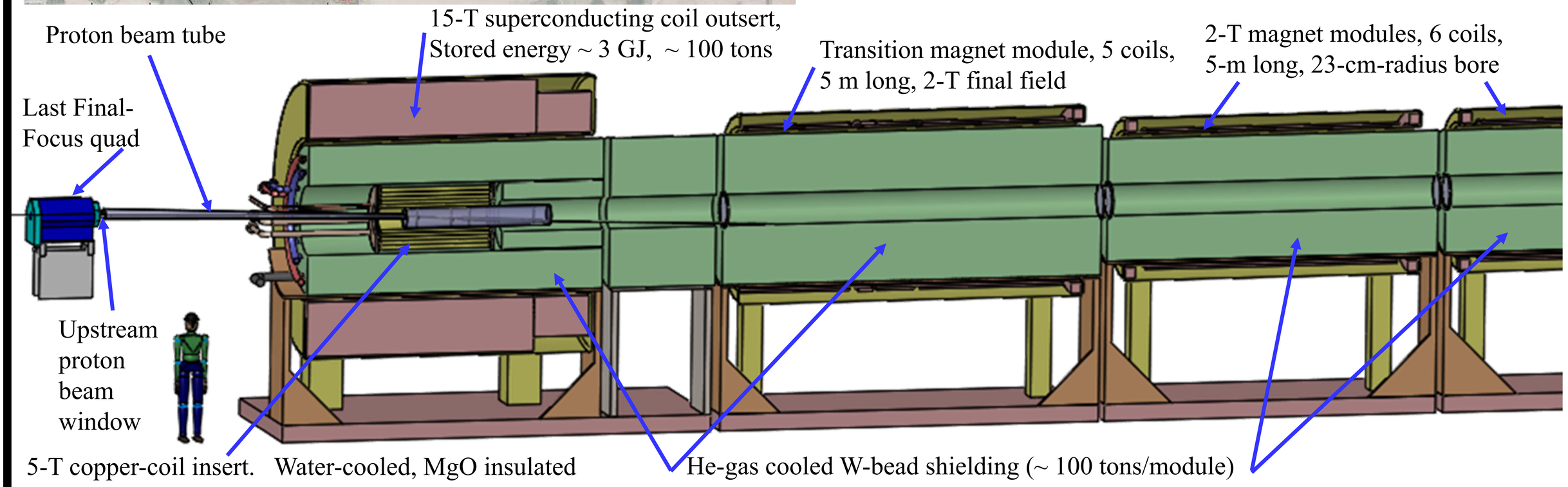


Target System Concept

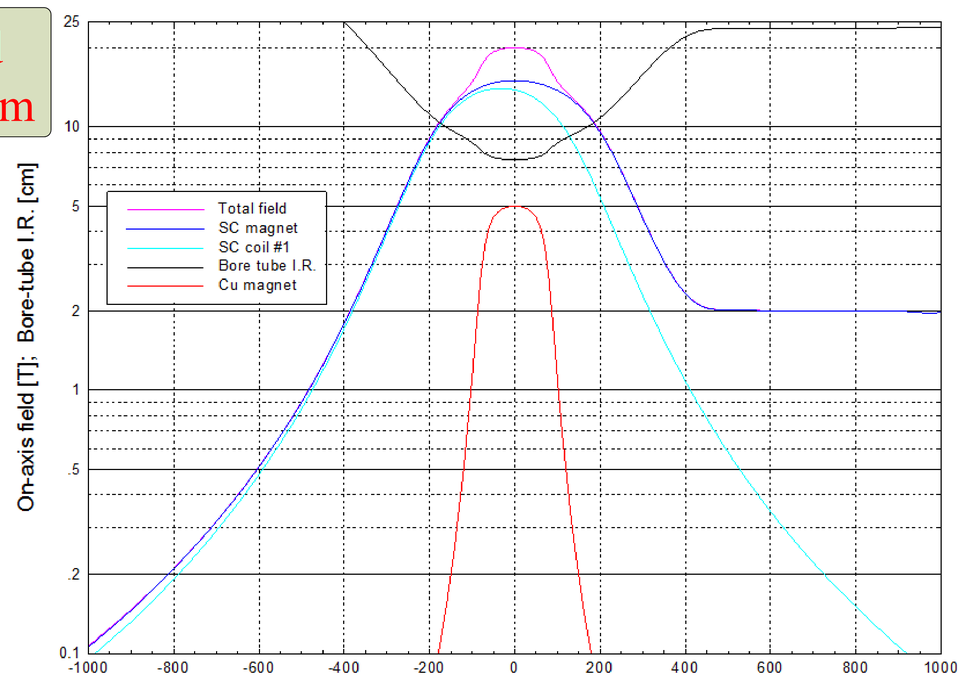
- Graphite target ($\rho \sim 1.8$ g/cm^3), radiation cooled.
- Target inside high-field solenoid magnet (20 T) that collects both $\mu^{\pm}$.
- Target and proton beam tilted with respect to magnetic axis.
- Superconducting magnet coils shielded by He-gas-cooled W beads.
- Proton beam dump via a graphite rod just downstream of the target.

Front End





Axial Field $-10 < z < 10$ m

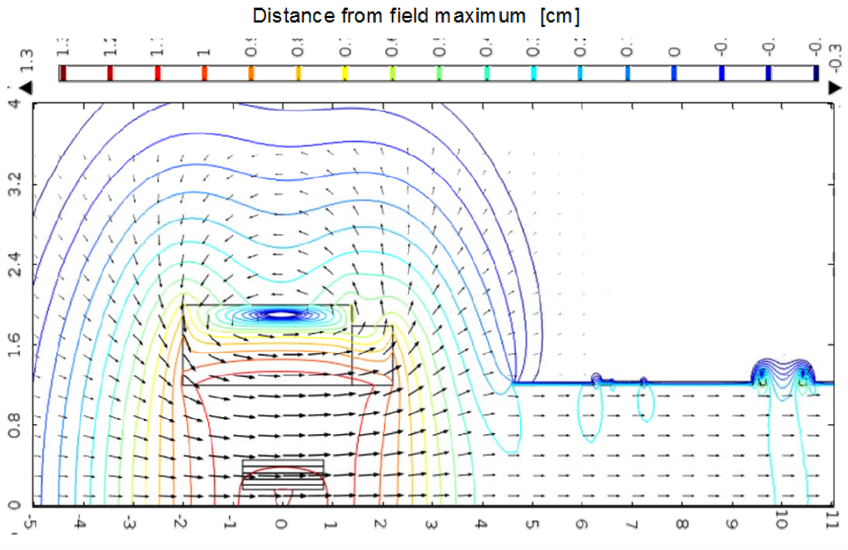


Field Map

$0 < r < 4$ m

$-5 < z < 11$ m

($z = 0$ at center of target)



Chicane

The Front End solenoid magnets also capture high-energy protons.

A sequence of tilted coils forms a bent-solenoid Chicane to deflect these protons out of the muon beam.

A proton absorber (≈ 10 cm Be) removes remaining soft protons after the Chicane.