MOLECULAR SPECTROSCOPY WITH A HIGH-RESOLUTION, FREQUENCY-CALIBRATED TERAHERTZ SPECTROMETER BASED ON OPTICAL PHOTOMIXING IN LOW-TEMPERATURE-GROWN GaAs

PIN CHEN, *127-72 Division of Chemistry and Chemical Engineering, California Institute of Technology, Pasadena, CA 91125*; SHUJI MATSUURA, GEOFFREY A. BLAKE, *170-25 Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, CA 91125*; J. C. PEARSON, HERBERT M. PICKETT, *MS 183-301, Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA 91109*.

An all-solid-state, fully fiber-coupled THz spectrometer based on photomixing of near-infrared radiation in low-temperature-grown (LTG) GaAs has been developed. The optical pumping system consists of three 850 nm diode lasers; lasers #1 and #2 are locked to different longitudinal modes of a Fabry-Perot cavity via the Pound-Drever-Hall method and the third laser is offset-locked to laser #2. The primary outputs of lasers #1 and #3 are injected into a master-oscillator power amplifier (MOPA). The two simultaneously amplified beams are focused onto a LTG GaAs photomixer to generate THz radiation. The free-spectral-range of our ultra-low-expansion, Fabry-Perot cavity can be precisely determined, allowing absolute calibration of the THz radiation. High-resolution molecular spectroscopy performed with this spectrometer will be presented.