al periods and so forth for the planets and natural and artificial satellites.

HELMUT K. WIMMER

In addition to the text, an instructor's manual is provided which contains quizzes and worksheets. The quizzes assume no mathematical background, as is the case with the questions in the main text; the worksheets contain some bare minimal mathematics. Both are optional, and the instructor must decide whether or not to supplement the main text with them.

This book, with its beautifully designed illustrations, should provide many introductory astronomy students with new insights on this subject.

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Theory of Defects in Solids: Electronic Structure of Defects in Insulators and Semiconductors

A. M. Stoneham
955 pp. Oxford U. P., New York, 1975. $79.50

Solids are known for the cornucopia of defects of all degrees of pathological complexity that determine most of their properties; by now the number of defects must have surpassed even the plethora of elementary particles. All of these defects have structural as well as electronic aspects, although in many instances only one type is dominant. To treat all of them with any theoretical detail in one book would have been an unmanageable undertaking, and the result would have been much longer than A. M. Stoneham's nearly 900 pages (at almost 10 cents per page!). Stoneham has therefore limited the scope of his book to defects in insulators and semiconductors, with only an incidental mention of metals and heavily doped semiconductors. He has also concentrated on the theoretical aspects of the electronic properties of these defects; in fact, nearly half of the book is concerned with theoretical *methods* rather than theoretical *results*.

The presentation and intercomparison of advantages and disadvantages of various theoretical approximations and schemes is very complete and detailed. One consequence is that, when it comes to experimental data, only those are given that are essential for guidance or comparison with theory. The stress is placed on directly observable electronic phenomena (such as optical transitions, photoionization, local modes, infrared absorption, external fields and resonance) of *static* defects. Hardly any mention is made of kinetic and dynamic questions of the formation, motion and annealing of defects, although the electronic aspects of these phenomena are often crucial, as illustrated by the frequent failure of the simple point or shell-model theories. The book is not and does not intend to be an encyclopedia of defects. Rather, it is a very systematically written survey of the variety of theoretical approaches necessary for the study of defects. The author's attitude is well illustrated by the first sentence of his chapter on vacancies in valence crystals: "There is no adequate theory of the defects discussed in this chapter." True but disconcerting.

Upon reading this book, one realizes why defects in insulators and semiconductors provide such a rich field for theory: even though usually many kinds of defects are simultaneously present, (1) they can often be observed individually, (2) they produce many easily measurable effects, either electronic or optical or elastic or resonance and (3) last but not least, they are not hidden behind the sometimes quite impenetrable curtain of electrons in metallically conducting solids.

The author avoids dwelling too long in the many areas where he made his own major contributions (polarons, F, V_k and H centers, quantum theory of diffusion and so on), and the result is a very uniform, coherent and pleasing presentation. The book also strikes a happy medium between being a textbook and a monograph, with a thoroughness of presentation and explanation that makes it suitable for graduate students. The wide coverage, the list of nearly 2000 references and a fair subject index make it a true monograph on theoretical methodology in this particular field. In that sense it is unique and of great value to all interested in the basic aspects of defects in solids.

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new books

Elementary Particles and Fields

Muon Physics, Vol. 3: Chemistry and Solids. V. W. Hughes, C. S. Wu, eds. 305 pp. Academic, New York, 1975. $41.50

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Atomic and Molecular Physics and the Interstellar Matter. R. Balian, P. Encrenaz, J. Lequeux, eds. 632 pp. North-Holland, Amsterdam, The Netherlands, 1975. $66.75

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Advances in Chemical Physics, Vol 31: Non-Simple Liquids. I. Prigogine, S. A. Rice, eds. 496 pp. Wiley, New York, 1975. $34.95

Encyclopedia of Electrochemistry of the Elements, Vol. 4. A. J. Bard, ed. 465 pp. Marcel Dekker, New York, 1975. $79.50

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Optical Properties of Highly Transparent Solids. S. S. Mitra, B. Bendow, eds. 538 pp. Plenum, New York, 1975. $39.50

Advances in Holography, Vol. 1. N. H. Farhat, ed. 170 pp. Marcel Dekker, New York, 1975. $17.50

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Engineering Applications of Lasers and Holography. W. E. Kock. 400 pp. Plenum, New York, 1975. $25.00

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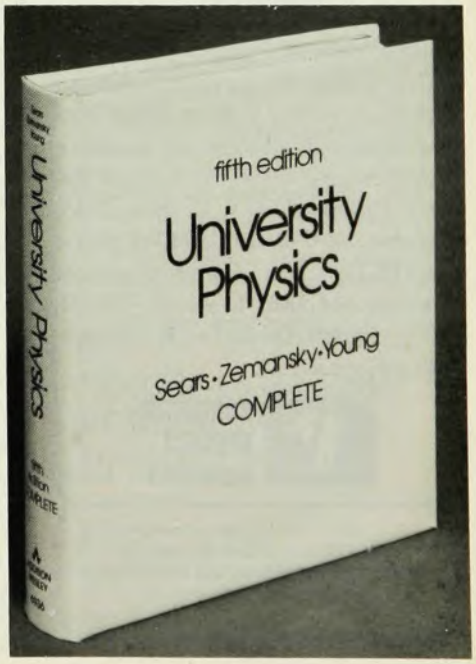

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The Solvay Conferences on Physics: Aspects of the Development of Physics since 1911. J. Mehra. 415 pp. D. Reidel, Dordrecht, Holland, 1975. $56.00

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Authenticity in Art: The Scientific Detection of Forgery. S. J. Fleming. 164 pp. Crane, Russak, New York, 1976. $14.50 (Note: *Authenticity in Art* is available to members of AIP Societies from Marketing Services, AIP, 335 E. 45th St., New York, N.Y. 10017, for $11.75 prepaid, with checks payable to Crane, Russak.)

Prelude to Science: An Exploration of Magic and Divination. R. F. Smith. 129 pp. Scribner's, New York, 1975. $7.95 □