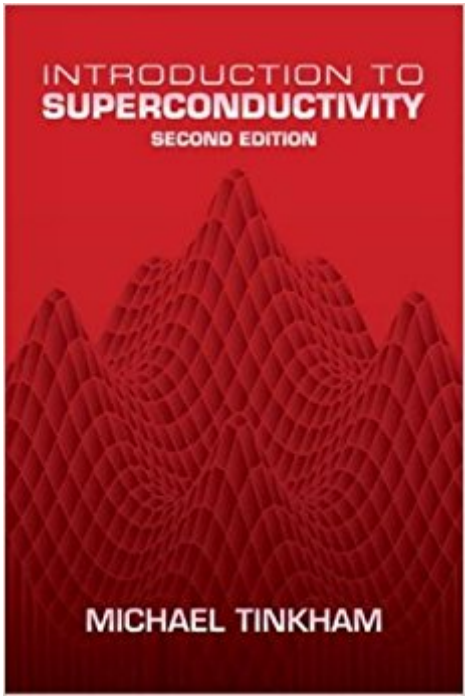
Introduction To Superconductivity: Second Edition (Dover Books On Physics) (Vol I)



Synopsis

Well known for its accessibility to graduate students and experimental physicists, this volume emphasizes physical arguments and minimizes theoretical formalism. The second edition of this classic text features revisions by the author that improve its user-friendly qualities, and an introductory survey of latter-day developments in classic superconductivity enhances the volumeÃ¢â ¬â„¢s value as a reference for researchers. Starting with a historical overview, the text proceeds with an introduction to the electrodynamics of superconductors and presents expositions of the Bardeen-Cooper-Schrieffer theory and the Ginzburg-Landau theory. Additional subjects include magnetic properties of classic type II superconductors; the Josephson effect (both in terms of basic phenomena and applications and of the phenomena unique to small junctions); fluctuation effects in classic superconductors; the high-temperature superconductors; special topics (such as the Bogoliubov method, magnetic perturbations and gapless superconductivity, and time-dependent Ginzburg-Landau theory); and nonequilibrium superconductivity. 1996 edition.

Book Information

Series: Dover Books on Physics

Paperback: 480 pages

Publisher: Dover Publications; 2 edition (June 14, 2004)

Language: English

ISBN-10: 0486435032

ISBN-13: 978-0486435039

Product Dimensions: 6.1 x 1.1 x 9.1 inches

Shipping Weight: 1.3 pounds (View shipping rates and policies)

Average Customer Review: 4.7 out of 5 stars 11 customer reviews

Best Sellers Rank: #505,975 in Books (See Top 100 in Books) #36 inÃ Â Books > Engineering & Transportation > Engineering > Electrical & Electronics > Superconductivity #168 inÃ Â Books > Science & Math > Physics > Solid-State Physics #1610 inÃ Â Books > Textbooks > Science & Mathematics > Physics

Customer Reviews

Using the simplest and most physically intuitive arguments and methods, Introduction to Superconductivity exposes not only graduate students but professionals in academe and industry to the breadth and richness of the phenomenon of superconductivity. Applications as well as fundamental principles are thoroughly covered. The author not only views superconductivity as a

macroscopic quantum state, as described by the Ginzburg-Landau phenomenological equation, but also recognizes that the fundamental entity is the paired electrons of the microscopic theory of Bardeen-Cooper-Schrieffer. Special features include a treatment of varied phenomena in a simple way which keeps the microscopic theory of BCS in the background, and a thorough discussion of magnetic properties of type II superconductors, including dissipative effects and the use of twisted multifilamentary wires. After treating the fundamentals of the Josephson effects, an analysis is given of how the popular RF-biased SQUID magnetometer works. An extensive discussion of fluctuation effects is also included. Major changes in this new edition include the following: new chapter on high temperature superconductors; updated and expanded discussion of the Josephson effect; new chapter on the Josephson effect in mesoscopic junctions; new chapter on nonequilibrium superconductivity; introductory treatment of electrodynamics in London theory level; and the deemphasis of nonlocal electrodynamics. The level of treatment presumes a background in Solid State Physics and Basic Quantum Mechanics and avoids the use of Thermal Green’s Functions.

I am a grad student researching superconducting circuits for quantum information. Everyone in my lab uses this book as a reference so I bought it to use as my introduction to superconductivity theory. I like the book very much and would recommend it to anyone who has taken a graduate course in quantum mechanics.Tinkham’s basic theoretical development is clear and comprehensive, and the accompanying discussion is actually helpful. You can learn how to really extract information from a theory if you pay attention to how Tinkham works the BCS theory in chapter 3. There’s a good reason this book is a classic. After just reading chapter 3 I was able to understand essentially everything I need to have an intelligent conversation with others in my research group.I recommend this book along with Van Duzer’s "Superconducting Devices and Circuit." While Tinkham is presumably a book on basic theory, and Van Duzer is presumably a book for applications, both books provide brilliant gems of insight in each other’s domain. They make a great pair.Prerequisits: Second quantization, basic solid state, and basic E&M. In short, a first year grad student’s education is more than enough.

A bit denser than other intros, but the best intro I’ve read. Tinkham does a great job guiding the reader (i.e. suggesting skipping the BCS chapter), giving examples, and not oversimplifying. Its clear the writer had a broad base of knowledge and a good historical account of a lot of the research. Comments on some complex superconductive phenomena which most other intros skip out on (non-equilibrium and other odd effects)

I was introduced to this book (1st edition) while in grad school (research in SC) and, in my collection of books related to this field, Tinkham's is all the way to the top.If you are really serious about understanding SC theory, this one is a must have.

worth to buy it

Michael Tinkham was a great developer of the field and made a fine book for students to have (in my opinion)a second approach to the subject.

Great book to learn basic superconductivity. Every thing basically you should know is compacted in the book. Sure you should know some basics on solid state physics and mathematics. That is obvious since superconductivity is no basic subject.

The theory of superconductors is an amazingly complicated and rich field, and it can be very daunting to begin studying without a large background in physics. This book does an excellent job telling you the details enough to understand what is going on without giving you so much that it becomes a daunting task to read the book.Having only read through the first three chapters so far, I give that caveat before continuing.The first chapter, the author says upfront, is difficult to follow, as it gives a quick outline of every future chapter in the book. I would recommend skimming the first chapter, and then after reading each chapter go back and see if you got the key points illustrated in the first chapter.The second chapter, a treatment of the London equations, does an excellent job deriving the London equations in the first section, then providing a great deal of application of the equations, as well as outlining the limits of that model of superconductors.Chapter 3 is where the book gets down to business, as Tinkham gives an introduction to BCS theory. This treatment uses plausibility arguements to justify many of the conclusions or assumptions, but also provides some guidance to the mathematical rigor you might use to really prove the assertions you make. The chapter does not leave you feeling very confused at all, and the section can be read almost straight through.Although I have not read any further into the book, I can only imagine that it is more of the same. I would strongly recommend this book to anybody interested in learning something about superconductors before trying something more rigorous, such as Schrieffer's classic text on the work.

This classic book on superconductivity is excellent for an experienced reader who has already some background in superconductivity. However, for a student trying to learn superconductivity, it says too many things in too brief which may be difficult to follow. While teaching a course I would prefer to follow a book like Superconductivity by Ketterson and Song and refer to this book for selected (special) topics.