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First FCC-ee lattice design with combined function magnets

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The Future Circular Electron-Positron Collider (FCC-ee) represents a cutting-edge particle physics facility designed to further investigate the Z^0 , W^\pm and Higgs boson in addition to the top quark. The implementation of Combined Function Magnets (CFMs) in the FCC-ee arc cells would maintain high luminosity and reduce its energy consumption. The use of these special magnets induces changes in the damping partition numbers. To mitigate this the dipole fields in focusing and defocusing quadrupoles have to be different. This solution gives rise to incompatibility problems for the machine layout between the different energy configurations as the optics is also changed. This problem is tackled by defining different bending and geometric angles for the combined function magnets. The beam dynamics and performance aspects of the new lattice are studied in this paper.

Footnotes

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