

NEW PRODUCTS

Focus on photonics, spectroscopy, and spectrometry

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. For all new products submissions, please send to ptpub@aip.org.

Andreas Mandelis

Q-TOF mass spectrometer



Agilent has launched its 6546 quadrupole time-of-flight (Q-TOF) liquid chromatography–mass spectrometry (LC/MS) system, which lets analysts acquire high-resolution data across a very wide dynamic range. According to Agilent, the instrument's data-independent Q-RAI (quadrupole-resolved all ions) acquisition mode reduces the complexity of tandem MS spectra while maximizing the accuracy and quality of the data acquired.

The MassHunter Quantitative Analysis 10.0 software includes features that allow laboratories to quickly and accurately screen complex sample sets for target and suspect compounds in a single workflow. Applications for the new LC/Q-TOF include metabolomics research, environmental screening, and food testing. **Agilent Technologies Inc**, 5301 Stevens Creek Blvd, Santa Clara, CA 95051, www.agilent.com

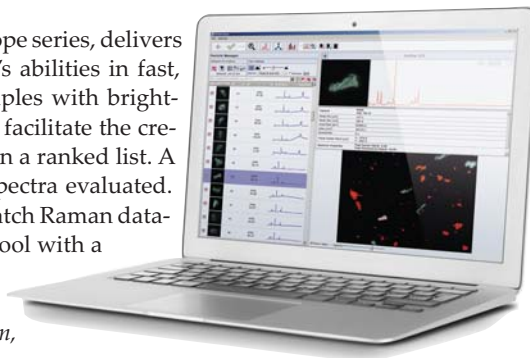
Noninvasive plasma chamber health monitoring

According to Impedans, its Moduli RF spectrometer is the first instrument to allow users to directly monitor the electrical state of a plasma from outside the plasma chamber without modifying their plasma tool. The radio emission spectroscopy tool can be placed outside the plasma source—for example, at a window port or near a turbo pump. It can detect air leaks, wafer displacement, and other serious plasma faults in real time. The antenna is split into two parts, so the antenna pickup can go within the RF shielding and the amplifiers outside. The radio antenna collects the electric and magnetic waveforms from the chamber and sends them to the acquisition unit, which extracts the RF harmonics. The harmonic spectrum is very sensitive to small changes in plasma impedance, a key indicator of process repeatability. **Impedans Ltd**, Chase House, City Junction Business Park, Northern Cross, Dublin 17, D17 AK63, Ireland, <https://impedans.com>



Particle analysis for Raman imaging

ParticleScout, a particle analysis tool for WITec's alpha300 Raman microscope series, delivers an accelerated workflow while making use of confocal Raman imaging's abilities in fast, label-free, and nondestructive chemical characterization. It surveys samples with bright- and dark-field illumination to view the particles in them. Optical images facilitate the creation of a mask used to categorize particles of interest and arrange them in a ranked list. A Raman spectrum is automatically acquired from each particle and the spectra evaluated. The particles can be identified manually or by using the integrated TrueMatch Raman database software. According to WITec, the integration of a particle analysis tool with a Raman database is unique in the industry. ParticleScout is suitable for use in such fields as environmental science, geology, and microplastics and pharmaceuticals research. **WITec GmbH**, Lise-Meitner-Str 6, D-89081 Ullm, Germany, www.witec.de



Multielement tube system



The versatile mix-and-match components in Edmund Optics' Techspec multielement tube system let users prototype and create uncommon optical designs. The system combines multielement outer tubes with multielement inner single and pair optic mounts. The outer tubes have M29 threads running down their entire length; inner mounts have M29 threads along their outer diameters, so they can be placed anywhere within an outer tube. The design allows for infinitely adjustable optical spacing along the optical axis. To ease adjustment, a custom-designed multielement tube spanner wrench has a hollow bore to let a beam pass through. The system can be further customized using spacer rings and tubes, inner apertures, and additional accessories. It accommodates circular optics with diameters from 5 mm to 25.4 mm and edge thicknesses up to 17 mm. System lengths, which can range from 15 mm to 100 mm, can be combined to expand capabilities. **Edmund Optics Inc**, 101 E Gloucester Pike, Barrington, NJ 08007, www.edmundoptics.com



Laser scanning microscope upgrade kit

A laser scanning microscope upgrade kit from PicoQuant expands the ability of Scientifica's HyperScope and VivoScope multiphoton microscopes to support fluorescence lifetime imaging (FLIM). Kit users can simultaneously acquire fluorescence intensity and lifetime images in up to two color channels. The combination of imaging techniques allows, for example, the acquisition of highly quantitative information regarding molecular interactions, the quantification of biosensor measurements, and the determination of absolute ion concentrations. Users gain access to time domain information, which can potentially enable such applications as the easy quantification of Förster resonance energy transfer experiments and the study of environmental parameters. The Scientifica FLIM upgrade kit supports galvo and resonance imaging and PicoQuant's rapidFLIM approach, with peak photon rates up to 1.5 Gcounts/s. *PicoQuant, Rudower Chaussee 29, 12489 Berlin, Germany, www.picoquant.com*



Ultracompact spectrometer

The Pebble VIS OEM spectrometer from Ibsen Photonics combines an ultracompact form factor with high resolution, high sensitivity, and environmental ruggedness.

At Pebble's core is an efficient transmission grating manufactured by Ibsen: It makes possible a resolution of 6 nm across the full 380- to 850-nm-wavelength range. According to the company, that is among the highest for this size spectrometer. Pebble uses a fast, sensitive CMOS detector array with 256 pixels. When combined with a large numerical aperture of 0.22 (low f-number of f/2.2), Pebble provides very high sensitivity for a small spectrometer. Pure transmission-based optics ensure a very good thermal stability. Pebble is suitable for use in handheld and portable spectroscopy instruments for applications such as fluorescence and color measurements. *Ibsen Photonics A/S, Ryttermarken 17, DK-3520 Farum, Denmark, <https://ibsen.com>*



Double-pulse lasers for LIBS

A series of neodymium-doped yttrium aluminum garnet lasers from Litron Lasers are fitted with low-divergence optics to ensure a high degree of focusing and make them suitable for laser-induced breakdown spectroscopy (LIBS) applications that use the double-pulse technique. The Bernoulli LIBS series has two laser oscillators combined onto a single beam axis in a single vibration- and shock-proof, fully sealed laser head. Two motorized attenuators allow for

independent energy adjustment of each laser. The compact lasers have output energies up to 250 mJ at 1064 nm and repetition rates up to 30 Hz. They feature fast-detachable connections, ruggedized oscillators, motorized safety shutters, intelligent microprocessor control and monitoring of all laser parameters, and a LUCi remote interface for ease of use. *Litron Lasers Ltd, 8 Consul Rd, Rugby, Warwickshire CV21 1PB, UK, www.litronlasers.com*

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Compact high-performance spectrometers

To bridge the gap between costly research laboratory systems and small economical ones, StellarNet has designed instruments that deliver high-performance spectroscopy measurements in a compact form. The Hyper-Nova spectrometers use a back-illuminated, deep-depletion detector technology that, according to the company, provides the lowest background

noise possible in a compact spectrometer. The Hyper-Nova's CCD detector is vacuum-sealed and cooled to -80°C , with peak quantum efficiencies up to 95%. Various wavelength configurations include specialty ones for Raman spectroscopy at 785 nm and 532 nm, 300–1100 nm optical spectroscopy, and custom low-light applications. High-scattering samples can be measured with the smallest of the available interchangeable slits for highest resolution; weak Raman can be measured with a larger slit to allow for increased light throughput. **StellarNet Inc**, 14390 Carlson Circle, Tampa, FL 33626, www.stellarnet.us



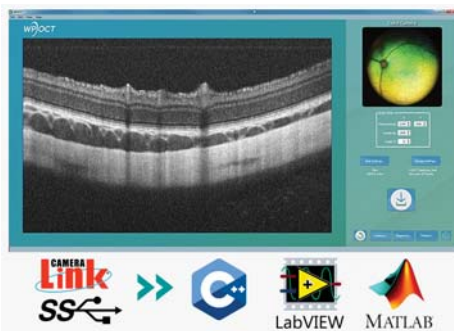
Microscopes for spectroscopy

With the accessories included in the Standard Microscope Spectroscopy systems now offered by Horiba Scientific, a standard microscope can be fitted with a spectrometer and a detector. The microscope can then be used to perform techniques such as Raman, steady-state and time-resolved photoluminescence, reflectance/transmittance, electroluminescence, and photocurrent and dark-field scattering. The

flexible, modular platforms let users leverage an existing standard microscope or create a turnkey system that performs the microscopy function and adds one or more spectroscopies as a complementary technique. The company's Optical Spectroscopy Division can design systems that meet users' individual research or application needs. **Horiba Scientific Division of Horiba Instruments Inc**, 20 Knightsbridge Rd, Piscataway, NJ 08854, www.horiba.com/scientific

Software for OCT system development

Wasatch Photonics has announced its WP OCT software platform. Optical coherence tomography (OCT) is a fast-growing imaging technology with applications as a primary and complementary diagnostic tool in medicine and industry. The suite of software development kits, sample graphical user interfaces, and turnkey application software facilitates imaging speeds of up to 250 kHz with minimal software development effort. It has the flexibility to customize user interface, algorithms, and analysis. Availability in C++, C#, Matlab, and Labview environments makes the platform versatile, as does compatibility with Camera Link and USB 3.0 data acquisition protocols. The software provides high-level computational capability for efficient data analysis using powerful yet flexible graphics processing unit platforms compatible with the fastest OCT spectrometers currently available. **Wasatch Photonics**, 4022 Stirrup Creek Dr, Ste 311, Durham, NC 27703, <https://wasatchphotonics.com>



Spectrograph and scanning monochromator



Teledyne Princeton Instruments has added a spectrograph and scanning monochromator with a 750 mm focal length to its SpectraPro HRS series. The HRS-750 features astigmatism-corrected optics and a mechanical scanning range of 0–1500 nm. Its resolution is 0.05 nm or better. According to the company, its ResXtreme spectral deconvolution technology enhances spectral resolution, peak intensities, and consistency across the 2D focal plane by as much as 60%. Its AccuDrive technology improves wavelength accuracy and repeatability over previous scan systems and increases grating-to-grating wavelength precision to subpixel repeatability. Among the applications for the SpectraPro HRS-750 are Raman spectroscopy, photoluminescence, fluorescence, laser-induced breakdown spectroscopy, plasma diagnostics, transmission, absorption, and microspectroscopy. **Princeton Instruments**, 3660 Quakerbridge Rd, Trenton, NJ 08619, www.princetoninstruments.com

Near-IR microspectrometer



AP Technologies has unveiled the latest MEMS grating-collimator microspectrometer from OtO Photonics. It claims the RedSparrow-Series RS1680 brings the size, performance, and cost benefits of the company's UltraMicro-Series technology to the near-IR band. The instrument uses a 128-pixel near-IR indium gallium arsenide sensor for operation from 950 nm to 1700 nm with a full width at half maximum resolution of 8–13 nm. OtO's MEMS-based microspectrometers replace the collimator-plane grating-focusing mirror optical structure used in traditional Czerny–Turner spectrometers with a nonspherical, mass-producible micro-sized component that combines grating and focusing functions. The microchip concave grating technology leverages patented algorithms to calculate curvature and ray tracing to eliminate aberrations. **AP Technologies Ltd**, The Coach House, Watery Ln, Bath BA2 1RL, UK, www.aptechnologies.co.uk



Extended-range spectrometer

A new version of the HDX high-definition spectrometer from Ocean Optics covers the UV to the near-IR range. The Ocean HDX-XR has an extended-range (XR) 200–1100 nm grating and a 10 μ m slit. According to the company, it delivers high spectral performance, with ± 0.5 pixel thermal stability, high throughput, and low stray light. The spectrometer features a back-thinned

CCD, a dynamic range of 12 000:1, a signal-to-noise ratio of 400:1, and optical resolution of 1.0 nm full width at half maximum. It has an onboard memory of 50 000 spectra. Applications for the HDX-XR spectrometer include health and life sciences, LED measurements, plasma monitoring, and photovoltaic and polymer analysis. **Ocean Optics Inc**, 8060 Bryan Dairy Rd, Largo, FL 33777, <https://oceanoptics.com>

Dual-beam UV-visible spectrophotometer

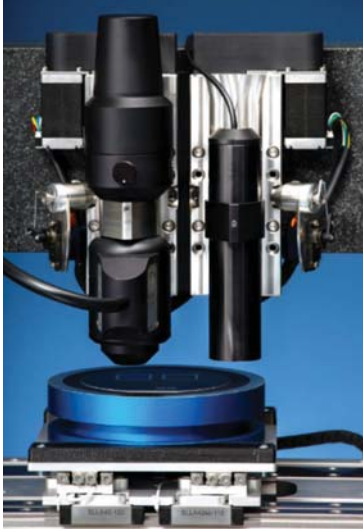
The DS5 UV-Vis Spectrophotometer from Edinburgh Instruments is a user-friendly, dual-beam instrument that measures absorption and transmission as a function of wavelength. It can be used for a wide range of sample types and measurements and is suitable for many analytical applications in which accurate and precise measurements are key to results. Additional benefits include stray light attenuation, baseline flatness, wavelength and photometric accuracy, and reproducibility. The instrument features a dual lamp, a Czerny–Turner configuration monochromator, and a compact footprint. It offers user-selectable variable bandpass options at 0.5, 1.0, 1.5, 2.0, and 4.0 nm. Fast scanning up to 6000 nm/min aids sample analysis throughput. **Edinburgh Instruments Ltd**, 2 Bain Sq, Kirkton Campus, Livingston EH54 7DQ, UK, www.edinst.com



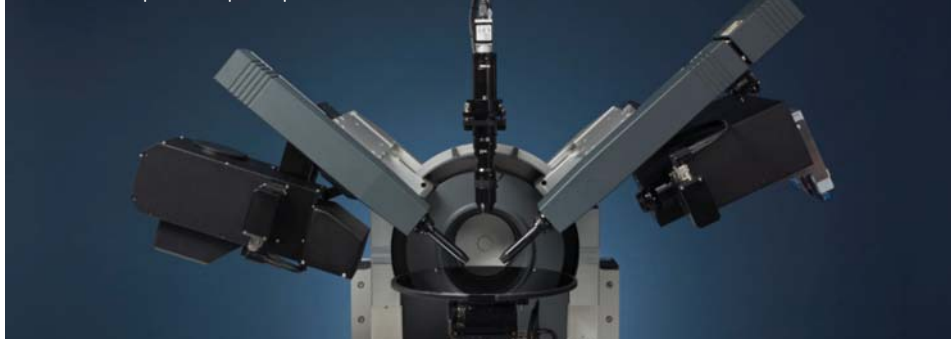
OPO laser system

Toptica offers its DLC TOPO high-power CW optical parametric oscillator (OPO) laser system for challenging applications in molecular spectroscopy, quantum optics, materials testing, biophotonics, and physical chemistry. The system integrates a distributed feedback seed laser, a fiber amplifier, OPO, and the company's DLC pro digital laser control. A large mode-hop-free tuning range up to 300 GHz enables visibility of full spectroscopic signatures, and a 2 MHz linewidth reveals narrow atomic and molecular features. For ease of use, no modules need to be exchanged or manual adjustments made. Convenient digital control over the full 1.45–4.00 μ m spectral range enables coarse wavelength tuning, fine-tuning, and frequency locking. The DLC TOPO is only available in North America. **Toptica Photonics Inc**, 5847 County Rd 41, Farmington, NY 14425, www.toptica.com **PT**

AFM



Visible and IR spectroscopic Ellipsometer



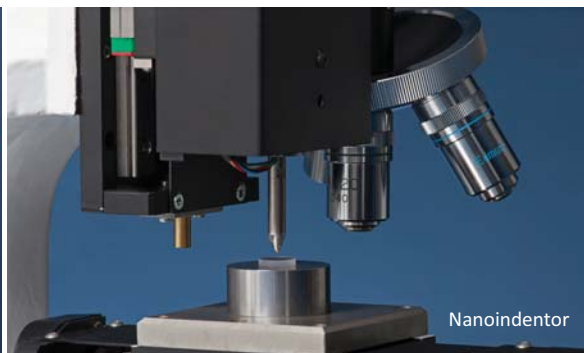
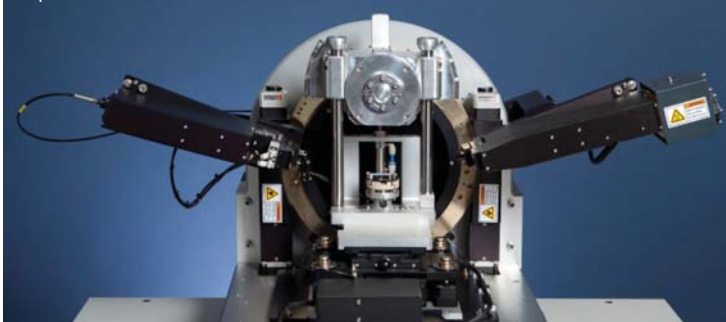
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