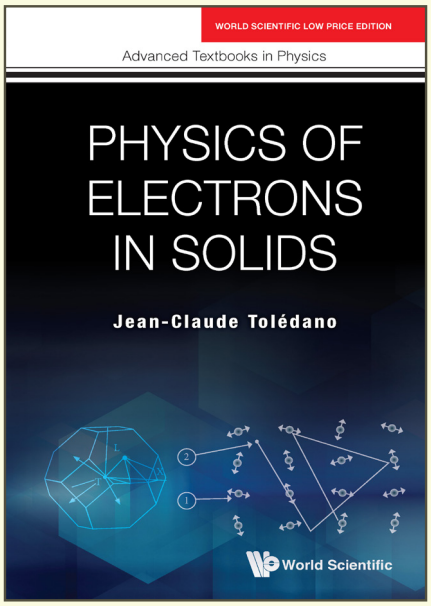
Physics of Electrons in Solids



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ABOUT THE BOOK

Primarily aiming to give undergraduate students an introduction to solid state physics, Physics of Electrons in Solids explains the properties of solids through the study of non-interacting electrons in solids. While each chapter contains a qualitative introduction to the main ideas behind solid state physics, it also provides detailed calculations of utmost importance to graduate students.

The introductory chapters contain crystallographic and quantum prerequisites. The central chapters are devoted to the quantum states of an independent electron in a crystal and to the equilibrium properties of conductors, insulators, and semiconductors. The final chapters contain insights into the assumptions made throughout, briefly describing the origin of ferromagnetism and superconductivity. The book ends with exercises and solutions based on a physics course taught by the author at École Polytechnique.

READERSHIP

Will be of value to any physics department, particularly those with courses on: Introduction to Solid State Physics; Introduction to Semiconductor Physics; Introduction to Crystallography. Will be of value in a secondary market of Research Centres in Material Science, Semiconductors and Electronic Devices.

CONTENTS

- The Dynamics of Electrons in a Crystal
- Electronic Transport Properties of Solids
- Intrinsic and Doped Semiconductors
- Solids as Systems of Particles in Interaction
- Ferromagnetism and Superconductivity
- Appendices:
  - Exercises
  - Solutions of Exercises
  - Constants Values

ABOUT THE AUTHOR

Professor Jean-Claude Tolédano was a research scientist at the National Center for Research in Telecommunications, and (retired) Professor in Physics at École Polytechnique and Guest Professor in the departments of physics at the University of Illinois, the University of Nijmegen and the University of Porto. His research is in various fields of solid state physics, mainly on the phase transformations in crystalline solids, but also on the mechanism of growth of crystals and on high Tc superconductors.

He is a Laureate of Prizes of the French Academy of Sciences and of the French Telecommunication Association. Author of about 100 research papers and of several books: *The Landau Theory of Phase Transitions* (with Pierre Toledano, World Scientific 1987), *Symmetries and Microscopic Physics* (with J P Blaizot, French, Editor Ellipse 1997) and *Physical Basis of Plasticity in Solids* (World Scientific 2012).