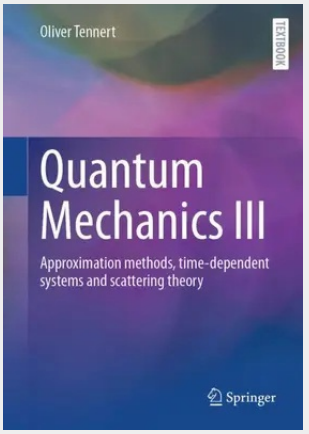
Tennert

Quantum Mechanics III

Approximation methods, time-dependent systems and scattering theory



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 third volume presents important approximation methods for time-independent problems and then leads from the treatment of time-dependent systems to the large topic of scattering theory. Special Features: Even complex topics are explained clearly and with illustrating examples. Numerous mathematical digressions elucidate general mathematical concepts. Particular highlights of the book are the derivation of emergent gauge theories from the Born–Oppenheimer approximation, the exact solutions for the hydrogen molecule ion as a two-center problem and for the Coulomb scattering problem, as well as the investigation of the analytical structure of the S-matrix, including the derivation of important dispersion relations. Translated with AI assistance and revised by the author. Contents: 1.°Approximation methods for bound states - 2.°Time-dependent systems and transitions - 3.°Scattering 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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