

new products

Focus on photonics and biomedical optics

The descriptions of the new products listed in this section are based on information supplied to us by the manufacturers. PHYSICS TODAY can assume no responsibility for their accuracy. For more information about a particular product, visit the website at the end of the product description.

Andreas Mandelis

Multipoint scanning confocal microscope

Bruker's Opterra multipoint scanning confocal microscope integrates confocal imaging with photoactivation for biological applications. A seven-position pinhole and slit aperture allows the Opterra to be optimized for varying objective lens magnifications so it can image deeper into tissue than conventional disk scanning confocal microscopes. The Opterra is based on Bruker's swept-field imaging scanner.



It allows high-speed confocal imaging of live cell and small organism preparations at resolutions comparable to conventional point scanners, but with minimal phototoxicity. The Opterra's second scanner, which can be used for photoactivation, bleaching, and ablation, can operate simultaneously with imaging. Applications include response to DNA damage, kinetics of photoactivatable fluorescent proteins, and fluorescence recovery after photo-bleaching. *Bruker Nano Surfaces Division, 3400 East Britannia Drive, Suite 150, Tucson, AZ 85706, <http://www.bruker.com>*

Scanning electron microscope

The latest of JEOL's tungsten low-vacuum scanning electron microscopes (SEMs) features an expanded pressure



range, a large specimen chamber, and high resolution for imaging and characterizing various sample types and sizes. The JSM-IT300LV extends the vacuum pressure range to 10–650 Pa, more than twice that of earlier models. In low-vacuum mode, that enhances SEM imaging versatility for samples that are wet or oily, outgas excessively, or are nonconductive without pretreatment. The customizable SEM features multiple ports for analytical attachments such as energy and wavelength dispersive x-ray spectrometers and electron backscatter diffraction and cathodoluminescence detectors. The vacuum chamber accommodates samples up to 300 mm in diameter and 80 mm in height. Multitouch screen operation and keyboard, mouse, and knob control are offered. Sample navigation control, an embedded CCD camera, and five-axis stage control with fast asynchronous movement make it possible to image and analyze samples at a wide range of angles and orientations. *JEOL USA Inc, 11 Dearborn Road, Peabody, MA 01960, <http://www.jeolusa.com>*

Photonic experiment sets

A line of photonics educational kits for colleges and universities is now available from Klinger Educational. Designed by Walter Luhs and manufactured by LD Didactic, the hands-on tools include programs that teach basic optics, laser, and other advanced applications. The kits cover more than 50 standalone experiments for the science

of photonics, including the optical and technical applications of light: generation, emission, transmission, modulation, signal processing, switching, amplification, detection, and sensing. Each photonics experiment comes in a sturdy travel case. The accompanying manuals and videos cover topics such as basic geometrical optics, optical applications, imaging and color, laser basics, solid-state lasers, optical fibers, and advanced setups in laser interferometry and technical applications. *Klinger Educational Products Corp, 112-19 14th Road, College Point, NY 11356, <http://www.klingereducational.com>*

Optical axis positioning system

Physik Instrumente now offers the N-725 system for positioning microscope objectives along the optical axis. A new design principle developed by the company extends the positioning range to 2 mm while maintaining very short settling times on the order of 20 ms. The compact device combines the performance of two individual stages: a fine-focus piezo drive and a stepper motor positioner for coarse, long-travel motion. The long-travel piezo motor provides subnanometer resolution and locks into a position without further need for power, thus improving long-term stability. According to the company, the piezo-motor objective positioner and scanner can help



users exploit the possibilities of high-resolution microscopy methods such as two-photon microscopy. The piezo-z-focus drive comes with a motion controller and software and is compatible with leading microscope imaging suite software packages. *Physik Instrumente LP, 16 Albert Street, Auburn, MA 01501, <http://www.physikinstrumente.com>*

Digital laser controller

Toptica has introduced the DLC pro digital laser controller for its tunable diode laser DL pro. Featuring low noise

and low drift levels, the controller provides precise, intuitive touch control and remote operation to run and stabilize the frequency of the DL pro while boosting its performance and lowering the linewidth down to 10 kHz. Experiments that require a narrow linewidth, such as optical clocks or quantum computing with cold atoms and ions, and setups that need remote laser control, such as polar light detection and ranging, may benefit from the DLC pro. The new controller has convenient control buttons and a multitouch user interface, a remote PC graphical user interface and command control, and intelligent locking features. *Toptica Photonics Inc., 1286 Blossom Drive, Victor, NY 14564, <http://www.toptica.com>*

Fiber-optic beam combiner

Coherent has designed its new OBIS Galaxy to enable users to combine the output of up to eight separate lasers spanning the 405- to 640-nm wavelength range into a single-mode fiber with plug-and-play simplicity. The robust, compact, polarization-maintaining fiber-optic combiner can simplify laser implementation in multiwavelength applications for laboratory and industrial users. High-precision FC connectors to the output fiber allow lasers to be replaced with greater than 85% repeatability in output power. That enables lasers to be “hot swapped” in the field to add extra wavelengths or to upgrade the power at specific wavelengths. The OBIS Galaxy operates over a wide 10–50 °C temperature range and is extensively tested for shock and vibration. The main applications for the combiner will be in bioinstrumentation, including flow cytometry and confocal microscopy, in which multiple wavelengths enable simultaneous and tandem use of multiple fluorescent probes and markers. *Coherent Inc., 5100 Patrick Henry Drive, Santa Clara, CA 95054, <http://www.coherent.com>*

Ultrafast electron microscope

The Tecnai Femto ultrafast electron microscope from FEI allows scientists to explore events and processes that occur at atomic and molecular spatial scales over time spans measured in femtoseconds. Among those fundamental processes are the absorption of light energy and its transformation into



heat or mechanical changes (photoactuation) and the crystallization or recrystallization of materials, including large biological molecules for structural analysis. A member of FEI's Tecnai family of transmission electron microscopes, the Femto has been modified to accommodate ultrashort laser pulses that stimulate a brief “flash” of photoelectrons from the electron source and a precisely timed pulse of laser energy directed at the sample as a stimulus. To achieve the highest temporal resolution when observing reversible processes, the microscope operates in stroboscopic mode. Precisely timed flashes, each containing either a few or a single electron, build up a representative image of the sample at a given delay between stimulus and flash. *FEI, North America NanoPort, 5350 Northeast Dawson Creek Drive, Hillsboro, OR 97124, <http://www.fei.com>*

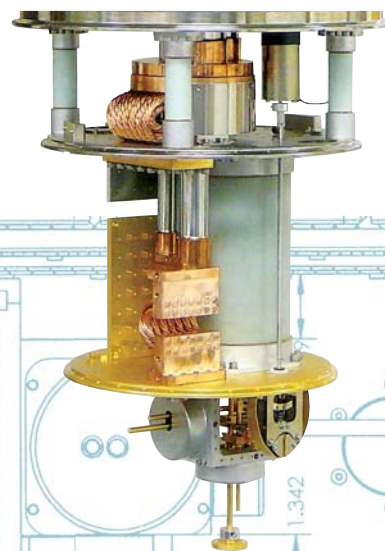
Microscope for 3D superresolution

The TCS SP8 STED 3X, Leica's 3D stimulated emission depletion system, achieves resolutions below the diffraction limit in lateral and axial directions. It provides users with the freedom to optimize resolution in all dimensions and to choose the setting that optimally fits users' scientific questions. The system is freely adjustable for the best lateral and vertical resolutions and the smallest confocal volume. The new system offers multiple depletion laser choices that open up the spectrum of visible light for confocal superresolution. The investigation of subcellular architecture and living cell dynamics is a significant challenge in life sciences research. According to Leica, its STED system is the only purely optical microscopy technology that yields resolution of structures below 50 nm without data processing. The extension of the

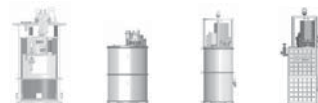


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technology to the third dimension and the freedom to use even more fluorophores result in improved capabilities for research imaging. *Leica Microsystems Inc, 1700 Leider Lane, Buffalo Grove, IL 60089, <http://www.leica-microsystems.com>*

Multitrack imaging spectrograph

Andor Technology has launched a new spectroscopic detection method based on its high-throughput imaging Holopec spectrograph. According to the company, the volume-phase holographic grating-based Holopec offers up to seven times better collection power than traditional $\frac{1}{3}$ -m Czerny-Turner spectrographs. Because it collects light efficiently, it can achieve a high signal-to-noise ratio rapidly. That is critical for applications such as detection of weak nanostructure photoluminescence, micro-Raman mapping, spectrally assisted microfluidics, real-time medical diagnosis, and stand-off chemical detection. The Holopec features high-density multitrack spectroscopy properties to enable high photon collection efficiency when combined with Andor's ultrasensitive detectors—for



example, the iDus 416 low dark current deep-depletion CCD series. *Andor Technology USA, 425 Sullivan Avenue, Suite 3, South Windsor, CT 06074, <http://www.andor.com>*

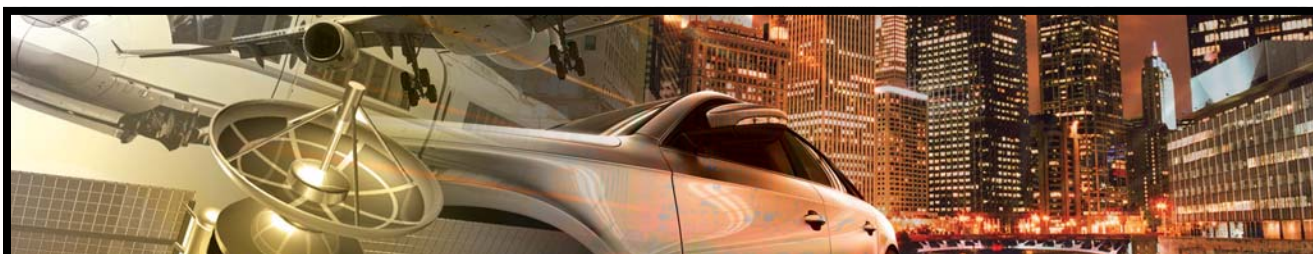
Fourier-transform IR spectrophotometer

Shimadzu Corp has launched the IRTracer-100 Fourier-transform IR spectrophotometer. Claimed to combine high speed, sensitivity, and resolution with expandability and easy-to-use software, the device obtains high-quality data for samples in such fields as pharmaceuticals, foods, chemicals, and electronics. Featuring an advanced interferometer that incorporates an automatic dehumidifier, the IRTracer-100 achieves a high signal-to-noise ratio of 60 000:1 and can quickly and easily obtain data of ultrasmall contaminants down to 10 μ m. It also acquires spectra

of additives at parts-per-million concentrations, which enables efficient identification. High-speed reaction monitoring software allows a maximum of 20 spectra/s to be obtained. That makes the IRTracer-100 suitable for ultrafast reactions that occur within a few seconds and for kinetics studies that occur in less than one second. *Shimadzu America Inc, 7102 Riverwood Drive, Columbia, MD 21046, <http://www.shimadzu.com>*

New literature Vacuum pump selection guide

Kurt J. Lesker has launched a vacuum pump selection guide on its website. It is a user-friendly tool that selects the proper vacuum pump to meet individual requirements. Users can search for a pump based on criteria that are most important to their application; those criteria include vacuum range, pumping speed, pump type, flange size, and manufacturer. The selection guide is available at www.lesker.com/PumpSelectionGuide. *Kurt J. Lesker Company, 1925 Route 51, Jefferson Hills, PA 15025, <http://www.lesker.com>*



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