Flying Saucer Physics

Connecting Electromagnetism and Gravity

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This page contains some mathematical equations relevant to the physics of flying saucers. This is a supplement to the author's thesis, *Flying Saucers 101*, and is in PDF format to retain the mathematical equations.

What I am attempting to discover/prove here is a simple relationship between electromagnetism and gravity, using an approach based on energy flow. This is not to be found in any of the textbooks, because, I believe, it is the suppressed knowledge (theory) behind the suppressed technology of flying saucers. I must apologise for the technical nature of this writing, understanding that only a very small percentage of the population have studied physics at university level, which although not a prerequisite, would certainly help in understanding all this. I admit that my own understanding of vector calculus is not as good as it should be, which makes this task much more difficult for me.

The first attempt was based on an incorrect equation, **div G** = m, an equation that was suggested during one of my university physics lectures, but which is not rigorous.

What we are looking for is an equation analogous to the **div D** = ρ equation of electromagnetism. Here ρ is the charge density, in units of coulombs per cubic metre. Using the *constitutive relation*, **D** = ε**E** , this becomes **div E** = ρ/ε

First we need to define the electric and gravitational fields:
The electric field of a point charge Q is defined by,

$$\mathbf{E} = \mathbf{F}_q / q = \frac{Q}{4\pi\varepsilon r^2}\hat{\mathbf{r}}$$

The units of the electric field are newtons per coulomb, or volts per metre.
The gravitational field of a point mass M is, by analogy,

$$\mathbf{G} = \mathbf{F}_m / m = \frac{-GM}{r^2}\hat{\mathbf{r}}$$

The units of the gravitational field are newtons per kilogram, equivalent to the units for acceleration, metres per second squared.

The Importance of the Negative Sign:
The negative sign in the second equation takes account of a fundamental difference between the electric and gravitational forces, namely that whereas like charges repel each other, positive masses attract each other. Thus if by some means it were possible to create something with negative mass, such an object would be instantly repelled by the Earth's gravitational field, and by the Sun's gravitational field, out into interstellar space, and then drawn into the positive magnetic monopoles, the white holes.

Comparing these two equations, it is apparent that replacing the charge density with ordinary (mass) density ρ_m, and replacing $1/4\pi\varepsilon$ with the gravitational constant G, gives the required result,

div **G** = $-4\pi G\ \rho_m$

The gravitational constant has the value $G = 6.67\mathbf{x}10^{-11}\,N.m^2.kg^{-2}$, while ρ_m has the units kilograms per cubic metre.

This raises the possibility of a "gravitational permittivity" ε_g defined by

$$\varepsilon_g = \frac{1}{4\pi G}$$

And then we have

$$\text{div}\ \mathbf{G} = \frac{-\rho_m}{\varepsilon_g}$$

The main equation to be proved is:

$$\text{div}\ (\mathbf{D}\ \mathbf{x}\ \mathbf{B} - \varepsilon_g \frac{\partial \mathbf{G}}{\partial t}) + \varepsilon\mu\sigma E^2 = 0$$

This is a vector field equation where **D** is the electric displacement, **B** is the magnetic induction, ε_g is the gravitational permittivity defined above, **G** is the gravitational field, and $\frac{\partial \mathbf{G}}{\partial t}$ indicates the derivative with respect to time.

This equation basically states that crossed electric and magnetic fields produce a changing gravitational field. Note that the Philadelphia experiment is believed to have involved crossed electric and magnetic fields.

(We are assuming that all the materials in the volume under consideration are isotropic. If this was not the case, then all of $\varepsilon, \mu,$ and σ would be tensors rather than scalars, and the maths would be rather more complicated.)

(Incidentally there are two ways of indicating the derivative with respect to time, rooted in the history of the calculus. Newton used $\frac{d}{dt}$, whereas Leibniz used a dot above the character. Both are still widely used to this day.)

The proof which follows is, I admit, not entirely rigorous, and I'm not even sure its 100% correct, but here goes anyway!

The Poynting vector is the vector cross product of the electric field **E** and the magnetic field strength **H**

We begin by calculating the divergence of the Poynting vector, using Maxwell's equations, which are:

curl $\mathbf{H} = \mathbf{J} + \dfrac{\partial \mathbf{D}}{\partial t}$

curl $\mathbf{E} = - \dfrac{\partial \mathbf{B}}{\partial t}$

div $\mathbf{D} = \rho$

div $\mathbf{B} = 0$

Using the usual rule for the divergence of a cross product (see any textbook on vector analysis),

div $(\mathbf{E} \times \mathbf{H}) = \mathbf{H}$. curl $\mathbf{E} - \mathbf{E}$. curl $\mathbf{H}$

and we immediately substitute for curl **E** and curl **H** from Maxwell's equations,

$$\text{div}\,(\mathbf{E} \times \mathbf{H}) = \mathbf{H} \,.\, \left(-\frac{\partial \mathbf{B}}{\partial t}\right) - \mathbf{E} \,.\, \left(\mathbf{J} + \frac{\partial \mathbf{D}}{\partial t}\right)$$

and also using the so-called *constitutive relations*, $\mathbf{D} = \varepsilon\mathbf{E}$ and $\mathbf{B} = \mu\mathbf{H}$ which take into account the electric and magnetic properties of the medium under consideration,

$$\text{div}\,(\mathbf{E} \times \mathbf{H}) = \mathbf{H} \,.\, \left(-\mu \frac{\partial \mathbf{H}}{\partial t}\right) - \mathbf{E} \,.\, \left(\mathbf{J} + \varepsilon \frac{\partial \mathbf{E}}{\partial t}\right)$$

$$\text{div}\,(\mathbf{E} \times \mathbf{H}) = -\mu\mathbf{H} \,.\, \frac{\partial \mathbf{H}}{\partial t} - \varepsilon\mathbf{E} \,.\, \frac{\partial \mathbf{E}}{\partial t} - \mathbf{E} \,.\, \mathbf{J}$$

(We assume that, although the permittivity and permeability change with the medium under consideration, that they do not vary with time, which would complicate the mathematics)

We now make use of a "trick" of mathematics (the chain rule), that for any variable x,

$$\frac{d}{dt}\left(\frac{1}{2}x^2\right) = \frac{d}{dx}\left(\frac{1}{2}x^2\right) . \frac{dx}{dt} = x \,.\, \frac{dx}{dt}$$

Hence $\mathbf{H} \,.\, \dfrac{\partial \mathbf{H}}{\partial t} = \dfrac{\partial}{\partial t}\left(\tfrac{1}{2}H^2\right)$ and similarly $\mathbf{E} \,.\, \dfrac{\partial \mathbf{E}}{\partial t} = \dfrac{\partial}{\partial t}\left(\tfrac{1}{2}E^2\right)$

Thus,

$$\text{div}\,(\mathbf{E} \times \mathbf{H}) = -\frac{\partial}{\partial t}\left\{ \tfrac{1}{2}\mu H^2 + \tfrac{1}{2}\varepsilon E^2 \right\} - \mathbf{E}.\mathbf{J}$$

We now make use of the result $\mathbf{J} = \sigma\, \mathbf{E}$

(This is simply Ohm's Law (V = I R) in another form as **E** is the electric field, **J** is the current density caused by the electric field, and σ is the conductivity of the medium.)

div (**E x H**) = $-\frac{\partial}{\partial t}\{\frac{1}{2}\mu H^2 + \frac{1}{2}\varepsilon E^2\} -$ **E.** σ **E**

and so finally we obtain the result for the divergence of the Poynting vector,

div (**E x H**) = $-\frac{\partial}{\partial t}\{\frac{1}{2}\mu H^2 + \frac{1}{2}\varepsilon E^2\} - \sigma E^2$

This can be written as

div (**E x H**) + $\frac{\partial}{\partial t}\{\frac{1}{2}\mu H^2 + \frac{1}{2}\varepsilon E^2\} + \sigma E^2 = 0$

This equation describes the conservation of energy. Interpreting this equation, the first term is the flow of energy out of the volume of space under consideration, the term in braces {} is the energy density stored in the electromagnetic field in the volume under consideration, and the final term is the energy lost due to Joule heating (analogous to P = V^2/R).

The remainder of the proof is much simpler:

As the term in braces is the energy density stored in the electromagnetic field (and energy density is energy per unit volume), we simply equate it to $\mathcal{E}$/V, where $\mathcal{E}$ is the energy in Einstein's famous equation and V is the volume of the space under consideration.

Hence $\mathcal{E}$ = mc^2 becomes

$\mathcal{E}/\mathrm{V} = \frac{\mathrm{m}}{\mathrm{V}}\, c^2 = \rho_{\mathrm{m}} c^2 = \{\frac{1}{2}\mu H^2 + \frac{1}{2}\varepsilon E^2\}$

Here m is the mass of the volume under consideration, and c is the speed of the electromagnetic wave (or light). This equation provides the link between electromagnetism and gravity.

div (**E x H**) + $\frac{\partial}{\partial t}\{\rho_{\mathrm{m}} c^2\} + \sigma E^2 = 0$

We will use the result $\varepsilon\mu c^2 = 1$

This result, not proved here, is obtained from solving Maxwell's equations for an electromagnetic wave travelling through a medium of *permittivity* ε and *permeability* μ. This equation links electricity and magnetism.

Multiplying throughout by $\varepsilon\mu$ yields

$\varepsilon\mu$ div (**E x H**) + $\frac{\partial}{\partial t}\{\rho_{\mathrm{m}}\varepsilon\mu c^2\} + \varepsilon\mu\sigma E^2 = 0$

div (ε**E x** μ**H**) + $\frac{\partial}{\partial t}\{\rho_{\mathrm{m}}\} + \varepsilon\mu\sigma E^2 = 0$

$$\text{div}\,(\mathbf{D} \times \mathbf{B}) + \frac{\partial \rho_m}{\partial t} + \varepsilon\mu\sigma E^2 = 0$$

Since at the beginning we proved from the definition of the gravitational field that

$\text{div}\,\mathbf{G} = -\frac{\rho_m}{\varepsilon_g} = -4\pi G\,\rho_m$ we can substitute for $\rho_m = \frac{-\text{div}\,\mathbf{G}}{4\pi G} = -\varepsilon_g \text{div}\,\mathbf{G}$ to obtain

$$\text{div}\,(\mathbf{D} \times \mathbf{B}) - \frac{\partial(\varepsilon_g \text{div}\,\mathbf{G})}{\partial t} + \varepsilon\mu\sigma E^2 = 0$$

$$\text{div}\,(\mathbf{D} \times \mathbf{B}) - \varepsilon_g \text{div}\,\frac{\partial \mathbf{G}}{\partial t} + \varepsilon\mu\sigma E^2 = 0$$

$$\text{div}\,(\mathbf{D} \times \mathbf{B} - \varepsilon_g \frac{\partial \mathbf{G}}{\partial t}) + \varepsilon\mu\sigma E^2 = 0$$

QED

Interpreting this equation, we first consider the last term, which as we proved above, is a term which causes loss of energy due to Joule heating. This could explain why the early model Nazi saucers (search the web for *Haunebu*) were prone to overheating. I believe this problem was solved by cooling the engine so that the loop became superconducting, so there were no energy losses due to Joule heating. Superconductivity was discovered by Heike Kamerlingh-Onnes in 1911 in the metal mercury. Other authors have suggested that mercury is used in flying saucer propulsion systems. The study of conducting fluids in magnetic fields is called magneto-hydro-dynamics or MHD. Mercury is the fluid of choice for experiments in MHD as it is the most readily obtained liquid metallic conductor. Gallium can also be used, as can other metals with low melting points e.g. sodium.

The Mass-Reduction (Weight-Loss) Formula
How could flying saucers reduce their mass?

Einstein's famous equation is:

$\mathcal{E} = mc^2$

For a system of constant energy $\mathcal{E}$, if the speed of light could be made to increase, the mass would have to decrease to keep the total energy constant.

{Note that most theoretical physicists assume that the speed of light is constant and use so-called *theoretical physicist units*, where the unit of length is chosen so that the speed of light is unity, c = 1. (One might ask, one what? One light year per year, or one light second per second!)* These units are chosen in order to simplify the mathematics, but this choice also prohibits any possibility of the speed of light varying throughout time or space.}

The equation that links electricity and magnetism is:

$\varepsilon\mu c^2 = 1$

(*) How long is a piece of string?

where ε is the permittivity (the electrical property) of the medium,
and μ is the permeability (the magnetic property) of the medium.

This equation proves that the speed of light c is not a constant, but depends on the electric and magnetic properties of the medium through which the light is travelling.

(In a vacuum, this equation simplifies to $c_0^2 \varepsilon_0 \mu_0 = 1$)
Combining these two equations and eliminating c,

$$E\varepsilon\mu = mc^2\varepsilon\mu = m \quad \ldots(*)$$

In free space, which is actually the ether, and .
The ether being a compressible fluid, by reducing the density of the ether, either ε, μ, or both can be made to approach zero, and the mass in turn must approach zero according to equation (*). Also μ is actually a function of π, which if spacetime is curved, is not a constant but a variable! I don't know what my university professor would have to say about that!

Adding an unknown force (gravity?) to Maxwell's Equations:

What if gravity is electromagnetism in disguise? How could it be included in Maxwell's equations?

The easiest way is for div **B** to be non-zero – very small, but big enough to account for the unknown force. This would imply the existence of magnetic monopoles – negative monopoles would be black holes to explain gravity, and by analogy, positive monopoles would be white holes to explain anti-gravity. Negative monopoles would attract one another, positive monopoles would also attract one another, but negative and positive monopoles would repel one another. Gravity would be understood as a flow of fluid out of the positive monopoles (sources) into the negative monopoles (sinks).

So we introduce this unknown force **X**, x into Maxwell's Equations as follows:

curl **H** = **J** + $\frac{\partial \mathbf{D}}{\partial t}$
curl **E** = **X** - $\frac{\partial \mathbf{B}}{\partial t}$
div **D** = ρ
div **B** = x

Where to from here?
Firstly a digression:

Kirchhoff's two laws of circuit analysis are:

1. The algebraic sum of all currents at a junction add to zero.
2. The algebraic sum of all voltage rises and falls around a circuit add to zero.

The first law results from conservation of charge.
The second law results from conservation of energy.

Now if we take the divergence of Maxwell's first equation, we have

div curl **H** = div **J** + div $\frac{\partial \mathbf{D}}{\partial t}$ = 0, since the divergence of any curl is zero.
Substitute for div **D** = ρ to obtain
div **J** + $\frac{\partial \rho}{\partial t}$ = 0
which is describing the conservation of charge.

By analogy, if we take the divergence of Maxwell's second equation,

div curl **E** = div **X** - div $\frac{\partial \mathbf{B}}{\partial t}$ = 0
Substitute for div **B** = x to obtain

div **X** - $\frac{\partial \mathrm{x}}{\partial t}$ = 0
My conjecture is that this equation is describing the conservation of energy.

(to be continued)

Comments on *Electrogravitic Systems*
As is clear from the title, this document deals mainly with research into *electro-gravitics*, whereas I believe flying saucers are more *magneto-gravitic* than *electro-gravitic* (or they may be both!)
One clear mistake in this document which is apparent to anyone with any physics training, is the use of the phrase *fundamental particles* in a context that clearly implies that it is *fundamental constants* that is meant.
According to physicist Sir Arthur S. Eddington (1882-1944), the **seven** fundamental *constants* are:

e	the charge of the electron
m	the mass of the electron
M	the mass of the proton
h	Planck's constant
c	the velocity of light (presumably in a vacuum)
G	the gravitational constant
Γ	the cosmological constant

To which I put the cat among the pigeons by adding π to that list!

References:
Flying Saucers 101 by this author, http://keith64.bigblog.com.au/index.do
and references therein.
Electrogravitic Systems available on the same website.
Magnetohydrodynamics by T.G. Cowling, Interscience Tracts on Physics and Astronomy no. 4. (1957)

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