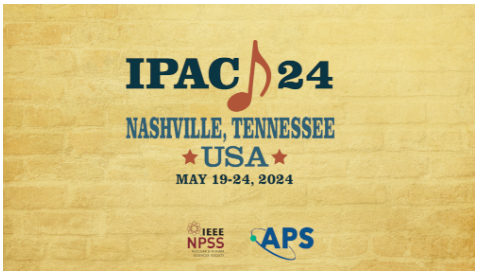

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Chromaticity and Landau damping effects in the SLS 2.0 transverse coupled bunch instability threshold

Tuesday, 21 May 2024 16:00 (2 hours)

Bunches excited by a transverse kick out of the closed orbit develop betatron oscillations, whose dynamics is affected by the chromaticity used in the accelerator or storage ring. Specifically, decoherence and recoherence effects caused by chromaticity can be modified by introducing Landau damping in the synchrotron phase space, when using a harmonic cavity to stretch the bunch length in order to improve the beam stability. Chromaticity will convert any oscillation in the longitudinal phase space into a frequency modulation of the betatron tune, changing the pattern of the echos of the kick in the beam offset. Focusing on the SLS 2.0 storage ring, we present a study about the damping of single bunch transverse oscillations with non zero chromaticity, including the harmonic cavity and the broadband impedance. These damping times are used to predict the threshold of the transverse coupled bunch instability in SLS 2.0.

Footnotes

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