The helical structure of the electromagnetic gravity field

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Abstract–Within the universe an influence creates processes and forms with helicity and spin, and there is a handedness bias. The scale of objects with helicity and spin goes from galaxies to miniscule atomic structures. A helical structure has chiral properties which allows helical structures of the same type at 180° to each other to effortlessly merge. Gravity with a helical electromagnetic field structure can influence the helicity and spin of everything. The form of the helical electromagnetic field structure that produces an attractant only type gravity force is described.

Introduction

"There appears to exist more asymmetry in the physical universe than is yet understood and it would not be surprising if this required a further revision of fundamental concepts."[1] The quote is from an article titled "Chirality" by Lancelot Law Whyte, published in 1975. It documents examples of helicity and spin that were known at least into the late 1960s, and some were significant. As noted by Whyte, "On six occasions from 1820 to 1957, chiral phenomena were unexpectedly discovered that involved a revision of previous theoretical assumptions." Whyte expands on the specific cases in his article. Many more specific examples of this phenomena have been found and it cannot be concluded that every possible helicity and spin examples have been identified. The initial quote is an understatement when it is realized that the mechanism of gravity causes the asymmetry.

Einstein's curved space-time theory of gravity dismissed all aspects of the electromagnetic (EM) phenomenon as the mechanism that causes the force of gravity. Before and after Einstein's theory was presented, there have been many theories proposed that implicate EM forces as the cause of gravity. Two basic characteristics of gravity have to be accommodated:

1. All materials with what is termed mass are attracted to each other.
2. Within the solar system, the influence of the force of gravity must be essentially instantaneous to prevent planetary orbits from becoming spirals.

An instantaneous influence in the solar system is required for solar system distances, but this characteristic is not always mentioned in papers or discussions concerning gravity. There are papers that specifically mention the gravity instantaneous influence-at-a-distance, some using the term superluminal.[2]-[5]

It is not difficult to find web sites and papers where the author purports to provide a clear understandable explanation of how gravity actually works. Periodically a particular title will attract attention and the material is reviewed. Two papers are cited, which are related, that provide a mathematical approach that is based upon the physical characteristics of atomic particles that have been measured and or mathematically derived. [6][7] The first paper has a simple title, "Electrifying Gravity", the second paper a conventional technical title, "Newton's Gravitation Constant G as a Quantum Coupling Constant."

The EM characteristics that produce the phenomenon of gravity are readily explained using a few diagrams and basic physics. No attempt is made to identify the process which produces gravity, except it is conceded that some quantum sized structure is involved.

Transverse Only

At the time Einstein formulated his gravity theory, the only EM field configuration known was where both the electric and magnetic fields were transverse to the axis of propagation. Most everyone dismissed EM fields as being the force associated with gravity because the force has to be in the direction of the axis of propagation. Recent research has shown that propagated TEM waves, with the same frequency and proper phasing, can attract or repel each other.[8] The parallel TEM waves experienced bending perpendicular to their axis of propagation, and the attraction or repelling is based upon electric and magnetic field principles. The significance of the experiments affirm that propagating electric and magnetic fields, well removed from their original sources, obey the same physical laws that were first identified in laboratory experiments on steady state electric and magnetic fields some 170 years ago. If one of the EM fields could be generated in-line with the axis of propagation, one element of an EM gravity force is in the correct direction.
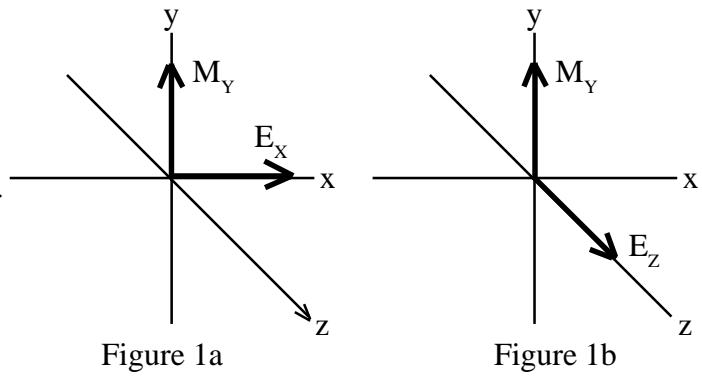
One of the basic methods of illustrating transverse EM (TEM) fields is using Cartesian coordinates, Fig. 1a, where the direction of electric, E_X, and magnetic, M_Y, field vectors are in the x-y plane, with the electric and magnetic fields at 90° to each other. Even if a way was found to generate one of the fields to be aligned with the axis of propagation, such as E_Z in Fig. 1b, the positive and negative E_Z field vectors would be aligned and there would be no net force measurable in the axis of propagation.

Maxwell's equations do not prohibit EM fields from having structural forms that are other than transverse. There are no theoretical reasons why EM fields cannot be generated in a circular form, which would result in a helix path when they are propagated. For a helix, when the positive and negative E field vectors are aligned with the axis of propagation, they would be displaced angularly and not canceling.

Circular Coordinates

Helical EM (HEM) waveforms were first described in 1992.[9] The helix form would result in the same field vector generation experienced with TEM fields, but with infinite planes angularly arranged around a cylinder in cylindrical and helical forms.

Cylindrical coordinates are used to represent the orientation of HEM fields, Fig.2, with the notation being altered from that traditionally used to depict cylindrical coordinates to accommodate the two possible vector orientations of the electric field, E. For convenience, the magnetic field vector will be restricted to being transverse to the axis of propagation, z, which allows the electric field vector to be either transverse or parallel to the axis. The electric field vector directions have been given the symbols E_H and E_C, with the subscript H identifying a helicoid field struc-
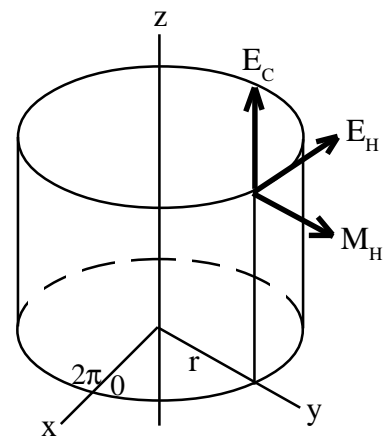
Figure 1a

Figure 1b

Transverse

Transverse-Longitudinal

Electromagnetic Fields Using Cartesian Coordinates

Fig. 2 - Helical EM Field Cylindrical Coordinates

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ture and subscript C identifying a cylindrical field structure. The magnetic field vector has been given the symbol M_H to represent the *magnetic field direction* relative to the cylindrical surface, with the subscript H indicating the field has a helical structure. A HEM waveform can have a field structure with a pair of helicoid fields, HEM-HH, or with a helicoid and cylindrical field, HEM-HC. The electric and magnetic field vectors retain their 90° relationship in both configurations.

A diverse number of mathematical forms can be used to mathematically describe positional information contained in circular coordinates, all requiring a reference position.[10] The helicoid in itself is an interesting topological form, as it is the only non-rotary surface that can roll along itself.[11] A helicoid with a hole is known as Hoffman's minimal surface.[12] Chirality is a property of a helix, and a helicoid is what is termed a *filled-in helix*. The topological characteristics of a helicoid and the chirality of both HEM waveforms give them special characteristics.[13]

HEM Angular Phase Position

Mathematically rendered depictions of a HEM type waveform have been produced by a number of photonic researchers.[14]-[16] A NASA web page has a large helical wavefront image credited to the University of Glasgow.[17] The American Institute of Physics graphic, where they choose to model an electric field in the form of a helicoid, uses color to illustrate the phase changes. Whether an electric or magnetic field, the angular phase position (APP) of the EM field vectors will be fixed relative to the HEM source orientation. In comparison to the simple *pull* characteristic of gravity, the APP is a HEM field trait that will cause a more complex interaction between objects with different APPs.

None of the mathematically rendered HEM waveforms modeled by photonic researchers have a hole in the middle, which represents the waveform they are producing. The coordinate system for an radio frequency HEM waveform, Fig. 2, has a center hole. A mathematical representation of a helical and column-shaped EM field has been produced in nature, Fig. 1 of the Chu (sprites) reference, where the column would represent the E_C vector and the helicoid represents the M_H vector, which is on the outside of the column.[18] Until instruments became available to ascertain the structure of sprites, it was not known they could have a helical structure. Chu uses Maxwell's equations to identify the mathematical forms that describe the sprite forms that have been observed.

For laboratory produced HEM type waveforms, the angular orientation and spin direction of the waveform is always known, but for HEM waveforms from natural sources, the sensor systems would have to accommodate unknown angular orientations and either spin direction.

Helicoid and Cylindrical Fields

From the viewpoint of an observer looking toward the source of a HEM-HH wave, the field vectors will be radial with spin, presenting characteristics somewhat like circular polarization. The E_H helicoid will have field vectors with an orientation between radial and azimuthal polarization. A HEM-HC would present a composite form with radial M_H vectors and longitudinal E_C vectors, both with spin. From a front or rear view, the E_C vectors will look like a ring, where the ring field intensities will have specific spatial and angular positions based upon the size and orientation of the device that produces that type of HEM field. Fig. 3 illustrates the orientation of the electric
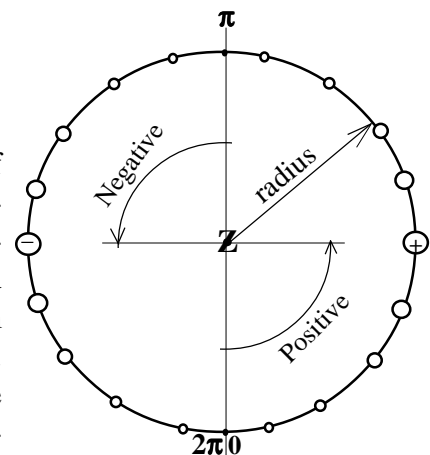

Fig. 3 HEM-HC Cylindrical Electric Field - Vertical View

field as a longitudinal component of an HEM emission where the axis of propagation, z, is into the paper. The APP reference is at the 2π,0 position.

Both HEM waveforms, HEM-HH and HEM-HC, present a chiral form. For an HEM waveform, this presents a condition where two identical HEM waves at 180° to each other, with the same handedness, will allow chiral coupling of the fields; Fig. 3 illustrates this for the electric field, where flipping the image over by 180° will result in the positive and negative field of one aligning with the negative and positive of the other.

A TEM wave can bend perpendicular to its axis of propagation, thus, one can consider that two identical HEM waves at 180° to each other, with the same handedness, can twist about the axis of propagation into alignment with each other.

HEM-HC Contiguous Field Alignment

The HEM field orientation with a single helicoid and the E_C vectors in a cylindrical form present unique characteristics in the direction of the axis of propagation. For the HEM-HC field orientation, the electric field is a series of plus and minus fields evenly spaced by the pitch of the helix and parallel to the axis of propagation on their respective sides of a cylinder surface. Fig. 4 illustrates an alignment where the vertical separation, pitch, of the helix loops has the same value as the helix circumference. For a continuous force, which gravity presents, a HEM-HC will have contiguous alignment of the electric field from the point of origination to the position where the field has propagated.

For a HEM waveform, the radius will be a function of the wavelength and pitch. Changing the pitch of a HEM-HC waveform will not affect the propagation velocity, but it would change the field-to-field coupling distances of the contiguously aligned electric fields and their coupling influence. The force of the coupling influence can be described by Coulomb's Law from the point of propagation to where the field has propagated.

The vector depiction of an electric field magnitude and polarity provides a sine wave type presentation of the concept of an electric field that has a directional factor. If each vertical line of the sine wave of Fig. 4 were replace with a circle sitting on top of the line, each circle varying in size according to the electric field intensity, and annotated with the direction and polarity, the perspective of field lines would be more as it is presented in classical physics, except for the directional characteristics of each electric field charge; the influence is in-line only with the preceding field. Fig. 5 represents a series of electric fields that are one finite segment of seven succeeding cycles of one of the + vector lines of Fig. 4. The electric field influence is through the contiguous linking of an unbroken chain of electric fields. A chain
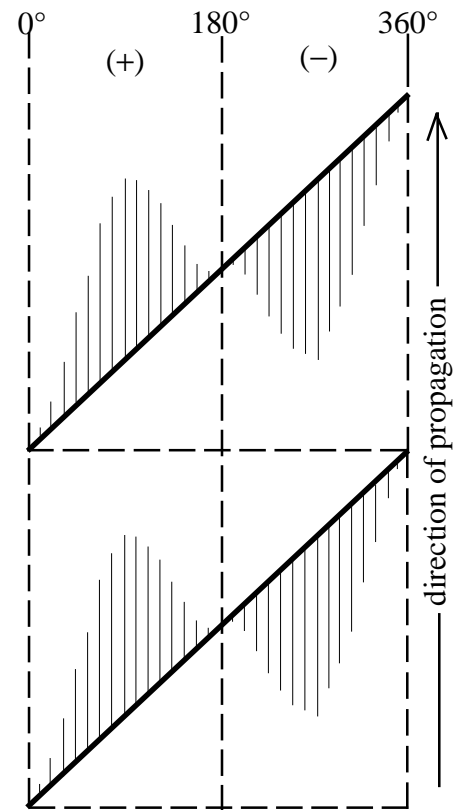
Fig. 4 - Cut and flattened cylindrical surface depicting two complete cycles of an electric field having longitudinal polarization
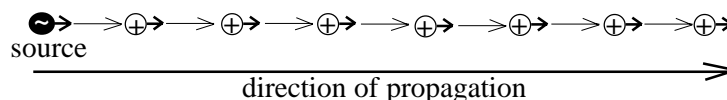
source
direction of propagation
Figure 5. Directional Electric Field

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of magnetic monopoles would accomplish the same contiguous field coupling for that element of the EM phenomenon if it were the longitudinal component of a HEM field.

Gravity is a two-way process, every mass object is linked to each other by the HEM-HC fields emitted by these objects. The classical definition of *inertia* is applicable for distances that result in essentially instantaneous action at a distance, with delayed inertia, but inevitable, between objects beyond instantaneous distances.

The HEM-HC original fields propagate at the normal EM velocity, but the contiguously linked longitudinal influence is not limited by that restraint, it is established by the original propagation. There are a number of papers that have identified essentially zero delays in far-zone EM measurements, one is cited.[19] Additionally, it will have to be determined whether the material in which a HEM-HC can propagate, its permeability and permittivity, will effect the velocity of the contiguous coupling influence. Measurement of superluminal influence velocities will require timing system improvements.[20]

Detecting HEM waveforms

For a mass, the frequency the HEM-HC gravity field is unknown, but it can be conceded that some quantum sized structure is responsible for its generation. It cannot be concluded that the wavelength will also be quantum sized, this based upon the various EM emissions with very long wavelengths from atomic structures, such as the 21 cm wavelength from the neutral hydrogen atom.

Additionally, it cannot be concluded that HEM waveforms are not being produced by other sources in the universe, or even in our solar system, because contemporary antenna-receiver-signal processors capable of detecting TEM signals would have difficulty in properly identifying a HEM signal.

One way to begin resolving HEM type emissions would be with the use of antenna arrays that are programmed to some circular scan rate that is at the frequency or some even division of the received signal such that the angular reference orientation of various circular polarized emissions, with different APPs, can be identified. Circular scanning antennas can be implemented using software defined radio (SDR) concepts. SDR concepts would be ideally suited for HEM receiving systems, except current field-programmable gate array (FPGA) devices, which are the core hardware element of SDR processes, have limited RF spectrum range; it is gradually being improved.

The HEM-HC waveform, with longitudinal polarization, would not be efficiently acquired by conventional TEM antenna-receiver systems Antenna structures will have to be able to receive a longitudinally polarized EM field, and the associated receiver system would have to be able to discriminate between TEM and HEM-HC emissions which could appear at the antenna output. Additionally, the spatial characteristics of an HEM-HC emission suggest that an array of elements would have to be spaced in a circular form that matches the diameter of the hole related to the wavelength of the HEM-HC emission. The diameter of helical axial mode antennas designed to acquire circular polarization have a diameter of approximately λ/π, but this is based on a TEM field vector that starts at the longitudinal axis, whereas, a HEM field vector starts with the radius, or effective radius, of the structure that produces the HEM waveform.

Although HEM-HC fields that produce the gravity force will always appear chiral from our viewpoint, other natural HEM-HH and HEM-HC fields may have a different handedness, which means HEM detection system will have to accommodate the polarization, angular rate and spin direction (handedness) of the source HEM emission in order that the acquired positive and negative polarities (phases) can be extracted in the correct sequence.

Summary

The HEM-HC field structure replicates the observed characteristics of gravity. HEM field structures exist, but have not been described using the descriptive methods commonly used to depict EM field structures.

Antenna, receiver and signal processor systems will have to be developed to enable them to efficiently acquire HEM emissions, which will aid in identifying the frequency of the EM gravity force.

Whether there is a difference in the propagation characteristics of HEM waves with a longitudinal field component as compared to TEM waves is unknown and will have to be determined by measurement.

The APP of HEM-HC emissions from solar objects, relative to some established reference, will have to be determined.

Recognizing that gravity is an EM phenomenon, and knowing the reason why there is no appreciable influence delay with solar system distances, will aid in understanding the dynamics of objects that are within essentially instantaneous gravitation influence as compared to objects with greater distances and delayed influence.

The helical characteristics of the EM gravity influence on objects and processes in the universe is readily apparent

It would be prudent to establish a *unit of energy* that is based upon EM principles, such that it will have a direct relationship to the EM force of gravity. Knowing that gravity is an EM phenomenon will allow mass to be defined in relationship to a *unit of energy*.

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