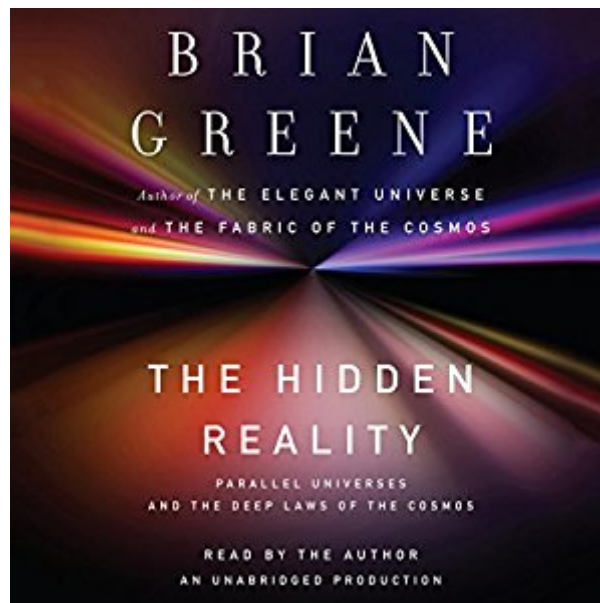


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The Hidden Reality: Parallel Universes And The Deep Laws Of The Cosmos



Synopsis

There was a time when "universe" meant all there is. Everything. Yet, in recent years discoveries in physics and cosmology have led a number of scientists to conclude that our universe may be one among many. With crystal-clear prose and inspired use of analogy, Brian Greene shows how a range of different "multiverse" proposals emerges from theories developed to explain the most refined observations of both subatomic particles and the dark depths of space: a multiverse in which you have an infinite number of doppelg ngers, each reading this sentence in a distant universe; a multiverse comprising a vast ocean of bubble universes, of which ours is but one; a multiverse that endlessly cycles through time, or one that might be hovering millimeters away yet remains invisible; another in which every possibility allowed by quantum physics is brought to life. Or, perhaps strangest of all, a multiverse made purely of mathematics. Greene, one of our foremost physicists and science writers, takes us on a captivating exploration of these parallel worlds and reveals how much of reality's true nature may be deeply hidden within them.

Book Information

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Customer Reviews

Brian Greene's previous books are exemplars of what science writing should be: clear, wide-ranging in discussion and respectful of the intelligence of his audience. The *Elegant Universe* and *The Fabric of the Cosmos* are two of my three favorite popular science books. The third, Kip Thorne's *Black Holes and Time Warps*, is another superb example of science writing at its best. Now Brian Greene has added another masterpiece to the list. Everything that distinguishes Greene's writing style is in evidence in *The Hidden Reality*. His elegant prose is enjoyable to read. His brilliant ability

to explain difficult abstract ideas in everyday language using easily understood examples still amazes me. And his use of vivid word pictures that always seem perfectly matched to the topic he's discussing propels his narrative forward so that the reader is never bored. Yes *The Hidden Reality* is more accessible than his previous books. This book seems easier to read and is readily understandable. In his earlier books, I often read a paragraph several times in order to fully comprehend what Greene was attempting to communicate. That is something science and math majors are used to doing when reading textbooks but difficult for those not as scientifically adept. Greene's first two books dealt with Quantum Mechanics, String Theory and Einstein's Special and General Theories of Relativity: vast math-intensive topics that he was able to distill masterfully. *The Hidden Reality* inhabits a more abstract world, a conceptually challenging world. I quickly found Greene's more casual approach extremely helpful, even comforting, when I felt slightly adrift. The topics he discusses begin with the geometry of the universe: whether it is spherical (or positively curved), flat (with zero curvature) like a tabletop, or negatively curved like a Pringle. The book devotes considerable time to the critical question of whether the universe is finite or infinite in size, something which has profound scientific and philosophical implications. It is a statistical certainty that in an infinite universe, regions of local space like ours will be endlessly repeated. In other words, assuming an infinite spatial universe with an expanding big-bang beginning, there are only a finite number of possible matter and energy configurations because the amount of energy and matter is finite. But there is an infinite amount of space within which those configurations will play out. Greene uses the example of a friend named Imelda whose passion for clothing has her purchasing 1000 pairs of shoes and 500 dresses. If Imelda is blessed with an infinitely long lifespan then, despite her vast wardrobe, if she changes outfits daily, within 1400 years she will have exhausted all possible new combinations. Imelda will be forced to repeat her sartorial choices. Philosophically, of course, all of that repetition of stars, planets and life's building blocks suggests that there are an infinite number of doppelgangers of each and every one of us. These infinite duplicates of ourselves would inhabit similar worlds that are forever hidden from mutual observation because the speed of light is finite. As Einstein showed in his Special Theory of Relativity, light-speed (300,000 km/sec) is the fastest rate by which information can be communicated. The bottom line: in an infinite universe the overwhelming bulk of reality remains hidden from its inhabitants by vast distances or by parallel dimensions harboring realities of every possible configuration. In a finite spherical universe, on the other hand, the light from distant objects should ultimately traverse it several times, leading to multiple images of galaxies, for example. This hasn't been observed as yet, suggesting that the universe is either finite but huge or actually infinite in

size. Though the size and shape of the universe remain undetermined, scientists when cornered tend to believe its size is infinite. Recent data also suggests that the universe is flat like a tabletop in shape. Greene discusses all of the current hot topics in cosmology: brane-worlds, the multiverse, the holographic universe, unseen parallel worlds in dimensions separated by millimeters, our universe as a super-advanced computer program, the essentially hidden nature of reality. These are topics that have been discussed in other books but seldom with the passion for communication and clarity of thought that Greene exhibits in this one. The topics here are abstract concepts that exist at the very boundaries of human thought but Greene somehow manages to bring them down to earth. Even if you don't understand everything, the scientific vistas that Greene offers in this superb book are breathtaking in their intellectual beauty. You will find your personal horizons exponentially expanded. The Hidden Reality is replete with excellent illustrations that illuminate the material and are fun to look at. If this kind of science intrigues you then you will love this book. Brian Greene has written another masterpiece in a difficult genre.

Dr Greene has written a book that deals with the multiverse and in particular, and the reason I bought the book, is he deals with the possibilities of us being in a Simulation. (Look out, Twilight Zone!) Chapter 10 deals with the concept of what is reality -- since all is filtered thru our brains/senses -- what are we not seeing, or how are we seeing whatever is there? A case in point is the movie Thirteenth Floor, as well as Matrix, wherein the main characters are not dealing with 3D physical reality -- they have more of a Simulation, and this idea intrigues Dr Greene. The application of the idea also intrigued the author of Virtual Earth Graduate and he (Hegland) goes into quite some detail in 2 chapters relating how Earth really could be a Simulation, albeit a very sophisticated one. And there are many physicists who are now saying the same thing about Earth and offer credible reasons for thinking thus... including Nick Bostrom. While the idea sounds silly on the surface, one of Dr Greene's key points (there are several) is that physical constants of the Universe should not be changing -- the speed of light, the decay rate of radioactive material, C-14 dating, etc... and they are -- which would happen if we were in a Simulation whose 'envelope was being pushed' by the mathematical rounding errors that are beginning to (eventually) overwork the system, and Dr Green reminds us "Logic alone cannot ensure that we are not in a computer Simulation." (p 289). To really get a sense of this issue, one needs to see the movie Thirteenth Floor. And if we are simulated, is the next level 'up' which drives our Simulation itself simulated? And then do we live in a Simulated Multiverse? And what happens when one of the simulations crashes? Dr Greene's book is fascinating in this regard. He also looks at the Double-slit Problem,

Parallel Universes, Black Holes, Branes and Strings. Dr Greene's other main point was that over time, with mathematics that is not carried to decimal points with infinite precision, there are going to be recursions of the same formulas and their outputs which will suffer rounding and approximations to the point where internal consistency is lost, sections of the Simulation would become incoherent, and the Simulation will crash -- is that what happened to the Maya back in AD 800 when they just all disappeared? (See Virtual Earth Graduate for a better, longer review of this issue.) Other physicists suggest that the Earth may be in a quantum computer running "qubits" and they theorize that just the Earth (not the universe) would be scalable to run within the memory confines of the largest computer that we can build nowadays... and all it would have to do is create just those scenes into which the ensouled human moves, suggesting as did Jim Elvidge in The Universe Solved that many humans would be Non-Playable Characters (NPCs) as in any VR Game. If this idea fascinates you, check out those books mentioned. Parts of the concept are not froo-froo and this gives cause to reflect... In short, if quantum physics annoys you, or you just can't feature some of the strange postulates, then try Dr Paul LaViolette's Genesis of the Cosmos book -- he says that Subquantum Kinetics (using the ether) has better answers than does quantum physics with its Dark Matter...

This is an updated review. Dr. Brian Green did a wonderful job with The Elegant Universe. And I had been enjoying his exploration of the interaction between Cosmology and Quantum Physics in The Hidden Reality: Parallel Universes and the Deep Laws of the Cosmos until I got to the material on both Einstein's $E=mc^2$ and Maxwell's $E=hf$ formulae. At this point in the book, Dr. Green writes, several times, that these formulae "govern" the natural processes they describe. As a voracious reader of science I believe that words matter. Does Dr. Green not realize that neither Einstein nor Maxwell were present when the laws of physics their formulae describe came into being or is he simply playing loose with the language? Whatever it is that GOVERNS nature, it most certainly is NOT any man-made theory or formula. Right?

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