Bonnet-Bidaud, Jean-Marc
The diffuse light of the universe. On the microwave background before and after its discovery: open questions. (English) Zbl 1372.83080

Summary: In 1965, the discovery of a new type of uniform radiation, located between radio waves and infrared light, was accidental. Known today as Cosmic Microwave Background (CMB), this diffuse radiation is commonly interpreted as a fossil light released in an early hot and dense universe and constitutes today the main "pillar" of the big bang cosmology. Considerable efforts have been devoted to derive fundamental cosmological parameters from the characteristics of this radiation that led to a surprising universe that is shaped by at least three major unknown components: inflation, dark matter and dark energy. This is an important weakness of the present consensus cosmological model that justifies raising several questions on the CMB interpretation. Can we consider its cosmological nature as undisputable? Do other possible interpretations exist in the context of other cosmological theories or simply as a result of other physical mechanisms that could account for it? In an effort to questioning the validity of scientific hypotheses and the under-determination of theories compared to observations, we examine here the difficulties that still exist on the interpretation of this diffuse radiation and explore other proposed tracks to explain its origin. We discuss previous historical concepts of diffuse radiation before and after the CMB discovery and underline the limit of our present understanding.

MSC:
83F05 Relativistic cosmology
85A40 Astrophysical cosmology
83C75 Space-time singularities, cosmic censorship, etc.
85A25 Radiative transfer in astronomy and astrophysics
85-03 History of astronomy and astrophysics
01A60 History of mathematics in the 20th century

Keywords:
Cosmology; Cosmic Microwave Background; big bang; steady state; MOND

Full Text: DOI

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