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Book Reviews

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Book Reviews

"Solid State Physics: Problems and Solutions" by Laszlo Mihaly and Michael C. Martin, John Wiley and Sons, New York, 1996; ISBN 0-471-15287-0; xiv + 261 pages (paper); $29.95.

Laszlo Mihaly and Michael C. Martin have developed a collection of problems which was used in their advanced undergraduate and introductory graduate solid state physics courses at SUNY Stony Brook. One of the objectives of the problem sets is to provide additional homework exercises to supplement the textbook so that students will gain understanding of the subject by "getting used to it" and not stumbling over details so they can see the "forest" more clearly. A second objective is to provide a measure of student progress at midterm and finals. One and two dimensional problems are included to keep the mathematics and graphs simple.

The problems are grouped according to general topics which include Crystal Structures (17 problems), Interatomic Forces, Lattice Vibrations (16 problems), Electronic Band Structure (17 problems), Density of States (12 problems), Elementary Excitations (11 problems), Thermodynamics of Non-interacting Quasi-particles (15 problems), Transport Properties (12 problems), Optical Properties (8 problems) and Interactions and Phase Transitions (15 problems). At the beginning of each topical problem set a brief introduction is included which highlights the basic concepts needed for the solutions which are given in a separate section. A list of 24 references is given at the end which includes most of the commonly used solid state physics textbooks.

The variety of problems available makes this a useful collection to supplement the textbook homework exercises. Many of the problems explore current topics such as the Quantum Hall Effect, carbon 60, solitons and Bloch oscillations. The solutions generally begin by referring either to an equation from the introductory material or sections in the solid state textbooks listed in the references. Although all the detailed steps in the solutions are not shown in general, the main points are indicated and the results are illustrated by the use of informative figures and discussions. The problems on Elementary Excitations (Chapter 5) and Interactions and Phase Transitions (Chapter 9) may

present difficulties for undergraduates since the problems and their solutions are presented in the second quantized formulation of quantum theory.

An additional feature of this problem collection is that it can be accessed on the internet at http://solidstate.physics.sunysb.edu/book/prob/. This site includes both the problem sets and the solutions. However, to access the solutions you must register so that your status as a nonstudent can be verified. The site also provides for feedback to the authors.

In conclusion, although I have not had classroom experience with this problem set as yet, I am sure that with a careful selection of appropriate problems it will be a valuable resource for instructors of solid state physics or materials science courses.

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"**Phthalocyanines: Properties and Applications**" edited by C. C. Leznoff and A. B. P. Lever, vol. 4, VCH Publishers Weinheim, 1996; ISBN 1-56081-916-2; xii + 524 pages; $150; DM 225; SFr 218.

This is the fourth in the successful series of books concerned with phthalocyanines. As with the previous volumes, the thirteen chapters contain an interesting mix of synthesis, theory and physical properties, and biological/medical applications. Each chapter is individually referenced and there is a 10 page index at the end.

The topics of the chapters are: synthesis and chromatographic separation; acid-base and coordination properties; nonlinear optical properties; hydrocarbon activation; carbon dioxide fixation and photoreduction; photovoltaic junctions; zeolite encapsulation; epitaxial films grown by organic molecular beam epitaxy; molecular orbitals and electronic spectra; recent results in single atom bridged dimers; radiolabelled compounds for imaging and therapy; reconstituted hemoproteins; developments in photobiology.

As with previous volumes in this series, this latest volume will be well received by both researchers active in phthalocyanines and those interested in learning about them. Electronic structure and spectra are at the heart of several of the chapters. The total number of pages devoted to these subjects is

over half the length of this volume. Better coordination among the authors by the editors would have been desirable.

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