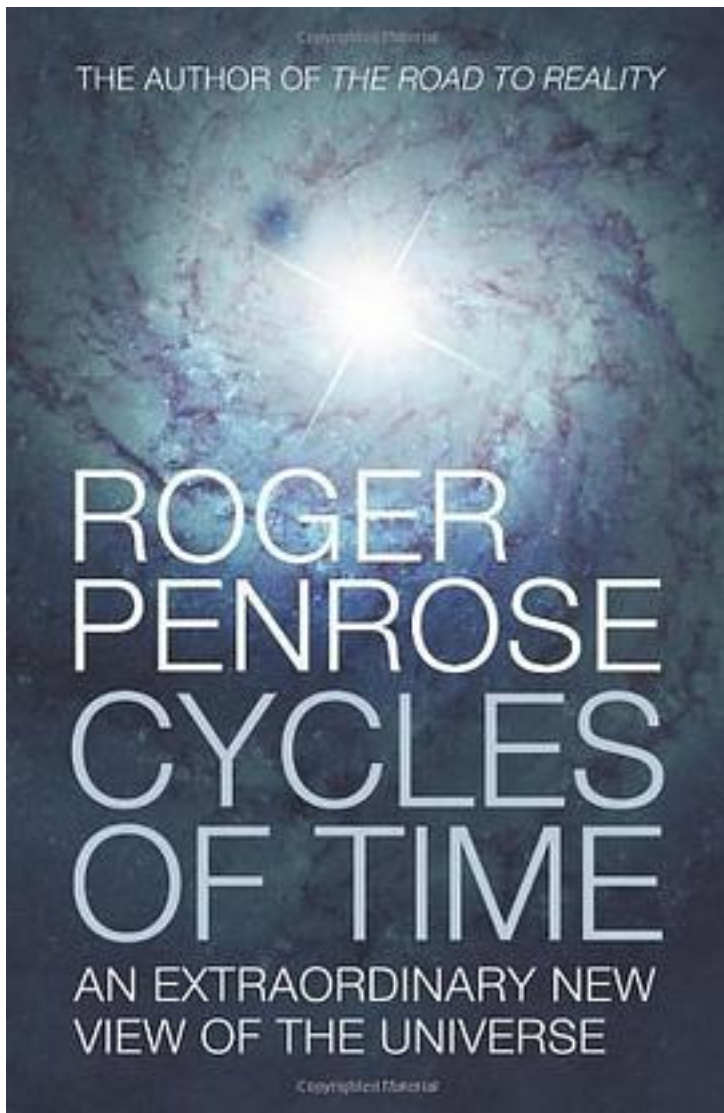


Cycles of Time



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著者:Penrose, Roger

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Roger Penrose's groundbreaking and bestselling "The Road to Reality" provided a comprehensive yet readable guide to our present understanding of the laws that are currently believed to govern our universe. In "Cycles of Time", he moves far beyond this to develop a completely new perspective on cosmology, providing a quite unexpected answer to the often-asked question, 'what came before the Big Bang'? The two key ideas underlying this novel proposal are a penetrating analysis the Second Law of thermodynamics - according to which the 'randomness' of our world is continually increasing - and a thorough examination of the light-cone geometry of space-time. Penrose is able to combine these two central themes to show how the expected ultimate fate of our accelerating, expanding universe can actually be reinterpreted as the 'Big Bang' of a new one. On the way, many other basic ingredients are presented, and their roles discussed in detail, though without any complex mathematical formulae (these all being banished to the appendices). Various standard and non-standard cosmological models are presented, as is the fundamental and ubiquitous role of the cosmic microwave background. Also crucial to the discussion are the huge black holes lying in galactic centres, and their eventual disappearance via the mysterious process of Hawking evaporation.

作者介绍:

Roger Penrose is Emeritus Rouse Ball Professor of Mathematics at Oxford University. He has received a number of prizes and awards, including the 1988 Wolf Prize for physics, which he shared with Stephen Hawking for their joint contribution to our understanding of the universe. His books include The Emperor's New Mind, Shadows of the Mind, and The Nature of Space and Time, which he wrote with Hawking. He has lectured extensively at universities throughout America. He lives in Oxford.

目录: Develops a fresh perspective on cosmology, providing an answer to the often-asked question, 'what came before the Big Bang'? This title presents an analysis the Second Law of thermodynamics - according to which the 'randomness' of our world is continually increasing - and an examination of the light-cone geometry of space-time.
• • • • • (收起)

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标签

宇宙学

广义相对论7

轮回宇宙

相对论

熵

暴涨

微波背景辐射

大爆炸

评论

虽然ccc理论不一定经得起时间考验，但作者对于时空的观点很值得反复思考。

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书评

上回说了，循环的CCC自然面对着两个问题：遥远的未来如何与大爆炸的起点等同起来呢？循环如何满足“永不循环”的热力学第二定律？
CCC对那两个问题的回答是：第一，宇宙的初态是低熵的，而终态是高熵的，其演化满足热力学第二定律；第二，一个世代的初态与前一个世代的终态...

上回说了，CCC是靠Weyl曲率来实现的，Weyl曲率是CCC的数学核心。这回就复习那个著名的张量。
Weyl曲率的故事大概可以从30多年前说起。1979年，剑桥大学出版社出版了一本由霍金等人编辑的纪念爱因斯坦的文集General relativity: An Einstein Centenary Survey (Eds. S W Haw...

40多年前，彭罗斯（与霍金一起）证明了奇点定理，这是他对宇宙学的最大贡献，我喜欢说那是数学的一小步（将整体微分几何用于时空结构），宇宙学的一大步。奇点定理

说，在几个简单的合理的条件下（如能量条件、时序性等），时空是不完备的（即存在不能延伸的非类空测地线）。 ...

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