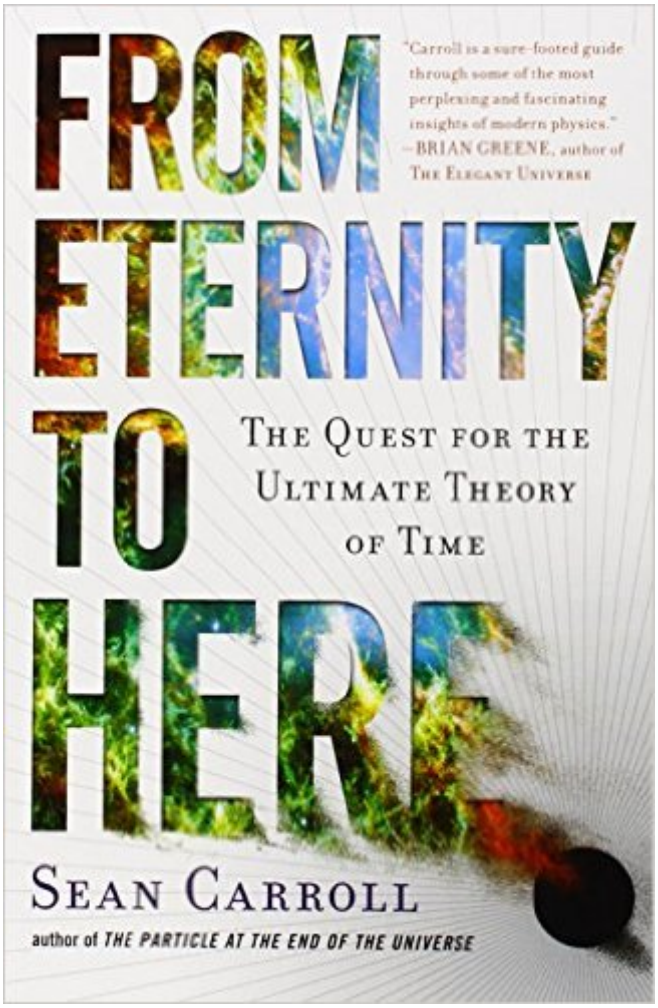
From Eternity To Here: The Quest For The Ultimate Theory Of Time



Synopsis

"An accessible and engaging exploration of the mysteries of time." -Brian Greene, author of The Elegant Universe Twenty years ago, Stephen Hawking tried to explain time by understanding the Big Bang. Now, Sean Carroll says we need to be more ambitious. One of the leading theoretical physicists of his generation, Carroll delivers a dazzling and paradigm-shifting theory of time's arrow that embraces subjects from entropy to quantum mechanics to time travel to information theory and the meaning of life. From Eternity to Here is no less than the next step toward understanding how we came to exist, and a fantastically approachable read that will appeal to a broad audience of armchair physicists, and anyone who ponders the nature of our world.

Book Information

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Customer Reviews

This is a wonderful book that would merit a second reading to understand it more fully. At a fundamental level physics consists of the Standard Model, General Relativity and the Big Bang Inflationary Model of the universe. However, in this model there is something unexplained and it is the Past Hypothesis, that is that the universe started in a low entropy configuration. However the author speculates that perhaps the Big Bang was neither the beginning of time nor a moment of low entropy, but a moment of lowest entropy and the entropy increases in both directions of time, towards the future of the Big Bang and towards its past (from our point of view). This would be the situation in a single connected universe, although string theory predicts a multiverse.Trying to elucidate the meaning of time (perhaps "an emergent phenomenon rather than a necessary part of our ultimate description of the world") the author reviews special and general relativity, Boltzmann's

entropy, black holes and the controversy about conservation of information, life, quantum mechanics, inflation and the multiverse. Generally speaking the book is written in an accessible style (eggs can be broken and turned into omelettes, but not the other way around to describe the Second Law), but you will need to reread some parts to make the most of it.In the final chapter Sean Carroll faces the "search for meaning in a preposterous universe". I quote: "We find ourselves, not as a central player in the life of the cosmos, but as a tiny epiphenomenon, flourishing for a brief moment as we ride a wave of increasing entropy...Purpose and meaning are not to be found in the laws of nature, or in the plans of any external agent...it is our job to create them.

Roughly the first 3/4 of the book is quite standard physics, and a few related fields, e.g. information theory. The last few chapters, where the author, Sean Carroll, suggests a possible answer to the puzzle, are much more speculative, something he makes very clear.To me the book was quite interesting. A few equations are displayed, but there is no actual use of mathematics. I have an M.S. in Applied Physics, so I cannot really say how a reader with no technical background would cope with it. Carroll goes through a lot of material, and the sheer quantity of it might be overwhelming. Unfortunately, that is just the way things are. Nobody is going to cope with this without the willingness to do some hard thinking. Carroll does include a lot of pop culture references that readers can relate to, although one of those may not be in any future edition of the book.A couple interesting (to me) notes:The complexity of the universe is different from the entropy. Just after the Big Bang the universe was very simple--the same high energy subatomic soup every where. Right now the universe is very complicated: There are lots of galaxies, stars, planets, black holes, people, etc. However, the entropy of the universe has increased: The formation of all those objects is mostly due to gravitation, as matter coalesces together. This gravitational process increases the total entropy, more than offsetting the order in all the structure. Eventually all of this structure will fade away. Even black holes will decay by the Hawking process, leaving a very thin, cold, dark, and simple universe. So while the universe started in a simple state, evolved into a complex state, and will eventually decay into another simple state, the entropy is always increasing. See pages 199-201.

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