

decoherence and the appearance of a classical world in quantum theory

[#quantum decoherence](#) [#classical world](#) [#quantum theory](#) [#quantum-classical transition](#) [#measurement problem](#)

This concept explores quantum decoherence, a fundamental process within quantum theory that explains how the inherently quantum nature of reality gives rise to the familiar classical world we observe. It addresses the mechanism by which quantum superpositions lose coherence, leading to the emergence of definite, classical properties and resolving aspects of the measurement problem in quantum mechanics.

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Decoherence and the Appearance of a Classical World in Quantum Theory

A unique description of the phenomena that arise from the interaction between quantum systems and their environment. Because of the novel character of the approach discussed, the book addresses scientists from all fields of physics and related disciplines as well as students of physics.

Decoherence and the Appearance of a Classical World in Quantum Theory

This fascinating book explores how a seemingly classical macroscopic world can evolve from a microscopic world based on quantum systems. While sometimes contradictory, the views expressed here reflect the lively nature of the debate within science about the nature of reality and the implications of quantum theory.

Decoherence

This detailed, accessible introduction to the field of quantum decoherence reviews the basics and then explains the essential consequences of the phenomenon for our understanding of the world. The discussion includes, among other things: How the classical world of our experience can emerge from quantum mechanics; the implications of decoherence for various interpretations of quantum mechanics; recent experiments confirming the puzzling consequences of the quantum superposition principle and making decoherence processes directly observable.

Compendium of Quantum Physics

With contributions by leading quantum physicists, philosophers and historians, this comprehensive A-to-Z of quantum physics provides a lucid understanding of key concepts of quantum theory and experiment. It covers technical and interpretational aspects alike, and includes both traditional and new concepts, making it an indispensable resource for concise, up-to-date information about the many facets of quantum physics.

Quantum Decoherence

This volume is devoted to Quantum Decoherence with lectures from the Séminaire Poincaré, held in November 2005 at the Institute Henri Poincaré Paris. The goal of this seminar is to provide up-to-date information about general topics of great interest in physics. Both the theoretical and experimental results are covered, with some historical background. Particular care is devoted to the pedagogical nature of the presentation.

Decoherence and Its Implications in Quantum Computation and Information Transfer

Decoherence is the physical process by which the classical world - the world of common sense - emerges from its quantum underpinnings. This physical process refers to the loss of phase coherence between the parts of a quantum system, because of the interaction of the system with the environment.

From Quantum to Classical

Quantum theory is at the foundation of the physical description of our world. One of the people who contributed significantly to our conceptual understanding of this theory was Heinz-Dieter Zeh (1932-2018). He was the pioneer of the process of decoherence, through which the classical appearance of our world can be understood. This volume presents a collection of essays dedicated to his memory, written by distinguished scientists and scholars. They cover all aspects of the interpretation of quantum theory in general and the quantum-to-classical transition in particular. This volume provides illuminating reading to anyone seeking a deep understanding of quantum theory and its relevance to the foundations of physics.

Beyond Weird

“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.

Time in Quantum Mechanics

The treatment of time in quantum mechanics is still an important and challenging open question in the foundation of the quantum theory. This multi-authored book, written as an introductory guide for newcomers to the subject, as well as a useful source of information for the expert, covers many of the open questions. The book describes the problems, and the attempts and achievements in defining, formalizing and measuring different time quantities in quantum theory.

Modern Challenges in Quantum Optics

Quantum Optics is a rapidly progressing field well suited to probe the many fundamental issues raised by the subtleties of quantum physics. This book consists of a collection of reviews and papers that highlight the most important challenges faced in this area of research, including topics such as cavity

QED, quantum entanglement, decoherence, matter waves and nonlinear optics. It will be a source of reference for all those who wish to familiarize themselves with the latest developments in the field.

Entanglement and Decoherence

Entanglement and (de-)coherence arguably define the central issues of concern in present day quantum information theory. Entanglement being a consequence of the quantum mechanical superposition principle for composite systems, a better understanding of the environment-induced destruction of coherent superposition states is required to devise novel strategies for harvesting quantum interference phenomena. The present book collects a series of advanced lectures on the theoretical foundations of this active research field, from mathematical aspects underlying quantum topology to mesoscopic transport theory. All lectures start out from an elementary level and proceed along a steep learning curve. This makes the material particularly suitable for student seminars on the more fundamental theoretical aspects of quantum information, and equally useful as supplementary reading for advanced lectures on this topic.

Quantum Measurements and Decoherence

Quantum measurement (Le., a measurement which is sufficiently precise for quantum effects to be essential) was always one of the most important points in quantum mechanics because it most evidently revealed the difference between quantum and classical physics. Now quantum measurement is again under active investigation, first of all because of the practical necessity of dealing with highly precise and complicated measurements. The nature of quantum measurement has become understood much better during this new period of activity, the understanding being expressed by the concept of decoherence. This term means a physical process leading from a pure quantum state (wave function) of the system prior to the measurement to its state after the measurement which includes classical elements. More concretely, decoherence occurs as a result of the entanglement of the measured system with its environment and results in the loss of phase relations between components of the wave function of the measured system. Decoherence is essentially nothing else than quantum measurement, but considered from the point of view of its physical mechanism and resolved in time. The present book is devoted to the two concepts of quantum measurement and decoherence and to their interrelation, especially in the context of continuous quantum measurement.

The Physical Basis of The Direction of Time

The asymmetry of natural phenomena under time reversal is striking. Here Zeh investigates the most important classes of physical phenomena that characterize the arrow of time, discussing their interrelations as well as striving to uncover a cosmological common root of the phenomena, such as the time-independent wave function of the universe. The description of irreversible phenomena is shown to be fundamentally "observer-related". Both physicists and philosophers of science who reviewed the first edition considered this book a magnificent survey, a concise, technically sophisticated, up-to-date discussion of the subject, showing fine sensitivity to some of the crucial philosophical subtleties. This new and expanded edition will be welcomed by both students and specialists.

Quantum Worlds

Offers a comprehensive and up-to-date volume on the conceptual and philosophical problems related to the interpretation of quantum mechanics.

Irreversible Quantum Dynamics

The idea of editing the present volume in the Lecture Notes in Physics series arose while organizing the "Conference on Irreversible Quantum Dynamics" that took place at The Abdus Salam International Center for Theoretical Physics, Trieste, Italy, from July 29 to August 2, 2002. The aim of the Conference was to bring together different groups of researchers whose interests and pursuits involve irreversibility and time asymmetry in quantum mechanics. The Conference promoted open and in-depth exchanges of different points of view, concerning both the content and character of quantum irreversibility and the methodologies used to study it. The following main themes were addressed: • Theoretical Aspects of Quantum Irreversible Dynamics • Open Quantum Systems and Applications • Foundational Aspects of Irreversible Quantum Dynamics • Asymmetric Time Evolution and Resonances Each theme was reviewed by an expert in the field, accompanied by more specific, research-like shorter talks. The whole topic

of quantum irreversibility in all its manifold aspects has always raised a lot of interest, starting with the description of unstable systems in quantum mechanics and the issue of quantum measurement. Further, in recent years a boost of activity concerning noise, dissipation and open systems has been prompted by the fast developing field of quantum communication and information theory. These considerations motivated the editors to put together a volume that tries to summarize the present day status of the research in the field, with the aim of providing the reader with an accessible and exhaustive introduction to it.

Quantum Theory: A Very Short Introduction

Quantum Theory is the most revolutionary discovery in physics since Newton. This book gives a lucid, exciting, and accessible account of the surprising and counterintuitive ideas that shape our understanding of the sub-atomic world. It does not disguise the problems of interpretation that still remain unsettled 75 years after the initial discoveries. The main text makes no use of equations, but there is a Mathematical Appendix for those desiring stronger fare. Uncertainty, probabilistic physics, complementarity, the problematic character of measurement, and decoherence are among the many topics discussed. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Elegance and Enigma

Quantum mechanics is one of mankind's most remarkable intellectual achievements. Stunningly successful and elegant, it challenges our deepest intuitions about the world. In this book, seventeen physicists and philosophers, all deeply concerned with understanding quantum mechanics, reply to Schlosshauer's penetrating questions about the central issues. They grant us an intimate look at their radically different ways of making sense of the theory's strangeness. What is quantum mechanics about? What is it telling us about nature? Can quantum information or new experiments help lift the fog? And where are we headed next? Everyone interested in the contemporary but often longstanding conundrums of quantum theory, whether lay reader or expert, will find much food for thought in these pages. A wealth of personal reflections and anecdotes guarantee an engaging read. Participants: Guido Bacciagaluppi, Caslav Brukner, Jeffrey Bub, Arthur Fine, Christopher Fuchs, GianCarlo Ghirardi, Shelly Goldstein, Daniel Greenberger, Lucien Hardy, Anthony Leggett, Tim Maudlin, David Mermin, Lee Smolin, Antony Valentini, David Wallace, Anton Zeilinger, and Wojciech Zurek.

Quantum Structural Studies

The structural aspects of composite quantum systems in the foundation, interpretation and application of quantum theory is an increasingly prominent topic of physics research. As an emerging field, it seeks to understand the origins of the classical world of experience from the quantum level. Quantum Structural Studies presents conceptual fundamentals and mathematical methods for investigating the structuring of quantum systems into subsystems. Split into four sections, the topics covered include the historical and philosophical aspects of quantum structures, specific interpretive approaches and ontologies, and alternative methodological approaches to quantum mechanics. Questions addressed are: Can the classically relevant degrees of freedom (such as the center of mass) be considered physically realistic, and if so, in what sense? In what sense might various emergent structures be relevant for the transition from the quantum description to the classical? Do suggested new approaches describe phenomenology and proposals for new experiments? Specialists, graduate students and researchers seeking an introduction to the field of emergent structures and new directions for research and experimentation can use this book to find up-to-date representative texts and reviews.

The Quantum Revolution in Philosophy

Quantum theory launched a revolution in physics. But we have yet to understand the revolution's significance for philosophy. Richard Healey opens a path to such understanding. The first part of this book offers a self-contained but opinionated introduction to quantum theory. The second part assesses the theory's philosophical significance.

Universal Quantum Computing: Supervening Decoherence - Surmounting Uncertainty

This breakthrough volume touts having dissolved the remaining barriers to implementing Bulk Universal Quantum Computing (UQC), and as such most likely describes the most advanced QC development platform. Numerous books, hundreds of patents, thousands of papers and a Googolplex of considerations fill the pantheon of QC R&D. Of late QC mathematicians claim QCs already exist; but by what chimeric definition. Does flipping a few qubits in a logic gate without an algorithm qualify as quantum computing? In physics, theory bears little weight without rigorous experimental confirmation, less if new, radical or a paradigm shift. This volume develops quantum computing based on '3rd regime' physics of Unified Field Mechanics (UFM). What distinguishes this work from a myriad of other avenues to UQC under study? Virtually all R&D paths struggle with technology and decoherence. If highly favored room-sized cryogenically cooled QCs ever become successful, they would be reminiscent of the city block-sized Eniac computer of 1946. The QC prototype proposed herein is room temperature and tabletop. It is dramatically different in that it is not confined to the limitations of quantum mechanics; since it is based on principles of UFM the Uncertainty Principle and Decoherence no longer apply. Thus this QC model could be implemented on any other quantum platform!

Quantum Computing Since Democritus

Takes students and researchers on a tour through some of the deepest ideas of maths, computer science and physics.

The Physical Basis of The Direction of Time

This thoroughly revised 5th edition of Zeh's classic text investigates irreversible phenomena and their foundation in classical, quantum and cosmological settings. It includes new sections on the meaning of probabilities in a cosmological context, irreversible aspects of quantum computers, and various consequences of the expansion of the Universe. In particular, the book offers an analysis of the physical concept of time.

Entangled World

In the quantum world, a particle can behave like a wave and accordingly seems to be in two places at the same time. This of course is contradictory to our daily experiences with classical particles. How then should this be understood? What happens in the transitional area between the classical world and quantum mechanics? The present book answers exciting questions like these in a way that is easy to follow and to understand and it shows that the link between these two worlds will have concrete and applied effects on our daily life in the near future. It will, for example, improve and change the conventional methods of information processing. With the help of quantum cryptography, it will be possible to communicate tap-proof. Using quantum computers we will be able to solve highly complicated problems in a very short time.

Foundations of Quantum Mechanics

Authored by an acclaimed teacher of quantum physics and philosophy, this textbook pays special attention to the aspects that many courses sweep under the carpet. Traditional courses in quantum mechanics teach students how to use the quantum formalism to make calculations. But even the best students - indeed, especially the best students - emerge rather confused about what, exactly, the theory says is going on, physically, in microscopic systems. This supplementary textbook is designed to help such students understand that they are not alone in their confusions (luminaries such as Albert Einstein, Erwin Schroedinger, and John Stewart Bell having shared them), to sharpen their understanding of the most important difficulties associated with interpreting quantum theory in a realistic manner, and to introduce them to the most promising attempts to formulate the theory in a way that is physically clear and coherent. The text is accessible to students with at least one semester of prior exposure to quantum (or "modern") physics and includes over a hundred engaging end-of-chapter "Projects" that make the book suitable for either a traditional classroom or for self-study.

Fundamentals of Quantum Information

Quantum information science is a rapidly developing field that not only promises a revolution in computer sciences but also touches deeply the very foundations of quantum physics. This book consists of a set of lectures by leading experts in the field that bridges the gap between standard textbook material and the research literature, thus providing the necessary background for postgraduate

students and non-specialist researchers wishing to familiarize themselves with the subject thoroughly and at a high level. This volume is ideally suited as a course book for postgraduate students, and lecturers will find in it a large choice of material for bringing their courses up to date.

Many Worlds?

What would it mean to apply quantum theory, without restriction and without involving any notion of measurement and state reduction, to the whole universe? What would realism about the quantum state then imply? This book brings together an illustrious team of philosophers and physicists to debate these questions. The contributors broadly agree on the need, or aspiration, for a realist theory that unites micro- and macro-worlds. But they disagree on what this implies. Some argue that if unitary quantum evolution has unrestricted application, and if the quantum state is taken to be something physically real, then this universe emerges from the quantum state as one of countless others, constantly branching in time, all of which are real. The result, they argue, is many worlds quantum theory, also known as the Everett interpretation of quantum mechanics. No other realist interpretation of unitary quantum theory has ever been found. Others argue in reply that this picture of many worlds is in no sense inherent to quantum theory, or fails to make physical sense, or is scientifically inadequate. The stuff of these worlds, what they are made of, is never adequately explained, nor are the worlds precisely defined; ordinary ideas about time and identity over time are compromised; no satisfactory role or substitute for probability can be found in many worlds theories; they can't explain experimental data; anyway, there are attractive realist alternatives to many worlds. Twenty original essays, accompanied by commentaries and discussions, examine these claims and counterclaims in depth. They consider questions of ontology - the existence of worlds; probability - whether and how probability can be related to the branching structure of the quantum state; alternatives to many worlds - whether there are one-world realist interpretations of quantum theory that leave quantum dynamics unchanged; and open questions even given many worlds, including the multiverse concept as it has arisen elsewhere in modern cosmology. A comprehensive introduction lays out the main arguments of the book, which provides a state-of-the-art guide to many worlds quantum theory and its problems.

The Quantum World

In this largely nontechnical book, eminent physicists and philosophers address the philosophical impact of recent advances in quantum physics. These are shown to shed new light on profound questions about realism, determinism, causality or locality. The participants contribute in the spirit of an open and honest discussion, reminiscent of the time when science and philosophy were inseparable. After the editors' introduction, the next chapter reveals the strangeness of quantum mechanics and the subsequent discussions examine our notion of reality. The spotlight is then turned to the topic of decoherence. Bohm's theory is critically examined in two chapters, and the relational interpretation of quantum mechanics is likewise described and discussed. The penultimate chapter presents a proposal for resolving the measurement problem, and finally the topic of loop quantum gravity is presented by one of its founding fathers, Carlo Rovelli. The original presentations and discussions on which this volume is based took place under the auspices of the French "Académie des Sciences Morales et Politiques". The book will appeal to everybody interested in knowing how our description of the world is impacted by the results of the most powerful and successful theory that physicists have ever built.

Modern Quantum Theory

In the last few decades quantum theory has experienced an extensive revival owing to the rapid development of quantum information and quantum technologies. Based on a series of courses taught by the authors, the book takes the reader on a journey from the beginnings of quantum theory in the early twentieth century to the realm of quantum-information processing in the twenty-first. The central aim of this textbook, therefore, is to offer a detailed introduction to quantum theory that covers both physical and information-theoretic aspects, with a particular focus on the concept of entanglement and its characteristics, variants, and applications. Suitable for undergraduate students in physics and related subjects who encounter quantum mechanics for the first time, this book also serves as a resource for graduate students who want to engage with more advanced topics, offering a collection of derivations, proofs, technical methods, and references for graduate students and more experienced readers engaged with teaching and active research. The book is divided into three parts: Part I - Quantum Mechanics, Part II - Entanglement and Non-Locality, and Part III - Advanced Topics in Modern Quantum Physics. Part I provides a modern view on quantum mechanics, a central topic of

theoretical physics. Part II is dedicated to the foundations of quantum mechanics and entanglement: starting with density operators, hidden-variable theories, the Einstein-Podolsky-Rosen Paradox, and Bell Inequalities, but also touching upon philosophical questions, followed by a deeper study of entanglement-based quantum communication protocols like teleportation, before giving a detailed exposition of entanglement theory, including tools for the detection and quantification of entanglement. Part III is intended as a collection of standalone chapters to supplement the contents of Parts I and II, covering more advanced topics such as classical and quantum entropies, quantum operations and measurements, decoherence, quantum metrology and quantum optics, and entanglement in particle physics.

Advances in Solid State Physics 46

This book presents written versions of selected invited lectures from the spring meeting of the Arbeitskreis Festkörperphysik of the Deutsche Physikalische Gesellschaft which was held from 27 to 31 March 2006 in Dresden, Germany. Many topical talks given at the numerous symposia are included. Most of these were organized collaboratively by several of the divisions of the Arbeitskreis. The book presents, to some extent, the status of the field of solid-state physics in 2006 not only in Germany but also internationally.

Quantum Shorts

This book presents winning and shortlisted stories from past editions of the international Quantum Shorts competition. Inspired by the weird and wonderful world of quantum physics, the shorts range from bold imaginings of a quantum future to contemplations rooted in the everyday. They feature characters of all sorts: lovers beginning their lives together, an atom having an existential crisis, and, of course, cats. These Quantum Shorts will unleash in your mind a multiverse of ideas.

Quantum Communication, Computing, and Measurement 3

This volume contains contributions based on the lectures delivered and posters presented at the Fifth International Conference on Quantum Communication, Measurement and Computing (QCM&C-Y2K). This Conference is the fifth of a successful series hosted this time in Italy, was held in Capri, 3-7 July, 2000. The conference was attended by more than 200 participants from all over the world. There was also a high level of participation from graduate students, who greatly benefited from the opportunity to attend world-class conferences. The Conference Hall was hosted in La Residenza Hotel in Capri, where part of participants were housed, while others were housed in various cozy nearby hotels. All enjoyed the pleasant atmosphere offered by the island of Capri. There were 59 invited lectures given as oral presentations of 30 minutes and 94 poster papers. The major topics covered at the Conference were new experimental and theoretical results in quantum information. They were divided in five parts; i) Quantum Information and Communication, ii) Quantum Measurement, coherence, and Tomography, iii) Quantum Computing, iv) Cryptography, v) Entanglement and Teleportation. We were lucky in that almost all major experimental groups in the world working in this area were represented, as were the major theoreticians. There was very active audience participation. A number of graduate students and post-docs were able to present their contributions in four after dinner poster sessions.

The Quantum Divide

We describe, and provide the quantum mechanical explanation of, a number of well-chosen illustrative modern (mostly optical) experiments that highlight the strange world of the quantum.

The Physics of Quantum Mechanics

"First published by Cappella Archive in 2008."

A Concise Treatise on Quantum Mechanics in Phase Space

This is a text on quantum mechanics formulated simultaneously in terms of position and momentum, i.e. in phase space. It is written at an introductory level, drawing on the remarkable history of the subject for inspiration and motivation. Wigner functions — density matrices in a special Weyl representation — and star products are the cornerstones of the formalism. The resulting framework is a rich source of physical intuition. It has been used to describe transport in quantum optics, structure and dynamics in nuclear physics, chaos, and decoherence in quantum computing. It is also of importance in signal

processing and the mathematics of algebraic deformation. A remarkable aspect of its internal logic, pioneered by Groenewold and Moyal, has only emerged in the last quarter-century: it furnishes a third, alternative way to formulate and understand quantum mechanics, independent of the conventional Hilbert space or path integral approaches to the subject. In this logically complete and self-standing formulation, one need not choose sides between coordinate or momentum space variables. It works in full phase space, accommodating the uncertainty principle; and it offers unique insights into the classical limit of quantum theory. The observables in this formulation are c-number functions in phase space instead of operators, with the same interpretation as their classical counterparts, only composed together in novel algebraic ways using star products. This treatise provides an introductory overview and supplementary material suitable for an advanced undergraduate or a beginning graduate course in quantum mechanics.

Foundations Of Quantum Mechanics, The: Historical Analysis And Open Questions

This volume provides a sample of the present research on the foundations of quantum mechanics and related topics by collecting the papers of the Italian scholars who attended the conference entitled "The Foundations of Quantum Mechanics — Historical Analysis and Open Questions" (Lecce, 1998). The perspective of the book is interdisciplinary, and hence philosophical, historical and technical papers are gathered together so as to allow the reader to compare different viewpoints and cultural approaches. Most of the papers confront, directly or indirectly, the objectivity problem, taking into account the positions of the founders of QM or more recent developments. More specifically, the technical papers in the book pay special attention to the interpretation of the experiments on Bell's inequalities and to decoherence theory, but topics on unsharp QM, the consistent-history approach, quantum probability and alternative theories are also discussed. Furthermore, a number of historical and philosophical papers are devoted to Planck's, Weyl's and Pauli's thought, but topics such as quantum ontology, predictivity of quantum laws, etc., are treated.

Decoherence and the Quantum-to-classical Transition

The quantum measurement problem is one of the most fascinating and challenging topics in physics both theoretically and experimentally. It involves deep questions and the use of very sophisticated and elegant techniques. After analyzing the fundamental principles of quantum mechanics and of the Copenhagen interpretation, this book reviews the most important approaches to the measurement problem and rigorously reformulates the "collapse of the wave function" by measurement, as a dephasing process quantitatively characterized by an order parameter (called the decoherence parameter), according to the many-Hilbert-space approach to the problem. The book deals not only with the measurement processes (including imperfect measurements) but also with related interference and mesoscopic phenomena — by means of general arguments — of solvable models and of numerical simulations. The quantum Zeno effect and the issue of irreversibility are also discussed. Contents: General and Historical Survey Elements of Quantum Mechanics Critical Review of Measurement Theories The Many-Hilbert-Space Theory Solvable Detector Models Neutron Interferometry Numerical Simulations of Measurement Processes Quantum Zeno Effect Quantum Dephasing by Chaos Readership: Physicists interested in the foundations of quantum theory. keywords: Decoherence; Irreversibility; Quantum Zeno Effect; Quantum Measurements; Environment; Classical Properties; Mesoscopic Systems; Time Evolutions; Projection Postulate; Collapse of the Wave Function "... considerable background material is given, allowing the volume to serve general educational and reference purposes as well. I can recommend it to anyone wanting an orientation to quantum measurement theory and, in particular, wanting to focus on the Many Hilbert Space Theory." Foundations of Physics "The book may be useful both for students and experts." Zentralblatt MATH

Decoherence and Quantum Measurements

A clear and accessible presentation of quantum theory, suitable for researchers yet accessible to graduates.

Consistent Quantum Theory

Philosophy of physics title by highly regarded author, fully revised for this paperback edition.

Interpreting the Quantum World

This overview of the state of the art of research in an exciting field mainly emphasizes the development of a semiclassical formalism that allows one to incorporate the effect of dissipation and decoherence in a precise, yet tractable way into the quantum mechanics of classically chaotic systems.

Dissipative Quantum Chaos and Decoherence