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A Future Muon-Ion Collider at Brookhaven National Laboratory

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There has been significant discussion in the community regarding a future $\mu^+\mu^-$ collider. While such a facility is still decades away from realization, it is also understood that significant technological development and feasibility demonstrations are necessary at lower beam energies. Here we propose such a possibility coupled with a rich physics program. We propose a future Muon-Ion Collider that would serve as a natural extension to the EIC program currently planned in the 2030's and 40's. We envision this collider would be implemented as an upgrade to the EIC, with μ beam energies between 18 GeV and 200 GeV and a luminosity of 10^{33} cm^{-2}s^{-1}. In this presentation we discuss the challenges of generating μ beams that satisfy the design requirements of such a collider, and review some current efforts in the field to design such beams. We discuss the physics reach of a future muon-ion collider and identify opportunities for synergy between the nuclear and particle physics communities.

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No

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