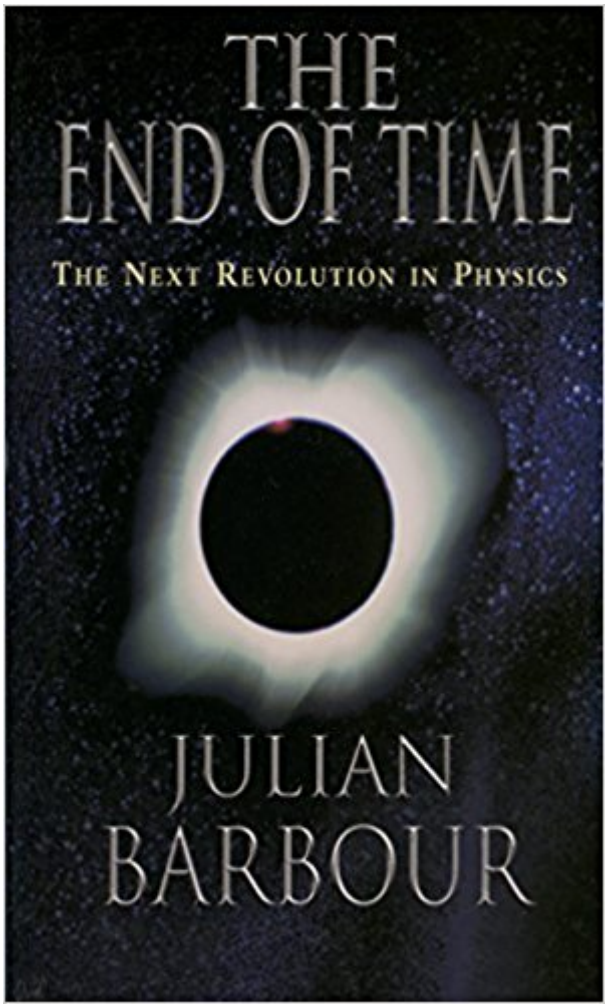
# The End Of Time: The Next Revolution In Physics



## Synopsis

Richard Feynman once quipped that "Time is what happens when nothing else does." But Julian Barbour disagrees: if nothing happened, if nothing changed, then time would stop. For time is nothing but change. It is change that we perceive occurring all around us, not time. Put simply, time does not exist.In this highly provocative volume, Barbour presents the basic evidence for a timeless universe, and shows why we still experience the world as intensely temporal. It is a book that strikes at the heart of modern physics. It casts doubt on Einstein’s greatest contribution, the spacetime continuum, but also points to the solution of one of the great paradoxes of modern science, the chasm between classical and quantum physics. Indeed, Barbour argues that the holy grail of physicists--the unification of Einstein’s general relativity with quantum mechanics--may well spell the end of time.Barbour writes with remarkable clarity as he ranges from the ancient philosophers Heraclitus and Parmenides, through the giants of science Galileo, Newton, and Einstein, to the work of the contemporary physicists John Wheeler, Roger Penrose, and Steven Hawking. Along the way he treats us to enticing glimpses of some of the mysteries of the universe, and presents intriguing ideas about multiple worlds, time travel, immortality, and, above all, the illusion of motion.The End of Time is a vibrantly written and revolutionary book. It turns our understanding of reality inside-out.

## Book Information

File Size: 6384 KB

Print Length: 384 pages

Publisher: Oxford University Press; Reprint edition (November 29, 2001)

Publication Date: November 29, 2001

Sold by:Ã Â Digital Services LLC

Language: English

ASIN: B0058RTLZU

Text-to-Speech: Enabled

X-Ray: Not Enabled

Word Wise: Enabled

Lending: Enabled

Screen Reader: Supported

Enhanced Typesetting: Enabled

Best Sellers Rank: #158,577 Paid in Kindle Store (See Top 100 Paid in Kindle Store) #18 inÃ Â Kindle Store > Kindle eBooks > Nonfiction > Science > Physics > Time #57 inÃ Â Books >

Science & Math > Experiments, Instruments & Measurement > Time  #118 inÃ  Â Books > Science & Math > Physics > Relativity

## Customer Reviews

Reader beware: This is hardcore theoretical physics, and as deep a thinker I believe myself to be, I clearly lack the education to keep up with a lot of the language and math Barbour uses to make his case. As near as I can figure it, Barbour theorizes that we exist in a 100% STATIC reality where nothing is actually ever in motion. I happen to agree with this theory, and believe that our experience is an ILLUSION of motion created by the rapid focusing and refocusing of individuated Consciousness into one holographic "still frame" after another. In a truly infinite reality, this is completely possible and even PLAUSIBLE. However, for me it’s far easier to imagine such a reality using allegory than the physics and math employed within this book by Barbour, a truly brilliant human being. One of few books in my library I was unable to finish, but just having it there makes me feel smarter, lol!

I’ve read many of the books on this topic. None has been as helpful in providing real insight regarding this totally un-intuitive concept. For example, at one point you started reading this review but now you’re reading these particular words. How could that have happened if "time" didn’t pass? One simplistic way to describe how Barbour explains it is that what we perceive as "time" is actually change. We get confused because we apply metrics to the perceptions.Obviously that’s not totally satisfying to our desire to really understand what’s going on, but it does ’move the ball’ a little toward that goal. And, the book provides a much richer view of the whole concept, including the history of theories and thoughts about time as well as how matter and motion impact what we experience.This is well worth the read for anyone obsessed with trying to comprehend reality.

This is a very difficult subject to explain. How does one argue against the concept of time in a language that evolved from the conscious experience of being and aging, birth and death? Now, after reading Barbour’s attempt, I wish he were more of an editor and writer than a wandering thinker. In today’s world of bumper sticker wisdom, in which our brains are accommodating to the exponentially increasing flow of information and increasing democratization of cultural memes, an amateur author isn’t much appreciated.

This is a serious book about his own work, and Julian Barbour should be commended for reaching

such a wide audience. He obviously shares the opinions of Einstein and Feynman that if you understand a new theory thoroughly you should be able to explain it to the layman.If you want to combine Einstein's theory of gravity with quantum mechanics, it is well known that there are serious obstacles.First obstacle: GR(General Relativity) is real and QM (quantum mechanics) is complex. (By complex, we mean z = x + iy, where i is the square root of -1.)JB (Julian Barbour) attacks this problem using his two main weapons: History and Philosophy.History: Schrodinger's first equation (I didn't know this) was real. It was also the one that he used to solve the problem of the hydrogen atom, which got him the Nobel prize.But Schrodinger's first equation also was static--i.e. timeless. It was also a first order differential equation.When Schrodinger later was developing his equation for the amplitude function that evolved with time, he was horrified to find that it turned into a second order differential equation, in which second derivatives appear. To bring it back down to a first order equation again, he used the trick that electrical engineers use: He introduced complex numbers. When they say that the impedance of a coil of wire is complex, it isn't really complex. This is just a mathematical trick based on the fact that AC current is sinusoidal and therefore satisfies a simple second order differential equation. By using complex numbers, they eliminate, in this case, differential equations altogether.So Schrodinger eliminated second derivatives at the cost of making the amplitude complex.Philosophy: JB's secoond weapon. He is an expert on Mach's two Principles. The second principle states essentially that inertia is an effect of the distant matter in the universe. JB uses this principle to produce a totally new geometry that he calls "Platonia," in which there is no time.JB believes that GR and QM can be combined in Platonia into a timeless theory. In his view, we must unshackle QM from the confines of Euclidean geometry and its Lorenz variant.Believe it or not, JB and others have shown that GR can be formulated in Platonia as is, and that Mach's principles are totally built into the fabric of GR (a fact that would have pleased Einstein). He even quotes results of others showing that GR is in a sense timeless despite earnest attempts to incorporate time into it.JB has technical papers on his website backing up these claims, but he also goes on to speculate what a cosmological theory would look like.By the way, he supports something like the "no collapse" view of Everett, but points out a serious flaw in Everett's view. In fact he points out a lot of things and is worth reading if only for that.I would now like to add my own two cents worth.Quantum Field theory is normally presented as if it lived in Minkowski space time, but it really doesn't. Consider the following:1) A Fermion (e.g. an electron) must rotate twice (720 degrees) before it returns to its original state.2) Feynman's virtual particles exist outside the light cone.3) Feynman's method of summing over histories has a distinct "out of time" flavor to it. True it does tell how a particle can move from one place at one time to another place at another time, but the

process takes place out of time. JB says (private communication) that it may be possible to model the Feynman propagator in Platonia.

There are currently several books dealing with new theories in physics, they are fascinating but I found the "End of Time" a bit disappointing after all the newspaper hype. What I want in a book of this type are three things, firstly to be educated on the general theoretical background, entertainingly presented the history of the subject up to the present day, secondly the author must, as succinctly as possible, explain their theory; show where it supports and where it overturns conventional ideas. Finally the books must present conclusions, sketch out the likely impact of the new concept. The "End of Time" devotes many pages to arguments in favour of the author's thesis, in a way that will bore the general reader but is unlikely to convince the physicist. Near the end of the book my feeling was ok ok you win, just tell me the implications, but that's the problem, the author refuses to speculate, possibly on the spurious grounds that predictions are impossible in a world without time. In summary a long, confusing and eventually a frustrating read. If you want to see how a book of this type should be handled read the unbelievably good "The Inflationary Universe" by Alan H. Guth.

From the Next Generation to J. J. Abrams: The Complete, Uncensored, and Unauthorized Oral History of Star Trek The Next IQ: The Next Level of Intelligence for 21st Century Leaders The "No Time" Boxed Set Featuring Michael Collins: No Time To Run; No Time To Die; No Time Hide (Legal Thriller Featuring Michael Collins) Active Physics [A Project-Based Inquiry Approach, Physics for All] by Arthur Eisenkraft, Ph.D. [It’s About Time,2010] [Hardcover] 3rd Edition Natural Capitalism: Creating the Next Industrial Revolution The Cuba Wars: Fidel Castro, the United States, and the Next Revolution