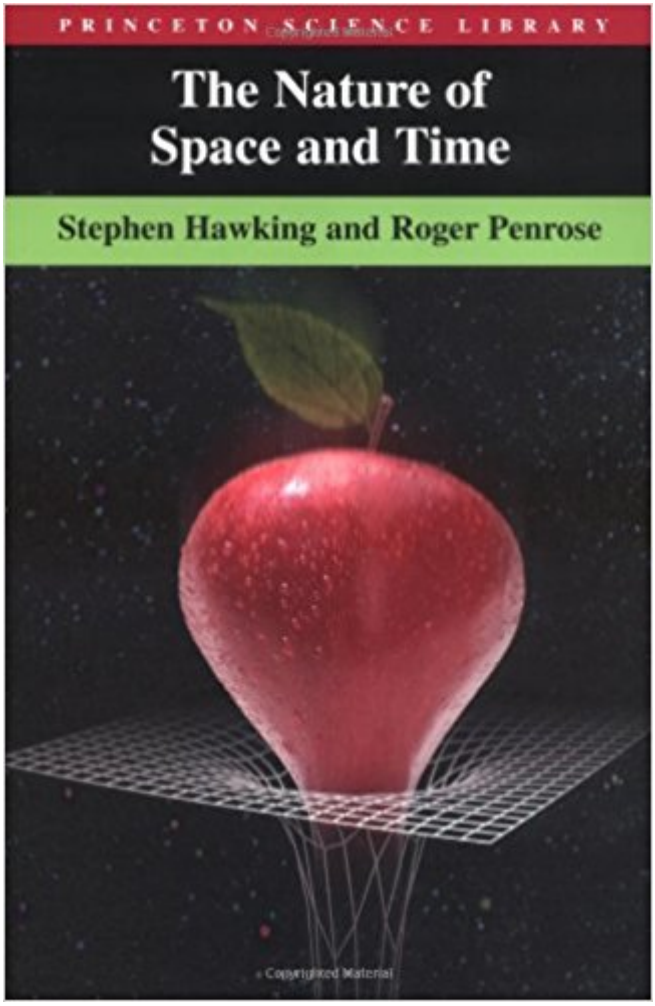
The Nature Of Space And Time



Synopsis

Einstein said that the most incomprehensible thing about the universe is that it is comprehensible. But was he right? Can the quantum theory of fields and Einstein's general theory of relativity, the two most accurate and successful theories in all of physics, be united in a single quantum theory of gravity? Can quantum and cosmos ever be combined? On this issue, two of the world's most famous physicists--Stephen Hawking (A Brief History of Time) and Roger Penrose (The Emperor's New Mind and Shadows of the Mind)--disagree. Here they explain their positions in a work based on six lectures with a final debate, all originally presented at the Isaac Newton Institute for Mathematical Sciences at the University of Cambridge. How could quantum gravity, a theory that could explain the earlier moments of the big bang and the physics of the enigmatic objects known as black holes, be constructed? Why does our patch of the universe look just as Einstein predicted, with no hint of quantum effects in sight? What strange quantum processes can cause black holes to evaporate, and what happens to all the information that they swallow? Why does time go forward, not backward? In this book, the two opponents touch on all these questions. Penrose, like Einstein, refuses to believe that quantum mechanics is a final theory. Hawking thinks otherwise, and argues that general relativity simply cannot account for how the universe began. Only a quantum theory of gravity, coupled with the no-boundary hypothesis, can ever hope to explain adequately what little we can observe about our universe. Penrose, playing the realist to Hawking's positivist, thinks that the universe is unbounded and will expand forever. The universe can be understood, he argues, in terms of the geometry of light cones, the compression and distortion of spacetime, and by the use of twistor theory. With the final debate, the reader will come to realize how much Hawking and Penrose diverge in their opinions of the ultimate quest to combine quantum mechanics and relativity, and how differently they have tried to comprehend the incomprehensible.

Book Information

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Customer Reviews

Who doesn't love a good argument? When physics heavyweights Stephen W. Hawking and Roger Penrose delivered three sets of back-and-forth lectures capped by a final debate at Cambridge's Isaac Newton Institute, the course of modern cosmological thinking was at stake. As it happens, The Nature of Space and Time, which collects these remarks, suggests that little has changed from the days when Einstein challenged Bohr by refusing to believe that God plays dice. The math is more abstruse, the arguments more refined, but the argument still hinges on whether our physical theories should be expected to model reality or merely predict measurements. Hawking, clever and playful as usual, sides with Bohr and the Copenhagen interpretation and builds a strong case for quantum gravity. Penrose, inevitably a bit dry in comparison, shares Einstein's horror at such intuition-blasting thought experiments as SchrÃƒÂ¶dinger's long-suffering cat--and scores just as many points for general relativity. The math is tough going for lay readers, but a few leaps of faith will carry them through to some deeply thought-provoking rhetoric. Though no questions find final answers in The Nature of Space and Time, the quality of discourse should be enough to satisfy the scientifically curious. --Rob Lightner

This volume contains a series of lectures delivered in 1994 by Hawking (A Brief History of Time) and Penrose (The Emperor's New Mind), renowned professors at Cambridge and Oxford, respectively. The overall topic is how mathematical physics might best represent the realities of the universe. The lectures assume a rather sophisticated knowledge of physics and mathematics. The authors present alternative views on approaching a formulation that fully accommodates both quantum and gravitational (general relativity) theories in physics. One question, for example, is whether parameters in a quantum description of matter can have definite ("real") values before they are measured. The issues extend to cosmological implications and have intriguing philosophical as well as technical aspects. Although well done, the treatment in this book is not for the general reader. Illustrations. --This text refers to an out of print or unavailable edition of this title.

This is a fairly technical book, not a book that "explains science to the lay person." You have to have some familiarity with general relativity and the math that goes with it. I'll keep reading it, but much of it will go over my head. Just so you know.

If you liked "The Road to reality" and have an understanding of the Mathmatics of Quantum Physics and Relativity then you will enjoy this book. Otherwise don't bother.

HAWKING IS ALWAYS GOOD

Very good read

I did not have the skills to get through that book . I was told when I started the book I needed to know more physics shame on me

This is a very educational book covering the lectures of one of the greatest physicists ever who explains a very complex subject in terms that are understandable and will get you thinking about the universe that combines space and time in a multi-dimensional level

Somehow less riveting than the book, even with all of the Hollywood wiles to sell the story.

important and precise

the NASA Space Shuttle (Owners' Workshop Manual) NASA Hubble Space Telescope - 1990 onwards (including all upgrades): An insight into the history, development, collaboration, construction and role of ... space telescope (Owners' Workshop Manual) Space Mission Analysis and Design (Space Technology Library) Wheels Stop: The Tragedies and Triumphs of the Space Shuttle Program, 1986-2011: Outward Odyssey: A People's History of Space The U.S. Navy's Secret Space Program and Nordic Extraterrestrial Alliance (Secret Space Programs Book 2) The Development of Outer Space: Sovereignty and Property Rights in International Space Law Space Race: The Epic Battle Between America and the Soviet Union for Dominion of Space Science Fiction Writers' Phrase Book: Essential Reference for All Authors of Sci-Fi, Cyberpunk, Dystopian, Space Marine, and Space Fantasy Adventure (Writers' Phrase Books Book 6)