

The Accelerating Universe

Infinite Expansion, the Cosmological Constant, and the Beauty of the Cosmos

Mario Livio

The Accelerating Universe: Infinite Expansion, the Cosmological Constant, and the Beauty of the Cosmos

By Mario Livio, Livio

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""The Accelerating Universe"" is not only an informative book about modern cosmology. It is rich storytelling and, above all, a celebration of the human mind in its quest for beauty in all things.""

--Alan Lightman, author of Einstein's Dreams

""This is a wonderfully lucid account of the extraordinary discoveries that have made the last years a golden period for observational cosmology. But Mario Livio has not only given the reader one clear explanation after another of what astronomers are up to, he has used them to construct a provocative argument for the importance of aesthetics in the development of science and for the inseparability of science, art, and culture.""

--Lee Smolin, author of ""The Life of the Cosmos""

""What a pleasure to read! An exciting, simple account of the universe revealed by modern astronomy. Beautifully written, clearly presented, informed by scientific and philosophical insights.""

--John Bahcall, Institute for Advanced Study

""A book with charm, beauty, elegance, and importance. As authoritative a journey as can be taken through modern cosmology.""

--Allan Sandage, Observatories of the Carnegie Institution of Washington



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Editorial Review

From Publishers Weekly

One of the most important recent discoveries in cosmology--and science in general--is that the expansion rate of the universe is not staying steady or getting slower, as most scientists had assumed; on the contrary, it is accelerating. Something is counteracting gravity and making it so that in billions of years, the universe will be an even vaster, emptier realm, filled with stars and galaxies flickering out one by one until there is only darkness. In this book, Livio, a senior scientist at Baltimore's Space Telescope Science Institute, evaluates current theories about the universe in terms of whether or not they are "beautiful." Livio defines beauty for purely scientific purposes: a beautiful scientific theory, he explains, must be symmetric and simple (reductionist), and it must follow the Copernican principle that man is not the center of the universe--it need not be elegant. Livio's discussion, however, carefully constructed (like a well-laid-out mathematical proof), certainly is elegant. Readers who only hazily remember high school math and science classes will enjoy the author's clear, jargon-free explanation of such complicated astronomical concepts as inflationary theory, "pocket" or multiple universes and the anthropic principle. Although the opening chapters are weighed down with extraneous references to art and literature, once Livio gets into his subject, he employs such references more selectively. Any educated individual interested in current theories about the past and future of the universe will want to read this lucid book. 10 b&w photos and drawings. (Mar.)

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From Library Journal

Like Donald W. Goldsmith's *The Runaway Universe* (LJ 1/00), this is a survey of modern cosmology, with an emphasis on recent observations that the universe is expanding at an ever-accelerating speed. But while Goldsmith focuses on the techniques of astronomical research, Livio, a scientist at the Space Telescope Science Institute in Baltimore, concentrates on scientific aesthetics. He argues that a fundamental theory of the universe must be beautiful--symmetrical, reductionist, and compliant with the generalized Copernican principle (i.e., assuming no special circumstances)--even though an eternally expanding universe appears to violate the requisites for scientific beauty. Along the way, Livio often digresses, recounting sometimes irrelevant anecdotes about astronomers or works of art. Superbly accessible explanations of physical and astronomical concepts compensate, however. More appropriate for general readers than Goldsmith's book, this is recommended for public and academic libraries.

-Nancy Curtis, Univ. of Maine Lib., Orono

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From Booklist

At least since Copernicus exulted over the beguiling simplicity of a sun-centered planetary system, scientists have counted the beauty of a theory as strong evidence of its truth. But beauty offers little guidance to the astronomers now scrambling to revise theories battered by new evidence of a universe expanding with undreamed-of speed. No one better understands this disturbing new evidence than Livio, who helps direct research conducted with the Hubble Telescope. With laudable clarity, he explains how the latest data are straining the long-standing assumptions of cosmologists, who are now forced to contemplate a universe in which the energy in empty space is unexpectedly dominating matter in pushing the galaxies toward frigid oblivion. Far more than a puzzle for specialists, the struggle to re-interpret the cosmos raises fundamental questions about the human craving for order: Does this craving reflect deep cosmic harmonies that helped create our species? Or does it simply defy an irreducible chaos that we would rather not confront? Livio probes these questions with a daring sufficient to satisfy the hungriest curiosity. *Bryce Christensen*

Users Review

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James Snyder:

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