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Transverse impedance and beam stability studies for the muon collider ring

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In the framework of the International Muon Collider Collaboration, a 10 TeV muon collider ring is being studied, with the option of an intermediate 3 TeV collider stage. The decay of high-energy muons represents a great challenge in terms of heat load management and radiation shielding for the superconducting magnets of the collider ring. Materials such as tungsten are being considered to shield the cold bore of the magnets from decay products. The transverse beam coupling impedance and related beam stability have been investigated in detail for several vacuum chamber designs to identify the minimum vacuum chamber radius and transverse damper properties required for stable beams.

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Footnotes

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