

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 SUPERCONDUCTIVITY

High-Temperature Superconducting Power Lead Systems

EURUS Technologies has developed a comprehensive power lead system that integrates high-temperature superconductive (HTS) and optimized resistive sections. Engineered for applications ranging from 1 to 60 kA, the new power leads can be customized with all of the fixtures and fittings necessary to meet thermal and electrical specifications. The system's standard HTS component is a 20 cm composite consisting of $\text{YBa}_2\text{Cu}_3\text{O}_x$ encased in a protective outer sheath. The power leads efficiently transport energy from room-temperature (300 K) power sources to low-temperature (4.2 K) applications, providing immediate savings in operating costs and system reliability, we are told. *EURUS Technologies, 2031 East Paul Dirac Drive, Innovation Park, Tallahassee, Florida 32310*

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Superconducting Magnetic Energy Storage Devices

American Superconductor Corp has announced the launch of the PQ DC, said to be the industry's first low-temperature superconductor magnetic energy storage (SMES) device. SMES units store electricity in a coil of superconducting wire, which is able to maintain the electrical energy because the wire exhibits no electrical resistance. Through the use of power converters, an SMES unit instantaneously taps into the stored electrical energy to mitigate the effects of short duration outages and voltage sags.

According to data published by the Electric Power Research Institute, 80 to 90% of all power quality problems result from momentary voltage dips and outages in electric power grids that last less than one second.

The focus of the company's SMES product line is on power levels of 1 to 10 megavolt-amperes, the power range of prime interest to industrial users. *American Superconductor Corp, Two Technology Drive, Westborough, Massachusetts 01581*

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Superconducting Magnet Systems for Magneto-Optical Studies

Janis Research is now offering its new SOM2 series of superconducting magnet systems for magneto-optical studies. These compact cryostats offer larger solid angles and magnetic fields of up to 9 tesla, with interchangeable sample chambers and window blocks. The sample environment is in a flowing helium vapor or in vacuum, with temperature variation between 1.5 and 300 K. Both top- and side-loading systems are provided for quickly interchanging samples without disturbing the magnet or the main dewar.

Complete systems are supplied with automatic temperature controllers, field-independent thermometry, Hall probes and computer-controllable bipolar magnet power supplies. Helium-3 and dilution refrigerator inserts are available for operation down to 0.3 K and 10 mK, respectively. These systems can be supplied with built-in closed-cycle refrigerators without sacrificing magnetic field strength or access to the high field region. *Janis Research, 2 Jewel Drive, PO Box 696, Wilmington, Massachusetts 01887*

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Ultrahigh-Vacuum Continuous-Flow Cryostat

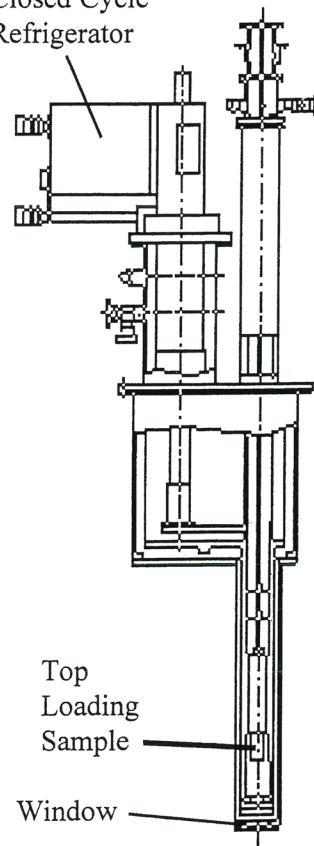
Applied Engineering Technologies is currently manufacturing the Kel-Tran UHV, a highly customizable continuous-flow cryostat available in a variety

CRYO

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Bi-metallic transition joints & couplings:



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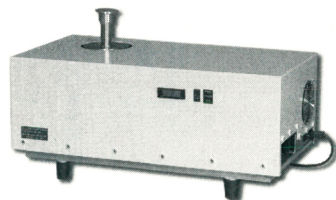
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77°K LABORATORY COOLER



Designed to meet the cooling requirements for the laboratory researcher, the BeCool™ Stirling cryocooler can be operated over a broad range of cryogenic temperatures with cooling capacity up to 15 watts @ 77°K O.E.M models available.

Convenient Operation

- ON/OFF operation
- 120V/60Hz electrical supply
- User defined temperature settings
- Fits easily on bench top
- Nearly silent operation
- Maintenance-free for life of machine >50,000 hours



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(509) 735-4700 ext. 103

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of sizes and configurations. Standard units come equipped with a 20-pin UHV feedthrough, low-temperature pump out port, six-foot flexible transfer line and gold-plated copper sample holder.

A removable, variable-temperature pod complete with silicon diode and 25-ohm heater is also included. The standard temperature test range of the unit is about 2 to 325 K, making it an excellent choice for UHV cooling applications, including superconductor and semiconductor materials characterization.

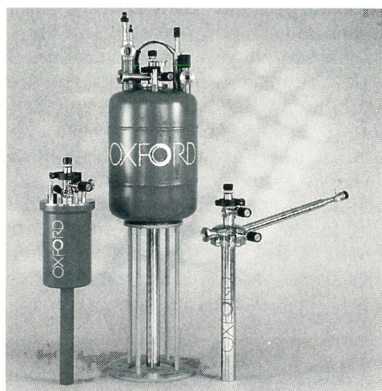
The company also manufactures a bench top model of the Kel-Tran UHV that contains all the features of the standard unit, plus an optical UHV vacuum jacket. *Applied Engineering Technologies, 155-B New Boston Street, Woburn, Massachusetts 01801*

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Cryostats for Electrical and Magnetic Materials Characterization

Oxford Instruments has announced its new Spectrostat series of cryostats for materials characterization using electrical and magnetic probes. The series consists of the Spectrostat DN for measurements at liquid nitrogen temperatures and the Spectrostat CF and Spectrostat Bath for liquid helium temperatures. The last applies technology from the company's optical series of cryostats to reduce helium consumption, allowing measurements of 8–10 hours.

Sample height and rotational options permit position adjustment



within a magnetic field without maneuvering the cryostat; the cryostats also have a load lock, which allows samples to warm up in a dry environment, thus avoiding problems of condensation and icing. *Oxford Instru-*

ments, Scientific Research Division, Old Station Way, Eynsham, Witney, Oxon OX8 1TL, England

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Vacuum Grease for Low Temperatures

M&I Materials is the manufacturer of Apiezon N vacuum grease. The renowned resistance of this grease to "crazing" ensures good thermal conductivity at low temperatures. With its ability to withstand frequent cycling between room and liquid helium temperatures, Apiezon N grease also offers excellent long life potential.

The good adhesive properties of the grease at ambient temperatures, coupled with its favorable thermal conductivity at low temperatures, make it ideal for the mounting of permanent or temporary samples and sensors.

The product is widely used in the manufacture of all types of cryogenic equipment, including magnetic resonance imaging magnets and cryogenic scientific instruments. As a hydrocarbon-based product, Apiezon N grease does not suffer from creep or carryover, which are problems associated with silicone grease. *M&I Materials, PO Box 136, Manchester M60 1AN, England*

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Heat Capacity Measuring System

Quantum Design has introduced a heat capacity option for its Physical Property Measurement System (PPMS). When combined with the PPMS base platform, the option provides users with a fully automated instrument capable of measuring heat capacity on small solid samples of about 1 to 500 mg in a temperature range from 1.9 to 350 K and in magnetic fields of up to 14 tesla. Included with the option is a convenient sample mounting station, modular sample holders, a fully automated high-vacuum system and a full-featured software package.

The option uses a relaxation technique that combines the highest measurement accuracy with robust analysis techniques. During each measurement cycle, the application software fits the temperature response of the sample platform to a model that accounts for both the thermal relaxation of the sample platform to the bath temperature and the relaxation between the platform and the sample itself. *Quantum Design, 11578 Sorrento Valley Road, San Diego, California 92121-1311*

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Cryogenic Freezer Achieves -150°C

Harris Manufacturing has introduced a new line of cryogenic storage freezers designed to operate at temperatures as low as -150°C using a single scroll refrigeration compressor with only three moving parts.

The expanded Cryostar product line includes -150°C , -140°C and -120°C chest freezers, as well as -95°C upright freezers. Each unit has a high-performance, mixed-refrigerant auto-cascade cooling system that operates without liquid nitrogen. Noise is reduced by as much as 75% over reciprocating compressor designs, and environmentally safe CFC-free refrigerants are employed.

The freezers are easy to use, with microprocessor controls and touchpad data entry of performance parameters. Because temperature gradients in the freezer chambers are relatively insignificant, the viability of stored material doesn't depend on its location in the cabinet. *Harris Manufacturing, 275 Aiken Road, Asheville, North Carolina 28804*

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Temperature, Resistance and DC Voltage Measurements with 1500 V Isolation

Keithley Instruments has announced four miniature instruments with up to 1500 V front-to-back isolation on up to six differential analog input channels. The units' design enables them to provide high isolation in one-sixth the space required by more conventional instruments. The models KNM-DCV41/42 and KNM-TC41/42 are additions to Keithley's SmartLink series.

The instruments exhibit 120 dB common-mode rejection at dc, 50 Hz or 60 Hz (100 Ω imbalance). In addition, the design provides current isolation that virtually eliminates ground loops in configurations such as four-wire resistance measurements and temperature measurements using thermocouples at high potentials. A wide variety of signals can be mixed and matched on the input channels, which provide 800 V between-channel isolation.

All the instruments feature a 16-20-bit analog-digital converter and a microcomputer, which enables a combination of data acquisition, signal processing and communication capabilities and allows the transfer of processed rather than raw data to a host

computer. *Keithley Instruments, 28775 Aurora Road, Cleveland, Ohio 44139*

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Triple-Point-of-Water Cells

Isotech is in full production in the US of Jarrett-Isotech cells for realizing the triple point of water. This temperature standard originated from a National Institute of Standards and Technology design and was formerly manufactured by the Jarrett Instrument Co.

The triple point of water is the temperature at which pure water, ice and vapor are in equilibrium. It is the fundamental defining fixed point of the International Temperature Scale of 1990 (ITS-90) and the one defining fixed point of the Kelvin thermodynamic temperature scale. This temperature has been assigned a value of $+0.01^{\circ}\text{C}$ on the ITS-90 and a value of 273.16 K on the Kelvin thermodynamic scale.

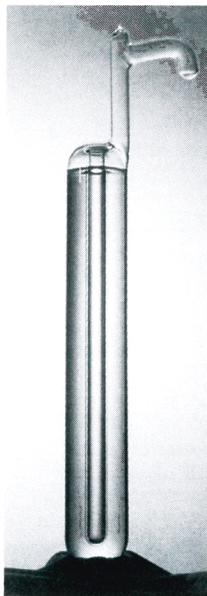
Unlike an ice bath, the triple-point-of-water cell is sealed, so there is no risk of accidental contamination. The uncertainty of the temperature of even a well-prepared ice bath is 50 to 200 times larger than that of the Jarrett-Isotech cell, which reproduces the assigned temperature to $\pm 0.00012^{\circ}\text{C}$. *Leico Industries, 250 West 57th Street, New York, New York 10107*

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New Literature

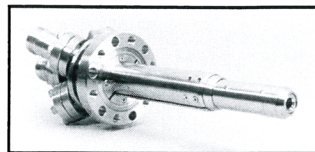
The 1997-98 Scientific Supplies Catalog from Scientific Instrument Services contains a wide variety of products. Included in its nine sections are supplies for mass spectrometers, gas chromatographs, vacuum systems and general laboratory use. Systems and accessories for thermal desorption and liquid chromatographs, as well as tools, books and software, are also listed. *Scientific Instrument Services, 1027 Old York Road, Ringoes, New Jersey 08551-1039*

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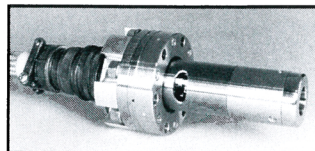


ELECTRON SOURCES

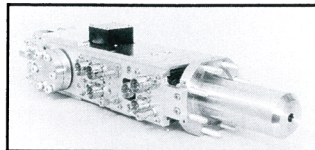
5 to 100 eV / Const Curr



100 eV to 10 keV / 50 mA

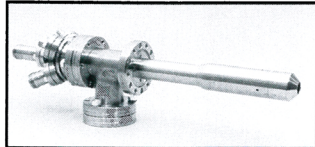


30 / 50 keV RHEED



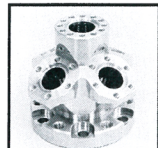
ION SOURCES

10 eV to 3 keV / Ar, O, H



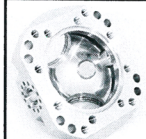
UHV COMPONENTS

Spherical Cube



Flange Multiplexer

Magdeburg Hemisphere



Close Coupler

GUNS, ELECTRONICS, SYSTEMS

5 eV to 100 keV / 10^{-15} A to 1 A
Collimated, Focused, or Flood
Beams: μm to m Diameters
Ultra Low Energy to High Energy
Wide-Range Energy Sweeping
Differential Pumping, Deflection
Computer Control, Fast Pulsing

SURFACE PHYSICS / RHEED / IPES
CHARGE NEUTRALIZATION / ESD
CATHODOLUMINESCENCE / ISS

Cathodes / Cathode Cartridges
Faraday Cups, Phos Screens
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