

tailed treatment of Coulomb scattering, has become a classic. It is a well-thumbed-through book in my own library. The present volume is a fitting successor to the earlier work and a lasting monument to McDowell, who passed away on 13 June 1993.

A particular strength of *Charge Exchange and the Theory of Ion-Atom Collision* is the fine explanation of the physical ideas motivating the coordinate systems used in theoretical models of charge-exchange reactions. Another strong point is the comprehensive discussion of the various systems of coupled equations that result from different ways of representing the system's wavefunction. Also valuable is the detailed treatment of boundary conditions in Coulomb scattering and the role that continuum states play in charge-exchange reactions. While I lament the omission of much of the older book's material on classical scattering, the deeper understanding afforded by the unified approach of Bransden and McDowell is certainly a signal addition to the literature and will give readers a road map to follow in answering the two fundamental questions posed above.

As befits a volume in the *International Series of Monographs on Physics* published by Clarendon Press, the present book is free of major typographical errors. However, because of the high cost of the hardcover edition I would have preferred a paperback edition for the use of graduate students.

In conclusion, *Charge Exchange and the Theory of Ion-Atom Collisions* will be a valuable addition to the libraries of theorists active in heavy-particle and electron scattering in atomic and molecular physics.

EDMUND J. MANSKY

Georgia Institute of Technology  
Atlanta, Georgia

## Materials Fundamentals of Molecular Beam Epitaxy

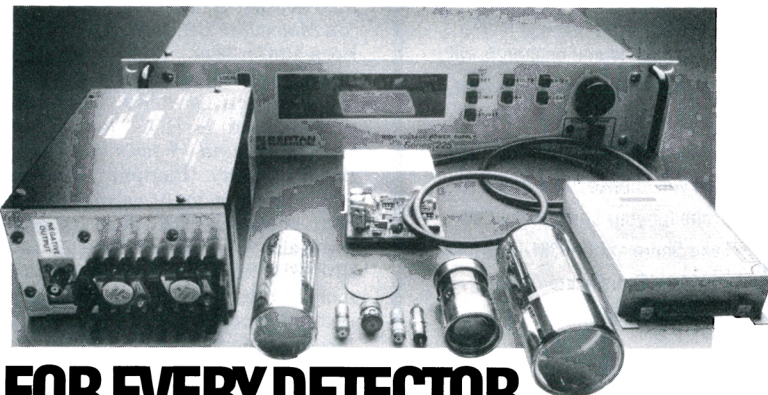
Jeffrey Y. Tsao

Academic, San Diego, Calif.  
1993. 301 pp. \$49.95 hc  
ISBN 0-12-70165-2

Some of the most elegant experimental solid-state physics explored in the last 20 years—from the integral and fractional quantum Hall effects to lower-dimensional systems, such as quantum wells, wires and dots—has

been enabled by the discovery and seemingly unending refinement of molecular beam epitaxy. MBE's ability to control the growth of layered semiconductor structures on the atomic scale has allowed its practitioners to create the thin film structures required for these elegant experiments with unparalleled precision. At the same time, progress in semiconductor physics has spawned a number of unique semi-

conductor devices, such as the high electron mobility transistor and the quantum well laser, making MBE an important production technology in high-performance devices. Yet even for those intimately familiar with the details of the exciting physics that these structures explore, the MBE growth process itself remains surprisingly mysterious and inaccessible. *Materials Fundamentals of Molecular Beam Epitaxy* by Jeff Tsao



## FOR EVERY DETECTOR, A HIGH VOLTAGE POWER SUPPLY THAT MATCHES PERFECTLY.

Bertan is the world leader in detector high voltage power supplies and can meet virtually every detector requirement, from lab to OEM. We can give you everything from regulated modules that are as inexpensive as unregulated supplies, to highly regulated instruments. Whichever you choose, you can be sure you're using the industry's standard for performance and reliability. In fact, we have MTBF success stories that others only dream about.

What's your application?

Photomultiplier tubes, proportional counters, avalanche photo diodes? Microchannel plates, channel electron multipliers or image intensifiers? Call Bertan because nobody knows high voltage power supplies like Bertan. Our units are being used across the board in research and industry. This unparalleled experience means that our people can help you get the best match of power supply to detector application. Ask for our free 102 page reference manual and catalog, "High Voltage Power Supply Solutions." Call or write. Toll free: **800-966-2776**.

In NY: 516-433-3110. Fax: 516-935-1766. Bertan High Voltage, Hicksville, NY 11801.

## THE MATCH MAKERS.



# BERTAN™

THE HIGH VOLTAGE PEOPLE™

Circle number 98 on Reader Service Card



## Wide Selection of Hall Probes

Our established sensor/probe manufacturing facility allows us to provide our customers with highly controlled gaussmeter/Hall probe performance specifications. Our scientists and engineers will work with you on specifying stem length, accuracy, field range, fragility, active area, and price to help you choose the correct probe for your application. Call Lake Shore at (614) 891-2243 for your free Gaussmeter Probe Selection Guide.

## High Performance Gaussmeters



● Measurement range  
0.02 mG to  
300 kG

- Frequency: DC and 10 to 400 Hz
- Dual display - Real time vs. Maximum or Setpoint
- IEEE-488 and RS-232C interfaces
- Light, compact weight
- Variety of probes: transverse, axial, cryogenic and custom assemblies

**LakeShore**  
Measurement and Control Technologies

Lake Shore Cryotronics, Inc.  
64 East Walnut Street  
Westerville, Ohio 43081-2399  
● Tel: (614) 891-2243

© Lake Shore Cryotronics, Inc. 6/93 M1

Circle number 99 on Reader Service Card

strips this fast-growing field of much of that shroud of mystery. The author clearly and thoroughly explains the underlying materials principles behind this exciting technology.

MBE as a subdiscipline has been around long enough to have generated a handful of texts that go beyond the straightforward conference proceedings, which typically cover only the latest developments for experts within the field. M. A. Herman and H. Sitter's *Molecular Beam Epitaxy: Fundamentals and Current Status* (Springer-Verlag, New York, 1989) and E. Kasper and J. C. Bean's *Silicon Molecular Beam Epitaxy* (CRC P., Boca Raton, Fla., 1988) both present unified overviews of the field from the perspectives of its finest practitioners, and E. H. C. Parker's *The Technology and Physics of Molecular Beam Epitaxy* (Plenum, New York, 1985) treats in great detail the actual MBE hardware that is so integral to the field. But Tsao manages to cut through the MBE technology issues most readers find so daunting and instead concentrates on the real materials science underpinnings of the growth technique. In so doing, he addresses a much wider audience than those hundreds of MBE crystal growers. Not only does the reader get a rare and insightful view into the MBE growth process, but he or she is treated to a remarkably complete course in the underlying disciplines of thermodynamics and kinetics, with careful explanations of when and where to apply each approach.

Thermodynamics pervades the majority of the topics discussed, and the book includes a good exposition of the essentials required for the in-depth treatments that follow. These include phase stability as it applies to vapor deposition, the concepts of congruent and incongruent evaporation, a thermodynamic treatment of surface roughening and a particularly detailed exposition of the cluster variation method, which is useful in treating pseudobinary III-V alloys.

Another theme running throughout the book is that of coherency and the effect of strain. Tsao gives an exceedingly thorough treatment of valence-force field calculations and how they can be applied to strain, and his treatment of critical thickness and dislocations in strained-layer epitaxy brings the classic ideas of Matthews and Blakesley several leaps ahead into the 1990s. His transformation of the classic deformation diagram concept of Harold Frost and Mike Ashby into a tool for predicting the kinetics of strain relaxation is a gem.

This text is not for casual bedtime reading. The author does a wonderful job, however, of summarizing the underlying physical underpinnings of each topic treated before embarking on his often exhaustive and complete mathematical treatments, thus allowing the reader to explore each area in the depth he or she desires. A complete set of references and a comprehensive set of problems at the end of each chapter make it an ideal text for an undergraduate or graduate course. It will be on my bookshelf for years to come.

JAMES P. HARBISON  
Bellcore  
Red Bank, New Jersey

## NEW BOOKS

### Fluids

**Algorithmic Trends in Computational Fluid Dynamics.** ICASE/NASA LaRC Series. M. Y. Hussaini, A. Kumar, M. D. Salas, eds. Springer-Verlag, New York, 1993. 423 pp. \$59.00 hc ISBN 0-387-94014-6

**Bénard Cells and Taylor Vortices.** Cambridge Monographs on Mechanics and Applied Mathematics. E. L. Koschmieder. Cambridge U. P., New York, 1993. 337 pp. \$64.95 hc ISBN 0-521-40204-2

### Geophysics

**Atmosphere, Weather and Climate.** Sixth edition. R. G. Barry, R. J. Chorley. Routledge, New York, 1992 [1968]. 392 pp. \$35.00 pb ISBN 0-415-07761-3

**Atmospheric Remote Sensing by Microwave Radiometry.** M. A. Janssen, ed. Wiley, New York, 1993. 572 pp. \$95.00 hc ISBN 0-471-62891-3

**Problems of Seismology: Selected Papers.** Yu. V. Riznichenko. Springer-Verlag, New York, 1992 [1985]. 445 pp. \$198.00 hc ISBN 0-387-54230-2

### History and Philosophy

**Constructing a Social Science for Post-war America: The Cybernetics Group 1946-1953.** S. J. Heims. MIT P., Cambridge, 1993. 334 pp. \$15.95 pb ISBN 0-262-58123-X

**The Development of X-Ray Analysis.** L. Bragg. Dover, New York, 1992 [1975]. 270 pp. \$8.95 pb ISBN 0-486-67316-2

**Invention: The Care and Feeding of Ideas.** N. Wiener. MIT P., Cambridge, Mass., 1993. 159 pp. \$19.95 hc ISBN 0-262-23167-0

**The Life of Isaac Newton.** R. S. Westfall. Cambridge U. P., New York, 1993. 328 pp. \$24.95 hc ISBN 0-521-43252-9

**Novelties in the Heavens: Rhetoric and Science in the Copernican Controversy.** J. D. Moss. U. Chicago P., 1993. 353 pp. \$49.95 hc ISBN 0-226-54234-3