

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.

Program Combines MRI, CT and PET Scan Data

Scanditronix has introduced what it describes as "the first computer software program that combines the anatomical information from magnetic-resonance imaging or computed tomography with positron-emission tomography data." The program was developed by A.C. Evans and his colleagues at the Montreal Neurological Institute. Scanditronix has been licensed to sell the program.

The program stores data for anatomical regions of interest, which the user combines with MRI or CT data for each subject. The combination produces anatomical templates that can be overlayed on each PET slice to indicate precise anatomy. The user can make global adjustments to scale, orientation and position to obtain an initial match. Individual regions of interest can then be moved, deleted or redrawn as needed. *Scanditronix, 106 Western Avenue, Essex, Massachusetts 01929.*

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Microscope with Atomic Resolution

A new ultra-high-resolution lens developed by VG Microscopes, a British firm, has yielded chemically sensitive images of semiconductor surfaces with atomic resolution. These are the first such images ever obtained from a commercial electron microscope, we are told. The instrument for which



the new lens was developed is the HB501 scanning transmission electron microscope with field emission source, operating at 100 kV.

The images are formed by scanning a 0.22-nm-diameter electron beam across a suitably oriented crystalline specimen. A special detector collects only those electrons scattered through large angles. The intensity of this signal is proportional to $Z^{3/2}$, where Z is the atomic number, and so the heavier atoms appear brighter in the atomic-resolution image. The illustration on this page shows the interface region between a silicon substrate and an alloy layer of $\text{Si}_{0.61}\text{Ge}_{0.39}$ deposited by molecular-beam epitaxy. The atom columns are individually resolved, and the diffuse alloy-silicon interface region is clearly visible, with the higher- Z alloy appearing brighter.

The combination of the field-emission source of the HB501 microscope, its ultra-high-resolution lens and the special detector "constitutes an important development in the field of high-resolution electron microscopy of materials," we are told. *YG Microscopes Ltd, Imberhorne Lane, East Grinstead, West Sussex, RH19 1UB, England.*

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Multidimensional Fast Fourier Analysis Software

Davis Associates offers its new Row-oriented Multidimensional Fast Transform Library for Fourier analysis. RMFTL is a comprehensive, integrated software system of optimized routines for multidimensional real and complex fast Fourier analysis and related functions. Its applications range from plasma diagnostics and astrophysics to medical imaging.

RMFTL employs a new, proprietary transform algorithm that is claimed to be more efficient than iteration of the Cooley-Tukey algorithm in multi-

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*Time varies depending on computer

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dimensional applications. The number of complex multiplications required by RMFTL decreases as the reciprocal of the dimensionality, relative to the number required by the iterative Cooley-Tukey method. There is no inherent upper limit on the dimensionality of the transforms RMFTL can undertake.

RMFTL computes transforms "across" the direction in which data are written within multidimensional arrays as readily as it does along the data stream. Consequently, RMFTL makes efficient use of data-file accesses when the array to be transformed is external to the computer's main memory. A measure of the significance of this efficiency is the reduction, from ten hours to about four hours, of the time required to evaluate a large external transform.

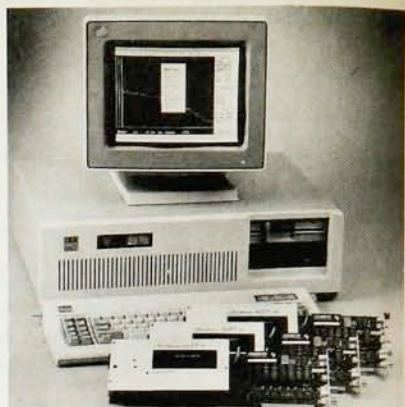
RMFTL extends the definition of the real transform to an arbitrary number of dimensions. This is said to provide an improvement of almost another factor of two when the multidimensional data array to be transformed is real. RMFTL transform execution time can be optimized with respect to the memory-access characteristics of the computer on which it is run.

Even though RMFTL reduces to the Cooley-Tukey method in the one-dimensional case, it is claimed to outperform other one-dimensional libraries by almost a factor of two. RMFTL is available on 9-track magnetic tape (object code only) for the IBM VM/CMS and DEC VAX/VMS operating systems. The fee for a lifetime license ranges from \$8500 to \$12 800. Alternative fee schedules are available. *Davis Associates, 43 Holden Road, West Newton, Massachusetts 02165.*

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Multichannel Analysis Plug-In Card and Software

The new Spectrum Ace from EG&G Ortec is the successor to the firm's well-known Ace multichannel analyzer plug-in cards for the IBM PC, PS/2 Model 30 and other compatible personal computers. It incorporates a 2 K, 4 K or 8 K ADC and memory on a 1½-slot standard PC card. When combined with its companion Maestro II MCA emulation software, it is said to provide a high-performance, computer-controlled multichannel analyzer, with instantaneously updated, high-resolution, color spectral displays and semiquantitative analysis.



The color display incorporates a system of drop-down menus and pop-up windows for ease of use. The Spectrum Ace also provides automatic peak-search, nuclide-identification and job-streaming capabilities. *EG&G Ortec, 100 Midland Road, Oak Ridge, Tennessee 37831-0895.*

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High-T_c Superconducting Thin Films

Superconductive Components Inc is offering thin films of high-critical-temperature superconducting materials in round, square and patterned forms. Both yttrium 1-2-3 and bismuth 2-2-2-3 superconducting thin films are available.

The films are about 1 micron thick, with typical critical temperature above 87 K and critical current of 100 000 amps/cm² on single-crystal strontium titanate substrates. These films can also be ordered with complete characterization, including x-ray diffraction data and critical-temperature measurements. The company will also prepare films patterned to user designs. *Superconductive Components, 1145 Chesapeake Ave., Columbus, Ohio, 43212.*

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Tubes for Accelerators and Tokamaks

The new TH 535 power tetrode from Thomson-CSF is suited for use in high-energy particle accelerators and tokamaks. It delivers up to 100 kW of continuous-wave rf power at 150 MHz, or 250 kW in pulses at 200 MHz. It has been chosen as a heating source for the French Tore-Supra tokamak, and it is currently under evaluation at CERN.

The TH 535 provides a high gain of 15 dB in common grid operation. It

uses Thomson's proprietary Pyroblock pyrolytic graphite grids and Hypervapotron cooling system. The new power tetrode joins Thomson's line of power grid tubes widely used in particle accelerators.

Thomson also offers three new high-voltage modulator tetrodes for particle accelerators. Specific applications include final-stage amplifier drives for power tetrodes, klystrons and gyrotrons. The new models TH 530, TH 573 and TH 558 are all cooled by the firm's Hypervapotron system.

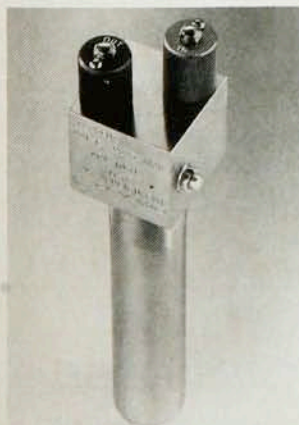
Among Thomson's new high-power klystrons for particle accelerators is the TH 2100, which delivers 40-MW peak power pulses at 3 GHz. This tube, which is available in several configurations, is principally intended for injector linacs. Several new medium-power klystrons are tailored for the new-generation of superconducting accelerators. The TH 2466, for example, delivers 5 kW power at 1.5 GHz. *Thomson Tubes Electronique, 38, Rue Vauthier, 92100 Boulogne-Billancourt, France*

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Liquid Silicon for Chemical Vapor Deposition

American Cyanamid has added high-purity hexachlorodisilane (HCDS) to its Cypure line of electronic-grade metalorganic source materials for chemical vapor deposition. HCDS is useful as a liquid replacement for the more hazardous silicon sources silane and dichlorosilane. Excellent film properties have been achieved with HCDS in applications such as silicon nitride deposition and polysilicon deposition, we are told.

HCDS, now available in research quantities, is shipped in Cyanamid's reusable cvd source bubbler, a high-integrity stainless steel package with electropolished interior walls and



valves, which protects the purity of the source materials. The bubbler is reusable. *American Cyanamid, One Cyanamid Plaza, Wayne, New Jersey 07470.*

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Stainless Steel Vacuum Gate Valves

Nor-Cal has added several new gate valves to its line of stainless steel vacuum valves. Their very slim profiles suit them for applications where space is limited, and their small volume reduces outgassing and speeds pumpdown. The internal mechanisms of these valves incorporate dry-film-lubricated needle bearings, and a new method is employed in the larger valves for damping the vibration caused by opening the gate. These features make the valves attractive for semiconductor processing and other vibration-sensitive operations.

The valve bodies are made of vacuum-furnace-brazed 304 stainless steel, and the welded stainless steel bellows have a short stroke for longer cycle life. The new gate valves are available with NW (ISO-KF), ISO, CF and ASA flanges, manual or pneumatically actuated with viton or copper seal bonnets, in port sizes from 1 1/2 to 12 inches. *Nor-Cal Products, 1512 Oregon Street, Yreka, California, 96097 (P.O. Box 518).*

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PC-Based System for Gamma Mapping

Canberra's MPA/PC system is a PC-based multiparameter system suitable for gamma-camera and coincidence mapping, energy-time correlation and similar applications. The MPA/PC card, in effect, converts 80386-based computers into flexible multiparameter data-acquisition and display work stations.

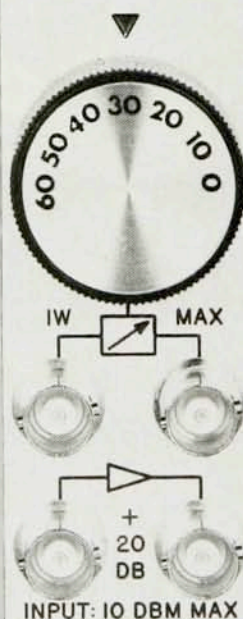
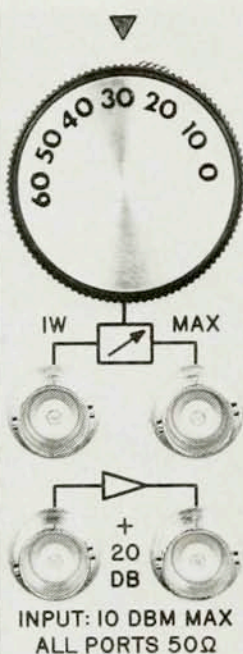
The system supports burst count rates up to 400 000 events/second. It has a full megabyte of on-board dual-ported memory, and it offers a high-throughput list mode. The new MPA/PC, we are told, offers ten times the performance of the firm's older series 88, at the same price. It supports up to eight ADCs, multiscalers and position processors. The PC card interfaces to an external busbox compatible with Canberra's ADCs and MCS modules. *Canberra Industries, One State Street, Meriden, Connecticut 06450.*

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