

TOPTICA Photonics AG  
Lochhamer Schlag 19  
D-82166 Graefelfing / Munich

## Press Release

### Contact:

#### Marketing Communication

Alena Bunk  
Phone + 49 89 85837-123  
Fax + 49 89 85837-200  
[alena.bunk@toptica.com](mailto:alena.bunk@toptica.com)

#### Sales

Dr. Anselm Deninger  
Phone + 49 89 85837-153  
Fax + 49 89 85837-200  
[anselm.deninger@toptica.com](mailto:anselm.deninger@toptica.com)

[www.toptica.com/pr\\_news/news.html](http://www.toptica.com/pr_news/news.html)

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### Next Generation THz: Fast, compact & cost effective

TOPTICA presents new cw THz System with 1.5  $\mu\text{m}$  lasers.

At the forthcoming Photonics West exhibition, TOPTICA Photonics presents the most compact frequency-domain terahertz spectrometer built to-date. The system combines TOPTICA's new TeraBeam, a highly integrated two-color diode laser, with newly developed InGaAs/InP emitter and detector technology (Fraunhofer Heinrich-Hertz Institute, Berlin, Germany). The new cw THz system features a fast scan option, which reduces the acquisition times in cw THz spectroscopy by more than two orders of magnitude and acquires a complete THz spectrum (e.g. 50-1200 GHz, sub-GHz resolution) in less than a minute.

Thus far, research in the field of frequency-domain (cw) terahertz has largely been carried out with GaAs photomixers, requiring laser wavelengths below 870 nm. Whilst excellent results in terms of bandwidth and signal quality have been obtained, the complexity of the optical source and a variety of non-standard optical components resulted in a price level inadequate for widespread industrial use.

Teaming up with the HHI, TOPTICA is now able to present an alternative solution: lasers and antenna packages for cw THz at the telecom wavelength of 1.5  $\mu\text{m}$ . The new TeraBeam represents a compact two-color laser, with a footprint of only 161 x 130 x 61 mm<sup>3</sup>. Making use of highly integrated DFB laser diodes and fiber components, the laser provides 30 mW per two-color output and is thus ideally suited to the power requirements of the cw THz emitters and detectors. These modules, developed by HHI, are based on InGaAs/InP semiconductor material. The emitter utilizes a high-bandwidth photodiode with an integrated waveguide structure, and provides output levels in the microwatt range. The receiver employs an InGaAs photoconductor and achieves excellent SNR values up to 80 dB. The modules are fully packaged with SM/PM fiber pigtails.

Drawing on extensive expertise in FPGA programming and data processing, TOPTICA has managed to cut the acquisition times in cw THz spectroscopy



The TeraBeam: an ultra-compact system for cw THz generation



Novel InGaAs/InP THz emitters and detectors by HHI

#### Author:

Dr. Marion Lang, TOPTICA Photonics AG

by more than two orders of magnitude. The new cw THz system achieves, for the first time, a measurement speed comparable to that of pulsed spectrometers (e.g. 50-1200 GHz spectrum with sub-GHz resolution in 50 sec). The frequency resolution can be selected via an intuitive graphic user interface and frequency steps as small as 10 MHz are feasible.

The new cw THz system along with the fast scan option will be shown live at Photonics West 2011 in San Francisco at the TOPTICA booth #8(8)17.

*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.*

**Author:**

Dr. Marion Lang, TOPTICA Photonics AG