Searching for Cosmic Matter

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OBJECTIVE

The purpose here is to review some of the concepts of gravimagnetism[1] and then to radically speculate regarding some means of verifying the theory, both astronomically and here on earth, and regarding some practical applications.

OVERVIEW OF THE EM-GK ISOMORPHISM

Gravimagnetism is theory based on an isomorphism between gravity and electromagnetism. In this theory of gravimagnetism the graviton is defined as the analog of the virtual photon. The graviphoton is defined as the analog of the photon. Gravitational mass charge, the analog of positive and negative Coulombic charge, is defined as positive when it is a positive imaginary quantity, and negative when it is a negative imaginary quantity. Imaginary here means a quantity containing the imaginary number i, the square root of minus one. A gravitational field g or gravimagnetic field K are imaginary analogs to the electromagnetic fields E and B.

An electrostatic attraction occurs when a virtual photon is exchanged between a positive and negative electrostatic charge. An electrostatic repulsion occurs when a virtual photon is exchanged between like electrostatic charges. Due to the effect of the i coefficient in gravitational fields, a gravitational repulsion occurs when a graviton is exchanged between a positive and negative mass charge. A gravitational attraction occurs when a graviton is exchanged between like mass charges.

By the fully defined isomorphism, every conceivable electromagnetic quantity, relationship, and law has a precisely defined gravimagnetic equivalent.

THE ISOMORPHISM

We now establish the isomorphism by applying the following rules to every electromagnetic equation and relation in order to obtain the gravitational analogs.

Here the use of SI units where possible is assumed. In any EM formula or relation, subscript every term with "g" to denote the gravitational analog. For example, replace c, μ_0 and ε_0 with corresponding terms c_g, μ_{0_g}, and ε_{0_g}, where $c_g = c$, $\mu_{0_g} = 4 \pi G/(c_g^2)$, $\varepsilon_{0_g} = 1/(4 \pi G)$. Co-gravity $B_g = K$ (with units i Hz) is defined as the gravitational analog to (corresponds under the isomorphism to) B, the magnetic field

B, so H_g the Gravimagnetic Field Intensity (with units i kg/(m s)) corresponds to H, the magnetic field intensity. Gravity g (with units m/s^2) is defined as the gravitational equivalent of the electrostatic field E. Wherever charge is used, gravitational mass charge q_g (gravitational mass) is substituted (with units of i kg.) J_g is the mass current density vector (with units i kg/(s m^2)) corresponding to current density vector J. The gravitational force constant $G = 6.67259 \times 10^{-11} m^3/(kg\ s^2)$ corresponds to the Coulomb force constant k. Virtual photons correspond to gravitons, photons correspond to graviphotons, with the qualities already described. Virtual particles carry no gravitational mass. Other particles have Coulomb charge and mass charge values as empirically determined. We now have the correspondence shown in Table 2.

Electric	Gravitational
virtual photon	graviton
photon	graviphoton
g	i m/s^2
q	q_g = i m (mass charge in i kg)
E	$E_g = g$ (gravitational field in m/s^2)
B	$B_g = K$ (Gravimagnetic field in i Hz)
H	H_g (Gravimagnetic Field Intensity in i kg/(m s))
J	J_g (mass flow density vector in i kg/(s m^2))
c	$c_g = c = 2.99792458 \times 10^8$ m/s
ε_0	$\varepsilon_{0_g} = 1/(4 \pi G)$
	$= 1.192299(31) \times 10^9$ kg s^2/m^3
μ_0	$\mu_{0_g} = 4 \pi G/(c_g^2)$
	$= 9.33196(96) \times 10^{-27}$ m/kg
$k=1/(4 \pi \varepsilon_0)$	$G = 6.67428(67) \times 10^{-11}$ $m^3/(kg\ s^2)$
$F_e = k\, q_1\, q_2 / r^2$	$F_g = G\ m_1\, m_2 / r^2$

Table 2: Gravity-electromagnetism Isomorphism
Correspondence Table

NOTATION AND NOMENCLATURE RELATED TO GRAVITATION

The EM-GK isomorphism, here named the *gravimagnetic isomorphism*, provides analogs to a vast quantity of physical laws, formulae and terms. From the correspondences provided in Table 2, all gravitational formulas, relations, and constants can be derived from the EM analogs. This can cause much confusion in the process of attempting to assign names and symbols to the gravitational analog items.

To be consistent, and to end terminology confusion, when discussing or expanding the isomorphism proposed here between the electromagnetic (EM) and gravikinetic (GK) fields, when referring to a gravitational feature the analogous term borrowed from the EM universe should be prefixed with "gravi" to indicate that that analogous feature is in the GK universe. If it is not appropriate to prefix a term with "gravi" then it can be preceded with the adjective "gravitational". It is noteworthy that GK fields are also called by some "gravikinetic". They are here named the *gravimagnetic* (GK) fields, and actually differ in that they are here considered to be imaginary entities as their units include a factor i.

Under the proposed EM-GK isomorphism every variable, every formula, every unit in EM now has a corresponding value, a gravitational analog. The formulas and variables from the EM world should be used faithfully, and simply subscripted where necessary with a "g" to designate the GK analog.

The exceptions to these rules are the variables g, and G, and co-gravitational field K, which is hereby now called the gravimagnetic field K, which are symbols that have been used by others, and now have the specific equivalencies:

$$E_g = g$$

$$k_g = G$$

$$B_g = K$$

Note, however, that here g and K are in imaginary units.

Based on the above nomenclature principles, Table 3, Sample Terminology Correspondences Under the EM-GK Isomorphism, demonstrates some typical terminology correspondences.

Electromagnetic	Gravimagnetics
electrostatic field E	gravitational field E_g = g
magnetic field B	gravimagnetic field B_g = K
magnetic field intensity H	gravimagnetic field intensity H_g
electromagnetic (EM)	gravimagnetic (or gravikinetic) (GK)
charge	gravicharge (an imaginary quantity in units of +i kg, or possibly -i kg, not to be confused with mass)
current	gravicurrent (an imaginary quantity in units of +i kg/s)
magnet	gravimagnet
monopole	gravimonopole
Poynting vector P	gravitational Poynting vector P_g
ohm (Ω)	graviohm (Ω_g)
permittivity (ε)	gravipermittivity (ε_g)
permeability (μ)	gravipermeability (μ_g)
lightspeed (c)	gravispeed (c_g)
impedance of the vacuum (η)	graviimpedence of the vacuum (η_g)
Maxwell's laws of electromagnetism	Maxwell's laws of gravimagnetism
Gauss' Law of electric flux	Gauss' Law of gravitational flux
Laplace's Law of Electrostatic pot.	Laplace's Law of Gravitational Potential

Table 3 - Sample Terminology Correspondences Under the EM-GK Isomorphism

Similar terminology should be used when applied to the laws of Lenz, Biot-Savart, Ampere, Ohm, etc. The theory itself, the EM-GK Isomorphic Theory, can simply be called a *theory of gravimagnetism,* or *gravimagnetic theory*.

Table 4, Summary of Estimated Values, summarizes some readily derived estimates of various gravimagnetic values of importance right here on earth. Some values may be way off due to the fact particle spin produces a gravimagnetic field, thus magnetic bodies like the sun and earth will carry extra gravimagnetism.

Gravimagnetic Planck's Constant	h_g = - h = -6.626 0693x10^{-34} J s
Gravicurrent of earth	i_{g_earth} = 6.927x10^{19} i kg/s
Gravimagnetic dipole moment of earth	μ_{g_earth} = 6.90x10^{32} i kg m^2/s
Gravimagnetic field (K=B_g) in Center of Earth due to its own rotation	K_{g_earth} = 1.815x10^{-13} (i Hz)
Gravimagnetic Field Intensity (H_g) in Center of Earth due to its own rotation	H_{g_earth} = 1.945x10^{13} i kg/(m s)
Lateral acceleration due to moving at orbital speed through earth's gravimagnetic field in a normal (perpendicular) direction	a_{earth} = 1.49x10^{-10} g
Gravimagnetic field from sun at Earth[2]	K_{sun} = 9.526x10^{-23} (i Hz)
Gravimagnetic field at earth from lunar rotation	K_{moon} = 1.778x10^{-30} (i Hz)
Gravimagnetic field at earth from lunar orbiting	K_{orbit} = 3.78x10^{-19} (i Hz)

Table 4 - Summary of Estimated Values

SOME IMMEDIATE IMPLICATIONS OF GRAVIMAGNETISM

The theory of gravimagnetism leads to many fully quantified and verifiable implications, some of which differ from those of general relativity. For example:

1. Gravity diminishes with distance due to propagation delays. A particle 14 billion light years from the origin of the big bang is 28 billion years behind in its graviphoton transactions with a particle 14 billion years on the other side of the big bang origin. Gravitons still in progress have not effected their force.

2. Gravimagnetic fields can cause errors in estimation of distant mass values.

3. Virtual particles carry no gravitational mass charge. Virtual photons carry no gravitational mass charge, thus black holes can exhibit electromagnetic effects beyond and through the event horizon.

4. The missing mass density of the zero point field ZPF is explained.

5. A black hole above a very small threshold mass creates from vacuum fluctuations and then emits matter carrying gravitational mass charge of a type opposed to the mass charge of that black hole. The black hole retains mass charge of like kind and thus builds its own mass from the vacuum.

6. Parts of space, especially near super massive black holes, are filled with mass containing negative mass charge. This matter accounts in part for dark energy[3] and large apparent voids in space. Some cosmic rays consist of this matter.

7. Newton's f = m a contains no imaginary portions, thus inertia is primarily an electromagnetic effect.

8. The gravimagnetic analog to Planck's constant, $h_g = -h$, to some extent, unifies gravity and electromagnetism, and determines the momentum carried by graviphotons, etc. However, gravimagnetic theory also permanently ***dis-unifies*** gravity and electromagnetism in the sense that the forces exist in differing dimensions and have differing charges and charge carriers.

9. A gravitational zero point field (graviZPF) exists, an analog to the EM ZPF. A gravimagnetic Casimir force therefore exists.

10. Because virtual photons carry no gravitational mass charge, black holes can have magnetic fields. Such magnetic fields, along with the gravimagnetic field, forms matter emitted from high spin black holes into jets.

FIELD PANCAKING

It is well known[4] that special relativity predicts changes in the observed electromagnetic field of a charged particle due to the flattening of the field in the direction of motion. This flattening is due to application of the Lorentz contraction due to relative motion. This relativistic effect of flattening the apparent field is called the "pancaking" of the Coulombic field. Shadowitz provides the equation for relativistic (Coulombic) field pancaking as:

$$E = Q/(4 \pi e_0 r^2) \ (1 - (v^2/c^2))/(1 - (v^2/c^2) \sin^2 \theta)^{3/2}$$

Where v is speed and θ is the angle of the observer to the direction of particle travel.

If we let $\beta = v^2/c^2$ then we can interpret apparent charge Q' to be:

$$Q' = Q\,(1 - \beta)/(1 - \beta \sin^2 \theta)^{3/2}$$

which can be interpreted to mean apparent charge is reduced to observers in line (forward or back) with the charge's velocity vector and increased as the observing angle is increased toward the side.

Note - it is not standard physics to interpret pancaking as a change in apparent charge (standard relativity assumes charge is invariant with velocity) but rather a change in observed field strength, but we are able to interpret the pancaking equation for Q' either way.

By the isomorphism, field pancaking applies to gravitational fields as well, so we have:

$$\beta_g = v^2/c_g^{\,2}$$

$$Q_g' = Q_g\,(1 - \beta_g)/(1 - \beta_g \sin^2 \theta)^{3/2}$$

This effect then, in part accounts for dark energy. Due to the increased observed departing velocity of bodies with distance, the source of the Hubble red shift, there is also a corresponding reduction in gravitational field strength, due to the tendency for θ to be statistically close to a departing angle, i.e. $\sin^2 \theta = 0$. Note that even at high angles, e.g. $\sin^2 \theta = 0.99$, as light speed is approached, apparent gravitational mass charge disappears:

$$\text{limit as } \beta_g \text{ ---> } 1, \quad (1 - \beta_g)/(1 - 0.99\,\beta_g)^{3/2} \text{ ---> } 0$$

GRAVIMAGNETIC SHIELDING

When a graviton is exchanged between two like gravitational mass charges an attraction occurs. This is somewhat counterintuitive in that momentum is exchanged in a direction opposed to that expected based on ordinary momentum. However, this is not at all unusual in the world of physics, in that virtual photons exchanged between unlike electrostatic charges act in an identical manner.

What is of special interest here is that, to have any effect, the graviton is absorbed. It doesn't continue forward on its way. A graviton has a single source and destination. This leads to the necessity that masses have gravitational penumbrae. A mass m_2 between two other masses m_1 and m_3 must in part shield m_1 and m_3 from each other. The magnitude of the graviton absorption from mass m_1 by mass m_2 is proportional to the force exerted between mass m_1 and m_2.

GRAVITATIONAL PENUMBRAE AND DARK ENERGY

Graviton absorption can occur by any particle carrying gravitation charge, including photons. The greater the distance between two bodies in space, the more matter that exists between them (assuming a nonzero mass density in space), and the more photon flux that exists between them. By implication then, the greater the distance between two bodies in space, the less the gravitational force between them compared to that predicted by Newton. The reduction in force is proportional to the mass charge directly between the two bodies. This then also accounts in part for dark energy, the apparent reduction of gravitational force between bodies with increasing distance.

POSSIBLE EVIDENCE OF GRAVITATIONAL PENUMBRAE

Gravitational penumbrae may have been recently observed.[5] Observations of earth shadowing of the moon's gravitation may provide some support for a messenger particle for gravimagnetism, depending on interpretation and confirmation.

DARK ENERGY

Gravity must necessarily be reduced by the effects of propagation delay, field pancaking, and graviton absorption by intermediary matter. These effects, however, are small compared to the effects of matter having negative mass charge, charge having negative imaginary value.

Through symmetry, gravimagnetics mandates the existence of such matter. Black holes above a critical mass must necessarily, spew forth mass manufactured from the vacuum having a gravitational mass charge opposed to that of the mass of such a gushing black hole. In the case of high angular momentum black holes or highly magnetic black holes, such an outward flow of matter will be channeled into polar jets.[6] The existence of such jets at the cores of massive galaxies provides evidence for the existence of this phenomenon, as does the spherical distribution of the dark mass halo about galaxies, as will be seen shortly.

The existence of negative mass charge necessitates the existence of both a repulsive gravitational force and matter containing negative gravitational mass charge . This matter has negative weight here on earth. Such matter will here simply be called *cosmic matter*, because the word cosmic is short, and recognizes the natural source of such matter.

Cosmic matter is born of black holes when the gravitational field is sufficient to separate particles of differing mass charge. We might expect both mass charge and Coulomb charge to be conserved by this process. Therefore, it might be expected a gravitationally separated light lepton pair must consist of either (1) a positron with negative gravitational mass and an electron with positive gravitational mass, or (2) a positron with positive gravitational mass and an electron with negative gravitational mass. We will see below that this is not correct.

THE GALAXY ROTATION PROBLEM

The Modified Newtonian Dynamics (MOND) theory is contrived to explain the galaxy rotation problem.[7] It shows that the problem is solved if gravitational acceleration $a_{grav}(r)$ obeys the law:

$$a_{grav}(r) = (a_0 G M)^{(1/2)} / r$$

where $a_0 = 1.2 \times 10^{-10}$ m/s^2. Suppose we want to preserve the inverse square gravitational law by assuming there is a distribution of mass about a galaxy that mimics the MOND formulation for local accelerations. We assume there is a large central mass M surrounded by a distribution of mass m(r). We then have:

$$(a_0 G M)^{(1/2)} / r = G M/r\hat{}2 + G m(r)/r\hat{}2$$

which yields a mass distribution m(r):

$$m(r) = k_1 r - k_2$$

for positive k_1 and k_2. This gives a mass density $\rho(r)$ of the form:

$$\rho(r) = m(r)/v(r) = m(r)/(4/3 \pi r^3) = 3k_1 / (4\pi r^2) - 3k_2 / (4\pi r^3)$$

Note the requirement that one component of the mass produce negative gravity. This mass density distribution problem is readily solved by positive gravitational mass charge matter in an approximately $1/r^2$ density planar configuration, and cosmic dark matter in a $1/r^3$ spherical configuration. Cosmic matter manufactured in the galactic plane, having negative gravitational mass charge, will leave the galactic plane to form a spherical halo. This $1/r^2$ distribution of positive matter and $1/r^3$ distribution of the cosmic matter halo solves the galaxy rotation problem as well as explaining the source and shape of the mass halo. The source of the spherical halo is principally the center of the galaxy.

REVERSE GRAVITATIONAL LENSING

Cosmic matter is not necessarily antimatter as it can be either matter or antimatter. In fact, again by symmetry, and conservation, a cosmic gamma, a gamma originating from cosmic matter and thus carrying negative gravitational mass charge, must decay into a cosmic electron and cosmic positron, or at least cosmic matter plus cosmic antimatter. All that distinguishes cosmic matter, as defined thus far, is that it gravitationally repels normal matter and attracts itself. However, we shall see the evidence overwhelmingly indicates that *cosmic matter and mirror matter are one and the same.*

Cosmic matter attracts itself, so in a locality consisting entirely of cosmic matter nothing appears different from our locality, at least to cosmic matter beings. Its spectra are normal, though photons emitted by such matter, *cosmic photons*, also carry negative mass charge, so exhibit *reverse gravitational lensing* in the presence of normal matter black holes. Similarly, ordinary light experiences reverse gravitational lensing near large cosmic matter masses.

Ordinary gravitational lensing, the bending of light around massive objects to create Einstein rings, is a well known effect.[8 9] Reverse gravitational lensing can similarly cause rings or crescents of light near a massive black hole, and centered on the black hole. A reverse gravitational lens (RGL) acts in some respects similar to a reflective glass ball. A large object, like a galaxy, behind an RGL, is distorted into a ring or partial ring around the RGL with an appearance similar to the Einstein ring produced by ordinary gravitational lensing. Because the mass forming the RGL repels the light, the view of the image immediately behind is highly darkened, thinned or obliterated in the vicinity of the center of the RGL. Light from the periphery is condensed into a brighter ring around the RGL center. Multiple paths from any light source located on the same radius to the rear and slightly to the side of the RGL simultaneously meat the eye, thus the bright ring from any large area light source. Detailed Hubble photos of at least eight Einstein rings are available.[10] Without knowing something about the background image being distorted, it can be difficult to tell if ordinary or reverse gravitational lensing is occurring, especially if the observer doesn't know the two possibilities exists. If an ordinary light source is clearly visible and to one side of the lens then an RGL is distinguished by the fact the reflection is on the same side as the light source, while the ordinary lens produces a bright spot on the side opposed to the source. A lens forming structure may consist of multiple black holes, so the lens may not be spherical and thus the reflection distorted.

MIRROR MATTER AND COSMIC MATTER ONE AND THE SAME

Physical evidence, like the invisibility of the Milky Way mass halo, makes it necessary that mirror matter and cosmic matter are one and the same. If they were not one and the same, then cosmic normal matter and cosmic mirror matter would be created in equal amounts from the vacuum by the black holes of our galaxy. This doesn't happen. Our mass halo consists of invisible matter. Therefore, all cosmic matter is invisible because it is *all mirror matter*. We interact only through gravity with mirror matter, except for a very weak EM force interaction, specifically a photon-mirror photon interaction equivalent to the interaction of charged particles with $5x10^{-9}$ the charge of an electron.[11] This accounts nicely then for the fact the spherical mass halo about visible galaxies, including ours, is invisible. It also means that RGLs should look like a bright spherical mass of matter with jets of high energy material spewing forth from its center. We can not see the cosmic-mirror matter galaxy from which the ordinary matter emanates. Its mirror matter black holes spew forth ordinary matter. A mirror matter galaxy with a real matter spherical halo would actually appear to us to be an elliptical galaxy, like M87. Further, photon reflections are obscured by normal mass emissions of mirror galaxies.

Cosmic matter being mirror matter also explains why cosmic matter is so difficult to find on earth, even though our galaxy, the Milky Way, assuming it is our galaxy, is surrounded by a sphere of mirror matter. It is invisible, and it blends with ordinary matter via a very weak EM interaction.

AN INTERACTION DEDUCED BY SYMMETRY

Table 5 - Selected Particle Interactions, summarizes the primary types of electromagnetic or gravitational force exchanges that occur between various types of particles, including various forms of cosmic matter.

Particle--->	Graviton	Gravi-photon	Virtual Photon	Photon	Cosmic Photon	Lepton	Hadron	Cosmic Lepton	Cosmic Hadron
Particle:									
Graviton	intf	null	null	g	-g	y,g	y,g	y,-g	y,-g
Graviphoton	null	intf	E	null	null	p	p	p	p
Virtual Photon	null	E	intf	null	null	z,E	z,E	z,E	z,E
Photon	g	null	null	intf	*	o	o	o	o
Cosmic Photon	-g	null	null	*	intf	o	o	o	o
Lepton	y,g	p	z,E	o	o	g,E	g,E	-g	-g
Hadron	y,g	p	z,E	o	o	g,E	g,E	-g	-g
Cosmic Lepton	y,-g	p	z,E	o	o	-g	-g	g,mE	g,mE
Cosmic Hadron	y,-g	p	z,E	o	o	-g	-g	g,mE	g,mE

Key:
g - ordinary (attracting) gravitational
-g - anti-gravitational
E - electromagnetic (+ or - depending on charges)
mE - mirror electromagnetic (+ or - depending on charges)
* - Weak EM with effective electric charge about 5×10^{-9} q
o - oscillating EM, momentum
p - oscillating GK, momentum
z - zero point EM
y - zero point GK
intf - superpositioning quantum waveforms interfere

Note: only largest interaction types specified

Table 5 - Selected Particle Interactions

Table 6 - the Particle Charge Table, summarizes the primary EM and GK interactions of selected particle types.

	Carried Charge EM	GK	Carried Force
Particle:			
Graviton	null	null	GK
Virtual Photon	null	null	EM
Graviphoton	w	null	
Photon	null	g	
Lepton	E	g	
Hadron	E	g	
Cosmic photon	null	-g	
Cosmic Lepton	mE	-g	
Cosmic Hadron	mE	-g	

Key:
g - ordinary (attracting) gravitational mass charge, positive imaginary value
-g - anti-gravitational, negative imaginary value
E - electromagnetic (+ or - depending on Coulomb charge +-q)
mE - mirror electromagnetic (+ or - depending on Coulomb charge +-q)
w - weak electromagnetic charge, about 5x10^-9 charge of electron
(apparent + or - depending on spin)

Table 6 - Particle Charge Table

Tables 5 and 6 contain an interesting symmetry. The photon carries a gravitational mass charge, but no Coulomb charge. By symmetry, then, the graviphoton carries a very small Coulomb charge, but no gravimagnetic charge. Graviphotons can be deflected, even focused, by a powerful electromagnetic field.

GENERATING GRAVIPHOTONS

This is a highly speculative area, so here are some wild speculations.

Graviphotons may be somewhat difficult to generate without having anti-gravitational matter, and even more difficult to detect. Graviphotons might be generated by the effect of a laser beam on a dense plasma by direct acceleration of the ions. If the beam is polarized, the graviphotons will be issued in the plane of polarization and normal to the laser beam. Similarly, graviphotons might be generated by directing a high energy beam of nucleons through static magnetic fields oriented in alternating directions - a device known as a “wiggler”. The graviphotons in a wiggler beam can be separated from the photons using a powerful magnetic field to bend the graviphoton beam. Graviphotons might be generated by nuclear magnetic resonance. Conversely the gravimagnetic field might be measurable using nuclear gravimagnetic resonance. The stimulating field could still be electromagnetic.

Graviphotons, rather than gravitons, may be involved in creating the effects measured by Matos and Tajmar[12] around spinning superconductors. This eliminates the puzzling need for gravitons to have mass in superconductors.

DARK MATTER AND MIRROR MATTER

Mirror matter has *only* gravitational mass charge[13] [14] to us in a normal matter world. Mirror photons, both virtual and real, have little effect on us. If mirror matter existed in both normal and cosmic form, then symmetry would demand that mirror matter exist in both positive and negative mass charge species. In that case, a black hole consisting of either mirror matter or normal matter, or a mixture of both types, when of sufficient size, would simultaneously spew forth *both* normal and mirror matter of the opposed gravitational mass charge, and in equal proportions. There is no evidence this happens, and much evidence to the contrary. The enormous spherical mass halos of galaxies are not made of visible matter.

So then, we are left with the problem of where large amounts of *dark* gravitational matter come from. First, it has already been shown the galaxy rotation problem is solved by negative gravitational mass charge matter, not positive gravitational mass charge dark matter, thus eliminating part of that problem. We will now see that black holes, both small ones generated by high energy large mass particle collisions, and massive ones, can account for a much larger dark matter mass than can be expected cosmologically.

Ordinary matter is created in particle-antiparticle pairs. This then is necessarily true of mirror matter pairs as well. Physicists in a mirror galaxy see particle-anti-particle pairs created from the vacuum. What physicists in neither ordinary nor mirror galaxies see is single charged particles created from the vacuum with an invisible partner. This means that mirror matter created in ordinary black holes is necessarily created in particle-antiparticle pairs. The gradient of the black hole gravitational field must therefore be large enough to tangentially separate charged pairs, thus a black hole must be of a very large size to emit much mirror matter. However, such a large gradient is not required to emit the annihilation photons which also have negative mass.

The vicinity near a singularity is comprised of a quark and lepton soup. CP violation establishes the species that survives the quark soup to emerge from the event horizon of a black hole - matter from negative mass charge black holes, cosmic antimatter from ordinary black holes. The imaginary charge of cosmic matter in some sense restores the symmetry lacking in the CKM matrix which includes only ordinary matter.

Statistically, we can expect that all that mirror matter generated from the vacuum by a black hole is matched, in terms of gravitational mass, by ordinary matter, or at least matched by the positive mass-energy that is added to normal matter black hole mass, i.e. to its singularity. Further, when a matter-antimatter pair is created from the vacuum there is reason to expect, for reasons of conservation of charge, that simultaneously there is created a mirror matter-mirror antimatter pair. Call such a foursome a *dual pair*. The pair having gravitational mass charge opposed to that of the black hole is expelled, the other pair is absorbed. Even given that pairs lose all their Coulomb charge identity in a singularity, or by annihilation, they retain mass charge, thus black holes will generate through time a much larger aggregate gravitational mass than could otherwise cosmologically be expected. Even very small black holes, created by high energy particle interactions, have a newly found ability to survive and grow despite their small size. A never ending exponential expansion of black hole mass does not seem consistent with observations, yet an unbounded growth is a logical necessity. Only the limit of the ability of the vacuum to produce dual pairs limits the growth rate of black holes.

Note that *any* sized black hole with mass occupying a *point* has, for some finite radius, a volume in which the field strength is sufficient for pair creation to take place. As the mass of a black hole increases, the radius of this mass spawning sphere increases. For this reason, essentially *every* black hole spawns mass from the vacuum, and thus simultaneously builds its own mass.

NEGATIVE ENERGY AND OTHER ISSUES

Cosmic matter, reverse gravitational lensing, and negative energy are all concepts previously anticipated in various forms. Cosmic matter is anticipated by the "exotic" or "negative energy" matter discussed by Davis and Puthoff.[15] The possibility of negative energy virtual photons also relates to their work, which includes various suggested means of generating negative energy. They further anticipate "negative vacuum energy densities, which arise from *distortion of the electromagnetic zero point fluctuations* due to the interaction with a prescribed gravitational background, for providing a violation of the energy conditions." This is the kind of effect necessary for black holes to generate opposed gravitationally charged matter. Yet, interestingly, the work of Davis and Puthoff is based on general relativity theory, not graviton exchange.

There is a seeming problem with gravimagnetic theory at this point regarding the conservation of gravitational mass charge. Matter-antimatter pairs created from the vacuum carry the same mass charge. Mass charge thus appears to not be conserved. There is a convenient and highly unanticipated resolution to this problem. When a matter-antimatter pair is created from the vacuum there is always simultaneously created a mirror matter-mirror antimatter pair. Here such a foursome is called a *dual pair*. Further, having negative mass charge, the mirror matter-mirror antimatter pair represents negative energy. Thus is provided a significant new interpretation of the Dirac equation negative energy. Further, the net energy created from the vacuum dual pair formation is then exactly zero. Following dual pair creation, matter-anti-matter pairs can annihilate, but in so doing they create photons having a corresponding mass charge, thus the cosmic and ordinary mass-energies of the universe remain in balance.

UNDERLYING IMPLICATIONS

The isomorphism as defined here has utility in its own right. It has utility in putting solutions forward to the dark energy problem, galaxy rotation problem, and the Pioneer anomaly[16], for example. It provides a simplistic but utilitarian overview of matter, though it also gives clues as to the underlying structure.

Gravitational mass charge, as defined by the isomorphism, is an *aspect* of a particle, something bound to the particle's location and other qualities, not a fermion in its own right. It can simply be viewed as a quality of a string or particle that interfaces with the imaginary universe. The imaginary universe is a quality of the vacuum characterized by ε_{0_g} and μ_{0_g}, which are the gravitational analogs to ε_0 and μ_0. The fact that c and c_g can differ in any particular volume of space, due to extreme field effects, i.e. a change in the index of refraction, accounts for the apparent space warping and time warping effects of GR.

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In many circumstances, many applications, due to the small gravitational constant, it is adequate to treat gravitational quantities completely independently for computational purposes, and then consolidate with Coulomb force results if that is even necessary to the purpose. The exact same Coulomb based equations can be independently applied to the gravitational portion of the computation in order to derive the gravitational forces, energies, waveforms, etc. The gravitational formulations are completely independent of the electromagnetic formulations. They are isomorphic, so the same equations are used, though using the isomorphism substitutions as defined. The *results*, however, are not similar in handedness or magnitude, because, though the equations are all formally identical, there are imaginary values coming into play, and h_g = - h, G is used instead of the Coulomb constant, etc. Because the mass charge and EM charge are bound together, the forces can be summed to characterize a fermion, or to characterize a boson-fermion interaction as a whole.

When full relativistic effects are involved, or a correct formalism is required, then it is necessary to dispense with MLTQ units in favor of the full definition over the field of complex numbers, LT(a QM + b Q_g), where the value of real a and b are determined by particle type(s) involved, and Q and the imaginary Q_g are units of Coulomb and mass charge, M is inertial mass. This in effect provides a fully unified field theory, as unified as possible at this point that is.

The Dirac equation, the Dirac Hamiltonians for field interaction, etc., the Rarita-Schwinger equation used for spin 3/2 fermions, etc. , must be defined over the full imaginary field, not just real numbers with units.

It is noteworthy that the technique of normalization of units, commonly used in relativity, can not necessarily be used when applying gravimagnetic theory as unified over the imaginary field. It is not necessarily true that $c = c_g$, so it is not possible to set both c = 1 and $c_g = 1$. Q and Q_g exist in differing proportions in differing particles, and one of the values is imaginary.

Photons, or bosons in general, are bound entities, having both an electromagnetic portion and a gravimagnetic portion. Photons have an electromagnetic potion and corresponding gravimagnetic charge. Graviphotons have a gravimagnetic portion and corresponding Coulomb charge. Virtual photons don't have a gravimagnetic portion and gravitons don’t have an electromagnetic portion. Virtual particles do not have a gravitational mass charge. This then provides a description of gravity consistent with both Newton and special relativity. But is there more? Yes.

An interesting outcome of all this is that strong fields can change the apparent qualities of the vacuum. From the expected effect on the path of a photon in a gravitational field, Jefimenko provides[17] a description of the field interrelationship:

$\varepsilon\ \mu\ \sim\sim\ 1 - (\varphi_g)/c^2$

where φ_g is the potential function

$\varphi_g = g\ ds$

If the apparent $\varepsilon\ \mu$ changes then the speed of light

$c_{new} = (\varepsilon\ \mu)^\wedge(-1/2)$

changes as well, as does the refractive index of the vacuum:

$n = c / c_{new}$

It is interesting that the dual is true also. There is implied the existence of general relativistic (GR) effects (though they are not gravitational effects) on graviphotons due to powerful EM fields, because

$\varepsilon_g * \mu_g\ \sim\sim\ 1 - (\varphi)/c^2$

where φ is the potential function

$\varphi = E\ ds$

The independent treatment of the gravitational and electromagnetic fermion portions, using the appropriate gravitational or electromagnetic description portion of the boson messenger particle, produces the bending of light in accord with Jefimenko's derivation. Therefore, the independent Dirac treatment of the imaginary qualities of fermions and bosons, combined with an EM Dirac treatment, produces GR effects. There is no difference in effect between changing the velocities c and c_g and the bending of space, i.e. changing the apparent distances between objects.

BLACK HOLES RADIATE

Black holes consisting of mirror matter create dual pairs, as described above, and absorb the negative gravitational energy of the mirror pair. The ordinary matter pair is then ejected in one form or another, either as a matter pair, or as a pair of ordinary photons. Analogous effects occur from ordinary black holes. The smaller the black hole, the greater the proportion of energy ejected that is in the form of annihilation photons. Most of the mass-energy ejected is in the form of photons due to the high probability of (like gravitationally charged) pair annihilation. These gravitationally emitted photons will have energy levels that indicate the positive gravitational potential of the radius at which they were formed. Further, the radiant mass-energy of a mirror black hole which is not feeding on other bodies provides a direct indicator of the rate of mass increase of that black hole due to dual pair creation, because the two mass-energy flow rates are equal. This radiant energy is *not* Hawking radiation. Its origin is not the event horizon, but rather the interior of the black hole, and its spectrum provides information about conditions inside the black hole, including its mass and the dual pair formation flux at various radii r. Negative gravitational matter is utterly unaffected by an ordinary matter event horizon. Dual pair initiated radiation is comparatively invisible when coming from an ordinary matter black hole because that radiation is mostly mirror radiation. Some coupling of mirror and ordinary photons occurs on the order of 5×10^{-9} times the charge of an electron, so visible halo type effects on local light can be seen from this.

TEST OF GRAVIMAGNETISM VS GR

Virtual photons can not carry gravimagnetic charge. Therefore, electric fields, i.e. near field effects, are readily transmitted from a black hole, and readily transmitted two ways across the event horizon. This means that black holes can exhibit Coulombic charge. This is not of any practical consequence except maybe when the size of the black hole is very small. Massive black holes will quickly neutralize any large net charge by creation of charge from the vacuum or by attraction of charged particles from space. What is really important here about the virtual photon's lack of gravitational mass charge is that black holes can exhibit very large magnetic fields even not in the presence of an accretion disk. This would be utterly impossible if either (a) GR effects are due to space warping or (2) virtual photons carried gravitational mass. This, then, provides a means of comparing gravimagnetic theory to that of GR. It should be possible, through spectral analysis, to see if polar jets from and near black holes are in a strong magnetic field, one too strong to be accounted for using accretion mass. Such a test should thus be made using a black hole with minimal accretion. It is notable that no polar jets should be present at all (under GR) if there is no accretion disk. The presence of polar jets without an accretion disk also eliminates GR as a viable theory, because there is no feasible source for the polar jet matter. Such an observation would exclude a GR explanation.

META-MATTER

Mirror photon and real photons very weakly interact. Therefor real matter and should be expected to be capable of weakly bonding to ordinary matter, possibly gravimagnetically via spin coupling, and vice versa. Call this bonded state *meta-matter*. If this happens, then accelerations of a meta-matter particle will produce simultaneously real photons and mirror photons. Real matter near a real black hole, being bathed in mirror photons, and some mirror particles, is thus slightly visible to the mirror world. Similarly, mirror matter near mirror black holes, being bathed in real photons, and some real particles, is thus faintly visible to the real world. Even without permanent bonding, a slight interaction of real matter or photons in the plasma of a mirror matter star should make it faintly visible in the mirror world, especially if it is nearby a real matter radiating black hole.

BARRED SPIRAL GALAXIES

The galaxies[18] [19] in Figures 1 and 2 could be interpreted to consist of matter condensed from jets from a point source not having an accretion disc.

These galaxies match the profile expected from the jets of a great spinning mirror matter black hole or black holes, possibly in the core of an invisible mirror matter galaxy. Galaxies of this two lobe spiral shape are classified as barred spiral galaxies. About fifty percent of all galaxies are of this type.[20] The source of the bar is suggested here to be the result of polar jets of matter from a spinning mirror matter black hole. The jets subside as the black hole's spin diminishes. The stars formed from the jet coalesce into a bar and migrate into spiral arms, eventually to form a ring about the galactic center.

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Bar galaxies tend to have long straight segments for the bars. This might be due to the outflow of negative gravitation mass mirror matter weakly interacting with outward flowing jets of real matter. There is a powerful gravimagnetic field cast by the central black holes, if they have a high spin rate. The gravimagnetic Lorentz force on the two outward matter types is in opposed directions. The tangential counter flow of the two weakly interacting outward flowing matter types tends to straighten the bar near the central part of the galaxy. The gravimagnetic force drops of as the 4th power, and the flow of the mirror matter diminishes in the outreaches, so the bar then warps tangentially. Eventually the bar disappears and only an ordinary ring of matter remains around the galaxy. Rapid precession rates must be involved for the jets of ordinary matter to spew out radially to the gravimagnetic field, but evidence for such precession can be seen in photos of bar galaxies. The gravimagnetic axis and the pole of bar galaxies thus must tend to be askew, and thus the Lorentz force is manifest by the outward flow of the jets and the mirror matter.

As viewed from the gravimagnetic north pole of a back hole, material within the equatorial plane which is falling inward directly toward the black hole will be acted upon by a gravitational Lorentz force to curve it into a clockwise rotating spiral, opposite to the direction of rotation of the black hole, assuming it is made of the same kind of matter. This will eventually diminish the black hole's angular momentum when the material enters the hole. Equatorial material moving in an outward direction is also forced into a clockwise rotation spiral, but as galaxies are classified, that spiral looks counterclockwise and is called counterclockwise, and if the matter is being repelled from a mirror matter black hole, then it rotates in the same direction as the mirror matter.

Material in a clockwise orbit, as seen from the north pole, experiences an outward Lorentz force, which reduces the apparent gravitational force and thus increases the orbital period for its orbital radius. This makes the mass of the black hole look smaller than it is. Similarly, material rotating in a counter clockwise direction as viewed from the north pole experiences an increase in apparent gravitational force, resulting in a reduced orbital period for its orbital radius. Black holes under the gravimagnetic influence of other black holes will precess if their gravimagnetic fields are not aligned. This precession can cause their polar gravimagnetic fields to align with and perturb the curvature of the galactic arms giving them a three dimensional curl.

MIRROR MATTER VIEWING

The EM power radiated by a charge q in oscillating motion over distance x with frequency w is given by:

$$Pe = q^2 w^4 x^2 / (12 \text{ Pi } e_0 c^3)$$

By the gravimagnetic isomorphism, the power radiated by mass charge (i m) in oscillating motion over distance x with frequency w is given by:

$$Pe = (i\ m)^2 w^4 x^2 / (12 \text{ Pi } e_{0_g} c^3)$$

where

$$\varepsilon_{0_g} = 1/(4\ \pi G)$$

We thus can see the ratio of powers is given by:

$$Pg/Pe = -4\ \pi\ G\ m^2\ \varepsilon_0 / q^2$$

which, for the electron is:

$$-2.400 \times 10^{-43}$$

and the proton is:

$$-8.091 \times 10^{-37}$$

It appears graviphoton emission is a highly unlikely event. Further, given that photon radiation is about 10^{36} times more powerful than gravimagnetic radiation from a proton acceleration, and photon rockets merely gain E/c inertia per photon, graviphoton propulsion appears to be difficult to achieve.

Graviphoton telescopes, on the other hand, appear to be a possibility, if viewing powerful x-ray sources. This would appear at first to be useless. However, it may be useful because it permits the observation of sources of mirror x-rays as well, and thus opens the astronomical world to direct mirror matter observation, and viewing of otherwise invisible black holes.

COSMOLOGICAL CONSEQUENCES

The existence of cosmic matter has profound cosmological consequences. Ordinary black holes spew forth quantities of negative mass mirror matter, while gaining an equal quantity of mass themselves. Such matter repels out a local space for itself , forms stars, and eventually cosmic matter black holes. Cosmic matter black holes then repeat the process in reverse. The continual generation of pockets of repelling matter guarantees the continual expansion of the universe. Overall, the universe must expand indefinitely, yet in localized zones consists primarily of mature bodies all of one gravitational mass charge type or another. Local bodies have a local mutual attraction, while negative gravitational mass gas leaves galactic planes to initially float in spherical halos above galactic planes, eventually to escape and form new galaxies, or through local attractions and gravimagnetic fields, to form a ring around the galaxy of origin. A phoenix effect takes place through generations of alternating black hole types.

Figure 3 provides a possible example of a fairly aged galaxy[21] having normal matter black holes which produce mirror matter. The effects of the mirror matter are (1) the repulsion of the inner portions of the galactic arms into a ring, and (2) the repulsion of some ordinary matter to the periphery of the spherical shaped mass of mirror matter which surrounds the galaxy, thus making the spherical shell visible.

COSMIC RAYS AS DARK ENERGY

Some high energy particles, cosmic rays, can be expected to mix into pockets of the opposing kind, creating dark energy effects even within local homogeneous pockets. Some of the cosmic rays of high energy that enter our solar system and impinge on the earth could consist of cosmic matter. Cosmic rays made of cosmic matter have far more energy than required to overcome the gravitational repulsion of our earth, our sun and our galaxy. Cosmic matter may exist in detectible quantities right here on earth. Further, like cosmic rays in general, it should be expected to occupy the space around us in a highly uniform density and isotropic velocity distribution.

SEARCHING FOR COSMIC MATTER HERE ON EARTH

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Cosmic matter, if it exists, arrives here as comic rays. About 90 percent of cosmic rays are hydrogen, i.e. protons, but they impact atmospheric molecules and cause a shower of particles, including gammas, neutrons, kaons, pions and mesons. It is possible the imaginary mass charge is preserved, and the most likely detectable surviving cosmic product is the cosmic hydrogen atom. The sun captures cosmic rays and transforms their energy into thermal energy. It can therefore be assumed that, if cosmic rays contain cosmic matter, that the solar wind carries a proportion of cosmic matter. The presence of such matter would cause a reduction in apparent solar gravity, and thus an underestimation of the mass of the sun.

It might be possible to detect cosmic electrons, but the low mass of the electron combined with its high charge to mass ratio makes a negative gravitational mass detection very difficult. A very slow electron beam separation by gravity over over a long distance might be required to distinguish one species from the other. Perhaps cosmic electrons could be sorted out in a long but ordinary resistor, or electrochemical cell, or superconductor, due to a gravitational force powered upward drift causing positive buoyancy. Centrifuges would be of no use to look for cosmic matter, only mirror matter, unless they are one and the same. Only gravity can do the separation of cosmic matter if it bonds as ordinary matter.

Isolating cosmic hydrogen might be much easier than cosmic electrons or even protons, if enough concentration exists on earth. An excellent source of cosmic particles in general may be melting glacier ice. Surface tension should hold cosmic particles in the water long enough to be sampled. Cosmic hydrogen (but not in the form of mirror matter) in water would be bound in H2O like ordinary hydrogen - at least long enough to obtain samples. If the hydrogen is electrolyzed from the water, and then liquified, it should result in three types. Ordinary hydrogen, half-ordinary-half-cosmic hybrid hydrogen which is highly buoyant, and pure cosmic hydrogen with two cosmic protons and having negative weight. If a visible amount of liquid cosmic hydrogen is made (and it is not indeed mirror matter as expected) it should be easy to detect floating in the sealed top of a clear Dewar flask. If enough of the stuff exists, it might even be possible to avoid the need to liquify hydrogen and directly separate water molecules based on increased buoyancy from the cosmic hydrogen atoms, and then detect them via their bulk water density.

Cosmic rays also sometimes consist of Calcium, Iron, Gallium, Lithium or Beryllium. The latter three, if in sufficient quantity, should be fairly easy to isolate from glacial runoff, and the cosmic species easily identified if present in sufficient quantities. A search of glacial runoff would also be an excellent way to locate mirror matter, as well as monopoles.

Mirror matter, even if it is cosmic matter, can be identified by its ability to cool an environment even when highly insulated, thus violating the Second Law of Thermodynamics.

SOME PRACTICAL IMPLICATIONS REGARDING COSMIC MATTER

Cosmic matter, if it exists as defined, is all around us, imbedded in all kinds of molecules. Cosmic rays are responsible for maintaining the carbon 14 concentration in the atmosphere, 40 tons worth, as well as numerous other kinds of isotopes common in the earth's crust. The earth has accumulated over 4 billion years worth of cosmic ray debris. That's a lot of matter. Meteoric dust rains down on us daily by the ton, continually burying past artifacts, as well as seeding rain and snow. Many micro meteorites have been exposed to cosmic rays for billions of years, as has the surface of the moon. Lunar dust has a reputation for being light and airy and having the ability to get into every nook and cranny. A high cosmic matter density would account for this.

If tons of pure cosmic matter can be isolated, and sufficiently contained, it will obviously be extremely useful for earth-to-space vehicles for reducing the space ship weight. Weight reduction to zero saves the energy required to overcome air resistance on the way to orbit. Zero net weight doesn't reduce the energy required to overcome inertia, but it does permit lifting a body to an altitude where the escape velocity is nominal. To maintain neutral weight on the return to earth a mass exchange must take place at a high altitude. A zero net weight vehicle (including its heavy weight cargo) is thus useful in space primarily as an earth-to-space shuttle in the case where an equal return mass is available. Neutral weight vehicles could hover indefinitely over one spot, in space or in the atmosphere, which has many applications. Transportation at a greatly improved energy cost is a clear possibility.

Even very small amounts of cosmic matter may be of use. It could be used for constructing a *graviphoton telescope* sensor, or antenna, or for new forms of communication. Even without cosmic matter, it should be possible to focus graviphotons using magnetic field lenses, due to their tiny charge, and thus build a graviphoton telescope. Graviphotons should exist carrying sufficient energy to exhibit a graviphotoelectric effect, and thus may be detectible using ordinary photon sensors. Obtaining cosmic matter may make the field of *gravitronics* a possibility, or at least a wide range of graviphoton sensors and transducers.

The thermodynamic properties of mirror matter can be used to create what would appear to be perpetual motion machines, free energy devices.

IDENTIFYING MIRROR MATTER

Real hands-on proof of the gravimagnetic theory may come in the form of finding mirror matter right here on earth. There may be minerals around that maintain a temperature colder than the local environment.

A high mirror matter content object can probably be detected by merely holding it in your hand. A large quantity underground can be identified by a temperature drop there. There would be a strong temperature gradient in the vicinity. It is of interest that temperature is often take in wire line surveys of oil wells. It may be of use to look at wire line surveys of wells in some areas, and also to manually examine mineral cores taken from some mining areas. Such cores are obtained throughout a mineralized site by drilling, in order to assess the scope and value of a find. Cores are stored for extended periods in some jurisdictions, like Canada.

If some material that seems to maintain a temperature colder than its surrounds is found, or a material is to be investigated for containing mirror matter, do some calorimetry on it. Put the material in a well insulated container, e.g. a small foam box with 2 thick inch walls, with a thermometer. After a while, say a half hour, check for a difference between the thermometer in the box and one outside the box. If the box is significantly colder then the material contains mirror matter. Mirror photons go right through ordinary matter, and thus the black body radiation from mirror matter flows right through our ordinary matter insulation.

Mirror matter in quantities of a gram or more is most easily identified by the fact it apparently violates the laws of thermodynamics. It spontaneously cools, especially when it is well insulated.

SOME PLACES TO LOOK FOR MIRROR MATTER

Finding a large source of mirror matter would be of great practical importance, both for space travel and for energy production. Such sources may exist deep in the ground in the neighborhood of large meteor hits. Even rocks ejected out by such hits may contain mirror matter.

An ideal place to look for cosmic matter, and positive gravitational charge mirror matter as well, if it exists, is the face of a melting glacier. Nuclear debris from space nucleates precipitation and such precipitation is locked into the ice of glaciers. Ice captures cosmic rays and their debris. Nature is freeing this matter into the environment now at a phenomenal rate. If the MOND equations are indeed due to mirror matter then there is a lot of mirror matter in our galaxy, which might well not be the Milky Way, but rather the Sagittarius Dwarf Galaxy.[22] Our solar system may take a polar route over the top of the Milky Way, in which case it has been bathed in a pretty good bath of the mirror matter.

We might be manufacturing cosmic matter ourselves, in particle colliders. A proton-anti-proton collider may manufacture just as much mirror matter as matter. It simply is not detectable. A very small quantity of either kind of matter is manufactured to be sure, but possibly a detectable quantity. It may be of interest to attempt concentration of mirror matter from collider target area parts that have been in service for a long time. However, there is probably a much better chance of a find just looking around at crater sites and checking rock temperatures. A thermal imaging device of the type used for home insulation inspections might be of special use in prospecting for mirror matter. Rocks containing mirror matter will be darker than normal rocks in the vicinity.

AN INEXPENSIVE SEARCH METHOD

This method only works to search for negative gravitational mass mirror matter that is lightly bound to ordinary matter. All mirror matter on earth should be in the form of meta-matter, i.e. bound to ordinary matter. Ordinary mirror matter can only be concentrated using a high speed centrifuge to separate the mirror matter from the ordinary matter to which it binds.

Anyone on a tight budget would prefer to use the cheap medical style centrifuges available on ebay. The following method achieves this and might prove to be an alternative to panning for gold for recreation. A tiny amount of negative gravitational mirror matter could be worth a million times its weight in gold. So, following here is the possibly useful and recreational method.

Chemically digest the material in question. (An alternative method might involve pulverizing it providing a liquid is available with density such that the normal variety of the material achieves neutral buoyancy or even very slightly positive buoyancy.) A good material to start with might be sea water because it avoids this digestion step entirely and the cosmic matter should be found near the surface of the ocean. The ocean is a great collector for mirror matter cosmic rays. Deep lakes might work well also. The negative gravitational mirror matter should be right on the surface.

Let the obtained solution sit in a holding tank and then take the top half and reject the bottom half. This is gravimetric separation so the top half should tend to contain the desired mirror matter. Place the remaining material in a centrifuge. This is inertial separation so the mirror matter should end up in the bottom of the tube. Reject the top half of the contents of the centrifuge tube. This completes one stage of separation, Stage 1.

The stages can be repeated as often as necessary. The material remaining from Stage N is fed into Stage N+1. Two Stage N runs may be necessary for one Stage N+1 run.

If it is known mirror matter is actually in the solution, or once (and if) it ever happens that enough material is separated at Stage N to show its presence thermally, then the reject material from Stage N can be fed back into Stage N-1, mixed with material from Stage N-2 to make the input for Stage N-1.

The process can stop at a stage N where the temperature drop for a fixed mass of material output from stage N is the same as that for the output from the prior stage, in other words when the separation process no longer improves the concentration of mirror matter.

For commercial purposes a high speed centrifuge is a much better method because the separation can occur in one stage, as suggested by Robert Foot. However, Foot's method does not search specifically for negative gravitational charge mirror matter, i.e. cosmic matter.

BOOTSTRAPPING A FIND

Searching for Cosmic Matter

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Finding any kind of mirror matter would be like winning a lottery. Mirror matter could then be located with great ease, assuming sensors for thermal infrared mirror radiation could be built using mirror meta-matter. Mirror matter could readily be seen even deep in the earth or oceans. We could build telescopes to observe mirror matter here on earth, through the earth, or in space. Given enough mirror matter to build mirror antennas, or lasers, we could communicate directly in a straight line through the earth using otherwise undetectable and unstoppable mirror radiation. We could locate large mineral deposits left by meteor hits.

SUMMARY

A gravimagnetic isomorphism, a correspondence between the formal descriptions of electromagnetism and gravity, has been reviewed. Despite much speculation along the way regarding assumptions, many consequences are logically, quantitatively and very specifically implied. One such implication is the existence of cosmic matter, matter having a negative mass charge, i.e. exhibiting negative gravity. Methods for searching for such material here on earth were presented.

Much work remains in adjusting, validating, expanding, and hopefully making practical use of this gravimagnetic isomorphism. Gravimagnetics as portrayed here may or may not provide an accurate description of reality. It does provide a large number of quantitative and qualitative predictions and much exciting food for thought. Through its simplicity, gravimagnetics provides access for the serious student or amateur to the world of gravitational computations, concepts, and vocabulary. It provides a wide variety of possibilities for improvements and corrections, as well as experimental and theoretical exploration. These are indeed the joys of physics: to speculate, to test, to refine, and to dream of the possibilities.

FIGURES

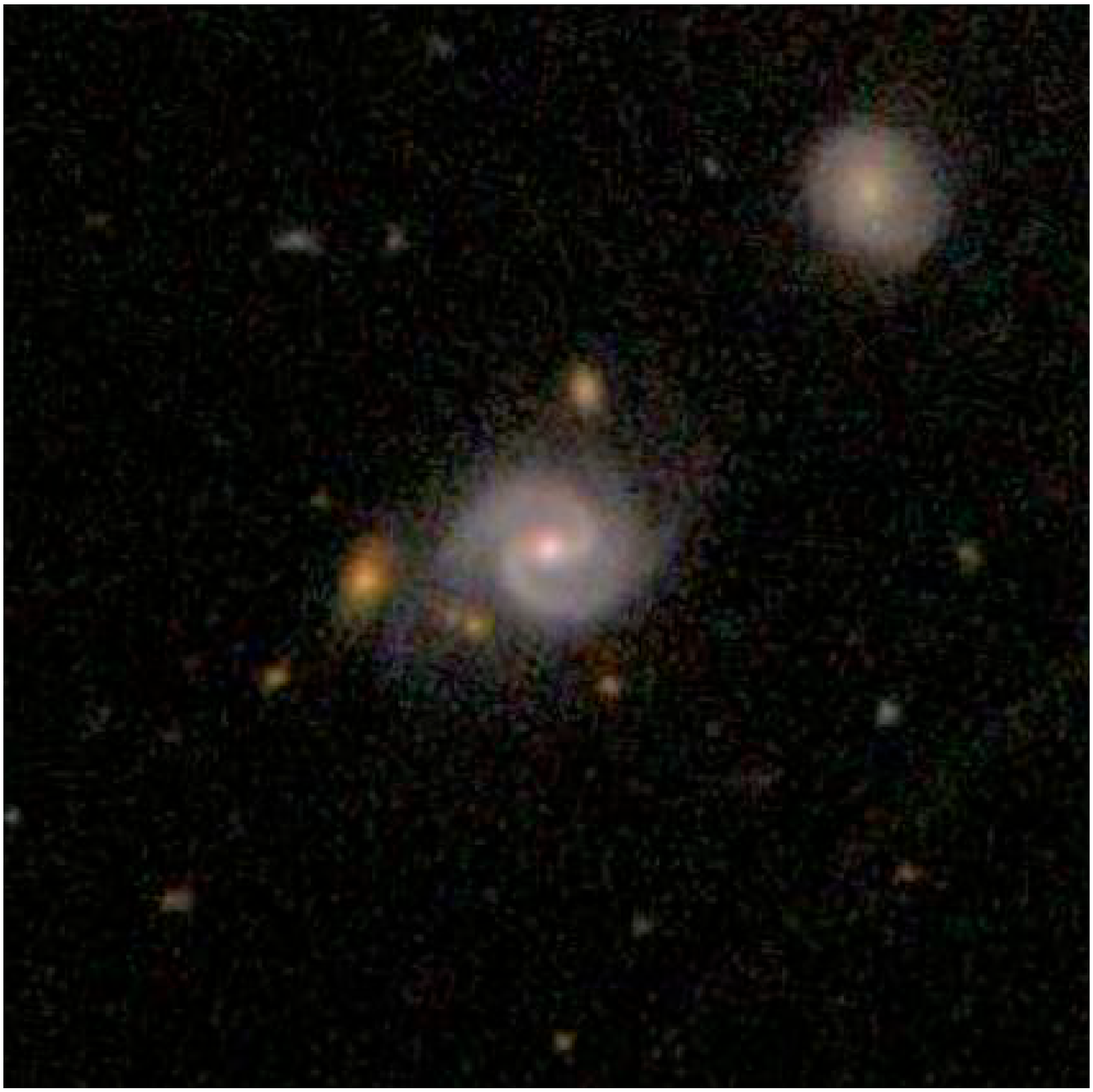

Figure 1 - Galaxy 587731868022800502

Figure 2 - Galaxy 587733195161272422

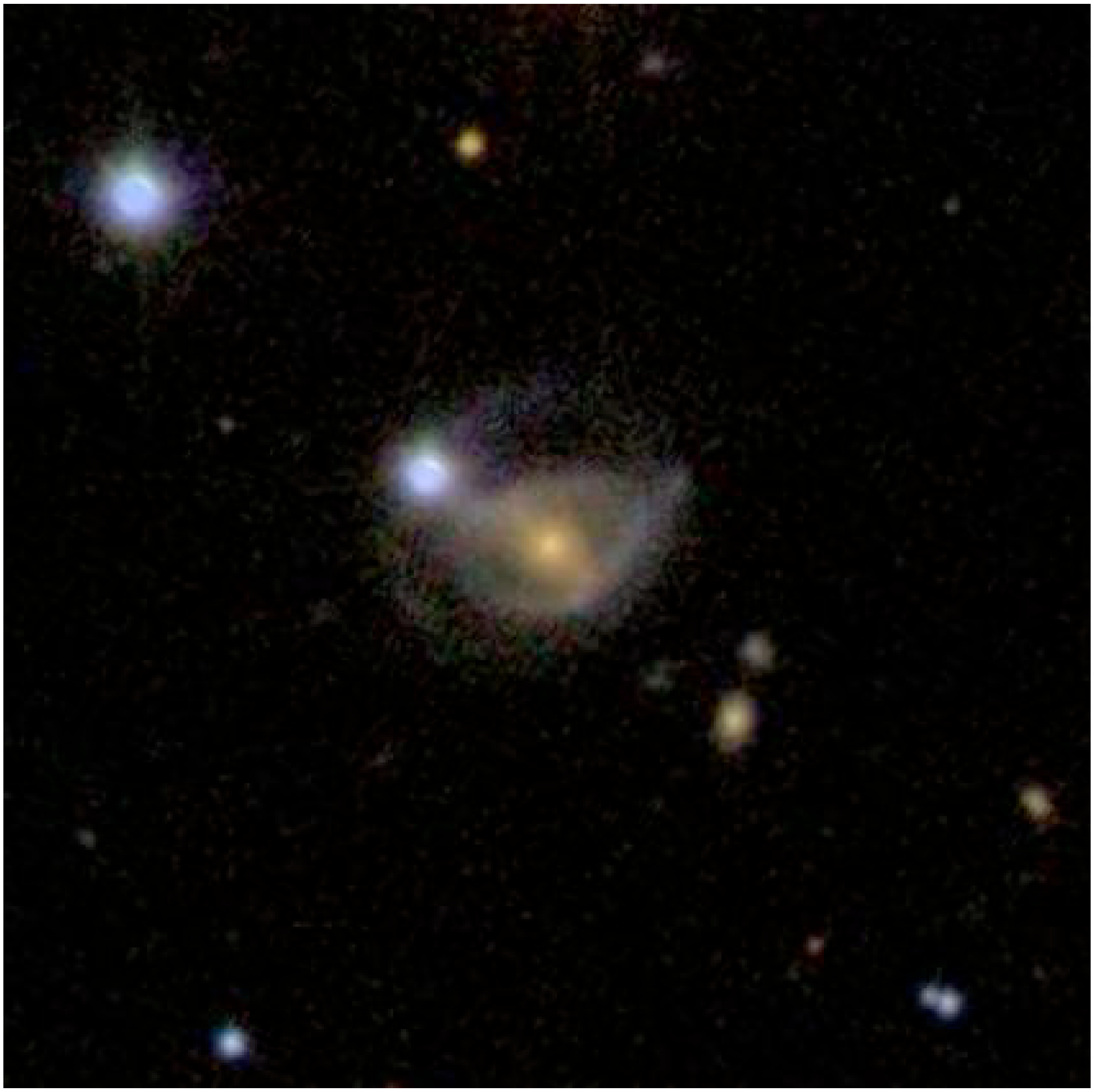

Figure 3 - Galaxy 587742782068817961

[1] Horace Heffner, 2007,"Gravimagnetism",
http://mtaonline.net/~hheffner/FullGravimag.pdf
[2] H. Heffner, 2006, "Solar and Lunar Gravimagnetic Fields",
http://www.mtaonline.net/~hheffner/SolarLunarGK.pdf
[3] Robert R. Caldwell, 2004, "Dark Energy",Physics Web, May 2004 Feature,
http://physicsweb.org/articles/world/17/5/7
[4] Albert Shadowitz, The Electromagnetic Field (New York, NY: Dover Publications, 1975) p 492.
[5] Xavier Borg,2002,"Experiment 11",
http://www.blazelabs.com/e-exp11.asp
[6] H. Heffner,2003,"SR applied to Circular Currents",
http://mtaonline.net/~hheffner/SR-CircleCoil.pdf
[7] Wikipedia article on the MOND Theory,
http://en.wikipedia.org/wiki/Modified_Newtonian_dynamics
[8] Wikipedia article on Einstien Rings,
http://en.wikipedia.org/wiki/Einstein_rings
[9] A. Bolton et al,2005,"Hubble, Sloan Quadruple Number of Known Optical Einstein Rings", Hubble Newsite Release 2005-32,
http://hubblesite.org/newscenter/archive/releases/2005/32/image/a/
[10] A. Bolton et al,2005,"Hubble, Sloan Quadruple Number of Known Optical Einstein Rings", Hubble Newsite Release 2005-32,
http://hubblesite.org/newscenter/archive/releases/2005/32/image/a/
[11] Robert Foot, 2003, "Implications of the DAMA and CRESST experiments for mirror matter-type dark matter",
http://arxiv.org/pdf/hep-ph/0308254
[12] Stuart Clarck, 2006, "Gravity's Secret",New Scientist Magazine, 11 Nov. 2006, page 36-39, and also:
http://www.newscientist.com/article/mg19225771.800
[13] Robert Foot, 2002, Shadowlands: Quest for Mirror Matter in the Universe, Universal Publishers, ISBN 158112645X
[14] Wikipedia article on Mirror Matter,
http://en.wikipedia.org/wiki/Mirror_matter
[15] E.W.Davis and H.E.Puthoff,"Experimental Concepts for Generating Negative Energy in the Laboratory",
http://www.earthtech.org/publications/davis_STAIF_conference_1.pdf
[16] Horace Heffner, 2007, "The Pioneer Anomaly",
http://mtaonline.net/~hheffner/PioneerAnom.pdf
[17] Oleg D. Jefimenko, 2006, Gravitation and Cogravitation, Electret Scientific Company, ISBN 0-917406-X, p. 290
[18] Galaxy 587731868022800502 of the Sloan Digital Sky Survey,
http://cas.sdss.org/astro/en/tools/explore/obj.asp?id=587731868022800502
[19] Galaxy 587733195161272422 of the Sloan Digital Sky Survey,
http://cas.sdss.org/astro/en/tools/explore/obj.asp?id=587733195161272422
[20] Wikipedia entry for "Barred spiral galaxy",
http://en.wikipedia.org/wiki/Barred_spiral_galaxy
[21] Galaxy 587742782068817961 of the Sloan Digital Sky Survey,
http://cas.sdss.org/astro/en/tools/explore/obj.asp?id=587742782068817961
[22] http://viewzone.com/milkyway.html