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HOLOGRAPHY . . . 1970

Thomas Kallard, editor.

Over 1000 bibliographic entries on the theory and applications of optical, acoustical, seismic & microwave holography. Sixty patents fully described; 241 illustrations; 240 pages. Introductory overview by Dr. Dennis Gabor, F.R.S., CBS Laboratories. (May, 1970) (ISBN 87739-002-9) . . . \$15.00
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the standard x-ray texts. On the other hand, a concise monograph like this one, which emphasizes solutions to practical problems using clear illustrative examples, should be most welcome to them. In fact, the book could have been entitled, *Practical X-Ray Metallurgy*.

The author has not omitted the essentials; he merely quotes most of them without proof. Chapter 4, for example, reviews the fundamentals of x-ray diffraction by crystalline matter in about seven pages of text. Conversely, Kovacs' much lengthier treatments of the Laue method and the powder method in Chapters 5 and 6, respectively, are as clearly written as any in the literature. His final two chapters are devoted to practical problems of the sort encountered in industrial research: identification of unknowns, analysis of alloy-phase diagrams, grain-size determination and the texture of wires and sheets. The book concludes with a bibliography of well known reference books.

One might well imagine a number of recalcitrant students being eased into the subject of x-ray diffraction by means of Kovacs' neat little book and the proper faculty guidance. But if you are planning to own just one reference on the subject, you had better look elsewhere.

ALLEN N. GOLAND

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Springer Tracts in Modern Physics, Vol. 49:

Electron Scattering, Photoexcitation and Nuclear Models; Baryon Current Solving SU(3), Charge-Current Algebra
G. Höhler, ed.

146 pp. Springer-Verlag, New York, 1969. \$11.00

This volume of the Springer *Tracts in Modern Physics* is in two parts, as reflected in the title of the book. Although the intent of the tracts is to present competent reviews of modern physics, they are not really intended for the pedestrian in the subject matter.

The first part of this book is a review of the basic theory of electron scattering from nuclei and of photonuclear processes. Several experiments in electron scattering are analyzed and discussed along with the theory. The giant-resonance region, which has received considerable attention in the past few years is emphasized, particu-

larly with reference to inelastic electron scattering and excitation of nuclear levels below and in this region.

The second part of the book is devoted to currents and their algebra. Group dynamics has already provided prescriptions for developing conserved currents for baryons of fixed internal quantum numbers. In this article these prescriptions are extended to apply to an entire SU(3) octet of weak and electromagnetic currents. Once again the treatment is not presented in a tutorial form and will be of interest to particle-algebraists rather than the casual reader.

The *Tracts* form in reality a hard-bound journal of reviews of selected topics of interest to specialists in various disciplines in modern physics. Although they may be valuable sources of information to researchers and serve as keys to new information for them on these selected topics, their audience appeal is not broad.

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Superconductivity Vols. 1, 2

R. D. Parks, ed.

664 pp. and 748 pp. Marcel Dekker, New York, 1969. \$75.00 a set

Superconductivity was discovered in 1911 by Kamerlingh Onnes in Leiden, when he found that the electrical resistance of certain metals vanishes below a critical temperature T_c . Although it was immediately apparent that this phenomenon was a scientific mystery of the first order, as well as having the possibility of many practical applications, progress toward unraveling the mystery or in making applications was rather halting for some 40 years.

Probably the most lasting development was the formulation of a pair of phenomenological equations in 1935 by Fritz and Heinz London to describe the perfect conductivity and perfect diamagnetism. Progress accelerated in the postwar period, leading to the theoretical breakthrough of the "BCS Theory" by John Bardeen, Leon Cooper and J. Robert Schrieffer in 1957. This theory opened the modern era of research in superconductivity, marked by the availability of a successful microscopic theory that

explains superconducting phenomena in terms of a condensed state in which electrons are paired.

In the subsequent dozen years exciting new advances have followed in a steady stream. For example, A. A. Abrikosov created the field of type II superconductivity, which has brought much theoretical insight as well as practical application in high-field superconducting solenoids. Brian Josephson's prediction of tunneling by superconducting pairs has led to a deeper undertaking of the significance of the phase of the macroscopic quantum wavefunction introduced rather phenomenologically by V. L. Ginzburg and L. D. Landau. It has also led to the development of ultrasensitive magnetometers and voltmeters and to a more precise value of the fundamental constant ratio h/e . In the past few years, attention has turned to the effects of thermodynamic fluctuations, both in causing finite (but usually extremely small) resistance below T_c and in causing weak superconducting effects above T_c .

Given this explosive expansion of our understanding of the subject, this book is a very timely effort at gathering together an authoritative account of where we stand (or more precisely, where we stood in 1968). Although enumeration of all the topics covered would obviously be impractical, some idea of the scope of coverage is given by a partial list: BCS theory, Green's function methods, Ginzburg-Landau theory (including the microscopic derivation and extensions to wider applicability), collective modes, weakly coupled superconductors and macroscopic quantum phenomena, strong-coupling superconductivity, superconducting semiconductors, transition-metal superconductivity, type II superconductivity, boundary and proximity effects, gapless superconductivity, flux flow, the intermediate state and superconducting devices. Comparison of theory with experiment is maintained throughout.

By drawing on 33 authors to write the 23 chapters, the editor was able to divide up the labor to a sufficient degree so that he could attract top-notch experts such as P. Anderson, de Gennes, Josephson, and Maki to contribute to the project. Despite the diverse authorship, Parks was able to maintain a satisfactory degree of uniformity in notation and overall coherence in organization. Thus, the resulting treatise is considerably more

useful than would be a compendium of completely independent contributions.

As Parks wryly remarks in his preface, this treatise might be thought to be "the last nail in the coffin (of superconductivity)." Although that is certainly unlikely, in view of the continuing vigorous activity, it is clear that the presented material forms a large body of knowledge that is highly developed and should not soon become obsolete. About the only major topic that developed too late to be included is fluctuation effects; a somewhat more extensive and up-dated discussion of time-dependent Ginzburg-Landau theory also would be desirable in view of developments since the treatise went to press. None the less, this treatise should remain the definitive one on the overall subject of superconductivity for some time.

The potential audience for these books appears limited by the high price to libraries and to those individuals and groups with a well developed commitment to the subject. However, the level of presentation makes it suitable as a reference for graduate students as well as professional research workers. Thus, it is heartening that the editor has persuaded the publisher to try offering a very substantial price reduction to \$40.00 for class orders by instructors in an effort to broaden the usage of this treatise as a textbook. In any case, the treatise is a "must" for the library of any organization dealing in any significant way with solid-state and low-temperature physics. We should all be grateful to the editor and his many authors for their labors to bring this treatise to fruition.

M. TINKHAM

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Special Relativity

By A. Shadowitz

203 pp. Saunders, Philadelphia, 1969.
\$3.50

Beginning students of special relativity fall into two well defined categories: those who prefer to do everything graphically, and those who do not. A. Shadowitz's book is lovingly written to indulge the former to the maximal degree.

In the old days, doing a problem

The following is a partial list of books in physical science published by The MIT Press. For full information on these and other titles, send without obligation for the catalogue, "MIT Press Books in Mathematics and Physics."

Analysis in Function Space. William Ted Martin and Irving Segal, editors. \$6.00

Applications of Group Theory in Quantum Mechanics. M. I. Petrashen and E.D. Trifanov. \$12.50

Atomic Order: An Introduction to the Philosophy of Microphysics. Enrico Cantore. \$12.50

Celestial Mechanics, Volume I. Yusuke Hagihara. \$25.00

The Character of Physical Law. Richard Feynman. \$6.95; Paper, MIT-66 \$2.45

Conceptual Foundations of Contemporary Relativity Theory. John C. Graves. \$15.00

Differential Space, Quantum Systems, and Prediction. Bayard Rankin, editor. \$7.50

Electrodynamics of Moving Media. Paul Penfield, Jr., and Hermann A. Haus. \$12.50

Electrons, Ions and Waves: Selected Papers of William Phelps Allis. \$20.00

The Elements of Neutron Interaction Theory. Anthony Foderaro. \$19.95

Francis Bitter: Selected Papers and Commentaries. Thomas Erber and Clarence M. Fowler, editors. \$20.00

Health Physics: Principles of Radiation Protection. D.J. Rees. \$12.95

In Honor of Philip M. Morse. Herman Feshbach and K. Uno Ingard, editors. \$15.00

Magnetism in Solids. D.H. Martin. \$22.50

Mathematical Theory of Elementary Particles. Roe W. Goodman and Irving E. Segal, editors. \$6.00

Nuclear Forces. Introduction to Theoretical Nuclear Physics. Gernot Eder. \$17.50

Plasmas and Controlled Fusion. David J. Rose and Melville Clark, Jr. \$15.00

Physics of Strength and Plasticity. Ali S. Argon, editor. \$12.50

Quantum Electronics. Volume 1: Basic Theory. Volume 2: Maser Amplifiers and Oscillators. V.M. Fain and Ya. I. Khanin. \$12.50 each

Quantum Physics and the Philosophical Tradition. Aage Petersen. \$7.50

Thermodynamics. Joseph H. Keenan. \$12.50; Paper, \$3.95

The Theory of Spinors. Elie Cartan. \$8.00

Wavelength Tables, 2nd Ed. George R. Harrison, editor. \$25.00

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