Abstracts

Gas-absorption spectroscopy with electronic terahertz techniques

D.W. Van der Weide, J. Murakowski and F. Keilmann. "Gas-absorption spectroscopy with electronic terahertz techniques." 2000 Transactions on Microwave Theory and Techniques 48.4 (Apr. 2000, Part II [T-MTT] (Special Issue on Terahertz Electronics)): 740-743.

In this paper, we present the first gas-absorption spectra measured with an all-electronic terahertz spectrometer. This instrument uses phase-locked microwave sources to drive GaAs nonlinear transmission lines that produce picosecond pulses, enabling measurement of broad-band spectra. By sweeping the fundamental excitation, however, the spectrometer can also measure single lines with hertz-level precision, a mode of operation not readily available with optoelectronic terahertz techniques. Since this system is based on integrated circuits, it could ultimately function as an inexpensive gas-sensing system, e.g., for vehicle emissions, an application for which we analyze the sensitivity of a prototypical system.

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