Accelerator Physics Seminar
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(16.00 in Room 459/30b)

Coherent beam-beam effects and Landau damping

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Abstract

Unlike most previous hadron colliders, the LHC operates in the so-called strong-strong regime, i.e. with equally strong beams, and may therefore suffer from coherent beam-beam effects.

For the nominal LHC parameters two modes may be present and following a prediction by Y. Alexahin, the pi-mode is outside the incoherent single particle spectrum and therefore does not experience Landau damping.

Mechanisms to restore damping by reducing the degree of symmetry between the two beams are effective, but may not be desirable due to possible side effects. Since the synchrotron tune and the linear beam-beam tuneshift have the same order of magnitude for the LHC, Landau damping could be provided by overlapping the discrete modes with the synchrotron sidebands of the incoherent continuum. We have developed a strong-strong simulation program to study this effect and to compare with the predictions.

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