Expanding Universe Theory
Not supported by Doppler red shift of Photons.
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Abstract:
In this paper we show that the Expanding Universe Theory primarily relies on the observed red shift of hydrogen spectrum absorption lines. This red shift of light has been used to argue for an Expanding Universe Theory that relies on the red shift as evidence for Galaxies moving away from the observer. The red shift has been tied to an increase in wavelength of the photon and finally translated via the Doppler Effect into a specific velocity of the Galaxy moving away from the observer. This application of the Doppler Effect requires a synchronized photon stream. We show that Professor Max Planck's 1900 paper identifies the photon as a single Quantum of light, rather than a synchronized photon stream, confirmed by Professor Albert Einstein's 1905 paper that also defines the photon as a single Quantum of light, and not a synchronized photon stream. Furthermore we show that spectrum absorption lines are a result of photons being absorbed by matter that matches the photons energy levels. The absence of the absorbed photons is recorded as black lines on the absorption spectrum. Thus any photons passing through a hydrogen cloud of matching energy will be absorbed. Thus the degree of red shift of the absorption spectrum more properly indicates the relative temperature of the matter traversed by the photon, rather than any change in photon wavelength and thus any movement by the Galaxy. Finally we will show that the Doppler Effect relates to the intensity of sound quanta and does not relate to changes in wavelength.

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Introduction:

The Expanding Universe Theory is a comprehensive theory that relies on various elements of proof aside from the escape velocities of Galaxies that are attributed to the Doppler red shift. However this Doppler red shift in its present form provides the most compelling evidence for an Expanding Universe. We will not address any of the minor issues as they are beyond the scope of this paper. Nor do we expect that the Expanding Universe Theory will be abandoned as a result of this paper, but perhaps there will be a shift in the focus away from Red shift calibration measurements of distant Galaxies.

1) Doppler Effect

The Doppler Effect is a well understood phenomenon discovered by Doppler in 1842 [1] and tested for sound waves by <u>Buys Ballot</u> in 1845 [2] as follows.

Ballot observed that sound quanta from a train approaching him had an increased intensity, while sound quanta from a departing train had a lower intensity, as shown in Figure 1.

Figure 1   Doppler Effect on Sound Quanta Intensity

Approaching Train velocity = (t)   Departing Train velocity = (t)
High Sound Quanta Intensity   Low Sound Quanta Intensity

OBSERVER

(Where the white dots represent sound quanta and the velocity of sound = (s)
Approaching sound quanta velocity   = (s + t)
And Departing sound quanta velocity = (s – t)

Thus the sound quanta travel at the velocity of sound (s) plus the velocity of the train (t) while the train is approaching the observer. This results in an increased Intensity of the sound quanta which we observe as a high pitch noise. On the other hand when the train is departing from the observer the sound quanta travel at the velocity of sound (s) minus the velocity of the train (t). This results in a decreased Intensity of the sound quanta which we observe as a low pitch noise. The wavelength of the sound itself does not change but rather the intensity of the sound quanta increases or diminishes. Thus the Doppler Effect is associated with the Intensity of sound quanta and has no effect on wavelength or frequency. Finally the Intensity of the sound quanta can be described in terms of Entropy (measured as the randomness of the sound quanta shown in (Fig.1).

2) Requirements in order for the Doppler Effect to measure a Hydrogen absorption spectrum red shift.

The basic premise of applying the Doppler Effect to the measurement of the Hydrogen absorption red shift observed in astronomy of a Galaxy moving away from the observer relies on the assumption that photons are emitted sequentially at precise intervals (regarded as wavelengths) as shown in Figure (2).

Figure 2   Sequentially launched Photons resulting in red shifted Photons (p)
←———————   Absorbed by Hydrogen clouds))))   Observed as black line spectra
Galaxy Moving away   p---p---p---p---p---p---p---p---))))) Absorbed photons   I I I I I I I I I I

(Where the wavelength = (--- + p), Hydrogen cloud = [ ))))], Black Line Spectra = (I I I I I I I)
Here we see that the Doppler Effect's measurement of the Intensity of sound quanta noise
(Fig.1) does not apply to the wavelength of the photon. As Fig.(2) shows the wavelength of the
photon (--- + p) must be external to the photon in order to allow for the measurement of an
increase in the wavelength of the photon due to the velocity of the light emitting Galaxy that is
moving away from the observer, Thus (the external wavelength of the photon) represents
several problems as defined by Max Planck and Albert Einstein. While the absorption of the red
shifted Photons by the intermediary Hydrogen cloud demands that the energy of said Photons
must equal the energy of the Hydrogen cloud in order to register as black line spectra (I I I I I
I). This Energy of course is a measure of the Temperature of the Hydrogen cloud and a red shift
is indicative of a lower Hydrogen cloud temperature than regular hydrogen black line spectra (I
I I I I I).
 Thus the preponderance of these recoded red shifts of Hydrogen would indicate that these far
away Galaxies are in low temperature regions of the Universe that can perhaps be identified as
the outer regions of the Universe in all directions away from our solar system.

3) **The objection presented by Planck's constant (h), the Quantum of action.**

Professor Max Planck in his 1900 paper defines the Planck constant (h) = $6.626 * 10^{-27}$ erg-/sec.
as the Quantum of Action per wavelength.
The photon energy (E) is shown in EQ.(1) ,The velocity of light (C) is defined in EQ.(2)

EQ.(1)   (E = h * f)   (Frequency of the photon = f)
EQ.(2)   (C = f * λ)   (Wavelength of the photon = λ)

Thus each photon has a unique (E) that through the application of EQ.1 reveals the unique (f) of
each photon. While the unique (λ) of each photon is calculated by substituting EQ.(2) into
EQ.(1) and solving for (λ) as shown in EQ.(3)

EQ.(3)   [λ = (c * h) / E)]

Thus each photon has a unique (λ) and (f) defined by Professor Max Planck's constant (h) the
Quantum of Action that he discovered in the year 1900, while the Hydrogen absorption red shift
observed in astronomy of a Galaxy moving away from the observer relies on the assumption
that photons are emitted sequentially (as shown in Figure 2) with identical (λ) between each
subsequent photon. The 1900 paper by Professor Max Planck that details the above uniqueness
of each photon as shown above was validated by the 1918 Nobel Prize

4) Professor Einstein's Quantum and the entropy of light as shown in his 1905 paper [2] awarded the   1921 Nobel Prize and quoted below.

"It seems to me that the observations associated with blackbody radiation, fluorescence, the production of cathode rays by ultraviolet light, and other related phenomena connected with <u>the emission or transformation</u> of light are more readily understood if one assumes that the energy of <u>light is discontinuously distributed</u> in space.
 In accordance with the assumption to be considered here, the energy of a light ray spreading out from a point source <u>is not continuously distributed</u> over an increasing space <u>but consists of a finite number of energy quanta which are localized at points in space</u>, which move without dividing, and <u>which can only be produced and absorbed as complete units</u>."[2]
The above assumptions are:

      a) Photons are not continuously distributed in space.
      b) Photons are a finite number of energy quanta localized at points in space,
      c) Photon energy quanta can only be produced and absorbed as complete units.

Thus Professor Albert Einstein introduces light as Energy quanta that are localized points in space which can only be produced and absorbed as complete units in his 1905 paper. These are the same light energy quanta that Professor Max Planck introduced in 1900 as Planck's constant (h) the Quantum of action that allows the calculation of one photon's Energy and wavelength as shown in EQ.1.

The Entropy of light is quoted from Section 8

(About the creation of cathode rays through the illumination of solid bodies.)
 Professor Albert Einstein's above paper as shown below.

"The usual perception that the energy of <u>light is continuously distributed</u> over an illuminated room, is found, in the attempt to explain the Photo-electric effect, to have particularly great difficulties, which are laid down in a path breaking work by P. Lenard(6

The continuous distribution of Light is here challenged by Einstein because the measured Entropy of light does not support the continuous distribution of light. But rather high Entropy or randomness distributed across a maximum range of random frequencies.

5) **The wave motion of the Photon**

As a result of the Nobel Prize recognition of both Professor Max Planck's constant (h) and Albert Einstein's Photo electric effect the particle/wave duality was born in the 1920's and continues to this day. The wave portion of this light duality is shown in the following Diagram(1)

Diagram (1)   The Electro-Magnetic wave motion of the Photon

[5]
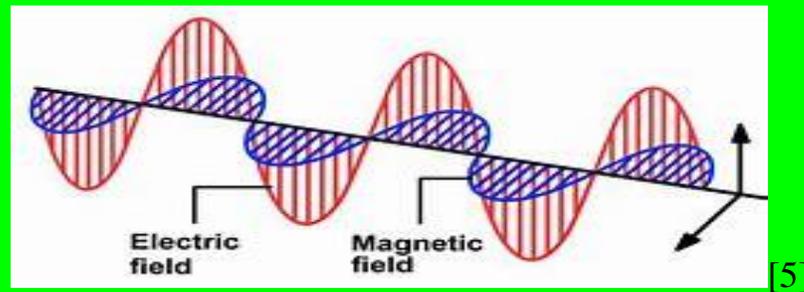
Here we see the co-ordinated wave motion created by the Electric field shown in (red) and the Magnetic field in blue working in unison to create the wave motion of the Photon. The diagram shows 3 wavelengths of the

Photon explicitly exhibiting the single Photon dynamics identified by Professors Planck and Einstein, while the Expanding Universe Red Shift scenario requires an additional photon at each end of the 3 wavelengths shown.

This would entail for a photon with a frequency of 1 billion herz per second an additional billion photons per second to provide for the external wavelength required as shown in Fig.(2) This requirement would exist for every photon wave over the whole range of the spectrum of photon wavelength available. (approx. 1 billion) More specifically the total number of Photons required per second = (1 billion)^2

The range of the photon's wavelength is not restricted to the visible-light portion of the electromagnetic radiation spectrum, but rather extends from radio waves, infrared rays, visible light, ultraviolet rays, X rays, to gamma rays, each consisting of a particular amount of energy relative to their wavelength. While single photons over the complete range of not just the light spectrum wavelengths, but beyond ultra violet and beyond infra red are transmitted simultaneously and are recorded in light spectra as shown in diagram 3.arranged by Frequency.

Diagram 3   Photon Frequency Range

Photon Distance Travelled 299,792,458 m. per second

10^{27} Hertz ⟶
10^{24} Hertz ⟶
10^{21} Hertz ⟶
10^{18} Hertz ⟶
10^{15} Hertz ⟶
10^{12} Hertz ⟶
10^{9} Hertz ⟶
10^{6} Hertz ⟶
10^{3} Hertz ⟶
10 Hert ⟶
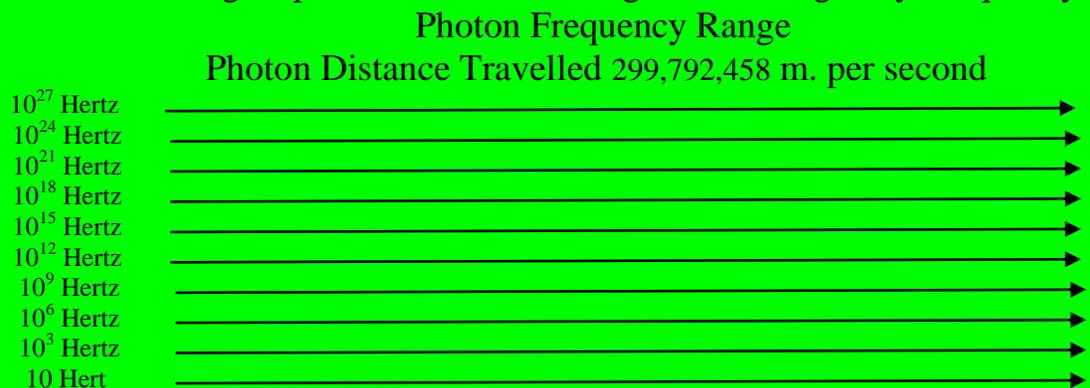
Here we see that for each second of Photon travel a Doppler Effect induced red shift would require on average 10^{12} wavelengths each separated by a Photon in order for the wavelength to be a result of the Galaxy moving away from the Observer. In the generality of the light Photons being emitted by said Galaxy the same quantity of wavelength separating Photons would be required by each unique frequency from 10^{27} Hertz to 10 Hertz.

This requirement would entail a quantity of Photons on average of (10^{12} Hertz per second) * 10^{12} Frequencies on average, for a total of 10^{24} Photons per second.

2) No known mechanism of any kind that is capable of emitting Photons in a contiguous stream of constant wavelength has ever been identified,

6) Conclusions

a) The Doppler Effect measures Intensity and cannot measure the length of light waves.

b) The wavelength of each Photon is unique and inherent in the wave movement of each Light Quantum as measured by Professor Max Planck's Constant (h).

c) The Entropy (randomness) of light is high and represents a great difficulty in explaining the possibility of streams of Photons that are perfectly sequenced at intervals equal to their wavelength, as identified by Professor Albert Einstein in his groundbreaking 1905 paper. [3] While perfectly sequenced streams of Photons require Entropy that is low and furthermore require a mechanism that can emit perfectly sequenced streams of Photon at equal wavelength intervals, which are not indicated anywhere.

d) Finally Absorption spectra are a result of photons that have been absorbed by intermediate clouds of material which equals the energy levels of the photons, which then are measured by their absence. Since the energy level of the absorbed photons are well understood it should not be difficult to identify the relative Temperature of the intermediate cloud of material that has absorbed the Photons, rather than relying on the absorption data of the Photons for proof of an Expanding Universe. More specifically the shift to the red side of the spectrum indicates the absence of Photons with longer wavelengths that indicate a lower energy and a lower temperature for the intermediate clouds of matter. This could perhaps point in the direction that would indicate that this particular research is reaching areas of the Universe in the vicinity of the outer edges of the Universe.

References

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(2) Buys Ballot (1845). "Akustische Versuche auf der Niederländischen Eisenbahn, nebst gelegentlichen Bemerkungen zur Theorie des Hrn. Prof. Doppler. Annalen der Physik und Chemie. **11** (11): 321–351.Bibcode:1845AnP...142..321B. doi:10.1002/andp.18451421102.

(3) Einstein, Albert (1905). "Über einen die Erzeugung und Verwandlung des Lichtes betreffenden heuristischen Gesichtspunkt" . Annalen der Physik. **17** (6): 132–148.

(4)   Planck, M. (1901). "Über das Gesetz der Energieverteilung im Normalspectrum". Annalen der Physik (in   German). **4** (3): 553– 563

(5) *Purcell and Morin, Harvard University. (2013). Electricity and Magnetism, 820p (3rd ed.). Cambridge University Press, New York. ISBN 978-1-107-01402-2*. p 430: "These waves... require no medium to support their propagation. Traveling electromagnetic waves carry energy, and... the *Poynting* vector describes the energy flow...;" p 440: ... the electromagnetic wave must have the following properties: 1) The field pattern travels with speed c (speed of light); 2) At every point within the wave... the electric field strength E equals "c" times the magnetic field strength B; 3) The electric field and the magnetic field are perpendicular to one another and to the direction of travel, or propagation.

(6) P. Lenard, Ann. D. Phys. 8. P. 169 – 170. IV. Folge 17. 1902