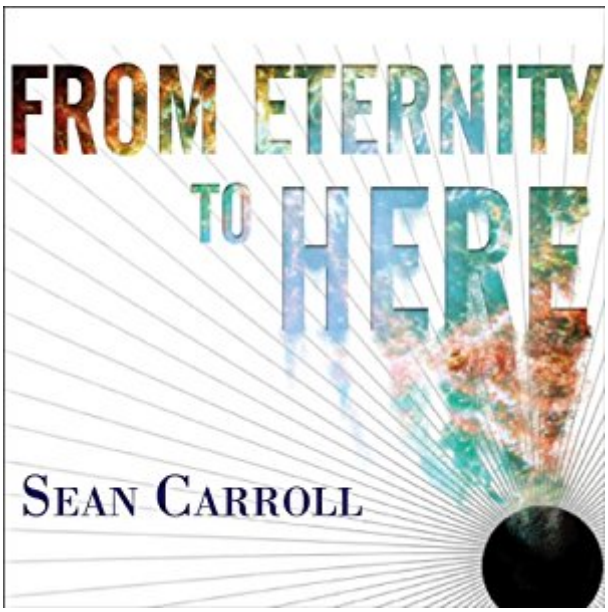
From Eternity To Here: The Quest For The Ultimate Theory Of Time



Synopsis

Time moves forward, not backward-everyone knows you can’t unscramble an egg. In the hands of one of today’s hottest young physicists, that simple fact of breakfast becomes a doorway to understanding the Big Bang, the universe, and other universes, too. In From Eternity to Here, Sean Carroll argues that the arrow of time, pointing resolutely from the past to the future, owes its existence to conditions before the Big Bang itself-a period of modern cosmology of which Einstein never dreamed. Increasingly, though, physicists are going out into realms that make the theory of relativity seem like child’s play. Carroll’s scenario is not only elegant, it’s laid out in the same easy-to-understand language that has made his group blog, Cosmic Variance, the most popular physics blog on the Net. From Eternity to Here uses ideas at the cutting edge of theoretical physics to explore how properties of space-time before the Big Bang can explain the flow of time we experience in our everyday lives. Carroll suggests that we live in a baby universe, part of a large family of universes in which many of our siblings experience an arrow of time running in the opposite direction. It’s an ambitious, fascinating picture of the universe on an ultra-large scale, one that will captivate fans of popular physics blockbusters like Elegant Universe and A Brief History of Time. --This text refers to the MP3 CD edition.

Book Information

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Customer Reviews

Popular science books as always hit or miss. You get quality books that describe modern physics in a way that actually helps you understand what science is discovering. On the other hand, you get

cheap pop books that are more focused with shiny theories and predictions that are at the peripheral of the science community. Fortunately, From Eternity to Here falls into the first group. Sean Carroll sets off to discuss the current theories of why time only flows in one direction. That is pretty heady stuff and can get really complex. Carroll does a good job explaining some of the science in an understandable way, but he does not cut corners when he does not need to. Because of that, From Eternity to Here has pretty lengthy discussions of the law of entropy and general relativity. These discussions do not rely so much on the flashy predictions that seems to populate a lot of science books, but rather involve the nuts and bolts of these theories, even going so far as to get into the mathematics. I enjoyed this approach, because I felt that Carroll was focusing on the actually science and not just trying to write what would appeal to mass audiences. CarrollÃ¢Â Â™s approach made this book interesting, especially to somebody like me who is studying physics in college. I would highly recommend From Eternity to Here to people who have some background in physics

If questions like "what is entropy and how do we know it’s always increasing" or "how did scientists come to the idea of a multiverse" interest you, braving through this book will answer these and more questions wholly, with zero math requirements.Towards the end of my reading the book, I happened upon an article titled "Universe Has Finite Lifespan, Higgs Boson Calculations Suggest". While reading the article, the crucial concepts mentioned were familiar to me from the book, and I understood what they were talking about and where these ideas come from. It was both a personal triumph and a seal of approval for the quality of the book. I did not waste my time reading this.The book takes a tour through modern theories and speculations by starting with a few fundamental questions "what is time and why is it moving forward" and "why did the universe start in a very low entropy configuration". Hunting the answers for these questions is the purpose of the book, and the author makes sure you’re not lost in increasingly complex explanations along the way.It’s not an easy read, though, even if it does present super complex subjects in laymen’s terms. I bought this book for a two-week vacation, and even though I read all the time, it took me 4 more days of reading after the vacation to finish it. The content requires a fair amount of concentration without stop, and the book is rather long.I did have a few gripes while reading.The author explains that the universe had a very low entropy configuration in the big bang, but from his description of entropy, it seemed like it actually had high entropy. I was plagued with this question early on and got the answer only about 75% into the book.The author keeps implying that the next paragraph or chapter will have an answer to the questions that he asks, but they never come. Only towards the end of the book did I

feel that I wasn’t being made to follow along with a promise that I could never reach.Finally, expect some lame humor. Most of the times these are charming, geeky jokes that aren’t funny but you appreciate the author’s trying, but a few of them were flat out annoying. For example, the author says that a "loaf of raisin bread rising in the oven, with each galaxy represented by one of the raisins, is a terrible analogy of the universe". Why? Because: Raisin bread has an edge, it’s inside an oven and it smells yummy, unlike the universe.I nearly stopped reading the book after this, as it came early on in the book and I was worried most of the book would be like this (it’s not). It tells me NOTHING about why the analogy is bad. Everything other than the universe has an edge, so every analogy will fail at that, and the two others are obviously ridiculous. I still don’t know whether it really is a terrible analogy or not, because the author had to crack another one.If you know to expect this kind of humor when reading the book, I’m sure it’d irritate you much less than it did me.

This is the first book I have read by Sean Carroll, and I found in it an elegant discussion on the concept of the arrow of time. I think he has done an excellent job of presenting us with an in-depth and provocative introduction to this subject. Some parts, I found, required clear, sharp thinking as I read the material; it can sometimes be a bit confusing. Nevertheless, Carroll did quite well in explaining the material in as clear and comprehensive manner as possible. I need to mention that this book packs a tremendous amount of information between it covers. Often I would read only so many pages before have to stop and digest the material.He divides the book into four sections. In section one, we get into some talk about the concepts of the past (events near the Big Bang), the present, the future, and an introduction to the laws of thermodynamics, especially the second law which is about entropy - an important topic in our understanding of the arrow of time. We also learn about vacuum energy, time symmetry, and what is maximum entropy as he lays the foundation for what is to come.Section two delves into concepts involving relativity, such as the speed of light and light cones, curved spacetime along with a discussion of white and black holes. Here we learn that black holes provide the strongest connection between gravitation and entropy - the two crucial ingredients in an ultimate explanation of the arrow of time according to Carroll.Section three introduces us to something called closed time-like curves, a closed flatland universe, and something called a space of states. Microstates and macrostates play an important role in the discussion. Chapter eight involves an interesting discussion of Boltzmann’s formula, which is a calculation of entropy based on the number of microscopic arrangements of a system that are macroscopically indistinguishable. For those rusty on exponentials and logarithms, Carroll provides an appendix covering the basics. Don’t worry, the book is not heavy on math. We get into a number of concepts

involving entropy: Liouville’s Theorem, Gibb’s formula, Loschmidt’s reversibility objection, and the past hypothesis (referring to a boundary condition at the beginning of the universe). I also need to mention Maxwell’s demon (illustrating a connection between entropy and information) and Laplace’s all-knowing demon. I found chapter eleven interesting. The material delves into quantum mechanics involving such topics as the "quantum cat" and the collapse of the wave function, entanglement, and decoherence. All of the material in this section is actually quite important to building a knowledge foundation for understanding the arrow of time.In the last section, there is a more in depth coverage of black holes, which, as I said, provides an important connection between entropy and gravity. The question of why the universe had such a low entropy at the beginning is explored in more depth, and the future state of the universe is hypothesized - possibly something called de Sitter space. Inflation and the multiverse are discussed. In this section, the concept of bubble universes is presented as a possible solution to the arrow of time. I found myself concurring with Carroll on this. It sounds plausible, if not testable.Don’t worry about all of the concepts introduced in this review. Carroll thoroughly explains and elaborates on these topics in the process of making them understandable.If you want a good summary of the contents of the book, I suggest you use ’s "Look Inside" feature, and scroll down to the table of contents. Under each chapter heading, you will find a brief description of the chapter. This gives you a pretty good idea of what is being discussed.

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