

Collective Effects in Low-Emittance Rings: Projection for FCC

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A comparative analysis of collective effects has been done for a dozen of operating low-emittance storage rings. The beam energy is in the range from 1.5 to 8 GeV, horizontal emittance - from 0.3 to 7 nm. Both single-bunch and multi-bunch effects have been analyzed including beam lifetime, collective instabilities, current-dependent bunch lengthening and betatron tune shifts. For the machines in operation, measured data have been compared with the predictions based on impedance budgets. Some extrapolations for FCC-ee have been done using design parameters. The results of the analysis are presented, general trends of collective effects behavior are discussed.

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