NEW PRODUCTS

The descriptions of the new products listed in this section are based on information supplied to us by the manufacturers, and in some cases by independent sources. 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.

FOCUS ON MAGNETISM

Three-Channel Gaussmeter Measures 3-D Fields

The model 460 gaussmeter from Lakeshore Cryotronics is a three-channel device that reads measurements from up to three separate probes or by a single three-axis, two-axis or differential probe. The results for each channel are displayed on a line of the gaussmeter's four-line by 20-character front-panel liquid-crystal display; the fourth line can be used to display the vectorial magnitude of two or more of the other readings. Setup is performed by means of buttons on the front panel. The user can either select autoranging or manually select one of seven ranges with full scales from 300 milligauss to 300 kG. Readings have a resolution of one part in ± 300 000, an absolute accuracy of ± 0.10% of reading ± 0.005% of range and a repeatability of 0.0007% of full scale for ranges of 300 G and above. *Lakeshore Cryotronics, 64 East Walnut Street, Westerville, OH 43081-2399*

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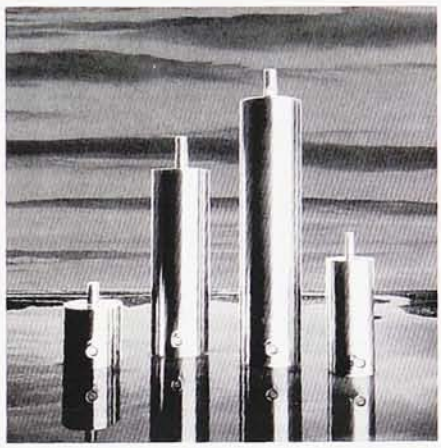
Bidirectional Actuators with Microsecond Response Time

Etrema Products has developed a family of bidirectional actuators using the company's magnetostrictive alloy, Terfenol-D. Within the actuator, the Terfenol-D is placed in the field of a permanent magnet, where it expands or contracts in response to the current flowing through a copper solenoid. Because of the rapid response and recovery of the alloy, the actuators have response times on the order of a few μs for frequencies from 0 to 6000 Hz. Displacements for different actuators range from ± 25 μm to ± 70 μm, and they operate in the temperature range



–20 to 100 °C. The actuators are said to provide forces and displacements similar to those available from conventional actuators. Expected applications include micropositioning, active vibration control, seismic imaging and fabrication of vibrators and shakers. *Etrema Products, 2500 North Loop Drive, Ames, IA 50014*

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Upgrade of Magnetic Property Measurement System

Quantum Design's MPMS XL is an upgraded version of its magnetic property measurement system. The new system incorporates additional measurement techniques, improved temperature measurement and control capabilities and augmented control and automation software. In addition to making DC magnetization and SQUID-AC measurements, MPMS XL makes use of a reciprocating sample technique, in which the sample is subjected to small, periodic vibrations within the device's second-order gradiometer. The vibrations result in an oscillating AC signal that can be detected by a SQUID sensor. This technique results in magnetic-moment measurements with sensitivities down

to 10^{-11} ampere·m^2 (10^{-8} emu). The low-temperature cryogenic system is capable of maintaining temperatures below 4.2 K for extended periods (1.9 K for over 45 hours) and smoothly warming or cooling through the liquid-helium boiling point of 4.2 K. A new thermometer design is said to provide improved temperature accuracy and control. The system software provides graphics, data analysis and system control, and it allows multiple files to be viewed simultaneously, even if they are in different formats. The MPMS XL is available with two magnet strengths—5 and 7 tesla—and options include transverse momentum detection, vertical and horizontal sample rotation, sample heating and environmental magnetic shielding. The system should be useful in materials science and condensed matter physics. *Quantum Design, 11578 Sorrento Valley Road, San Diego, CA 92121-1311*

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Three-Axis, Computer-Controlled Magnetometer

Honeywell's HMR 2300 magnetometer measures the magnitudes and directions of the x, y and z components of a magnetic field, converts them into 16-bit values by means of analog-to-digital converters and then communicates those values directly to a computer. The device is also controlled by means of the computer, through which one enters commands to configure the sampling rate, output format, averaging and zero offset. When power is shut off, an electrically erasable programmable read-only memory stores configurations until the next use. The magnetometer has a digital filter for rejecting 50-Hz and 60-Hz noise and employs a switching technique to eliminate the effects of past magnetic history. The device measures fields from −2 gauss to 2 gauss with a resolution of 70 microgauss and an accuracy of 1% of full scale. Communication with the computer is by means of an RS-232 interface or an RS-485 interface at baud rates of 9600 or 19 200. With an RS-485 interface, one can connect to up to 32 devices on a single wire. Suggested applications include anomaly detection, linear and angular position measurement, and laboratory instrumentation. *Honeywell, 12001 State Highway 55, Plymouth, MN 55441*

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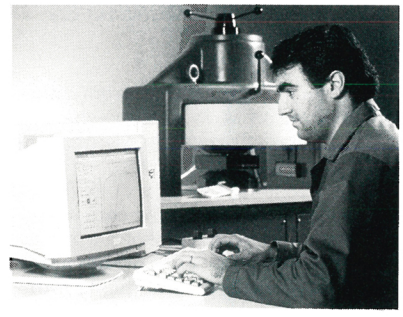
Temperature Control System for Magnetic Samples

Walker Scientific's TCSC-1 magnetic sample measurement and control system is a temperature controller intended for use with hysteresisgraphs. After the user selects the desired temperature using a dial, the system controls temperatures to an accuracy of ± 1 °C in the temperature range −100 to 300 °C. The system consists of a temperature control chamber, a coil set probe, a power supply and an electronic controller. Control chambers are available for samples with areas of 1 cm^2 and larger. The system is expected to



be useful for measurements of magnetic properties as a function of temperature. *Walker Scientific, Rockdale Street, Worcester, MA 01606*

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NonMagnetic Components for Magnetic Force Microscopy

Digital Instruments has made available a nonmagnetic option for its magnetic force and scanning probe microscopes. With this option, all parts located near the sample and probe are nonferrous, and so will not become magnetized by external fields. In scanning probe microscopy, this allows imaging of magnetically soft samples. In magnetic force microscopy, it allows investigation of magnetic microstructure in the presence of magnetic fields, making possible research on phenomena such as media erasure and domain wall pinning in permanent magnets. When used in conjunction with other techniques, the nonmagnetic option can achieve images of magnetic domains with resolutions down to 20 nm. *Digital Instruments, 520 East Montecito Street, Santa Barbara, CA 93103*

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Layered Magnetic Shielding with High-T_c Superconductor

Amuneal Manufacturing has developed a magnetic shielding material consisting of a layer of high-temperature superconducting (HTS) thin-film bonded to a layer of high-permeability alloy. The HTSc film consists of polycrystalline yttrium–barium–copper–oxide on an yttria-stabilized zirconia substrate, and it has a T_c of 92 K, thermal conductivity of 2 W/mK and a critical current of between 1000 and 3000 amperes/cm^2 at 77 K. The high-permeability layer is composed of Cryoperm 10, an alloy with a high nickel content, a saturation point of 9000 gauss and an initial permeability of 65 000; Cryoperm 10 is processed so that its permeability increases with decreasing temperature. The two layers are laminated together using an electrically insulating material. The shielding is intended for use at temperatures below 77 K. *Amuneal Manufacturing, 4737 Darrah Street, Philadelphia, PA 19124*

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Magnets and Measurement Systems for Condensed Matter Physics

Oxford Instruments has introduced several products for use in magnetic studies in condensed matter physics and materials science.

The company has extended its Teslatron family of superconducting magnet systems to include 6- and 8-tesla solenoids. Each magnet system includes the superconducting magnet, cryogenic system, power supply and driver software compatible with National Instruments Labview. The company's Pulselab magnets have a footprint of 2.4 m × 1 m and include a charging unit, capacitor bank for energy storage, computer-controlled firing unit, monitoring circuitry and liquid-nitrogen cooling system. Available with energy storage capacities from 25 to 150 kJ the systems can deliver 10-ms pulsed fields from 21 T to 45 T. These magnets are expected to find application in investigations of compounds ranging from spin glasses to superconductors.

The company has also added to its Maglab materials characterization systems. Maglab System 2000 provides a platform for routine characterization of materials, including measurements of AC susceptibility, DC extraction, AC/DC resistivity, critical current, heat capacity and magnetic properties. Maglab CMP is a microcantilever system for torque and force magnetometry. It measures magnetic fields

by detecting the change in capacitance resulting from the deflection of the cantilever plate relative to a reference plate. The cantilever probe has an angular excursion of 360° and a rotation speed of 0.8°/s. The system includes the probe, control unit and software. Among the applications suggested for these systems are investigations of magnetic materials, correlated electron systems, intermetallics and organics. *Oxford Instruments, Old Station Way, Eynsham, Witney, Oxon OX8 1TL, UK*

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New Literature

DC magnetron power supply brochure—Advanced Energy Industries has made available a brochure on its DC magnetron power supplies for reactive, DC and bias sputtering applications. *Advanced Energy Industries, 1625 Sharp Point Drive, Fort Collins, CO 80525*

Metals and alloys catalog—Advent Research Materials' 1996–97 catalog describes foils, sheets, wires, rods and tubes of 29 metals and alloys supplied by the company. *Advent Research Materials, Blyth, Road Industrial Estate, Halesworth, Suffolk IP19 8DD, UK*

Searchable database—National Instruments has developed a searchable database containing the latest technical support information from the company's applications engineering department. The database can be found at http://www.natinst.com/public on the World Wide Web. *National Instruments, 6504 Bridge Point Parkway, Austin, TX 78730-5039* ■