ID: 1168  Front-end design studies for a muon collider

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Abstract
Using muons instead of electrons is a promising approach to designing a lepton-lepton collider with energies beyond that available at the proposed ILC. At this time a self-consistent design of a high-luminosity muon collider has not been completed. However, a lot of progress has been made in simulating cooling and parts of other systems that could play a role in an eventual collider design. In this paper we look at front-end system designs that begin with a single pion bunch produced from a high power mercury target. We present ICOOL simulation results for phase rotation, charge separation, and pre-cooling of the muon beams. A design is presented for a single-frequency phase rotation system that can transmit 0.47 muons per incident proton on the target. A bent solenoid can be used for high-efficiency separation of the positive and negative muon beams.

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