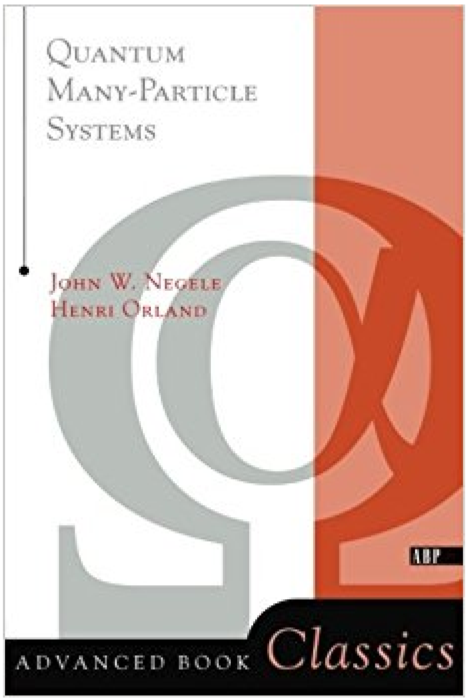
Quantum Many-particle Systems (Advanced Books Classics)



Synopsis

This book explains the fundamental concepts and theoretical techniques used to understand the properties of quantum systems having large numbers of degrees of freedom. A number of complimentary approaches are developed, including perturbation theory; nonperturbative approximations based on functional integrals; general arguments based on order parameters, symmetry, and Fermi liquid theory; and stochastic methods.

Book Information

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Customer Reviews

Quantum Many-Particle Systems is a book of lecture notes that are rough and informal.

John Negele is Professor of Physics at M.I.T., where he has been a faculty member since 1970. He has been a recipient of numerous fellowships, including Guggenheim, Japan Society for the Promotion of Science, Alfred P. Sloan, NATO, National Science Foundation, Danforth, and Woodrow Wilson. His research interests range from the structure and dynamics of nuclei and the properties of dense matter to spin systems and quantum chromodynamics.Henri Orland, a Physicist at the Service de Physique ThÃƒÂ©oretique, CEA Saclay, has worked extensively in nuclear physics and statistical physics and is currently focusing his research in statistical physics on disordered media: spinglasses, optimization problems, neural networks, wetting phenomena, two-dimensional systems, interfaces in random systems, quasi-periodic systems, and related topics.

This is an excellent book. I read the first three chapters. The harder ones, I think. It is incredibly precise and contains very few errors, even of the typographical kind. The discussion is entirely general (fermions, bosons, finite-temperature, two-body and higher interactions, etc.) and sufficient detail is always given for me to be able to fill in any remaining details. I never felt frustrated or confused! That’s amazing for a book on many-body field theory. In fact, I eventually bought it again after spilling a drink on it.Here is the only real downside of the book: It is SO dense as to be a mind-numbing read. There is a lot of precise mathematical detail to keep up with. I have a tough time even remembering the final formulas. After a few pages of reading you begin to feel exhausted and want to put it down. But maybe you’re more disciplined than I am! It would help to have more interesting, real-world examples in text to break the monotony.

A great physics book for field theory applied to condensedmatter and sometimes nuclear physics problems. The authorsare EXTREMELY careful mathematically and really don’t skipany steps or shove stuff under the rug; in fact, the firstchapter is just all math about how to do integrals and pathintegrals and field integrals and deal with Grassman numbers.A bit unusual for a physics book, but that’s their style.The rest of the book deals with the usual and other material:zero-temperature Green’s functions and perturbation theory(for energy, Green’s function, etc.) The treatment is detailedand relatively exhaustive. Then there is the same for finite-temperature. The earlier sections on linear response areconcise and one of the best treatments of the subject I haveseen leading directly to the fluctuation dissipation expression(after this book I realized this vaunted "fluctuation-dissipation" that no one can explain is justa straightforward thing about commutators and pert. theory).The book also has other good stuff: a chapter on mean field theory, Landau-Ginzburg theory, order parameters, and a nicediscussion about spontaneous symmetry breaking that helpsclarify a bunch of stuff. Then there is a whole chapter onfurther aspects of one-particle Green’s functions (Dysonequation, solving for poles, quasiparticles, satellites, etc.)that is pretty good and gets the physical point across. Thereis also a chapter on statistical (monte carlo, numerical, etc.)methods for doing quantum many body problems. While some ofthe methods are not the most up to date or modern, the basicsare all there (Monte Carlo, Hubbard-Strataonvich (spelling?),inverting matrices via Monte Carlo, some stuff about latticesystems, Langevin equation simulation for Monte Carlo, updatingproblems, etc.) There is also a chapter on more advancedfunctional integration stuff. Also there is a nice descriptionof the loop expansion and whatnot.The book is very well written, has no errors as far as I cantell, and is exhaustive on what it treats. The problems atthe end of the first few chapters deal with physics problemsand help build intuition whereas the texts in these chaptersare more formal. The book could use some more physical insightssprinkled throughout, but that is not too much of a drawback.The book is based on functional integration (Feynman integral)methods for field theory: this is the modern way folks do itand it is a powerful way of doing field theory both toderive results, connect results, do expansions and what not,and also for certain kinds of monte carl computations. Sohaving read this, the reader is up to date on a pretty modernview of field theory in condensed matter (and somewhat onnuclear physics).Highly recommended unless you can’t stand precise and longmathematical treatments. My only misgiving is that sometimesI wish the authors provided more physical insights for certainconcepts and gave some examples rather than "just the math

This book is recommended by my professor when I asked him about good books on quantum field theory for condensed matter physicists.Although a bit out of date, this book still serves a good introductory to many body physics and every point is pretty clear.

The book is actually very good, however the printing is quite poor. Not sure if it is copyright or not.

the printing is very poor and hard to recognize the letters, e.g., it’s so small and thick that 3 and 8 are not distinguishable and etc.

Book from library. Not looks like as shown in the pictures.Same content I would expected.

A very good introduction to the many particle systems, includes all from the basics of coherent states to very complex parts of theory.

Composite Quantum Systems (Lecture Notes in Physics) Quantum Electrodynamics: Gribov Lectures on Theoretical Physics (Cambridge Monographs on Particle Physics, Nuclear Physics and Cosmology) Six Stories from the End of Representation: Images in Painting, Photography, Astronomy, Microscopy, Particle Physics, and Quantum Mechanics, 1980-2000 (Writing Science) Quantum Electrodynamics (Advanced Books Classics) Recent Advances in the Theory of Chemical and Physical Systems: Proceedings of the 9th European Workshop on Quantum Systems in Chemistry and Physics ... in Theoretical Chemistry and Physics) READING ORDER: TAMI HOAG: BOOKS LIST OF THE BITTER SEASON, KOVAC/LISKA BOOKS, HENNESSY BOOKS, QUAID HORSES, DOUCET BOOKS, DEER LAKE BOOKS, ELENA ESTES BOOKS, OAK KNOLL BOOKS BY TAMI HOAG Nuclear and Particle Physics (Cambridge Advanced Sciences) Computational Transport Phenomena of Fluid-Particle Systems (Mechanical Engineering Series) Inorganic Scintillators for Detector Systems: Physical Principles and Crystal Engineering (Particle Acceleration and Detection) Scaling Limits of Interacting Particle Systems (Grundlehren der mathematischen Wissenschaften) Many Peoples, Many Faiths: Women and Men in the World Religions Multiple Sclerosis Many Stories Many Symptoms: A book written by people living with Multiple Sclerosis, about how they deal with the challenges they face. Many Lives, Many Masters: The True Story of a Prominent Psychiatrist, His Young Patient, and the Past-Life Therapy That Changed Both Their Lives So Many Circles, So Many Squares