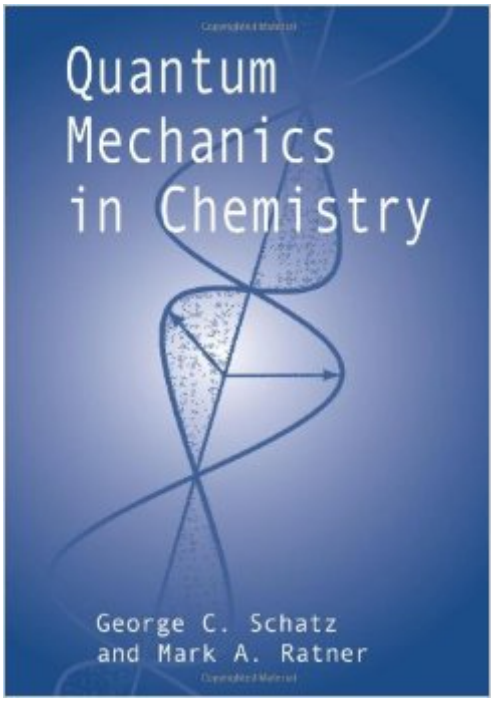
Quantum Mechanics In Chemistry (Dover Books On Chemistry)



Synopsis

Intended for graduate and advanced undergraduate students, this text explores quantum mechanical techniques from the viewpoint of chemistry and materials science. Dynamics, symmetry, and formalism are emphasized. An initial review of basic concepts from introductory quantum mechanics is followed by chapters examining symmetry, rotations, and angular momentum addition. Chapter 4 introduces the basic formalism of time-dependent quantum mechanics, emphasizing time-dependent perturbation theory and Fermiâ ™s golden rule. Chapter 5 sees this formalism applied to the interaction of radiation and matter. In Chapter 6, the authors introduce occupation number representations, including applications to both quantized radiation fields and electronic structure; while chapters 7 and 8 focus on scattering theory and basic theories of chemical reaction rates. The remaining three chapters deal with the use of correlation functions and density matrices in quantum mechanics. Problems and a bibliography appear at the end of each chapter; and at the end of the book there is an Appendix C, "Solutions to Problems," new to this edition.

Book Information

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Customer Reviews

A great book for chemistry students (advanced undergraduate or graduate) who have a thorough understanding of the basics of quantum mechanics. The book begins with a quick review and quickly goes into methods and theory that are of interest to chemists i.e, many electron and molecular techniques. They also provide a nice collection of problems...with solutions! It is a very

clearly written and well thought out book...highly recommended. For those who need a more elementary approach, check out "Introduction to Quantum Mechanics in Chemistry" by the same authors.

This book is not so easy for beginners. But if you are somewhat familiar to introductory quantum physics (or quantum chemistry) and mathematics (maybe introductory linear algebra and differential equations), this will be helpful for you to understand the applications of quantum mechanics to chemistry.This book offers many of topics to you, especially related to spectroscopy and kinetics. Not only that, but also it tells you about the theories (Fermi's golden rule, group theory, etc.) to understand those things. If you are interested in the details and foundations about Hartree-Fock equations, I'd like to recommend "Modern Quantum Chemistry: Introduction to Advanced Electronic Structure Theory". (And other books concerned about computational chemistry)The only problem is that the formulas are not derived in detail. Of course there are so many equations, I think, but much more formulas are needed to explain all the things clearly. However, you can fill up the gaps between the expressions, if you are the one satisfies the condition what I mentioned in the first paragraph.

This book is devoted to the uses of quantum mechanics in chemistry. Not surprisingly, it has a lot of ground to cover.While it is an excellent work, it is definitely not suitable as an introduction to quantum chemistry. The prospective reader should bring a background in molecular orbital theory, and also in group theoretical applications to chemistry. I'd suggest Modern Quantum Chemistry: Introduction to Advanced Electronic Structure Theory (Dover Books on Chemistry), and Group Theory and Chemistry (Dover Books on Chemistry).Also the author's favorite basic quantum mechanics text appears to be Quantum Mechanics with which I am personally unfamiliar, but it has a good reputation.Much of the book is devoted to relatively advanced topics of which it provides an excellent survey.My favorite part was the last chapter on the density matrix. Here we are presented with some of the key ideas of quantum computation and quantum information theory such as qubits and decoherence. These terms aren't actually used unfortunately, but I liked seeing how these same concepts arose and played a role in quantum chemistry.In addition, for the student with the necessary background, this book provides a quick introduction to quantum field theory, again within the framework of applying the same methods to quantum chemistry.All around an excellent book well worth the time for the prepared reader.

I bought this book to review for PhD candidacy exams and look back on it once every six months for reference. This book explains in a very clear way the most fundamental concepts in theoretical chemistry, particularly dynamics. It touches very little on quantum chemistry, ie electronic structure theory, as there are many other books on that topic available already. The coverage of Fermi's golden rule and response theory is very accessible.Even at $50, this would be the best money one could spend on a graduate level textbook on quantum dynamics. I can't imagine someone in the field not finding this book useful at almost any stage of their career.

I enjoyed this book as a review of some quantum mechanics basics. The applied examples are pretty good. This would be an excellent book to use as a source of problems if one were teaching an undergraduate class.

This book isn't for the first time QM experience. It skips right past all the basics and starts with two awful chapters on group theory that just seem out of place in the context of the rest of the book. I'm really not sure why they are there... After that, this book is golden. Its not overly thorough, but covers quite a bit of ground in the 300+ pages you get. I love the style, coming from a physical chemistry perspective. This book cant be beat for the price. I only wish it were longer. Not taking the group theory stuff into consideration, (you can just skip it... Its not used anywhere else in the book) this is definitely 5 stars for the price.

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