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First spectral measurements of single-pass high-gain THz FEL at PITZ

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The Photo Injector Test facility at DESY in Zeuthen (PITZ) develops a prototype tunable high-power THz source for pump-probe experiments at the European XFEL. A single-pass high gain THz free-electron laser (FEL) was realized at PITZ. A THz beam line based on a strongly focusing planar LCLS-I undulator is used for proof-of-principle experiments. The first lasing at the center frequency of ˜3 THz demonstrated high gain with radiation pulse energies exceeding 100 microjoules. Electron beams with bunch charge of 2-3 nC and mean beam momentum of ˜17 MeV/c were used to generate high-energy THz pulses. Recently, a narrow-band spectrum has been measured using a Fourier Transform Infra-red (FTIR) spectrometer based on a reflective lamellar grating. The experimental results, including the gain curves as well as spectral properties along them, are presented.

Footnotes

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