

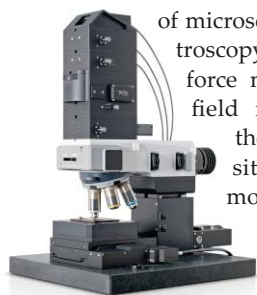
NEW PRODUCTS

Focus on spectroscopy and photonics

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

Microscopes for Raman spectroscopy



WITec has revised its alpha300 series of microscopes for Raman spectroscopy and imaging, atomic force microscopy, and near-field microscopy to make them more flexible, sensitive, and faster. The modular line allows users to create single-technique solutions and correlative imaging configurations and to integrate additional analysis methods. The company has also added an entry-level system for micro-Raman single-spot analysis and Raman mapping. According to WITec, the optical element design of the alpha300 Access system ensures high spectral quality, optical throughput, and signal sensitivity. The upgradable and expandable Access features a research-grade optical microscope body with LED Köhler white-light illumination and video camera sample view. It can be adapted to multiple laser excitation sources and allows easy integration of scan stages, spectrometers, cameras, lasers, and advanced Raman techniques. **WITec Instruments Corp**, 130G Market Place Blvd, Knoxville, TN 37922, www.witec-instruments.com



Short-pulse laser diode

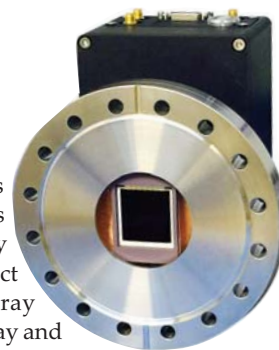
Quantel Laser has released a high-energy, short-pulse laser diode illuminator that can serve as an ultrasonic generator for photoacoustic imaging, active imaging, and 3D scanner applications. It is available in wavelengths from 640 nm to 1570 nm with up to 4 mJ of average energy output. It features electrical-to-optical conversion efficiencies of 30%. Pulse durations of 20–150 ns generate the high peak powers required to create ultrasound for photoacoustic imaging. Repetition rates up to 10 kHz enable blood flow visualization, cancer detection, and other tissue imaging applications. A single quasi-CW (QCW) laser diode stack, the driver, and the power supplies are housed in a compact 50.8 mm² package. The QCW diode can be collimated in the fast and slow axes and requires only a low-voltage power supply and an external TTL trigger for operation. It can be cooled with a thermoelectric cooler. **Quantel Laser-USA**, 601 Haggerty Ln, Bozeman, MT 59715-2001, www.quantel-laser.com

Compact near-IR spectrometer



The ultracompact Qred near-IR spectrometer from RGB Photonics measures 67 × 62 × 20 mm and weighs 250 g. The company claims it is the first truly portable nonscanning near-IR spectrometer and may open up new field applications for portable near-IR spectroscopy. The Qred can deliver advanced technical specifications within a single exposure, and it has a powerful microcontroller for evaluating on-board, application-specific spectra. It has a high-throughput Czerny–Turner design with a thermoelectrically cooled indium gallium arsenide line image sensor. The standard configuration offers a resolution of 8 nm across a wavelength range of 900 nm to 1700 nm. The rugged device has no moving parts, so it can reliably operate in rough environments. Custom wavelength ranges up to 2.5 μm and higher resolutions are available on request. **RGB Photonics GmbH**, Donaupark 13, 93309 Kelheim, Germany, www.rgb-photonics.com

High-energy cameras



Raptor Photonics has launched its Eagle XO family of open-front direct and indirect x-ray and high-energy cameras, which are available in a range of resolutions, use 2048 × 2048 and 2048 × 512 back-illuminated sensors from e2v and come with accessories and options to suit most application requirements. According to the company, the Eagle XO cameras offer good spatial resolution, quantum efficiency, and linear response; single-photon sensitivity; and high dynamic range for energy resolution. Raptor can provide vacuum levels to ~10⁻⁷ mbar. The cameras are designed to work in various applications, including medium x-ray diffraction, x-ray lithography, x-ray spectroscopy, plasma physics, and electron detection. **Raptor Photonics Limited**, Willowbank Business Park, Larne, Co Antrim BT40 2SE, Northern Ireland, www.raptorphotonics.com

Thermoelectric cooler

According to StellarNet, the two-stage eXtreme thermoelectric cooler (TEC) it now offers as an optional upgrade for its Raman and SILVER-Nova instruments can make them among the most sensitive compact spectrometers available. Thermoelectric detector cooling improves the stability of the detector for lengthy measurements in which thermal noise can distort and override the signal. The addition of eXtreme TEC lowers the temperature of the CCD to 30° below ambient and increases instrument signal-to-noise ratio by reducing noise more than 80% at long exposures. To achieve such low temperatures, the TEC includes a new sealed and isolated detector enclosure with a specialized heat sink and air flow design for added stability and cool operation. The upgrade can improve low light measurement quality and detection limit capability for Raman, fluorescence, and other weak light emission applications. **StellarNet Inc**, 14390 Carlson Cir, Tampa, FL 33626, www.stellarnet.us

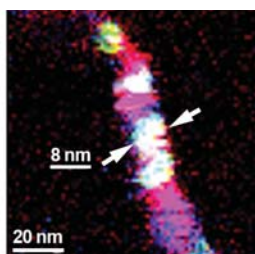
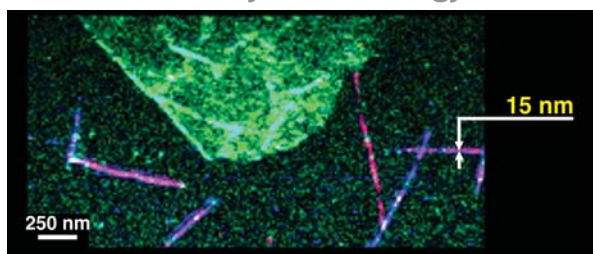


Photonics alignment platform

Aerotech's FiberMaxHP photonics platform has noncontact direct-drive technology to enable high-precision alignment: It is capable of 2 nm linear and 0.05 μ rad rotary minimum incremental motion with speeds to 400 mm/s. Aerotech's controllers work with various smart cameras and machine vision systems. Servo-scanning algorithms can optimize power coupled through the devices. Standard scanning routines include fast align, hill climb, spiral, and raster searches in up to six axes of motion.

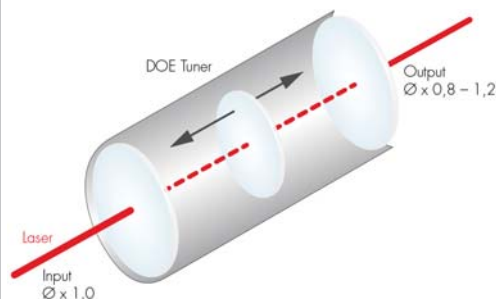
Advanced kinematics enables a virtual pivot point where rotation can occur at any user-defined point in space rather than at the physical rotation points of the FiberMaxHP axes. The platform is available with three to six axes for automatic alignment. It also comes with one to three axes of manual angular alignment with $\pm 2^\circ$ of motion; the axes mount directly to the direct-drive platform. *Aerotech Inc, 101 Zeta Dr, Pittsburgh, PA 15238, www.aerotech.com*

Nano-Raman analysis technology



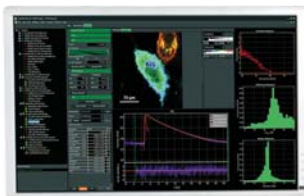
Horiba Scientific's Raman technology has been integrated with AIST-NT's scanning probe microscopy to create a novel approach to nano-Raman/tip-enhanced Raman spectroscopy (TERS). According to Horiba, its NanoRaman platform is easy to use, fast, and automated for nanoscale chemical imaging at spatial resolution typically down to 10 nm. It produces comprehensive sample characterization by integrating atomic force microscopy that can provide physical sample information on the nanoscale with scanning tunneling microscopy and Raman spectroscopy. Therefore it can characterize topography, hardness, surface potential, electrical and thermal conductivity, and temperature, and produce chemical information. The integrated technology features high numerical aperture collection optics, is controlled with piezo scanners, and is available in various configurations. Currently it's only available in North America. *Horiba Scientific, 3880 Park Ave, Edison, NJ 08820-3012, www.horiba.com/scientific*

Accessories for diffractive optical elements



Diffractive optical elements (DOEs) are mainly used for laser-beam shaping and splitting. Laser Components has introduced two DOE accessory products from Holo/OR: a DOE tuner and a beam expander. The tuner is a variable beam expander with a zoom range between 0.8 and 1.2. If it is placed before a diffractive TopHat element in the beam path, the smallest ideal spot can be finely adjusted; when placed before multispot elements, the spot size can be reshaped without affecting the distance between the spots. When the tuner is placed between the DOE and a focusing lens, the spot size can be adjusted in beam-shaping elements. The beam expander has fixed zoom levels. It is available in two magnification versions: 5 times and 10 times. Its beam expansion capabilities have been optimized for use with square TopHats and 2D beamsplitters. Both lens systems feature very small wavefront errors and are especially suitable for high-power applications. *Laser Components USA Inc, 116 South River Rd, Bldg C, Bedford, NH 03110, www.lasercomponents.com*

Time-resolved spectroscopy



PicoQuant's fluorescence lifetime imaging (FLIM) and fluorescence correlation spectroscopy (FCS) upgrade kit is now compatible with the Olympus FV3000 confocal laser scanning microscope. The external addition to the FV3000 extends the microscope's capacity to make time-resolved measurements with resolutions down to picoseconds and to perform techniques such as FLIM, rapid2 FLIM, FCS, and Förster resonance energy transfer analysis. The kit consists of picosecond pulsed excitation sources, single-photon-sensitive detection systems, and time-correlated single-photon-counting data acquisition hardware. The internal CW and picosecond pulsed lasers are coupled into the scan head via a polarizing beamsplitter that supports simultaneous use of CW



and pulsed excitation. With its available laser sources ranging from 405 nm to 640 nm, its high photon sensitivity, and time resolutions from pico- to microseconds, the kit allows users to analyze all types of commonly used fluorophores and samples. *PicoQuant GmbH, Rudower Chaussee 29, 12489 Berlin, Germany, www.picoquant.com*

Arbitrary waveform generator with signal acquisition



Zurich Instruments has launched an ultra-high-frequency arbitrary waveform generator (UHF-AWG) with integrated signal acquisition. Designed for fast and intuitive waveform programming with sequence branching based on a variety of detection schemes, the UHF-AWG is well suited for applications that require response acquisition, such as quantum computing, NMR spectroscopy, and mixed-signal device testing. Pulse sequences and waveforms can be defined and adjusted using the LabOne instrument user interface software. The dual-channel 1.8 GSa/s AWG has 128 MSa waveform memory per channel with a symmetric 600 MHz analog bandwidth and 14-bit vertical resolution, features which minimize feedback times and reduce the complexity of the experiment setup. Available options include a digitizer, a boxcar averager, a lock-in amplifier, and multiple demodulators. **Zurich Instruments AG**, Technoparkstrasse 1, 8005 Zürich, Switzerland, www.zhinst.com



High-speed mid-wave IR camera

According to FLIR, its X6900sc science-grade MWIR camera is the fastest thermal camera currently available: It captures full-window 640 × 512 pixel data at 1000 fps for up to 26 s. Advanced triggering and precise camera synchronization make the X6900sc suitable for capturing high-speed events. With thermal sensitivity of less than 20 mK, the camera can detect subtle temperature changes. It records thermal imagery to internal

RAM or to a removable solid-state drive; it can also stream through GigE simultaneously with Camera Link or CoaxPress. An automatic filter system with an easy-access, four-position motorized wheel allows users to change filters in the laboratory or in the field. The camera works with FLIR ResearchIR Max or third-party software. **FLIR Systems**, 27700 SW Parkway Ave, Wilsonville, OR 97070, www.flir.com

NEW LITERATURE Mass spectrometer analyzers catalog

Hidden Analytical's catalog *Mass Spectrometers for Catalysis and Thermal Analysis Applications* describes the company's latest range of mass spectrometers and microreactor systems for gas and vapor analysis in catalytic and thermal reaction and desorption processes. The catalog includes systems that feature application-specific operating programs for both automated and manual control of mass spectrometers and of the thermal process. Inputs to the systems provide for integration of additional process-specific parameters—for example, weight change in thermogravimetric analysis. Products covered include the CATLAB systems for quantification of catalytic activity through a temperature range to 1000 °C, the TPD workstation for high-temperature gas desorption studies under true ultrahigh vacuum conditions, and the PIC-series analyzer with digital ion counting detector. The catalog can be downloaded at <http://tinyurl.com/cta-catalogue-166-3>. **Hidden Analytical Inc**, 37699 Schoolcraft Rd, Livonia, MI 48150, <http://hiddeninc.com>



Smartline Vacuum Transducers



Thyracont's Smartline vacuum transducers have set new standards for wide range measurement with precision, functionality, reliability and affordability.

- Models offer a variety of measurement ranges from atmospheric pressure to 5×10^{-10} Torr / hPa / mbar
- Precise, robust sensor combinations include Piezo/Pirani, Pirani/Cold Cathode and Pirani/Hot Cathode
- Choice of communication options: RS485, EtherCAT and 0-10V analog
- Dual, fully configurable process set points
- Models available with a large, intelligent, illuminated display
- Choice of vacuum flange options

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