

# DESIGN OF MAGNETS FOR THE TARGET AND DECAY REGION OF A MUON COLLIDER/NEUTRINO FACTORY TARGET

(IPAC13, TUPFI073)

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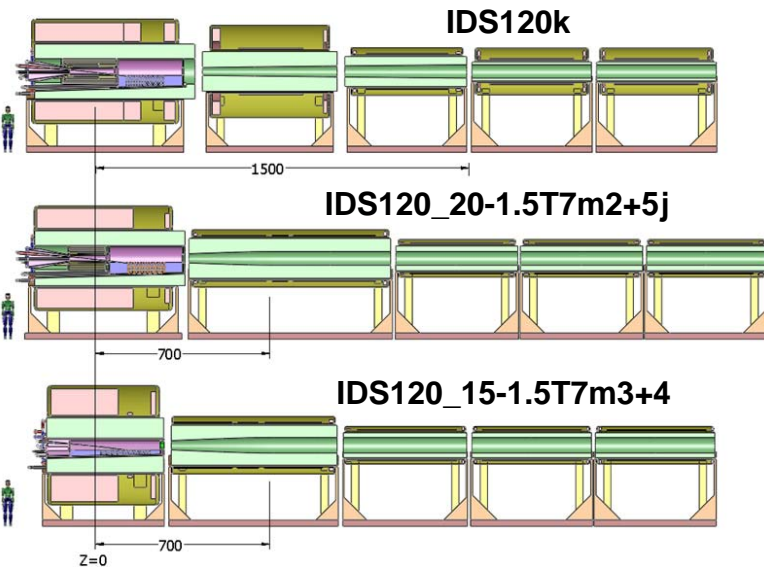
The baseline target concept for a Muon Collider or Neutrino Factory is a free mercury jet within a 20-T magnetic field being impacted by an 8-GeV proton beam.

A pool of mercury serves as a receiving reservoir for the mercury and a dump for the unexpended proton beam.

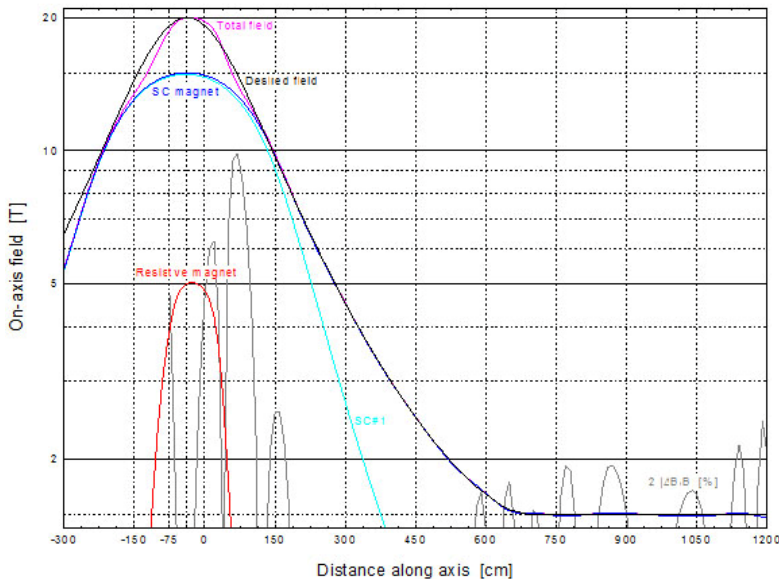
Modifications to this baseline are discussed in which the field at the target is reduced from 20 to 15 T, and in which the magnetic field drops from its peak value down to 1.5 T over 7 rather than 15 m.

## Evolution of coil design;

Ramp field down to 1.5 T over 7 m rather than 15 m to improve longitudinal phase space (TUPFI075);  
 Reduce peak field from 20 to 15 T.



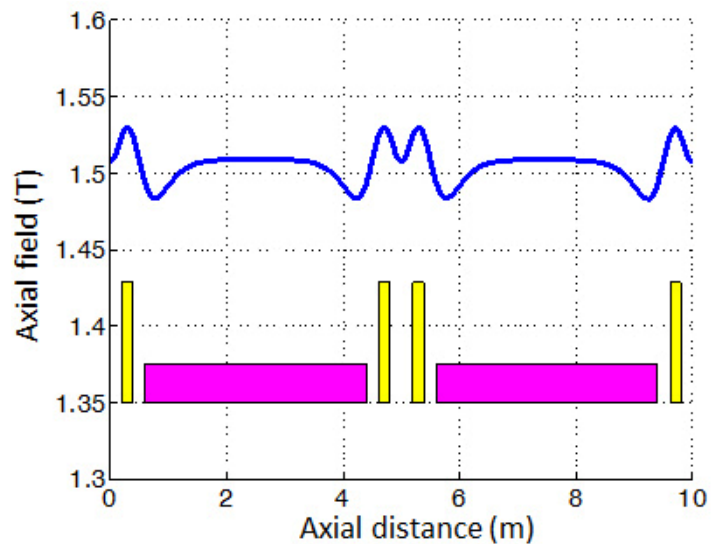
Axial-field profiles of Target-System magnet configurations that ramp down to 1.5 T at 7 m downstream of the target. The field error (grey), plotted as  $2|\Delta B|/B$ , is 4.9% at  $z = 70$  cm and 1.2% at 1,190 cm, where  $z = 0$  is at the downstream end of the beam-target interaction region



## Suppression of stop bands in the Decay Channel:

The pions produced in the target decay to muons in a Decay Channel that extends 70 m downstream. This Channel consists of 5-m-long modules of triplets of superconducting coils to deliver a ~ 1.5 T solenoid field. The field perturbations at the module boundaries must be minimized to suppress stop bands in the momentum transmission.

## Axial-field profile of two Decay-Channel modules:



## ICOOL simulation of transmission through an ideal 1.5-T solenoid compared sequence of Decay-Channel modules:

