ELECTROMAGNETISM WITH SPACE AND TIME AT DISCONTINUOUS DIMENSIONS

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ABSTRACT
The application of the dimensional discontinuity to the coordinates of space and time, through the two minimum units MIN-S and MIN-T without submultiples despite being of finite extension, leads to the followings results inherent in electromagnetism:
- Determination of the way energy is transferred through photons.
- Identification of the extension electromagnetic waves during propagation.
- Formulation of a hypothetical measurement of sidereal distances.
- Re-examination of the "train of Einstein"

References

M. Born	Einstein' s Theory of Relativity
J. Andreade e Silva	Les Quanta
E. Parzen	Modern Probability Theory
R. Feynman	QED – The strange theory of light and matter
R. Feynman	Six easy pieces
R. Feynman	Six not so easy pieces

0 – **Introduction**

An electromagnetic field is revealed in the form of waves: some are visible, such as light, others, such as used in the radio transmissions, are invisible; the only factor that differentiates the ones from the others is the frequency of oscillation. The description of this physical phenomenon, so critical for our lives, implies the knowledge of a manuscript published in the GSJournal at, http://www.wbabin.net/science/serafin.pdf, from which the following formulas are derived using values of 10^{-30} meters for the minimum space unity MIN-S and 10^{-38} / 3 second minutes for the minimum time unity MIN-T.

$\mathbf{Dn} = (\mathbf{n}$ MIN-S, $\mathbf{n}$ MIN-T $)$ 0.1
$L = h / m (1 - \mathbf{v}) / \mathbf{v}$ 0.2
$R = L (1 - \mathbf{v}) / \mathbf{v}$ 0.3
$h = 3.10^{68}/1$; $h / m = (10^{22} / 3) / 1$; $e = 10^{30}/1$; $f = 1 / 3.10^{38}$; $m = 9.10^{46}/1$; $a = 1/ 9.10^{46}$. 0.4
$\mathbf{v} = L$ MIN-S / $(L + R)$ MIN-T 0.5

Vd, dyadic speed, is the quotient MIN-S / MIN-T equal to $3 .10^{8}$ m/sec verified for all the dyads.
Vs is the specific speed that, for a determined mass, makes unitary the parameter R of the formula 0.3.
The meaning of the aforementioned formulas will be clarified ahead.

1 – Electromagnetic waves and photons.

Graphs are very helpful in understanding physical phenomena and also in the case of wave propagation they are useful when comparing it to a rotating vector, subject to movements in space.
Using this representation, the preponderant parameters featured by the phenomenon are immediately evident.

Firstly the module of the vector, i.e. its length which illustrates the wave intensity and therefore the time, named period T, in which it carries out a complete rotation around its foot and the reciprocal of which quantifies the frequency f. Also the velocity **v** of its rectilinear and uniform movement in space which establishes the wavelength, expressed by the product **v** T.
In formulae we have the following relations:

$$f = 1 / T \quad ; \quad \lambda = \mathbf{v} T = \mathbf{v} / f \qquad 1.1$$

where λ stands for wavelength. By putting two rotating vectors together, their vectorial composition comes into play, giving a modality which can exalt or depress the intensity of the wave.

So there is the so-called interference phenomenon, the greater or lesser entity of which depends on the angle formed by the two vectors described above. This angle creates what is called a phase difference.
The phase difference is not linked to formulae, but to the geometrical arrangement of the two vectors. On the same frequency it is created by two or more sources, especially if they are arranged in different positions.
Within a sinusoidal wave there are different phase positions which correspond to all the submultiples of 360° which can physically be distinguished.

The waves can be of different types. Electromagnetic waves are perfectly suitable to being described using dyads. In fact they move at the velocity of light, so close to **Vd** that for formula 0.1, it can be supposed that their T and λ parameters are made up of the same number of elements, MIN-S and MIN-T respectively, similar to dyadic extensions.

For example, an electromagnetic wave with λ equal to one metre is made up of 10^{30} MIN-S and 10^{30} MIN-T arranged in pairs, each of which takes up its own phase angle. In this way 360° is broken down into 10^{30} slices and each slice is a wave element distinct from all the others.

More generally, if we call one of these slices a photon, we can see that it shows two special features. The first is its phase position, i.e. the angle which the slice creates with the propagation direction; the second is the result of the algebraic product of the vector's module by the trigonometrical syne of the said angle.
Electromagnetic propagation, especially at high frequency, is surprisingly split into two types of physical representation: undulatory and corpuscular.

Although Newton discovered the famous rings of light which could be interpreted as interference phenomenon, he was uncertain as to which of the phenomenological manifestations was correct. In the end he decided upon the corpuscular and relegated research made by Huygens to oblivion. Huygens was the first to have understood the importance of attributing wave-type behaviour to light, where there is no movement of matter whatsoever, only of force.

Let us consider a single sinusoidal wave of complete extension, the length being made of a finite number of MIN-S segments. A second wave of equal length is placed alongside the first, so that the two waves make possible as many pairs of identical photons as there are MIN-S in a single wave.

The energy of a photon is quantified by the Planck relation in the following:

$$e = \mathrm{h}\, f \qquad 1.2$$

where e stands for electromagnetic energy, f for the wave frequency and h for the Planck constant.
The frequency coincides with the reciprocal of the period T , that is with the number of MIN-T in the period and this number, as already said, is that of the MIN-S making up the wavelength λ .
Therefore formula 1.2 changes into the following:

$$e = \mathrm{h} / \mathrm{n} \qquad 1.3$$

where n gives the said number of MIN-S .
Relation 1.2 can be transformed as follows:

$$e = \mathrm{h}\ (\mathrm{n} / \mathrm{n}^2) \qquad 1.4$$

where the term in parentheses expresses the probability relating to the extraction of a pair of identical photons from the set of all the pairs formed by the photons of the two adjacent waves. The wavelength is a spatial interval greater than the dimensions of the photon. Therefore, the probability given above expresses the revelation of electromagnetic energy in the only expected manner, i.e. that of a collision between two identical photons, one for each wave, belonging to two adjacent waves, which takes place on the same point of an obstacle in accordance with a spatial-temporal scan equal to that of the wave to which they belong. We must note that inside two adjacent waves there can only be two photons, one per wave, able to transmit energy. In fact, a third photon situated between them would interfere with their maintaining a correct scan. The coupled collision of photons, necessary for energy transmission, confirms the dual nature corpuscular and undulatory of the phenomenon, due to its creation by two autonomous entities which are however energetically interdependent.

To sum up, since a single photon is incapable of transmitting energy, it maintains its intensity intact throughout its propagation time, even after every reflection from obstacles it may meet along the way. The energy transfer mode described above, given by two identical photons is confirmed in the Taylor experiment described below which is, as it will be possible to recognise, improperly considered to be the an interference phenomenon.

2 – The Taylor test

An interesting experiment with light was devised at the start of the nineteenth century by the doctor and Egyptologist Thomas Young also a scholar of optics.
He placed a screen, in which he had made two pinholes extremely close together, at a fixed distance from a source of light. In this way the light passing through the pinholes created two new light sources, by which a second screen placed behind the first was illuminated.

On observing this second screen, Young found that it was not illuminated in a regular manner, but alternately by light and dark fringes which could apparently be ascribed to interference phenomena, whereas the illumination became uniform only by blocking one of the pinholes.

Although it was disputed by physics scholars of the day, at that time the experiment was the decisive proof in favour of the undulatory nature of light, which was later confirmed by the mathematical elaborations of Maxwell. A century later, however, with the introduction of quanta, the theoretical and experimental outlook changed radically and the nature of light, especially concerning the interpretations on the photo-electric effect offered by Einstein, was re-aligned with ideas concerning the corpuscular version, already foretold by Newton.

Luminous energy is hypothesised as being in packets, in quanta of light named photons and every luminous ray becomes a rectilinear projection of entities whose energy is proportional to the frequency of the radiation, that is its “colour”. In the year 1909, when the technique was sufficiently perfected, Taylor undertook the Young experiment once more but this time using such a weak source of light that the photons, that is the minimal quantisations of radiant energy, reached the experimental device one at a time.

He believed that by using this expedient he could reveal a lack of interference between photons when they follow non-simultaneous paths, on their path towards the last screen. However, Taylor discovered that as the single sparkings of the photons accumulated, their traces arranged themselves in the alternating bright and dark fringes, already observed in the more intense illumination. When one of the two pinholes was covered the sparking of the photons exhibited a uniform arrangement on the final screen.

This was the starting point of a problem which increased over the years: that of the wave-corpuscle dualism, that is of the dual manifestation of electromagnetic radiation, as a function of the experimental conditions.
In many phenomena, such as in photographic emulsions or the Wilson camera, it takes on an purely corpuscular aspect, whereas in others, as in the above-described Young experiment, it behaves in an undeniably undulatory manner.

Even today, the enigma of this dual nature does not seem to have been solved, and therefore physics scholars have now accepted the theory that the experimental diversities themselves, case by case, determine the appearance of one or the other mutually exclusive physical states. The meaning of this dualism still remains rather mysterious and its different theoretical interpretations have not been without paradoxical evaluations.

As a further complication of the panorama of Physics, we have additional proof that the corpuscles, extremely small mass, can take on behaviour similar to photons and sometimes appear as waves, depending on the type of experimentation to which they are subjected. Now we shall try to apply the concepts inherent of dyads to these problems, in the hope of smoothing out some of these difficulties.

For the moment, let us concentrate on photons. It must be noted that the phenomenon of electromagnetic radiation, from the point of view of dyads, is already of dualistic type since the photons themselves can appear both as wave and corpuscle. They are waves when they act in pairs according to their spatial-temporal scan and corpuscles because of their independent behaviour patterns.

At this point let us consider a sinusoidal-type radiation, emitted by such a weak punctiform source that it allows the passage of only a few photons along a direction leading to the screen with the two closely-made pinholes.

The narrow solid angle in which the weak ray is propagated means that the single photons have an equal probability of entering either of the pinholes and that on the other side of the screen they are free to choose any rectilinear trajectory in order to reach the detection screen.

Let us consider three identical photons, that is with the same phase angle, arranged one by one on three adjacent and equal waves. Their path through the pinholes follows different combinations, thus giving the following consequences for the Taylor test.

The first combination is given by the passage of two photons, displaced by 360°, through different pinholes, whereas the third photon is absorbed by the first screen. Thus the two photons can transmit energy onto the detection screen only at its median area, creating a clear fringe perpendicular to the conjunction direction of the two pinholes, which is the only area where the equality of the paths leaves the scan of the two said photons intact. The second combination is inherent to the path, through different pinholes, of two photons belonging one to the first wave and the other to the third, i.e. displaced by twice 360°, whereas the intermediate photon is absorbed. This combination allows sparking, displaced from the median area of the detection screen, in two areas of light fringes, parallel to that described above. They correspond to positions where the diversity in the length of the distances between the pinholes and the second screen recreate the correct scan of the two incident photons by eliminating the extra 360° that separated them.

The third combination refers to the path of two identical photons through only one pinhole, displaced by 360° whereas the third is absorbed. If they undertake the same direction as they exit from the pinhole, a flash can take place in any part of the detection screen, showing the arrival of the pair which has been able to maintain its correct spatial-temporal scan throughout. To summarise, the combinations above show that the said three photons can bring about aleatory events which are mutually exclusive, represented by three parallel positions of flashing and a fourth, active over the entire detection screen.

The last is the flashing event typical of when one of the two pinholes is covered, creating the uniform screen illumination mode. The considerations given above can also be extended to photons belonging to waves further apart than the previous ones and in this case, as can easily be deduced, there is an increase in the number of clear fringes arranged parallel to the first on the centre of the screen. Thus dyads seem to shed some light on the disconcerting result of the Taylor test, for which it is correct to add that it does not depend on interference phenomena, as has generally been hypothesised, rather on the paired reconstruction of identical photons, by the aleatory paths that can be created beyond the closely-placed pinholes.

We can observe that the dark fringes are not without photons, in fact those falling on it are possibly the majority, but since they do not follow the scan of the wave to which they belong, they remain inert.
Based on the statements above, it is easy to recognise, concerning pairs of corpuscles with identical mass, that they can be subjected to experiments similar to those for photons , giving similar results.
In fact, the speed of such corpuscles, because of their small mass, can generate a parameter L for the formula 0.2 wider than their very own dimensions.

For this it is necessary to refer to the previous formulae 0.2, 0.3 and 0.5 . The first two establish pairs of values (L, R) which are in bi-univocal relation with the pairs made up of mass and velocity (m , v); in other words, there is no (m, v) pair which has more than one (L, R) pair and vice versa; that is we obtain the following:

$$m = \mathrm{h} / \mathrm{L} \,.\, \mathrm{R} / \mathrm{L} = \mathrm{h} \,.\, \mathrm{R} / \mathrm{L}^2 \qquad 2.1$$

a result which, when applied to the classical formula of kinetic energy leads to the following expression:

$$e = (m / 2) \,.\, \mathbf{v}^2 = \mathrm{h} / 2 \,.(\, \mathrm{R} / \mathrm{L}^2 \,).[\mathrm{L}^2 / (\, \mathrm{L} + \mathrm{R}\,)^2] = \mathrm{h} / 2 \,.\, [\mathrm{R} / (\, \mathrm{L} + \mathrm{R}\,)^{2}] \qquad 2.2$$

where e, h, R and L are quantified in MIN units and **v** is in ratio to the dyadic speed.

The formula 2.2 contains the algebraic form of the probabilistic nature of kinetic energy and offers a reasonable interpretation of the undulatory nature to be shown by corpuscles. Firstly it is necessary to turn our attention to some noteworthy correlations of formulae 0.2 and 0.3 referring to the field of extremely small masses. The length distance L, which is a specific quantity of dyadic “steps” depending on mass and velocity, can be of greater extension than the corpuscle to which it refers.

For example the L of an electron (0,91 .10^{-30} Kg), stressed to a velocity of 3000 km/sec, for formula 0.2 and the second of 0.4 corresponds to around 10^{20} MIN-S that is 10^{-10} metres which can be estimated larger than the electron itself and not by chance equivalent to the wave used by the electronic microscopes. Thus it is easy to understand that a corpuscle, in the condition of its extremely reduced dimensions relative to L can rarely reveal its involvement in greater spatial margins if, as in the case of encountering an obstacle, it must transfer kinetic energy to it, and this energy is closely linked to the magnitude L .

To shed some light on this contradiction we must turn to the part of the second member of formula 2.2 given by:

$$[R / (L + R)^2] \qquad 2.3$$

In the probabilistic field this represents the relation between a number of pairs with equal elements featuring R and the number of arrangements with repetition of (L + R) elements, each chosen in groups of two and differing by at least one element or the order in which they appear.

The dynamic which responds to this probabilistic aspect takes on the following meaning: if a single corpuscle is unable to demonstrate its own pair of L and R parameters, that is to transfer kinetic energy to an obstacle that it encounters on its path, this task, based on formula 2.3, can be hypothesised as a possible effect of the collision of two equal corpuscles, featuring the same R, falling on the same point of the same obstacle in accordance with the scan they feature.

In practice, similarly as described for the photons, high velocity projections of particles can be examined using apparatus similar to that of the Taylor test, where aleatory paths, through which the spatial-temporal scan of their kinetic modules L and R is recreated, are able to develop a geometry of kinetic energy transfer on a suitable screen, similar to the one described above of light and dark fringes.

NOTE: the calculation of the h/m of an electron, as expressed in MIN dimensions, is calculated on the 0.4 second formula as follows:

h/*m* = (6,63 .10^{-34} / 0,91 .10^{-30}). (10^{22} / 3) = 2,42 .10^{18}; being h = 6,63 .10^{-34} and *m* = 0,91 .10^{-30}.

3 – Lengthening of λ

Above we saw how the physical dimensions of a photon are exactly MIN dimensions; therefore every photon must move in space using a continuous series of MIN-S “steps”, each one having the duration MIN-T.
This type of movement coincides with dyadic velocity and it should be carried out in a perfectly rectilinear trend. However, there have been several experimental tests which prove how a luminous ray tends to change direction when for example it is performed in a gravitational field.

This leads to the hypothesis that photons carry out velocities close to **Vd**, but not coinciding with it. That is their movement must happen by long sequences of MIN-S “steps” which are however interspersed with MIN-T “stops”. In fact, it is easy to understand that such movements are not represented by the motion of a point, as is hypothesised in classical physics, but by an entire MIN-S segment which proceeds along a certain straight line.

If after a rectilinear sequence of MIN-S motions a change of direction takes place, it is therefore logical to suppose that the first of the MIN-S segments must undergo an inclination equal to the angle formed by the new travelling direction compared to the pre-existing one. In this manner its projection in the two directions, which cannot appear instantaneously but which requires the minimum time of at least one MIN-T , seems to be lower than MIN-S; or rather it implies a submultiple of MIN-S itself which, as has already been noted, is inadmissible.

For this reason, a change in direction can be carried out only in moments of dyadic immobility, that is exclusively in the kinetic condition observable at velocities lower than **Vd**; therefore this velocity can be carried out exclusively and only with constant performance of a perfectly rectilinear direction
The intermittent velocities which allow a single MIN-T “stop” interposed in sequences of MIN-S “steps” are known as **Vs** and are those, as described in the above mentioned manuscript, beyond which the exponential increase of mass and kinetic energy begins.

If we then hypothesise that pairs of photons, possessing electro-magnetic energy, also move at **Vs**-type velocity, the phenomenon they display would take on the following aspect: every pair containing one anterior photon and one posterior photon, separated from a perfect interval λ, travels through space in a straight line for a distance L , made up of a certain number of MIN-S "steps", at the end of which there is an immobile state given by a single MIN-T and this trend is repeated cyclically. Therefore the velocity of the pair, or rather of its posterior photon as will be shown below, takes on the following value:

$$\mathbf{v} = L / (L + 1) \qquad 3.1$$

In ratio to the dyadic, considered as unitary value.
However, at this point it is necessary to add some clarifications.
Firstly, we are referring to the kinetic condition which displays the following disequality:

$$L > \lambda \qquad 3.2$$

As seen in 1.4, the energy of an electromagnetic wave is determined by two photons that propagate in couple according to the precise spatial-temporal scan coincident with λ. This energy can only be displayed through the participation of both photons and not by one alone.

This dynamic condition leads one to believe that the MIN-T "stop" is carried out only with the complete passage of the pair, that is the moment when the posterior photon finishes its L sequence, while the first one has already started the following L. In other words, only the posterior photon is able to perform a MIN-T of immobility expressed from 3.1, suitable to manifesting the energy level of the same wave. This asymmetric behaviour causes the addition of one MIN-S and one MIN-T to the spatial temporal scan which characterises the two photons or, in other words, it creates the very slight lengthening of λ equal to MIN-S .

This increase in the wave brings about a reduction in the energy of the photon, although the energetic balance of the radiation remains intact since a greater wavelength corresponds to a greater number of photons. An additional MIN-S establishes such a small increase in length that, as can be seen in the following pages, it takes enormous intergalactic distances for light waves to manifest any consequences.
A different condition is shown when using the equality:

$$L = \lambda \qquad 3.3$$

In this case, where λ equalises the quantity of MIN-S belonging to the sequence L , the passage of the pair is shown by a MIN-T "stop" carried out by both photons. In fact, unlike what described above, the two photons place together inside the same wave scan at the end of the run L and they both perform a "stop" MIN-T of 3.1, suitable to attest the energy level of the same wave. Thus, since they take part together in the dyadic arrest, they exclude the occurrence of the possibility described above of an increase in the wavelength.

When the following condition is observed:

$$L < \lambda \qquad 3.4$$

the wave λ involves more than one MIN-T "stop" and in this situation formula 3.1 is no longer suitable for representing electro-magnetic propagation The reader would be justified in wondering about the experimental support of such a radical choice regarding electro-magnetic waves. To support this choice it is useful to remember the following experiment carried out by two American radio-astronomers.

It all started in the early 1960s when two young radio-astronomers from new Jersey Arno Penzias and Robert Wilson, undertook the job of modifying a special horn antenna which had been designed for communications to and from the satellite, Telstar. The device looked like an enormous alpenhorn used by Swiss shepherds, placed on its side and with an aperture measuring almost two square metres, made specifically for picking up micro-waves and transmitting them to a receiver, equipped with its own amplifier. However, when the two scientists tried to calibrate the gain of the antenna, measuring its response using a transmitter installed on an aeroplane, some problems arose.

They observed a constant and unexplainable signal, a hissing or a buzzing, which was picked up by the receiver whatever the antenna position, even if it was trained on an empty space and wherever the experiments were carried out. It was an extremely weak but persistent signal and the experimenters were sure it was a noise produced by their system. They spent a whole year trying to remove that signal, examining their equipment piece by piece, trying all kinds of screening systems and checking every soldered connection, but to no avail. Finally, in the Spring of 1965, they gave up their search, and only some months later did they find out from their Astro-Physics colleagues that they had called forth the so-called fossil radiation, the electro-magnetic phantom which surrounds the universe.

This special wave, which reaches the Earth from every corner of space, has a uniform frequency of 4080 MHz (7.35 centimetres in length), which is a virtually stable figure, almost devoid of the slightest variation except for ten thousandths of degrees centigrade, as accurate tests were later to prove. Could this mysterious frequency be the evidence of a universal constant inherent to the phenomena of electromagnetism?

In the following chapter, fossil radiation, also known as background radiation, will be the main feature of a possible calculation of sidereal distances, by which the dimensions of the cosmos are seen to be far greater than the current estimates.

4 – Sidereal distances

Above, it was described how two adjacent electro-magnetic waves can carry a pair of photons, one for each wave which are identical in phase and intensity, of which only the second photon travels through space in a straight line for L sequences of MIN-S "steps" separated by a single MIN-T "stop". Photons with different phases, belonging to the two waves described above and propagated along the same straight line as the pair above would break their scan and consequently cancel the capacity of transferring energy of the wave itself. Therefore the power of an electro-magnetic radiation lies in the number of parallel straight lines along which, per minute second, a pair of identical photons is transmitted every two consecutive waves. In addition to this electro-magnetic arrangement, we have seen that the wavelength increases by a MIN-S for every distance L until it is equalled and the increase comes to an end.

The following hypothesis is put forward: the radiation discovered by the two radio-astronomers above is nothing but the extreme result of the lengthening of the electro-magnetic wave which has been able to propagate itself for enormous distances such as those to be found in the cosmos. If this hypothesis is accepted, we can state that waves with lower lengths than the fossil, i.e. with $\lambda < 7{,}35$ cm, exhibit a greater L than the said length. Furthermore, if we suppose that the variation of parameter L is of a linear type, it is likely to comply with the following expression:

$$L = (7.35 \cdot 10^{-2})^2 / \lambda \qquad 4.1$$

where λ and L are expressed in metres.

Formula 4.1 shows that if $\lambda = 7{,}35 \cdot 10^{-2}$ its L parameter, as predicted, is equal to the length, whereas for $\lambda < 7.35 \cdot 10^{-2}$ the extension of L, that is the sequence of "steps" carried out in a straight line by the posterior photon, is greater than λ itself. For example, in the case of yellow light which has a wavelength equal to 0,6 micron, L takes on the value of approximately 9000 metres, corresponding to $9 \cdot 10^{33}$ MIN-S.
This length shows that for every pair of photons in this light, the posterior photon follows a trend in the vacuum created by a cyclical sequence of rectilinear tracts of 9000 metres at dyadic velocity, which are separated by a single MIN-T "stop". In this way for formula 4.2 they create a velocity equal to $9 \cdot 10^{33} / (9 \cdot 10^{33} + 1)$ in ratio to the dyadic velocity considered as a unitary value.

For background radiation, the same calculations identify a velocity quantified by $7{,}35 \cdot 10^{28}/(7{,}35 \cdot 10^{28}+1)$, slightly lower than the previous. Therefore, electro-magnetic waves show different propagation velocities in function of frequency, although in values extremely close to **Vd**.

In these terms it is mathematically possible to calculate the wavelength lengthening during propagation through vacuum. Its increase is due to the accumulation of a MIN-S "step" for every distance equal to L, a circumstance which allows to find the distance between the transmitter and the receiver when the drift value of the frequency is identified. Both λ_1 the original wavelength and λ_2 that observed at the end of the propagation, each measured in metres. The difference between the two wavelengths gives the MIN-S which have been acquired during propagation, whereas the value of L can be obtained with acceptable approximation from the arithmetic average found in the values obtained from formula 4.1, applied to the same two wavelengths. Thus the distance between transmitter and receiver is calculated in the following expression:

$$D = (\lambda_2 - \lambda_1) \cdot 10^{30} \{[(7{,}35)^2 \cdot 10^{-4}] / [(\lambda_2 + \lambda_1) / 2]\} = [2z / (2 + z)] (7{,}35)^2 \, 10^{26} \text{ metres} \qquad 4.2$$

or from the formula below:

$$D = 11{,}4 \ . [z / (2 + z)] \ .10^{11} \quad \text{light years} \qquad 4.3$$

where the term z indicates the quotient between the differences of the two wavelengths and the original wavelength, that is $(\lambda_2 - \lambda_1) / \lambda_1$.

The continuous drift of frequency, so slow as not to give observable results over the distance, for example, between our galaxy and the nearest ones such as Andromeda, takes place without solution of continuity during electro-magnetic propagation and in practice is a redshift, the term used to describe the expansion phenomenon of Hubble.

Of course, a reciprocal distancing or approaching movement of the galaxies creates a redshift phenomenon, and this must be added to or subtracted from the drift described above. However it is important to note that formulae 4.2 and 4.3 lead to a revision of the ideas concerning the extension of the cosmos. In fact, these formulae show that at the end of a journey of around 10^{12} light years any electro-magnetic propagation, whether it be infra-red or X rays, changes into background radiation, and this condition reveals how beyond such enormous distances there is an unexplorable crown of the universe, forever hidden from our sight, from which we pick up only that humming or buzzing which was so irritating for the two American radio-astronomers. On the other hand, the possibility that astronomical distances of such considerable size could exist brings about the necessity of considering the telescopic images of galaxies as the result of particular perturbations of the routs of the photons approaching the Earth, rather than the spatial distribution of the stars.

6- Re-examination of the “train of Einstein”

A convincing “mental experiment” was conceived by Einstein to prove the fault of simultaneity pointed out from velocity. Let us consider a convoy that moves at a uniform speed **v** along a straight railway, and inside, in the middle point, an observer who sees both the head and the tail ends of the train. When the observer turns on a lamp, he will notice that the light reaches the two extreme walls of the train in perfect simultaneity, being equal the speed of the light in the two opposite directions. An external observer will see instead the light illuminate first the tail of the train, that is approaching, and immediately after the head of the train, which is getting away because the speed **v.**

This experiment demonstrates, for the spatial-temporal compositions just now mentioned, that perfect synchronous phenomenons are not the same for the inside observer as for the external observer. This reasoning is part of the theory of relativity; from which the formulas of contraction of space and expansion of time are derived. Such formulas define the failure of all the accurate tests performed with an interferometer in the year 1887 by Michelson-Morley. However, this logic is recently being debated by various physics scholars and it is not even in agreement with the system of the dyads, as explained below.

The formula 0.1 states that all physical phenomenons must be quantified by pairs of units of measure belonging to the set of dyads and for each of such pairs the ratio between space and time units has to yield the value of 3.10^8 m/sec, the speed of the light. This outcome is clearly explained by the observation of the above mentioned observers who unconsciously choose different dyads, which are pairs of samples of measure whose intrinsic metrological function makes them unsuitable to be added or subtracted. An example of such fallacy would be trying to add or subtract Metric and British samples of measure.

In conclusion, the use of space and time of the “train of Einstein”, in other words the use of perfectly independent pairs of units of measure and submitting such units to sum or subtraction cannot be a correct calculation.