

BESSY III orbit correction scheme layout and performance

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Currently in its Conceptual Design Phase (CDR), the 4th generation light source BESSY III aims to become a world-leading soft X-ray source, enabling numerous applications in metrology, life sciences, energy and catalysis materials, and many more. Its performance relies on ultra-low transverse emittances, achieved through the use of strong focusing magnetic elements that are sensitive to magnetic and alignment errors.

If left uncorrected, these errors give rise to a distortion of the closed orbit, beta beating, linear coupling, and a stronger impact of resonances thus impairing the storage ring performance.

In this work, we address how to devise an initial BESSY III orbit correction scheme. Two criteria were considered to find the optimal locations of Beam Position Monitor (BPM) and dipolar Corrector Magnet (CM). Different orbit correction scheme candidates are presented and their advantages and disadvantages are discussed. All calculations were performed in parallel with the Matlab toolkit Simulated Commissioning (SC) and its Python counterpart (pySC).

Author: JOLY, Sebastien (HZB)

Co-authors: Dr ALBERDI ESUAIN, Benat (HZB); Dr GOSLAWSKI, Paul (HZB)

Presenter: JOLY, Sebastien (HZB)

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