



Fundamentals of Condensed Matter Physics

By Marvin L. Cohen, Steven G. Louie

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Based on an established course and covering the fundamentals, central areas and contemporary topics of this diverse field, *Fundamentals of Condensed Matter Physics* is a much-needed textbook for graduate students. The book begins with an introduction to the modern conceptual models of a solid from the points of view of interacting atoms and elementary excitations. It then provides students with a thorough grounding in electronic structure and many-body interactions as a starting point to understand many properties of condensed matter systems - electronic, structural, vibrational, thermal, optical, transport, magnetic and superconducting - and methods to calculate them. Taking readers through the concepts and techniques, the text gives both theoretically and experimentally inclined students the knowledge needed for research and teaching careers in this field. It features 246 illustrations, 9 tables and 100 homework problems, as well as numerous worked examples, for students to test their understanding. Solutions to the problems for instructors are available at www.cambridge.org/cohenlouie.

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Editorial Review

Review

'At the same time modern and classic, a text in the grand tradition of Kittel, and Ashcroft and Mermin, proposed by two great masters of condensed matter physics.' Erio Tosatti, SISSA and the International Centre for Theoretical Physics 'An elegant and pedagogical journey into the basic foundations, concepts and techniques of condensed matter physics.' John D. Joannopoulos, Director of The Institute for Soldier Nanotechnologies, Massachusetts Institute of Technology 'This book, written by two physicists who have done groundbreaking work in the field, elegantly explains complex condensed matter physics concepts in a way that anyone with an average undergraduate education in mathematics and physics can read and understand. Such a book will be valuable not only for those who are theoretically inclined, but also for those who are going to pursue experimental or computational research in condensed matter physics or materials science. Even graduate students in engineering will find this book a useful text and reference.' Che Ting Chan, Hong Kong University of Science and Technology '[Fundamentals of Condensed Matter Physics] is based on lectures given as part of the condensed matter physics graduate course at the University of California, Berkeley since 1965. This course was taught over the years by one of the authors, either Marvin L. Cohen or Steven G. Louie. More than one thousand students have followed the lectures. It also includes 100 homework problems ... There are sixteen chapters, each very well written, that give a good insight into important models in solid state physics. There are many books at the undergraduate level but at the graduate level books generally focus on specific topics. The Fundamentals of Condensed Matter Physics fills a much needed gap.' Yves Petroff, Laboratoire National de Luz Sincrotron (LNLS)

About the Author

Marvin L. Cohen is University Professor of Physics at the University of California, Berkeley, and Senior Faculty Scientist at the Lawrence Berkeley National Laboratory. His research covers a broad spectrum of subjects in theoretical condensed matter physics. He is an elected member of the National Academy of Sciences, the American Academy of Arts and Sciences, and the American Philosophical Society. He has received numerous awards, including the US National Medal of Science, the Buckley Prize and the Lilienfeld Prize of the American Physical Society, the von Hippel Award of the Materials Research Society, and the Dickson Prize in Science. He has received honorary degrees from the University of Montréal, Hong Kong University of Science and Technology and the Weizmann Institute of Science. He is a past President of the American Physical Society.

Steven G. Louie is Professor of Physics at the University of California, Berkeley, and Senior Faculty Scientist at the Lawrence Berkeley National Laboratory. His research spans a broad spectrum of topics in theoretical condensed matter physics and nanoscience. He is an elected member of the National Academy of Sciences and the American Academy of Arts and Sciences, and an academician of the Academia Sinica of the Republic of China, Taiwan. He has won numerous awards and prizes for his work, including the Rahman Prize and the Davisson-Germer Prize of the American Physical Society, the Materials Theory Award of the Materials Research Society, and the Sustained Outstanding Research in Solid State Physics Award of the US Department of Energy. He and Marvin L. Cohen shared the Foresight Institute Richard P. Feynman Prize in Nanotechnology (Theory).

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