Joint DESY and University of Hamburg Accelerator Physics Seminar

Tuesday, 25.02.2025 16:00

Hybrid Seminar:

Seminar Room 30b/459 & `zoom` Video Access

Modelling Slow Beam Degradation from Electron Clouds in the Large Hadron Collider

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Abstract

Electron clouds are being consistently observed to cause slow beam degradation of the beams of the Large Hadron Collider in the form of beam lifetime reduction and slow emittance growth. This effect is attributed to the non-linear forces that are being induced by the electron clouds and affect the dynamical behaviour of each particle.

Recent progress in the modelling of these type of electron clouds effects are done through particle tracking simulations of realistic distributions and are done with the XSuite simulation code.

In this talk, focus will be given on two examples:
1) slow degradation during the injection phase, and
2) lifetime reduction during collision of the two counter-rotating beams.
In the first example, we will show the simulation analysis that points to synchro-betatron resonances being responsible for the beam degradation. Based on this analysis, we will present how the optics were modified to alleviate the degradation alongside experimental measurements. Finally, we will present the steps taken to model electron cloud effects during collision of the two beams, which come exclusively from the final focusing quadrupoles next to the interaction points.

Access to seminar room 30b/459 only for a limited no. of participants!
Please consider our zoom link

W.Hillert, (Univ. HH), I.Agapov (MPY) and M.Vogt (MFL).

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