STOE electric charge

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Abstract

The Scalar Theory of Everything (STOE) model of hods and plenum is extended to model charge and electric fields. The hods' movements are generating vortices in the plenum. These vortices are the electric charge and also cause the coherent ripples postulated in the Hodge Experiment simulation. Free hods are the electromagnetic signal. Gauss's Law is a simplification of the STOE model.

keywords: STOE, charge attraction, charge repulsion, magnetism, electromagnetic effests

1 INTRODUCTION

The Scalar Theory Of Everything (STOE) was developed to model cosmological problems (Hodge 2015d). Hodge (2004) posited hods and plenum were the only fundamental components of the universe. The hods were two dimensional round surfaces. The hod was a magnet with one side plenum density $\rho = 0$ and the other side was held at the highest (but not infinite) $\rho = \rho_{max}$ value in the universe as shown in Fig. 1. The hod is positioned at the vertical line of Fig. 1 at the discontinuity in the ρ.

The plenum is a continuous, hyperelastic medium whose ρ gradient exerts a force on the surface of the hod. The hod warps the plenum such that it causes the gravitational mass of particles that are combinations of hods and plenum. The plenum follows the heat equation that induces a 1/distance static warp from hods, Sources, and Sinks. A temporary dynamic warp may be induced in the plenum. A potential different from the static potential causes the plenum to flow to restore the static potential. The plenum is also the inertial contributor to matter and is able to obey the wave equation.

Because these are the only components of the universe, their properties and their interaction must produce all the observed effects in the universe. The fractal and one–universe principles are a corollary of the Reality Principle. All the mathematics of the models have their analogy in our everyday life (Hodge 2015d). The problem is to discover their properties and how they interact. By

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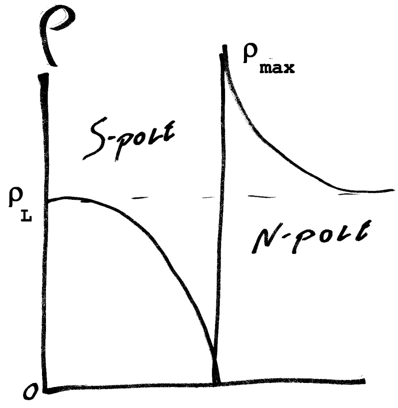

Figure 1: Diagram of the ρ around the hod.

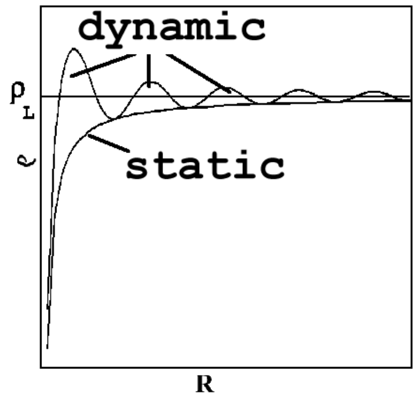

Figure 2: Plot of the calculated ρ from a hod.

using observations about the macro world, a model of photon diffraction was developed that suggested new experiments (Hodge 2012, 2015a) and rejected the wave model of light (Hodge 2015b,c, 2017b). The action of the plenum on the hod surface was posited to be analogous to the Newtonian movement of a body through a medium (Hodge 2012, section 2.2) in the direction perpendicular to the hod surface. The plenum ρ_{other} from other hods effect on the test hod is through the force generated by $\vec{\nabla}\rho_{\text{other}}$ which is the gravitational force. The STOE rejects the "action at a distance" model. Action is by contact.

Photons were modeled and a simulation program created. The simulation equation calculated ρ at the photon

$$\rho = \rho_L + \frac{K_f}{R}\cos(K_p R + K_t t + \pi), \tag{1}$$

where ρ_L is the maximum plenum density in the vicinity of the photon caused by all other hods, Sources, and Sinks; K_f, K_p, and K_t are constants; R is the distance from the emitting hod; and t is the time parameter of the wave. Because the simulation calculated the photon position in time increments, the simulation considered the t component to be averaged such that it had no effect in the simulation. Figure 2 shows the nature of the ρ variation from the hods of a photon.

The photon model was a column of hods. The analogy of a linear array of dipole antennas suggested the effect of the hods of a photon followed a sinc() function. This was used to calculate the intensity N_ρ of impact on ρ at R. The resulting simulation equation was

$$\rho = \rho_L + \frac{K_f N_\rho}{R}\cos(K_p R + \pi). \tag{2}$$

The resulting model suggested a simulation that predicted the results of the

Hodge Experiments (Hodge 2015c, 2017b). These diffraction and interference experiments rejected wave models of light. This model's success suggested other properties of the components. Because the plenum had to carry true waves according to the wave equation, the plenum carriers the inertia mass and the speed of the waves is $> 10^7 c$ (Hodge 2014a). The Equivalence principle means the hods capture a constant amount of inertial energy.

The simulation used an array with 8 to 12 antennas. Hodge (2017c) found that the energy of a photon $E = Nkh$ where N was the number of hods in the photon, k was a constant, and h was Plank's constant. The h is derived from the photoelectric effect experiment that represents the amount of energy added to a photon with one more hod added. Comparison of the difference of energies of different light colors suggests there is large number of hods in the photons of visible light. Therefore, the k represents the number of hods in a group that represents a single dipole antenna in the simulation.

The hod width was assumed to be constant at about the plank length ($\approx 10^{35}$ m). The electron may be $\approx 10^{22}$ m. If 10^3 photons make one electron, then the photons are composed of 10^6 or more hods. Hodge (2017c) suggested there may be few large groups (less than 50) of vortices in the diffraction experiments. Thus, each large group has vortices from thousands of hods.

de Sangro et al. (2012) found the speed of coulomb field is compatible with an electric field rigidly carried by an electron beam. That is, the speed of a coulomb field is much faster than photons.

Jackson (2018) noted that relative motion of matter in a fluid produce "...vortices at all known scales." Therefore, the analogy proposition applies. This suggests that the vortices exist at the scale of hods, also. Roychoudhuri (2012) suggested the role of vortices at the quantum size scale was to give rise to particles.

This Paper suggests the role of vortices at the quantum scale is the electric charge. Electromagnetic signals are composed of hods. The model of hods and plenum interaction is discussed in section 2. The Discussion and Conclusion are in section 3.

2 The model

The speed of the coulomb field suggests the coulomb field is a plenum characteristic. The speed of an electromagnetic signal (EM) suggests the EM is a hod/photon characteristic. Because vortices may be observed at all known scales, the fractal structures of the universe suggest vortices exist in the plenum. The STOE suggests the vortices are the carrier of the coulomb field.

The analogy to aerodynamics suggests vortices are formed when the trailing edge of an airfoil looses contact with the surrounding fluid. This is diagramed in Fig. 3 for the case when the velocity $\vec{v}$ of the hod is parallel to the hod surface. Because free hods, photons, and neutrinos present a zero cross-section to the direction of motion, they have the velocity of the speed of light c parallel to the hod surface, the vortices are formed one at a time at a production rate

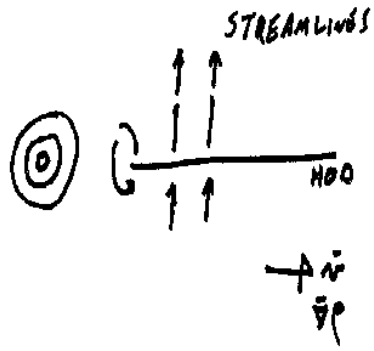

Figure 3: Diagram of the formation of a vortex at the trailing edge when the $\vec{v}$ or $\vec{\nabla}\rho$ is parallel to the hod surface.

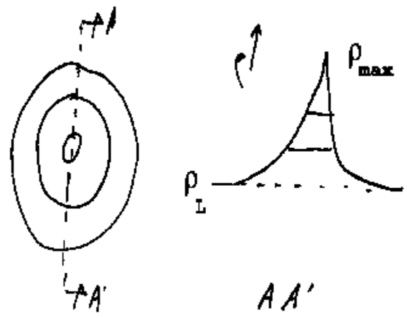

Figure 4: Diagram of the structure of the plenum in a negative vortex.

$\eta = \eta(\rho, v)$ that is a function of the ρ_L and the hods velocity. Note the velocity of the hod is the velocity of light which is dependent on the ρ_L of the volume around the hod (herein "local").

The left edge of the hod (Fig. 3) shows the streamline of ρ in a tight, high $\vec{\nabla}\rho$ circle. The plenum is hyperelastic and the near circulation at the hod edge causes the streamlines to become free in the plenum. Vortices formed this way are called "negative" vortices. Because the plenum is inviscid, this is not a circulation in the sense of aerodynamics, which requires viscous flow. The vortices can exert no tangential force. However, vortices can exert a radial force $\propto \vec{\nabla}\rho$.

Figure 4 diagrams the ρ structure of a negative vortex (N-vortex). The ρ is much higher in the vortex than ρ_L. The analogy is the tornado where one end of the vortex axis is held at a "ground" value. This value is the peak $\rho = \rho_{max}$. The amount of plenum in the vortex is constant unless an external event occurs. Therefore, all negative vortices have the same amount of enclosed plenum.

Therefore, the equipotential lines of the plenum around the center of the vortex are stable. If a vortex approaches another vortex, the ρ near one side of each vortex rises above the static limit. This causes the vortices to repel and spread to form a constant, vortex flux density $\vec{\mathcal{F}}$ surface from their point creation.

Further, other vortices cause the vortices to flow in the plenum. Because the plenum is inviscid, the vortices can move a considerable distance. The velocity $\vec{V}(\vec{r}, \theta, \zeta)$ of the vortices is the velocity of waves in the plenum ($V(r, \theta, \zeta) >> c$) in the spherical coordinate system where θ is in the plane of the equipotential surface of the local ρ. This plane is perpendicular to the generating hod. The

Figure 5: Diagram of the flow of vortexes and the ρ value along the path.

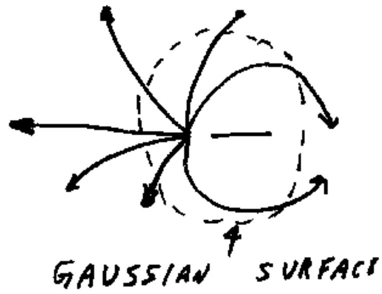

Figure 6: Diagram depicting paths of vortices from the generating hod.

vortex is spherical.

The vortices also contribute to the ρ. The vortices form a dynamical ρ value approximating a cosine function in addition to the static value. The ρ value along such a line of vortices (Fig. 5) is approximated to be a cos() function in the diffraction simulation.

Figure 6 depicts the possible paths of vortices immediately after creation. The $V = |\vec{V}|$ = constant. However, the θ and ζ changes in response to nearby vortices. The path length a vortex travels for a given time is the same for all vortices. However, not all the vortices paths appear to be from a source ($\vec{\nabla} \bullet \vec{V} \neq 0$). All hods have the same emission rate η_N of vortices. All vortices from a hod eventually pass through a closed surface enclosing the i^{th} hod.

If the radius r_i from the i^{th} hod to a Gaussian Surface S is large, the $\vec{\mathcal{F}}_{Ni}$ becomes more uniform and normal to S. Consider, two hods H_1 and H_2 separated by a distance r_{12} large enough such that $\mathcal{F}_N$ is uniform on their respective S. The $\vec{V_2}$ may be assumed to be normal and uniform across the spherical surface S_2 for large r_2. The vortices from each are the same type. Therefore, the analogy with macro-size suggests the vortices add and not cancel. Therefore, η add $\eta_{N12} = \eta_{N1} + \eta_{N2}$ and fluxes add $\vec{\mathcal{F}}_{N12} = \vec{\mathcal{F}}_{N1} + \vec{\mathcal{F}}_{N2}$ through the surface enclosing both S_{12}. The force of hods on other hods depends on the the static force and the dynamic force of the flux from one hod impacting the other hod. The dynamic force F_{N12} of H_2 on H_1 depends on the η_{N2} on the normal area of H_1 presented to H_2 (see Fig. 7). The dynamic force of like vortex flow is opposite to the attractive static force. Therefore, the vortices obey the divergence theorem and obey Gauss's Law for large distance.

For small r the $\vec{\mathcal{F}}_N$ may not be radial or uniform as depicted in Fig. 6. If two hods are close, the flux from each may be attractive as depicted in Fig. 8.

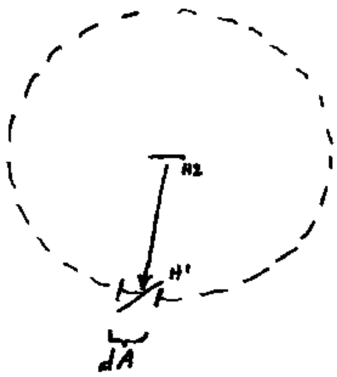

Figure 7: Diagram depicting the force of the flux of H_2 on H_1.

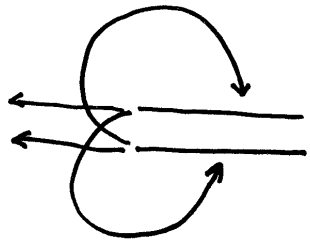

Figure 8: Diagram depicting the force of the flux when hods are very close.

This is forming the structure of a photon (Hodge 2012). The flux perpendicular to the plane of the hods is reduced to only at the ends of the photons. The flux in the plane of the hods remains and, at larger distance, encircles the photon. Hods this close also influence the formation of vortices of neighbor hods. Thus, the emissions of hods in a photon become synchronized. This is seen in the macroscopic world as two close cyclone type vortices such as drains of fluid merge to become one large vortex (Fig. 9). The large vortices form the dynamical addition to the static ρ of Fig. 2.

The vortex formed by a hod traveling in a direction perpendicular to its surface (a P-vortex) is a ring as depicted in Fig. 10. The center of the ring is at $\rho = \rho_{max}$. The rate of emission η_P of this travel is the same as η_N. If the P-vortex collides with a N-vortex, the vortex action ceases and the ρ dynamical addition to the static ρ becomes zero. This is in analogy to the macroscopic observation that different vortices cancel each other. Therefore, the Gaussian surface at large distance enclosing both has no flux through it. However, some vortexes will curve enough so that a pressure will exist to push the hods together. However, this pressure will be short lived because the hods are traveling in different directions and the hod presenting an edge will travel much faster than the hod presenting a flat.

Hodge (2014b) suggested the structure of the electron and positron. Figures 11 and 12 show the electron and positron, respectively, traveling into the page. These structures are composed of photons. Therefore, the large vortices of Fig. 9 apply. The electron has more edges than flats and, therefore, $\eta_N > \eta_P$. The positron has more flats than edges and, therefore, $\eta_P > \eta_N$.

A Gaussian Surface around the electron will have varying η_N through the surface. The usual derivation of integration around S with large radius yields

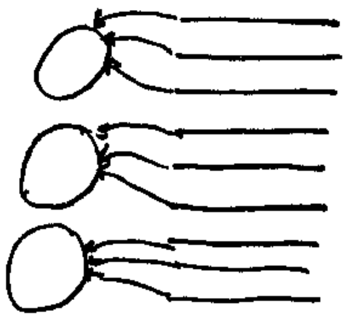

Figure 9: Diagram depicting the flow of vortices from a photon.

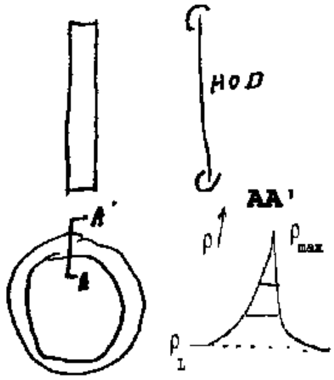

Figure 10: Diagram depicting a ring vortex formed by a hod traveling perpendicular to its surface.

Figure 11: Model of the electron.

Figure 12: Model of the positron.

Gauss's Law for η_N and η_P. If S is close to the electron, there will be parts where the η_P will not be normal or uniform to the surface. This non-uniformity may cause experiments to deviate from the Gausses Law. A possible speculative example is the electron in an atom. The positive vortices may approach the electron from the side where $\vec{\mathcal{F}}_N$ is small. This may yield a repulsive pressure on the electron close to the nucleus because the positive charges eliminate the negative charges between the nucleus and the electron. The ρ on the side of the nucleus will be higher, therefore repulsive. This situation changes as the distance between the nucleus and electron increases. The same applies to the positron and other charged particles. This may be the reason electrons orbiting a nucleus do not emit energy or collapse to smaller orbits.

Consider the free hods traveling close to particles. The positive charge particles will have the P-vortices cancel some of the N-vortices of the hod. The hod will be weakly attracted to the positive charges. The N-vortices of the Negative charged particles will cause a strong repulsion. A material such as a wire with excess electrons will cause an outward flow of hods. The material with a scarcity of electrons (positive charge) adsorbs some hods. Therefore, the flow of hods is the EM signal.

3 Discussion and Conclusion

The STOE proposes interactions are (1) hods warp the plenum, (2) the plenum density level change is transmitted according to the superposition principle in non-interacting waves at superluminal speeds, and (2) the plenum directs the hods through $\vec{\nabla}\rho$. Therefore, all interactions are non-local in relation to Bell's Theorem. Photons and matter may interfere with itself via reflection of plenum waves and with other photons and matter.

This paper looked at the ad hoc creations of fields and charges that seem to have no emergent foundational entities. Indeed, the fields and charges are assumed to be the fundamental entities. The STOE components are assumed to emerge into objects that have analogies in the macroscopic world. The density of these entities then forms fields. Thus, fields and charges are emergent characteristics.

Traditional electrostatics considers electric lines of force originate from areas of positive divergence (sources) and end at areas of negative divergence. The STOE model considers both positive and negative areas have positive divergence with different vortices. The different vortices extinguish each other wherever they intersect.

This paper introduces Gauss's Law into the STOE. After all, the STOE started for Newtonian concepts.

These speculations now need an experiment. Hopefully, an experiment to explore the electromagnetic fields using the considerations herein will be devised. Two possible areas to explore are (1) close to the electron and (2) where a difference between a flow from sources to sinks and the elimination positive sources and negative sources exists. Further, applicability of the STOE to Maxwell's equations should be explored.

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