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Magnet Needs for a Muon Collider SOREN PRESTEMON, Lawrence Berkeley National Laboratory, MAP COLLABORATION — A muon collider will require a variety of advanced magnet systems of various flavors, including radiation-tolerant solenoid configurations for beam capture at the target and high-field solenoids for the ionization cooling sections, various fast-ramp dipole magnets for the rapid acceleration sections and large-bore dipoles for the muon storage ring, and large-bore focusing optics for the interaction regions. We review the families of magnets needed for a muon collider, and in each case we summarize the current state of the art in magnet performance. The importance of evaluating the tradeoff in muon collider performance with magnet parameters is highlighted, so as to identify the most important magnet design elements that impact a muon collider facility. We summarize the primary technical challenges associated with each flavor of magnet in the context of a muon collider. We will also identify areas of particular interest for integrated design efforts to optimize muon collider performance, where magnet and optics design, together with accelerator physics considerations, are likely to provide unique opportunities for enhanced collider performance optimization.

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