

# First Lasing of the THz SASE FEL at PITZ

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## Abstract

Research and development of an accelerator-based THz source prototype for pump-probe experiments at the European XFEL are ongoing at the Photo Injector Test Facility at DESY in Zeuthen (PITZ). The existing accelerator was modified and extended downstream into a tunnel annex for the proof-of-principle experiments on high-power THz pulse generation. A Self-Amplified Spontaneous Emission (SASE) FEL is used to generate the THz pulses using an LCLS-I undulator (on loan from SLAC) driven by an electron bunch from the PITZ accelerator. A beam energy of  $\sim 17$  MeV is used to generate THz radiation with a center wavelength of  $100 \mu\text{m}$ . The installation of the first THz beamline setup was finished in summer of 2022, and commissioning with the electron beam started. A specially developed procedure for high charge beam matching into the undulator was successfully tested, resulting in the first THz pulse generation. First measurements of the THz generation using pyrodetectors for 1 nC, 2 nC and 3 nC bunches have been taken. The statistics properties analysis reflects the expected SASE performance. This contribution presents and discusses the experience and results of the first commissioning and the first measurements of the THz SASE FEL at PITZ.