

<<固体物理学现代教程>>

图书基本信息

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内容概要

Solid State Physics is the study of the state of solids. Its development is accompanied by the development of modern science and technology. It contains many fundamental concepts that are essential to a great number of branches of science, including those within as well as those outside physics. An exhausted list of these branches is intimidating. Here we just name a few: Condensed matter physics, material science, semiconductor physics, laser physics, spin-tronics, physical optics, electric engineering, and electronic engineering. In solids, there exist a variety of particles (including quasiparticles and elementary excitations) and interactions among them. These particles and interactions determine the potential applications of various solids. For example, the peculiar band structure of electrons in semiconductors lead to transistors that are the heart of everything electronic; the electron-photon interactions lead to laser diodes, photodiodes, and CCDs (coupled charge diodes); the electron-phonon interactions lead to piezoelectric materials; the electron spin-charge interactions lead to spintronics and quantum computation; the macroscopic quantum phenomena of electrons in metallic solids lead to superconductivity, with the strong correlation of electrons leading to high temperature superconductivity. Thus, it can be said that Solid State Physics is the study of the properties of various particles in solids and the interactions among these particles as well as the interactions of these particles with external fields. Electrons and nuclei (or valence electrons and ions) are the basic constituents of solids, with many other quasiparticles or elementary excitations arising due to the interactions among themselves or due to their interactions with external fields.

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章节摘录

版权页:Chapter 1 Drude Theory o MetalsWe start our journey into the terrain of the solid state physics with our visit to the two early theories of metals: The Drude and Sommerfeld theories. Studying these two early theories is definitely worthy of the efforts because they are still in use nowadays and because knowing their failures will certainly give us motivation to pursue further study to see how we can overcome some of their failures in the modern theory of solids. This undertaking also serves as an introduction to the history of theoretical solid state physics and an attestation for the need of the development of the modern theory of solids.....

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编辑推荐

《固体物理学现代教程》编辑推荐：In solids , there exist a variety of particles (including quasiparticles and elementary excitations) and interactions among them. These particles and interactions determine the potential applications of various solids.

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