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Muon Cooling Innovations and the Future of Bright Muon Beams

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Muon-based accelerators have the potential to enable facilities at both the Intensity and the Energy Frontiers, with industrial applications as well. Progress in muon accelerator designs has advanced steadily in recent years. In regard to 6D muon cooling, detailed and realistic designs now exist that provide more than 5 order-of-magnitude emittance reduction, with recent progress in “supercooling” techniques offering at least another order of magnitude. Furthermore, detector performance studies indicate that with suitable pixelation and timing resolution, backgrounds in the collider detectors can be significantly reduced thus enabling high quality physics results. Thanks to these and other advances in design and simulation of muon systems, technology development, and systems demonstrations, muon storage-ring-based neutrino sources and a muon collider appear more feasible than ever before. A muon collider is now arguably among the most compelling approaches to a multi-TeV lepton collider and an S-Channel Higgs Channel.

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