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Kanamori rules and the phenomena of double-exchange. This important chapter thus ties in with the atomic theory developed earlier.

The remainder of the book is devoted to solid-state theory. There is a development of band structure, with or without applied fields, effective mass theory, various kinds of resonance and even slight digressions to the polaron (treated by perturbation theory). There is a chapter on semiconductors, and one on metals, in which the topic of magnetic impurity states is reviewed. These chapters, dealing with relatively recent topics are reasonably well self-contained, but also well annotated and referenced for further study. This concludes the material in the main part of the text, but a number of more theoretical topics such as angular momentum, perturbation theory, quantization, density matrix are left to the voluminous appendices.

Altogether, the text presents only the basic elements of the phenomenon of magnetism in the solid state. This thorough presentation is suitable for graduate students in theoretical or experimental solid-state physics and in quantum-chemistry and as an excellent reference text in the laboratory. Only the price tag will undoubtedly limit its dissemination.

DANIEL C. MATTIS
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Methods of Experimental Physics, Volume 10: Physical Principles of Far- Infrared Radiation

L. C. Robinson
460 pp. Academic, New York, 1973.
\$29.00

The part of the electromagnetic spectrum between the infrared and the microwave regions has attracted much attention during the last two or three decades. Intensive development has resulted in extending optical techniques into the far infrared, and microwave techniques into the millimeter and submillimeter wavelength regions. In recent years books discussing the spectroscopic aspects of the far infrared, millimeter and submillimeter spectral regions in great detail, have appeared.

Physical Principles of Far Infrared Radiation appears as volume 10 of the series "Methods of Experimental Physics." L. C. Robinson, treats under this title both the extension of optical techniques into the longer wavelength region, and those methods which are an outgrowth of microwave techniques into the submillimeter and millimeter

wavelength regions. To these latter techniques the book pays considerably more attention.

The generation and detection of far infrared radiation and the transmission of waves and transmission systems are presented in three chapters. In the chapter on generation of far-infrared radiation, there is a presentation of some of the recent techniques such as the use of a tunable laser, solid-state laser diodes and the Josephson junction as wave generator. Also included is a section on gas lasers (with a table of laser lines), harmonic generation, electron tubes and some other techniques. The presentation is given with many details without appearing lengthy. The chapter on detection of far-infrared radiation presents all important methods. We find a discussion of thermal and photoconductive detectors of various kinds, as well as point-contact diodes and the Josephson junction. The last section includes a detailed discussion on noise.

The third chapter on wave transmission and transmission systems treats at the same time the physical methods of frequency analysis of radiation as well as the transmission properties of materials. We find a discussion on grating spectrometers and a short discussion of Fourier-transform spectroscopy without treating phase error corrections or the operation in the asymmetric mode. The Fabry-Perot properties are discussed in several sections, as needed, but no mention of multiple-layer interference filters is made. Also included are discussions of all kinds of filters, including transmission and reflection properties of various materials, metallic reflection, waveguides, light pipes, polarizers and a millimeter wave spectrometer. It would have been preferable if the author had separated the treatment of the physical methods of frequency analysis from the "transmission properties of matter." The former deserves a much more systematic treatment than presented here.

The remaining three chapters contain discussions of applications. One could argue that applications do not belong in a book devoted to "principles," but one would go along with some for demonstrative purposes. With this point of view it is understandable that the author selects subjects close to his own activities. Two chapters included are "Cyclotron Resonances with Free Electrons and Carriers in Solids" and "Wave Interaction in Plasmas." These two chapters add much to the usefulness of the book. Most subjects presented here are discussed in other books in this field in far less detail, if treated at all.

The last chapter is devoted to the spectra of gases, liquids and solids and could have easily been omitted without

reducing the value of this book. Most of the subjects are presented too briefly; they can be found discussed in more detail in several books on spectroscopy and in review articles.

The book is well produced and proof-read—it is recommended to advanced graduate students and researchers interested in the field.

K. D. MOELLER
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Solid State Chemistry and Physics, An Introduction, Volume 1

P. F. Weller, ed.
500 pp. Marcel Dekker, New York, 1973.
\$26.50

The topic of this book, solid-state chemistry and physics, has received lip service for many years, but because of the separation of the academic disciplines it has seldom been taken seriously. The changing employment market has, however, caused a corresponding change in attitude in academic departments where there is interest in what becomes of their graduates, and these changes are reflected in this volume. In short, the subject of this book is "Relevant." This fact has

not escaped the publishers, who have produced an unattractive photo-offset volume for which they expect, and probably will get, a handsome price.

Physicists who are concerned with adjusting to the changing attitude of society toward science would do well to consider this modest but effective volume. The average age of the seven contributing authors is less than 40, and all are competent if not very distinguished. The exceptional feature of the book is its simple, direct approach, which deliberately avoids not only sophisticated mathematics but also elegance. As a result, the average reader with little or no previous acquaintance with the subject will not feel overawed. Instead, he is likely to finish the book, and when finished he will have a vocabulary sufficient to encourage him to approach the many authoritative and elegant texts available at higher levels.

This is the first volume of a two-volume set, and it covers most of the properties that would be of interest from a materials viewpoint: structure and bonding, electrical, magnetic and optical properties, and some transport and magnetic resonance phenomena. The standard it sets is not high, and there is some unavoidable repetition from one author to the next, but it is likely to be useful to many students.

J. C. PHILLIPS
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new books

Elementary Particles and Fields

Fields and Particles: An Introduction to Electromagnetic Wave Phenomena and Quantum Physics. F. Bitter, H. A. Medicus. 688 pp. Elsevier, New York, 1973. \$17.95

Fundamental Interactions in Physics. (Conf. on Fundamental Interactions, Coral Gables, Fla., 22-26 January 1973). B. Kursunoglu, A. Perlmutter. 399 pp. Plenum, New York, 1973. \$25.00

Hadron Physics at Very High Energies. D. Horn, F. Zachariasen. 378 pp. W. A. Benjamin, Reading, Mass., 1973. \$17.50 hardcover, \$9.50 paperback

Nuclear Research Emulsions II: Particle Behavior and Emulsion Applications. W. H. Barkas. 462 pp. Academic, New York, 1973. \$36.00

Chemical Physics

Electron Spin Resonance in Chemistry. L. A. Blumenfeld. 322 pp. Halsted, New York, 1974. \$32.50

Electricity and Magnetism

The Electromagnetic Interaction. R. L. Armstrong, J. D. King. 493 pp. Prentice

Hall, Englewood Cliffs, N.J., 1973. \$11.95

Magnetism, Vol. 5: Magnetic Properties of Metallic Alloys. H. Suhl, ed. 400 pp. Academic, New York, 1973. \$34.00

Materials Science

Crystal Structures: A Working Approach. H. D. Megaw. 563 pp. W. B. Saunders, Philadelphia, 1973. \$19.50

Electrotransport in Metals and Alloys. J. N. Pratt, R. G. R. Sellors. 201 pp. Trans Tech, Riehen, Switzerland, 1973.

Festkörper-theorie III: Lokalisierte Zustände. O. Madelung. 195 pp. Springer-Verlag, New York, 1973. \$7.60

Solid State Surface Science, Vol 3. M. Green, ed. 222 pp. Marcel Dekker, New York, 1973. \$24.50

Optics

IR—Theory and Practice of Infrared Spectroscopy. N. L. Alpert, W. E. Keiser, H. A. Szymanski. 380 pp. Plenum, New York, 1973. \$7.95

Fluids and Plasmas

Advances in Aerosol Physics, Vol. 4. V.

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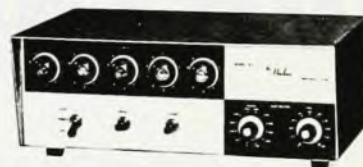
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