

# Tapering options for the FCC-ee collider

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FCC-ee is being optimised for operation at four different collision energies in the range of 90 GeV to 350 GeV. At these high energies, vast synchrotron radiation losses cause orbit offsets, creating the so-called sawtooth effect and optics distortions due to focusing errors.

In order to achieve the foreseen beam emittances, strong constraints are inflicted onto the design of the arc lattice as well as the beam orbit and high beam stability and performance are needed. To ensure a high level of stability, there is the idea of adjusting dipole magnets to the local beam energy, effectively suppressing the sawtooth-effect and decreasing orbit distortions by two orders of magnitude. This process is called dipole tapering. It can be shown, that the residual optics distortion in the form of beta- and dispersion beat, which before tapering is hardly manageable, after dipole tapering can easily be corrected solely by rematching the quadrupoles in the dispersion suppressors and matching sections.

The talk will present different dipole magnet tapering scenarios and compare them in terms of effectiveness, feasibility and cost.

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