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Study of the coherent < x-z > instabilities for FCC-ee

Monday 2 June 2025 16:00 (2 hours)

This work examines the dominant coherent head-tail type (< x-z >) instabilities in the vertical plane of the FCC-ee collider, focusing on a mode analysis method with the Circulant Matrix Model (CMM) to assess instability mechanisms under the influence of beam-beam effects and transverse wakefields. While the impact of vertical plane instabilities have been already studied, different mechanisms are prominent in the horizontal plane. Understanding these mechanisms is crucial to identifying a stable working point at the Z energy. This study aims to advance the stability analysis and optimisation of FCC-ee at Z energy by investigating horizontal plane dynamics. Our findings indicate that mitigation strategies effective for vertical plane instabilities may not be sufficient and need to be adapted in order to ensure overall beam stability.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

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