NEW PRODUCTS

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. To facilitate inquiries about a particular product, a Reader Service Card is attached inside the back cover of the magazine.

LAWRENCE G. RUBIN

FOCUS ON CRYOGENICS

Detector-Cooling Cryostat

Janis Research has announced a compact helium-3 (^{3}He) cryostat for detector cooling below 0.3 K. The system includes a superinsulated, liquid-nitrogen–shielded, liquid-helium cryostat with a side-looking or bottom-looking window; an internal charcoal sorption pump; heaters; two silicon-diode sensors; and a ruthenium oxide thermometer (at the ^{3}He stage). The ^{3}He is permanently stored in a compact volume attached to the side of the dewar, with a pressure gauge that monitors the ^{3}He space. The ^{3}He is condensed inside the 1-K pot, and does not require any pressure reduction or cooldown of the main helium-4 reservoir. After initial ^{3}He condensation, the system can be operated with the 1-K pot at 4.2 K, with a hold time of more than 30 hours. If the pressure at the 1-K pot is continuously reduced, the ^{3}He hold time will be significantly increased and the lowest temperature decreased. *Janis Research Co, 2 Jewel Drive, P.O. Box 696, Wilmington, Massachusetts 01887, http://www.janis.com*

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Modular B–T Systems

A modular magnetic field–ultra-low temperature environment (B–T) system from Oxford Instruments Superconductivity includes both a magnet and refrigerator from a single source, reportedly for the first time. As part of the package, the company is offering its Kelvinox MX dilution refrigerator, providing access to temperatures as low as 7 mK. Oxford claims that researchers can choose from more than 200 different packages; these include superconducting magnets with field strengths as high as 20 tesla, with individual homogeneity and bore-size needs, and with a wide range of vapor-shielded and ultralow loss dewars. *Oxford Instruments Superconductivity, Tubney Woods, Abingdon, Oxon OX13 5QX, England, http://www.oxford-instruments.com*

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Cryogen-Free Variable-Temperature Insert

Magnavolt Technologies offers a system engineered by Cryogenic Ltd that has simultaneously controlled cooling of a sample space and superconducting magnet using a single cryocooler. A cryogen-free, variable-temperature insert provides dynamic temperatures in the 4.2–300 K range by cooling the sample in a flow of helium exchange gas drawn from an external reservoir. Temperature variation is achieved by passing the gas through a heat exchanger around the sample space. The tail of the insert is mounted in the room-temperature bore of the cryogen-free magnet (CFM); for temperatures down to 1.6 K, the insert can be charged with He. CFMs are available in large volumes of medium strength field (750-mm diameter by 1-m length and an 0.5-T field) to 16-T magnets with 50-mm bores. *Magnavolt Technologies Inc, 334 Cornelia Street, #525, Plattsburgh, New York 12901, http://www.magnavolt.com*

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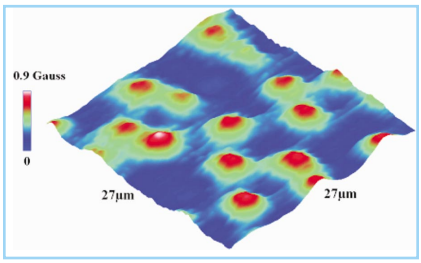
Low-Temperature Scanning Hall Probe Microscope

NanoMagnetics Instruments has introduced a low-temperature scanning Hall probe microscope (LT-SHPM), which can image local magnetic fields quantitatively and noninvasively with a sensitivity of 60 nT/root Hz at 77 K and up to 120-nm spatial resolution. A nanometer-scale Hall probe scans across the sample with scanning probe microscope techniques to obtain magnetic field distribution and topography simultaneously. The scan size is 40 × 40 μm at 300 K, 14 × 14 μm at 77 K,



and 4 × 4 μm at 4.2 K, all with 20-bit resolution. Vortices in superconductor thin films can be imaged (see figure). The LT-SHPM can be run at very high magnetic fields without loss of sensitivity, and high-resolution B–H curve magnetization measurements can be performed on a nanometer scale. *NanoMagnetics Instruments Ltd, 17 Croft Road, Oxford OX3 0JZ, England, http://www.nanomagnetics-inst.com*

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Temperature Controller

Lake Shore's new model 332 temperature controller is designed to support the company's Cernox resistance temperature detector (RTD) over the greater portion of its useful temperature range, as well as other negative-temperature-coefficient RTDs. It also can be used with platinum RTDs, diodes, and thermocouples, and offers two sensor inputs and two powered control loops. The model 332 automatically scales excitation current for RTDs, providing 1 mA at higher temperatures where resistance is low, but only 1 μA at low temperatures to minimize sensor self-heating and self-heating–induced error; excitation currents of 10 and 100 mA are also available. The controller includes a 50-W heater output on the first control loop and 10 W on the second, current reversal for RTDs, autotuning, parallel and serial interfaces, and an analog voltage output. *Lake Shore Cryotronics Inc, 575 McCorkle Boulevard, Westerville, Ohio 43082-8888, http://www.lakeshore.com*

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Low-Temperature Transformers

Cambridge Magnetic Refrigeration has announced low-temperature impedance-matching transformers that benefit from the large reductions in winding resistance that come from cooling to low temperature. The model LTT-m is packaged in a superconducting can with flying leads and fully potted, low-temperature connectors; a more compact variant, the LTT-m/up, is available without the can and lead treatments. The transformers operate at 4 K and 1 K close to the cryogenic source to minimize interference and cross talk. Transformer winding ratios of 30, 100, 300, and 1000 make it possible to match low-noise preamplifiers to a range of source impedances typical of both electrical resistance and magnetic pickup coil measurements. As with all matching transformers, the frequency response will depend on the source impedance and the transformer gain. *Cambridge Magnetic Refrigeration Ltd, 55 Richmond Road, Cambridge CB4 3PS, England, http://www.cmr.uk.com*

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Hydrogen Gas Generators

Balston H2-500 hydrogen gas generators from Parker Hannifin are designed to eliminate high-pressure hydrogen gas cylinders. Six models produce flows of 90, 150, 300, 500, 800, and 1200 cm^3/min of pure hydrogen gas safely and conveniently at regulated pressures from 0 to 100 psig (1 to 7 bar). The purity of the output gas is guaranteed to be 99.99999+%, said to be two orders of magnitude higher purity than dessicator-based or silica gel-based systems. The H2-500 generators produce the hydrogen gas through the electrolytic dissociation of water via proton exchange and palladium membranes; they require only deionized water and electricity to operate. The generators comply with all current OSHA regulations concerning hydrogen. *Parker Hannifin Corp, Filtration and Separation Division, 100 Ames Pond Drive, P.O. Box 1262, Tewksbury, Massachusetts 01876-0962, http://www.parker.com*

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Automatic Changeover Gas Regulator

Scott Specialty Gases has announced the model 8403 series Automatic ChangeOver Regulator system that provides a constant uninterrupted flow of specialty gases. The system combines a pressure-reducing regulator with diaphragm valves to direct gas flow from two separate high-pressure cylinders (or banks of cylinders) to a user's application. When one gas source empties, the system automatically draws from the second source. The model 8403 is available with either brass or 316 L-stainless steel wetted-body materials. Delivery pressure is adjustable from 0 to 200 psig (1 to 13.8 bar); a safe purge vent in the rear of the control panel protects operators. Options include a remote alert when gas supply changeout is necessary; a flash arrestor; and flow-limit, shutoff, pressure-relief, and check valves. *Scott Specialty Gases, 6031 Eaton Road, Plumsteadville, Pennsylvania 18949, http://www.scottgas.com*

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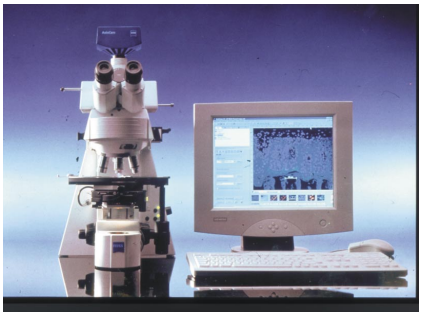
Microscopes for Live-Cell Imaging

Carl Zeiss has introduced the Axioplan 2 MOT IE, the second generation of the company's Axioplan 2 MOT imaging microscopes, which offer several new features. An integrated high-speed shutter allows short exposure times in fluorescence (down to 20 ms), which protects specimens against bleaching in live-cell imaging environments. A new motor control enables fast, vibration-free positioning of objectives, reflector modules, and filter wheels. A motorized double-TV tube allows image recording with two cameras, with manually or software-controlled



neutral or dichroic beam splitting. The new microscopes incorporate a removable field/aperture diaphragm and a dual-control knob system with a motorized *z*-axis functionality that provides better acceleration, higher resolution, and improved reproducibility of the *z*-drive. *Carl Zeiss Inc, One Zeiss Drive, Thornwood, New York 10594, http://www.zeiss.com/micro*

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3D Structural Studies of Cells

FEI Company offers the Tecnai G^2 Sphera, a new member of the company's second-generation Tecnai transmission electron microsopes (TEMs). Designed primarily for producing high-resolution 3D images, the Sphera model can acquire complete sets of tomographic data automatically and make it possible to use the most advanced TEM techniques for scientific insight into the architecture and functioning of living cells, cell organelles, and their constituting supramolecule complexes. A set of tomographic data, consisting of 140 images, can be acquired in just 25 minutes using a comprehensive tomography software package. Image data are collected using CCD cameras and stored on Tecnai Sphera's hard disk. *FEI Company, 7451 NW Evergreen Parkway, Hillsboro, Oregon 97124, http://www.feicompany.com*

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New Literature

Alfa Aesar has released a new CD-ROM version of the company's 2001/02 inorganics, organics, metals, and materials catalog. The CD contains virtually all of the information found in the print catalog plus a database of material safety data sheets. The CD is searchable by molecular structure and substructure. *Alfa Aesar, 30 Bond Street, Ward Hill, Massachusetts 01835-8099, http://www.alfa.com* ■

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