

new products

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Lawrence G. Rubin

Focus on lasers and optics

Diode laser modules

Two new diode laser series developed by nLight incorporate the company's nXLT single emitters and are combined with a proprietary optical design for efficient fiber coupling and capable of either CW or pulsed operation. The Pearl high-power modules deliver up to 100 W from a 400- or 600- μm fiber at wavelengths of 808, 880, or 980 nm and up to 7 W from a 400- μm fiber or afocal at 639 nm. The high-brightness series offers up to 40 W from a 200- μm fiber at 808, 915, or 980 nm. Both series include greater than 50% wall plug efficiency and use nDure fiber. They have been designed to meet the requirements of laser pumping and materials-processing applications; diode-based laser systems are accelerating the rate at which they are displacing gas-based laser and non-laser systems for such applications as welding, cutting, soldering, and heat treating. nLight, 5408 NE 88th Street, Building E, Vancouver, WA 98665, <http://www.nlight.net>

See www.pt.ims.ca/16300-131

Cold-processing picosecond laser

RPMC has introduced the HYPER RAPID, a new industrial cold-processing picosecond laser that provides up to 50 W TEM₀₀ average power and pulse repetition rates up to 1 MHz. The device, designed for high-quality industrial micromachining, can produce a cold ablation of more than 10 mm³ of material per minute, with minimum thermal side effects; there are virtually no heat-affected zones, no

cracks, and no burrs at the free edges. The lateral resolution for the machining is in the micrometer range with a depth control of about 10 nm. Four versions of the company's RAPID laser are now available: 2.5, 10, 25, and 50 W. A picosecond laser beam can be focused to a diameter of a few μm , and each controllable single pulse will remove coldly only about a 10-nm layer of materials used in the semiconductor, aerospace, and automotive industries. RPMC, 203 Joseph Street, O'Fallon, MO 63366, <http://www.rpmclasers.com>
See www.pt.ims.ca/16300-132

Industrial excimer laser base

J P Sercel Associates has announced the industrial excimer laser base, a self-contained base that integrates a gas-handling system and a utility system.



The product provides portability for an excimer laser system and its gas supply. It allows users to ship and set up the laser without expensive laboratory plant gas and ventilation system installations and enables it to move to different experiments such as remote sensing and applications dedicated to specific processes. The laser base is available with options such as an integrated cooling system, activated carbon air filtration, and advanced software. Excimer lasers provide the highest power levels of all UV lasers for materials processing. The laser base is ideal for use with the Coherent (Santa Clara, California) LPXPro excimer laser (see photo). J P Sercel Associates Inc, 220 Hackett Hill Road, Manchester, NH 03102, <http://www.jpсалaser.com>

See www.pt.ims.ca/16300-133

Quantum cascade laser diodes

Nanoplus GmbH has expanded its range of single-mode DFB-QCL quantum cascade laser diodes up to a wavelength of 2.7 μm . Designed for tunable diode laser spectroscopy, the new devices allow access to higher absorption levels in the near-IR range, especially

Atomic Force Microscope



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AFM Head



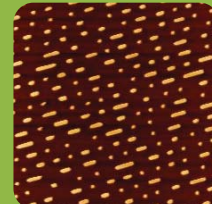
MFM Image of
Garnet Single Crystal



Bacillus Thuringiensis
Phase Image



DVD Surface Topography



- 56 μm XY scan range, 4.8 μm Z range with 20 Bit resolution
- Motorised approach for XY and Z axes
- Contact Mode AFM, Dynamic Mode AFM, Phase Imaging, Non-contact AFM, STM, MFM, EFM, Liquid AFM, Nanolithography
- Dual Integrated Video Microscopes for top and side view
- AFM Control Electronics and Software

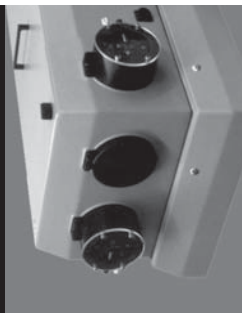


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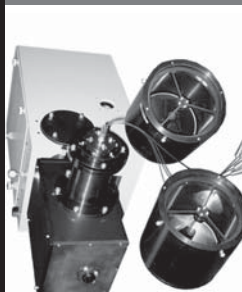
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for the fundamental rotational-vibrational mode of water that leads to strong absorption lines in the region from about 2.4 to 3.0 μm . For bipolar quantum cascade lasers, restrictions on long wavelength operation are relaxed, a design discovered by Lucent Technologies and licensed to nanoplus. The 2.7- μm diodes operate at room temperature in the CW mode with an output power of several milliwatts. The laser line can be tuned by current (0.025 nm/mA) or temperature (0.21 nm/ $^{\circ}\text{C}$); typical side-mode suppression rates of the units are greater than 30 dB. *nanoplus GmbH, Oberer Kirschberg 4, D-97218 Gerbrunn, Germany, <http://www.nanoplus.com>*

See www.pt.ims.ca/16300-134

High-power yellow laser

Coherent claims that its Compass 561-50 laser, which delivers 50 mW at a wavelength of 561 nm, offers lower noise than any other solid-state yellow laser currently available. The frequency-doubled, diode-pumped laser has a noise specification of 0.25% rms from 10 Hz to 1 GHz, excellent beam characteristics (M^2 less than 1.2), and a beam-pointing stability of less than 6 $\mu\text{rad}/^{\circ}\text{C}$. The laser uses the company's PermAlign construction to achieve high reliability and long lifetime and has the same form, fit, and function as the previous generation of the Compass 561-nm and 532-nm series. The new laser's 561-nm output is optimum for exciting several key fluorophores, such as the rhodamine series and Alexa Fluor dyes, and provides better separation between excitation and fluorescence than a 532-nm output. *Coherent Inc, 5100 Patrick Henry Drive, Santa Clara, CA 95054, <http://www.coherent.com>*

See www.pt.ims.ca/16300-135

488-nm CW laser

The Cyan Scientific laser from Newport Corp is a CW device with an output of 488 ± 0.5 nm wavelength and an output power of 10, 20, 40, or 50 W. It emits an optical beam in a single spatial mode— M^2 less than 1.1—which allows for tight focusing and uniform sample illumination. With an active power control system, the Cyan Scientific laser is able to start up quickly and locks output power over the entire operating temperature range, providing power stability better than 1%. The laser's true single-frequency operation (a linewidth of less than 1 MHz) is ideal for Raman spec-



troscopy, interferometry, and other applications that require high coherence and spectral stability. Even at the highest output power, the system draws less than 15 W, a low power consumption that eliminates the need for large heat sinks and cooling mechanisms. *Newport Corporation, Spectra-Physics Lasers Division, 1335 Terra Bella Avenue, Mountain View, CA 94039, <http://www.newport.com>*
See www.pt.ims.ca/16300-136

Quasi-CW laser arrays

Intense Ltd is offering an expansion of the Hermes family of high-power quasi-CW laser arrays that combine high reliability with modular packaging in a standard wavelength of 808 nm and power levels up to 900 W; they degrade by less than 5% over 2×10^8 shots. The stacked arrays use the company's quantum-well intermixing technology, a process that increases the quantum-well bandgap of a semiconductor laser in a controlled and precise manner. Thus active and passive sections can be created in the same laser cavity, which results in superior power and unrivaled brightness. The Hermes QCW arrays come as vertically or horizontally stacked assemblies of up to 10 bars, with lensed and unlensed options. Standard configurations include 360, 540, 720, and 900 W peak output powers; other wavelengths are available on request. *Intense Ltd, 1200A Airport Road, North Brunswick, NJ 08902, <http://www.intenseco.com>*

See www.pt.ims.ca/16300-137

Laser-beam profiling cameras

Ophir-Spiricon's two new USB 2.0 silicon CCD cameras are designed for laser-beam profiling measurement applications. The SP503U and SP620U units, both CW and pulsed modes, accurately capture and analyze wavelengths from 190 to 1550 nm. The cameras feature a high dynamic range of 64 dB and a programmable, high-speed

electronic shutter. With photodiode trigger and pretrigger circuitry, the units synchronize effortlessly with even nanosecond-pulse lasers. The SP503U has a resolution of 640×480 pixels; the SP620U, with 1600×1200 pixels, offers more than 1.9 million pixels. Both cameras include a set of filters that when used in combination with the automatic shutter and gain controls allow measurement of power levels from microwatts to watts. Users have a choice between the company's LBA or BeamStar software packages. *Ophir-Spiricon Inc, 60 West 1000 North, Logan, UT 84321, <http://www.ophir-spiricon.com>*
See www.pt.ims.ca/16300-138

Ultrafast laser system

FEMTOLASERS Produktions has introduced the FEMTOSOURCE scientific XL 500, a laser system with a center wavelength of 800 nm, an output level exceeding $0.5 \mu\text{J}$, a pulse duration of less than 50 fs, and a repetition rate of greater than 5 MHz. The result is a peak power of greater than 10 MW and an average power level of more than 2.5 W; the laser head is temperature-stabilized. The new product combines the advantages of both the company's dispersive mirror technology and its



chirped pulse oscillator technology and represents a crossover between ultrafast oscillators and ultrafast amplifier systems. Applications for the scientific XL 500 include materials processing, terahertz generation, and spectroscopy for which high peak power, stability, and reliability are advantageous. *FEMTOLASERS Produktions GmbH, Fernkorngasse 10, 1100 Vienna, Austria, <http://www.femtolasers.com>*
See www.pt.ims.ca/16300-139

Green laser for mobile projection

Eagleyard Photonics has demonstrated a directly modulated green laser source with an output power in excess of 20 mW. The green laser is a key component, up to now unavailable, for projection displays on mobile phones, personal digital assistants, and game

consoles. The design is based on a gallium arsenide laser diode that emits nonvisible IR laser radiation and a frequency doubling crystal that converts the IR directly into visible green. The technology involves a semiconductor chip that allows direct modulation at video rates, a stable wavelength to match the doubling crystal, and high output power for efficient projection brightness. The laser driver is capable of data rates up to 450 megabits/s and modulated currents up to 1.5 A. *eagleyard Photonics GmbH, Rudower Chaussee 29, 12489 Berlin, Germany, <http://www.eagleyard.com>*
See www.pt.ims.ca/16300-140

Fiber laser modules

QPC Lasers has developed the Brightlock Ultra-500 series of semiconductor lasers, which can produce 75 W and 180 W of output power at a center wavelength of 976 nm with spectral widths of less than 2 nm and 3 nm, respectively. Other units deliver 35 W and 90 W at 1532 nm with spectral widths of 2 nm and 4 nm; fiber core diameters range from 200 to 400 μm with a nominal numerical aperture of 0.22. The modules feature cladding-free power, internal gratings for higher spectral brightness and wavelength stabilization, and a water-cooled plate with standard unfiltered water. Detachable fiber and dichroic filters are available. Applications for the units include pumping of fiber lasers and solid-state lasers; materials processing such as soldering, welding, and engraving; and uses in the medical and defense fields. *QPC Lasers Inc, 15632 Roxford Street, Sylmar, CA 91342, <http://www.qpclasers.com>*
See www.pt.ims.ca/16300-141

Cooler for laser diodes

The UPF Optocooler from Nextreme Thermal Solutions, when embedded in a laser diode package, can pump a heat density up to 78 W/cm^2 to maintain the diode's optimal operating conditions and performance. A low-power laser diode might generate as little as 0.09 W of power, but since the device's size is only about $300 \times 200 \mu\text{m}$, this means the diode is producing about 150 W/cm^2 . Even if that power is spread by a factor of 30, it still falls outside the operating regime of a typical bulk thermoelectric cooler. A thin-film TEC can pump more heat and be made much smaller than a conventional TEC. The UPF Optocooler

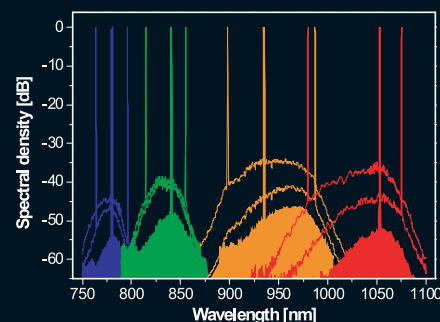


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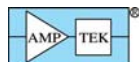
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can remove a maximum of 420 mW at 25 °C ambient in a footprint of only 0.55 mm². At 85 °C, the module can pump a heat density up to 112 W/cm² or cool up to 60 °C. *Nextreme Thermal Solutions Inc*, 3908 Patriot Drive, Suite 140, Durham, NC 27703-8031, <http://www.nextreme.com>

See www.pt.ims.ca/16300-142

Kit for projection display applications

Agilent Technologies has released the RBG Laser Combiner Developer's Kit. Created for projection system designers, the kit is based on the company's complex monolithic optics technology, which offers superior alignment throughout a product's lifetime because the optics are bonded together into a single prealigned structure. As a result, they do not drift out of alignment due to vibration or room temperature fluctuations, thus maintaining a clear, in-focus image. Fewer optical surfaces decrease environmental contamination that can cause on-screen interference. The kit can be used with various image panels and features color coordinates that can be white-balanced for screen optimization. *Agilent Technologies Inc*, 5301 Stevens Creek Boulevard, Santa Clara, CA 95051, <http://www.agilent.com>
See www.pt.ims.ca/16300-143

Light engines and arrays

Enfis has announced the QUATTRO Mini, a high-power, extremely bright, cost-effective spot source that produces up to 160 W in a 2 × 2 cm array. The company's technology ensures that colors are mixed evenly and effectively, giving a homogeneous spot of light



rather than a cluster of different colors provided by conventional LED solutions. Three optimized multichannel variants are offered: RGBA provides an extra-large color gamut; RGBW delivers RGB color mixing with the addition of a white channel to give a higher maximum lumen capability; and Hi-CRI Vari-CCT enables one device to provide a high-quality light source with a range of color temperatures from 3000 to 6500 K. The QUATTRO Mini incorporates built-in optical feedback at the

array level. *Enfis Ltd*, Technium 2, Kings Road, Swansea Waterfront, Swansea SA1 8PJ, UK, <http://www.enfis.com>
See www.pt.ims.ca/16300-144

Particle characterization system

Malvern Instruments has announced the Morphologi G3 automated particle characterization system. The new tool delivers high-quality, statistically significant particle size and shape information and microscope-quality images through the rapid analysis of hundreds of thousands of particles. An integrated, software-controlled dry powder dispersion system reduces preparation times and enables the reliable measurement of dry powders. The sample is dispersed with an instantaneous pulse of compressed air; precise control of dispersion pressure, injection time, and settling time is maintained. Measurements with the Morphologi G3 are made in an enclosed sample carrier, minimizing environmental exposure and ensuring safe material handling. *Malvern Instruments Inc*, 117 Flanders Road, Westborough, MA 01581-1042, <http://www.malvern.com>

See www.pt.ims.ca/16300-145

New literature

Jenoptik Laserdiode has published its *Optical Infrared Components Product Portfolio*. In addition to listing systems and components, the brochure provides a table with data on key optical materials used in IR technology, such as germanium, zinc sulfide, silicon, and calcium fluoride. *Jenoptik Laserdiode GmbH*, Goeschwitz Strasse 29, 07745 Jena, Germany, <http://www.jenoptik.com> ■
See www.pt.ims.ca/16300-146

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