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Design of pulsed synchrotrons for the high-energy acceleration chain of a muon collider

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Reaching collision energy in a matter of milliseconds is a key challenge for the high-energy acceleration chain. The baseline is to use a chain of pulsed synchrotrons including hybrid synchrotrons, a never-operated configuration, that allows working with a more compact machine. Because of the very fast acceleration, we have to distribute the radiofrequency cavities (the acceleration stations) along the machine instead of having one or two dedicated insertions. The lattice design (the way we organize the bending and focusing magnetic elements) has to be adapted to the fast acceleration and ensure good beam parameters.

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