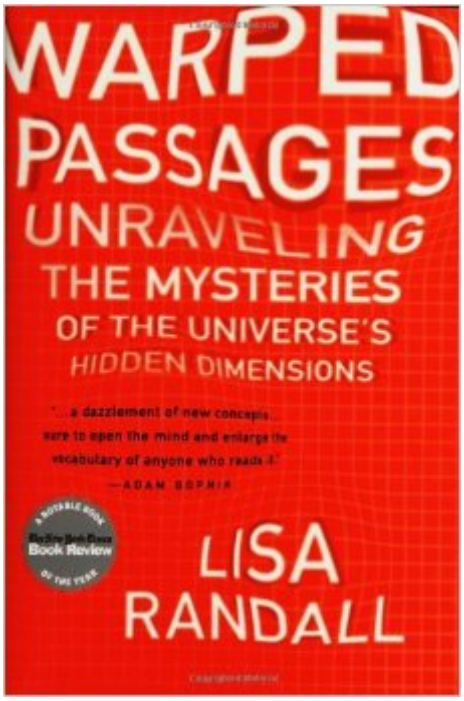
Warped Passages: Unraveling The Mysteries Of The Universe's Hidden Dimensions



Synopsis

The universe has its secrets. It may even hide extra dimensions, different from anything ever imagined. A whole raft of remarkable conceptsnow rides atop the scientific firmament, including parallel universes, warped geometry, and threedimensional sink-holes. We understand far more about the world than we did just a few short years ago -- and yet we are more uncertain about the true nature of the universe than ever before. Have wereached a point of scientific discovery so advanced that the laws of physics as we know them are simply not sufficient? Will we all soon have to acceptexplanations that previously remained in the realm of science fiction?Lisa Randall is herself making these extraordinary breakthroughs, pushing back the boundaries of science in her research to answer some of the most fundamental questions posed by Nature. For example, why is the gravitational field from the entire Earth so defenseless against the small tug of a tiny magnet? Searching for answers to such seemingly irresolvable questions has led physicists to postulate extra dimensions, the presence of which may lead to unimaginable gains in scientific understanding. Randall takes us into the incredible world of warped, hidden dimensions that underpin the universe we live in, describing how we might prove their existence, while examining the questions that they still leave unanswered.Warped Passages provides an exhilarating overview that tracks the arc of discovery from early twentieth-century physics to the razor's edge of today's particle physics and string theory, unweaving the current debates about relativity, quantum mechanics, and gravity. In a highly readable style sure to entertain and elucidate, Lisa Randall demystifies the science and beguilingly unravels the mysteries of the myriad worlds that may exist just beyond the one we are only now beginning to know.

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Customer Reviews

Prof. Lisa Randall’s new book, Warped Passages, is a grand tour of some of the most important recent developments in high-energy physics.The book is intended for a popular audience, but is also a very interesting read for anybody with a background in theoretical physics (like myself). The first part contains an overview of modern physics - Einstein’s theories of relativity, quantum mechanics and the Standard Model of particle physics. The last part concentrates on the idea of extra dimensions beyond the standard four we know about, which can be motivated by string theory and its discovery of the so-called D-branes. Specifically, she explains the work, pioneered by herself, Raman Sundrum and others, on the so-called "braneworld scenarios". Basically, this is the idea that our four dimensional space-time is embedded in some higher dimensional space, usually called the "bulk".You might think, that extra dimensions are just part of a set of crazy ideas? On the contrary. You should know, that the idea of extra dimensions is actually not at all new. Already in 1884, the original book, "Flatland: A Romance of Many Dimensions" (written by the English mathematician Edwin Abbott) described a world of two-dimensional beings, who only have indirect knowledge of the extra third space-dimension. But, from a mathematical point of view, one can imagine as many dimensions as one wants to. In physics, the story is somewhat different.In physics, there are basically two distinct ways in which one can add extra dimensions to our four-dimensional universe. Already in the 1920’s, Klein suggested that our universe is five-dimensional, where the extra dimension is rolled up in a circle, which is so tiny, that the universe looks four-dimensional at long enough distance-scales.

I am shocked that so much of the praise of this book is centered on its readability for popular audiences. I regularly read philosophy and popular physics and biology books and articles, and I took a modern physics course in college and quite enjoyed it and did well (I did a degree to be a secondary science teacher), but I did not learn what I wanted to learn from this book. I just don’t think Randall is a good writer.I understand the basic ideas of quantum mechanics and particle physics, and I want something more, a deeper understanding. She states the facts that can be found in an encyclopedia (e.g., "the uncertainty principle means that position and momentum cannot both be measured"), but when she tries to go deeper and into more detail, I found her explanations incomprehensible. They seem to me to be both too simple (and her tone often condescending) and too complex. I beat my head against the wall re-reading sections of the text trying to grasp her

meaning, which she is maddeningly confident that she has conveyed, but finally concluded that in many of the sections the words simply were not there that needed to be there. Sufficient bridges are not created from one idea to the next, and in her effort to avoid scaring people away with long explanations, she has instead given insufficient explanations. A lot of space that could have been given over to actual explanation is taken up with literary fluff and the typical popular-science-book encouragements of "don't worry if this seems hard, I know you can do it!" I have stopped halfway through, and haven't even gotten to the parts about extra dimensions. Maybe I should just skip to those.