

Joint DESY and University of Hamburg Accelerator Physics Seminar

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(16:00 in Room 459/30b)

LHC Optics Measurement and Correction

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Abstract

The measurement and control of the optics of an accelerator is a critical task for machine performance. Linear optics corrections have achieved remarkable performance in the last years, pushing the precision and accuracy of beta function and transverse coupling measurements further. In order to locate error sources we are interested in local observables, i.e. terms that only depend on lattice parameters and error sources in a localised region. Finding such a local observable for perturbations of the linear beam dynamics is a non-trivial task, contrary to the non-linear regime, where local resonance driving terms already exist. The phase beating between two locations depends on errors outside of this region. However, phase advances between four nearby locations can be arranged in a way to cancel the contributions from errors outside of this region up to first order. In this talk I will give a quick overview of the optics measurement and correction (OMC) procedures at CERN's LHC and a summary of my work in the LHC OMC team. This work consists of developing, improving and implementing optics measurement algorithms. One of the projects of my PhD seeks to explore the mentioned local phase beating observable and its usefulness for gaining insight in the linear optics imperfections of a circular accelerator.

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