



Contribution ID: 743 Contribution code: WECD2

Type: **Contributed Oral Presentation**

Measures to mitigate the coherent beam-beam instability at CEPC

Wednesday, 22 May 2024 15:20 (20 minutes)

Both horizontal and vertical coherent beam-beam instability are important issues at CEPC. The horizontal instability ($X-Z$ instability) could be induced by beam-beam itself. The main method to suppress the $X-Z$ instability is the optimization of machine parameters. In this paper we try to study the effect of chromaticity, local vacuum impedance and resistive feedback by analysis and simulation. The vertical instability may be induced due to the combined effect of beam-beam interaction and vacuum impedance. Finite chromaticity and asymmetrical tunes have been proposed to suppress the vertical instability. Due to the further increase of impedance budget, we need to find more measures to mitigate the instability. The effect of resistive feedback and hourglass effect are evaluated by analysis and/or simulation.

Footnotes

Funding Agency

Paper preparation format

LaTeX

Region represented

Asia

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Session Classification: WECD: Colliders and other Particle and Nuclear Physics Accelerators (Contributed)

Track Classification: MC1: Colliders and other Particle and Nuclear and Physics Accelerators: MC1.A02 Lepton Circular Colliders