Julian Barbour The End Of Time

The End of Time
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The Janus Point
The Discovery of Dynamics
Mach's Principle
Absolute or relative motion ? : a study from a Machian point of view of the discovery and the structure of dynamical theories
The End of Time
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The Singular Universe and the Reality of Time
Three Roads to Quantum Gravity
Space, Time, and Stuff
An Experiment with Time
Time, Conflict, and Human Values
The Physicist and the Philosopher
The Road to Reality
The Deep Structure of General Relativity
The Problem of Time
Ibn ʻArabî - Time and Cosmology
Science and Ultimate Reality
Shape Dynamics
The History of Time: A Very Short Introduction
About Time
Death by Black Hole: And Other Cosmic Quandaries
On Space and Time
October the First is Too Late
Philosophy of Physics
Buddha and the Quantum
Time Travel in Einstein's Universe
Time's Arrow and Archimedes' Point
The Science of Can and Can't

2006-09-28 Paul Davies This is a book about the meaning of time, what it is, when it has started, how it flows and where to. It examines the consequences of Einstein's theory of relativity and offers startling suggestions about what recent research may reveal.

2016-03-31 Roger Penrose **WINNER OF THE 2020 NOBEL PRIZE IN PHYSICS** The Road to Reality is the most important and ambitious work of science for a generation. It provides nothing less than a comprehensive account of the physical universe and the essentials of its underlying mathematical theory. It assumes no particular specialist knowledge on the part of the reader, so that, for example, the early chapters give us the vital mathematical background to the physical theories explored later in the book. Roger Penrose's purpose is to describe as clearly as possible our present understanding of the universe and to convey a feeling for its deep beauty and philosophical implications, as well as its intricate logical interconnections. The Road to Reality is rarely less than challenging, but the book is leavened by vivid descriptive passages, as well as hundreds of hand-drawn diagrams. In a single work of colossal scope one of the world's greatest scientists has given us a complete and unrivalled guide to the glories of the universe that we all inhabit. 'Roger Penrose is the most important physicist to work in relativity theory except for Einstein. He is one of the very few people I've met in my life who, without reservation, I call a genius' Lee Smolin

2014-03-20 Lee Smolin A leading theoretical physicist describes the search for a 'theory of everything'. The Holy Grail of modern physics is the search for a 'quantum gravity' view of the universe that unites Einstein's general relativity with quantum theory. Until recently, these two foundational pillars of modern science have seemed incompatible: relativity deals exclusively with the universe at the large scale (planets, solar systems and galaxies), whereas quantum theory is restricted to the domain of the very small (molecules, atoms, electrons). Here, Lee Smolin provides the first accessible overview of current attempts to reconcile these two theories. Written with wit and style, Three Roads to Quantum Gravity touches on some of the deepest questions about the nature of the universe - are space and time continuous or infinitely divisible? Is there a limit to how small things can be? - while speculating on what developments we can expect at the frontiers of physics in the twenty-first century.

2007-11-17 Neil deGrasse Tyson "[Tyson] tackles a great range of subjects…with great humor, humility, and—most important—humanity." —Entertainment Weekly Loyal readers of the monthly "Universe" essays in Natural History magazine have long recognized Neil deGrasse Tyson's talent for guiding them through the mysteries of the cosmos with clarity and enthusiasm. Bringing together more than forty of Tyson's favorite essays, Death by Black Hole explores a myriad of cosmic topics, from what it would be like to be inside a black hole to the movie industry's feeble efforts to get its night skies right. One of America's best-known astrophysicists, Tyson is a natural teacher who simplifies the complexities of astrophysics while sharing his infectious fascination for our universe.

2001-11-29 Julian Barbour Provides basic evidence for the nonexistence of time, explaining what a timeless universe is like and showing how the nonexistence of time solves a great paradox of modern science.

2005-02-09 Julian B. Barbour This is the second in a two volume series discussing the theories of Einstein, Newton and other ideas of late 19th and early 20th century physics as in-depth research and basis for Barbour's theory that time is an illusion. This volume gives a comprehensive survey of the major issues associated with the transition in our understanding of the nature of space and motion that came with Einstein's theory of general relativity. Einstein's work and thoughts are critically reexamined in their historical context of Mach's earlier reinterpretation of Newton's arguments for absolute space, and other ideas in physics of the time. Along with its new interpretations, this book is an excellent guide to the deeper philosophical implications of general relativity, and has much to contribute to the studies relevant to the current effort to create a quantum theory of gravity.

2015-05-26 Tim Maudlin Philosophical foundations of the physics of space-time 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

2015 Roberto Mangabeira Unger Roberto Mangabeira Unger and Lee Smolin argue for a revolution in our cosmological ideas. Ideal for non-scientists, physicists and cosmologists.

1999 Julian B. Barbour Time is an illusion. Although the laws of physics create a powerful impression that time is flowing, in fact there are only timeless ¿nows¿. In The End of Time, the British theoretical physicist Julian Barbour describes the coming revolution in our understanding of the world: a quantum theory of the universe that brings together Einstein¿s general theory of relativity ¿ which denies the existence of a unique time ¿ and quantum mechanics ¿ which demands one. Barbour believes that only the most radical of ideas can resolve the conflict between these two theories: that there is, quite literally, no time at all. The End of Time is the first full-length account of the crisis in our understanding that has enveloped quantum cosmology. Unifying thinking that has never been brought together before in a book for the general reader, Barbour reveals the true architecture of the universe and demonstrates how physics is coming up sharp against the extraordinary possibility that the sense of time passing emerges from a universe that is timeless. The heart of the book is the author¿s lucid description of how a world of stillness can appear to be teeming with motion: in this timeless world where all possible instants coexist, complex mathematical rules of quantum mechanics bind together a special selection of these instants in a coherent order that consciousness perceives as the flow of time. Finally, in a lucid and eloquent epilogue, the author speculates on the philosophical implications of his theory: Does free will exist? Is time travel possible? How did the universe begin? Where is heaven? Does the denial of time make life meaningless? Written with exceptional clarity and elegance, this profound and original work presents a dazzlingly powerful argument that all will be able to follow, but no-one with an interest in the workings of the universe will be able to ignore.

2022-08-17 J.W. Dunne A fascinating look at author J. W. Dunne’s controversial model of multidimensional time, based on precognitive dreams. The proposed concept accounted for insights into higher consciousness and many of life’s mysteries.

1999 Julian B. Barbour

2016-10-04 Jimena Canales The explosive debate that transformed our views about time and scientific truth On April 6, 1922, in Paris, Albert Einstein and Henri Bergson publicly debated the nature of time. Einstein considered Bergson's theory of time to be a soft, psychological notion, irreconcilable with the quantitative realities of physics. Bergson, who gained fame as a philosopher by arguing that time should not be understood exclusively through the lens of science, criticized Einstein's theory of time for being a metaphysics grafted on to science, one that ignored the intuitive aspects of time. The Physicist and the Philosopher tells the remarkable story of how this explosive debate transformed our understanding of time and drove a rift between science and the humanities that persists today. Jimena Canales introduces readers to the revolutionary ideas of Einstein and Bergson, describes how they dramatically collided in Paris, and traces how this clash of worldviews reverberated across the twentieth century. She shows how it provoked responses from figures such as Bertrand Russell and Martin Heidegger, and carried repercussions for American pragmatism, logical positivism, phenomenology, and quantum mechanics. Canales explains how the new technologies of the period—such as wristwatches, radio, and film—helped to shape people’s conceptions of time and further polarized the public debate. She also discusses how Bergson and Einstein, toward the end of their lives, each reflected on his rival’s legacy—Bergson during the Nazi occupation of Paris and Einstein in the context of the first hydrogen bomb explosion. The Physicist and the Philosopher is a magisterial and revealing account that shows how scientific truth was placed on trial in a divided century marked by a new sense of time.

2021-05-04 Chiara Marletto A young theoretical physicist's guide to how the radical new science of counterfactuals can reveal the full scope of our universe There is a vast class of properties that science has so far almost entirely neglected. These properties are central to an understanding of physical reality both at an everyday level and at the level of fundamental phenomena, yet they have traditionally been thought of as impossible to incorporate into fundamental explanations. They relate not only to what is true - the actual - but to what could be true - the counterfactual. This is the science of can and can't. Chiara Marletto, a pioneer in this field, explores the promise that this fascinating, far-reaching approach holds not only for revolutionizing how fundamental physics is formulated, but also for confronting existing technological challenges, from delivering the next generation of information-processing devices to designing AI. In each chapter, Marletto sets out how counterfactuals can solve a vexed open problem in science, and demonstrates that by contemplating the possible as well as the actual, we can break down barriers to knowledge and form a more complete and fruitful picture of the universe. 'Clear, sharp and imaginative... The Science of Can and Can't will open the doors to a dazzling set of concepts and ideas that will change deeply the way you look at the world' David Deutsch, bestselling author of The Beginning of Infinity

1976 Fred Hoyle

1988 Julian B. Barbour

1995-08-11 Julian B. Barbour This volume is a collection of scholarly articles on the Mach Principle, the impact that this theory has had since the end of the 19th century, and its role in helping Einstein formulate the doctrine of general relativity. 20th-century physics is concerned with the concepts of time, space, motion, inertia and gravity. The documentation on all of these makes this book a reference for those who are interested in the history of science and the theory of general relativity

2004-04-22 John D. Barrow This volume provides a fascinating snapshot of the future of physics, covering fundamental physics, at the frontiers of research. It comprises a wide variety of contributions from leading thinkers in the field, inspired by the pioneering work of John A. Wheeler. Quantum theory represents a unifying theme within the book, along with topics such as the nature of physical reality, the arrow of time, models of the universe, superstrings, gravitational radiation, quantum gravity and cosmic inflation. Attempts to formulate a final unification of physics are discussed, along with the existence of hidden dimensions of space, space-time singularities, hidden cosmic matter, and the strange world of quantum technology.

2005-08-11 Leofranc Holford-Strevens Why do we measure time in the way that we do? Why is a week seven days long? At what point did minutes and seconds come into being? Why are some calendars lunar and some solar? The organisation of time into hours, days, months and years seems immutable and universal, but is actually far more artificial than most people realise. The French Revolution resulted in a restructuring of the French calendar, and the Soviet Union experimented with five and then six-day weeks. Leofranc Holford-Strevens explores these questions using a range of fascinating examples from Ancient Rome and Julius Caesar's imposition of the Leap Year, to the 1920s' project for a fixed Easter. 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.

2001-09-06 Julian B. Barbour Ever since Newton created dynamics, there has been controversy about its foundations. Are space and time absolute? Do they form a rigid but invisible framework and container of the universe? Or are space, time, and motion relative? If so, does Newton's 'framework' arise through the influence of the universe at large, as Ernst Mach suggested? Einstein's aim when creating his general theory of relativity was to demonstrate this and thereby implement 'Mach's Principle'. However, it is widely believed that he achieved only partial success. This question of whether motion is absolute or relative has been a central issues in philosophy; the nature of time has perennial interest. Current attempts to create a quantum description of the whole universe keep these issues at the cutting edge of modern research. Written by the world's leading expert on Mach's Principle, The Discovery of Dynamics is a highly original account of the development of notions about space, time, and motion. Widely praised in its hardback version, it is one of the fullest and most readable accounts of the astronomical studies that culminated in Kepler's laws of planetary motion and of the creation of dynamics by Galileo, Descartes, Huygens, and Newton. Originally published as Absolute or Relative Motion?, Vol. 1: The Discovery of Dynamics (Cambridge), The Discovery of Dynamics provides the technical background to Barbour's recently published The End of Time, in which he argues that time disappears from the description of the quantum universe.

2017-09-18 Edward Anderson This book is a treatise on time and on background independence in physics. It first considers how time is conceived of in each accepted paradigm of physics: Newtonian, special relativity, quantum mechanics (QM) and general relativity (GR). Substantial differences are moreover uncovered between what is meant by time in QM and in GR. These differences jointly source the Problem of Time: Nine interlinked facets which arise upon attempting concurrent treatment of the QM and GR paradigms, as is required in particular for a background independent theory of quantum gravity. A sizeable proportion of current quantum gravity programs - e.g. geometrodynamical and loop quantum gravity approaches to quantum GR, quantum cosmology, supergravity and M-theory - are background independent in this sense. This book's foundational topic is thus furthermore of practical relevance in the ongoing development of quantum gravity programs. This book shows moreover that eight of the nine facets of the Problem of Time already occur upon entertaining background independence in classical (rather than quantum) physics. By this development, and interpreting shape theory as modelling background independence, this book further establishes background independence as a field of study. Background independent mechanics, as well as minisuperspace (spatially homogeneous) models of GR and perturbations thereabout are used to illustrate these points. As hitherto formulated, the different facets of the Problem of Time greatly interfere with each others' attempted resolutions. This book explains how, none the less, a local resolution of the Problem of Time can be arrived at after various reconceptualizations of the facets and reformulations of their mathematical implementation. Self-contained appendices on mathematical methods for basic and foundational quantum gravity are included. Finally, this book outlines how supergravity is refreshingly different from GR as a realization of background independence, and what background independence entails at the topological level and beyond.

2020-12-03 Julian Barbour What is time? The Janus Point offers a ground-breaking solution to one of the greatest mysteries in physics. For over a century, the greatest minds have sought to understand why time seems to flow in one direction, ever forward. In The Janus Point, Julian Barbour offers a radically new answer: it doesn't. At the heart of this book, Barbour provides a new vision of the Big Bang - the Janus Point - from which time flows in two directions, its currents driven by the expansion of the universe and the growth of order in the galaxies, planets and life itself. What emerges is not just a revolutionary new theory of time, but a hopeful argument about the destiny of our universe. 'Both a work of literature and a masterpiece of scientific thought' Lee Smolin, author of The Trouble with Physics 'Profound...original...accessible to anyone who has pondered the mysteries of space and time' Martin Rees, Astronomer Royal 'Takes on fundamental questions, offering a new perspective on how the Universe started and where it may be headed' Science Magazine

2023-07-19 Samuel Avery Buddha and the Quantum is about the connection between meditation and physics. Many books show parallels between consciousness and physics; a few of these attempt to explain consciousness in terms of the physics of everyday experience.

2015-08-25 J. Richard Gott A Princeton astrophysicist explores whether journeying to the past or future is scientifically possible in this “intriguing” volume (Neil deGrasse Tyson). It was H. G. Wells who coined the term “time machine”—but the concept of time travel, both forward and backward, has always provoked fascination and yearning. It has mostly been dismissed as an impossibility in the world of physics; yet theories posited by Einstein, and advanced by scientists including Stephen Hawking and Kip Thorne, suggest that the phenomenon could actually occur. Building on these ideas, J. Richard Gott, a professor who has written on the subject for Scientific American, Time, and other publications, describes how travel to the future is not only possible but has already happened—and contemplates whether travel to the past is also conceivable. This look at the surprising facts behind the science fiction of time travel “deserves the attention of anyone wanting wider intellectual horizons” (Booklist). “Impressively clear language. Practical tips for chrononauts on their options for travel and the contingencies to prepare for make everything sound bizarrely plausible. Gott clearly enjoys his subject and his excitement and humor are contagious; this book is a delight to read.” —Publishers Weekly

1999 Julius Thomas Fraser "Over the course of history, Fraser argues, human values have served primarily not as conservative influences that promote permanence, continuity, and balance - as commonly believed - but as revolutionary forces that, in the long run, promote change by generating and sustaining certain unresolvable conflicts."--BOOK JACKET.

2006 Julian B. Barbour This text describes a quantum theory of the universe that brings together Einstein's general theory of relativity, which denies the existence of a unique time, and quantum mechanics, which demands one. The author contends that only the most radical of ideas can resolve the profound conflict between these two foundational pillars of modern physics. He proposes that there is, quite literally, no time at all.

2012-03-26 Alain Connes Gets to the heart of science by asking a fundamental question: what is the true nature of space and time?

2018 Flavio Mercati Shape Dynamics is a radical yet soundly based reinterpretation of Einstein's theory of gravity that has opened up new approaches to gravity research. This text offers both a brief introduction and a detailed walk-through of the motivations for the theory, its development from first principles and an in-depth look at its present status.

1997-12-04 Huw Price Why is the future so different from the past? Why does the past affect the future and not the other way around? What does quantum mechanics really tell us about the world? In this important and accessible book, Huw Price throws fascinating new light on some of the great mysteries of modern physics, and connects them in a wholly original way. Price begins with the mystery of the arrow of time. Why, for example, does disorder always increase, as required by the second law of thermodynamics? Price shows that, for over a century, most physicists have thought about these problems the wrong way. Misled by the human perspective from within time, which distorts and exaggerates the differences between past and future, they have fallen victim to what Price calls the "double standard fallacy": proposed explanations of the difference between the past and the future turn out to rely on a difference which has been slipped in at the beginning, when the physicists themselves treat the past and future in different ways. To avoid this fallacy, Price argues, we need to overcome our natural tendency to think about the past and the future differently. We need to imagine a point outside time -- an Archimedean "view from nowhen" -- from which to observe time in an unbiased way. Offering a lively criticism of many major modern physicists, including Richard Feynman and Stephen Hawking, Price shows that this fallacy remains common in physics today -- for example, when contemporary cosmologists theorize about the eventual fate of the universe. The "big bang" theory normally assumes that the beginning and end of the universe will be very different. But if we are to avoid the double standard fallacy, we need to consider time symmetrically, and take seriously the possibility that the arrow of time may reverse when the universe recollapses into a "big crunch." Price then turns to the greatest mystery of modern physics, the meaning of quantum theory. He argues that in missing the Archimedean viewpoint, modern physics has missed a radical and attractive solution to many of the apparent paradoxes of quantum physics. Many consequences of quantum theory appear counterintuitive, such as Schrodinger's Cat, whose condition seems undetermined until observed, and Bell's Theorem, which suggests a spooky "nonlocality," where events happening simultaneously in different places seem to affect each other directly. Price shows that these paradoxes can be avoided by allowing that at the quantum level the future does, indeed, affect the past. This demystifies nonlocality, and supports Einstein's unpopular intuition that quantum theory describes an objective world, existing independently of human observers: the Cat is alive or dead, even when nobody looks. So interpreted, Price argues, quantum mechanics is simply the kind of theory we ought to have expected in microphysics -- from the symmetric standpoint. Time's Arrow and Archimedes' Point presents an innovative and controversial view of time and contemporary physics. In this exciting book, Price urges physicists, philosophers, and anyone who has ever pondered the mysteries of time to look at the world from the fresh perspective of Archimedes' Point and gain a deeper understanding of ourselves, the universe around us, and our own place in time.

2014-04-04 Mohamed Haj Yousef This book is the first comprehensive attempt to explain Ibn ‘Arabî’s distinctive view of time and its role in the process of creating the cosmos and its relation with the Creator. By comparing this original view with modern theories of physics and cosmology, Mohamed Haj Yousef constructs a new cosmological model that may deepen and extend our understanding of the world, while potentially solving some of the drawbacks in the current models such as the historical Zeno's paradoxes of motion and the recent Einstein-Podolsky-Rosen paradox (EPR) that underlines the discrepancies between Quantum Mechanics and Relativity.

2014-04 Frank Arntzenius Frank Arntzenius presents a series of radical new ideas about the structure of space and time. Space, Time, and Stuff is an attempt to show that physics is geometry: that the fundamental structure of the physical world is purely geometrical structure. Along the way, he examines some non-standard views about the structure of spacetime and its inhabitants, including the idea that space and time are pointless, the idea that quantum mechanics is a completely local theory, the idea that antiparticles are just particles travelling back in time, and the idea that time has no structure whatsoever. The main thrust of the book, however, is that there are good reasons to believe that spaces other than spacetime exist, and that it is the existence of these additional spaces that allows one to reduce all of physics to geometry. Philosophy, and metaphysics in particular, plays an important role here: the assumption that the fundamental laws of physics are simple in terms of the fundamental physical properties and relations is pivotal. Without this assumption one gets nowhere. That is to say, when trying to extract the fundamental structure of the world from theories of physics one ignores philosophy at one's peril!