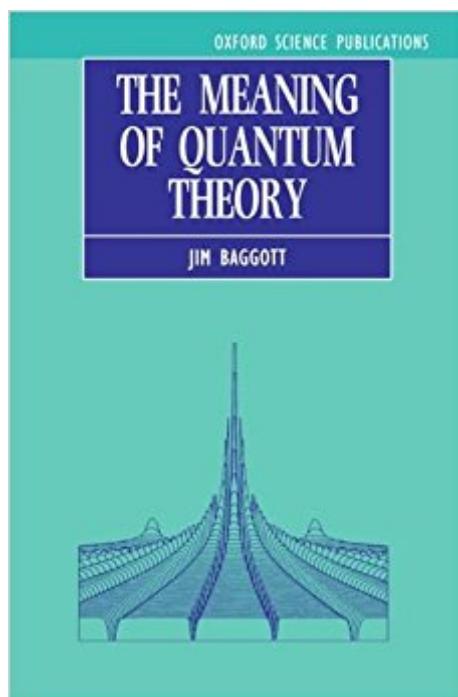


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The Meaning Of Quantum Theory: A Guide For Students Of Chemistry And Physics (Oxford Science Publications)



Synopsis

Why is quantum theory so difficult to understand? In this book, written for both undergraduate and graduate students of chemistry and physics, the author looks at the continuing debate about the meaning of quantum theory. The historical development of the theory is traced from the turn of the century through to the 1930s, and the famous debate between Niels Bohr and Albert Einstein. The book examines in detail the arguments that quantum theory is incomplete, as made by Einstein, Boris Podolsky, and Nathan Rosen; the development of Bell's theorem; and crucial experimental tests performed in the early 1980s. Alternative interpretations -- pilot waves, quantum gravity, consciousness, and many worlds -- are described in the closing chapter.

Book Information

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Customer Reviews

'I can recommend it warmly. Baggott has a practised, informal, attractive style that renders the potentially turgid digestible . . . , he gives a lucid, thoughtful, and helpful account of one of this century's great conundrums.' The Times Higher Education Supplement'Baggott is a chemist; he combines scepticism with an honest and painstaking effort to understand the message coming from the Copenhagen priesthood, the physicists Irwin Schrodinger, Niels Bohr and their colleagues. He tries, with refreshing modesty, to pass on the results of his labours ...Baggott has an entertaining style, with clever use of analogies and diagrams - and, above all, its realist honesty that shines like a beacon through the fog of contemporary mystical speculations.'Trevor Marshall and Max Wallis,

New Scientist' The book is clearly written and should be of interest to all scientists and mathematicians.' Aslib Book Guide, Vol 57. No. 10, October 1992' this reasonably priced and well produced book forms a valuable bridge from basic undergraduate knowledge to the real stuff' R. Crossley, Institute of Physics Journal 'I can recommend it warmly. Baggott has a practised, informal, attractive style that renders the potentially turgid digestible . . . , he gives a lucid, thoughtful, and helpful account of one of this century's great conundrums.' The Times Higher Education Supplement' Baggott's strength lies precisely in his appreciation of the problem of making real measurements on microscopic quantum systems using macroscopic devices. Baggott has an entertaining style, with clever use of analogies and diagrams - and, above all, its realist honesty that shines like a beacon through the fog of contemporary mystical speculations. The final sentence is particularly worth noting: "If you find the theory difficult to understand, this is the theory's fault - not yours." Trevor Marshall, University of Manchester and Max Wallis, University of Wales, Cardiff, New Scientist, October 1992

Jim Baggott, Environmental Officer, Lubricants Marketing, Shell International.

An excellent coverage of all things quantum theory. It starts off going over the foundations and concepts of quantum theory, similar to the concepts you would learn in an undergraduate course. Baggott goes over the foundations concisely and logically. It's no textbook (as he says at the beginning) but it's fantastic as a refresher or to solidify your understanding of the concepts. The second part of the book is a discussion of the interpretations of quantum mechanics, looking at the Copenhagen interpretation, hidden variables, many worlds etc. It's a very good account of all the most popular theories, and understanding this book is a great way to get yourself thinking of quantum mechanics in a deeper way than an undergraduate course will give you.

This is the best book I've read on the philosophy of quantum mechanics, complete with mathematical detail. Non-technical readers can appreciate the book without following the math, but for curious students of physics, chemistry, and engineering, this book is a true jewel. I believe all serious students of philosophy should also read this.

This book concentrates more on the philosophical aspects of quantum theory rather than formalism and problem solving, though some simple and easy to follow derivations are presented that give real insights into the guts of the theory, which will help a reader who goes on to pursue quantum theory

in greater detail. The historical debate between the positivists and realists during the theories development is presented in a very readable and entertaining way. A very well written and researched book that you will be glad you read.

Succinctly: if you want more than descriptive science popularizations and are ready to tackle the math then this is, quite simply, the best book there is. Jim Baggott introduces the notation and the concepts in an engaging and untiring style and after a careful reading (or three) one is ready to read the original papers. Cannot recommend highly enough.

I ordered this for my son who is majoring in math & physics. The book is used but in excellent condition. It was a great bargain and my son loves it.

excellent!

This is the best exposition of the subject I have ever read. It should be the introductory text for all advanced students.CAB

This book covers pretty much the same ground as Gribbins "In Search of Schrodinger's Cat", but does so in a more mathematical manner. The math is not overly complex, it does not go beyond algebra, but does use very complicated notation systems (including Dirac's bracket notation). The reader should be familiar with the concept of an operator and not be frightened by the sight of partial differential equations, although none are actually solved. The book is aimed at students of Chemistry and Physics, but it is not a textbook per se, but rather an adjunct to a quantum theory text. This book is about the meaning of quantum theory, rather than about solving specific quantum problems. It focuses on the implications of the various interpretations of quantum theory. It not only goes into the standard Copenhagen interpretation (developed by Niels Bohr and colleagues) and the objections to it raised by Einstein and others, but also goes into several other interpretations, such as Einstein's hidden variable idea, DeBroglie's pilot waves and Bohm's quantum potentials. Baggott not only develops these other ideas, but also shows where many have been abandoned by their developers or proved to be inconsistent with quantum theory and experimental data. By using some math the book Baggott is able to derive the Schrödinger wave equation in a very simple manner. This derivation comes from Schrodinger's own notebooks and is much simpler than the more sophisticated one that Schrodinger used in his paper describing the wave equation. Baggott

also shows where the uncertainty principle comes from and why it is inherent in the mathematics of wave and matrix mechanics because it is a feature of all non-commuting operators. In my opinion the derivation of the wave equation and this analysis of the uncertainty principle are alone worth the price of the book. Baggott also goes into the EPR thought experiment, derives Bell's inequality and describes in some detail the various tests for the EPR experiment and Bell's inequality. Much of this material is also included in "In Search of Schrodinger's Cat", but because no math is included, Gribbin's discussion is not as detailed or complete as Baggott's. (This is not a criticism of Gribbin's book, as it is aimed at a more general audience.) Baggott's book a great choice for someone studying quantum mechanics, but is probably beyond those with an insufficient background in mathematics. I recommend Gribbin's "In Search of Schrodinger's Cat" (see my review of this book for more details on it) for those who want a non-mathematical treatment of this subject.

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