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The Measurement and Simulation of Terahertz Difference Frequency Generation in Quantum Cascade Lasers[1] FENG XIE, Department of Physics, Texas A&M University, MIKHAIL BELKIN, FEDERICO CAPASSO, Department of Engineering and Applied Science, Harvard University, JEROME FAIST, Institute for Quantum Electronics, ETH Zurich — Recently the research on Terahertz (THz) source and imaging has attracted significant attention. To achieve the room-temperature operated semiconductor light source in the THz range became one of the main challenges. Quantum Cascade lasers (QCL) are the primary contenders. However, the goal of achieving room-temperature operation in THz QCLs still remains elusive. Combining optical nonlinearities with a mid-infrared QCL or a near-infrared diode laser is an alternative approach. A device integrating two QCL active cores lasing at different mid-infrared wavelengths and giant second order susceptibility for difference frequency generation (DFG) together could be a promising THz light source. In this talk, the measurement of a THz difference frequency generation QCL is presented. The laser works at two mid-infrared wavelengths, around 9um and 10um. The wavelength of the DFG signal is around 60 um. The result of simulations for the DFG spectra is also presented.

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