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FCC-ee collective effects: introduction and overview(including Full Energy Booster)

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Collective effects generated by the high beam intensities for FCC-ee, in particular for the Z-pole configuration, have to be carefully analyzed. We have found that the resistive wall represents a major source of impedance, but also the bellows with RF fingers make another important contribution. With the impedance model evaluated so far for this machine, thresholds for single bunch instabilities have been evaluated.

Additionally, the interplay between beam-beam interaction, beamstrahlung and the longitudinal beam coupling impedance has a strong influence on the coherent X-Z instability, which may compromise the collider performances.

Results of these studies, as well as some mitigation possibilities, will be discussed in detail in the following talks. Here an overview of the collective effects and some considerations about the impedance model and the obtained instabilities are presented.

Finally a preliminary overview of the collective effects for the FCC-ee booster is discussed, focused, in particular, on the microwave instability threshold with possible mitigating actions.

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