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Rapidly pulsed synchrotron acceleration chain for a Fermilab sited muon collider

Sunday 10 August 2025 15:00 (3 hours)

We present preliminary lattices for a rapid cycling synchrotron (RCS) chain based on a bottom up design for a 10 TeV parton center-of-momentum (pCM) muon collider sited at Fermilab. The smallest RCS rings in this lattice are 6.28 km in circumference and the largest RCS ring fitting fully within the Fermilab site is 15.5 km. To reach 5 TeV per beam, a single tunnel containing up to two rings is allowed to exceed the 15.5 km limit. Each ring is either a conventional RCS or a hybrid RCS. A conventional RCS relies on only iron dominated, ramped field magnets while a hybrid RCS relies on a combination of interleaved ramped field and superconducting fixed field magnets to achieve higher average magnetic fields while maintaining the high ramp rates achievable with iron dominated magnets. A pair of 6.28 km RCS rings and a 15.5 km RCS ring accelerate beams from 63 GeV to 1.54 TeV. Three scenarios for acceleration from 1.54 TeV to 5 TeV using an off-site tunnel are presented.

Please consider my poster for contributed oral presentation

No

Would you like to submit this poster in student poster session on Sunday (August 10th)

Yes

Footnotes

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Yes

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