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Solitons in Field Theory and Nonlinear Analysis - Yisong Yang 2013-03-14
There are two approaches in the study of differential equations of field theory. The first, finding closed-form solutions, works only for a narrow category of problems. Written by a well-known active researcher, this book focuses on the second, which is to investigate solutions using tools from modern nonlinear analysis.
The Foundation of Reality -

David Glick 2020-04-29
Are space and time fundamental features of our world or might they emerge from something else? The Foundation of Reality brings together metaphysicians and philosophers of physics working on space, time, and fundamentality to address this timely question. Recent developments in the interpretation of quantum mechanics and the understanding of certain approaches to quantum gravity have led philosophers of physics to propose that space and time might be emergent rather than fundamental. But such discussions are often conducted without engagement with those working on fundamentality and related issues in contemporary metaphysics. This book aims to correct this oversight. The diverse contributions to this volume address topics including the nature of fundamentality, the relation of space and time to quantum entanglement, and space and time in theories of quantum gravity. Only through consideration of a range of different approaches to the topic can we hope to get clear on the status of space and time in our contemporary understanding of physical reality.

Shifting Standards - Allan Franklin 2013-12-20
In Shifting Standards, Allan Franklin provides an overview of notable experiments in particle physics. Using papers published in Physical Review, the journal of the American Physical Society, as his basis, Franklin details the experiments themselves, their data collection, the events witnessed, and the interpretation of results. From these papers, he distills the dramatic changes to particle physics experimentation from 1894 through 2009. Franklin develops a framework for his analysis, viewing each example according to exclusion and selection of data; possible experimenter bias; details of the experimental apparatus; size of the data set, apparatus, and number of authors; rates of

data taking along with analysis and reduction; distinction between ideal and actual experiments; historical accounts of previous experiments; and personal comments and style. From Millikan's tabletop oil-drop experiment to the Compact Muon Solenoid apparatus measuring approximately 4,000 cubic meters (not including accelerators) and employing over 2,000 authors, Franklin's study follows the decade-by-decade evolution of scale and standards in particle physics experimentation. As he shows, where once there were only one or two collaborators, now it literally takes a village. Similar changes are seen in data collection: in 1909 Millikan's data set took 175 oil drops, of which he used 23 to determine the value of e, the charge of the electron; in contrast, the 1988–1992 E791 experiment using the Collider Detector at Fermilab, investigating the hadroproduction of charm quarks, recorded 20 billion events. As we also see, data collection took a quantum leap in the 1950s with the use of computers. Events are now recorded at rates as of a few hundred per second, and analysis rates have progressed similarly. Employing his epistemology of experimentation, Franklin deconstructs each example to view the arguments offered and the correctness of the results. Overall, he finds that despite the metamorphosis of the process, the role of experimentation has remained remarkably consistent through the years: to test theories and provide factual basis for scientific knowledge, to encourage new theories, and to reveal new phenomenon.

Physics Meets Philosophy at the Planck Scale - Craig Callender 2001-01-29

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.

Against the Philosophical Tide - Danny Frederick 2020-06-28

This is a collection of nineteen

essays in the tradition of critical rationalism (as advocated by Karl Popper). All but one of the essays is previously unpublished and the one previously published paper has undergone significant revisions. The first four essays tackle topics in the philosophy of science, the first being an exposition of Popper's views, the others discussing falsifiability, truth, the aim of science, and ceteris-paribus law-statements. Five essays follow concerned with Reason, reasoning and reasons, in which faulty conceptions of theoretical and practical reason are criticised, the nature and uses of argument are discussed, and the rationality of debate, agreement and disagreement are explained. Next, there are two papers on economics, one of which is a substantial critique of the so-called subjective theory of value, the other a brief discussion of entrepreneurial insight. The last section of the book contains a miscellany of eight critical essays in which some errors of contemporary philosophers are exposed regarding issues including the interpretation of Popper's work, the Gettier problem, no-platforming, open-mindedness, homosexual equality, tolerance, philosophical heuristics and the conduct of debate.

The LaTeX Companion - Frank Mittelbach 2004

Provides information on the tools and techniques to transform LaTeX sources into Web formats for electronic publication and to transform Web sources into LaTeX documents for optimal printing.

D-Branes - Clifford V. Johnson 2006-11-02

D-branes represent a key theoretical tool in the understanding of strongly coupled superstring theory and M-theory. They have led to many striking discoveries, including the precise microphysics underlying the thermodynamic behaviour of certain black holes, and remarkable holographic dualities between large-N gauge theories and gravity.

This book provides a self-contained introduction to the technology of D-branes, presenting the recent developments and ideas in a pedagogical manner. It is suitable for use as a textbook in graduate courses on modern string theory and theoretical particle physics, and will also be an indispensable reference for seasoned practitioners. The introductory material is developed by first starting with the main features of string theory needed to get rapidly to grips with D-branes, uncovering further aspects while actually working with D-branes. Many advanced applications are covered, with discussions of open problems which could form the basis for other avenues of research.

Some Properties of the Harmonic Quadrilateral - Ion Patrascu

In this article, we review some properties of the harmonic quadrilateral related to triangle simedians and to Apollonius's Circle.

Chthon - Piers Anthony 2014-07-01

A Nebula and Hugo Award Finalist: The first novel by the New York Times–bestselling author of the Xanth series. Chthon was Piers Anthony's first published novel in 1967, written over the course of seven years. He started it when he was in the US Army, so it has a long prison sequence that is reminiscent of that experience, being dark and grim. It features Aton Five, a space man who commits the crime of falling in love with the dangerous, alluring Minionette and is therefore condemned to death in the subterranean prison of Chthon. It uses flashbacks to show how he came to know the Minionette, and flash-forwards to show how he dealt with her after his escape from prison. The author regards this as perhaps the most intricately structured novel the science fantasy genre has seen.

The Genesis of General Relativity - Jürgen Renn 2007-02-16

This four-volume work represents the most comprehensive documentation

and study of the creation of general relativity. Einstein's 1912 Zurich notebook is published for the first time in facsimile and transcript and commented on by today's major historians of science. Additional sources from Einstein and others, who from the late 19th to the early 20th century contributed to this monumental development, are presented here in translation for the first time. The volumes offer detailed commentaries and analyses of these sources that are based on a close reading of these documents supplemented by interpretations by the leading historians of relativity.

Scientific Elite - 1977

Scientific Elite is about Nobel prize winners and the well-defined stratification system in twentieth-century science. It tracks the careers of all American laureates who won prizes from 1907 until 1972, examining the complex interplay of merit and privilege at each stage of their scientific lives and the creation of the ultra-elite in science. The study draws on biographical and bibliographical data on laureates who did their prize-winning research in the United States, and on detailed interviews with forty-one of the fifty-six laureates living in the United States at the time the study was done. Zuckerman finds laureates being successively advantaged as time passes. These advantages are producing growing disparities between the elite and other scientists both in performance and in rewards, which create and maintain a sharply graded stratification system.

Vortices and Monopoles - Arthur Jaffe 1980

Archaeological Fantasies - Garrett G. Fagan 2006

Including case studies, this collection of engaging and stimulating essays written by a diverse group of scholars, scientists and writers examines the phenomenon of pseudoarchaeology from a variety of perspectives.

Reality and Its Structure - Ricki Bliss 2018

Fifteen leading philosophers explore metaphysical foundationalism, the idea that reality has an over-arching hierarchical structure ordered by relations of metaphysical dependence, where chains of entities ordered by those dependence relations terminate in something fundamental.

The Realistic Empiricism of Mach, James, and Russell - Erik C. Banks 2014-08-28

This book redevelops an important movement in philosophy for the first time, exploring the ways in which three of the greatest thinkers can be connected, and applying their ideas to contemporary problems in the philosophy of mind and the philosophy of science.

CARDINAL FUNCTIONS AND INTEGRAL FUNCTIONS - MIRCEA E. SELARIU

This paper presents the correspondences of the eccentric mathematics of cardinal and integral functions and centric mathematics, or ordinary mathematics. Centric functions will also be presented in the introductory section, because they are, although widely used in undulatory physics, little known.

An Extension Collaborative Innovation Model in the Context of Big Data - Xingsen Li

The processes of generating innovative solutions mostly rely on skilled experts who are usually unavailable and their outcomes have uncertainty. Computer science and information technology are changing the innovation environment and accumulating Big Data from which a lot of knowledge is to be discovered.

Glass Science and Technology - Tepiwan Jitwatcharakomol 2016

In this issue are collected materials of 2015 Annual Meeting of International Commission on Glass which was held in Bangkok. It has brought together leading researchers and industry representatives to review and share scientific advantage referred to the understanding of glassy state and the

development of new materials as well as recent progress in production practices and advanced technical support

Mantova e la qabbalah - Giulio Busi 2001

Reflection High-Energy Electron Diffraction - Ayahiko Ichimiya 2004-12-13

Publisher Description

Mereology: A Philosophical Introduction - Giorgio Lando 2017-06-29

Parthood and composition are everywhere. The leg of a table is part of the table, the word "Christmas" is part of the sentence "I wish you a merry Christmas", the 13th century is part of the Middle Ages. The Netherlands, Belgium, and Luxembourg compose Benelux, the body of a deer is composed of a huge number of cells, the Middle Ages are composed of the Early Middle Ages, High Middle Ages, and Late Middle Ages. Is there really a general theory covering every instance of parthood and composition? Is classical mereology this general theory? Are its seemingly counter-intuitive features serious defects? Mereology: A Philosophical Introduction addresses the multifaceted and lively philosophical debates surrounding these questions, and defends the idea that classical mereology is indeed the general and exhaustive theory of parthood and composition in the domain of concrete entities. Several examples of parthood and composition, involving entities of different kinds, are scrutinised in depth. Incidentally, mereology is shown to interact in a surprising way with metaontology. Presenting a well-organized and comprehensive discussion of parthood and related notions, Mereology: A Philosophical Introduction contributes to a better understanding of a subject central to contemporary metaphysics.

Scientia Magna, Vol. 1, No. 1, 2005 - Zhang Wenpeng 2006-01-01

Collection of papers from various scientists dealing with smarandache notions in

science.

Advanced Ceramics and Applications - Rainer Gadow 2021-10-04

New ceramic materials are highly appreciated due to their manifold features including mechanical properties, environmental uses, energy applications and many more. This work presents the latest research development and covers a broad range of topics from stabilized zirconia ceramics with enhanced functional properties to ceramic components in medical/biological applications.

Quantum Gravity - Bertfried Fauser 2007-02-15

This book provides the reader with an overview of the different mathematical attempts to quantize gravity written by leading experts in this field. Also discussed are the possible experimental bounds on quantum gravity effects. The contributions have been strictly refereed and are written in an accessible style. The present volume emerged from the 2nd Blaubeuren Workshop "Mathematical and Physical Aspects of Quantum Gravity".

Galileo at Work - Stillman Drake 2003-01-01

This fascinating, scholarly study by one of the world's foremost authorities on Galileo offers a vivid portrait of one of history's greatest minds. Detailed accounts, including many excerpts from Galileo's own writings, offer insights into his work on motion, mechanics, hydraulics, strength of materials, and projectiles. 36 black-and-white illustrations.

What Remains to Be Discovered - John Maddox 1999-11-05

What wonders of science will the 21st century bring? John Maddox takes up this challenge by describing precisely what remains to be discovered. Building on twenty-three years' experience at the helm of the world's preeminent science magazine, Nature, Maddox identifies new areas of discovery in physics, biology, health, intelligence, and global catastrophe. As Maddox shows, the rate of scientific discovery

will continue to accelerate, hurtling us toward ever more exciting discoveries in the next century.

Harmonia Philosophica - Spyridon Kakos 2010-10-20

The goal of this book is to show that dogmatism, under any form, is wrong. And even though dogmatism had for a long time been associated with religion, things have drastically changed in the last centuries. Nowadays science has replaced religion in the throne of doctrinaire thinking and the poison of materialism has dominated human intellect to a great extend. In this work one can read how separate opinions on crucial philosophical matters can be merged into one single "truth", if such thing even exists. The point of every chapter is to illustrate that one-way thinking is never correct â€“ most of the times a combination of science and religion, measurements and theoretical thinking, logic and intuition, is required to draw a conclusion.

Epistemology of Experimental Gravity - Scientific Rationality - Nicolae Sfetcu

The evolution of gravitational tests from an epistemological perspective framed in the concept of rational reconstruction of Imre Lakatos, based on his methodology of research programmes. Unlike other works on the same subject, the evaluated period is very extensive, starting with Newton's natural philosophy and up to the quantum gravity theories of today. In order to explain in a more rational way the complex evolution of the gravity concept of the last century, I propose a natural extension of the methodology of the research programmes of Lakatos that I then use during the paper. I believe that this approach offers a new perspective on how evolved over time the concept of gravity and the methods of testing each theory of gravity, through observations and experiments. I argue, based on the methodology of the research programmes and the studies of scientists and philosophers, that the current theories of quantum gravity are

degenerative, due to the lack of experimental evidence over a long period of time and of self-immunization against the possibility of falsification. Moreover, a methodological current is being developed that assigns a secondary, unimportant role to verification through observations and/or experiments. For this reason, it will not be possible to have a complete theory of quantum gravity in its current form, which to include to the limit the general relativity, since physical theories have always been adjusted, during their evolution, based on observational or experimental tests, and verified by the predictions made. Also, contrary to a widespread opinion and current active programs regarding the unification of all the fundamental forces of physics in a single final theory, based on string theory, I argue that this unification is generally unlikely, and it is not possible anyway for a unification to be developed based on current theories of quantum gravity, including string theory. In addition, I support the views of some scientists and philosophers that currently too much resources are being consumed on the idea of developing quantum gravity theories, and in particular string theory, to include general relativity and to unify gravity with other forces, as long as science does not impose such research programs. CONTENTS: Introduction Gravity Gravitational tests Methodology of Lakatos - Scientific rationality The natural extension of the Lakatos methodology Bifurcated programs Unifying programs 1. Newtonian gravity 1.1 Heuristics of Newtonian gravity 1.2 Proliferation of post-Newtonian theories 1.3 Tests of post-Newtonian theories 1.3.1 Newton's proposed tests 1.3.2 Tests of post-Newtonian theories 1.4 Newtonian gravity anomalies 1.5 Saturation point in Newtonian gravity 2. General relativity 2.1 Heuristics of the general relativity 2.2

Proliferation of post-Einsteinian gravitational theories 2.3 Post-Newtonian parameterized formalism (PPN) 2.4 Tests of general relativity and post-Einsteinian theories 2.4.1 Tests proposed by Einstein 2.4.2 Tests of post-Einsteinian theories 2.4.3 Classic tests 2.4.3.1 Precision of Mercury's perihelion 2.4.3.2 Light deflection 2.4.3.3 Gravitational redshift 2.4.4 Modern tests 2.4.4.1 Shapiro Delay 2.4.4.2 Gravitational dilation of time 2.4.4.3 Frame dragging and geodetic effect 2.4.4.4 Testing of the principle of equivalence 2.4.4.5 Solar system tests 2.4.5 Strong field gravitational tests 2.4.5.1 Gravitational lenses 2.4.5.2 Gravitational waves 2.4.5.3 Synchronization binary pulsars 2.4.5.4 Extreme environments 2.4.6 Cosmological tests 2.4.6.1 The expanding universe 2.4.6.2 Cosmological observations 2.4.6.3 Monitoring of weak gravitational lenses 2.5 Anomalies of general relativity 2.6 The saturation point of general relativity 3. Quantum gravity 3.1 Heuristics of quantum gravity 3.2 The tests of quantum gravity 3.3 Canonical quantum gravity 3.3.1 Tests proposed for the CQG 3.3.2. Loop quantum gravity 3.4 String theory 3.4.1 Heuristics of string theory 3.4.2. Anomalies of string theory 3.5 Other theories of quantum gravity 3.6 Unification (The Final Theory) 4. Cosmology Conclusions Notes Bibliography DOI: 10.13140/RG.2.2.35350.70724

Free Will and Consciousness in the Multiverse - Christian D. Schade 2019-01-29

It is hard to interpret quantum mechanics. The most surprising, but also most parsimonious, interpretation is the many-worlds, or quantum-multiverse interpretation, implying a permanent coexistence of parallel realities. Could this perhaps be the appropriate interpretation of quantum mechanics? This book collects evidence for this interpretation, both from physics and from other fields, and proposes a subjectivist version of it, the clustered-

minds multiverse. The author explores its implications through the lens of decision making and derives consequences for free will and consciousness. For example, free will can be implemented in the form of vectorial choices, as introduced in the book. He furthermore derives consequences for research in the social sciences, especially in psychology and economics.

Quantum Measurements and Decoherence - M. Mensky 2013-04-17

Quantum measurement (Le., a measurement which is sufficiently precise for quantum effects to be essential) was always one of the most impor tant points in quantum mechanics because it most evidently revealed the difference between quantum and classical physics. Now quantum measure ment 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 bet ter during this new period of activity, the understanding being expressed by the concept of decoherence. This term means a physical process lead ing 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 entangle ment 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 measure ment and decoherence and to their interrelation, especially in the context of continuous quantum measurement.

Ultrafast Phenomena XVI - Paul Corkum 2010-03-23

Ultrafast Phenomena XVI presents the latest advances in ultrafast science, including both ultrafast optical technology and the study of ultrafast phenomena. It covers picosecond, femtosecond and attosecond processes relevant to applications in physics, chemistry, biology, and engineering. Ultrafast technology has a profound impact in a wide range of applications, amongst them biomedical imaging, chemical dynamics, frequency standards, material processing, and ultrahigh speed communications. This book summarizes the results presented at the 16th International Conference on Ultrafast Phenomena and provides an up-to-date view of this important and rapidly advancing field.

Diffraction Physics - John Maxwell Cowley 1975

The first edition of this highly successful book appeared in 1975 and evolved from lecture notes for classes in physical optics, diffraction physics and electron microscopy given to advanced undergraduate and graduate students. The book deals with electron diffraction and diffraction from disordered or imperfect crystals and employed an approach using the Fourier transform from the beginning instead of as an extension of a Fourier series treatment.This third revised edition is a considerably rewritten and updated version which now includes all important developments which have taken place in recent years.

Newton as Philosopher - Andrew Janiak 2010-09-09

Newton's philosophical views are unique and uniquely difficult to categorise. In the course of a long career from the early 1670s until his death in 1727, he articulated profound responses to Cartesian natural philosophy and to the prevailing mechanical philosophy of his day. Newton as Philosopher presents Newton as an original and sophisticated contributor to natural philosophy, one who engaged with the principal ideas of his most important

predecessor, René Descartes, and of his most influential critic, G. W. Leibniz. Unlike Descartes and Leibniz, Newton was systematic and philosophical without presenting a philosophical system, but over the course of his life, he developed a novel picture of nature, our place within it, and its relation to the creator. This rich treatment of his philosophical ideas, the first in English for thirty years, will be of wide interest to historians of philosophy, science, and ideas.

Innovation in Maxwell's Electromagnetic Theory - Daniel M. Siegel 2003-12-11

Siegel's close analysis of the original texts - with careful attention to the equations as well as to the words - reveals that mechanical modeling played a crucial role in Maxwell's initial conceptualizations of the displacement current and the electromagnetic character of light.

Solitons in Optical Fibers - Linn F. Mollenauer 2006-03-08

Solitons are waves that retain their form through obstacle and distance. Solitons can be found in hydrodynamics, nonlinear optics, plasma physics, and biology. Optical solitons are solitary light waves that hold their form over an expansive interval. Conservation of this form creates an effective model for long distance voice and data transmission. The application of this principle is essential to the technology of wired communications. Optical solitons produce crystal clear phone calls cross-country and internationally. It is because of these that someone on the other end of the phone sounds 'in the next room.' It is also pertinent to high-speed network information transmittal. Mollenauer and Gordon have written the only text that an engineer or graduate student will need to understand this foundation subject in optics. *Written by Linn Mollenauer and James Gordon who are celebrated for applying optical solitons to telecommnications *Combines mathematical developments

with well-chosen practical examples and design formulas *Extensive material on the basic physics of fiber optic transmission and its practical applications

Manifesto of New Realism - Maurizio Ferraris 2014-12-01

Retraces the history of postmodern philosophy and proposes solutions to overcome its impasses. Philosophical realism has taken a number of different forms, each applied to different topics and set against different forms of idealism and subjectivism. Maurizio Ferraris's Manifesto of New Realism takes aim at postmodernism and hermeneutics, arguing against their emphasis on reality as constructed and interpreted. While acknowledging the value of these criticisms of traditional, dogmatic realism, Ferraris insists that the insights of postmodernism have reached a dead end. Calling for the discipline to turn its focus back to truth and the external world, Ferraris's manifesto—which sparked lively debate in Italy and beyond—offers a wiser realism with social and political relevance. Maurizio Ferraris is Full Professor of Philosophy and Director of the Laboratory for Ontology at the University of Turin, Italy. His books include Goodbye, Kant! What Still Stands of the Critique of Pure Reason, also published by SUNY Press. Sarah De Sanctis is a PhD candidate in contemporary forms of realism in literature and philosophy at the London Graduate School and a translator for the Department of Philosophy at the University of Turin.

The Center and Focus Problem - M.N. Popa 2021-09-23

The Center and Focus Problem: Algebraic Solutions and Hypotheses, M. N. Popa and V.V. Pricop, ISBN: 978-1-032-01725-9 (Hardback) This book focuses on an old problem of the qualitative theory of differential equations, called the Center and Focus Problem. It is intended for mathematicians, researchers, professors and Ph.D. students working in the field of

differential equations, as well as other specialists who are interested in the theory of Lie algebras, commutative graded algebras, the theory of generating functions and Hilbert series. The book reflects the results obtained by the authors in the last decades. A rather essential result is obtained in solving Poincaré's problem. Namely, there are given the upper estimations of the number of Poincaré-Lyapunov quantities, which are algebraically independent and participate in solving the Center and Focus Problem that have not been known so far. These estimations are equal to Krull dimensions of Sibirsky graded algebras of comitants and invariants of systems of differential equations. Table of Contents 1. Lie Algebra Of Operators Of Centro-Affine Group Representation In The Coefficient Space Of Polynomial Differential Systems 2. Differential Equations For Centro-Affine Invariants And Comitants Of Differential Systems And Their Applications 3. Generating Functions And Hilbert Series For Sibirsky Graded Algebras Of Comitants And Invariants Of Differential Systems 4. Hilbert Series For Sibirsky Algebras And Krull Dimension For Them 5. About The Center And Focus Problem 6. On The Upper Bound Of The Number Of Algebraically Independent Focus Quantities That Take Part In Solving The Center And Focus Problem For The System s(1,m1,...,m`) 7. On The Upper Bound Of The Number Of Algebraically Independent Focus Quantities That Take Part In Solving The Center And Focus Problem For Lyapunov System. Bibliography Appendixes Biographies Popa Mihail Nicolae, holds a Ph.D. from Gorky University (now Nizhny Novgorod, Russia). He has served as Director and Deputy Director of Vladimir Andrunachievici Institute of Mathematics and Computer Science (IMCS)) in the Laboratory of Differential Equations. He is Professor at the State University of Tiraspol (based in Chisinau). His scientific interests are related

to the invariant processes in the qualitative theory of differential equations, Lie algebras and commutative graded algebras, generating functions and Hilbert series, orbit theory, Lyapunov stability theory. Pricop Victor Vasile, holds a Ph.D. from Vladimir Andrunachievici Institute of Mathematics and Computer Science. He is professor at the State Institute of International Relations of Moldova. Victor Pricop's scientific interests are related to Lie algebras and graded algebras of invariants and comitants, generating functions and Hilbert series, applications of algebras to polynomial differential systems.

Concept and Formalization of Constellatory Self-Unfolding - Albrecht von Müller 2018-05-29

This volume offers a fundamentally different way of conceptualizing time and reality. Today, we see time predominantly as the linear-sequential order of events, and reality accordingly as consisting of facts that can be ordered along sequential time. But what if this conceptualization has us mistaking the “exhausts” for the “real thing”, i.e. if we miss the best, the actual taking place of reality as it occurs in a very differently structured, primordial form of time, the time-space of the present? In this new conceptual framework, both the sequential aspect of time and the factual aspect of reality are emergent phenomena that come into being only after reality has actually taken place. In the new view, facts are just the “traces” that the actual taking place of reality leaves behind on the co-emergent “canvas’’ of local spacetime. Local spacetime itself emerges only as facts come into being – and only facts can be adequately localized in it. But, how does reality then actually occur? It is conceived as a “constellatory self-unfolding”, characterized by strong self-referentiality, and taking place in the primordial form of time, the not yet sequentially structured “time-space of the present”.

Time is seen here as an ontophainetic platform, i.e. as the stage on which reality can first occur. This view of time (and, thus, also space) seems to be very much in accordance with what we encounter in quantum physics before the so-called collapse of the wave function. In parallel, classical and relativistic physics largely operate within the factual portrait of reality, and the sequential aspect of time, respectively. Only singularities constitute an important exemption: here the canvas of local spacetime – that emerged together with factization – melts down again. In the novel framework quantum reduction and singularities can be seen and addressed as inverse transitions: In quantum physical state reduction reality "gains" the chrono-ontological format of facticity, and the sequential aspect of time becomes applicable. In singularities, by contrast, the inverse happens: Reality loses its local spacetime formation and reverts back into its primordial, pre-local shape – making in this way the use of causality relations, Boolean logic and the dichotomization of subject and object obsolete. For our understanding of the relation between quantum and relativistic physics this new view opens up fundamentally new perspectives: Both are legitimate views of time and reality, they just address very different chrono-ontological portraits, and thus should not lead us to erroneously subjugating one view under the other. The task of the book is to provide a formal framework in which this radically different view of time and reality can be addressed properly. The mathematical approach is based on the logical and topological features of the Borromean Rings. It draws upon concepts and methods of algebraic and geometric topology – especially the theory of sheaves and links, group theory, logic and information theory, in relation to the standard constructions employed in quantum mechanics and general relativity, shedding new light

on the pestilential problems of their compatibility. The intended audience includes physicists, mathematicians and philosophers with an interest in the conceptual and mathematical foundations of modern physics.

Concepts of Mass in Contemporary Physics and Philosophy - Max Jammer 2009-06-28

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."--BOOK JACKET.

Quantum Ontology - Peter J. Lewis 2016-06-13

Metaphysicians should pay attention to quantum mechanics. Why? Not because it provides definitive answers to many metaphysical questions-the theory itself is remarkably silent on the nature of the physical world, and the various interpretations of the theory on offer present conflicting ontological pictures. Rather, quantum mechanics is essential to the metaphysician because it reshapes standard metaphysical debates and opens up unforeseen new metaphysical possibilities. Even if quantum mechanics provides few clear answers, there are good reasons to think that any adequate understanding of the quantum world will result in a radical reshaping of our classical world-view in some way or other. Whatever the world is like at the atomic scale, it is almost certainly not the swarm of particles pushed around by forces that is often presupposed. This book guides readers through the theory of quantum mechanics and its implications for metaphysics in a clear and accessible way. The theory and its various interpretations are presented with a minimum of technicality.

The consequences of these interpretations for metaphysical debates concerning realism, indeterminacy, causation, determinism, holism, and individuality (among other topics) are explored in detail, stressing the novel form that the debates take given the empirical facts in the quantum domain. While quantum mechanics may not deliver unconditional pronouncements on these issues, the range of possibilities consistent with our knowledge of the empirical world is relatively small-and each possibility is metaphysically revisionary in some way. This book will appeal to researchers, students, and anybody else interested in how science informs our world-view.