DESCRIPTION

Now updated—the leading single-volume introduction to solid state and soft condensed matter physics

This Second Edition of the unified treatment of condensed matter physics keeps the best of the first, providing a basic foundation in the subject while addressing many recent discoveries. Comprehensive and authoritative, it consolidates the critical advances of the past fifty years, bringing together an exciting collection of new and classic topics, dozens of new figures, and new experimental data.

This updated edition offers a thorough treatment of such basic topics as band theory, transport theory, and semiconductor physics, as well as more modern areas such as quasicrystals, dynamics of phase separation, granular materials, quantum dots, Berry phases, the quantum Hall effect, and Luttinger liquids. In addition to careful study of electron dynamics, electronics, and superconductivity, there is much material drawn from soft matter physics, including liquid crystals, polymers, and fluid dynamics.

- Provides frequent comparison of theory and experiment, both when they agree and when problems are still unsolved

- Incorporates many new images from experiments

- Provides end-of-chapter problems including computational exercises
Includes more than fifty data tables and a detailed forty-page index

Offers a solutions manual for instructors

Featuring 370 figures and more than 1,000 recent and historically significant references, this volume serves as a valuable resource for graduate and undergraduate students in physics, physics professionals, engineers, applied mathematicians, materials scientists, and researchers in other fields who want to learn about the quantum and atomic underpinnings of materials science from a modern point of view.

ABOUT THE AUTHOR

Michael P. Marder, PhD, is the Associate Dean for Science and Mathematics Education and Professor in the Department of Physics at the University of Texas at Austin, where he has been involved in a wide variety of theoretical, numerical, and experimental investigations. He specializes in the mechanics of solids, particularly the fracture of brittle materials. Dr. Marder has carried out experimental studies of crack instabilities in plastics and rubber, and constructed analytical theories for how cracks move in crystals. Recently he has studied the way that membranes ripple due to changes in their geometry, and properties of frictional sliding at small length scales.

NEW TO EDITION

• This Second Edition presents an updated review of the whole field of condensed matter physics.

• It consolidates new and classic topics from disparate sources, teaching not only about the effective masses of electrons in semiconductor crystals and band theory, but also about quasicrystals, dynamics of phase separation, why rubber is more floppy than steel, granular materials, quantum dots, Berry phases, the quantum Hall effect, and Luttinger liquids.
FEATURES

• Brings together an exciting collection of heretofore disjointed new topics from the last three decades.

• Provides a thorough treatment of classic topics, including band theory, transport theory, and semiconductor physics.

• Includes over 300 figures, incorporating many never-seen-before images from experiments.

• Clarifies subject matter for reader via frequent comparison of theory and experiment, both when they agree and when problems are still unsolved.

• Offers more than 50 data tables and a detailed index.

• Comes with end-of-chapter problems, including computational exercises and a solutions manual for instructors.

• Combines over 1000 references, both recent and historically significant.

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