The Photon: Displacement in a Second Scalar Dimension

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The simplest displacement to the natural progression is a unit reversal in one scalar dimension of the outward motion of a unit of space associated with a unit of time. 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.

The motion which is the photon must continue in one of the other scalar dimensions because its energy is of course conserved. It is also at the lowest energy state possible for a space displacement. It follows that it can not change form readily either. The inward unit motion which is the photon can not continue over a second unit of time, because that would require an additional unit of energy. The single displacement is one unit greater than 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 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 its form of a unit displacement again.

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 again to the inward direction after completion of the mandatory outward unit is the unrelenting tendency of the inward motion to manifest itself due to its energy conservation.

This $1/n$ motion is similar to translational motion but it does not involve motion of an object, just the inherent motion of the displacement. Without an object to move, the subject motion does not have any representation in extension space. 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 2 scalar dimensions one of which is represented in the spatial reference system. The motions in the other scalar dimensions, though real, have no influence on the motion represented in the spatial reference system, except where this motion interacts with matter. This will be investigated further on.

The inherent motion which is the photon is in one of the other scalar dimensions. 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.[1] This would constitute motion greater than unity when the two motions are added vectorially.

Therefore the motion which is the photon is a pure displacement in a second scalar dimension. The second dimensional motion is carried along with the object photon in its translation in extension space.

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

However, based on the above deductive development the nature of the photon can be further deduced. The simplest photon is a one unit displacement of the natural progression. As such it cancels the motion

1 See page 209 of *Universe of Motion*.

of the outward progression with a unit of inward motion. This creates a packet of zero motion of unit size within the continuity of the natural progression. When this packet of zero motion impinges on a material object, it acts similarly to a pulse at point of contact.

The pulse varies in intensity depending on the energy of the photon. The intensity is therefore 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. This is related to the wave length by the expression $n+1$, where n is the pulse duration, or units of energy, with the additional unit of time for the inevitable reversal to the outward direction. The frequency is of course forward unit speed divided by the wave length, the duration of the pulse plus one unit of time for reversal. This frequency is therefore $1/n+1$. Looking at this another way, the frequency and the wavelength are the inverse of each other when the speed is at unity, one unit of space per one unit of time. The frequency is cycles per unit time and the wavelength is units of time per cycle.

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. It follows that the displacement which is the photon object is completely distributed in the two vectorial dimensions other than the direction of the photon object translation. Naturally this distributed motion will be centered on the line of translation as there is no preference for any one direction. This scalar motion becomes apparent when it contacts a physical object.

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. This corresponds very well with the concept that the photon motion is distributed and centered on the line of travel about one wavelength in total width. 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.

The next consideration is motion of the photon through a physical medium. Any medium constitutes a concentration of time displacement and space displacement in a localized volume in extension space. The clock time of transition of the location of the photon relative to the reference system in extension space is necessarily longer through the medium due to more net units of space to be traversed.

However, this is offset to some extent by the additional motion which is the photon in a second scalar dimension. This is a motion inward in space which is equivalent to a motion outward in time. Time has no relation to the dimensions of space, therefore this motion in time can have some effect on the forwards speed of the photon in extension space. Since the physical medium is composed of net time displacement, any additional motion outward in time will shorten the clock time required for the outward progression of the photon's location to traverse the concentrated time in the medium.

It follows that the photon with the greatest displacement or longest wave-length, will have the greatest additional outward motion in time. Therefore the longer the wavelength, the greater the speed in the reference frame of extension space. This corresponds to measurements of the speeds of light.

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 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. If 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.

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 located 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 passes through without hindrance. If offset from 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 empty spaces between. When a screen is placed within a certain range of the slits, the light bands will appear at each radial line with dark bands between. These will be much more pronounced if the screen is placed at such a distance from the slits that it's 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 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. However this would only happen to photons within one half amplitude of the slit edge. However 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 other's energy is pure assumption.

There is no real evidence that this effect ever occurs.

Now after this review of the nature of the photon, it would be appropriate to link this theoretical photon with the remainder of the physical universe. We original established a one unit reversal of the natural progression as the simplest displacement. This one unit displacement occupies one unit of space. It is essentially a disk of distributed scalar motion in the 3-dimensional reference system. This disk of one unit diameter would seem to have some propensity to spin around the axis through its center.

Rotation of a disk of pure motion, a disk without any material inertia and constituting the simplest possible displacement confined to a single unit of space, would seem a very reasonable incremental next step towards more complex displacements of the natural progression, the simplest rotational progression displacement would of course be one unit of motion. Thus there would be a disk of distributed inward scalar motion occupying occupying one unit of space spinning with one unit of motion around its central axis. This hypothetical compound motion can be shown to possess the qualities of a physical electron with one unit displacement of the photon being its base for rotation.