A Solenoidal Double Helix of Sinks and Sources

(Faraday's Lines of Force)

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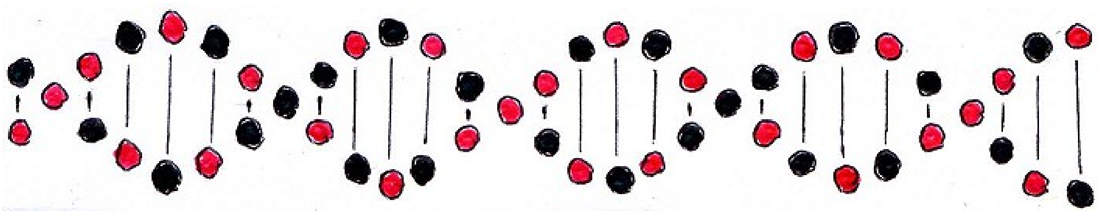

Abstract. The magnetic field is solenoidal, yet the equation for the magnetic field indicates the existence of singularities. This paper shows how a double helix arrangement of sinks and sources can resolve this dilemma. Faraday's lines of force, while being solenoidal on one scale, contain within them a double helix array of electrons and positrons. This accounts for the Coulomb force of attraction between two unlike magnetic poles, and the centrifugal force of repulsion between two like magnetic poles.

The Double Helix Theory of the Magnetic Field

I. We saw in 'The Double Helix Theory of the Magnetic Field',

http://www.wbabin.net/science/tombe.pdf

how rotating electron-positron dipoles could be arranged in a double helix fashion to account for the magnetic field. A rotating electron-positron dipole consists of an electron and a positron undergoing a mutual central force orbit such that the rotation axis is perpendicular to a line joining the electron to the positron. If we stack these dipoles on top of each other along their axes of rotation with the electrons placed approximately above the positrons and angularly synchronized in a twisted rope ladder fashion, we will effectively have a helical spring. These helical springs account for the Coulomb tension which runs through magnetic **H** lines of force, and **H** is a measure of the vorticity of the rotating aether within these dipoles. If the rope ladder untwists, the tension will increase because the electrons will come closer to the positrons above and below them. See Figure 1 below,

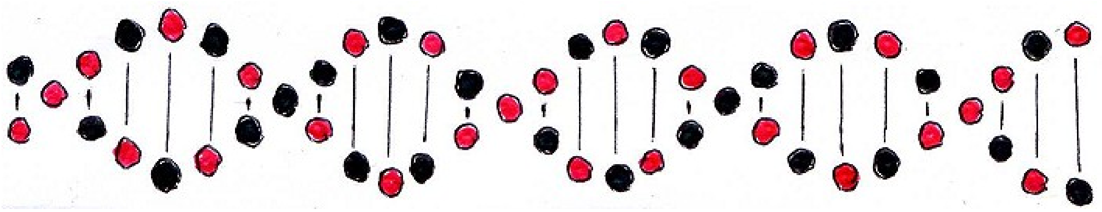

Figure 1. A close-up view of a single magnetic line of force. The electrons are shown in red and the positrons are shown in black. The double helix is rotating about its axis with a prodigious angular speed and the rotation axis represents the magnetic field vector H. The diagram is not to scale as the relative dimensions remain unknown.

The dipoles in adjacent **H** field lines will be aligned in their mutual equatorial planes and the mutual tangential velocities existing between these adjacent dipoles will cause a centrifugal repulsion to act laterally between **H** lines. This centrifugal repulsion accounts for both ferromagnetic and electromagnetic repulsion.

The Biot-Savart Law

II. It was discussed in 'The Unification of Gravity and Magnetism' at,

http://www.wbabin.net/science/tombe15.pdf

how the Biot-Savart law should only apply on the microscopic scale within the individual electron-positron dipoles of the electric sea, and that the correct equation should look like this,

$$\mathbf{H} = \varepsilon \mathbf{v} \times \mathbf{E} \qquad \mathbf{(1)}$$

The **E** term refers to the sum of the Coulomb force and the centrifugal force. The Coulomb force contains an inverse square law term with a singularity, and the centrifugal force, grad(**A**.**v**), which is an inverse cube law force in the absence of tangential acceleration, also therefore contains a singularity. Regarding the equation,

$$\text{div } \mathbf{H} = 0 \qquad \textbf{(2)}$$

if this is due to **H** being solenoidal, then we will have a dilemma, because the singularities inherent in both the Coulomb force and the centrifugal force imply the existence of sources and/or sinks.

The Double Helix Solution

III. This dilemma can be resolved with a suitable physical model for Faraday's lines of force. The **H** vector is essentially the angular momentum of the rotating electron-positron dipoles. Hence the **H** vector is a solenoidal axial vector field, and the divergence of **H** will be zero.

The sources and sinks implicit in the Coulomb force which underlies the Biot-Savart law are at the edge of the lines of force as in figure 1 above.

So although Faraday's lines of force are solenoidal, they are nevertheless pierced at the sides with sources and sinks forming a double helix pattern.

Faraday's lines of force therefore comprise of narrow solenoidal cylinders with a double helix of sources and sinks wrapped around the outside.

The Equations of Electromagnetism

IV. The equations of electromagnetism can be summarized as,

$\text{div } \mathbf{E} = \rho/\varepsilon$ (Gauss's Law)

$\text{curl } \mathbf{A} = \mu\mathbf{H}$ (The Solenoidal Equation)

$\mathbf{E} = -\text{grad}\psi + \text{grad}(\mathbf{A}.\mathbf{v}) + \mu\mathbf{v}X\mathbf{H} - \partial\mathbf{A}/\partial t$ (The Force Equation)

$\mathbf{H} = \varepsilon\mathbf{v}X\mathbf{E}$ (The Biot-Savart Law)

The 'Force Equation' is essentially the Lorentz force with an additional centrifugal force component added. The centrifugal force term comes into effect with magnetic repulsion. The four components in the 'Force Equation' all appeared in either equation (5) or equation (77) of Maxwell's 1861 paper 'On Physical Lines of Force' at,

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

Gauss's law and the Biot-Savart law are also therefore considered to contain all four of these components, but only the two radial components, the Coulomb force and the centrifugal force, will be relevant in this case. If we take the curl of the 'Force Equation', we will obtain Faraday's law of electromagnetic induction where only the two tangential components are relevant. If we take the curl of the Biot-Savart law, we will obtain Ampère's circuital law. See **Appendix A** of 'The Double Helix Theory of the Magnetic Field' at,

http://www.wbabin.net/science/tombe.pdf

and section **VII** of 'The Unification of Gravity and Magnetism' at,

http://www.wbabin.net/science/tombe15.pdf

Since Ampère's circuital law is not restricted to the microscopic scale, it is often more convenient to consider it instead of the Biot-Savart law equation, especially as it contains Maxwell's displacement current.