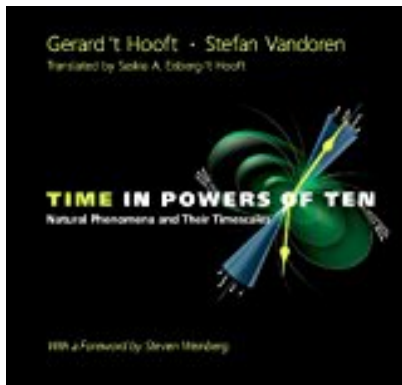


Time in Powers of Ten Natural Phenomena and Their Timescales



BOOK DETAILS

- Author : Gerard t Hooft
- Pages : 232 Pages
- Publisher : World Scientific Publishing Company
- Language : English
- ISBN : 9814489816



BOOK SYNOPSIS

With a Foreword by writer Steven Weinberg In this richly illustrated book, Nobel Laureate Gerard t Hooft and Theoretical Physicist Stefan Vandoren describe the enormous diversity of natural phenomena that take place at different time scales. In the tradition of the bestseller Powers of Ten, the authors zoom in and out in time, each step with a factor of ten. Starting from one second, time scales are enlarged until processes are reached that take much longer than the age of the universe. After the largest possible eternities, the reader is treated to the shortest and fastest phenomena known. Then the authors increase with powers of ten, until again the second is reached at the end of the book. At each time scale, interesting natural phenomena occur, spread over all scientific disciplines: orbital and rotation periods of planets and stars, decay times of elementary particles and atoms, biological rhythms and evolution processes, but also the different geological time scales.

Contents: Part I: 100 Seconds = 1 Second 101 Seconds = 10 Seconds 102 Seconds = 100 Seconds = 1 Minute, 40 Seconds 103 Seconds = 1,000 Seconds = 16 Minutes, 40 Seconds 104 Seconds = 10,000 Seconds = 2.78 Hours 105 Seconds = 100,000 Seconds = 1.16 Days = 27.78 Hours 106 Seconds = 1,000,000 = 1 Million Seconds = 11.57 Days = 1.65 Weeks 106.41 Seconds = 2,592,000 Seconds = 30 Days \approx 1 Month 107 Seconds = 10 Million Seconds = 115.74 Days = 3.86 Months 108 Seconds = 100 Million Seconds = 3.17 Years 109 Seconds = 1 Billion Seconds = 31.7 Years 1010 Seconds = 10 Billion Seconds = 317 Years 1011 Seconds = 100 Billion Seconds = 3,171 Years 1012 Seconds = 1 Trillion Seconds = 31,710 Years 1013 Seconds = 10 Trillion Seconds = 317,098 Years 1014 Seconds = 100 Trillion Seconds = 3.17 Million Years 1015 Seconds = 1 Quadrillion Seconds = 31.7 Million Years 1016 Seconds = 10 Quadrillion Seconds = 317 Million Years 1017 Seconds = 100 Quadrillion Seconds = 3.17 Billion Years 1018 Seconds = 1 Quintillion Seconds = 31.7 Billion years: The Large Timescales 1021 seconds = 1 Sextillion Seconds = 3.17×10^{13} Years: The Large Timescales 1028 Seconds = 3.17×10^{20} Years: The Large Timescales 1032 Seconds: To Infinity and Beyond: The Dark Eternities Part II: 10-44 to 10-26 Seconds: Small Timescales 10-25 Seconds 10-24 Seconds = 1 Yoctosecond 10-23 Seconds = 10 Yoctoseconds 10-22 Seconds = 100 Yoctoseconds 10-21 Seconds = 1 Zeptosecond 10-20 Seconds = 10 Zeptoseconds 10-19 Seconds = 100 Zeptoseconds 10-18 Seconds = 1 Attosecond 10-17 Seconds = 10 Attoseconds 10-16 Seconds = 100 Attoseconds 10-15 Seconds = 1 Femtosecond 10-14 Seconds = 10 Femtoseconds 10-13 Seconds = 100 Femtoseconds 10-12 Seconds = 1 Picosecond 10-11 Seconds = 10 Picoseconds 10-10 Seconds = 100 Picoseconds 10-9 Seconds = 1 Nanosecond 10-8 Seconds = 10 Nanoseconds 10-7 Seconds = 100 Nanoseconds 10-6 Seconds = 1 Microsecond 10-5 Seconds = 10 Microseconds 10-4 Seconds = 100 Microseconds = 0.0001 Seconds 10-3 Seconds = 1 Millisecond = 0.001 Seconds 10-2 Seconds = 10 Milliseconds = 0.01 Seconds 10-1 Seconds = 100 Milliseconds = 0.1 Seconds 100 Seconds = 1 Second -> Readership: Science enthusiasts and students. Keywords: Time; natural Phenomena; Time Scales; Age of the Universe; Powers of Ten Reviews: "The somewhat facetious narrating style and the abundance of illustrations are so inviting and rather addictive once you picked up the book." European Mathematical Society "Pleasingly accessible volume that will give pleasure to academics, students, connoisseurs of coffee-table books and even the people who compile questions for Trivial Pursuit ... Can be enjoyed as a source of scientific stories and images, as an unusual perspective on history, as a popular account of modern physics, and so on. Underneath them all is a wealth of serious science that will give readers insights into abstract fundamental ideas via concrete realities ... Every science teacher would benefit from reading Time in Powers of Ten, but I hope it will have an even wider reach." Times Higher Education "The authors have compiled a refreshing mix of historical anecdotes and examples from music to sport and biology to astronomy to lighten up the heavier taste of particle physics and cosmology... It is both an enjoyable read and very pleasant to browse at leisure... It fully conveys the authors amazement at — as Feynman put it — our fantastically marvellous universe." Nature Physics "The authors introduce the reader to the diversity of nature in a novel way by describing typical and interesting phenomena that occur or have occurred on many different time scales. The time scales considered differ by powers of ten, as the title of the book says, from the shortest times of which we have knowledge to the longest. I am sure many readers will enjoy the book as I have." Edward Witten, Fields Medalist "Time is an essential dimension of life. Indeed, its remarkable and awesome variation of scale shapes the natural world. This book by Gerard t Hooft and Stefan Vandoren gives us an exposé of a wide range of natural phenomena and their associated time scales, spanning the very small, the very large, and the life events of our universe. The book is elegantly illustrated and should be an enjoyable read for anyone interested in a deeper understanding of the fourth dimension, time, and how it shapes our lives." Ahmed Zewail, Nobel Laureate in Chemistry "Like the original Powers of Ten, it is a wonderful book for flipping through and thinking about puzzles and is a good introduction to basics like how to tell a quark from a lepton." The Dispatch "The book reveals the extraordinary complexity of our universe — it is a fascinating journey." CERN Courier "This is a fascinating coffee-table book ranging from the unimaginably huge to the unimaginably tiny." Ultramicroscopy "You can read the book in any direction. Delving into the index takes you on a mystery tour of the time domain. Helpfully, all the major phenomena are gathered together on an illustrated time line. This book is definitely one for your reading list." Physics Education

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