The MS10-HR spectograph from Agilent Technologies (Palo Alto, CA) is designed for use with a variety of charge-coupled device (CCD) or photodiode-array (PDA) detectors and is equipped with an original holographic grating for low stray light.

The company also presented its Aberration-Corrected Concave gratings, which combine the functions of optical imaging and diffraction into one optical element. The gratings allow users to couple into a fiber array or image onto a detector array.

Avantes (Boulder, CO) presented AvaMouse, a handheld reflection spectrometer that reportedly can perform 35 measurements/s; this measurement speed enables the averaging of more than 16 scans into one measurement value. The spectrometer comes with SpectraWin 5.0 color software, with measurement of $L$, $a$, $b$, hue, $c$, $X$, $Y$, and $Z$; ability to save multiple reference colors to a database; and ability to display online $\Delta L$, $\Delta a$, $\Delta b$, and $\Delta E$ values.

Blue Sky Research (Milpitas, CA) presented its Fiberdrive405 laser module, which features a high power output, a fiber-coupled 405-nm laser diode, and integrated drive electronics. Standard features include automatic power control or automatic current control electronics, a 1-m single-mode fiber pigtail, and 6.5 V dc operation. Power outputs to 15 mW are available.

Coherent (Santa Clara, CA) released the Vioflame violet laser series that includes four models ranging in output power from 4 mW to 30 mW. The Vioflame series targets applications such as cytometry, high-throughput screening, reprographics, confocal microscopy, and disk mastering. Each system is a complete 408-nm, thermoelectrically cooled–diode laser system with Class 3 electrostatic discharge (ESD) protection.

The company also introduced the GEM Select 100 — a 100-W, 10.6-μm, rf-excited, waveguide CO2 laser designed specifically for scientific applications such as all-optical atom trapping. When coupled with the recommended power supply, the GEM Select 100 supports atom-trapping lifetimes of greater than 10,000 s.

Coherent also presented the latest addition to its AVIA product family, the AVIA 355-X, which is a Q-switched, diode-pumped, solid-state industrial UV laser that delivers 10 W of 355-nm light at 60 kHz. It is designed for microvia drilling and other high-speed materials processing applications.

The company also featured MaxBlack J25LP-MB and J45LP-MB laser energy probes, designed to measure laser pulse energies ranging from 200 μJ to 2 J at rep rates as high as 1000 pps for lasers across the spectrum — 0.19 μm to 11 μm. MaxBlack probes are designed to perform at fluency levels as high as 265 mJ/cm² at 1064 nm.

Coherent also demonstrated a new low-power UV diode laser technology,
producing more than 1 mW of continuous wave output at 375 nm, and designed for applications ranging from flow cytometry and high-throughput screening to confocal microscopy, semiconductor test and measurement, and biological and chemical detection.

The NIR Spectral Sensor from Control Development (South Bend, IN) features permanent wavelength calibration, a sampling head with built-in calibration standard, and no moving parts. The sensor uses near-infrared (NIR) InGaAs diode-array technology, along with the company’s proprietary f/3.0 optic. Applications include blending and drying operations.

VariSpec liquid crystal tunable imaging filters from CRi Instruments (Woburn, MA) are available in two models: the VariSpec standard model filter for remote sensing and OEM applications in the visible or near infrared (NIR) wavelength ranges, and the VariSpec CM filter for use in brightfield and fluorescence microscopy. The company also presented its Micro*Color and Macro*Color tunable RGB filters for digital imaging.

Carl Zeiss and Hellma International (Plainview, NY) introduced the MCS CCD multichannel spectrometer. The module consists of a spectrometer body made of a patented ceramic structure; an aberration-corrected concave grating, a fiber cross-section converter, or a mechanical slit as an optical entrance; and a thermoelectrically cooled Hamamatsu (Bridgewater, NJ) CCD detector. The spectrometer offers a spectral range of 200–980 nm and a full width half maximum (fwhm) resolution of 3 nm for the UV version and 3–4 nm for the UV-NIR version. Benefits include very high sensitivity, detection of low light levels, and diverse measuring applications such as fluorescence measurement, according to the company.

Infrared Fiber Systems (Silver Spring, MD) presented a handheld infrared (IR) spectrometer based on the acousto-optic tunable filter. It is all solid-state, with no moving parts, and is designed for use in such fields as plastics recycling and quality control, liquid fuel analysis, pharmaceutical analysis, and gas monitoring.

The optical spectroscopy division of Jobin Yvon (Edison, NJ) announced the release of its new liquid nitrogen-cooled, back-illuminated deep depleted CCD detector for low-light applications in the NIR region (500–1000 nm) including Raman, photoluminescence, and fluorescence spectroscopy. Features include a 1024 × 256 pixel format, an NIR-coated CCD chip with 26 μm × 26 μm pixel size, and an overall format of 26.6 mm × 6.7 mm.

The division also introduced its new 750S scanning spectrometer and 750I imaging spectrograph. Both the 750S and 750I have a 750-mm focal length, are fully automated, and are equipped with an autocalibrating precision wavelength drive system and an autocalibrating grating system.

Lambda Physik (Fort Lauderdale, FL) introduced its compact, high-repetition-rate industrial excimer laser NOVATEX, which is optimized for ArF (193 nm) operation. Applications include material processing by microstructuring, microdrilling, marking of cable, optics testing, surface inspection, semiconductor inspection, and metrology.

The company also announced engineering enhancements to its Gator series diode-pumped solid-state lasers. These new features include variable repetition rate, external trigger capabilities, variable output power, parallel interface, and an option to switch wavelengths.

Linos Photonics (Milford, MA) presented its continuous wave optical parametric oscillator–based OS 4000 laser system. The system—which includes an integrated pump laser, a control unit, and automatic stabilization—can be used for high-resolution spectroscopy in the IR spectral range. Applications include investigation or detection of molecules, atoms, clusters, and ions.

Lytron (Woburn, MA) announced enhancements to the temperature stability of its Kodiak recirculating chillers: a typical temperature stability of ±0.05 °C, a five-fold reduction in temperature stabilization time, and immediate response to a setpoint change.

nLight Photonics (Vancouver, WA) announced its launch of high-power diode lasers based on both GaAs (780–1000 nm) and InP (1300–1700 nm), as well as package options including high-power, water-cooled stacks as well as conductively cooled, fiber-coupled packages.

The LambdaCommander programmable spectral processor from Newport (Irvine, CA) is designed for spectrum processing for optical applications in remote fiber-optic sensing, optical telecon, and life and health sciences. According to the company, the fiber-coupled instrument can apply any arbitrary transformation to the original optical signal by passing selected narrow wavelengths and blocking others; it can also apply a time-varying function to the spectral shape with bandwidths as large as 100 nm.

New Wave Research (Fremont, CA) announced Orion, a compact, air-cooled Nd:YAG laser system designed for laser-induced breakdown spectroscopy, time-of-flight mass spectroscopy, and general-purpose scientific laser applications. The Orion offers
ready been selected with this preconfigured spectrometer.

The company also offers the LIBS2000+ laser-induced breakdown spectrometer, a broadband, high-resolution system that provides spectral analysis from 200 to 980 nm, with resolution of ~0.1 nm (fwhm). According to the company, this spectrometer allows users to perform real-time measurements in hostile environments in such applications as environmental monitoring, art restoration analysis, and military and safety applications.

P&P Optica (Kitchener, Ontario, Canada) presented a multichannel, fiber-optic coupled spectrometer with VPH transmission grating, customizable platform, refractive optics (rather than reflective optics), and 1-nm spectral resolution.

The TPMI fully integrated thermopile module sensor from PerkinElmer Optoelectronics (Fremont, CA) is designed for remote temperature measurements in industrial, consumer, appliance, and automotive applications. The TPMI consists of a PerkinElmer thermopile, a sensor that detects heat, and a signal-processing chip in a compact TO-5 type housing.

The company also announced its custom OEM spectrometer engines, which feature designs from 190–20,000 nm (UV, UV/Vis, NIR, and IR models), high resolution, spectral calibration, and cuvette, fiber, or gas sampling.

PerkinElmer (Wellesley, MA) debuted its SPCM-AQ4C photon detector, a four-channel photon-counting card that detects single photons over a wavelength range from 400–1100 nm.

The VelociCam VC200A camera from PixelVision (Tigard, OR) is designed for scientific and technical applications in areas including hyperspectroscopy, biomedical sciences, and nuclear research. The 14-bit camera provides typically four frames/s (one output) or 16 frames/s (four outputs), front illuminated; or two frames/s (one output) or 5 frames/s (four outputs), back illuminated, according to the company. Thermoelectric cooling and optional liquid cooling are available.

Positive Light (Los Gatos, CA) was awarded the 2002 Photonics Spectra Circle of Excellence Award for its Indigo-DUV laser, which, according to the company, is the first all solid-state, narrow linewidth, 193-nm laser source for optical metrology and calibration of 193-nm lithography stepper lenses and deep-UV spectrometers.

Additionally, the company presented these new products at the show: the Legend Sub-30 fs Ti:sapphire Regenerative amplifier, designed for time-resolved femtosecond spectroscopy and high-field physics; the Evolution-TEM00 diode-pumped, intra-cavity doubled, Nd:YLF laser, for applications such as marking, cutting, machining, and laser-induced breakdown spectroscopy; the Indigo-S broadly tunable, all solid-state, deep ultraviolet laser, designed for applications in biological and chemical research, such as Raman spectroscopy; and Cadence, an Nd:YAG laser designed to meet such industrial and original equipment manufacturing requirements as compact packaging and stable performance, according to the company.
**Conference Overview**

**Saint-Gobain Quartz** (Wallsend, United Kingdom) presented its Spectrosil 1000 and 2000 series optical fused silica. Spectrosil is a synthetic fused silica manufactured using a patented, environmentally friendly process that results in a virtually chlorine-free material that is bubble- and fluorescence-free.

**Spectra-Physics** (Mountain View, CA) announced the latest in its UV diode-pumped solid-state laser products and the first in its new line of compact pulsed lasers, the Triton laser. It is a frequency-tripled Nd:YLF laser operating at 349 nm, providing output pulses of 250 μJ at repetition rates as high as 1 kHz. Triton is an all-solid-state laser upgrade to nitrogen lasers currently used in biomedical applications, according to the company; it operates at pulse rates that are 50 times faster than a comparable nitrogen laser, with a head only 20% of the size.

The company also announced the following products: The Vanguard 350-HMD 355 laser, a frequency-tripled Nd:YVO₄ laser delivering 350 mW of quasi-CW output at 355 nm, designed as a replacement for applications currently using water-cooled UV ion lasers; the Vanguard 2000-HM 532 green laser generating 2 W of output at 532 nm for uses such as synchronous pumping of dye lasers, as well as other research applications for visible picosecond laser pulses; and the V-XTREME laser, which delivers pulse repetition rates in the 200–400 kHz range, and is targeted at applications involving micromachining and surface structuring of metals, semiconductors, and plastics.

**Torsana Laser Technologies** (Skodsborg, Denmark) debuted the Starbright 785 S broad-area emitting diode laser. A passive feedback system enables an output power of 500 mW with a substantial beam quality improvement over diodes having a normal external cavity design, according to the company. Application areas include FT/dispersive Raman spectroscopy, optical tweezers, ophthalmology, frequency doubling, and pumping of high-performance laser systems.

The company also presented the Starbright Laser Controller, designed for OEM applications. The controller has two command interfaces: RS-232, and a digital control interface, which allows users to choose between a simple command interface and an advanced host interface with higher functionality.