



## Heart of Darkness: Unraveling the Mysteries of the Invisible Universe (Science Essentials)

By Jeremiah P. Ostriker, Simon Mitton

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*Heart of Darkness* describes the incredible saga of humankind's quest to unravel the deepest secrets of the universe. Over the past thirty years, scientists have learned that two little-understood components--dark matter and dark energy--comprise most of the known cosmos, explain the growth of all cosmic structure, and hold the key to the universe's fate. The story of how evidence for the so-called "Lambda-Cold Dark Matter" model of cosmology has been gathered by generations of scientists throughout the world is told here by one of the pioneers of the field, Jeremiah Ostriker, and his coauthor Simon Mitton.

From humankind's early attempts to comprehend Earth's place in the solar system, to astronomers' exploration of the Milky Way galaxy and the realm of the nebulae beyond, to the detection of the primordial fluctuations of energy from which all subsequent structure developed, this book explains the physics and the history of how the current model of our universe arose and has passed every test hurled at it by the skeptics. Throughout this rich story, an essential theme is emphasized: how three aspects of rational inquiry--the application of direct measurement and observation, the introduction of mathematical modeling, and the requirement that hypotheses should be testable and verifiable--guide scientific progress and underpin our modern cosmological paradigm.

This monumental puzzle is far from complete, however, as scientists confront the mysteries of the ultimate causes of cosmic structure formation and the real nature and origin of dark matter and dark energy.

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**Editorial Review**

Review

**Jeremiah P. Ostriker, Co-Winner of the 2015 Gruber Cosmology Prize for Theoretical and Experimental Explorations of the Universe (with John Carlstrom and Lyman Page), The Gruber Foundation**

**One of *Choice's* Outstanding Academic Titles Top 25 Academic Books for 2013**

**Honorable Mention for the 2013 PROSE Award in Cosmology & Astronomy, Association of American Publishers**

"In this stimulating study, the Princeton astrophysics professor and the University of Cambridge scholar offer a compelling insider's take on how astronomers have worked to reveal the mystery that is our universe. . . . Ostriker and Mitton's knowledge is vast, and while they acknowledge that our understanding of the universe is far from complete, this thought-provoking presentation is as accessible as it is exciting."--*Publishers Weekly*

"Jeremiah Ostriker and science historian Simon Mitton seamlessly blend historical narrative with lucid scientific explication, from the depths of classical time to the data-fuelled hyperdrive of the past 50 years."--*Nature*

"A lucid history of cosmology. . . . With infectious enthusiasm, diagrams and even a little high school math, the authors deliver the available answers along with the increasing confusion. A fine introduction to cosmology but rich enough to inform readers familiar with introductions."--*Kirkus Reviews*

"This is a strong, confident book, easily one of the best guides to why cosmologists make the claims they do."--*New Scientist*

"[*H*]eart of Darkness . . . traces the implications of modern cosmology and more. The path is a fascinating history from the first debates over the cosmic redshift and the Hubble constant through the discovery of the cosmic microwave background by Penzias and Wilson in the 1960s right up to the big questions being raised today."--*Astro Guyz*

"An excellent book celebrating the contribution to cosmology by many unsung heroes such as Tinsley, Slipher, Lemaitre and Friedman."--**Dave Mannion, *Popular Astronomy***

"Here is a new and welcome perspective on modern cosmology that any reader can easily grasp and appreciate. Excellent archival photos and a very useful appendix that clearly and simply explains some of the essential mathematical concepts add to the pleasure of reading this book. Written with authority and flair, this is one of the very best books on the topic. Recommended reading for any science buff."--*Choice*

"Ostriker's and Mitton's book is a lively and informative account of the story of modern cosmology."--**Helge Kragh, *Journal for the History of Astronomy***

"I enjoyed *Heart of Darkness* hugely. Rare among astronomy books, it was a 'page-turner', an exciting, intriguing, authoritative historical review of past cosmological endeavors coupled with an informed assessment of where we are at the present time. It is accurately aimed at the general reader and non-expert."-

**-David W. Hughes, *Observatory***

"*Heart of Darkness* is a cheerful and accessible introduction to some of the most fascinating topics in astronomy today. It presents the concepts clearly, tells the stories about the discoverers with remarkable detail, and explains the logic leading to the hypotheses of dark matter and dark energy. I would not hesitate to recommend it for both general readers and scientists."--**John C. Mather, *Physics Today***

"What does come through in [this book], is a real sense of the excitement that these scientists feel in not knowing everything, together with the confidence that one day we'll work it out."--**Clive Prince, *Magonia Review of Books***

From the Back Cover

"The invisible rules the visible while the infinitesimal determines the cosmic. This is not fuzzy mysticism. It is the clear-eyed logic of the world observed by astronomers, described here with precision and verve by Ostriker and Mitton. Read this book and let them guide you to enlightenment."--**Robert P. Kirshner, author of *The Extravagant Universe***

"If you want a clear and fair assessment of the astonishing recent progress in understanding the cosmos--and of the mysteries that remain to be addressed--then this is the book for you. Ostriker and Mitton write with authority, and with style as well."--**Martin Rees, Master of Trinity College, University of Cambridge, and Astronomer Royal**

"*Heart of Darkness* offers an engaging historical perspective on cosmology, and fluently moves onto the key modern issues in the dark sector. It is full of anecdotes and insights that will intrigue a general readership."--**Joseph Silk, author of *On the Shores of the Unknown: A Short History of the Universe***

"*Heart of Darkness* offers a fresh perspective on the development of cosmology from one of its pioneers and most original thinkers, Jeremiah Ostriker, in collaboration with an exceptional science writer, Simon Mitton. This engaging history introduces nonexperts to the discoveries and basic concepts behind our current understanding of the universe."--**Abraham Loeb, author of *How Did the First Stars and Galaxies Form?***

"*Heart of Darkness* is a penetrating and thorough narrative of how humans discovered the universe. Ostriker and Mitton are strong advocates for the tenacity and creativity of physicists and astronomers. This is an upbeat and inspiring story, told with vigor and enthusiasm."--**Alan Dressler, author of *Voyage to the Great Attractor: Exploring Intergalactic Space***

About the Author

**Jeremiah P. Ostriker** is professor of astrophysical sciences at Princeton University. His books include *Formation of Structure in the Universe* and *Unsolved Problems in Astrophysics* (Princeton). **Simon Mitton** is affiliated research scholar in the history and philosophy of science and a fellow of St. Edmund's College, University of Cambridge. His books include *Fred Hoyle: A Life in Science* and *The Young Oxford Book of Astronomy*.

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