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## Design of the low-energy acceleration stages of the muon collider

*Wednesday, 22 May 2024 16:00 (2 hours)*

The Muon Collider aims to produce collision of  $\mu^-$  and  $\mu^+$  beams at a center-of-mass energy of 10 TeV by using various stages of acceleration and cooling. In order to bring the muon beams to the relevant energy before injection into the collider ring, both  $\mu^-$  and  $\mu^+$  beams are proposed to be accelerated on same beamline by a series of fast acceleration stages including Recirculating Linac Accelerators (RLA) and a Rapid Cycling Synchrotron (RCS). One of the multi-pass RLAs is used to accelerate the beam from 5 GeV to 62 GeV. The need for fast acceleration, a wide range of operating energies, a large longitudinal and transverse emittance, and a high-bunch charge bring many challenges in the design. In this study, we present a cost-effective lattice for the linac and arcs of the RLA and discuss instabilities in the proposed lattice.

### Footnotes

### Funding Agency

### Paper preparation format

### Region represented

Europe

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