



# Advanced Solid State Physics

By Philip Phillips

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## Advanced Solid State Physics By Philip Phillips

Providing an up-to-date and lucid presentation of phenomena across modern advanced-level solid state physics, this new edition builds on an elementary understanding to introduce students to the key research topics with the minimum of mathematics. It covers cutting-edge topics, including electron transport and magnetism in solids. It is the first book to explain topological insulators and strongly correlated electrons. Explaining solid state physics in a clear and detailed way, it also has over 50 exercises for students to test their knowledge. In addition to the extensive discussion of magnetic impurity problems, bosonization, quantum phase transitions, and disordered systems from the first edition, the new edition includes such topics as topological insulators, high-temperature superconductivity and Mott insulators, renormalization group for Fermi liquids, spontaneous symmetry breaking, zero and finite-temperature Green functions, and the Kubo formalism. Figures from the book and solutions to student exercises are available online at [www.cambridge.org/solidstate](http://www.cambridge.org/solidstate).

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#### Review

"This book has an excellent choice of both traditional and modern topics, which is not found elsewhere. Students and researchers will find it to be a valuable introduction to advanced solid state physics. The text is lucidly written, and there are many supplementary exercises for students to enhance their understanding."  
Sudip Chakravarty, Distinguished Professor and David S. Saxon Presidential Term Chair of Physics, University of California Los Angeles

"The book is very carefully written, typeset and illustrated. I consider the author's treatment of the material a complete didactic success. He puts lots of effort in making the complicated theoretical framework and the necessary mathematical manipulations as transparent as possible. He also does an excellent job in explaining the underlying physics ... I can recommend the book to anyone interested in a theoretical understanding of many-body effects in solid state physics. Its wide coverage of topics and its didactic approach will help beginning graduate students in the field become familiar with this important research area."

Thomas Peters, Contemporary Physics

"The book provides an up-to-date and lucid presentation of modern advanced-level solid state physics."  
Utkir Rozikov, Zentralblatt MATH

"[This book] has an excellent mixture between modern and traditional topics, with emphasis on strongly correlated phenomena ... The presentation of the subjects is very pleasing, with important formulas in gray boxes, simple illustrations and instructive tables. Numerous exercises help to deepen the understanding and give additional background on modern developments like, for example, graphene ... an ideal textbook for getting acquainted with the most important methods and concepts in modern condensed matter physics ..."  
Matthias Eschrig, Journal of Applied Crystallography

#### About the Author

Philip Phillips is Professor of Physics at the University of Illinois. As a theoretical condensed matter physicist he has an international reputation for his work on transport in disordered and strongly correlated low-dimensional systems.

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