Focus on vacuum, cryogenics, and nanotechnology

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

Rotary vane pumps

The KJLC-RV series of two-stage, oil-sealed rotary vane vacuum pumps from the Kurt J. Lesker Co feature ultralow

ultimate pressure, high pumping speed, low noise and vibration levels, and efficient vapor handling capabilities. The four models offer pumping speed ranges from 3.8 cfm to 22.9 cfm. Each model features a gas ballast, anti-suckback valve, and QF25 flanges and is suitable for use in a range of applications. The simple, modular design allows for ease of maintenance. According to the company, the KJLC-RV pumps are vigorously tested to ensure their quality and reliability. They are shipped with an initial supply of KJLSS19 oil, which the company claims provides superior performance. Various standard accessories are available, including mist eliminators, traps, and filters. *Kurt J. Lesker Company, 1925 Route 51, Jefferson Hills, PA 15025, http://www.lesker.com*

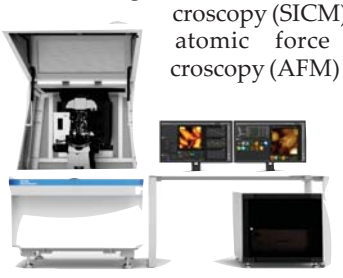
Optical measurement platform

The Cryostation C2 is the latest generation of Montana Instruments' Cryostation optical measurement platform. Ac-

cording to the company, the new 3.2- to 350-K cryostat offers enhanced performance, reliability, and ease of use for low-temperature research. A redesigned sample support structure improves stiffness for better positional stability and increased thermal performance. The improved system ensures consistent vibrational control across various experimental setups and in demanding applications. Other design innovations result in less energy transfer to the table, which allows for seamless optical integration. Updated firmware and electronics provide more intuitive temperature control, optimized wide-range temperature stability, and quicker speeds to set point. *Montana Instruments Corporation, 151 Evergreen Drive, Bozeman, MT 59715, http://www.montanainstruments.com*

Nanoscale imaging platform

The NX-Bio bioresearch tool from Park Systems combines on the same platform scanning ion conductance microscopy (SICM) and atomic force microscopy (AFM) with



an inverted optical microscope (IOM). The SICM component performs 3D in-liquid imaging of the surface morphology of micrometer-sized bio-objects—single and multiple cells and tissue—at 30-nm resolution without physical contact. The AFM capability detects and images bio-objects under 10 nm, such as DNA and protein. When used to measure surface mechanical properties, the NX-Bio characterizes the stiffness, adhesion force, and Young's modulus of biological materials by means of AFM force–distance spectroscopy. Transparent biological samples can be observed

through the IOM's bright field and phase contrast microscopies and their heights measured in the micrometer range. A live cell chamber allows for experiments under optimal temperature, pH, and humidity. *Park Systems Inc, 3040 Olcott Street, Santa Clara, CA 95054, http://www.parkafm.com*

Nanomechanical testing system

The launch of its NanoForce system marks Bruker's entry into nanoindenting and nanomechanical characterization. It supports investigations of the nanomechanical properties of materials and enables users to perform studies of nanoscale material behavior on a wide range of specimen geometries, including thin films, nanostructures, MEMS,

and various device components. NanoForce leverages the accuracy afforded by electromagnetic actuation technology. Based on Bruker's Dimension Icon atomic force microscope product family, the novel gantry design and enclosure cabinet provide positional accuracy and acoustic and vibration isolation. A vacuum sample tray offers convenient sample mounting. NanoScript software enables real-time experimental control based on recorded or calculated data. *Bruker Nano Surfaces Division, Tribology and Mechanical Testing, 1717 Dell Avenue, Campbell, CA 95008, http://www.bruker.com*

Vacuum pumps for mass spectrometers

Hiden Analytical has announced that its turbomolecular-pumped, quadrupole mass spectrometer–based gas analysis systems now incorporate oil-free dry scroll pumps as standard. The company claims the pumps significantly reduce the ultimate attainable vacuum base pressure and minimize system residual and contaminant species. According to Hiden, the new vacuum configuration improves detection levels for all gas

species and is particularly beneficial for measurement of trace levels of hydrogen and helium. Hydrogen detection levels are typically improved by up to a factor of 50 relative to alternative dry-pumping configurations. Hiden's configuration increases throughputs where hydrogen is a significant component species and enables higher sample pressures with enhanced determination of low-abundance species. *Hiden Analytical Inc, 37699 Schoolcraft Road, Livonia, MI 48150, http://hideninc.com*

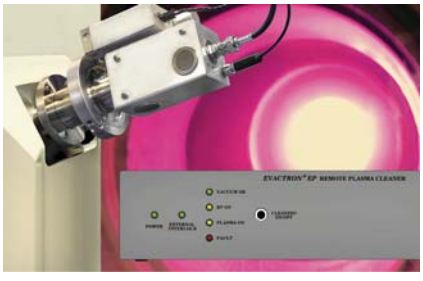
Optical cryostat

Using the Optistat Dry, Oxford Instruments' latest cryogen-free optical cryostat, spectroscopists can cool samples to less than 3 K without liquid cryogens. Designed for quick, easy setup, the cryostat has novel puck-style sample holders to make electrical connections to the sample straightforward. Sample change is done through the load port with the cryostat *in situ*, so users do not

need to remove it from the bench and realign optics when setting up again. The Optistat Dry can be used for a wide range of low-temperature spectroscopy applications, including Raman, Fourier-transform IR, fluorescence, photoluminescence, and UV and visible. Its modular design allows users to choose from various wiring options and sample holders and upgrade to future models without having to buy a new cryostat. *Oxford Instruments plc, Tubney Woods, Abingdon, Oxfordshire OX13 5QX, UK, http://www.oxford-instruments.com*

Plasma cleaning system

The Evactron EP remote plasma source from XEI Scientific offers a new approach to plasma cleaning for physicists and materials scientists building and using custom-designed vacuum systems. The compact system employs flowing afterglow cleaning with air to remove carbon compounds from vacuum chambers that operate with turbomolecular pumps. The novel system has instant ignition from any vacuum level and uses a low-wattage hollow cathode electrode to produce plasma. Designed for cleaning electron microscopes safely, the Evactron EP removes in minutes carbon acquired during exposure to ambient air. It prevents cross contamination and stops carbon deposition by lasers and charged particle beams on optics and other sensitive surfaces. The unit is compliant with CE, Nationally Recognized Testing Laboratory, Semi-S2, and Restriction of Hazardous Substances requirements. *XEI Scientific Inc, 1755 East Bayshore Road, Suite 17, Redwood City, CA 94063, http://www.evactron.com*



Closed-cycle cryo-optical system

To accommodate and allow access to the delicately arranged optical elements and to provide cryogenic temperatures required in quantum optics experiments, attocube's attoDRY800 consists of an ultralow-vibration, cold breadboard platform integrated into an optical table. The novel design makes use of the space under the table and ensures unobstructed optical access to the cold sample from all directions via one top and four side optical windows. To ensure very low drift and optimal collection efficiency, apochromatic objectives with high numerical aperture (NA = 0.81–0.95) can be integrated into the cryostat or the vacuum shroud or placed outside next to the optical windows. The closed-cycle attoDRY800 requires no liquid cryogens. Fully automated temperature control between 4 K and 350 K enables long, unattended measurement cycles. Vibration isolation technology keeps displacements to a maximum of 1 nm (rms). *attocube systems AG, Koeniginstrasse 11a, 80539 Munich, Germany, http://www.attocube.com*

Vacuum and cryo transfer system

Leica Microsystems' ion-beam milling system EM TIC 3X is now available with a docking port that enables the company's EM VCT100 vacuum cryo system to transfer to the next preparation step samples at vacuum and cryo conditions. After ion beam milling, room-temperature or cryo cross sections can be loaded into the transfer system and moved to the next step. The sections can be coated and then analyzed using scanning electron and atomic force microscopes under inert gas or vacuum conditions as required by the sample. The sample's integrity is preserved for microstructure investigation using techniques such as energy dispersive spectrometry, wavelength dispersive and Auger electron spectroscopy, and electron backscatter diffraction. *Leica Microsystems Inc, 1700 Leider Lane, Buffalo Grove, IL 60089, http://www.leica-microsystems.com* ■