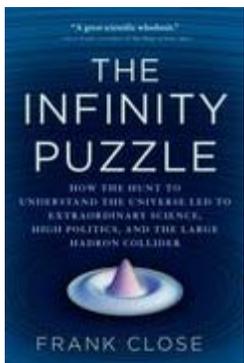


A Little Light Reading: 2011 in Physics Books

By Jennifer Ouellette | Mon Jan 2, 2012 05:46 AM ET



Every year brings a fresh new crop of popular books on physics and cosmology, and 2011 was no exception, featuring books on dark matter and dark energy, the Large Hadron Collider, time, the multiverse, cosmic mortality, a bit of history, biography, and even a celebration of "fringe physics." My top ten picks are offered below, in handy alphabetical order. Feel free to leave your own favorites in the comments!



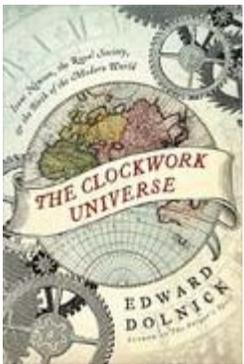
1. Frank Close. *The Infinity Puzzle: Quantum Field Theory and the Hunt for an Orderly Universe*. It's fair to say that physicists closing in on the Higgs boson was one of the top science stories of 2011. Close's book veers from the usual popular science treatment of the topic to focus on quantum field theory, described as "our best understanding of physics" -- and yet very few folks outside of physics have a clear grasp of what it is, and why it's so significant. A great read for those who've been following the Higgs story closely and are intrigued by some of the deeper questions. As Close's book description points out:

"Unfortunately, in its raw form, [quantum field theory] doesn't make sense—its outputs are physically impossible infinite percentages when they should be something simpler, like the number 1. The kind of physics that the Higgs boson represents seeks to 'renormalize' field theory,

forcing equations to provide answers that match what we see in the real world."

2. Brian Cox and Jeff Forshaw. *The Quantum Universe (And Why Anything That Can Happen, Does)*. Technically, this book isn't out yet (release date is January 31, 2012), but what the heck, we'll throw it into the mix, if only to give you an early glimpse of the sciency goodness to come in 2012. Cox has rapidly become one of the top explicators of head-busting physics, and this is a terrific introduction to his style. Per the book description:

*"The subatomic realm has a reputation for weirdness, spawning any number of profound misunderstandings, journeys into Eastern mysticism, and woolly pronouncements on the interconnectedness of all things. Cox and Forshaw's contention? There is no need for quantum mechanics to be viewed this way. There is a lot of mileage in the "weirdness" of the quantum world, and it often leads to confusion and, frankly, bad science. **The Quantum Universe** cuts through the Wu Li and asks what observations of the natural world made it necessary, how it was constructed, and why we are confident that, for all its apparent strangeness, it is a good theory."*

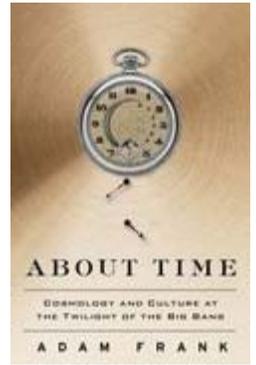


3. Edward Dolnick. *The Clockwork Universe: Isaac Newton, the Royal Society, and the Birth of the Modern World*. Admittedly, I long for the day when popular science books about cosmology finally abandon the trend for titles like "The [BLANK] Universe: [INSERT EXPLANATORY SUBTITLE HERE]." But that's no reason to ignore this wonderful history of the Royal Society, which gathered together many of the greatest minds in 17th century science -- and thereby changed our view of the world.

"At the end of the seventeenth century—an age of religious wars, plague, and the Great Fire of London— when most people saw the world as falling apart, these earliest scientists saw a world of perfect order. They declared that, chaotic as it looked, the universe was in fact as intricate and perfectly regulated as a clock. ... It was a time when little was known and everything was new. These brilliant, ambitious, curious men believed in angels, alchemy, and the devil, and they also believed that the universe followed precise, mathematical laws—a contradiction that tormented them and changed the course of history."

4. Adam Frank. *About Time: Cosmology and Culture at the Twilight of the Big Bang*. This is a terrific companion to last year's opus on the physics of time, Sean Carroll's *From Eternity To Here: The Quest for the Ultimate Theory of Time*. Frank focuses on our cultural notions of time throughout history, providing a fascinating socio-historical backdrop to this all-too-familiar, yet mysterious concept. As Carroll blurbled, Frank "tells

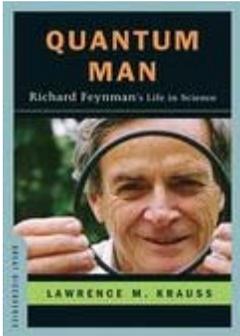
the fascinating story of how humans have struggled to make sense of time, especially in the context of the universe around us. From prehistory to the Enlightenment, through Einstein and on to the multiverse, this is a rich and inspiring tour through some of the biggest ideas that have ever been thought."



5. Brian Greene. *The Hidden Reality: Parallel Universes and the Deep Laws of the Cosmos*. Greene has been blowing our minds for years now, first with string theory in *The Elegant Universe*, then tackling spacetime in *The Fabric of Reality*. This time he's wrestling with the boggling notion of a multiverse -- an idea once dismissed as crackpot that has gained respectability over the last few decades, and is now a topic of serious debate among theoretical physicists. There's still a great deal of speculation, of course, and one of the best things about Greene's book is how carefully he delineates between theories of the multiverse that might just hold water, and those likely destined to remain in the realm of speculation.

6. Chris Impey. *How It Ends: From You to the Universe*. If the above selections are just a bit too cheery and upbeat for your tastes, check out Impey's in-depth exploration of death at the cosmic scale, in which he delves the mortality of everything in the universe (including us) -- and still manages to work in some humorous touches, lest the reader succumb to existential despair before reaching the end. Per the book description:

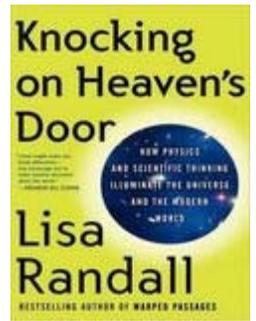
*"Astronomer Chris Impey... chronicles the death of the whole shebang: individual, species, biosphere, earth, sun, Milky Way, and, finally, the entire universe. With a healthy dose of humor, **How It Ends** illuminates everything from the technologies of human life extension and the evolutionary arms race between microbes and men to the inescapable dimming of the sun and the ultimate "big rip," giving us a rare glimpse into a universe without us."*



7. Lawrence Krauss. *Quantum Man: Richard Feynman's Life in Science*. Feynman probably has as many biographies about him at this point as Albert Einstein. If you're wondering why we need another one, well, Krauss' deft, engaging prose, sweeping overview of Feynman's scientific legacy, and colorful tales from his own personal friendship with Feynman will win you over. And as an added bonus, check out Jim Ottaviani's marvelous graphic novel biography, appropriately (and simply) titled *Feynman*. (I guess technically that means my Top Ten list goes to 11.)

8. Richard Panek. *The 4 Percent Universe: Dark Matter, Dark Energy, and the Race to Discover the Rest of Reality*. Yes, it's another "The Universe" title, but it's also a wonderful read, and a terrific introduction to the question, "What is the universe made of?" The troubling answer is that most of the "stuff" in the universe is stuff we have yet to discover/understand. Panek spoke with some of the leading scientists wrestling with these questions in researching the book, and the result is an engaging, intellectually stimulating account of physics at the cutting edge.

9. Lisa Randall. *Knocking on Heaven's Door: How Physics and Scientific Thinking Illuminate the Universe and the Modern World*. This is kind of two books in one: a highly readable, accessible look at particle physics today and the experiments currently underway at the Large Hadron Collider in Switzerland, on the one hand, and on the other, it's a passionate defense and celebration of the scientific worldview in general. Randall patiently explains to the general reader how science works, how scientists think and why this is such a fruitful way of thinking about and exploring our universe.



Just how accessible is this book? Randall won over *Lost* co-creator Carlton Cuse, who blurbed, "I didn't think it was possible to write a complex, detailed look at the world of physics that the non-scientist could understand, but then Lisa Randall wrote this amazing, insightful, and engaging book and proved me wrong." Q.E.D.

10. Margaret Wertheim. *Physics on the Fringe: Smoke Rings, Circlons, and Alternative Theories of Everything*. Every physicist has to contend occasionally with so-called "outsider physicists," more commonly derided as "crackpots." (There's even a famous [Crackpot Index](#) to help identify them.) But few have delved as deeply into their thinking as Margaret Wertheim.

Several years ago, she became fascinated by the ideas of one Jim Carter, who "developed his own complete theory of matter and energy and gravity that he demonstrates with experiments in his backyard. [W]ith garbage cans and a disco fog machine he makes smoke rings to test his ideas about atoms." The result is a rare peek into this world of alternative theories, that never loses sight of Carter's humanity -- whether one accepts his theory or not (and most physicists, it must be said, would not). Per the book description:

Centuries ago, natural philosophers puzzled out the laws of nature using the tools of observation and experimentation. Today, theoretical physics has become mathematically inscrutable, accessible only to an elite few. In rejecting this abstraction, outsider theorists insist that nature speaks a language we can all understand. Through a profoundly human profile of Jim Carter, Wertheim's exploration of the bizarre world of fringe physics challenges our conception of what science is, how it works, and who it is for.
