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Electron cloud mitigation techniques for the FCC-ee

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The Future Circular Collider (FCC)-ee is a planned electron-positron collider under development. The future collider would be built in an about 91 km ring-shaped underground tunnel located beneath the French departments of Haute-Savoie and Ain, and the Swiss canton of Geneva. The FCC-ee may face challenges from electron cloud (e-cloud). The strongest effects are foreseen for the Z configuration, due to the highest number of bunches, which corresponds to the smallest bunch spacing, which is a key parameter for the e-cloud formation process. A high electron density in the beam pipe could limit the accelerator's achievable performance through various mechanisms, such as transverse instabilities, transverse emittance growth, particle losses, vacuum degradation and additional heat loads on the inner surface of the vacuum chambers. In the design phase, the objective is to suppress the e-cloud effects in the FCC-ee. Therefore, effective e-cloud mitigation techniques, to avoid the e-cloud avalanche multiplication and its deleterious effects, are discussed in the paper.

Footnotes

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