NEW PRODUCTS

Focus on cryogenics, vacuum equipment, materials, and semiconductors

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 its description. Please send all new product submissions to ptpub@aip.org.

Andreas Mandelis

Cryocooler for quantum research

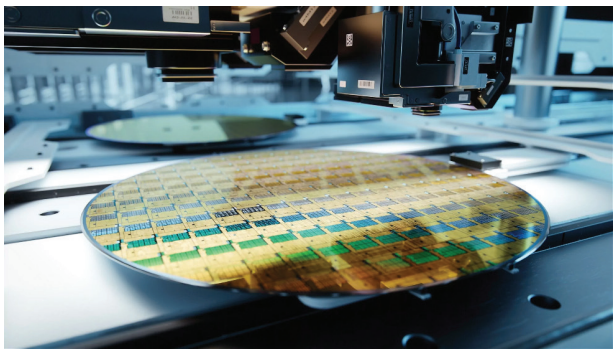
Bluefors' Cryomech PT205, a two-stage pulse tube cryocooler, supports advanced scientific applications and superconducting technologies. The lack of moving parts in its design provides for reliability, longevity, and low-vibration operation, which is particularly crucial in applications in which even the smallest of vibrations can disrupt sensitive equipment or measurements. For example, the cryocooler can be used with superconducting nanowire single-photon detectors, which are indispensable in quantum optics, communications, and other applications that require precise photon detection. The PT205 provides substantial cooling power at low temperatures, ensuring reliable performance in demanding environments. It consumes only 1.3 kW of power at 60 Hz and delivers more than 10 mW of cooling power in the 2.5 K range, which makes it energy efficient and cost-effective for long-term operation. ***Bluefors Oy**, Arinatie 10, 00370 Helsinki, Finland, https://bluefors.com*

Liquid diaphragm pump

KNF has launched its FP 1.70 liquid diaphragm pump for high-pressure and low-pulsation applications. As the high-pressure version of the FP 70 model, the FP 1.70 offers state-of-the-art diaphragm pump technology for demanding applications such as fuel-cell and 3D-printing technology. Depending on the configuration, it delivers a flow rate from 70 to 800 mL/min at a maximum pressure of 6 bar (relative). The self-priming and dry-run-safe pump offers a suction height of at least 3 mH_2O. (Suction height is the vertical distance between the pump's inlet and media source.) The FP 1.70 not only delivers a smooth flow similar to that of pump technologies known for their low pulsation, such as gear pumps and circular pumps, but it also offers the advantages of a diaphragm pump. Those include clean and gentle media handling, oil-free operation, high chemical compatibility, and reliability. Users can choose among various elastomer materials for maximum chemical compatibility and motor options, including a lower-cost brushed 12 V or 24 V DC motor and an advanced 12 V, 24 V, or 10–28 V brushless DC motor. ***KNF Neuberger Inc**, 2 Black Forest Rd, Trenton, NJ 08691, https://knf.com*

Vacuum gauges

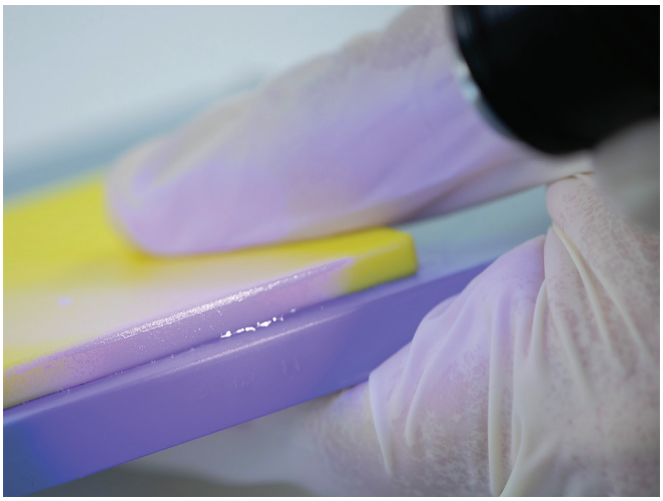
Pfeiffer Vacuum+Fab Solutions has expanded its CenterLine family of vacuum gauges by adding the CNR series of analog capacitive vacuum gauges, which can measure over four decades in the full scale between 0.1 and 1000 Torr. They deliver reliable measurements even under harsh operating conditions. Ideally used in combination with pressure-control valves, CNR gauges can be used for many applications in the semiconductor industry, such as chemical-vapor and atomic-layer deposition and dry etching, R&D and analytics, and other fields. Five versions provide options for processes at different temperatures. The 36x, an unheated variant for measurements at ambient temperatures, has an accuracy of 0.2%. Self-heating versions are available at 45, 100, 160, and 200 °C. With an accuracy of 0.15%, the 45 °C variant is suitable for calibration laboratories and high-quality control. The other self-heating versions allow for a higher accuracy of readings, at 0.4%, in high-temperature or hot-gas processes than comparable gauges, according to the company. ***Pfeiffer Vacuum Inc**, 24 Trafalgar Sq, Nashua, NH 03063, www.pfeiffer-vacuum.com*



Semiconductor etch end-point optimization

Hiden Analytical has released its EP-Replayer, a software tool for optimizing end-point (EP) detection in semiconductor etch processes. Built with real-time data replay and advanced simulation capabilities, the EP-Replayer enables fine-tuning of semiconductor etch recipes without the need for repeated wafer consumption. Designed for seamless use with Hiden's HAL10 IMP-EPD ion-beam etch monitoring systems, the EP-Replayer lets users replay previous etch data, enabling predictive EP development and recipe refinement. With the algorithmic recipe template, users can define and adjust parameters to simulate EP behavior. Like live data acquisition, the EP-Replayer offers complete tracking of time stamps, state transitions, and key-count rates through the events log. The chart marker graph simultaneously displays the EP progression, thus allowing users to visualize outcomes. By helping to streamline processes, the EP-Replayer saves time and reduces material waste. ***Hiden Analytical Ltd**, 420 Europa Blvd, Gemini Business Park, Warrington WA5 7UN, UK, https://www.hidenanalytical.com*

Nanosilica-filled adhesive



Master Bond LED422DC90 is a one-component, nanosilica-filled, dual-cure adhesive system designed for the precise, high-speed fixturing and bonding of opaque substrates and heat-sensitive components. Its side-bonding capability allows for rapid polymerization up to 3–4 mm in depth. The adhesive is first exposed to 405 nm of LED light from an angle, then the cure is completed by heating it to 90–95 °C for 30–45 min. LED422DC90 provides good dimensional stability and a relatively low coefficient of thermal expansion for a dual-cure LED product, at 30–40 × 10^{-6} inches/°C. It is optically clear and has a refractive index of 1.49, a Shore D hardness of 85–90, and an elongation of 1–3%. The system has a tensile strength of 6000–7000 psi and a tensile modulus of 475 000–575 000 psi. It is a reliable electrical insulator with a volume resistivity greater than 10^{14} Ω-cm. LED422DC90 meets NASA's low-outgassing standards; bonds well to various substrates, including plastics, glass, and metals; and is suitable for use in the electronics, optics, and aerospace industries. ***Master Bond Inc**, 154 Hobart St, Hackensack, NJ 07601, www.masterbond.com*

Accessories for broadband vector network analysis

Keysight has introduced vector network analyzer (VNA) accessories to help accelerate the design and validation of 1.6 and 3.2 Tb/s components and next-generation semiconductors. There are two millimeter-wave frequency extender modules—the NA5305A, up to 170 GHz, and the NA5307A, up to 250 GHz—and the 85065A 0.5 mm coaxial precision calibration kit. When used with Keysight's PNA and PNA-X VNAs and N5292A test-set controller, the new accessories enable users to achieve fully calibrated single-sweep broadband S-parameter measurements from 100 kHz or 10 MHz to 170 or 250 GHz. The broadband VNA accessories simplify test setups and reduce the lengthy design and verification cycles needed to characterize subterahertz on-wafer or packaged components such as optical RF drivers, transimpedance amplifiers, printed circuit boards, cables, packages, and passive devices. The accessories achieve the system dynamic range of 105 dB at 170 GHz to accommodate various measurements, lossy passive component testing, high rejection filters, and active devices testing under various power levels. ***Keysight Technologies Inc**, 1400 Fountaingrove Pkwy, Santa Rosa, CA 95403-1738, www.keysight.com*

Upgraded digital vacuum transducers

Thyracont has announced that its Smartline digital vacuum transducers are being equipped with an upgraded EtherCAT module. The Smartline transducers enable accurate measurements across a wide range of demanding environments, including rough and high vacuum ones, to ensure reliable control of industrial vacuum processes. The enhancement, beginning with models from serial number 25004917, provides expanded functionality and a more user-friendly experience in day-to-day operation. Full support for the Thyracont Communication Protocol V2 provides additional diagnostic and maintenance features, including the ability to read out sensor wear parameters, which is an advantage for predictive maintenance. Firmware updates can now be conveniently installed via the EtherCAT interface without having to remove the device or use external programming hardware, which saves time, reduces maintenance costs, and increases system reliability. ***Thyracont Vacuum Instruments GmbH**, Max-Emanuel-Str 10, 94036 Passau, Germany, https://thyracont-vacuum.com* PT