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. To facilitate inquiries about a particular product, a Reader Service Card is attached inside the back cover of the magazine.

Lawrence G. Rubin

Focus on Lasers and Optics

350-mW UV Laser

Spectra-Physics has released a new solid-state laser that delivers 350 mW of quasi-CW output at a wavelength of 355 nm. The Vanguard 350-HMD 355 is a frequency-tripled, Nd:yttrium vanadate laser with a pulse repetition rate of 80 MHz. It was designed to improve upon water-cooled UV ion lasers by eliminating the replacement of UV ion tubes and offering no degradation of beam quality or beam pointing over its lifetime. A key to its operation is the use of a saturable Bragg reflector, a proven optical element from Lucent Technologies that causes the laser to automatically operate with passively mode-locked output. The Vanguard 350-HMD 355 produces an ultralow-noise, near-diffraction-limited TEM_{00} output; with its pulsed, high repetition rate, it is suitable for most applications of CW UV lasers. *Spectra-Physics, 1335 Terra Bella Avenue, Mountain View, California 94043, http://www.spectra-physics.com*

Circle number 181 on Reader Service Card

Ti:Sapphire Regenerative Amplifier

Positive Light has introduced the Legend Sub-30 fs Ti:sapphire Regenerative Amplifier. Designed for time-resolved femtosecond spectroscopy, high-field physics, and nonlinear physics, the standard model of the new Legend produces sub-30-fs pulses with an energy-per-pulse of greater than 1 mJ; its repetition rate is 1 kHz at a wavelength of 800 nm. A mixed-grating stretcher and compressor compensate higher-order phase errors in broadband pulses and the regenerative amplifier minimizes spectral narrowing. The Legend HE (high-energy) model supplies compressed pulses in excess of 2.5 mJ at 1 kHz from a single crystal amplifier. The Legend is pumped with the company's Evolution laser, a diode-pumped, intra-cavity doubled, Q-switched Nd:YLF laser that is optimized for pumping Ti:sapphire. *Positive Light Inc, 101 Cooper Court, Los Gatos, California 95032, http://www. poslight.com*

Circle number 182 on Reader Service Card

Violet Diode Laser

Coherent has announced the Vioflame violet diode laser series consisting of four models that range in output power from 4 to 30 mW at a wavelength of 408 nm. Each Vioflame incorporates the latest indium gallium nitride semiconductor laser technology and includes a thermoelectric cooler (TEC) using bipolar linear drives and Class-3 electrostatic-discharge protection. The TEC integrated package enhances the system's laser-output-power stability and its beam diameter and pointing. The

series offers a choice of diode driver electronics: constant current, constant power, and in the EP version, a second photodiode in a closed-loop system to further enhance stability. The Vioflame series targets applications such as cytometry, reprographics, confocal microscopy, and disk mastering. *Coherent Inc, 5100 Patrick Henry Drive, P.O. Box 54980, Santa Clara, California 95056-0980, http://www.coherentinc.com*

Circle number 183 on Reader Service Card

DWDM Laser Source

Orbits Lightwave has launched Ethernal, an all-fiber laser featuring an architecture that allows traveling wave operation. The new laser was developed for the dense wavelength division multiplexing (DWDM) market. The challenge in this application is to add bandwidth capability by increasing the DWDM channel count, which demands stringent, absolute frequency stability of the laser, down to 1 GHz for 25-GHz channel spacing. Compared to the previous industry standard, the distributed feedback semiconductor laser, the Ethernal reportedly offers orders-of-magnitude better frequency stability and noise performance. The Orbits laser passively locks on the ITU (International Telecommunications Union) channel frequency, and does not require an external locking system, temperature control, or complex electronics. *Orbits Lightwave Inc, 101 Waverly Drive, Pasadena, California 91105, http://www.orbitslightwave.com*

Circle number 184 on Reader Service Card

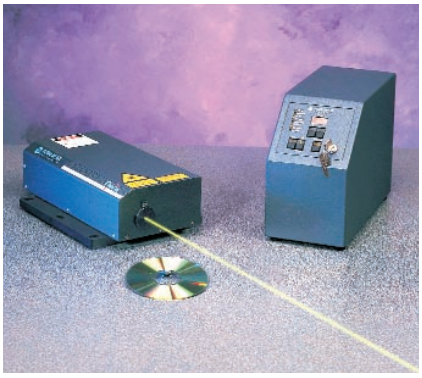
Fixed Wavelength Lasers

New Focus has released a series of fixed-wavelength solid-state lasers. The FLB-3900 units provide outputs in the visible spectrum at four wavelengths: 405 nm (20 mW), 475 nm (5 mW), 532 nm (5, 10 or 20 mW), and 635 nm (3 mW). Respectively, the specific model numbers are 3941 (violet), 3946 (blue) 3951 (green), and 3961 (red). The combination of excellent beam characteristics, including clean modal quality, and less than 1 mrad divergence, makes the lasers suitable for beam focusing and long distance beam positioning. The 3900-series lasers offer less than 1-nm line widths and come in self-contained modules that include thermoelectric coolers to enable the lasers to operate over a temperature range of 10–35°C with stable output power and low noise. The power supply includes a key-lock switch, an emission indicator, and a remote connector. *New Focus, 2584 Junction Avenue, San Jose, California 95134, http://www.newfocus.com*

Circle number 185 on Reader Service Card

Air-Cooled Nd:YAG Laser

New Wave Research has unveiled Orion, an air-cooled flash-lamp pumped Nd:YAG laser system designed for



laser-induced breakdown spectroscopy, time-of-flight mass spectroscopy, and other scientific laser applications. The Orion offers continuous operation at 1 Hz or single-shot operation with 5-Hz bursts for 50 shots. A motorized optical attenuator, harmonic generators, and dichroic mirror sets are available for second-, third-, and fourth-harmonic operation. The laser can be supplied with output levels of 35 mJ at 1064-nm wavelength, 17 mJ at 532 nm, 4 mJ at 355 nm, and 3 mJ at 266 nm. Beam diameters range from 2.5 to 3 mm; beam divergence is <3 mrad at the third and fourth harmonics, 4 mrad at the second harmonic, and <5 mrad at the fundamental. Jitter is ±1 ns for all models. *New Wave Research, 47613 Warm Springs Boulevard, Fremont, California 94539, http://www.new-wave.com*

Circle number 186 on Reader Service Card

Fiber-Coupled Diode Laser System

Martin, Froeschner & Associates has announced the FDLM, a high power, fiber-coupled, solid-state laser source module. The system uses a distributed Bragg reflector and multiple quantum well structure to achieve highly stable, single longitudinal mode operation. The base wavelength may be specified from 1528 to 1610 nm and is tunable over a range of about 4 nm (400 GHz); wavelength purity or linewidth is less than 10 MHz and stability or drift is less than 0.1 GHz over 24 hours. Power at the fiber output connector is 40 mW CW maximum and is controlled by a feedback system that can be set to either constant current or constant power operation. A thermoelectric cooler and thermistor are built into the diode laser chip and are used to control the laser's operating temperature. *Martin, Froeschner & Associates, 14300 Mines Road, Livermore, California 94550, http://www.mfa-optics.com*

Circle number 187 on Reader Service Card

Full-Band Tunable Laser

The TSL-210F from Santec USA is a laser that is continuously tunable from 1260 to 1630 nm: It covers the O, E, S, C, L, and U communication bands. It offers a wavelength accuracy of <±0.1 nm, a resolution of <0.1 nm, and a stability of <±0.01 nm after a warm-up of 1 h. Output power is >10 mW (peak) with a stability of better than ±0.01 dB. With the laser's automatic power control, power flatness across the entire tuning range is better than ±0.3 dB. A low-frequency modulation of 0–10 kHz is standard, but there is an RF modulation option available with 1–100 MHz capability. Other options include an optical tracking filter and an output attenuator. The TSL-210F is equipped with software that allows easy and automatic control of the laser via a GPIB interface. *Santec USA Corp, 433 Hackensack Avenue, Hackensack, New Jersey 07601, http://www.santec.com*

Circle number 188 on Reader Service Card

3-D Laser Imaging Scanner

The LMS-Z420 from Riegl USA is a portable, 3-D laser-imaging scanner with dual scanners for rapid acquisition of high-quality dimensional images. The scanner provides a combination of a wide scan range (up to 80° vertical or 360° horizontal frame scan) and fast data acquisition. A high-accuracy mode produces accuracy levels of ±10 mm at up to 250 m; a long-range mode maintains a ±20-mm accuracy at up to 1000 m. A True Color Channel enhancement improves texturing; the red-green-blue values are exactly correlated to each measurement pixel. The measurement rate of the LMS-Z420 varies from 9000 points/min with the low scanning rate (mirror oscillating) to 3000 points/s with the long-range operating mode (mirror rotating). Scanning rate varies from 1 scan/s to 20 scans/s. *Riegl USA, 7041 Grand National Drive, Suite 232, Orlando, Florida 32819, http://www.rieglusa.com*

Circle number 189 on Reader Service Card

Laser Linearization System

Precision Photonics has introduced the SW 1501, a precision tunable laser linearization system that is designed for use with narrowly tunable lasers. The SW 1501 measures equal optical-frequency intervals during scans at speeds of up to 100 nm/s with a resolution of 0.4 pm; those measuring rates reportedly surpass what is provided by traditional wavemetering devices. By combining fast scan speeds with high resolution, the SW 1501 makes spectroscopic detection and study of trace gases more of a commercial reality. Distributed feedback (DFB) lasers, as used in remote sensing systems, must have their wavelengths calibrated with each scan. The SW 1501 can measure the light from a DFB laser and produce the linear optical frequency scale needed in commercial spectroscopy. *Precision Photonics Corp, 2901 55th Street, Boulder, Colorado 80301, http://www.precisionphotonics.com*

Circle number 190 on Reader Service Card

New Literature

Tower Optical has released the *Optics Cookbook No. 1* that describes their product line of wave plates, lenses, beam splitters, prisms, windows, and mirrors. The information can aid in the design of photonic-based systems. *Tower Optical Corp, 1215 Wallace Drive, Delray Beach, Florida 33444, http://www.toweroptical.com*

Circle number 191 on Reader Service Card

Edmund Industrial Optics is offering the *Best of EO Application Notes 2003*, a revised edition of the company's first installment. The notes are a resource of advanced design and theory and of real-world applications and solutions. *Edmund Industrial Optics, 101 East Gloucester Pike, Barrington, New Jersey 08007-1380, http://www.edmundoptics.com*

Circle number 192 on Reader Service Card

The *Measurements and Automation Catalog 2003* from National Instruments highlights software and new measurement hardware. It includes detailed product specifications and services along with information on customized configurations. *National Instruments, 11500 North Mopac Expressway, Austin, Texas 78759-3504, http://www.ni.com* ■

Circle number 193 on Reader Service Card

Circle number xx on Reader Service Card

Circle number xx on Reader Service Card

Aspheric Focusing Lenses

Optical Surfaces Ltd is able to produce, from high-quality optical glass or silica substrates, aspheric focusing lenses up to f 2.5 with diffraction-limited performance. These lenses can be manufactured to have ultrasmooth slope errors, surface finish to 20/10 scratch/dig, surface microroughness typically of the order of 1 nm rms, and in a choice of sizes up to 300 mm o.d. Aspheric lenses are crucial for applications such as lidar research and laser launch telescopes, where a laser beam has to be precisely projected to a far object. A range of high-power laser coatings, including those at wavelengths of 249, 527, 1053, and 1550 nm, can be provided to maintain high transmission through the aspheric lenses and enable them to operate even at the ultra-high-energy thresholds of terawatt lasers. *Optical Surfaces Ltd, Godstone Road, Kenley, Surrey, England CR8 5AA, http://www.optisurf.com*

Circle number 194 on Reader Service Card

193-nm Optics

Alpine Research Optics (ARO) offers a series of 193-nm optics designed and fabricated to deliver long lifetime and high damage thresholds when used with high-fluence, high-repetition rate excimer lasers. The calcium fluoride and UV fused silica components include mirrors, partial reflectors, and windows for both 0° and 45° operation, and a range of spherical and cylindrical lenses. The spherical lenses and windows are available in diameters up to 75 mm; the spherical lenses can be supplied with radius of curvature between 0.05 and 10 m. Cylindrical lenses are offered with radius of curvature between 0.05 and 10 m and can be produced in lengths of up to 75 mm. ARO grinds, polishes, and coats the components in a manner to ensure longevity and damage resistance at the deep-UV wavelengths. *Alpine Research Optics. 3180 Sterling Circle, Suite 101, Boulder, Colorado 80301, http://www.arocorp.com*

Circle number 195 on Reader Service Card

Digital Camera Systems

Leica Microsystems has introduced the new DC 300 FX and DC 350 FX digital camera systems. The DC 300 FX is a 1.4-megapixel cooled color model; the DC 350 FX is a 1.4-megapixel cooled monochrome camera that offers NIR sensitivity for analysis and quantification. Both models offer 12 bits per color (RGB) for precise image replication and incorporate the latest advances in CCD sensor design. The Leica DC FX series provides quantitative cameras for users involved with live-cell fluorescence. Quantum efficiency in excess of 50% from 400 to 750 nm enables faster exposure times and greater sensitivity. A new thermoelectric cooling system has been

incorporated to offer exposure times of up to 600 s with increased dynamic range while minimizing thermal background noise. *Leica Microsystems Inc, 2345 Waukegan Road, Bannockburn, Illinois 60015 http://www.leica-microsystems.com*

Circle number 196 on Reader Service Card

Rotary Encoders

New model RESR rotary encoders from Renishaw are noncontact optical encoders with a low-mass, low-inertia design that provides accuracy to ±0.5 arcsecond, up to 129.6 million counts per revolution, and speeds to more than 2900 rpm with zero backlash. The RESR models come in a wide range of diameters and line-count options—degrees, arcseconds and 2^n—and are available with digital quadrature outputs providing resolutions from 0.01 to 27 arcseconds. Sized for shafts from 30 to 392 mm o.d., the encoders provide line counts from 4096 to 64 800 with up to 2000 × interpolation. The RESR one-piece design features a low-profile ring with integral scale and large through-hole. Optional models are available with UHV, nonmagnetic, and ultralow inertia capabilities. *Renishaw Inc, 5277 Trillium Boulevard, Hoffman Estates, Illinois 60192, http://www.renishaw.com* ■

Circle number 197 on Reader Service Card