

D. Greenberger · K. Hentschel  
F. Weinert *Editors*

# Compendium of Quantum Physics

Concepts, Experiments, History and Philosophy



Springer

# Compendium Of Quantum Physics Concepts Experiments History And Philosophy

**Didier Musso**



## **Compendium Of Quantum Physics Concepts Experiments History And Philosophy:**

*Compendium of Quantum Physics* Daniel Greenberger,Klaus Hentschel,Friedel Weinert,2009-07-25 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

*Compendium of Quantum Physics* Daniel Greenberger,Klaus Hentschel,Friedel Weinert,2009-08-12 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

*Compendium of Quantum Physics* Daniel Greenberger,Klaus Hentschel,Friedel Weinert,2010-11-16 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 Mechanics Between Ontology and Epistemology** Florian J. Boge,2018-10-24 This book explores the prospects of rivaling ontological and epistemic interpretations of quantum mechanics QM It concludes with a suggestion for how to interpret QM from an epistemological point of view and with a Kantian touch It thus refines extends and combines existing approaches in a similar direction The author first looks at current hotly debated ontological interpretations These include hidden variables approaches Bohmian mechanics collapse interpretations and the many worlds interpretation He demonstrates why none of these ontological interpretations can claim to be the clear winner amongst its rivals Next coverage explores the possibility of interpreting QM in terms of knowledge but without the assumption of hidden variables It examines QBism as well as Healey's pragmatist view The author finds both interpretations or programs appealing but still wanting in certain respects As a result he then goes on to advance a genuine proposal as to how to interpret QM from the perspective of an internal realism in the sense of Putnam and Kant The book also includes two philosophical interludes One details the notions of probability and realism The other highlights the connections between the notions of locality causality and reality in the context of violations of Bell type inequalities

**Identity and Indiscernibility in Quantum Mechanics** Tomasz Bigaj,2022-01-03 This book analyzes metaphysical consequences of the quantum theory of many particles with respect to the fundamental notions of identity individuality and discernibility The main focus is on the proper interpretation of the quantum formalism in relation to the role of permutation invariance and the adequate representation of the properties of individual subsystems Two main approaches to the issue of the individuation of quantum particles are distinguished and thoroughly discussed These

approaches differ radically with respect to their metaphysical consequences while one of them implies the complete indiscernibility of quantum particles of the same kind the other one restores the possibility of discerning individual particles by their properties We connect the problem of quantum individuation and discernibility with an analysis of the concept of quantum entanglement and we also discuss identity over time and in counterfactual scenarios **Advanced**

**Nanoelectronics** Razali Ismail, Mohammad Taghi Ahmadi, Sohail Anwar, 2018-09-03 While theories based on classical physics have been very successful in helping experimentalists design microelectronic devices new approaches based on quantum mechanics are required to accurately model nanoscale transistors and to predict their characteristics even before they are fabricated Advanced Nanoelectronics provides research information on advanced nanoelectronics concepts with a focus on modeling and simulation Featuring contributions by researchers actively engaged in nanoelectronics research it develops and applies analytical formulations to investigate nanoscale devices The book begins by introducing the basic ideas related to quantum theory that are needed to better understand nanoscale structures found in nanoelectronics including graphenes carbon nanotubes and quantum wells dots and wires It goes on to highlight some of the key concepts required to understand nanotransistors These concepts are then applied to the carbon nanotube field effect transistor CNTFET Several chapters cover graphene an unzipped form of CNT that is the recently discovered allotrope of carbon that has gained a tremendous amount of scientific and technological interest The book discusses the development of the graphene nanoribbon field effect transistor GNRFET and its use as a possible replacement to overcome the CNT chirality challenge It also examines silicon nanowire SiNW as a new candidate for achieving the downscaling of devices The text describes the modeling and fabrication of SiNW including a new top down fabrication technique Strained technology which changes the properties of device materials rather than changing the device geometry is also discussed The book ends with a look at the technical and economic challenges that face the commercialization of nanoelectronics and what universities industries and government can do to lower the barriers A useful resource for professionals researchers and scientists this work brings together state of the art technical and scientific information on important topics in advanced nanoelectronics *The Meaning of the Wave Function* Shan Gao, 2017-03-16 At the heart of quantum mechanics lies the wave function a powerful but mysterious mathematical object which has been a hot topic of debate from its earliest stages Covering much of the recent debate and providing a comprehensive and critical review of competing approaches this ambitious text provides new decisive proof of the reality of the wave function Aiming to make sense of the wave function in quantum mechanics and to find the ontological content of the theory this book explores new ontological interpretations of the wave function in terms of random discontinuous motion of particles Finally the book investigates whether the suggested quantum ontology is complete in solving the measurement problem and if it should be revised in the relativistic domain A timely addition to the literature on the foundations of quantum mechanics this book is of value to students and researchers with an interest in the philosophy of

physics     **Photons** Klaus Hentschel, 2018-08-16 This book focuses on the gradual formation of the concept of light quanta or photons as they have usually been called in English since 1926 The great number of synonyms that have been used by physicists to denote this concept indicates that there are many different mental models of what light quanta are simply finite quantized packages of energy or bullets of light Atoms of light or molecules of light Light corpuscles or quantized waves Singularities of the field or spatially extended structures able to interfere Photons in G N Lewis's sense or as defined by QED i.e. virtual exchange particles transmitting the electromagnetic force The term light quantum made its first appearance in Albert Einstein's 1905 paper on a heuristic point of view to cope with the photoelectric effect and other forms of interaction of light and matter but the mental model associated with it has a rich history both before and after 1905 Some of its semantic layers go as far back as Newton and Kepler some are only fully expressed several decades later while others initially increased in importance then diminished and finally vanished In conjunction with these various terms several mental models of light quanta were developed six of them are explored more closely in this book It discusses two historiographic approaches to the problem of concept formation a) the author's own model of conceptual development as a series of semantic accretions and b) Mark Turner's model of conceptual blending Both of these models are shown to be useful and should be explored further This is the first historiographically sophisticated history of the fully fledged concept and all of its twelve semantic layers It systematically combines the history of science with the history of terms and a philosophically inspired history of ideas in conjunction with insights from cognitive science     **Choice**, 2009     **Copernicus, Darwin, and Freud** Friedel Weinert, 2008-11-10 Copernicus Darwin Freud Why is Darwin less the Copernicus than the Kepler of biology What are good criteria for scientific revolutions Shift of perspective Replacement of paradigms Reweaving conceptual networks Explanatory gain Restructuring the constraint space Threatening worldviews Whoever wants to learn more about these and many other important issues of history and philosophy of science will have to read on Klaus Hentschel University of Stuttgart Friedel Weinert has done a rare and excellent thing in this book he has shown how the philosophy of science is intimately connected with the development of physical biological and social sciences and that argument concerning the foundations of these sciences cannot be advanced without reference to philosophy It is a clearly written and engaging book that will be informative for teachers students and the lay public alike Robert Nola University of Auckland     □□□□, 2012     **Physics Briefs**, 1993     *Paperbound Books in Print*, 1983     **The Cumulative Book Index**, 1959 A world list of books in the English language     Whitaker's Five-year Cumulative Book List, 1968     **Scientific and Technical Books in Print**, 1972

**The Quantum Theory—Origins and Ideas** Carl S. Helrich, 2021-08-02 This book offers a fresh perspective on some of the central experimental and theoretical works that laid the foundations for today's quantum mechanics It traces the theoretical and mathematical development of the hypotheses that put forward to explain puzzling experimental results it also examines their interconnections and how they together evolved into modern quantum theory Particular attention is paid to J J

Thomson's atomic modeling and experiments at the Cavendish Laboratory Max Planck's struggle to explain the experimental results of Heinrich Rubens and Ferdinand Kurlbaum as well as the path leading from Louis de Broglie's ideas to the wave theory of Erwin Schrödinger Combining his experience in teaching quantum mechanics with his interest in the historical roots of the subject the author has created a valuable resource for understanding quantum physics through its history and a book that is appreciated both by working physicists and historians

**Books in Print** ,1991     *Subject Guide to Books in Print* ,1991

**Current Index to Journals in Education** ,1969

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dominant over another. The heterozygous phenotype ... 11-4 Meiosis (Answers to Exploring Mendelian Genetics ... Genes for different traits can segregate independently during the formation of gametes. dominant recessive false. 10. codominance multiple ... 11-3 Exploring Mendelian Genetics Flashcards the inheritance of biological characteristics is determined by genes that are passed from parents to their offspring in organisms that reproduce sexually Exploring Mendelian Genetics Exploring Mendelian Genetics. Section 11-3. Independent Assortment. In a two-factor cross, Mendel followed \_\_\_\_\_ different genes as they passed from one ... 11-3 Exploring Mendelian Genetics Mendel crossed the heterozygous F1 plants (RrYy) with each other to determine if the alleles would segregate from each other in the F2 generation.  $RrYy \times RrYy$ . 11-3 Exploring Mendelian Genetics What is the difference between incomplete dominance and codominance? • Incomplete dominance = heterozygous phenotype is somewhere in between the 2. Section 11-3 Exploring Mendelian Genetics Section 11-3 Exploring Mendelian Genetics. (pages 270-274). Key Concepts. • What is the principle of independent assortment? • What inheritance patterns exist ... Answers For CH 11, 13, 14 Reading Handout Section 11—3 Exploring Mendelian Genetics 9. What was the ratio of Mendel's F2 generation for the two-factor cross? (pages 270-274) 10. Complete the Punnett ... 11-3 Exploring Mendelian Genetics Aug 14, 2014 — 11-3 Exploring Mendelian Genetics. Key Concepts: What is the principle of independent assortment? What inheritance patterns exist aside from ... Answers to All Questions and Problems Aug 14, 2015 — CHAPTER 1. 1.1 In a few sentences, what were Mendel's key ideas about inheritance? ANS: Mendel postulated transmissible factors—genes—to.