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Lattice correction and polarization estimation for Future Circular Collider e+e-

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Precise determination of the center-of-mass energy in the Future Circular Collider e+e- (FCC-ee) at Z and W energies can be achieved by employing resonant spin depolarization techniques, for which a sufficient level of transverse beam polarization is demanded under the presence of machine imperfections. In this study, the FCC-ee lattice has been modeled and simulated with a variety of lattice imperfections, including misalignments, angular deviations, BPM errors, long range errors, etc., along with orbit correction, tune matching, and dispersion correction procedures. The equilibrium polarization is calculated within the context of realistic machine models. A more profound examination has been conducted on the association between imperfections and polarization, aiming to understand the underlying reason for polarization loss and potentially improve polarization by lattice manipulation.

Footnotes

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