

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.

Continuous Hydrogen Fluoride Infrared Laser

Helios has developed new cw single-line lasers that operate on the R-branch fundamental and overtone transitions of hydrogen fluoride. These new laser systems are modifications of existing Helios lasers. They produce unique wavelengths not available from any other laser, we are told. Their cw power levels go as high as 2.25 watts.

The mid-infrared hydrogen fluoride fundamental R-branch laser produces wavelengths of 2.4994 μm (2.10 W), 2.4758 μm (2.25 W), 2.4537 μm (2.10 W), 2.4330 μm (1.90 W), 2.4237 μm (1.65 W), 2.3957 μm (1.60 W), 2.3790 μm (1.15 W), 2.3636 μm (0.85 W) and 2.3494 μm (0.31 W) in cw operation. These transitions are the R0 to R8 lines of the $v=1$ to 0 hydrogen fluoride vibrational band. In the near-infrared, the overtone R-branch laser operates at 1.2839 μm (0.30 W), 1.2781 μm (0.50 W), 1.2729 μm (0.50 W) and 1.2683 μm (0.20 W); these transitions are the R0 to R3 lines of the $v=2$ to 0 vibrational band.

Applications for these new lasers include laser-tissue interaction studies and their corresponding medical procedures. They can also serve as high-power sources for infrared optical fibers and as sources for atmospheric transmission studies and missile-seeker countermeasures.

Helios has also introduced the model OCLII, hydrogen fluoride chemical

laser system (see photo). The OCLII is tunable to 13 individual wavelengths in the 1.29–1.42 micron region of the near infrared, with a single-line cw output specification of 7 watts on the stronger lines. *Helios, 1822 Sunset Place, Longmont, Colorado 80501*
Circle number 180 on Reader Service Card

Mobile Cryogenic Refrigerator for Goniometers

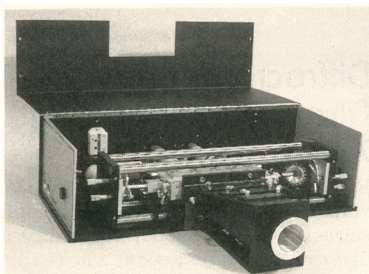
APD Cryogenics is offering a new cryogenic refrigerator. The CS-202G is intended for applications requiring movement of the refrigerator, specifically for goniometers. It achieves ease of movement through its axial design, which brings all gas hoses and instrumentation connections out the cold end, thus removing them from the sphere of motion.

The CS-202G was designed to fit into the cryostat carrier developed by Huber for use with its 511 or 512 goniometers. A vacuum shroud and a radiation shield have been developed for x-ray crystallographic applications. *APD Cryogenics, 1833 Vultee Street, Allentown, Pennsylvania 18103*

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Software to Simulate Dynamical Motion

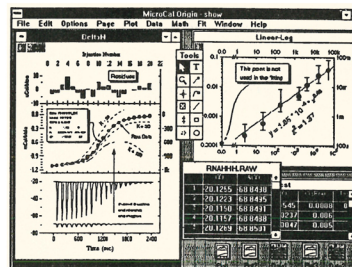
Knowledge Revolution has introduced its new Interactive Physics II software for Macintosh computers. It simulates and measures objects in motion, driven by physical laws. Interactive Physics II, a second generation of the firm's well-known Interactive Physics program, includes a new simulation engine, research-level modeling capabilities and custom tools for devising new simulated experiments. The software can also run



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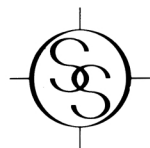
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on Apple Computer's System 7 and Quicktime.

The user can build and model simple or rather complex motion experiments on the Macintosh and see the results in full animation. Interactive Physics II is intended for educators as well as people seeking to explore motion in various real physical situations. The software lets users draw and build any number of objects, such as squares, rockets and cars, on a Macintosh screen, define motion parameters and then immediately run the simulated experiment. The dynamic simulation engine mathematically creates smooth, animation-like simulations whose measurement data can be displayed simultaneously in graphical, meter or table format.

The new software can create and run solar system simulations, molecular gas models, electromagnetic phenomena and chaotic processes. New tools (pulleys, pin joints, actuators, rods, motors, analytical and custom forces) enhance the software's ability to model a great variety of real physical systems. The retail price is about \$400. *Knowledge Revolution, 15 Brush Place, San Francisco, California 94103*

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Underwater Photometer for Ultraviolet to Infrared

International Light is offering a portable research radiometer/photometer with nine decades of dynamic range. The new Model IL1700 can be supplied with a wide variety of underwater detectors. It has band-pass filters for visible and infrared measurements, and it can integrate dose measurements over time.



The IL1700 can be operated remotely by computer. It provides direct readings in any optical units. Standard features include auto-zeroing, auto-ranging, memory and a current-reading range from 0.3 picoamps to 2

milliamps with $3\frac{1}{2}$ digit resolution. The instrument's spectral range extends from 190 nm in the ultraviolet to 3.5 microns in the infrared. Power options include ac, dc and internal batteries. These underwater detectors are all pressure tested to 120 ft. Prices begin at \$2050. *International Light, 17 Graf Road, Newburyport, Massachusetts 01950*

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Tensor Analysis Software Based on Mathematica

MathSolutions has released MathTensor 2.0, a system (based on Wolfram's Mathematica) for performing tensor analysis. MathTensor is the largest Mathematica package yet developed outside of Wolfram Research, we are told. It adds some 250 new functions and objects to Mathematica for tensor analysis.

MathTensor is a general tool for handling both indicial and concrete tensor indices. It was developed by cosmologists Leonard Parker and Steven Christensen. Standard objects such as the Riemann tensor, Ricci tensor, metric and others are built into the system along with common functions like the covariant derivative, index commutation, raising and lowering of indices, and various differential-form operations. Programming constructs are provided so that users can build their own tensor applications.

MathTensor contains over 25 000 lines of Mathematica code held in nearly 100 files, using 1.5 megabytes of disk space. MathTensor will run on any machine that runs Mathematica and has sufficient RAM memory (generally 8 megabytes or more) and disk space. It runs under version 1.2 or 2.0 of Mathematica. MathTensor sells for \$500 on personal computers, and \$750 on single-CPU UNIX workstations. Server and site licenses and upgrade contracts are available. Extensive documentation is provided. *MathSolutions, PO Box 16175, Chapel Hill, North Carolina 27516*

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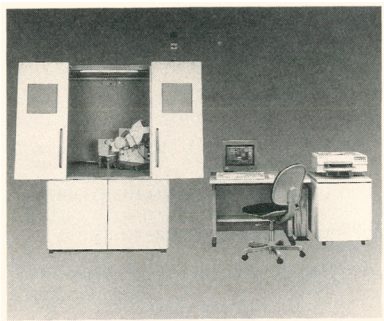
Diffractionmeter with Direct-Drive Rotating X-Ray Source

Rigaku USA has introduced a vertical version of its D/MAX diffractionmeter series. The new model has a direct-drive rotating-anode x-ray source that

NEW PRODUCTS

allows simultaneous use of both line and point focuses. The new D/MAX-1500V diffractometer's direct-drive capability reduces the vibration and noise associated with belt-driven systems, we are told. The system also eliminates particle generation, making it suitable for clean-room applications.

The high intensity of x-rays generated by the D/MAX-1500V coupled with its improved stability facilitate the analysis of thin-film specimens and microscopic samples. The system is particularly suited for materials characterization and structural anal-



ysis in chemical, semiconductor and other clean-room applications. The instrument's automatic switchover feature lets the user make concurrent measurements employing the optical systems of both the point and line-focus modes with a single wide-angle goniometer.

The D/MAX-1500V's triple-axis goniometer has been redesigned with extended 2θ scan ranges from -10° up to 154° . An optional 285-mm-radius configuration achieves up to 164° . Rigaku USA, Northwoods Business Park, 200 Rosewood Drive, Danvers, Massachusetts 01923

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Fast Digital Storage Oscilloscope

Gould describes its new digital storage oscilloscope as the fastest such instrument in its price class. The new 4096 DSO, which sells for \$11 000, can digitize at 1.6 gigasamples per second with repetitive signals being captured at up to 5 GS/sec. For transient signals, the time resolution of the new instrument is 625 picoseconds. This is important for nuclear and particle physics, where conventional digitizing instruments are generally too slow to show fine detail.

Analog engineers can avail themselves of the new oscilloscope's capability to view high-frequency signals. Transient signals up to 200 MHz can

be captured with eight points per cycle for accurate reproduction. Once captured, they can be measured, processed and analyzed by an optional waveform processor. The 8-bit vertical resolution of the analog-digital converters used in the 4096 DSO serves to display the fine detail of a signal in both time and amplitude, even at the most sensitive ranges of the attenuator. The oscilloscope incorporates sophisticated triggering facilities that facilitate the capture of elusive signals.

The user can capture both an overview of the signal and detailed sections of the waveform by using the dual timebase capability. The instrument has a built-in color plotter and IEEE-48 and RS-423 interfaces. Gould Electronics Test & Measurement Group, 8333 Rockside Road, Valley View, Ohio 44125

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New Literature

Infrared spectrometers—The National Institute of Standards and Technology has just published the most accurate atlas to date for the calibration of infrared spectrometers. The increased accuracy is due to the fact that the data are based on frequency rather than wavelength measurement techniques. The publication also lists lower-state energy levels for the transitions as well as estimated intensities for calculating the spectral appearance at different temperatures. The book includes statistically determined and documented uncertainties for the listed transitions, discussion of the intensity calculations and pressure shifts, and a bibliography of frequency and intensity measurements. The authors also have available a set of four floppy disks that give a complete list of all the molecular transitions that went into making the spectral maps.

The text includes a description of heterodyne frequency measurement techniques, details of the analysis including the Hamiltonians and least-squares fitting, and calculation procedures. Intensities and line shape parameters are also included. The atlas has several hundred spectral maps and tables for the various calibration molecules. To order *Wavenumber Calibration Tables from Heterodyne Frequency Measurements* (NIST Special Publication 821), by Arthur Maki and Joseph Wells, contact the Superintendent of Documents, US Government Printing Office, Washington, DC 20402. Order by stock number 003-003-03136-4. The price is \$31.

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400-420	MHz	14 KW	.0002 DC
410-430	MHz	225 KW	60 μ S
950-1550	MHz	1 KW	.1 DC
900-1040	MHz	5/15 KW	1 μ S
1.2-1.35	GHz	500 KW	2 μ S
1.25-1.35	GHz	4 MW	.2 μ S
2.1-3.8	GHz	100 W	1.5-7 μ S
3.2-3.3	MHz	10 KW	.001 DC
2.7-2.9	GHz	250 KW	0.8 μ S
2.7-2.9	GHz	1 MW	1 μ S
3.1-3.5	GHz	1 MW	1.2 μ S
2.7-2.9	GHz	5 MW	2-3 μ S
5.4-5.8	GHz	250 KW	.001 DC
5.4-5.9	GHz	500 W	.002 DC
5.4-5.8	GHz	5 MW	.001 DC
6	GHz	1 MW	1 μ S
6.2-6.6	GHz	200 KW	.37 μ S
8.7-8.9	GHz	1.2 KW	.045 DC
9.375	GHz	40 KW	5-12 μ S
8.5-9.6	GHz	250 KW	.0013 DC
9.375	GHz	100 KW	5-12 μ S
9.1	GHz	400 KW	1.8 μ S
13.8-14.2	GHz	70 KW	.001 DC
15.5-17.5	GHz	135 KW	33-13 μ S
24	GHz	40 KW	.15 μ S
35	GHz	80 KW	.001 DC

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4-21	MHz	40 KW
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160-350	MHz	100 W
200-2000	MHz	40 W
385-575	MHz	1.5 KW
750-985	MHz	1 KW
950-1550	MHz	150 W
1.5-5.0	GHz	150 W
1.7-2.4	GHz	1 KW
1.7-2.4	GHz	10 KW
4.4-5.0	GHz	1 KW
7.25-8.8	GHz	150 W
7.4	GHz	2 KW
8.5-9.6	GHz	1 mw
8.7-10	GHz	150 W
16-17	GHz	40 mw

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250 KW Hard Tube	16 KV	16 A .002 DC
405 KW Float's Dk	20 KV	20 A .1 DC
500 KW Line Type	22 KV	28 A .001 DC
1 MW Hard Tube	25 KV	40 A .002 DC
3 MW Line Type	50 KV	60 A .30 μ S
10 MW Line Type	76 KV	135 A .001 DC
13 MW Line Type	135 KV	112 A .3 μ S
17 MW Line Type	17 KV	1000 A .5 μ S

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