DIODE-PUMPED TERAHERTZ PHOTOMIXING SPECTROMETER

J. M. VAN ROOIJ[a], A. S. PINE and R. D. SUENRAM, *Optical Technology Division, National Institute of Standards and Technology, Gaithersburg, MD 20899*.

We previously demonstrated a high-resolution terahertz spectrometer[b] by mixing dye lasers in a fast low-temperature-grown (LTG)-GaAs photoconductor with submicron interdigital electrodes feeding a broadband complementary spiral antenna which radiates the coherent terahertz beat through a sample gas cell to a composite Si bolometer. We have upgraded the system efficiency, range and sensitivity by replacing the dye lasers with near-infrared diode lasers, using lower capacitance photomixers and detecting the far-ir radiation with a faster response hot-electron InSb bolometer. The fixed-tuned laser is a single-frequency ($\lambda \approx 852$ nm) distributed-Bragg-reflector (DBR) GaAlAs diode, self-locked to a confocal interferometer; and the tunable diode laser is a broadband quantum-well ($828 \leq \lambda \leq 858$ nm) single-mode Littman-Metcalf external-cavity oscillator and a tapered planar amplifier, with precision linear piezoelectric tuning of up to 60 GHz and complete spectral coverage from 0.1 to 2 THz. Sample spectra will be given.

[a] Also, Department of Physics, Catholic University of Nijmegen, the Netherlands.

[b] A.S. Pine, R.D. Suenram, E.R. Brown and K.A. McIntosh, *J. Mol. Spectrosc.* **175**, 37 (1996)