A theory for how gravity causes electromagnetic fields

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ABSTRACT:

Electromagnetic fields are considered to be the result of the fundamental force of electromagnetism. Using classical mechanics, a description for how gravity could theoretically cause electromagnetic fields is presented. Due to the capability of particles to physically travel through systems which they orbit, the existence of gravitational orbital patterns in the shape of a Figure-8 is proposed. As a result, it is proposed that gravity produces electromagnetic fields by the flow of particles in a Figure-8 orbital. Thereby, according to the theory, gravity is demonstrably the cause of electromagnetism.

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I. INTRODUCTION

Standard models of physics describe the universe to have four fundamental forces of nature: gravity, electromagnetism, weak interaction, and strong interaction. In these models, an electromagnetic field is considered to be produced by charged particles due to electromagnetism (1).

However, these models require four causeless forces that are said to produce the universe as we see it. This is inconsistent with the simplest possible description of the mechanics of the universe, which would have the fewest fundamental forces possible. In order to address this issue, it is necessary to find the causes of the fundamental forces of nature and thereby arrive at a simpler model that more accurately describes our universe.

This is achieved through a first step of connecting gravity and electromagnetism using classical mechanics. In order to do this, there are various presently unrecognized characteristics of the universe that need be incorporated into considerations:

1) *The universe is infinite.*

This consideration allows us to envisage an infinite array of particle types of different masses, from *"infinitesimal"* through *"infinite"* in mass, relative to the mass of the atoms which we use to observe our surroundings.

2) *Particles are capable of physically traveling through other particles.*

As is demonstrable in the case of neutrinos passing through the Earth (2), the capacity of particles in the cosmos to pass unabated through other particles is an important characteristic regarding how the universe functions which requires necessary consideration in developing a working understanding of how electromagnetic fields are produced.

With the above considerations, it is possible to arrive at a description for how gravity causes electromagnetism.

II. HOW ELECTROMAGNETIC FIELDS ARE FORMED BY GRAVITY

In *Philosophiæ Naturalis Principia Mathematica*, Isaac Newton describes the laws of motion and the law of gravity (3). Today, these laws are common knowledge and are the foundation of classical mechanics.

However, because Isaac Newton was unaware of the capacity of particles to physically travel through other particles, he did not incorporate this characteristic into his model. Thus, he was unable to propose a mechanism through which electromagnetic fields, and thereby electromagnetism as a whole, were caused by gravity.

In order to recognize this mechanism, we can envision a first particle having a first mass, m_1, and a second particle having a second mass, m_2, wherein $m_2 >> m_1$. Comparatively, the particles can be considered *"infinitesimal"* and *"infinite",* respectively. When these systems are proximal, such that the *inverse radius-squared* function of gravity is sufficiently large so that the second mass physically pulls the first mass directly towards it, a unique outcome is achieved if the conditions are such that the

first mass is capable of traveling through the building block components of the second mass, alike to neutrinos passing through the space between the atoms of the Earth.

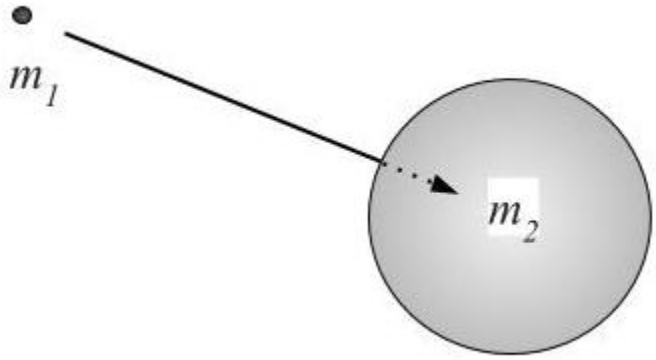

Figure 1: Simple diagram depicting the direction of travel of m_1 due to the gravity of m_2. The dotted line portion indicates that m_1 continues to travel physically through m_2.

As is shown in Figure 1, in such a case, the first mass is led to travel directly towards the center of gravity of the second mass. However, due to its large relative mass difference, it is sufficiently small compared to the second mass so as to physically travel through the body of the second mass.

As a result, the direction of the force of gravity upon the first mass as acted upon by the second mass is then *reversed*, due to the first mass physically traveling past the center of gravity as its momentum carries it through the center of the body of the second mass. In turn, the first mass is caused to be redirected back towards the center of gravity, as shown in Figure 2.

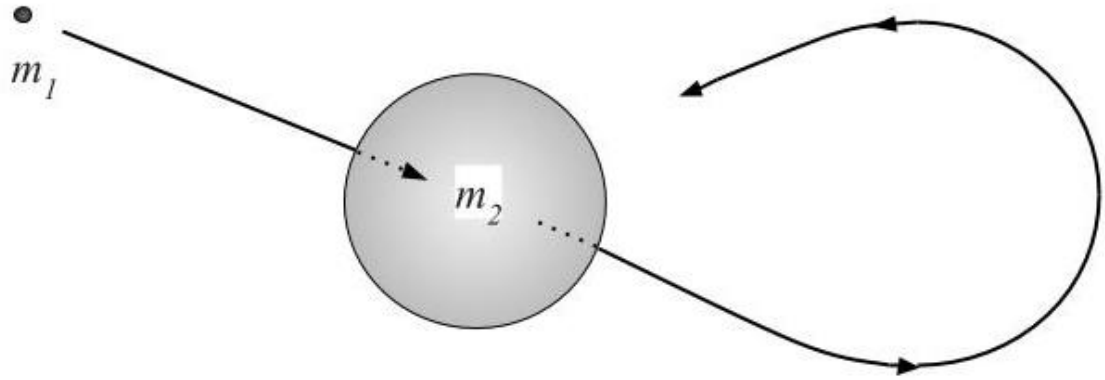

Figure 2: Simple diagram depicting the change in the direction of travel of m_1 after it passes through the center of gravity of m_2 so that it subsequently travels back towards the center of gravity of m_2.

After the first mass is redirected back towards the center of gravity of the second mass, it physically travels through the body of the second mass and the direction of the force of gravity upon the first mass is again *reversed*. Repetitively, this traveling through the center of gravity of the second mass by the first mass and the reversal in the direction of the force of gravity upon the first mass occurs. This results in a Figure-8 orbital as is shown in Figure 3.

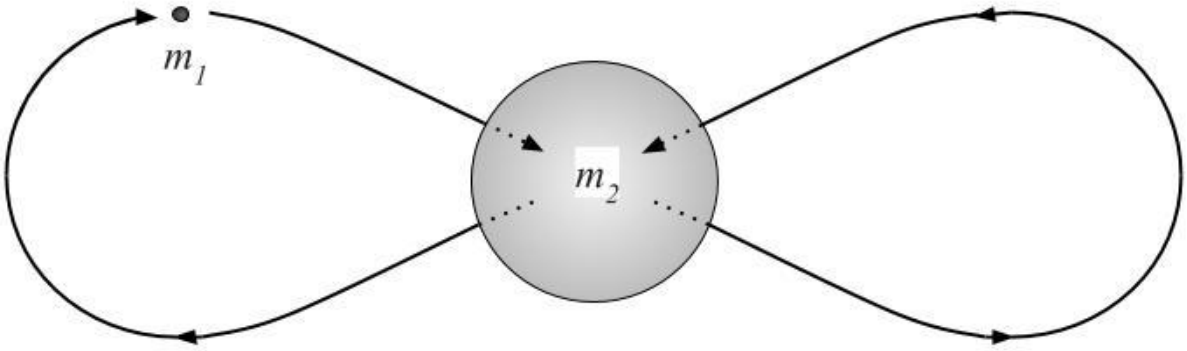

Figure 3: Simple diagram depicting the full Figure-8 orbital of m_1 due to repetitively physically passing through the body and center of gravity of m_2.

For a given system, such as Earth, this Figure-8 orbital is produced for all particles meeting the parameters necessary for them to physically pass through the body and to be redirected back towards the center of gravity of the system it orbits afterwards. The summation of the flow of all particles around a given mass in this manner is proposed to produce what is known as an electromagnetic field.

III. ELECTROMAGNETIC FIELD STRENGTH AS A FUNCTION OF:

a. THE SPIN OF THE SECOND MASS

It is additionally necessary to consider the physical rotation of the second mass in determining the resultant path of travel of the first mass. In the instance where the second mass does not rotate rapidly, such as in the case of Venus' slow rotation, it is possible for the first mass to pass through the center of gravity of the second mass but to not be redirected back towards the second mass. Thus, Venus' magnetic field is so weak that it is only detectable in observance of near-Venus wake symptomatic of magnetic reconnection (4). This is proposed to be because systems that rotate generate bulges at their equator by their centrifugal force, inclusive of the disc of mass perpendicular to the axis of rotation of the system, which leads to a gravitational imbalance in the direction of the bulge and disc material so as to produce the necessary curvature in the flow of the first mass. In Venus' case, it is known to be the most spherical body in the solar system (5) and thereby its electromagnetic field is not detectable. It is from the curvature in the path of travel that the first mass is able to be redirected back towards the center of gravity of the second mass. If there is a perfect balance, so that the direction of the force of gravity upon the first mass after passing through the second mass is exactly opposite to its direction of travel, then it can continue to travel sufficiently away from the second mass so as to reach a distance where it is no longer greatly influenced by the second mass, as shown in Figure 4.

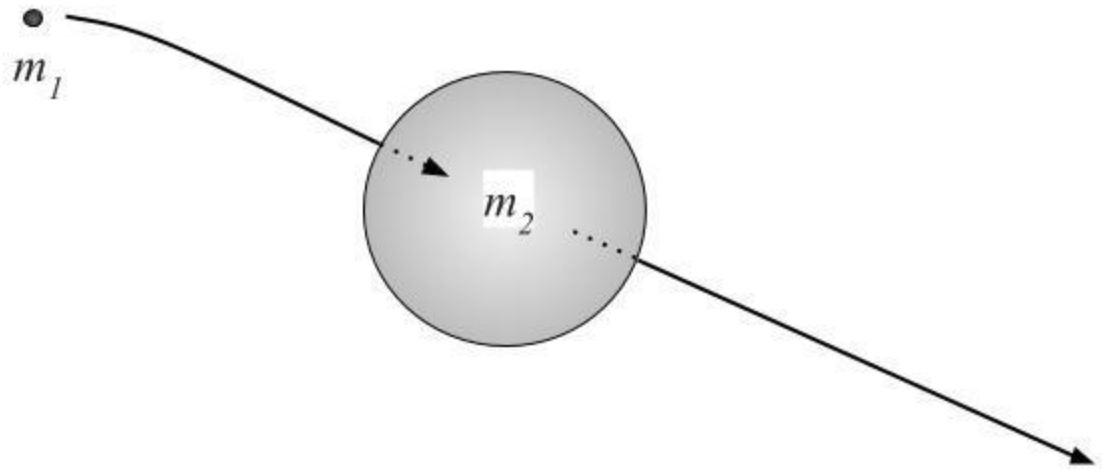

Figure 4: Simple diagram depicting the path of travel of m_1 when it is capable of physically traveling through the center of gravity of m_2, and when the direction of the force of gravity thereafter is directly opposite to the path of travel so as to maintain a linear trajectory away and not produce the outcome of a Figure-8 orbital.

Greater rotation rates lead to greater bulges and disc structures due to the rotation as depicted in Figure 5. This in turn leads to more drastic imbalances in the direction of gravity acting upon m_1 in the direction of the bulge, and thereby when a system is in rotation relative to its environment it is capable of producing electromagnetic fields whose observed strength is a function of its mass as well as the degree to which the mass is *"pancaked"* by the rotation versus *spherical* due to non-rotation.

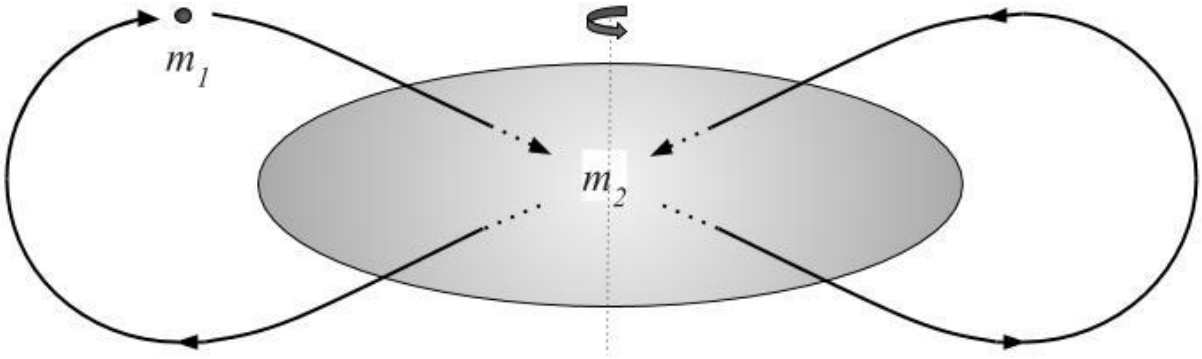

Figure 5: Simple diagram showing an exaggerated *"pancaking"* of m_2 due to its rotation about its axis and the resultant Figure-8 orbital of m_1 due to the gravitational imbalance of the rotating system.

Thereby, higher mass systems which rotate rapidly have the most apparent and observably strong electromagnetic fields, while relatively lower mass systems which rotate relatively slowly can have such weak electromagnetic fields that they are undetectable. Therefore, systems of identical mass which are non-rotating generate no detectable electromagnetic field, whereas the same mass systems under rotation are capable of generating observable electromagnetic fields.

b. THE DENSITY OF THE SECOND MASS

Moreover, it is proposed that due to the inverse radius-squared function of gravity, higher *density* systems also produce relatively stronger electromagnetic fields than lower density systems of the same mass. This is because when a given mass is distributed widely, the distance of separation of the bulk of the mass on a given orbiting mass is larger than when it is densely packed, and so low density systems are less able to influence the trajectory of an orbiting mass than higher density systems where the cumulative force of gravity of all the constituent particles of the densely packed mass *"spikes"* more when the orbiting particle is near the center of gravity than in the case of a lower densely packed system. As a result, a densely packed mass more drastically influences the trajectory of the orbiting mass than a low density system. This *spike* additionally occurs nearest to the body of the densely packed mass, where radius of separation is lowest, and so it is able to bring more particles back to the center of gravity so as to produce a stronger electromagnetic field than a system of lower density and the same overall mass. Thereby, in the case of systems such as neutron stars (6), higher density systems produce observably stronger electromagnetic fields than lower density systems of the same mass.

IV. CONCLUSION

As a result, it is proposed that electromagnetic fields are produced by gravity. This is particularly apparent because it so drastically reduces the fundamental mechanics of the universe, as we are not presently aware that electromagnetic fields are connected directly to gravity, that it is proposed to necessarily be the case. Moreover, the existence of particles capable of traveling in this manner, as shown by the existence of electromagnetic fields, indicates that the universe is infinite and contains no such thing as an elementary particle.

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