

Books on Particles and Fields

Title	Author	a	b
Elementary Particle Physics (Wiley, 1966)	Stephen Gasiorowicz	3/4	1/4
An Introduction to Relativistic Quantum Theory (Harper-Row, 1961)	Silvan Schweber	1/3	2/3
The Theory of Elementary Particles (Oxford Univ. Press, 1959)	James Hamilton	1/2	1/2
Elementary Particle Physics (Addison-Wesley, 1964)	Gunnar Kaellen	2/3	1/3
The General Theory of Quantized Fields (Am. Math. Soc., 1965)	Res Jost	0	1
Particle Physics: The High Energy Frontier (McGraw-Hill, 1968)	Milton S. Livingston	1	0

all and the book appears to have been written from the happy perspective of a world in which CP is good. The latest reference to a published paper that I could find is 1966, which probably reflects the lamentably long time lag between writing a complex book like this and actually getting it printed.

All of this having been said, as a high *b* text it appears to me like a good one. There is a very complete discussion of field quantization, Feynman perturbation theory and, at the end of the book, Lurié gives a treatment of nonperturbative methods as applied to special soluble models. I did not try to check all of the equations in detail

but a cursory inspection gave me the feeling that the book was largely free of misprints, which in this kind of enterprise is no small achievement.

There are suggested problems that make it suitable for a course in field theory at the advanced graduate level. As such it is a serious contender with other books of large *b*.

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Jeremy Bernstein is a professor at Stevens Institute of Technology and the author of "Elementary Particles and their Currents," a book on particle physics whose a and b rating he has modestly refrained from revealing.

History of low-energy neutrons

LOW-ENERGY NEUTRON PHYSICS.
By I. I. Gurevich and L. V. Tarasov.
(Trans. from the Russian). 607
pp. Wiley, (Interscience), New
York, 1968. \$28.00

by ROBERT S. SHANKLAND

This book is an extensive survey of much of the physics accomplished with slow neutrons since Enrico Fermi and his coworkers in Rome made the chance discovery of the enhanced effectiveness of neutrons that had been moderated by water and other low-atomic-number substances. This moderation process, together with the Oppenheimer-Phillips reaction discovered at Berkeley that was used extensively with Ernest O. Lawrence's early cyclotrons, opened up the major avenues for progress in neutron physics. These discoveries led to all the pioneer work, culminating in Otto Hahn's discovery of the fission of uranium.

The experiments that revealed the basic properties of the neutron itself

are well discussed in this book. The beautiful experiment of Luis Alvarez and Felix Bloch that gave the neutron magnetic moment, the lifetime of the neutron measured at Chalk River and the neutron-parity experiments performed by Victor Krohn and his coworkers at the Argonne National Laboratory are clearly discussed. In addition the interactions of the neutron with the proton and with the electron are well treated, as are the experimental developments of intense neutron beams. The invention of neutron mirrors by Donald J. Hughes and the cold-neutron beams found by Fermi and Walter Zinn are considered, but largely ignored are the outstanding developments of mechanical choppers used at large nuclear reactors and the significant progress from the first neutron-crystal spectrometers to present refinements of triaxial crystal systems.

The central concern of the book is the use of slow neutrons for the study of matter both in the solid and liquid



New publications from Pergamon



Einstein Spaces

By A.A. Petrov, *Professor of Relativity and Gravitation, Kazan Univ., U.S.S.R.*

Provides a study of the mathematical basis of general relativistic theory of gravitation with emphasis on invariant methods. Covers the most recent advances in the field of general relativity.
1969 432 pp. \$18.00

Introduction to Superconductivity

By A.C. Rose-Innes & E.H. Rhoderick, *University of Manchester Institute of Science and Technology*

This introductory book explains basic phenomena and concepts of superconductivity in a manner that will be easily understood by anyone with a modest knowledge of solid state physics.
1969 244 pp. \$9.50

Theory of Intermolecular Forces

By H. Margenau, *Yale University*, and N.R. Kestner, *Louisiana State University*

This book provides graduate and senior undergraduate students of physics with an understanding of the modern theory of intermolecular forces.
1969 380 pp. \$12.00

Crystals and Their Structures

By Arthur P. Cracknell, *University of Essex, England*

An elementary introduction to the structure of the various types of crystals and crystalline solids which are encountered in solid state physics.
1969 242 pp. \$7.00

Pergamon Publishing Co.
MAXWELL HOUSE, FAIRVIEW PARK
ELMSFORD, NEW YORK 10523

The Institute of Physics and The Physical Society

Books 1970

PHYSICS EXHIBITION HANDBOOK

The Physics Exhibition Handbook is published annually in connection with the Physics Exhibition, which is organised every year by The Institute and Society at the Alexandra Palace, London. The Handbook contains descriptions of all the instruments and apparatus shown at the Physics Exhibition in a form which makes it suitable for future reference as well as providing a valuable catalogue of exhibits. Because the Physics Exhibition offers British instrument manufacturers and developers a valuable opportunity to display *original prototypes* of their latest scientific instruments, the Physics Exhibition Handbook has come to be regarded as an up-to-date guide to the latest developments being made in the UK.
SBN 85498 004 0 **Price \$1.80**

Orders for the 1970 Physics Exhibition Handbook should be sent to the Circulation Department, The Institute of Physics and The Physical Society, 47 Belgrave Square, London SW1, England.

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Proceedings of a Conference held in Oxford in September 1966.
1967; viii + 304 pp; illustrated; B5 \$10.80

2 *Radiation measurements in Nuclear Power*

Proceedings of the International Conference organised by The Central Electricity Generating Board in collaboration with The Institute of Physics and The Physical Society at Berkeley Nuclear Laboratories, Berkeley, Gloucestershire, in September 1966.
1967; viii + 456 pp; illustrated; B5 \$12

3 *Gallium Arsenide*

Proceedings of the First International Gallium Arsenide Symposium organised by The Institute of Physics and The Physical Society in cooperation with the Avionics Laboratory of the US Air Force at Reading, England, in September 1966.
1967; viii + 248 pp; illustrated; B5 \$10.80

4 *Static Electrification*

Proceedings of the Conference organised by The Static Electrification Group of The Institute of Physics and The Physical Society in London in May 1967.
1968; vi + 176 pp; illustrated; B5 \$24

5 *Fourth International Vacuum Congress—Part One*
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1969; xvi + 448; illustrated; B5; SBN 85498 000 8 \$15

6 *Fourth International Vacuum Congress—Part Two*
Part Two of the Proceedings of a Conference arranged by The British Joint Committee for Vacuum Science and Technology on behalf of the International Union for Vacuum Science, Technique and Applications in Manchester in April 1968. Published by The Institute of Physics and The Physical Society for the conference organisers.

1969; xvi + 380 pp; illustrated; B5; SBN 85498 001 6 \$15

7 *Gallium Arsenide*

Proceedings of the Second International Gallium Arsenide Symposium organised by Southern Methodist University and The Institute of Physics and The Physical Society in cooperation with the Avionics Laboratory of the US Air Force, held in Dallas, Texas, from 16-18 October 1968.

1969; viii + 244 pp; illustrated; B5; SBN 85498 002 4 \$15

INSTITUTE AND SOCIETY CONFERENCE BOOKLET SERIES

1 Proceedings of the International Conference on High Magnetic Fields and Their Applications organised by the Solid State Physics Sub-Committee and the Magnetism Group of The Institute of Physics and The Physical Society, under the auspices of IUPAP, in Nottingham, from 17-19 September 1969.

1969; ab. 72 pp; B5; SBN 85498 005 9 \$3.60

OTHER CONFERENCE PROCEEDINGS

Magnetism

Proceedings of the International Conference held in Nottingham in September 1964 under the auspices of IUPAP.

1964; xvi + 878; illustrated; A4 \$20.88

Cosmic Rays

Proceedings of the International Conference held in London in September 1965 under the auspices of the Cosmic Rays Commission of IUPAP.

1966; xxiv + 1114 pp (two volumes); illustrated; A4 \$25.92

**All orders for books to
Circulation Department,
The Institute of Physics and
The Physical Society,
47 Belgrave Square, London SW1,
England.**

state, including the relationship of slow-neutron experiments to those with x rays, the Raman effect and infrared spectroscopy. Crystal properties revealed by phonon and magnon interactions and experimentally determined dispersion relations are examined, but the scattering of neutrons by molecules, especially the significant advances made by H. L. McMurray, G. W. Griffing and others in recent years, deserves much more attention than this book provides.

Even though slow neutrons are of central importance for nuclear reactors the authors make no mention of this relationship. It is true that a separate treatise would be required to do this subject complete justice, but the present volume would be greatly enriched by some consideration of the extensive work on neutron cross sections and the relation of basic neutron physics to the properties of reactor moderators and fuels. Some discussion of neutron dynamics in chain reactors would have enlightened the whole treatment by indicating the relationship of neutron physics to related technology, for example, the mechanism employed in the TRIGA reactor. Up to a point the book gives an ade-

quate and often detailed review of work in low-energy neutron physics.

However, no reference later than 1964 is mentioned and most of the references are to work done much earlier. It also emphasizes Russian research even more than is normally expected in books from that country. The coverage of low-energy neutron work in the US is by no means adequate with the exception of the work at Oak Ridge National Laboratory carried on for many years by E. O. Wollan and his associates. There is only scant mention of the work conducted at the Materials Testing Reactor in Idaho by R. M. Brugger and his coworkers and the most recent experiments carried on at the Brookhaven National Laboratory by R. E. Chrien and his associates.

The theoretical treatments are often not well correlated with the experimental results. A notable example is the Van Hove correlation functions that are formally discussed, yet no explicit example of their relationship to any experimental data is given.

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Robert Shankland is Ambrose Swasey professor of physics at Case Western Reserve University.

The "science of science"

PUBLIC KNOWLEDGE: AN ESSAY CONCERNING THE SOCIAL DIMENSION OF SCIENCE. By John M. Ziman. 154 pp. Cambridge U. Press, London, 1968. Cloth \$3.95, paper \$1.95

by DIANA CRANE

After many years as research scientist and teacher, John Ziman, a British physicist, has set down his ideas about the internal workings of science. He has been stimulated by recent publications on the "science of science," a relatively new field in which models are being developed to explain the growth of science and the social behavior of scientists.

Ziman's thesis is that the goal of science is not knowledge per se but public knowledge, a consensus about what has currently been discovered in any field. He argues that a number of the normative and competitive aspects of scientists' behavior, which have been stressed by sociologists, can only be understood in terms of this goal. This objective also explains other characteristics of the scientific community, such as the high standards of evalua-

tion of scientific work, the refereeing of scientific manuscripts and the existence of review articles, all of which are designed to establish a consensus about scientific knowledge or to state it explicitly.

After a brief discussion of the nature of science and of scientific method, Ziman explores the theme of science as consensus in a number of contexts: the education of the young scientist, communication between colleagues and the scientist's organizational loyalties. His insights into the tensions that develop from the necessity to have certified knowledge and, at the same time, to develop new ideas are especially interesting.

He has chosen to write as an educated layman or amateur philosopher rather than as an expert in the science of science. Although specialists in that field will find interesting insights into the social organization of science, the book would have gained in value if he had elaborated the relationship between his ideas and previous work in the field. The general reader, seeking an introduction to an unfamiliar

Atomic Order:

An Introduction to the Philosophy of Micro-physics

by Enrico Cantore

The intention of *Atomic Order* is to encourage and contribute to the dialogue between philosophers and scientists by discussing a concrete example of scientific discovery according to a method acceptable and understandable to both sides.

The book consists of two parts. The first part is devoted to the problem of atomic order as discovered and verified by physics, from the speculations of Dalton to the consequences of modern quantum mechanics. These chapters will afford a telescopic, historical review to the scientific reader and a reliable, understandable account of the physical discoveries and theories to the nonscientist. The second part analyzes the presuppositions, guiding principles, and implications that made possible the development of atomic physics and that impart a humanistic meaning to it.

\$12.50

In Honor of Philip M. Morse

edited by Herman Feshbach and K. Uno Ingard

When Philip Morse was promoted to Professor Emeritus of Physics at M.I.T. in 1969, he already had behind him at least three full professional careers — in quantum physics, in acoustics, and in what Julius Stratton calls "the reduction of theory to numerically useful results," a general field of which Morse was a founder and for which no good term yet exists, that includes operations research, machine computation, and systems analysis. This volume contains papers in all these fields, written by Dr. Morse's students and colleagues. By their presence here, they gratefully testify to the influence that Philip Morse has had on their work and, in many cases, on their lives.

\$20.00

Applications of Group Theory in Quantum Mechanics

by M. I. Petrushen and E. D. Trifanov

This book is intended for theoretical physicists with a desire to understand the value of modern group-theoretical methods in quantum theory. The theory of groups and of their matrix representations is fully developed to the level required for applications, and their relevance to the invariance properties of a physical system is established. In particular, the fundamental relation between the irreducible representations of the invariance group of a Hamiltonian and the eigenvalue degeneracy is obtained.

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