

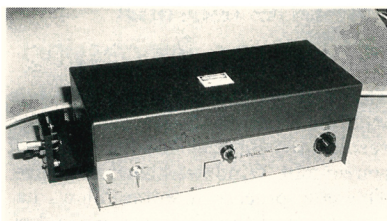
NEW PRODUCTS

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.

CO₂ Laser with Variable Pulse Width

Pulse Systems has introduced a new variable-pulse-width CO₂ laser. The pulse width of this Model VPW LP-30 can be digitally selected for any number of preset widths from 5 microseconds to 1 millisecond. Alternatively, the pulse width can be continuously variable over that same range.

The energy per pulse or the peak



power can be held constant over durations ranging from 15 microseconds to 1 millisecond. The initial spike usually contains no more than 2 or 3% of the energy. The VPW LP-30 can be used to determine the optimum laser pulse width for a specific laser interaction under study. *Pulse Systems, 422 Connie Avenue, Los Alamos, New Mexico 87544*

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Channel Electron Multipliers Made of Ceramics

Topac is offering a line of ceramic channel electron multipliers from the German firm Dr. Sjtus Optoelectronic. This KBL series of ceramic electron multipliers can be fabricated in a variety of shapes and sizes to suit special applications. They were originally designed for rocket-borne applications, where the requirements for small size and ruggedness are paramount. Versions of these devices have flown on NASA and Euro-

pean Space Agency missions.

Electro-optically the ceramic devices are similar to traditional all-glass designs, but they are claimed to have lower noise and faster rise times. The reduced lead-glass secondary-electron emissive channel is formed on the inner wall of the ceramic body. It is curved to reduce ion feedback. The ceramic "block" bodies make mounting very straightforward. The devices can be produced in a range of shapes with different sizes of input cones or slits, or even with the input and output set at an angle to each other for extra compactness.

Applications of these channel electron multipliers include all sorts of pulse counting applications that require high gain, for example: mass spectrometry, ultraviolet and x-ray spectroscopy and surface analytical instrumentation. There are 10 standard designs, and customized versions are available on request. *Topac, 99 Derby Street, Suite 303, Hingham, Massachusetts 02043*

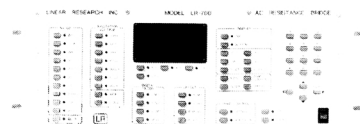
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World's Smallest Commercial Photomultiplier Tube

Hamamatsu describes its Model OPTO-8 as the "world's smallest photomultiplier tube ever offered in commercial quantities." It is housed in a TO-8 metal package. The OPTO-8 is claimed to offer the performance of much larger photomultiplier tubes in a size that until now has been the exclusive domain of semiconductor devices. OPTO-8 has a number of advantages, in many applications, over larger tubes and avalanche photodiodes. It allows photomultiplier tubes to be mounted on PC boards. It also provides fast response at low cost.

The OPTO-8 was designed with Hamamatsu's proprietary computer-aided design software and manufactured with ultra-fine processing techniques. It utilizes a dynode that was

NEW FOR 1993 LR-700



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- 2x16 characters alphanumeric
- Dual 5½ digit set resistance (R, X)
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- 10 nano-ohms display resolution
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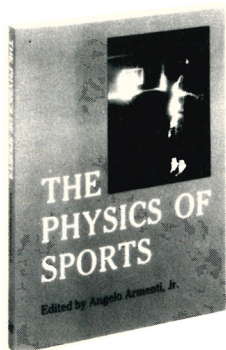
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The Physics of Sports

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Villanova University

Applying fundamental laws of physics, this armchair volume puts to rest a number of popular sports-related misconceptions and accounts for phenomena that, for many, have been a source of wonder since childhood. Why does a golf ball have dimples? How can a sailboat travel almost directly into the wind? The answers are eye-opening—for professionals, students, and teachers in the fields of both physics and sports.

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created by computer simulation. OPTO-8 is the first photomultiplier tube small enough to fit within the confines of a semiconductor package. It is seven times smaller than Hamamatsu's next smallest end-on photomultiplier. *Hamamatsu, 360 Foothill Road, P.O. Box 6910, Bridgewater, New Jersey 08808-0910*
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Manufacturing Tools for Flat Panel Displays

Semiconductor Systems has entered the market for large, area-flat panel display manufacturing systems. Its first product for this field, the APEX panel-processing system, is designed to coat and develop the ultra-thin photosensitive films used to pattern the displays. Virtually all of the emerging flat panel technologies—active matrix liquid-crystal displays, electroluminescent displays, field-emission displays—require a photolithographic sequence to pattern the fine dots or pixels on the viewing screen surface.

Engineered to handle rectangular or square substrates of up to 500 mm × 500 mm, the APEX design incorporates the firm's cluster-tool architecture. Flat panel substrates move between processing steps via an automatic, programmable, rotating robot arm. Modules carry out substrate cleaning, adhesion priming and photoresist processing. APEX has a random-access cluster design for flexibility and easy interfacing with lithography tools. *Semiconductor Systems, 47003 Mission Falls Court, Fremont, California 94539*
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Magnetic Bearing Turbomolecular Vacuum Pump

Leybold's new turbopump 1000MC magnetic-bearing turbomolecular pump is designed for applications such as particle-beam accelerators, plasma etching and coating. A permanent-magnetic passive bearing suspends the pump rotor. The pump shaft position is monitored by an axial sensor that continuously adjusts the rotor position in case of deviation. Two lubricant-free bearings can stabilize the rotor shaft in the event of severe mechanical impact. This low-vibration, convection cooled pump requires no lubrication on other maintenance.

The firm's new Turbotronik NT30



frequency converter is a solid-state power unit that requires no backup batteries. It fits onto a 19-inch rack. *Leybold Vacuum Products, 5700 Mellon Road, Export, Pennsylvania 15623*
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On-Line Monitor for Plasma Processing

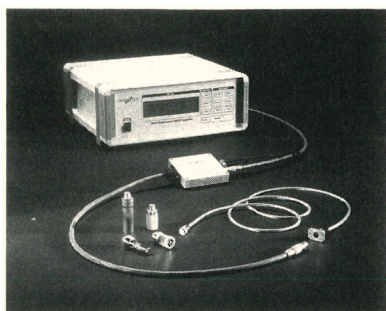
The new PPM 421 plasma process monitor from Balzers promises high resolution, on-line monitoring and convenient Windows-based software. The new process monitor allows optimization of the plasma process during developmental studies and higher yield during production. The PPM 421 is suited for all types of plasma processing, including dc, radiofrequency and microwave or plasma arcs. Applications range from cleaning and surface modification to plasma-assisted coating and etching.

On-line monitoring is accomplished by measuring the mass-resolved energy distribution of neutrals and ions (positive and negative) in the plasma. Energy resolution is better than 0.3 eV over the whole energy range up to 500 eV. The standard molecular mass range up to 512 amu can be extended to 2048 amu. These specifications are achieved by the use of a differentially pumped Balzers QMA 400 quadrupole mass analyzer with an energy analyzer inserted between the ion optic source and the mass filter.

Using Balzers QUADSTAR 421 software package, the PPM 421 operates under Windows 3.1. Recording additional plasma-process parameters facilitates correlation of the measurement results with process products. *Balzers, 8 Sagamore Park Road, Hudson, New Hampshire 03051*
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Low-Noise High-Temperature SQUID Devices

Conductus has introduced what it describes as "the first commercially available low-noise 77-K SQUIDS". They are part of the firm's new iMAG series of sensors and control electronics. The first iMAG products include liquid-nitrogen-temperature SQUID magnetometers with less than 300 fT/ $\sqrt{\text{Hz}}$ noise at 1 Hz, liquid-helium-temperature SQUIDS, an ultracompact flux-locked loop and a 3-channel, autotuning microprocessor-based SQUID controller. The flux-lock loop uses optical-fiber communication to eliminate shielding and grounding problems. Forthcoming iMAG components include liquid-helium-temperature gradiometers, magnetic coupling components and addi-



tional multichannel controllers. *Conductus*, 969 West Maude Avenue, Sunnyvale, California 94086

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Ion Beam Machining with Electron Microscopes

FEI has introduced the DualBeam FIB/SEM workstation, which it describes as "the first commercial focused ion-beam tool to combine a digital field-emission scanning electron microscope and high-performance focused ion beam into a single integrated package." Designed to process samples ranging from packaged integrated circuits to whole production wafers, the DualBeam provides a full range of gallium ion-beam micromachining, metal deposition and scanning ion microscopy plus the high-resolution imaging and microanalysis capabilities of Schottky-emitter field-emission microscope with an (optional) energy dispersive x-ray system.

DualBeam places the specimen tar-

get area in position for simultaneous ion beam cross-sectioning and electron-beam viewing. Separate scan generators for the two beams permit coupled or independent scan patterns and magnifications. Electron-beam imaging during milling helps define milled features without repeated tilting. Immediate high-resolution SEM imaging after ion-beam milling also eliminates sample transfer and subsequent exposure of the milled cross sections to atmospheric contaminants. Integrating both electron and ion beams into a single system, we are told, provides an expanded range of new capabilities not possible with individual stand-alone ion-beam and electron microscopes. *FEI Company*, 19500 N. W. Gibbs Drive, Suite 100, Beaverton, Oregon 97006-6907

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Copper-Filled Conductive Adhesive

Syon is offering a new, highly conductive copper-filled epoxy for conductive joints and rf shielding. Syons TRU-BOND is a two part, electrically conductive adhesive that provides good electrical and thermal conductivity at a fraction of the cost of silver-filled adhesives, we are told. With a volume resistivity of 0.002 ohm-cm, this solventless resin has a cure time of 2 hours to a hardness of 90 Shore D.

Useful for conductive paths and in applications that cannot tolerate silver migration, TRU-BOND 215 has a tensile shear strength of 1500 psi at 73° F. Shelf life is one year, and the material has a pot life of 45 minutes. The adhesive is available in the Syon Acupak and in pints, quarts and gallons. *Syon Corporation*, 280 Elliot Street, Ashland, Massachusetts 01721

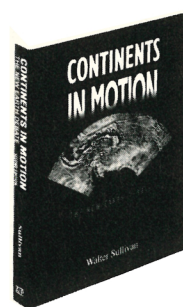
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New Literature

Optics—Grasenby Optronics is offering, free of charge, a two-sided, laminated guide to optical units. The guide is meant to be a convenient reference for photometric, radiometric and fiberoptic measurements. It has tables of photometric and radiometric quantities and units as well as absolute and relative fiberoptic measurements. Diagrams illustrate typical measurement techniques and graphs show typical detector responses. There are also tables of photometric illumination, luminance and conversion factors from photometric to radiometric units. *Grasenby Optronics*, 12152 Research Parkway, Orlando, Florida 32826-3207

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