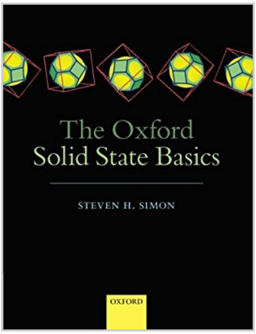

The Oxford Solid State Basics

By Steven H. Simon

The Oxford Solid State Basics By Steven H. Simon

The study of solids is one of the richest, most exciting, and most successful branches of physics. While the subject of solid state physics is often viewed as dry and tedious this new book presents the topic instead as an exciting exposition of fundamental principles and great intellectual breakthroughs. Beginning with a discussion of how the study of heat capacity of solids ushered in the quantum revolution, the author presents the key ideas of the field while emphasizing the deep underlying concepts.

The book begins with a discussion of the Einstein/Debye model of specific heat, and the Drude/Sommerfeld theories of electrons in solids, which can all be understood without reference to any underlying crystal structure. The failures of these theories force a more serious investigation of microscopics. Many of the key ideas about waves in solids are then introduced using one dimensional models in order to convey concepts without getting bogged down with details. Only then does the book turn to consider real materials.

Chemical bonding is introduced and then atoms can be bonded together to crystal structures and reciprocal space results. Diffraction experiments, as the central application of these ideas, are discussed in great detail. From there, the connection is made to electron wave diffraction in solids and how it results in electronic band structure. The natural culmination of this thread is the triumph of semiconductor physics and devices.

The final section of the book considers magnetism in order to discuss a range of deeper concepts. The failures of band theory due to electron interaction, spontaneous magnetic orders, and mean field theories are presented well. Finally, the book gives a brief exposition of the Hubbard model that undergraduates can understand.

The book presents all of this material in a clear fashion, dense with explanatory or just plain entertaining footnotes. This may be the best introductory book for learning solid state physics. It is certainly the most fun to read.

To request a copy of the Solutions Manual, visit:
http://global.oup.com/uk/academic/physics/admin/solutions

The Oxford Solid State Basics

By Steven H. Simon

The Oxford Solid State Basics By Steven H. Simon

The study of solids is one of the richest, most exciting, and most successful branches of physics. While the subject of solid state physics is often viewed as dry and tedious this new book presents the topic instead as an exciting exposition of fundamental principles and great intellectual breakthroughs. Beginning with a discussion of how the study of heat capacity of solids ushered in the quantum revolution, the author presents the key ideas of the field while emphasizing the deep underlying concepts.

The book begins with a discussion of the Einstein/Debye model of specific heat, and the Drude/Sommerfeld theories of electrons in solids, which can all be understood without reference to any underlying crystal structure. The failures of these theories force a more serious investigation of microscopics. Many of the key ideas about waves in solids are then introduced using one dimensional models in order to convey concepts without getting bogged down with details. Only then does the book turn to consider real materials.

Chemical bonding is introduced and then atoms can be bonded together to crystal structures and reciprocal space results. Diffraction experiments, as the central application of these ideas, are discussed in great detail. From there, the connection is made to electron wave diffraction in solids and how it results in electronic band structure. The natural culmination of this thread is the triumph of semiconductor physics and devices.

The final section of the book considers magnetism in order to discuss a range of deeper concepts. The failures of band theory due to electron interaction, spontaneous magnetic orders, and mean field theories are presented well. Finally, the book gives a brief exposition of the Hubbard model that undergraduates can understand.

The book presents all of this material in a clear fashion, dense with explanatory or just plain entertaining footnotes. This may be the best introductory book for learning solid state physics. It is certainly the most fun to read.

To request a copy of the Solutions Manual, visit: http://global.oup.com/uk/academic/physics/admin/solutions

The Oxford Solid State Basics By Steven H. Simon Bibliography

- Rank: #48106 in Books
- Brand: imusti
- Published on: 2013-08-16
- Released on: 2013-08-16
- Original language: English
- Number of items: 1
- Dimensions: 7.40" h x .70" w x 9.60" l, .0 pounds
- Binding: Paperback
- 312 pages

Editorial Review

Review
"The style of the book is very accessible for undergraduates. The topics are well motivated and the explanations are clear, helped by a generous set of figures for illustration. This textbook may well establish itself as an alternative to the available classics."

--Derek Lee, Imperial College London

"The author, Steven Simon, is well known as an insightful scientist and an engaging and witty speaker, and it is a pleasure to see how well his talents translate to the printed page. He has re-examined with a modern eye the question of which topics should be covered in a student's first
exposure to the physics of solids. My impression is that his presentation of those topics will be accessible for the student, illuminating for the expert, and entertaining for all."

--Joel E. Moore, University of California, Berkeley, and Lawrence Berkeley National Laboratory

About the Author

Steven H. Simon, *Professor of Theoretical Condensed Matter Physics, Department of Physics, University of Oxford, and Fellow of Somerville College, Oxford.*

Professor Steven Simon earned a BSc degree from Brown in Physics & Mathematics in 1989 and a PhD in Theoretical Physics from Harvard in 1995. Following a two-year post-doc at MIT, he joined Bell Labs, where he was a director of research for nine years. He is currently Professor of Theoretical Condensed Matter Physics in the Department of Physics at the University of Oxford, and a Fellow of Somerville College, Oxford.

His research is in the area of condensed matter physics and communication, including subjects ranging from microwave propagation to high temperature superconductivity. He is interested in quantum effects and how they are manifested in phases of matter. He has recently been studying phases of matter known as "topological phases" that are invariant under smooth deformations of space-time. He is also interested in whether such phases of matter can be used for quantum information processing and quantum computation.

Users Review

From reader reviews:

Frederick Roark:

Information is provisions for individuals to get better life, information today can get by anyone at everywhere. The information can be a knowledge or any news even a problem. What people must be consider any time those information which is within the former life are challenging be find than now's taking seriously which one works to believe or which one typically the resource are convinced. If you get the unstable resource then you have it as your main information we will see huge disadvantage for you. All of those possibilities will not happen in you if you take The Oxford Solid State Basics as the daily resource information.

Rachel Kaufman:

People live in this new day time of lifestyle always make an effort to and must have the spare time or they will get lot of stress from both day to day life and work. So , once we ask do people have free time, we will say absolutely of course. People is human not just a robot. Then we inquire again, what kind of activity are you experiencing when the spare time coming to you of course your answer will probably unlimited right. Then do you try this one, reading books. It can be your alternative with spending your spare time, the actual book you have read is actually The Oxford Solid State Basics.

Catherine Estey:

In this period globalization it is important to someone to find information. The information will make a professional understand the condition of the world. The condition of the world makes the information easier to share. You can find a lot of referrals to get information example: internet, classifieds, book, and soon. You will see that now, a lot of publisher that will print many kinds of book. The actual book that recommended for your requirements is The Oxford Solid State Basics this reserve consist a lot of the information from the condition of this world now. That book was represented how do the world has grown up. The dialect styles that writer make usage of to explain it is easy to understand. The actual writer made some research when he makes this book. That's why this book suited all of you.

Walter Pyle:

Is it you who having spare time and then spend it whole day by watching television programs or just resting on the bed? Do you need something new? This The Oxford Solid State Basics can be the answer, oh how comes? A fresh book you know. You are consequently out of date, spending your spare time by reading in this completely new era is common not a geek activity. So what these publications have than the others?

Read The Oxford Solid State Basics By Steven H. Simon for online ebook

The Oxford Solid State Basics By Steven H. Simon Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read The Oxford Solid State Basics By Steven H. Simon books to read online.

Online The Oxford Solid State Basics By Steven H. Simon ebook PDF download

The Oxford Solid State Basics By Steven H. Simon Doc

The Oxford Solid State Basics By Steven H. Simon Mobipocket

The Oxford Solid State Basics By Steven H. Simon EPub

IGCJXEQM4UP: The Oxford Solid State Basics By Steven H. Simon