Joint DESY and University of Hamburg Accelerator Physics Seminar

Wednesday, November, 12-th, 2008

(10:30 in Room 459/30b)

Quasicrystalline Beam Formation in RF Photoinjectors

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Abstract

The recent observation of coherent optical transition radiation from high brightness beams in a variety of FEL injectors line has raised serious questions concerning the present model of beam dynamics in RF photoinjectors. We present here an analysis of what we term quasicrystalline beam formation. In this scenario, the relatively low longitudinal temperature, in combination with strong acceleration and, finally, temporal rearrangement due to bending in chicanes or transport lines, allows the longitudinal beam dimension to become more regular, on the microscopic scale of optical wavelengths, than expected from equilibrium statistical properties. This beam distribution then may then display a strong degree of coherence in its optical transition radiation output. We present initial theoretical and computational analyses of these effects, and discuss implications for further experimental investigations of the COTR phenomenon and underlying beam dynamics.

NOTE THE UNUSUAL DATE AND TIME

D.P.Barber (MPY), J.Roßbach (Univ. HH) and M.Vogt (MPY).

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