

new products

Focus on vacuum and cryogenics

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

Dilution refrigerator for quantum computing

Janis Research has announced that its dilution refrigerator (DR) JDry-500-QPro has been optimized for quantum computing research that uses instrumentation at ultralow temperatures. The cryogen-free DR employs a pulse tube cryocooler for shield cooling and mixture condensation. It includes a mechanical heat switch and a liquid nitrogen circuit for rapid precooling. The DR achieves further cooling to a base temperature of ~9 mK via condensation and



circulation of a gas mixture of helium-3 and helium-4 in conjunction with the company's model GHS2 automated gas handling system. The time for cool-down to base temperature is 36 hours. The DR features cooling power of 500 μ W at 100 mK; larger cooling power is also available. Access ports and thermal anchoring are provided for up to 200 coaxial cables. There is a large experimental volume below the mixing chamber plate. *Janis Research Company LLC, 225 Wildwood Avenue, Woburn, MA 01801-2025, <http://www.janis.com>*

Small vacuum pump

The compact TwisTorr 84 FS turbomolecular pump from Agilent Technologies

features innovations designed to extend performance, reliability, and energy efficiency benefits for demanding academic and industrial applications involving a range of scientific instruments, from high-stability electron microscopes to high-throughput gas chromatography/mass spectrometry systems. The pump's drag stage offers high pumping speed and compression ratios for hydrogen and helium applications. It ensures high throughput, high fore-line pressure tolerance, low power consumption, and a low operating temperature. The floating suspension minimizes vibration and acoustical noise while extending the pump's operating life. The TwisTorr 84 FS yields high stability suitable for applications involving scanning electron microscopes. It will be used in Agilent's compact turbo and minitask benchtop pumping systems. *Agilent Technologies, 5301 Stevens Creek Boulevard, Santa Clara, CA 95051, <http://www.agilent.com>*



Cold cathode and Pirani vacuum gauges

Pfeiffer Vacuum has introduced the pure cold cathode IKR 360/361 and Pirani cold cathode PKR 360/361 vacuum gauges to its family of ActiveLine total pressure measurement devices. The IKR gauges cover the pressure range between 10^{-2} mbar and 10^{-9} mbar and the PKR gauges from atmosphere to 10^{-9} mbar. According to the company, the gauges' patented design substantially minimizes stray magnetic fields. That is an



PFEIFFER  **VACUUM**



PRISMAPLUS®

The perfect solution for mass spectrometry

- Modular design offers optimum adaptability
- Compact size yet high performance
- A variety of interfaces make for simple systems integration



Are you looking for a perfect vacuum solution? Please contact us:

Pfeiffer Vacuum, Inc. · USA
T 800-248-8254
F 603-578-6550
contact@pfeiffer-vacuum.com
www.pfeiffer-vacuum.com

Evactron® EP De-Contaminator Stops dirt!



**“Since we got
the Evactron®
plasma cleaner
installed, pump
downs have
been fast and
clean!”**



Evactron®
By XEI Scientific

www.Evactron.com/pt

advantage in applications in which external magnetic fields would prove disruptive, such as mass spectrometry and electron microscopy. Magnetic shielding is no longer required. The novel double-chamber design keeps process-related contaminants away from the measurement chamber for increased product life and lower maintenance. The chamber's textured surface prevents measuring errors and lapses due to self-sputtering. The vacuum gauges are available in a corrosive gas version and low- and high-current models. Pfeiffer Vacuum Inc, 24 Trafalgar Square, Nashua, NH 03063-1988, <https://www.pfeiffer-vacuum.com>

Low-temperature measurement

Lake Shore Cryotronics has updated its model 372 AC resistance bridge and temperature controller with new firmware to enable more accurate measurements and increase data collection speed. It is designed to perform multiple tasks at very low temperatures, including measurements for temperature



control and sample impedance. With the update, the instrument can make more simultaneous measurements, and a cubic-spline interpolation method can be implemented to more accurately convert resistance measurements to temperature values. Two new user-selectable AC excitation frequencies—11.6 Hz and 18.2 Hz—supplement existing 9.8-, 13.7-, and 16.2-Hz frequencies, so users have greater experiment capability in applications that require simultaneous measurements to be made at multiple locations. Using three model 372 units, up to five measurement experiments can be run in parallel. Lake Shore Cryotronics Inc, 575 McCorkle Boulevard, Westerville, OH 43082, <http://www.lakeshore.com>

Magneto-optical trap

ColdQuanta has announced a streamlined, compact version of its magneto-optical trap for creating and trapping cold atoms. The economical miniMOT SE will have functionality similar to the original miniMOT but in a smaller foot-

print. The miniMOT SE is designed to be incorporated into undergraduate physics courses that include experiments based on quantum physics. The aim is to develop student skills in applications based on quantum technologies, such as quantum information processing, positioning, navigation and timekeeping, gravimetry, and magnetometry. ColdQuanta says that the miniMOT SE can help introduce students to the practicalities of working in the quantum sphere by generating cold atoms and exploring related experimentation. ColdQuanta Inc, 3030 Sterling Circle, Boulder, CO 80301, <http://coldquanta.com>

Vacuum process diagnostics

Hidden developed its HMT quadrupole mass spectrometer, a novel dual-mode residual gas analyzer (RGA), to offer a single partial pressure gauge operating through the full vacuum spectrum from ultrahigh (UHV) to process pressures in the millitorr regime. The ability to operate through diverse pressure stages is an essential requirement of various vacuum processing, chemical, metallurgical, and electronics-related procedures. The instrument provides process gas monitoring, vacuum background diagnostics, and leak detection. It enables measurement at high pressure with a Faraday detector and at reduced pressures to UHV with an electron multiplier detector, and it gives a full conventional RGA specification with partial pressure detection down to 2×10^{-13} torr and a total dynamic range in excess of 10 decades. Selection of the process and RGA modes sets the analyzer parameters for high-pressure operation and for optimum UHV sensitivity, respectively. Hidden Analytical Inc, 37699 Schoolcraft Road, Livonia, MI 48150, <http://hiddeninc.com>

X-ray diffraction grating

A new diffraction grating enables McPherson's soft x-ray (SXR) spectrometer model 251MX to offer improved efficiency over a wider range for more sensitive spectral acquisition. With a digital camera and adjustable slits, the spectrometer now works from 1 nm to 100 nm (10 eV to 1500 eV). Joining the spectrometer's gold-coated 2400 grooves/mm grating used at energies above 250 eV and the 1200 g/mm grating, the new gold-coated grating is suit-



able for work from 20 nm to 80 nm. Gratings can be exchanged for range or efficiency even while the instrument is under vacuum. The units' grazing incidence angles provide optimal reflective efficiency. The latest grating is available for new and existing instrumentation and may be retrofitted in the field. It is potentially useful for measuring with subnanometer spectral resolution SXR, extreme UV, and vacuum radiation and emission spectra. *McPherson Inc, 7A Stuart Road, Chelmsford, MA 01824, <http://www.mcphersoninc.com>*

Thin-film monitor

Designed to inspect and control coating and deposition processes, McVac's compact model TMC-13 thin-film monitor has up to six channel inputs, two vacuum gauge channels, and a 7-inch thin-

film-transistor touch-panel display. It produces high-speed, high-accuracy measurements controlled by a digital signal processor that the company claims can improve film quality and repeatability. Sensor inputs can be assigned to monitor specific parameters of different materials such as thickness and uniformity. The TMC-13 features two reprogrammable analog outputs for rate and thickness monitoring with 16-bit resolution. It has Ethernet and RS-232/485 IP communication interfaces, a frequency resolution of 0.1 Hz, and one-touch material change. System operation uses up to two multicrystal sensor heads, either a pneumatic or stepper motor, and an industry-standard 6-MHz crystal. *McVac Manufacturing Co Inc, 7030 Fly Road, East Syracuse, NY 13057, <http://www.mcvac.com>*

High-pressure freezer

Leica Microsystems has launched its EM ICE high-pressure freezer with an integrated light-stimulation option. High-pressure freezing is currently the only method for preserving aqueous samples in a close-to-native state at

nanometer resolution. Leica claims the EM ICE enables users to cryo-immobilize samples without introducing structural alteration and may allow for novel experiment design in life-sciences and industry research. High-pressure freezing and light stimulation are synchronized with millisecond precision. The precise correlation between



the light impulse and the time of freezing is essential to reveal the intricate changes in fine structure and fundamental processes. The instrument offers five wavelengths for light stimulation and can freeze up to nine samples consecutively. Samples are frozen within one second of being placed in the specimen carrier and brought to liquid nitrogen temperatures (-195.7°C) to capture dynamic phenomena for further analysis. *Leica Microsystems Inc, 1700 Leider Lane, Buffalo Grove, IL 60089, <http://www.leica-microsystems.com>* ■



The global leader
in vacuum solutions

MKS INSTRUMENTS, INC.

978.645.5500 / 800.227.8766

WWW.MKSINST.COM



The CRYOgeneration

**At HPD, we are proud to collaborate
with the world's greatest innovators.**

You are ushering us into the future, the thought leaders of our time. And we, at HPD, are your collaborators. Along with being the world leaders in ADR design and manufacturing, we can offer you a variety of customized, cryogenic solutions. Let's work together on your next great project.

hpd-online.com

Boulder, Colorado USA

+1 303-447-2558

