

# **The Unification of Gravity and Magnetism**

(A Theory of Rotationally Siphoned Aether)

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**Abstract. Kepler's law of areal velocity is mathematically equivalent to the Lorentz force. This provides the link between Gravity and Magnetism. We learn how gravity is an irrotational aether flow that is permeated with tiny swirling sinks that siphon the aether away from the larger sink. These tiny swirling sinks are stacked on top of each other in their axial planes so as to form the double helixes that constitute Faraday's lines of force. The magnetic permeability represents the areal density in the equatorial plane of these vortices and hence it represents the flux density of a bundle of Faraday's lines of force measured perpendicularly to the lines. Magnetic permeability and electric permittivity both represent a leakage factor in the gravitational field.**

## **Gravity and Electricity**

I. It has already been discussed in 'Gravity Reversal and Atomic Bonding',

<http://www.wbabin.net/science/tombe6.pdf>

how gravity and electricity are essentially the same thing. Electricity is the consequence of radial inflow or outflow of the aether mainly considered on the small scale, whereas gravity is exclusively the inflow of the aether mainly considered on the large scale. The controversial issue of why gravity involves mutual attraction whereas electricity involves mutual repulsion was resolved on the basis that with negative charge, either scenario can occur depending on the field strength. The key factor in the reversal effect is the existence of a luminiferous solid that is comprised of electrons and positrons in which the electrons and positrons are paired together in mutual central force orbits. This electron positron sea pervades space and acts as the luminiferous medium, and also as the medium in which Faraday's magnetic lines of force are embedded.

An electrically/gravitationally charged body will linearly polarize this electric sea. If the field strength is strong enough, the centrifugal repulsive force in the linearly polarized rotating electron positron dipoles that permeate space will override the aether inflow.

Consider two large gravitating spheres. The gravitational field lines will emerge radially from each sphere. As the lines from each sphere come together, they will spread outwards just as in the case of ferromagnetic repulsion. The electron positron dipoles that permeate space will linearly polarize in sympathy with the gravitational field lines. The rotational axes of the electron positron dipoles will align solenoidally. These solenoidal field lines will interweave their way through the radial field lines of linear polarization and will ensure that the linearly polarized dipoles, that are aligned along the gravitational field lines coming from each sphere, will meet together laterally in their mutual equatorial planes as they spread outwards together. The interwoven solenoidal dipole axial lines will form concentric rings around an axis joining the centres of the two large gravitating spheres.

## **Areal Density and Magnetic Permeability**

**II.** We saw in ‘ $E = mc^2$  and Maxwell’s Fifth Equation’,

<http://www.wbabin.net/science/tombe14.pdf>

how the areal density of an electron positron dipole corresponds to the term  $\mu$  that Maxwell substituted into the density term of Newton’s equation for the speed of sound. This two dimensional quantity becomes of significance in the equatorial plane of a bundle of Faraday’s lines of force. It contributes towards the vorticity density **B** when magnetism is considered on the large scale. In ferromagnetic materials in which the value for  $\mu$  is high, there will be a lot more **H** lines of force permeating through it than in the case of a paramagnetic material of similar cross sectional area. This explains the significance of the term ‘permeability’. A ferromagnetic material allows a higher concentration of **H** lines to permeate through it than does a paramagnetic material. Hence a large value of  $\mu$  will result in a large degree of rotational siphoning from the gravitational field. It will add to the magnetic field and subtract from the gravitational field.

## **Dielectric Constant and Electric Permittivity**

**III.** We also saw how the dielectric constant was effectively an elastic constant bearing a close relationship to transverse elasticity and Young’s modulus. This elastic constant is related to the fundamental hydrodynamical force that operates between the electrons and the positrons in the dielectric units. This means that the dielectric constant is related to both the area of the rotating dielectric units and also to the much more fundamental rate of aether flow which in turn is related to electric charge. Since the value of the dielectric constant is unique to an electron positron dipole of a given size, it therefore constitutes a specific elastic constant for an electron positron solid of a specific density. The electric permittivity is a quantity that is related to the inverse of the dielectric constant and it undermines the gravitational force, being a measure of the rate of leakage from the main flow.

## The Speed of Light

IV. In modern electromagnetic notation we write the equation  $E = mc^2$  (Newton's equation for the speed of sound in a solid) as,

$$c^2 = 1/\mu\varepsilon \quad (\text{Wave Speed in the Electric Sea}) \quad (1)$$

The magnetic permeability  $\mu$  relates to magnetic flux density in the luminiferous solid on the macroscopic scale and to the areal density of the electrons and the positrons on the microscopic scale, whereas the electric permittivity  $\varepsilon$  relates to the rate of aether leakage for a specific density and is a measure of the stiffness of the electric sea.

## Curled Gravity

V. The general hydrodynamical solution to all particle motion is,

$$\mathbf{g} = -\text{grad}\Psi + v^2/r + \mathbf{v}\times\mathbf{H} - \partial\mathbf{u}/\partial t \quad (2)$$

where  $\mathbf{g}$  is the gravitational acceleration. See 'Gravitational Induction and the Gyroscopic Force' at,

<http://www.wbabin.net/science/tombe5.pdf>

The term  $-\text{grad}\Psi$  is the inverse square law Newton/Coulomb force corresponding to radial aether flow,  $v$  is the tangential component of the velocity  $\mathbf{v}$  of the particle,  $\mathbf{u}$  is the tangential velocity of the aether and  $\mathbf{H}$  is the vorticity of the aether. The  $v^2/r$  term is the centrifugal acceleration, the  $\mathbf{v}\times\mathbf{H}$  term is the Coriolis acceleration, and the  $\partial\mathbf{u}/\partial t$  term is the rotational tangential acceleration of the aether. The latter two terms on the right hand side are the microscopic basis for Maxwell's fourth equation that is otherwise known as the Lorentz force. See equation (D) in part III of Maxwell's 1865 paper 'A Dynamical Theory of the Electromagnetic Field' [1].

In planetary orbital theory, we remove the latter two rotational terms as a consequence of Kepler's law of areal velocity. This means that we remove the Lorentz force for planetary orbital analysis. Within our own Solar system it would appear that the rotational terms have been sponged off by the sea of tiny vortices into a separate theory of electromagnetism. If we take the curl of the remaining two terms we will get zero since they are irrotational.

In other words, electromagnetism is curled gravity which is coordinated by a double helix arrangement of electrons and positrons. The siphoning off of the rotational flow into the tiny vortices leaves large scale gravity irrotational. Hence in large scale planetary orbital theory, since we are only dealing with the radial inverse square law force and the radial centrifugal force, we obtain a law of conservation of energy as a result of the interplay of these two effects. The sea of electrons and positrons pervading space ensures that energy is conserved in planetary orbital motion by virtue of siphoning away the Lorentz force. The electrons and positrons that pervade

throughout space actually create an anti-frictional effect rather than cause one as might be expected.

## The Biot-Savart Law

**VI.** Maxwell's equations can only be fully understood by examining them at microscopic level. We saw in the previous article regarding Maxwell's fifth equation (105) how measurements of distance were based on a coordinate frame of reference that was centred inside the individual electron positron dielectric units. See 'E = mc<sup>2</sup> and Maxwell's Fifth Equation' at,

<http://www.wbabin.net/science/tombe14.pdf>

We will now consider the proposition that the precise solution to the theory of electromagnetism lies fundamentally rooted in an electron orbiting a positron in a perfect circle. That is not to say that the electron and positron cannot move otherwise but that any motions of electrons or positrons other than in a perfect circle do not constitute a part of the theory of electromagnetism.

Let us once again look at Maxwell's fifth equation,

$$\mathbf{R} = -4\pi\epsilon^2\mathbf{h} \quad (\text{Electric Displacement Equation}) \quad (105)$$

For simplicity and familiarity, we will re-write it in modern notation,

$$\epsilon\mathbf{E} = -\mathbf{D} \quad (\text{Modern version of 105}) \quad (4)$$

where  $\mathbf{E}$  is the electromotive force,  $\mathbf{D}$  is the displacement vector, and  $\epsilon$  is the electrical permittivity. The magnetic field vector  $\mathbf{H}$  is essentially the vorticity or angular momentum of the dipole and so we will define it as,

$$\mathbf{H} = \mathbf{D} \times \mathbf{v} \quad (\text{The Magnetic Vortex Field}) \quad (5)$$

Substituting (4) into (5) we get,

$$\mathbf{H} = \epsilon\mathbf{v} \times \mathbf{E} \quad (6)$$

Within the context of a perfectly circular rotating dielectric unit, the  $\mathbf{E}$  vector must therefore be radial in order to have any effect. If we substitute  $\mathbf{E}$  for the radial Coulomb force, we end up exactly with the Biot-Savart law. The permittivity  $\epsilon$  will cancel out, the permeability  $\mu$  will come in when we convert  $\mathbf{H}$  to  $\mathbf{B}$  and the charge and velocity will link up to yield the electric current. This puts the Coulomb force right at the centre of electromagnetism and with a coordinate frame centred right in the centre of a perfectly circular electron positron dipole.

## Angular Displacement Current

**VII.** Although the  $\mathbf{E}$  vector in the Biot-Savart law is derived from the Coulomb force, this does not appear to be so in the equation for which the Biot-Savart law is a solution. If we take the curl of equation (6)

$$\text{curl}(\mathbf{v} \times \mathbf{E}) = \mathbf{E}(\text{div} \mathbf{v}) - \mathbf{v}(\text{div} \mathbf{E}) + (\mathbf{E} \cdot \text{grad})\mathbf{v} - (\mathbf{v} \cdot \text{grad})\mathbf{E} \quad (7)$$

it follows that,

$$\text{curl} \mathbf{H} = -\rho \mathbf{v} - (\epsilon \mathbf{v} \cdot \text{grad})\mathbf{E} \quad (\text{Ampère's Circuital Law}) \quad (8)$$

where  $\rho$  is charge density. Since the velocity is a tangential velocity and hence at ninety degrees to the Coulomb force, the second term on the right hand side of equation (8) will vanish. This also means that the remaining  $\rho \mathbf{v}$  term is tangential. If we differentiate equation (4) with respect to time we obtain,

$$\epsilon \partial \mathbf{E} / \partial t = -\rho \mathbf{v} = -\mathbf{J} \quad (9)$$

and substituting into equation (8) we get,

$$\text{curl} \mathbf{H} = \epsilon \partial \mathbf{E} / \partial t \quad (\text{Maxwell's Displacement Current}) \quad (10)$$

However, since the divergence of a curl is always zero and considering that the right hand side of equations (8) and (9) arise out of the tangential velocity of the electrons and positrons in a rotating dielectric, the  $\mathbf{E}$  term must therefore be given by the tangential rotational component of force which in modern notation is written  $\partial \mathbf{A} / \partial t$ . The vector  $\mathbf{A}$  is closely related to the aether tangential velocity  $\mathbf{u}$  and it is called the magnetic vector potential. The rotational  $\partial \mathbf{A} / \partial t$  component of  $\mathbf{E}$  is the component that is involved in the Lorentz force and which Maxwell used to derive the electromagnetic wave equation (see part VI pdf links 4 and 5 at [1]). This means that Maxwell's displacement current, contrary to popular belief is actually a rotational phenomenon that acts tangentially at microscopic level and applies a torque to the circular dielectric units.

Displacement current in electromagnetic radiation is not the same quantity that is involved in the linear polarization of a dielectric such as would occur between the plates of a capacitor, yet displacement current is often taught and justified within that very context. The mathematical equation for linear displacement current would in fact be identical in form to equation (9), but the  $\mathbf{E}$  term would refer to the Coulomb force at ninety degrees to the rotational  $\partial \mathbf{A} / \partial t$  force of the angular displacement current. This ninety degree angular difference between the radial Coulomb force and the tangential  $\partial \mathbf{A} / \partial t$  is mirrored in the ninety degree phase difference between displacement and velocity in the equation of simple harmonic motion which is the basis of Maxwell's fifth equation (105).

When a capacitor is charging we will have a magnetic field and an angular displacement current causing magnetization all around the circuit. When the electric current stops flowing, the magnetic field will drop away but the dielectric between the

plates will remain linearly polarized. During the polarization process, the displacement current term between the plates of the capacitor would have been a combination of both angular and linear displacement current, whereas around the rest of the circuit it would have been exclusively angular displacement current.

When electrical energy propagates along high tension power transmission lines, the displacement current involved in the electromagnetic radiation should be exclusively angular displacement current.

## **Electromagnetic Radiation**

**VIII.** Although the rotational  $\partial\mathbf{A}/\partial t$  force is clearly the prime mover in electromagnetic radiation, we must not lose sight of the fact that the inverse square law Newton/Coulomb force is also involved through the vorticity vector  $\mathbf{H}$ . The inverse square law term inherent in  $\mathbf{H}$  refers to a coordinate frame with the origin at the centre of a circular electron positron dipole. When we consider the vector  $\mathbf{B}$ , we are considering the summation of values of  $\mathbf{H}$  within a bundle of Faraday's lines of force. The inverse square law relationship applies on the microscopic scale within the individual vortices but we cannot assume that it extends into large scale electromagnetism. There can be only so many  $\mathbf{H}$  lines emerging from a bar magnet and this means that the field will extend to a finite distance in space. That doesn't tend to suggest an inverse square law on the large scale.

Consider the case of Coulomb's law and its associated coordinate frame origin in conjunction with electromagnetic radiation that is deep in space and far away from any large scale source of electric charge. If we have an oscillating  $\mathbf{H}$  field in conjunction with a passing electromagnetic wave at a point in space, then that  $\mathbf{H}$  vector must be referred to a coordinate frame of reference with an origin in order to satisfy Coulomb's law. The only possible place where that origin can be located is right at the very point in question. We must therefore have some physically real motion at that point in space in order to give any meaning to the vorticity vector  $\mathbf{H}$ . The existence of a rotating dielectric unit at that point in space is the only possible explanation and it further tends to suggest that the inverse square law in magnetism might only apply on the microscopic level.

We need to abandon traditional ideas of the vacuum being a rigid void. Space is clearly dynamical and permeated with tiny vortices that move relative to space and which convert gravity into magnetism. Light is clearly a non-divergent tangential flow of aether swirling across from vortex to vortex. This non-divergent rotational aether flow is connected with the  $\partial\mathbf{A}/\partial t$  angular force of electromagnetic induction and it causes torque and hence magnetization of the electron positron dipoles. Light is a gyroscopic phenomena which probably also involves the convective effects of precession and centrifugal compression.

## **Energy and Aether Flow**

**IX.** Radial flow of aether (gravity) passing over a sea of rotating electron positron dipoles will linearly polarize them and render them into a higher energy state. The solenoidal alignment of the vortices that fits around the radial flow lines of linear polarization will mean that where the gravitational field lines from two planets come

together, the electrons and positrons in the luminiferous medium will glide over each other due to centrifugal repulsion in the equatorial plane of the dielectric units.

Solenoidal alignment is clearly a coordinated curling of gravity on the microscopic scale. Magnetization seems to be a rotational version of linear polarization. In both cases, the electron positron dipoles are rendered into a higher energy state by passing aether flow. In linear polarization it is radial aether flow of non-zero divergence and in magnetization it is zero divergent tangential aether flow that causes torque. In either case, the dielectric units behave like little satchels that fill up with aether to an equilibrium amount with the passing flow. In an electric circuit, when the power is switched off, the excess aether flows back out of the dielectric satchels and into the current again, giving the current a final surge forwards.

We can imagine a gravitational field as a perfect irrotational flow into a large sink that is pierced like a sieve with tiny holes. The tiny holes constitute rotating pairs of sources and sinks but with a net inflow. The rotation renders the tiny holes into tiny whirlpools within the overall radial inflow. These tiny swirling sinks reduce the overall inflow rate on the large scale by siphoning away aether that would otherwise have gone down into the larger sink. They are essentially a leak, and the electric permittivity is a measure of the leakage. The greater the permittivity, the lesser will be the Coulomb force or the gravitational force. As there is no leakage in the aether between electrons and positrons within a dipole, we would therefore expect the hydrodynamical force to be a lot greater than the Coulomb force formula would suggest, since the Coulomb force formula was calculated within the leaking context of the electric sea of electron positron dipoles. This means that the distance between the electrons and positrons may be a lot greater than that calculated on the basis of their mutual gravitational charge. We can only speculate on the diameter of the electron positron dipoles based on compatibility with atomic and molecular matter and the behaviour of the orbital electrons and the interaction with electromagnetic radiation.

## **Magnetization and Polarization**

**X.** Magnetization seems to be the increasing of the vorticity and the rotational kinetic energy of the electron positron dipoles and solenoidal field lines above a nominal value. It would be very difficult to find a region of space that is not under the influence of some seeding source of spin. We can generally expect there always to be a magnetic field of at least some nominal value at any point.

Linear polarization seems to be the elongation of the electron positron dipoles and the separation of the overlapping orbits into a double circle arrangement without any increase in the vorticity. It would however seem to be accompanied by an increase in kinetic energy which suggests that the overlapping effect undermines any tendency for the vorticity to increase.

## **The Pierre Duhem Error**

**XI.** The nineteenth century French positivist Pierre Duhem alleged that Maxwell cheated by using Newton's equation for the speed of sound at equation (132) in his 1861 paper 'On Physical Lines of Force' [2]. This allegation was based on the idea

that a factor of  $\frac{1}{2}$  should have been introduced beside the elastic constant of equation (132) in order to account for the dispersion of light.

But we know that light on the microscopic scale is totally coherent and doesn't disperse. We have seen above that light is a non-divergent flow of aether passing from vortex to vortex.

The falsity of Pierre Duhem's allegation can be thoroughly exposed simply by ignoring Maxwell's so called arbitrary introduction of equation (132). We can arrive at the exact same result simply by combining Faraday's law of electromagnetic induction at equation (54) of Maxwell's 1861 paper with the Ampère/Maxwell equation (112) in the same paper. This is the standard modern way of deriving the electromagnetic wave equation. When we carry out this method using Maxwell's original equations and his original units and symbols, we end up with a wave speed given by the equation,

$$V^2 = E^2/\mu \quad (\text{Maxwell's Wave Speed Equation}) \quad (132)$$

This is exactly the same as the equation which Maxwell introduced as equation (132).

## References

[1] Clerk-Maxwell, J., "A Dynamical Theory of the Electromagnetic Field", Philos. Trans. Roy. Soc. 155, pp 459-512 (1865). Abstract: Proceedings of the Royal Society of London 13, pp. 531--536 (1864)

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[2] Clerk-Maxwell, J., "On Physical Lines of Force", Philosophical Magazine, Volume 21, (1861)

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