

The electron cloud challenge for the HL-LHC

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The build-up of electron clouds in accelerator beam chambers can lead to detrimental effects, such as transverse instabilities, emittance growth, beam loss, vacuum degradation, and heat load. Such effects are systematically observed in the Large Hadron Collider (LHC) during operation with proton beams, limiting the total intensity achievable in the collider. The High Luminosity LHC (HL-LHC) project aims at an order of magnitude increase of the integrated luminosity of the LHC. With the associated increase in bunch intensity, as well as an observed increase in electron cloud effects after each long shutdown of the LHC, electron cloud poses a significant risk to the performance of the HL-LHC. In this contribution, we discuss the related limitations and proposed mitigation measures to ensure the best possible performance of the HL-LHC.

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