



Cosmology

By Steven Weinberg

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Cosmology By Steven Weinberg

This book is unique in the detailed, self-contained, and comprehensive treatment that it gives to the ideas and formulas that are used and tested in modern cosmological research. It divides into two parts, each of which provides enough material for a one-semester graduate course. The first part deals chiefly with the isotropic and homogeneous average universe; the second part concentrates on the departures from the average universe. Throughout the book the author presents detailed analytic calculations of cosmological phenomena, rather than just report results obtained elsewhere by numerical computation. The book is up to date, and gives detailed accounts of topics such as recombination, microwave background polarization, leptogenesis, gravitational lensing, structure formation, and multifield inflation, that are usually treated superficially if at all in treatises on cosmology. Copious references to current research literature are supplied. Appendices include a brief introduction to general relativity, and a detailed derivation of the Boltzmann equation for photons and neutrinos used in calculations of cosmological evolution. Also provided is an assortment of problems.

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Editorial Review

Review

"A technical tour de force for the intrepid graduate student, Weinberg's new book will greatly appeal to particle physicists tooling up in cosmology and be an indispensable source for the practitioner."--*Physics Today*

"A monumental book written by a leading authority in particle physics and cosmology. Since publication of Weinberg's famous book *Gravitation and Cosmology* 35 years ago, there has been a real revolution both in cosmological theory and observations. A major effort of a great expert has been required to summarize the main developments in one book, and to make this presentation both highly accurate and accessible. This book will be greatly appreciated by a broad readership, ranging from students who just enter the field to experts in modern cosmology. It should be on the desk of every actively working cosmologist."--Andrei Linde, Stanford University

"Time is right for a survey of the physics of what has become a large and well-developed subject. Weinberg has done it, in an impressive fashion. He presents a full and careful assessment of the broad range of physics of modern cosmology, from the tools for measurements of the structure and evolution of the universe we see around us to the puzzles of dark matter and dark energy and the ideas about what the universe was like in the remote past, before it could have been described by the well-tested part of the theory."--Jim Peebles, Princeton University

"This book tackles the main events of today's cosmology: cosmic acceleration observed with supernovae, the exquisite structure of the cosmic microwave background, and the evidence for dark matter. Weinberg pays close attention to the historical development and summarizes the observations with care. He brings deep knowledge of the underlying physics and weaves these threads together into a rich text that will be of great value to astronomers and physicists. The first half of this book is a wonderful introduction to cosmology, suitable for a graduate course or for someone coming into the field from a neighboring region of the scientific forest. The second half is an original development of the theory for the growth of inhomogeneities in the Universe. Everyone who works on cosmology will find something to learn in this book."--Robert P. Kirshner, Harvard University

"The result is a tour de force that even established cosmologists will learn from." - Peter Coles, *Science*

"Nobel laureate, Steven Weinberg, is known not only for his exceptional contribution to modern physics, but also for his incomparable pen...With his unsurpassed ability to explain even the most difficult mathematical and conceptual steps with a few strokes of his pen, Weinberg takes the reader from the basics of

cosmological kinetics and dynamics...to advanced topics."--*Mathematical Reviews*

About the Author

Professor Steven Weinberg
Jack S. Josey-Welch Foundation Chair in Science and Regental Professor and Director, Theory Research Group
Department of Physics
University of Texas at Austin

Nobel Prize in Physics, 1979

National Medal of Science, 1991

Benjamin Franklin Prize, American Philosophical Society, 2004

Member, U. S. National Academy of Sciences

Foreign Member, Royal Society of London

Honorary Member, Royal Irish Academy

Member, American Philosophical Society

Fellow, American Academy of Arts and Sciences

J. Robert Oppenheimer Prize, 1973

Dannie Heineman Prize for Mathematical Physics, 1977 Earned degrees

A.B., Cornell University, 1954

Ph.D., Princeton University, 1957

Honorary degrees

Harvard University, A.M., 1973

Knox College, D.Sc., 1978

University of Chicago, Sc.D., 1978

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Yale University, Sc.D., 1979

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Dartmouth College, Sc.D., 1984

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University of Barcelona, Sc.D., 1996
Bates College, Sc. D., 2002
McGill University, Sc. D., 2003
University of Waterloo, Sc. D., 2004

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