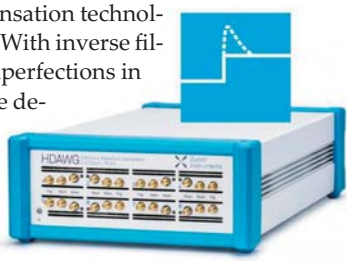
NEW PRODUCTS

Focus on test, measurement, software, and instrumentation

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. For all new products submissions, please send to ptpub@aip.org.

Andreas Mandelis

Arbitrary waveform generator with precompensation



Zurich Instruments now offers real-time precompensation technology for its HDAWG arbitrary waveform generator. With inverse filtering, precompensation minimizes the effect of imperfections in the wiring and ensures that the signal applied to the device under test equals the signal designed on the HDAWG. Available filters can correct for AC coupling, spurious inductance and capacitance, impedance mismatch, amplifier ringing, and other effects. Real-time precompensation can be applied individually to each channel. It needs to be configured only once for each wiring arrangement; testing and simulation tools are provided to facilitate configuration. The HDAWG precompensation will benefit quantum computing applications that use flux bias and gate voltage pulses. Other applications include electron paramagnetic resonance and nuclear magnetic resonance. ***Zurich Instruments AG**, Technoparkstrasse 1, 8005 Zürich, Switzerland, www.zhinst.com*

Low-pulsation diaphragm pump

The FP 400 diaphragm pump from KNF combines the traditional advantages of diaphragm-pump technology—it is self-priming, can run dry, and has a long operating lifetime—with a pulsation level comparable to those of gear pumps. The FP 400 offers pulsation less than 150 mbar; lower levels can be achieved, depending on factors such as flow-path length and configuration. It delivers up to 5 L/min of liquid at back pressures to 15 psi. The flow is fully stable with fluid viscosities between 1 cSt and 150 cSt. Viscosities up to 500 cSt can be handled with some flow-rate reduction. The FP 400 provides gentle, low-shear conveyance of sensitive media. It features very low vibration, a noise level below 55 dBA, an IP65 protection rating, and chemically resistant flow-path-material options for use with aggressive media. It is suitable for recirculation applications in various fields, including semiconductors and fuel cells. ***KNF Neuberger Inc**, 2 Black Forest Rd, Trenton, NJ 08691-1810, www.knfusa.com*

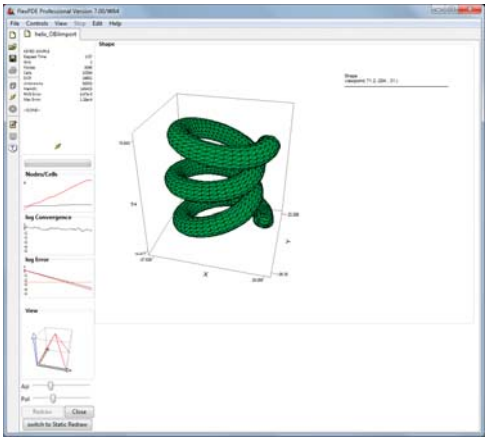
High-speed amplifier

Aerotech's XL4s network digital drive is a high-performance linear amplifier designed to provide closed-loop servo control of voice-coil and single-phase motors and eliminate the nonlinearities common with pulse width-modulation amplifiers. According to the company, the XL4s outperforms other single-phase motor controllers because of its high 192 kHz servo rate. That correlates to both better tracking of errors and better quality of parts at high speeds in applications such as fast-tool servos and high-dynamic optical focusing axes. The amplifier offers a fiber-optic interface and easy software setup. A floating-point digital signal processor controls the proportional-integral-derivative functions. Aerotech claims that advanced features such as full state feedforward control and look-ahead-based velocity control help XL4s users achieve low settling times, long-term thermal stability, and submicron-level tracking accuracy. ***Aerotech Inc**, 101 Zeta Dr, Pittsburgh, PA 15238, www.aerotech.com*

Wideband vector signal generators

In a single test instrument, each of the two signal generators in Keysight's VXG series delivers an optimized 5G New Radio test system setup that leverages dual-channel 44 GHz vector signal generation with up to 2 GHz RF modulation bandwidth and phase-coherent capability. The microwave signal generators address demanding wideband millimeter-wave applications for 5G and satellite communications. They decrease test setup complexity and reduce path losses introduced in over-the-air test environments. The VXG series is offered in benchtop and modular form factors. Their low phase noise and distortion, high output power, and excellent modulation make them suitable signal generators for a wide range of applications in wireless communications and aerospace defense industries. ***Keysight Technologies Inc**, 1400 Fountaingrove Pkwy, Santa Rosa, CA 95403-1738, www.keysight.com*

Scientific modeling software



PDE Solutions has introduced the latest version of its FlexPDE Multiphysics software, which provides computational support for solving partial-differential-equation systems in science and engineering. Revisions in version 7 include the removal of diagnostic blocking staged eigenvalue runs and the addition of a diagnostic for duplicate region definitions. The software now correctly suppresses prompts when using the −S switch in the nongraphical user interface version and changes the default values for NGRID in 2D and 3D. Corrections have been made to an occasional gridder cross-link in periodic domains and to some errors, such as the one that was in the table-bounds report and the one that was causing erratic behavior in the convergence of linear steady-state equations. ***PDE Solutions Inc****, 9408 E Holman Rd, Spokane Valley, WA 99206, www.pdesolutions.com*

Miniature linear stages

The L-505 miniature-linear-stage series from Physik Instrumente provides high-precision motion in a compact, economical package. The series includes various drive and configuration options, from open-loop stepper motors with lead screws to fast, servo-motor-driven units with linear encoders and low-friction ball screws. Two basic designs are offered: a shorter, 60-mm-wide, lower-profile 21 mm version with a folded drive train and the motor side by side with the platform; and a longer, 36-mm-wide, higher-profile 25 mm inline version. Both come in travel ranges of 13 mm and 26 mm. The *XY* combinations can be assembled without adapter plates; a *Z* bracket is available for *XYZ* assemblies. For the most demanding applications, such as the fast, precise alignment of photonics components, an *XYZ* piezo scanner option can be added to the linear stages. ***Physik Instrumente LP****, 16 Albert St, Auburn, MA 01501, www.pi-usa.us*

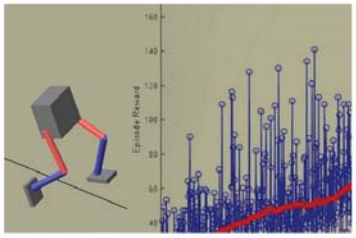
Ultrahigh-frequency AWGs

Spectrum Instrumentation has released six arbitrary waveform generators optimized for signal quality, size, and cost. The M2p.65xx series offers the latest 16-bit digital-to-analog converters (DACs), a fast PCIe x4 interface with a streaming speed up to 700 megabytes/s, and a card length of only 168 mm to fit into nearly every PC. With a speed of 40 megasamples/s or 125 megasamples/s, high onboard memory of 512 megasamples, output levels of up to ±6 V, and four additional multipurpose outputs, the cards are suitable for use in signal generators operating at frequencies between 1 MHz and 60 MHz. Applications include ultrasound, laser, lidar, radar, medical science, and big physics experiments. Models have one, two, or four channels per card, and each channel has its own DAC and output stage. Multichannel cards share a common clock and trigger to ensure full synchronization. ***Spectrum Instrumentation Corp****, 15 Warren St, Ste 25, Hackensack, NJ 07601, https://spectrum-instrumentation.com*

Multisequence AWGs

Tektronix has launched its AWG70000B series of arbitrary waveform generators to support advanced research and other applications that require the ability to dynamically alter signal sequences during test scenarios. The new AWGs feature waveform memory of 32 gigasamples and the company's Streaming Waveform ID functionality, which provides users with immediate access to a total of 16 383 sequence steps through a direct Ethernet interface. The new capabilities allow the AWG70000B to replicate the chaos of the real world during evaluation of modulated-signal formats and electronic-warfare-simulation exercises. For example, in wireless communications research, users can change modulation types to simulate Doppler radars, building obstructions, or other obstacles to improve the durability of orthogonal frequency-division multiplexing signals. ***Tektronix Inc**, 14150 SW Karl Braun Dr, PO Box 500, Beaverton, OR 97077, www.tek.com*

Mathematical programming software

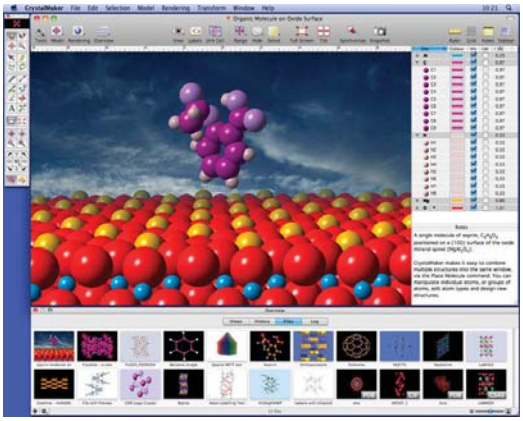


Release 2019a of MATLAB and Simulink from MathWorks contains new products and enhancements for artificial intelligence (AI), signal processing, and static analysis and new capabilities and bug fixes across all product families. The reinforcement learning toolbox improves the MATLAB workflow for AI by facilitating a type of machine learning that trains an "agent" through repeated trial-and-error interactions with an environment to solve controls and decision-making problems. Enhancements to the computer-vision and data- and image-acquisition toolboxes further support AI. New signal-processing and communications products promote wireless and electronics development. For example, a Simulink add-on, Mixed-Signal Blockset, provides fast model construction, rapid simulation, and deep insights into mixed-signal system design models with dedicated analysis and visualization tools. ***The MathWorks Inc**, 1 Apple Hill Dr, Natick, MA 01760-2098, www.mathworks.com*

Optical tensiometer

The Attension Theta Flex contact angle meter from Biolin Scientific has a modular design with several measurement options and all-inclusive software. It features advanced imaging and analysis algorithms to detect and precisely gauge static and dynamic contact angles and surface free energy. The effect of roughness to wettability can be measured with the new 3D topography module. The Theta Flex also analyzes surface and interfacial tension and interfacial rheology. All steps from loading and performing the measurement to analyzing the data can be automated, and disposable liquid tips eliminate the need for preparations and cleaning. The tensiometer is suitable for research and quality control in various research and industrial applications, including chemicals, pharmaceuticals, electronics, and energy. ***Biolin Scientific Inc**, 514 Progress Dr, Linthicum Heights, MD 21090, www.biolinscientific.com*

Crystal structure software



CrystalMaker has made available the latest version of its software for visualizing crystal and molecular structures in research and teaching in chemistry, solid-state physics, materials science, mineralogy, and crystallography. Version 10.4 includes more than 60 new features and 100 new structures, with over 70 new minerals. The structures library window has been redesigned for easy access to documentation and incorporates CrystalViewer for visualizing structures. A new modeling engine takes torsion angles into account and automatically detects rings. The software offers a dark mode for Mac users, a live powder-diffraction mode for physicists, an interpolate structures command for crystallographers, and customizable axes. The company has also updated its CrystalDiffract powder-diffraction software to version 6.8. ***CrystalMaker Software Ltd***, *Centre for Innovation & Enterprise, Oxford University Begbroke Science Park, Woodstock Rd, Begbroke, Oxfordshire, OX5 1PF, UK, http://crystalmaker.com*

High-speed floating picoammeter

A new version of RBD Instruments' 9103 USB picoammeter features more reads per second and 5000 DC volts of isolation to chassis ground. According to the company, it may open up research possibilities such as DC measurement of very small electron and photomultiplier signals. Electron- and ion-beam measurements can be biased to reduce secondary electrons or retard the beam as needed for experiments. Designed to provide accurate current measurements in noisy environments such as synchrotron beamlines, the 9103 can capture bipolar DC from low picoamps to milliamps. The new option increases the number of reads per second from 40 to more than 500, which is fast enough to perform optical chopper experiments and improves accuracy. Because the 9103 can be synced, users can configure a multichannel DC picoammeter to have up to 256 channels and high speed, high voltage, or both. ***RBD Instruments Inc***, *2437 NE Twin Knolls Dr, Ste 2, Bend, OR 97701, https://rbdinstruments.com*

Laser frequency phase-lock stabilizer

The Moku:Lab Laser Lock Box from Liquid Instruments uses high-performance modulation locking techniques to stabilize a laser's frequency to a reference cavity or atomic transition. The instrument can generate and output modulation signals at up to 200 MHz and demodulate the input signal with an internal or external local oscillator, including a phase-locked loop option. It can scan across resonances with sawtooth or triangle waveforms at up to 1 MHz, quickly lock to any zero crossing in the error signal by using the tap-to-lock feature, filter the demodulated input signal with up to fourth-order infinite-impulse response filters, and individually configure fast and slow proportional-integral-derivative controllers. With the instrument's integrated two-channel oscilloscope, users can observe signals at any point in the signal-processing chain at up to 500 megasamples/s. ***Liquid Instruments***, *2223 Avenida De La Playa, Ste 204, La Jolla, CA 92037, www.liquidinstruments.com*

Electro-optical software

Electro Optical Industries has announced its latest Infratest electro-optical software for research and industrial testing of visible, near-IR, and IR cameras; intensified CCDs; goggles; and laser range finders. The software allows parameters such as distortion to be accurately measured with a mirror-based collimator, which enables determination of resolution and ranges at the edge of the wide-field-of-view camera. It is now possible to remotely monitor the temperature of blackbodies' cooling fluid. Infratest calculates key functions such as minimum resolvable temperature difference by automatically taking into account the background temperature data simulated by a secondary background blackbody. ***Electro Optical Industries Inc***, *320 Storke Rd, Ste 100, Goleta, CA 93117, www.electro-optical.com*

Capacitance manometer

According to the Kurt J. Lesker Co, its KJLC Carbon is the most cost-effective capacitance manometer on the market, yet it maintains a high accuracy rate and a fast response time. Conceived for research use, the gauge uses an ultrapure alumina ceramic diaphragm, which is corrosion-proof and allows for better signal stability. The Carbon offers direct measurement of chamber total pressure independent of gas type or composition and eliminates lookup tables and conversion factors. Long-term output stability makes possible state-of-the-art process repeatability. A compact, simplified design allows for placement in space-restricted areas. The Carbon can be mounted in any orientation. ***Kurt J. Lesker Company***, *1925 Rte 51, Jefferson Hills, PA 15025, www.lesker.com* PT