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## Wed-Mo-Or2-02: Updates on the Conceptual Design Study of the Magnets for the Muon Collider Storage Ring

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The Muon Collider represents an exciting proposal for a post-LHC accelerator, capable of exploring higher-energy regions with greater power consumption efficiency compared to hadronic alternatives, while avoiding synchrotron radiation limitations inherent in electron colliders.

This contribution will focus on the magnets for the Muon Collider storage ring. These magnets pose an unprecedented technological challenge: high magnetic fields are required to ensure the compactness of the ring, maximizing the number of muon beam passes through the interaction region and thereby increasing luminosity. Additionally, large apertures are essential to accommodate an adequate shielding system that keeps the thermal and nuclear loads induced by the beam within acceptable limits. Furthermore, minimizing straight sections is critical to avoid the radioactive hazard posed by collimated neutrino beams, necessitating the use of combined-function magnets (dipole + quadrupole and dipole + sextupole). The interaction region also presents extreme conditions that demand the development of magnets beyond the current state of the art.

In this contribution, we will discuss the progress in the feasibility study of magnets for both the arc and the interaction region of the Muon Collider storage ring. Performance limits will be analyzed for dipoles, quadrupoles and combined function magnets, taking into consideration constraints on mechanical stresses, margin on the load line, ease of the protection system and cost, assuming both LTS ( $\text{Nb}_3\text{Sn}$ ) and HTS ( $\text{ReBCO}$ ) materials.

Finally, the most up-to-date conceptual designs of the arc dipole will be presented, comparing the strengths and challenges of the cos-theta and block coils layouts in terms of achieving of electromagnetic requirements, mechanical structure feasibility, and windability. This analysis will provide valuable insights into the development of advanced magnet technologies required for the Muon Collider.

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