

## RESOURCES

*A summary of new products and services for materials research...*

**SEM for ICs:** A scanning electron microscope has been designed specifically to inspect integrated circuits. Controlled by a Sun workstation, the ABT-2200 from International Scientific Instruments places special emphasis on flexibility of sample handling, for both wafers and discrete ICs. The instrument is also optimized for low-voltage imaging of electrically sensitive circuitry. Automation features speed and simplify use in production and lab environments or where operators change frequently or vary in proficiency. The SEM can accommodate wafers up to 200 mm. A motor-driven eucentric stage provides x, y translation, z adjustment, and tilt and rotation control. A conical objective lens ensures high resolution even on steeply tilted wafers. The system uses a thermally assisted field emission electron gun operating from 500 V to 2000 V, producing 10 nm resolution at 1000 V beam energy. Stage control and automatic linewidth measurement software are available.

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**High Sensitivity Leak Detector:** The UL400 from Leybold Inficon can detect leak rates as low as  $2 \times 10^{12}$  atm cm<sup>3</sup>/s. In direct-flow mode, the UL400 can begin testing at an inlet pressure of  $10^2$  mbar (7.5 mtorr). By reducing pump downtime, this method reduces testing time, especially in the most sensitive detection range. The cold trap uses liquid nitrogen to increase the volume flow rate, keeping water vapor and other condensable gases out of the vacuum system. The UL400 microprocessor can perform many tasks automatically, such as controlling operation sequences, detecting and suppressing helium background variations, and logging data. This helps reduce the level of expertise required to operate the system, and ensures accurate results.

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**Ion Beam Source:** The ECR904 ion beam source from Microscience combines ECR plasma technology with ion beam extraction optics to produce a new kind of ion beam source. As the ECR process does not require a filament, the 904GR can work with reactive gases for extended periods of time. The source produces a 1.5 inch diameter beam with densities up to 3 mA/cm<sup>2</sup>. It also works at lower pressures than conventional ion beam sources, extending the range of operating conditions. Applications include RIBE and CAIBE for GaAs technology, precision milling for semiconductor laser fabrication, and optical structures.

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**Single and Four-Channel Cryopump Monitors:** Cryopump monitors, Models 818 (single channel) and 819 (four channel) from Lake Shore Cryotronics, are compatible with most major cryopumps. They perform over a broad range of temperatures (1.4 K to 475 K) and use silicon diode sensors. The monitors feature a four-digit temperature display in K, °C, and °F, or sensor voltage with high and low front panel programmable alarm function keys. An interface allows integration with vacuum control systems and computer hardware. The regeneration cycle can easily be varied. Model 819 features four sets of contacts for independent and simultaneous operation and can adapt to future system expansion. Up to four pumps can be operated from the cryopump monitor. The 819 can scan between channels with dwell times at 0 (skip), 5, 10, 30, or 60 seconds, independently set for each channel.

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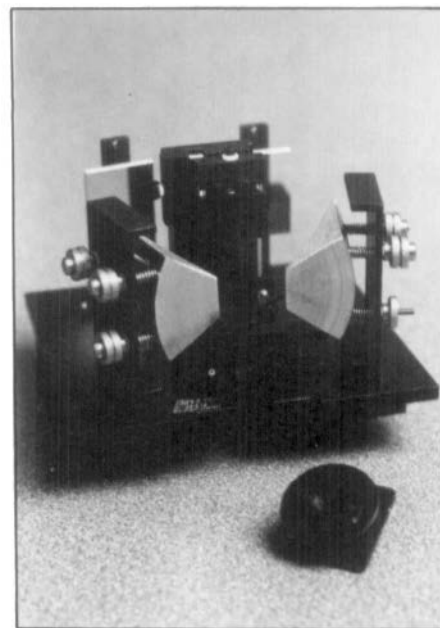
### **Theta Stage Laser Interferometer Feedback for Multi-Axis Positioning System:**

The Anorad Model RL-500 four-axis motion system combines three linear stages with a rotary stage to provide extremely accurate linear motion of a workpiece through a 0.5 inch cubic volume with rotational correction of up to 5 degrees. It is ideal for small area focus, process, and inspection tasks, such as mask alignments, laser scribing, and microscopic inspection. Accuracy over the 0.5 inch by 0.5 inch plane area of motion is better than 0.1 micron. The vertical projection accuracy of the x-y plane is 1.0 micron for the full 0.5 inch range of focus. Theta is accurate to 3 arc-seconds over the full 10 degrees of the plane's rotation. Plane mirror interferometers and retroreflectors are combined for x, y, and theta to achieve this accuracy. A precise linear optical encoder was used for the z axis. The short length of the direct drive motors enables a small footprint for the stage combination and provides a very stiff servo system. The four-axis system is stabilized by securing all interferometer and mechanical elements to a common massive granite surfaced plate.

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**ASTM Publications Catalog:** Free 1991 catalog describes 68 volumes of the *Annual Book of ASTM Standards* and several hundred related technical publications. ASTM standards and related publications are used worldwide to specify materials, assure quality, integrate production processes, promote trade, and enhance safety.

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**Beam Condenser with Diamond Cell**

### **Beam Condenser with Diamond Cell:**

The diamond compression cell, an accessory to Spectra-Tech's 4x Beam Condenser offers a cost-effective alternative to FT-IR microscopy for many analyses. This cell flattens hard materials such as minerals, rubbers, plastics, polymers, and drugs to the ideal thickness for transmission analysis. A screw-top fitting simplifies sample loading and removal. The 4x Beam Condenser allows a large image reduction without spherical aberrations.

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### **Workstation-Based Imaging for Light Microscopy and TEM:**

Imagist-2, a Sun-based image processor/analyzer for light microscopy and TEM applications, offers an advanced graphic display, true multitasking and multiuser capabilities, networking, 4 to 15 MIPS of processing power, built-in report generation, and optional desktop publishing. Complete system package also has programs for viewing and measuring stereo pairs or serial section reconstructions, and for automatically determining count, size, shape and distribution features. The imaging system automates complex procedures such as cell separation, particle segmentation, grain boundary reconstruction, inclusion analysis, and twin detection and removal. Princeton Gamma-Tech supports its Imagist-2 with a comprehensive service and applications support program.

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