

The Matter/Antimatter Issue.

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Abstract.

From the moment it was first proposed, the Big Bang model has faced serious problems of one form and another. Amongst these was the fact that it proposed an initial balance between matter and antimatter but no collections of antimatter were observed. Here, this problem is addressed yet again, drawing on earlier work by several distinguished scientists but also advancing ideas based on recent analyses that have revealed a new seventh scalar part to the electromagnetic field with positive and negative energy.

Introduction.

From the outset there have been serious concerns about the basic model of the so-called Big Bang. These have been concerned with the model itself, not whether it was better or worse than other models such as the Steady State Model. One of these concerns, which is not shared with the Steady State Model, is that the Big Bang model predicts an initial equivalence between matter and antimatter but no sources of naturally occurring antimatter have been detected in the present Universe and this constitutes a serious problem for adherents to the Big Bang. Over time various theories have been proposed in attempts to solve this problem but it seems it is another big question that simply will not go away. Here the present situation will be reviewed before outlining another possible resolution of the issue. This proposed resolution will, however, resort to utilising ideas from electromagnetism in a similar way to the possible solution to other problems existing in astrophysics provided by the advocates of the so-called electric universe or plasma cosmology.

The Problem of the Missing Negative Mass.

The question of whether or not there is actual predominance of matter over antimatter is not necessarily a trivial one. In the middle of the last century, Hannes Alfvén and Oskar Klein suggested cosmological models which start with perfect symmetry between matter and antimatter. Subsequently in the theories these two components which comprise the Universe separate into matter-dominated and antimatter-dominated regions. Several objections were raised concerning this theory but an important one involved the manner of separation of the regions of matter and antimatter, since it was understood that even intergalactic space contains a small amount of matter and so galaxies could not be completely separate from antigalaxies. Alfvén [1] did propose a possible mechanism for achieving the required separation but most astrophysicists remained sceptical.

The mechanism proposed by Alfvén was effectively a generalisation of a phenomenon investigated in the 19th century by a German physician, Johann Leidenfrost. It was noted that, if a drop of water is placed on a surface whose temperature is in the region of 100°C , it

will evaporate almost immediately. However, if the surface temperature is several hundred degrees, the drop does not boil off immediately; rather it becomes smaller gradually before disappearing completely. The explanation is that, at the higher temperature, as the drop evaporates, a layer of steam forms between the drop and the surface and this layer acts to insulate the drop from the surface so that heat is conveyed from the surface to the drop more slowly. Alfvén's idea was that a similar situation might exist in some circumstances between matter and antimatter.

Another model introduced just a little later in the 1970's by Omnès, Stecker and others had as an initial state a mixture of matter and antimatter separated by a Jordan surface, which is a simple closed curve separating two different components, each of which is fully connected. This state was referred to as an 'emulsion'. However, before too long, these efforts were abandoned because it emerged that separation on the scale of clusters of galaxies was needed to satisfy the then current observations but the model was found unable to demonstrate that coalescence could continue long enough for the accumulation of matter and antimatter to grow even to the size of galaxies, let alone clusters of galaxies, before separation occurred. The problem of an initial baryon, anti-baryon asymmetry, necessary in today's dominant model to ensure the apparent dominance of matter in the Universe as it is today, remains. The fact is that the existence of an initial imbalance between baryons and anti-baryons is a purely ad hoc assumption. That being so, people have continued to speculate on the presence of antimatter in our Universe, even though the models of Alfvén, Omnès and others have long since been discarded. However, it is possibly of interest to note that, although, as mentioned, Omnès and his co-workers referred to a state as an 'emulsion', at no time did they utilise the properties exhibited by an actual emulsion in their deliberations. It is worth noting these particular properties and contemplating the effects of incorporating them into the model.

An emulsion is a mixture of two substances which normally wouldn't mix; that is, a mixture of two immiscible substances. One, referred to as the dispersed phase, is dispersed throughout the other, referred to as the continuous phase. Again, emulsions fall into two categories; colloidal emulsions which are stable so that one phase will remain dispersed throughout the other over a period of time, and non-colloidal emulsions which are unstable and in which the two components tend to separate out. On occasions, substances known as emulsifiers may be added to stabilise an emulsion. A very typical example of an unstable emulsion is provided by salad dressing. In this example, as is well known to all, the emulsion will separate out very quickly unless shaken very vigorously. However, for present purposes, this common example is worth bearing in mind as it is an example of an emulsion which illustrates very clearly what an emulsion is, how it looks and how it behaves.

In the original Omnès model, although the term 'emulsion' was used, the situation envisaged was more a mixture of individual blobs of matter and antimatter; there seemed no notion of one phase being dispersed throughout a second phase which remains fully connected. Normally, the two substances forming an emulsion will separate out over time if left undisturbed but the situation in the early universe described by Omnès was certainly not undisturbed, more akin in fact to the situation of a violently shaken salad dressing. However, simply introducing the notion of a genuine emulsion into the discussion cannot, of itself, help in the resolution of the problem of the missing antimatter since no conglomerations of antimatter have been identified in the Universe. Recently, an ingenious suggestion [2] has been advanced in an attempt to rectify this and that suggestion is that what might be termed the cores of black holes are all, both primordial and supermassive black holes, composed of antimatter. With the popular modern notion of a black hole, such a suggestion would mean all the antimatter being hidden from view inside the event horizon of the black hole. Also, considering the sizes of the postulated supermassive black holes, it is relatively easy to see how an equivalence of content of matter and antimatter in the Universe could be achieved;

indeed, in the above mentioned article 2 some rough figures are included to support the plausibility of this assertion.

However, what if matter manages to cross the event horizon and come into contact with the antimatter? Obviously, any matter/antimatter contact will result in the annihilation of both but, in the model, the annihilation rate would be slowed down tremendously due to the antimatter being condensed into an extremely small body. Also, this annihilation would occur inside the event horizon and so there need not be any observation of resulting radiation. Further, it is suggested that such annihilation might not proceed too rapidly if a Leidenfrost layer, such as suggested by Alfvén, were to exist inside the event horizon. One further point occasioned by this idea is that such matter/antimatter annihilation could help the gradual evaporation of the black hole without recourse to the possible phenomenon of Hawking radiation, if such evaporation does, in fact, occur as speculated. All this depends on matter being attracted towards the black hole but, if the black hole itself is composed of antimatter, the question of whether it would attract or repel ordinary matter is raised and it seems likely it would repel such matter.

In the discussion so far, the role of the event horizon has been simply to prevent evidence of any possible matter/antimatter annihilation being viewed by observers; apart from that possibility, it appears to play no significant part in the model. Event horizons, though, are only part of the notion of a black hole which seems to emerge from the theory of general relativity. In the simplest case of an uncharged, non-rotating black hole, the starting point for discussion of the model is the Schwarzschild solution to the Einstein field equations but, as has been pointed out on numerous occasions [3], the popular version of that solution on which this deduction is based is not actually Schwarzschild's original solution, as is easily verified by referring to his original article and comparing it with the popular version which appears in so many textbooks. Schwarzschild's original solution does not possess the singularity which leads to the idea of a black hole. Hence, serious question marks hang over the modern notion of a black hole, added to which, as again has been pointed out on numerous occasions [3], so far no black hole candidate has satisfied the fundamental inequality to be satisfied by the ratio of its mass to its radius; that is, the inequality;

$$M/R \geq c^2/2G = 6.7 \times 10^{26} \text{ kgm}^{-1} \quad (2)$$

However, even if the modern notion of a black hole has problems, theoretically the idea put forward by Michell in 1784 [4] and based on purely Newtonian principles seems sound and is a model of a particular type of star which many could realistically accept physically. Of course, whether or not such a type of star actually exists is another question. However, Michell simply investigated the problem of a body with an escape speed greater than, or equal to, the speed of light. He found that the mass and radius of such a body would satisfy the same inequality as that mentioned above for a black hole as derived from the principles of general relativity. Since the event horizon plays so small a part in the above mentioned model of a balanced matter/antimatter Universe, it would not seem too much of a problem to substitute a Michell dark body instead of a black hole in that model. The term 'dark body' is used more correctly to describe the Michell idea since, as was pointed out by McVittie [5], if such a body exists, it would be simply a very dense body which could be approached and, in fact, viewed from a suitable distance, unlike the modern notion of a black hole. Obviously, this latter comment is in accordance with the usual meaning of a so-called 'escape speed'. It follows that the ideas advanced in the mentioned recent article [5] would hold if the bodies referred to were Michell type dark bodies of the appropriate size rather than conventional black holes since, although such objects wouldn't be hidden behind an event horizon, they would be effectively hidden from view by the very fact that even light would be unable to escape completely from them. Also, as with the suggestion based on black holes advocated in

reference 2, any annihilation occurring would be slowed down to a great degree by the antimatter being condensed into an extremely small compact body. Of course, with no event horizon, if the dark body was composed of antimatter, any annihilation with nearby matter could only be prevented, or the effects slowed down, by the Leidenfrost layer solution as advocated originally by Alfvén. That in itself is no drawback to this modified suggestion since it is such a Leidenfrost layer which proves so important in the model suggested. It might be commented also that, in the case of a Michell dark body, the visibility referred to above would not mean that photons would reveal the presence of annihilation reactions since such photons would be degraded in energy and would not be what would be expected from annihilation. Of course, all of this particular discussion of the matter/antimatter problem is basically dependent on the big bang model being accepted as fundamentally correct. If it is not, then no immediate argument springs to mind to suggest the existence of antimatter in the Universe, at least not in quantities comparable with the amount of matter actually observed. Again, consideration of this suggested model for the possible existence of comparable quantities of matter and antimatter in the Universe offers yet another possibility for examining the validity of the big bang model. As always, it should be remembered that the big bang is simply a theoretical model of how the Universe originated and developed and, as such, it must be open to observational and experimental checks in an attempt to establish how accurate a model it is or, in fact, if it is valid at all.

Another possible contribution.

Since the latter part of the nineteenth century there have been many attempts to introduce new equations into Newton's theory of gravitation so as to make that theory more like the usual electromagnetic theory which has proved so successful in explaining phenomena in that particular field. It seems that this all comes about because, out of the four equations associated with electromagnetic theory which go under the name of Maxwell's electromagnetic equations, two bear a striking formal similarity to two of the basic equations of Newton's theory of gravitation. Also, and crucially, both theories depend on an inverse square law of force as a starting point. In electromagnetism, this takes the form of Coulomb's law for charges Q_1 and Q_2 , dielectric power e , and is given by

$$\mathbf{F}_e = \frac{Q_1 Q_2}{e r^2} \mathbf{r},$$

where \mathbf{r} is a unit vector.

In gravitation, Newton's law for masses M_1 and M_2 , gravitational constant G , is

$$\mathbf{F}_g = -G \frac{M_1 M_2}{r^2} \mathbf{r},$$

where \mathbf{r} is a unit vector once again.

The formal mathematical similarity of these two force laws is immediately striking and it is not surprising to find that the idea of having a theory of gravitation more akin to the usual electromagnetic theory goes back to Heaviside [6] in the later years of the nineteenth century, but it has been revisited since then by such as Brillouin [7], Jefimenko [8] and Carstoiu [9]. Here the topic will be revisited yet again with a view to suggesting a possible contribution to the solution of the problem of the so-called missing negative mass in our universe; that is, to offering another possible explanation for the apparent lack of antimatter when the presently accepted view concerning the origin of our universe demands an initial equality of matter and antimatter. As has been shown previously [10], one of the big problems encountered when considering particles of negative mass is the fact that many of the accepted equations of statistical mechanics run into grave difficulties and this has led some [10] to believe that it is not possible to have such particles. Recent reflections on previous work by those mentioned above seem to suggest a possible way out of these problems and it is a method which does

not rely on there being any extra gravitational equations to equate with all the Maxwell equations of electromagnetism.

However, following Brillouin [7], simply looking at results in electrostatics rather than speculating on links between electromagnetism and gravitation, it may be noted that, in that branch of physics,

$$\begin{aligned} \mathbf{F} &= -\nabla V \\ \mathbf{D} &= e\mathbf{F} \\ \nabla \cdot \mathbf{D} &= 4\pi\rho \end{aligned}$$

where V is the static potential, \mathbf{F} the field, \mathbf{D} the displacement, e the dielectric constant and ρ the charge density. Further, the energy density in the field is given by

$$\mathcal{E} = (\mathbf{F} \cdot \mathbf{D})/8\pi$$

or, if e is strictly constant

$$\mathcal{E} = e\mathbf{F}^2/8\pi = \mathbf{D}^2/8\pi e.$$

Also, for a point charge Q ,

$$\mathbf{D} = (Q/r^2)\mathbf{r}, \quad \mathbf{F} = (Q/er^2)\mathbf{r}, \quad V = Q/er.$$

It is straightforward to determine the value of the energy density in this case to be given by

$$\mathcal{E} = Q^2/8\pi r^4 e$$

and it should be noted that, as Brillouin showed [7], the volume integral of this density does yield the classical potential energy. However, what of the so-called gravistatics case as opposed to the electrostatic case?

In the gravistatic case, the equations are formally exactly the same as the above equations for electrostatics but with the charge Q replaced by the mass M and the dielectric constant e replaced by minus the reciprocal of Newton's gravitational constant G . It is important to note that Brillouin points out that one of the big difference between electrostatics and gravistatics is that, while a point charge may exist, a point mass is highly unlikely to exist. He then proceeds to consider the situation with the mass not be considered infinitely small but to be a small sphere of radius a . He does this by considering an empty spherical shell of mass M_0 . There is no field inside if the mass is distributed uniformly on the sphere. Outside this sphere, the energy density is seen to be given by

$$\mathcal{E} = -G \frac{M_0^2}{8\pi r^4}$$

and this is equivalent to a mass density multiplied by c^2 if the usual mass-energy relation is employed. Hence, the sphere of mass M_0 and radius a is surrounded by an atmosphere of negative mass. By integrating over the entire space, the total mass distributed throughout the field is seen to be given by

$$M_g = -\frac{G M_0^2}{c^2 2a}$$

and this quantity is seen to be strictly negative. However, this quantity is seen to be extremely small and would not help imply any sort of matter/antimatter balance. It does, though, indicate a possible source of antimatter. Any real resolution of the overall problem, if in fact there is a genuine problem, would have to rely on other sources of antimatter such as the one discussed earlier or possibly by referring to the work of Ruggero Santilli on antimatter [11].

Nevertheless, as it stands, this manipulation would appear to indicate the existence of a 'gravitational' field comparable to the electrostatic field discussed above and, as Brillouin [7] noted, this field is negative. This deduction, published in Brillouin's book [7] in 1970, seems interesting in itself but surprisingly has not (as far as is known) been linked with the solution to the age-old problem of the alleged 'missing' negative mass. Many have felt that, if the Big

Bang theory is true, there should be equal amounts of positive and negative mass in our universe but, so far, no negative mass has been identified. There may be other possibilities in attempting to answer this question, such as Santilli's work on antimatter as mentioned above, but this work of Brillouin surely indicates a very appealing contribution to the solution of the fundamental issue; – in this case, some of the missing negative mass is all around us, it pervades all space, but not as particles, rather as a mass density pervading all the space. Exactly what physical form this takes is another matter but an explanation such as that proffered here would circumvent the objections raised against the existence of negative mass in the form of particles as discussed in earlier work [10]. However, this conclusion refers specifically to issues concerning the presence, or apparent absence, of negative mass and makes no mention of antimatter. It would seem that negative mass does constitute a form of antimatter but the question remains as to whether it is the only form. Nevertheless, following on from Santilli's comments in the introduction to his book [11], it seems that his meaning of antimatter refers to negative energy situations and, in that case, because of the well-known relation between energy and mass, $E = mc^2$, it would appear that negative mass situations really are those under discussion.

Is there evidence of antimatter galaxies with mirror opposite properties? Are they somehow shrouded from view by a mechanism such as the Leidenfrost one mentioned above because, if such antimatter galaxies do exist, they must be shielded from ordinary matter by some means. Santilli claims to have secured telescopic evidence based upon the theory that the refractive properties of the light antimatter galaxies emit would be inverse to our own. [19-24] Is he right? One possible answer seems implied from Santilli's assertion that negative energy composes such galaxies, implying negative time and gravitation and so, the reversal of forces in the entirety of the region so defined, leading to an anti-gravitational and anti-temporal barrier surrounding any time and mass reversed region, which is technically not in the same dimension. Any object approaching that region of space time which is defined by negative time and energy will experience time and gravity as a barrier, and gravitational/temporal resistance akin to that of the difference between the directionally opposed expressions of entropy, time and gravitation could well assert an insulating force against interaction.

New emerging solutions

Note that Brillouin attributes gravitation to negative energy distribution in the gravitational field akin to a negative dielectric constant. Within the work of Brillouin [7] pp. 102-103 referring to equation (8.6):-

$$\mathcal{E}_{EM} = \frac{\epsilon E^2}{8\pi} + \frac{\mu H^2}{8\pi} = \rho_{EM,add} c^2$$

may be read: "This electromagnetic *energy density* \mathcal{E}_{EM} represents a positive mass-density ρ_{EM} to be added to our previous negative ρ_{add} of equation (8.5):-

$$\rho_{add} = -\frac{1}{Gc^2} \frac{\pi |F|^2 - c^2 |\Omega|^2}{8\pi}$$

and this mass-density distribution in any type of electromagnetic field must generate new types of gravitational fields." Noting the implied ubiquitous presence of electromagnetically associated negative gravitational energies and related negative mass densities, it must be remembered that, at the outset, one problem confronting the Big Bang model was that of the absence of any clear, natural source of antimatter, which of course implies the absence of any associated source of negative energies. If negative energy and any implied negative mass are to be represented in equal amounts as proposed by the Big Bang model, or, found to be

demonstrably working in these ways in whatever proportion, where is the working theory and mathematics representing these supposed facts? What actually constitutes a gravistatic mass-plasma and where is the negative gravitational component implied within electromagnetic theory?

Answers appear to be available when the quaternion treatments of the equations of Maxwell are examined in depth. Unlike the original quaternion forms provided by Maxwell himself, these have several different aspects which prove crucial in the present circumstances. Books and papers written by government sources, some of which were featured in the CIA e-reading room itself under the freedom of information act and have been removed subsequently, have made clear the features of the mathematical treatments used to engineer key effects, as has been reported previously [12]. The work of P.M. Jack offers just such a quaternion treatment of the equations of Maxwell. The work of P.M. Jack makes plain the type of mathematics which have apparently been successfully engineered in government work. The mathematics of Jack are based upon, but differ from, the foundational equations of Maxwell [13]:

"When James Clerk Maxwell . . . wrote the second edition of his Treatise on Electricity and Magnetism he included a quaternion representation of his electromagnetic equations, but he did not include both left-hand and right-hand derivatives, and the differential operator nabla was restricted to the 3-dimensional space form lacking a time component, and so his work is fundamentally different from that presented here."

The quaternion mathematics of Jack have revealed a previously unrecognised seventh scalar part to the electromagnetic field. This new scalar field expresses temporally forward-moving positive energies that add heat in association with negative charge, and temporally reversed negative energies that subtract heat associated with positive charge, and hence, is named the Temporal Field. [13]

". . . thus a positive charge, $q > 0$, under the influence of a positive value temporal field, $T > 0$, produces the equivalent of negative work, i.e. the charge-field interacting system will absorb energy from its surroundings, positive charges thus effectively appearing "cold," while negative charges effectively appearing "hot").

In this case, over the given time interval, energy is absorbed or evolved from the charge-field interacting system accordingly as the signs of the charge and the temporal field are the same or opposite. Since this scalar energy does not require the charge to move in space, in order to materialize as some observable physical phenomena the energy that is absorbed and/or evolved must manifest as a form of heat. Moreover, this heat is proportional to the first power of the charge, and thus reverses sign with the change in sign of the charge, or correspondingly a change in sign of the electric current..." [13]

This is in close agreement with apparent working government designs using gravitational propulsion [14] and claimed weaponized applications under the headings of scalar interferometry and gravitobiology [13]. Close reading of associated texts revealed that this working technology, just as the original work of Maxwell, is based on the presence of an aetherial medium permeating space. This government work is admittedly, aether physics. "The concept of an aether is again accepted." [15] (p.139).

Maxwell originally theorized that gravitation could be caused by an energetic reduction between massive bodies [16], but discounted the idea of negative energy. It appears he was correct in his fundamental hypothesis, but failed to unearth the results of his quaternion work as eventually treated by P.M. Jack, and so, missed the apparent cause of energetic reduction between gravitational bodies: the reality of negative energetic expression within gravitation and its relation to electromagnetic fields.

It has been deduced that Brillouin was right, negative energy and hence negative mass are everywhere, doing the work of gravitation and perhaps much more. It appears that a great deal of negative energy and so, implied antimatter, might already be accounted for, now no longer missing at all, but instead functioning as the mediator of gravitational expressions *and time* within physical systems. Gravitational expressions in the T field are longitudinal wave expressions; gravity waves are longitudinal [12, 14, 17]. Brillouin's so called "atmosphere" of mass densities permeating space and surrounding gravitational bodies may then be defined as mass/charge associated positive and negative energy/aetherial densities expressed as longitudinal waves.

A physical definition of the graviton as being the transient coupling of a photon and antiphoton of positive and negative energy respectively is, therefore, proposed. Dependent upon any particular systemic energy component balance and interactive expression, the rate and direction of time may vary. This then, constitutes our basic definition of the cause of the rate and passage of time: the transient coupling and dissociation of the system expressed gravitons. Similar, although not identical, ideas have been expressed elsewhere. [15, 18]

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Recalling that positive charge and the proton are associated with negative energy and gravitational expressions, note how a magnet, composed of charge balanced matter exhibits less strength of repulsion between like poles, than it does attraction between opposite poles. It may be hypothesized that the mass difference between charge balanced electrons and protons leaves a residual of attractive (negative) energy due to the proton's larger mass and hence energy which are greater than the electron's. So, as gravitons emerge along with mass across T field expressions, the negative energy residual leaves less energy between massive bodies, creating the attraction of gravitation. The neutron is charge balanced with an electron bound within the proton,^Δ but there is a neutrino needed, .782 MeV more positive energy and one-half spin are needed, the neutrino's positive energetic addition balancing energy, cancelling the negative energy gravitational residual in the neutron leaving a truly neutral particle energetically, once positive and negative energies are both taken into account.

Insomuch as the aetherial medium permeating space (and constituting objects) expresses negative T field densities, it may be inferred that negative energy, mass and antimatter are found.

^Δ Norman, Dunning-Davies (2017) Hadronic paradigm reassessed: neutroid and neutron synthesis from an arc of current in Hydrogen gas, *Hadronic Journal*. 40; 119 - 148.
https://www.researchgate.net/publication/317267278_Hadronic_paradigm_reassessed_neutroid_and_neutron_synthesis_from_an_arc_of_current_in_Hydrogen_gas

The question of annihilation

When photons of equal or greater values than 1.02 MeV interact an electron positron pair is produced as the “electron and positron curve away from the point of formation in opposite directions in arcs of equal curvature.”^Ψ

Such pairs conserve quantum values from angular momentum to charge and must sum to zero. It may be deduced from this that a particle and its antiparticle are formed around opposite vortical handedness and exhibit opposite charges. The strict matter/antimatter case supposing interactive annihilation then, is not the same as that seen in gravitational negative energy situations. Annihilation appears to be the province of charge opposed and vortically opposed antimatter and matter particles only. Positive and negative energies on the other hand, appear and interact all around us in gravitational and other systemic expressions.

Other possible examples of unaccounted for negative energies and masses at work

Since T field temporally-reversed negative energy from the previously unknown seventh scalar part of the electromagnetic field has not been accounted for in physical processes until now, several possible places for investigation where negative energies and masses are likely to be operating, as well as potential unaccounted for possibilities concerning positive T field energies, may be presented.

1. As negative T field energy is associated with positive charge, and positive T field energy with negative charge, the emergence of a graviton providing close atomic-range binding and orbital electron shell curvature across atomic structure between the electrons and corresponding protons is implied.
2. All binding energies in quantum chemistry are negative, implying negative energetic contributions bind molecular structures.
3. The electron hole within solid state physics is often characterized as a negative-mass valence band electron gone missing, implying that the of the top of the valence band functions as a negative energetic polarization yielding negative effective-masses.^Φ
4. As a possible causal source for observed transverse electrical wave effects and explanation for the divergence between electron drift velocities and field velocities.
5. As a heretofore unrecognized adherent, negative energetic contributor of positive charge accounting for like charge attraction, such as that demonstrated in clouds and bodily tissues.

Possibility 4 will now be outlined in brief:

From PIONEER RADIO ENGINEER GIVES VIEWS ON POWER

by Nikola Tesla *New York Herald Tribune*, September 11, 1932

Tesla Says Wireless Waves Are Not Electromagnetic, But Sound In Nature, Holds Space Not Curved

“The so-called Hertz waves are still considered a reality proving that light is electrical in its nature, and also that the ether is capable of transmitting transverse vibrations of

^Ψ [https://www.britannica.com/science/pair-production]

^Φ The electron hole: an offhand speculation:

<https://host.megapress.org/blogiq/2021/07/the-electron-hole-an-offhand-speculation.html>

frequencies, however low. This view has become untenable since I showed that the universal medium is a gaseous body in which only longitudinal pulses can be propagated, involving alternating compressions and expansions similar to those produced by sound waves in the air. Thus, a wireless transmitter does not emit Hertz waves which are a myth, but sound waves in the ether, behaving in every respect like those in the air, except that, owing to the great elastic force and extremely small density of the medium, their speed is that of light.”

and later

“I hold that space cannot be curved, for the simple reason that it can have no properties. It might as well be said that God has properties. He has not, but only attributes and these are of our own making. Of properties we can only speak when dealing with matter filling the space. To say that in the presence of large bodies space becomes curved, is equivalent to stating that something can act upon nothing. I, for one, refuse to subscribe to such a view.”

It appears that a longitudinal wave might be the source of electromagnetic transverse expressions.

What is the explanation for the divergence of speeds between the electric field propagating at light speed and the electron drift velocity which is very slow by comparison? Tesla appears to imply that the causal source of the transverse electrical effects we see is attributable to the T field: as a longitudinal scalar wave set of electrical pressure waves, voltage over time propagating through the aether at light speed constituting the electrical field itself, and then, the electrons once impacted by those longitudinal scalar waves precess,^Σ creating observed transverse effects.

The field then, not the slow moving electron, appears as the causal source, and that field is created of longitudinal perturbations in the aether, a standing quantity, the scalar T field. It is interesting to note that Whittaker showed that the entire electromagnetic field may be derived from a few scalar potential functions.⁹ As the T field expresses both positive and negative energy associated with negative and positive charge respectively, both positive and negative energies are seen all around, expressed in gravitation and electromagnetism alike. Resorting to conceptualizations such a curved space time may then be avoided and instead, thought might be directed along the lines of aetherial densities.^δ

Conclusion:

Are the quantities of matter and antimatter equal as the Big Bang model supposes? That is not known. However, it may be concluded that negative energies and masses are functional daily contributors to physical processes, from gravitation to time. New insights into the previously unaccounted for seventh scalar part of the electromagnetic field and the negative energies revealed there with their roles in gravitation, thermodynamics, matter and antimatter interactions alike have demonstrated for us the ubiquitous roles for both positive and negative

^Σ <https://www.youtube.com/watch?v=GqA4s6rURNg>

⁹ E. T. Whittaker "On an Expression of the Electromagnetic Field Due to Electrons by Means of Two Scalar Potential Functions," Proc. Lond. Math. Soc., Series 2, Vol. 1, 1904, pp. 367-372

^δ J. Dunning-Davies & R. Norman, *Truth in Paradigm*. see essay entitled: Practical and theoretical assessment of relativistic theory. Standing Dead Publications, Samson Press, 2017.

ISBN: 9781983853173. URL: <https://www.researchgate.net/publication/3215332>

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energy in physical processes across scales. It may be concluded, therefore, that physics and cosmology are essentially electrical by nature.

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