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On an Expanded Maxwellian Geometry of Space

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Abstract:

Definition of an expanded Maxwellian geometry of space that allows description of a possible mechanics 1) of motion of photons; 2) of conversion of a photon of energy 1.022 MeV or above to a pair electron/positron as it passes close to a nucleus as well as re-conversion of such a pair to a single photon through Coulomb interaction close to a nucleus; 3) of creation of protons and neutrons from the capture within a volume of space of diameter 2.116708996E-10 meter of 2 electrons plus one positron, or alternately, of 2 positrons plus one electron, possessing insufficient energy to escape from that volume against mutual Coulombian interaction; 4) of gravitation.

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It should be noted that from the day in mid-June 2000 when the acting Vice President Jaroslav Klyuschin kindly and unexpectedly confirmed that the hastily submitted summary manuscript would be welcomed at the congress – a congress that the author had only learned about by chance a few weeks before, during an informal conversation with a friend, Alexandr Timofeev, who was planning to submit his work ([9], pp.201-208, and [Proceedings of Congress-2000], pp.430-435) and who had suggested that such a contribution would certainly be welcome at this congress – only 3 weeks remained to prepare the final text of the paper presented below and its presentation text, and that no aspect of the trispatial model, conceived less than a year before [9] and still in process of preliminary analysis, had yet been mathematized.

The text used to present the article in plenary session is available here:

Presentation in plenary session at CONGRESS-2000

All aspects of the trispatial model that were raised in the conference paper were subsequently deeply analyzed and mathematized in a series of formally published open access articles that are all listed in the following index:

INDEX - Electromagnetic Mechanics (The 3-Spaces Model)

Introduction

The observation that gravitation has not yet been explained, despite the fact that all stable fundamental particles have been identified and their properties thoroughly ascertained in the course of the past 100 years, led me to suspect that something fundamental may have been misunderstood in fundamental physics. This suspicion caused me to reconsider the accepted space geometry and to carefully re-examine what properties of particles had positively been verified, an exercise that led to the elaboration of a theoretical solution based solely on the objectively verified properties of stable fundamental particles.

Surprisingly, this solution draws a natural bridge between Maxwell's electromagnetic theory, the Coulomb interaction and Newton's gravitational theory, despite the fact that it is at odds with the bulk of accepted orthodox theories, namely special relativity, general relativity, quantum mechanics, quantum electrodynamics and quantum Chromodynamics, as well as with many of the postulates that are now taken for granted.

Maxwell's Geometry and the Photon

In Maxwell's geometry of electromagnetic interaction with space, the intersection of a magnetic field with an electric field at right angles with each other and with space is not easy to visualize. If we imagine the magnetic field as a plane corresponding to the horizontal x-axis of a co-ordinate system, and the electric field as a plane corresponding to the vertical y-axis, then normal space becomes the z-axis. No speed as such can be associated with the fields, but everywhere both fields intersect, there comes into being, according to Maxwell’s theory, an electromagnetic wave that moves at the speed of light along the z-axis, a motion that can be visualized as a spherical expansion of the wave-front from the intersection point, within space itself.

It must be realized that the x- and y-axes of this representation of Maxwell's geometry are not the x- and y-axes of our 3-dimensional normal space. They are by definition extra-spatial dimensions.

To more easily visualize Maxwell’s geometry, we must mentally do something very special with our idea of normal space. We must imagine the 3 dimensions of normal space (x, y, z) as if they were the ribs of an open three-rib metaphorical umbrella. If we fold the umbrella, it becomes possible to visualize the folded umbrella as being the z-axis of our geometrical representation of Maxwell's theory.

Let it be very clear here again that real space cannot be opened and closed in this fashion, and that the umbrella idea is only a convenient mental artifact that allows us to more easily visualize Maxwell’s geometry. Real space has a permanent and fully expanded existence.

Now, according to Wien's observations and Planck's interpretation of these experimental observations, electromagnetic interaction is not continuous as Maxwell had assumed, but discontinuous, and consequently what was visualized as waves by Maxwell, turns out to be in reality a crowd phenomenon caused by the existence of innumerable discrete electromagnetic events – an idea that was strongly supported by Einstein's photoelectric proof in 1905, and which were called photons.

Compton and Raman further added credit to that interpretation, as they explored other types of

collisions between photons and electrons. These experimental findings conclusively demonstrated that Maxwell's theory does not completely describe the physical reality of electromagnetic interaction.

When dealing with Maxwell's view, we observe that the electric and magnetic aspects must of necessity always be in phase, that is, at maximum at the same moment for a wave to exist and propagate, which fails to properly describe a photon. When both aspects are 90^o out of phase, we obtain a standing wave, which does not describe a photon correctly either. Finally, if we attempt to visualize both aspects as being 180^o out of phase, we end up back where we started, with a configuration exactly equivalent to both aspects being in phase.

Observing on the other hand, how precisely Maxwell's theory allows calculating the speed of light and how his equations describe so accurately crowd behavior of electromagnetic phenomena, it appeared to me that he must have been looking in the right direction anyway, even if there was no way that he could have predicted the existence of photons, given the state of knowledge at that time.

Having considered all of these facts, in correlation with all fundamental discoveries that had been made since Maxwell, Louis de Broglie came to the conclusions that the only way for a photon to satisfy at the same time Bose-Einstein's statistic and Planck's Law; and to perfectly explain the photoelectric effect while obeying Maxwell's equations and conforming to the properties of Dirac's theory of complementary corpuscles symmetry, would be that it be constituted, not of one corpuscle, but of two corpuscles, or half-photons, that would be complementary like the electron is complementary to the positron ([1], p.277).

Expanded Maxwellian Geometry

Reconciling de Broglie's observation with Maxwell's theory seemed a hopeless endeavor at first, but the idea came to me that maybe Maxwell's geometry was simply not sufficiently elaborated to accommodate the dual-particle idea.

Keeping in mind that photons fundamentally are quantized quantities of motion, it also appeared not illogical to me to assume that this energy could presently not suffer any change in nature even when quantized and moving at the speed of light in vacuum, despite our perception of it as alternately possessing distinct and irreconcilable magnetic and electric aspects, that were reciprocally induced by motion of the other aspect, and that this impression could be due to other causes.

For example, considering that magnetostatic interaction obeys the inverse cube law of attraction and repulsion and that electrostatic interaction obeys the inverse square law of attraction and repulsion, made it appear illogical to me that quantized quantity of motion could possess both magnetic and electric properties at the same moment.

It is this very conclusion that convinced me that photons must alternate in some fashion between magnetic and electric behavior to allow for the nature of the fundamental quantized energy not to change, and that Maxwell's geometry needed to be expanded to allow for 180^o dephasing to actually separate these aspects.

I eventually understood that if, instead of considering extra-spatial planes for the electric and magnetic aspects, we expand these planes to become extra-spaces of their own, a whole new geometry comes into being, which ultimately allows, as we will see, reconciling de Broglie's

dual-particles idea with Maxwell's theory.

If we imagine observed electric behavior as being caused by quantized energy being present in a space which allows such behavior, and magnetic behavior being caused by the same quantized energy being present in a different space which allows such behavior, each space allowing the same laws of motion as normal space, and each space allowing quantized energy not to change in fundamental nature, it becomes possible to visualize our photon much more clearly.

In order to more easily refer to these hypothetical spaces, let us name **electrostatic space**, the one in which quantized energy displays electric behavior, and **magnetostatic space**, the one in which it displays magnetic behavior.

In this geometry, a junction point of these two spaces is located at the geometrical center of each photon and it is this junction point that would move at the speed of light in normal space. The photon itself now appears as a discrete amount of quantized energy pulsating non-stop through this junction by means of orthogonal translation, between electrostatic space and magnetostatic space, at the frequency determined by Planck's quantum of action.

For intelligibility, let us name normal, electrostatic and magnetostatic spaces, z-space, y-space and x-space respectively. Within normal space, let us rename the three spatial dimensions: n-x, n-y and n-z. Likewise, for electromagnetic and magnetostatic spaces, e-x, e-y, e-z and m-x, m-y, m-z. Let’s assume furthermore that the z-axes of all spaces are parallel to each other.

In such an expanded geometry of space, electrostatic properties such as Coulombian inverse square interaction with distance belong to electrostatic space, while magnetostatic inverse cube interaction belongs to magnetostatic space.

Freefall acceleration induced motion will appear quantized to an observer located in normal space when it occurs in either one of these other spaces, but would locally be perceived as unquantized. For example, as perceived from normal space, magnetostatic space would be the realm of quantum states; electrostatic space would harbor quantum/2 states, while normal space would be, as far as we observers located in the same space are concerned, the realm of freefall acceleration induced unquantized relative (or potential) quantities of motion between bodies.

If we come back to our analogy of normal space with an umbrella, and if we visualize these new spaces as closed umbrellas intersecting each other and normal space at right angles at their tips, we only need to mentally open any one of them to examine what is occurring in it at any given moment.

De Broglie's Dual-Particle Photon

Since it always turned out to be impossible to identify separate northern and southern magnetic «objects», contrary to the positive and negative charges that can positively be identified in the electrostatic field, we will assume that de Broglie's half-photons would of necessity correspond to two half-quantities residing in electrostatic space during the electrostatic phase of a photon's motion, while the total energy of the photon would consist in a single quantity residing in magnetostatic space during the magnetostatic phase.

Let us bear in mind that in view of de Broglie's definition of their being complementary as a Dirac pair, it is not illogical to think that his half-photons will be subject to Coulomb interaction in the space which allows division of the photon into two particles. Moreover, such an interaction

is already provided for in Maxwell's own theory when dipoles are considered ([2], p.199).

To facilitate referring to relative interaction, let us now define as **heterostatic attraction** any occurrence of attraction at the fundamental level, which will remind us that all particles which are in different states of charge (electron and positron, for example), as well as all magnetostatic fields that are in antiparallel orientation ([9], p.45), universally attract each other.

Similarly, let us define as **homostatic repulsion** any occurrence of repulsion which can exist at the fundamental level, which will remind us that all particles that are in the same state of charge (two electrons or two positrons, for example), as well as all magnetostatic fields that are in parallel orientation, universally repel each other.

Let us consider here that what is induced between particles through Coulombian interaction is an unquantized relative quantity of motion in a direction which depends on whether the particles involved are heterostatic or homostatic. The fact that the speed of two homostatic particles moving away from each other will quickly stabilize in view of the fact that the relative quantity of motion induced with respect to distance will quickly become infinitesimal as distance increases, whereas freefall acceleration of two heterostatic particles towards each other will quickly become extreme in close proximity, indicates that induced quantity of motion is cumulative, and that there is a specific amount of motion induced for every specific distance between two particles.

This means that the effects of homostatic repulsion become negligible at rather short distances between particles, while those of heterostatic attraction will be felt at any distance.

Furthermore, it is particularly rewarding to consider this attractive force as not resulting from a mutual attraction between both half-photons, but as originating from the junction point of the three spaces. So, in the present exposé, when we say that two heterostatic particles attract each other, let us always assume implicitly, that they are attracted by the trispatial junction located on a straight line between them, at a point where they would come together if the attractive interaction successfully forces them.

As we will see further on, it is very interesting also to consider the possibility that homostatic repulsion might be an intrinsic property of quantized energy, which thus would continue to exist even within each half-photon in electrostatic space. It is very interesting to consider that any pair of homostatic half-photons, by definition belonging to different photons approaching each other, may repel each other according to Coulomb’s inverse square law as long as they do not interpenetrate, but would repel or attract each other according to the inverse cube law if they were forced to interpenetrate depending on the mutual direction of their spin alignment. Finally, two photons that would approach each other while their substance is in magnetostatic space would repel or attract each other according to the law of the inverse cube of the distance, if they come close enough to interpenetrate, depending on the direction of their mutual spin alignment.

To facilitate reading, we will name each occurrence of Coulombian attraction between the half-photons, by the simple name of "Maxwell attractor", since it is already provided for in Maxwell's theory when dipoles are considered ([2], p.199).

The Mechanics of the Photon

Let's consider a pair of heterostatic half-photons as they reach the farthest distance that they can reach on either side of their junction in electrostatic space as they fly apart from each other. Given the Coulomb attraction that we assume between them, they will immediately start

accelerating in freefall back towards the junction, according to the inverse square law.

Since freefall acceleration due to such an interaction locally progressively increases the unquantized relative quantity of motion between bodies accelerating towards one another in normal space, and assuming that the same fundamental laws also apply in electrostatic and magnetostatic spaces, it becomes logical to assume that locally unquantized quantity of motion will increase between half-photons accelerating towards each other in electrostatic space also.

In theory, we would intuitively expect that when both half-photons finally come together, they will form a mathematically punctual single quantity possessing an infinite amount of energy, as is assumed from Maxwell's theory and Coulomb interaction in dipoles ([2], p.199).

But referring to verified behavior of photons, we know that any given photon's energy is stable as perceived from normal space, and does not peak to infinity in this fashion. Consequently, if de Broglie's idea matches reality, this means that nature has found a way for this not to happen.

We already know that photonic energy is quantized, that is, that photons come into being as the result of an electron, or a quark Up or Down, emitting it during a process resulting in the particle moving from a precise given energy state to a lower very precise quantum state in atoms.

Although the actual mechanics of such quantic emission is not understood, we know that it is clearly related to Planck's quantum of action.

Consequently, it is not illogical to conclude that the mechanics involved in preventing both half-photons from forming a mathematically punctual single quantity possessing an infinite amount of energy as they meet at the trispatial junction would also be related to Planck's quantum of action.

What can be assumed in our expanded geometry, is that when a given density of energy has locally been reached in vacuum, as both half-photons are crowding in, some threshold is reached that locally forces open a passage through the trispatial junction, which will allow the locally excessive energy to flow into whatever other space will allow it, thus preventing a local buildup of energy to infinity.

Arriving at the ultimate end of their run, with the full relative velocity that the quantity of motion that accumulated between them during acceleration affords them, the substance of both half-photons, each of which can possibly be visualized as a quantity of substance spherically decreasing in density from the center out, will then merge and dive into this kind of aperture opening up between the three spaces, because in electrostatic space, the inertia due to the quantity of relative motion accumulated between them towards one another during acceleration, can conceivably force them to behave like a totally incompressible fluid for which it is easier to flow through the junction than to go on locally piling up in electrostatic space.

Once engaged into the junction, it might be expected that the energy would indiscriminately flow into both normal and magnetostatic space. But since photons already move at the speed of light in normal space and that it has been verified that electromagnetic energy can move at no other speed in vacuum, we emphatically know that none of this energy will flow into normal space, since the slightest such inflow in that space would result in an increase in the speed of the photon. Certainty is thus established that all of the photon's energy will flow into the only other space available to it at that moment, which is magnetostatic space, which happens to locally not be saturated at that precise moment.

Since we know that magnetostatic fields cannot be split into opposite quantities, we can expect that the photon's energy will gather into a single quantity in magnetostatic space. So, irrespective of the fact that both half-photons had opposite directions of motion in electrostatic space, it seems reasonable to expect that the half-photons' energy will fuse together as it flows into magnetostatic space, diffusing omnidirectionally in spherical expansion about the junction point, as if the material was metaphorically attempting to get away from the junction in all possible directions.

Such omnidirectional expansion being perfectly symmetrical by very nature, perfectly balances the also perfectly symmetrical bi-directional resorbtion of the half-photons that are in the process of leaving electrostatic space.

As both half-photons leave electrostatic space, the Maxwell attractor whose intensity had been increasing according to the inverse square law as they were approaching the junction, instead of its strength increasing to infinity when both half-photons reach the junction, will gradually decrease in intensity as the substance of both particles leaves electrostatic space, to finally completely disappear when the particles have completely left that space.

The frequency of a photon depending solely on the amount of energy that it carries, the simple fact that a photon possessing twice the energy of another, requires a distance twice shorter in normal space to complete its cycle, is sufficient in and of itself to demonstrate that the photon's energy locally behaves as a totally incompressible material. It can thus be said that the quantity of energy carried by a photon is inversely proportional to the distance it must travel in the vacuum of normal space for one cycle to be completed.

As for the distance travelled in electrostatic space at right angles with respect to normal space by the half-photons of a photon whose energy is double that of another, it will not be doubled, but will rather be that required for double the quantity of motion to be accumulated between the half-photons as a function of the inverse square of that distance.

One could now wonder what takes place in magnetostatic space once both half-photons have completely left electrostatic space.

We have already reflected on the fact that within electrostatic space, the attraction between both half-photons is of necessity a relative characteristic, the very existence of a Maxwell attractor within the photon being made possible only on account of the simultaneous existence of two individual "quantities" between which it can occur.

Things are different in magnetostatic space. We are locally dealing here with a single entity, so to speak, that we perceive as a magnetic field. To explain the state of equilibrium of the photon, this unique entity must succeed on its own in locally complementing the two entities that are associated by relative Coulombian attraction in electrostatic space.

Since it is unique, and that while it does exist, its electrostatic counterpart has ceased to exist; it is impossible that a relative property could be involved in magnetostatic space in the restricted reference frame of the existence of the photon itself. Consequently, the property that the magnetic aspect of the photon must have in order for equilibrium to be maintained must inevitably be intrinsic, meaning that it has to be a property of the fundamental substance itself.

After much reflection, it appeared to me that the only characteristic that could permit the magnetic quantity to force a return to electrostatic space, would be a property of self-repulsion of the fundamental material proper, a property that is not at all incompatible with the idea that the energy of motion would locally spread in spherical expansion about the trispatial junction within

magnetostatic space as it enters it. That is to say, a property such that the fundamental material, by its very nature, would constantly tend to divide because each of its parts would behave as if it repelled all other parts.

Keeping in mind that to even begin entering magnetostatic space from electrostatic space, the triggering threshold amount of energy that can open a trispatial junction had to locally be reached, we know that the total amount of quantized energy now located in magnetostatic space is at least equal or superior to that threshold amount. So, the photon's energy will now have no other way to go but to force itself back through the obviously still open junction which is by definition located at the geometric center of the local magnetic sphere.

We can thus visualize the sphere decreasing in volume and density in magnetostatic space as two half-quantities begin to move away along the e-y axis in diametrically opposite directions from point zero into electrostatic space, thus maintaining perfect equilibrium.

Having already explored the behavior of half-photons in electrostatic space, it is easy now to understand that a Maxwell attractor will begin to exist as soon as both half-photons engage into that space, and that when both half-quantities will have again reached the farthest point from the junction that their energy allows them to reach, they will once again locally freefall accelerate towards each other, thus initiating the next cycle.

The Equation of the Photon

Let us now examine the equation that allows calculating of the speed of light ([2], p.689).

$$c = \frac{1}{\sqrt{\varepsilon_0 \times \mu_0}} \tag{1}$$

where ε_0 is the electrostatic permittivity constant of vacuum, with an established value of 8.854187817E-12 Farad per meter, and μ_0 is the magnetic permeability constant of vacuum, which is estimated at 1.256637061E-6 Henri per meter.

In our expanded geometry, just as we shifted electric and magnetic properties of photons from normal space to orthogonal spaces of their own, in order for us to mathematically match the mechanics of the pulsating photon with this equation, we must also associate these constants with their respective spaces. But in so doing, we must become aware that they individually will locally cease to be constants, as they will have no choice but to vary inversely with respect to each other, while their product remains constant.

We can now define a new constant that we will name $\varepsilon\mu_0$ and whose value will of course still be the product of ε_0 and μ_0

$$\varepsilon\mu_0 = \varepsilon_0 \text{ x } \mu_0 = 1.11208599\text{E-}17 \tag{2}$$

We now have a single constant value, the square root of the inverse of which still gives us the speed of light in vacuum.

We can now write equation (1) as

$$c = \frac{1}{\sqrt{\varepsilon\mu_0}} \tag{3}$$

But we have an apparent problem with such a reciprocal variation of ε_0 and μ_0, because when one reaches maximum value, which now is 1.11208599E-17, the value of the other apparently tends towards zero, and we can logically expect that when that point is reached, the whole expression will resolve to zero.

To solve this apparent dilemma, it is important to reflect upon what we are describing. Let us consider that a value of zero means that there remains nothing of a quantity of something that exists. But here, we have seen that when the substance of the photon is totally engaged in either electrostatic or magnetostatic space, it completely ceases to exist in the other space, which can also be considered to have locally also ceased to exist since it has momentarily no relative reason to exist. So, the lower limit in this case is not zero quantity of something that exists, but rather nothing of a quantity of something that, momentarily at least, does not exist!

Consequently, when the value of ε_0 in electrostatic space, or μ_0 in magnetostatic space, reaches maximum intensity in objective reality, the other component completely disappears with its own space and must thus also disappear from our equation instead of falling to zero, if we want it to reflect reality. This is what allows us to use $\varepsilon\mu_0$ instead of ε_0 and μ_0 in this equation and still mathematically calculate the speed of light in the vacuum of normal space, within the reference frame of this expanded geometry.

This form of the equation allows us to easily visualize the pulsating motion of the photon as it locally alternates between electrostatic and magnetostatic spaces through orthogonal translation, while streaking through normal space at the speed of light.

Interactions between Photons

Until now, we have observed that the intrinsic motion of photons defines 3 different relative states of the fundamental substance, which are the magnetic state, and 2 opposite electrical states.

The difference between the two electrical states cannot be anything else than the difference in the directions of motion of the half-photons along the e-y axis, because the assumption that quantity of motion suffers no change in nature as it travels between the orthogonal spaces is fundamental to this geometry.

The substance of all photons being the same, and all of them being similarly structured by definition, it seems logical that the phenomena of attraction and repulsion that we have just examined between the various aspects of one photon would also be at play between all photons that are in existence at any given moment.

For the whole duration of the existence of the electrostatic phase of each photon, besides the appearance of a Maxwell attractor between the two electrical components of a photon, it seems logical to expect that a secondary attractor will also appear between each half-photon and every other heterostatic half-photon that happens to exist at the same moment. It can also be expected that when the magnetic spheres come in contact in magnetostatic space, they will repel or attract each other according to the inverse cube law.

The Birth of an Electron and a Positron

Numerous experimentalists, among whom Blackett and Occhialini, Anderson, Irène Curie, Joliot, Chadwick, etc, have experimentally verified that a photon possessing an energy of 1.022

MeV or higher can convert to a pair electron/ positron if it passes close to an atom's nucleus ([3], p.17), a process that was named materialization.

It has also been exhaustively demonstrated that positrons and electrons are totally identical, except for the sign of their charge, both particles having the exact same mass of 9.1093897E-31 kg, or 0.511 MeV/c^2, which is exactly half the energy of the lowest energy photon that can convert to a pair of these particles.

If a photon being converted possesses more the 1.022 MeV threshold, the surplus energy is dequantized as a quantity of relative motion which directly determines the relative speed in opposite directions of both particles in normal space after materialization.

The Mechanics of Conversion

We will now examine how materialization of a pair could be explained in the reference frame of this expanded geometry.

Up to now, in order to understand the mechanics of the pulsating photon, we only needed to become aware of the e-y dimension within electrostatic space, and that this dimension is orthogonal to normal space, even though it belongs to electrostatic space, which is itself orthogonal to normal space.

To understand how the dual-particle photon can convert to a pair of separate particles, we now must also become aware of the e-z dimension, which is at the same time perpendicular to the e-y dimension, and parallel to normal space (z-space) even though it belongs to electrostatic space.

Let us now mentally observe a pulsating 1.022 MeV dual-particle photon. We can visualize how stable it must be, boring at the speed of light through normal space, as it locally alternates in a perfectly stationary manner with respect to its local trispatial junction, between a state of single spherical event in magnetostatic space, and a state of double particles flying in diametrically opposite directions along the e-y axis of electrostatic space.

We can easily visualize that no force other than the internal Maxwell attractor of the photon can locally strongly interact with the half-photons. Considering the speed at which photons circulate, it can easily be understood that homo- and heterostatic interactions between photons whose trajectories could possibly intersect at the speed of light will be too fleeting to really do anything more than possibly mutually affect the orientation of their e-y polarity.

So, in the process of locally distancing themselves from their junction to as far as their energy will allow along the e-y axis, the half-photons usually don’t have any choice but to accelerate back in a straight line towards the junction, to ultimately fuse once again in magnetostatic space.

Let's consider now what could occur if a photon happens to be passing very close to a heavy nucleus at the precise moment when both half-photons have reached the farthest distance possible on either side of their local junction, along the e-y axis.

We know since de Broglie, that all particles are electromagnetic in nature, which includes of course the Up and Down quarks making up atoms' nuclei. This being established, it becomes obvious that the particles making up the nucleus will enter into homo- and heterostatic interaction with the half-photons while they are in their electrostatic phase, and it is just as obvious that these interactions will be intense in relation to the inverse square of the distance between them.

It can thus easily be imagined that any substantial Coulomb interaction which we must assume between our half-photons and the components the nucleus may destabilize the motion of the half-photons, pulling and pushing them in directions that could cause them to miss, so to speak, their usual rendezvous with their local junction.

Now, if they are forced to accelerate diagonally with respect to the straight line that normally allows them to meet at the local junction, the half-photons are unavoidably going to enter into an elliptical orbit within electrostatic space about the junction, on the e-y/e-z plane, that is to say, on a plane oriented towards normal space, while their local attractor retains its intensity, since the half-photons will not set about decreasing in quantity, as they do when they actually cross the junction on their way to magnetostatic space.

It is here that things become interesting, considering that the farthest distance from each other that half-photons reach in electrostatic space is exactly sufficient to allow them to re-accumulate all the energy carried by the photon when they accelerate back towards the junction. But that very precise amount of energy is insufficient however within electrostatic space itself, to provide for the increased energy requirement which would allow the half-photons to actually maintain this forced elliptical orbit about the junction.

We know besides, that during the operation, no additional energy is provided to the photon as it passes close to the heavy nucleus, experimental results showing that after they separate, both particles produced carry only the energy of the initial photon. This indicates that quantization threshold is not reached regarding the Coulomb interaction induced quantity of motion buildup that occurs between the nucleus and the incoming photon, a buildup which is obviously totally expended in a totally elastic collision as the pair of materializing particles rebound from the nucleus. The photon is thus forced to manage on its own, so to speak, to provide for the added energy requirement being felt within electrostatic space for the now forced elliptical orbit to be maintained.

Considering that energy appears to locally behave like an incompressible material when it is in excess or shortage in one of the three spaces, the half-photons will have no other choice but to borrow through orthogonal translation from the only reserve of additional energy at the photon's disposal, that is, the energy that manifests itself under the guise of the speed of light of the photon in normal space, which can only result in a slowing down the group in normal space.

So, after having left their usual straight-line trajectory, as the half-photons arrive on either side of the junction, but without actually meeting it, a shortage of energy will develop which obviously is sufficient to trigger open the junction to let in the energy available in normal space. As the half-photons' orbit becomes rounder in electrostatic space on account of the half-photons' inertia, as they draw on the photon's reserve of energy from normal space, the photon itself will slow down in normal space as its z-space energy is drained into electrostatic space.

Finally, the slowing photon will come to an almost complete standstill in normal space, as its constituting half-photons now streak at the speed of light in electrostatic space in opposite directions on the e-y/e-z plane, on a stable orbit about the junction point, at right angles with respect to the direction that would have permitted them to dive again in magnetostatic space.

Since the pair of particles is known to physically separate in normal space, we could maybe have spoken of the speed of light being the "escape velocity" of the half-photons in electrostatic space.

We can certainly speak of a "decoupling" speed of the pair, so to speak, since if we associate the fixed charges of the particles with their decoupling distance from their common junction, these fixed charges seem to indicate that they remain at a fixed distance from the junction point around which they have established a stable orbit, with each particle now able to move separately in normal space.

The Decoupling of Pairs

Now, what could cause such a decoupling of the particles when they reach the speed of light in electrostatic space?

If we consider that the half-photons are in fact pure energy, which, as it leaves magnetostatic space, where it moved in omnidirectional expansion, acquires, as it penetrates electrostatic space, two diametrically opposed directions, it must be realized that the Maxwell attractor against which the two half-photons now struggle at 90^0, actually succeeds in exactly balancing in the direction of the junction, all of the energy of each of the half-photons.

Referring back to a Newtonian reference frame of gravitation, if we suppose that a hypothetical planet is suddenly placed on an ideally stable and mathematically perfectly circular orbit about the Sun, and that it mathematically possessed the energy to maintain itself on this orbit, it would be difficult to challenge the fact that the inertia of both planet and Sun would momentarily perfectly balance the attraction between the two bodies as a function of the inverse square of the distance between them, in relation with their respective masses.

Now, Newton's first law tells us that «left to themselves, the planets would follow a uniform rectilinear motion»! If we come back to our hypothetical planet, which is momentarily in a perfect state of equilibrium on its perfectly circular orbit, it is difficult not to conclude, that at this precise moment, it would not be in perfect free fall, inertia and attraction being in a state of complete mutual cancellation, and that it will behave precisely as if it was "left to itself", and it consequently seems physically impossible that at this precise moment, the planet will not obey this principle and tend to continue its route in a straight line, thus initiating a tendency for the orbit to become elliptical.

If we now consider the decoupling phenomenon of half-photon pairs as they reach the speed of light in electrostatic space, as they technically reach a perfectly circular freefall orbit on the e-y/e-z plane, contrary to what occurs in the Solar System, where the attractive force of the solar mass does not intrinsically diminish when a planet draws away from it, when both half-photons initiate the unavoidable motion induced by equilibrium towards the exterior, the force of the Maxwell attractor will instantly inherently physically slightly decrease, which will have as an immediate consequence that the inertia of the two half-photons will dominate and will allow them to escape and travel freely.

On account of this, as far as materialization of electron/positron pairs is concerned, stable freefall orbital velocity on the e-y/e-z plane, and escape velocity of the particles, are exactly the same: the speed of light.

Since it is an established fact that all electrons are identical to each other, and that this is also the case for all positrons, and that any electron attracts any positron indifferently and vice versa, we can also conclude that there is a Maxwell attractor between each electron and each positron in the universe.

The fundamental material of the two particles, the mechanics of materialization of which we have just examined in the reference frame of this expanded space geometry, and which now travel separately, can also not be dissociated from each its own internal trispatial junction, because of the fact that a magnetic field of fixed intensity estimated at 1,00116 is associated to all electrons, and that magnetostatic properties belong exclusively to magnetostatic space in this expanded geometry.

What is mass?

Now, why can electrons and positrons appear to us as almost immobile in normal space in some circumstances, since according to the mechanics just explored, they are still going at a speed of light, but in electrostatic space rather than in normal space? Well, very simply because electrostatic space is at right angles with respect to normal space and that the electron behaves with respect to us as if we were following it, going at the same speed, and in the same manner, we perceive positrons as if we were preceding them, going at the same speed.

It is important to understand here that our two half-photons have not changed in nature as they became separate particles. They have simply changed direction in electrostatic space. We are still dealing with the same two half-photons, two quantized half-quantities of motion.

We can now see that «mass» is a relative impression. Consequently, the mass of electrons and positrons, which is estimated at 9.1093897E-31 kg, is nothing more than the inertia of decoupled .511 MeV/c^2 half-photons moving in opposite directions at the speed of light along the e-z axis, on the e-y/e-z plane of electrostatic space, as it can be perceived from orthogonal normal space.

Materialization is Change in Direction

So, in this expanded space geometry, instead of talking of materialization or creation of electron/ positron pairs from photons, we can simply talk of the establishment of .511 MeV/c^2 half-photons on a decoupling orbit at the speed of light in electrostatic space, 1.022 MeV simply being the minimum threshold quantity of energy required for this change in direction to succeed, through orthogonal translation of the photon's speed of light in normal space to electrostatic space, as speed of light in opposite directions transmitted to the half-photons.

Any photon possessing less than that threshold amount of energy will rapidly recover its normal balance between electrostatic space and magnetostatic space, and its normal speed in normal space, even if it was momentarily destabilized as it grazed a heavy nucleus.

It seems, on the other hand, that the decoupling distance for a pair of half-photons is universally reached at the very moment that they reach the speed of light in electrostatic space, because the charge of the electron is the only one known for free elementary particles.

Even Muons, despite being 200 times more massive and energetic than electrons, possess exactly the same charge and the same magnetic field intensity of 1,00116, which is a good indication that these particles were at the same distance from their local trispatial junction as electrons when they originally decoupled. It could very well be that they merely are normal electrons, that would be hyper-accelerated in some fashion, a possibility that remains to be further explored and described.

The same conclusion could possibly be drawn for particle Tau which, with Muons, could

simply be authorized higher energy quantum states that electrons can temporarily have in electrostatic space, on one of the planes that are parallel to normal space.

Dematerialization

Of the various cases of dematerialization, those that result from the decay of positronium into two or three photons are well known and documented. The case that is of particular interest to us here however, and that I found only two references to, ([4], p.79) and ([3], p.34), results in the production of a single photon, and was confirmed by Irène Curie, Frédéric Joliot and J. Thibaud in 1933, a case which has not been referred to in scientific literature since the 1950's.

When an electron and a positron are made to interact close to a heavy nucleus, a process, which is the opposite of materialization is liable to occur. In such cases, the two particles actually succeed in finding their way back to a common trispatial junction, and the resulting single photon recovers its regular locally stationary pulsating motion between y-space and x-space at the speed of light in the vacuum of normal space.

The Birth of a Proton and a Neutron

The symbol universally associated with the electron is e^-, and that of the positron e^+. Also, protons and neutrons are often represented by symbols p^+ and n^0.

Experimental verification has allowed locating by scattering only 3 particles in protons and neutrons, Up quarks having a charge equal to 2/3 of that of a positron, and Down quarks having a charge equal to 1/3 of that of an electron.

For the needs of the present exposé, we will redefine the symbol of the electron as being e^{---}, and that of the positron as e^{+++}. The symbol for the Up quark can now be defined as U^{++}, and that of the Down quark as D^-. This will allow us to more easily visualize the relationship between charges as we examine protons and neutrons.

So, the symbol for the proton thus becomes:

$$p^{+++} = U^{++} + U^{++} + D^-$$

And for the neutron, the symbol becomes:

$$n^0 = U^{++} + D^- + D^-$$

Given that electrons and positrons appear to be the only fundamental particles that can be manufactured from close interaction of single photons with heavy nuclei, the idea came to me that nature may not have had any other material at its disposal to construct protons and neutrons, despite the differences in intensity of the electrical charges of Up quarks versus positrons and Down quarks versus electrons. Let us examine how such a construction could come about in our expanded Maxwellian geometry.

We know from positronium experiments that when a pair of electron/positron is forced into a volume of space of diameter 2.116708996E-10 meter ([5], p.323), with insufficient energy to escape mutual interaction, a metastable system is established, the decay of which eventually results in dematerialization of the pair into 2 or 3 photons, depending on the orientation of the spins of the particles. Such dematerialization is totally coherent with Dirac's theory of complementary particle/antiparticle pairs, and has been extensively confirmed by experiment.

We are faced however, with a very special problem if any one of two possible combinations three particles involving both electrons and positrons are forced into that volume of space. I found only one reference in literature indicating that such combinations have been considered in the past. M. Haïssinsky, then Director of Research at the C.N.R.S. in Paris, reveals in his book «**La chimie nucléaire et ses applications**«, that it had been theoretically demonstrated that combinations of 2 positrons + 1 electron, or alternately 2 electrons + 1 positron show some stability, but that it is much less than that of positronium, and that no experimental verification had been carried out at the date of publication (1957). ([3] , p. 33)

Considering the presence of 2 electrons plus 1 positron, in the restricted volume of space that allows positronium to momentarily stabilize before inevitably decaying, we observe that we have two electrons that homostatically repel each other, while at the same time, both of them are attracted to the same single positron by attractors of equal strength.

Since the particles do not have enough energy to escape from each other in normal space, and are locally captive of equal strength Maxwell attractors, it is physically impossible for their unstable orbit not to eventually decay in electrostatic space, and still more rapidly than in the case of positronium, according to Haïssinsky.

Positronium Decay

Now, how can such decay mechanically occur? Let us consider that in this expanded 3-space geometry, a positronium system could momentarily be established by a pair electron/positron orbiting a common trispatial junction on the e-y/e-z plane only if their speed was slightly less than decoupling speed in electrostatic space, or else instant decoupling would result, as we previously concluded. This means that, for energy to be conserved, the remaining energy has to force both particles to orbit a common center of rotation in normal space at a speed making up the difference, speed equilibrium between normal space and electrostatic space being reached through orthogonal translation.

Let us consider here that the Maxwell attractor of the positronium system will gain strength as a function of the inverse square of the distance between the particles, and that since both particles have less than decoupling energy in electrostatic space, it is only a matter of time before the particles are drawn to progressively accelerate in a decreasing spiral on the e-y/e-z plane as their orbit decays and brings them ever closer to their now common trispatial junction, with the attractor constantly gaining strength in the process on account of the diminishing distance. Eventually, the pair will join at the junction, local opening threshold will be reached, and conversion to 2 or 3 photons will occur.

Triad Decay

But we are faced with a very special problem when 2 electrons and 1 positron are captured in such a common system with less than decoupling energy in electrostatic space. We are dealing here with 3 particles instead of 2 Dirac-complementary particles, none of which can be split, as well as with 2 Maxwell attractors instead of one, which also involves the presence of two trispatial junctions.

As decay proceeds and the particles accelerate, the two electrons will repel each other more and more strongly as the radius of the orbit diminishes in electrostatic space.

The repulsion between the electrons, combined with the orbital speed of the three particles in electrostatic space about the coplanar axis formed by a line passing through the two junction points located in the center of each Maxwell attractor, will gradually force the three particles into an approximately equilateral triangular configuration, which now rotates much faster in electrostatic space, a change in configuration which will of necessity cause the trispatial junctions to gradually drift towards the two electrons.

It has been assumed with the acceptance of special relativity that it is impossible for electrons and positrons to go faster that the speed of light, but in this expanded Maxwellian spatial geometry, it is impossible for electrons and positrons to even exist if they do not move at the speed of light to start with, within electrostatic space. Consequently, it seems very simply impossible for them, in this geometry, not to exceed that speed as they accelerate from it as an initial velocity, on their inwards spiraling trajectories.

This acceleration in electrostatic space induces between each of the three particles a much greater quantity of motion than they can use in that space, in their ever contracting orbit, since it is cumulative. This excess quantity of motion, having no possibility of escaping through the junctions about which the particles rotate, the particles will be forced to begin rotating in a circle in normal space, besides continuing their coplanar rotation in electrostatic space, while accelerating more and more in both spaces as their orbit contracts, under the impulsion of the two attractors that are getting stronger as the distance between the particles diminishes.

Finally, an apparently stable state will be reached; a point at which it becomes impossible for the particles to approach any closer, since it apparently is impossible for the single positron to split in two, which would allow these two parts to dive into the junctions each with one of the two electrons. The triangular formation is now inertially rotating about the coplanar e-x axis while the ring formation rotates inertially about the perpendicular n-z axis, the equilibrium of speeds between normal and electrostatic spaces being maintained here again through orthogonal translation.

It seems obvious to me here that magnetic interaction at such close range between the material of the particles that travels at any given moment to magnetostatic space through the particles internal junctions, will also contribute to the definition of this smallest possible volume of space that can be occupied by the triad.

The diameter of this new dynamic structure is well known. It is that of the neutron, which is approximately 100 000 times smaller than that of the initial metastable orbit of the triad, a new minute and extremely energetic orbit on which the quantity of motion induced by acceleration is exactly balanced in both electrostatic and normal spaces by the inertia of the particles in motion, who constantly tend to continue their motion in a straight line in both spaces, in accordance with Newton's principle of inertia.

Although, if observed from outside their local reference frame, the three particles can be visualized as individually accelerating on inwards spiraling trajectories, as we have just done, it must be considered that in their own reference frame, the three equal particles were simply linearly approaching each other while the intensity of the interactions between them was increasing as a function of the inverse square of the distances between them.

Geometrically speaking, it was the shrinking triangular formation as a whole which was accelerating in its rotation about the coplanar electrostatic axis, at the same time as the shrinking ring shaped formation of the same particles was accelerating in its rotation about the orthogonal

normal space axis. In the final state of the triad, the three particles can be seen as geometrically immobile with respect to one another, in their own reference frame.

As the final state is reached, three extremely energetic photons will be emitted, across the three internal junctions of the particles, because local quantization threshold has been exceeded by far at each intra-particle junction, transporting the excess quantity of motion that the three particles accumulated between them during acceleration.

But, let us remember that when photons pass close to a heavy nucleus, they tend to convert to electron/positron pairs. Given that our three new photons appear in the immediate vicinity of a neutron, which is rather massive, it is not at all unthinkable that they could immediately destabilize and convert to electron/ positron pairs.

Et voilà! A neutron is born, which now possesses 600 times more energy than the three original particles, that is to say 939,56533 MeV/c^2!

But this logic implies that Up and Down quarks would simply be hyper-accelerated positrons and electrons. So, how could this be reconciled with the fact that Up quarks have a charge of only ++, and Down quarks have a charge of only - ?

It must be said here that the charge of particles is probably the deepest enigma of fundamental physics. Despite hundreds of years of experimentation and reflection, we are still down to the level of pure speculation as to its nature.

We only know that the only possible charge for a particle moving freely is that of the electron, or of its converse, that of the positron. As to fractional charges, they are indissociable from quarks and can be observed only within the confines of complex particles made up of quarks.

Despite decades of high-energy bombardment of protons and neutrons, it seems that not a single quark could ever be separated from its brothers to circulate freely to be observed and measured. Or else, maybe they have been separated and isolated to circulate freely, but without being recognized as such!

For example, if quarks Up fundamentally were simple hyper-accelerated positrons, and quarks Down, simple hyper-accelerated electrons, as we hypothesize here, maybe they very simply re-manifest the unitary charge of the electron or positron at the very moment of their liberation from the confines of nucleons, under the guise of electrons, muons, Tau particles, or their antiparticles. This is a point that will be clarified only when the true nature of charge is finally understood.

In this expanded spatial geometry, if we perceive the charges of electron and positron as a measure of the radius of their decoupling orbit in electrostatic space, we can easily understand that as the triad was shrinking, the particles are forced to come closer to the common trispatial junctions in that space, where their electrostatic axis of rotation is located. And this distance obviously decreases while remaining relative to the rotation axis.

In the triad, the Up quark, which is located at the tip of the triangle formed by the 3 particles, is geometrically located twice farther away than the two Down quarks from the electrostatic axis, which gives it a charge/distance of ++ in relation to this axis, whereas the two electrons have a charge/distance relation of -, on the other side of the axis, as they travel in the opposite direction.

It is interesting to note that from the point of view of the Up quark, each Down quark is located at a distance of --- relative to it, that is -- to reach the rotation axis, and an additional - from the axis to any of the Down quarks.

Conversely, if we place ourselves from the point of view of a Down quark in electrostatic space, the Up quark seems to be located at a distance of +++ relative to it, that is, a distance of + to get to the rotation axis, and an additional distance of ++ from the axis to the Up quark.

So, we can still recognize here in some fashion the +++ and --- charges of electrons and positrons, but these charges are now relative to the distances between the particles themselves in the triad.

Furthermore, the 5 MeV/c^2 “mass” currently associated with the Up quark, and the 10 MeV/c^2 associated with the Down quark in the Standard Model, perfectly correlate with the notion that Up quarks would orbit at twice the distance from the electrostatic axis of rotation as do the Down quarks, if we consider that the apparently increased "mass" of Up and Down quarks with respect to that of electrons and positrons could simply be a reflection of the increased energy induced by acceleration of the lighter particles.

Simple logic indicates that quarks Down will be much more energetic than quarks Up in electrostatic space, because the shorter distance between them and the junctions located on the coplanar axis implies that the Maxwell attractors are acting on them with much greater strength than they are on Up quarks, on account of the inverse square rule.

It is particularly interesting on the other hand to note that a ratio of 2 to 1 is also provided by the chiral perturbation theory for the mass of quarks Down with respect to that of quarks Up, and that most of the other estimation methods provide similar ratios favoring quark Down ([8], p.382).

This fact alone lends credit to the hypothesis of a rotation of the triad about a coplanar axis, and by extension, to the possible real existence of the three orthogonal spaces that we have been considering here, because a rotation in circle of the quarks about a perpendicular axis, which is the only possible rotation configuration in normal space, can in no way explain why one of the two types of quarks should be twice more massive than the other, whereas a coplanar rotation, which is the only possible configuration in the electrostatic space that we assume here, explains it quite naturally.

The Internal Structure of the Triad

Let us now get closer, by imagination, to examine our triad in electrostatic space. Let us imagine that we are rotating at the same speed, so that we perceive the triad as being immobile with respect to us. The approximate equilateral triangle that we now consider is made up of one Up quark at the summit, and two Down quarks at the base.

The two intersection points of the three spaces can be found at a third of the distance between the Down quarks and the Up quark, starting from the base, along the sides, which are, let's keep in mind, Maxwell attractors.

The distance between the Up quark and the two Down quarks is maintained by the combined action of the heterostatic attraction between the Up quark and each of the Down quarks, and the inertia caused by the combined rotation speed of the triad in electrostatic space as well as in normal space.

The distance between the two Down quarks at the base is maintained by the combined action of the homostatic repulsion between the two particles, and the angular speed of the triad in

normal space.

If we trace a line between each particle and the center of the opposite side of the equilateral triangle that they form, we observe that the three lines intersect at the geometric center of the triad.

Now that the center of the triad has been located, let's trace a line between the two trispatial junction points located at a third of the distance between the Down quarks and the Up quark, on the sides of the triangle. We will observe that this line, which is the e-x axis about which the triad rotates in electrostatic space, actually intersects the geometric center of the triad.

If we trace another line that intersects the center of the triad, perpendicularly to the surface delimited by the three particles, we obtain the n-z axis of rotation about which the triad inevitably rotates in normal space.

Here, it might be argued that it is impossible for an object to rotate about two different axes at the same time. Let us note however that in this expanded space geometry, both axes about which our triad rotates belong to two different spaces that already are themselves, by definition, at right angles with respect to each other.

When we cause a spinning top to rotate on the floor, we are all familiar with the fact that if we attempt to push it in order to force it to lean on its axis, it will strongly resist, and will tend to continue rotating about its original rotation axis.

The same phenomenon obviously must apply to our triad if we assume inertia to universally apply, but the effect of resistance to displacement will occur in relation to the combined effect of the rotation about both axes. According to my perception, this is what creates the impression of "mass" of protons and neutrons, an impression that is constant no matter in what direction we try to push the triads in normal space.

We have then our triangular formation rotating at an unimaginable speed in electrostatic space about the coplanar e-x axis which passes through the geometric center of the triad and which is parallel to a line that would join both Down quarks. Analyzing this motion, we observe that the Up quark rotates twice as far from the axis as do the Down quarks.

At the same time, the triad is also rotating at the same unimaginable speed in normal space about the n-z axis which passes through the center of the triad, perpendicularly to the surface delimited by the three quarks. We observe here that in normal space, the three quarks orbit about this axis at exactly the same distance, that is, the same distance as the Up quark in electrostatic space, which is double that at which the Down quarks rotate in electrostatic space.

The system seems to be in perfect balance, with both rotation axes intersecting nicely in the center of the triad, and we effectively are dealing here with the densest possible configuration for 3 particles in rotation in two spaces intersecting at right angles.

This perception is deceptive however. The problem relates to the Down quarks, which are individually more energetic than the Up quark because they rotate closer to the electrostatic axis. The simple fact that these two bigger “masses” are orbiting inertially very close to the electrostatic axis, in opposition to the Up quark which rotates twice as far and which can be perceived as being much lighter in electrostatic space, possibly is a destabilizing element in the neutron.

Conversion of a Neutron into a Proton

If we consider that electrons and positrons, even after they have decoupled from their local trispatial junction, let part of their substance, to which a figure of 1.00116 has been associated, pass into magnetostatic space through a junction which obviously must be internal to them, it is not at all illogical to think that the Down quarks, which have stabilized at a distance of only 1/3 of the charge of the electron relative to the electrostatic axis, may let pass into magnetostatic space a quantity of their substance proportionally larger than the free electron, through their internal junction. The same must also be true for the Up quark, which is located at a distance of 2/3 charge from the electrostatic axis.

One thing is certain, the magnetic field associated with isolated neutrons is much more powerful than that generated by a single electron, and of reverse sign. It is not at all illogical to think that the powerful reverse magnetic field naturally produced by the isolated neutron would be of sufficient intensity to also be a destabilizing element.

This obviously is not the case for isolated protons however, since they are known for their total stability. But there nevertheless exists special nuclear configurations which apparently succeed in locally concentrating a sufficiently strong magnetic field on the magnetic side of the axial junctions of one of the protons in the nucleus for it to spontaneously convert to neutron state with emission of a positron, in a process that would be the reverse of the one that we will now examine for the neutron. I am thinking here for example about the β^+ decay of 7-N-13 into stable 6-C-13.

Considering that magnetostatic fields produced by magnets are caused by the fusion of the individual fields of forced parallelly spin aligned electrons in the material of magnets into a single larger field, and the non-differentiated nature of the magnetic material, it seems quite likely that the magnetic fields associated with the Up quark and the two Down quarks of a neutron could fuse in a similar manner in magnetostatic space on account of proximity, after having entered it through their respective internal junctions.

According to all probabilities, we should find on the magnetostatic side of both trispatial intersections located on the electrostatic axis, a combined quantity of fundamental material possibly close to the threshold quantity required to open a passage through one of these junctions.

For reasons that remain to be determined, and through a mechanics that remains to be minutely explored, in an average time of approximately 16.88 minutes, something extraordinary occurs in isolated neutrons. Part of this magnetic substance shared in common, seems to successfully return to electrostatic space through one of the junctions located on the electrostatic axis, which allows it to interact with the closest Down quark as if they were the two halves of the same complete photon.

It goes without saying, in my view, considering that the energy of the Down quark involved is much higher than 1.022 MeV, that this newly returned quantity of substance will instantly behave as an electron/positron pair with the Down quark, on account of the strongly destabilizing influence of the two other elements of the triad, which are rapidly moving in close proximity.

The newly returned quantity will logically become the positron of the newly formed pair and will naturally enter into rotation close to the Up quark of the triad, at a distance which will be determined by the combined action of the homostatic repulsion between itself and the previously existing Up quark and the resulting inertia of the rotation speed of the triad in normal space.

The involved Down quark, which now possesses very little energy, most of it having been transferred to the positron which is stabilizing as a new Up quark, will be ejected as a free electron in a direction which is in relation with the orientation of the rotation of the neutron. And we now have a proton, possessing slightly less energy than the original neutron, with a measurable mass of 938,271998 MeV/c^2.

This possible mechanics of β-decay of neutrons, with production of a proton and an electron, does not require that the existence of hypothetical neutrinos be invoked to explain the apparent «disappearance» of part of the original neutron's energy. We will cover this point further on, when we discuss the e-x dimension.

If we compare this new configuration with the mental image that we previously built of the neutron, we can see that we are also dealing here with an approximately equilateral triangle, but instead of appearing to us with its tip upwards, this one appears to us with its tip pointing downwards, if we continue to visualize the electrostatic axis as being horizontal.

The remaining Down quark from our original neutron is now by itself under the electrostatic axis. In addition to the Maxwell attractor that previously connected it to the original Up quark of the neutron, a new equal strength attractor has appeared, as the new positron appeared, which now connects the Down quark to the new Up quark.

In this new configuration, the trispatial junctions are still to be found at the same level as in the neutron, as witnessed by the charges associated with the quarks, that is, at one third of the distance between the Down quark and the two Up quarks, starting from the Down quark.

Let us back up a little to examine the motion of our new triad in electrostatic space. We still have our inertial rotation speed, now barely reduced, of the triad about the electrostatic axis. We can observe that the two Up quarks rotate twice further away from the axis as does the single Down quark. We can well imagine that such a configuration is very stable since we now have two inertial masses rotating far from the axis, in relation to a single equivalent mass rotating close to the axis.

We can also observe that at the same time, the triad rotates at the same unimaginable speed in normal space about the normal space axis, which still intersects the center of the triad, perpendicularly to the surface delimited by the three quarks. We can observe here that in normal space, they rotate about their axis at exactly the same distance as the two Up quarks in electrostatic space, just as they did in the neutrons. The impression of perfect balance is now well founded and is even confirmed by reality, since protons are considered to be eternal if no external event destructive of their structure occurs.

We have seen that in the neutron, both rotation axes intersect at the geometric center of the triad. Well, our proton has a big surprise in store for us, because the geometric center of rotation of the triad in normal space does not intersect the electrostatic axis anymore. The n-z rotation axis of normal space has now drifted upwards to a new location half way between the e-x electrostatic axis and a line that would link the two Up quarks!

What are the consequences of the fact that these two axes do not intersect each other anymore at the geometric center of the triad? Well, this remains to be clarified.

We have just explored the structure of a proton produced by this hypothetical mechanics of β-decay in a neutron, but it goes without saying that in this expanded geometry of space, a proton could as easily have been directly manufactured from two positrons plus one electron.

Consequently, it can be posed that in this expanded geometry of space, when triads of a mix of electrons and positrons are forced into a volume of space of diameter $2.116708996 \times 10^{-10}$ meter or less, with insufficient energy to escape mutual Coulomb interaction, we can logically expect the following outcome:

$$2e^+ + e^- \Rightarrow p + 3e^- + 3e^+ \quad (4)$$

and

$$2e^- + e^+ \Rightarrow n + 3e^- + 3e^+ \Rightarrow p + 4e^- + 3e^+ \quad (5)$$

Experimental Verification

It will be argued that if it were so easy to create protons and neutrons merely by forcing electrons and positrons close to one another, the phenomenon would have frequently been observed in reality.

Indeed, for the past 50 years, physicists have been bombarding and colliding particles in a score of ever more powerful particle accelerators. It seems quite improbable that even accidentally, the right combination of circumstances would not have occurred, even considering the very small cross-section involved. My view on this is that it has occurred numerous times, but without being recognized for what it was.

It was confirmed to me on **sci.physics**, a Usenet discussion forum, that a similar phenomenon is regularly observed in accelerators when two electrons are collided head-on with sufficient energy:

$$2e^- + \text{Quantity of Motion} \Rightarrow p + 4e^- + 2e^+ + \text{various mesons} + \text{other particles} \quad (6)$$

Given the homostatic repulsion between electrons, it obviously is necessary to strongly accelerate them in opposite directions for precise head-on collisions to occur.

Indeed, remaining coherent with our exploration, it is not at all impossible that "inside" an electron, which is, let's not forget, a half-photon, the energy could behave as repelling omnidirectionally from a central point, where the internal trispatial junction of that electron would be located.

When such a precise head on collision occurs, intense slowing down of the particles necessarily takes place on the final leg of their intersecting trajectories, which is bound to cause the quantization threshold to be exceeded, provided that sufficient energy was communicated to the electrons to start with. If quantization threshold is not locally reached, either because the energy is insufficient or because the trajectories cause the electrons not to collide with perfect alignment, they will simply rebound off each other in a perfectly elastic collision.

If quantization threshold is reached however, two bremsstrahlung photons will be created which will cause both electrons to become relatively immobile in space with respect to one another at a point in the slowing down process, where they interpenetrate almost completely.

Since the total amount of energy that will be carried away by these photons will exactly match the energy that had to be imparted to the electrons to successfully force them into head-on collision, these photons will obviously be way more energetic than the 1.022 MeV threshold.

It can thus be expected that local circumstances may be reunited for the Maxwell attractors that will locally enter into play, to be sufficiently powerful between the two very closely packed

electrons and the heterostatic half-photons of at least one of the photons that just appeared, to force the production of a new pair of electron/positron.

Moreover, given the hellish quantity of energy that will be localized at this point in space, it is not improbable that a neutron being produced would immediately destabilize and convert to a proton.

Presently, we could possibly dissect the transformation in the following manner:

$$2e^- + \text{Quantity of Motion} \Rightarrow 2e^- + 2\,\gamma \Rightarrow \quad (7)$$

$$(2e^- + e^+) + e^- + 1\,\gamma \Rightarrow \quad (8)$$

$$(n + 3\,\gamma) + e^- + 1\,\gamma \Rightarrow \quad (9)$$

$$(n + 3e^- + 3e^+) + e^- + 1\,\gamma \Rightarrow \quad (10)$$

$$(p + 4e^- + 3e^+) + e^- + 1\,\gamma \Rightarrow \quad (11)$$

$$p + 4e^- + 2e^+ + (e^+ + e^-) + 1\,\gamma \Rightarrow \quad (12)$$

$$p + 4e^- + 2e^+ + 2\,\gamma \Rightarrow \quad (13)$$

$$p + 4e^- + 2e^+ + \text{various mesons} + \text{other particles}, \quad (14)$$

which is exactly what has apparently been observed.

Moreover, following the same logic, we could possibly extrapolate what would occur if two positrons were collided in the same manner in a high energy accelerator; an experiment that should be relatively easy to set up, and that would confirm the reality of this mechanics of conversion:

$$2e^+ + \text{Quantity of Motion} \Rightarrow 2e^+ + 2\,\gamma \Rightarrow \quad (15)$$

$$(2e^+ + e^-) + e^+ + 1\,\gamma \Rightarrow \quad (16)$$

$$(p + 3\,\gamma) + e^+ + 1\,\gamma \Rightarrow \quad (17)$$

$$(p + 3e^- + 3e^+) + e^+ + 1\,\gamma \Rightarrow \quad (18)$$

$$p + 2e^- + 3e^+ + (e^- + e^+) + 1\,\gamma \Rightarrow \quad (19)$$

$$p + 2e^- + 3e^+ + 2\,\gamma \Rightarrow \quad (20)$$

$$p + 2e^- + 3e^+ + \text{various mesons} + \text{other particles}. \quad (21)$$

Direction of Motion versus Detectability

We have observed that energy whose motion is directed along the e-y axis, along which the half-photons of non-decoupled photons normally pulse, cannot be directly measured. It is not illogical to think that this could be due to the very fact that this energy is moving in directions which are perpendicular to normal space.

In reality, we can measure the energy of a photon only after this energy has been communicated to another particle in the form of a relative quantity of motion dequantized into normal space.

The difference between the relative quantity of motion that can be associated to this particle

before and after the collision, constitutes the only measure available to us of the quantity of energy that the photon possessed, if it did not elastically rebound on the particle (Compton or Raman effects).

At the other extreme, energy whose motion is directed along axis e-z, which is parallel to normal space by definition, despite the fact that it resides within electrostatic space, and along which the .511 MeV/c^2 half-photons which enter into decoupling orbits mandatorily circulate, can also be directly measured. We perceive it as a resistance to motion in normal space of the decoupled half-photons, that is to say, as a «mass», which can henceforth be associated to the half-photons, which relates to the notion of inertia of Newton's Principle of Inertia.

We have also observed that energy which circulates on a plane of electrostatic space that would be parallel to normal space, such as plane e-y/e-z, which allows rotation about axis e-x, and which is the plane on which the quarks of protons and neutrons circulate, also allows direct measurement of the energy as a measurable mass of the particles.

Consequently, it could be assumed that any energy circulating on any other plane parallel to normal space within electrostatic space, should also allow direct measurement of that energy as measurable mass of the particles. It would thus be very interesting in this context to study and comprehend the behavior of Muons and Tau particles in this expanded geometry.

By extension, it can also be concluded that that any energy circulating on a plane which is not parallel to normal space should allow to a lesser degree a direct measurement of that energy, with as a limit case, plane e-x/e-y, which is perpendicular to normal space and which should allow no direct measurement whatsoever of quantities of energy directed along that plane, just like that directed along axis e-y itself.

We have also seen as we were examining the decoupling mechanics of a 1.022 MeV photon, that a quantity of motion can be exchanged without loss through orthogonal translation between normal space and electrostatic space and that the possibility of such a transfer without loss could very well also explain why electrons which are forced into relative immobility in normal space when they are forced into covalent molecular bounding, appear to conserve the same energy as when they are not involved in such a bound; the energy of motion that they display as they circulate on their orbital in normal space before bounding being transferred without loss to electrostatic space, through orthogonal translation at the moment of bounding, on a plane which can logically be expected to be parallel to normal space.

Occurring on a plane parallel to normal space, just like plane e-y/e-z which allows direct measurement of particles' inertia, it is not illogical to think that the transfer of the electron's energy of motion to such a plane could explain why that energy would still be directly measurable despite the fact that the electron may seem immobile on its orbit in normal space.

The Energy Associated With Neutrinos

Conversely, it is also not illogical to think that we may not be able to directly measure a quantity of motion that an electron could possess if it was directed along plane e-x/e-y of electrostatic space for example, for the same reason.

It is then not illogical to think that when an electron is ejected from a neutron as it spontaneously converts to a proton during β-decay, the quantity of energy that seems to disappear at the time of conversion could very simply have been transferred to the electron on that e-x/e-y

plane of electrostatic space.

If a method could be found to verify this, it would no longer be necessary to resort to the idea of neutrinos to explain the "disappearance" of energy when triads change state, because this apparent disappearance of energy would simply turn out to be a change of direction which makes it undetectable directly. The fact that Muons are always present in reactor neutrino experiments should be a definite telltale of this possibility.

Gravity

Let us now visualize a Hydrogen atom with its hyper-dense proton at the center and solitary electron orbiting very far from the nucleus.

In light of our exploration, we can now see that we are considering a perfectly balanced structure, that can be considered as having been constructed by nature from 2 electrons and 2 positrons, which can themselves be considered as having been constructed from two 1.022 MeV photons.

The proton can be seen as having been constructed from 2 positrons plus one of the electrons, whose total initial energy of 1.533 MeV was increased by acceleration to eventually stabilize at 938.271998 MeV. If we add the 0.511 MeV energy of the remaining electron, we observe that with an initial energy of 2.044 MeV, plus acceleration induced quantity of motion in three of the four particles, we can literally manufacture an atom possessing 460 times more energy than we had initially.

We have a clear understanding now of what holds quarks together in protons and neutrons in this expanded space geometry: two Maxwell attractors maintaining three 0.511 MeV/c^2 half-photons, the combined speed of which in normal space and electrostatic space, about two perpendicular axes, is required to exactly balance the inertia of the particles against the strength of the fundamental Maxwell attractors.

Let’s now consider what holds the electron on its orbital about the proton; very simply two more Maxwell attractors!

Let's consider that each existing electron is inevitably associated to all existing positrons in the universe, merely on the basis of Coulomb interaction, by as many Maxwell attractors as there are positrons, as weak as these links may be, and as far as these particles may be from one another in normal space, and that when two particles thus associated approach one another, the intensity of the common attractor very simply increases in accordance with Coulomb’s Law.

We are not very far here from the principle that Newton formulated, according to which all particles in the Universe act on all other particles with a force of attraction directly proportional to the product of their respective masses and inversely proportional to the square of the distance that separates them.

In fact, his formulation would coincide much more exactly with the now understood structure of atoms and nucleons if we added the notion of heterostatic and homostatic states to qualify interactions between particles:

> "*Each particle in the Universe interacts with all heterostatic particles with an intensity of attraction, and with all homostatic particles with an intensity of repulsion, inversely proportional to the square of the distance that separates*

them, and directly proportional to the product of their respective masses."

Consequently, an attractor exists between our orbiting electron and each of the Up quarks of the proton. The combined speed of the electron in normal and electrostatic spaces about the proton that is required to exactly balance the inertia of the proton and the electron against the strength of the two attractors is determined by the inertia of the 0.511 MeV/c^2 «mass» of the electron, which is also the initial "mass" of each of the quarks making up the proton.

This behavior is born out by experiments done by Niels Bohr in the 1930's, as he was studying how to calculate Rydberg's constant from his theory, and was verifying the exactness of his calculations by comparing the spectral lines produced by Hydrogen atoms with those produced by ionized Helium atoms. His observation that Rydberg's constant didn't have exactly the same value for the specter of Hydrogen and that of ionized Helium gave him the idea that the difference could come from an oscillatory motion of the nucleus about a common center of rotation that it would share with the orbiting electron.

By adding a corrective term 4 times larger for Hydrogen than for Helium, he succeeded in proving that the difference observed for Rydberg's constant in both cases was due to such an oscillatory motion ([1], p.137).

Four Types of Permanent Attractors

Let us now examine a Deuterium atom. We have here, in the nucleus, a proton and a neutron about which a single electron is orbiting. We can observe that 5 additional attractors are required to connect the proton and the neutron.

Considering that the two triads of the nucleus are very close to one another, it is logical to think that these 5 new attractors will be much more powerful than those that hold the electron on its distant orbital and much less powerful than those that hold the quarks together in the internal confines of each triads.

Let us now classify the attractors according to their intensities, which are relative to the distances at which they usually act.

Table I - Table of local attractors

Range	Name
Between half-photons inside a photon	Temporary Local Attractor
Between heterostatic quarks inside a proton or neutron	Primary Attractor
Between heterostatic quarks belonging to different protons and neutrons in a nucleus	Secondary Attractor
Between an electron orbiting a nucleus and each of the Up quarks of the nucleus	Tertiary Attractor

Within a Deuterium nucleus, we know that the 5 secondary attractors that must exist between the proton and neutron are sufficiently powerful to maintain both triads together in a permanent and stable manner, as confirmed by the fact that Deuterium is stable, just like normal Hydrogen.

Let us keep in mind, as we attempt to visualize the manner in which the 5 secondary attractors are acting, that each triad is individually and permanently animated by the dizzying rotating motion that we have examined, in both electrostatic and normal spaces.

Even if secondary attractors are much less powerful than primary attractors, it is not logically possible that they would not force each triad to slightly enlarge its rotation orbit. Given the inverse square law, it is in fact impossible that the motion of the individual component quarks of each triad would not be slightly slowed down in proportion. If there is a slowing down, there inevitably will be a decrease in inertia for the whole rotating structure, and consequently, a decrease in the measurable "mass" of the nucleus.

And this could explain, in this expanded geometry, why the Deuterium nucleus is slightly less massive than the sum of the masses of a proton and a neutron when measured separately. Let us say also that this phenomenon can also explain why all nuclei are less massive than the sum of the masses of the individual protons and neutrons that make them up.

Whereas our Hydrogen atom presented us with only 2 primary attractors and two tertiary attractors, our Deuterium atom is already much more complex. It offers us 4 primary attractors, whose action is slightly weakened by the action of the secondary attractors; 5 secondary attractors that maintain both triads together, and 3 tertiary attractors that now maintain the electron on its orbital.

It has been experimentally verified that the diameter of the orbital of the electron is slightly smaller for Deuterium atoms than for Hydrogen atoms, which is explained in this expanded geometry by the fact that the electron is more strongly attracted towards the nucleus by 3 tertiary attractors than by 2.

We now have considered every type of attractor involved within the confines of photons and atoms in our expanded geometry of space.

Let us examine what other types of Maxwell attractors could possibly exist.

Table II – Table of Far Attractors

Range	Name
Between any half-photon and each of the other heterostatic particles of the Universe	Temporary Far Attractor
Between each particle of an atom and each heterostatic particle in the rest of the Universe	Quaternary Attractor

In this expanded geometry of space, temporary far attractors are those responsible for the deflection of photons' trajectories when they pass close to any concentration of matter.

Each temporary far attractor exists only for the period of time that each half-photon actually exists in electrostatic space. It disappears, by definition, at the same time as the temporary local attractor, when each pair of half-photons has completely crossed its local junction to locally join in magnetostatic space.

Each temporary far attractor reappears at the same time as the temporary local attractor, when each pair of half-photons resumes reentering electrostatic space through their local junction.

One must also be aware that temporary far attractors also appear between each half-photon, for the duration of its presence in electrostatic space, and all other heterostatic half-photons for the duration of their own presence.

Despite their temporary nature, the temporary far attractors are particularly important, because it is their action between the half-photons of photons of 1.022 MeV or more, and the heterostatic quarks of heavy nuclei that they might graze, that succeed in destabilizing them, which results in the appearance of electron/positron pairs.

It has even been experimentally verified in 1997 by a team led by Kirk McDonald, at the Stanford Linear Accelerator (SLAC) that it is possible to produce electron/positron pairs by simply converging towards a single point in space sufficiently concentrated streams of sufficiently energetic photons, which means that photons can succeed in mutually destabilizing each other under the action of the temporary far attractors, when they are forced close enough to each other.

So, it appears possible, and even more than probable, that the first electrons and positrons that appeared at the beginning of the universe could have been produced from simple photons interacting with each other, which then allowed the production of the first protons and neutrons from these first electrons and positrons, according to the logic that we have examined here, leading to the evolution of the universe towards the state that we know today.

Theoretically, this means that to trigger the birth of the universe, the only requirement may have been the prior existence of only 2 sufficiently energetic photons which, their trajectories intersecting in an optimal manner, could have produced the first 2 pairs of electron/positron. The first two positrons thus produced could then, by interacting with one of the electrons, have produced the first proton, which would have triggered the appearance of 3 new electron/positron pairs on top of producing the first Hydrogen atom. The new particles could then have continued to combine very naturally over time in a quasi-exponential and completely unstoppable process, during which innumerable pairs of particles would eventually have been created.

The only remaining enigma would then be the actual origin of these 2 hypothetical primordial photons. How could these first 2 photons, which would mandatorily have been quantized quantities of motion, appear before the appearance of atoms, which support the only known quantization process?

Something is obviously missing even in this more elaborate scheme of things to answer such a question; possibly a few more dimensions yet, who knows!

Quaternary Attractors

Let us now examine quaternary attractors, which are responsible for gravitation in this expanded geometry of space.

All atoms or particles that are not at rest with respect to other atoms are inevitably in free fall, and are subjected to an acceleration due to the combined action of all quaternary attractors that connect the particles which compose these atoms to all other heterostatic particles in the universe.

Over the course of the billions of years that went by since the beginning of times, atoms have

collided and some ended up remaining captive of each other, because the intensity of the quaternary attractors that associated them over short distances eventually prevented them from escaping to continue on free falling individually.

Each such accumulation of atoms thus formed is also free falling with respect to all particles with which it is not in immediate contact, and is subject to the acceleration induced by the whole collection of quaternary attractors that connect each of the particles that make it up, to all other heterostatic particles in the rest of the universe.

Planetary systems and galaxies eventually formed, but contrary to atoms, which can lose excess quantities of motion through photon emission when the relative quantization threshold is locally reached, there seems to exist no such mechanism to allow heavenly bodies to evacuate excess quantity of motion when such an excess develops between them as a result of the acceleration that brought about the establishment of systems of orbiting heavenly bodies.

This fact alone could possibly explain why the Solar System has been stable for so many billions of years, and possibly also support the idea that the whole universe may also be stable.

Inside Planetary Masses

We have seen already that when a neutron joins a proton to form a Deuterium nucleus, the intensity of the secondary attractors is sufficient to force each triad to slightly enlarge its rotation orbit, and that it is consequently impossible for the rotation speed of each of them not to be slightly diminished in proportion, which can only result in a slightly diminished measurable mass of the nucleus with respect to the sum of the measurable masses of its two components, when taken separately.

It is then just as impossible, for the same reason, that the action of all quaternary attractors that are in action at short range between atoms that make up a celestial body, not to produce a similar effect on all of the triads of all the atoms of which this body is made up.

One must be aware here, that even though all atoms are in immediate contact with each other inside planetary masses, they are still being subjected to the acceleration resulting from the action of the whole collection of Maxwell attractors acting on each of their constituting particles, and that the quantity of motion which is induced between the atoms can no longer express itself as relative motion either in electrostatic or normal space in the direction indicated to them by the resultant of the whole collection of attractors acting on each of them. This quantity of motion is unable to express itself otherwise than as a "pressure" of each atom against its neighbors, in the direction indicated by the collection of attractors acting on it.

In the very center of the Earth, for example, given the incompressible nature of relative quantities of motion, that we have become aware of in this exposé, it is quite certain that this pressure will be sufficient to force the electrons of the outermost layers of atoms to tighten their orbit and circulate at shorter distances from their respective nuclei, at which the quantity of motion induced by acceleration on these tighter orbits will be greater than what electrons could sustain at these same distances from the nuclei if these atoms were isolated in deep space far from concentrations of matter.

The result can only be in my view, an eventual repetitive release of energy, in the central area of planets that are sufficiently massive to force the threshold quantization level to be reached at the internal trispatial junction of electrons located on those forcibly compressed outer electronic

layers.

There is absolutely no doubt in my mind that it is this kind of pressure-induced energy that keeps the interior of planets hot as a function of the sizes of planetary masses.

The Birth of a Photon

Now the question is how does each electron get rid of this incompressible energy in excess?

Well, by emitting a photon each time that it is forced to do so. When a photon of appropriate frequency collides with the electron of a Hydrogen atom, it is rarely energetic enough to force the electron to completely escape from the atom. In general, the electron is simply forced to move farther away from the nucleus, on account of the increase in quantity of motion between itself and the nucleus.

But, since only one orbital is totally stable in Hydrogen atoms, that is, that on which the quantity of motion induced in the direction of the nucleus by the 2 tertiary attractors is exactly balanced by the inertia of the electron, the latter will tend to return onto this least action orbital, so to speak, because on its new more distant orbital, the quantity of motion normally induced is insufficient to maintain such a small mass in orbit in a stable manner, which causes the quantization threshold to be locally immediately exceeded. The orbit of the electron will consequently degrade.

Let us consider that electrostatic space offers no way out in this particular case on account of the simple fact that the electron is already traveling at the speed of light on the decoupling e-y/e-z plane, and that the orbit of the electron in the Hydrogen atom, both on the e-x/e-z plane of electrostatic space, and in normal space, is precisely the one which is saturated. These speeds appear as insurmountable as the speed of light in normal space for a photon. Consequently, in this particular case, magnetostatic space offers the only possible way out, when quantization threshold is locally exceeded.

As the excess quantity of motion progressively penetrates magnetostatic space through the internal junction of the electron, an extraordinary event will occur as soon as relative quantization threshold will be reached within magnetostatic space. A new junction will open in the center of the new quantity, through which the quantity of motion already transferred to magnetostatic space will surge into electrostatic space in opposite directions along the e-y axis, as previously discussed.

We have a peculiar situation here however, since the photon being born is still connected to the electron, which is in the process of returning to its least action orbital as it keeps injecting excess quantity of motion into magnetostatic space. This quantity of motion will then go on surging behind the two half-photons that are now dashing in opposite directions in electrostatic space, through the new internal junction of the emerging photon. This process will continue on non-stop until the electron reaches its least action orbit.

At the end of the process, the totality of the excess quantity of motion will have been transferred to magnetostatic space through the internal junction of the electron, to immediately rush into electrostatic space through the junction of the emerging photon. And bingo! The transfer is complete and the "umbilical cord" is automatically severed. A new photon is born.

Let us consider that before the photon separated, the electron was traveling at the speed of

light on the e-y/e-z plane in electrostatic space on its decoupling orbit.

In this expanded space geometry, as the two new half-photons start moving back towards one another, as the new photon begins pulsating, the speed of its substance in electrostatic space on the e-y/e-z plane, which is that of the electron to which it was previously attached, will instantly be transferred through orthogonal translation to its motion in normal space, where it will now move at the speed of light, becoming stationary in its pulsating motion between electrostatic and magnetostatic spaces, in the now familiar configuration, bringing with it the total excess quantity of motion that the electron was forced to get rid of, under the guise of an appropriate pulsation frequency.

In this expanded geometry, all photons could be seen as being born in this manner, including those emitted by quarks in triads when they must get rid of surplus quantities of motion and those that are emitted by electrons of the outer layers of atoms, which are forced by pressure to circulate closer to nuclei than their least action orbital allow at the center of concentrations of matter.

The Death of a Photon

Let's now examine what occurs when a photon collides with an electron. Considering the pulsating motion that perpetually animates photons, and the extreme relative velocities at which they collide with electrons which happen to be in its path, it is quite easy to understand that such encounters are liable to occur at any stage of the pulsating photon's cycle.

So, not every collision will possibly result in total or even partial absorption of a photon's energy by an electron, since the state of the photon at the precise moment of collision can possibly result in the whole gamut of possible cases, from total absorption to total repulsion, in which case, the electron and photon will behave as two particles entering into perfectly elastic collision, as in Compton or Raman effects.

The type of collision that is of interest to us here, is the one that occurs while both half-photons of the incoming photon are in the process of reentering magnetostatic space through their internal junction. Let's remember that electrons seem to maintain part of their substance into magnetostatic space at all times while that substance seems to constantly partially pulsate between electrostatic and magnetostatic spaces through their own internal junctions, a regular motion that could possibly be associated to spin.

Spin, in fact, despite the general impression that it actually is a rotating motion of the particle about a central axis ([3], p.32), might simply turn out to be such a partial pulsating motion of the material of the particle, a cyclic motion that could easily have been misinterpreted as being a rotation.

Despite the obvious homostatic repulsion which is liable to occur between the substance of the electron which is in magnetostatic space and that of the incoming photon which is already in that space as the collision occurs, it is certain, if this expanded geometry matches reality, that the pressure caused by the force of the collision can succeed in countering this repulsion, or else, no photon could be absorbed in objective reality.

Let’s assume that a photon and an electron located on the outer layer of an atom are in the process of colliding in this manner. It seems quite logical here again that a relative quantization threshold will be reached at the electron's internal junction from the magnetostatic side of the

junction, even before all of the photon's substance has penetrated magnetostatic space.

Here again, the quantity of motion can be expected to behave locally as a totally incompressible material. The inertia of the motion of the two half-photons towards the junction within electrostatic space momentarily interdicting escape of the energy in that direction, so to speak, their substance will have no choice but to surge as dequantized quantity of motion into normal space through the internal junction that the photon momentarily shares with the electron.

Now, why in normal space rather than in electrostatic space through the internal junction of the electron? Very simply because the electron is already going at its maximum decoupling speed in this space on the e-y/e-z plane, which is the speed of light.

The transfer being engaged, it will be maintained by the inertia of the energy, which will continue surging in through the internal junction of the photon, arriving from electrostatic space. The transfer will continue on as long as all of the photon's energy has not completely transferred to normal space as additional unquantized relative quantity of motion between the electron and the nucleus.

Our photon has now disappeared, and our electron now shares with its nucleus this new quantity of motion on top of that which existed before the collision. This added quantity of motion is expressed as a change in the relation that the electron has with the other particles with respect to which it was previously in relative motion.

The Slowing down of Atomic Clocks

On their part, the triads that are to be found at the center of atoms located in the depths of heavenly bodies are much too far inside the atoms' electronic layers to feel the pressure from surrounding atoms that forces a mutual reduction of the diameter of the outer electronic shells. The full force of the surrounding quaternary attractors is in action here, and the closer the triads will be to the geometric center of a heavenly body, the more their diameter will be forced to increase under the combined action of the quaternary attractors that link their components to all other heterostatic particles making up the other atoms in the body, and the more their energy, that is their measurable masses, will consequently decrease.

Even the triads of nuclei of atoms located at the surface of the Earth, for example, are sufficiently slowed down by this process for the difference to be measurable in comparison to atoms of the same elements located far above the surface. It has been experimentally verified that cesium atoms emit higher frequency photons when located high above the surface than when they rest at the surface of the Earth.

This is exactly what was demonstrated with the experiments that were carried out with identical cesium clocks on the ground and at altitudes of 10,000 meters, experiments that were meant to demonstrate that time runs more slowly at the surface of the Earth than at a distance from it, because denser triads will naturally emit higher frequency photons than less dense triads when quantization of excess energy occurs.

In fact, protons and neutrons can reach their maximum «mass», that is, their smallest rotation diameter, only when they are deep in space, far from any planetary masses. It seems to me that it is exactly what was demonstrated by the supposedly "anomalous" and still unexplained constant residual acceleration directed towards the Sun of the far spacecrafts on escape trajectories from the Solar System Pioneer 10/11, Galileo and Ulysses ([7], p.1).

All of these spacecrafts behave presently exactly as if they were slightly more massive than can be measured at the surface of the Earth, which conforms to the analysis that we have just conducted.

But up to now, all computations have been made using the masses of the spacecrafts as measured before launch at Earth-ground level, because one of the fundamental premises of contemporary physics is that the mass of bodies is universally invariant, an assumption that our analysis reveals as being a physical impossibility.

So, an appropriate correction taking into account the individual increase in mass of all constituent atoms of the spacecrafts on account of their being located in space far from large planetary masses should therefore nicely iron out the problem.

Given that triads literally swell, when the atoms, the nuclei of which they constitute, agglutinate to form celestial bodies, it can also be extrapolated that there may be a limit to the increase in mass of celestial bodies, and that bodies may become so massive that the quarks making up the protons and neutrons of the nuclei located at the center of these masses may be forced to circulate too far from each other for the integrity of the triads to be maintained. It doesn't seem illogical then that when triads located in the center of such hypermasses destabilize, the half-photons could be released to possibly recombine into very energetic photons that will escape towards outer space in infernal surges of energy.

Doesn't there exist in the universe strange celestial bodies projecting intense energy streams from their poles, and that may have mistakenly been associated with the concept of black holes?

The Orbit of Mercury

Let us now consider the case of Mercury's orbit. Given its proximity to the Sun, it is more than likely that the combined actions of the quaternary attractors connecting every particles of Mercury to all heterostatic particles in the Sun, and which are spread out over surfaces facing each other, could result in an additional increase in size of the triads of Mercury's atoms which would render that planet measurably less massive than has been estimated to this date, and it is not impossible that if account was taken of such an effect, this could possibly explain why calculation of Mercury's orbit according to Newton's theory does not match reality, since this theory does not take such an effect into account.

According to Newton’s mechanics, what is perceived as the attraction of celestial bodies for each other, is the sum of the individual attractions between each individual particle making up one celestial body and each individual particle making up all other celestial bodies, according to straight lines between each particle of a body and each particle of all other bodies ([1], p.29).

When celestial bodies are far enough away from each other, the bundle of straight lines connecting the particles making up one of them to the particles making up any other far body tend towards becoming parallel to each other and become close enough to each other, on account of the distance, for the attraction to effectively act as if the bodies were dimensionless points. Newton thus concluded that the orbits of planets could be calculated in a verifiable manner, if the mass of each celestial body was considered concentrated in one point located at its center.

But when the bodies are close enough for these lines not to become relatively parallel, as is the case with the Earth and the Moon, or with the Sun and Mercury, it might well be argued that the method becomes approximate.

In these cases, celestial bodies cannot behave anymore with respect to each other like points that would attract each other at the macroscopic level, but have no choice but to behave rather like attractive surfaces facing each other, each of which surfaces being made up of a massive amount of particles, each of which particles individually attracting each heterostatic particle making up the facing body.

The central areas of such bodies presenting larger densities of particles than their borders, the intensity of the resulting attraction will thus be higher between the central areas, but the force is also be at play between all particles in the borders and every heterostatic particle in the facing body. Obviously, the attraction between such bodies can no longer exactly conform to the inverse square law.

Conclusion

In the first place, if quaternary attractors truly force triads to increase the diameter of their orbits when concentrations of matter occur, most fundamental constants, which have evidently been established in relation to the density of matter as it can be measured at the surface of the Earth, are inevitably approximate, and only their values determined in deep space, far from any sizable mass, could truly pretend to be universal.

Their values at the surface of the Earth must be adjusted by taking into account the expansion of the triads caused by the position of the surface of the Earth relative to the local balance of the masses that constitute it. For example, the depth within the gravitational field of the Earth, of the atoms emitting the frequency that is used to determine the length of the *second* as a universal unit of time, must be specified.

The masses assigned to the neutron and the proton for example, are their masses as measured on the surface of the Earth. Logically, they should turn out to be slightly higher when measured in deep space, far from any important masses.

It is not difficult to imagine what would become possible if we eventually become able to consistently manufacture protons and neutrons from simple 1.022 MeV photons, that is, manufacture matter from energy, instead of extracting energy from matter as has been the trend up to now.

To put it bluntly, converting 2 MeV of energy to about 938 MeV/c^2 of mass through an entirely natural and irreversible acceleration process, would give us about 470 times our stake, which represents 47,000 % efficiency instead of less than 100 % for the most efficient methods available up to now. In other words, it would provide us with an inexhaustible supply of reaction mass. It would become possible, among other things, to stop ravaging our planet's natural resources to supply cities and factories with energy.

In my view, the solution would fundamentally involve bombarding thin targets of still to be identified materials with massive amounts of highly focused photons of frequencies slightly lower than 2.471E20 Hz, so that the decoupling pairs will have insufficient energy to really escape while being produced in sufficiently high concentrations and proximity for the triads to have a chance to form.

Presently, a whole range of possibilities remain to be explored, from bombarding a precise point in space with the appropriate frequency of photons to produce a sufficient quantity of pairs, to using more energetic photons producing pairs that would then have to be slowed down to allow

the triads to come into being.

Regarding space exploration, it becomes possible to envision propulsion systems fueled by photons, that would eject Hydrogen in such huge quantities that constant acceleration at 1g would become possible, in spaceships the mass of which would no longer be a factor. It would become possible to design hulls as thick as required to efficiently protect crews against radiation ambient in deep space, and to profile and magnetize them so as to offer adequate protection against interstellar dust at the huge relative velocities that could be reached.

The three spaces of this expanded Maxwellian geometry seem to act like communicating vessels, of which at least one is always in a state to offer an exit by means of orthogonal translation for any surplus quantity of motion which could locally be in excess in either of the other two, allowing integral respect of the second principle of thermodynamics.

Energy seems to locally behave like a totally incompressible material in the frame of its distribution between these communicating vessels. The energy always seems to be in a position to reach one of the equilibrium states that we have described, while conforming to the least action principle.

References

[1] De Broglie, Louis. (1937/1973/1993) *La physique nouvelle et les quanta.* Flammarion. France. Deuxième édition 1993, avec nouvelle préface de 1973 par L. de Broglie.

[2] Stratton, Julius Adam. (1961) *Théorie de l'électromagnétisme*. Traduit par J. Hebenstreit, France, Dunod, Paris.

[3] Haïssinsky, M. (1957) *La chimie nucléaire et ses applications*. France, Masson et Cie, Éditeurs.

[4] Duquesne, Maurice. (1968) *Matière et Antimatière*, Collection Que sais-je #767, Presses Universitaires de France.

[5] Greiner, Walter & Reinhardt, Joachim. (1994) *Quantum Electrodynamics.* Second Edition, Springer Verlag. New York.

[6] Feynman, Richard. (1949) *Space-Time Approach to Quantum Electrodynamics*, Phys. Rev. 76, 769.

http://authors.library.caltech.edu/3523/1/FEYpr49c.pdf

[7] Anderson, Laing, Lau, Liu, Nieto and Turyshev. (1998) *Indications from Pioneer 10/11, Galileo, and Ulysses Data, of an Apparent Anomaleous, Weak, Long-Range Acceleration*. grqc/9808081, v2, 1 Oct 1998.

https://arxiv.org/abs/gr-qc/9808081

[8] Particle Data Group. (2000) *Review of Particle Physics***.** Volume 15 – Number 10-4.

[9] Michaud, André. (1999) *Theory of Discrete Attractors*. Canada, SRP Books. Republished (2012) in eBook format:

https://www.smashwords.com/books/view/176961