

Physics Potential, Accelerator Options, and Experimental Challenges of a TeV-Scale Muon-Ion Collider

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A TeV muon-ion collider could be established if a high energy muon beam that is appropriately cooled and accelerated to the TeV scale is brought into collision with a high energy hadron beam at facilities such as Brookhaven National Lab, Fermilab, or CERN. Such a collider opens up a new regime for deep inelastic scattering studies as well as facilitates precision QCD and electroweak measurements and searches for beyond Standard Model physics, in an alternative and complementary way to the proposed LHC-electron collider. We discuss the potential physics program of a muon-ion collider and summarize some accelerator options. We also explore some of the associated experimental challenges to be addressed and the requisite detector performance, including initial studies of a forward muon spectrometer design applicable for a muon-ion or muon-muon collider experiment.

Alternate track

1. Accelerator: Physics, Performance, and R&D for Future Facilities

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