

Superconducting Magnet Development for Next-Generation Accelerator Capabilities

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Abstract— The physics needs of particle accelerators have pushed the boundaries of superconducting magnet technology from their initial implementation in the Tevatron through the current High Luminosity Upgrade project for the LHC. Potential future machines like the FCC, ILC, or the CEPC will require the development of even more advanced magnet technology. Current state of the art Nb₃Sn magnets are unable to meet the needs of future colliders both from a cost and performance standpoint, so teams around the world are working to define the needs and develop the technologies needed to meet the aggressive requirements of future accelerators. Everything from the conductor through the design and construction of magnets will need to be re-thought to ensure that future accelerators will be feasible. Current roadmaps on how this development may play out, along with the magnet needs for future accelerators and technologies under development to meet these needs will be presented

Keywords (Index Terms) — Accelerators, Tevatron, superconducting magnets, high temperature superconductors, Nb₃Sn.

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