

NEW PRODUCTS

The descriptions of the new products listed in this section are based on information supplied to us by the manufacturers, and in some cases by independent sources. 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.

Scanning Near-Field Optical Microscope

Topometrix has introduced its Aurora scanning near-field microscope. "It is the first commercial microscope to break the diffraction limit barrier to spatial resolution," the manufacturer tells us. The Aurora offers the 50-nanometer resolution of a scanning probe microscope plus the advantages of an optical microscope.

The optical diffraction limit is overcome by placing the sample within a fraction of a wavelength of a small light aperture. The resolution limit then becomes the size of the aperture, not the optical wavelength. Photons exiting the small aperture remain collimated for about 5 nm, then rapidly diverge in the lateral direction. In the Aurora, the sample is kept within the collimated region. Apertures can be fabricated repeatedly with sizes of less than 50 nanometers.

The Aurora microscope operates in liquid as well as air, it is noninvasive to the sample, and it provides an image to which the eye can relate directly. It is intended for a wide range of applications in research, engineering and manufacturing. The same contrast mechanisms that are common to conventional far-field microscopy can also provide contrast in the near field. Thus the Aurora can be used for high-resolution imaging in any optical microscopy application. Applications include biological fluorescence imaging, medical imaging, semiconductor imaging, thin film analysis, data storage, optical lithography, polarization imaging of optoelectronic materials, and polymers and spectroscopy. *Topometrix, 5403 Betsy Ross Drive, Santa Clara, California 95054-1162*

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Single Crystals of Superconducting Ceramics

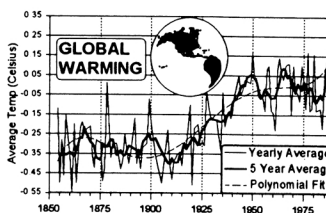
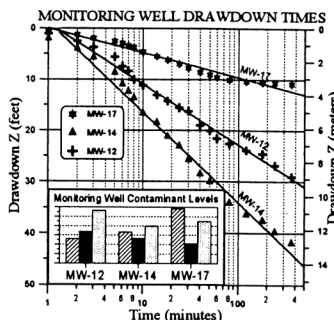
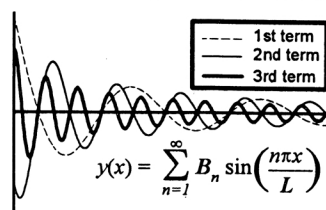
Atomet claims to have a unique new crystal-growth technique that lets the firm offer heretofore unavailable single crystals (as well as currently popular varieties) in production quantities. Atomet is offering dielectric, superconducting and magnetic single crystals. The firm is growing $\text{Sm}_3\text{Ga}_5\text{O}_{12}$, $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_x$, CoGa_2O_4 , $\text{Nd}_3\text{Ga}_5\text{O}_{12}$, SrTiO_3 , TiO_2 , LaAlO_3 , Fe_2O_3 and such highly textured crystal boules of high- T_c superconductors as $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$, $\text{YBa}_2\text{Cu}_4\text{O}_{8-x}$ and $\text{YBa}_2\text{Cu}_4\text{O}_{8-\delta}$ by the use of a focused-light float-zone process. This new method, which allows melt temperatures up to 3000°C , permits the blending of incongruent melted materials under pressures up to 100 atm. It involves extra-sharp quenching from melting points. Many other ferrite, gallate, titanate and aluminate crystals can also be grown by this technique.

Atomet single crystals are being produced with diameters up to 25 mm. *Atomet, 222 Sherwood Avenue, Farmingdale, New York 11735-1718*
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Vacuum Gauges Integrate Sensor and Electronics

Balzars has introduced two new low-cost, compact vacuum gauges, the TPR 250 compact Pirani gauge and the IKR 250 compact cold-cathode gauge. Both models integrate the sensor and electronics into one compact unit. That suits them for use with any computer-controlled vacuum system without a separate gauge controller. For vacuum systems requiring a controller, Balzars

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NEW PRODUCTS

ganic chemistry at Columbia, says that "infrared spectroscopy has a lot of potential that is lost on students because it's very difficult to convey with chalk and blackboard."

IR Tutor shows how molecules vibrate at each infrared spectral peak. Using the program to select peaks on the infrared spectrum of toluene, for example, produces a three-dimensional model of the molecule's ring-like structure expanding and contracting, then bouncing back and forth like a trampoline, and finally deforming asymmetrically with three carbons bouncing up while the alternate three bounce down.

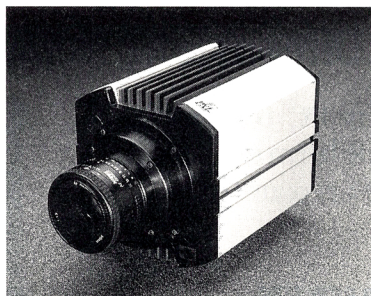
The package will include a manual entitled *FT-IR Basic Techniques and Experiments* and a guidebook entitled *Theory and Practice of Spectral Interpretation*. The package is meant to supplement, not replace, laboratory work. Additional software allows researchers to link a spectrometer directly to the computer, import and analyze data, and write a laboratory report on the same terminal. The program also offers a review of the physics of light.

A theory window on IR Tutor shows two atoms oscillating on a spring. Adding energy or decreasing the mass of the atoms increases the distance between the atoms as they pull away from each other, to the point where the chemical bond can break. Clicking the computer's cursor on a spectral peak brings up a model of the vibrational mode at that energy. "These modes are difficult to demonstrate in the classroom," says Abrams. *Perkin-Elmer, 761 Main Avenue, Norwalk, Connecticut 06859-0012*

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Cooled High-Speed Modular CCD Camera

Photometrics has introduced the PXL high-speed modular camera system, which the firm describes as "a new type of high-performance CCD imaging system." The new camera is designed to address the needs of speed-critical scientific imaging applications that require fast readout. The PXL delivers readout rates up to 4 megapixels per second with low noise and high linearity. PXL is the first commercial CCD imaging system, we are told, to offer multimode cooling. It supports passive-air, forced-air and liquid cooling in a single camera head. System flexibility is enhanced by full software control of parameters such as readout rate, binning, subarrays and CCD operating temperature.



The PXL is available with a number of high-resolution CCD arrays, including the new Kodak KAF6300 (3072 x 2048 pixel) high-speed sensor. It is fully compatible with 386 and 486 PC and Macintosh computers and Sun SPARC stations. *Photometrics, 3440 East Britannia Drive, Tucson, Arizona 85706*

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Intensified Photodiodes for Low Light

Intevac has introduced a new optical detector that seeks to combine the features of photomultipliers and avalanche photodiodes. This so-called intensified photodiode is offered in versions covering the wavelength range from 300 to 900 nm. It consists of a highly efficient semiconductor photoemitter whose output electrons are focused onto a high-speed avalanche photodiode.

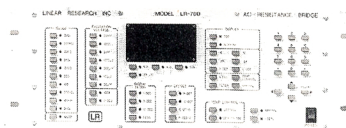
Intevac's intensified photodiodes employ single-crystal AlGaAs/GaAs and AlGaAsP/GaAsP photocathodes. The photodiodes respond to light in the range of 400–900 nm with typical peak quantum efficiencies in excess of 20%. In the range of 300–700 nm their typical peak quantum efficiencies exceed 35%.

The rise time of the intensified photodiode to an optical impulse is less than 600 psec when the center of the photocathode is illuminated. Such short time response is achieved through the use of demagnifying electron optics that focus the photoelectrons onto a small-format avalanche photodiode.

Gains of greater than 2×10^4 are typical, we are told. Photomultiplier tubes are available with both 18-mm and 25-mm diameter photocathodes. The overall lengths of the 25-mm and 18-mm intensified photodiodes are 2.0 inches and 1.7 inches, respectively, including the 50-ohm output connector. *Intevac, 601 California Avenue, Palo Alto, California 94303*

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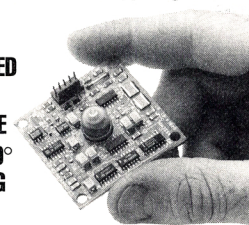
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