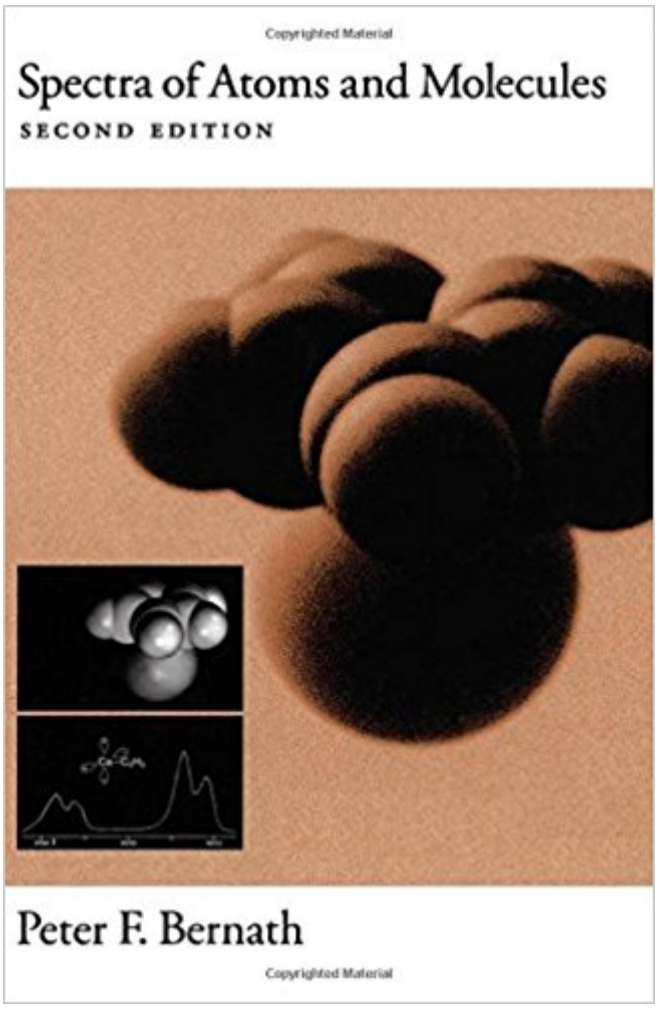
Spectra Of Atoms And Molecules



Synopsis

Spectra of Atoms and Molecules, 2nd Edition is designed to introduce advanced undergraduates and new graduate students to the vast field of spectroscopy. Of interest to chemists, physicists, astronomers, atmospheric scientists, and engineers, it emphasizes the fundamental principles of spectroscopy with its primary goal being to teach students how to interpret spectra. The book includes a clear presentation of group theory needed for understanding the material and a large number of excellent problems are found at the end of each chapter. In keeping with the visual aspects of the course, the author provides a large number of diagrams and spectra specifically recorded for this book. Topics such as molecular symmetry, matrix representation of groups, quantum mechanics, and group theory are discussed. Analyses are made of atomic, rotational, vibrational, and electronic spectra.Spectra of Atoms and Molecules, 2nd Edition has been updated to include the 1998 revision of physical constants, and conforms more closely to the recommended practice for the use of symbols and units. This new edition has also added material pertaining to line intensities, which can be confusing due to the dozens of different units used to report line and band strengths. Another major change is in author Peter Bernath’s discussion of the Raman effect and light scattering, where the standard theoretical treatment is now included. Aimed at new students of spectroscopy regardless of their background, Spectra of Atoms and Molecules will help demystify spectroscopy by showing the necessary steps in a derivation.

Book Information

Hardcover: 454 pages
Publisher: Oxford University Press; 2 edition (April 21, 2005)
Language: English
ISBN-10: 0195177592
ISBN-13: 978-0195177596
Product Dimensions: 10.1 x 1.1 x 7 inches
Shipping Weight: 1.8 pounds (View shipping rates and policies)
Average Customer Review: 3.4 out of 5 stars 10 customer reviews
Best Sellers Rank: #489,334 in Books (See Top 100 in Books) #51 inÂ Books > Science & Math > Physics > Nuclear Physics > Atomic & Nuclear Physics #375 inÂ Books > Science & Math > Chemistry > Physical & Theoretical #1570 inÂ Books > Textbooks > Science & Mathematics > Physics

Customer Reviews

"Bernath offers an excellent book on fundamental spectroscopy for senior-level undergraduates or graduate students. The revised edition (1st ed., 1995) includes updated references and consistent use or recommended symbols and units... The figures are plentiful and clear, and the index complete." Choice

Spectra of Atoms and Molecules is a very thorough and pedagogically organized textbook. It emphasizes the fundamental principles of spectroscopy with its primary goal being to teach students how to interpret spectra. This book reviews the basic skills needed to understand the material, including a clear presentation of group theory. A large number of excellent problems, many stated in the language of matrices, are found at the end of each chapter. In keeping with the visual aspects of the course, the author provides a large number of diagrams and spectra specifically recorded for this book. The author discusses such topics as molecular symmetry, matrix representation of groups, quantum mechanics and group theory. Analyses are made of atomic, rotational, vibrational, and electronic spectra. The Raman effect is also discussed. Undergraduate seniors and first-year graduate students studying molecular spectroscopy will find this text indispensable. It will also be of interest to professionals in chemistry, physics, astronomy, and engineering.

I took a course in Laser Spectroscopy and this was the suggested text. Overall, the book covered most topics relevant to the course. I don’t think this would be the book I would purchase, if there were no course, as some of the information is severely attenuated and leaves important details/concepts out.

Where do I begin?If I could have given it zero stars, I would have.1. Examples: There are almost no examples. Many of the formulae that he uses are actually quite simple when put into practice. But he doesn’t give any good examples.2. Partitioning: The book is not partitioned into discrete parts that deals with each subject, one at a time.3. Application: One uses this book in a course on spectroscopy, which is something used in the lab in *real life* (picture someone in academia knowing about that!). But he does not give us any examples of how this could apply to a real life problem. That may have been the best way to solidify some of these rigid, technical formulae.4. Problems: There are no answers to the problems. The Atkins book (Physical Chemistry) is used for about 95% of Physical Chemistry classes in the USA. But they give the answers to the odd numbered problems, so that you can go through and work them out and check your answer. The

even numbered problems are not given answers, but are usually a variation of the odd numbered ones.

If you’re a beginner to spectroscopy, don’t purchase this book. The author makes many assumptions about the knowledge of the reader while going from idea to idea. Many equations are not derived. Not only are they not derived, but the author makes no effort to explain where they came from or to provide anything that resembles context. This caused me to constantly lose my place, which caused a few pages to take hours to read and still not understand. If you’re a beginner, do not buy this book. In fact, if you’re anyone, don’t buy this book. I keep trying to think of a suitable audience for this awful work, but I can’t come up with any.

This book is very pedagogical and also contains information pertaining spectroscopy that I could not find anywhere else. A great purchase!

The condition was good. The contains are a little bit too simple, but is fine to start learning.

Bad written or organized book, weird way of treating units, feels like he was engineering the instruments not from math or physics point of view.

This review is for the Kindle edition, which is a great bargain, by the way!Contrarily to some of the other reviews, I find this book delivers exactly as promised. In the preface to the first edition, we read: "This book is designed as a textbook to introduce advanced undergraduates and, particularly, new graduate students to the vast field of spectroscopy. It presumes that the student is familiar with the material in an undergraduate course in quantum mechanics. I have taken great care to review the relevant mathematics and quantum mechanics as needed throughout the book." I have not yet read all of the book, so I can’t be sure of the full validity of the "throughout the book" statement, but from what I have read, including the new chapter on Raman spectroscopy, I believe the statement is not an exaggeration. For the rest of the quote, I am in full agreement with how the author has described his attempt.I come to this topic with an undergraduate degree in physics and a Ph.D. in Engineering that focused in the field of optical sensing. I find the material in this book presented in a way that lets me rely on my background knowledge, yet presents sufficient review and detail in the mathematical steps to comfortably bring me from where I am to where the author wants to take me.The illustrations are plentiful and clear. I have not taken full advantage of the problem sets yet

but I can see the author has taken great care to make the problems relevant to, and complementary to, the text. We see this from the many references to the problems within the text where the author promises an opportunity for deepening a particular aspect.At the end of each chapter we find a numbered list of references referred to in the chapter, plus a list of general references which I understand to be the material from which the author has gathered much of his material for the chapter in question. I very much like the combination of specific references where needed plus general ones (most textbook authors choose to present one or the other), and the fact that each chapter has its own lists.The Kindle format is that of an image (similar to a PDF text), so one cannot change the font size and the pages preserve their identity as pages. This is mostly a good thing except for the few places where it is clear that the image scanning could have benefited from being at a higher resolution. One fortunate aspect that is preserved with this format (compared to PDF) is that it is still possible to select a single word and Kindle will find its definition. (Highlights, bookmarks, and comments that can be shared in outside world, and the benefit of "cloud access" are also a plus.)I very much recommend this book and vouch for the value and great experience to be obtained with its Kindle edition.

This is a comprehensive exposition of the concepts in spectroscopy essential to the graduate student. As a student, I found this textbook an invaluable learning tool and reference. It is no surprise that "Spectra of Atoms and Molecules" is highly recommended and widely used.

Organometallic, and Bioinorganic Chemistry, 5th Edition NMR Data Interpretation Explained: Understanding 1D and 2D NMR Spectra of Organic Compounds and Natural Products Molecular Vibrations: The Theory of Infrared and Raman Vibrational Spectra (Dover Books on Chemistry) Atomic Spectra and Radiative Transitions (Springer Series in Chemical Physics, Vol. 1) Interpretation of Mass Spectra Organic Structures from Spectra