The Photon: Displacement in a Second Scalar Dimension

(Revised and Updated)

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1 Introduction

The development presented here provides a reconciliation of the apparent conflict between the left-right vectorial motion and the inward-outward motion of the photon. This is shown on page 50 and page 98 of *Nothing But Motion*. For those not familiar with the problem, this photon model in *Nothing But Motion* requires inward to be left vectorial and then switch to right vectorial in different units of time. Study was given to the problem from every conceivable angle and by applying every principle which related to the motion in question. (Careful examination was given to the copy of *Reciprocity* with the discussion of the photon by David Halprin and others.) After following many deductive trails, a complete rational correlation of all factors remained elusive. But then it finally hit me.

As discussed in the Chapter 15, "Intermediate Ranges" in *The Universe of Motion*, on page 208 and 209, the maximum vectorial motion that can manifest itself in extension space is unit velocity (in fixed reference frame). Therefore the outward motion of the photon at unit speed is all that can be represented in the spatial reference frame. The vectorial sum of this motion and an additional motion either left or right would obviously exceed the one unit limit. A careful reading of Chapter 15, which discusses motions beyond unit speed shows this to be unquestionable.

There is therefore no vectorial component to the motion which "is" the photon. Only the translation of the photon object is vectorial. The inconsistency between inward and outward, and right and left does not exist. Whatever motion the photon has other than the object's translation, can not manifest itself in extension space. The sequence of inward and outward motion occurs in a second scalar dimension. The problem of conservation of direction disappears.

The concepts of the photon motion are very fundamental. So much so that other areas of theory may be profoundly affected by this finding. This becomes more and more apparent on reviewing reciprocal theory while considering that all phenomena in the physical universe come forth from photons as their prima base.

On one deductive trail extending from this new finding, can be found a new answer to the enigmatic question of how inward gravitational motion can coincide precisely with the outward motion of a photon. The gravitational motion is restricted to one scalar dimension (for reasons that are found on the trail), but the photon is not so restricted. It has a full two scalar dimensions open to it. Therefore a photon can move on a path which appears to be inward in relation to the gravitational scalar dimension but is actually outward in a second scalar dimension.

2 The Theory

The fundamental postulates provide for a background motion outward at unit speed in three independent scalar dimensions. The familiar three dimensions of our perception constitute but one of these scalar dimensions. This outward motion in three scalar dimensions is the natural progression of the true state of what is commonly referred to as the proverbial infinite eternal void of nothingness.

The simplest displacement to the natural progression is a unit reversal in one scalar dimension of the outward motion (natural progression) of a unit of space associated with a unit of time. The motion which constitutes the simplest displacement is identical to the natural progression except it has a negative magnitude, a pure simple reversal.

This displacement is the simplest physical object and being an object it necessarily occupies a location. This location is moving with the natural progression in the other two scalar dimensions and therefore moves outward at unit speed in reference to the spatial reference system. This object can be shown to possess the properties of a photon.

The inward motion which is the photon must continue with its original scalar magnitude, because its energy is of course conserved. It is also at the lowest energy state possible for a space displacement. It follows that it cannot change form readily. It constitutes the simplest type of energy, as it is energy itself in its purest form. A $1/n$ displacement is a pure inverse speed, or a pure energy. This is established many times in Larson's works.

The inward unit motion which is the simplest photon cannot continue over a second unit of time, because that would require an additional unit of energy. The single unit displacement is one unit greater that the natural progression of 1/1, that is 1/2. To carry over to a second sequential unit of time would require one more unit of energy for a total inverse speed of 1/3. So the inward motion inevitably lapses and is replaced by the natural progression for one unit of time at the end of which it can assume the form of a unit displacement again. For convenience in the remainder of this document, n will represent the actual number of units of displacement. The motion which "is" the photon is then $1/n$+l.

The mechanism for the lapse is an energy limitation at the end of the units of time associated with the inward motion. The mechanism for reversal to the opposite, inward, direction is the unrelenting tendency of the inward motion to manifest itself due its energy conservation.

This $1/n$+l motion is similar to translational motion but it does not involve motion making up the displacement. Without an object to move, the subject motion does not lend itself well to representation in extension space. Another way to look at this is that the motion of the object predominates over the more subtle inner motion which "is" the object, as far as manifestation in 3-D space. All of the available speed representation, unit speed, is fully used by the photon object translation, leaving no link in this respect between the photon inward motion and the fixed reference system.

The photon motion which manifests itself in extension space is the motion of the photon as an object. This is the outward translation of the location which is occupied by the photon. This outward motion is in two scalar dimensions. One of these is represented in the spatial reference system, which will be named the extension scalar dimension for convenience in this work. One of the other two scalar (second scalar dimension in this work), while in the third is an additional unit outward translation of the photon object. The motions in the second and third scalar dimensions, though real, have no influence on the motion represented in the spatial reference system, except under certain circumstances where this motion interacts with matter. Some of these interactions will be investigated further on. Also, any circumstance where the speed of the object in the extension scalar dimension is less than unity.

The inherent motion which is the photon is in scalar dimension other than the extension scalar dimension. The motion $1/n$ which is the photon itself could not be represented in extension space, even if it was the motion of the object, if that object were also moving in another scalar dimension at unit speed (see page 209 of *The Universe of Motion*). This would constitute motion greater than unity when

the two motions are added vectorially. In fact, even a motion greater than unity in the extension scalar dimension could not be represented in the 3-D fixed reference frame. Dewey Larson clearly establishes this in many contexts.

Summarizing to this point, the motion which is the photon is a pure linear displacement in a second scalar dimension. The second dimensional motion is carried along with the object photon in its translation in extension space.

3 Region of Influence

The simplest photon is a one unit displacement of the natural progression. As such it cancels the motion of the outward progression with a unit of inward motion. This creates a pocket of zero motion of unit size within the continuity of the natural outward (relative to the fixed reference frame) progression. When this pocket of zero motion impinges on a material object, if acts similar to a pulse at point of contact. The pocket of zero motion is a simple discontinuity in the ever pervasive background motion of the natural progression.

The pulse varies in intensity depending on the energy of the photon. The intensity is therefore essentially the duration of the pulse, because each unit of energy simply increases the number of consecutive units of time over which constant motion inward, that is the pulse, is effective. The exact duration of this pulse must be determined further on, because the nature of the photon must be further deduced beforehand.

Being similar to a pulse does not mean the photon is just like a wave. It is actually motion of translation without an object of translation. The motion, being in a second scalar dimension, is not manifested in extension space. However its motion is real nonetheless. Therefore when the photon interacts with other displacements in its environment, the inherent inner motion of the photon exhibits responses depending on circumstances. The question that naturally follows is, what is the region of influence for the photon?

The distortion of the space progression which constitutes the photon in the second scalar dimension exists at the location of the photon in extension space. Since the second scalar dimension motion of the photon is not represented in extension space, only the spatial distortion is evident. The nature of this distortion is of course space. It follows that an n unit distortion is of greater magnitude than a one unit distortion. The space in the distortion must exist in units as do all physical phenomena. Therefore the distortion of the uniform natural space progression, which is the photon displacement, manifests itself in extension space as n units of space, this distortion is a distortion of the space progression, not space. Only because of the linking with the fixed reference system, does the distortion manifest as simple space.

Before actually measuring a photon, some other parameters of the photon's region of influence need to be brought out. The displacement in the natural progression which is the photon is linear and will manifest as the units of space aligned linearly to a length of n units. The only spatial attribute of the photon motion manifest in extension space is the length, its displacement, just as the period of the displacement is the only temporal attribute represented in time within the extension scalar dimension. The motion is not generally represented in the extension scalar dimension, neither the direction nor the magnitude, only the units of progression involved in the process transmit between scalar dimensions. If only the units of the progression reflect between scalar dimensions, the time units and space units will be independent of each other. Therefore, their direct interrelation, the properties of motion, are lost in the transference. (Under special circumstances the magnitude or direction of the motion will be

manifested, as will be discussed in more detail below.)

The *n* unit length of the photon is located in extension space at the location of the photon. The orientation of the length, being not defined in extension space is centered at the photon location in extension space and extends *n*/2 units radially outward from this central point. The photon, being linear and continuous within itself, will have the other *n*/2 units extending on the same alignment radially outward in the opposite direction.

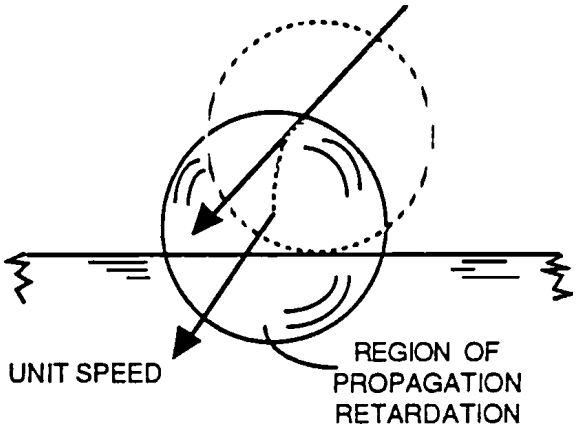

Figure 1: Unit Speed Propagation

Photon Sphere of Influence at Material Interface

The radial orientation of the *n* unit displacement is the final item pertaining to the region of the influence of the photon. When the photon left its point of formation in a physical phenomenon, it immediately lost its link to the 3-D reference system. Only in contact with matter or other phenomena existing in extension space can the radial orientation of the photon be manifested, and even then only under certain circumstances. Therefore,the radial orientation is completely indefinite yet it does potentially exist. The conclusion is that the photon region of influence is completely distributed about the central point at the location of the photon. This is a spherical region with diameter n space units, as represented in Figure 1.

All interaction with objects in extension space are through those objects encroaching within the sphere of influence. It is through interaction with material objects that the wavelength of light is measured. The wavelength is the diameter of the sphere, *n*. The frequency is determined by dividing the speed of light by the wavelength. This is 1/*n*.

The progression of time in both scalar dimensions is the same, because time is undisplaced by the photon under study, and therefore proceeds uniformly outward. (A cosmic photon does displace time, but not space; all principles developed here apply in the inverse sense to the cosmic photons). The period of the photon in extension space is one unit of time less than the period in the second scalar dimension. The period in extension space is the inverse of the frequency $l/(l/n) = n$. In the second scalar dimension, the period is the units of time within a complete cycle: *n* units inward followed by a one unit lapse outward that returns the process to the point of beginning, for a total of *n*+1 units. The period in extension space is the time for a photon to completely pass a given point in extension space. That is, the time for the wavelength to pass a given point. Because the speed of propagation is one unit of speed in one unit of time, the units of time in the period are equal to the units of space in the wavelength, *n* units.

This demonstrates further the relative independence of processes in each scalar dimension. The motion which "is" the photon, as previously discussed, has no speed in the extension scalar dimension, while the speed of the photon in the second dimension is $1/n+1$. The speed is the source of the period in each dimension, therefore the different speeds, $1/n+1$ as opposed to the 1 unit speed of propagation in extension space, naturally yield different periods. However since there is no distortion of the time progression there is no manifestation of the second scalar dimension period in the extension scalar dimension. The period in the latter is an entirely unrelated property extending solely from the independent propagation of the photon in extension space. Without this independent unrelated propagation speed, there would be no period in the extension scalar dimension, just the photon spatial distortion.

4 Further Development

At this point it would be appropriate to launch into a calculation of Planck's constant, however a complete derivation of the constant cannot be made without a detailed study of the ratio of the natural unit of mass to grams. The gram is a unit arbitrarily defined under the assumption that mass is an independent quality bearing no direct relation to time or space. To develop the needed ratio requires a careful derivation of the number of natural mass units, t^3/s^3, in one atomic weight unit, plus derivation of the equation: $E=mc^2$. The latter derivation is accomplished in a straightforward manner, however the former is a major undertaking beyond the scope of the present work. It requires a careful analysis of the atomic structure. In fact, a clearer understanding of $E = mc^2$ can be attained through atomic theory.

If the assumption is made that one atomic weight unit equals one mass unit, then a one unit electric displacement in the atomic structure of Larson's development is somehow equal to a half unit inward displacement. This entire area of atomic structure must be reevaluated before a complete derivation of Planck's constant can be provided without discontinuities. Filling discontinuities with assumptions will never yield a theory acceptable to the scientific community as a whole.

It must suffice at this stage of the development that the natural equivalent of Planck's constant is unity with adjustment for transference across the unit space boundary, within which the photon motion exists, to extension space where energy manifests itself for our purposes. This is evident from the following derivation:

Energy is equal to inverse speed or more precisely net inward speed in relation to the natural reference frame. This photon is essentially inverse speed: $1/n+1$. This is $n+1$ units of time in one unit of space since speed less than unity does not exist. The inverse speed is the same as a speed or outward displacement, $n+1/1$, with time and space inverted. Both are simply displacements from the natural datum, 1/1, but one is a time displacement (speed $n/1$) and one is a displacement in space ($1/n$).

Since the natural datum is 1/1, the speed or inverse speed in relation to this datum is one unit less than the speed in the fixed reference. Therefore an inverse speed of $1/n+1$ has a net displacement of n units, just as a speed of 2/1 is a net effective speed of 1 with relation to the natural datum. Only n of the units of inverse speed $1/n+1$ of the photon are effective displacements, therefore only n units of energy are included in the photon.

The frequency of the photon is $1/n$, therefore in terms of pure numbers, the energy of the photon happens to equal the inverse of the frequency, $1/(1/n) = n$. This is not a physical relation between frequency and energy, as if a frequency contains energy. It is simply a correlation between quantities of two related aspects of the same phenomena. Their equality of quantity is the result of the linking of the photon motion with the extension scalar dimension.

The units of frequency are cycles per time unit, 1/t, and units of energy are time unit per space unit, t/s. Yet a formula can be structured representing the equality of quantity between these two entities. The energy of the photon is equal to the inverse of the frequency, subject to modification from crossing the unit space boundary. The interregional ratio used, 1/156.44, is comprehensively derived by Larson in *Nothing But Motion*.

$$E = \frac{1}{156.44} \times \frac{1}{frequency}$$

Since a photon exists entirely within one unit of space, the energy manifested in extension space is modified by the interregional ratio. The photon theory developed above clearly establishes that the photon occupies one unit of space in the second scalar dimension, where it actually exists. It has a specific location there within one unit of space which moves inward at unit speed for n units of time and outward for one unit of time in a continuous cycle. As such the theory fully reconciles the difficulty that the photon seems to have properties such as wavelength that extend greatly beyond one unit of space. This is simply due to the linkage with the fixed reference system in extension space, merely a distorted reflection of the true photon phenomenon.

A photon of course cannot be viewed, because directing light at a photon would accomplish nothing, even if the speed of the photon could be overcome in this task. A photon would not reflect from another photon. All of the supposed properties of a photon have been induced from the photons' interaction with matter.

An example is the phenomenon of diffraction. When light passes through a slit about the size of the wavelength, the light is affected by the slit. The wavelength is equal to *n* where *n* is the number of space displacements constituting propagation but also radially outward in all directions. The concept that the region of influence of the photon is fully distributed around the central location on the line of propagation corresponds very well with the diffraction phenomena. A slit one wavelength in width just begins encroaching on the photon; a larger slit does not. This is as opposed to conventional theory which puts the wavelength along the line of travel with the hypothetical amplitude extended laterally. As such the diffraction should take effect based on the amplitude not the wavelength.

Matter is made up of net time, a concentration of time units in the otherwise uniform realm of space-time. To illustrate the consequence of this, it is easier to look at the inverse situation, a medium of net space. A location moving outward at unit speed upon entering a region of net space will slow down, relative to 3-D space, because the time progression continues at the usual rate but there are more space units to traverse. The space progression of the location also continues as before at one unit of space per one unit of time. But there are more units of space in a given volume of net space than in a vacuum. Therefore at the progression of one unit of space in one unit of time, the space in the net space region takes more units of time to traverse than a vacuum.

Now consider the inverse condition, a region of net time. The location will traverse the net time region in more units of the space progression, the inverse of clock time, than traversing the same distance in normal space-time. However, in this case also, clock time progresses uniformly at one unit of time in one unit of the space progression. Therefore the units of clock time to traverse the medium of net time is more than through normal space-time. The clock units are equal to the greater units of space in the space progression.

This is the base explanation of the reduction of the speed of the photon in matter. Now when the speed in the fixed reference system falls below unity, it provides an opening for the motion in the second

scalar dimension to manifest itself in 3-D space. The motion in the second scalar dimension is inverse speed or motion in time. Therefore an additional outward motion of time becomes effective. This increases the number of units of time traversed in one unit of the space progression in the extension scalar dimension, or 3-D space. Again, the clock time in the extension scalar dimension is still one unit of time per one unit of space in the space progression and therefore the clock time is also reduced for traversing the net time region.

The net time in the medium is fixed, and if it were not for the varying inverse speeds of photons of different wavelengths, the speed in a medium for all photons would be the same. Actually the speed varies in relation to the inverse speed of the photon. The greater the inverse speed the greater the speed in the medium. The net inverse speed is equal to n units of time per unit of space. The wavelength is also equal to n and so the speed in the medium is greater for larger wavelengths. This corresponds to measurements of light speeds.

A more complex phenomenon of light is its refraction at the interface of two mediums or a medium and a vacuum. This is a result of the change in speed from one medium to the other as the photon crosses the interface at an angle to the surface less than perpendicular. The speed of the photon in a medium is, as previously discussed, retarded in relation to extension space. It follows that since the photon has distributed motion in a second scalar dimension centered on the line of travel, it begins to retard on the side of the photon which contacts the interface first.

Naturally the greater the angle from the perpendicular, the longer does this differential effect act on the photon motion. This bends the photon line of travel as a function of the angle of approach. The side of the photon furthest from the surface continues at the original speed longer while the other side of the photon changes speed in extension space. Thus the photon twists around to a different line of travel (Figure 1).

As discussed above, the greater the wavelength, the greater the neutralization of the speed reduction in a physical medium. Therefore photons of larger wavelength have less differential in speed between the side in one medium to the side in the other and so less refraction at a given angle of approach than a photon of smaller wavelength.

A more complex phenomenon of interaction between light and matter is what has been called interference. This is the result of diffraction at two slits location parallel and a short distance from each other. In diffraction the slit is about the size of the wavelength. Therefore any photon passing through the center of the slit will pass through without hindrance. If offset from the center the edge of the slit will impede the forward translation of the distributed motion in the second scalar dimension. The remainder of the photon will continue at unit speed causing the photon to twist similar to refraction.

The motion in the second scalar dimension exists in discrete units. When the outer most unit is impeded, a certain angle of twist occurs. If the photon is offset from slit center one more unit, an additional angle is added to the total twist, and so forth for each additional unit. As a result the photons leaving the slit are redirected on radial lines at different angles. Both slits have the same action.

This combination of the radial lines of photons and the spaces between the lines create points of intersection of radially projected lines from the two slits with relatively empty spaces between. When a screen is placed within a certain range of the slits, light bands will appear at each radial line with dark bands between them. These will be much more pronounced if the screen is placed at such a distance from the slits, that its plane passes through intersections of two radial lines, one from each slit.

The conventional explanation for this light pattern on the screen is based on a major leap of inference.

Longitudinal waves, such as water waves which are visible, create a similar pattern after passing through two slits. The diffraction in this case is due to a discontinuity in a longitudinal wave which allows the end of the wave after passing the slit to move laterally. The hump of the wave when cut off vertically at the end will redistribute laterally such that the top of the wave at the end will taper off on a slope. This slope supports the remainder of the wave. The slope extends a substantial distance inward towards the center of the wave segment created by the slit.

This lateral movement of wave energy causes the ends of the wave segment to move out radially. This causes further loss of lateral support to the central wave and more lateral motion occurs with more radial effect. At the slit size of one wavelength, the effect is a nearly complete radial wave.

These radial waves form a new pattern with waves from one slit crossing waves from the other slit. This sets up the true interference pattern with peaks of double amplitude, and points of net zero wave where crest meets trough.

A photon in conventional theory is *not* a longitudinal wave. The radial arcing of the photon as in the case of the water wave is clearly not possible. The action of the slit would be to clip off the top of the postulated wave amplitude peak in conventional theory. However this would only happed to photons within one half amplitude of the slit edge. The phenomenon occurs when the slit is about one wavelength in size. The appearance of multiple bands of intensity with multiple dark bands is not explained by this.

There would be perhaps a somewhat diffused band on the outer ends of the pattern with one very bright band in front of each strip. There would be little in the way of concentration of photons. In fact the concept that photons can occupy the same location and cancel each others' energy is pure assumption. There is no real evidence that this effect ever occurs.

5 Photon Theory Comparisons

Dewey Larson is far and away the greatest scientist of all time. His contributions to the understanding of physical science are more fundamental and of far greater scope than those of any previous scientist including such all time greats as Einstein and Newton. He discovered a complete new system of theory that encompasses and unifies all phenomena in the physical universe. Even more important and exhibiting a work of incredible proportions, was his development and extension of the theory in published form to almost every area of physical science. No one before or after Larson can hope to match these amazing achievements. If civilized man has a history extending decades or centuries into the future, Dewey B. Larson will surely be recorded as having made the greatest contribution to physical science.

Yet even Dewey Larson is not superhuman, and he would be the first to admit his theory is not nearly complete in its development. After all, the universe is tremendously vast in every sense of the word. A theory covering every aspect accurately in every detail is obviously beyond the ability of one man. The inconsistency in the photon theory is simply a gap in the theory, of which there are doubtless many others. It remains for the rest of us to attempt to fill the gaps in the theory structure and continue to extend the theory into uncharted areas; those areas not outlined in Larson's works.

Larson's theory of the photon was, as always, very close to the mark. His photon, as the one in this work, was an oscillation, a linear inward displacement or reversal of the magnitude of the outward natural progression, within a unit of space existing at a location in extension space, and propagated outward with the natural progression. The only inconsistency between the two theories extends from

the idea that the photon is a sine wave, as is so widely accepted within conventional physics. The tendency to conform to this longstanding concept may have been the reason the sine wave concept crept into his theory. Clearly this present work is simply a minor clarification of a relatively small part of the vast study undertaken and presented to us by Dewey Larson.

“We always have time enough if we will but use it aright.” —W. Goethe