

TOPTICA at Photonics West 2017: Finest lasers at exotic wavelengths for biophotonics, material inspection and quantum optics

From January 28th to February 2nd, TOPTICA Photonics will exhibit their latest innovations in laser technology in the San Francisco Moscone Center at the BIOS (booth 8709) and Photonics West (booth 923) exhibitions. These lasers are excellent light sources for a variety of applications in biophotonics, materials metrology and quantum optics.

For **biophotonics**, a specialized multi-laser engine, as well as new femtosecond fiber lasers are available. In particular for **microscopy**, the completely new **iChrome CLE** is an ideal tool. This compact and economic multi-laser engine provides up to 20 mW output power at 405, 488, 561 and 640 nm each. It is the third member of TOPTICA's "iChrome" product line, which includes the cost-effective iChrome CLE with four pre-defined colors, the power-champion iChrome MLE with four selectable colors, as well as the flexible iChrome SLE that integrates up to 8 exchangeable colors. All iChrome systems feature a unified user interface, unique modulation skills and COOL^{AC}, TOPTICA's proprietary and fully automated beam alignment algorithm.



TOPTICA's multi-color laser engine iChrome CLE provides up to 20 mW at 405, 488, 561 and 640 nm.

The new **FemtoFiber dichro midIR** is ideally suited for **mid-infrared spectroscopy**, as well as **near-field studies**. It provides pulses with a broadband mid-infrared spectrum ranging from 5 to 15 μm at an 80 MHz repetition rate and more than 0.5 mW output power. This spectrum is generated via DFG between the fundamental beam and a frequency shifted beam, both originating from an Er-doped fiber oscillator. The FemtoFiber dichro midIR is a unique tool for the chemical analysis of materials with nanoscale resolution accuracy, e.g. in near-field spectroscopy systems.



The FemtoFiber dichro midIR provides ultra-broadband mid-infrared spectra, reaching from 5-15 μm .

The **FemtoFiber ultra 1050** is the most recent addition to TOPTICA's third generation of ultrafast fiber lasers. It provides powerful pulses centered at 1050 nm with > 5 W average power and 80 MHz repetition rate. The pulse duration of less than 120 fs is one of the shortest currently available on the market at this wavelength. The FemtoFiber ultra 1050 is ideally suited for **multiphoton (SHG) microscopy**, **supercontinuum generation**, **material processing**, as well as **OPCPA or amplifier seeding**.



Pulses with > 5 W output power and < 120 fs duration at a wavelength of 1050 nm are provided by the FemtoFiber ultra 1050.

Advanced **materials metrology** is possible with TOPTICA's completely new **TopWave 266** laser system. This industrial-grade UV cw-laser provides 150 mW power at a 266 nm wavelength. It stands out due to excellent power stability, low noise and an extended lifetime that is realized with a digital control architecture and an optimized, completely sealed doubling cavity. The TopWave 266 lends itself to demanding applications like **semicon inspection**, **optical lithography** and **Raman spectroscopy/microscopy**.



The TopWave 266 delivers 150 mW output power at 266 nm with low noise and extended lifetime.

Other material characterization techniques like **non-destructive testing, plastic inspection** or **layer thickness measurements** are feasible with TOPTICA's unique terahertz systems. The time-domain terahertz platform **TeraFlash** achieves an unsurpassed peak dynamic range of up to 100 dB at a 6 THz bandwidth. In addition, the frequency-domain terahertz platform **TeraScan** convinces with a high resolution better than 10 MHz and a dynamic range of 100 dB.



TOPTICA's TeraFlash enables advanced non-destructive testing applications using pulsed terahertz radiation.

Sophisticated experiments in **quantum optics** often require advanced lasers with state of the art specifications and highest reliability. TOPTICA provides unique solutions that fulfill these requirements. For example, the new **DLC DFB pro** laser systems combine the ease-of-use and ruggedness of distributed feedback diodes with the outstanding features of the TOPTICA's **DLC pro** driver. With the digital controller, this system is ideal for **spectroscopic applications**, since it enables zooming in onto a signature of interest, and permits frequency locking with just a few touchscreen gestures. In addition, a new "wide-scan" option enables large scan ranges attainable with thermally tuned DFB diodes (more than 1000 GHz at selected near-infrared wavelengths).



The new DFB pro is ideal for spectroscopic applications due to its ease-of-use and outstanding features.

Ultrawide mode-hop-free wavelength tuning is possible with TOPTICA's **CTL**. It is now available at new central wavelengths: 1050, 1320 and 1470 nm (also available: 950, 1500 and 1550 nm). At these wavelengths, it supports guaranteed mode-hop-free wavelength tuning of up to 110 nm with up to 80 mW output power. The CTL is ideal for **spectroscopy, quantum dot or microcavity measurements**, as well as **component testing**.



TOPTICA's CTL is now available at new central wavelengths: 1050, 1320 and 1470 nm (also available: 950, 1500 and 1550 nm), with up to 110 nm mode-hop-free tuning.

Experiments that require a reliable reference for optical frequencies like **atomic clocks, high-resolution spectroscopy** or **CEP-stable amplifier seeding** can be realized with TOPTICA's **DFC CORE**. This low-noise frequency comb is based on difference frequency generation which results in an unprecedented high phase stability of < 32 mrad in a spectral interferometry measurement. The DFC CORE is available with up to 8 outputs at 1560 nm that can be converted to any desired wavelength in the range of 420 – 2200 nm using extensions. This way, TOPTICA is able to provide complete stabilized laser systems including the DFC CORE, wavelength extensions, beat units, stabilization electronics, wavelength meters, counters and diode lasers.



The DFC CORE is TOPTICA's low-noise frequency comb which is available with up to eight CEP-stable outputs.

Come to TOPTICA's booth at BiOS (booth #8709) or Photonics West (booth #923) to learn more about these laser systems and to speak to TOPTICA's experienced team!

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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 are offered worldwide through TOPTICA Germany and its subsidiaries TOPTICA USA and TOPTICA Japan, as well as all through 11 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.