

# The Particle at the End of the Universe: How the Hunt for the Higgs Boson Leads Us to the Edge of a New World

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Scientists have just announced an historic discovery on a par with the splitting of the atom: the Higgs boson, the key to understanding why mass exists has been found. In *The Particle at the End of the Universe*, Caltech physicist and acclaimed writer Sean Carroll takes readers behind the scenes of the Large Hadron Collider at CERN to meet the scientists and explain this landmark event.

The Higgs boson is the particle that more than six thousand scientists have been looking for using the Large Hadron Collider, the world's largest and highest energy particle accelerator, which lies in a tunnel 17 miles in circumference, as deep as 575 feet beneath the Franco-Swiss border near Geneva. It took ten years to build and this search has now cost over \$9 billion and required the collaboration of engineers from more than one hundred countries.

What is so special about the Higgs boson? We didn't really know for sure if anything at the subatomic level had any mass at all until we found it. The fact is, while we have now essentially solved the mass puzzle, there are things we didn't predict and possibilities we haven't yet dreamed. A doorway is opening into the mind boggling, somewhat frightening world of dark matter. We only discovered the electron just over a hundred years ago and considering where that took us--from nuclear energy to quantum computing--the inventions that will result from the Higgs discovery will be world-changing.

*The Particle at the End of the Universe* not only explains the importance of the Higgs boson but also the Large Hadron Collider project itself. Projects this big don't happen without a certain amount of conniving, dealing, and occasional skullduggery-- and Sean Carroll explores it all. This is an irresistible story (including characters now set to win the Nobel Prize among other glories) about the greatest scientific achievement of our time. Sean Carroll, PhD, is a theoretical physicist at the California Institute of Technology. After receiving his doctorate at Harvard, he pursued his research at MIT, the Institute for Theoretical Physics in Santa Barbara, and the University of Chicago. Also the author of *From Eternity to Here*, he lives in Los Angeles. "The science is authoritative, yet bold and lively. The narrative is richly documented, yet full of human drama. Carroll's saga pulls you aboard a modern voyage of discovery."

-Frank Wilczek, Nobel Laureate, author of *The Lightness of Being*

"In this superb book, Sean Carroll provides a fascinating and lucid look at the most mysterious and important particle in nature, and the experiment that revealed it. Anyone with an interest in physics should read this, and join him in examining the new worlds of physics to which this discovery may lead."

-Leonard Mlodinow, author of NYT bestseller *The Drunkard's Walk*

"Carroll tells the story of the particle that everyone has heard of but few of us actually understand. After you read his book--an enticing cocktail of personal anecdote, clever analogy, and a small dose of mind-bending theory--you will truly grasp why the Higgs

boson has been sought after for so long by so many. Carroll is a believer in big science asking big questions and his beliefs are infectious and inspiring."

-Morgan Freeman, Actor and Executive Producer of Through the Wormhole

"Carroll is a sure-footed guide through some of the most perplexing and fascinating insights of modern physics."-Brian Greene, author of The Elegant Universe

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"[Carroll's] writing is accessible and peppered with cultural refernces... but don't be fooled Carroll isn't afraid to wade into topics that have befuddled even brand-name physicists."-

Wired - Wired

"Carroll keeps it real, getting at the complex guts of cutting-edge cosmology in discussions that will challenge fans of Hawking's A Brief History of Time."-The Washington Post

- The Washington Post

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