Inaugural
US Muon Collider
Meeting

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HTS-Based Rapid-Cycling Magnet for Muon Acceleration

The wide range of operational temperatures of the HTS (YBCO) conductor makes it suitable for the construction of rapid-cycling magnets required for the muon acceleration. The measured *) 0.06 W/m power loss of the 0.4 T magnet operating at 300 T/s suggests realistic possibility of the HTS-based accelerator magnet with much higher B-fields and ramp rates. The magnet core and power cable designs with projected HTS cable power loss for the +/- 1.7 T field in the 30 mm gap at the ramp rate of 1000 T/s are presented. The required supporting cryogenic power and the options of expanding B-field above 1.7 T are discussed.*) H. Piekarz, S. Hays, B. Claypool, M. Kufer, V. Shiltsev, MT-27- IEEE Trans. on Superconductivity. Vol: 32, Issue 6, Print ISSN: 1051-8223 (2022), https://arxiv.org/abs/211.06459

Primary author: Dr PIEKARZ, Henryk

Presenter: Dr PIEKARZ, Henryk

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