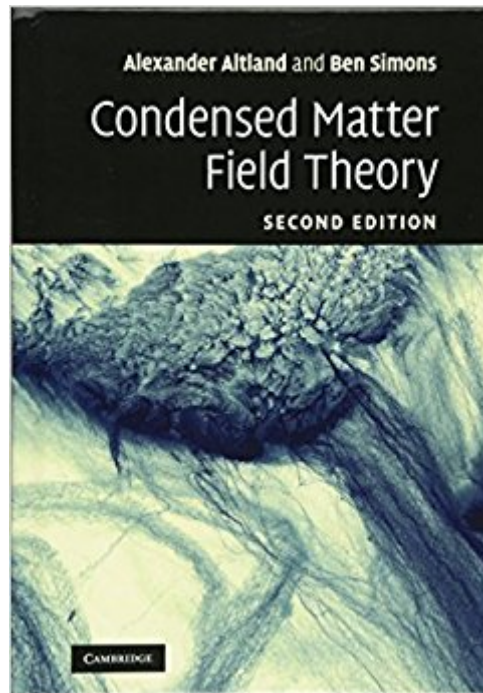




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Condensed Matter Field Theory



Synopsis

Modern experimental developments in condensed matter and ultracold atom physics present formidable challenges to theorists. This book provides a pedagogical introduction to quantum field theory in many-particle physics, emphasizing the applicability of the formalism to concrete problems. This second edition contains two new chapters developing path integral approaches to classical and quantum nonequilibrium phenomena. Other chapters cover a range of topics, from the introduction of many-body techniques and functional integration, to renormalization group methods, the theory of response functions, and topology. Conceptual aspects and formal methodology are emphasized, but the discussion focuses on practical experimental applications drawn largely from condensed matter physics and neighboring fields. Extended and challenging problems with fully worked solutions provide a bridge between formal manipulations and research-oriented thinking. Aimed at elevating graduate students to a level where they can engage in independent research, this book complements graduate level courses on many-particle theory.

Book Information

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Customer Reviews

'... this work is so well written that it succeeds in making even the most intricate and abstruse models admirably clear ... it is timely in that it brings the reader completely up to date on most of the newer approaches currently in vogue ... eminently suitable for researchers in the field ... could also be read with interest by advanced students because the numerous info sections elucidate and expand upon the many themes addressed ... this very attractive book will remain a standard reference work in its field for years to come.' Dennis Rouvray, Chemistry World

A pedagogical introduction to quantum field theory in many-particle physics, this book complements graduate level courses on many-particle theory. It contains two new chapters developing path integral approaches to classical and quantum nonequilibrium phenomena, and includes extended and challenging problems with fully worked solutions.

A very thorough and inventive treatment of quantum field theory in the condensed matter context. The book is good at skipping all trivial steps while maintaining all needed for understanding and summarizing results in a way that makes it easy to also use it in an encyclopedia way. I really recommend this book. It's often similar to elegance to Landau Lifshitz. Note: I used the book as a good night literature self learning during the summer to broaden my horizon and if it does well it's at broadening one's horizon, too.

Covers almost everything. Another thing I love is this book comes with a lot of good exercises and problem sets worked out.

This book is a good introduction to Field Theory applied in condensed matter physics. In dealing with two difficult subjects the authors do it in a very simple language. This is very important either to beginners or experts. There are very good solved examples to illustrate each section. Besides, there are small boxes citing the people behind the development of the issue.

Very good book. Covers a lot of modern condensed matter topics

Very good book!

Path integral techniques becomes very prevailing in condensed matter theory. I tried several times to start it with not much progress. This book is excellent starting point if you have already know a little about diagrammatic approach (such as Abrikosov, Mahan, or Fetter). You do not need to be an expert in diagrammatic approach to start it though. And you don't need to have any background in a normal quantum field theory with context of high-energy. This book contains a chapter about Hubbard-Stratonovich transformation, which is most useful and pertinent to condensed matter, and explains it very clear. Also, the book has an interesting comment on perturbative approach (Ch. 5) and present it in a concise but clear way. The problems in the book are detailed and have answers

afterward. They complement the main text very well and actually can be read as the application of the ideas in main text instead of simple exercises. Also they are not too far away from the real research. I just wish I met this book earlier and it helps me immensely with my work.

This book presents condensed matter field theory from a very modern standpoint, using the language of (euclidean space) path integrals. In addition to a good discussion on mean field theory, the includes more modern topics, and includes extensive discussions of the renormalization group, topological field theories. Furthermore, the coverage is very intuitive, but simultaneously does not shy away from the more subtle technical details. The authors are also careful to point out and explain potential points of confusion. Finally, there are a number of excercises (each accompanied by a brief solution, which makes the book great for self-study!). In summary, this book is the most readable introduction to condensed matter field theory that I've come across. It's a necessary, and welcome addition to the current literature.

This book is very clearly written, with good motivation and broad explanations for the underlying philosophy of condensed matter physics. It introduces important and instructive examples for fairly thorough study, with each example clearly building on the previous one.

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