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LCLS-I undulator horizontal gradient modeling for THz@PITZ

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The Photo Injector Test Facility at DESY in Zeuthen (PITZ) develops a prototype of an accelerator based THz source for pump-probe experiments at the European XFEL. For the proof-of-principle experiments an LCLS-I undulator will be installed in a second PITZ tunnel downstream of the accelerator. Two LCLS-I undulators (on loan from SLAC) have arrived at Hamburg in August 2019. The fields of the undulator L143-112000-26 have been re-measured at DESY Hamburg and are consistent with SLAC measurement. A model for 3D field reconstruction based on the undulator magnetic measurements has been developed. This includes also a horizontal gradient of the vertical undulator field. Beam tracking has revealed that the transverse gradient will lead to an off-axis trajectory in the horizontal plane. This offset has to be corrected by steering coils which design is presented as well.

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