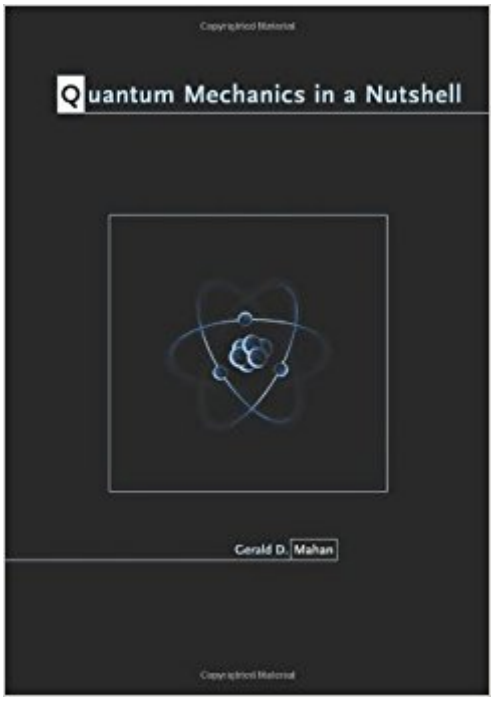
Quantum Mechanics In A Nutshell



Synopsis

Covering the fundamentals as well as many special topics of current interest, this is the most concise, up-to-date, and accessible graduate-level textbook on quantum mechanics available. Written by Gerald Mahan, a distinguished research physicist and author of an acclaimed textbook on many-particle physics, Quantum Mechanics in a Nutshell is the distillation of many years' teaching experience. Emphasizing the use of quantum mechanics to describe actual quantum systems such as atoms and solids, and rich with interesting applications, the book proceeds from solving for the properties of a single particle in potential; to solving for two particles (the helium atom); to addressing many-particle systems. Applications include electron gas, magnetism, and Bose-Einstein Condensation; examples are carefully chosen and worked; and each chapter has numerous homework problems, many of them original. Quantum Mechanics in a Nutshell expertly addresses traditional and modern topics, including perturbation theory, WKBJ, variational methods, angular momentum, the Dirac equation, many-particle wave functions, Casimir Force, and Bell's Theorem. And it treats many topics--such as the interactions between photons and electrons, scattering theory, and density functional theory--in exceptional depth. A valuable addition to the teaching literature, Quantum Mechanics in a Nutshell is ideally suited for a two-semester course. The most concise, up-to-date, and accessible graduate textbook on the subject Contains the ideal amount of material for a two-semester course Focuses on the description of actual quantum systems, including a range of applications Covers traditional topics, as well as those at the frontiers of research Treats in unprecedented detail topics such as photon-electron interaction, scattering theory, and density functional theory Includes numerous homework problems at the end of each chapter

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Customer Reviews

"Praises in no way can do full justice to the strength and detail of Mahan’s well crafted and superb nutshell book. I found the book fascinating, stimulating and convincing and one can easily observe that the book is bursting with intellectual energy and ambition. I am not a rated scientist but as a student and follower of science and scientific projects since the beginning of my academic career, I have come across several books of topical interest but this time I enjoyed Quantum Mechanics in A Nutshell as a whole for its intelligence and manner of treatment of topics. All said and done, it is a book that can be enjoyed by any science student interested in quantum mechanics."--Uwe C. Tauber, Current Engineering Practice"[A] comprehensive and up-to-date exploration of quantum mechanics."--Nature Physics"This book, in spite of 11 chapters densely written, consists of a quick and very readable presentation of basic principles and an impressive number of applications of quantum mechanics. It can be profitably used in courses for beginning, intermediate and, in some cases, advanced students of physics."--Valter Moretti, Zentralblatt MATH

"This is an excellent textbook, written in a very readable style, and it should be perfectly accessible to beginning and intermediate physics graduate students. Gerald Mahan, the author of an acclaimed textbook on many-particle theory, has taught quantum mechanics extensively, and his thorough knowledge and deep understanding of the material is evident in every chapter of Quantum Mechanics in a Nutshell. Its examples are excellently worked out and it has many interesting homework problems."--Uwe C. Tauber, Virginia Tech"This book compares well with other graduate textbooks on quantum mechanics, and I will seriously consider adopting it the next time I teach the subject. The choice of material is very good. Gerald Mahan has included both the usual standard topics and a large number of special topics, including some of current research interest. The book is rich in interesting applications, and each chapter has lots of well-chosen problems. If a student can master this book, he or she will have gained an excellent foundation in quantum mechanics."--David G. Stroud, Ohio State University

Quantum Mechanics in a Nutshell was the textbook for my two-semester graduate quantum

mechanics sequence. Much of what I know about quantum mechanics I learned from this book, though I cannot recommend it.The best part of this book is the homework problems. The book emphasizes being able to apply quantum mechanics knowledge to useful calculations. However, there are many negatives to this book.First, the author has an unpleasant habit of stating the most blatantly obvious things while leaving more complicated things unexplained. For example, in chapter 8, he makes the statement "The A-squared term in V contains the factor of A^2." And in the first chapter he manages to introduce the reduced Planck constant twice in as many pages (something with which any physics graduate student, the target audience, should already be very familiar).Furthermore, the notation used in this book is sloppy and nonstandard. For instance, there are two common equivalent conventions for the metric tensor that is introduced at the beginning of chapter 11, but the author chooses to introduce a third, nonstandard convention.Finally, the tone of the book, where it is not dry, is condescending and arrogant.Here are some examples. From chapter 2: "Many eager students volunteer the answer [to the harmonic oscillator Hamiltonian] that it is a Hermite polynomial. This answer is usually incorrect." And from chapter 3: "Students should recognize the above expression as a form of the old Bohr-Sommerfeld quantization conditions from the early days of quantum mechanics."All these issues make this a quantum mechanics textbook to avoid.

I am currently in my first semester of graduate physics, and I purchased this book as the required textbook for my Introduction to Quantum Mechanics course. The item shipped quickly, and I got it in time for my course. However, this is the most useless physics textbook I have ever bought. I realize that a textbook sometimes leaves things out in the interest of brevity, but this book took it WAY too far. The index is horrible, and hasn’t helped me locate a single item all semester (despite looking in it weekly). I have to go to the table of contents and hope that it lists whatever I’m looking for, or just look through the book until I find it. There are entire sections that don’t have a single equation, just a description of the topic. Most of my classmates have bought at least one other book to use instead; the title I hear most often is "Quantum Mechanics: Concepts and Applications" by Zettili.I can honestly say that the only time during the semester that the book was actually helpful was when I needed to look up one of the recursion relations for the Hermite polynomials. If you are looking for a book to teach you the basics of quantum mechanics, STAY AWAY FROM THIS BOOK! There are better books available at comparable prices. If you already know quantum and want a light refresher, then this might be the book for you. This certainly isn’t the book for me.

Let me start right off the bat, that despite the title, this book is not written in the style of "Quantum Field Theory in a Nutshell", by A. Zee. That book is a classic, this one is not even close. Getting that out of the way, I have completely gone thru Griffiths Intro to QM, Sakurai's Modern QM, Shankar's Principles of QM and Ballentine's QM book. I am telling you this not because it almost shut down my brain, but to tell you that these seem to be the new classics. MIT, Stanford and Yale use one or more of these books. You should not need any other books but these and maybe schaum's outline of QM, schaum's has lots of examples that really help.Manhan's book is just an ok book. The first four books I mentioned are all good/great books. Manhan's book is really just a list of the equations used in quantum mechanics. I really do not know why it was written. The other books I mentioned all: 1) have good examples, 2) prepare you for Quantum Field Theory, 3) teach you how to think about Quantum Mechanics, 4) teach you to work problems, 5) explain the basics about QM. Manhan's book does non of these. Manhan's book would almost be as good he had just listed all the equations in it. If you read both Shankar and Sakurai you can become a master, both are graduate level books so read Griffiths first.The book seems thick, but the pages are thick and the writing is large with lots of spacing. It was like the author had to do 390 pages so he put in as much space as he could. This book has little derivation or explanation of most of the equations. They claim on page 120 that they will show the derivation for the Hydrogen Atom Problem. The author says, "most books just provide the eigenvalues and eigenfunctions". But Griffiths Intro to QM does almost the same derivation as does Shankar's QM book. So nothing new here. This book would not even make a good reference book.Quantum Mechanics is one of the most important subjects you will ever take. It has it all, the physics, the mystery, and all the math you could ever want. It is a beautiful subject. The books I have listed are expensive but after these books other physics subjects do not look so hard. This book is just a cheap book.This book admits to being a graduate level text, but all I see is the same equations I saw in the other books. This book claims to have examples, but I could only find a few. I did not finish the whole book as there was no point. This book does not cost much but do not waist your money, use the money to buy one of the other books I mentioned. Again I do not know why this book was written. If you did try to learn graduate level QM from this book I do not think you could do it. This book does have one purpose, it is to make Shankar's and Sakurai's books look like masterpieces. I gave it two stars to be nice.

I'll just add one criticism to those already posted. No textbook containing symbols should ever be without a symbol table, preferably with internal and/or external references. If symbols have multiple meanings, it should be clear which is meant. And the same symbol should never, ever, ever, ever

be used with two different meanings in the same paragraph.

I was a little worried to see the price in the library and I decided to purchase online to see if I could save some money. Now, I got it just in time as mentioned. I'm happy

I received book very fast and its quality is very good. It is nearly new. It is good for me to use this book to study. If you have another good books which is suitable to my research, I will buy your books.