

The High-Power Target System for a Neutrino Factory/Muon Collider

A Neutrino Factory based on muon beams and a Muon Collider both require an intense source of muons with similar parameters: collection of pions/muon of low energy and both signs from a multimegawatt proton beam with pulses at 10-100 Hz and only 2 ns duration. A Target System based on capture in a solenoid field (rather than a toroidal field) has been studied. An initial strong magnetic field followed by a lower field in the pion decay/muon bunching channel permits initial transverse cooling via longitudinal-transverse emittance exchange. Operation with a several megawatt proton beam favors use of a free-liquid-metal-jet target. Shielding of the superconducting solenoid coils from radiation damage leads to large coil dimensions, large stored energy, and substantial mass in the Target System. The present status of conceptual design of this challenging system will be presented.

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