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Performance study of the MUSIC detector in $\sqrt{s} = 10$ TeV muon collisions

This study investigates the performance of the MUSIC (MUon System for Interesting Collisions) detector concept in the context of sqrt{s} = 10 TeV muon-antimuon collisions. The detector is designed to mitigate machine-induced background effects while maintaining high efficiency and accuracy in reconstructing physics events, particularly in the Higgs boson sector and searches for new physics. The MUSIC detector features an advanced tracking system, electromagnetic and hadronic calorimeters, and a superconducting solenoid providing a 5T magnetic field. Simulation studies demonstrate promising tracking efficiency, photon and electron reconstruction capabilities, and jet identification performance, confirming the detector's potential for high-energy muon collider experiments.

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