Can the Mystery of the Speed of Light be Unveiled by Kinetic Waves?

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Abstract

An in-depth analysis of the dynamics connected to the Doppler-effect brings clear light to elements of contradiction with the original ground on which the axiom of the constancy of lightspeed was based.

Thereby, with regard to electromagnetic phenomenology, the duality waves/particles and the wavy dynamic of light-propagation suggest the existence of a natural kind of waves, which differently from the classic ones, are originating by kinetic thrust and propagating, also though vacuum, by inertial force. The model taken into consideration, to which has been given the name of "*kinetic waves*" is, like the classic one, a concretely existing natural phenomenon which can also be visually perceived if produced on molecular scale. Moreover, *kinetic waves* seem to offer many more points of similarity, in dynamic and behavior, with the electromagnetic waves, than the classic model.

Applying the obtained results to astrophysical field, taking as example the quasar 3C-273, the recently found, most far galaxy GN-z11 and the galaxy NGC 224 (better known as Andromeda), can mathematically and concretely be sustained that none of the energy sources we optically perceive, showing a Doppler-shift, is regressing nor approaching.

In the appendix, a suggested and accurately described experiment on base of Radar Astronomy to possibly confirm the validity of the model presented by this article.

Keywords: Light Propagation; Classic Waves; Kinetic Waves; Particles; Doppler-Shift; Redshift.

1. Introduction.
1.1. A brief history of light-waves.

Around the end of 17th century Christian Huygens (1629-1695), the Dutch mathematician, physicist and astronomer, formulated the "Huygens principle", nowadays better known as Huygens–Fresnel principle, and generally argued that light consists of waves. He connected the dynamics of light-waves to that of sound-waves.

Huygens and his principle were in contrast to Isaac Newton who argued that light consists of small particles or corpuscles. By his "Corpuscular Theory" he sustained that those particles are literally shouted from the source in the form of beams. Basically, a ballistic theory, as we should call it today. Because Newton at that time enjoyed a much greater consideration by the scientific world, than Huygens, the Corpuscular Theory become accepted and that of Huygens denied.

In 1865 the Scottish physicist James Maxwell, arrived by experiment to the formulation of the Theory of the Magnetic Fields, concluding that light propagates in form of waves through space. This discovery sustained Huygens's principle, so that Newton's Corpuscular Theory, was finally disregarded.

The common concept of "waves" is connected to vibrations of matter through the matter itself. So, we could without doubt state that, in the classical concept of waves, these must necessarily make use of a medium – liquid, solid or gassy - to be able to propagate; since the very concept of "waves" contains a dynamic of vibration of matter through matter itself. It is understood that the conclusions of Maxwell, with regard to electromagnetic waves, referred to the classic model of waves as above described (according to the Huygens-Fresnel principle), that also include the constancy of propagation's speed and the principle of Doppler Effect as a result of variation of wavelength, caused by the movement the light-source through space, and, a consequent variation of frequency, with respect to an observer.

Closed after that time, to explain how electromagnetic waves could propagate through space, sourced the concept of "ether" as a non-substantial medium scattered all over the universe, able to provide a base of propagation.

In 1887, the experiment performed by A.A. Michaelson and E. Morley, excluded the existence of such a "non- substance".

It is a fact that, originally, all theories of Modern Physics developed in mathematical-theoretical way, sourced referring to the wavy dynamics connected to the original classical model of sound-waves. Not to forget, that this experiment was meant to prove the existence of the "ether" and based of the model of classic waves.

It's important to note that M.M. besides excluding the existence of ether, considering the way it was performed, also could confirm that in absence of relative motion between source and observer, the movements of source trough space, do not make register any variation of the original emitted frequency.

From this very angle, to explain the reason of the constancy of lightspeed regardless the movements of a light source relatively to an observer, in 1900 A.H. Lorentz realized a mathematical transformation which could theoretical explain the unexpected results of this experiment. In 1905 A. Einstein, making use of the Lorentz transformation, introduced his Special Relativity Theory, proposing the universal constancy of speed of light and the relativity of time.

Modern Physics took place considering the result of an experiment performed on the expectations made on ground of the classic model of the Doppler Effect and interpreted on this very base.

Around 1920, the history of electromagnetic waves became more complicated: by a simple but intriguing experiment, performed at that time (double-split), undoubtedly resulted that the structure of light rays does not consist of waves only, but in a combination (duality) of those latter and particles. This discovery, moreover, indicated that also Newton was partially right, concerning his Corpuscular Theory.

The path of scientific research that has followed during the last century till nowadays, was certainly not free of contradictions and doubts about the validity/consistency of mathematical-physics theories that have been gradually introduced in the course of more than a century.

Many problems have been solved by means of quantum theories and the "Standard Model" with regard to the Particles Physics, but certainly not all of them. Especially those relative to the contradictory connection between the Standard Model and Einstein's General Relativity or those to Astrophysics and Cosmology, where some important interrogatives are still without an answer.

Of course, until the constancy of the speed of light is not questioned, things remain unchanged and the theoretical research must go on the same base as it started, although, we may consider that Physics, till date, has never taken into consideration that electromagnetic waves may not be connected to the classic ones. As previously announced, there is in nature a different kind of waves with a strong similarity in structure, behavior and dynamic of propagation with the electromagnetic ones, that could explain all unsolved problems, especially with regard to the above-mentioned ones.

This research aims to give of it an analytical description and mathematical proof, starting at first, to take into consideration all aspects of the classic Doppler, that, as explained, represents the base on which the invariability of speed of light has been assumed and Modern Physics originally was conceived.

2. DOPPLER SHIFT ON BASE OF SOUND WAVES.

Regarding the classic Doppler, we consider two different aspects: a) when an emitting source is moving to or from a stationary observer or: b) when an observer is moving to or from a stationary emitting source. Just for clarity, we shall call a) Doppler 1 and b) Doppler 2

2.1

Doppler 1

Treating of classical waves (sound waves), we have to consider that an objective variation of the wavelength can be registered when a source is moving through a matter. Let us take a look at the following figure (1):

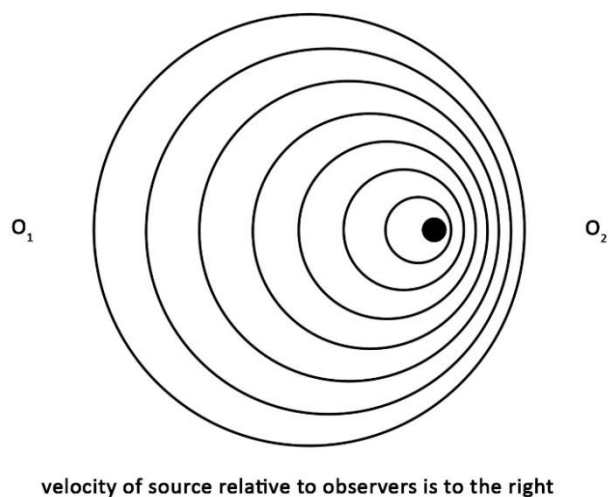velocity of source relative to observers is to the right

Figure 1

As we can see, the movements of the source through the matter produce a real, objective increasing or decreasing of the wavelength, so that the observer, at a constant speed of propagation, receives an increased or decreased frequency.

In case of decrease of wavelength (the distance between two wavetops becomes smaller), the observer will receive a frequency:

$$f_o = f_e \left(\frac{v_u}{v_u + v} \right) \qquad (1)$$

By decreasing (the wavelength becomes bigger):

$$f_o = f_e \left(\frac{v_u}{v_u - v} \right) \hspace{3cm} (2)$$

(f_o = observed frequency; f_e = original emitted; v_u = velocity of waves through matter; v = velocity of source with regard to observers.)

2.2

Doppler 2

We examine the case when the observer is moving to a stationary source of waves (fig. 2):

When the emitting source is stationary, we see that there is no difference between wavelength emitted and wavelength observed:

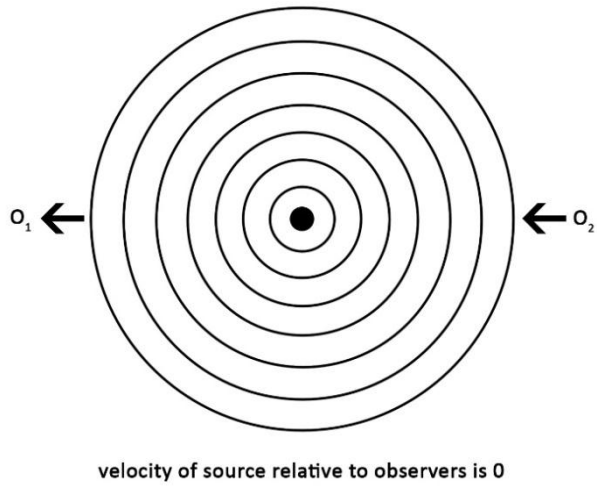velocity of source relative to observers is 0

Fig. 2 (Observers move to and from source)

By observing this figure, it is evident that we are dealing with a completely different phenomenon than that described in fig. 1. What we can see in fig. 2 is that when a source is stationary there isn't any variation of wavelength, but the observers subjectively record a decreased or increased frequency which is consequence of the relative motion between these latter and the source. In this case the frequency observed has been calculated by:

$$f_o = f_e \left(1 - \frac{v}{v_u} \right) \quad \text{when the observer is regressing from source:} \hspace{1cm} (3)$$

And:
$$f_o = f_e \left(1 + \frac{v}{v_u} \right) \quad \text{when is approaching.} \hspace{1cm} (4)$$

Which can be transformed into:

$$f_o = f_e \left(\frac{v_u + v)}{v_u} \right) \quad \text{approaching} \hspace{1cm} (5)$$

And:
$$f_o = f_e\left(\frac{v_u - v)}{v_u}\right) \quad \text{regressing} \tag{6}$$

(f_e = frequency original emitted; f_o=frequency obs.; v_u = speed of waves through matter; v = speed of the observers with regard to source)

Eq. 5 and 6, written this way, clearly indicate that the observed frequency, in this case, is given by adding or detracting the speed of the observer, to/from the numeric value of the constant speed of propagation. This latter, as we know, is calculated with regard to the medium in which the waves occur and not to the source.

By this context, we attempt to analyze how a wavelength is produced:

Normally speaking, we are used to say that a sound-source emits a frequency, which is realistically not correct: a source emits a constant wavelength (λ) which is given by the speed- or frequency - of vibrations of the source (f_v): a wire, for example and the constant speed of propagation (v_u). The observer receives a frequency, which is the number of wave-tops, transmitted through the medium, in a unit- measure of time:

$$\lambda_e = \frac{1}{f_v} v_u \rightarrow f_o = \frac{1}{\lambda} v_u \tag{7}$$

in absence of relative motion between source and observer, at constant speed of propagation:
$$f_v = f_o \text{ and } \lambda_e = \lambda_o \tag{8}$$

To make it clearer, let us see the following example:
Let's say that a wire is vibrating at a frequency: f_v = 500/s; Constant speed of propagation: v_u =300m/s; observer's speed: v = 0:

$$\lambda_e = \frac{1}{500} 300 = 0,6 \rightarrow f_o = \frac{1}{0,6} 300 = 500$$

a) By relative motion between stationary source and moving observer, the wavelength remains constant (fig.2) but the frequency undergoes a variation relatively to the observer's speed *v*:

$$f_o = \frac{1}{\lambda_e}(v_u \pm v) \text{ and: } \lambda_e = \lambda_o = \lambda \tag{9}$$

Now, the observer moves towards the stationary source at a speed: *v = 20m/s:*

$$f_o = \frac{1}{0,6}(300 + 20) = 533,33$$

Corresponding to: $f_o = f_e(1 + \frac{v}{v_u}) = 500(1 + \frac{20}{300}) = 533,33$

By these results, we can sustain that a wavelength is obtained interpolating frequency of the source's vibration and speed of propagation, while the frequency results by interpolating wavelength and the same speed of propagation.

Besides, the difference in observed frequency calculated by Doppler 1 (eq. 1) and Doppler 2 (eq. 5)   is very small when dealing with a low speed *v*, but it **grows quadratically** the more the difference between *v* and $v_{u, \text{decreases}}$. Let's see by these results:

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By Doppler 1, using eq. 1, when the source is moving towards a stationary observer at the same speed $v = 20_{m/s:}$

$$f_o = f_e(\frac{v_u}{v_u - v}) = f_o = 500(\frac{300}{300 - 20}) = 535,71$$

Taking in the same example a velocity $v = 40m/s$, by Doppler 2: $f_o = 566,66$; and by Doppler 1: $f_o = 576,92$. Increasing the speed v to 80m/s, by D2: $f_o = 633,33$; by D1: $f_o = 681,81$.

2.3

To resume: Doppler 1 modifies the frequency on base of the constancy of the speed of propagation and variation of the measure of wavelength. Doppler 2 modifies the frequency on base of the measure of relative motion (*v*) between source and observer. Which means that the source emits a wavelength, which remains constant once sent off, while an observer receives a measure of frequency given by adding or detracting the measure of relative speed to/from that of constant speed of propagation.

2.4

Important to note:

a) By Doppler 1, the measure of variation of wavelength which occurs when a sound-source moves towards a stationary observer, becomes smaller the more the velocity of the source increases. In this case, we expect that, when the speed of a source exactly reaches that of the propagation of the waves, its original emitted wavelength becomes = 0 in frontal direction (as results by eq. (1). This happens due to the fact that the speed of propagation of waves (to understand in this case: ripples of the atmosphere through the atmosphere itself) is constant and limited, while that of the source is, classically speaking, virtually unlimited. It does not mean, concerning the classic Doppler, that the constant speed of propagation cannot be surpassed by the emitting source. In the opposite direction, as shown in fig. 1, for the same virtual illimitation offered by the classic mechanic (to which the calculations of the classic Doppler belong) by continuous and unlimited increasing of the source's speed, the wavelength can expand itself to the infinite. Considering that the Law of Hubble originally stands on the astrophysical findings interpreted on ground of the classic Doppler (1), it wouldn't be surprising to find out that the redshift resulting by several recently discovered far bodies, indicates that the recession speed of those light-sources has far exceeded that of light.

b)

c) By Doppler 2, as shown by fig. 2, clearly results that when an observer moves, approaching or regressing with regard to a stationary emitting source, the variations registered between f_e and f_o are not a consequence of a variation of wavelength but exclusively of the relative speed between stationary source and moving observer ($v_u + v$) or ($v_u - v$), as results by eq. 5/6. There isn't any other reason that can justify these observed differences. Applying this model to electromagnetic waves, we must consider that when an observer moves to or from a stationary light-source, the first registers a variation between frequency emitted and frequency received, calculated in the same way as by sound-waves. But treating of electromagnetic waves, that means: ($c + v$) when the observer approaches the source and ($c - v$) when regressing from it; in other terms, according to the Galilei transformations. Thus, it cannot support the statement by Special Relativity (SRT), according to which the speed of light remains constant with regard to any observer, simply because those differences in frequency are obtained just by adding to, or detracting from the numeric value of the speed *c*, that of the moving observer's speed *v*. Considering the constancy of lightspeed abstractly and independent of the movement of the source, with regard to stationary observers, it would be correct to suppose the same constancy to be independent of the movements of the observers with regard to the stationary source, so that on base of the expectations formulated in the axiom of SRT the speed of light should remain = *c*, despite the movements and the speed of the observer, which should not register any variation of the original emitted frequency. While we know that a difference is detected. Besides, this consideration opens a serious contradiction: by Doppler 1, to support and confirm the constancy of lightspeed as explicitly theorized by SRT, is necessary make use of mathematical abstractions which include the relativity of the factor *time*, while referring to Doppler 2, we can simply make use of the formulae of the classic mechanics to reach a correct result in the variations of observed frequency.

For major clarity, let us see it this way:
Given that lightspeed **c = λf**, , when the source moves through space in absence of relative motion with regard to

its observer, taking into account the existence of an ether, as by the M.M. experiment 1887, was expected: $c = \lambda' f'$, which did not result. As we know, f remained constant despite the variation of λ.

Differently, in a similar classic contest, when the observers move and the source is stationary, λ remains constant (fig 2) and f variates into f', so that: $\lambda_c f' = c'$, which contradicts the axiom of constancy of lightspeed.
Given the above, . as we can see ahead, regarding the model of *kinetic waves,*
 it can be correctly suggested that these differences in frequency, in both cases, are just consequence of the relative speed between source and observer, besides considering the fact the measure in variations of frequency, in both cases are exactly the same. As we can see ahead, regarding the model of *kinetic waves.*

2.5
Concluding this part:
The bases of the Doppler Principle are strongly connected to the Classic Mechanic, but in the light of the last discoveries, especially on field of Astronomy and Astrophysics, they seem not to be suitable to explain results which are originally supposed to be interpreted and explained on this ground. However, since Modern Physics, has been conceived and developed on the very bases and the results deducted and interpreted by the classic Doppler, denying this latter as unsuitable to explain results on different fields of Theoretical Physics, we consequently deny the original ground on which this latter has been conceived.

3.   Kinetic Waves and Duality Waves/Particles.

Newton's Corpuscular Theory, as told, is basically a ballistic theory. He argued that light was made up of particle beams projected from the source. At his time, there was no certainty of the fact, found a century later by Maxwell, that the light propagated in the form of waves. Since about a century, besides, it is known that the composition of the light beams consists in a duality of waves and particles.

Electromagnetic waves, in several aspects, are not similar to the above-mentioned classic waves. There are some important differences, like:

1) It appears that they do not need a field of any kind in which to propagate:

When we speak about "Doppler-shift" we implicitly speak of rippling of material substances through the matter self. Any theorizing referring to the Doppler must be connected to classical waves in the sense above explained.

 2) Electromagnetic emanation consists of both waves and particles:

The structure of electromagnetic, waves on field of research can never be considered as a synthetic phenomenological context. Research can just be made on particles or, separately, on waves, treating (on field of research) the two parts of the same energy emanation as two different phenomena.

Differently, classical waves can be contained in a single context: there is a matter and rippling of the matter self.

3) Regarding the Doppler Effect, there is not any difference in observed frequency, when the source is moving from the observer or vice versa.

3.1 Method.

We integrate those data in a single context, in order to obtain an image of what the structure and the nature of electromagnetic waves concretely could be, on ground of Newton's Theory and Maxwell's findings, as well:

The most relevant data which we can use is the knowledge of the fact that the particles making up matter contain a vibratory motion. It is also well-known that the speed of these vibrations is directly proportional to the degree of heat of the matter in a relation that in rough synthesis we may define thus: the hotter the matter the faster its particles vibrate, the higher the frequencies it emanates.

Now let us imagine that, due to kinetic thrust, these particles are literally fired from electrons into space in the form of continuous jets, at the original constant speed - in relation to the source - of approx. 300 thousand Km/s. With regard to the fact that the electrons have a vibratory movement, the result that we would obtain is that of rippling fluxes, or better of

particle waves, whose original wavelength would vary in relation to the degree of heating of the source emitting them. (as solved by eq. 5)

This figure shows what a vibrating electron would look like:

Fig. 3

It is already well known that each electron sends photons. Let us imagine that those small particles together have been shot in a continuing flux from vibrating electrons. Then we see something like this:
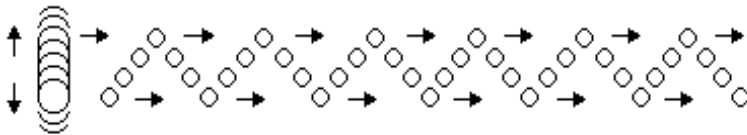

Fig. 4

$$\lambda_e = \frac{1}{f_v} c$$

Although each small particle follows a straight line, all parts together give the flux a waving motion. This would give a concrete explanation of the fact that research on the field of electromagnetic emission have to consider waves and particles separately from each other: if we take a look at figure 4 we clearly see that every single particle follows a straight line, so that when researching particles, it is impossible to get an idea of a wavy structure. If not, when researching waves, we must synthetize the particle emission in a global wavy flux.

Heated matter is never heated uniformly: usually the nucleus is the part most heated. The temperature gradually decreases towards the external parts of the matter. Making a relation between thermic degree and speed of the particles' vibration, we would logically find that the highest frequencies would be emanated from the hottest layers while the lowest from the coldest.

That means, the hotter the matter, the faster the electrons vibrate, the shorter the wavelength of the waving flux, so that the distance between two wave tops becomes smaller:
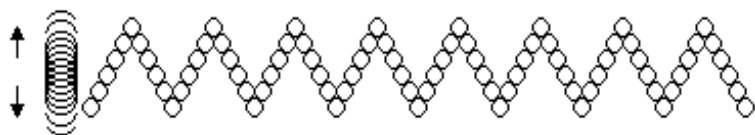

Fig. 5

$$\lambda'_e = \frac{1}{f_v'} c \qquad\qquad (f_v' > f_v)$$

Considering that light is propagating in the form of beams (rays) and not in that of concentric circles (like represented in fig.2 with regard to sound waves) we have to imagine that all different wavelengths produced by the hot matter must be concentrated, contained and sent off from the different layers of the hot matter, in the form of separated beams, as represented in the next figure (6):
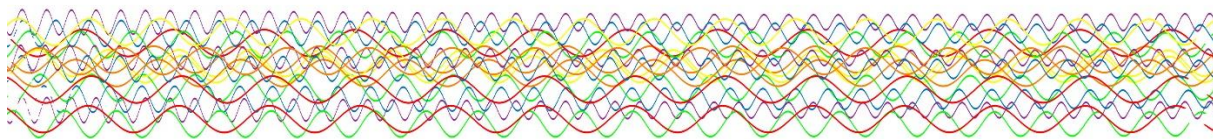

Fig. 6 : composition of a light beam observed along its side.

It is to understand that each wavy line represented in this figure is made up by particles, as suggested in figure 4 and 5. Also in this figure (6), if we make a blow-up, we'll note that the lines are made of pixels. It is interesting to note that the wavy motion of a light beam, in this model, would be evident just when it has been observed along its side. Differently, observing the same beam frontally we would obtain the next image (fig. 7):
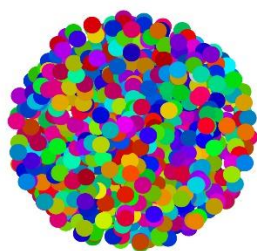

Fig. 7: Frontal section of a ray of light.

The image we can observe from this angle will show us a beam of particles without a recognizable wavy motion. Only spectroscopically or by a human eye the different frequencies can be selected or   translate into images composed by different colors.

This model offers us the following conclusions:

1)Kinetic waves do not need any material substance in which to propagate. Since they originate from the source that produces them, they can propagate even through vacuum and proceed by inertial force. In the absence of gravity and agents of attrition, we could suppose that the speed originally imparted and so the wavelength remains unvaried (constant) to the infinite.

 2) From this point of view, we can see how the duality of emission regarding waves and particles can be totally and concretely explained: looking at this structure we can easily conclude that we are dealing with waves and with particles emanation as well. In fact, the particles are making_up a wavy flux. This would be a concrete way to connect waves and particles emission in a synthetic phenomenological context conform to Newton's Corpuscular Theory and Maxwell's field equations.

3) Regarding Doppler 2, in this hypothesis the behavior of the waves in relation to the frequency variations ascribable to the relative motion is perfectly coherent with the premise: the variation of frequency recorded in relation to the source's movements with respect to the observer, or vice versa, are not a consequence of Doppler 1 effect: in the sense that they do not represent a variation of wavelength, but a variation of the observed frequency, caused by the relative increase or decrease in relative speed of the flux between source and observer.

Frequency is depending on movements of the source with regard to an observer. Which means that every variation of the emission speed – due to a performing relative speed - will be perceived by an observer as a variation of frequency in the sense of blue or red shift.

Dealing with electromagnetic waves, using the formulas relative to Doppler 2 we can observe:

a) The wavelength emitted is related to the frequency of vibrations of the electrons and the constant speed of propagation:
(f_v = frequency of vibrations)

$$\lambda = \frac{1}{f_v} c$$

b) The stationary observer (or in absence of relative motion) receives a frequency:

$$f_o = \frac{1}{\lambda} c$$

c) The moving source relatively to the observer or the moving observer with regards to the source at a relative velocity v receives a frequency:

$$f_o = \frac{1}{\lambda} (c \pm v) \tag{10}$$

Comparing electromagnetic waves to kinetic waves, as above explained, we expect that the variations in frequency we register when the source moves to a stationary observer, or when the latter moves to a stationary source, are exactly the same.

3.2
Results:

a) The observer is regressing from the source: speed of vibration = f/s. Speed of the flux $v_u = c$ *(numeric value)*; velocity of the observer = v. The distance between two wave-tops is: $d = \frac{1}{f} c$

$$d = \frac{c}{f}$$

$$O = a_o + vt$$

$$W_1 = b_o + ct$$

$$W_2 = b_o - d + ct$$

$$W_{2(\Delta t)} = O_{\Delta t} \Rightarrow b_o - d + c\Delta t = a_o + v_{\Delta t}$$

$$W_{1(o)} = O_{(o)} \Rightarrow b_o = a_o$$

$$W_{2(\Delta t)} = O_{\Delta t} \Rightarrow b_o - d + c\Delta t = a_o + v_{\Delta t}$$

$$-d = v_{\Delta t} - c_{(\Delta t)} = (v - c)\Delta t \Rightarrow \Delta t = \frac{-d}{v - c}$$

$$\Delta t = \frac{c}{(c - v)f}$$

$$f_o = \frac{1}{\Delta t} = \frac{(c - v)f}{c}$$

b) The source is moving away from the observer:

Speed of the flux + distance

$$d' = \frac{c - v}{f} + \frac{v}{f}$$

$$d' = \frac{c - dv + v}{f} = \frac{c}{f}$$

$$W_1' = a_o + (c - v)t$$

$$W_2' = a_o - d' + (c - v)t$$

$$O' = 0$$

$$\left(\begin{array}{l} W'_{1(o)} = O'_{(o)} \Rightarrow a_o = 0 \\ W'_{o(\Delta t)} = O'_{(\Delta t)} \Rightarrow a_o - d' + (c - v)\Delta t = 0 \end{array} \right) \rightarrow$$

$$\rightarrow d' + (c - v)\Delta t = 0$$

$$\Delta t(c - v) = d'$$

$$\Delta t = \frac{d'}{(c - v)}$$

$$f_o' = \frac{1}{\Delta t} = \frac{(c - v)}{d'} \Rightarrow f_o' = \frac{(c - v)}{c}f$$

[Whether the source approaches the observer the sign will be (+) as solved by eq.5]

In both cases (source moves to observer or vice versa, approaching or moving away) the result in frequency' s variation will be exactly the same.

In absence of relative motion between source and observer the wavelength is constant and at constant speed of propagation the frequency observed will be the same of the original emitted vibration frequency:

$$f_o = \frac{1}{\lambda}c = f_v \qquad\qquad (11)$$

3.3

To resume:

1. Sound waves are originating by the vibrations of a source (a wire for example) which emits a wavelength that is directly proportional to the speed of the vibration. Sound waves propagate trough a matter - at a constant speed - which can change the structure of the wavelength by propagating through the medium. The wavelength remains constant when the source is stationary, but an observer can receive a lower or higher number of wave-tops in the same measure of time, as consequence of the relative motion between source and observer. The frequency observed, in the two cases, is different. A difference which is very small, when dealing with low relative speed, but increasing quadratically by increasing of relative speed with respect to the propagation's speed.

2. Kinetic waves (by original model) are beams of particles originating by kinetic thrust, from a vibrating source (think of the wavy effect of a flow of water produced by a vibrating garden hose), which emit a wavelength that is directly proportional to the speed of vibration. Kinetic waves propagate at constant speed trough vacuum, by inertial thrust. The wavelength remains constant even when the source is moving through space, but the observed frequency changes by effect of the relative motion between source and observer. Kinetic waves make no difference in observed frequency whether the source moves to the observer or vice versa.

4. Experimental Results.

The following mentioned experimental results:

Michelson-Morley

Fizeau convection coefficient

Kennedy-Thorndike

Moving sources and Mirrors

Aberration

since they are performed on ground of the movements of sources through space, in absence of relative motion between source and observer, did not register any different observed frequency than that original emitted. About the above, could be interesting to take into account the results by Walther Ritz about his Research on electrodynamic Theories of C.L Maxwell and A.H. Lorentz, published in 1908 [1,2,3].

Experimental results like **De Sitter Spectroscopic Binaries** which disagree with ballistic theories, are starting from the ground of Doppler 1 which is based on the constancy of propagation speed of electromagnetic waves, and the variations of wavelength.

De Sitter Spectroscopic Binaries is the most mentioned experimental result in disagree with Ritz emission theory. Just to remind:

"According to simple emission theory, light thrown off by an object should move at a speed of c with respect to the emitting object. If there are no complicating dragging effects, the light would then be expected to move at this same speed until it eventually reached an observer. For an object moving directly towards (or away from) the observer at v meters per second, this light would still be expected to be travelling at $(c + v)$ (or $(c - v)$) at the time it reached us.

In 1913, Willem de Sitter argued that if this was true, a star in a double-star system would usually have an orbit that caused it to have alternating approach and recession velocities, and light emitted from different parts of the orbital path would then travel towards us at different speeds. De Sitter made a study of double stars and found no cases where the stars' computed orbits appeared. Since the total flight-time difference between "fast" and "slow" light-signals would be expected to scale linearly with distance in simple emission theory, and the study would (statistically) have included stars with a reasonable spread of distances and orbital speeds and orientations, De Sitter concluded that the effect should have been seen if the model was correct, and its absence meant that the emission theory was almost certainly wrong."

(Figure 6 and italics text are taken from Wikipedia.org as referred in [4])
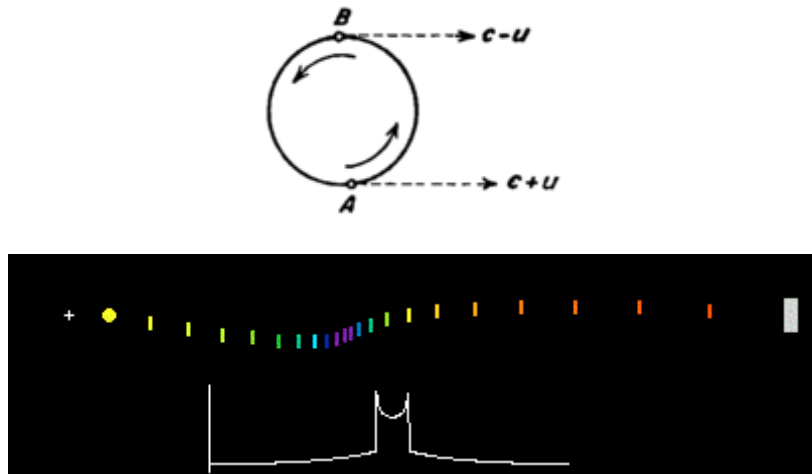
Fig. 8: De Sitter Spectroscopic Binaries experiment

Comparing electromagnetic waves to the classic model, the arguments deducted by De Sitter's astronomical observation, would be certainly correct. It won't be such, whether we connect his conclusions to the model of kinetic waves.

Since all experimental results have been treated till now in the present research, have been interpreted by the classic model of waves, is assumed that the movements of a source trough space must produce a variation of wavelength. Which is not when we consider the propagation speed related to the source, according to the *kinetic waves* model. By this angle, as we could see, the only cause of variation of observed frequencies, is given by the relative motion between source and observer. De Sitter, instead, grounding is calculations on the classic Doppler, by this angle, correctly expected a decreasing of wavelength by the approaching phase of the star, and assuming this variation would be transported at an increased speed $(c +v)$ to the observer:

$$f_o = f_e(\frac{c}{c-v})+v$$

which should have resulted in an ulterior increasing of the observed frequency:

$$f_o = f_e(\frac{c}{c-v})+ \ f_e(1+\frac{v}{v_u})$$

As De Sitter sustained this effect should have clearly appeared, if Ritz's model was correct, considering that the expectations were denying, the emission theory must be wrong.

 By kinetic waves, as shown, the variation in frequency must be calculated just on base of the variation of the observed speed of emission: $(c + v)$ or $(c - v)$. So, we expect that, when the source is moving towards the observer the variation in frequency will be given by:

$$f_o = \frac{1}{\lambda}(c+v)$$

And when the source is regressing: $\qquad f'_o = \frac{1}{\lambda}(c-v)$

From the angle of kinetic waves model, we also expect that these two results will be constantly alternate each other in approach and recession velocities. We don't expect any ulterior increasing or decreasing of speed of the fluxes, just because the variations in constant speed of emission is already considered as only cause of the differences in observed frequency between approaching of de source and regressing of it.

5. REDSHIFT AS PROGRESSIVE DECREASING OF LIGHT-SPEED ON TRAVELLED DISTANCE,

We make use of Doppler 2 model, which, as we have seen, previews constancy of wavelength and variation of emission speed, to recalculate the redshift, given that the emitting sources finding them self at very great distances from us are stationary and the frequency we observe registers a decreasing with regard to the original emitted, due to a decreased original emitted light-speed, proportionally to the travelled distance. Whether light-beams travel by inertial force through great distances, the original kinetic thrust could be decreased by effect of gravity fields they have to cross or scattered atomic waste present in space.

5.1 Results.

Let us consider the following examples:

Example 1:

We take as first the quasar known as 3C-273:

 (*for these calculations has been used a round light-speed of c = 300.000Km/s*)

Calculation of the redshift of 3C-273 on base of classic Doppler.

Doppler 1 fixes the constant factor in the value of speed of propagation and the variable one in the measure of wavelength.

The hydrogen Ballmer-alpha line in stationary stand registers a wavelength of $656_{n.m.}$ The observed wavelength of this body in $760_{n.m.}$ Calculating redshift and recession velocity on base of Doppler 1:

$$\lambda_e = 656_{n.m} \; ; \; \lambda_o = 760_{n.m} \; ; \; z = \frac{\lambda_o - \lambda_e}{\lambda_e} = 0,1585 \rightarrow v = (cz) = 47550 km/s$$ (recession speed on base of

wavelength)

$$f_e = \frac{c}{\lambda_e} = 457_{THz} \; ; f_o = \frac{c}{\lambda_o} = 394_{Thz} \; ; \; z = \frac{f_e - f_o}{f_o} = 0,1585 \rightarrow v = (cz) = 47550 km/s$$ (on base of

frequency)

The calculation of the redshift this way, would be possible till *z* < 1. When *z* > 1, the regression speed will exceed that of light. If we take the quasar 5C 02.56 discovered in 1970 [5], it shows a redshift of: *z= 2,399*, corresponding to a regression speed of: *v= 719.700km/s;* GB1428+4217 [6] =z= 4,72 and recession speed = *1.416.000km/s;* GRB090423 [7] = z= 8,2 and recession speed = *2.460.000km/s*. Going on to the most recent time, the galaxy GN-z11 [8], which shows a redshift calculated in z = 11,09, on base of classic Doppler, it would pretend to move away from us at a speed of more than 3,5 million km/s.

The Law of Hubble, which is originally based on the calculations of Doppler, is grounded on the astronomical observations and relative spectrum analysis made since 1929. At the time of Hubble's publication, the most distant observable body was the galaxy NGC-7619 [9] which registered a redshift of 0,012 and a regression speed of about 3.700km/s: a surprising result, at that time, but still contained in the limits allowed by Relativity.

5.2

Calculation of the redshift of 3C-273 on base of kinetic waves.

Considering the observed frequency, based on constancy of the wavelength and progressive decreasing of light-speed and according to what explained about the bases of Doppler 2, the source produces a wavelength and the observer receives a

frequency, which is directly proportional to the value of decreased light-speed. This way, is to understand that the redshift would not be consequence of a progressive regression of light-sources on distance, relatively to the observer, but to a decreasing of the observed light-speed which results in a decreased frequency.

According to that, we have to suppose that the length of 656$_{n.m.}$ remains constant in emission as in observation. In stationary stand and at constant speed of emission, an observer will receive a frequency:

$$f = \frac{1}{\lambda} c = 457_{THz} \quad \text{and} \quad \lambda_e = \lambda_o = \lambda = 656_{n.m}$$

In case of decreasing of original emission-speed to (c-v):

$$f = \frac{1}{\lambda}(c - v) \qquad (12)$$

Now we don't know yet the value of *v*, so we have to fix it on base of which we think to be an observed wavelength. As told, the Hydrogen Ballmer-alpha line relative to this body is on 760$_{n.m.}$ which correspond to a decreased observed frequency of 394$_{THz}$. It means that when on spectrum appears the line on 760$_{n.m.}$, in fact we are receiving a frequency of 394$_{THz}$. Since the calculations are programmed on base of Doppler 1, the result on frequency is automatically translated into a value of increased wavelength. However, the frequency observed is the value we really need to reach the value of decreasing in velocity (*v*). So, we can state: the original emitted wavelength (656) is the same observed and the corresponding emitted frequency (457) is decreased by effect of decreased original emission speed to c-v:

$$z = \frac{f_o - f_e}{f_e} = \frac{394 - 457}{457} = -0{,}1378 \rightarrow v = cz = -41.340 km/s$$

In this case the negative sign of the shift doesn't mean *blue-shift*, but the value that must be detracted from the original emitted speed. This way:

$$c_{obs} = (c - v) = 300.000 - 41340 = 258.660 km/s$$

Now we obtained the value of *v*, we can complete the eq. 12 with the missing value:

$$f_o = \frac{1}{\lambda}(c - v) = \frac{1}{656}(258660) = 394_{THz}$$

As already explained, this value of decreased observed frequency (394$_{THz}$) which by Doppler 1 will be automatically interpreted as an increased wavelength of 760$_{n.m.}$ from this angle it expresses a value of decreased light-speed.

Example 2:

5.3.

 Calculation of the redshift of the galaxy GN-z11, on base of kinetic waves.

The redshift of this body is calculated in z = 11,09:

$$\lambda = 656 \rightarrow f = \frac{c}{\lambda} = 457_{THz}$$

The Hydrogen-Ballmer-alpha-line signs a wavelength on 7.831$_{n.m.}$ which corresponds to an observed frequency:

$$f_o = \frac{c}{\lambda_o} = \frac{300.000}{7931} = 37,8_{THz}$$

$$z = \frac{f_o - f_e}{f_e} = \frac{37,8 - 457}{457} = -0,9172 \, ; \; v = cz = (300.000)(-0,9172) = -275.186 km/s$$

$$c_{obs} = (300.000 - 275186) = 24.814 Km/s$$

$$f_o = \frac{1}{\lambda}(c - v) = \frac{1}{656}(24.814) = 37,8_{THz}$$

Whit regard to the galaxy GN-z11, is to suppose that objects finding them self on distances >30Gly would be impossible to be optical perceived, because the observed frequency will be decreased below the optical frequency limit.

The results obtained by the calculations on base of Doppler 2 model, taking as example 3C-273 and GN-z11, would give theoretical proof that none of the cosmic objects we can optically perceive is regressing.

5.4 Is Andromeda Galaxy really approaching?

The galaxy Andromeda (NGC 224), differently from all other far light-sources, seems to be approaching us. According to the calculation relative to the present model can correctly be theorized that this galaxy is not approaching, nor regressing from us, but like all others far bodies taken into consideration as above, is stationary.

 At first, we know that our system is rotating around the core of our Galaxy at a speed calculated in about 250Km/s.

Assuming that the current position of our planet (which can take several millions years), is facing towards this source, we should have to consider our planet as the moving observer towards the stationary source. For more clarity, let us see the next figure:
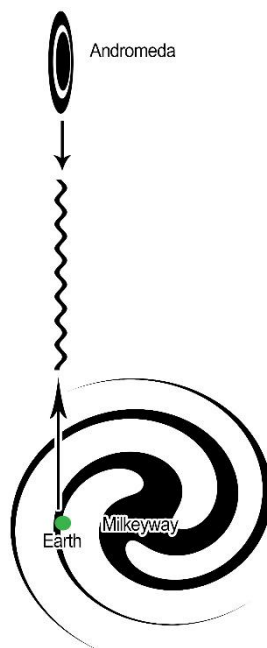

Fig. 9

This proposition exactly reflects the model of Doppler 2, where in facts the wavelength emitted by this body is constant with regard to the moving observer.

Results:

We still consider a constant emitted wavelength of $656_{n.m}$ (Hydrogen Balmer/alpha), which corresponds to an original observed frequency of: $c/\lambda = 457,3_{THz}$. We are receiving a frequency, deducted by the presumed observed wavelength:

$$\lambda_o = (\lambda z) + \lambda = (656)(-0,001001) + \lambda = 655,34_{n.m.}$$

And corresponding to an observed frequency: $f_o = \dfrac{c}{\lambda_o} = 457,77 \; _{Thz}$

If we estimate the calculated speed of rotation (250Km/s) around 300km/s and adding it to the numeric value of *c*, on base of constant wavelength*:*

$$f_o = \frac{1}{\lambda}(c+v) = \frac{1}{656}(300300) = 457,77 \; _{Thz}$$

This small difference in speed of rotation (300 instead of 250) could be imputed to the difficulty to exactly estimate the real extension of our Galaxy. However, in the case of NGC 224, given the small difference in original and observed increased frequency, it would be essential to take this speed into account for the calculation of the shift.

6. Conclusion.

The kinetic waves theory (KWT), described and analyzed in the present theoretical research, in addition to a correct mathematical analysis of the Doppler-shift, based on classic mechanics, offers many more points of connection to the electromagnetic waves than the classic model:

 Kinetic waves are expected to behave in full agreement with the experimental results which confirm there is no difference in variation of frequency whether a source is moving to a stationary observer or vice versa.

1) They could give an explanation of physical consistency about the duality particles/waves.
2) Kinetic waves do not need any medium through which propagate.
3) KWT denies the Doppler principle as original interpretative basis of the universal constancy of the speed of light and the principle of universal expansion, connecting the electromagnetic phenomenology to the ground of Classic Mechanic.
4) KWT, agrees with all experimental results performed on field of light propagation and offers a correct, sustainable and logical answer about the causes of the redshift, next to the classic physical laws we know:
    The relation *travelled distance/redshift*, above described and analyzed, would give us the image of a globally static universe and as consequence, a clear indication that light emanated from the most distant celestial bodies, undergoes a slowdown which is directly proportional to the distance it has to travel to reach an observes.

Appendix.

Suggested experiment:

Considering the variations between emitted and observed frequencies as consequence of variations of original emitted light-speed it would be possible to perform the following experiment, based on the speed of revolution of earth around the sun, with regard to an external body. In this example has been taken Jupiter as model. Our planet, related to the orbit of Jupiter presents two phases: one with sign plus (+) when the earth is approaching Jupiter, for example in March, and one with sign minus (-), when the earth is regressing from it, in September.
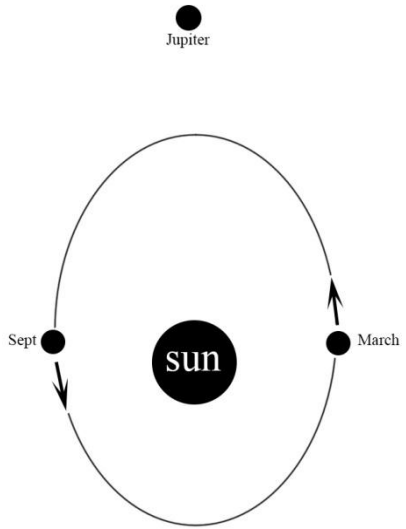
Fig.9: Earth's orbital ellipses relatively to Jupiter

Results:

C = 299.792,458

Velocity of earth's revolution (*v*) = 30 km/s

 Average distance Earth/Jupiter (*s*) = 588.000.000 Km.

Using radar astronomy by sending a beam of microwaves in March in direction of Jupiter, the distance we have to calculate it to reach Jupiter and reflecting back will be:

S = 1.173.000.000 km.

To recover this distance at light-speed *(c)* the signal would take:

$$\frac{s}{c} = \frac{1.173.000.000}{299.792.458} = 3922",7137$$

If we add the average rotation's speed of Earth around the sun in March, we obtain:

$$\frac{s}{(c+v)} = \frac{1.173.000.000}{299.822,458} = 3922",3212$$

Corresponding to a frequency variation calculated by:

$$f_o = \frac{1}{\lambda}(c+v)$$

Repeating the same experiment on September:

$$\frac{s}{(c-v)} = \frac{1.173.000.000}{299.762,458} = 3923",1063$$

And a frequency variation:

$$f_o = \frac{1}{\lambda}(c - v)$$

The difference in terms of time between March and September would be 8/10th of a second: when this result would support the expectation, will confirm that the differences of frequency produced by the movements of a source are ascribable to the relative motion between source and observer. This kind of experiments, meant to a direct measuring of the speed of light on base on distance and time taken to cover it, in the age of Modern Physics, has never been performed.

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