Quantum Concepts In The Social Ecological And Bio

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Quantum Field Theory for Economics and Finance Sounds True
A complete overview of quantum mechanics, covering essential concepts and results, theoretical foundations, and applications. This undergraduate textbook offers a comprehensive overview of quantum mechanics, beginning with essential concepts and results, proceeding through the theoretical foundations that provide the field’s conceptual framework, and concluding with the tools and applications students will need for advanced studies and for research. Drawn from lectures created for MIT undergraduates and for the popular MITx online course, “Mastering Quantum Mechanics,” the text presents the material in a modern and approachable manner while still including the traditional topics necessary for a well-rounded understanding of the subject. As the book progresses, the treatment gradually increases in difficulty, matching students’ increasingly sophisticated understanding of the material. • Part 1 covers states and probability amplitudes, the Schrödinger equation, energy eigenstates of particles in potentials, the hydrogen atom, and spin one-half particles • Part 2 covers mathematical tools, the pictures of quantum mechanics and the axioms of quantum mechanics, entanglement and tensor products, angular momentum, and identical particles. • Part 3 introduces tools and techniques that help students master the theoretical concepts with a focus on approximation methods. • 236 exercises and 286 end-of-chapter problems • 248 figures

Quantum Politics Cambridge University Press
"A thorough, illuminating exploration of the most consequential controversy raging in modern science." --New York Times Book Review An Editor's Choice, New York Times Book Review Longlisted for PEN/E.O. Wilson Prize for Literary Science Writing Longlisted for Goodreads Choice Award Every physicist agrees quantum mechanics is among humanity's finest scientific achievements. But ask what it means, and the result will be a brawl. For a century, most physicists have followed Niels Bohr's solipsistic and poorly reasoned Copenhagen interpretation. Indeed, questioning it has long meant professional ruin, yet some daring physicists, such as John Bell, David Bohm, and Hugh Everett, persisted in seeking the true meaning of quantum mechanics. What Is Real? is the gripping story of this battle of ideas and the courageous scientists who dared to stand up for truth. "An excellent, accessible account." --Wall Street Journal "Splendid. . . . Deeply detailed research, accompanied by charming anecdotes about the scientists." --Washington Post

Quantum Mind and Social Science Praeger
The book considers foundational thinking in quantum theory, focusing on the role the fundamental principles and principle thinking there, including thinking that leads to the invention of new principles, which is, the book contends, one of the ultimate achievements of theoretical thinking in physics and beyond. The focus on principles, prominent during the rise and in the immediate aftermath of quantum theory, has been uncommon in more recent discussions and debates concerning it. The book argues, however, that exploring the fundamental principles and principle thinking is exceptionally helpful in addressing the key issues at stake in quantum foundations and the seemingly interminable debates concerning them. Principle thinking led to major breakthroughs throughout the history of quantum theory, beginning with the old quantum theory

and quantum mechanics, the first definitive quantum theory, which it remains within its proper (nonrelativistic) scope. It has, the book also argues, been equally important in quantum field theory, which has been the frontier of quantum theory for quite a while now, and more recently, in quantum information theory, where principle thinking was given new prominence. The approach allows the book to develop a new understanding of both the history and philosophy of quantum theory, from Planck's quantum to the Higgs boson, and beyond, and of the thinking the key founding figures, such as Einstein, Bohr, Heisenberg, Schrödinger, and Dirac, as well as some among more recent theorists. The book also extensively considers the nature of quantum probability, and contains a new interpretation of quantum mechanics, "the statistical Copenhagen interpretation." Overall, the book's argument is guided by what Heisenberg called "the spirit of Copenhagen," which is defined by three great divorces from the preceding foundational thinking in physics—reality from realism, probability from causality, and locality from relativity—and defined the fundamental principles of quantum theory accordingly.

Compendium of Quantum Physics Basic Books

An overview of how complex systems from a variety of fields can be modelled using principles of quantum mechanics; from biology and ecology, to sociology and decision-making. The mathematical basis of these models is fully described, providing a self-contained introduction for students and researchers in applied mathematics or theoretical physics.

Quantum Theory: Concepts and Methods Springer Science & Business Media

Quantum Mind. The Edge Between Physics and Psychology This is the second edition with new preface from the author. In a single volume, Arnold Mindell brings together psychology, physics, math, myth, and shamanism – not only mapping the way for next-generation science but also applying this wisdom to personal growth, group dynamics, social and political processes, and environmental issues. Beginning with a discussion of cultural impacts on mathematics, he presents esoteric but plausible interpretations of imaginary numbers and the quantum wavefunction. In this context he discusses dreams, psychology, illness, shape-shifting (moving among realities), and the self-reflecting Universe – bringing in not only shamanism but also the Aboriginal, Greek, and Hindu myths and even sacred geometry from the Masonic orders and the Native Americans. The book is enriched by several psychological exercises that enable the reader to subjectively experience mathematics (counting, discounting, squaring, complex conjugating), physics (parallel worlds, time travel), and shamanism (shape-shifting).

Beyond Weird Oxford University Press, USA

"Anyone who is not shocked by quantum theory has not understood it." Since Niels Bohr said this many years ago, quantum mechanics has only been getting more shocking. We now realize that it's not really telling us that "weird" things happen out of sight, on the tiniest level, in the atomic world: rather, everything is quantum. But if quantum mechanics is correct, what seems obvious and right in our everyday world is built on foundations that don't seem obvious or right at all—or even possible. An exhilarating tour of the contemporary quantum landscape, Beyond Weird is a book about what quantum physics really means—and what it doesn't. Science writer Philip Ball offers an up-to-date, accessible account of the quest to come to grips with the most fundamental theory of physical reality, and to explain how its counterintuitive principles underpin the world we experience. Over the past decade it has become clear that quantum physics is less a theory about particles and waves, uncertainty and fuzziness, than a theory about information and knowledge—about what can be known, and how we can know it. Discoveries and experiments over the past few decades have called into question the meanings and limits of space and time, cause and effect, and, ultimately, of knowledge itself. The quantum world Ball shows us isn't a different world. It is our world, and if anything deserves to be called "weird," it's us.

Quantum Concepts in the Social, Ecological and Biological Sciences Springer

This book was inspired by the general observation that the great theories of modern physics are based on simple and transparent underlying mathematical structures – a fact not usually emphasized in standard physics textbooks – which makes it easy for mathematicians to understand their basic features. It is a textbook on quantum theory intended for advanced undergraduate or graduate students: mathematics students interested in modern physics, and physics students who are interested in the mathematical background of physics and are dissatisfied with the level of rigor in standard physics courses. More generally, it offers a valuable resource for all mathematicians interested in modern physics, and all physicists looking for a higher degree of mathematical precision with regard to the basic concepts in their field.

Foundations of Quantum Theory Faber & Faber

Quirky Quantum Concepts explains the more important and more difficult concepts in theoretical quantum mechanics, especially those which are consistently neglected or confusing in many common expositions. The emphasis is on physical understanding, which is necessary for the development of new, cutting edge science. In particular, this book explains the basis for many standard quantum methods, which are too often presented without sufficient motivation or interpretation. The book is not a simplification or popularization: it is real science for real scientists. Physics includes math, and this book does not shy away from it, but neither does it hide behind it. Without conceptual understanding, math is gibberish. The discussions here provide the experimental and theoretical reasoning behind some of the great discoveries, so the reader may see how discoveries arise from a rational process of thinking, a process which Quirky Quantum Concepts makes accessible to its readers. Quirky Quantum Concepts is therefore a supplement to almost any existing quantum mechanics text. Students and scientists will appreciate the combination of conversational style, which promotes understanding, with thorough scientific accuracy.

Quantum Mind Walter de Gruyter GmbH & Co KG

This book is based on a conference held at Oxford in the Spring of 1984 to discuss Quantum Gravity. As an assessment of the present status of quantum theory which also considers future developments, this book should provide much stimulating material for both researchers and post graduate students in theortical and mathematical physics.

Quantum Theory from First Principles WmMorrowPB

The main emphasis of this work is the mathematical theory of quantum channels and their entropic and information characteristics. Quantum information theory is one of the key research areas, since it leads the way to vastly increased computing speeds by using quantum systems to store and process information. Quantum cryptography allows for secure communication of classified information. Research in the field of quantum informatics, including quantum information theory, is in progress in leading scientific centers throughout the world. The past years were marked with impressive progress made by several researchers in solution of some difficult problems, in particular, the additivity of the entropy characteristics of quantum channels. This suggests a need for a book that not only introduces the basic concepts of quantum information theory, but also presents in detail some of the latest achievements.

Quantum Theory: Informational Foundations and Foils Springer Science & Business Media

There are many excellent books on quantum theory from which one can learn to compute energy levels, transition rates, cross sections, etc. The theoretical rules given in these books are routinely used by physicists to compute observable quantities. Their predictions can then be compared with experimental data. There is no fundamental disagreement among physicists on how to use the theory for these practical purposes. However, there are profound differences in their opinions on the ontological meaning of quantum theory. The purpose of this book is to clarify the conceptual meaning of quantum theory, and to explain some of the mathematical methods which it utilizes. This text is not concerned with specialized topics such as atomic structure, or strong or weak interactions, but with the very foundations of the theory. This is not, however, a book on the philosophy of science. The approach is pragmatic and strictly instrumentalist. This attitude will undoubtedly antagonize some readers, but it has its own logic: quantum phenomena do not occur in a Hilbert space, they occur in a laboratory.

Quantum Theory Cannot Hurt You University of Chicago Press

This book introduces mathematicians, physicists, and philosophers to a new, coherent approach to theory and interpretation of quantum physics, in which classical and quantum thinking live peacefully side by side and jointly fertilize the intuition. The formal, mathematical core of quantum physics is cleanly separated from the interpretation issues. The book demonstrates that the universe can be rationally and objectively understood from the smallest to the largest levels of modeling. The thermal interpretation featured in this book succeeds without any change in the theory. It involves one radical step, the reinterpretation of an assumption that was virtually never questioned before - the traditional eigenvalue link between theory and observation is replaced by a q-expectation link: Objective properties are given by q-expectations of products of quantum fields and what is computable from these. Averaging over macroscopic spacetime regions produces macroscopic quantities with negligible uncertainty, and leads to classical physics. - Reflects the actual practice of quantum physics. - Models the quantum-classical interface through coherent spaces. - Interprets both quantum mechanics and quantum field theory. - Eliminates probability and measurement from the foundations. - Proposes a novel solution of the measurement problem.

Quantum Language and the Migration of Scientific Concepts Springer Science & Business Media

This book provides an introduction to how the mathematical tools from quantum field theory can be applied to economics and finance. Providing a range of quantum mathematical techniques for designing financial instruments, it demonstrates how a range of topics have quantum mechanical formulations, from asset pricing to interest rates.

An Introductory Path to Quantum Theory Cambridge University Press

In The Quantum Society authors Danah Zohar and Ian Marshall offer a compelling vision for transforming society using the insights of quantum physics to illuminate their ideas. Diversity, they suggest, is the creative evolutionary force, and the more diverse the society, the greater the opportunity for transformation and growth. Their theory of cosmic and social evolution allows us to discover the meaning and purpose of society through an appreciation and understanding of pluralistic thinking. The result is an all-embracing social model that celebrates the dynamic unity that is possible when we work together to orchestrate and articulate our interdependence. The quantum society is flexible, evolving, and ambiguous. In short, it reflects the idea of society as a living system. The authors use the language of physics to provide the images and metaphors appropriate for understanding the principles that inform this system, bringing into focus our harmonious place within the natural world.

Quantum Theory Springer Nature

Written by world experts in the foundations of quantum mechanics and its applications to social science, this book shows how elementary quantum mechanical principles can be applied to decision-making paradoxes in psychology and used in modelling information in finance and economics. The book starts with a thorough overview of some of the salient differences between classical, statistical and quantum mechanics. It presents arguments on why quantum mechanics can be applied outside of physics and defines quantum social science. The issue of the existence of quantum probabilistic effects in psychology, economics and finance is addressed and basic questions and answers are provided. Aimed at researchers in economics and psychology, as well as physics, basic mathematical preliminaries and elementary concepts from quantum mechanics are defined in a self-contained way.

Mastering Quantum Mechanics MIT Press

In the last five decades various attempts to formulate theories of quantum gravity have been made, but none has fully succeeded in becoming the quantum theory of gravity. One possible explanation for this failure might be the unresolved fundamental issues in quantum theory as it stands now. Indeed, most approaches to quantum gravity adopt standard quantum theory as their starting point, with the hope that the theory's unresolved issues will get solved along the way. However, these fundamental issues may need to be solved before attempting to define a quantum theory of gravity. The present text adopts this point of view, addressing the following basic questions: What are the main conceptual issues in quantum theory? How can these issues be solved within a new theoretical framework of quantum theory? A possible way to overcome critical issues in present-day quantum physics – such as a priori assumptions about space and time that are not compatible with a theory of quantum gravity, and the impossibility of talking about systems without reference to an external observer – is through a reformulation of quantum theory in terms of a different mathematical framework called topos theory. This course-tested primer sets out to explain to graduate students and newcomers to the field alike, the reasons for choosing topos theory to resolve the above-mentioned issues and how it brings quantum physics back to looking more like a "neo-realist" classical physics theory again.

Meeting the Universe Halfway Springer

Since the 17th century, physical theories have been expressed in the language of mathematical equations. This introduction to quantum theory uses that language to enable the reader to comprehend the notoriously non-intuitive ideas of quantum physics. The mathematical knowledge needed for using this book comes from standard undergraduate mathematics courses and is described in detail in the section Prerequisites. This text is especially aimed at advanced undergraduate and graduate students of mathematics, computer science, engineering and chemistry among other disciplines, provided they have the math background even though lacking preparation in physics. In fact, no previous formal study of physics is assumed.

The Possibility Principle Springer Nature

This text systematically presents the basics of quantum mechanics, emphasizing the role of Lie groups, Lie algebras, and their unitary representations. The mathematical structure of the subject

is brought to the fore, intentionally avoiding significant overlap with material from standard physics courses in quantum mechanics and quantum field theory. The level of presentation is attractive to mathematics students looking to learn about both quantum mechanics and representation theory, while also appealing to physics students who would like to know more about the mathematics underlying the subject. This text showcases the numerous differences between typical mathematical and physical treatments of the subject. The latter portions of the book focus on central mathematical objects that occur in the Standard Model of particle physics, underlining the deep and intimate connections between mathematics and the physical world. While an elementary physics course of some kind would be helpful to the reader, no specific background in physics is assumed, making this book accessible to students with a grounding in multivariable calculus and linear algebra. Many exercises are provided to develop the reader's understanding of and facility in quantum-theoretical concepts and calculations.

Quantum Social Theory for Critical International Relations Theorists MIT Press

This book is devoted to aspects of the foundations of quantum mechanics in which probabilistic and statistical concepts play an essential role. The main part of the book concerns the quantitative statistical theory of quantum measurement, based on the notion of positive operator-valued measures. During the past years there has been substantial progress in this direction, stimulated to a great extent by new applications such as Quantum Optics, Quantum Communication and high-precision experiments. The questions of statistical interpretation, quantum symmetries, theory of canonical commutation relations and Gaussian states, uncertainty relations as well as new fundamental bounds concerning the accuracy of quantum measurements, are discussed in this book in an accessible yet rigorous way. Compared to the first edition, there is a new Supplement devoted to the hidden variable issue. Comments and the bibliography have also been extended and updated.

The Quantum Story Icon Books Ltd

The most accessible guide to quantum physics there is, from the New Scientist cosmology correspondent.