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## First Lasing of UCLA High Efficiency THz FEL

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Here we report on the first lasing of the high efficiency THz FEL operating at the UCLA Pegasus laboratory. The FEL is operated in the zero-slippage regime where a circular waveguide is used to match the radiation and electron-beam velocities in a 0.96 m long tapered helical undulator, allowing resonant interaction with the ultrashort 200-pC 5.5-MeV electron beam from the RF photogun over an extended region. Electron-beam spectrum measurements, supported by energy and spectral measurement of the terahertz FEL radiation, indicate an average energy efficiency of  $\sim 10\%$ , with some particles losing  $>20\%$  of their initial kinetic energy.

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