

Press Release

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New: cw Terahertz Spectroscopy Kit

TOPTICA integrates leading-edge photomixer technology

Reacting to the increasing market demand, TOPTICA has designed a complete cw terahertz spectroscopy kit, which complements the existing diode laser packages. The spectroscopy kit provides all necessary equipment to get an actual cw terahertz measurement started! State-of-the-art photomixers offer a high bandwidth of > 1750 GHz, attractive terahertz power levels in the 1 μ W range, and excellent signal-to-noise ratios up to 80 dB.

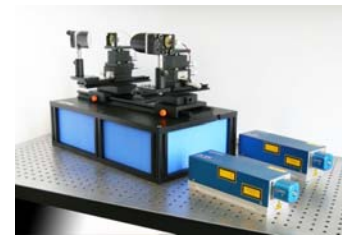
The photomixers are based on GaAs material and suited for laser wavelengths up to 860 nm. In a coherent detection scheme, one photomixer acts as terahertz transmitter, whilst the second one functions as a highly sensitive receiver. This configuration permits accurate measurements of both amplitude and phase of the terahertz wave.

Two versions of the cw terahertz spectroscopy kit are available. The basic version features two photomixers, a TC110 TeraControl unit, a low-noise transimpedance amplifier for the detector photocurrent, and an intuitive LabView user interface. The extended version further comprises two precision positioning stages for the photomixers, two off-axis parabolic mirrors to collimate and re-focus the terahertz beam, and a motorized delay stage for phase-sensitive terahertz measurements. The entire optomechanics are mounted on a rail system and enable a straightforward adjustment of the terahertz beam path.

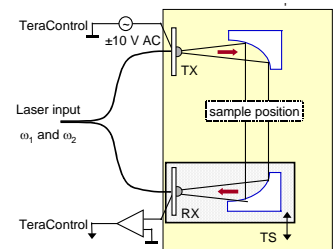
The terahertz emitter / receiver modules are equipped with broadband log-spiral antennae, a Silicon lens on the terahertz output side, and a single-mode fiber pigtail. The all-fiber setup removes the need for cumbersome beam alignment, and permits a flexible change of the terahertz path length.

Electronic chopping of the emitter bias voltage, as well as lock-in detection of the receiver photocurrent, is accomplished by TOPTICA's proprietary TeraControl unit TC110. Drawing upon latest FPGA technology, the TC110 unites all of the advantages of a digital lock-in amplifier in a compact module, which fits in the DC110 laser supply rack.

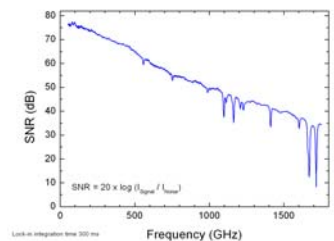
The entire terahertz setup is computer-controlled and a LabView software package is supplied as part of the delivery.



TOPTICA's new cw terahertz spectroscopy kit complements the DFB diode laser packages.



Scheme of the cw terahertz spectroscopy kit.



High SNR from 50 – 1750 GHz. The absorption features are resonance lines of water vapor.

Author:

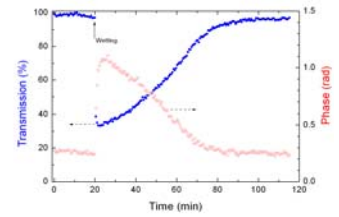
Dr. Anselm Deninger, TOPTICA Photonics AG

The spectroscopy kit has been designed for institutes and companies who want to develop their own, proprietary analytical setup. The open, multi-purpose design enables a convenient and flexible adaptation into any terahertz assembly.

The spectroscopy kit is compatible with TOPTICA's existing laser packages. The Standard Package comprises two Distributed Feedback diode lasers with driver electronics and fiber-optic beam combination. The High Power Extension boosts the laser power to the 500 mW range. The Precision Frequency Control Extension enables a spectral resolution on the 1 MHz level, unmatched by any other commercial system.

A compact cw terahertz demonstrator, including all of the above packages, will be on display at LASER 2009.

Please visit us at LASER World of PHOTONICS, hall B1, booth 115.



Drying curve of tissue, sprayed with a detergent solution. Both amplitude and phase of the terahertz signal mirror the drying process.

TOPTICA Photonics AG develops, manufactures, services and distributes technology-leading diode and fiber lasers and laser systems for scientific and industrial applications. Sales and service is offered worldwide through TOPTICA Germany and its subsidiary TOPTICA USA, as well as all through 14 distributors. A key point of the company philosophy is the close cooperation between development and research to meet our customers' demanding requirements for sophisticated customized system solutions and their subsequent commercialization.

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