

Equilibrium in the Electric Circuit

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Abstract. The electron-positron sea impedes the flow of aether due to the fact that the electron-positron dipoles become linearly polarized and hence induce a back EMF. A capacitor in an electric circuit can completely block the flow of electric current, yet the evidence of fluorescent lights and cathode ray tubes indicates that electric current can actually flow quite easily in the electron-positron sea. This would imply that the impeding effect of a capacitor does not appear to be entirely due to the dielectric space between the capacitor plates. It would seem as though the major impeding effect actually takes place inside the conducting material when the conducting circuit is broken. The breaking of the circuit seems to be the crucial factor in both blocking the flow of electric current and also in converting the conducting material into an excellent dielectric.

This might be explained if we consider electric current to be primarily a flow of dynamic and compressible vitreous aether. When a conducting circuit is broken, the aether gets absorbed and blocked by the electrical particles inside the conducting material since they cannot leave the conducting material to jump across the gap. This state of affairs would occur if the electrical particles were dielectric. In a closed circuit they would flow freely with the aether, but if their path became blocked they would stretch like a spring and oppose the applied electric field. In a metal, these particles are probably electron-positron dipoles.

The absorption of aether in a broken electric circuit leads to what has been referred to as ‘the barrier potential’.

The Barrier Potential

I. The barrier potential is what prevents the aether from flowing out of a metal conductor into the dielectric space beyond. It can only be attributed to some kind of aether absorption process that occurs in a metal when the charge carriers are blocked from moving due to the circuit being broken.

This absorption will probably be due to dielectric polarization of the charge carriers themselves, which are probably electron-positron dipoles synchronized to the surrounding double helices of the magnetic field. See ‘The Link between Electric Current and Magnetic Field’ at,

<http://www.wbabin.net/science/tombe7.pdf>

In other words, a conductor is most likely to be a better dielectric than an insulator when a closed electric circuit is broken. When the circuit is not broken, the stress will be relaxed and taken up by the translational kinetic energy of the charged electrical particles. It is interesting to note that Ivor Catt has also concluded that conductors are in fact dielectrics with very high permittivity. See ‘Copper as a Dielectric’ at,

http://www.ivorcatt.co.uk/2_4.htm

In order to overcome the barrier potential, we will need to saturate the cathode with aether. This can be done either by heating the cathode with infra red radiation or by the photoelectric effect.

Discharging a Capacitor into an Open Ended Transmission Line

II. Ivor Catt's article mentioned above at,

http://www.ivorcatt.co.uk/2_4.htm

deals with a very interesting scenario in the section entitled 'The Reed Relay Pulse Generator'.

The implications of this section are that when a charged capacitor with its power source disconnected is extended laterally to an indefinite length, the charge only spreads out to a distance equal to the original length of the capacitor. After that, a slab of energy current moves out of the original capacitor region and travels along between the wires leaving the original capacitor region totally discharged.

Under conventional theory we would expect that the pressurized electron cloud in one plate should spread out indefinitely into the extension limb, and that the rarefied plate should be fed by electrons from the neutral extension. This clearly doesn't happen.

The charge sharing process comes to an abrupt halt at the moment when the original voltage has halved and the original charged area has doubled in length. After that, the entire charged region begins translational motion. We need to try and understand why the charged region stops expanding and starts moving when its length has exactly doubled.

Regarding the well known capacitor equation $Q = CV$ (which is essentially Maxwell's fifth equation and the equation for simple harmonic motion. See <http://www.wbabin.net/science/tombe14.pdf>) we might suppose that since the capacitance has doubled and the voltage has halved, that the charge has therefore remained constant. This equation is however based on the principle that charge and voltage are both a measure of pressure. Maxwell made no explicit mention of the term 'charge' in his 1861 paper 'On Physical Lines of Force'. At equation (113) in that paper,

http://vacuum-physics.com/Maxwell/maxwell_oplf.pdf

which is the equation of continuity, he talked about the density of 'free electricity' and he applied that equation to this 'free electricity' which we

can take to refer to the vitreous electric fluid or the aether. By equation (127) we can see that the concept of aether density corresponds to our modern concept of charge. The implication is that charge is actually a potential energy (or voltage) quantity and that the equation of continuity is an equation containing Bernoulli's Principle which describes the interplay between kinetic and potential energy in the aether. Hence when the volume increases in a pressurized system, the charge and voltage will simultaneously reduce.

A problem begins at equation (127) of Maxwell's 1861 paper which has its repercussions to this day. Equation (127) has devolved the variable aspect of aether density into the inverse square law in order to obtain Coulomb's law. This then renders charge as it appears in Coulomb's law into the role of being a constant for any given sink/source/particle. Modern textbooks now deal with this concept of charge in connection with a cloud of electrons and they apply the equation of continuity to charge density instead of to aether density. Charge is then considered as a conserved quantity by virtue of the fact that it has now become a head count of particles. Vitreous charge as in aether pressure has disappeared from modern textbooks.

The modern concept of $Q = CV$ works as long as we are only applying it to the fully pressurized situation in which an external power source charges up a capacitor. That equation, within the context of our modern understanding of charge, cannot be further extrapolated to the dynamic situation which follows when we disconnect the power source and then alter the capacitance, because charge in the modern sense is not actually involved. We are not dealing with an electron cloud and conservation of sink/source based charge. We are dealing with Bernoulli's Principle in a compressible vitreous aether.

In the 'Reed Relay Pulse Generator', some aether potential energy (voltage) must have converted to kinetic energy in the form of an ongoing circulation of aether that constitutes an electric current and that doesn't actually involve the motion of charged particles.

Let us name the left end of the capacitor A, and let us name the right end B. The transmission line extension of indefinite length is attached to end B. Let us propose that the compressed aether in one plate begins to expand beyond B into the extension to the right. It will immediately arc across to the opposite rarefied plate because the dielectric space between the two plates/wires will not be polarized in this region and neither will the dielectric inside the wire. Aether (vitreous electricity) will cross over

between the two plates hence beginning a discharge process. Linear polarization of the dielectric will result in a displacement current occurring which will simultaneously impede the aether flow. The aether will then flow wide of this region and the pattern will repeat.

Beyond end B to the right, a sinusoidal transverse wave of displacement current will expand into the dielectric space of the transmission line extension. This wave will be causing aether to circulate from the pressurized limb into the rarefied limb which will now also be expanding to the right and becoming less rarefied.

When the aether arrives in the rarefied limb, it will flow to the left to fill the void. Moving left from end B, the aether will cause a displacement current in the dielectric space in the opposite direction to that which is being caused to occur to the right of B. The net result is that a complete transverse sinusoidal wave cycle of displacement current will be expanding symmetrically in both directions from end B, and that aether will be circulating around the perimeter of this rectangular wave packet like a caterpillar track. There will be a net inflow of aether from the compressed plate into the rarefied plate for as long as the wave packet continues to expand laterally.

When the left bound wavefront reaches end A, it will reflect and the entire wave packet will now move to the right. When this happens, the expansion will stop and there will no longer be any net flow of aether from the compressed plate to the rarefied plate. The aether will now be circulating uniformly around the energy slab. The pressure and hence the charge and voltage will have reduced by one half and the charged region will have doubled in length. When the wave packet moves to the right and vacates the original capacitor region, the original capacitor region will become totally discharged. The original potential energy stored in the capacitor will now be split between kinetic energy and potential energy in the moving rectangular energy slab.

We will now have a discrete rectangular (or cylindrical) wave pulse containing exactly one full sinusoidal cycle of transverse electric displacement current. There will be an ongoing circulation of aether flow around the perimeter of this energy slab which will constitute a real electric current and generate a real magnetic field. However, this electric current will not involve any translational flow of charged particles.

The magnetic field will be at right angles to the transverse electric field in the plane of the wave but it will be out of phase by ninety degrees. This is

because when the linear polarization is at a maximum, the double circle effect in the microscopic electron-positron dipoles will scramble the vorticity. We are not therefore dealing with an electromagnetic wave.

We are dealing with a linear phenomenon that is closely related to the rotational electromagnetic wave. We are dealing with the linear equivalent to the electromagnetic photon. This slab of energy current differs from electromagnetic radiation in four important respects. These are,

- (1) The **E** field satisfies the equation $\text{curl } \mathbf{E} = 0$, whereas in electromagnetic radiation the **E** field satisfies the equation $\mathbf{E} = -\partial\mathbf{A}/\partial t$.
- (2) The **E** field is ninety degrees out of phase with the **B** field, whereas in electromagnetic radiation the **E** field is always exactly in phase with the **B** field.
- (3) It requires two conducting wires to act as a waveguide, whereas electromagnetic radiation can propagate wirelessly. The waveguide operates on the principle that broken circuit conductors act as better dielectrics than insulators.
- (4) There appears to be no theoretical basis upon which to link the slab of energy current to the speed of light because it doesn't connect with the electromagnetic wave equation.

The Electromagnetic Photon

III. In section **II** above, we saw how a fixed amount of aether can expand into a larger volume leading to a lower voltage/potential energy. Aether can have both kinetic energy due to its motion and potential energy due to its state of compression. We know that the energy of an electromagnetic photon is given by the equation $E=mc^2$. Half of this energy $1/2mc^2$ will be the kinetic energy associated with its velocity c . The other half will be the potential energy associated with the state of compression of the aether in the photon. For the meaning of mass m in relation to an electromagnetic photon, see 'The Connection between Gravity and Light' at,

<http://www.wbabin.net/science/tombe18.pdf>

The photon is a single pulse electromagnetic wave which is emitted from matter. The details of the emission process are somewhat obscure. It is

suspected that it is connected with changes that are going on in the atomic orbitals. In the case of heat and light being emitted from an electrical resistor, aether is flowing linearly through the wire and being absorbed by the conducting material. It is then being ejected in pulses of fine-grain vortex aether flow known as electromagnetic radiation.

These pulses of electromagnetic radiation have been shown to have their frequency related to their energy content through Planck's constant. This could be understood if we were to view a photon as a planar pulse of pure aether that is probably circular in shape and that moves through a region involving perhaps millions of electron-positron dipoles. The flow would be vortex flow when examined at fine-grain level, but on the scale of the photon itself, it would be equivalent to a net linear aether flow. When the aether pulse is compressed and concentrated, the photon will be small in area and possess a low wavelength, but its energy and frequency will be high. The wavelength will correspond to the diameter of the photon. Within each photon, all the electron-positron dipoles will possess the same value of magnetic intensity \mathbf{H} which will be different from the value of \mathbf{H} outside the photon. \mathbf{H} will essentially correspond to the fine-grain spin of the photon, and the changing value of \mathbf{H} at the boundaries of the photon will propagate at the speed of light in line with Maxwell's electromagnetic wave equation.

The Planck relationship between energy and frequency in electromagnetic photons is likely to be an approximation which only applies to electromagnetic radiation of a particular kind in which the photon pulses approximately contain the same amount of aether, and in which the variable is the state of compression of the pulse.

Cathode Rays

IV. Cathode rays are undoubtedly pure linear aether flow and hence pure electric current. They can exhibit wave behaviour which suggests that rather than being a stream of electrons, they constitute something which flows through a medium which already contains electrons. Cathode rays differ from electromagnetic radiation in that they are a linear flow of aether whereas electromagnetic radiation is a fine-grain vortex flow of aether.

Maxwell derived Ampère's Circuital Law at equation (9) in his 1861 paper 'On Physical lines of Force' on the basis of a closed circulation of pure aethereal space. He did not involve electrical particles until part II of that same paper. See,

http://vacuum-physics.com/Maxwell/maxwell_oplf.pdf

It is likely that the electron beam concept is a total myth in line with the modern day 'electron cloud' concept, and that all electric current in vacuum tubes and gaseous discharge situations constitutes pure aether flow. Maxwell showed that a closed circuit of pure flowing aether can cause a magnetic field, and so it follows that pure flowing aether constituting an electric field or a gravitational field will be deflected by a magnetic field, or indeed by another electric or gravitational field.

The Earth's gravitational field must therefore be deflected by the Earth's Magnetic field. This will lead to a certain amount of vorticity in the inflowing aether which is visible in the vortex patterns that we observe in the Aurora Borealis and the Aurora Australis in the polar regions.