new products

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

Focus on lasers and imaging

Imaging and machine vision lenses

Edmund Optics has expanded its line of Techspec imaging and machine vision lenses to include fixed-focal-length lenses and telecentrics. Designed for factory automation and inspection, compact fixed-focal-length lenses support imaging sensors as large as two-thirds of an inch. They are available in focal lengths of 8.5, 12, 16, 25, and 35 mm. Telecentric lenses offer low distortion and distance-independent magnification, making them suitable for metrology and gauging applications in machine vision. Compact telecentrics feature 65- and 110-mm working distances ranging from 0.5× to 4× magnification. Large format telecentrics support sensors that have 4-megapixel resolution and measure up to 28.7 mm diagonally. They are offered in various magnifications and camera mount styles. High-resolution telecentrics also support sensors as large as two-thirds of an inch; they have 5-megapixel resolution and come in 0.28×, 0.5×, 0.9×, and 1.7× magnification. *Edmund Optics Inc, 101 East Gloucester Pike, Barrington, NJ 08007-1380, http://www.edmundoptics.com*

Ultracompact diode laser

Toptica Photonics has announced the iBeam smart diode laser. With its compact design (100 × 40 × 40 mm^3) and direct modulation capabilities, the iBeam smart can substitute for argon + gas lasers and solid-state laser counterparts. Direct digital modulation up to 250 MHz and analog modulation up to 1 MHz eliminate the need for acousto-optic modulators. The laser's small size is the result of the highly integrated, intelligent microprocessor-based electronic setup in combination with an appropriate optomechanical design. The integrated laser controller permits the iBeam smart to be both compact and very powerful. It features 150-mW single-mode operation at 660 nm. Complex, fast analog modulation procedures can be performed with the new laser, and Toptica's feedback induced noise eraser comes as a standard function. Applications include confocal microscopy, microlithography, and retina scanning. *Toptica Photonics Inc, 1286 Blossom Drive, Victor, NY 14564, http://www.toptica.com*

Laser combiner system

Agilent Technologies has introduced its monolithic laser combiner system for confocal and fluorescence microscopy applications. The MLC400 features Agilent's patented complex monolithic optic design technology and proprietary fiber coupling capability. The factory-aligned optical structure will not drift out of alignment from factors such as temperature changes, vibration, or elapsed time. That is key to maintaining stable laser throughput. As a result, researchers can spend more time on scientific experimentation and less time on illumination optics maintenance. The laser combiner is compatible with all major confocal and fluorescence microscopy systems and is suitable for applications such as total-internal-reflection fluorescence, fluorescence lifetime imaging, and photo-activated localization microscopy. *Agilent Technologies Inc, 5301 Stevens Creek Boulevard, Santa Clara, CA 95051, http://www.home.agilent.com*

Ti:sapphire laser with 1-GHz repetition rate

Taccor, Gigaoptics' new hands-off titanium-doped sapphire fs laser with integrated laser pump and 1-GHz repetition rate, makes space-consuming beam-steering optics and an external pump source obsolete. It offers turnkey operation and excellent passive stability of output power and center wavelength. The high-pulse repetition rate leads to reduced peak intensities—compared with conventional Ti:sapphire systems at similar average output power levels—and allows for a substantial decrease in bleaching and photodamage in nonlinear microscopy applications. Features include short pulses of 50 fs; high average output power of up to 950 mW; center wavelengths ranging from 750 nm to 940 nm, which can be factory set; and excellent beam quality near TEM_{00} with $M^2 < 1.2$. The laser head is hermetically sealed and temperature stabilized with external cooling water. Neither optical alignment nor maintenance is required. *Gigaoptics GmbH, Blarerstrasse 56, 78462 Konstanz, Germany, http://www.gigaoptics.com*

Q-switched DPSS laser

A new Q-switched diode-pumped solid-state (DPSS) industrial laser, the Pulseo 355-10 from Spectra-Physics, provides 10 W of 355-nm output at 90 kHz with a pulse width of < 23 ns

and high peak power. Combined with higher repetition rates, the features reduce undesired thermal effects and result in higher throughput with less damage to the laser parts. The Pulseo 355-10 is designed for crystalline silicon photovoltaic solar cell manufacturing processes such as wafer drilling, marking, dicing, and scribing. This high-power industrial laser is also suitable for microelectronics applications such as via hole drilling and flat panel manufacturing. *Newport Corporation, 1791 Deere Avenue, Irvine, CA 92606, http://www.newport.com*

Atomic force microscope system

Veeco has introduced the Dimension Edge atomic force microscope system for physical and life sciences applications in which high AFM performance is essential but budgets are limited. The Dimension Edge produces reliable data in minutes, enabling a seamless path from sample placement through optical identification of the region of interest, and from survey to zoomed-in feature identification. The system acquires images with small-sample, open-loop resolution. With low noise levels, the Di-

mension Edge AFM system features a drift-compensated stage that permits collection of the finer details critical to proper material identification, protects fragile tips and samples, and diminishes tip artifacts. *Veeco Metrology Inc, 112 Robin Hill Road, Santa Barbara, CA 93117, http://www.veeco.com*

High-frame-rate CMOS camera

Designed for low-light imaging, the ORCA-Flash2.8 is Hamamatsu's first high-sensitivity digital camera based on a next-generation CMOS image sensor. The new FL-280 sensor at the camera's core features 2.8 megapixels with a pixel size of 3.63 × 3.63 mm^2 which ensures high resolution. The sensor wavelength sensitivity ranges from UV to visible, with peak sensitivity of more than 60% quantum efficiency at about 450–500 nm. The sensor features low readout noise, typically 3 electrons rms, and low dark current that requires cooling to only +5 °C. The high-speed imaging readout of the ORCA-Flash2.8 ranges from 45 frames/s at full resolution to 1273 frames/s with subarrays. The camera can provide quantitative measurements with 12-bit output. It interfaces with a PC using a CameraLink frame grabber board that is included with the camera. *Hamamatsu Corporation, 360 Foothill Road, Bridgewater, NJ 08807, http://sales.hamamatsu.com*

UV solid-state laser

Coherent's AVIA 355-5 is a frequency tripled, diode-pumped solid-state laser for tasks such as scribing sapphire substrates used in the fabrication of gallium nitride LEDs. A Q-switched Nd:YVO_4 laser that delivers 5 W of 355-nm output at 50 kHz, the AVIA 355-5 is suitable for operation at repetition rates of up to 150 kHz. Its combination of high repetition rate and short pulse length (< 20 ns at 5 W) enables high throughput processing with a minimal heat-affected zone.

The laser's automated harmonic crystal shifter maintains constant output power for more than 20 000 hours and helps reduce maintenance costs. Its PosiLock beam position sensor and feedback loop result in very high beam position stability over the life of the laser. The AVIA 355-5 has been designed for easy integration with a laser head measuring only 491 × 216 × 141 mm^3. *Coherent Inc, 5100 Patrick Henry Drive, Santa Clara, CA 95054, http://www.coherent.com*

Laser-beam analysis system

BeamGage Professional is the latest addition to the Ophir-Spiricon family of next-generation laser-beam analysis systems. New capabilities include camera sharing, partitioning of the camera output for separate analysis of multiple laser beams from sources such as fiber, and a .NET interface for full remote control when integrating beam analysis into an automated application. Automated applications can now be obtained by interfacing through BeamGage Professional's .NET controls for embedded or remote operation. Users can control the software using Active X or National Instruments' LabVIEW controls. Among the features that can be automated are camera settings, data and image capture, and launch and termination of applications. Examples are provided in LabVIEW, Excel, and .NET VB. *Ophir-Spiricon LLC, 60 West 1000 North, Logan, UT 84321, http://www.ophir-spiricon.com*

Quasi-CW laser bars and stacked arrays

Intense has expanded its range of high-power quasi-CW bars and stacked array products. The new Hermes stacked array line includes higher-power QCW laser diodes ranging from 600 to 3000 W and qualified to MIL-Standards. All Hermes bars and stacked arrays utilize Intense's patented quantum well intermixing technology in combination with specific soldering techniques and robust packaging to ensure that the diodes

operate reliably and efficiently while delivering high powers at elevated temperatures. Applications include diode-pumped solid-state pumping, direct illumination, and range finding. In DPSS applications, the high-power diodes replace traditional lamp pump designs. Individual bars and stacks are offered with an optional fast-axis collimation lens. Intense's QCW products are designed to work at duty cycles of 0.5% to 2.0% and at pulse durations between 100 and 250 μs. *Intense Limited, 1200A Airport Road, North Brunswick, NJ 08902, http://www.intenseco.com*

Near-IR avalanche photodiodes

Voxtel has released the Deschutes BSI series of back-side-illuminated avalanche photodiodes. The APDs are available on ceramic submounts with a co-mounted temperature sensor. The company says that compared with front-side-illuminated APDs, its new photodiodes offer superior responsivity of > 1.0 A/W at 1550 nm and 0.73 A/W at 1064 nm and lower capacitance for high-bandwidth applications with operating gain from 3 to 20. The InGaAs/InAlAs APDs have been designed for low excess noise, in a manner that exploits the nonlocal behavior of impact ionization. They feature an equivalent ionization coefficient $k_{eff} < 0.2$ and have 40% less excess noise than conventional telecom InGaAs/InP APDs. That makes them suitable for laser and light detection and ranging (LADAR and LIDAR) and for laser range finding and designating applications. Optional fiber pigtails are available for all versions. *Voxtel Inc, 15985 NW Schendel Ave. #200, Beaverton, OR 97006, http://www.voxtel-inc.com*

Megapixel cameras with gigabit ethernet interface

SVS-Vistek has introduced a new family of 1- and 2-megapixel cameras for space-restricted applications: The slc1050, slc2050, and slc2150 models have resolutions of 1024 × 1024, 1600 × 1200, and 1920 × 1080 (HD format) pixels, respectively. The cameras are designed to reach high frame rates at an excellent signal-to-noise ratio and are enclosed in a small periscope-type housing. The area-of-interest scan mode allows for the increase of frame rates depending on the vertical resolution. The cameras come with a gigabit ethernet interface and are available with Bayer pattern monochrome and color sensors. For system integration and camera configuration, a software development kit and driver let users adjust the operational mode, gain, and offset. The cameras comply with GigE Vision and GenICam standards. *SVS-Vistek GmbH, Muehlbachstrasse 20, 82229 Seefeld, Germany, http://www.svs-vistek.com*

Laser diode with passive cooling

Jenoptik has announced its JOLD-120-CPNN-1L passively cooled laser diode. Using air-cooled aluminum extrusion heat sinks, the new instrument provides 30% more cooling efficiency than other standard laser diodes. Lower demands on the cooling system make it possible to increase the laser's optical output power up to 25%, increase its operating temperature, or prolong its lifetime. The JOLD-120-CPNN-1L can be integrated into fiber-coupled diode laser modules, such as the air-cooled JOLD-100-CPXF-2P A, and can be collimated and reach up to 120 W of optical output power in continuous mode. When coupled to a fiber with a 400-μm core diameter and 0.22 NA, the JOLD-120-CPNN-1L can reach 100 W output power. By passively cooling the diode with industrial water, power can be increased to 140 W. *Jenoptik Laserdiode GmbH, Göschwitzer Strasse 29, 07745 Jena, Germany, http://www.jenoptik.com*

High-power red lasers

Modulight has extended its ChiliLase family by introducing new products for medical, industrial, and display applications. The new red lasers at 635 nm deliver power to fiber-coupled lasers and to turnkey, OEM systems. Red diode lasers can replace bulky helium-neon lasers and reduce the size and cost of systems using such lasers. Diode lasers offer a feasible alternative to traditional visible laser systems because of their compact size, increased reliability, and simpler control electronics. Among the new lasers in the visible red spectral range are the ML1819, which delivers 4 W at 632 nm for photodynamic therapy (PDT) and display applications; the ML1886, with 10 W at 650 nm for PDT and displays; and the ML1893, which provides 10 W at 680 nm for illumination. *Modulight USA Inc, 2033 Gateway Place, Suite 500, San Jose, CA 95110, http://www.modulight.com*

Large-area pyroelectric detectors for pulsed lasers

Spectrum Detector has developed a family of pyroelectric quadrant detector pulsed laser probes. The two new probes—models DPQ-9 and DPQ-20—include either a 9- or 20-mm^2 detector mated to a fast, four-channel preamplifier that integrates the laser pulses. The voltage output from each channel is proportional to the pulse energy and position of the laser pulse. The sum of channels A, B, C, and D equals the total pulse energy. The quad probes are compact and have a shielded cable terminated into a locking 8-pin LEMO connector. They are designed for position sensing, tracking, and alignment of pulsed lasers with energies in the μJ to mJ range, repetition rates of 1 to 1000 pps, and wavelengths from DUV to far-IR. Position resolution of < 10 μm is possible but depends on such pulsed-laser-beam properties as uniformity and spatial stability. *Spectrum Detector Inc, 5825 Jean Road, Lake Oswego, OR 97035, http://www.spectrumdetector.com*

Real-time digital image processor

Dalsa has introduced its XRI-1600 digital image processor for x-ray imaging applications. Specifically engineered for x-ray instrumentation and radioscopy, the XRI-1600 can handle a wide range of resolutions, pixel depths, and frame rates. It can generate high-quality diagnostic pictures because it incorporates Dalsa's image processing engine, which performs real-time digital image processing in three stages. In the first stage, the IPE can perform shading and lens correction and image realignment without sacrificing system performance. In the second stage, a user-configurable, motion-compensated noise reduction algorithm optimizes both static and dynamic images. The third stage enables image rotation and/or flip, image enhancement, and masking. *Dalsa Billerica, 700 Technology Park Drive, Billerica, MA 01821, http://www.dalsa.com* ■