the general science journal

On the Motion of Matter

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30th August 2012

The central revelation contained in this paper is the discovery of the fundamental modality of the motion of matter. A genuine understanding of the mechanism by which matter moves and travels through space, connects also, to an awareness and appreciation of the underlying fabric of space itself. From this, the actual physical origin and meaning of several physical constants become easily discerned and the illusion of wave-particle duality is clarified. With the benefit of these realisations I attempt an initial analysis of gravity, charge, light and electromagnetism. This reveals an elegant picture of the fundamental operating dynamics of the universe that is both consistent and understandable.

1 ACTION-AT-A-DISTANCE IS IMPOSSIBLE

"Tis inconceivable that inanimate brute matter should, without the mediation of something else which is not material, operate upon and affect other matter, without mutual contact....That gravity should be innate, inherent, and essential to matter, so that one body may act upon another at a distance, through a vacuum, without the mediation of anything else, by and through which their action and force may be conveyed from one to another, is to me so great an absurdity, that I believe no man who has in philosophical matters a competent faculty of thinking can ever fall into it. Gravity must be caused by an agent acting constantly according to certain laws" Isaac Newton

"Gravity must be caused by an **agent** acting constantly". Hopefully, even without the insistence of Mr. Newton, this should be quite obvious, although it bears stating and repeating nonetheless. We could also re-write the above quote, replacing the word "gravity", with the word "charge", and it would remain just as valid. The point is that action at a distance is a ridiculous and absurd impossibility. The only way then, by which apparent action at a distance can be satisfactorily explained, is that there exists throughout the universe a field of invisible, undetectable particles. We can detect this field indirectly by its affect upon matter, but we cannot detect it directly. However, in denying any possibility of action at a distance, the existence of an aetheral particle field becomes a logical imperative.

Logically, space must contain some form of aethereal particle field that mediates the operation and interactions of matter. For further clues, the most obvious areas of phenomena are light, electromagnetism and especially gravity. Gravity seems special in that it cannot be shielded against, implying that it operates by some more fundamental process. Whether this is true or not, it nevertheless makes it a good starting point.

Ignore for now the added complication of orbits and start by considering only gravitational "attraction". Obviously, the concept of mechanical attraction is impossible, as is action at a distance. Therefore, we are led in very short order to a model of gravity caused by a randomly moving aethereal particle field. This model involves particles moving at high velocity in entirely random directions relative to each other, but such that the momentum density in three dimensional space is evenly distributed throughout the universe. The other important principles of the model are that the field particles have negligible interaction between each other and that they move through empty space with no forces acting upon them besides the infrequent collision with other field particles and with matter. Also, interactions with matter involve only a small fraction of the the field, with most particles passing straight through matter unaffected. The end result is that gravity is caused by a **net** push from the particle field.

The randomly moving particle field gravity model was first developed by Nicolas Fatio in the 17^{th} century. His work was later taken up by Georges Le Sage, for whom it is best known. The idea has been revisited, with and without refinements, many times over the years since. As such, it is generally presumed to be well understood and a list of supposedly intractable objections is held against the model:

1) Objects attempting to travel through a randomly moving particle field will experience "harder" collisions at their forward most point.

2) In the process of receiving momentum from the aethereal particle field via collision, matter would rapidly reach thermodynamic catastrophe.

3) If a portion of the aethereal particles passing through matter lose some of their momentum to the matter, then there must be a gradual weakening of the gravitational field effect.

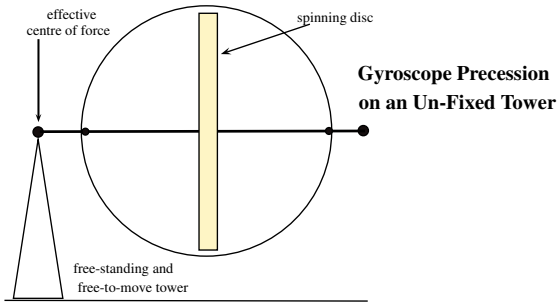
4) It is suggested that to avoid orbital aberration and to maintain stable "gravitational" orbits, a physical method of gravity would have to operate at many orders of magnitude greater than c.

Action at a distance is impossible, so there must exist an aethereal particle field; this is logically unavoidable. You should note that this is by no means esoteric, given that Standard theories utilise a multi-faceted particle field as a "quan-

tum vacuum" described by mathematical methods. I will show that the term "quantum" does not actually refer to the field at all. For this reason and to avoid making any specific claims about the actual field particles, I deliberately use the term "aethereal". This is not the aether of old, simply a field of particles that are not the matter of electrons and protons, but operate such that momentum is conveyed and transferred. Also, it is not primarily my intention to solve the issues with Fatio's model, although those solutions and corrections are presented. My main purpose is to demonstrate that a randomly moving aethereal particle field must exist and operate to produce an inherent motion of matter, which once identified, in turn provides some proof of the nature of the field.

2 The PRECESSION of GYROSCOPES

Composite bodies, i.e. atoms and atomic structures, are held together by forces acting between their component parts. So the motion of one component due to an externally applied force must be distributed through the body by its system of internal structural forces. Thus an external force applied at one point results in a lag, as the rest of the component parts receive that force via the body's structural integrity. **This motional hysteresis is inertia**.



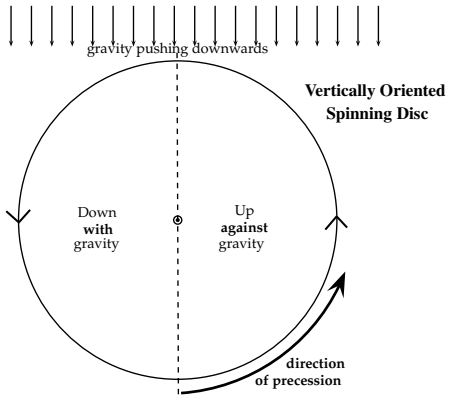
While the disc is spinning quickly the gyroscope is able to rotate, that is, precess, about the top of the tower, even though it only rests loosely on the tower. If the precession of the gyro is prevented, then the gyro immediately falls off the tower. Somehow, both the spin and precession of the gyro are important to this seemingly inexplicable behaviour. There are a number of unusual aspects concerning this that do not conform to our everyday expectations:

- the gyroscope appears to defy gravity
- but, the spinning and stationary mass are identical
- the gyroscope precesses about its pivot point
- but, the tower is not pushed sideways.

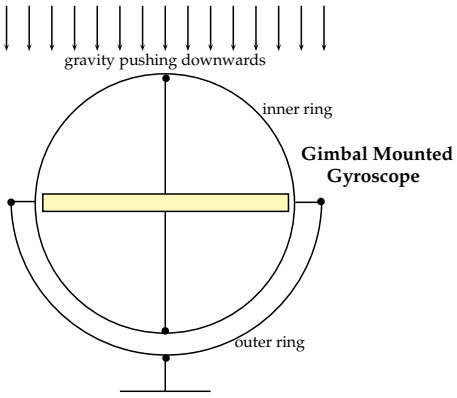
This leads to a several important questions:

- why does the gyroscope not fall under gravity
- why does it precess
- why is the tower not pushed sideways
- why does preventing precession make it fall

Since the tower is not pushed sideways and also there is no reduction in the gravitational mass of the system, we must conclude that by some method the spinning gyro transfers all of the force due to its gravitational mass downwards through the pivot point. The only physically possible way that the tower is not pushed sideways, is if the gravitational force belonging to the gyro is acting directly downwards through the pivot point. In some way precession is important in helping it achieve this trick.



At any given instant, we can think of the disc as two halves with two different experiences. One half is spinning down with gravity, so experiences low inertia and acceleration. The other half is spinning up against gravity, so experiences inertia and deceleration. The result of this is an impetus which is throwing the disc upwards and in the direction of spin. This results in the gravitational force acting on the disc being applied, via the frame, through the pivot point, and also the entire disc is able to rotate about that pivot point - a motion referred to as precession.



When the gyro is mounted in gimbal rings, we get to see something else. When a force is applied to the outer ring, the inner ring precesses. When a force is applied to the inner ring, the outer ring precesses. Viewing this in terms of the simple precession system about a tower, it can be seen that a point of force becomes a pivot point. The reason the gyro falls off the tower when precession is blocked is because a greater pivoting force is introduced that the gyro attempts to precess about. So, **a pivot point is a point of force, and, a point of force becomes a pivot point, and, the greatest instantaneous force is the pivot point at any given instant**.

3 HELICAL PRECESSION

It is my assertion that electrons and protons spin, that is to say, sub-atomic particles are spinning objects. *Objection 1): Objects attempting to travel through a randomly moving particle field will experience "harder" collisions at their forward most point.* Applying the principles of gyroscope behaviour to spinning sub-atomic particles within a randomly moving aethereal particle field, it should be apparent that the forward most point of a spinning sub-atomic particle becomes a point of force. That point of force becomes a pivot point, a pivot point about which the particle is compelled to precess. For a spinning and precessing object, that forward most point is constantly changing. The affect of this is that the precessional motion describes a curve. In a moving field, all matter is, in effect, constantly travelling in relation to the field. **As a particle travels, whilst at the same time precessing through a curve, it will describe a helical trajectory; a process I refer to as Helical Precession.** Helical precession is a constant function of all spinning particles, in other words, sub-atomic particles have two permanent modes of motion: spin and helical precession, both spin and helical precession should be considered to be an **inherent property of matter**.

The push of **ALL** motive force effects upon matter, follows a specific method. A force can only be applied to an electron or proton by a momentum density fluctuation of the aethereal field. Whether that momentum density fluctuation be due to gravity, charge or collision, all matter interactions are mediated by the field. A point of force as a result of that momentum density fluctuation becomes a pivot point about which a spinning object is compelled to precess - the point of force acts only a vectored **force of influence**. A force of influence disrupts the normally random operation of a particle. Rather than a random precessional direction of travel from the randomly moving field, a particle alters its behaviour. Instead of tumbling randomly at the mercy of the field, it becomes aligned by the source of influence. **When oriented to a preferred direction, precessional motion translates to "linear" motion. However, linear motion of matter is not rectilinear, it takes the form of a larger secondary precessional helix. The motive force that accelerates a particle comes directly, and only, from its inherent helical precession.** There is no other method by which matter can be made to travel.

Motion is at right-angles to both the source of influence and to the direction of travel. A closer examination of the travel of matter reveals that matter actually travels via several nested precessional helices. As a simple visualisation, picture a long flexible spring, which is a helix, moulded into the shape of a larger helix: **a helix within a helix**. The degree of pivoting disturbance a particle experiences is a function of the influencing force. In all cases, the influence force is a fluctuation in the momentum density of the field and the actual accelerative force comes directly from a particle's inherent helical precession. The greater the vectored momentum density fluctuation of the influencing force, the greater the translation to a specific direction of travel, i.e. the greater the acceleration.

Electrons and protons can be said to have more than one velocity. The velocity along their inherent precessional helix and other velocities associated with secondary helices. These secondary helix velocities are more commonly understood as "linear" velocity. Clearly, the linear velocity cannot exceed the inherent precessional velocity. Also, once an object is accelerated to a given linear velocity, it is able to maintain that state of uniform motion even once the source of influence is removed. In other words, its secondary helix is maintained simply by its precessional reaction to travel through the field.

Louis de Broglie is credited with the discovery of "matter waves", although until now there was no physical explanation. With the reason and mechanism for this property of matter revealed we can now investigate the physical meaning that underlies de Broglie's equation and some other physical constants:

$$\lambda = \frac{h}{mv}$$

Planck's constant, h, comes from the Planck relation:

$$\frac{E\lambda}{c} = h = \frac{E}{\nu}$$

and is also included in the definition of the classical electron charge radius, as the reduced Planck constant, $\hbar$ (i.e. $h/2\pi$):

$$r_e = \frac{\alpha\hbar}{m_e c}$$

The physical dimensions of a helix can be described by, pitch: the distance between complete turns, arc length: the distance along a complete turn, and, radius of curvature. **The physical dimension assigned as a wavelength is the pitch length of the electron precessional helix**. The helix arc length is 2π times the pitch, and in moving through the arc length a full circle is completed which 2π times the radius of curvature times. **The electron charge radius is the electron's precessional radius of curvature**. The curvature and pitch length (i.e. wavelength) described by an electron moving along its inherent precessional helix defines the range of motion over which its momentum is distributed. This leads to another well known constant: **the fine structure constant, α, also called the electromagnetic coupling constant, is the ratio of the curvature and pitch length of the electron precession helix**.

$$\alpha = \frac{2\pi r_e}{\lambda_e}$$

From the de Broglie equation we can see that wavelength and velocity are inversely proportional. As velocity increases,

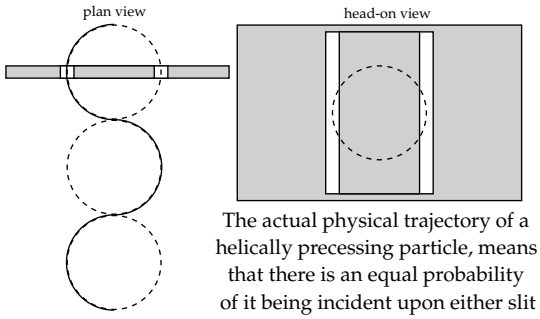
wavelength decreases, but from the Planck relation we can see that h is energy per cycle. Many people might think that Planck's constant refers to energy quanta specifically with respect to light photons, however, light photons are emitted and detected via electrons. Planck's constant does not tell us about photons, except by inference, instead it tells us about the motion of electrons. **Planck's constant, h, is the energy of a single electron precession**. Both the Planck relation and the electron charge radius equation refer to a velocity of c. So, using c as the electron velocity and electron "rest" mass in the de Broglie formula, we get the Compton wavelength, which then gives us the value for alpha. Of course, c is a measured constant, so by implication we can deduce that **c is the constant velocity of electron precession**. The speed of precession is constant and is a function of the interaction between electrons and the aethereal field. I would further suggest that c might be the speed of the field.

Equipped with a physical understanding of the meaning of de Broglie's equation, it can be seen that it is slightly incorrect. As is the premise that the equation, in the given form, can be applied to all objects. It is true that all objects in the universe do travel along helical trajectories and so the equation might in principle be correct. However, the h in de Broglie's equation only applies to the Compton wavelength of electrons and protons, where velocity is c. It has been assumed that the wavelength of large objects is too small to be observed, whereas in fact, the opposite is true. The wavelengths of large objects are so large that they have so far gone unnoticed. In fact an objective review of the motion of matter shows that rectilinear motion is an illusion. Matter can not and does not move in straight lines. **Matter can only travel through the aethereal field by helical precession**. There is absolutely no alternative or exception.

4 The MECHANICS of UNCERTAINTY

A quote from the wikipedia page for "Quantum Superposition" states the belief of some scientists at time of writing: *"Quantum superposition is a fundamental principle of quantum mechanics. It holds that a physical system – such as an electron – exists partly in all its particular, theoretically possible states (or, configuration of its properties) simultaneously; but, when measured, it gives a result corresponding to only one of the possible configurations. .... An example of a directly observable effect of superposition is interference peaks from an electron wave in a double-slit experiment."*

It has been claimed that in the double-slit experiment an electron goes through both slits simultaneously. Such an explanation is hardly scientifically satisfying. Electrons and all matter can only travel by helical trajectories. An accelerated electron is following a secondary helix: a trajectory with a wavelength and a radius of curvature. So the possible position of an electron as it approaches a double-slit is defined, not by a straight line to a point, but by a radius of curvature: a circle or ellipse. No, an electron does not go through both slits at the same time. But it can **approach both slits** at the same time. It is valid to express the chances of an electron passing through one slit or the other as a probability. However, it is not due to some spooky property of *intrinsic uncertainty*. The helically precessing object is at all times quite certainly in motion. Experimenters, on the other hand, will at all times be uncertain as to its precise position, velocity and, perhaps most importantly, its instantaneous direction of motion. **The uncertainty belongs entirely to the observer and not to the object in motion**. Quantum superposition, intrinsic uncertainty, wave-particle duality, are an illusion - simply a misinterpretation of mechanical motion. You might now say, that the wave-function has most certainly collapsed.



The actual physical trajectory of a helically precessing particle, means that there is an equal probability of it being incident upon either slit

Obviously, the starting position and absolute line of travel of an electron cannot be controlled precisely in such an experiment. Some electrons will pass straight through a slit, some will impact the barrier and some will be **reflected by the slit-edges**. As is already well known, the diffraction pattern produced is a function of slit separation and wavelength. There is certainly no *interference* involved. All non-central diffraction lines are due to interaction with slit-edges.

5 GRAVITY and CHARGE

Gravity

In order to keep spinning, electrons and protons must take momentum from the continuous collisional attention of the aethereal field. As a consequence there is a permanent reduction in field momentum density vectored away from spinning matter particles. **Due to the spin of electrons and protons, there is always a greater net momentum density towards spinning sub-atomic matter particles and this leads to the effect called gravity**. When objects approach, each object presents the other with a reduced field momentum density from its direction so that there is a net force "pushing" them together, which gives us the effect of a gravitational "attraction". Since momentum has been removed from the outward vector, there is a net inward vector, which leads to gravity and is understandably proportional to mass and inversely proportional to distance.

$$F = \frac{GM_1M_2}{r^2}$$

The push of gravity is not a direct push by the field in the sense that we might imagine it to be, based on our everyday experience. Electrons and protons are spinning and following their inherent precessional helices at the speed of c. The push of gravity derives from a field momentum density fluctuation that acts as a point of force, and a point of force becomes a pivot point. Gravity, like ALL accelerative "forces", is a source of influence that aligns matter to a secondary helix, propelled by each particle's inherent helical precession. Gravity does not act in a straight line between mass centres, it acts by a helical curve between travelling objects in motion.

Charge

With a mechanism to maintain spin momentum, it would be wise for matter particles to lose momentum back to the field, lest all the momentum in the universe be held exclusively by matter; something which patently does not happen.
Objection 2): In the process of receiving momentum from the aethereal particle field via collision, matter would rapidly reach thermodynamic catastrophe.

In order to maintain spin, electrons receive/take momentum from the moving field particles and this gives rise to the effect of gravity. As a consequence of spinning in the moving aethereal field, electrons and protons are forced into a helical precession. As a particle moves through the field it pushes away the aethereal particles in its path. **The precessional motion through the field transfers momentum back to the field as charge**. The difference in momentum absorbed as spin and that returned as charge does not result in thermodynamic catastrophe, it results in a net momentum drop away from matter particles that leads to gravity.

The momentum transfer due to precessional motion, that is charge, is dissipated over the path of that precessional motion. This means that the momentum transferred back to the aethereal field occurs as a helix of momentum travelling at c and **this helix of momentum is a charge photon**. **All transfer of momentum back to the field by electrons occurs as photons**. As an electron moves along its precessional helix, it is randomly bombarded from the field so that it is constantly changing is direction, such that its charge photon momentum is distributed spherical, which gives it a charge photon "sphere of influence" or, less accurately but more familiarly, "electrostatic field" of influence.

When charge photon emitting particles, or "charged" particles, are in proximity, the charge photon sphere of influence of each particle applies a force of influence to the other. A point of force is a pivot point that aligns the opposing particle. When oriented to one direction its precessional motion translates to "linear" motion. The orientation is due to the pivoted reaction to the charge of the opposing particle and the force that generates the linear motion, is due to the field. In other words, as with ALL accelerative actions of matter, **the force that we associate with charge comes directly from the aethereal field via the process of helical precession**. The secondary helix accelerative force experienced by both charged particles is described by Coulomb's law:

$$Force = \frac{kQ_1Q_2}{r^2}$$

In the case of two single electrons this becomes e^2k/r^2. By comparing and combining equations for charge radius, alpha and de Broglie and Planck relationships with a knowledge of helical motion, we can find several ways to view equivalences to e^2k:

$$e^2k = \frac{r_e}{\lambda_e}hc = \frac{radius_e}{pitch_e}hc = \alpha\hbar c$$

Charge, as a causal effect, is due to the charge photon sphere of influence of a charged particle. This pivoting force is due to the momentum constantly returned to the field as charge photons by the inherent precessional motion of sub-atomic particles. The degree of pivoting disturbance a particle experiences is due to the influence of other particles, but **the accelerative (Coulomb) force itself, comes directly from its own inherent helical precession motion**, and as such is proportional to its own mass. By this method both electrons and protons have the same charge affect on other electrons and protons, and also experience the same force.

Another curiosity of charge interactions is a property referred to as positive and negative. It is a feature of electrons and protons that their charge sphere of influence can cause varying reactions depending on whether the two particles are

the same or different. Two the same results in repulsion, two different results in attraction. A quote from the wikipedia "Helix" page: *"Helices can be either right-handed or left-handed. With the line of sight along the helix's axis, if a clockwise screwing motion the helix away from the observer, then it is called a right-handed helix; if towards the observer then it is a left-handed helix.* ***Handedness (or chirality) is a property of the helix****, not of the perspective:* ***a right-handed helix cannot be turned or flipped to look like a left-handed one unless it is viewed in a mirror****, and vice versa."*

A simple but important insight into helix geometry: "unless it is viewed in a mirror". **A helix is matched by an opposite helix that is coming towards it. Knowledge of the helical nature of charge photons immediately provides a simple solution to the mystery of positive and negative charge**. If we arbitrarily assign a left-handed helix to electrons and call that a negative helix, and a right-handed helix to protons and call that a positive helix. Remember, motion is at right-angles to the source of influence. When the same handed helices meet from opposite directions it causes particles to pivot, such that they precess away = repulsion. When the opposite handed helices meet from opposite directions it causes particles to pivot, such that they precess towards = attraction. In all cases the acceleration of a charged particle comes directly from the field via helical precession. The pivoting charge photons act only as a pivot and play no role in the subsequent actual acceleration. A greater charge causes a greater force only because it acts as a greater pivoting force, more effectively disturbing a charged object's normal random precessional operation.

6 LIGHT

As can be seen from the phenomenon of charge, charged particles are constantly emitting photons as a consequence of their inherent helical precessional motion. However, the influence of charge, gravity or collision can cause a particle to be accelerated into a secondary helix. That is, a pivoting influence causes it to effectively propel itself through space along secondary helically precessive paths, which is what we recognise as "linear" travel. A closer study of the motion that is described as, and assumed to be, linear, will show that it is actually helical. This secondary helical motion gives rise to another method of photon production.

Charge photons are emitted as a momentum helix resulting from the inherent helical precession of electrons caused by their spin. An electron accelerated due to the influence of charge or gravity has a separate linear velocity. Remember the electron is also constantly moving at c along its inherent precessional helix. An encounter with another pivoting influence may cause a change to an electron's linear velocity: either to slow down or change direction. To do so, there must be an additional transfer of momentum to the field from the electron. This produces a momentum helix in the field with a velocity of c and a **frequency** that is a function of the electron's linear velocity. **These momentum frequency photons are what we refer to as light.**

Inherent helix momentum is radiated back to the field as charge photons and secondary helix momentum is radiated back as frequency photons.

It is important to understand that although the electron is moving precessionally, **the momentum frequency photon helix is not spinning or waving**. **It is certainly not an electromagnetic wave, it is an aethereal momentum fluctuation with a helical geometry**. Aethereal particles, and thus fluctuations in the aethereal field, are not subject to any forces except occasional field particle collisions. Obviously, photons cannot be directionally affected by gravity or charge. As such they are capable of travelling great distances across space and through the aethereal particle field of which they are made. This demonstrates some proof of the nature of the aethereal field. The size of the particles must be sufficiently small in relation to the field density to allow individual particles to travel significant distances between statistically inevitable collisions. **Photons travel through space utterly unaffected by any forces except occasional field particle collisions. As a frequency photon helix travels across space it is gradually eroded at a rate proportional to distance. This process limits the distance that photons can travel, so that in effect, Hubble's discovery solves Olbers' Paradox**. Whilst travelling large distances through the field photons are progressively redshifted out of existence.

The sphere-of-influence and pivoted reaction of charged particles is the method and cause of electromagnetism. **Electromagnetic "fields of influence" emanate from charged particles**. The notion of EM fields existing without charged particles at their centre is another instance of the absurdity of action at a distance. Since Young's demonstration of light diffraction at the start of the 19^{th} century, there had been a cultural desire to provide an explanation for "light-waves". Reasoning by unproven agenda led to Maxwell's invention of electromagnetic waves; a contrivance which appeared to be justified because the calculated velocity matched the speed of light. Of course, light photons, in common with charge photons, travel at the speed of electron helical precession. A travelling wave system comprised of self-perpetuating EM fields is no longer acceptable.

There is no such thing as light reflection in the way that we understand it from the normal course of human experience. Photon "reflection" is a process of an electron intercepting a frequency photon, being pivoted to change direc-

tion then "re-emitting" a new photon. We might assume that the pivoting affect of intercepting a photon is to change the direction of the electron by an angle in keeping with the well observed laws of reflection. For the electrons in the slit edges of a diffraction grating we might be tempted to call it deflection, but reflection it is. However you might have previous imagined photons to behave, it should be supremely evident that they cannot and do not interfere.

7 MASS

Field momentum towards electrons and protons is equal to: field momentum outwards, charge photons outwards and the spin of the particle:

Field In = Field Out + Charge + Spin

Spin accounts for the field momentum that is gravity and that at the same time is mass. Mass and gravity are in fact the same thing: they are the momentum removed from the field due to particle spin. Protons remove more momentum from the field, so they have more mass and a greater gravitational effect. Obviously, mass is the field momentum, or energy if you prefer, and gravity is the effect induced upon other matter particles.

Objection 3): If a portion of the aethereal particles passing through matter lose some of their momentum to the matter, then there must be a gradual weakening of the gravitational field effect.
The quite obvious explanation in this regard is that mass is the constant proportionality of particle spin and aethereal field momentum density. Mass is momentum removed from the field due to particle spin, so effectively mass is proportional to spin and that spin is directly proportional to field momentum density. Therefore, mass is proportional to field momentum density. Since force and acceleration are proportional to mass, then all motions of matter would remain precisely the same and changes of field momentum density would go unnoticed.

Mass does not vary with velocity, because velocity is constant at c; the inherent precessional velocity of electrons and protons is constant. Previous theoretical analyses have failed to identify inherent helical precession and so the nature of mass and motion has been misinterpreted. Yes, mass is momentum (or energy if you prefer), but not in an exchangeable or convertible sense. The amount of field momentum that represents mass does vary with field momentum density, but because it is a proportionality there is no operational change in mass.

We cannot directly measure the "mass" of the aethereal field, so use of the terms momentum or energy may appear semantically doubtful, and presumably reasoning along these lines resulted in the invention of an energy "substance". However, from Newton's laws of motion, a description of field momentum is easily justified. Mass is effectively a measure of matter's interaction with the aethereal field. The aethereal field must consist of real physical particles of real physical interactional substance and real motion, and must obey the laws of motion just as much as matter, since action at a distance and magic are impossible. After all, the universe can only be a momentum transfer system.

To do work an object must cause a change in the motion of another object. The only way to achieve this is by collision. An object collides and decelerates, the second object accelerates. Effectively, force is the act of collision and momentum is transferred as force is applied. Energy is mass times velocity squared. The maximum force possible via collision is a function of deceleration and the total deceleration possible is given by the square of an object's velocity, i.e. v^2, or when v=c, c^2.

The aethereal field can travel in straight lines, matter can not and does not. An electron transfers momentum to the field as momentum photons, which are a function of its mass and its velocity squared. The direction of motion of the electron has no bearing upon its collision and transfer of momentum to the field, because it collides directly with the field and the field is everywhere. As such, photons receive the full benefit of the electron's mass and inherent precessional velocity, which is c.

$$E = mc^2$$

Matter to matter collisions occur as a function of the velocity of an object's "linear" motion. The collision is not direct, but is mediated by the field. In the complexity of mediated momentum transfers, there is some loss of collisional efficiency, which leads to the familiar kinetic energy equation:

$$K.E. = \frac{1}{2}mv^2$$

The only way for matter to travel through the aethereal field is by helical precession. Therefore, **linear velocity, which is a secondary precessional helix, can never exceed the primary precessional velocity**. This is better known as the rule that **nothing can travel faster than c**. This is a physical limitation imposed upon matter by the aethereal field.

Action at a distance is impossible, matter does not travel along rectilinear paths and mass is not a freely convertible "form of energy". The only "form of energy" is material substance, either aethereal or matter, in motion. Mass is a function of field momentum density. Momentum, energy, force and acceleration are proportional to mass.

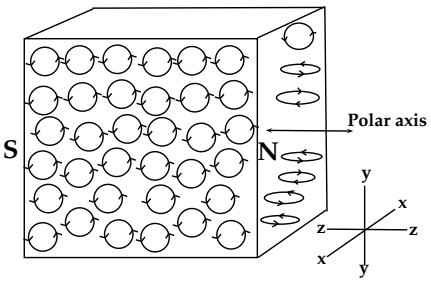
8 MAGNETISM and ELECTRICITY

The charge photon sphere-of-influence of electrons (aka electrostatic charge field) causes other electrons to pivot and move with a secondary precessional helix. In an atomic structure electrons are bound to the nucleus, that is, they are already heavily influenced. However, some atoms are able to retain their structure despite the ”loss” of electrons by ionisation. Although, the precise meaning of ”free-electrons” may hold some rather obvious doubt, it seems that some atoms and molecules are more tolerant of free-electron ionisation than others. I do not suggest that free-electrons are able to move entirely freely through their host atomic lattice, but just that they have sufficient freedom of movement to react to charge influence from other electrons, and, that they then transmit the force due to their motion, inertially to the rest of the structure. I see the concept of free-electrons to be more like a case of being freed from full-time atomic duties. Regardless of the precise details of free-electron existence, I contend that it is free-electrons that are the operational channel for the processes that we identify as electromagnetism.

Magnetism
With a knowledge of the physical mechanism of charge interactions, we already understand the processes of pivoted alignment and attraction and repulsion. We can reasonably say that those simple reactions are magnetism. However, magnetism as we experience it involves not just two, but trillions of free-electrons. Some materials, most commonly Iron, have the property that, due to some fortuitous arrangement of their atomic matrix/lattice, free-electrons can be made to align, and, they can be made to stay aligned. In other words, they react magnetically and they can be made into magnets.

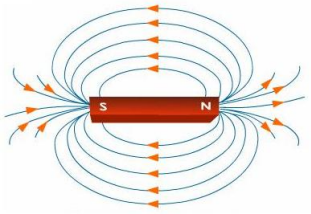
If the free-electrons are aligned such that they continuously move in a loop, then instead of emitting charge photons spherically, they would emit them in a disc-like distribution. The magnet would still be producing a field of influence in all directions, but with a distinct peak along one axis. Since **all the free-electrons would be emitting some component of their charge photons along that axis** (the z-axis in the following diagram). **This produces the effect of poles**. The emissions from each pole are equal, **with helix chirality producing the North and South effect**.

Regarding the ”loop” of free-electron movement: To act as I suggest, the free-electron must be travelling along a helix with some limited range of motion that causes it to reverse direction at each end. Whether this be a simple figure-eight, a cylinder or a tight loop is somewhat academic. The point is that they are causally aligned and limited in their degree of freedom so that their charge photons emission are restricted to preferential directions.



An atomic structure whose free-electrons are similarly aligned, that is, a magnet, does not emanate a ”field of force”, it emanates a ”field of influence”. **Projected magnetic force is an illusion**, magnetised objects move due to the secondary precessional motion experienced by their own components, i.e. free-electrons. A magnetisable object reacts to become a temporary opposite pole magnet, so a magnet and, for example an iron nail, are always ”attracted” to each other. It is important to realise that the ”attraction” is mutual and interactive, not simply a case of the magnet attracting a passive nail; both become active participants.

We can certainly abandon the notion of a curved force field and the less said about ”field lines” the better. The curved field diagram is still valid as a map of interaction which equates to a sort of volumetric relief map of charge photon emission. The directional arrows do not indicate a force or motion of the field of influence, but show only the direction of motion of reacting magnetic objects.

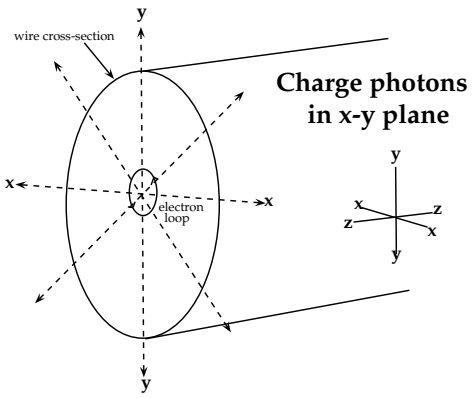


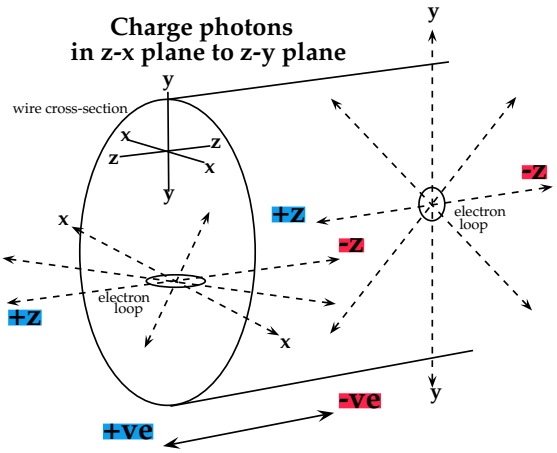
Another previously unexplained peculiarity of magnetism is B-field ”Curl”. Fleming’s right/left-hand rules tell us, that charge photons cause the pivoted alignment of electrons via helical precession. The electron’s motion, which we recognise as a force, comes from its primary and inherent precessional helix. A magnetic object in a magnetic field of influence is prompted to move by the net influence at any particular point or position within that field of influence. As soon as it moves its position in the field the pivoting influences are different. The resulting secondary precessional helix is Maxwell’s ”curl”. When viewed with the benefit of an understanding of helical precession, of spinning motion and pivoting forces, we can see that right/left-hand rules and light reflection are really just the same underlying process at work. In fact, for the fundamental root cause of magnetic curl, ”spiralling” magnetic fields, oscillations, vibrations, wave and harmonic behaviours, we need look no further than helical precession.

Anyone who has looked with curiosity at two plasma filaments twisting round each other to form a single structure will be relieved to at last have received the basis for a physical explanation for this phenomena. As with lightning, although the structure appears to propagate, remember that the "emitted" charge photons are travelling at c. Although free-electrons in a plasma may experience accelerated travel it is the charge photon "signal of influence" that is the propagating mechanism. For the process to continue propagating free-electrons need to be available, or commandeered by ionisation - hence the zig-zag nature of lightning. There is no true "transfer of energy" from sky to ground as is commonly believed, simply a signal of influence that alters the behaviour of locally available free-electrons. All electrons, are at all times, "powered" to the same extent, it is simply that their behaviour changes.

Electricity

A magnet can induce electricity in a copper wire, but the copper cannot be made permanently magnetic. The magnetic field of influence must be continually moved through the copper to sustain the electricity: a so called time-varying magnetic field. In a permanent magnet, the atomic environment keeps free-electrons aligned in a precessional loop. In other materials, such as copper, the wire must be rotated in the magnetic field to cause the free-electrons in the "conductor" to loop and emit their charge photons as a disc-like distribution rather than spherically. The affected free-electrons in the wire then influence their neighbours and pass the alignment "signal" down the wire. However, there are two signals transmitted through the free-electron population of the wire, and as they must be, they are at right-angles to one another. These are referred to by the terms *current* and *potential difference* or Amps and Volts.





Established electrical theory provides us with several inappropriate and misleading terms and concepts. Obviously, free-electrons do not travel along the wire - *carrying their charge with them*. The only thing that flows along the wire is a signal of influence, passed from one electron to the next, like falling dominoes; only these dominoes are a bit more dynamic. The ideas of "*current*" and "*potential difference*" are conceptual analogies and don't really have any meaning in respect to the physical processes of electricity. The B-field and E-field are net force vector maps and so do not directly correspond to the actual charge photon fields-of-influence. "*B and E fields*" are a description of what happens if and when, rather than what **is** happening, how and why. Also, the B and E fields refer to the charge photon emissions that extend beyond and away from the wire. The electrons whose motions, "emissions", reactions and interactions, produce the effect of electricity, are in the wire.

To discover more precisely the physical meaning of Volts and Amps we need to analyse how these terms have been interpreted and defined. This is made more difficult, by virtue of the fact that charge and all things electromagnetic have been assigned as due to an "electric" property of matter. From a knowledge and understanding of helical precession we know that charge force is the motion of an electron, i.e. work done or energy. Electron charge is given in Coulombs, where 1 C = $6.24 \times 10^{18} e$, so that $e = 1.602 \times 10^{19}$C. One electronvolt is defined as one volt per e, so that 1 Joule is 6.24×10^{18}eV, and 1 eV = 1.602×10^{19}J. Charge has unknowingly been defined as the energy of free-electron motion. Since charge, and hence coulombs, are a measure of energy, then Amperes, which are defined as coulombs per seconds are also energy. **Current in Amps is the x-y energy**. Voltage is given as Joules per Coulomb, so actually it is energy per energy: **Voltage is a ratio that provides us with the energy for z-x through z-y orientations**. The power available is then given by P=IV, which is the x-y energy times the z ratio: the energy in the z-axis orientations. Motion is at right-angles to the source of

influence. In order to have free-electrons looping in one orientation, there must be free-electrons looping at right-angles to provide a field-of-influence, hence the two components of electricity.

The z-axis charge photon emission is to some extent representative of the concept of potential difference, since Voltage indicates the ability of the signal to propagate. All of these free-electrons have a z-axis component, which is exactly the same as a bar magnet. **The poles of an electrical wire are at either end, just like a bar magnet, except that here they are referred to as positive and negative. An electrical wire is effectively a long thin bar magnet.** By sending that magnetic signal along the wire, it becomes possible to use the magnetic effect of aligned free-electrons at any point along the wire. It is not energy that is transmitted along the wire, it is a "signal" of free-electron alignment. Electrons are of course "powered" directly by the aethereal field. They do not "carry" a magic "electric charge" property.

9 Some Thoughts on Orbits

The final objection to particle field gravity is that of orbital stability. *Objection 4): It is suggested that to avoid orbital aberration and to maintain stable "gravitational" orbits, a physical method of gravity would have to operate at many orders of magnitude greater than c.* Basically, unless the gravity field is travelling at many orders of magnitude faster than c, it is claimed by some that gravitational orbits would not remain stable.

Electromagnetism and light, which are both the result of photons, operate at c. More importantly, that means that momentum is being returned to the aethereal field at c. So, what evidence we do have, points to a field velocity of c. It has been suggested that a randomly moving particle field would have to be superluminal to avoid orbital aberration, which is one reason why there has never been an accepted physical theory of gravity. It is further claimed that since Newton's gravity has no time factor, there is the implication that it must operate instantaneously. It is also claimed that gravity acts in a straight line between mass centres, but that is not the case either, since gravity acts via a secondary precessional helix.

We would do well to remind ourselves that in this particular universe there is only one motive force of matter, that is inherent helical precession. A force of influence or pivoting force, be it photonic, gravitational or collisional, provides only a steering mechanism. With that said, an object travelling by a secondary helix will continue to do so uninfluenced, with just its travel through the field sufficient to maintain its secondary helix.

Taking the simple case of a small object orbiting a very much more massive "parent" body. An object with sufficient velocity may orbit another and somehow avoid being subject to the effect of gravity. Gravity is a force effect that is pushing the small orbiter toward the "parent" body. It is interesting then, that to achieve orbit requires additional velocity through space and thus the aethereal field. In other words it requires an additional precessional helix, since that is the true form of the conventional concept of linear, or angular, velocity.

The Sun is travelling around the galaxy with respect to the galactic centre. A short journey through googleland throws up a range of values, but a rough average puts the Sun's velocity at about 230km/s. Also, the Sun "oscillates" above and below the galactic plane with a period of perhaps 65 million years and an amplitude of about 225light-years. So it has a wavelength of 4.718×10^{20}m (65My x 230km/s) and a radius of 2.219×10^{18}m and so has an alpha of approximately 0.0283. As the Sun travels along its galactic helix its system of planets travel with it, and as they do so they trace out helical trajectories around the Sun. In short, a body circling another and travelling along with it, is moving along a helix within a helix. It is already following the helical path of the "parent" body, and then it must follow an additional helix to achieve orbit. This is what **is** happening.

The Milky Way galaxy itself is also travelling through the aethereal field and the **only method of travel possible** is helical precession. The galaxy is a helically precessing, travelling and rotating object. It makes little sense to try to compare a spiral galaxy to a simple orbital system, so I would not think of it as an enlarged version of the solar system. Both the shape and rotation velocities point to it being a composite rotating object. Much effort has been expended in trying to enforce a model of gravitational orbits upon an uncooperative galaxy. Surely there cannot be any hope of successfully arriving at an accurate analysis of orbital mechanics without first understanding and considering the mechanics of gravity and the mechanics of motion. Orbits may be a composite precessional helix, but a precessional helix nonetheless. And, at the same time, a visible de Broglie wave.

10 Summary

To have any hope of useful analysis, I am forced to assume that the universe that we observe and experience is at least some fair approximation of true reality, albeit with some operational aspects intrinsically hidden from our innate sensory abilities. Included with this is a complete rejection of all superstition and magic and any other outlandish fictions. With this definition of reality, it seems to me that the most obvious and basic property of the universe is motion. Unless we are willing to bow to unfathomable magic and entirely reject our perceptions, senses, intuitions and cognitive logic, we must accept that motion is a real phenomenon. From acceptance of motion as real, there is no logical escape from that which must follow. To have motion we must have substance that moves, and to allow freedom of movement, we must also embrace the concept of separation. Spatial separation can more usefully be defined as empty space and substance as discrete material particles. In short we have two classes of volume occupying entity. One is inert, that is empty space, the other is interactive, that is particles of material substance. Since we have sensory access to matter, and action at a distance is absurd, then the interactive material substance may be further split into two categories: one is the ponderable brute matter that are electrons and protons and that which their combination forms, the other is an aethereal field of particles that is responsible for producing and mediating the actions and interactions of matter. With motion included, all theories and models must comply with the concept of particles separated by completely empty space. There is no philosophical or logical avoidance to this regime, as without the reality of motion, all other considerations become meaningless and invalid.

Newton's First Law of Motion tells us that an object cannot alter its motion without the application of a force. This is a rather formal and long winded way of stating "Cause and Effect": it is absolutely completely and utterly impossible to have effect without cause. Acceptance of effect without cause is the conceptual basis of superstition. Action at a distance is effect without cause, and I contemptuously reject any such absurdity. From the premise that action at a distance is impossible, and rigorously adhering to that premise, then there is no logical avoidance of the existence of an aethereal particle field. Once you renounce magic and action at a distance, and accept the existence of an aethereal field as a logical imperative, then there is no option but to then view motion as affected by it.

Once all the foregoing is considered, and after an objective process of elimination to remove the impossible, we are led rapidly to the concept of a randomly moving aethereal particle field. Since the field must exist and since motion must be affected by it, then a logical analysis of motion reveals the process of inherent helical precession. Electrons and protons are in spinning and helical motion at all times and are constantly moving at c. Their very existence is defined by their inherent motion. Mass, gravity and charge are all a result of that invariable inherent motion. With helical precession discovered, further analysis shows that all fundamental phenomena can be explained and understood, not as a cause of, but as a consequence of, the mechanical motion of matter.