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FCC-hh: Longitudinal beam dynamics and RF requirements

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In addition to physics requirements and the injector chain capability, the choice of the rf and longitudinal beam parameters in the FCC-hh is defined by transverse and longitudinal single-bunch stability. Namely, the Transverse Mode Coupling Instability (TMCI) should be prevented for the calculated transverse impedance model, and Landau Damping in the longitudinal plane should be provided for the assumed longitudinal inductive impedance, based on the LHC experience. This work presents an update on the beam and rf parameters, which satisfy these criteria with sufficient margin during injection, acceleration, and physics. The rf power required for the transient beam loading compensation during cycle is also discussed.

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