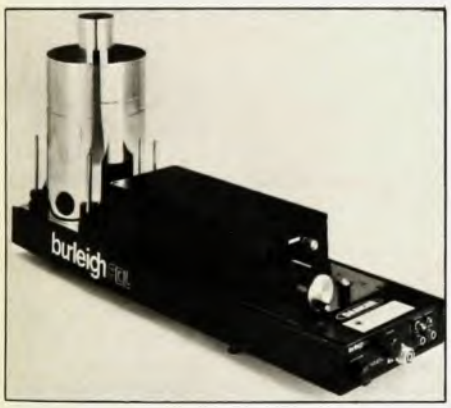
new products

The items listed have been selected from among those appearing concurrently in "New Instruments" or "New Materials and Components" in *Review of Scientific Instruments*. We gratefully acknowledge the cooperation of the editor of *RSI*, J. B. Horner Kuper, the associate editor for New Instruments, Joshua Stern, and the associate editor for New Materials and Components, R. K. Eby.

These descriptions are based on information supplied by the manufacturer and in some cases from independent sources. Neither *Review of Scientific Instruments* nor PHYSICS TODAY assume responsibility for their correctness.

Laser

The model FCL tunable infrared laser based on the lasing action of F-center crystals provides high-resolution output continuously tunable in the infrared region of the spectrum from 2.2 to 3.1 μm. The active medium of the laser is a doped crystal such as KCl:Li. Three crystals with



different dopants are required for the full tuning range. Laser action occurs when the crystals are pumped with an external laser operating in the 500–800-nm region. The optical cavity of the FCL is a folded, three-mirror, astigmatically compensated design using totally reflecting optics. The end mirror is a diffraction grating that serves as both output coupler and tuning element. Optical pumping of the lasing crystal is achieved by introducing a visible pump laser beam through an on-axis beamsplitter. The beamsplitter and two of the cavity mirrors are located in the crystal chamber and do not require adjustment during operation. Features include resolution to 1 MHz, low divergence, a collinear visible tracer beam to locate the infrared beam, an adjustable crystal cassette, a Super-Invar base, and a tuning arm that can be separately evacuated for intercavity experiments.—*Burleigh Instruments, Inc., 100 Despatch Drive, Box 270, E. Rochester, NY 14445.*

Circle No. 140 on Reader Service Card

Dye laser

A high average power tuneable dye laser can replace many fixed wavelength lasers. The Candela TFDL-1 can be adjusted in the spectrum of approximately 430–900 nm. Average power is 3–10 W. The laser attains a rep rate of 30 Hz at 200-kW peak power, but can achieve rep rates of 200 Hz at lower peak powers. It can be equipped for high average power in the range of approximately 220–350 nm by frequency doubling. The laser provides low beam divergence and has a pulse-to-pulse repeatability of better than ±5%. Flash lamp life exceeds 3×10^6 shots; the R6G dye solution has a lifetime greater than 10^6 J/l electric power input to the ½ power point. For low sync jitter, the TFDL-1 incorporates thyratron switching.—*Candela Corp., 11 Highland Circle, Needham, MA 02194.*

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CO_2 lasers

The models TE280 and TE281 transversely excited, tunable CO_2 lasers operate at pressures up to 10 atm. The resulting pressure broadening of the normal CO_2 transition allows for continuous tuning over a wide range. In the model TE280, a gas volume measuring $1 \times 1 \times 45$ cm is pumped with a Marx generator delivering 70 J at up to 150 kV. Ultraviolet preionization and fast discharge circuitry elimi-

new products

nate the need for seed gas in the cavity. The model TE281, which includes a standard optics package, delivers 250 mJ TEMoo, tunable over four 20-cm^{-1} bands with bandwidth less than 0.1 cm^{-1}. Pulse energies greater than 500 mJ can be produced over a more limited tuning range. Output pulse is 50–100 ns FWHM, depending upon the output coupler used. Pulse repetition rate is 0.5–1 Hz. The model TE280 includes Brewster windows; the TE281 includes an optical bench and optical elements necessary for tuning: Brewster windows, grating mount, master grating, output coupler with mount, and removable pellicle for cavity alignment with the aid of a He–Ne laser.—*Lumonics Research Limitied, 105 Schneider Rd., Kanata (Ottawa), Canada K2K 1Y3.*

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Spectrometer

The model 4300 photon correlation spectrometer system employs time-dependent laser light scattering technique to characterize the dynamic and static properties of biological and synthetic macromolecules. The basic system consists of photon correlator, photon detection system, spectrometer, and video display. Options include

a temperature controller, filtration system, clipping counter-scaler, and rate meter for optical setup.—*Malvern Scientific Corporation, 7 Holiday Park Dr., Centereach, NY 11720.*

Circle No. 143 on Reader Service Card

X-ray spectrometer

The 7100 series x-ray spectrometers use minicomputer circuitry to reduce cost and complexity. Available with either black-and-white or color-coded video display, the series offers a choice of 2048 or 4096 data storage channels. Standard features include an alphanumeric character generator, 100 digitally selectable energy windows, spectrum labeling facilities, peak integration, preset time and integral controls, an x-ray pulse processor module, an energy-to-digital converter, and a detector bias supply. Optional programs, implemented by means of programmed read-only memories, provide MLK characteristic line markers for x-ray peak identification, bidirectional data transfer, spectrum smoothing, peak stripping, background removal, and intensity ratio computation. A 200-step learn capability is available for unattended data collection, reduction, and readout. All standard and optional programs are accessed by front panel pushbutton.—*Kevex Corporation, 1101 Chess Dr., Box 4050, Foster City, CA 94404.*

Circle No. 144 on Reader Service Card

Fiber optic scintillators

A new fiber optic matrix for radiation imaging scintillator applications has been introduced. The scintillator, Bismuth Germanate, has a density of 7.0 g/cm^3, is nonhygroscopic, and has a light conversion efficiency of 10% of that of thallium activated sodium iodide. Because of its high index of refraction, $n = 2.1$, it is suited to application of fiber optics techniques. The high atomic number of the scintillator provides a high photofraction and the high density provides good localization of the event. Elements typically 1×110 mm can be assembled to provide several square centimeters of imaging area. Surfaces can be made to conform to the photocathode of an image intensifier, DDC, or conventional television image converter.—*The Harshaw Chemical Co., Crystal & Electronic Products, 6801 Cochran Rd., Solon, OH 44106.*

Circle No. 145 on Reader Service Card

Oscilloscopes

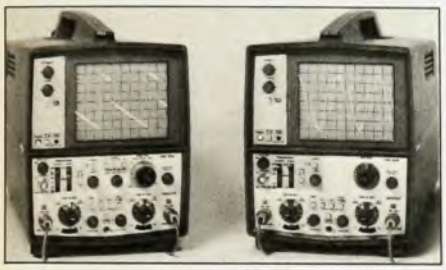
Five dual trace oscilloscopes are offered: The OS 4000 is a dual-trace digital storage instrument that combines flicker-free viewing of low-frequency signals, comparison of stored and real-time signals, pretrigger and post-trigger viewing, with output options for analog and digital recording, including unattended transient capture. The OS 3300B is a 50-MHz dual-trace, dual-time-base oscilloscope with sensitivity 1 mV/cm, time-base speeds to 10 ns/cm, accelerating potential 13 kV, and comprehensive triggering capabilities. The OS 1100 is a 30-MHz dual-trace oscilloscope with 1 mV/cm sensitivity, sweep rates to 20 ns/cm, delayed sweep, and signal delay features. The OS 260 is a dual-beam, 15-MHz oscilloscope with 2-mV/cm sensitivity and sweep rates to 50 ns/cm that provides unambiguous viewing of pulse waveforms and the ability to observe two simultaneous

one-shot events. The OS 245A is a compact dual-trace oscilloscope with 10-MHz response, 5-mV/div sensitivity, sweep rates to 100 ns/div, and $X-Y$ mode plotting capability.—*Gould Inc., 3631 Perkins Ave., Cleveland, OH 44114.*

Circle No. 146 on Reader Service Card

Oscilloscopes

The T932A and T935A general purpose oscilloscopes feature low cost. The dual-trace T932A features a 35-MHz bandwidth at 2-mV/div sensitivity; the T935A adds delayed sweep and is otherwise identical. Capabilities include a differential display mode; full sensitivity $X-Y$ (channel 1 versus



channel 2); ac or dc trigger coupling; variable trigger holdoff; channel 1, channel 2, or composite triggering; and selectable chop-alternate display modes. Modular circuitry is used to simplify calibration and repair. Display area is 8 × 10 cm; weight is less than 8.2 kg.—*Tektronix, Inc., Box 500 Beaverton, OR 97077.*

Circle No. 147 on Reader Service Card

Optical/filter detector

This series contains a wavelength selective filter and quantum detector in a single hermetically sealed TO-5 can. They operate in the ultraviolet, visible, and near infrared wavelengths using silicon, lead sulfide, or lead selenide quantum detectors as the sensing elements. The units are suited for applications requiring a high degree of electrical, optical, and mechanical reliability, even in hostile environments. A variety of ultraviolet, visible, and infrared channels are standard, covering the wavelength region from 200 to 5000 nm, with bandwidths as narrow as 10 nm.—*Infrared Industries, Inc., Eastern Div., 62 Fourth Ave., Waltham, MA 02154.*

Circle No. 148 on Reader Service Card

Plotter–printer

The microprocessor based 7245A desktop plotter–printer uses a bidirectional paper drive to advance the chart for plots with Y axis as long as 5000 mm. The charts can be returned to the starting point accurately. Thermally sensitive roll paper 61 m long is used. The combination of the bidirectional sprocket drive and microstep motor drive provides plotting repeatability of ±0.25 mm maximum from any point in any direction, and a minimum addressable resolution of 0.0079 mm. The smallest step is 0.025 mm. Highest speed is 0.5 m/s in each axis for positioning and 0.25 m/s when plotting. A 7 × 9 matrix font allows 88 columns to be printed across the 216-mm-wide paper. A larger 14 × 9 matrix font is used to print titles. Built in are 44 programmable instructions for point digitizing, user unit scaling, window plotting, graph rotation, seven dash-line fonts, and user definable characters. Standard printer escape code sequences enable tabs to be set and cleared, forms to be fed or reversed, character size to be changed, and character sets to be selected. Other features are paper and top-of-page sensors, a variable left margin, a 120-character buffer, and a built-in diagnostic test.—*Hewlett-Packard Company, 1507 Page Mill Rd., Palo Alto, CA 94304.*

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New Literature

Optical Interference Filters—A 12-pp. catalog of standard in-stock items: over 11,000 catalog filters in 865 combinations of wavelength, bandwidth and designs at every nm from 340 to 1060 nm and all important lines from 254 to 1064 nm. Types include narrow and wide band interference filters, long- and short-pass filters and neutral density filters.—*Ditric Optics, Inc., 247 R Maple Street, Marlboro, MA 01752.*

Molecular weight—Application note LS-3 describes molecular weight measurement techniques using the KMX-6 low-angle laser light scattering photometer.—*Chromatix, 1145 Terra Bella Ave., Mountain View, CA 94043.*

Frequency counters—Application note 200-1, 13 pp., discusses the four principal down-conversion techniques for extending the frequency range of counters into the microwave region: prescaling, heterodyne down conversion, transfer oscillators, and the harmonic heterodyne converter. Measurement speed, accuracy, sensitivity and dynamic range, signal-to-noise ratio, AM and FM tolerance, and amplitude discrimination of the four are compared.—*Hewlett-Packard, 1507 Page Mill Road, Palo Alto, CA 94304.*