Structure and spin of the neutrino, electron, and positron

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Abstract

The Scalar Theory of Everything (STOE) model of photons is extended to a model of the structure of neutrinos, electrons and positrons. The polarization of photons in a magnetic field suggests the photons are magnets. This observation and the STOE model of the photon suggest the hods are magnetic. Using disc magnets as an analogy of hods suggests the structure of elementary particles. The relative abundance of elementary particles and anti–particles is dependent on their relative probability of formation that depends on the difficulty of forming their structure. The structure of the neutrino explains why its velocity is the velocity of photons. The structure of large neutrinos suggests how they can transform into electron neutrinos. The position of north seeking magnetic poles relative to the direction of movement is qualitatively consistent with the "spin" observation. The postulate of "space quantization" is unnecessary. The structure models are consistent with several observations of elementary particle behavior.

keywords: STOE, elementary particles, spin, electron, positron, neutrino.

1 INTRODUCTION

The periodic table of chemical elements suggested an answer to why the relationships existed. Decades later a structure involving nucleons and electrons was found. Now the grouping of elementary particles suggests an underlying structure of more basic particles.

The Scalar Theory of Everything (STOE) model (Hodge 2013a) was developed from cosmological considerations. Hodge (2004) posited the hods were two dimensional round surfaces that maintained a plenum density $\rho = 0$. The rising ρ from the surface of the hod obeys the inverse radius law where each equipotential surface has the same total potential energy over the total surface. The equipotential surfaces form oblate spheroids with the minor axis along the normal through the center of the hods. The streamlines that are lines of force are confocal hyperbolae lines.

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The Sources at the center of spiral galaxies emit plenum and hods into our universe. Nucleosynthesis occurs as the ρ declines farther from the Source and is the combining of hods into structures that are elementary particles.

The photon model of diffraction posited the hods cause waves in the plenum and that this causes hods to be separated by a distance inversely proportional to the ρ environment. Thus, the high ρ at the center of spiral galaxies causes hods to organize into very high energy (long) photons. The photons break into smaller photons as they travel outward to lower ρ. This model is consistent with the idea black holes "evaporate" to generate gamma ray bursts from the center of spiral galaxies and explains the high correlation of central mass to outer galaxy parameters that no other model explains.

Those hods that are oriented flat-to-flat emerge as assemblies of hods. Other hods become independent. Those hods that are edge–to–edge have less attraction but they are attracted because of the oblate spheroid equipotential. The oblate spheroid become spheres at larger distances and the potential energy is the gravitational potential energy of classical physics.

Hodge (2013b, and references therein) expanded on the hod and plenum interaction and particle formation by describing the photon. Hodge (2015a) developed a model for photon diffraction and interference based on the STOE. The photon was posited to be a column of hods oriented flat–to–flat. The photons traveled in the direction of minimum surface area. Equations of motion for a photon were developed using Newtonian mechanics. A computer simulation then calculated the path each photon traveled in single slit and double slit experiments. The simulation patterns were well fit by the Fraunhofer equation. Partial illumination diffraction and interference experiments (Hodge 2015c) confirmed the model by predicting and not rejecting the STOE model and rejecting all other models of the experiments.

The fractal and one universe principles is a corollary of the Reality Principle. All the mathematics of the models have their analogy in our everyday life (Hodge 2015d).

The Stern–Gerlach experiment has been considered the exemplary experiment that demonstrates intrinsic quantized "spin" of elementary particles. Originally, thermal silver atoms were directed through an inhomogeneous magnet field. The magnetic field exerts a torque on the magnetic dipole of elementary particles. The magnetic moment vector will precess about the direction of the magnetic field. The non–uniformity of the magnetic field induces a sideways force on the particle.

The classical expectation is that the random thermal effect should result in a random space orientation of the particle's magnetic moment. Therefore, a line should be projected on the screen. However, the observation for electrons was two points that argued for a "quantized space" orientation. This observation has been interpreted to be due to the electron (elementary particle) having a spin of charges.

This Paper suggests a structure of the neutrino, electron and positron. The analogy of hods and hods structure is discussed in section 2. The structure of particles is discussed in section 3. The Discussion and Conclusion are in section

4.

2 The analogy

The STOE suggests elementary particles are assemblies of hods. Because the ρ field streamlines near hods are confocal hyperbolae, the complex N–body problem of an assembly of hods is even more complex to solve or simulate. Because elementary particles decay into photons, they must be assemblies of photons.

The passing of photons through a magnetic field produces a polarization of the photons. If the photons are a column of hods, then the photons must behave as a magnet with North (N) and South (S) poles. Therefore, the hods are like magnets with a N and S poles normal to the flats.

The fractal principle suggests the streamlines have analogies in our domain. Disc magnets were used to qualitatively suggest the structures that may be formed. The hod was imagined to be in the center of the disc. The diameter of the disc presents a solid to other discs that positions the hod at a distance from other hods, which is the suggested structure of the photon. Although the streamlines of force are similar to magnetism on the surface, they are dissimilar on the edges. However, the discs will attract other discs on the edge as well as on the flat as hods do. The magnets will also repel same poles that the hods are posited to do for the photon assembly. Assemblies of magnets should be an analogy to assemblies of hods.

The assembly for a photon is shown in Fig. 1. Placing this assembly in a dish and floating the dish in water allows the column to align with the Earth's magnetic poles. The "N" in Fig. 1 denotes the magnetic axis pole pointing toward the Earth's North magnetic pole. The arrow in Fig. 1 depicts the direction of travel for the assembly. This is the direction presenting the least surface area to the direction of travel for a photon.

3 Structure

Figure 2 shows a possible assembly of two photons. This structure is very unstable in the sense that even handling the structure causes it to revert to a single column of hods (a photon). Therefore, it may exist as an elementary particle with a very short lifetime.

Figure 3 shows another possible structure of two photons. This structure will revert to a photon when dropped on the floor from more than 10 centimeters. This structure has a direction of travel presenting a zero surface area like the photon. Therefore, it may travel at the speed of light c. Note also this structure has two directions that can align with the north pole. More photons may be added at the sides and at the ends.

Figure 4 shows another possible structure of three photons. This structure is more stable than that shown in Fig. 3, but it is still unstable when dropped

from approximately 10 centimeters. The length of the photons may differ. More photons may be added at the sides and at the ends.

Figure 5 shows another possible structure of four photons. This structure is stable when dropped. This may be the structure of a neutrino. It has a direction with no surface area presented to the direction of travel, which is out of the page. Therefore, it may travel at c as neutrinos have been shown to do. This structure has two directions that can align with the N–S axis of earth, which is perpendicular to the direction of travel. More photons may be added at the sides and at the ends of the external photons. However, the interior photons must be the same length. Figure 6 shows the result of an unequal number of hods in the interior photons. This structure is very unstable.

Figures 7 and 8 are larger structures with the same form as Fig. 5. Each is limited in size by the length of the photon. Figures 8 also has the property that a shock can break the structure into several structures such as seen in Fig. 5 as observed when the muon neutrino transforms into electron neutrinos.

Figure 9 shows a variation of the stacked neutrino structure where the end photons are turned to form a more stable three dimensional structure. This is an electron structure. There are four possible directions of motion perpendicular to the four flat surfaces and four different orientations to a magnetic north pole. For any of the directions of motion there is a magnetic orientation relative to the direction of motion $> \pi/2$ and a magnetic orientation $< \pi/2$ which causes the two "spin" orientations. The angle between the directions of motion and a N–S axis is dependent on the length of the interior photons. This assembly is stable but shatters and forms a long photon structure upon dropping. Like the neutrino, the center photons must be of equal length or the structure will be unstable.

Figure 10 shows a variation of the stacked neutrino structure where the end photons are turned to form a more stable three dimensional structure. Like the neutrino, the center photons must be of equal length or the structure will be unstable. There are four internal photons versus two of Fig. 9. Because this structure is less likely (or more difficult) to form, this is an positron structure and Fig. 9 is the electron structure. Thus the probability or difficulty of forming determines relative abundance of electron and positron structures.

Figure 11 shows a variation of the electron structure where the size is limited by the long photon length.

4 Discussion and Conclusion

The proposal is that the hod has a magnetic field rather than a rotating electric field. The moving hods then cause the electric field effect.

How a particle has a positive or negative charge may be found through the electron and positron structural differences.

The digitization of "spin" is also easily explained by classical arguments that the magnetic poles of the assembly of hods cause the unique directions. That is "space quantization" is not necessary.

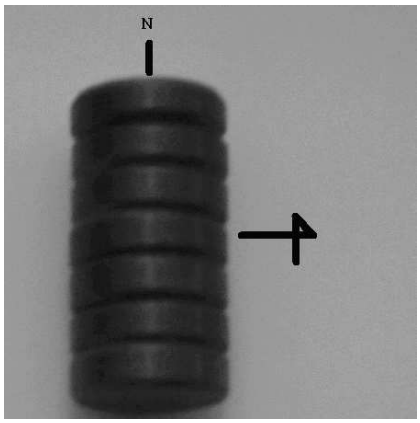

Figure 1: Photon.

Figure 2: Unstable structure of photons.

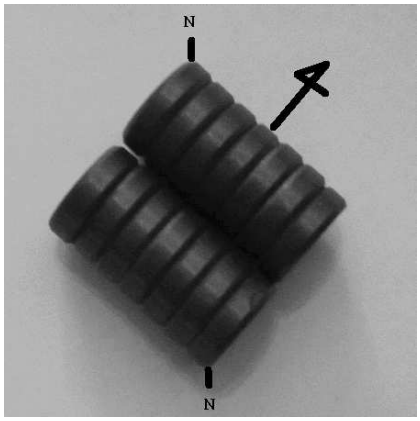

Figure 3: More stable structure of photons.

Figure 4: Still more stable but sill unstable structure of photons.

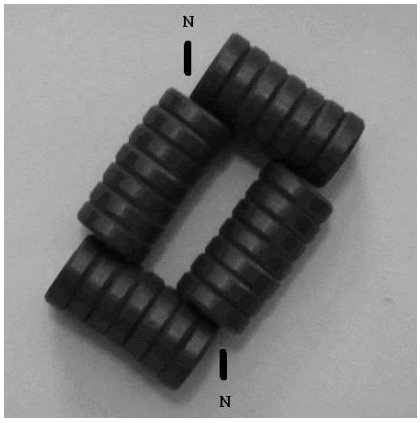

Figure 5: Neutrino.

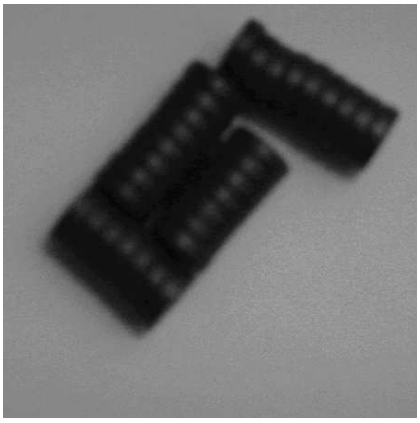

Figure 6: Neutrino with one extra magnet in interior photon.

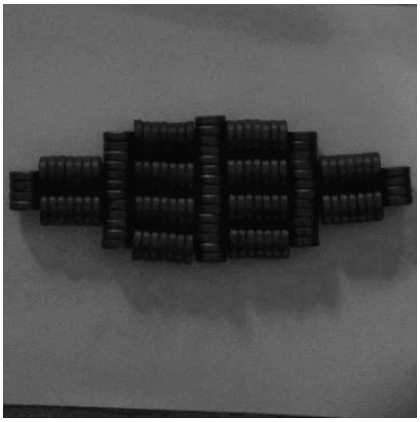

Figure 7: Larger neutrino structure.

Figure 8: Another larger neutrino limit by photon length.

Figure 9: Electron depending how charge works.

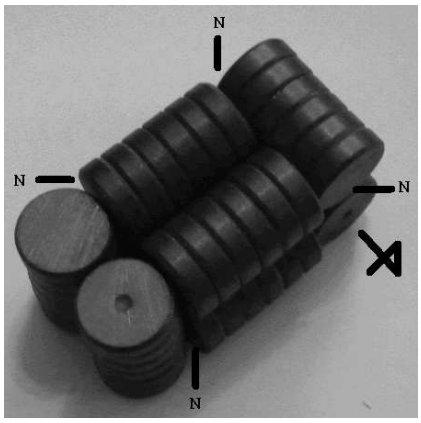

Figure 10: Positron.

Figure 11: Electron and positron size limited by photon length limit.

The external magnetic field will cause the electron and positron structure to turn slightly. This will present a larger hod surface area to the direction of travel, thus slowing the particle in a magnetic field.

The polarization of photons in a magnetic field suggests the photons are magnets. This observation and the STOE model of the photon suggest the hods are magnetic. Using disc magnets as an analogy of hods suggests the structure of elementary particles. The relative abundance of elementary particles and anti–particles is dependent on their relative probability of formation that depends on the difficulty of forming their structure. The structure of the neutrino explains why its velocity is the velocity of photons. The structure of large neutrinos suggests how they can transform into electron neutrinos. The position of north seeking magnetic poles relative to the direction of movement is qualitatively consistent with the "spin" observation. The postulate of "space quantization" is unnecessary. The structure models are consistent with several observations of elementary particle behavior.

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