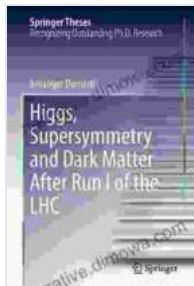


# Unveiling the Mysteries of the Universe: Higgs Supersymmetry and Dark Matter after Run of the LHC



## Higgs, Supersymmetry and Dark Matter After Run I of the LHC (Springer Theses) by Hiroyuki Aizawa

★★★★★ 5 out of 5

Language : English  
File size : 13997 KB  
Text-to-Speech : Enabled  
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Enhanced typesetting : Enabled  
Print length : 276 pages



The discovery of the Higgs boson in 2012 was a major milestone in particle physics, but it also raised new questions about the nature of the universe. One of the most pressing questions is whether supersymmetry, a theory that predicts the existence of new particles that are partners to the known particles, is true. Supersymmetry could provide a way to explain the existence of dark matter, another major mystery of the universe.

In this book, we will explore the latest results from the Large Hadron Collider (LHC) and discuss their implications for supersymmetry and dark matter. We will also discuss the theoretical underpinnings of supersymmetry and dark matter, and we will provide an overview of the experimental techniques that are used to search for these particles.

## Supersymmetry

Supersymmetry is a theory that predicts the existence of new particles that are partners to the known particles. These supersymmetric partners have the same mass as their ordinary counterparts, but they have different spins. For example, the supersymmetric partner of the electron is called the selectron, and it has a spin of 0 instead of  $1/2$ . Supersymmetric particles were not discovered at the LHC, but this does not rule out their existence.

Supersymmetry is a very attractive theory because it solves several problems with the Standard Model of particle physics. For example, supersymmetry can explain why the Higgs boson is so light and why the strong nuclear force is so strong. Supersymmetry could also provide a way to explain the existence of dark matter.

## **Dark Matter**

Dark matter is a type of matter that does not emit or reflect any light. It is thought to make up about 85% of the matter in the universe, but we do not know what it is made of. Dark matter is inferred from its gravitational effects on visible matter. For example, dark matter is thought to be responsible for the rotation curves of galaxies and for the formation of large-scale structures in the universe.

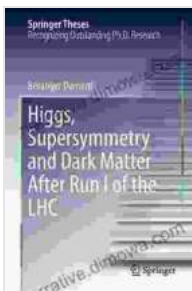
There are many different theories about what dark matter could be made of. One possibility is that dark matter is made of supersymmetric particles. This is because supersymmetric particles are stable and they do not interact with ordinary matter very much. This would make them a good candidate for dark matter.

## **The LHC**

The LHC is the world's largest and most powerful particle accelerator. It is located at CERN, the European Organization for Nuclear Research, in Switzerland. The LHC accelerates protons to very high energies and then smashes them together. This creates a shower of particles that can be studied by detectors.

The LHC has been used to discover the Higgs boson and to search for supersymmetric particles and dark matter. So far, no supersymmetric particles or dark matter particles have been discovered at the LHC, but this does not rule out their existence. The LHC is still running, and it is possible that these particles will be discovered in the future.

The discovery of the Higgs boson was a major milestone in particle physics, but it also raised new questions about the nature of the universe. Supersymmetry and dark matter are two of the most promising candidates for explaining these questions. The LHC is the world's largest and most powerful particle accelerator, and it is being used to search for these particles. It is possible that these particles will be discovered in the future, and this would provide us with a deeper understanding of the universe.



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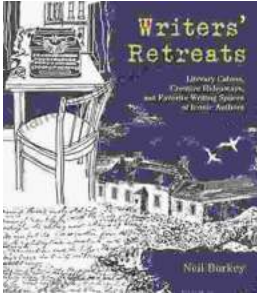
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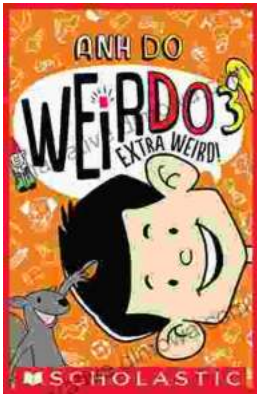
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