

properties of solids at a beginning graduate level, assuming knowledge of electromagnetic theory and elementary quantum mechanics. The style is personal and informal, and no steps are omitted in the derivations. There are more than 100 well chosen illustrations, and each major chapter has a set of problems, as well as references to selected papers, reviews and books. Gaussian units are used throughout, but their relation to practical units is not mentioned.

Most of the basic aspects of the optical properties of metals, semiconductors and insulators are covered, with emphasis on the dielectric function as a unifying concept. Infrared absorption by lattice vibrations is discussed only briefly, and stimulated emission and nonlinear effects are not treated at all. On the other hand, there is a useful introduction to photoemission, drawing in part on the author's own work. This is a readable book, and gives a good conceptual introduction to the optical properties of solids.

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Raman Spectra of Molecules and Crystals.

M. M. Sushchinskii

446 pp. Wiley, New York, 1972. \$34.00

There have been numerous books and articles published reviewing the ever growing field of Raman scattering. However most of these have been application oriented and have discussed the theoretical foundations of light scattering phenomena only superficially. Sushchinskii, in his preface, states his objective of bridging the gap between the extensive theoretical treatment given by G. Placzek and the more qualitative discussions currently available in other books and review articles. He has succeeded very well in this goal by presenting a complete but concise discussion of Raman scattering ranging from a description of the classical polarizability theory for individual molecules through R. Loudon's theories of polar modes in crystal lattices and a complete chapter on stimulated Raman scattering. Wherever appropriate, specific examples and illustrations have been cited.

Sushchinskii originally published this book in the Soviet Union in 1969. The English edition was prepared by the Israel Program for Scientific Translations in 1972. The text has no hint of Russian sentence structure and flows in perfect idiomatic English.

Raman Spectra of Molecules and Crystals is divided into four long chap-

ters: General Theory of Raman Scattering, Raman Spectra and Molecular Structure, Raman Spectra of Crystals, and Stimulated Raman Scattering. In addition to classical polarizability theory, the general-theory chapter includes a discussion of quantum effects such as the absorption and emission of radiation, Raman intensities, and vibrational transitions. Chapter II, Raman Spectra and Molecular Structure, comprises nearly half of the book and covers a variety of subjects. Included are discussions of rotational Raman scattering and rotational sidebands on vibrational lines. In addi-

tion, there is a rather standard section on the group theory of vibrational modes and a section on the calculation of frequencies. Considerable attention is given to the characteristic Raman shifts of simple paraffins, structural analysis and various systematic effects observable in organic molecules. These sections could prove very useful to analytical and organic chemists. The chapter on Raman scattering from crystals discusses space group theory, lattice vibrations, polar modes and first- and second-order Raman scattering. The last chapter gives an excellent introduction to the top-

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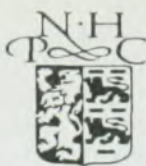


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By **J. D. ACHENBACH**, Technological Institute, Northwestern University, Evanston, Ill.

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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.

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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-