



New Books from North-Holland

Wave Propagation in Elastic Solids

By **J. D. ACHENBACH**, Technological Institute, Northwestern University, Evanston, Ill.

North-Holland Series in Applied Mathematics and Mechanics, Vol. 16

Intended as a reference source for engineers and scientists in the broad sense, and as a textbook for graduate courses, this book presents the basic phenomena and the pertinent mathematics of wave propagation in elastic solids, within the framework of the classical theory of linear elasticity.

CONTENTS: One-dimensional motion of an elastic continuum. The linearized theory of elasticity. Elastodynamic theory. Elastic waves in an unbounded medium. Plane harmonic waves in elastic half-spaces. Harmonic waves in waveguides. Forced motions of a half-space. Transient waves in layers and rods. Diffraction of waves by a slit. Thermal and viscoelastic effects, and effects of anisotropy and non-linearity. Index. 1973, approx. 365 pp. \$46.50

Currents in Hadron Physics

By **V. DE ALFARO**, University of Torino, **V. S. FUBINI**, M.I.T. and University of Torino, **G. FURLAN**, University of Trieste, and **C. ROSSETTI**, University of Torino

This book acquaints the newcomer to the field of theoretical elementary particle physics with the present state of knowledge and the trends of progress. The most important facts and techniques developed in recent years in hadron physics have been collected together with particular emphasis given to the achievements going under the name of current algebra.

CONTENTS: Introduction to the theory of strong interactions. Weak and electromagnetic currents. Ward intensities and low-energy limits. Dispersion sum rules in current algebra. Phenomenological Lagrangians and chiral symmetry. Completeness sum rules from equaltime commutators. The role of Lorentz invariance. The infinite-momentum limit. A new approach to strong interactions: duality. Open problems and recent developments in the theory of currents. Current commutators on the light cone. References. 1973, approx. 900 pp., \$85.00

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ic of stimulated Raman scattering.

Although every book of this nature must suffer from the time lag between writing and publishing, it is most unfortunate that this book was written before many of the major breakthroughs resulting from laser excitation occurred. Because the book was written in the mid 1960's, nearly all the experimental examples cited were done with mercury-arc excitation and photographic detection. Therefore there is little or no mention of many of the more recent important developments such as Raman scattering from glasses and magnons, resonant Raman scattering and Rayleigh-wing scattering from liquids. In discussing Raman scattering from α -quartz to exemplify first-order Raman scattering in crystals, Sushchinskii refers only to papers written before there was a clear understanding of the effects of long-range electrostatic forces on the spectrum. As a result the reader not familiar with later experiments may become confused.

The documentation is very extensive (there are 550 references), but it is predominantly from the Russian literature. Some of these sources are either not translated or not readily available. Consequently, in some cases, when Sushchinskii has used approaches unfamiliar to the American reader, the reader may not be able to refer to convenient or familiar reference books or journal articles. On the other hand the bibliography of the Russian literature may be very useful to others.

In spite of the mentioned drawbacks, the extensive number of subjects covered in the book, the clarity of presentation, and the vast number of Russian references, make the book a worthwhile investment both to scientists already working in the field and to students wishing to gain a thorough understanding of Raman scattering.

DENIS L. ROUSSEAU
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Kinetic Equations

R. L. Liboff, N. Rostoker, eds.
346 pp. Gordon and Breach,
New York, 1971. \$19.50

Kinetic Equations consists of the 25 papers (three in abstract form) presented at a symposium in 1969 at Cornell. Perhaps even more than most conference products, it is a mixed bag. Although about half the material concerns plasma physics; there are articles on such diverse topics as Fermi liquids, nuclear magnetic resonance, and lasers. With regard to form, the range of

the book includes detailed calculations, such as J. V. Sengers's evaluation of ternary collisional corrections to the Enskog transport coefficients; discursive comments on work in progress, such as J. R. Dorfman's discussion of divergences in the Bogoliubov pair-correlation function, and review articles, such as R. N. Sudan's survey of wave-wave and wave-particle interactions in a plasma.

This diverse collection (despite the generally high quality of the individual papers) should not be expected to provide any coherent picture of recent work in the field, especially since the editors' short introduction makes little attempt to put things in their place. In this regard the four part-headings—Axiomatics, Quantum and Relativistics (*sic*), Properties and Solutions, Waves and Fluctuations—which were taken directly from the four symposium sessions, are almost useless: the content of the last two articles, for example, clearly makes them belong in the first part of the book. However, the coherence problem would be in any case quite severe, especially since roughly half of the papers have fewer than ten pages.

Incidentally, the second part-heading mentioned above indicates the apparent haste with which this book was assembled. Even for a publication of its kind, *Kinetic Equations* contains an unusually large number of typographical errors. Fortunately most of these are not likely to confuse, and the equations are quite accurate (an exception is the κ which becomes a χ on page five.) But it is annoying, for example, to have Bogoliubov's name misspelled on almost every page of the last article; and that's E. A. Freiman (not I. Freeman) in the picture caption at the back of the book.

There are definite advantages in the fact that the subject matter of this book tends to cut across traditional disciplinary lines. Most importantly, it implies that symposium participants could not assume in their audience the same familiarity with a field as is taken for granted in the writing of a typical journal article. Hence (despite a few obscurely brief papers), *Kinetic Equations* abounds in well written articles which should be comprehensible to the nonspecialist. The above-mentioned article by Sengers, for example, includes in addition to its calculational *tour de force* an extremely clear review of the Enskog method and its refinements. Similarly, one finds in the paper by T. Kihara and D. Aono a valuable survey of the attempts, in plasma kinetic theory, to go beyond lowest order in the Coulomb logarithm; it is shown how a variety of kinetic equations that include the effects of very close collisions may be summa-

rized in a single formula, and the quantitative effects of this formula on transport coefficients are calculated. A third example is the article by A. H. Kritz, G. V. Ramanathan, and G. Sandri, in which the defects of the usual Bogoliubov treatment of the two-body correlation function are convincingly demonstrated and amended—without recourse to three body effects. Of course not all of this material is new, and one suspects that much of what is new will later be published elsewhere. But one also suspects that, misprints aside, many of the articles in *Kinetic Equations* appear in a uniquely intelligible form.

This is an interesting and readable book.

RICHARD HAZELTIN
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Austin

Tunneling in Solids

C. B. Duke
353 pp. Academic, New York,
1969. \$16.00

This book deals with the process known as the tunnel effect whereby electrons are transferred through ultra-thin insulating films. This ubiquitous effect has been of great interest to solid-state physicists from a wide range of experimental and theoretical viewpoints, and it ranges from the study of field emission into a vacuum to the semiconductor tunnel diode invented by Leo Esaki. It also includes the many-faceted superconducting tunnel effects that flowed from the pioneering efforts of Ivar Giaever. C. B. Duke has attempted to embrace the major aspects of this interesting field in a single volume. I believe he has achieved a high degree of success in his endeavor.

A major goal of the book was to serve as a source for a unifying view of this rather diverse field. One of the key problems the author faced was the establishing of criteria for the critical examination of the literature in this field. Somewhat arbitrary decisions are obviously required to accomplish this, but I tend to agree with his handling of the problem. In any case he was able to make tractable his task of organizing the subject matter and this has yielded an excellent bibliography of the experimental and theoretical papers in tunneling.

The book treats the subject with sufficient breadth so that it will be useful to physicists with varying theoretical and experimental background. One can begin to discuss tunneling using the idealized models of potential bar-

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