The Positronium Orbit in the Electron-Positron Sea

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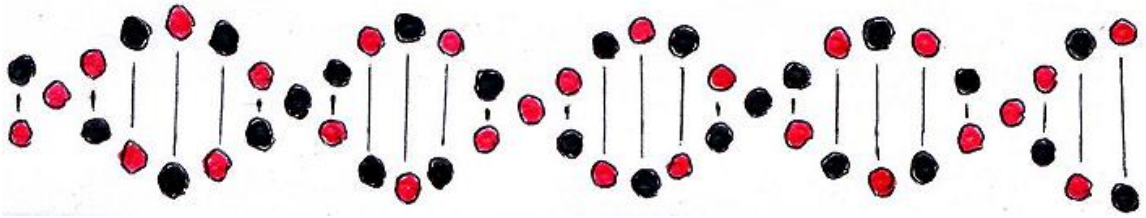
Abstract. **The purpose is to show that the equation $E = mc^2$ was already implicit in Maxwell's 1861 paper *"On Physical Lines of Force"* and that it doesn't mean that mass is equivalent to energy, but rather it relates to the propagation of electromagnetic radiation through a sea of rotating electron-positron dipoles which pervades all of space.**



Electron-Positron Pair Annihilation

I. Unlike in the case of a Kepler planetary orbit, the positronium orbit involving an electron and a positron, is a spiral orbit. When the two particles appear to touch each other, they seem to metamorphose into two gamma photons. This is much like in the case in one of Helen Bannerman's stories for children, where a group of tigers chase each other around a tree until they all turn into ghee, which is then used to make pancakes. In the positronium case, the energy in the gamma photons is said to have been supplied entirely from the mass of the electron and the positron, and meanwhile, just like the tigers, these two particles have ceased to exist entirely.

Alternative and more realistic explanations have been offered, akin to the manner in which a stage magician makes a rabbit vanish from a hat, **[1]**, **[2]**, **[3]**. The rabbit never actually disappears. It still exists in a latent state close by, as perhaps in a bag hanging under the table. It will here be proposed that the electron and the positron do not metamorphose at all, but rather that the full positronium orbit remains intact in a concentrated and latent state at the locality where the two particles were believed to have mutually annihilated, and that the orbit is now bonded into an already existing background medium comprised of identical tiny rotating electron-positron dipoles in a totally stable state. So, in fact, the *apparently* disappeared electron and positron very much continue to exist, and in a state totally indistinguishable from their neighbouring electron-positron dipoles in the wider electron-positron sea.

Such an approach is usually rejected quite swiftly on the back of the totally tautological argument that such an electron-positron medium wouldn't be stable because positronium is unstable, and so the electrons and positrons would annihilate each other. In other words, because the textbooks teach that electrons and positrons annihilate each other, then there can be no possible physical explanation for what might really be happening when a positronium orbit appears to decay. Let's now take a closer look at the positronium orbit.

The Positronium Orbit

II. At first there would appear to be no theoretical reason why a positronium orbit involving an electron and a positron should be any different than a Keplerian orbit. The electrostatic force of attraction between the two particles obeys an inverse square law just like in the case of gravity, and so the dynamics should be identical. The full trajectory should trace out an eccentric ellipse, and when the electron and the positron reach closest approach, there should be a recoil due to centrifugal force, as like in the case of a comet at perihelion.

There is however a slight difference in the manner in which the centrifugal force arises in the positronium orbit. In a Keplerian orbit, the centrifugal force is sourced at the interface between the two gravitational fields and is due to the shear interaction between the two fields, **[4]**. This cannot be so however in the case of the positronium orbit. Where gravitational attraction is monopolar, such that the field lines between the two gravitating bodies spread outwards from each other and meet laterally, enabling the centrifugal force to engage at the interface, the attractive force in electrostatics, on the other hand, is dipolar, and so the field lines connect directly between the two charged particles. It will now be shown in the case of a positronium orbit, that the centrifugal force is intertwined with the creation of a magnetic field, and that it only kicks in, in earnest, during an abrupt fusion event, and this can only be explained if space is already densely packed with tiny electron-positron orbitals, **[2]**, **[3]**. This background dielectric sea serves as the physical medium for the propagation of light. The wider stability of this dielectric sea, in three dimensions, is explained in ***"The Double Helix Theory of the Magnetic Field"***, **[2]**.

The electrostatic field pulls the electron and the positron together. In this situation, we have an electric current which consists fundamentally in the pure aethereal fluid that flows in a single direction, out from the positron and into the electron, while the two particles move together in opposite directions to each other. This aethereal current is represented by its momentum, **A**, known variously as the *electrotonic state*, the *electromagnetic momentum*, or the *magnetic vector potential*. See sections **IV** and **V** in ***"The Double Helix and the Electron-Positron Aether"***, **[5]**. This momentum is also the basis of *Maxwell's displacement current*, especially in the dynamic state when the aether flows

from an angularly accelerating (or precessing) electron-positron dipole to its immediate neighbour, **[6]**.

While the positronium orbit is collapsing, and hence decaying, the electron and the positron are moving in opposite directions to each other, both radially and transversely, while the aethereal current is flowing between them in a single direction. This principle carries through to electric current in general, **[7]**. A more fundamental aethereal undercurrent flows in one direction only through an electrolyte, while the ions flow in both directions.

Returning again to the positronium decay, at the moment of transition into the bound state, the mutual transverse speed between the electron and the positron will be so high that the aethereal current flow connecting the two particles will break. The two streams of flow will then meet laterally while flowing in opposite directions to each other, and so they will be pushing each other apart with centrifugal force in the equatorial plane. The excess centrifugal pressure will then be ejected in the form of two gamma photons, leaving the remaining centrifugal pressure within the dipole in a state of equilibrium with the centrifugal pressure pushing in on it from the neighbouring dipoles. The dipole will now be hemmed in, and the two branches of aethereal current within the trapped dipole will each be spiralling, both upwards and downwards, to the neighbouring dipoles in the axial direction. The dipole will now be bonded within the double helix alignment of the wider background magnetic field. As the trapped dipole rotates, the aethereal current spirals into the electron and out of the positron with a vorticity, $\mathbf{H}$, expressed in the form, $\nabla\times\mathbf{A} = \mu\mathbf{H}$, where, $\mathbf{H}$, is the magnetic field strength.

The Speed of Light and $\mathbf{E = mc^2}$

III. In Part III of Maxwell's 1861 paper ***"On Physical Lines of Force"*** **[8]**, he introduces *elastic displacement* (and later displacement current) within the context of a dielectric solid that pervades all of space. Maxwell applies elasticity theory in order to link the dielectric constant with the transverse elasticity of this solid medium. He is able to utilize the result of an experiment performed in 1855 by German physicists Wilhelm Eduard Weber and Rudolf Kohlrausch, **[9]**, in order to equate the speed of light with the ratio of the dielectric constant to the magnetic permeability, and hence also with the ratio of the transverse elasticity to density in this luminiferous medium. Since the latter ratio forms one side of Newton's equation for the speed of a wave in an elastic solid, Maxwell is able to conclude that light is a transverse wave in an elastic solid that is also the cause of electric and magnetic phenomena. Hooke's law appears at equation (105) in Maxwell's 1861 paper in the form,

$$R = -4\pi k^2 h \qquad \textbf{(1)}$$

where R is electromotive force, k is a coefficient depending on the nature of the dielectric, and h is displacement. Maxwell doesn't actually use the letter k in his paper, but it has been chosen here in order to avoid confusion with the normal symbol for energy which will appear later in the analysis.

The purpose now will be to show how equation **(1)** can be related to Newton's equation,

$$V^2 = \sigma/\rho \qquad \textbf{(2)}$$

where V is the speed of a wave in an elastic solid, σ is the coefficient transverse elasticity, and ρ is the density. Maxwell didn't actually use the symbol σ for transverse elasticity in this equation (equation (132) in his paper), but it will be used here to avoid confusion with the usual symbol for mass which appears later in the analysis. Maxwell equated the transverse elasticity σ to k through equation (108) in his paper as per,

$$k^2 = \pi\sigma \qquad \textbf{(3)}$$

and he equated density ρ to magnetic permeability μ (which he called the coefficient of magnetic induction) through equation (133) in his paper as per,

$$\mu = \pi\rho \qquad \textbf{(4)}$$

Hence combining equations **(2)**, **(3)**, and **(4)**, we obtain,

$$V^2 = k^2/\mu \qquad \textbf{(5)}$$

which is equation (135) in Maxwell's paper and equivalent to $\mathbf{E} = mc^2$, as will be demonstrated in the next section. Maxwell didn't know the actual density of his elastic solid but he was only concerned with the ratio k^2/μ, and by comparison with the results of the 1855 experiment of Weber and Kohlrausch in which the ratio of electrostatic units of charge to electrodynamic units of charge had been established by the discharging of a Leyden jar (a capacitor) **[7]**, he was then able to establish that the dielectric coefficient k equated with the speed of light (equation 131 in Maxwell's paper) as measured optically by Fizeau.

The objective now will be to show how equation **(5)** can be derived from the sea of tiny aethereal vortices described in Part I of Maxwell's 1861 paper. In this part, in order to explain the magnetic field and magnetic repulsion, Maxwell utilizes the concept of tiny aethereal molecular vortices that press against each other with centrifugal force while striving to dilate, **[10]**.

The Fine-Grained Vortex Nature of the Elastic Solid

IV. It is now further proposed that Maxwell's molecular vortices will be dipolar, having both a sink (electron) and a source (positron) in mutual orbit around the edge of the vortex, **[2]**, **[5]**, and since Maxwell has all immediately neighbouring vortices spinning in the same direction, the effective speed for the purposes of centrifugal potential energy will be the mutual transverse speed, which will be twice the circumferential speed. Centrifugal potential energy is the same thing as transverse or rotational kinetic energy, and summed over the two particles of each dipolar vortex this will be equal to $m(2V)^2$, or $4mV^2$, where 2m is the combined mass of the two particles, and where V is their circumferential speed. Mass is considered to be a measure of the amount of aether. The centrifugal potential energy will be equal to the maximum linear kinetic energy as resolved along a diameter in relation to the projected simple harmonic motion. This in turn will be equal to the maximum potential energy that we obtain from Hooke's law. Since we are dealing with shared elasticity over the two particles within each dipole, this maximum potential energy will be $2\pi k^2h^2$. Therefore,

$$4mV^2 = 2\pi k^2h^2 \qquad \textbf{(6)}$$

and hence,

$$2mV^2 = \pi k^2h^2 \qquad \textbf{(7)}$$

The centrifugal potential energy, $4mV^2$, is the resultant of an outward centrifugal force and an equal and opposite inward centrifugal force generated by the neighbouring dipoles. As such, if we double the outward centrifugal potential energy, we will split the dipole. The input energy needed to split an electron-positron dipole is therefore $2mV^2$. We also know from the 1932 Carl D. Anderson experiment that this energy is the 1.02 MeV associated with gamma radiation, and that it corresponds exactly to $2mc^2$, where c is the speed of light **[1]**. Hence it follows that the circumferential speed of the electrons and positrons in the dipoles that make up of this elastic solid is equal to the speed of light, **[6]**, **[12]**, and that,

$$c^2 = k^2/\mu \qquad \textbf{(8)}$$

where μ is the areal density, $2m/\pi h^2$, of an electron-positron dipole. Equation **(8)** is equivalent to equation (135) in Maxwell's 1861 paper, and it is more familiar nowadays in the form,

$$c^2 = 1/\mu\varepsilon \qquad \textbf{(9)}$$

where ε is the electric permittivity and where μ is the magnetic permeability. By multiplying the top and bottom lines of equation **(9)** by area, we end up with,

$$\mathbf{E} = mc^2 \qquad \textbf{(10)}$$

where **E** is the centrifugal potential energy. It is the compressed orbit syndrome that gets rid of the factor of one half that appears in the standard formula for kinetic energy.

Maxwell never knew the size of his molecular vortices, but it would be reasonable to assume that they are small enough to flow through the interstitial spaces between the atoms and molecules of ponderable matter, as like water flows through a basket. We could assume that the circumference of these dipolar vortices is equal to half of the Compton wavelength for an electron, since gamma radiation of this wavelength, or lower, can resonate with the dipoles and split them apart, as has just been explained above. This would make their diameter 0.3863 picometres, hence setting them at about one thousandth the size of the average atom. The density of the vortex sea will however be difficult to calculate because the balance between the electrostatic force in the axial direction and the centrifugal force in the equatorial plane would point to inter-particle spacings between neighbouring vortices on the femtometre scale. Since this is very much less than their actual diameters, the magnetic lines of force will in effect become tubes of force. Then on the issue of the density, as an absolute minimum, if we were to simply consider only the diameter of the vortices, the density of the vortex sea will already be into the region of fourteen hundred times denser than lead, but it will surely be many orders of magnitude yet higher than that still.

Conclusion

V. Contrary to popular belief, a positronium atom doesn't decay. The deeply ingrained belief that it decays, and that the constituent electron and positron annihilate each other, is based purely on the fact that the actual details of what does happen at the crucial moment are unknown. When the gamma radiation is released, the electron and the positron continue to exist in a stable and bound state, propped up by centrifugal potential energy (centrifugal pressure) quantified by the equation $\mathbf{E} = mc^2$. Space is already densely packed with rotating electron-positron dipoles pressing against each other with centrifugal force while striving to dilate. The circumferential speeds equal the speed of light, and this dielectric sea serves as the medium for the propagation of light. A

positronium atom is merely a liberated component which falls back naturally into its bound state within this all-pervading medium.

This event happens in like manner to when an escaped vapour particle fuses back into the main body of the liquid, releasing a latent heat of fusion.

References

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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"*

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"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****."*

[11] Tombe, F.D., ***"Induction of Electrostatic Repulsion by Strong Gravity"*** (2017)
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http://www.ascension-research.org/tesla.html