Joint DESY and University of Hamburg Accelerator Physics Seminar

Tuesday, November 13-th, 2007

(16:00 in Room 459/30b)

Measurement and Analysis of
Coherent Synchrotron Radiation Effects at FLASH
(Disputation)

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Abstract

The vacuum–ultra–violet Free Electron Laser in Hamburg (FLASH) is a linac driven SASE–FEL. High peak currents are produced using magnetic bunch compression chicanes. In these magnetic chicanes, the energy distribution along an electron bunch is changed by effects of Coherent Synchrotron Radiation (CSR). Energy changes in dispersive bunch compressor chicanes lead to transverse displacements along the bunch. These CSR induced displacements are studied using a transverse deflecting RF-structure. Experiments and simulations concerning the charge dependence of such transverse displacements are presented and analysed. In these experiments an over–compression scheme is used which reduces the peak current downstream the bunch compressor chicanes. Therefore other self interactions like space charge forces which might complicate the measurements are suppressed. Numerical simulations are used to analyse the beam dynamics under the influence of CSR forces. The results of these numerical simulations are compared with the data obtained in the over–compression experiments at FLASH.

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