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Deflecting cavity-based multifunctional longitudinal manipulator for CSR-mitigated bunch compression

Tuesday 3 June 2025 16:00 (2 hours)

A deflecting cavity is an interesting tool providing a coupling between transverse and longitudinal planes. Several methods employing deflecting cavities have been proposed to shape current profiles or adjust longitudinal chirp. Even, a method using deflecting cavities was recently proposed for imparting arbitrary correlation on the longitudinal phase space. In this work, we introduce an integrated deflecting cavity-based beam manipulator capable of simultaneously controlling three longitudinal properties: chirp, linearity, and current profile. This relatively compact system can provide a linearized longitudinal chirp for bunch compression without requiring linac phase control and harmonic linearizers. Also, it generates a current profile that flattens the CSR wake, thereby minimizing emittance growth caused by CSR. The presentation includes the working principle of the system and simulation results.

Footnotes

Paper preparation format

Region represented

America

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