

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 Analytical Instruments

Earth's Field NMR Instrument

Exstrom Laboratories has released the Magnum, a proton precession NMR instrument. It can be used to calculate the nuclear magnetic relaxation times for different liquid samples and to monitor daily and seasonal variations of the Earth's field and geomagnetic storms. The Magnum incorporates a liquid-filled bottle mounted in coil sets on a tiltable platform, a low-noise high-gain amplifier, a programmable current switch with power supply, a data-acquisition system, and signal-processing software for spectral analysis and digital filtering. In operation, protons precess about the Earth's field and induce a voltage in a pickup coil; for a field of 0.5 G ($50 \mu\text{T}$), the signal would be at 2.13 kHz. The Magnum has a frequency range of 1.5–2.4 kHz and a line width (at half-height) of 0.8 Hz. *Exstrom Laboratories LLC, P.O. Box 7651, Longmont, Colorado 80501, <http://www.exstrom.com>*

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Acoustic Bubble Spectrometer

Dynaflow has announced the ABS Acoustic Bubble Spectrometer for measurement of bubble-sized distributions and void fractions in gas-liquid mixtures and flows. The ABS exploits the fact that bubbles strongly affect acoustic wave propagation; bubble content can be easily determined in the presence of particulates. The instrument incorporates a pair of hydrophones or transducers used to transmit and receive a series of short monochromatic bursts of varying frequencies. From these bursts, one can obtain the attenuation and phase speed in the bubbly liquid. The ABS is useful in oceanography; controlled laboratory testing, particularly where cavitation or boiling are possible and the underlying bubble nuclei distribution must be known; industrial flows; aeration; and heat exchangers. *Dynaflow Inc, 10621-J Iron Bridge Road, Jessup, Maryland 20794, <http://www.dynaflow-inc.com>*

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Scanning Electron Microscope

FEI Company has introduced the Quanta environmental scanning electron microscope (SEM), with field emission gun (FEG) technology, that offers high-resolution imaging with-



out charging samples. Its beam current of more than 100 nA provides a continuous operational stability of better than 0.1% per hour. The new instrument features three imaging modes: high vacuum, low vacuum, and environmental SEM (ESEM). Reportedly, switching between vacuum modes is seamless, allowing excellent imaging resolution to be maintained in all vacuum modes. The Quanta's ESEM technology enables dynamic wetting, heating, and tensile and compression experiments that can be recorded with digital video. The Quanta FEG offers four-quadrant imaging, auto-focus, and auto-contrast and brightness. *FEI Company, 5350 NE Dawson Creek Drive, Hillsboro, Oregon, 97124-5793, <http://www.feicompany.com>*

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Scanning Probe Microscope

Quesant Instrument has released a new version of its Q-Scope 350 scanning probe microscope (SPM) that features a newly added standard z-axis positioning sensor with a continuous accuracy of better than 99%. The benefit of this sensor, which is currently used in the company's full metrology scan head, is that it allows

the z (vertical) piezoelectric movement to stay accurate and linear over its full range once it is calibrated. The improved SPM also includes the latest software release with additional analysis capabilities and a built-in reporter that allows users to copy images and analysis screens to a multipage metafile that they can save, print, and export. Upgrades to existing Q-Scope 250s and 350s are available. *Quesant Instrument Corporation, 29397 Agoura Road, Suite 104, Agoura Hills, California 91301, <http://www.quesant.com>*

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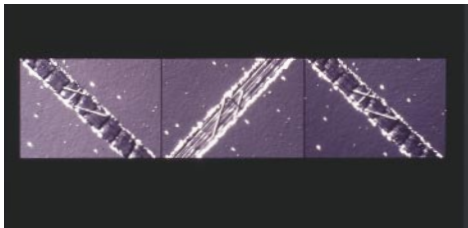
X-Ray Imaging System

The Princeton Instruments PI•SCX:4096 from Roper Scientific is an x-ray imaging system with a high-performance, cooled digital camera designed for lensless, direct imaging of phosphor screens and other Lambertian sources. The 16-bit system includes a 4096×4096 -pixel array, each with $15 \times 15\text{-}\mu\text{m}$ pixels and 100% fill factor, to provide a $61.44 \times 61.44\text{-mm}$ imaging area, high spatial resolution, and wide dynamic range. This large-format detector can be thermoelectrically cooled down to -50°C . As options, the PI•SCX:4096 offers a 1.9:1 fiber optically coupled configuration with a 165-mm taper for applications in which a large field of view is important. There is also a 1:1 coupled arrangement—with the fiber optic extended outside the vacuum—that provides a resolution of 33 line pairs per millimeter. *Roper Scientific, 3440 East Britannia Drive, Tucson, Arizona 85706-5006, <http://www.roperscientific.com>*

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Microscope Contrast Technique

Carl Zeiss has introduced its Circular Differential Interference Contrast (C-DIC) technique that uses circularly polarized light rather than conventional DIC to solve the problem of insufficient contrast, often observed in classical bright-field and dark-field microscopy. The C-DIC prism is



inserted into the microscope's compensator mount and works independently of sample orientation. All information about the sample is rendered visible with sharper contrasts by adjusting the C-DIC prism; no stage or object rotation is required. With a fully opened illumination aperture, the circularly polarized light ensures homogeneous illumination for improved image contrast. The new technique enables one to observe fine surface structures with high contrast and resolution simultaneously. *Carl Zeiss Inc, One Zeiss Drive, Thornwood, New York 10594, <http://www.zeiss.com>*

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Multifocal Microscopy

LaVision BioTec's TriMScope, a multifocal, multiphoton microscope is based on a beam divider that splits up an incoming laser beam into as many as 64 beamlets, which are scanned simultaneously in the object plane. This process results in either 64 times brighter images or 64 times higher image rates compared to standard single-beam multiphoton scanning microscopes. The beamlets are displaced with respect to one another by several picoseconds, so there is no crosstalk. The foci in the object are aligned in a single line and the number of foci can be switched from a single beam up to 64. Image rates up to 3600 Hz are possible. The use of TriMScope in conjunction with the company's ultrahigh-repetition-rate picosecond-gated camera allows real-time acquisition of fluorescence lifetime images with 3D resolution. *LaVision BioTec GmbH, Meisenstrasse 65, D-33607 Bielefeld, Germany, <http://www.lavisionbiotec.com>*

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Field Emission Electron Microscope

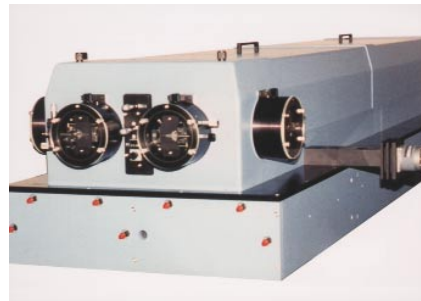
JEOL USA has announced the JEM-2100F, a high-resolution transmission electron microscope (TEM) with applications in electron diffraction, cryomi-

croscopy, in-situ microscopy, holography, and tomography. The new TEM incorporates a high-brightness Schottky field-emission electron gun that produces a probe size of less than 0.15 nm. Point-to-point TEM resolution is guaranteed at 0.19 nm, and atomic scale resolution of 0.136 nm can be achieved using high-angle annular dark field imaging to directly reveal atomic position and detail. The JEM-2100F features a tension-free specimen-holding system and the company's five-axis, LoDrift goniometer stage. A passive air mount minimizes transfer of vibration to the specimen stage; an active air mount is optional. *JEOL USA Inc, 11 Dearborn Road, Peabody, Massachusetts 01960, <http://www.jeol.com>*

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Picometer Resolution Spectrometer

The model 2062 from McPherson is a 2-m focal length, double pass/double dispersion spectrometer with a nomi-



nal 5 pm resolution, provided the 1200 grooves/mm grating is used. Incorporating a Czerny Turner optical system, the instrument features multiple entrance and exit ports, precision wavelength drives, echelle- and oversize-grating mounting capabilities. The oversize grating has almost 40% more area, thereby achieving a faster f/number and more throughput. The grating can rotate through an auxiliary 20°, resulting in an extension of the wavelength range. The instrument can cover a wavelength range from 185 nm to an upper limit determined by the grating: 650 nm with a 2400 g/mm up to 78 μm using a 20 g/mm. *McPherson Inc, 7A Stuart Road, Chelmsford, Massachusetts 01824-4107, <http://www.mcpherson.com>*

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New Scanning Technique for SPMs

Veeco Instruments has released TRmode, a new scanning technique

for the company's scanning probe microscopes (SPMs). TRmode measures tip-to-sample interactions through torsional resonance of the SPM cantilever to provide superior lateral characterization of sample surfaces. This technique enables in-plane anisotropic materials investigations, leading to unique information about nanoscale surface interactions. TRmode also provides faster scanning and enhanced sensitivity for Veeco's Phaseimaging applications. The new technique can be used in conjunction with the company's TappingMode to offer complementary lateral and vertical data in SPM applications such as nanotribology, magnetic properties, and polymer studies. *Veeco Instruments Inc, Corporate Headquarters, 100 Sunnyside Boulevard, Woodbury, New York 11797 <http://www.veeco.com>*

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New Literature

The Pfeiffer Vacuum 2002-2004 *Mass Spectrometry* catalog covers mass spectrometry fundamentals, including how the instruments work, mass filter theory, and ion source design. The company's current vacuum products are included, with detailed specifications and applications examples. *Pfeiffer Vacuum Inc, 24 Trafalgar Square, Nashua, New Hampshire 03063-1988, <http://www.pfeiffer-vacuum.com>*

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Advanced Design Consulting has produced an 82-page color catalog that features standard products such as spectrometers, high-precision slits, crossed-roller jacks and slides, optical tables, seven models of rotation stages, and two-, four-, and six-circle goniometers. *Advanced Design Consulting Inc, 126 Ridge Road, P.O. Box 187, Lansing, New York 14882, <http://www.adc9001.com>*

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The *Sterilization & Decontamination using High Energy Light* booklet from Xenon Corp describes how the company's high-energy, broad-spectrum pulsed UV/visible light systems are used to sterilize and disinfect food, pharmaceutical products, medical devices, and other materials. *Xenon Corporation, 20 Commerce Way, Woburn, Massachusetts 01801-9711, <http://www.xenoncorp.com>* ■

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Multifunction I/O Boards

Acromag's new multifunction I/O boards, the APC730 for desktop PCI and AcPC730 for Compact PCI, combine the capabilities of four separate I/O boards on a single card. Analog input functions are handled by 16 differential or 32 single-ended input channels with four selectable ranges. A 16-bit A/D converter scans inputs in 10 μ s per channel for 100-kHz throughput. For analog output functions, eight channels, each with a 16-bit D/A converter, are provided with a ± 10 V signal range. Digital I/O tasks are accommodated with 16 TTL transceivers. The I/O direction is selectable on an eight-channel basis. A 32-bit counter/timer is provided for applications such as watchdog timers, event counting, pulse and period measurements, and output waveform generation. *Acromag Inc, 30765 South Wixom Road, P.O. Box 437, Wixom, Michigan 48393-7037, <http://www.acromag.com>*

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Data Acquisition for Handhelds and Laptops

Analog & Digital Peripherals has released the DATAQ-CF2, said to be the first virtual instrument package and data acquisition system designed for Microsoft Windows handhelds, Tablet PCs, and laptops with Windows CE/Pocket PC/Winx test-panel software. The useful features of handhelds—high-resolution, touch screens, PC docking stations, and local area network connectivity—are imported into a data acquisition and analysis system. The DATAQ-CF2 consists of a 24-bit compact, flash-data-acquisition card with 32 kilobytes of RAM. Six software-reconfigurable channels allow combinations of up to four 24-bit analog inputs, two 12-bit analog outputs, and four digital I/Os. The system has low power consumption (34 mA at 5 V, 6 mA in sleep mode). *Analog & Digital Peripherals Inc, P.O. Box 499, Troy, Ohio 45373, <http://www.adpi.com>*

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Biological Safety Cabinet

The Baker Co has introduced the SterilGARD III Advance (Class II Type A2, referring to the exhaust system) biological safety cabinet. It pro-

vides a view screen sloped at a 10° angle that reduces glare, brings the work closer to the user, and creates the most natural head and neck, and arms and elbows, position when working. The cabinet incorporates the company's UniPressure Preflow air management system that puts more uniform air pressure on the supply filter for better vertical flow across the work surface. A telescoping air filter mount provides a direct seal of the filter to the UniPressure Preflow plenum, thus simplifying filter replacement. A proprietary momentum air curtain contains particulates within the work area and inhibits migration of room air into the work area. *The Baker Company, P.O. Drawer E, Sanford Airport Road, Sanford, Maine 04071, <http://www.bakerco.com>*

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Thin-Film Metrology System

Scientific Computing International (SCI) has announced the FilmTek 4000EM-DUV thin-film metrology system. It combines SCI's multi-angle differential polarimetry and differential power-spectral-density technologies to provide spectroscopic reflection of polarized light at multiple angles to measure film thickness and index of refraction. The instrument can also simultaneously determine extinction coefficients, surface roughness and damage, porosity, crystallinity, birefringence and stress, and energy band gap. The FilmTek 4000EM-DUV can accurately monitor advanced thin films such as high-k (dielectric constant) film stacks, oxide-nitride-oxide low-k films, 193-nm photoresist, and silicon-germanium and amorphous carbon films. *Scientific Computing International, 6355 Corte Del Abeto, Building C105, Carlsbad, California 92009, <http://www.sci-soft.com>*

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