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Centrifugal Force in the Schwarzschild Field

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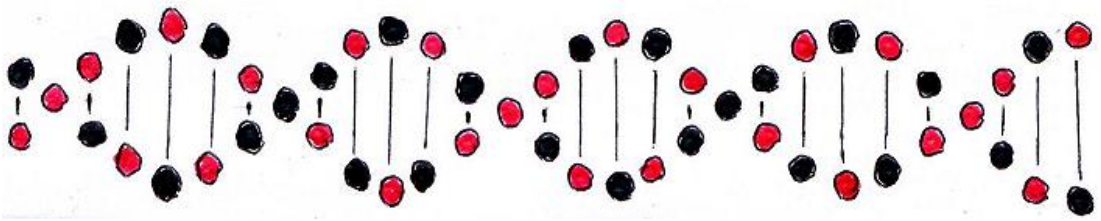
Abstract. **Centrifugal force is an inertial effect which is induced by motion through the luminiferous medium. While it can act in opposition to gravity, there is evidence from Einstein's General Theory of Relativity, that gravity, if strong enough, can affect the physical structure of the luminiferous medium in such a way as to destroy the centrifugal force and convert it into an electrostatic force of attraction that augments the gravity. The physical nature of centrifugal force and the manner in which it can be altered by gravity will now be investigated.**



Leibniz's Equation Corrected for General Relativity

I. When corrected for Einstein's ***"General Theory of Relativity"***, Leibniz's radial planetary orbital equation, [1], takes on the form,

$$m\ddot{r} = -GMm/r^2 + L^2/mr^3 - 3GML^2/mc^2r^4 \qquad \textbf{(1)}$$

where L is angular momentum, $-GMm/r^2$ is the familiar Newtonian gravity term, L^2/mr^3 is the centrifugal force, and $-3GML^2/mc^2r^4$ is the so-called relativistic term. Note that the relativistic term, which is negligible in most cases, is an attractive term like gravity and hence it detracts from the repulsive effect of the centrifugal force. This leads to a deviation from the classical Keplerian solution to planetary orbits, and this deviation starts to become noticeable in strong gravitational fields.

On initial inspection, the relativistic term appears somewhat mysterious since it is a hybrid effect involving characteristics of both gravity and centrifugal force, each of which has a completely different

physical cause. Gravity is an inverse square law force indicating that it arises in connection with a monopole field, whereas centrifugal force is an inverse cube law force indicating that it arises in connection with a dipole field. We can however get a better insight into the physical interaction between gravity and centrifugal force which underlies this hybrid force if we rearrange equation **(1)** so as to reduce the right-hand-side into two distinct forces, one being an attractive monopole force and the other being a dipole force which can be either repulsive or attractive. Equation **(1)** then takes on the form,

$$m\ddot{r} = -GMm/r^2 + L^2/mr^3[1 - (3/2)(v^2/c^2)] \qquad \textbf{(2)}$$

where c is the speed of light, and v is the escape velocity as per the equation,

$$v^2 = 2GM/r \qquad \textbf{(3)}$$

The dipole inverse cube law force is primarily a repulsive centrifugal force, but with gravity acting as a reducing factor which can make it become attractive in a strong gravitational field, hence augmenting the gravity. It can be seen from equation **(2)** that the greater the escape velocity, and hence the greater the gravitational field strength, the lesser will be the magnitude of the inverse cube law force in the positive direction. Indeed, when the escape velocity is such that the ratio of v^2/c^2 is 2/3, this force will disappear altogether, and as v increases further still, approaching the speed of light, the inverse cube law force will have reversed its direction and will now be working to bolster the gravitational force of attraction rather than opposing it.

Maxwell's Sea of Molecular Vortices

II. In order to better understand how gravity acts to reduce centrifugal force, we will identify the luminiferous medium with Maxwell's sea of molecular vortices, **[2]**, as amended by ***"The Double Helix Theory of the Magnetic Field"***, **[3]**, **[4]**. This means that Maxwell's vortices become dipolar vortices, each containing an aether sink (electron) and an aether source (positron). The luminiferous medium then becomes a dipole field, and hence it only relates to the inverse cube law inertial force in equation **(2)**, and not to gravity. The role of the dipolar vortex sea in causing the inertial forces has already been covered in earlier papers, **[5]**, **[6]**, and the objective now will be to try and explain how gravity acting upon this

dipolar vortex sea, when strong enough, converts the inverse cube law force from a centrifugal repulsion into an attractive force.

The general principle behind the following proposed explanation is that the orientation of the rotation axes of the individual dipolar vortices within the vortex sea is determined by either an externally applied gravitational field or by something in the vicinity moving through the sea. This orientation will in turn determine whether these rotating dipoles face their immediate neighbours in their equatorial planes or in their axial planes. This can make the difference between mutual repulsion or mutual attraction between neighbouring dipoles across the interface between two gravitational fields.

If gravitating bodies, just like electrons, are also aether sinks, but on the large scale, then when a gravitational field is superimposed upon the sea of tiny dipolar vortices, these vortices will experience a torque which will cause them to precess about an axis that is parallel to the gravitational field lines. In a weak gravitational field, this won't cause too much impact on the already existing background double helix magnetic alignment of this electron-positron dipole sea, but when the gravitational field strength increases significantly, this creates gravitational tubes of force comprised of precessing dipoles which repel their immediate neighbours laterally due to fine-grained centrifugal force emanating from the equatorial plane of the tiny dipoles as they strive to dilate. Increasing the gravitational field strength further, will increase this centrifugal force, and as argued in section **II** of ***"Induction of Electrostatic Repulsion by Strong Gravity"***, **[7]**, the centrifugal force will increase at a greater rate than the gravity does, and therefore a reversal threshold will be reached in which two gravitating bodies will actually repel each other. This is perhaps what we observe when two like-electric charges repel each other, suggesting that an electrostatic field, in the case where the charge is sink-based, is simply a strong gravitational field.

The explanation for convectively induced centrifugal force is extrapolated from Maxwell's explanation for Ampère's Circuital Law, whereby the rotation axes of the tiny molecular vortices form concentric solenoidal rings of force around the path of motion of the electric current, **[5]**, **[8]**. This constitutes a magnetic field, equivalent to a centrifugal force field. When this principle is extended to all moving objects, then when two bodies pass each other transversely, the tiny vortices at the interface between the two centrifugal force fields will repel each other, **[5]**. The same principle will apply at the interface between two gravitational fields undergoing mutual transverse motion, and this will give rise to orbital centrifugal force on the large scale. But if the gravitational field strength is large enough, the precessional angle of the tiny electron-positron vortices in the gravitational tubes of force will exceed ninety degrees, and

so their direction of rotation will reverse. At the interface with another gravitational field, unless that other gravitational field is equally excessive, the neighbouring vortices will instead bond, electron to positron, across the interface. The centrifugal repulsion will therefore be replaced by an electrostatic force of attraction. We can therefore have a gravitational field that is so strong, that below a certain radius there can never be a centrifugal force to protect another body from falling into it, unless that other body has an excessively strong gravitational field also. This radius is known as the ***Schwarzschild Radius***.

Aether Terminologies

III. Einstein used the term ***luminiferous aether*** for what James Clerk Maxwell termed ***"the luminiferous medium"***, **[9]**. But what Einstein referred to as the ***luminiferous aether*** should not be confused with the ***pure aether*** itself. The former is the latter, only when the latter is rendered into a state of tiny dipolar whirlpools, **[10]**, **[11]**, **[12]**. The former is Maxwell's sea of molecular vortices while the latter is the inflowing medium associated with the gravitational field, and from which the tiny dipolar vortices in the former are comprised. The interaction between these two inter-related physical media interferes with the inertial forces. We will equate the speed of inflow of the pure aether (electric fluid) in a gravitational field with the escape velocity mentioned in section **I**.

It is considered that gravity, of which the ultimate cause remains unknown, is mediated by the flow of this fundamental aether (electric fluid) as it flows through the sea of tiny aether whirlpools, and into gravitating bodies. The sea of tiny aether whirlpools, which constitutes the luminiferous medium, does not in itself flow into gravitating bodies. In the sea of tiny whirlpools, the aether flows into sinks (electrons) and out of sources (positrons). These electrons and positrons orbit each other, and when subjected to a gravitational field, there will be a prevailing net flow of the same pure aether, towards and into a gravitating body of ponderable matter. Hence, contrary to common belief, gravity is not explained as being a warp in the 4-D space-time continuum as is taught in conjunction with General Relativity. We don't actually have an explanation for the vital force that draws the aether into the sinks, and which is the ultimate cause of gravity. Meanwhile, gravity is something external to the luminiferous medium, but which superimposes upon and distorts its internal structure, hence affecting optical and inertial phenomena. It's possible that in turn, the luminiferous medium, being Maxwell's sea of tiny aethereal whirlpools, also has an effect on gravity by acting like a rotationally elastic sponge which absorbs some of the

large scale vorticity in the velocity field of the aether that flows into gravitating bodies.

Conclusion

IV. Einstein's ***"General Theory of Relativity"***, published in its final form in 1916, is about fine-grained gyroscopics in the medium for the propagation of light, which Einstein referred to as the *luminiferous aether*. In the abstract of his earlier 1905 paper on ***"Special Relativity"***, **[9]**, Einstein discarded the luminiferous aether, and he was quite wrong to do so. He was wrong because this only resulted in paradoxical absurdities, **[13]**, in what otherwise would have been a very ingenious theory. For a start, we need the luminiferous aether as a physical standard of absolute rest. Einstein did however back-pedal somewhat during his address at the University of Leiden in 1920, **[14]**. He realized that to deny the aether is to assume that space has no physical qualities whatsoever, but again he erred by failing to identify the luminiferous aether specifically with Maxwell's sea of molecular vortices. This is despite the fact that special relativity can be made correct, and electron-positron pair annihilation explained too, simply by re-introducing this fine-grained vortex sea, **[15]**, **[16]**, **[17]**. What Einstein saw as the Minkowski's 4-D space-time continuum is in fact an electron-positron sea, **[18]**, while General Relativity is simply a case of applying special relativity to the escape velocity in a gravitational field. General relativity is ultimately about the manner in which gravity distorts the physical structure of the dipolar electron-positron vortex sea, and the effect that this has on optical and inertial phenomena.

Gravity exerts a torque on the tiny electron-positron vortices, hence causing them to precess about the radial gravitational field lines. This in turn generates centrifugal pressure perpendicular to the field lines. If, however, the gravity happens to be very strong, the precession cone can exceed ninety degrees, hence reversing the direction of spin so as to undermine the centrifugal pressure that is generated at the interface with the gravitational field of another body. An electrostatic force of attraction then acts, between electron and positron, across the interface. There will therefore be a certain radius below which Kepler's laws break down to the extent that there can be no escape. However, if both gravitational fields are excessively strong, then the rotation reversal will have occurred in the tiny vortices on both sides of the interface, and so a centrifugal force of repulsion will still exist. It would seem that between two comparable masses, there is always a self-standing centrifugal force of repulsion, independent of any angular momentum on the large scale, but that it is always overridden by gravitational attraction.

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https://www.researchgate.net/publication/322211308_Induction_of_Electrostatic_Repulsion_by_Strong_Gravity_The_Link_between_Gravity_and_Electromagnetism

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http://users.physik.fu-berlin.de/~kleinert/files/1905_17_891-921.pdf
https://en.wikisource.org/wiki/Translation:On_the_Electrodynamics_of_Moving_Bodies

[10] O'Neill, John J., ***"PRODIGAL GENIUS, Biography of Nikola Tesla"***, Long Island, New York, 15th July 1944, Fourth Part, paragraph 23, 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
http://www.ascension-research.org/tesla.html

[11] 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****."*

[12] 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
In relation to the speed of light, *"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"*

[13] Dingle, H., ***"The Case Against Special Relativity"***, Nature, Volume 216, pages 119-122, (1967)
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But on the other hand there is a weighty argument to be adduced in favour of the ether hypothesis. To deny the ether is ultimately to assume that empty space has no physical qualities whatever. The fundamental facts of mechanics do not harmonize with this view.
https://mathshistory.st-andrews.ac.uk/Extras/Einstein_ether/

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Appendix I

(A Note on Entrainment of the Luminiferous Medium by Planetary Bodies)

In the case of small objects where their gravitational fields are too weak to entrain the luminiferous medium, then when in motion, the luminiferous medium will pass through the interstitial spaces between their constituent atoms and molecules, just like water flowing through a basket. As explained in section **II** above, centrifugal force is then caused by the solenoidal vortex rings that form around these bodies when in motion through this electron-positron vortex sea.

In the case of large planetary bodies however, as also explained in section **II** above, when gravity acts on the electron-positron sea such as to cause the tiny vortices to precess, hence forming fine-grained gyroscopic tubes of force consisting of the tiny precessing vortices, then the entire vortex sea within the gravitational field will be bonded to the planet. Centrifugal force is generated in the equatorial planes of these tiny precessing vortices, and the gravitational field strength will determine the precessional angle and hence the orientation of the centrifugal force on the large scale. While precessing, the centrifugal force being generated by the tiny vortices, will have components acting both parallel to the gravitational tubes of force and perpendicular to them. It's the perpendicular component that gives rise to orbital centrifugal force on the large scale.

When the gravitational field strength is very strong, the centrifugal force can become orientated almost entirely parallel to the tubes of force. While this will prevent the tiny vortices themselves from being drawn down into the planet by the gravity, since the vortices will now be repelling each other along the line of the gravitational tubes of force, the orbital centrifugal force on the large scale will now have been destroyed, unless a similar situation has occurred in the other body.