



## METADATA

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### Abstract

Cosmology is the study of the structure and the evolution of the Universe in large scale. This book covers the topic of Cosmology via three main directions. 1) The main astronomical observations that shaped our understanding of Cosmology and lead to the model of the expanding universe are discussed. Then, a Newtonian approach is presented. This is followed by a brief introduction in the concept of curvature, so that, through General Relativity, the equations governing the evolution the universe depending on its content are introduced. The main definitions of distances used in Cosmology are also presented in this context.

2) Next, we follow the evolutions of the Universe starting from its first stages, the decoupling of fundamental forces, the synthesis of the first element and the emission of the Cosmic Background Radiation reaching the dark ages and the reionisation epoch. The physical mechanisms interpreting these phenomena are studied. 3) We complete our study exploring the Standard Model of Cosmology and its challenges. We examine possible answers to open Cosmology problems. Furthermore, topics related to dark matter and gravitational lensing are presented and some cosmological problems that can be solved numerically are discussed.

