new products

Focus on test, measurement, and materials

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. For more information about a particular product, visit the website at the end of the product description.

Andreas Mandelis

Ultralow-noise lock-in amplifiers

Designed for precise phase and amplitude measurement, Zurich Instruments' MFLI 500-kHz and 5-MHz lock-in amplifiers come with an integrated data and Web server. Input noise is 2.5 nV/$\sqrt{\text{Hz}}$ for frequencies greater than 1 kHz and only 7 nV/$\sqrt{\text{Hz}}$ at 10 Hz, so even weak signals can be captured quickly. The platform-independent LabOne software, which is included, has an intuitive, browser-based user interface. It visualizes the settings and

signal processing path for each of up to four demodulators and provides a tool set for signal analysis. Besides the lock-in amplifier, the software features a signal generator, an oscilloscope, and sweeper/frequency and fast-Fourier-transform spectrum analyzers. The flexible MFLI lock-in amplifiers have applications in photonics, low-temperature physics, impedance and ultrasonic measurements, MEMS characterization, quantum electronics, and nanoelectronics. *Zurich Instruments AG, Technoparkstrasse 1, 8005 Zürich, Switzerland, http://www.zhinst.com*

Compact XY scanning stage

The A-311 PIglide IS series planar air bearing stages from Physik Instrumente are suitable for microscopy, optical metrology, wafer inspection, laser marking, and other precision motion applications. Preloaded air bearings, which replace mechanical contact by a thin air film, provide frictionless, vibration-free motion; the result is negligible hysteresis or reversal error and zero wear of mechanical components. The planar stages' compact, single-baseplate design provides a low profile and makes integration in tight spaces easy. By eliminating the height and overhung loads of an XY stack design, the A-311 stage achieves 0.1-µm/inch straightness and flatness and roll, pitch, and yaw errors of 1–2 arcsec. Ironless linear motors provide smooth motion. They reach velocities up to 1 m/s and acceleration to 1 g for fast scanning and automation applications. Integrated linear encoders supply position information down to 1 nm. *Physik Instrumente LP, 16 Albert Street, Auburn, MA 01501, http://www.pi-usa.us*

Atomic force microscope for polymer research

Asylum Research, an Oxford Instruments company, has announced its Cypher ES Polymer Edition atomic force microscope (AFM) for polymer and materials science applications. Those include imaging morphology and structure, measuring force and deformation, mapping nanomechanical and thermal properties, and monitoring dynamic processes such as solvent and thermal effects. Asylum Research claims it is the only AFM manufacturer to offer high-resolution and quantitative imaging of both the elastic and viscous responses of materials. The fast-scanning AFM system features three nanomechanical characterization tools: amplitude and frequency modulation and contact resonance viscoelastic modes for quantitative mapping of elastic moduli and viscous responses, and fast force software for quantitative high-speed elastic modulus mapping. An integrated high-temperature sample heater allows exploration of polymer phase transition phenomena at temperatures up to 250 °C. *Asylum Research, 6310 Hollister Avenue, Santa Barbara, CA 93117, http://www.asylumresearch.com*

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A. *Total number of copies (net press run)*	110 236	104 863
B. *Paid subscriptions*		
1,2. *Mailed subscriptions*	67 256	68 474
3,4. *Sales through dealers and carriers, street vendors, counter sales outside USPS; other classes mailed*	17 075	16 204
C. *Total paid distribution (sum of B1–B4)*	84 331	84 678
D. *Free or nominal rate distribution*		
1,2. *Free or nominal rate mail copies*	20 349	17 489
3,4. *Free or nominal rate copies mailed at other classes or other distribution*	4 990	2 116
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F. *Total distribution (sum of C and E)*	109 670	104 283
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I. *Percent paid (C/F × 100)*	76.9%	81.2%

16. *Electronic copy circulation:* PHYSICS TODAY

	Average*	August**
A. *Paid electronic copies*	15 416	17 132
B. *Total paid print copies (line 15C) plus electronic copies (line 16A)*	99 747	101 810
C. *Total print distribution (line 15F) plus electronic copies (line 16A)*	125 086	121 415
D. *Percent paid (both print and electronic copies) (B/C × 100)*	79.74%	83.85%

* *Average number of copies of each issue during preceding 12 months.*

** *Actual number of copies of single issue published nearest to filing date.*

I certify that the statements made by me above are correct and complete.

Randolph A. Nanna, Publisher

Measurement and data management system

National Instruments (NI) offers hardware and software to help users perform measurements and manage data: new 4- and 8-slot CompactDAQ controllers, a new 14-slot USB 3.0 CompactDAQ chassis, DIAdem 2015, and DataFinder server edition 2015. The

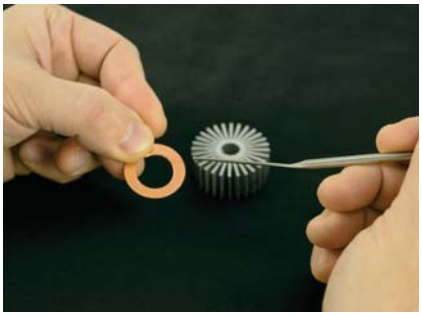
controllers feature Intel Atom quad-core 1.91-GHz E3845 processors programmable with LabVIEW 2015 system design software, so data acquisition systems can be customized with functions such as processing, intelligence, and control. They can run Windows embedded 7 or NI Linux Real-Time and include 32 GB of nonvolatile storage and removable secure digital storage. NI is releasing DIAdem 2015 as 64-bit software, so users can load and analyze more data than before. DataFinder server edition 2015 delivers multistep querying that can be sent out to a global network of servers for fast retrieval of the data users need to analyze. *National Instruments Corporation, 11500 North Mopac Expressway, Austin, TX 78759-3504, http://www.ni.com*

Surface analyzer

Hiden's Compact ultrahigh-vacuum-compatible secondary ion mass spectrometry/sputtered neutral mass spectrometry (SIMS/SNMS) instrument performs elemental surface characterization of layer structures, contaminants, and impurities rapidly and with minimum complexity. The sensitive SIMS technique provides analysis of surfaces and of surface layers at the nanometric level, and the SNMS mode enables direct quantification of elemental concentrations. Spot size can be adjusted down to just 50 μm for both dynamic and static SIMS analyses. Control and operation are integrated with the MAXIM 600P quadrupole detector to provide depth profiling, 2D and 3D spectral imaging, and mass spectral data. The sample is located and imaged by the built-in camera, and the optional electron gun enables analysis of insulating surfaces. Application areas include photovoltaics, semiconductor fabrication, glass coating, metallurgy, and geology. *Hiden Analytical Inc, 37699 Schoolcraft Road, Livonia, MI 48150, http://hideninc.com*

Optically clear epoxy

Master Bond EP21NDCL is a novel two-component epoxy system that cures optically clear in thin sections, although part A is translucent and part B is light amber. The nondrip compound is suitable for bonding, sealing, and coating applications in optical, electrical, aerospace, and other fields. Its 1:1 mix ratio can be adjusted to deliver different properties. A 2:1 mix ratio cures more rigidly, while a 1:2 mix ratio produces a flexible system. The epoxy cures at room temperature and faster at higher



temperatures. It bonds well to many substrates, such as metals, glass, rubbers, and plastics. Bonds are durable with high tensile lap shear, tensile, and compressive strengths. With a volume resistivity greater than 10^{14} ohm-cm, EP21NDCL offers high electrical insulation properties. It resists chemicals, including water, oils, acids, and salts, and it withstands rigorous thermal cycling over the service temperature range of –60 °F to 250 °F. *Master Bond Inc, 154 Hobart Street, Hackensack, NJ 07601, http://www.masterbond.com*

Ion source for sputter cleaning

RBD Instruments has improved its sputter cleaning ion source package, the IG2, which the company originally developed as an economical tool for scientists and engineers in analytical laboratories, universities, research institutions, and government agencies. Ion sputter cleaning is an essential tool for researching and developing new materials. The IG2 has a model 04-165 ion source and a model 32-165 2-keV ion source controller. It generates ions with acceleration energies of up to 2 keV. The ions' kinetic energy erodes the topmost atomic layers of materials in vacuum. A digital panel meter on the front of the IG2 controller now displays the anode current, which makes it easier to set and maintain reproducible ion currents. The IG2 also can sputter clean scanning tunneling microscope tips in vacuum; clean tips are necessary to obtain high-quality images and spectra at the atomic level. *RBD Instruments Inc, 2437 Northeast Twin Knolls Drive, Suite 2, Bend, OR 97701, http://www.rbdinstruments.com*

Sound and vibration measurements

By combining four rugged enclosures of its VIBbox-64, Data Translation has expanded sound and vibration measurement capabilities to 256 IEPE channels. Parallel configuration and operation allow data from all channels to be available at the same time, so vibration data can be analyzed simultaneously without the time lapse and phase difference of multiplexed systems. IEPE inputs from sensors such as microphones, accelerometers, and other transducers with a large dynamic range can be connected directly and measured at a fast throughput rate of 51.2 kHz on each channel. The large VIBbox configuration has other input–output capability, including 32 stimulus digital-to-analog and 16 tachometer channels and digital input–output, counter/timer, and measure counter channels. Applications include acoustic, audio, and vibration testing on large structures such as airplane wings, turbines, and water vessels. *Data Translation Inc, 100 Locke Drive, Marlboro, MA 01752-1192, http://www.datatranslation.com* ■