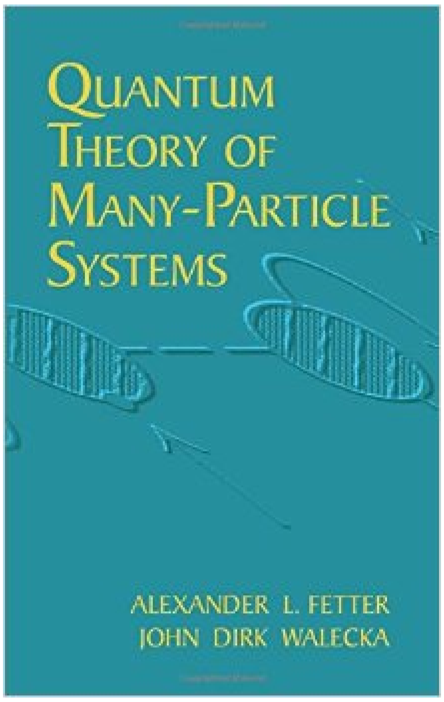
Quantum Theory Of Many-Particle Systems (Dover Books On Physics)



Synopsis

"Singlemindedly devoted to its job of educating potential many-particle theoristsâ |deserves to become the standard text in the field." â ” Physics Today"The most comprehensive textbook yet published in its field and every postgraduate student or teacher in this field should own or have access to a copy." â ” EndeavorA self-contained, unified treatment of nonrelativistic many-particle systems, this text offers a solid introduction to procedures in a manner that enables students to adopt techniques for their own use. Its discussions of formalism and applications move easily between general theory and direct use by offering illustrations of principles to specific cases.Chapters on second quantization and statistical mechanics introduce students to ground-state (zero-temperature) formalism, which is explored by way of Greenâ ™s functions and field theory (fermions), Fermi systems, linear response and collective modes, and Bose systems. Finite-temperature formalism is examined through field theory at finite temperature, physical systems at finite temperature, and real-time Greenâ ™s functions and linear response. Additional topics cover canonical transformations and applications to physical systems in terms of nuclear matter, phonons and electrons, superconductivity, and superfluid helium as well as applications to finite systems.Graduate students will find this text enormously practical in making the transition from taking courses in quantum mechanics to interpreting the vast quantity of literature concerning the many-body problem.

Book Information

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Customer Reviews

It is the best text on Green's functions, especially if you are a kind of person who really reads through books trying to figure the things out. Probably the only book which succeeds in promoting analytic continuation for newcomers (although I also recomment appendix in the book by Kadanoff&Baym): it seems like many people get impression of this being a topic of secondary importance, whereas it is the conerstone of the imaginary time techniques. I also recommend Abrikosov et al. as a classic and a good sample of how the things are done in majority of the papers (and the Dover edition is really cheap).Sorry for Mahan, as it makes a good reference book, but not a book you can learn from. I found that more practical people give preference to the book by Jauho and Haug- it is not a bad one, has Keldysh technique, and containes useful references to important review papers. Finally, I recommend the book by Negele and Orland as a more modern look at "many-body physics" as it is versus "Green's functions books".

Very well written and with a comprehensive explanation of the basics of advanced quantum theory. This is the place for understanding about computing propagators and Feynman diagrams to arbitrary order.Plus, the Dyson equation! At last, you can find out what made Freeman Dyson famous amongst physicists. You can decide whether this ranks in importance to Feynman's and Schwinger's discoveries.The problem sets are nontrivial. Which will be appreciated by you, AFTER you have attempted them. (Whilst you are in an allnighter, trying to finish a problem set, your opinion may differ!)The book does not cover superstrings, because those came after its publication.

I find F&W's writing lucid and their math clear. it's more fleshed out than a text like mahan. the only drawback is that it's old fashioned. hbar isnt 1 like many authors.so I would get this over abrikosov et al, and you'd need another text if you wanted to learn about path integral techniques, but pound for pound (and considering that dover reprints are cheap) it holds its own.it's good for bosons (BEC stuff these days), and superconductors, weak on interacting fermions bc it focused on the nuclear problem instead of metals.

This book is one of the most famous textbooks for the manyparticle theory. I like it and recommend to anyone who studiesmany particle theory for the first time. But, I should make somecomments on this book. First, this book does not contain anydescriptions for the path integral method, which is now verypopular in the field of many particle theory and is compactlyexplained in Negele and Orland. Second, applications seems to besomewhat old. This is inevitable and not author's fault. Forexample, modern nuclear theory goes far beyond the RPA. Third,authors focused on the perturbational expansion of the Green'sfunction and did not give explanations how to use the Feynmandiagrams to calculate the energy corrections for the fermionsystems, which is found in March, Raimes and Gross.Anyway, this is a good book. I hope everyone likes it!

The Fetter and Walecka is an excellent introductory read on many-body quantum mechanics. It slowly introduces new concepts, beginning from the basics of second quantization, and proceeds through the entire theory using Wick's theorem and second-quantized methods. The section on examples gives the book a nice general appeal. As a condensed matter physicist, I can focus on getting the basic examples given in my section down, while still getting a good sampling of other branches of physics in a well-written way.Although it should not be the end of one's study of many-body quantum mechanics, it should certainly be the beginning. The Abrikosov, although very thorough and covering a wide range of topics, is written more as a list of results than as a text to learn from. Furthermore, one would probably want to hunt down a text like the Schulman "Methods and Applications of Path Integration" or the Negele "Quantum Many-Particle Systems" to see the imaginary time and path integral formulations of these topics.

This book is definitely a good start to study quantum field theory. To read this book, the reader must be already acquainted with single body quantum theory, perturbation theory and the symmetrization principles. The text is formal and somewhat old-fashioned, but very complete : every step of every calculation is justified. Although the style might not be the most pedagogical you can find, everything the reader needs to know is included in the book, which makes it easy to progress. Relevant and realistic examples of many-body systems are presented throughout the book to illustrate the theoretical concepts. If you plan to do a lot of work on quantum many-body systems, you should have this book : it is a very good reference and it is not expensive. This should not prevent the reader, however, from looking at more modern references.This is a graduate level textbook, but some chapters may be relevant to an undergraduate student doing an internship in the field, or that is simply curious!Benjamin D'AnjouPhysics MajorUniversitÃ© de Sherbrooke

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