# Induction of Electrostatic Repulsion by Strong Gravity
(The Link Between Gravity and Electromagnetism)

Frederick David Tombe,
Northern Ireland, United Kingdom,
sirius184@hotmail.com
27th December 2017

Abstract. **The radial lines of force that are associated with Gauss's law indicate the presence of fluid-like sinks and sources in matter, whether or not we know where these lead to. This article will examine how two sinks can be either mutually attractive or mutually repulsive depending on the rate of flow.**
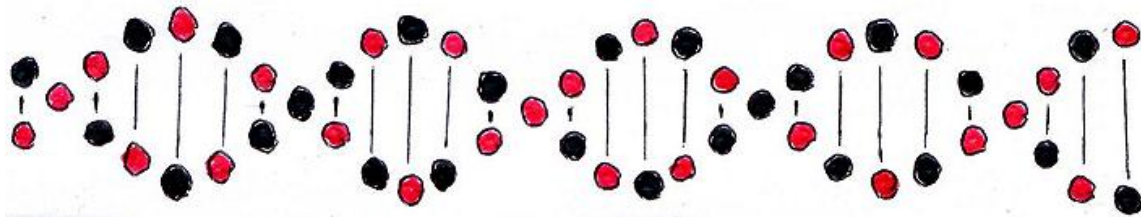
The Radial Force Field

I. In the case of gravity, two like charges attract, whereas in the case of electrostatics, two like charges repel. This discrepancy is often cited as being the reason why the two theories cannot possibly be unified into a single theory under the jurisdiction of Gauss's law. It would have to be explained how two fluid sinks could mutually attract in one case, yet mutually repel in the other case.

This is not however a particularly difficult problem to solve. Two neighbouring sinks will naturally attract each other, providing that they are largely irrotational. If on the other hand, the two sinks are both swirling in the same direction, their flow lines will sweep past each other laterally, and if they are swirling fast enough they could conceivably push each other apart. It simply remains for us to identify a structural arrangement within an all pervading fluid-like aethereal medium, which would allow for there to be an inter-play between rotational and irrotational effects.

In the 18th century, while working in the field of optics, the younger John Bernoulli provided us with the necessary arrangement [1]. He postulated that space is permeated with excessively small whirlpools that press against each other with centrifugal force while striving to dilate. A similar view was adopted in the 19th century by James Clerk-Maxwell while he was attempting to explain the electromagnetic field. In the preamble of Part I of his 1861 paper *"On Physical Lines of Force"*, while attempting to explain magnetic repulsion, Maxwell wrote *"The explanation which most readily occurs to the mind is that*

1

the excess of pressure in the equatorial direction arises from the centrifugal force of vortices or eddies in the medium having their axes in directions parallel to the lines of force" [2].

Early in the 20th century, Nikola Tesla indicated that he was likewise under the impression that space was thrown into infinitesimal whirls of prodigious velocity, and that mankind had already realized this long ago [3]. Later, in 1937, Sir Oliver Lodge when writing the article on ***"Ether (in physics)"*** for the Encyclopaedia Britannica, indicated that such a point of view was by then standard [4]. He said that the *ether* is most probably *"in a state of fine-grained vortex motion, circulating with that same enormous speed"*. The speed that he was referring to was of course the speed of light.

In order to understand how two sinks on the large scale might repel each other, it's merely a question of establishing the structural alignment of the all pervading tiny whirlpools so as to direct their equatorial centrifugal pressure perpendicularly to the large scale flow lines. It was discussed in a previous article entitled ***"The Double Helix and the Electron-Positron Aether"*** [5] how the attractive force between an electron and positron can be converted into a repulsive force when their mutual transverse speed exceeds a certain threshold of magnitude. This is the fundamental principle behind centrifugal force which is in turn the fundamental principle behind magnetic repulsion. Consider space to be densely packed with rotating electron-positron dipoles, with electrons being aether sinks and positrons being aether sources. If we then superimpose a radial force field in the form of a larger scale prevailing aether flow, this will act differently on electrons than on positrons, so causing a torque which will cause each rotating electron-positron dipole to precess about an axis that is parallel to the large scale external radial force. This will give rise to centrifugal pressure acting at right angles to the field lines. It follows therefore that every sink based radial field will be primarily tensile along the lines of force, but that there will also be centrifugal pressure acting sideways from the lines. When two like-charged bodies are immersed side by side in the electron-positron sea, the field lines from each charge will avoid each other and spread out sideways into space, only touching each other sideways on. The lateral centrifugal pressure emanating from the tiny precessing electron-positron dipoles at the interface will act to push the two larger charged bodies apart. This will be so whether we have a pair of positive charges or a pair of negative charges.

There will therefore always be two forces acting between like-charged bodies. There will be one force acting along the field lines and another force acting at right angles to the field lines. The latter will always be repulsive. In cases where the former is attractive, the question is then a matter of whether the attractive force is lesser or greater than the centrifugal repulsive force that acts perpendicularly to the field lines.

The Reversal Threshold

II. A radial line of force will resemble a wind tunnel that is lined with turbines, although instead of the wind causing the turbines to rotate, a tensile or pressurized aether flow will cause already rotating electron-positron dipoles to precess. There will be an analogy with a pivoted spinning top. The equation for the spinning top is,

$$\omega_p = mgr/I\omega_r \tag{1}$$

where ω_p is the precessional angular speed, ω_r is the rotational angular speed, m is the mass, g is the gravitational field strength, r is the distance from the centre of mass to the pivot, and I is the moment of inertia. The significant factor is that the field strength is directly proportional to the precessional angular velocity term, ω_p, in equation (**1**).

In the case of the radial gravitational field, the tensile inflowing aether will cause a torque to act on the all pervading tiny rotating electron-positron dipoles. This will cause them to precess with their precession axes parallel to the gravitational field lines. Since in general, centrifugal force is $mr\omega^2$, and since the angular speed of the tiny dipoles will be proportional to the gravitational field strength, it follows therefore that for a fixed distance from the centre of the gravitational field, the repulsive centrifugal pressure acting at right angles to the field lines will be proportional to the square of the gravitational field strength. This means that at a fixed distance from the origin, should the gravitational field strength be increasing for whatever reason, then the repulsive force will be increasing too, but at a greater rate. A reversal threshold must therefore be reached where the repulsive force will overtake the attractive force in magnitude, hence becoming dominant. This is the watershed between gravitational attraction and electrostatic repulsion. Electrostatic repulsion is in effect strong gravity that has been turned around by the inertial antics of the all pervading rotating electron-positron dipoles which are acting like tiny soft gyroscopes. See **Appendix I**.

Friction in Space and Ampère's Circuital Law

III. It was discussed in ***"The Double Helix and the Electron-Positron Aether"*** how Newton's first law of motion follows from the fact that space is filled with a dielectric solid [5]. This solid is loosely bound and it interacts with moving bodies in conjunction with Ampère's Circuital Law. According to Maxwell [2], although he himself didn't express it in such words, Ampère's Circuital Law

derives from a gyroscopic Coriolis force that causes vortices to form toroidal vortex rings around a source of motion [6]. This alignment is the basis of the magnetic fields which surround an electric circulation. A loose analogy to a magnetic field would be the vortex rings that form around a jet of water within a larger body of water. Steady state magnetic field lines will be something in the same vein as smoke rings, with their kinetic energy circulating around and not dispersing into the wider surroundings.

And so it is too with moving terrestrial bodies. The electron-positron sea flows through the interstitial spaces between atoms and molecules just as like water flows through a basket, and when this occurs, the physical interaction causes the tiny electron-positron dipoles to align along their rotation axes forming solenoidal vortex chains like smoke rings. These solenoidal double helix chains are *inertial field lines* and they are centred round the direction of motion. They are the same thing as magnetic field lines but considerably weaker, and just as in the case of an electric circuit, when deceleration occurs, the accompanying magnetic field collapses and the stored energy is discharged back into the moving body again, giving it a final surge forwards. It is proposed however that if the speed is exceedingly high, that some of the energy in the accompanying inertial magnetic field may in fact diverge and be lost as EM radiation.

The inertial forces that follow as a consequence of Newton's first law are ultimately caused at a deeper level by the centrifugal force and the Coriolis force acting on a smaller scale between the neighbouring dipolar vortices that fill all of space [7], [8], [9]. In the case of large planetary bodies that entrain a pocket of the electron-positron sea within their gravitational fields, there is a variation on the terrestrial theme, but the same principle occurs at the interface between the two entrained regions of electron-positron sea where the two gravitational fields come into contact with each other. The mutual transverse motion of the two planets induces the electron-positron dipoles at the interface to align as per Ampère's Circuital Law so as to create a cushion of centrifugal pressure between the two gravitational fields as they shear past each other. The centrifugal pressure coming from the electron-positron dipoles creates a kind of hovercraft effect which acts to prevent the two planets from falling together.

Bi-Directional Radiation in the Near Field

IV. The idea of an accompanying circular energy flow in the region surrounding moving objects and electric currents can be illustrated more clearly by considering a bar magnet that is rotating about an axis that is perpendicular to its own magnetic axis. EM radiation must be occurring, because as each electron-positron dipole in the rotating magnetic field realigns during the

rotation, this will induce a corresponding realignment in the neighbouring dipoles as we move outwards from the source magnet. We will have a propagated changing magnetic field, and therefore the situation is no different in theory to that which exists in the vicinity of an AC circuit. Some energy will be radiated away, but this will only be significant at very high angular speeds. As regards the trapped radiation, this follows the path of the rotating magnetic field lines, and so in effect it remains in orbit around the source bar magnet. And since the situation involves no chirality, the symmetry means that the near field radiation will have to be bi-directional. The double helix structure of magnetic field lines does of course perfectly provide the possibility for two rays of radiation to pass each other on opposite tracks. While pressurized aether flows from positron to electron in one direction, it does likewise in the opposite direction on the other track.
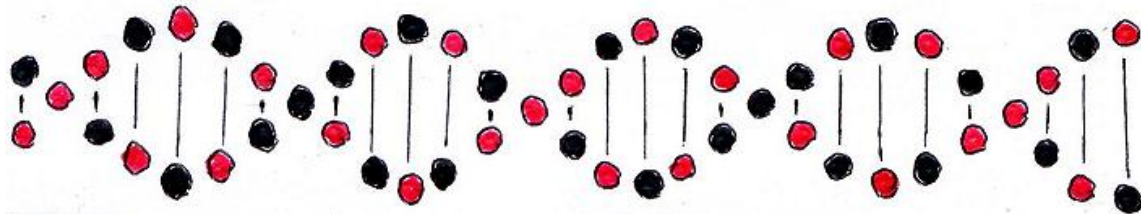

Fig. 1 A close-up view of a single magnetic line of force. The electrons are shown in red and the positrons are shown in black. The double helix is rotating about its axis with a speed which determines the speed of light, and the rotation axis represents the magnetic field vector H.
The diagram is not to scale as the relative dimensions remain uncertain [10].

The same thing happens with linear motion such as in the case of a moving terrestrial body, or in the case of a DC transmission line pulse. The accompanying magnetic field will be constantly realigning within the background electron-positron sea hence leading to a bi-directional circular flow of radiation.

Conclusion

V. It is a common mistake to believe that a fluid-like aether can explain electromagnetism without specifying that the aether first needs to be rendered into tiny whirlpools. In order to have a sea of enduring aether whirlpools, we need to have sources and sinks in the aether. The whirlpools (or vortices) that are responsible for electromagnetic phenomena are dipolar. The sinks are electrons and the sources are positrons. Only when the aether is rendered into a sea of rotating electron-positron dipoles does it constitute the medium for the

propagation of light, known as the luminiferous medium. The luminiferous medium can therefore be described as being either a sea of tiny aether vortices or as a sea of rotating electron-positron dipoles. It's the presence of the tiny vortices that enables two sinks on the large scale to either mutually attract or mutually repel, depending on the large scale rate of flow, since the large scale flow has a polarizing torque action on the tiny dipoles, which in turn generates a centrifugal repulsion to act at right angles to the flow lines. In summary, the fine-grained gyroscopic antics in the fabric of a force field can cause the direction to undergo a U-turn if the force is great enough.

References

[1] Whittaker, E.T., *"A History of the Theories of Aether and Electricity"*, Chapter 4, pages 100-102, (1910)
"All space, according to the younger Bernoulli, is permeated by a fluid aether, containing an immense number of excessively small whirlpools. The elasticity which the aether appears to possess, and in virtue of which it is able to transmit vibrations, is really due to the presence of these whirlpools; for, owing to centrifugal force, each whirlpool is continually striving to dilate, and so presses against the neighbouring whirlpools. It will be seen that Bernoulli is a thorough Cartesian in spirit; not only does he reject action at a distance, but he insists that even the elasticity of his aether shall be explicable in terms of matter and motion. This aggregate of small vortices, or " fine-grained turbulent motion," as it came to be called a century and a half later,* is interspersed with solid corpuscles, whose dimensions are small compared with their distances apart. These are pushed about by the whirlpools whenever the aether is disturbed, but never travel far from their original positions. A source of light communicates to its surroundings a disturbance which condenses the nearest whirlpools; these by their condensation displace the contiguous corpuscles from their equilibrium position; and these in turn produce condensations in the whirlpools next beyond them, so that vibrations are propagated in every direction from the luminous point. It is curious that Bernoulli speaks of these vibrations as longitudinal, and actually contrasts them with those of a stretched cord, which, "when it is slightly displaced from its rectilinear form, and then let go, performs transverse vibrations in a direction at right angles to the direction of the cord." When it is remembered that the objection to longitudinal vibrations, on the score of polarization, had already been clearly stated by Newton, and that Bernoulli's aether closely resembles that which Maxwell invented in 1861-2 for the express purpose of securing transversality of vibration, one feels that perhaps no man ever so narrowly missed a great discovery. Bernoulli explained refraction by combining these ideas with those of his father. Within the pores of ponderable bodies the whirlpools are compressed, so the centrifugal force must vary in intensity from one medium to another. Thus a corpuscle situated in the interface between two media is acted on by a greater elastic force from one medium than from the other; and by applying the triangle of forces to find the- conditions of its equilibrium, the law of Snell and Descartes may be obtained. * Cf . Lord Kelvin's vortex-sponge aether, described later in this work."

[2] Clerk-Maxwell, J., *"On Physical Lines of Force"*, Philosophical Magazine, Volume XXI, Fourth Series, London, (1861)
http://vacuum-physics.com/Maxwell/maxwell_oplf.pdf

[3] O'Neill, John J., *"PRODIGAL GENIUS, Biography of Nikola Tesla"*, Long Island, New York, 15th July 1944, quoting Tesla from his 1907 paper *"Man's Greatest Achievement"* which was published in 1930 in the Milwaukee Sentinel,
"Long ago he (mankind) recognized that all perceptible matter comes from a primary substance, of a tenuity beyond conception and filling all space - the Akasha or luminiferous ether - which is acted upon by the life-giving Prana or creative force, calling into existence, in never ending cycles, all things and phenomena. The primary substance, thrown into infinitesimal whirls of prodigious velocity, becomes gross matter; the force subsiding, the motion ceases and matter disappears, reverting to the primary substance".
http://www.rastko.rs/istorija/tesla/oniell-tesla.html

[4] Lodge, Sir Oliver, *"Ether (in physics)"*, Encyclopaedia Britannica, Fourteenth Edition, Volume 8, Pages 751-755, (1937)
http://gsjournal.net/Science-Journals/Historical%20PapersMechanics%20/%20Electrodynamics/Download/4105
"The most probable surmise or guess at present is that the ether is a perfectly incompressible continuous fluid, in a state of fine-grained vortex motion, circulating with that same enormous speed. For it has been partly, though as yet incompletely, shown that such a vortex fluid would transmit waves of the same general nature as light waves— i.e., periodic disturbances across the line of propagation—and would transmit them at a rate of the same order of magnitude as the vortex or circulation speed" (Sir Oliver Lodge, 1937)
The articles then goes on to cite Lord Kelvin, **"The Vortex Theory of Ether,"** *Phil. Mag.* (1887) and *Math. and Phys. Papers*, vol. iv. and passim; also G. F. FitzGerald, *Proc. Roy. Dub. Soc.* (1899), or *Collected Papers*, pp. 154, 238, 472.

[5] Tombe, F.D., *"The Double Helix and the Electron-Positron Aether"* (2017)
http://gsjournal.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/7057

[6] Tombe, F.D., *"The Coriolis Force in Maxwell's Equations"*, (2010)
Galilean Electrodynamics, Volume 25, Number 2, p.22, (March/April 2014)
http://gsjournal.net/Science-Journals/Research%20Papers-Astrophysics/Download/3161

[7] Tombe, F.D., *"Compressed Orbits and the Secret Behind E = mc²"* (2017)
http://gsjournal.net/Science-Journals/Research%20Papers-Astrophysics/Download/6767

[8] Tombe, F.D., *"Centrifugal Force Between Two Orbital Systems"* (2017)
http://gsjournal.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/247

[9] Tombe, F.D., *"The Rattleback and the Gyroscopic Force"* (2010)
http://gsjournal.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/3160

[10] Tombe, F.D., *"The Double Helix Theory of the Magnetic Field"* (2006)
Galilean Electrodynamics, Volume 24, Number 2, p.34, (March/April 2013)
http://gsjournal.net/Science-Journals/Research%20Papers-Mathematical%20Physics/Download/6371

[11] Tombe, F.D., ***"Atomic Clocks and Gravitational Field Strength"*** (2017)
http://gsjournal.net/Science-Journals/Research%20Papers-Astrophysics/Download/6780

[12] Tombe, F.D., ***"The Rings of Force that Cause the Tides"*** (2010)
http://gsjournal.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/253

Appendix I

Direct electrostatic repulsion can also occur between source based (positive) charges, in which case the repulsion will be acting both along the field lines and perpendicular to them. It is now proposed that Coulomb's Law of Electrostatics relates only to an inverse square law force acting along the field lines, and not to any induced force that acts at right angles to them. It's only when so restricted, that Coulomb's law can be unified with Newton's Law of Gravity into a single force law. The force that acts sideways from the field lines, and which can cause two sinks to repel each other, would not appear to fall under the jurisdiction of Coulomb's law, and as will be seen below, it even has a different power law.

Additionally, if we intend to unite Coulomb's law with Newton's law of gravity, then the quantity *"gravitational mass"* should more accurately be called *"gravitational charge"*. It is wrongly believed, as a consequence of Einstein's General Theory of Relativity, that gravitational mass and inertial mass are equivalent. What in fact is observed is that the two appear to be directly proportional to each other in magnitude, and so this enables us to synchronize the units, hence allowing the two quantities to become confused with each other. What needs to be done is to redefine gravitational mass as a weak sink based (negative) charge, and then to give it the standard units of electric charge.

Once the units of charge have been standardized, Coulomb's law will extend to gravity, while bearing in mind, particularly in the gravitational cases, that the force acts mutually across two bodies, causing each to accelerate relative to their common centre of mass. The issue of the centre of mass was ignored in the case of Galileo's free fall experiment at the Leaning Tower of Pisa in the 16th century, and this led to the erroneous belief that the inertial mass of a body does not affect its own acceleration when it is subjected to a gravitational force. This false assumption, now well and truly ingrained, has the effect of creating an unnecessary schism between gravity and electrostatics. It was no doubt a contributing factor to Einstein's erroneous *"Equivalence Principle"*, and it has acted as a major hindrance when it comes to attempts to unify gravity and electrostatics into a single theory.

The term *"gravitational field strength"* which normally means the acceleration due to gravity, *g*, at a point in space, will now mean *"force per unit charge"* just as in the case of *"electric field"*. We will however continue to use the symbol, *g*, for cases where the electric field that we are considering, is one that would normally be considered to be a gravitational field.

The electrostatic repulsive force that is generated at right angles to radial field lines is similar in nature to inertial centrifugal force, differing only in the manner of its induction. Inertial centrifugal force is convectively induced and it is closely tied up with kinetic energy, whereas sink based electrostatic repulsion is induced by the inflow tension in the sink itself. In both cases, the root cause of the repulsion lies in the fine-grained rotation of the tiny electron-positron dipoles (dipolar vortices) that fill all of space. At the interface between two sinks on the large scale, the tiny dipolar vortices that permeate them are caused to angularly accelerate, either convectively by a transverse shear as occurs in orbital motion, or inductively by the radial force field itself, hence causing the tiny dipoles to precess. Interestingly, a similar split in cause, as between convective and inductive, can be observed in the case of atomic clocks in orbit. The process operating within the caesium atoms is dilated in a similar manner, whether by the orbital motion or by the gravitational field strength [11]. The clocks slow down with both increasing orbital speed and with increasing gravitational field strength. This suggests that when linear acceleration of a terrestrial object occurs, there is a mutual angular acceleration as between its molecules and the background electron-positron dipoles. This interaction will be closely tied up with Ampère's Circuital Law.

Sink based electrostatic repulsion that occurs in the absence of any of the normal large scale transverse motion that induces inertial centrifugal force, could be seen as a centrifugal force of the form $mr\omega^2$ where ω is the angular speed of the tiny dipoles at the interface between the two radial force fields, and where *r* is the distance to the centre of the large scale field under consideration. As explained in section **II** above, since the field intensity *g* is proportional to ω, it follows from equation **(1)** in that section, that the electrostatic repulsive force F_E must satisfy,

$$F_E = mr\alpha g^2 \qquad\qquad (2)$$

where α is a constant of proportionality dependent upon choice of units. Since,

$$g = -k/r^2 \qquad\qquad (3)$$

where *k* is a constant related to the gravitational charge, then substituting equation **(3)** into equation **(2)**, we obtain,

$$F_E = m\alpha k^2/r^3 \qquad\qquad\qquad\qquad\qquad\qquad\qquad \textbf{(4)}$$

Therefore, just like in the case of inertial centrifugal force, electrostatic repulsion that is generated sideways from the field lines follows the inverse cube law relationship. Interestingly, the inverse cube law relationship is also found in the tidal force, suggesting that the tides may also be caused by a sideways pressure from surrounding lines of force [12].

  The reversal threshold is that distance from the centre of a planet, below which the gravitational field intensity is weaker than the upward induced electrostatic repulsion. In the case of a planetary body whose mass is sufficiently large, it's theoretically possible to have the reversal threshold above the surface of the planet, meaning that objects would levitate at a particular height.

8th January 2018 – **Appendix I** added