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## Transverse impedance and beam stability studies for the muon collider Rapid Cycling Synchrotrons

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The International Muon Collider Collaboration is currently investigating the possibility to build a muon collider with a center of mass energy of 3 TeV in a first phase, with an option to build a 10 TeV collider in a second phase. The muon beam decay is the global challenge of such a collider and fast acceleration is required to reach high luminosities. A series of three or four Rapid Cycling Synchrotrons are currently proposed as the last acceleration stage before injecting the muon beams into the collider ring. The transverse collective effects in these synchrotrons have been analysed in detail. Both the higher-order modes of the numerous RF cavities needed for the fast acceleration, and the ceramic chamber needed to avoid eddy current effects, have been looked at in detail along with possible mitigation measures. Promising results have been obtained considering for the moment a single muon bunch.

### Funding Agency

### Footnotes

### I have read and accept the Privacy Policy Statement

Yes

**Primary author:** AMORIM, David (European Organization for Nuclear Research)

**Co-authors:** BATSCH, Fabian (European Organization for Nuclear Research); CHANCE, Antoine (Commissariat à l'Énergie Atomique et aux Énergies Alternatives); DAMERAU, Heiko (European Organization for Nuclear Research); GRUDIEV, Alexej (European Organization for Nuclear Research); KARPOV, Ivan (European Organization for Nuclear Research); MÉTRAL, Elias (European Organization for Nuclear Research); PIELONI, Tatiana (European Organization for Nuclear Research); SCHULTE, Daniel (European Organization for Nuclear Research)

**Presenter:** AMORIM, David (European Organization for Nuclear Research)

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