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Parameter ranges for a chain of rapid cycling synchrotrons for a muon collider complex

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A facility for a muon collider brings the big advantages of a compact lepton collider and a collision energy up to several TeV, well above the energy reach of conventional electron circular accelerators.

However, the short lifetime of muons drives the design of the accelerator complex and collider, which makes this complex unique. A high muon survival rate and luminosity requires an extremely fast energy increase in combination with intense and ultra-short bunches. The International

Muon Collider Collaboration proposes a chain of rapid cycling synchrotrons (RCS) for acceleration from several tens of GeV to several TeV.

The minimization of the muon decay during the acceleration process is driven by technological limitations like the maximum magnet ramp and field, and cavity gradient.

We will consider different scenarios to reuse as much as possible the existing infrastructure at CERN.

We will give some scaling laws for a hybrid RCS to evaluate the frequency shift due to a path variation and the trajectory variation.

Finally, we will propose a preliminary parameter range for the different stages of an RCS chain.

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Footnotes

I have read and accept the Privacy Policy Statement

Yes

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