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Beam-Beam and Wakefield-Induced Collective Instabilities and Mitigation Strategies in the FCC-ee at Z Energy

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This presentation discusses the various collective instabilities that arise in the FCC-ee at Z energy. Intensity limitations in both the vertical and horizontal planes are influenced by the combined effects of beam-beam interactions and impedance. In the vertical plane, the transverse mode repulsion instability, driven by impedance, is a limiting factor, while in the horizontal plane, the coherent $\langle x-z \rangle$ instability, driven by beam-beam interactions, is the more significant. We will discuss the relevant parameters, optimisation strategies, and mitigation techniques, such as chromaticity and transverse feedback, for both cases. Our results suggest that the mitigation approaches differ between the two planes.

Author: SOOS, Roxana (Université Paris-Saclay (FR))

Co-authors: Dr FAUS-GOLFE, Angeles (IJClab IN2P3 CNRS-Université Paris-Saclay (FR)); BUFFAT, Xavier (CERN)

Presenter: SOOS, Roxana (Université Paris-Saclay (FR))

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