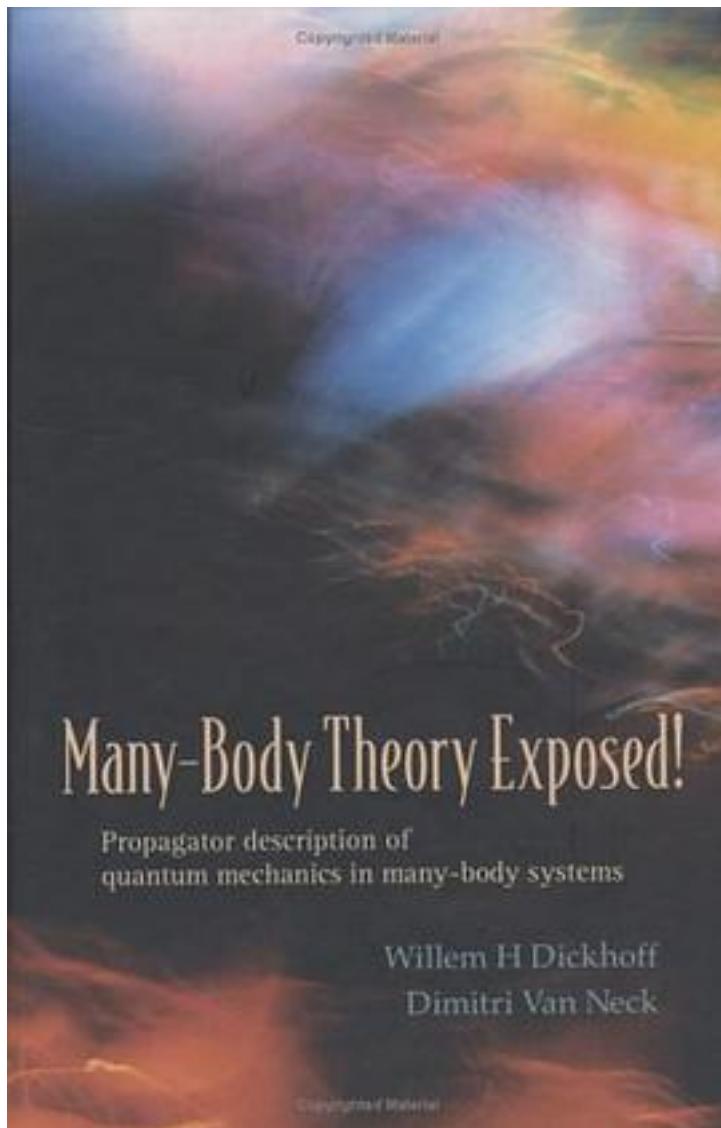


Many-Body Theory Exposed! Propagator Description of Quantum Mechanics in Many-Body Systems



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Standard textbooks on the many-body problem do not include a wealth of valuable experimental data, in particular recent results from direct knockout reactions, which are directly related to the single-particle propagator in many-body theory. In this indispensable book, the comparison with experimental data is incorporated from the start, making the abstract concept of propagators vivid and comprehensible. The discussion of numerical calculations using propagators or Green's functions, also absent from current textbooks, is presented in this book. Much of the material has been tested in the classroom and the introductory chapters allow a seamless connection with a one-year graduate course in quantum mechanics. While the majority of books on many-body theory deal with the subject from the viewpoint of condensed matter physics, this book also emphasizes finite systems and should be of considerable interest to researchers in nuclear, atomic, and molecular physics. A unified treatment of many different many-body systems is presented using the approach of self-consistent Green's functions. Several topics, not available in other books, in particular the description of atomic Bose-Einstein condensates, have been included. The coverage proceeds in a systematic way from elementary concepts, such as second quantization and mean-field properties, to a more advanced but self-contained presentation of the physics of atoms, molecules, nuclei, nuclear and neutron matter, electron gas, quantum liquids, atomic Bose-Einstein and fermion condensates, and pairing correlations in finite and infinite systems.

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目录:

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评论

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