Collective instabilities in Collider, booster and damping rings with the high luminosity

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The collective instabilities in the CEPC collider, booster and damping rings are investigated based on the high luminosity design. The impedance model in the collider is updated regarding the change of the vacuum chamber cross section from elliptical to circular. Meanwhile, more impedance contributions are included. The instability issues for the high luminosity Z are investigated. The longitudinal impedance will induce bunch lengthening and beam energy spread increase. It will also interact with beamstralung and make the beam-beam interaction more unstable. The transverse resistive wall instability requires an efficient bunch by bunch feedback damping. Furthermore, the high order modes in some critical elements, such as the electro-separator or the beam pipe at the interaction region, need to be further investigated. On the other hand, the instabilities issues in the booster and damping rings are investigated considering only the resistive wall impedance.