



# Supernovae and Nucleosynthesis (Princeton Series in Astrophysics)

By David Arnett

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**Supernovae and Nucleosynthesis (Princeton Series in Astrophysics)** By David Arnett

This book investigates the question of how matter has evolved since its origin in the Big Bang, from the cosmological synthesis of hydrogen and helium to the generation of the complex set of nuclei that comprise our world and our selves. A central theme is the evolution of gravitationally contained thermonuclear reactors, otherwise known as stars. Our current understanding is presented systematically and quantitatively, by combining simple analytic models with new state-of-the-art computer simulations.

The narrative begins with the clues (primarily the solar system abundance pattern), the constraining physics (primarily nuclear and particle physics), and the thermonuclear burning in the Big Bang itself. It continues with a step-by-step description of how stars evolve by nuclear reactions, a critical investigation of supernova explosion mechanisms and the formation of neutron stars and of black holes, and an analysis of how such explosions appear to astronomers (illustrated by comparison with recent observations). It concludes with a synthesis of these ideas for galactic evolution, with implications for nucleosynthesis in the first generation of stars and for the solar system abundance pattern. Emphasis is given to questions that remain open, and to active research areas that bridge the disciplines of astronomy, cosmochemistry, physics, and planetary and space science. Extensive references are given.

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#### Review

"The book is delightful reading. . . the best available source of material on supernova physics for the graduate student."--**A.G.W. Cameron, *Nature***

"This well-illustrated and well-referenced volume is an extremely valuable addition to the astronomical literature."--**New Scientist**

#### From the Back Cover

This book is intended to be what was well described by Prof. S. Chandrasekhar in reference to his own goals for scientific books: '...a certain viewpoint of the field, written by one who has been an active participant in its development...' The subject is the synthesis and evolution of atomic nuclei, by thermonuclear reactions, from the Big Bang to the present.

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