

The Theory of Atomic Collisions

Third Edition

By SIR NEVILL MOTT, *Cambridge University*, and SIR HARRIE MASSEY, *University of London*. This completely revised and much expanded edition incorporates new methods resulting from the extensive research that has been carried on since the Second Edition appeared in 1949. The organization of the book remains the same, proceeding from the one-body collision to the many-body case, electron collisions with atoms, collisions between atomic systems, nuclear collisions, two-body collisions under relativistic conditions, and use of time-dependent perturbation theory.

International Series of Monographs on Physics. 191 text figures. \$20.20

Electricity and Magnetism

Second Edition

By B. BLEANEY, *Wadham College*, and B. I. BLEANEY, *St. Hugh's College, Oxford*. For this second edition Professor and Mrs. Bleaney have revised their broad but rather detailed examination of the principles and experimental aspects of electricity and magnetism, together with an elementary account of the underlying atomic theory. Like its predecessor, it deals with such topics as: electrostatics, electric currents, magnetic fields and effects, alternating current theory, electro-magnetic waves, thermionic vacuum tubes, noise, theory of dielectrics and dispersion, various types of conductors and magnetism, and magnetic and cyclotron resonance.

362 text figures. \$11.20

Oxford University Press
New York

find a unified field theory, and why he expected to find such a unified theory hidden in geometry. Einstein's lack of complete success in this undertaking may be blamed on the fact that he was biologically human; he simply did not live long enough. The next man of equal mental powers who devotes himself to the task, I am convinced, will probably succeed.

If I were a graduate student in physics, interested in relativity, I would certainly want to read Born. If I were a philosopher, a lawyer, or a historian with an interest in relativity, I would consider that Lanczos had written his book specifically for me. I have, in fact, never read a better nonmathematical exposition of relativity and its effect on the scientific model of the universe.

Lanczos combines his exposition of relativity throughout with a never-ending eulogy of Einstein. I do not object to this. Since my early teens, I have held Einstein as very little below the gods, and to find a man of Lanczos' stature agreeing with me gave me personally great satisfaction.

Elementary Particle Physics. By Gunnar Källén. 546 pp. Addison-Wesley, Reading, Mass., 1964. \$15.00.

Reviewed by Eugen Merzbacher, University of North Carolina.

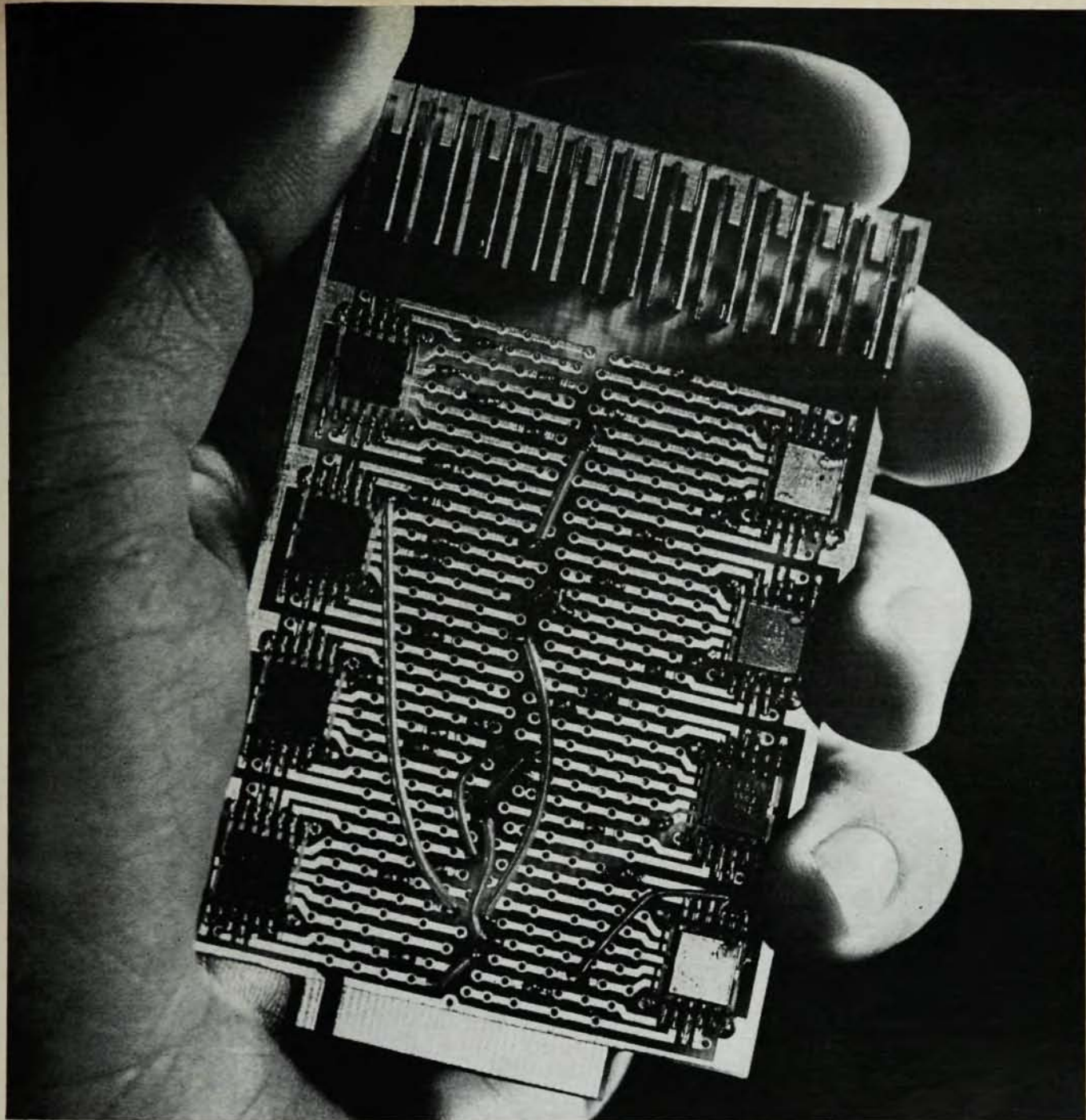
Although there is no shortage of good books on the concepts and broad principles of the physics of elementary particles, few high-energy physicists have had the time, or the perspective, to provide us with a full textbook treatment of the theory as it is used in the analysis of experimental data. A book was available ten years ago when H. A. Bethe and F. de Hoffmann published Volume 2 of *Mesons and Fields*, but since that time we have had to rely on a flood of hastily published lecture notes. Such lecture notes can be extremely valuable, but one's pleasure in their appearance is enhanced when the product is as polished and coherent a textbook as this volume which is based on a course given by the author at the University of Lund in 1961-62. The use of consistent notation throughout seventeen chapters distinguishes Källén's *Elementary Particle Physics* from many other books with similar titles.

Strong interactions are given about twice as much space as weak interactions, but the discussion of both is thorough. The emphasis is on the calculation of cross sections, form factors, and branching ratios. The reader is taken in a businesslike fashion through the evaluation of every trace of Dirac matrices and every integration in phase space, but the conceptual features of elementary particle physics emerge only when he has accomplished some hard work with pencil and paper.

The most comprehensive discussion is reserved for the interaction of pions with nucleons and the weak interactions, although there is also a section on strong interactions of strange particles and associated resonances. Generally, the great virtue of Källén's book is that no topic is taken up unless the author can arrive at an angular distribution or a decay rate which may be compared with the experimental data available at the time of writing (early 1963, with a few more recent references, such as the Ω^- particle, added).

In spite of many deliberate omissions, this introduction to the theory of elementary particles can be recommended to everyone who wishes to study the theory from a primarily phenomenological point of view. There is, for instance, a full-dress derivation of the Rosenbluth formula for the cross section of electrons scattered by protons, a complete analysis of the spin and parity of the ω meson, and a detailed discussion of the consequences of the conserved vector current hypothesis.

The book is addressed primarily to graduate students in theoretical physics and presupposes a familiarity with quantum mechanics, including the Dirac equation and the elements of quantum field theory. Appendices on angular momentum, the Dirac equation, and second quantization are intended for a brief review. However, Chapter 5 goes considerably beyond the general level of the book and explores the theory of pion-nucleon scattering on the basis of the Low equation and the LSZ reduction technique in terms of forward dispersion relations, but Källén has made an effort to enable the less mathemati-



Careers on the move in solid state electronics

The Advance Electronics Department of the Douglas Missile & Space Systems Division offers challenging opportunities for physicists with interests and backgrounds in solid state devices. Since the work is of a fundamental nature, publication of results is encouraged. Specific areas of interest are:

Semiconductor and Thin Film Transport Phenomena ■ Electronic and Magnetic Measurements

■ Electronic Materials Properties ■ Device Concepts.

We prefer Ph.D.'s with backgrounds in solid state electronics and device physics. Send your resume to Mr. J. H. Snodgrass,

DOUGLAS

MISSILE & SPACE SYSTEMS DIVISION
2715 Ocean Park Boulevard, Santa Monica, California
An equal opportunity employer

THE CONQUEST OF SPACE

in books published by
VAN NOSTRAND
in cooperation with NASA

SOURCEBOOK ON THE SPACE SCIENCES

By Samuel Glasstone. The incredible developments in the field of space science, both in its principles and its applications, are simply and clearly explained in this comprehensive book. Stressing throughout that the ultimate purpose of space exploration must be to increase the store of human knowledge, the author places great emphasis on basic scientific principles. 339 illustrations. 912 pages. \$7.95

SPACE PROBES AND PLANETARY EXPLORATION

By William Corliss. What systems and components are necessary for unmanned space craft bound for the moon, the planets, the sun and more remote parts of the universe? Mr. Corliss describes methods of propulsion, navigation and control, plus instrument systems that report information back to earth. 289 illustrations. 532 pages. \$7.75

FREE EXAMINATION COUPON

Van Nostrand
Dept. T-PT-6
120 Alexander Street, Princeton, N. J.

Please send me _____ copies of
SOURCEBOOK ON THE SPACE
SCIENCES @ \$7.95 and
copies of SPACE PROBES AND
PLANETARY EXPLORATION @
\$7.75 for free examination. Within
10 days I will remit purchase price
plus small delivery cost or return the
books and owe nothing.

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

SAVE! Remit with order and we pay
delivery. Same return privilege
guaranteed.

cally inclined reader to skip this chapter.

It should be stated that Källén's treatment avoids all analytic continuations into the complex plane and, because of its publication before the recent resurgence of interest, almost all group theory. It is of course, a reflection on the speed with which knowledge is acquired rather than on the author's ability to foresee future developments if the section on the decay of the neutral K meson, which assumes CP invariance, is now obsolete. The student who is aware of these limitations is not likely to find a better mentor than Professor Källén.

The book has an inadequate subject index, but the quality of the printing is very high.

The Language of Nature. An Essay in the Philosophy of Science. By David Hawkins. 372 pp. W. H. Freeman, San Francisco, 1964. \$7.50.

Reviewed by R. B. Lindsay, Brown University.

It is generally agreed that the philosophy of science is a very important branch of scholarly activity, but as is the case with other interdisciplinary subjects, there is no single interpretation of its essential character. Some would see in it merely the logical analysis of the language of science, while others believe that its task is the thoroughgoing examination of the basic concepts and hypotheses of scientific theories, particularly with reference to their relations to the world of experience and to each other. Still another view stresses the historical evolution of scientific ideas and in particular the influence of successful concepts in one branch of science, e.g., physics, on the development of another branch, e.g., psychology or sociology. Finally, a detailed development of some interpretation of a scientific theory, e.g., the theory of measurement in quantum mechanics, which many will consider to be quantum mechanics, and hence an investigation in physics may by others be treated as essentially philosophical in character. It is clear that the discipline provides considerable scope for operation, and this doubtless explains the relatively large numbers of works on the philosophy of science which now claim readers' attention.

The book under review represents to a certain degree a synthesis of the various approaches to the philosophy of science, though in his preface the author asserts that it has also been his aim to "show that the content of positive knowledge reacts upon the ways of thought from which that knowledge evolved". Thus he covers a very wide range of topics from the nature of mathematics to the theory of the soul, with way stations on measurement, motion and its laws, probability, quantum physics, thermodynamics, biology, ethics, and economics. In such a wide-ranging study, it is obviously a major task to make clear to the reader the relevant connections, and not all would agree that this has been done with complete success. So far as physical ideas are concerned, the author evidently bases his considerations in general on a sound knowledge of the subject with the possible exceptions of inadequate definition of wave motion, as well as of entropy in thermodynamics, and a misleading reference to the history of the origin of quantum theory.

The presentation is rather heavily laden with metaphors, which, though they add to the freshness and novelty of the discussion, tend to provide in some cases an obstacle to the reader's clear understanding of what the author is trying to say. This is unfortunate, since the book contains much material of interest to scientists in general and to physicists in particular.

Structure and Function in Biological Membranes, Volume I. By J. Lee Kavanau. 321 pp. Holden-Day, San Francisco, 1965. \$10.95.

Reviewed by George Weiss, National Institutes of Health.

It is fashionable these days to try to account for all biological phenomena in terms of physical or chemical processes. Particular examples for which clear answers are not yet available include the analysis of how and why cells become differentiated and combine in limited configurations. At least some of the explanation must be sought in the physical and chemical properties of cell membranes.

It is apparently the purpose of Kavanau's book to bring to the attention of biologists results in phys-