Simple explanation for the 'cosmological red-shift' and it's evidence

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Abstract

We first find here that the ratio of: (loss in energy of cosmologically red-shifting photon) and (loss in electrostatic potential-energy of an electron at the same distance D) remains equal to the famous ratio $(G\, m_e\, m_p) / e^2$ leading us towards a possibility that 'cosmological red-shift' may be due to gravitational effect. Also the ratio $h\, H_0 / m_e\, c^2 = (G\, m_e\, m_p) / e^2$. So we consider three different possibilities how the reduction in energy of the photon can be understood in terms of gravitational effects; namely: (i) absorption and re-emission of intergalactic photons by the 'virtual particles' in space, (ii) photons have to climb the gravitational potential well produced by their own energy, and (iii) the quantum jumps of the photons causing repeated productions and collapses of gravitational fields giving rise to gravitational waves or ripples. For the purpose of comparison we express the 'cosmological red shift' as deceleration of the photon. Then it is argued that if such a deceleration is true for a chunk of energy called photon, then it must be true for every particle of matter too. Strikingly, the decelerations experienced by the space-probes Pioneer-10, Pioneer-11, Galileo and Ulysses, as carefully measured by Anderson J.D. ET. Al. match perfectly with the deceleration of the 'cosmologically red-shifting photons'; thus providing supportive evidence for the simple explanation proposed here.

Keywords: *Cosmology; Astrophysics; Cosmological Red Shift; Pioneer Anomaly.*

1. Introduction

Since the date Edwin Hubble published his paper on the 'cosmological red-shift', at least sixty different explanations have been proposed by different scientists. Out of them the 'expansion of space' is currently most popular. This writer has been of the opinion that 'time' is not a physical entity; so Einstein's 'space-time-continuum' is a mathematical model. 'Space-time-continuum' is not a physical entity, so 'expansion of space' may also be a 'mathematical term' not a physical reality. It was also noticed by this writer that the ratio $z_c / z_e = (G\, m_e\, m_p) / e^2$, that is: the ratio of (loss in energy of cosmologically red-shifting photon at any distance D) and (the loss in electrostatic potential-energy of the electron at that distance D) strikingly remains equal to the famous ratio $(G\, m_e\, m_p) / e^2$. So I have been trying to think in terms of possible 'gravitational effects' on the inter-galactic photons, e.g. [1]. So in the papers, posted at the pre-print server site viXra, (i) I considered a possibility of 'virtual particles' in the space absorbing the photons and re-emitting two kinds of waves, namely electromagnetic and gravitational; branching out the absorbed energy into two parts. (ii) Another interesting observation [2] has been that the accelerations $G\, M / R^2$ at the surface of the electron, the proton, the nucleus-of-atom, the globular-clusters, the spiral galaxies, the galactic-clusters and the whole universe too are of the same order of magnitude as $H_0\, c$! Gravitational self-acceleration at the surface of the photon too is of the order $H_0\, c$. So, the photon may have to climb the 'gravitational-potential-well' produced by its own quantum of energy. (iii) The repeated productions and collapses of the 'gravitational field' produced by the 'quantum jumps' of the photon should give rise to 'gravitational waves' or 'ripples' which should carry certain amount of energy with them. So the photon has to continuously keep on loosing energy, which we may have been interpreting as 'the cosmological red-shift'.

Then it is argued that if it is true for a chunk of energy called 'photon', then it must be true for every chunk of energy and 'matter'. Strikingly, the decelerations measured for Pioneer-10, 11, Galileo and Ulysses space-probes match perfectly with the value of deceleration of the photons [3]. This writer is aware of various explanations for Pioneer anomaly proposed; like 'gas leaks' and 'thermal radiations', but they cannot be the same for all the space-probes. Matching of decelerations of four space-probes itself is a striking phenomenon; and its matching with the deceleration of the photon cannot be ignored by a scientific mind as a coincidence. So in the humble opinion of this writer these observations should be considered as evidence for the simple explanation for the 'cosmological red-shift' proposed here. After a lengthy survey of several years of debate by the authors of the original 1998 paper documenting the Pioneer-anomaly, the authors conclude,[4]: "Until more is known, we must admit that the most likely cause of this effect is an unknown systematic. (We ourselves are divided as to whether 'gas leaks' or 'heat' is this 'most likely cause.')" The writer of this paper humbly feels that the correct explanation for the pioneer anomaly is found only now in this paper.

2. Derivations

For the purpose of comparison with 'cosmological red-shift' let us define the reduction in electrostatic potential-energy of the electron z_e as:

The reduction $z_e = [(e^2 / r_e) - e^2 / (r_e + D)] / [e^2 / (r_e + D)]$

i..e. $\qquad z_e = D / r_e \qquad\qquad\qquad (1)$

And the linear part of the 'cosmological red-shift' is expressed as: Cosmological red-shift:

$z_c = (h f_0 - h f) / h f = H_0 D / c$

Where H_0 is Hubble's constant and c is the speed of light.

i..e. $z_c = D / R_0$ (2)

Where R_0 is known as 'Radius of the universe' and $R_0 = c / H_0$
So the ratio $z_c / z_e = r_e / R_0$
And from the 'Large-Number-Coincidence' of Dirac, and its explanation proposed by this writer [5] we know that:

$r_e / R_0 = (G m_e m_p) / e^2$

So the ratio: $z_c / z_e = (G m_e m_p) / e^2$ (3)

That is, the ratio of: (Reduction in energy of the 'cosmologically red-shifting photon at a distance D) and (The reduction in electrostatic potential-energy of the electron at the same distance D) remains equal to the famous ratio $(G m_e m_p) / e^2$.

Also the ratio: $h H_0 / m_e c^2 = (G m_e m_p) / e^2$ (4)

So the expressions-3 and 4 suggest that 'cosmological red-shift' can be due to some of the possible gravitational effects considered below:
Possibility-1 is: Space can be viewed as a 'sea' of virtual 'positronium atoms'. The 'virtual particles' in the space may be absorbing the inter-galactic-photons and re-emitting two kinds of waves, namely electromagnetic and gravitational; branching out the absorbed energy into two parts. Thus reducing energy of the inter-galactic-photons, observed as the 'cosmological red-shift'.
Possibility-2: Since the gravitational accelerations $G M / R^2$ at the surface of the electron, the proton, the nucleus-of-atom, the globular-clusters, the spiral galaxies, the galactic-clusters and the whole universe are of the same order of magnitude as $H_0 c$, and the gravitational self-acceleration at the surface of the photon too is of the order $H_0 c$, the photon may have to climb the 'gravitational-potential-well' produced by its own quantum of energy. So the traveling photon is expected to be continuously accelerated backwards, causing its deceleration.
Possibility-3: Dynamic gravitational red-shift experienced by intergalactic-photons possibly-observed as the 'cosmological red-shift'.
Photon is a chunk of energy $h f$ where h is Planck's constant, and f the frequency. Every chunk of energy has to produce a gravitational field around it. The 'particle' photon travels in the manner of 'quantum jumps'; whereas the field travels in the manner of 'waves'. Therefore, when the photon jumps to a new position from 'a' to 'b' at a distance, say equal to its 'wavelength', the gravitational-field produced by its previous position 'a' is present there; so the 'photon' experiences the 'gravitational red-shift'. By this time the gravitational-field around the position 'a' collapses and new field at the position 'b' gets established; so when the photon jumps to a new position 'c', it has to 'climb' the gravitational potential-well produced at 'b'; and so it again experiences the gravitational red-shift. This process continues for every jump of the photon, reducing its frequency at every step. It is proposed here that the 'cosmological red-shift', first observed by Edwin Hubble, is possibly caused by this mechanism, termed here as 'dynamic gravitational red-shift'.
Possibility-4: Photon is a chunk of energy $h f$, where h is Planck's constant, and f frequency. Every chunk of energy or mass must produce a gravitational field around it. Now, when this chunk of energy moves from one to another position, in the manner of 'quantum jumps', the gravitational-field around the previous position has to collapse, and new field should keep getting established around the new positions. These productions and collapses of gravitational field should give rise to gravitational waves or ripples. These ripples must carry certain amount of energy with them, and this energy can come only from the kinetic energy of the photon. So the energy of the photon should keep on reducing, which

we have been observing as the 'cosmological red-shift'. And we can express this reduction in kinetic-energy of the photon as deceleration of the photon. If such a deceleration is true for a chunk of energy called photon, then it must be true for every particle of matter too. Strikingly, the decelerations experienced by the space-probes Pioneer-10, Pioneer-11, Galileo and Ulysses, as carefully measured by Anderson J.D. ET. Al. match perfectly with the deceleration of the 'cosmologically red-shifting photons'; thus providing supportive evidence for this simple explanation.
Linear part of the 'cosmological red-shift' is expressed as:

$z_c = (h f_0 / h f) / (h f)$

i.e. $(h f_0 - h f) = (h f / c^2) (H_0 c) D$

That is, the reduction in kinetic-energy of the photon is equal to its mass $(h f / c^2)$ times the deceleration $(H_0 c)$ times the distance D traveled by it.
Numerically, the quantity $(H_0 c) = 6.87 \times 10^{-10}$ meter/second^2, and the decelerations experienced by the Pioneer 10, 11, … space-probes were also of the same order of magnitude 10^{-10} meter/second^2, thus providing supportive evidence for our simple explanation! The carefully measured values of accelerations experienced by the space-probes Pioneer-10, Pioneer-11, Galileo, and Ulysses are [3]:
For Pioneer-10, a = $(8.09 \pm 0.2) \times 10^{-10}$ meter/sec^2,
For Pioneer-11, a = $(8.56 \pm 0.15) \times 10^{-10}$ meter/sec^2,
For Ulysses,   a = $(12 \pm 3) \times 10^{-10}$ meter/sec^2,
For Galileo,   a = $(8.0 \pm 3) \times 10^{-10}$ meter/sec^2, and
For the cosmologically-red-shifted-photons: a = 6.87×10^{-10} meter/sec^2 = $H_0 c$.
Matching of decelerations of four space-probes itself is a striking phenomenon; and its matching with the deceleration of the photon cannot be ignored by a scientific mind as a coincidence. So in the humble opinion of this writer these observations should be considered as evidence for the simple explanation for the 'cosmological red-shift' proposed here.
If an accelerated 'gravitational-charge', that is, a chunk of energy or mass can radiate gravitational-waves, then the decelerations of photons and various space-probes can also be due to their radiations of gravitational waves.

3. Conclusion

We first found that the ratio of: (loss in energy of cosmologically red-shifting photon) and (loss in electrostatic potential-energy of an electron at the same distance D) remains equal to the famous ratio $(G m_e m_p) / e^2$ leading us towards a possibility that 'cosmological red-shift' may be due to gravitational effect. So we considered various possibilities how the reduction in energy of the photon can be understood in terms of gravitational effects. The carefully measured decelerations of the Pioneer 10/11…space-probes provide supportive evidence for the gravity-based explanation proposed here.

Acknowledgements

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