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## Impact of ground motion on FCC-ee performance

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The Future Circular Collider for electron-positron collisions (FCC-ee) is a proposed next-generation particle accelerator aimed at achieving high luminosity and precision for fundamental particle physics experiments. Its performance is sensitive to environmental factors such as ground motion, which can induce vibrations and misalignments in critical accelerator components. This paper presents a detailed study on the impact of ground motion on FCC-ee performance, with a focus on beam stability, alignment tolerances, and the complex interplay between ground motion and operational parameters. Using advanced simulations and analytical modeling, we evaluate the FCC-ee's sensitivity to various ground motion scenarios, ranging from localized, uncorrelated disturbances to correlated plane waves, and analyze their effects on the beam optics, orbit distortions, and overall beam dynamics. The findings provide valuable insights into the design and operational strategies required to mitigate ground motion effects, guiding future research and engineering efforts to ensure the successful realization of the FCC-ee project.

### Footnotes

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