



Quantum Mechanics: Theory and Applications (Fundamental Theories of Physics)

By Ajoy Ghatak, S. Lokanathan

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An understanding of quantum mechanics is vital to all students of physics, chemistry and electrical engineering, but requires a lot of mathematical concepts, the details of which are given with great clarity in this book. Various concepts have been derived from first principles, so it can also be used for self-study. The chapters on the JWKB approximation, time-independent perturbation theory and effects of magnetic field stand out for their clarity and easy-to-understand mathematics. Two complete chapters on the linear harmonic oscillator provide a very detailed discussion of one of the most fundamental problems in quantum mechanics. Operator algebra is used to show the ease with which one can calculate the harmonic oscillator wave functions and study the evolution of the coherent state. Similarly, three chapters on angular momentum give a detailed account of this important problem. Perhaps the most attractive feature of the book is the excellent balance between theory and applications and the large number of applications in such diverse areas as astrophysics, nuclear physics, atomic and molecular spectroscopy, solid-state physics, and quantum well structures.

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Review

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"Ghatak (Indian Institute of Technology) and Lokanathan (Bangalore-Jawahar Lal Nehru Planetarium, India) discuss the full range of quantum mechanics an advanced undergraduate is expected to know, plus topics normally reserved for first-year graduate studies. a] The strength of the book is in the applications; thus students will better understand how quantum mechanics is used by practicing scientists. Summing Up: Recommended. Upper-division undergraduate and graduate students." (E. Kincanon, CHOICE, Vol. 42 (5), 2005)

"The most important fact about this book is the wonderful admixture of theory and applications. a] The problems are treated at a level that can be understood by the novice student. The second noteworthy aspect of the book are the large number of worked problems a] . There is plenty of material here for an instructor a] . The book is a] a reference book for working quantum physicists. Ita (TM)s strong points include clarity of presentation, lucidity, extensive figures/diagrams, and applications." (V.Lakshminarayanan, Foundations of Physics, Vol. 35 (6), 2005)

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