



# Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts)

*By Efstratios Manousakis*

Download now

Read Online ➔

## Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) By Efstratios Manousakis

Quantum mechanics forms the foundation of all modern physics, including atomic, nuclear, and molecular physics, the physics of the elementary particles, condensed matter physics. Modern astrophysics also relies heavily on quantum mechanics. Quantum theory is needed to understand the basis for new materials, new devices, the nature of light coming from stars, the laws which govern the atomic nucleus, and the physics of biological systems. As a result the subject of this book is a required course for most physics graduate students.

While there are many books on the subject, this book targets specifically graduate students and it is written with modern advances in various fields in mind. Many examples treated in the various chapters as well as the emphasis of the presentation in the book are designed from the perspective of such problems. For example, the book begins by putting the Schrodinger equation on a spatial discrete lattice and the continuum limit is also discussed, inspired by Hamiltonian lattice gauge theories. The latter and advances in quantum simulations motivated the inclusion of the path integral formulation. This formulation is applied to the imaginary-time evolution operator to project the exact ground state of the harmonic oscillator as is done in quantum simulations. As an example of how to take advantage of symmetry in quantum mechanics, one-dimensional periodic potentials are discussed, inspired by condensed matter physics. Atoms and molecules are discussed within mean-field like treatment (Hartree-Fock) and how to go beyond it. Motivated by the recent intense activity in condensed matter and atomic physics to study the Hubbard model, the electron correlations in the hydrogen molecule are taken into account by solving the two-site Hubbard model analytically. Using the canonical Hamiltonian quantization of quantum electrodynamics, the photons emerge as the quanta of the normal modes, in the same way as the phonons emerge in the treatment of the normal modes of the coupled array of atoms. This is used later to treat the interaction of radiation with atomic matter.

 [\*\*Download\*\* Practical Quantum Mechanics: Modern Tools and Appl...pdf](#)

 [\*\*Read Online\*\* Practical Quantum Mechanics: Modern Tools and Ap  
...pdf](#)

# Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts)

*By Efstratios Manousakis*

**Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) By Efstratios Manousakis**

Quantum mechanics forms the foundation of all modern physics, including atomic, nuclear, and molecular physics, the physics of the elementary particles, condensed matter physics. Modern astrophysics also relies heavily on quantum mechanics. Quantum theory is needed to understand the basis for new materials, new devices, the nature of light coming from stars, the laws which govern the atomic nucleus, and the physics of biological systems. As a result the subject of this book is a required course for most physics graduate students.

While there are many books on the subject, this book targets specifically graduate students and it is written with modern advances in various fields in mind. Many examples treated in the various chapters as well as the emphasis of the presentation in the book are designed from the perspective of such problems. For example, the book begins by putting the Schrodinger equation on a spatial discrete lattice and the continuum limit is also discussed, inspired by Hamiltonian lattice gauge theories. The latter and advances in quantum simulations motivated the inclusion of the path integral formulation. This formulation is applied to the imaginary-time evolution operator to project the exact ground state of the harmonic oscillator as is done in quantum simulations. As an example of how to take advantage of symmetry in quantum mechanics, one-dimensional periodic potentials are discussed, inspired by condensed matter physics. Atoms and molecules are discussed within mean-field like treatment (Hartree-Fock) and how to go beyond it. Motivated by the recent intense activity in condensed matter and atomic physics to study the Hubbard model, the electron correlations in the hydrogen molecule are taken into account by solving the two-site Hubbard model analytically. Using the canonical Hamiltonian quantization of quantum electrodynamics, the photons emerge as the quanta of the normal modes, in the same way as the phonons emerge in the treatment of the normal modes of the coupled array of atoms. This is used later to treat the interaction of radiation with atomic matter.

**Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) By Efstratios Manousakis Bibliography**

- Sales Rank: #1933516 in Books
- Published on: 2016-01-12
- Original language: English
- Number of items: 1
- Dimensions: 6.80" h x 1.00" w x 9.80" l, .0 pounds
- Binding: Hardcover
- 344 pages

 **[Download](#)** [Practical Quantum Mechanics: Modern Tools and Appl ...pdf](#)

 **[Read Online](#)** [Practical Quantum Mechanics: Modern Tools and Ap ...pdf](#)

## **Download and Read Free Online Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) By Efstratios Manousakis**

---

### **Editorial Review**

#### **Review**

"The book teaches students how to approach and solve the types of quantum mechanical problems they will encounter throughout their careers. It will serve as an excellent text for a graduate level course." --C. Stephen Hellberg, Naval Research Laboratory

#### **About the Author**

Efstratios Manousakis, *Professor of Physics, Florida State University*

Efstratios Manousakis received his Ph. D. in Theoretical Physics, in 1985, from the University of Illinois at Urbana-Champaign. After a Post-Doctoral Research position at the Center for Theoretical Physics at the Massachusetts Institute of Technology (1985-1987) and at the Supercomputer Computational Research Institute (1987-88), he joined the Florida State University physics faculty, where he is the Donald Robson Professor of Physics and holds the title of Distinguished Research Professor.

### **Users Review**

#### **From reader reviews:**

##### **Gracie Thomas:**

Book is to be different for every single grade. Book for children until adult are different content. As we know that book is very important for people. The book Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) had been making you to know about other understanding and of course you can take more information. It is extremely advantages for you. The e-book Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) is not only giving you considerably more new information but also to get your friend when you feel bored. You can spend your spend time to read your book. Try to make relationship with all the book Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts). You never really feel lose out for everything should you read some books.

##### **David Munsch:**

This book untitled Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) to be one of several books in which best seller in this year, that's because when you read this e-book you can get a lot of benefit onto it. You will easily to buy this book in the book retailer or you can order it by way of online. The publisher of this book sells the e-book too. It makes you more easily to read this book, since you can read this book in your Smartphone. So there is no reason for you to past this e-book from your list.

**Philip Mejia:**

Beside this kind of Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) in your phone, it can give you a way to get closer to the new knowledge or facts. The information and the knowledge you will get here is fresh through the oven so don't always be worry if you feel like an previous people live in narrow town. It is good thing to have Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) because this book offers for your requirements readable information. Do you often have book but you do not get what it's all about. Oh come on, that won't happen if you have this in the hand. The Enjoyable blend here cannot be questionable, just like treasuring beautiful island. Use you still want to miss it? Find this book and also read it from at this point!

**Robert Oshea:**

In this era which is the greater particular person or who has ability in doing something more are more special than other. Do you want to become one among it? It is just simple solution to have that. What you have to do is just spending your time little but quite enough to get a look at some books. One of the books in the top list in your reading list is actually Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts). This book that is certainly qualified as The Hungry Hillside can get you closer in growing to be precious person. By looking up and review this e-book you can get many advantages.

**Download and Read Online Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) By Efstratios Manousakis #1XZ7L5C43JI**

# **Read Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) By Efstratios Manousakis for online ebook**

Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) By Efstratios Manousakis Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) By Efstratios Manousakis books to read online.

## **Online Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) By Efstratios Manousakis ebook PDF download**

**Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) By Efstratios Manousakis Doc**

**Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) By Efstratios Manousakis Mobipocket**

**Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) By Efstratios Manousakis EPub**

**1XZ7L5C43JI: Practical Quantum Mechanics: Modern Tools and Applications (Oxford Graduate Texts) By Efstratios Manousakis**