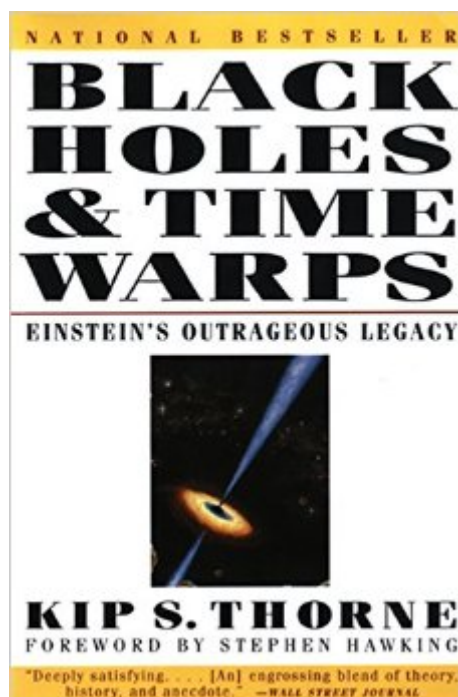


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# Black Holes & Time Warps: Einstein's Outrageous Legacy (Commonwealth Fund Book Program)



## Synopsis

Ever since Albert Einstein's general theory of relativity burst upon the world in 1915 some of the most brilliant minds of our century have sought to decipher the mysteries bequeathed by that theory, a legacy so unthinkable in some respects that even Einstein himself rejected them. Which of these bizarre phenomena, if any, can really exist in our universe? Black holes, down which anything can fall but from which nothing can return; wormholes, short spacewarps connecting regions of the cosmos; singularities, where space and time are so violently warped that time ceases to exist and space becomes a kind of foam; gravitational waves, which carry symphonic accounts of collisions of black holes billions of years ago; and time machines, for traveling backward and forward in time. Kip Thorne, along with fellow theorists Stephen Hawking and Roger Penrose, a cadre of Russians, and earlier scientists such as Oppenheimer, Wheeler and Chandrasekhar, has been in the thick of the quest to secure answers. In this masterfully written and brilliantly informed work of scientific history and explanation, Dr. Thorne, the Feynman Professor of Theoretical Physics at Caltech, leads his readers through an elegant, always human, tapestry of interlocking themes, coming finally to a uniquely informed answer to the great question: what principles control our universe and why do physicists think they know the things they think they know? Stephen Hawking's *A Brief History of Time* has been one of the greatest best-sellers in publishing history. Anyone who struggled with that book will find here a more slowly paced but equally mind-stretching experience, with the added fascination of a rich historical and human component.

## Book Information

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## Customer Reviews

**WHO WROTE IT:** Kip Thorne is the Feynman Professor of Theoretical Physics at CalTech. He wrote several other books, including such a classic as GRAVITATION (with J. Wheeler, C. Misner). This rich combination (plus an obvious talent as a communicator and an apparently fun loving personality) makes him both a knowledgeable and understandable writer.

**WHAT YOU GET:** Many books have been written about black holes. Some are really simple. They make for a good introduction but are somewhat too basic for my taste. Some aim at staying intellectually affordable but they describe more than they explain. You are left frustrated: you don't understand what you are shown (see among others, John Gribbin's Unveiling the Edge of Time ). Some are too technical and took me out of my depth. K. Thorne gives explanations which are complete enough to give you a coherent understanding while still being aimed at a non specialist public.

**HOW IT IS DONE:** The theoretical concepts involved are exposed along an historical structure . This way, the necessity of each element of the theory is made more obvious. Also, one gets briefly acquainted with the circumstance of the discoveries, the personality of the involved researchers and the prevalent questioning as our knowledge evolved.

**WHAT YOU NEED:** The book contains very little mathematics. A college level should suffice. There are no equations (still rigorous; quite a challenge). Thorne illustrates his text with schematic illustrations, diagrams and simple mathematical curves. Being acquainted with the theory of relativity is probably a prerequisite. Thorne's explanation's of Einstein's space-time appears too short to bring you up to speed if you have no notion on the subject.

Don't be too swayed by the word "outrageous" in the title of this book. That may be there to attract attention, but needless to say, physicist Kip Thorne does a good job of explaining the more bizarre aspects of the universe in this book. Thorne's writing style is very accessible and down to earth, as he explains relativity, black holes, quantum mechanics, and even time warps. However, you'll still need to be really on the ball to understand many of these extremely complicated topics. I was impressed by Thorne's ability to explain bizarre concepts like gravitational time dilation and Einstein's theory of relativity to non-eggheads. But some of the more arcane aspects of quantum

gravity or unified field theories will be beyond even the most well tuned laymen who read this book. Thorne also keeps the mood light by giving us the human side of advanced physics research, focusing on the friendships, rivalries, and personalities of the world's leading minds. This extends from Einstein in the beginning to Hawking in the present, and dozens of other less famous but almost as brilliant minds in between. Watch out for some inconsistency in this book however, as Thorne sometimes gets into too much sentimental detail about the scientists' social lives (including his own), while the middle of the book sags as it digresses into the mechanical specs of radio telescopes and gravitational wave detectors. Also, beware of Thorne's suspiciously enthusiastic endorsements of gravitational wave research in chapter 10, as this is his own field of research, and I suspect he's trying to promote the need for funding.

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