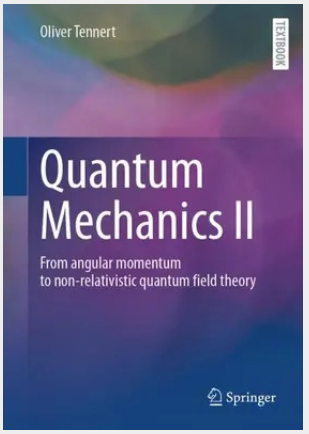
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In a comprehensive presentation, the four volumes of this textbook develop and explore the foundations of non-relativistic quantum mechanics in depth, which makes them also ideally suited as a reference work. The second volume examines quantum mechanical angular momentum, as well as symmetries in non-relativistic quantum mechanics. The formalism is then applied to three-dimensional problems, a very important field of application, using both algebraic and analytical methods. The subsequent chapters offer a thorough treatment of particles in electromagnetic fields, and of identical particles, which leads seamlessly on to field quantisation. Special Features: Even complex topics are explained clearly and with illustrating examples. Numerous mathematical digressions elucidate general mathematical concepts. Particular highlights of the book include the algebraic proof of the integer nature of orbital angular momentum, the detailed investigation of the connection between Clifford algebras and spinors, and a linearisation approach to the Schrödinger equation. The mathematics of gauge theories provides a coherent formulation of many topological phenomena, such as magnetic monopoles, the Aharonov–Bohm effect and Landau levels. Translated with AI assistance and revised by the author. Contents: 1.°Theory of angular momentum I - 2.°Symmetries in quantum mechanics I - 3.°Three-dimensional problems - 4.°Particles in electromagnetic fields - 5. °Theory of angular momentum II - 6.°Identical particles and non-relativistic quantum field theory Audience: The book is aimed at both undergraduate and graduate students and their instructors. Due to its multi-volume format, the wide range of topics, and references to original scientific papers, it is also a must-have for the bookshelf of anyone working in physics. Previous knowledge: Knowledge of theoretical mechanics, electrodynamics, and special relativity, as well as real analysis, linear algebra, and complex analysis, is assumed.

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