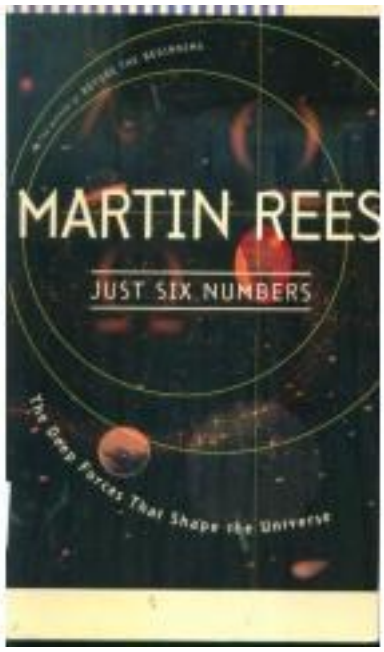
Just Six Numbers: The Deep Forces That Shape The Universe



Just Six Numbers: The Deep Forces That Shape The Universe_下载链接1_

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内容简介：Chapter One THE COSMOS AND THE MICROWORLD Man is ... related inextricably to all reality, known and unknowable ... plankton, a shimmering phosphorescence on the sea and the spinning planets and an expanding universe, all bound together by the elastic string of time. It is advisable to look from the tide pool to the stars and then back to the tide pool again. John Steinbeck, The Log from the Sea of Cortez SIX NUMBERS Mathematical laws underpin the fabric of our universe — not just atoms, but galaxies, stars and people. The properties of atoms — their sizes and masses, how many different kinds there are, and the forces linking them together — determine the chemistry of our everyday world. The very existence of atoms depends

on forces and particles deep inside them. The objects that astronomers study — planets, stars and galaxies — are controlled by the force of gravity. And everything takes place in the arena of an expanding universe, whose properties were imprinted into it at the time of the initial Big Bang. ??? Science advances by discerning patterns and regularities in nature, so that more and more phenomena can be subsumed into general categories and laws. Theorists aim to encapsulate the essence of the physical laws in a unified set of equations, and a few numbers. There is still some way to go, but progress is remarkable. ??? This book describes six numbers that now seem especially significant. Two of them relate to the basic forces; two fix the size andoverall `texture' of our universe and determine whether it will continue for ever; and two more fix the properties of space itself: • The cosmos is so vast because there is one crucially important huge number N in nature, equal to 1,000,000, 000,000,000,000,000,000,000,000,000,000. This number measures the strength of the electrical forces that hold atoms together, divided by the force of gravity between them. If N had a few less zeros, only a short-lived miniature universe could exist: no creatures could grow larger than insects, and there would be no time for biological evolution. • Another number, [Epsilon], whose value is 0.007, defines how firmly atomic nuclei bind together and how all the atoms on Earth were made. Its value controls the power from the Sun and, more sensitively, how stars transmute hydrogen into all the atoms of the periodic table. Carbon and oxygen are common, whereas gold and uranium are rare, because of what happens in the stars. If [Epsilon] were 0.006 or 0.008, we could not exist. • The cosmic number [Omega] (omega) measures the amount of material in our universe — galaxies, diffuse gas, and `dark matter'. [Omega] tells us the relative importance of gravity and expansion energy in the universe. If this ratio were too high relative to a particular `critical' value, the universe would have collapsed long ago; had it been too low, no galaxies or stars would have formed. The initial expansion speed seems to have been finely tuned. • Measuring the fourth number, [Lambda] (lambda), was the biggest scientific news of 1998. An unsuspected new force — a cosmic `antigravity' — controls the expansion of our universe, even though it has no discernible effect on scales less than a billion light-years. It is destined to become ever more dominant over gravity and other forces as our universe becomes ever darker and emptier. Fortunately for us (and very surprisingly to theorists), [Lambda] is very small. Otherwise its effect would have stopped galaxies and stars from forming, and cosmic evolution would have been stifled before it could even begin. • The seeds for all cosmic structures — stars, galaxies and clusters of galaxies — were all imprinted in the Big Bang. The fabric of our universe depends on one number, Q which represents the ratio of two fundamental energies and is about 1/100,000 in value. If Q were even smaller, the universe would be inert and structureless; if Q were much larger, it would be a violent place, in which no stars or solar systems could survive, dominated by vast black holes. • The sixth crucial number has been known for centuries, although i

作者介绍:

Sir Martin Rees is Royal Society Research Professor at Cambridge University & Astronomer Royal. --This text refers to an out of print or unavailable edition of this title.

目录: 媒体评论： Just six numbers govern the shape, size and texture of our universe. If their values were only fractionally different, we would not exist nor, in many cases, would matter have had a chance to form. If the numbers that govern our universe were elegant--1, say, or Pi or the Golden Mean--we would simply shrug and say that the universe was an elegant mathematical puzzle. But the numbers Martin Rees discusses

are far from tidy. Was the universe "tweaked" or is it one of many universes, all run by slightly different, but equally messy, rules?This is familiar ground, though rarely so comprehensively explored. What makes Rees's book exceptional is his conviction that cosmology is as materialistic and as conceptually simple as any of the earth sciences. Indeed, "cosmology is simpler in one important respect: once the starting point is specified, the outcome is in broad terms predictable. All large patches of the universe that start off the same way end up statistically similar. In contrast, if the Earth's history were re-run, it could end up with a quite different biosphere."Rees demonstrates how the cosmos is full of "fossils" from which we can deduce how our universe developed, as surely as we infer the earth's past from the relics found in sedimentary rocks. Rees's theme is nothing less than the colossal richness of the universe. It is an ambitious book, if anything, it deserves to be longer. --Simon Ings --This text refers to an out of print or unavailable edition of this title.
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评论

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书评

听着约翰丹佛把《六个数》看完了，纪念他飞去。科普书一定要看真正的大师作品。这本书不难懂，高中物理知识就足够。
在马丁.里斯笔下，深奥的宇宙学充满宏大试验和绚丽猜想，害的我都想转专业去学天体物理。 摘抄里面几个句子： 我们是来自恒星的灰烬 望远镜：一种装置，它...

如果有人有根有据地预测一个尺度为后面跟着100万个零（单位当然是光年）的年头之后的世界会怎样； 光年还是年?

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