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SP6: Experimental Optimization and Characterization of Electron Beams for Generating IR/THz SASE FEL Radiation with PITZ

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The Photo Injector Test facility at DESY, Zeuthen site (PITZ), develops high brightness electron sources for modern linac-based Free Electron Lasers (FELs). The PITZ accelerator can also be considered as a suitable machine for the development of an IR/THz source prototype for pump-probe experiments at the European XFEL. One of the interesting options for the IR/THz generation with PITZ is to generate the radiation by means of a SASE FEL using an uncompressed electron beam with bunch length of a few 10 ps and a peak current of ~200 A. In this contribution, results of experimental optimizations and characterizations, including transverse phase space, slice transverse emittance and longitudinal phase space, of electron beams with bunch charges of 4 nC are presented and discussed. The measurements were done with beam momenta of 15 MeV/c and 22 MeV/c. Results of IR/THz SASE FEL calculations by using the GENESIS1.3 code based on the measured beam parameters are also presented and discussed.

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