Received July 15, 2013, accepted July 26, 2013, date of publication August 2, 2013, date of current version August 14, 2013.

Digital Object Identifier 10.1109/ACCESS.2013.2276623

Does a Unified Energy Equation Contain the Higgs Field?

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ABSTRACT A comprehensive equation for natural and physical systems including electric and magnetic, mass, and wave interactions has long been an objective of engineers and scientists. Dynamic energy appears to be one possible technique. A method of mathematics is used with curved space vectors which greatly reduces the calculus. The vector relationship between cyclic time and reference time is identified. A diffusion relationship is developed which has the potential for describing the Higgs field. The diffusion is defined in terms of a volume gradient varying with reference time. By judicious definition of dynamic energy, the diffusion is also a direct relationship of electrical charge and magnetism with waves or photons, and mass.

INDEX TERMS Electromagnetics, electromagnetic fields, physics, waves, spatiotemporal, high energy physics, energy fields, Higgs field, curved space vectors, curved space coordinate system, time vectors, unified field

I. INTRODUCTION

Energy is the forum for conversion between varied systems such as mechanical, electrical, and magnetic. The point source is commonly employed, but fields arise when the energy is dispersed in space. The foundations of electrical and magnetic field theory are the venerable Maxwell suite of four equations. The relationships use partial differential equations with a rectangular coordinate system to explain the fields. By transforming the coordinate system to spherical, the calculus is reduced to trigonometry and the four equations are rolled into one algebraic term [1]. A single correlation was shown for the electrical and magnetic spectrum, when these principles were proposed a couple of decades ago [2]–[7].

Einstein gave a simple, powerful, comprehensive relationship for mass when he proposed its relationship to energy [8], [9]. The math of Einstein's expression is very simple algebra. However, the implementation is difficult with relative positioning of the motion between two objects. The results are tensors with very complex calculus relationships. Perhaps the biggest problem with the relativistic approach is the application is not inclusive. Although effective near the boundary for speed of light, the relationship fails to account for slow speeds in the tangible world.

Consequently, the field model for mass continues to be elusive. The present state of the science is looking to the Higgs field to provide a universal correlation. To obtain a comprehensive energy relationship, then electric, magnetic, and wave phenomenon must be included with a mass energy function.

Such a relationship is proposed. The field is defined in terms of space and time only. Then the field is described in terms of electrical charge, magnetic flux, mass, and waves/photons.

II. COMMON RESEARCH MODEL

Natural physical systems yield a principle for research models. The fundamental principle has been uniformly observed and ascertained for all physical relationships studied [2], [3], [7], [10].

Triad Principle – *Any item which can be uniquely identified can be further explained with three components.*

Corollary One – *Two of the items will appear similar and the third will appear orthogonal.*

Corollary Two –*All three components always exist, even when one or two dominate the analysis.*

Consider the following illustrations. The first obvious representation is the three-dimensional space. A more analytical representation is the second order system which is used to describe natural phenomenon. A second order system is one which has three terms, one of which has a second time component. The second order relationship is an obvious representation of the triad principle in terms of time.

The pattern extends to observations about electrical, mechanical, and fluid systems [10]. In applications, only three

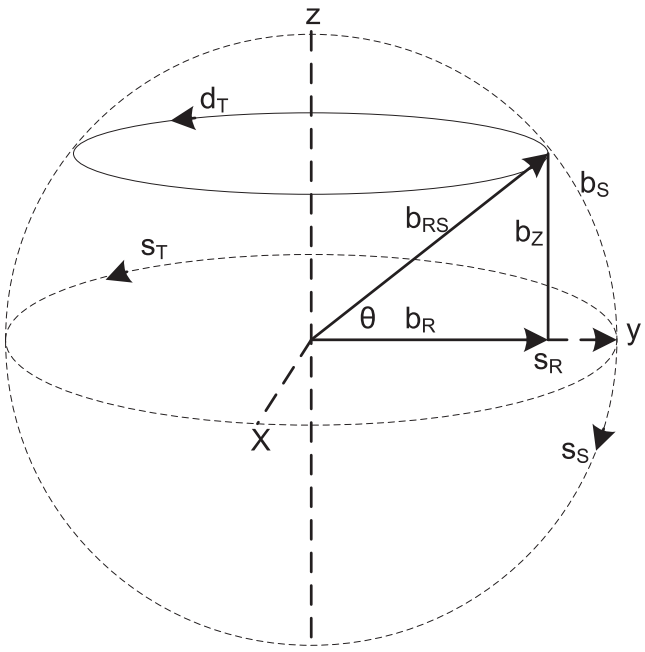

FIGURE 1. Curved Space Vectors.

items are necessarily measured to provide information for analysis. Voltage, current, and time provide a complete suite of data. The product provides energy. The ratio of voltage and current with time as an angle gives impedance.

Tesla was correct: the physical universe is about multiples of three. The suites of three items give the framework for the following development of the diffusion field.

III. SPACE

Energy is the concept for conversion between physical systems. Energy consists of three components - space, time, and matter. According to the Triad Principle, each of these can progressively be broken down into three aspects or states [1], [7].

The *first* of the energy components, space, has three measures – motion, ray, and volume, as shown in Figure 1. Motion 'd_t' is a vector which tells the distance and direction an item is moving. Ray 'b_{rs}' is the length of the arm acting on the force. Volume 's_r' is the physical dimension measure.

The three dimensions must be described for a curved space.In a flat-earth world, the three dimensions are straight lines which are perpendicular. In reality the earth and all within its realm is a spheroidal type space. A coordinate system which uses a method more conducive to airplane and space travel is introduced. The same system works at the sub-atomic level. The three curved space dimensions define a spheroidal-type volume.

Latitude 's_t' is horizontal or tangential about a spheroidal type shape. Longitude 's_s' is on a vertical or standing axis. Altitude 's_r' is a reference ray which actually extends from the reference origin of the spheroid. The spheroid does not have to be uniform, and in fact seldom is. The volume can be represented as the average area of the surface of a Riemann sphere and the dot product of the volume distance. The intrigue of the proposed space measurement system is the mathematics can be accomplished using vector products, without calculus [1].

IV. SPACE TIME

The *second* energy component is time. The space-time relationship obviously has a way to measure events and the duration between the events. Time has three manifestations. In static situations, there is no movement, so time has no variation. The time, which measures most activity, is cyclic. Cyclic or motion time is represented by 't_t'. The third time manifestation is directly related to how mass reacts to space. Space time is reference or seasonal and is represented by 't_r'. Significantly, time is now defined as a vector.

The product of the three measures of space called motion, ray, and volume divided by space direction and the reference, seasonal time is defined as *diffusion*. Diffusion is simply the explanation of the space-time interaction.

$$D = \frac{b_{rs} \times d_t \cdot s_r}{t_r s_r}$$

Diffusion is the time varying volume gradient. The reference volume vector is repeated to assure volume in the numerator and to provide direction. The reference vector in the denominator provides a volume gradient.

Space and seasonal time are inseparable. Together the two form a continuum in the diffusion. The relationship is very much like electric and magnetic which are inextricably linked.

Now correlate diffusion with more conventional relationships. The rate of diffusion over motion time 't_t' becomes the product of reference velocity and motion velocity.

$$\frac{D}{t_t} = \frac{b_{rs} \times d_t \cdot s_r}{t_r t_t s_r} = u_{rt} u_t$$

Significantly, the relative velocity vectors can range from orthogonal to parallel. In Newtonian motion, the diffusion rate is velocity squared. However, at the boundary interface diffusion rate is the speed of light squared, a critical component of Einsteinian relative motion.

$$\left.\frac{D}{t_t}\right|_{lim} = c^2$$

Consequently, the rate of diffusion provides the critical link between Newtonian and Einsteinian motion.

V. MATTER

The *third* component of energy is matter. Matter is the fabric of which physical items are made. Matter is three regents – mass 'm', charge 'q', and magnetism 'φ'. Each regent has its own energy domain.

Mass is the tangible measure which can be perceived with the five senses of see, hear, touch, taste, and smell. Mass is uniquely coupled to the space-time concept. The space-time interaction is contained in diffusion 'D', which was defined above.

Charge is the measure of electrical activity. Charge, as electrons and protons, is a key ingredient of chemical and nuclear phenomenon. However, charge is not restricted to these particles.

Magnetism is the measure of magnetic attraction. Magnetism is observed from a pair of poles. Magnetism is inextricably coupled to charge when either is in motion. Together charge and magnetism make the electro-magnetic spectrum.

In the fundamental perception, each of these regents occurs at a point or node. All the energy is lumped at one location. In many instances, the energy is dispersed in a fluid made up of liquid or gas. In these energy fields, the regent effects are distributed over a volume.

Matter, space, time moves in waves 'w', oscillations, or vibration motion. Energy results from oscillation when coupled to a constant of the universe 'h_p', Planck's constant.

With these definitions, the concepts are combined to form a unified field. The step necessarily involves mathematics. Fortunately, because of the choice for space vector definitions, the model is explained with only multiplication and division applied to the Conservation of Energy.

All calculations discussed are changes in values of variables from a reference. The relations represent the instantaneous and peak values. Therefore, calculus notation is superfluous, at this stage. Derived concepts and average values may depend on the calculus [1].

VI. UNIFIED FIELD DEFINITION

With the foundations in place, now the objective for a unified field relationship is to integrate the concepts of matter, space, and time. Three discrete relationships provide the foundation of the complete equation. The relationships in this form are not conventional and are not generally known, but are mathematically rigorous [1].

1) The first term is the product of mass and space-time diffusion over cyclic time.

$$E = \frac{m\,D}{t_t}$$

2) The second term is the product of magnetism and charge over cyclic time.

$$E = \frac{\varphi\, q}{t_t}$$

3) The third term is the product of a universal constant and the number of waves or photons over cyclic time.

$$E = \frac{h_p w}{t_t}$$

The common denominator is cyclic time. Following the conservation of energy, the three terms are joined to yield a Unified Field representation. The three terms of the Unified Field are in triad form and can be called the dynamic energy.

$$E = \frac{m\,D}{t_t} + \frac{\varphi\, q}{t_t} + \frac{h_p w}{t_t}$$

The fundamental dynamic energy was accomplished with only seven parameters. One equation now correlates mass with space-time, electromagnetics, and wave (photon) energy. The reckoning which describes all of matter has only seven items which are combined. When set to zero, the relationship is the characteristic equation of energy.

The simplicity of the relationship expresses all the elusive terms for light which have been proposed throughout history. The summation is the handle for how the universe is wired. Whether looking in space, at the book on your desk, or at subatomic nuclear particles, all operates according to this simple, elegant summation of matter and energy.

Perhaps one of the most significant factors is the diffusion. The diffusion relationship has the characteristics to describe the field associated with the Higgs particle.

VII. DIFFUSION FIELD

The diffusion field can be calculated from the characteristic equation of energy obtained by setting the dynamic energy equation to zero. The characteristic equation then becomes an alternative statement of Conservation of Energy.

$$\mathbf{0} = \frac{m\,D}{t_t} + \frac{\varphi\, q}{t_t} + \frac{h_p w}{t_t}$$

By rearranging terms, diffusion is described in terms of matter.

$$-D = \frac{\varphi\, q + h_p w}{m}$$

The negative sign has multiple significant meanings. The first is the direction of one of the defined vectors is in the opposite direction. The second significance implies whether the field is an applied forcing function or is a resulting field.

The diffusion field was earlier illustrated in terms of space-time.

$$D = \frac{b_{rs} \times d_t \cdot s_r}{t_r s_r}$$

Considering both relationships, the diffusion field provides a universal correspondence to curved space-time. The field also projects the interaction of all matter. Consequently, the diffusion field meets the requirements of the Higgs field as well as providing a basis for a unified energy field equation.

VIII. SUMMARY

Dynamic energy is the sum of the mass-diffusion product over cyclic time plus the electric-magnetic product over cyclic time plus the wave constant and number of waves (photons) product over cyclic time. When set to zero, the characteristic equation of energy is observed.

Diffusion is the volume gradient varying over seasonal time.

Diffusion can be calculated from dynamic energy to be the magnetism and charge with Planck's constant and number of waves (photons) over the mass.

The diffusion field provides a universal correspondence to curved space-time. The field also projects the interaction of all matter. Consequently, the field meets the requirements

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