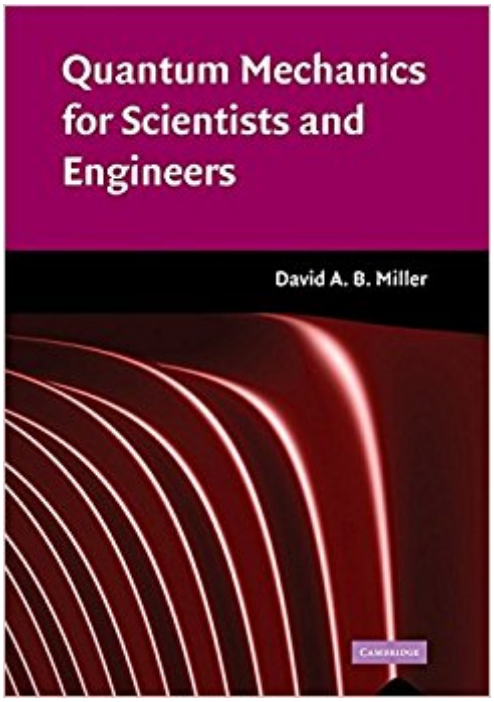
Quantum Mechanics For Scientists And Engineers



Synopsis

If you need a book that relates the core principles of quantum mechanics to modern applications in engineering, physics, and nanotechnology, this is it. Students will appreciate the book's applied emphasis, which illustrates theoretical concepts with examples of nanostructured materials, optics, and semiconductor devices. The many worked examples and more than 160 homework problems help students to problem solve and to practice applications of theory. Without assuming a prior knowledge of high-level physics or classical mechanics, the text introduces Schrodinger's equation, operators, and approximation methods. Systems, including the hydrogen atom and crystalline materials, are analyzed in detail. More advanced subjects, such as density matrices, quantum optics, and quantum information, are also covered. Practical applications and algorithms for the computational analysis of simple structures make this an ideal introduction to quantum mechanics for students of engineering, physics, nanotechnology, and other disciplines. Additional resources available from www.cambridge.org/9780521897839.

Book Information

Hardcover: 568 pages

Publisher: Cambridge University Press; 1 edition (April 21, 2008)

Language: English

ISBN-10: 0521897831

ISBN-13: 978-0521897839

Product Dimensions: 7 x 1.3 x 10 inches

Shipping Weight: 2.6 pounds (View shipping rates and policies)

Average Customer Review: 4.4 out of 5 stars 25 customer reviews

Best Sellers Rank: #271,266 in Books (See Top 100 in Books) #10 inÃ Â Books > Engineering & Transportation > Engineering > Electrical & Electronics > Electronics > Optoelectronics #250 inÃ Â Books > Science & Math > Physics > Quantum Theory #1848 inÃ Â Books > Science & Math > Technology

Customer Reviews

"This is an excellent introductory-level textbook on quantum mechanics for physicists and engineers. It is a timely contribution with a modern perspective on not only the fundamental concepts of quantum mechanics, but also their applications to nanotechnology as well as quantum information. The author is a leading expert in quantum devices and he writes the text with remarkable clarity and authority. It is highly recommended as a textbook for courses on quantum

mechanics in undergraduate curricula in science and engineering. " Shun Lien Chuang, Robert MacClinchie Distinguished Professor, University of Illinois, Urbana-Champaign"I think this is an excellent book. It will become my standard reference for text for quantum mechanics and I will expect to see it on the shelves of my PhD students as well as undergraduate students. If students want to find one book that that will serve as both an introductory and future reference text on quantum mechanics, condensed matter and quantum optics they should buy this one." >Gareth Parry, Imperial College, London"Miller teaches electrical engineering and applied physics at Stanford, so he is aware of the pitfalls in learning quantum mechanics. This text is a lucid introduction to the subject, even for those who haven't studied linear algebra. He even gives the Greek alphabet in an appendix so the formulae can be read out loud without embarrassment. The book is designed for a two-term course. It begins with Schroedinger's equation and its implications. He continues with approximation methods, perturbation theory, quanta in crystalline materials, various matrices, harmonic oscillators and photons, and fermions. Each chapter closes with a review of terms used. Miller ends with possible used for quantum mechanics in computing, cryptography and even teleportation, although he warns that the last does not mean stepping into the transporter beam any time soon." >Book News, Inc."... a well-written book on an advanced subject." N. Sadanand, Central Connecticut State University for Choice Magazine

By relating the core principles of quantum mechanics to the growing range of practical applications in engineering, physics, and nanotechnology, students will develop an understanding of theoretical concepts through examples of nanostructured materials, optics, and semiconductor devices. The book focuses on students' problem solving skills in worked examples and more than 160 homework problems. Additional resources are available from www.cambridge.org/9780521897839.

This is a textbook like no other: Clear. Honest. Eloquent. Thorough. Typo-free. Readable.Reading Quantum Mechanics for Scientists and Engineers feels like nothing more than a friendly chat with Dave Miller about the nature of the universe. This year, as an undergrad EE major at Stanford, I took the quantum mechanics course from which this book emerged, using the book as a primary textbook and reference. You can pick up this book with nothing but a basic linear algebra background--the simple math relevant to QM is reviewed in the appendix--and immediately dive in, learning from cover to cover without ever feeling lost in the vast world of QM. A fantastic teacher and writer, Prof. Miller devotes particular attention to practical methods for using quantum mechanics in engineering (e.g., transfer matrix, perturbation theories, various approximation

methods). That said, he never fails to explore and explain the theoretical and philosophical aspects of QM, giving a satisfyingly honest sense of certainty to an inherently uncertain field.Without a clear guide, learning (and using) quantum mechanics can be a frightening endeavor for students and experienced researchers alike. With this book in hand, you'll quickly find that David Miller is the right man for the job.

Many textbooks, in general, suffer in readability due to the author assuming the reader thinks just as he or she does, or knows a sufficient amount of information prior to reading. David Miller is one of those authors that is just the opposite: he never assumes you know anything that isn't in his book (other than that you know how to read and do basic math). In addition, Miller has the unique ability to relate complex and complicated concepts to common examples. You will find that reading through this text is much smoother than with other textbooks. There are also solutions to certain problems and viewgraphs available for free online.The topics in the book cover the basic quantum mechanical scenarios, such as simple 1D/3D potentials, operators, the uncertainty principle (taught in two ways...Griffiths provides a third), matrix formalism, Dirac notation, angular momentum, spin, and the Hydrogen atom. In addition, more advanced topics, such as perturbation theory (time independent and dependent), the density matrix, and approximation techniques. Miller also relates much of the material to photonics topics, such as absorption, Fermi's Golden Rule, non-linear effects, refractive index, and much more. As an EE professor, he also covers some band theory of crystalline solids.I feel that this book is extremely complete and will be extremely useful for anyone wanting to learn Quantum Mechanics. I've also used Griffiths and Singh, which are also excellent texts. I feel that Griffiths accompanies this text very well (so having both is more than complete). I have yet to find an error in the text, and this is most likely because Miller wrote this originally as a course reader that was published through Stanford. The course reader has been used by other professors and hundreds of student prior to publishing. This means that your learning won't be plagued or interrupted with errors, or with the need to purchase a new edition.

I agree with most of the reviewers that gave this book high marks. The book is easy to read and well written, and at the same time it gives you a good and accurate representation of QM (ie, its not too watered down). I found it a good background book that allows me to move on to more advanced books when needed.The old Kindle version had horrible formatting, you could barely read the equations. But the new Kindle version of this book, as sold here, reads very well on a Kindle for PC. Equations are very readable, as is the graphical material. The equations are still a little small on a

Kindle Fire HD, but they are readable. Not sure how the equations would be on a larger tablet like an iPad or something.

Super book, but it paid to know something about quantum physics first since the "key" algebra can be quite involved. As D. Miller said in online course lecture, your need to be reading 5 or 6 books at once to make more sense out of the subject matter.

Third year course that makes Quantum Mechanics accessible to undergrads, and those of us working in the industry who have not used that level of mathematics for some time. The appendices are great reference, and refreshers.

This book is very carefully written and easy to follow. It has a wonderful collection of appendices which present all the prerequisite math and physics needed to begin the book. Answers to many of the problem sets are available on-line. It’s the best book on QM I’ve found yet.

The author is teaching a class through Stanford online using this text. Really awesome!

The subject of Quantum Mechanics has been made very easy even for people with elementary mathematics knowledge. I like the Authors approach to this subject and once started you cannot lay this book down. It stimulates reading and imparts knowledge. I hope other authors follow this author in writing books.

Physics Mathematical Handbook for Scientists and Engineers: Definitions, Theorems, and Formulas for Reference and Review (Dover Civil and Mechanical Engineering) Physics for Scientists and Engineers, Hybrid (with Enhanced WebAssign Homework and eBook LOE Printed Access Card for Multi Term Math and Science) Bundle: Physics for Scientists and Engineers: Foundations and Connections, Advance Edition, Loose-leaf Version + WebAssign Printed Access Card for ... and Connections, 1st Edition, Multi-Term Probability and Statistics for Engineers and Scientists Successful Women Ceramic and Glass Scientists and Engineers: 100 Inspirational Profiles Electronics and Communications for Scientists and Engineers C++ and Object-Oriented Numeric Computing for Scientists and Engineers Probability and Statistics for Engineers and Scientists (9th Edition) Introduction to Probability and Statistics for Engineers and Scientists, Fifth Edition