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MECHANICAL RADIATION

By R. B. LINDSAY

Brown University

McGraw-Hill International Series
in Pure and Applied Physics

Ready in February

The book provides an introduction to wave motion at the senior-graduate level, using mechanical radiation as the principal vehicle, but laying stress on those aspects common to all kinds of wave propagation. Mechanical relation is presented in the broad sense in integrated form by bringing together a unified treatment of the most significant radiation aspects of acoustics.

INTRODUCTION TO SOLIDS

By LEONID V. AZAROFF

Illinois Institute of Technology

Ready in April

An introductory text for students, advanced undergraduate and graduate, of chemistry, metallurgy, mineralogy, physics, and all engineering fields dealing with solids. The book covers more topics than previously covered in a single volume, but the author has tried to make most discussions complete and authoritative. Primary emphasis is on underlying principles; practical applications and specialized topics are omitted. The book concentrates on the structure, nature, and properties of inorganic crystalline solids.

tinuous group theory; a discussion of the three-dimensional rotation group, including its two-valued representations, which is then related to the theory of double point groups. There follows a long section on the material of the quantum chemist; the Schrödinger equation, stationary perturbation theory, and molecular orbitals. The chapter ends with a discussion of crystallographic space groups and an account of wave functions in crystals, essentially Bloch theory and the Wigner-Seitz method.

Chapter 5 is devoted to the theory of subgroups, etc., followed by an account in Chapter 6 of space-group representations. Chapter 7 restates most of the material of Chapters 2 and 3 in a form specialized to symmetric groups. Chapter 8 is again devoted to applications: Pauli exclusion principle, atomic and molecular structure, and, finally, elementary results on nuclear structure, including some relationships between group theory and selection rules.

A second glimpse of continuous groups is afforded by a lucid discussion of the Lorentz groups in Appendix III.

The book is so rich in material that it would seem churlish to ask for more. However, Kauffman's derivation of the Onsager solution for the two-dimensional Ising problem is such a beautiful application of group representation theory that one can only regret its omission from the book. And there is an amusing misprint on p. 258 where a permutation on n -ordered symbols is defined as a "recording" of the set.

It has already been mentioned that this is not an easy book, but neither is the subject itself an easy one. On the other hand, those who take the trouble to master the techniques will find that it can guide them through many a difficult area of mathematical physics. Most people find learning to drive a car harder than their earlier lessons in crawling. But, having taken that trouble, they usually find afterwards that they can get farther, and with less effort, by car!

The Structure of Electrolytic Solutions: Based on Electrochem. Soc.-NSF Symp. (Washington, D. C., May 1957). Edited by Walter J. Hamer. 441 pp. John Wiley & Sons, Inc., New York, 1959. \$18.50. *Reviewed by Stuart A. Rice, Institute for the Study of Metals, University of Chicago.*

FOR eighty years the properties of solutions of electrolytes have been the subject of continuing investigation. The major landmarks in this history are provided by the Van't Hoff treatment of colligative properties, the Arrhenius theory of dissociation, the Debye-Huckel-Onsager theory and, most recently, the elegant statistical mechanical theories of Mayer and Kirkwood and the study of relaxation phenomena by Eigen. This monograph is based on a symposium sponsored by the Electrochemical Society and the National Science Foundation in 1957. The contributions indicate quite clearly the extent to which the landmarks mentioned still dominate the landscape. Of the twenty-seven papers, thirteen deal with the measurement

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PHYSICS TODAY

Important Academic Press Books

Paramagnetic Resonance in Solids

By W. LOW

January 1960, 212 pp. illus., approx. \$7.50

Nuclear Spectroscopy

Edited by FAY AJZENBERG-SELOVE

Part A, January 1960, 621 pp., illus.

Special Price (through March 31): \$14.00

Price after March 31: \$16.00

Part B, March 1960, about 600 pp., illus.

Fluctuation Phenomena in Semi-Conductors

By A. VAN DER ZIEL

1959, 168 pp., illus., \$6.50

Group Theory and Its Application to the Quantum Mechanics of Atomic Spectra

By EUGENE P. WIGNER

Translated from the German by J. J. GRIFFIN

1959, 372 pp., illus., \$8.80

Wave Propagation and Group Velocity

By LÉON BRILLOUIN

With a contribution by A. SOMMERFELD

January 1960, 154 pp., illus., \$6.00

Waves in Layered Media

By LEONID BREKHOVSKIKH

Translation edited by R. T. BEYER

Translated from the Russian by

DAVID LIEBERMAN

Spring 1960

Electromagnetic Wave Propagation

Proceedings of a Conference Sponsored by the
Postal and Telecommunications Group of the
Brussels Universal Exhibition, September 1958

Edited by M. DÉsirANT and J. L. MICHIELS

February 1960, 730 pp., illus.

Advances in Electronics and Electron Physics

Edited by L. MARTON

Volume 11, 1959, 523 pp., illus., \$15.00

Volume 12: **Symposium on Photo-
Electronic Image Devices as Aids to
Scientific Observation, London, 1958**

Edited by J. D. MCGEE and W. L. WILCOX

February 1960, about 400 pp., illus.

Physics of the Upper Atmosphere

Edited by J. A. RATCLIFFE

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Advances in Space Science

Edited by FREDERICK I. ORDWAY, III

Volume 1, December 1959, 412 pp., illus., \$12.00

Introduction to Rocket Technology

By V. I. FEODOSIEV and G. B. SINIAREV

Translated from the Russian by S. N. SAMBUROFF

October 1959, 344 pp., illus., \$9.50

Formation and Trapping of Free Radicals

Edited by A. M. BASS and H. P. BROIDA

January 1960, about 530 pp., illus., \$16.00

Solid State Physics Advances in Research and Applications

Edited by FREDERICK SEITZ and

DAVID TURNBULL

Volume 10, January 1960, about 530 pp., illus.

Solid State Physics in Electronics and Telecommunications

Proceedings of an International Conference
Held in Brussels, June 2-7, 1958

Edited by M. DÉsirANT and J. L. MICHIELS

Semiconductors

Volumes 1 and 2, February 1960, about 700 pp. each

Prepublication price through February, \$16.00 each

Postpublication, \$18.00 each

Magnetic and Optical Properties

Volumes 3 and 4, March 1960, about 600 pp. each

Similarity and Dimensional Methods in Mechanics

By L. I. SEDOV

Translation edited by MAURICE HOLT

Translated from the fourth

Russian edition by MORRIS FRIEDMAN

December 1959, 363 pp., illus., \$14.00

Journal of Mathematical Analysis and Applications

Edited by RICHARD BELLMAN

Volume 1, 1960, \$16.00



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JANUARY 1960

COLLEGE TEXTBOOKS

Physics, Physical Science

FOR YOUR EXAMINATION

THE PHYSICAL SCIENCES, 4th, 1959

by Cable, Getchell, Kadesch, Crull, and Poppy

This long-popular text is now in its 4th edition, contributing new concepts and up-to-the-minute data to the sciences of astronomy, chemistry, physics, geology, and meteorology. Revised, expanded material includes a new chapter, *Transmutation and Atomic Energy*, covering nuclear reactions, the discovery of new elements, atomic reactors or furnaces, and more. The authors have not only revised chapters on *Machines, Force and Motion*, and *Behavior of Molecules*, but have also retained their popular feature of combining factual information with illustrative material for ease in teaching and in learning about the world of science.

1959

553 pages

Text list: \$6.95

INTRODUCTION TO MODERN PHYSICS

by Blanchard, Burnett, Stoner, and Weber

Ideally suited for use as a basic text in a one-semester course, *INTRODUCTION TO MODERN PHYSICS* will help the student learn basic physical ideas of atomic and nuclear physics with a minimum of mathematical complications. The qualitative ideas and the simpler quantitative results of microscopic (atomic) physics. The quantum theory and theory of special relativity are introduced in detail with application of these theories to the study of the structure of atoms and of atomic nuclei. Diagrammatic and mathematical illustrations, helpful problems, and informative appendices are outstanding features.

1958

414 pages

Text list: \$7.00

COLLEGE PHYSICS

by Beyer and Williams

Students lacking a background in calculus will benefit from Beyer and Williams' introduction to the living science of physics. Although algebraic analysis is used freely, the authors have limited the text to discussion of physical fundamentals and essentials. The Mach treatment of mass-energy relations, and the elementary theory of specific heats of gases are presented to the student as early as possible. An appendix of Answers to Representative Problems, with Trigonometric and Log Tables is an integral part of the text.

1957

660 pages

Text list: \$8.75

and/or the interpretation of measurements of activity or conductance in electrolyte solutions, three articles are concerned with ion pair formation, three articles with the subject of thermal diffusion or mixed diffusion, and the remainder with Raman spectral investigations, proton transfer, molten salts, complex ions, and conductance of polyelectrolytes. The only major topic omitted is a discussion of the modern statistical theory of electrolytes.

In the reviewer's opinion the most interesting and provocative articles were concerned with the mechanism of proton transfer (Eigen and De Maeyer) and the measurements of Soret coefficients (Longworth, Agar). There is little doubt that this volume will be useful to all physical chemists interested in the properties of solutions, and the over-all clarity of the presentation makes it a welcome introduction to a still vital field of research.

Science and the Modern Mind: A Symposium.

Edited by Gerald Holton. 110 pp. The Beacon Press, Boston, Mass., 1958. \$3.95. Reviewed by Norwood Russell Hanson, Indiana University.

THE American Academy of Arts and Sciences, and its editor, Gerald Holton, deserve congratulations for this enlightened collection of essays. The volume is an exercise in communication. Five humanists have been asked here to react to the fact of science. And four scientists have responded by seeking to locate their pursuits within the humanistic tradition of the West. The objective of the book is "to lift each of us above his cell in the labyrinth of learning in order that he may see the entire structure as if from above". This is not an unqualified success; doubtless the essayists would be uneasy if anyone supposed it was. But each paper is a jewel. In each, a sharp, polished specialist is looking up from his bench to the more comprehensive setting in which he finds himself. Were one to disagree with every sentence, he would still have to concede that the transparent style and sparkling insights which brighten every page make this volume a choice addition to any library.

Indeed, one cannot disagree with much in these essays. The first three, by Henry Guerlac, Harcourt Brown, and Giorgio de Santillana, discuss—with the varying degrees of specificity and generality appropriate to their chosen themes—the extent to which the explosion of 17th-century science affected the outlook of the 18th-century literati. Notwithstanding popular conceptions, these essays establish that, although the "Newtonian attitude" did superficially affect Enlightenment thinking, the full impact of the mechanical philosophy was felt by few in the legions of the learned. The authors delineate how ancient, pre-Copernican, intellectual coordinates anchored even those Enlightenment arguments which seemed most to have been inspired by the *Philosophiae Naturalis Principia Mathematica*. It is difficult to avoid extrapolation; doubtless the real impact of the present revolution in scientific

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