

New Products

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New Products

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In order to supplement manufacturers' information, this Department will welcome the submission by our readers of brief communications reporting measurements on the physical properties of materials which supersede earlier data or suggest new research applications.

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NEW INSTRUMENTS AND COMPONENTS

Chemical imaging and spectral analysis system

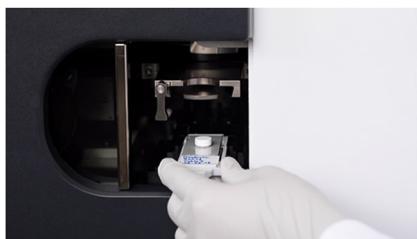
According to Agilent, its 8700 laser direct infrared (LDIR) system introduces a new approach to chemical imaging that will bring greater clarity and higher speed to pharmaceutical, biomedical, food, and materials science studies. The 8700 LDIR combines quantum cascade laser technology with rapid scanning optics and intuitive Agilent Clarity software. It provides fast, high-definition (HD) chemical imaging and accurately analyzes the composition of tablets, laminates, tissues, polymers, and fibers. Actionable information about pharmaceutical ingredients, excipients, polymorphs, salts, and defects lets investigators quickly identify and resolve issues encountered during drug development. The 8700 LDIR produces images free from laser coherence artifacts and provides HD images of large areas. Its compact size, lack of liquid nitrogen, and automated operation make HD chemical imaging accessible to operators of all levels in academic and commercial facilities. *Agilent Technologies, Inc., 5301 Stevens Creek Boulevard, Santa Clara, California 95051. (877-424-4536 or 408-345-8886) <https://www.agilent.com>*

for improved signal-to-noise (SNR) ratios when compared to wider-band filters; they can also be used in elemental or laser line separation, chemical detection, or fluorescence applications. The precision bandpass filters offer 80–50 surface quality and center wavelengths from 343 nm to 1064 nm, covering 2nd and 3rd harmonic neodymium-doped yttrium lithium fluoride, and neodymium-doped yttrium aluminum garnet, diode, and helium-neon lasers. Manufactured with hard, durable coatings to minimize filter degradation and increase transmission, they provide a blocking wavelength range of 200–1200 nm and >85% minimum transmission. Hard-coated OD 4.0 bandpass filters are available in 12.5-mm, 25-mm, and 50-mm diameter options. *Edmund Optics Inc., 101 East Gloucester Pike, Barrington, New Jersey 08007-1380. (800-363-1992 or 856-547-3488) <https://www.edmundoptics.com>*



High-frame-rate cameras

iX Cameras designed its i-Speed 5 series of midrange cameras to offer a balance among speed, size, and memory. Three compact models—508, 510, and 513—have sufficient power for laboratory, research, and test-range applications. 144 GB of memory allows for long-duration recording. A novel internal cooling system ensures the cameras are robust enough for use in highly demanding environments. The cooling system extracts heat from the sensor and electronics without airflow and keeps the image sensor completely environmentally sealed. No airflow in or near the internal optical system makes the cameras suitable for digital image correlation, particle image velocimetry, motion analysis, and other test technologies that rely on black level reference. The 12-bit complementary metal-oxide-semiconductor light-sensitive image sensor in the model 508 can record 3980 fps at full HD resolution, with a maximum speed of



High-transmission bandpass filters

Techspec hard-coated optical density (OD) 4.0, 5-nm bandpass filters from Edmund Optics provide the high transmission and deep rejection needed to isolate narrow spectral regions in a wide variety of demanding applications. Their narrow 5-nm full width at half maximum makes them suitable for laser line clean-up applications. The filters allow

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500 000 fps. The models 510 and 513 record at 4980 and 6382 fps at 1920 × 1080, respectively. An optional fast-mode shutter lets the 508 achieve 250-ns exposure times. Other features include an optional internal solid-state drive (SSD) of up to 8 TB, a swappable external SSD of up to 2 TB, high-speed image download, memory segmentation, and camera control via the touch-screen control display unit or the i-Speed personal computer (PC) software suite 2.0. A focus-assist algorithm, i-Focus, aids in setting the focus of images in bright environments or on moving objects and helps the user quickly see the available depth of field in a shot. The company offers a wide range of accessories for the i-Speed cameras, including lenses, lights, and data acquisition solutions. *iX Cameras, 8 Cabot Road, Suite 1800, Woburn, Massachusetts 01801. (339-645-0778) <http://www.ix-cameras.com>*



Fourier-transform infrared (FTIR) spectrometer

Thermo Fisher Scientific has upgraded its Nicolet iS10 FTIR spectrometer to enable analytical scientists in pharmaceutical, polymer, chemical, and forensics laboratories to analyze complex samples quickly and accurately. The iS20 model features a redesigned optical system consisting of four components: an IR source, interferometer, laser, and detector. Users who collect and interpret FTIR data with the new instrument can identify unknown compounds, verify incoming materials, and conduct failure analysis and root cause studies. Thermo Fisher Scientific claims the iS20 is the only spectrometer on the market that features a touch panel with a multicolored light-emitting diode scan bar. The touch panel is designed to help collect data from even very challenging samples and to help users understand instrument status at a glance. The spectrometer can easily interface with external modules, including the Thermo Scientific Nicolet iN5 and Continuum IR microscopes. Cloud-based spectroscopy software with improved functionality lets users analyze their data anytime and anywhere. *Thermo Fisher Scientific Inc., 168 Third Avenue, Waltham, Massachusetts 02451. (800-678-5599 or 781-622-1000) <https://www.thermofisher.com>*



NEW DETECTORS, MEASUREMENTS, AND MATERIALS

Quantum analyzer for up to 10 qubits

According to Zurich Instruments, its UHFQA Quantum Analyzer is the first commercial instrument dedicated to quantum bit readout. When combined with the company's HDAWG Arbitrary Waveform Generator, it offers a complete solution for multiqubit control and measurement. With high speed and fidelity, the analyzer simultaneously measures up to 10 qubits and operates at 1.8 GSa/s with 10 configurable digital filters. Compared with unweighted filters, the UHFQA's matched filters improve the SNR and readout time significantly. A 10 × 10 matrix multiplication offers fully configurable cross-talk suppression. The result of the multiqubit state measurement is made available on the 32-bit low-latency digital output for quantum error correction. The included LabOne software supports configuration and measurement and application programming interfaces support rapid integration. The UHFQA is suitable for demanding quantum computing applications involving superconducting and spin qubits. *Zurich Instruments AG, Technoparkstrasse 1, 8005 Zürich, Switzerland. (+41 44 5150410) <http://www.zhinst.com>*



Low-noise oscilloscopes

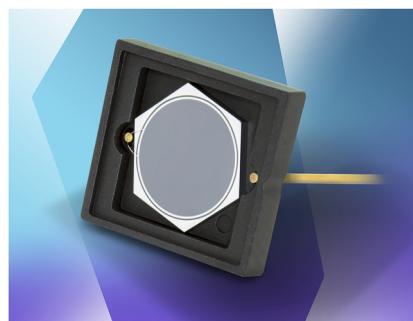
Keysight's Infinium UXR-series of oscilloscopes comprises models that range from 13 GHz to 110 GHz of true analog bandwidth. According to the company, their high performance levels, high signal integrity, and wide selection of bandwidths make the oscilloscopes suitable for users working with any generation of double data rate, universal serial bus (USB), peripheral component interconnect express, and other serial technologies; pulse amplitude modulation 4, 5G, satellite communications, and radar; and other areas including terabit and optical research. The Infinium UXR-series delivers a low noise floor and 10-bit vertical resolution to ensure that measurements are not affected by oscilloscope noise and signals are represented accurately. As a result, eye diagrams are significantly more open, and true margins and performance can be determined. Sampling rates of

256 GSa/s/channel on 40–110-GHz models and 128 GSa/s/channel on 13–33-GHz models allow for accurate reconstruction of high-speed signals. Up to four full-bandwidth channels with <35 fs rms of interchannel intrinsic jitter provide accurate timing and skew measurements. *Keysight Technologies Inc., 1400 Fountaingrove Parkway, Santa Rosa, California 95403-1738. (800-829-4444) <https://www.keysight.com>*



Circular photodiodes for radiation detection

Opto Diode Corporation, an ITW company, has introduced its AXUV20A circular photodetectors for radiation, electron, and photon response in the ultraviolet (UV), extreme-UV, visible, and near-IR wavelength ranges. With an active area of 5.5 mm diameter, the circular devices feature sensitivity to low-energy electrons. The AXUV20A photodiode shunt resistance is 100 MΩ, minimum. Reverse breakdown voltage is 5 V, minimum, and 10 V, typically. Other features include capacitance at 4 nF, typically, with a maximum of 10 nF, and a rise time of 2 μs. The company's AXUV series of photodiodes exhibits response to electron energy levels as low as 100 eV. Operating and storage temperatures range from -10 °C to +40 °C in ambient environments and from -20 °C to +80 °C in nitrogen or vacuum environments. A cover plate protects the photodiode chip and wire bonds. *Opto Diode Corporation, 1260 Calle Suerte, Camarillo, California 93012. (805-465-8700) <https://optodiode.com>*



Arbitrary function generator

In designing its AFG31000 arbitrary function generator (AFG) series, Tektronix addressed usability shortcomings perceived to cause traditional AFGs to lag behind other test instrumentation. Those shortcomings include small displays and the lack

of deep memory and the programming capability needed to compose a series of test cases with complex timing. Tektronix claims that the AFG31000 series offers features and capabilities not currently available elsewhere on the market for efficiently characterizing devices under test (DUTs). According to the company, the device's nine-inch capacitive touch screen is the largest available on an AFG. Users can see all related settings and parameters on a single screen within a shallow menu tree. They can tap or swipe to easily select, browse, locate, and change settings. Another new feature that debuts with the AFG31000 addresses impedance. Traditional AFGs assume they are driving a $50\ \Omega$ impedance, but most DUTs do not have a $50\ \Omega$ impedance. The mismatch results in an inconsistency between the waveform as set on the AFG and the signal at the DUT. The new InstaView feature on the AFG31000 series monitors and displays the waveform at the DUT with no need for additional cables or instruments. The waveform shown on the display instantly responds to changes in frequency, amplitude, waveform shape, and the DUT's impedance. In addition to traditional AFG operation modes, the AFG3100 offers an advanced or waveform sequencer mode. The advanced mode allows the instrument to segment its waveform memory, which can be up to 128 Mpts, into up to 256 entries. Users can drag and drop both long and multiple waveforms into the sequencer and define how they are outputted. The AFG31000 series can be an affordable alternative to arbitrary waveform generators for users who need long, nonrepeating waveforms or multiple waveforms with complex timing. The ArbBuilder tool facilitates creating and editing arbitrary waveforms directly on the instrument instead of on a PC (to be transferred to the instrument). That can improve test efficiency, especially for arbitrary waveforms that need to change frequently. The AFG31000 series instruments are available in one- or two-channel configurations. They deliver 14-bit vertical resolution and 250 MSa/s, 1 GSa/s, or 2 GSa/s sample rate performance. *Tektronix, Inc., 14150 Southwest Karl Braun Drive, P.O. Box 500, Beaverton, Oregon 97077. (800-833-9200) <https://www.tek.com>*



Multiple-signal data acquisition

Spectrum Instrumentation has added 12 products to its family of LXI-based digitizerNETBOX data acquisition instruments. The DN6.59x series is designed for situations in which multiple signals—such as those produced by arrays of

sensors, receivers, detectors, or antennas—need to be acquired, stored, and analyzed, and for testing signals from multiple electronic components or test points. The digitizers are based on the latest high-resolution, 16-bit analog-to-digital converter (ADC) technology. They come with a choice of 20, 40, or 125 MS/s maximum sampling rates and 10, 20, or 60 MHz bandwidths to best match a wide variety of applications. Users can select from models that provide 24, 32, 40, or 48 fully synchronized channels. Each channel of a digitizerNETBOX has its own ADC and signal conditioning circuitry. The ADCs share a common clock so that the acquisitions made on all the channels are fully synchronous and have zero phase error. The clocking system's design ensures that cross channel timing measurements are made with high precision, while the independent signal conditioning enables the units to be used with signals that have a wide range of amplitudes. Each channel has its own programmable input amplifier, with ranges between $\pm 200\text{ mV}$ and $\pm 10\text{ V}$, input offset for unipolar measurements, termination of $50\ \Omega$ and $1\text{ M}\Omega$, and an integrated calibration circuit. The inputs feature single-ended and true differential channel modes. The high-resolution 16-bit ADCs offer a SNR up to 81 dB, spurious free dynamic range up to 103 dB, and total harmonic distortion as low as -86 dB . Controlling and accessing the data collected by the digitizerNETBOX is performed by connecting it with Gbit Ethernet to a host computer. The platform is fully LXI compliant. Users can write their own control program using almost any popular language including C++, LabVIEW, MATLAB, and Python code. They can also run Spectrum's own software, SBench 6 Professional. It comes as standard with the digitizerNETBOX and lets users control all the modes and settings of the hardware via an easy-to-use interface. The software is designed to support multichannel acquisitions and has built-in features for waveform display, data analysis, and documentation. To match many application requirements, the units come with various signal triggering techniques, large onboard memories, and a number of intelligent acquisition modes. Front-panel clock and trigger inputs and outputs for synchronization with other external equipment are standard. Applications for the digitizerNETBOX instruments are found in areas such as physics, lasers, ultrasound, electronic test and measurement, power, and materials science. *Spectrum Instrumentation Corp., 15 Warren Street, Suite 25, Hackensack, New Jersey 07601. (201-562-1999) <https://spectrum-instrumentation.com>*



Adhesive with high glass transition temperature

Master Bond UV26, a one-part UV-curable system, features a very high glass transition temperature that

ranges from $160\text{ }^{\circ}\text{C}$ to $170\text{ }^{\circ}\text{C}$. The NASA low-outgassing certified compound is suitable for high-performance bonding and coating applications. It offers strong adhesion to a wide variety of substrates such as glass, surface-treated metals, and many plastics. As a coating and adhesive, it can withstand harsh chemicals including acids, bases, fuels, and many aggressive solvents. The compound has a low viscosity of 250–1500 cps at $75\text{ }^{\circ}\text{F}$. It cures rapidly upon exposure to a UV light source at a wavelength of 320–365 nm with an energy output as low as 20–40 mW/cm². With a refractive index of 1.55 at room temperature, the system features high optical clarity. Upon curing, it exhibits robust physical strength and low shrinkage. It is serviceable from $-60\text{ }^{\circ}\text{F}$ to $+500\text{ }^{\circ}\text{F}$ [$-51\text{ }^{\circ}\text{C}$ to $+260\text{ }^{\circ}\text{C}$]. Master Bond UV26 is 100% solids, contains no solvents or volatiles, and is not oxygen-inhibited. It is available in 10-cc and 30-cc syringes and half-pint and one-pint containers. Its shelf life at $75\text{ }^{\circ}\text{F}$ is six months in the original unopened containers. *Master Bond Inc., 154 Hobart Street, Hackensack, New Jersey 07601-3922. (201-343-8983) <https://www.masterbond.com>*



BIOINSTRUMENTATION AND BIOTECHNOLOGIES

Wide-field multiphoton microscope for optogenetics

Bruker has released its Ultima 2Pplus multiphoton, all-optical stimulation and simultaneous imaging platform for neurobiology applications. Built on the platform design of the company's Ultima multiphoton microscopes, the new system provides the advantages of photoactivation with advances in field of view, sensitivity, wavelength, and sample accommodation. According to Bruker, it features the best commercially available combination of advanced photostimulation experiments—including holographic stimulation—with simultaneous wide-field, enhanced-sensitivity imaging, and delivers a blend of flexibility, resolution, imaging depth, and speed. It allows users to perform simultaneous imaging, stimulation, and electrophysiology protocols effectively and efficiently. The Ultima 2Pplus offers longer-wavelength three-photon imaging (up to 1700 nm) for looking deep into living tissue, and its optimized optical train delivers high performance to the edges of the wide field. An extended clearance stage designed for large-animal imaging and a fully corrected, decoupled electrically tunable lens for simultaneous holographic stimulation and three-dimensional imaging

make the system suitable for advanced neuroscience inquiry into awake animals. *Bruker Corporation, 40 Manning Road, Billerica, Massachusetts 01821. (978-439-9899) <https://www.bruker.com>*



NEW FACILITIES AND HARDWARE

Programmable DC power supplies

The Asterion power supply platform from Ametek Programmable Power now includes a line of programmable, high-performance DC 1.7–5 kW power supplies with either fixed or autoranging output. All units are just 1U (44.45 mm/1.75 in.) high. Asterion DC series supplies offer rated output voltages in 40 V and 60 V for 1.7 kW, 3.4 kW, and 5.0 kW power levels. The fixed range supplies are economical, traditional rectangular wave output power supplies; the autoranging supplies feature expanded current and voltage range at the full output power level and can fulfill a wider testing need without requiring the purchase of additional models. The front-panel touch-screen interface and multilanguage display ensure ease of use. An auto-parallelizing capability supports operating multiple units in parallel to increase the total output power level. The Asterion DC series

is digital signal processor-controlled and supports multiple programming interfaces. The supplies can be controlled from the touch screen or remotely via LXI Ethernet, USB, and RS-232 standard control interfaces; an optional general-purpose interface bus interface allows for legacy applications. Function group icons on the touch screen give access to the supplies' dashboard, output programming parameters, measurements, sequencing, configuration, control interfaces, applications, and system settings functions. Users can select functions and enter parameters directly through the touch screen or by using the encoder selector button. A dynamic rate change algorithm can adjust the control resolution and provides precise control over small parameter changes and quick sweeps through an entire range. Asterion DC Virtual Panels are graphical user interfaces that allow the supplies to be programmed, monitored, and controlled remotely. The Asterion DC series is suitable for testing complex electronics applications that require low-profile, lightweight power supplies with high-power density. Applications include research and development, DC power simulation, aerospace electronics test, and a wide range of automatic test equipment applications. *Ametek Programmable Power, Inc., 9250 Brown Deer Road, San Diego, California 92121. (800-733-5427 or 858-450-0085) <http://www.programmablepower.com>*

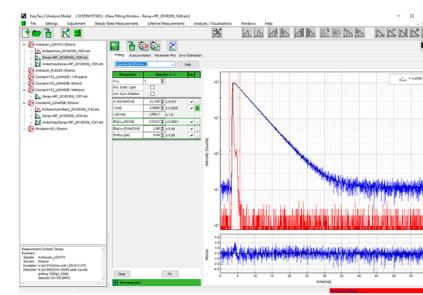


NEW LITERATURE AND SOFTWARE

Fluorescence spectroscopy software

For its FluoTime 300 spectrometer, PicoQuant has upgraded the software for acquiring and analyzing time-resolved fluorescence spectroscopy data. A new fitting module in the EasyTau 2 software lets users control the spectrometer's hardware components and measure and analyze the spectra results

in a user-friendly graphical environment. Steady-state and time-resolved data can be subjected to basic arithmetic and calculus-based functions, such as addition, normalization, and integration, and can be fitted to determine fluorescence lifetimes and anisotropy. The module, which minimizes nonlinear errors, provides global decay analysis and tail and iterative deconvolution fitting. It uses various exponential decay (up to fifth order) or rate constant distribution models. The software also allows for rigorous error analysis and generates presentation-ready numerical and graphical output. *PicoQuant, Rudower Chaussee 29, 12489 Berlin, Germany. (+49-30-1208820-89) <https://www.picoquant.com>*



Scientific programming software

Version 3.7 of the Python programming software features performance enhancements in many diverse areas. For example, for the improved functionality of annotations, the compiler stores the annotation in a string form equivalent to the abstract syntax tree of the expression in question rather than compiling code that executes expressions in annotations at their definition time. Annotations can be resolved at runtime. The new built-in breakpoint function is an easy, consistent way to enter the Python debugger. Six new time functions with nanosecond resolution have been added to the time module to help avoid loss of precision. The standard library now allows developers to choose among three deprecation warning behaviors. *Python Software Foundation, 9450 Southwest Gemini Drive, ECM#90772, Beaverton, Oregon 97008. <https://www.python.org>*