CMB, Cosmological Redshift, and Wien's Law

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Abstract

CMB radiation is the blackbody radiation at 2.7 Kelvin with a peak wavelength of 966 nm. Its origin is supposed to be the recombination period 378.000 years after the initial explosion, when the temperature was 3000 Kelvin, and the radiation peak wavelength was 1.073.249 nm. Since its origin in the recombination period, this radiation has existed in space-time for about 13,8 billion years. The idea that radiation at 3000 Kelvin has transformed into radiation at 2,7 Kelvin and increased its peak wavelength by 1111 times because universal space has cooled contradicts Wien's law. Also, cosmological redshift contradicts Wien's law. There is no experimental evidence that, in an expanding space, light increases its wavelength.

Keywords: CMB, cosmological redshift, Wien's law, Big Bang cosmology

1. Introduction

The CMB has a thermal blackbody spectrum at a temperature of 2.72548±0.00057 K [1]. CMB has its origin in the recombination period, which was about 380.000 years after the Big Bang: "About 380,000 years after the Big Bang, the temperature of the Universe had dropped sufficiently for electrons and protons to combine into hydrogen atoms, p + e ⇒ H. From this time onwards, cosmic radiation was effectively unable to interact with the background gas; it has propagated freely ever since, while constantly losing energy because its wavelength is stretched by the expansion of the Universe. Originally, the radiation temperature was about 3000 degrees Kelvin, whereas today it has fallen to only 3K" [2].

The Cosmic Microwave Background (CMB) is the cooled remnant of the first light that could ever travel freely throughout the Universe. This 'fossil' radiation, the furthest that any telescope can see, was released soon after the Big Bang. Scientists consider it as an echo or 'shockwave' of the Big Bang. Over time, this primeval light has cooled and weakened

considerably; nowadays we detect it in the microwave domain. It took about 300 000 years for the Universe to cool down to a temperature at which atoms can form (about 3000 °C). Matter then became neutral, and allowed the light to travel freely: the Universe became transparent. The relic of that 'first light' is the CMB. Since the time when that radiation was released, the Universe has expanded, becoming at the same time cooler and cooler. The cosmic background has been affected by the same process: it has expanded and cooled down. Space has 'stretched' itself, and with it all length scales [3]. This is the current explanation of the CMB, fully accepted by mainstream physics.

2. Current CMB Radiation Model Contradicts Wien's Law

The current interpretation of CMB encounters an insoluble contradiction with Wien's law, which tells us the relation between the temperature T of a blackbody and the wavelength λ of its radiation, see Eq. (1).

$$\lambda = 0{,}002997771955 / T \qquad (1)\ [4].$$

This equation is valid when the source of radiation changes temperature. It is not valid when radiation is produced and moves through space where temperature changes, and because of this, its wavelength will increase. The Big Bang model claims that radiation produced in the recombination period is transformed into today's CMB radiation because the universe has cooled and expanded.

According to Wien's law, the frequency of light can change only if the temperature of the source has changed. The Big Bang model proposes another solution, namely that the radiation wavelength can increase because the space in which the radiation moves has cooled down. There is no single experiment in physics proving that the cooling of space increases the wavelength of the radiation that moves through it. Big Bang model interpretation of the CMB has no experimental evidence and also has no solid theoretical basis. There is no mathematical description available in the scientific literature that would describe how the cooling and expansion of space increases the wavelength of the light. Big Bang model interpretation of the CMB is an unproven hypothesis and not a scientific fact.

What do we measure in CMB observations? The undeniable fact is that we measure the current radiation of space. The idea that CMB is relic radiation that remains from the 'first light'

that was generated after a hypothetical Big Bang is a working hypothesis with no experimental evidence and should be abandoned if we want to make progress in cosmology. Misinterpretation of CMB keeps the Big Bang model artificially alive.

3. Cosmological redshift contradicts Wien's law

The only known experiment in which light changes frequency after leaving a source was carried out by Pound and Rebka; it is known as gravitational redshift and gravitational blueshift [5]. In the case of a cosmological redshift, the situation is the same as with the CMB. In physics, there is no experiment that would prove that, in an expanding space, the wavelengths of light would increase; see Figure 1.

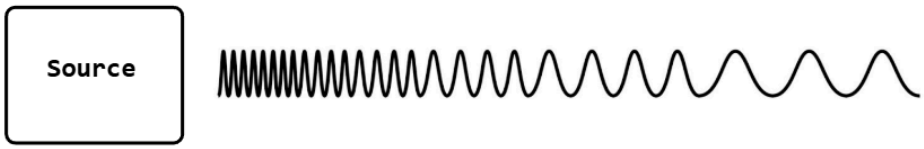


Figure 1: Except for gravitational redshift and blueshift, once the light leaves the source is cannot change wavelength

According to Wien's law, only a decrease in the source temperature can increase the light wavelength. Moreover, there is no convenient mathematical model that would describe the cosmological redshift, which is also an experimentally unproven working hypothesis: "We can read on Hubble site: 'When space expands, light stretches. Since the Big Bang, the physical space of the universe has been expanding. Stars and galaxies maintain their size, but the space between them grows'. The idea that when space expands, light stretches was never experimentally confirmed. It is an unproven working hypothesis" [6]. So-called cosmological redshift is a misinterpretation of gravitational redshift that is actually measured. The misinterpretation of the CMB contradicts Wien's law. Cosmological redshift is a misinterpretation of gravitational redshift.

4. The Big Bang model has insurmountable problems

In Chapters 2 and 3, we see that the Big Bang has insurmountable problems. Also, it is against the first law of thermodynamics, which stationary cosmology respects. Our research results [6] propose that the universe is a non-created system in a dynamic equilibrium as it was conceived in ancient Chinese philosophy: “The first concept is that all states are in flux, in transition to the next state. Ancient Chinese cosmology posits a universe in constant, eternal, ever-refreshing change. There is no entropy in this system” [7]. In our model, AGNs are refreshing systems of the universe [8]. Newton advocated a non-created, stationary infinite universe: “Until the 20th century everybody believed that the universe is naturally static: not expanding and not contracting. Even Albert Einstein, after the discovery of general relativity, continued to hold this belief for several years. The Newtonian theory of universal gravity, in which all bodies attract one another, reinforced the growing belief that the universe must be edgeless and therefore infinite. For if the universe were finite and bounded by a cosmic edge, it would have a center of gravity, and the attraction between its parts would cause it, said Newton, to “fall down into the middle of the whole space, and there compose one great spherical mass.” This argument led him finally to abandon the finite Stoic cosmos in favor of the infinite Atomist universe” [9].

5. Conclusions

The progress of cosmology requires direct reading of astrophysical data without interpretation. When we measure the CMB, we measure the radiation of the existing space. When we measure redshift, we measure gravitational redshift. Any interpretation of this data leads us down the wrong path.

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