

The Physics of Solids


By J.B. Ketterson

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This comprehensive text covers the basic physics of the solid state starting at an elementary level suitable for undergraduates but then advancing, in stages, to a graduate and advanced graduate level. In addition to treating the fundamental elastic, electrical, thermal, magnetic, structural, electronic, transport, optical, mechanical and compositional properties, we also discuss topics like superfluidity and superconductivity along with special topics such as strongly correlated systems, high-temperature superconductors, the quantum Hall effects, and graphene. Particular emphasis is given to so-called first principles calculations utilizing modern density functional theory which for many systems now allow accurate calculations of the electronic, magnetic, and thermal properties.

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Review

"This new book is outstanding in its discussion of fundamental concepts and choice of topics, unlike many current texts, which vary from the too-specialized and advanced, to engineering texts which avoid fundamentals, and the older classics (Kittel, Ashcroft and Mermin, Raimes, Ziman, Omar) which omit modern topics. From elasticity to superconductivity, magnetism, phonons, graphene, DFT (just the right level for upper level physics), glasses, dislocations, strong correlations, High Tc, quantum devices and multilayers, optical properties, electron transport, Hartree-Fock and band-structure methods, Ketterson gets the physics right, and uses more clearer language in setting up his equations than any text I've seen. For clarity, coverage, the minimal necessary connection with experiment, and level, this is one of the very best condensed matter texts I've come across." --*John C. H. Spence ForMemRS, Physics, Arizona State University*

About the Author

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John B. Ketterson received his BS, MS, and PhD degrees from the University of Chicago, USA. He worked at the Argonne National laboratory from 1962 to 1974 at which time he joined the faculty of the Physics and Astronomy Department at Northwestern University, USA. Research interests have included electronic properties of metals (particularly Fermi surface measurements); superfluid ^4He , normal and superfluid ^3He , and ^3He - ^4He solutions; superconductivity, magnetism and magnetic resonance, nonlinear optics, and excitons.

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