On Physics And Philosophy By Bernard Despagnat

Was the first book to examine the exciting area of overlap between philosophy and quantum mechanics with chapters by leading experts from around the world.

In three volumes, a distinguished group of scholars from a variety of disciplines in the natural and social sciences, the humanities and the arts contribute essays in honor of Robert S. Cohen, on the occasion of his 70th birthday. The range of the essays, as well as their originality, and their critical and historical depth, pay tribute to the extraordinary scope of Professor Cohen's intellectual interests, as a scientist-philosopher and a humanist, and also to his engagement in the world of social and political practice. The essays presented in Physics, Philosophy, and the Scientific Community (Volume I of Essays in Honor of Robert S. Cohen) focus on philosophical and historical issues in contemporary physics: on the origins and conceptual foundations of quantum mechanics, on the reception and understanding of Bohr's and Einstein's work, on the emergence of quantum electrodynamics, and on some of the sharp philosophical and scientific issues that arise in current scientific practice (e.g. in superconductivity research). In addition, several essays deal with critical issues within the philosophy of science, both historical and contemporary: e.g. with Cartesian notions of mechanism in the philosophy of biology; with the language and logic of science - e.g. with new insights concerning the issue of a `physicalistic' language in the arguments of Neurath, Carnap and Wittgenstein; with the notion of `elementary logic'; and with rational and non-rational elements in the history of science. Two original contributions to the history of mathematics and some studies in the comparative sociology of science round off this outstanding collection.

This concise book introduces nonphysicists to the core philosophical issues surrounding the nature and structure of space and time, and is also an ideal resource for physicists interested in the conceptual foundations of space-time theory. Tim Maudlin's broad historical overview examines Aristotelian and Newtonian accounts of space and time, and traces how Galileo's conceptions of relativity and space-time led to Einstein's special and general theories of relativity. Maudlin explains special relativity with enough detail to solve concrete physical problems while presenting general relativity in more qualitative terms. Additional topics include the Twins Paradox, the physical aspects of the Lorentz-FitzGerald contraction, the constancy of the speed of light, time travel, the direction of time, and more. Introduces nonphysicists to the philosophical foundations of space-time theory Provides a broad historical overview, from Aristotle to Einstein Explains special relativity geometrically, emphasizing the intrinsic structure of space-time Covers the Twins Paradox, Galilean relativity, time travel, and more Requires only basic algebra and no formal knowledge of physics

This accessible and engaging book gives a broad overview of contemporary philosophy of physics.

Max Planck, the physicist who originated the quantum theory, turns in this volume to a definition of the philosophy of physics, analyzing the task of that science and scrutinizing its achievements in the light of its goals. He deals most exhaustively with a basic problem common to both physics and philosophy, the problem of causality in nature--not because he hopes to solve it at last, but because he feels he cannot avoid it: "Placed at birth in the middle of life, and in order to find our way through this live which is ours whether we want it or not, we try to introduce order into our experience." He discusses the characteristics of a "scientific"

idea, its origin and effect, and in closing makes some extremely shrewd remarks on the familiar subject of science versus faith.

Ruth Glasner presents an illuminating reappraisal of Averroes' physics. Glasner is the first scholar to base her interpretation on the full range of Averroes' writings, including texts that are extant only in Hebrew manuscripts and have not been hitherto studied. She reveals that Averroes changed his interpretation of the basic notions of physics - the structure of corporeal reality and the definition of motion - more than once. After many hesitations he offers a bold new interpretation of physics which Glasner calls 'Aristotelian atomism'. Ideas that are usually ascribed to scholastic scholars, and others that were traced back to Averroes but only in a very general form, are shown not only to have originated with him, but to have been fully developed by him into a comprehensive and systematic physical system. Unlike earlier Greek or Muslim atomistic systems, Averroes' Aristotelian atomism endeavours to be fully scientific, by Aristotelian standards, and still to provide a basis for an indeterministic natural philosophy. Commonly known as 'the commentator' and usually considered to be a faithful follower of Aristotle, Averroes is revealed in his commentaries on the Physics to be an original and sophisticated philosopher.

From the very beginning it was realised that quantum physics involves radically new interpretative and epistemological consequences. While hitherto there has been no satisfactory philosophical analysis of these consequences, recent years have witnessed the accomplishment of many experiments to test the foundations of quantum physics, opening up vistas to a completely novel technology: quantum technology. The contributions in the present volume review the interpretative situation, analyze recent fundamental experiments, and

discuss the implications of possible future technological applications. Readership: Analytic philosophers (logical empiricists), scientists (especially physicists), historians of logic, mathematics and physics, philosophers of science, and advanced students and researchers in these fields. Can be used for seminars on theoretical and experimental physics and philosophy of science, and as supplementary reading at advanced undergraduate and graduate levels.
This book explores the work of Bernhard Riemann and its impact on mathematics, philosophy and physics. It features contributions from a range of fields, historical expositions, and selected research articles that were motivated by Riemann's ideas and demonstrate their timelessness. The editors are convinced of the tremendous value of going into Riemann's work in depth, investigating his original ideas, integrating them into a broader perspective, and establishing ties with modern science and philosophy. Accordingly, the contributors to this volume are mathematicians, physicists, philosophers and historians of science. The book offers a unique resource for students and researchers in the fields of mathematics, physics and philosophy, historians of science, and more generally to a wide range of readers interested in the history of ideas.
This book is a social-intellectual biography of the Belgian physicist Léon Rosenfeld (1904–1974). Rosenfeld was at the center of modern theoretical physics and he became the Danish physicist Niels Bohr's right-hand man. Rosenfeld was a perceptive, polyglot cosmopolitan, whose life crossed those of many important people in many countries. He was also a strong integrated personality capable of performing exotic calculations at one moment, while

disentangling subtle philosophical questions or intervening in a political discussion the next — all at the highest level. This book aims at a broad audience interested in contextual history of twentieth century physics. No specialized knowledge of physics is required to read it.

This book offers a collection of texts by Carl Friedrich von Weizsaecker (1912-2007), a major German universal scientist who was a pioneer in physics, philosophy, religion, politics and peace research. He started as an assistant to the physicist, Werner Heisenberg, held professorships in theoretical physics (Strasbourg), physics (Goettingen) and philosophy (Hamburg) and was a co-director (with Juergen Habermas) of a Max Planck Institute for Research into living conditions in a world of science and technology in Starnberg. This unique anthology spans the wide scope of his innovative thinking including his philosophical self-reflections, on peace, nuclear strategy, security and defensive defense, on nuclear energy, on the conditions of freedom, on his experience of religion, including poetry from his early youth. Most texts appear in English for the first time and are selected for use in seminars on physics, philosophy, religion, politics and peace research.

To celebrate Adolf Griinbaum's sixtieth birthday by offering him this bouquet of essays written for this purpose was the happy task of an autonomous Editorial

Committee: Wesley C. Salmon, Nicholas Rescher, Larry Laudan, Carl G. Hempel, and Robert S. Cohen. To present the book within the Boston Studies in the Philosophy of Science was altogether fitting and natural, for Griinbaum has' been friend and supporter of philosophy of science at Boston University for twenty-five years, and unofficial godfather to the Boston Colloquium. To regret that we could not include contributions from all his well-wishers, critical admirers and admiring critics, is only to regret that we did not have an encyclopedic space at the committee's disposal. But we, and all involved in this book, speak for all the others in the philo sophical, scientific, and personal worlds of Adolf Griinbaum in greeting him on May 15, 1983, with our wishes for his health, his scholarship, his happiness. Our gratitude is due to Carolyn Fawcett for her care and accuracy in editing this book, and for the preparation of the Index; and to Elizabeth McMunn for her help again and again, especially in preparation of the Bibliography of the Published Writings of Adolf Griinbaum; and to Thelma Griinbaum for encouraging, planning, and cheering. Boston University R.S.C. Center for the Philosophy and History of Science M.W.W.

Through both an historical and philosophical analysis of the concept of possibility, we show how including both potentiality and actuality as part of the real is both compatible with experience and contributes to solving key problems of

fundamental process and emergence. The book is organized into four main sections that incorporate our routes to potentiality: (1) potentiality in modern science [history and philosophy; quantum physics and complexity]; (2) Relational Realism [ontological interpretation of quantum physics; philosophy and logic]; (3) Process Physics [ontological interpretation of relativity theory; physics and philosophy]; (4) on speculative philosophy and physics [limitations and approximations; process philosophy]. We conclude that certain fundamental problems in modern physics require complementary analyses of certain philosophical and metaphysical issues, and that such scholarship reveals intrinsic features and limits of determinism, potentiality and emergence that enable, among others, important progress on the quantum theory of measurement problem and new understandings of emergence.

Dart nun, bei den Heiden, bei diesen wirkiich vorbild haften Menschen erscheint uns das Interesse fiir die Person, fiir den Namen, fiir Gesicht und Gebiirde er iaubt und natiiriich. H. Hesse, "Das Giasperienspiel" In 1979 the world celebrates the centenary of Albert Einstein's birth. This offers an occasion to review his life and his scientific work in retrospect, to survey his importance for our time, and to look forward to future years of scientific research. Undoubtedly, Einstein was one of the key-figures in the intellectual history of our century. He influenced physics

and philosophy, as well as politics. The creation of general relativity is one of the greatest scientific achievements of our time, as well as the apex of Einsteins's scientific work. Its full implications for the other fields of physics have become clear only in recent years. The technological possibilities offered by space research have enabled mankind to survey the universe for the first time unhindered by the earth's atmosphere. This has led to new discoveries and has shown that even some of the far-reaching conclusions derived from Einstein's theory are borne out by observation. General relativity, which has for a long time been viewed as an outsider among physical theories because of its mathematical difficulty and complexity, is considered now to be the prototype of theories in the fields of elementary particle physics and even solid state physics.

This volume defends a novel approach to the philosophy of physics: it is the first book devoted to a comparative study of probability, causality, and propensity, and their various interrelations, within the context of contemporary physics -- particularly quantum and statistical physics. The philosophical debates and distinctions are firmly grounded upon examples from actual physics, thus exemplifying a robustly empiricist approach. The essays, by both prominent scholars in the field and promising young researchers, constitute a pioneer effort in bringing out the connections between probabilistic, causal and dispositional

aspects of the quantum domain. The book will appeal to specialists in philosophy and foundations of physics, philosophy of science in general, metaphysics, ontology of physics theories, and philosophy of probability.

Exploring more than seventy-five well-known paradoxes in mathematics, philosophy, physics, and the social sciences showing how reason and logic can dispel the illusion of contradiction. Paradox is a sophisticated kind of magic trick. A magician's purpose is to create the appearance of impossibility, to pull a rabbit from an empty hat. Yet paradox doesn't require tangibles, like rabbits or hats. Paradox works in the abstract, with words and concepts and symbols, to create the illusion of contradiction. There are no contradictions in reality, but there can appear to be. In Sleight of Mind, Matt Cook and a few collaborators dive deeply into more than 75 paradoxes in mathematics, physics, philosophy, and the social sciences. As each paradox is discussed and resolved, Cook helps readers discover the meaning of knowledge and the proper formation of concepts--and how reason can dispel the illusion of contradiction.

Does the future exist already? What is space? Are time machines physically possible? What is quantum mechanical reality like? Are there many universes? Is there a ‘true’ geometry of the universe? Why does there appear to be an arrow of time? Do humans play a special role in the world? In this unique introductory

book, Dean Rickles guides the reader through these and other core questions that keep philosophers of physics up at night. He discusses the three pillars of modern physics (quantum mechanics, statistical mechanics, and the theories of relativity), in addition to more cutting-edge themes such as econophysics, quantum gravity, quantum computers, and gauge theories. The book's approach is based on the idea that philosophy of physics is a kind of 'interpretation game' in which we try to map physical theories onto our world. But the rules of this game often lead to a multiplicity of possible victors: rarely do we encounter a simple answer. The Philosophy of Physics offers a highly accessible introduction to the latest developments in this exciting field. Written in a lively style, with many visual examples, it will appeal to beginner-level students in both physics and philosophy.

Highlighting main issues and controversies, this book brings together current philosophical discussions of symmetry in physics to provide an introduction to the subject for physicists and philosophers. The contributors cover all the fundamental symmetries of modern physics, such as CPT and permutation symmetry, as well as discussing symmetry-breaking and general interpretational issues. Classic texts are followed by new review articles and shorter commentaries for each topic. Suitable for courses on the foundations of physics, philosophy of physics and philosophy of science, the volume is a valuable reference for students and researchers.

An investigation into Aristotle's metaphysics of nature as expounded in the Physics. It focuses in particular his conception of change, a concept which is shown to possess a unique metaphysical structure, with implications that should engage the attention of contemporary analysis. First published in hardback in 1982, the book is now available for the first time in paperback. 'A powerful and appealing explanatory scheme which succeedson the whole in drawing together a great many seemingly disparate elements in the Physics into a neat unitary stucture.' Canadian Philosophical Review

In this small book, theoretical physicist Gerard 't Hooft (Nobel prize 1999), philosopher Emanuele Severino (Lincei Academician), and theologian Piero Coda (Pontifical Lateran University) confront one another on a topic that lies at the roots of quantum mechanics and at the origin of Western thought: Determinism and Free Will. "God does not play dice" said Einstein, a tenacious determinist. Quantum Mechanics and its clash with General Relativity have reanimated ancient dilemmas about chance and necessity: Is Nature deterministic? Is Man free? The “free-will theorem” by Conway and Kochen, and the deterministic interpretation of quantum mechanics proposed by 't Hooft, revive such philosophical questions in modern Physics. Is Becoming real? Is the Elementary Event a product of the Case? The cyclopean clash between Heraclitus and Parmenides has entered a new episode, as evidenced by the essays in this volume.

On Physics and PhilosophyPrinceton University Press

Heisenberg explains the central ideas of the quantum revolution, and his uncertainty principle. He reveals how words can lose their meaning in the world of relativity and quantum physics, with philosophical implications for the nature of reality.

Jammer then devotes a chapter to the distinction between inertial and gravitational mass and to the various versions of the so-called equivalance principle with which Newton initiated his Principia but which also became the starting point of Einstein's general relativity, which supersedes Newtonian physics. The book concludes with a presentation of recently proposed global and local dynamical theories of the origin and nature of mass."--Jacket.

Niel Bohr's life spans times of revolutionary change, in science and in its impact on society. Along with Einstein, Bohr can be considered as this century's major driving force behind the new mathematical and philosophical descriptions of the atom, the nucleus, and all that resulted fromthem. Abraham Pais, the acclaimed biographer of Einstein, traces Bohr's progress from his well-to-do origins in late nineteenth-century Denmark to his central position in the world political scene, particularly because of the development of nuclear weapons during the Second World War. Bohr was one of the great enabling figures in modern science, not only because of his direct involvement in the application of quantum theory to our understanding of the structure of the atom, but also because he gathered around him in Copenhagen most of the brightest young minds of the period.Figures like Pauli, Dirac, and Heisenberg, all required Bohr's imprimatur, to varying degrees, before they considered their work ready for widespread consumption. He had a complex relationship with Einstein, both in terms of their fundamental disagreements and their profound though distant mutualrespect. He owed an important debt to his mentor, Rutherford - a man who came to serve, in many ways, as his role model. Pais describes the state of physics before Bohr and considers his legacy, both theoretical and practical. But more than this, he captures the essence of Bohr, the intensely private family man who, despite appalling personal tragedy, became one of the best-loved cultural figures of

recenttimes.

Symmetry considerations dominate modern fundamental physics, both in quantum theory and in relativity. This book presents a collection of philosophy-on-physics papers, highlighting the main issues and controversies, and providing an entry into the subject for both physicists and philosophers. It covers topical issues such as the significance of gauge symmetry, particle identity in quantum theory, how to make sense of parity violation, the role of symmetry-breaking, the empirical status of symmetry principles, and so forth, along with more traditional problems in the philosophy of science. These include the status of the laws of nature, the relationships between mathematics, physical theory, and the world, and the extent to which mathematics dictates physics. A valuable reference for students and researchers, it will also be of interest to those studying the foundations of physics, philosophy of physics and philosophy of science.

This Oxford Handbook provides an overview of many of the topics that currently engage philosophers of physics. It surveys new issues and the problems that have become a focus of attention in recent years. It also provides up-to-date discussions of the still very important problems that dominated the field in the past. In the late 20th Century, the philosophy of physics was largely focused on orthodox Quantum Mechanics and Relativity Theory. The measurement problem, the question of the possibility of hidden variables, and the nature of quantum locality dominated the literature on the quantum mechanics, whereas questions about relationalism vs. substantivalism, and issues about underdetermination of theories dominated the

literature on spacetime. These issues still receive considerable attention from philosophers, but many have shifted their attentions to other questions related to quantum mechanics and to spacetime theories. Quantum field theory has become a major focus, particularly from the point of view of algebraic foundations. Concurrent with these trends, there has been a focus on understanding gauge invariance and symmetries. The philosophy of physics has evolved even further in recent years with attention being paid to theories that, for the most part, were largely ignored in the past. For example, the relationship between thermodynamics and statistical mechanics—-once thought to be a paradigm instance of unproblematic theory reduction—-is now a hotly debated topic. The implicit, and sometimes explicit, reductionist methodology of both philosophers and physicists has been severely criticized and attention has now turned to the explanatory and descriptive roles of "non-fundamental," phenomenological theories. This shift of attention includes "old" theories such as classical mechanics, once deemed to be of little philosophical interest. Furthermore, some philosophers have become more interested in "less fundamental" contemporary physics such as condensed matter theory. Questions abound with implications for the nature of models, idealizations, and explanation in physics. This Handbook showcases all these aspects of this complex and dynamic discipline. Quantum theory is one the most important and successful theories of modern physical science. It has been estimated that its principles form the basis for about 30 per cent of

the world's manufacturing economy. This is all the more remarkable because quantum theory is a theory that nobody understands. The meaning of Quantum Theory introduces science students to the theory's fundamental conceptual and philosophical problems, and the basis of its non-understandability. It does this with the barest minimum of jargon and very little mathematics in the main text. Readers wishing to delve more deeply into the theory's mathematical subtleties can do so in an extended series of appendices. The book brings the reader up to date with the results of new experimental tests of quantum weirdness and reviews the latest thinking on alternative interpretations, the frontiers of quantum cosmology, quantum gravity and potential application of this weirdness in computing, cryptography and teleportation.

Like Bohr, Einstein and Heisenberg, Wolfgang Pauli was not only a Nobel laureate and one of the creators of modern physics, but also an eminent philosopher of modern science. This is the first book in English to include all his famous articles on physics and epistemology. They were actually translated during Pauli's lifetime by R. Schlapp and are now edited and annotated by Pauli's former assistant Ch. Enz. Pauli writes about the philosophical significance of complementarity, about space,time and causality, symmetry and the exclusion principle, but also about therole of the unconscious in modern science. His famous article on Kepler is included as well as many historical essays on Bohr, Ehrenfest,and Einstein as well as on the influence of the unconscious on scientific theories. The book addresses not only physicists, philosophers and

historians of science, but also the general public.
Scheibe is one of the most important philosophers of science in Germany. He has written extensively on all the problems that confront the philosophy of physics: rationalism vs. empiricism; reductionism; the foundations of quantum mechanics; space-time, and much more. Since little of his work has been translated into English, he is not yet well known internationally. However, this collection of some 40 of his papers will remedy this unfortunate situation.
"On Physics and Philosophy is an accessible, mathematics-free reflection on the philosophical meaning of the quantum revolution, by one of the world's leading authorities on the subject. D'Espagnat presents an objective account of the main guiding principles of contemporary physics - in particular, quantum mechanics - followed by a look at just what consequences these should imply for philosophical thinking."--
In recent times a new dialogue has begun between the natural sciences and the humanities. This is particularly true of physics and philosophy, whose sphere of mutual interest expanded significantly with the advent of quantum mechanics. Among other topics, the discussion covers the evolution of theories, the role of mathematics in the physical sciences, the perception and cognition of nature and definitions of space and time. In contrast to the custom of the last two centuries, mathematics - the language of physics - is once again finding a respected place in the discourse of philosophers. The

interdisciplinary communication between philosophers, mathematicians and physicists will be given new impetus by the thoughtful and wide-ranging contributions to this book. Thomas Brody had one of the most powerful and wide-ranging intellects of his generation. Although primarily a physicist who worked on statistical prob lems in nuclear physics, on probability theory and on computational physics he had an extensive knowledge of the philosophy of science and of philosophy, and was fluent in many languages. He is well-known among physicists for the Brody-Moshinsky transformation but his extensive work on probability and on the philosophy of science remained almost unknown. This was because the originality of his ideas entailed many lengthy battles with uncomprehending referees, and he frequently published in Mexican journals of limited circula tion. In addition, his strongly critical spirit inhibited his willingness to publish his ideas. He was always most concerned by the very unsatisfactory situation in the philosophy of physics, that is largely due to the generally poor knowledge that physicists and philosophers have of each other's disciplines. Philosophers of science write at length about physics without any detailed first-hand knowl edge of how research is actually carried out. Physicists, for their part, often implicitly assume naive or erroneous philosophical ideas, and this often hinders their scientific work, besides spreading further confusion if they try to give an account of what they are doing.

The book offers an entry-level introduction to the more important points of intersection

of Physics and Philosophy. Until the second half of the twentieth century, physics and philosophy enjoyed a harmonious and mutually beneficial relationship. The leading theorists of the period - such as Einstein, Heisenberg, Bohr, Pauli, and Schrodinger - had a keen interest in philosophy, with some (for example, Max Born) viewing the two areas as coextensive. The latter part of the century saw the development of a rift between the disciplines which has progressively deepened. The current situation is one of indifference towards philosophy on the part of the overwhelming majority of physicists and outright hostility from others (including Steven Weinberg, Leonard Susskind, and the late Stephen Hawking and Richard Feynman) who celebrate the disjunction and promote a vision of science, and physics in particular, as a universal and unrivalled explanatory scheme. This book aims to challenge this stance.

This historic book may have numerous typos and missing text. Purchasers can usually download a free scanned copy of the original book (without typos) from the publisher. Not indexed. Not illustrated. 1802 edition. Excerpt: ... LETTERS ON DIFFERENT SUBJECTS IN PHYSICS AND PHILOSOPHY. m LETTER I. Of Magnitude, or Extension. Madam, THE hope of having the honour to communicate, in person, to your Highness, my lessons in Geometry, becoming more and more distant, which is a very sensible mortisication to me, I feel myself impelled to supply personal instruction by writing, as far as the nature of the

objects can permit. I begin my attempt, by assisting you to form a just idea of magnitude; producing, as examples, the smallest as well as the greatest extensions of matter actually discoverable in the system of the Universe. And sirst, it is necessary to six on some one determinate division of measure, obvious to the fenses, and of which we have an exact idea, that of a foot, for instance. The quantity of this, once established, and rendered familiar to the eye, will enable us to form the idea of every other quantity, as to length, great Vol. I. B or or small; the former, by ascertaining how many feet it contains; and the latter, by ascertaining what part of a foot measures it. For, having the idea of a foot, we have that also of it's half, of it's quarter, of it's twelfth part, denominated an inch, of it's hundredth, and of it's thoufandth part; which is so small as almost to escape the sight. But it is to be remarked; that there are animals, not of greater extension than this last subdivision of a foot, which, however, are composed of members through which the blood circulates, and which again contain other animals, as diminutive compared to them, as they are compared to us. Hence it may be concluded that animals exist, whose smallness eludes the imagination; and that these again are divisible into parts inconceivably smaller. Thus, for example, though the ten...

This volume has 41 chapters written to honor the 100th birthday of Mario Bunge.

It celebrates the work of this influential Argentine/Canadian physicist and philosopher. Contributions show the value of Bunge's science-informed philosophy and his systematic approach to philosophical problems. The chapters explore the exceptionally wide spectrum of Bunge's contributions to: metaphysics, methodology and philosophy of science, philosophy of mathematics, philosophy of physics, philosophy of psychology, philosophy of social science, philosophy of biology, philosophy of technology, moral philosophy, social and political philosophy, medical philosophy, and education. The contributors include scholars from 16 countries. Bunge combines ontological realism with epistemological fallibilism. He believes that science provides the best and most warranted knowledge of the natural and social world, and that such knowledge is the only sound basis for moral decision making and social and political reform. Bunge argues for the unity of knowledge. In his eyes, science and philosophy constitute a fruitful and necessary partnership. Readers will discover the wisdom of this approach and will gain insight into the utility of cross-disciplinary scholarship. This anthology will appeal to researchers, students, and teachers in philosophy of science, social science, and liberal education programmes. 1. Introduction Section I. An Academic Vocation (3 chapters) Section II. Philosophy (12 chapters) Section III. Physics and Philosophy of

Physics (4 chapters) Section IV. Cognitive Science and Philosophy of Mind (2 chapters) Section V. Sociology and Social Theory (4 chapters) Section VI. Ethics and Political Philosophy (3 chapters) Section VII. Biology and Philosophy of Biology (3 chapters) Section VIII. Mathematics (3 chapters) Section IX. Education (2 chapters) Section X. Varia (3 chapters) Section XI. Bibliography

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.

This book offers a new perspective on Niels Bohr's interpretation of quantum mechanics as complementarity, and on the relationships between physics and philosophy in Bohr's work. The importance of quantum field theory for Bohr's thinking has not been adequately addressed in the literature on Bohr. This book provides clarification of Bohr's writings (which usually pose problems of reading), and an analysis of the role of quantum field theory in Bohr's thinking.