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

Adiabatic Demagnetization Refrigerators

Cambridge Magnetic Refrigeration has launched the mFridge series of adiabatic demagnetization refrigerators for laboratory experiments to temperatures as low as 30 mK. Reportedly the first commercially available refrigerators of their kind, the systems provide one-step cooling from 4 K to less than 100 mK, typically in a 4 h time frame. The company uses an off-the-shelf superconducting magnet, new refrigerant pill designs, and computer control and measurement systems to provide an insert that permits a wide choice of cooling and warming profiles to be specified. The mFridge inserts incorporate multiple line-of-sight ports that can accommodate standard experimental plug-ins for sample measurement and manipulation; various plug-ins are available. *Cambridge Magnetic Refrigeration Ltd, 55 Richmond Road, Cambridge, CB4 3PS England*

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80 K Closed-Cycle Cooling System

MMR Technologies has announced an advanced version of its 120 K cryocooler that now permits continuous operation at 80 K and below. The new coolers use a single stream, mixed refrigerant throttle expansion cycle, and a self-cleaning feature for trouble-free operation. The new units weigh less than 14 kg and have a remotely located cold-stage connected to the compressor module by a single, flexible umbilical cord. Operation at 76 K has been achieved with a cooling capacity of 5W at 90 K (for the smallest unit) and with an input power of 180 W. The new units are said to have logged more than 6000 h of maintenance-free continuous operation at 80 K. Applications for the coolers include the cooling of low-noise amplifiers, a variety of instrumentation, and biomedical devices (as pictured). *MMR Technologies Inc, 1400 North Shoreline Boulevard, Suite A-5, Mountain View, California 94043-1346*

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Low-Temperature Scanning Tunneling Microscope

Omicron has introduced the LT STM, a UHV scanning tunneling microscope (STM) capable of being cooled to 5 K within approximately 6 h. A combination of liquid nitrogen (LN_2) and liquid helium (LHe^4) cooling is used to reach that temperature. The microscope is mounted in a thermally shielded compartment directly connected to the LHe^4 cryostat and is equipped with a heater, allowing the user to vary the temperature of the sample stage between 5 and 60 K (or between 77 and 150 K with LN_2 cooling). A temperature of 2.6 K can be reached by pumping on the LHe^4 reservoir. The maximum temperature is limited by increased evaporation and bubbling of the coolant. A temperature controller provides a stability of better than 0.1 K. *Omicron Associates, 1226 Stoltz Road, Bethel Park, Pennsylvania 15102*

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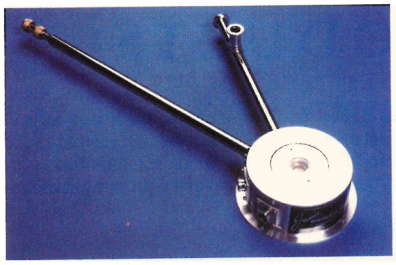
Microscopy Cryostat

The ST-500 microscopy cryostat from Janis is a low vibration system designed for use in microscopy, imaging, and high spatial resolution photoluminescence. With a nominal vibration amplitude of ±25 nm and a



positional drift of ±50 nm, the ST-500 provides a temperature range of 3.5 to 325 K (or 400 K as an option) and the ability to operate with either nitrogen or helium in any orientation. The cryostat geometry offers a short working distance for use with high-magnification optics and permits mounting on common microscope stages and translators; it can be used in both transmission and reflection geometries. The cryostat system includes a flexible, high-efficiency, variable-flow transfer line that delivers cryogens to a two-stage heat exchanger and sample mount. *Janis Research Co, Two Jewel Drive, P.O. Box 696, Wilmington, Massachusetts 01887-0696*

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Large Storage Capacity Freezer

Harris offers a low-temperature freezer, which has an increased storage capacity but no increase in footprint. The new Harris Essential Economizer 691 L vacuum-insulated −85°C upright freezer holds up to 30 standard stainless steel inventory racks suitable for 5 cm- or 7.5 cm-high boxes. The freezer's thin wall insulation technique minimizes wall thickness; its air-cooled cascade refrigeration system uses chlorofluorocarbon-free refrigerants. A pressure-equalization port allows reentry to cabinet within 30 s of door opening. The freezer is supplied with an electronic controller that includes a digital temperature display and remote alarm contacts, warns of elevated storage temperature, and provides an integrated voltage-boost system. An optional temperature recorder is available. *Harris, Division of GS Laboratory Equipment, 275 Aiken Road, Asheville, North Carolina 28804*

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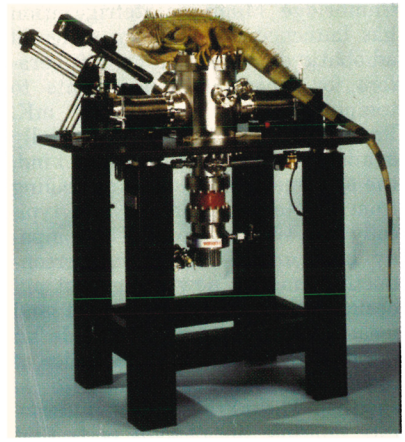
Manipulated Probe Systems

Desert Cryogenics has announced enhanced probe systems with microwave capability up to 110 GHz at temperatures from 4.2 to 475 K. By pumping the exhaust, the systems can lower the temperature to 2.5 K and, with an optional third stage, to 1.5 K. The sample temperature matches the stage temperature to better than 0.1 K, and temperature control is better than ±0.05 K. The systems can support scanning probe measurements and can work at ultra-high vacuum. Integrated optics provide a view of the sample on a high-resolution monitor (with a resolution as high as 1.5 μm). Helmholtz coils are available for generating magnetic fields up to 60 mT normal to the sample or 20 mT in the sample plane; a



superconducting split-coil magnet can be provided to generate up to 3 T normal to the sample plane. *Desert Cryogenics, 1665 East 18th Street, #112, Tucson, Arizona 85719*

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Silicon Diode Cryogenic Temperature Sensor

Lake Shore has introduced the DT-600 silicon diode series, an addition to its line of low-temperature sensors. With a useful temperature range of 1.4 to 500 K, the new devices are said to offer the tightest tolerances and the best low-temperature repeatability and long-term stability of the company's silicon diodes to date. The DT-600 diodes are interchangeable—that is, they conform to a standard temperature response curve, so that for many applications, they do not require individual calibration. However, for higher accuracy measurements, the diodes are available with calibrations across the full temperature range. The DT-600 series devices can be provided as bare die sensors (0.4 × 0.43 mm)—

offering small size and fast response—or with any of the company's diode packaging options. *Lake Shore Cryotronics Inc, 575 McCorkle Boulevard, Westerville, Ohio 43082*

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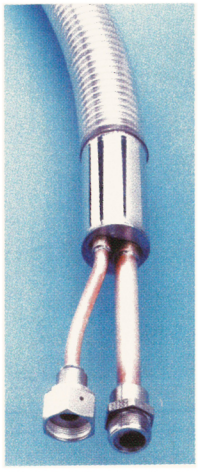
Recirculating Refrigerant Transfer Lines

The PolyFlex vacuum-insulated cryogenic transfer line from VBS is used to connect cryocompressors to process tools. The refrigerant supply and return lines can be contained in a single PolyFlex line or separated into two lines, depending on the installment parameters. The PolyFlex line is said to have 24 times lower heat loss than the basic foam-insulated line it was designed to replace. As a result, there is practically no limit on the distance between a compressor and the vacuum tools loads—as opposed to the typical 8 to 15 ft length maximum for the foam line. The new lines are lightweight and bendable: the 38 mm outside diameter line weighs 1.6 kg/m, with a minimum bend radius of 450 mm; the 63 mm diameter line weighs 2.5 kg/m, with a minimum bend radius of 813 mm. Standard lengths of 10 and 20 ft are available; custom lengths can be provided. *VBS Industries Inc, 808 East McGlincey, Campbell, California 95008*



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Cryostat for Scanning Tunneling Microscope

Advanced Research Systems has redesigned its Helitran Flow cryostat to cool a variable temperature scanning tunneling microscope (STM) for the temperature range of 8–300 K. The new design incorporates a helium transfer line with supercooled coaxial flow to produce uniform laminar liquid flow in the tip circuit at very low flow rates. The cryostat has a matrix heat exchanger to provide high-efficiency heat transfer between the STM and the cryogen. Characteristics of the cryostat/STM system at 8 K include 0.01 nm/s mechanical drift in the Z direction and 0.1 nm/s drift in the X and Y directions (both with feedback off); and thermal drift of 2 mK/s and 10–15 mK in a 24 h period. *Advanced Research Systems Inc, 905 Harrison Street, Suite 109, Allentown, Pennsylvania 18103*

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Nanopositioning Systems

Mad City Labs has announced the Nano-H series of high-resolution nanopositioning stages with sub-nanometer stability and precision. The Nano-H100 is an aluminum two-axis 100 μm × 100 μm stage with a 2 in square hole in the center. For high thermal stability, the Nano-H70-Invar provides two-axis 70 μm × 70 m motion and is made of Invar. Both positioners can be mounted to any microscope and allow easy access for optical lenses, atomic probes, or fiber optics. There is also a stage (Nano-H50-UHV) that is compatible with UHV and is bakeable to 150°C. All of the company's stages have measured linearities of better than 0.1% and come complete with a position sensor for closed-loop feedback. *Mad City Labs Inc, 6666 Odana Road, PMB#198, Madison, Wisconsin 53719-1012*

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On the Web

For science and engineering professionals, ScienceWise.com (www.ScienceWise.com) provides comprehensive information on published research, funding sources, teaming opportunities, and products and services. In doing so, it combines its own services with those from the most trusted industry leaders. *ScienceWise.com, 555 Quince Orchard Road, Suite 200, Gaithersburg, Maryland 20878-1437*

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New Literature

An analytical gas supplies catalog from Whatman provides information on air compressors, gas purifiers, gas receiving tanks, pressure regulators and flowmeters, a deionized water system, and a halogenated hydrocarbon scrubber. *Whatman Inc, 100 Ames Pond Drive, P.O. Box 1262, Tewksbury, Massachusetts 01876-0962* ■

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