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Proton-electron scattering at injection and extraction of the hollow electron lens at the HL-LHC

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The Hollow Electron Lens (HEL), initially planned for the High-Luminosity project of the LHC (HL-LHC), consists of an electron current in the shape of a cylindrical shell coaxial to the circulating hadron beam for typical distances of a few meters. At injection and extraction of the HEL, the electron beam intercepts the circulating hadron beam, leading to possible losses of the latter (e.g. via intensity burn-off) and to local radiation losses. In this note, we examine the rate at which such losses may occur due to elastic and inelastic proton-electron scattering, as well as the phase-space of the electron-proton collision.

Footnotes

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