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ELECTRICAL SCHEMATIC OF THE EARTH AND SOLAR SYSTEM

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Abstract

By visualizing the Sun and Earth coupled together by a mechanical spring, I have shown how gravity is like spring tension. This rotating spring coupler example is then exchanged for an analogous rotating electrical capacitor which leads to an improved electrical circuit diagram of the solar system. The series capacitive coupled circuit is the electrical transmission system for the solar system. Low frequency electrical energy is transferred from the Sun to the planets via flux transfer events. A capacitive coupled system inherently develops torque which provides rotation and centripetal/centrifugal force or what we call gravity. The paralleling of electricity generating Suns indicates that the power of the universe is virtually unlimited as James Clerk Maxwell inferred. Harnessing the power of the universe is one step closer to reality by virtue of the electrical schematic of the solar system.

Keywords and phrases: flux transfer events, gravity, Newton's cradle, spring coupler, series capacitive coupling, wireless transmission system.

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1. Introduction

In 1686, a controversy arose when the first book of Newton's Principia was presented to the Royal Society. Robert Hooke accused Newton of plagiarism by claiming that he had taken from his paper "System of the World" [1]. Historical review of manuscripts written by Newton in the 1660s shows that he arrived at proofs where in a circular case of planetary motion, planets "endeavour to recede" (Newton later called centrifugal force) and have an inverse-square relation with distance from the centre [2]. However, after his 1679-1680 correspondence with Hooke, Newton adopted the language of inward or centripetal force.

I aim to end the centuries old controversy by combing Hooke's classical spring law with Newton's cradle and thus represent gravitational pull between planets as a rotating spring coupling. From this paired representation of the Earth and Sun, I will choose an electrical analogy of the spring coupling and model our solar system as a series capacitive resonant coupling system. The controversy between Hooke and Newton will effectively be a mute argument by introducing an electrical analogy to better explain and demonstrate the nature of gravity. The paper will also provide a direct challenge to Einstein's "unipolar" system in Special and General Relativity and finally give credence to James Clerk Maxwell's notes on the enormous energy required for gravity.

2. Spring Coupled Pendulum

In physics, the word "coupling" refers to the transfer of energy between two or more physical states or systems. A classic example of coupling between oscillators is two simple mechanical pendula joined by a spring, as shown in Figure 1 below [3]. When one pendulum is swinging, it will push and pull on the connecting spring giving the second pendulum a push or pull. If the two pendulums have the same length and mass, the

second pendulum continues to swing with ever greater speed as the first pendulum ball slows down. Eventually, the first pendulum ball comes to rest as it has transferred all its energy to the second pendulum. But now the original situation is exactly reversed, and the first pendulum is positioned to steal back its energy from the second. The energy exchange repeats itself repeatedly.

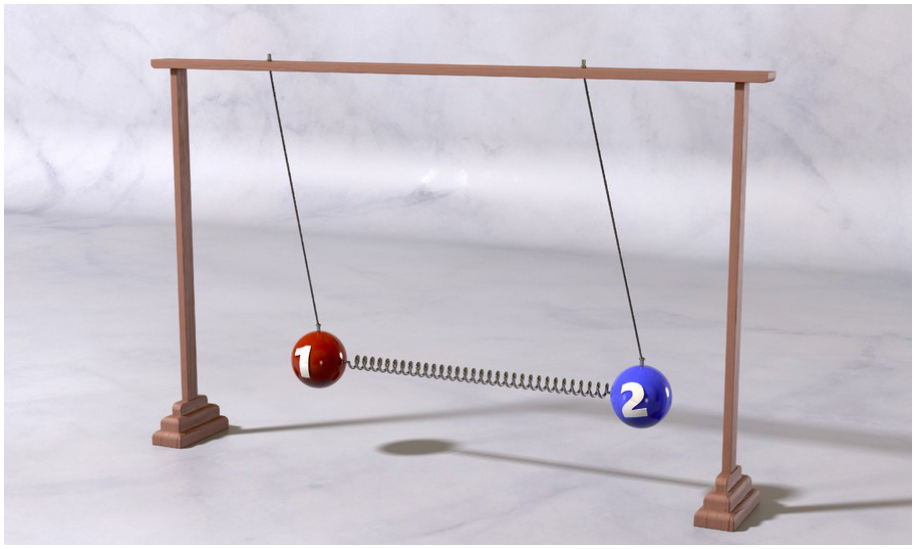

Figure 1. Mechanical Pendulum.

3. Planetary Spring Coupler

We can translate this same concept to planetary coupling by representing the Sun and Earth with a spring in between them. However, we know that the Sun is many times greater in mass and size than the Earth. The Sun is set in a relatively fixed position, and the Spring is compressed and stretched as the Earth travels in its elliptical orbit. The length of the spring changes from 146 million km to 152 million km as the Earth makes its way around the Sun. Gravity is thus shown to be similar in nature to the force of a rotating spring coupling, where centrifugal and

centripetal forces are acting on the spring. I point out that both Hooke's Law and Newton's Law are measured in Newtons.

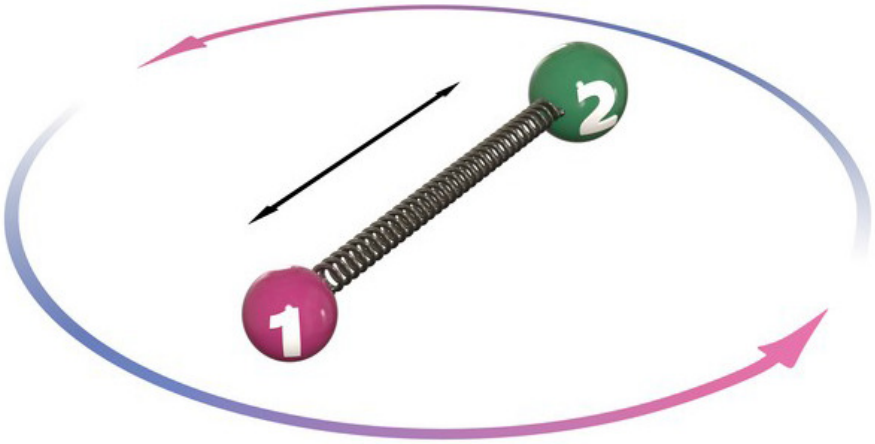

Figure 2. Two planets joined by a spring.

As the Earth spins around the Sun there exists a tug of war, or push and pull, between the Sun and Earth. We call this the gravitational pull of the Sun to the Earth, but it is an exchange of coupling energy between the Earth and Sun. Other planets have a similar effect and can be represented as coupling springs as well. We can also visualize springs between the planets themselves as they are all exchanging this spring coupled energy. Newton's law is, in a sense, built on Hooke's law [4]. Newton and Hooke realized this basic notion but also knew that although the forces between planets resembled springs, there were in fact no springs between planets to be seen. Newton used a fictitious *gravitational force* to explain an unseen force akin to the working mechanical force of springs. Newton writes: "That force by which the moon is held back in its orbit is that very force which we usually call *gravity*" [5].

4. Capacitor Spring Analogy

There are several formal analogies that can be made between

electricity and the motion of mechanical devices [6]. In the case of capacitance, a mechanical analogy to a capacitor is a spring where the stiffness of the spring is analogous to the capacitance. Thus, in electrical engineering, a capacitor is an electrical component which satisfies the equation:

$$V = \frac{1}{C}\int I dt,$$

where V = voltage of the capacitor, C = the capacitance of the capacitor, I = current flowing between the plates of the capacitor, and t = time.

An ideal massless spring has a similar equation form:

$$F = k\int v dt,$$

where: F is the force applied between the spring, k is the spring constant and v is the velocity of one end of the spring, the other end being fixed.

Note that in the electrical case, current (I) is defined as the rate of change of charge (Q) with respect to time:

$$I = \frac{dQ}{dt}.$$

While in the case of the spring, velocity (v) is defined as the rate of change of displacement (x) with respect to time:

$$v = \frac{dx}{dt}.$$

Thus, in the Spring to Capacitor analogy, we can conclude the following:

- Charge is akin to linear displacement,
- Current is akin to linear velocity,

- Voltage is akin to force,
- Time is the same in either analogy,
- Energy stored in a spring is $\frac{1}{2}kx^2$, while energy stored in a capacitor is $\frac{1}{2}\frac{Q^2}{C}$.
- There is an analogy between the mechanical concept of power as the scalar product of velocity and displacement, and the electrical concept that in an AC circuit, power is the product $VI\cos(\varphi)$ where φ is the phase angle between V and I, measured in RMS terms.
- Electrical resistance (R) is analogous to mechanical viscous drag coefficient, where force being proportional to velocity is analogous to Ohm's law, where voltage is proportional to current.
- Mass (m) is analogous to inductance (L), since $F = m(dv/dt)$, while $V = L(dI/dt)$. Thus, an ideal inductor with inductance L is analogous to a rigid body with mass m.

It is possible to make electrical and mechanical systems using two different mechanical analogues (see Table 1). An analogous electrical and mechanical system will have differential equations of the same form. There are two analogues that are used to go between electrical and mechanical systems; one is called Force-Current and the other is Force-Voltage [7-10].

Table 1. Important concept: Analogous quantities

Electrical Quantity	Mechanical Analog (Force-Current)	Mechanical Analog (Force-Voltage)
Voltage, e	Velocity, v	Force, f
Current, i	Force, f	Velocity, v
Resistance, R	Lubricity, $1/B$ (Inverse friction)	Friction, B
Capacitance, C	Mass, M	Compliance, $1/K$ (Inverse spring constant)
Inductance, L	Compliance, $1/K$ (Inverse spring constant)	Mass, M

To apply the Force Current analogy, every node in the electrical circuit becomes a point in the mechanical system. Ground becomes a fixed location, resistors become friction elements, capacitors become masses and inductors become springs. Sources must also be transformed. A current source becomes a force generator, and a voltage source becomes an input velocity. One deficiency in this analogy is that it only works easily for capacitors that are grounded. The Force Voltage also uses every loop in the electrical circuit, which becomes a point in the mechanical system. Resistors become friction elements, capacitors become springs and inductors become masses. Sources must also be transformed. A current source becomes an input velocity, and a voltage source becomes a force generator. The shortcoming of the Force Voltage analogy is that it only works easily for inductors with only one current defined through them.

Using the Force Voltage analogy, I show how two planets are connected via a capacitor. The analogy of the capacitor, forms part of the more comprehensive impedance analogy of mechanical to electrical systems. In Figure 3, I show the planetary mechanical to electrical

equivalent model.

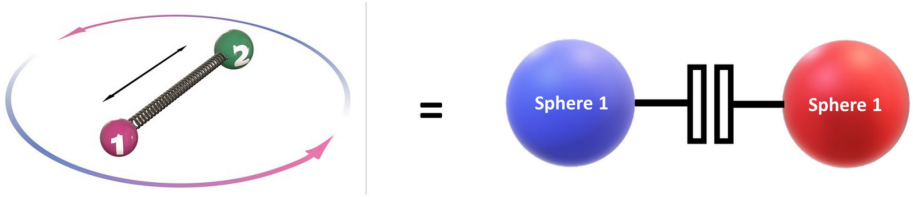

Figure 3. Coupled spring to coupled capacitor.

Space has extraordinarily little inductance or resistance, it is chiefly capacitance. Since the dielectric constant is essentially 1 for a vacuum, the impedance of space becomes $377\ \Omega$. Dark energy is electrical energy. Dark matter is an unbounded dielectric with negligible magnetic properties. The overall theory is thus supported, and the Creator(s) has provided an intelligent electrical engineering design.

5. Series Capacitive Coupling of the Earth and Sun

The electrical analogue of the two celestial bodies joined by a spring is a circuit composed of two LC resonators (Sun and Earth) joined by a coupling element. Energy is coupled in the circuit, not by mechanical springs, of course, but by electric and magnetic fields, or a mixture thereof. The basic coupling capacitive mechanism between synchronously tuned pairs of resonators is shown below [11]. For the type of coupling, which best demonstrates our solar system, I show the coupling equations, the even and odd resonant frequencies (denoted ω_e and ω_m, respectively), and the coupling coefficient - all in terms of the lumped element values.

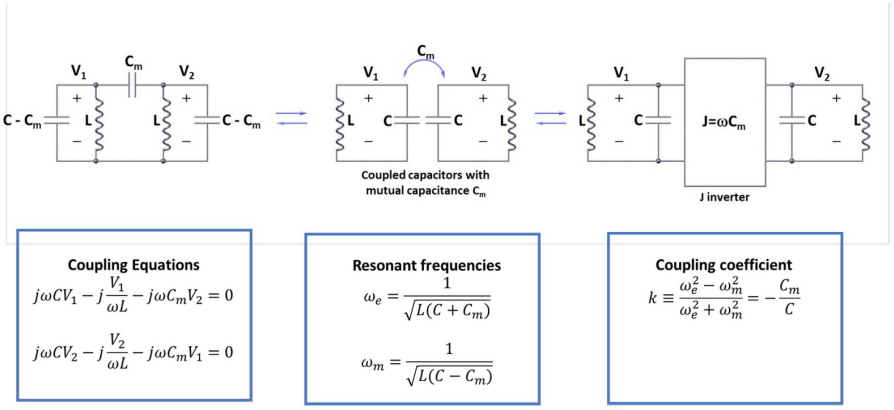

Figure 4. Series capacitive coupling.

6. Solar System Schematic Diagram

It has been shown that the Sun and planets operate as Resonant Frequency LC circuits and thus each planet has a different flux transfer frequency. Between each body is a capacitance that determines the synchronous frequency of each planet. Because some planets are closer together, opposite charges attract one another due to their electric fields, allowing the capacitor to store more charge for a given voltage than when the planets are separated at a greater distance, yielding a larger capacitance.

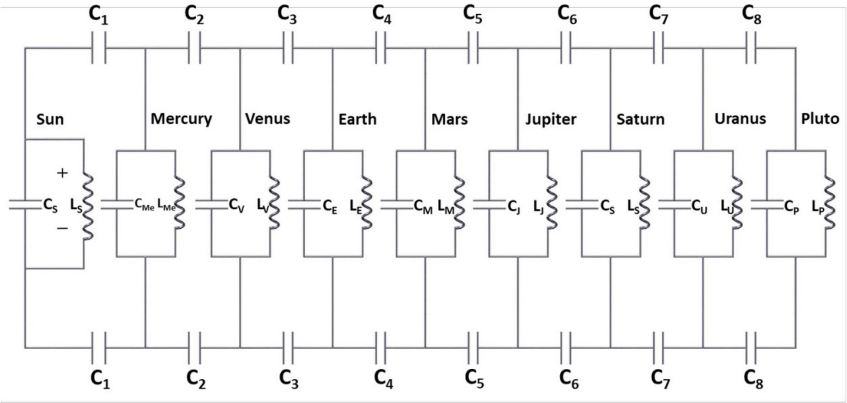

Figure 5. Electrical schematic of solar system.

7. Planetary Flux Transfer Event (Resonant Frequency)

A flux transfer event (FTE) occurs when a magnetic portal opens in the Earth's magnetosphere through which high-energy particles flow from the Sun. This connection, while previously thought to be permanent, has been found to be brief and very dynamic. The European Space Agency's four Cluster II spacecraft and NASA's five THEMIS probes have flown through and surrounded these FTEs, measuring their dimensions and identifying the particles that are transferred between the magnetic fields. Earth's magnetosphere and the Sun's magnetic field are constantly pressed against one another on the dayside of Earth. Approximately every eight minutes, these fields briefly merge, forming a temporary "portal" between the Earth and the Sun through which high-energy particles such as solar wind can flow. The portal takes the shape of a magnetic cylinder about the width of Earth [12].

Shown below (Table 2) are hypothetical Flux Transfer Events based on the estimated frequency of the portal events for each planet in our solar system.

Table 2. Hypothetical flux transfer events

Planet	Min. distance m	Max. distance m	Avg. distance m	Speed of light *c*	*f* Min.	*f* Max.	*f* Avg.	FTE (minutes)
Mercury	4.60E+10	7.00E+10	5.79E+10	3.00E+08	6.52E–03	4.29E–03	5.18E–03	3.22
Venus	1.07E+11	1.09E+11	1.08E+11	3.00E+08	2.80E–03	2.75E–03	2.78E–03	6.00
Earth	1.47E+11	1.52E+11	1.50E+11	3.00E+08	2.04E–03	1.97E–03	2.00E–03	8.33
Mars	2.05E+11	2.49E+11	2.28E+11	3.00E+08	1.46E–03	1.20E–03	1.32E–03	12.66
Jupiter	7.41E+11	8.17E+11	7.78E+11	3.00E+08	4.05E–04	3.67E–04	3.86E–04	43.22
Saturn	1.35E+12	1.51E+12	1.43E+12	3.00E+08	2.22E–04	1.99E–04	2.09E–04	79.69
Uranus	2.75E+12	3.00E+12	2.87E+12	3.00E08	1.09E–04	1.00E–04	1.04E–04	159.58
Neptune	4.45E+12	4.55E+12	4.50E+12	3.00E+08	6.74E–05	6.59E–05	6.67E–05	249.73

8. Mechanical Energy and Force in a Capacitor

If the Sun's voltage (V) is applied to the capacitor between the Sun and Earth a positive charge is distributed on the pole of the Sun and an equal charge of opposite polarity is distributed on the other pole of the Earth. These charges produce a force of attraction between the Sun and Earth, and if the Sun is fixed while the Earth is free to move, a force f is developed and tends to move the Earth towards the Sun. As a result, electrical energy is converted to mechanical energy. However, the conversion of electrical energy to mechanical energy is generally accompanied by a change in the amount of energy stored in the dielectric between the Sun and Earth.

The force and mechanical energy exerted on the poles of the Earth is found from standard Capacitor plate equations,

$$fdx = dW_{mech} = \frac{v^2}{2}\,dC = \frac{q^2}{2C^2}\,dC, \text{ [13, 14].}$$

We thus find the capacitive equivalent force of gravity to be

$$f = \frac{v^2}{2}\frac{dC}{dx} = \frac{q^2}{2C^2}\frac{dC}{dx}, \text{ [15].}$$

As the arrangement of the Sun and planets develops, forces that produce rotation, the torque of the Earth, is expressed by:

$$T = \frac{v^2}{2}\frac{dC}{d\theta} = \frac{q^2}{2C^2}\frac{dC}{d\theta}, \text{ [16].}$$

9. Earth Analogous Mechanical and Electrical Systems

The procedure to go from Mechanical to Electrical is simply the reverse of Electrical to Mechanical. Either a mathematical method or a simple visual method can be used where force generators are replaced by current sources, friction elements by resistors, springs by inductors, and masses by capacitors (which are grounded). Each position becomes a node in the circuit [17-20]. In Figure 6 below, an analogy of the Earth is depicted using the Force Current mode. The Force Current mode depicts the nuclear core of the Earth and known electrical currents in the liquid inner core.

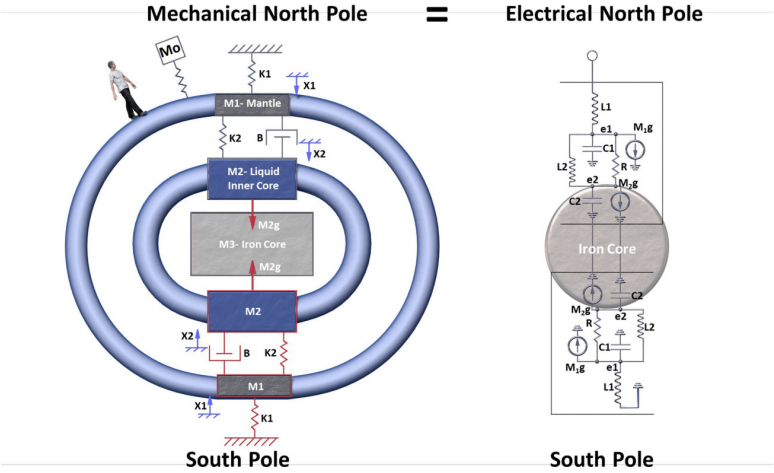

Figure 6. Earth mechanical and electrical analogy.

The Earth analogous figures demonstrate that gravity, can be represented as cascading mass and springs from the iron core of the Earth, where the mass is greatest, to the surface of the Earth where mass is typically less dense. With this representation, we must also keep in mind that for the mechanical analogy the iron core mass is rotating in one direction and the outer mantle in the other direction. The springs on the surface of the Earth are in compression or tension, which can mirror the centripetal or centrifugal force due mainly to the rotation of the iron inner core. Hooke's Law is thus proportional to Newton's law such that, $F = kx = ma = mv^2/r$. But we know there are no springs beneath our feet and thus the spring compression or tension force is fictitious. We also know that what is often referred to as a "centrifugal" force is an example of a "fictitious" or "apparent" force that is not the result of an interaction with another object. The centripetal force is a real force, but it is the sum of all components of the real forces that act on that object towards the centre of curvature when the object travels in a direction other than in a straight line. So, in that sense, "centripetal forces" are not real either, but a combination of forces that change the direction of motion of an object, which are real.

All of which begs the question. If there are no springs and spring forces, and the centrifugal force does not really exist, then what is the force of gravity? We are left with the centripetal force, which both Newton and Einstein agreed was the force of gravity, but centripetal forces are not real either. There must be another force acting to change the direction of motion for the centripetal force to be real. Our analogy tells us that electromagnetic force(s) are the forces that combine to create the torque or centripetal force.

10. Conclusion

The fundamental phenomenon of gravity whereby one body acts on

another has been shown to be due to cosmic capacitance between the Sun and the planets. The mechanical force of gravity is in fact an electromagnetic force derived from a rotating electrical circuit. Hooke, Newton and their 17th century counterparts were not privy to the attributes of electricity, as it had not yet been discovered, and had absolutely no way of considering the simple conclusions as shown in this paper.

Einstein's theory of general relativity is built on special relativity "unipolar system" and thus does not conform to what we know is a dipole planet. The use of Lorentzian transformations, which are based on unipolar charged particles, and purposely place "electromagnetism in the backseat", raises questions to Einstein's methodology [21]. The Einstein model of the unipolar universe does not allow fellow scientists to see the elegant dipole electrical solutions elaborated in this paper. Relativity ignores the north and south poles of suns and planets.

I note the great James Clerk Maxwell in his singular note on Gravitation concluded, "*that every part of this medium possesses, when undisturbed*, *an enormous amount of intrinsic energy*, *and that the presence of dense bodies influences the medium so as to diminish the energy wherever there is a resultant attraction*". Maxwell then goes on to state, "*As I am unable to understand in what way a medium can possess such properties*, *I cannot go any further in this direction in searching for the cause of gravitation*" [22]. Ironically the very next Chapter is entitled, "Theory of Condensers", but its focus is small commercial application and makes no mention of the cosmic capacitance of space. James Clerk Maxwell's most notable achievement was to formulate the classical theory of electromagnetic radiation, bringing together for the first-time electricity, magnetism, and light as different manifestations of the same phenomenon. Perhaps a rearrangement of chapters in his treatise and a more expansive view of condensers might have changed the course of scientific history, as gravity may have been added to his achievements.

I have shown through simple mechanical to electrical analogy that an electromagnetic energy and force is propagated between celestial bodies. Capacitance creates torque and planetary rotation which provide a Centripetal and Centrifugal force as Newton and Einstein claimed gravity must be. This paper is consistent with Einstein's fundamental observations about gravity and rotation. I agree with Albert Einstein on this important point. It is the rotation of planets, which creates a mechanical inward or receding force. This is also what Newton concluded.

However, Einstein and I differ in the nature of the force of that rotation and our modelling of the universe. The use of a dipolar system vs. unipolar system have led Einstein and I to quite different conclusions. I do believe that monopoles exist, but they are rare and likely relegated to very deep space. But, in the proximity of extremely high voltage electromagnetic fields of the Sun, the dipole system provides a much more realistic model of the solar system and gives us a better understanding of gravity and energy transfer between celestial bodies. Using a dipole system provides a standard electrical schematic of the solar system that is fully understandable to any electrician. Maxwell's laws are the same on Earth as they are in the heavens.

Furthermore, I have laid out a cosmic wireless electrical transmission system whereby electrical energy is transferred from the Sun to the planets through capacitive coupling. The basic equations for energy transfers, force and torque are based on known electrical equations that we use in wireless communications, power transfer, and electrical heating.

This paper supports and enhances my earlier work of modelling planets as machines, provides simple clarity to the electrical nature of gravity and shows how power is conveyed through the universe [23-26]. By extending the schematic, we can add other solar systems, other galaxies and perhaps someday will be able to show a wiring diagram for

the entire universe. It is the nature of things that are so profound and universal that it is hypothesized that all solar systems in the universe are electrically paralleled, thus providing a potential electrical generation source to the "enormous amount of intrinsic energy" that Maxwell described. The electrical power of the universe is virtually unlimited.

An electrical schematic of the Earth has been developed using a mechanical to electrical analogous system. The work shows that the centripetal/centrifugal force on the Earth is also derived from electromagnetism. There are only three forces of nature. The force of gravity is created by and through electromagnetism. Whether we weigh ourselves with a spring scale, an electronic scale or measure our bodies electrical impedance using a capacitance/inductance meter, the results are analogously and inherently the same. All bodies are electrically connected to the Earth and subject to electromagnetic forces. Mass and springs are equivalent to capacitance and inductance. To put it more succinctly an ounce of gold is equal to 'so many' farads (force voltage) or 'so many' henrys (force current).

This paper presents an abstract concept. But the true nature of the universe is measured in volts, amps, farads, and henrys. Our system of weights and measures has evolved over the centuries from fictitious forces, that do not really exist. Electrical ignorance of the universe's power system has not allowed us to see that we have evolved from a stone age society where springs, levers and mass are the basis of our standards. When the world finally accepts that the force of gravity does not exist, that centrifugal forces are fictitious and centripetal forces are derived from electromagnetism, perhaps the standards committee will rethink their current methods of weights and measurements. The only true standard is one built around electromagnetic measurements.

It is also proposed that if my simple electrical power transmission system is the driving power source of all things as large as the solar

system then it would seem reasonable to propose that the simple schematic is also the driving energy for all things small. There are many different electrical coupling schematics, but if the universe is truly universal in application then I propose that the series capacitive coupling circuit is the building block for all classical physics and quantum physics as well. This is, of course, a great leap and purely conjecture, but I propose that the series capacitive coupler is the simple electrical circuit that powers and gives life to all things that exist in the universe. From the nanometre to an entire galaxy the capacitive coupler is how electrical energy is transferred. It is the electrical transmission circuit for everything.

Acknowledgements

The author wishes to acknowledge ASK Scientific for assistance in formatting the equations. And bring attention to the original work of James Clerk Maxwell, a Scottish scientist in the field of mathematical physics. Maxwell demonstrated that electric and magnetic fields travel through space as waves moving at the speed of light. He proposed that light is an undulation in the same medium that is the cause of electric and magnetic phenomena. The unification of light and electrical phenomena led his prediction of the existence of radio waves. Maxwell is regarded as a founder of the modern field of electrical engineering.

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