the general science journal

# The Alternative to The Standard Model
# Light – The Elementary Act of Radiation

What is light? According to the knowledge on this subject we have received since the time of Huyghens, Young, Maxwell and others, light is an electromagnetic radiation that is transmitted into space in all directions at a speed equal to c/n (c is the speed of light in vacuum and n is the refractive index of the medium) and it is noted at any point in space by two perpendicular field vectors one electric and the other magnetic rotating in a plane perpendicular to the line connecting the source point and the receiver point. This is the view that classical physics has always had about light as electromagnetic radiation.

Let us recall that electromagnetic radiation carries information on the movement of electric charges, movement that is the origin of the radiation and implies the concept of charge-speed, having called "pole intensity vector" to the charge-speed vector. Clearly the atomic elemental act of radiation is related to this pole intensity vector.

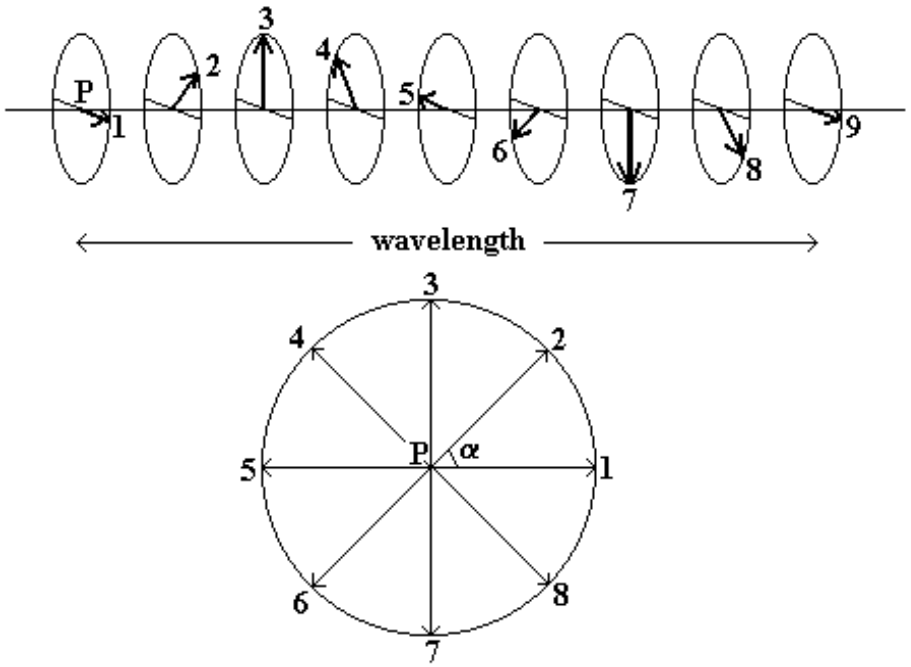
We know on the other hand that a pole intensity vector created at a point O generates at any distant point P, when that point is reached by the wave, a magnetic field intensity vector perpendicular on the one hand to line OP and on the other to the direction of the pole intensity vector (See figure on page 9). We also know that a changing magnetic field generates a changing electric field **by induction** so that both field vectors are perpendicular to each other.

If we see that electromagnetic radiation implies the existence of rotating field vectors it would be logical to assume that the "pole intensity vector" origin of the radiation were also a rotating vector. I challenge the reader to find some other form of "pole intensity vector" rotating in a plane coming from the movement of electrical charges in space different from the one presented in this Article. If we hide in the virtual world this kind of search is superfluous since in this world does not even exist "pole intensity vectors". The accuracy with which this Theory describes the formation of light can not be put aside. I sincerely believe that a Theory that seeks to give physical explanations to natural phenomena outside the virtual world is bound to tackle issues such as the light origin. The result is so accurate that clearly reveals what a wave is, how it spreads, what its frequency, its energy, its wave train are and finally the different polarizations with totally matching results with experimental reality. A new and great achievement of this Theory to be added to those already expressed: spin of all single particles equal to $h/4\pi$, definition and measure of nuclear forces, matches with particles sizes, mass increase with speed with arguments outside Relativistic Theories, etc., and no serious objections.

At the end of this Article there is a comment about β decay. It is evident that this Theory doesn't support the idea that forces are transmitted through material particles. The weak force doesn't exist. Neutron decay occurs due to its instability. Its two electric rings, positive and negative, located in the same plane tend to become instable and break the particle when the planes of the rings cease to coincide. However, when the neutron is part of an atomic nucleus, its electric rings are supported by other nucleons electric rings that make up the nucleus and the instability of the neutron disappears.

The only existing forces are gravitational and electromagnetic.

Coming back to the radiation, let us imagine a point P through which an electromagnetic disturbance passes, as is shown in the next figure. In the upper figure different positions of the fields intensity vectors (either magnetic or electric) have been depicted **at a certain instant** along a wave-length. In this moment the vector has different directions along the considered length.




In the bottom figure different positions of the vector at point P have been shown **at different moments** during a lapse of time equal to one period 1/ν.

The main features of the radiation is that each of the representative vectors, one electric and the other magnetic, behaves according to the wave laws, that it carries information about the movement of charges and that it may transmit energy to an electric charge.

But in the twentieth century certain behaviours of light, such as the photoelectric effect and the Compton effect, did physicists, then surrendered to Quantum Mechanics, think

that light consisted of something they called "photons" and considered the photon as a single "quantum of light" or "light quantum". According to Quantum Mechanics the energy of an electron bound to an atom is quantized and a quantum is the minimum amount of any physical entity involved in an interaction. Behind this, one finds the fundamental notion that a physical property may be "quantized". This means that the magnitude can take on only certain discrete values and is regarded by physicists as part of the fundamental framework for understanding and describing nature at the smallest length-scales.

This view of nature is discussed by this new Theory, which presents some simple statements that have been deducted after thoroughly analyzing some experimental facts. (See Article "The Alternative to the Standard Model – Starting Point of this Theory"). It is shown there that the existence and characteristics of electric rings follow from the fact that the gyromagnetic ratio of the electron is e/m, double what it should be. The two simple laws $E\ 2\ \pi\ R = h\ c$ ; $E = h\ \nu$ are also deduced from experimental facts. I invite the reader to interpret these two equations: more energy means smaller size; similarity between the frequencies of the electromagnetic radiation and matter in their way of contributing to the common energy formula $E = h\ \nu$. This Theory has not invented anything. The only thing that it has accepted is the initial idea of Yukawa: elementary particles are small rotating blobs made of an existing single material in the Universe that some call "urmaterie" and other "goo". I have called it "goo". Based on this unique course and following the strictest logic and a few experimental data, this new Theory has been developed and the result is that it agrees with Reality amazingly. Among these matches, some of them, such as nuclear energy, the spin of all elementary particles equal to $h/4\ \pi$, mass increase with speed, sufficient by itself each to reaffirm the validity of the Theory, the origin of the elementary act of radiation is added now. If the reader follows the reasoning, will come to know how the light from an orbital electron is born and will see that the newborn is equal to the light Huyghens, Young and Maxwell had imagined. And he can also see that the light has no particle character. Light simply looks for its target, which is nothing but a magnetic dipole, and once the dipole is found, light transfers all or part of its energy to the dipole, which experiences a force as if he had been kicked. It is the simultaneous occurrence of two vectors perpendicular to one another, one of the electric field and another of magnetic field rotating with the frequency of the light, which, apart from changing the orientation of the dipole provides a force that constitutes the kick the particle receives from the light.

The idea of Quantum Mechanics that the fact that a magnitude can take on only certain discrete values and is regarded by physicists as part of the fundamental framework for understanding and describing nature at the smallest length-scales must be considered as absolutely wrong. I copy some paragraphs from the Article "The Alternative to the Standard Model – Spin and Magnetic Moment":

"It is incredible, but the fact is that Nature has conceived material elementary particles as small spinning "dynamic" objects with a very strange feature: their angular

momentum is always h/4π (you can see the demonstration of this subject in previous article "The Standard Model is wrong"). The real miracle of Nature is that all elementary particles are the same thing in different states of movement and their spins are not quantized, they are simply fixed, equal to h/4π. This extraordinary fact has nothing to do with Quantum Mechanics and is valid for electrons, protons, neutrons, neutrinos and particles forming what is called dark matter and even the initial particle that stored the whole energy of the Universe at the very beginning."

"And it is precisely the electric rings, which constitute small dipoles, what brings an irresistible orientation in space beyond quantum mechanics. To say that the material particles, both in the free state or as orbital electrons are quantized, is a mistake that will hinder our understanding of the Universe until that misconception is banished from physics."

"There is good evidence that the spin of the orbital electrons is not virtual, but rather a spin in accordance with the concepts of classical physics. The previous article of "The General Science Journal" entitled "The Standard Model is wrong" shows demonstration that the Bohr Theory of the atom is correct. In other words, that the atom works as a planetary system since the emissions of the hydrogen atom obtained experimentally coincide with the emissions which result from a situation in which the atom consist in a planetary system. That admitted, the orbital electrons have a spin as a result of their orbital rotation and this spin is added to the internal spin of orbital electrons and nucleons to determine the total spin of the atom. It would be painful to believe that we are adding inside the atom real spins from the orbital electrons and internal virtual spins from electrons and nucleons."

"It is difficult to imagine the enormous complexity and the great amount of restrictions orbital electrons must be subject to. They must follow the electromagnetic laws. It may be noted here, on the one hand, that relative distances are much shorter in the case of the atom than in the case of the motion of planets around the sun and, on the other hand, that the forces acting on the atom are much stronger than the force of gravitation. Another fact adding complexity to the atom is the enormous number of electrons which may be orbiting the nucleus. Orbital electrons must also obey the strict energy and spin invariability laws. All these laws together with the proven fact that the emission or absorption of a photon creates an alteration in the angular momentum of the system equal to the spin unit h/2π, originate a situation so complex that it is impossible for the human mind to try to deduce some reasonable rules. Paradoxically one of the very few rules we can establish is that electronic jumps must always take place between orbits so that the change in angular momentum should be ± h/2π (positive for absorption and negative for emission), which means abandoning the idea that electrons can follow infinite orbits. The spin or angular momentum of the whole atom must remain constant and, when this spin is modified by the emission of a photon, the atom must necessarily in some way offset that alteration and this can only be done by changing the electron's orbit path, so that the electron's angular momentum should change in the same amount."

"This is an experimental fact that cannot be discussed. It is "the main observable fact incorporated to Quantum Mechanics"**.** I don't care whether the photon has a spin equal to h/2π or whether the emission of the photon changes the whole spin of the atom in an amount equal to the spin unit. This is a fact and it is neither patrimony of Quantum Mechanics nor the result of any prediction. I shall mention this paragraph from Heckman and Starring: "Historically, the four quantum numbers n, l, m and s were incorporated in the Theory of atomic spectra simply to account for experimental observations.""

"The pillars of Quantum Mechanics lie in quantization. But there is no place for quantization: We have already shown that all elementary particles have a simple spin equal to h/4π (one of the great achievements of this Theory), that orbital jumps of electrons are subject to the law of conservation of spin (when a photon is absorbed or emitted by the atom a fact that has been experimentally observed to satiety occurs: the spin of the whole atom is altered in an amount equal to ± h/2π) and that elementary particles, being real magnetic dipoles, have only two possible positions: up and down. Now it is evident that h/4π is not a quantum number, that atomic orbits are not infinite and they are not quantized, they are well regulated by simple rules, and the particles are subject to an orientation similar to that of magnetic dipoles and besides the atom works as a planetary system. These facts are clearly faced with the postulates of Quantum Mechanics and their accuracy is proved. What makes us think that perhaps Quantum Mechanics should undergo a severe overhaul. It is not enough reasoning that the Theory has achieved notable successes when trying to explain the inexplicable and its paradoxes. Can't we think that the cause of the paradoxes could be again an inconsistent theory? And Quantum Mechanics is precisely the Theory that has led Modern Physicists to the freedom to accept the virtual world in physics. Nature does not accept quantum whims. Accepts only simple laws and rules and makes it easy to understand what is complicated."

## The Elementary Act of Radiation

Any electromagnetic radiation, with no exception, is caused by moving electric charge. Radio waves, for example, are generated when currents of electrons in an antenna oscillate at frequencies corresponding to that particular part of the electromagnetic spectrum.

We are going to study in this chapter the electromagnetic radiation created when a charge-ring suddenly modifies its frequency and its size. This is the most common case of electromagnetic radiation, including the emission due to electronic jumps between atomic orbits, gamma emissions by atomic nuclei and even emission generated in the process of matter and antimatter annihilation.

Apart from this type of radiation and radio waves there exist other types of

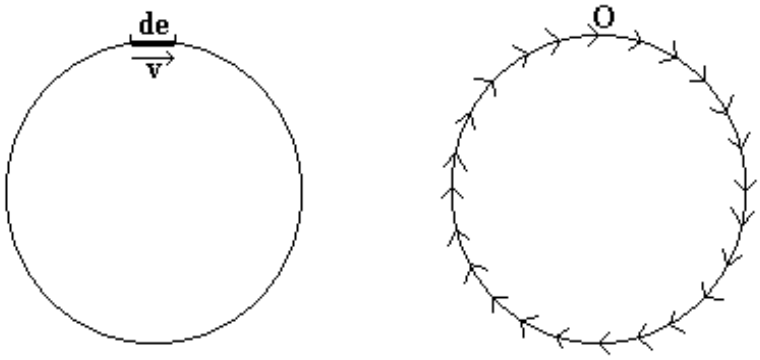
electromagnetic radiation through inversion of particles or atoms or through vibration or rotation of atoms. An example of radiation through inversion of particles is the radiation created by inversion of the electron of the hydrogen atom with a wave-length of 21 cm. This radiation has been used to find the distribution of hydrogen clouds in space. Infrared radiation may be caused by the above mentioned vibration of atoms inside their molecules and microwaves by rotation of complete molecules, such as the microwave of 1,26 cm wave-length emitted through the inversion of the ammonia molecule, which was the origin of the first "maser". But rotations of atoms do not always create radiation; sometimes the energy is released in the form of heat as in the case of the ruby laser.

Certain requirements are necessary for an electric moving charge to create an electromagnetic radiation. First of all, **the moving charge must be able to generate an electromagnetic field and the magnetic and electric fields have to be perpendicular to each other**. We shall see that, when a charge-ring suddenly modifies its frequency and its size, it creates a variable **magnetic field**, which, due to the induction laws of electromagnetism, creates a variable electric field, so that the field intensity vectors should be perpendicular to each other.

That is to say, the magnetic field is the first effect of the charge-ring alteration and the electric field, perpendicular to the magnetic field, is the second effect. This is due to the induction laws of electromagnetism: **a variable magnetic field creates a variable electric field so that they are perpendicular to each other.**

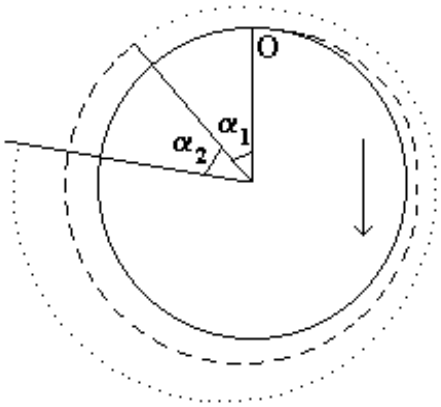
We have seen that there exists a great variety of types when the origins of radiation are analysed. But, as I have said before, I am going to refer exclusively to the most common radiation caused by the sudden alteration of a charge-ring remaining on its own plane. How is the electromagnetic radiation created when a charge-ring experiences a sudden alteration in frequency and size? This Theory states that the emission of radiation implies a loss of the frequency and an increase in the size of the charge-ring in question.

Let us imagine a static charge-ring whose differential elements of charge are moving at a certain speed. Each differential element of charge provided with a speed v can be identified with what is called a pole intensity vector, charge multiplied by speed, as is shown in the next figure. If we fix any given origin O on the circumference which represents the charge-ring and if we draw the pole intensity vectors for all the differential elements of charge at a given instant, the component of all these vectors is evidently zero. We can thus affirm that a static charge-ring has no pole intensity, since the component of all the vectors, at a given instant, is zero.



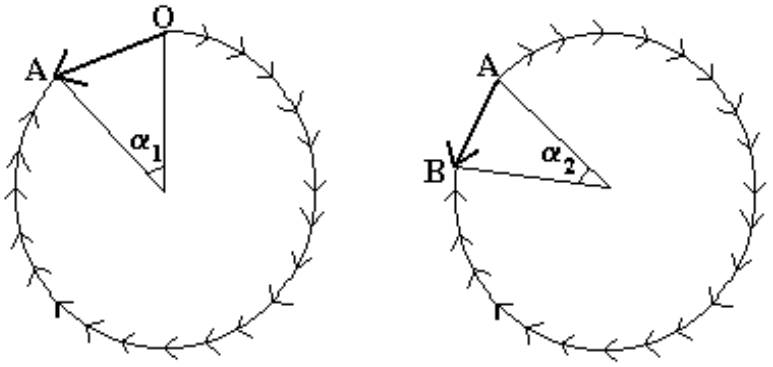

Let us now imagine that the charge-ring experiences a transformation such that its radius increases progressively and its spin frequency starts decreasing. Even though the transformation takes place in a continuous way in time, we are going to take an interval, in order to compare the effects in successive instants. Let this interval be the time any given differential element of charge would take in completing a turn under normal conditions. Once the perturbation of the charge-ring starts the differential elements of charge should travel a greater circumference and with lower turning frequency. The result is that in the turn corresponding to the first interval after the perturbation has started, the path a differential element of charge travels is not the full circumference, but there will be a certain phase difference which we are defining by angle $\alpha_1$ .

In the next figure we have drawn the route under normal conditions, in other words, the complete circumference, with a continuous line, and the second route with a broken line. In the next interval, for the same reason, another phase difference is produced, determined by another angle $\alpha_2$, and this route has been shown with a dotted line.



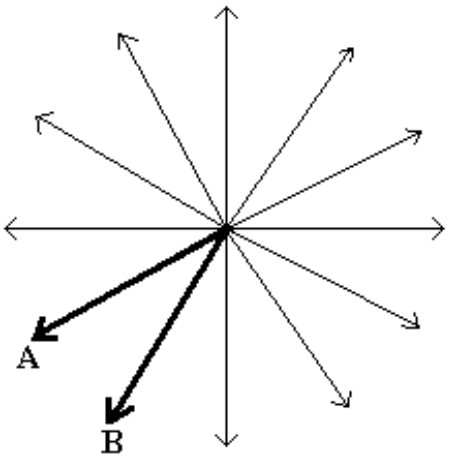

Thus we find that a continuous phase difference is produced in time. If the position of all the differential elements of charge covers the whole circumference, except the span corresponding to the phase difference $\alpha_1$ after the first interval, evidently a component of all the pole intensity vectors in that instant will now exist, as is shown in the figure.

This component will be OA, multiplied by a factor which depends on the charge concentration by length unit, which would evidently vary with the radius. In the following interval, there will be another component AB. On the other hand, it would seem only natural that the larger the phase difference of the charge-ring the greater the components OA, OB, etc, and the greater the pole intensity vector, and it will take less time in completing a revolution of 360º.

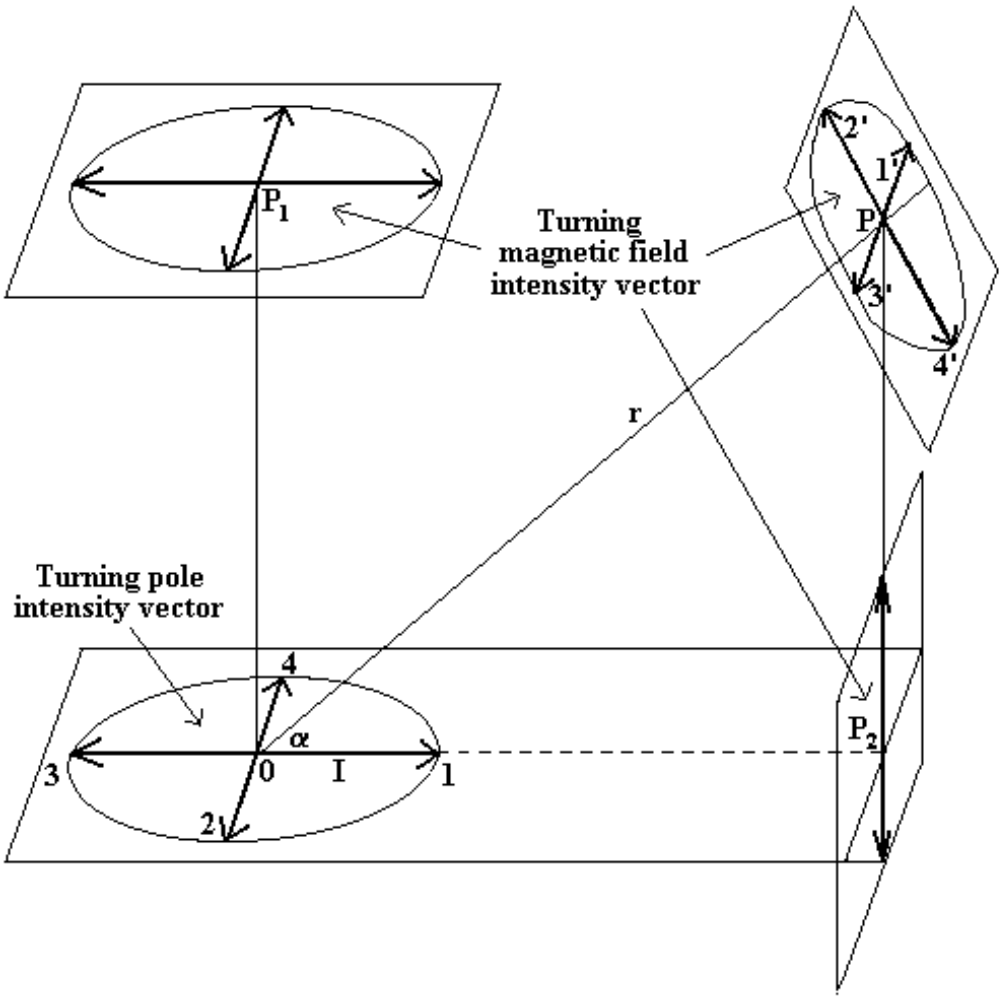



One can consequently consider that in each instant, whilst the perturbation of the charge-ring lasts, there is a pole intensity component, such that its absolute value does not vary and is proportional to the turning frequency difference of the charge-ring in the initial and final moments of the perturbation, in other words, the frequency loss of the particle. Likewise, the turning frequency of the pole intensity vector is equal to that frequency loss.

We would therefore get a loss in internal spin frequency of a particle implying a frequency loss of its charge-ring. This will give rise to a pole intensity vector, turning on the same plane as the charge-ring, with a frequency equal to the frequency loss of the particle, from the time the perturbation is initiated until it ends. The absolute value of the vector would also be proportional to this frequency loss.




This pole intensity turning vector could then be responsible for the electromagnetic radiation. What will be the effect of that pole intensity vector turning on a plane?



Let us imagine a point P, as is depicted in the figure, sufficiently far away from the charge-ring which is experiencing the alteration and let us consider that the pole intensity vector, charge multiplied by speed, is turning on the plane of the charge-ring, without altering its length and describing a circumference. We call r distance OP and I the absolute value of the pole intensity vector.

If we consider the position 1 of the pole intensity vector corresponding to the minimum angle $\alpha$ between OP and the direction of the pole intensity vector, we know that that position 1 of the vector creates on point P a magnetic field intensity vector perpendicular on the one hand to OP and on the other hand to the direction of vector 1. The result is the magnetic field intensity vector 1' and its value is

$$\frac{I \sin \alpha}{4 \pi K_m \mu r^2}$$

Where $K_m$ is the fundamental electromagnetic constant and $\mu$ is the magnetic resistivity which depends on the nature of the medium. As we have seen before, in the electromagnetic system of units $4 \pi K_m = 1$.

As the pole intensity vector is turning around point O on the horizontal plane, the magnetic field intensity vector is turning **with the same frequency** around point P on the plane perpendicular to OP. It is easy to check that vector 2 corresponds to vector 2' and so on, and that the curve described by the magnetic field intensity vector is an ellipse. The value of $\sin \alpha$ is changing from its minimum value corresponding to vectors 1 and 3 up to its maximum value corresponding to vectors 2 and 4, which is 90º. We therefore have on point P a magnetic field intensity vector turning on the plane perpendicular to OP with a frequency equal to the frequency lost by the charge-ring in question during the emission process. **This magnetic field intensity vector must be identified with what is called the luminous vector**. As we have a changing magnetic field, an electric field is created by induction so that the directions of the two field intensity vectors, one magnetic and the other electric, should always be perpendicular. The result of this is the coexistence of an electric field and a magnetic field with **exactly the same features as the electromagnetic radiation.**

It is easy to see that, when point P is in position $P_1$ on the vertical through point O, the turning magnetic field intensity vector describes a circumference, as angle $\alpha$ is always 90º, and when it is in position $P_2$ on the plane of the charge-ring, the magnetic field vector describes a straight line perpendicular to that plane. Obviously the electric field intensity vector describes a straight line located on that plane. The three mentioned cases correspond to elliptical, circular and linear polarization respectively. This circumstance has been fully proved through experiments. The Zeeman effect is in

agreement with the conclusions of this Theory and the linear polarized light resulting from the experiments at the Zero Gradient Synchroton (ZGS) is a new confirmation of those conclusions. This is what the experimenters say: "Synchrotron radiation is highly polarized; that is, the oscillating electric field associated with the radiation vibrates primarily in the plane of the electron's orbit."

It is clear that the perturbation in point P will last exactly the time it takes the charge-ring to complete the process. This explains the wave train affecting point P with a beginning and an end.

What will happen when two different orbital electrons with coincident charge-ring planes emit two linearly polarized photons? What will happen is that the polarization line will **always** be the same for the two photons. This will be remembered when dealing with the so called quantum paradoxes in a later chapter. I am referring to the correlations between members of pairs of photons emitted in energy state transitions of calcium and mercury atoms which have led some to think that "**information is somehow exchanged between the photons even though the photons have no apparent means of communicating with each other".**

We see that light is an electromagnetic wave, **a propagating disturbance** in space and time that carries information about the movement of charges. This disturbance travels with the same speed in all directions. In other words, it is a spherical pulse with an impact capacity when it meets its objective: an electric charge as defined in this Theory. If light has enough energy, that is to say enough frequency, the objective, which is nothing more than a particle with its corresponding charge-ring, will be affected as if it had been reached by a projectile.

The electromagnetic disturbance changes the electric and magnetic field intensity vectors at every point of the space as soon as the point is reached by the disturbance and this effect will continue until the disturbance has disappeared, when the wave train has passed through. This effect will be clearly shown when dealing with the Photoelectric and Compton effects. The propagating disturbance, which is a photon, may transmit energy to its objective, the charge-ring, in the same way as radio waves transmit energy, though in a totally different way, to their objective: electric charges inside an antenna.

But the disturbance is present at many points of space simultaneously, in other words, the photon can act on different and distant points. The disturbance, that is to say the photon, propagates spherically in all directions. It is not a ray, unless an obstacle prevents it from doing so. In case the obstacle allows only a linear direction, the disturbance becomes a ray. If two only linear directions are allowed, two rays of the same photon will exist, so that they can act on different and distant points of space at the same time. And in case these two rays are reunited at the same point, they will interfere with each other depending on the distance each of them has travelled from the

light source until the reunion point. In other words, a photon can interfere with itself. This can explain some of the so-called quantum paradoxes.

On the other hand, a photon may appear at a certain point with linear polarization and at the same time with circular or elliptical polarization at another distant point. The photon is a disturbance which is propagating along the space so that its effect may be felt at every point reached by the spherical pulse and this effect will depend on the relative positions and orientations of the orbital electron which has created the radiation and the charge-ring located on the point in question.

Concerning directionality of the radiation emitted by electrons I shall mention what experimenters has to say about this subject: "At low speeds (well below that of light) the electrons emit very weak, low-frequency radiation in almost all directions. But if the electrons are travelling at relativistic speeds (nearly as fast as light), the radiation increases spectacularly in intensity, **directionality**, and frequency." And after that they say: "Virtually all the radiation emitted at a given instant by a single electron as it curves in the field of a bending magnet is **confined to a forward cone with a very small opening angle.** This natural emission angle is numerically about equal to the ratio of the energy represented by the electron's rest mass to the electron's total energy. Since the electron's rest mass represents an energy of 0,5 MeV, if an electron is given a total energy of, say, 5 GeV, the natural angle over which synchrotron radiation is emitted is only 0,0001 radian, or about 0,006 degree. This can be regarded as a beam of nearly parallel rays."

Bearing in mind that the speed of the electrons emitting synchrotron radiation, with energy of 5 GeV, is almost the speed of light, their turning axes will be very near the charge-ring and the asymmetry very high. Could this be the reason why the natural angle over which the radiation is emitted is confined to a forward cone with a very small angle? This subject of the asymmetry of the charge-ring will be seen in a future Article.

We have clearly seen what a photon is and what its effects can be on the sole thing capable of detecting it: the charge-rings. Perhaps this knowledge will help us to understand some of the so called "light paradoxes".

In short, light is a spherical pulse with an impact capacity when it meets its objective: an electric charge as defined in this Theory. If light has enough energy, that is to say enough frequency, the objective, which is nothing more than a particle with its corresponding charge-ring, will be affected as if it had been reached by a projectile. There is no particle-like behaviour. As soon as the radiation reaches the charge-ring, all or part of the energy is handed to the particle through its charge-ring and the particle seems to have received an impact. This is the process. The radiation is not a particle.

At any point of space there is a sole magnetic field intensity vector and a sole electric field intensity vector as resultant of all the magnetic and electric field intensity vectors

concurring at that point at a certain instant. This is a consequence of the interference characteristics. If the capability of delivering an impact to a particle is called a particle-like characteristic, light has a particle-light nature. But when the phenomenon is properly analysed we see that this is not the case. On the other hand, if light interferes in the way it does, light is a wave.

It is worth noting, as I have mentioned in a previous chapter, that any of the vectors in question, either electric or magnetic, coincides in behaviour with the so-called light or luminous vector. But we must realize that the **magnetic field is cause and the electric field is effect**. In other words, the magnetic field is created by a moving electric charge and the electric field is created through induction by a changing magnetic field. In another Article experiments which apparently lead to believe in the particle-light nature will be discussed as one of the Quantum paradoxes.

## The Photoelectric and Compton Effects

In the photoelectric effect the energy of a photon is transformed completely into kinetic energy and ejection energy as the electron is removed from its energy shell. If the energy of the photon is less than the binding energy of the electron, the electron cannot be removed from the atom. On the contrary, in the Compton effect a photon transfers only part of its energy to the electron.

The main difference between these effects is the energy of the incident photon. In the Compton effect the relative small binding energy of the electron can be ignored in the interaction so that it can be considered to be free. On the other hand, the photoelectric effect involves the interaction between a photon and an atom; whereas the Compton effect is strictly an interaction between a photon and a single electron.

In both cases we have an electromagnetic radiation which reaches its objective, an electric charge-ring, forming a magnetic dipole. When the electromagnetic radiation encounters the electron it does not affect the material component of the electron, what I have called "goo", but it affects the electrical component that is the electric ring or magnetic dipole. A force starts acting on the electron through its charge-ring. The result is that the electron receives an impact and is therefore affected as if it had been reached by a projectile. The electromagnetic radiation which is the photon transmits energy to its objective, the charge-ring, in the same way as radio waves produced by oscillating electrons in transmitting antenna hand energy by exerting a force on electrons in the receiving antenna.

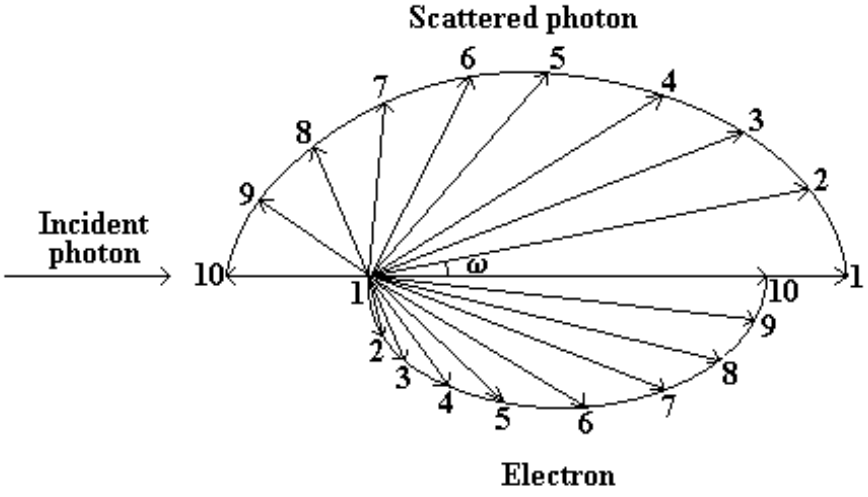
The most important feature of the Compton effect is that the relation between the kinetic energy of the electron $E_{ke}$ and the energy of the scattered photon $E_{sp}$ depends on the angle $\omega$ at which the photon is scattered. This has been confirmed in the case of elementary acts of radiation in the form of rays. Thus we have, calling $E_{ip}$ the energy of

the incident photon and $E_{re}$ the energy of the electron at rest:

$$\frac{E_{ke}}{E_{sp}} = \frac{E_{ip}}{E_{re}} (1 - \cos \omega)$$

Thus, for a given incident photon, we shall have a determined distribution of the available energy $E_{ip}$ between the scattered photon and the electron in the form of kinetic energy. This distribution varies with the scattering angle ω as is shown in the figure of the next page, which corresponds to the case **when the wave-length of the incident photon is exactly equal to Compton's wave-length h/mc**. The electron recoils with its kinetic energy according to the arrows in the bottom part of the figure and the scattered photon follows the arrows in the upper part of the figure. Couples of arrows are marked with the same numbers. When the photon is not scattered, the electron is not removed (position 1). As the photon is scattered a greater angle, from 0º up to 180º, the energy distribution is changing as well as the angle at which the electron recoils, from 90º to 0º. The electron receives maximum kinetic energy when it is projected directly forward and the photon is scattered backward (position 10, ω = 180º).

One of the conclusions of the Compton effect is that the photon has momentum as well as energy. The conservation laws of energy and momentum are verified. It must be accepted the fact that electromagnetic radiation carries momentum but this doesn't mean that the photon has a particle-like nature.




One of the most significant aspects of this experiment, that seems to have gone unnoticed by modern physicists, is that the result depends exclusively on the variation of the scattering angle ω which determines the distribution of energy between the scattered photon and the electron. Why this variation of angle ω? Why the same photon may interact in different ways? It is clear that the outcome of the experiment does not depend on the incident photon as the same photon may give way to different results.

The result is more connected to "geometry" than would be expected if the electron were a point charge and, to make matters worse, virtual. The fact is that the result depends entirely on the electron and, rather, on **the orientation of its charge-ring in space. The elementary material particles have much more to do with "geometry" than what modern physicists have decreed.**

Moreover, it should be noted that the Compton experiment was performed with a determined energy for the photon, with the so-called Compton frequency, which is exactly equal to the frequency of the electron at rest as defined in this Theory, with value $mc^2/h$, where m is the mass of the electron at rest. That means that frequencies of photon and electron are the same. The two vectors perpendicular to each other, electric and magnetic, which are turning in a plane perpendicular to the movement of the photon, rotate with the same frequency at which the electron spins. It is a very special case, which will only appear in an experiment duly designed. In the case of the photoelectric effect the frequency of the incident photon is several orders of magnitude smaller than that of the electron.

## β Decay

I want to mention here an issue that may constitute an objection to this new Theory. I refer to the β decay, as one of the few and inconsistent objections that this Theory has received.

How does this Theory explain this decay process, called weak? Simply by the emission of pairs of whirls of "goo" with spins always equal to $h/4\pi$ and opposite directions, so that the angular momentum law is not violated. What happens in β decay, when a neutron decays into a proton, an electron and a neutrino? What happens is that two whirls, two amounts of "goo", each of them submitted to the laws of Matter Mechanics presented in this Theory, come off the initial whirl that is the neutron, formed by part of "goo" also submitted to the same laws. The initial whirl remains with less energy, which means lower frequency, and two new whirls are liberated.

As the above decay cannot break spin constancy law, all decays of this kind must imply the formation of at least a couple of new whirls with opposite spins. Remember that all single particles have a spin $h/4\pi$. As electric charge constancy law must also be respected, the whirls share the existing charges in the form of electric rings.

In the case of β decay, one of the whirls that come off carries away the negative electric ring of the neutron, becoming an electron and leaving the initial whirl converted into a proton. The other whirl, the neutrino, has no electric ring. We see that neutrino doesn't exist at rest and they move in space with its own helicity and an ample spectrum of energies and sizes. A new article will be dedicated to "neutrinos" explaining why they seem to get lost in their way from the sun to the earth.

How can one explain that an electric ring undergoes a change of size 1836 times its original size without any modification of energy, when in the orbital jump there is an energy transfer with minimal alterations of size and frequency? I can not answer, but I can say that the processes are totally different and Nature very well can choose which process involves energy change and what not. Apart from this, the description of how electromagnetic energy is formed, with two field vectors perpendicular to each other and with different polarizations, from a slight increase in size and a small decrease in frequency of an electric ring is something that falls within the unbelievable.

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