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First view at alignment tolerances in the FCCee Interaction Region

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The FCC-ee is a next-generation high-luminosity electron-positron collider designed for beam energies between 45.6 and 182.5 GeV. Achieving its ambitious performance objectives relies on precise optics tuning. This study addresses the challenges of magnet misalignments, gradient errors and stringent alignment tolerances in the Interaction Region (IR). Utilizing the pyAT framework, correction algorithms were applied to restore the lattice configuration in presence of realistic IR errors, followed by stability testing under operational conditions. The findings offer critical insights into alignment strategies, correction methods, and their influence on beam dynamics, contributing to the development of the FCC-ee.

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