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Higgs Discovery: The Power Of Empty Space (Kindle Single)



Synopsis

On July 4, 2012, physicists at the Large Hadron Collider in Geneva made history when they discovered an entirely new type of subatomic particle that many scientists believe is the Higgs boson. For forty years, physicists searched for this capstone to the Standard Model of particle physics—the theory that describes both the most elementary components that are known in matter and the forces through which they interact. This particle points to the Higgs field, which provides the key to understanding why elementary particles have mass. In *Higgs Discovery*, Lisa Randall explains the science behind this monumental discovery, its exhilarating implications, and the power of empty space.

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Customer Reviews

Higgs Discovery: The Power of Empty Space by Lisa Randall "Higgs Discovery" this timely and topical Kindle Single, is written to enlighten the public to what the discovery of the Higgs boson means and to explain where it will take us. Influential and highly acclaimed theoretical physicist and best-selling author of "Knocking on Heaven's Door", Lisa Randall, gives the reader an intellectual

appetizer on the implications of the announcement that a key particle, the Higgs boson was discovered. Randall's expertise and ability to convey such a complex topic to the layperson is what makes this Kindle Single such a great value. This 83-page book is composed of three sections: Higgs Discovery: The Power of Empty Space, An Excerpt from Warped Passages and An Excerpt from Knocking on Heaven's Door.

Positives:

1. A timely and fascinating topic, written at an accessible level for the layperson and everyone in between.
2. Randall's expertise in the field and background as an educator provides the perfect mix to reach out and educate the public.
3. A great Kindle Single value. A great idea that is now benefitting authors and readers alike. In merely 83 pages, the author provides much needed information on what has become a pop-scientific topic.
4. What the Higgs boson is. Finally, I get it, I think.
5. The implications of the discovery.
6. As a true scientist and educator, Randall keeps the discovery in perspective. That is, in science everything is a matter of degrees of certainty.
7. Not to be confused with the Higgs boson but also insight into what the Higgs mechanism is and its implications.
8. Understanding what empty space really is.
9. The Large Hadron Collider (LHC)...what makes it a remarkable machine and its future use.

Randal's book consists of 3 chapters. The first chapter details Randall's reaction to the discovery of the Higgs boson, as well as some general information about the particle and what it implies about the physical laws of the universe, and the future direction of this understanding now that the discovery has been made. The two remaining chapters are taken from Randall's previous books, and are meant to provide additional context around the Higgs boson and what it entails, as well as why scientists were expecting to find it.

Beginning with the basics, we learn that the Higgs boson is an elementary particle--a fundamental constituent of matter out of which all things are made (there are 3 types of elementary particles: quarks, leptons and bosons, and the Higgs is a variety of boson). The Higgs particle was created by way of smashing protons together at very high speeds in the LHC. The reason it took so long to identify the Higgs is because many elementary particles are produced when protons are smashed together (and the Higgs is produced only very rarely in these collisions), and differentiating between the various particles requires analyzing the results over numerous trials (to ensure that random noise is not adulterating the data). The discovery of the new fundamental particle was significant in its own right, of course, but the real reason why finding the Higgs was so important is because the particle has peculiar qualities that implies the existence of a charged field that pervades space. This field is known as the Higgs field, and in order to see why it is so important we will have to make a brief detour into the Standard Model of particle physics.

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