

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.

Surface Electron Diffraction Imaging and Analysis

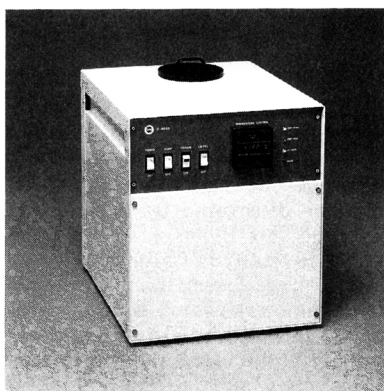
K-Space Associates has introduced a new imaging and analysis system for surface electron diffraction. The Model KSA300 is a computer-controlled CCD array imager intended for both RHEED and LEED techniques. The system utilizes user-selectable on-chip time integration to improve signal-to-noise ratio and to facilitate the recording of diffraction patterns in a time-resolved mode. The instrument is designed primarily for the quantitative analysis of RHEED patterns, thus allowing users to study, monitor and control thin-film deposition processes in real time.

The camera head of the KSA300 is thermoelectrically cooled to minimize dark current. It is interfaced to an AT486 computer, and a menu-driven software package is included to permit multiple line scan and multiple-region recording down to 0.03-second time resolution. Eight selected areas of the pattern can be tracked simultaneously for LEED I/V analysis. The software offers access to extended memory, permitting up to 4096 sequential line scans, or 8 full-frame images, to be stored in fast buffer memory. Diffraction data may be transferred to disk for archiving and analysis. Extensive analysis routines are provided for determination of in-plane lattice spacing, in-plane coherence lengths and deposition rates. *k-Space Associates Inc, 2379 Leslie Circle, Ann Arbor, Michigan 48105*

Circle number 180 on Reader Service Card

Gas Purifier for Industrial Excimer Laser

Applied Photonics has introduced its new Model C-8000 cryogenic gas purifier for industrial excimer lasers. The C-8000 is claimed to extend laser gas



life and the intervals between required servicing. The purifier's cryo-trap and heat exchanger are intended to improve laser beam quality and pulse stability.

The automated purifier includes an automatic liquid nitrogen refiller. The Model C-8000 is designed for unattended operation. Its cabinet is a sealed, gas-tight safety enclosure. The electrical system includes a remote control option for computer control; it follows TUV and IBM standards.

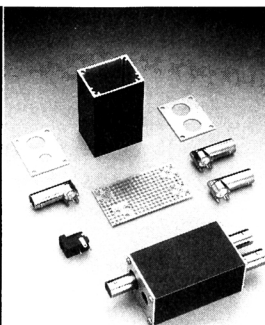
Plumbing connections are stainless steel VCR at all service points, and internal components are designed for convenient access. The operating gas pressure ranges from 500 to 4400 millibars (absolute). The gas circulation flow rate is 25 standard liters per minute at 4000 millibars. *Applied Photonics, 97 Marcus Boulevard, Hauppauge, New York 11788*

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Optical Characterization for Magnetic Disk Films

N&K Technology, a new company in Silicon Valley, is offering an optical analyzer for characterizing the hydrogenated carbon overcoat of magnetic disks. This instrument simultaneously determines thickness, optical con-

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METHODS IN COMPUTATIONAL NEUROSCIENCE

August 3-31, 1993 at the Marine Biological Laboratory, Woods Hole, MA. This is an intensive, four week course that addresses issues relevant to computational neuroscience: the study of how the biophysical and biochemical properties of neurons and synapses, together with the architecture of neural circuits, produce animal behavior. The program of the course consists of two daily lectures, presented by a faculty of 30 established investigators, computer simulation tutorial projects, and an individualized modeling project. The course is designed for advanced graduate students, postdoctoral fellows, and faculty members who have trained in a variety of disciplines, including neurobiology, physics, electrical engineering, computer science, and psychology. Admission in the course is limited to 23 students. *Directors: David Kleinfeld, and David W. Tank, Biological Computation Research Department, AT&T Bell Laboratories, Murray Hill, NJ.*

Tuition: \$1500 (includes room and board).
Partial financial aid is available.

APPLICATION DEADLINE: May 21, 1993

For admission application and information contact
Doranne Chrysler, Admissions Coordinator,
Marine Biological Laboratory, Woods Hole, MA 02543
(508) 548-3705, Ext. 401

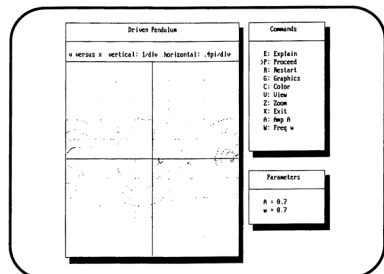
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New

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CHAOS DEMONSTRATIONS presents an inviting environment for exploring chaotic dynamics. The program has a broad range of uses, from learning to research.

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For the IBM PC

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stants and hydrogen content of the carbon film, whether or not the disks are textured. It also ascertains the rms surface roughness of the substrate. Furthermore, the instrument can characterize the lubrication layer. It relies on a nondestructive spectroscopic technique. The user follows prompts displayed on the computer screens. The only necessary input information is magnetic alloy composition.

The N&K optical analyzer determines the index of refraction, $n(\lambda)$, and the extinction coefficient over a wide wavelength range, from 200 to 900 nm. Knowledge of these parameters over such a wide spectral range furnishes information about intrinsic material characteristics. For example, as a carbon film becomes more diamond-like, its spectral peak shifts towards shorter wavelengths. The technology is based on dispersion relations discovered by Rahim Forouhi and Iris Bloomer at San Jose State University in California.

In the past, determining these optical parameters over a wide spectral range required the use of a spectroscopic ellipsometer. But an ellipsometer cannot provide $n(\lambda)$ and $k(\lambda)$ if the disks are textured. Additionally, establishing the hydrogen composition of carbon films required something like Rutherford scattering. The information provided by the new optical analyzer can be used for quality control or to establish a correlation between optical constants and desired material properties of carbon. *N&K Technology, 333 Cobalt Way, Suite 107, Sunnyvale, California 94086*
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Ambient Scanning Probe Microscope

Park Scientific Instruments has introduced a new ambient scanning probe microscope, the AutoProbe CP. It is a research-oriented instrument fully compatible with the firm's other AutoProbe microscopes. The lowest priced member of the line, the AutoProbe CP is based on the same digital-signal-processing control electronics and uses the same proprietary position sensors and closed-loop, three-dimensional scanner positioning as its more expensive predecessors. The instrument provides scan linearity of better than one percent under all conditions, we are told, regardless of scan speed, scanner offset or scan direction, and independent of sample thickness. The scanner position is measured directly, eliminating the need for software modeling that can produce inaccurate measurements

and distortions.

The AutoProbe CP employs a fully motorized tip-to-sample approach, prealigned cantilever assemblies and the Windows operating environment. A high-level macro programming language gives the user full control through simple commands and permits easy set-up of simple, one-button scan and measurement sequences for routine tasks.

The system can be configured to include all the latest scanning probe techniques, including atomic force microscopy, scanning tunneling microscopy, lateral force microscopy, noncontact magnetic force microscopy, and electrochemical and liquid cell SPM. *Park Scientific Instruments, 1171 Borregas Avenue, Sunnyvale, California 94089*

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Another New Version of Mathematica

Wolfram Research has introduced Mathematica 2.2, a significantly enhanced version of its software system for technical computing. This new version includes several thousand enhancements and new features, involving all the major areas of Mathematica: numerical, symbolic and graphical computation; programming; and notebook interfaces. Some of these new features and enhancements are additional capabilities for linear algebra and differential equations, a new on-line reference guide, an enhanced notebook front end that includes a capability to browse functions, and an extended and improved Windows version.

Mathematica 2.2 is available for all platforms supported by Mathematica. For many of these platforms, the new version includes machine-specific improvements. Mathematica 2.2 improves upon many of the program's numeric functions. It can now recognize sparse linear systems and solve them faster. Equation-solving capabilities now include a more sophisticated handling of symbolic matrices. New interval arithmetic capabilities have been added to facilitate rigorous error estimates for numerical computations.

Mathematica's new symbolic capabilities include more sophisticated treatment of singularities in definite integrals. In addition, solutions of symbolic differential equations have been greatly enhanced. The system can now generate symbolic solutions to systems of nonlinear ordinary differential equations, additional Riccati equations and first-order partial dif-

NEW PRODUCTS

ferential equations. New packages have been added in such areas as spline fitting, variational methods, elliptic integrals and music. A new graphic package lets the system plot implicit functions of three variables and construct isosurfaces from three-dimensional data sets. Another new graphics package defines pointers and arrows that can be used in plotting vector fields. Existing packages in graphics, statistics, numerical limits and Fourier and Laplace transforms have also been significantly enhanced. *Wolfram Research, 100 Trade Center Drive, Champaign, Illinois 60120-7237*

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Compact Residual-Gas Analyzers

The NGS division of MKS Instruments has introduced an expanded series of residual gas analyzers. The new PPT Series compact residual gas analyzers are controlled by PC-based software. Each analyzer consists of a single electronics control unit that mounts directly onto the quadrupole sensor flange.

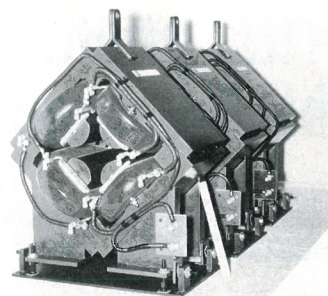
The PPT Series identifies molecu-

lar masses up to 200 amu. The analyzers offer Faraday-cup electron-multiplier detectors, convenient software and 16-channel multiplexing operation. Reliability is enhanced, we are told, by built-in electronic circuitry that monitors the principal sensor parameters. The quadrupole is calibrated against the firm's NIST-traceable spinning-rotor gauge. *MKS Instruments, 6 Shattuck Road, Andover, Massachusetts 01810*

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Electromagnets for Charged-Particle Beams

Walker Scientific has introduced a new line of standard and custom electromagnets for focusing, deflecting and analyzing all types of charged-particle beams. These new beam optics systems include analyzing, deflecting, switching, quadrupole, octopole, corkscrew and custom-beam magnets. Engineered to customer requirements, dipole magnets with fields above 5 kilogauss have the pole edges contoured to approximate a Rogowski profile so as to minimize edge saturation. Analyzing magnets can be supplied with homogenizing



gaps and field clamps.

Quadrupole magnets can be produced with yokes and pole roots that operate at flux densities below 12 kilogauss to provide almost linear response to excitation currents. Magnetic and geometric center lines coincide to within 0.05 mm, and pole-to-pole symmetry and gap uniformity are held to the same tolerance. The new beam electromagnet systems can include power supplies with 0.001% current regulation.

Walker Scientific's new beam magnet offering reflects the firm's recent acquisition of the Magnecoil Corporation. *Walker Scientific, Rockdale Street, Worcester, Massachusetts 01606*

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3 kW HV Generator for X-RAY DIFFRACTION

HIGH PERFORMANCE LOW COST • COMPACT SIZE

Spellman has once again refined the state-of-the-art in XRD High Voltage Generators through our advanced high frequency resonant conversion techniques coupled with sophisticated digital technology. The DF3 provides the power and control functions required for practically all X-ray diffraction applications including the floating filament circuits. The greater than 85% efficiency results in higher packaging density with air cooling in a 5 1/4" chassis

SPECIFICATIONS:

- **Maximum Output Power:** 3kW / 4 kW
- **Input Voltage:** 198-242V ac 50/60 Hz
- **Output Voltage:** 0 to 60 kV, negative polarity
- **Output Current:** 0 to 80 mA
- **Regulation:**
 - Output Voltage: 0.005%
 - Emission Current: 0.01%
- **Filament Voltage:** 14V ac (dc available)
- **Filament Current:** 5A (12A max available)
- **Size:** 5 1/4" (133mm) H x 19" (483mm) W x 22" (559mm) D

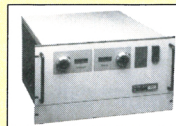
FEATURES:

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- Automatic Ramp of the high voltage and emission current to preset values
- Continuous adjustment of high voltage and emission current
- Fail Safe X-Ray ON Lamp Circuit
- Water flow control for X-Ray tube
- Complete system Fault Diagnosis
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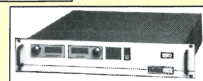
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