

Activating the Dirac Sea

*Frederick David Tombe,
Northern Ireland, United Kingdom,
sirius184@hotmail.com
23rd March 2024*

Abstract. If ponderable matter serves as a sink for an all-pervading and all-connecting fluid-like aether, the role of rotation in the stability of the universe, and also in the structure of the medium for the propagation of light, will now be examined.

Man's Greatest Achievement

I. An article written in 1907 by Nikola Tesla entitled "*Man's Greatest Achievement*" appeared in several American Sunday papers over the course of July 1930, and in this article the following quote appeared, [1],

"Long ago he (mankind) recognized that all perceptible matter comes from a primary substance, of a tenuity beyond conception, filling all space, the Ākāśa 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." Nikola Tesla, 1907

This quote suggests, that although a primary fluid-like aether fills all of space, it was already known to men of old that the aether only becomes perceptible matter when it is in a state of fine-grained rotation. By the term "*perceptible matter*", one tends to think of the elements of the periodic table that make up *ponderable matter*, but in the eighteenth century, the younger John Bernoulli was invoking fine-grained spin in the aether in connection with refraction in the medium for the propagation of light. The following quote appeared in Whittaker, [2],

"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."

The light-carrying medium, as proposed by the younger John Bernoulli, can't be weighed on the scales, because the tiny aethereal whirlpools from which it is comprised would simply pass through the interstitial spaces between the atoms and molecules of ponderable matter as like water passing through the holes in a basket, and therefore it cannot be described as ponderable matter. Nevertheless, it still constitutes perceptible matter, and it would still be acted

upon by gravity, which would hold it stationary within a planet's gravitational field as the planet orbits its star.

In the next section, we will look at the question of how fine-grained rotation in the aether, such as is required to form perceptible matter, can be achieved on a stable and enduring basis.

Maxwell's Sea of Molecular Vortices

II. In Part I of his 1861 paper, "*On Physical Lines of Force*", James Clerk Maxwell described the magnetic field and explained magnetic force in terms of a sea of tiny aethereal vortices, but in Part II of the same paper, he began by questioning how such vortices could be stable and self-sustaining, [3]. As a solution, he introduced electric particles to move around the edge of the vortices. But rather than simply realizing that such electric particles need to constitute sinks and sources in the aether, he chose instead to view them as idle wheels, hence making something of a straw man out of what had otherwise been an excellent theory, [4]. It's only the presence of sinks and sources in the aether that could ever account for fine-grained rotation on an enduring basis, although the driving power behind these sinks and sources will always remain a mystery.

The question needs now to be asked, if perhaps it is sinks and sources, as in negatively charged particles and positively charged particles, that are the basis of perceptible matter, rather than fine-grained rotation. Or is it both? The next section will first consider sinks and sources in the absence of fine-grained rotation.

Electrons and Positrons

III. Coulomb's law of electrostatics describes the radial electric force field that surrounds charged particles such as the electron and the positron. This law doesn't tell us what electrons or positrons actually are, but it is suggestive of an aethereal electric fluid flowing, either into a sink or out of a source. One might object to this view on the grounds that we don't know where the electric fluid is coming from or going to, or what is driving it, but if we choose instead to view fundamental particles as tiny hard balls or even as waves, this only opens up even more difficult questions. The sink and source idea is easily the best model to fit with both Coulomb's law, and also with Newton's law of gravity.

Several speculative scenarios involving particles as sinks and sources in the aether will now be considered, and to that end it is proposed that an electron constitutes an aether sink, while a positron constitutes an aether source. Consider an electron in the near vicinity of a positron. If the aether flows out of the positron at the same rate that it sinks into the electron, no force will arise between the two particles. An all-pervading sea of equally distributed electrons and positrons as described, would be totally inert. We need inter-particle forces

in order to activate such an electron-positron sea so that it can explain electromagnetic phenomena. So, in order to create the force of attraction between a positron and an electron, as per Coulomb's law, we need the electron to be absorbing the aether at a greater rate than the positron is supplying it. After that, we then have to deal with the problem of how an all-pervading electron-positron sea wouldn't collapse under the electrostatic force. In that respect though, it should be considered that it wouldn't all collapse into a single point, but rather, it would likely collapse in dipole pairs. As to what comes next, it's very hard to imagine what would happen when the sink (electron) comes into direct contact with the source (positron). One perhaps imagines that some kind of cancellation or annihilation would occur, but without being able to comprehensibly visualise such a manoeuvre. The situation, however, may never happen. At the creation, individual dipoles were almost certainly supplied with angular momentum for the sole purpose of constructing an electromagnetic wave-carrying medium. Maxwell referred to this medium as the *luminiferous medium*, as distinct from the more fundamental aether that is involved in the tiny vortices that comprise it.

The Luminiferous Medium

IV. Franz Maria Ulrich Theodor Hoch Aepinus, (1724-1802), suggested that the attractive forces between two uncharged bodies might be very slightly greater than the repulsive forces, and that this difference might be the cause of gravitation, [5]. While this would mean that an electron is more negatively charged than a positron, the system of units can nevertheless be calibrated in a way that apparently cancels this reality out. Therefore, we will now explore the full implications of Aepinus's proposition. It would mean that all perceptible matter which is normally considered to be neutral with respect to electric charge, is in fact mildly negative. The question then needs to be settled as to why two sinks would ever repel each other, as is the case with like-electric charges, whether positive or negative.

Two sinks, side-by-side, should by rights attract each other, and gravity is such an example, but that assumes there is no rotation involved in the aether, and that there is no intervening perceptible medium. Consider two rotating electron-positron dipoles sitting side-by-side, rotating in the same direction with the same angular velocity, both aligned in their mutual equatorial planes. Within each dipole, the electron and the positron are undergoing a mutual circular orbit. When the electron of one of these dipoles passes the positron of the other dipole, they will both be moving in opposite directions. If the mutual transverse speed is high enough, the aether flow that would normally flow from the positron to the electron, will be broken, and since aether cannot pass through itself, the two strands of aether from each dipole will now contact each other laterally, tending to push the electron and positron apart with centrifugal force.

Hence, it doesn't matter whether an electron is passing a positron, or two positrons are passing each other, or two electrons are passing each other. Two rotating dipoles, as described above will repel each other with centrifugal force in their equatorial planes, if they are spinning fast enough.

Meanwhile, two such rotating dipoles aligned in their mutual axial planes will attract each other with the electrostatic force acting between the electrons and positrons. Such an axial alignment is the basis of the magnetic field, where the rotating dipoles trace out solenoidal lines of force, with stability in the steady state maintained through a balance between the centrifugal pressure acting sideways from the field lines, and an electrostatic tension acting along the double helix alignment of electrons and positrons that form the core of these field lines, [6], [7]. See Fig. 1 below,

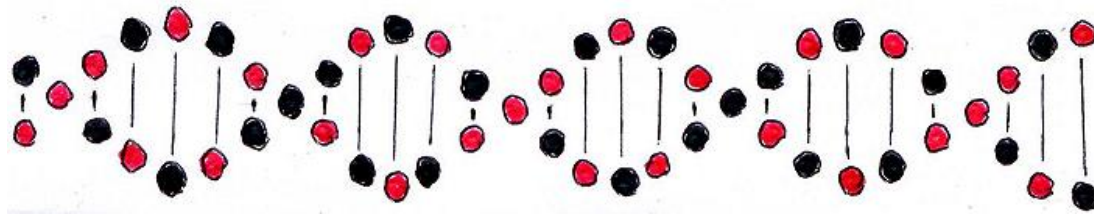


Fig. 1. A single magnetic field line comprised of a double helix of rotating electron-positron dipoles. The vertical lines marked in the diagram represent the equatorial planes of these dipolar vortices, and due to centrifugal force and the fact that the aether (electric fluid) can't pass through itself, then, *when in the steady state*, no electric fluid crosses between the electrons and positrons at right angles to the field lines. In the axial direction, however, there is a mutually cancelling bi-directional flow. A ray of light can, however, cross such magnetic lines of force at any orientation. The precession of the vortices, when in the dynamic state, allows for the electric fluid to pass between neighbouring vortices at any angle, irrespective of their default alignment when in the steady state, and it is this net flow of electric fluid that constitutes EM radiation. EM radiation is therefore a relay of tiny electric currents in space, and these electric currents are what gives rise to radiation pressure.

Electron-Positron Pair Annihilation

V. If the individual rotating electron-positron dipoles that are hemmed in by each other with centrifugal force, such as to comprise the luminiferous medium, have been initially powered with an angular momentum corresponding to a circumferential speed equal to the speed of light, then it follows, that should one of these dipoles be supplied with an additional energy of the same amount, it will split, and the individual electron and positron will break out of the solenoidal lattice. The argument is explained in, *“The Positronium Orbit in the Electron-Positron Sea”*, [8], confirming that known to men of old, whereby perceptible matter, even in the case of the luminiferous medium, requires the primary substance, as in the electric fluid (aether), to be in a state of fine-grained rotation, [5]. This means that electrons and positrons never actually annihilate each other. When they appear to have annihilated each other along with the release of two pulses of gamma radiation, all that has actually

happened is that they have bonded into the background magnetic field structure, and the two emitted gamma photons correspond to the equivalent of the latent heat of fusion. The newly fused dipole still fully exists in the bound state, and it still possess an enormous centrifugal potential energy corresponding to $2mc^2$ or 1.02MeV, where $2m$ is the mass and c is the speed of light.

Electrostatic Force

VI. If gravity is a sink-based force, where all perceptible matter in the neutral state is actually mildly negative, this would mean that the electrostatic field of an electron is one and the same thing as its gravitational field. The corollary of this, meanwhile, would be that a positron, while still being a particle of matter, is nevertheless an anti-gravity particle. The positron is not, however, as is commonly believed, an anti-matter particle. This erroneous belief derives from the faulty Einsteinian interpretation of the equation, $\mathbf{E} = mc^2$, [9], [10].

Meanwhile, if aether emerges from a positron at a greater rate than the local gravitational field is drawing this aether in, it means that the positron should rise upwards. There is never, however, a situation where a positron is isolated from an electron, such as that this situation would arise. Any time that a positron appears through electron-positron pair production, it is always weighed down on a very tight lead connecting it to the associated electron, and this electron is draining the aether coming from the positron. This is a positronium atom and it soon collapses again, back into the bound state within the all-pervading sea of rotating electron-positron dipoles, [8].

The more interesting question, still unanswered, concerns why two negatively charged particles, both being sinks, repel each other, whereas two gravity sinks attract each other. The answer to this lies in the intervening sea of electron-positron dipoles that forms the luminiferous medium. The radial force field surrounding any sink particle causes a torque to act on the constituent tiny rotating electron-positron dipoles. This causes them to precess with their precession axes parallel to the radial lines of force, leading to a centrifugal repulsion acting between adjacent lines of force. Meanwhile, the stronger the radial force, the faster will be the induced precession, and so the greater will be the centrifugal repulsion acting sideways from the field lines. If the radial force field is strong enough, as for example in the case of an electrostatic force field, electrostatics being very much stronger than gravity, then the centrifugal repulsion acting sideways from the field lines will override the tension that acts along the field lines, and so the two sinks will repel each other rather than attract each other, [11].

Conclusion

VII. Coulomb's law of electrostatics and Newton's law of gravity both suggest that electric particles are either sinks or sources in an all-pervading primary substance known as the *aether* or the *electric fluid*. In order for the aether to form perceptible matter; it has to be rendered into a state of rotation. When fine-grained rotation is factored into the medium for the propagation of light, this explains how two sink particles that are immersed in this medium, might repel each other under certain conditions, and it also explains the nature of light as it was described in the article entitled, "*Ether (in Physics)*", in the 1937 Encyclopaedia Britannica, [12]. In relation to the speed of light, this quote appeared,

Possible Structure. – "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"

The Dirac Sea, meanwhile, failed because it was inert to electromagnetic phenomena. It was a bit like an electric grid with the power switched off. It was lacking the fine-grained centrifugal potential energy needed to activate it.

References

- [1] Tesla, N., "*Man's Greatest Achievement*", (1907)
New York American, p.10, 6 July 1930, Milwaukee Sentinel, July 13, 1930, San Antonio Sunday Light, Editorial-City Life Section, July 20, 1930
O'Neill, J.J., "*PRODIGAL GENIUS, Biography of Nikola Tesla*", Fourth Part, paragraph 23, Long Island, New York, 15th July 1944
<http://www.rastko.rs/istorija/tesla/oniell-tesla.html>
<http://www.ascension-research.org/tesla.html>
- [2] Whittaker, E.T., "*A History of the Theories of Aether and Electricity*", chapter 4, pp. 100-102, (1910)
- [3] Clerk-Maxwell, J., "*On Physical Lines of Force*", Philosophical Magazine, vol. XXI, Fourth Series, London, (1861)
http://vacuum-physics.com/Maxwell/maxwell_oplf.pdf
- [4] Tombe, F.D., "*A Short Note on Maxwell's Idle Wheels*", (2024)
https://www.researchgate.net/publication/378901702_A_Short_Note_on_Maxwell's_Idle_Wheels

[5] Tombe, F.D., ***“Rotation is the Stability of the Universe”***, (2009)
<https://www.researchgate.net/publication/332594166> Rotation is the Stability of the Universe

[6] Tombe, F.D., ***“The Double Helix Theory of the Magnetic Field”***, (2006)
Galilean Electrodynamics, vol. 24, Number 2, p.34, (March/April 2013)
<https://www.researchgate.net/publication/295010637> The Double Helix Theory of the Magnetic Field

[7] Tombe, F.D., ***“The Double Helix and the Electron-Positron Aether”***, (2017)
<https://www.researchgate.net/publication/319914395> The Double Helix and the Electron-Positron Aether

[8] Tombe, F.D., ***“The Positronium Orbit in the Electron-Positron Sea”***, (2020)
<https://www.researchgate.net/publication/338816847> The Positronium Orbit in the Electron-Positron Sea

[9] Simhony, M., ***“The Electron-Positron Lattice Space, Cause of Relativity and Quantum Effects”***, Physics Section 5, The Hebrew University, Jerusalem (1990)
<http://web.archive.org/web/20040606235138/www.word1.co.il/physics/mass.htm>

[10] Tombe, F.D., ***“The Myths Surrounding Time Dilation and $E = mc^2$ ”***, (2023)
<https://www.researchgate.net/publication/373776967> The Myths Surrounding Time Dilation and $E = mc^2$

[11] Tombe, F.D., ***“Maxwell’s Equations Extended to Gravity”***, (2017)
<https://www.researchgate.net/publication/322317219> Maxwell's Equations Extended to Gravity The Link Between Gravity and Electromagnetism

[12] Lodge, Sir Oliver, ***“Ether (in physics)”***, Encyclopaedia Britannica, Fourteenth Edition, vol. 8, pp. 751-755, (1937)

See pp. 6-7 in the pdf file in the link below, and note that while the quote suggests that the ether is incompressible, this is almost certainly not the case

<http://gsjournal.net/Science-Journals/Historical%20PapersMechanics%20/%20Electrodynamics/Download/4105>