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【385】 A novel approach to Landau damping of transverse collective instabilities in hadron colliders

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The study reports on an alternative method to generate transverse Landau damping to suppress coherent instabilities in circular accelerators. The idea is to produce the incoherent tune spread through detuning with longitudinal rather than transverse action. This approach is motivated by the high-brightness, low transverse emittance beams in future colliders where detuning with transverse action is less effective. Detuning with longitudinal action can be introduced with a radio-frequency quadrupole, or using second order chromaticity. The method has been studied in simulations, theory, and experiments. Specifically, second order chromaticity was enhanced in the LHC at CERN, and experimental results on single-bunch stabilisation will be shown. The observations are interpreted from a Vlasov-theory point-of-view including benchmarks against numerical accelerator physics models.

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