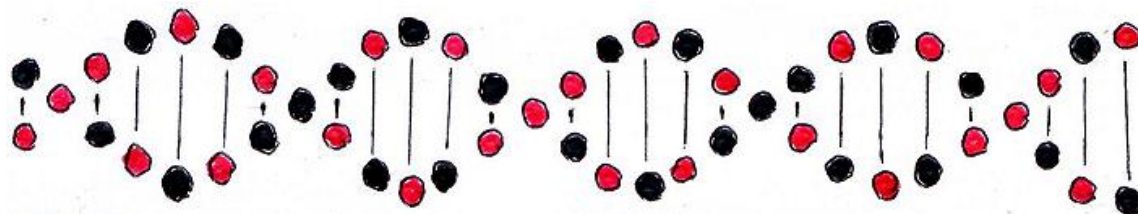# Electromagnetic Radiation in the Near Magnetic Field

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27th September 2017

Abstract. **This article follows on from the double helix theory of the magnetic field [1]. A closer look will be taken at the low energy electromagnetic radiation that is confined to a solenoidal path along the field lines within a near magnetic field, such as occurs in a transmission line pulse.**

Time Varying Electromagnetic Induction

I. Electromagnetic radiation is a propagation of energy through space. It involves an oscillation in the background magnetic field, and so we have to assume that there is always a magnetic field present at every point in space between us and the most distant observable celestial objects. The electromagnetic wave equation, first derived by Maxwell in his 1864 paper [2], as well as involving the equations of electromagnetic induction, also involves Ampère's Circuital Law. As such, it further follows that in deep space, at any point where starlight is passing through, there must exist in addition to a magnetic field, a closed electric circuit, even though there is no visible presence of such. The circuit must therefore exist on a very small scale as part of the fabric of space itself.

In the laboratory, time varying electromagnetic induction can be observed when an alternating electric current in a primary circuit induces an alternating current in a nearby secondary circuit. Although the primary circuit will have its own magnetic field, which we will

call *the near field,* the electromagnetic induction process does not specifically depend on its existence, as can be seen in the case of a toroidal transformer where the near field is wholly contained inside the primary solenoidal winding, whereas the energy transfer to the secondary winding occurs outside the primary solenoid. While the alternating near field represents the typical visual image of an alternating magnetic field, the actual alternating magnetic field in electromagnetic radiation is clearly occurring on a much smaller scale.

Since electromagnetic radiation is believed to travel in straight lines irrespective of the intensity or orientation of the already existing magnetic field that the radiation is passing through, we need to establish a more fundamental basis for the alternating magnetic field of the actual radiation itself, which doesn't depend on those aspects of the local magnetic field. This can be established by considering that space is a dielectric filled with tiny dipolar aether vortices that act like miniature electric circuits [3], [4], [5]. Each vortex would comprise of a sink (electron) in orbit with a source (positron). This would enable an alternating electric current and an alternating magnetic field to be present everywhere. The time varying electromagnetic induction process would take the form of an overflow of aether from one vortex to its neighbour, in conjunction with angular acceleration [6].

This then brings us to the issue of alignment and anisotropy. As per *the double helix theory of the magnetic field* [1], in the case of a single magnetic field line in the steady state, there will be a cancelling flow of aether in both directions along the double helix, from positron to electron, while there will be zero flow between vortices in the equatorial plane. Two neighbouring vortices will be rotating in the same direction, and so in the equatorial plane they will be pressing against each other with centrifugal force while striving to dilate. However, in the dynamic state when electromagnetic radiation is passing through, there will be a net flow of aether accompanied by an angular acceleration of the vortices. In the axial direction there will be an excess flow from positron to electron in one direction and the spiralling could account for the rotation of the plane of polarized light as was observed by Faraday and analysed in Part IV of Maxwell's 1861 paper [3].

In the equatorial plane, any overflow of aether could only follow a line along one side of a row of vortices, but since the circumferential speed of the electrons and positrons in the vortices is the same as the average flow speed of aether between the positrons and electrons [7], then the speed of the radiation will be much the same in the axial direction as in the equatorial direction.

In the case of a laboratory electric circuit, when the power is first switched on, the creation and inflation of the near magnetic field constitutes electromagnetic radiation. According to Maxwell in Part I of his 1861 paper, where he explains Ampère's Circuital law around about equation (9), the tiny vortices that already exist in space will re-orientate with their rotation axes tracing out solenoidal rings around the electric current. This then forms the near magnetic field.

While the near magnetic field is in the process of forming, the solenoidal field lines are expanding in length and so some of the radiation must necessarily be axial, flowing along the actual lines themselves. Since the field is also expanding in volume, some of the radiation must also be flowing in the equatorial plane of the vortices at right angles to the lines. The axial radiation, while following the solenoidal path, will not be flowing in a straight line, and it will be absorbed by the near magnetic field which it is in the process of forming, to be returned back into the circuit again when the power is switched off. Some of the equatorial radiation however will escape, never to return. An alternating near field is therefore an example of radiation being trapped inside the magnetic field that it is propagating within. It involves electromagnetic radiation but it does not in itself constitute electromagnetic radiation.

High Frequency Radiation

II. The relationship between frequency and energy in electromagnetic radiation is established by the Planck relationship, although the energy term would perhaps be more accurately represented by energy density, as in pressure, and Planck's constant is surely related to the density of the sea of aethereal vortices. The Planck relationship is usually associated with what is believed to be the particle nature of

radiation. A photon of light however, although possessing momentum and being emitted as a discrete quantized pulse, is not the same as a particle. A particle is a tangible and enduring sink or source surrounded by a force field and which can be accelerated to arbitrary speeds. The light photon on the other hand has a fixed speed and no stationary existence. It is made of the stuff of the fields of particles and it weaves in and out of sinks and sources. Light is primarily an electromagnetic wave.

In the case of high frequency electromagnetic waves, the aether pressure is high and the waves seem to travel in straight lines, unperturbed by local variations in the intensity or orientation of the existing background magnetic field. The situation has a degree of analogy with bodies moving in a hyperbolic path of infinite eccentricity that have escaped from a gravitational field.

Transmission Line Pulses and Newton's First Law

III. Newton's first law of motion and transmission line pulses share something in common. They both involve constant speed, which means that there is no energy loss involved.

A DC transmission line pulse is a closed electric circulation moving like a caterpillar track between two conducting wires at a speed believed to be equal to the speed of light [8]. The surrounding near magnetic field is in a state of translational motion. In the case of a static DC magnetic field, there will be no radiation, ignoring heat losses to resistance in the wire, but since a magnetic field represents an alignment of the surrounding dipolar vortices, then if it is in a state of translational motion, it will be constantly renewing as the vortices in the vicinity of the path of motion are constantly re-aligning. This realigning process, being an angular acceleration/precession, constitutes electromagnetic radiation. It will however be low energy radiation because it will be flowing along the closed solenoidal magnetic field lines as the pulse moves along the line. It will be a lossless circular energy flow.

In mechanics, as a body follows its straight line inertial path, it will similarly induce the background dipolar vortices to angularly

accelerate as it shears past them, while inducing centrifugal force. This will cause a chain reaction similar to that which occurs in the case of the moving magnetic field, hence inducing a very low energy radiation.

In both of these cases, the circulating EM radiation along the solenoidal field lines behaves a bit like an object that has not escaped from a force field, but which is undergoing a closed orbit.

Conclusion

IV. The idea that light travels in straight lines is true to the extent that it seems to be unperturbed by the intensity or orientation of the local magnetic field that it is propagating through. This can probably be attributed to the fact that light is a high frequency, and hence a high energy radiation. In lower energy situations, such as in the case of a DC transmission line pulse, the radiation follows the closed solenoidal path of the surrounding magnetic field lines that move along with the pulse. The same thing happens in planetary orbits where the net angular acceleration is zero. Energy is conserved, and the low energy electromagnetic radiation (inertial radiation) that is tied up with the centrifugal force, is recycled within the system

Angular acceleration seems to be closely associated with energy transfer. Mechanical collisions possess an analogy with time varying electromagnetic induction. In both cases, energy is transferred between two bodies in the form of waves of angular acceleration [9]. Inertial mass is analogous to inductance and the induction equation relating electric field to rate of change of current is analogous to Newton's second law, while Newton's third law is analogous to Lenz's Law.

The two transverse acceleration terms in orbital theory correspond respectively to the time varying term and the convective term in electromagnetic induction, the latter which is closely connected to Coriolis force [10]. In a Keplerian orbit there is no net angular acceleration and so the two terms cancel, therefore any radiation being emitted within the orbit is recycled into the internal motion and it does not escape. The possibility is however open that

bodies being accelerated to an extremely high kinetic energy might leak energy by emitting inertial radiation that breaks out of its solenoidal path and escapes.

References

[1] Tombe, F.D., *"The Double Helix Theory of the Magnetic Field"* (2006) Galilean Electrodynamics, Volume 24, Number 2, p.34, (March/April 2013)
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See also *"The Double Helix and the Electron-Positron Aether*" (2017)
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[2] Clerk-Maxwell, J., *"A Dynamical Theory of the Electromagnetic Field"*, Philos. Trans. Roy. Soc. London **155**, pp 459-512 (1865). Abstract: Proceedings of the Royal Society of London 13, pp. 531--536 (1864).
Maxwell's derivation of the electromagnetic wave equation is found in the link below in Part VI entitled *'Electromagnetic Theory of Light'* which begins on page 497,
http://www.zpenergy.com/downloads/Maxwell_1864_4.pdf

[3] Clerk-Maxwell, J., *"On Physical Lines of Force"*, Philosophical Magazine, Volume XXI, Fourth Series, London, (1861)
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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. It will be seen that Bernoulli is a thorough Cartesian in spirit; not only does he reject action at a distance, but he insists that even the elasticity of his aether shall be explicable in terms of matter and motion. This aggregate of small vortices, or " fine-grained turbulent motion," as it came to be called a century and a half later,* is interspersed with solid corpuscles, whose dimensions are small compared with their distances apart. These are pushed about by the whirlpools whenever the aether is disturbed, but never travel far from their original positions. A source of light communicates to its surroundings a disturbance which condenses the nearest whirlpools; these by their condensation displace the contiguous corpuscles from their equilibrium position; and these in turn produce condensations in the whirlpools next beyond them, so that vibrations are propagated in every direction from the luminous point. It is curious that Bernoulli speaks of these vibrations as longitudinal, and actually contrasts them with those of a stretched cord, which, "when it is slightly displaced from its rectilinear form, and then let go, performs transverse vibrations in a direction at right angles to the direction of the cord." When it is remembered that the objection to longitudinal vibrations, on the score of polarization, had already been clearly stated by Newton, and that Bernoulli's aether closely resembles that which Maxwell invented in 1861-2 for the express purpose of securing transversality of vibration, one feels that

perhaps no man ever so narrowly missed a great discovery. Bernoulli explained refraction by combining these ideas with those of his father. Within the pores of ponderable bodies the whirlpools are compressed, so the centrifugal force must vary in intensity from one medium to another. Thus a corpuscle situated in the interface between two media is acted on by a greater elastic force from one medium than from the other; and by applying the triangle of forces to find the- conditions of its equilibrium, the law of Snell and Descartes may be obtained. * Cf . Lord Kelvin's vortex-sponge aether, described later in this work."

[5] O'Neill, John J., *"PRODIGAL GENIUS, Biography of Nikola Tesla",* Long Island, New York, 15th July 1944, 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

[6] Lodge, Sir Oliver, *"Ether (in physics)"*, Encyclopaedia Britannica, Fourteenth Edition, Volume 8, Pages 751-755, (1937)
This quote is 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" (Sir Oliver Lodge, 1937)
The articles then goes on to cite Lord Kelvin, **"The Vortex Theory of Ether,"** *Phil. Mag.* (1887) and *Math. and Phys. Papers*, vol. iv. and passim; also G. F. FitzGerald, *Proc. Roy. Dub. Soc.* (1899), or *Collected Papers*, pp. 154, 238, 472.
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