

The book is non-mathematical and obviously designed for general reading by the lay public. Only minimal scientific background material is presented, but that which does appear is technically accurate. The book could also be used as supplementary reading in a variety of courses designed for the non-science student.

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Introduction to Superconductivity

M. Tinkham.
296 pp. McGraw-Hill, New York, N.Y., 1975.
\$19.50

For the last two decades Michael Tinkham, both in experiments and theory, has ranked as one of the outstanding contributors to the science of superconductivity. His work extends over a broad range, from the pioneering work on far-infrared absorption to studies of the effect of thermodynamic fluctuations on superconductivity. Well known for his lucid and physically understandable lectures in superconductivity, he has written a book that is no disappointment.

According to the author's preface, the objective of the book "is to provide an up-to-date introduction to the intriguing subject of superconductivity and some of its potential applications. The emphasis is on the rich area of phenomena and how they may be understood in the simplest possible way . . . the power of phenomenological theory in giving insight is emphasized. . . . It is hoped that this emphasis will make the treatment more palatable to the experimentalist and also complement the more generous coverage of the formal theoretical aspects of the subject in most books presently available."

Although one finds an introductory chapter, which outlines some of the basic phenomena, the book does not represent an introduction to the vast lore of experiments and empirical results that constitute a great deal of the field of superconductivity. Thermal and thermodynamic properties, such as heat capacity and heat conductivity, do not receive emphasis, nor is there an introduction to the field of superconducting materials. Rather, the book constitutes an outstanding introduction to a conceptual understanding of a broad range of phenomena associated with electromagnetic effects in superconductors.

The treatment of various electromagnetic phenomena appears basically phenomenological, but rooted in a careful development of microscopic concepts from the BCS theory of superconductivity.

Tinkham describes each particular area thoroughly, carefully, and completely; generally he begins with fundamentals and proceeds to final results without inscrutable gaps in the argument. I thought that the chapters on the Ginsberg-Landau theory, on magnetic properties of Type-II superconductors and on the Josephson effect were particularly good ones, with careful discussion of a wide range of applications. The book includes a section on practical SQUID magnetometers which, though it does not deal deeply with the noise problem, will be a useful introduction to those experimentalists intending to use these devices for practical measurements.

One of the most exciting chapters, located near the end of the book, takes up fluctuation effects. Here we see experimental points on a graph and know that we are dealing with a developing subject, rather than with a description of a mature field. Many of the concepts introduced earlier see an application here.

According to the author, the book had its genesis as a graduate course of lectures. It will, indeed, serve admirably for this purpose in addition to being an important source book of *concepts* for scientists and technologists working in either the science or the applications of superconductivity.

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book notes

Selected Papers of Great American Physicists: The Bicentennial Commemorative Volume of the American Physical Society 1976. S. R. Weart, ed. 176 pp. American Institute of Physics, New York, 1976. \$3.50 prepaid

To span two centuries of American physics in honor of this bicentennial year, Spencer R. Weart, Director of the AIP's Center for History of Physics, has selected ten papers by seven US physicists. Benjamin Franklin leads off with an exuberant letter about his observations in the field of electricity—including a satirical account of experiments with a charged-up picture of the British monarch—and a description of his famous kite experiment. Arthur Holly Compton brings up the rear with his quantum-theoretical explanation of x-ray scattering by light elements. In between come works by Joseph Henry, Albert A. Michelson, Henry Rowland, J. Willard Gibbs and Robert A. Millikan. Weart provides introductory material and an afterword on the last 50 years of American physics, and there is a preface by this year's APS president, William A. Fowler.

Carbon Black: Physics, Chemistry and Elastomer Reinforcement. J.-B. Donnet, A. Voet. 351 pp. Marcel Dekker, New York, 1976. \$39.50

Use of carbon black, say the authors, dates back to antiquity; now they have distilled the widely scattered literature on this subject into a single volume. Jean-Baptiste Donnet and Andries Voet discuss both particular carbon-black manufacturing processes and theories of carbon formation, both the commercially important reinforcement of elastomers (especially rubber) with carbon black and the physical and chemical properties of the substance itself. Graphs, photos and diagrams lend visual interest to a practical book dedicated "to all to whom black is beautiful."

High-Energy Physicists and Graduate Students: 1975 Census. Energy Research and Development Administration. 358 pp. National Technical Information Service, Springfield, Va., 1975. \$10.60 (microfiche, \$2.25)

This compilation, prepared by those in ERDA's high-energy physics program within the Division of Physical Research, consists of alphabetical listings of individual high-energy physicists and graduate students in the US, first by name, then by institution. Basic information available includes birthdate, year and institution of highest degree, rank and affiliation, research specialties and sources of federal support; the listing also presents grad students' estimated dates for degree receipt. High-energy researchers may find this a useful tool, and perhaps physicists in other vineyards should ask themselves why such sources are not obtainable in their own disciplines.

Atomic Energy Levels and Grottrian Diagrams, Vol. 1: Hydrogen I to Phosphorus XV. S. Bashkin, J. O. Stoner Jr. 615 pp. North-Holland, Amsterdam, The Netherlands, 1975. \$59.95

Those who have benefited from Charlotte Moore's works on this subject will greet with pleasure the new compilation by Stanley Bashkin and John Stoner, Jr. With more than 500 diagrams, the book summarizes much of the recent information on electronic structures of monatomic species through phosphorus; the authors confess, however, to having largely neglected radiofrequency spectroscopy, inner-shell transitions and hyperfine effects. They are planning to extend their work to higher-numbered elements, and drawings for a second volume are already begun.

Classical Field Theory. D. E. Soper. 259 pp. Wiley, New York, 1976. \$19.95

Hamilton's Principle, otherwise dubbed the "principle of least action," informs Davison Soper's book throughout. He formulates in terms of the

least-action principle both the structure of field theories generally and specific theories having to do with electrodynamics and the mechanics of electrically polarized media, continuum mechanics and gravity. General considerations of the conservation of momentum and energy pass quickly by; then the author takes up more particular matters: the electromagnetic-field-dipole-moment interaction, for example, or the momentum of the gravitational field in general relativity. In the final chapter Soper considers dissipative processes, where effects such as viscosity and heat flow enter into the theories.

Techniques of Applied Quantum Mechanics. J. P. Killingbeck. 224 pp. Butterworths, Borough Green, Kent, U.K., 1975. £9.00

The author takes as his main theme, he tells us, the view that "... a few ideas (mainly from linear space theory) can go a long way." Even a fragmentary listing of topics serves to demonstrate that there are many ideas and approaches explored in this volume. He discusses, in a section on modern mathematical concepts, such matters as the propositional calculus, sigma rings, dense sets and Banach spaces. A section on operator theory includes completely continuous operators and hypervirial theorems, and in the group-theory section one finds Lie groups and their generators, the Cartan-Weyl basis and space groups.

The Origin of the Planets. I. P. Williams. 108 pp. Hilger, London, 1975. £8.00

In this slim volume the author presents a descriptive review of theories advanced during the "Age of Reason" and after to explain the formation of our sun's family. The tidal theories of James Jeans and Harold Jeffreys and the accretion theory of Hannes Alfvén appear here, as do many others and a catalogue of objections to them. Cartesian, Kantian and Laplacian ideas about the formation of the solar system claim the author's attention before he summarizes the main approaches and concludes that only two types of theories deserve immediate consideration: the floccule theory of W. H. McCrea and the various explanations that follow Immanuel Kant's vision.

and the New Resonances in e^+e^- Annihilation (Lecture Notes in Physics, Vol. 45). B. Humpert, ed. 248 pp. Springer-Verlag, New York, 1976. \$10.30

Nuclei, Nuclear Physics

Nuclear Analytical Chemistry, Vol. 4. J. Tölgyessy, S. Varga. 300 pp. University Park, Baltimore, 1975.

Atoms and Molecules

Laser Spectroscopy of Atoms and Molecules (Topics in Applied Physics, Vol. 2). H. Walther, ed. 383 pp. Springer-Verlag, Berlin, 1976.

Molecular Energy Transfer (Papers presented at a Conf., Ein Bokek, Israel, December 1973). R. D. Levine, J. Jortner, eds. 310 pp. Wiley, New York, 1976. \$35.00

Electronic and Atomic Collisions (Ninth Int. Conf. on the Physics of Electronic and Atomic Collisions, Seattle, July 1975) J. S. Risley, R. Geballe, eds. 902 pp. Washington U. P., Seattle, 1976. \$40.00

Environmental Effects on Molecular Structure and Properties (Proc. of the 8th Jerusalem Symposium on Quantum Chemistry and Biochemistry, Jerusalem, April 1975). B. Pullman, ed. 588 pp. D. Reidel, Dordrecht, Holland, 1976. \$68.50

Chemical Physics

Encyclopedia of Electrochemistry of the Elements, Vol. 5. A. J. Bard, ed. 407 pp. Marcel Dekker, New York, 1976. \$69.50

The Hydrolysis of Cations. C. F. Baes Jr, R. E. Mesmer. 489 pp. Wiley, New York, 1976. \$29.95

Quantum Theory of Scattering Processes: General Principles and Advanced Topics (Int. Encyclopedia of Physical Chemistry and Chemical Physics, Topic 2, Vol. 5). J. E. G. Farina. 130 pp. Pergamon, Oxford, U.K., 1975. \$17.50

Advances in Chemical Radiosensitization (Proc. of a panel organized by the IAEA in collaboration with WHO, Stockholm, June 1973). UNIPUB, New York, 1974. \$8.00

Acoustics

Principles of Underwater Sound, 2nd edition. R. J. Urick. 384 pp. McGraw-Hill, New York, 1975. \$22.50

The Physics of Music, 7th edition. A. Wood (as revised by J. M. Bowsher). 258 pp. Halsted, New York, 1975. \$15.00

Introduction to the Physics and Psychophysics of Music, 2nd edition (Heidelberg Science Library, Vol. 16). J. G. Roederer. 200 pp. Springer-Verlag, New York, 1975. \$5.90

Optics

Advances in Holography, Vol. 2. N. H. Farhat, ed. 191 pp. Marcel Dekker, New York, 1976. \$22.50

Beam and Fiber Optics. J. A. Arnaud. 447 pp. Academic, New York, 1976. \$34.00

Optics of Thin Films (An Optical Multilayer Theory). Z. Knittl. 548 pp. Wiley, New York, 1976. \$37.50

Optical Properties of Solids: New Devel-

opments. B. O. Seraphin, ed. 1018 pp. North-Holland, Amsterdam, The Netherlands, 1975. \$111.95

Dynamic Light Scattering with Applications to Chemistry, Biology and Physics. B. J. Berne, R. Pecora. 376 pp. Wiley, New York, 1976. \$24.95

Quantum Electronics and Lasers

Introduction to Quantum Electronics. P. A. Lindsay. 202 pp. Halsted, New York, 1975. \$19.75

Laser Doppler Measurements. B. M. W. Wasiewicz, M. J. Rudd. 160 pp. Butterworths, Scarborough, Ontario, 1976. £6.90

Gasdynamic Lasers: An Introduction. J. D. Anderson Jr. 180 pp. Academic, New York, 1976. \$17.50

Progress in Quantum Electronics, Vol. 3. J. H. Sanders, S. Stenholm, eds. 299 pp. Pergamon, New York, 1975. \$37.50

Electricity and Magnetism

Transient Electromagnetic Fields (Topics in Applied Physics, Vol. 10). L. B. Felsen, ed. 274 pp. Springer-Verlag, New York, 1976.

Advances in Electronics and Electron Physics, Vol. 39. L. Marton, ed. 398 pp. Academic, New York, 1975. \$39.50

Materials and Solid State

The Liquid Phase. D. H. Trevena. 109 pp. Springer-Verlag, New York, 1975. \$7.20

Real Solids and Radiation. A. E. Hughes, D. Pooley. 196 pp. Springer-Verlag, New York, 1975. \$8.60

Topics in Applied Physics, Vol. 8: Light Scattering in Solids. M. Cardona, ed. 339 pp. Springer-Verlag, New York, 1975. \$38.00

Ion Implantation Range and Energy Deposition Distributions, Vol. 1: High Incident Ion Energies. D. K. Brice. 590 pp. Plenum, New York, 1975. \$49.50

Surface Physics (Springer Tracts in Modern Physics, Vol. 77). P. Wissman, K. Müller (G. Höhler, ed.). 125 pp. Springer-Verlag, New York, 1975. \$22.20

Crystal Structure Data of Inorganic Compounds, part e (Landolt-Börnstein Numerical Data and Functional Relationships in Science and Technology—Group 3: Crystal and Solid State Physics—Vol. 7—New Series). W. Pies, A. Weiss (K.-H. and A. M. Hellwege, eds.). 739 pp. Springer-Verlag, Berlin, 1976. \$278.80

Magnetism in Crystalline Materials: Applications of the Theory of Groups of Cambiant Symmetry. A. P. Cracknell, 276 pp. Pergamon, New York, 1975. \$20.00

Constitutive Equations in Plasticity. A. S. Argon, ed. 591 pp. MIT, Cambridge, Mass., 1975. \$19.95

The Physics of Metals, Vol. 2: Defects. P. B. Hirsch, ed. 302 pp. Cambridge U.P., New York, 1975.

Growth of Crystals, Vol. 9. N. N. Sheftal', E. I. Givargizov, eds. 329 pp. Plenum, New York, 1975. \$35.00

Physical Properties of Textile Fibres.

new books

Elementary Particles and Fields

The Theory of Photons and Electrons, 2nd expanded edition. J. M. Jauch, F. Rohrlich. 553 pp. Springer-Verlag, New York, 1976. \$16.80

Dynamical Concepts on Scaling Violation