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The Maxwell force as a unified force theory including gravity

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All gravitational effects can be accounted for as parts of the electromagnetic Maxwell force, and as such, the two forces can be unified into a single force. Inertia is an electrically neutral effect similar to self-induction, which naturally expands to an electrically neutral Maxwell force for any reasonable model of inertia. The neutral Maxwell force explains many components of gravity and also an accelerating force causing matter to move away from matter. Any physical model for acceleration due to electromagnetic force has the appearance of a Casimir effect with acceleration occurring due to differentials in pressure from the quantum field. One part of that is the Fatio-Casimir effect that also accelerates electrically neutral bodies and behaves like the attractive force due to gravity. Newton's constant G is a combination of the Maxwell repulsive force, the attractive Fatio-Casimir effect, the attractive neutral Lorentz forces, and other neutral Maxwell forces. The increase in quantum van der Waals torque due the presence of stable matter leads to clock-rate and speed of light slowing that leads to phenomena considered as tests of general relativity. All forces, electromagnetic, weak, strong, gravity, and mechanical can be combined into a single Maxwell stress-energy tensor in quantum field metric space where clock-rates change but not lengths.

1. Introduction

The author recently completed a paper titled "General relativity as a quantum van der Waals torque effect."[1] This paper is intended to build on those points and more explicitly set out the conditions that arise from quantum field theory in order to determine the proper form for quantum gravity. The conclusion reached is that gravitation can be described entirely as part of Maxwell force theory.

This form of Maxwell's equations must take into account the basic force terms that are normally associated with the gravitational force and the modification of those force terms due to the relative locations of stable matter. At the same time, Maxwell's equations must still account for quantum field theory in its entirety including relativistic frame transformations.

2. The Quantum Field

To understand the physical conditions that the quantum field places on any theory of gravity, we must review its properties. The quantum field behaves like it is filled with numerous matter-antimatter quantum fluctuation particle pairs. These quantum particle pairs interact causing van der Waals forces that lead to the Casimir effect.[2] The van der Waals forces allow the quantum field to push on bodies of stable matter and can accelerate them when there are differentials in van der Waals forces.

There is an additional van der Waals force that occurs in any sea of dipoles and that is van der Waals torque. Van der Waals torque arises naturally in the quantum field and regulates all linear and rotational motion. This includes regulating the motion of the quantum fluctuations of the field. In this way the quantum field is entirely self-regulating.[3]

The wavelengths and frequencies of the quantum field arise naturally from this regulatory process. The electric and magnetic constants, $\boldsymbol{\varepsilon}$ and $\boldsymbol{\mu}$, arise from quantum van der Waals torque process as well. When $\boldsymbol{\varepsilon}$ and $\boldsymbol{\mu}$ change, the speed of light changes, so the speed of light varies with quantum van der Waals torque. Van der Waals torque also effects clock-rates. Clock-rates and distances traveled change in proportion so the speed of light appears the same to any observer.[1]

The quantum field also has a rest frame. We can identify the quantum field's rest frame is it is the frame of reference where the van der Waals torque is the lowest and is uniform on average. The speed of light is also the greatest and clock-rates are the fastest. The existence of a quantum field rest frame is one parameter that differs from special relativity and general relativity which assume there is no preferred rest frame. The existence of a preferred rest frame in quantum field theory invalidates that assumption.

Note again that the speed of light and clock-rates change at the same rate so that the apparent velocity of light remains the same for any observer. We only notice the effect because it changes the wavelength, energy, and frequency of the light, which we see as red-shifting or blue-shifting. When an observer is moving at a velocity relative to the rest frame, they experience an effective increase in quantum van der Waals torque, which makes light reaching them appear blue-shifted from its wavelength in the rest frame.

It is also important to note that since space is filled with quantum particle-pair dipoles, they orient with respect to electric and magnetic fields in a manner consistent with classical Faraday field lines. When photons travel through space producing rotating electric and magnetic fields, those fields propagate through the quantum field. From the photon's perspective it is always traveling in the quantum field's rest frame rather than the frame of reference of a source or detector moving relative to the rest frame. This is another area where quantum field theory varies from the assumptions of relativity theory. Special relativity theory incorrectly assumes that light travels in the frame of reference of the light source.

We also must take into account that quantum van der Waals torque increases in the presence of stable matter. We can think of it as stable particles interfering with the free rotation of quantum dipoles. That interference increases the quantum torque. At any point in space in the rest frame, the total quantum van der Waals depends on the self-generated torque plus an additional torque term that depends on the location of all stable matter in the universe relative to that position.[1]

Note that $\boldsymbol{\varepsilon_0}$ and $\boldsymbol{\mu_0}$ are not dependent on the location of stable matter, but the correction term is. So, in a sense we can think of the correction term as Machian, since it is dependent on the relative location of all stable matter, while the base constants in free space are not Machian. We should also note the possibility that the van der Waals torque and thus $\boldsymbol{\varepsilon_0}$ and $\boldsymbol{\mu_0}$ are reduced inside a quantum cavity.

For any observer moving at a fixed velocity or accelerated versus the rest frame, they will experience an effective increase in van der Waals torque. These forms of torque increase or decrease must be included in any general form of Maxwell's equation to account for those relativistic effects.

3. Space's Dimensions and Clock-rate

Space is by definition a boundless region that contains all matter. Space is not physical on its own so it does not have spatial dimensions or clocks by itself. In order for space to have spatial dimensions and clocks it must contain matter with spatial dimensions and clocks.

The quantum fluctuations of the quantum field have wavelengths and frequencies, so the quantum field has spatial dimensions and clock-rates. Space gets its spatial dimensions and clock-rates from the quantum field, and any change to those spatial dimensions and clock-rates must come from changes to the quantum field.

We have already identified that an increase in van der Waals torque changes the clock-rate of the quantum field and thus of space. As such, we have a confirmed mechanism for varying clock-rates. This mechanism is consistent with relativistic clock-rate changes due to velocity, acceleration, and the location of stable matter. This covers both relativity theory due to frame transformations and general relativity theory. The latter is frequently termed to be gravitational time-dilation but that is a misnomer. It is an electromagnetic effect rather than gravitational and is not a form of dilation but rather clock-rate changes. Aside from the underlying cause and terminology, these clock-rate changes are consistent with standard relativity theory.

The spatial dimensions of the quantum field, and thus of space, are set in the quantum field's rest frame. Those spatial dimensions do not change just because an observer moves relative to the rest frame. A moving observer experiences clock-rate changes and sees wavelength-shifting of light due to the clock-rate change, but not changes in physical dimensions. An observer in motion relative to the rest frame does not cause length contraction that is only valid in his or her frame of reference.

This is another area where standard relativity theory differs from quantum field theory. In standard relativity theory it is thought that a moving observer changes the length dimensions throughout the entirety of space relative to the direction of his or her motion.

It is not physically possible for a moving observer to change quantum fluctuation wavelengths, except due to their stable matter. It is a logical impossibility for a million different observers to physically change the dimensions of the quantum field in a million different directions and magnitudes simultaneously. The idea that a moving observer causes physical lengths to contract is invalidated by quantum field theory.

Einstein actually recognized in 1907 that the relativistic frame transformation that applies in the case of the Michaelson-Morley experiment could be calculated as either a length contraction or time dilation effect but not both. He correctly decided that the clock-rate correction was valid and that Fitzgerald-Lorentz contraction was not valid. He went on to state that his version of relativity was valid failing to recognize that he needed to drop the length contraction term from his special relativity theory as well.[4]

He went on to include the invalid length correction term in his theory of general relativity.[5] The length correction term in three-dimensional space leads to a space curvature term. Quantum field theory invalidates space curvature effects due to the presence of matter. In the presence of matter the dimensions of space are still determined by the quantum fluctuation wavelengths in the quantum field rest frame.

Initially Einstein considered that a speed of light correction term arises due to an effect of mass. He considered speed of light correction terms in 1907, 1911, and later papers. He even went so far as to compute the deflection around the Sun due to the speed of light variability in 1911.[6] He forgot to include a clock-rate slowing term then, so his result was half the correct result.

Quantum field theory tells us that he was on the right track by considering a speed of light correction term. The increase in van der Waals torque near stable matter slows the speed of light by changing the electric and magnetic constants. His general relativity theory incorrectly uses a space curvature correction instead of a speed of light correction.

4. Quantum Field Conditions

Based on the above information we can make a list of conditions due to the quantum field that must be met by both electromagnetic and gravitational force theory. Van der Waals is abbreviated VDW.

A. The quantum field produces VDW torque.

B. VDW torque establishes the wavelengths and frequencies of the quantum field.

C. The spatial dimensions and clock-rate of space are determined by the wavelengths and frequencies of the quantum fluctuations.

D. The quantum field has a rest frame.

E. Light always travels in the rest frame.

F. The spatial dimensions and clock-rate of the quantum field are set in the quantum field's rest frame.

G. Motion relative to the rest frame does not cause the dimensions in the quantum field rest frame to change in length or curvature.

H. VDW torque increases in the presence of stable matter.

I. The effective VDW torque changes due to velocity and acceleration relative to the rest frame.

J. VDW torque regulates clock-rates.

K. VDW torque regulates ε and μ and by extension, the speed of light c.

L. Velocity and acceleration relative to the quantum rest frame slows clock-rates.

M. Clock-rate changes due to changes in VDW torque changes light energy (red-shifting and blue-shifting).

5. Inertia and Maxwell Forces

In order to understand the forces actually responsible for gravity we must first understand the physical cause of inertia. Inertia is the property of stable matter to either stay at rest or continue in motion unless a force is applied to it. We also know that velocities of objects, whether electrically charged or neutral, are limited to the speed of light, so there is some physical interaction limiting velocity.

We have a good theory about how this works with electrically charged objects. Moving electrical charges cause a magnetic field to form and the magnetic field causes the objects to move. This is called self-induction. Something about how the magnetic field interacts with the quantum field limits velocities to the speed of light. The speed of light limit is related to the electric and magnetic constants ε and μ.

Quantum field theory tells us that the magnetic fields are rotating quantum dipoles, as moving electric charges cause quantum dipoles to rotate. The rate of rotation is regulated by quantum van der Waals torque. The quantum van der Waals torque also determines the values of ε and μ and the speed of light

c. So electromagnetic inertia is a relationship between a moving charged object and the rotating quantum field which is regulated by quantum van der Waals torque that sets the speed of light limit.

Because the speed of light limit is the same for electrically neutral objects, their speed is also limited by the quantum van der Waals torque. This means that the motion of electrically neutral objects causes quantum dipoles to rotate, and quantum dipole rotation causes the object to keep moving.

This is a form of electrically neutral self-induction that is otherwise identical to electromagnetic self-induction except that the field that is formed is not an electromagnetic field. The field is electrically neutral at large distances from the individual atoms.

No matter how we try to understand the physical cause of inertia, we end up with a form of electrically neutral self-induction. But any form of electrically neutral self-induction leads to a complete electrically neutral force that can be described by a set of equations analogous to Maxwell's equations. The physics of tops and gyroscopes is also consistent with an electrically neutral Maxwell force.[7]

So, in general, any rotating body, such as the Sun, will generate electrically neutral forces that are equivalent to the known force interactions of electromagnetic theory. As such, the neutral Maxwell force accounts for precession of elliptical orbits, tidal forces, Lorentz forces, de Sitter precession, Lense-Thirring precession, and solar and planetary dynamos to name a few things. Since Lorentz forces are not accounted for in Newtonian gravitation or general relativity, they explain one form of "missing" or "dark" matter. The neutral Lorentz force has been a missing force, not in the standard model.

The Maxwell force also has a linear force underlying it causing stable matter to repel stable matter. This force is partially or completely responsible for the force causing the accelerating expansion of the universe, the so-called "dark energy." [7]

The existence of the neutral Maxwell force tells us that the Newtonian gravitational constant **G** is the sum of an unidentified electrical attractive force, attractive Lorentz forces, the repulsive neutral Maxwell force, and other neutral Maxwell forces.

Historically, physicists have tried explaining gravity as a Maxwell force while ignoring the Lorentz force the repulsive force. They have instead tried flipping the polarity to set the repulsive force equal to attractive Newtonian gravity or general relativity. The existence of a force causing the accelerating expansion of the universe—dark energy—tells us that approach was wrong. We should rather recognize that the neutral Maxwell force behaves identically to the electromagnetic Maxwell force and is repulsive.

Even more generally, since electrically charged objects are matter and have mass, the electromagnetic Maxwell force includes the electrically neutral Maxwell force as a component. So generally speaking, there is only one Maxwell force and it is the electromagnetic force. We can, however, strip out the electrical charge parts of it and derive a neutral form that is a subset of the full Maxwell theory.

6. Fatio-Casimir Effect

In order to completely understand gravity as an electromagnetic force we must explain acceleration due to gravity and gravitational attraction as electromagnetic force effects. We can note that Newtonian gravity and general relativity never provided a physical cause of acceleration due to gravity and as such are incomplete theories.

To figure out how acceleration due to gravity works we must first understand how acceleration due to electromagnetic forces work. Maxwell did not provide a good explanation for acceleration due to electromagnetic forces so it is incomplete as well.

There is one force within electromagnetic theory that does explain electromagnetic acceleration relative to that effect. That is the Casimir effect. In the Casimir effect the van der Waals forces between the quantum dipoles produces pressure on bodies. Motion occurs when the forces directed on an object from different directions are not equal. In the case of the Casimir effect, force differentials arise because of the existence of a cavity where some vacuum fluctuation wavelengths are excluded.

When we consider the force between two electric charges or magnets, we can recognize that attractive polarization between opposite charges or opposite magnetic poles causes a reduction in quantum forces pushing the bodies apart. The opposite occurs between like charges or like magnetic poles, as the force pushing objects apart increases in those conditions. This gives us a clear indication that we can extend the Casimir effect mechanics to explain electromagnetic acceleration in general.[8]

The problem is that there needs to be a quantum field pressure being exerted on all bodies all of the time that follows the inverse square law. If we assume such a pressure exists, it explains all electromagnetic acceleration. If we assume such a force does not exist, we are stuck without an explanation for electromagnetic acceleration.

An additional way for the force between two bodies to be reduced is the Fatio-LeSage effect. Fatio determined that two bodies shield each other from a pressure force in space as illustrated in Figure 1. We can think of it as two bodies casting a shadow on each other and the size of that shadow determines how much the force pushing the bodies apart is reduced.

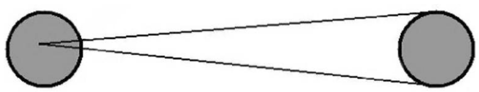

Fig. 1. An illustration the Fatio-LeSage effect. Pressure between bodies is reduced by bodies blocking some of the quantum pressure coming from the direction of the opposite body.

Assuming electromagnetic acceleration is an extension of the Casimir-effect, one component of that phenomena must be the Fatio-LeSage shadowing effect. We can call it the Fatio-Casimir effect. So, if the extended Casimir effect exists, the Fatio-Casimir effect exists too, and it explains acceleration due to gravity as a purely electromagnetic effect. The author has addressed this in more detail in another paper.[8]

The remaining question is determining how the quantum field develops a van der Waals, or van der Waals-like, pressure force that follows the inverse square law. The author's working hypothesis is based on the fact that electron-positron quantum dipoles always repel proton-antiproton quantum dipoles regardless of orientation.

This is true in one orientation due to Coulomb repulsion. In the other orientation we find they are repelled by the same force responsible for the 780 keV potential between protons and electrons. Because these two basic types of quantum dipoles are always repelled there is an associated van der Waals force that follows the inverse square law.

Regardless of whether that hypothesis is correct, since electromagnetic acceleration occurs, the quantum field must be pushing on objects somehow causing them to accelerate in response to electromagnetic forces. That pressure force, whatever it is, must follow the inverse square law. So, we are in a situation where such a force must exist in some form, and one of its components will behave like the Fatio-Casimir effect. Then once we include the Fatio-Casimir effect as part of electromagnetic force theory as described by Maxwell's equations, we can describe gravity entirely as an electromagnetic force.

7. Maxwell-Gravity Stress-Energy Tensor

The general form of quantum gravity combined with quantum field theory is simply the Maxwell equations where the electric and magnetic constants ε and μ and the clock-rate t are variable. They depend on the velocity or acceleration relative to the quantum field's rest frame, the location of all stable matter, and any change in quantum van der Waals torque in quantum cavities.

To put this in terms of tensor algebra as used in general relativity theory, the energy-momentum tensor is based on the Maxwell stress tensor in flat Minkowski spacetime with a function that changes ε, μ, and t appropriately. This is similar to the equations for the relativistic Maxwell stress tensor, which is also in flat Minkowski spacetime.

It is important to note that there are no special gravitational terms or constants needed in the final electromagnetic equations since the gravitational effects are entirely electromagnetic. When computing the neutral Maxwell force separately from the electrical force we do need some new terminology as discussed in the next section.

Equation 1

$$T^{\mu\nu} = \frac{1}{\mu_0}\left[F^{\mu\alpha}F^{\nu}_{\alpha} - \frac{1}{4}\eta^{\mu\nu}F_{\alpha\beta}F^{\alpha\beta}\right]$$

Equation 1 is the Maxwell stress-energy tensor in flat Minkowski spacetime.[9] $F^{\mu\nu}$ is the Maxwell stress tensor and $\eta_{\mu\nu}$ is the Minkowski metric tensor. In curved spacetime the flat Minkowski tensor is replace by a curved space metric tensor. It is usually written $g_{\mu\nu}$ and inserted in place of $\eta_{\mu\nu}$ to apply the space curvature terms.

Since length contraction and space curvature do not occur in the quantum field rest frame, nor do they occur due to velocity of an observer or the location of matter, we need a different metric tensor that only includes the clock-rate term. While the letter we chose to represent this different metric tensor is not critical, we can use lower case q to represent that it is the quantum field metric tensor which only includes the clock-rate term based on the sources of change to the quantum van der Waals torque.

Equation 2

$$T^{\mu\nu} = \frac{1}{\mu_0}\left[F^{\mu\alpha}F^{\nu}_{\alpha} - \frac{1}{4}q^{\mu\nu}F_{\alpha\beta}F^{\alpha\beta}\right]$$

We can then replace $\boldsymbol{\eta_{\mu\nu}}$ with $\boldsymbol{q_{\mu\nu}}$ as shown in Equation 2. This is the Maxwell stress-energy tensor with only the clock-rate change.

The other change that must be made is to allow $\boldsymbol{\varepsilon}$ and $\boldsymbol{\mu}$ to vary with velocity, acceleration, the distribution of stable matter, and the effect of quantum cavities. Since this change is not a change to Minkowski spacetime, it was not appropriate to put it in the quantum field metric tensor. Instead, those correction terms need to be incorporated into the Maxwell stress tensor ($\boldsymbol{F^{\mu\nu}}$) in order for Maxwell's equations to be universally correct. As such, Equation 2, assuming it reflects the corrected Maxwell stress tensor, can be considered to be the final form of a combined electromagnetic and gravitational force equation.

The author has also shown previously that the strong nuclear force is an electromagnetic force as the Casimir effect between nucleons is strong enough and has the correct range to account for it.[10] Weak interactions are also unified with the electromagnetic force in the standard model and the author has shown that weak interactions are due to interactions with quantum fluctuations in other ways. So weak interactions are also part of electromagnetic theory.[11]

That means that Equation 2 is the unified field theory stress-energy tensor that represents all forces in one simple equation. It also includes mechanical force interactions such as those involving inertia, tops, and gyroscopes which are normally ignored when physicists attempt to unify the known forces into a single theory.

8. Neutral Maxwell Force Terms

The version of the Maxwell stress-energy tensor in equation 2 does not address the problem of how we need to handle the neutral Maxwell force when we compute it separately. The Maxwell force is based on electric charge and the electric charge dipole, so the equivalent non-electric Maxwell force needs equivalent non-electric constants and terms, and an electrically neutral charge-like dipole.

Physicists who have previously attempted to devise a neutral Maxwell force have assumed that the "charge" is mass. This creates a problem since there is no such thing as a negative mass, so it is not a dipole property. Using mass as charge also makes it difficult to unify the neutral Maxwell equations with the electrical ones since mass is still important to the electrical equations to fully address energy and momentum but it is a completely separate term from electrical charge.

While physicists may claim that there is no electrically neutral dipole that applies to the neutral Maxwell force, they are ignoring the obvious. The obvious solution is found in the positive and negative energy solutions to the Dirac equation. The negative energy solution is now known to be the positron while the positive solution is the electron. Physicists came up with the idea to call the negative energy solution antimatter and the positive one matter. So, based on the Dirac equation matter and antimatter are a positive and negative polar property.

If we consider electrons and positrons, they only have two polar properties, electric charge and matter and antimatter so we do not have another choice for a dipole. The author decided to call the neutral Maxwell force the matter force in 2001 and the combined force the electro-matter force initially for the reason that there was no other choice.[12]

However, analysis of how particles polarize the quantum field supports the idea that electrons will tend to polarize quantum dipoles with the electron-like electric charge and matter-antimatter orientation. At the same time, protons tend to polarize proton-like quantum fluctuations. This leads to polarization with respect to matter-antimatter around stable objects whether electrically charged or neutral. While additional arguments can be made to support the idea that matter and antimatter—which we can call matter-charge—is the dipole of the neutral Maxwell force we will stop there in this paper.[13]

Electrons and protons both have a unit of 1 matter-charge in elementary charge units. Matter-charge is not proportional to mass. However, because electrically neutral objects have the same number of electrons and protons, mass and matter-charge are proportional such that we do not notice mass is different from matter-charge. This proportionality is however broken by neutrons, which we can assume have a matter-charge of 1. But the mass to matter-charge ratio is still the same to four decimal places even when neutrons are present. Since mass is measured by way of acceleration we would see this as a small irregularity in calculated mass related to the atomic proton-neutron ratio.

Table 1

Electric	Neutral
q (charge)	***q*** (matter-charge)
ρ (volume charge density)	***ρ*** (volume charge density)
σ (surface charge density)	***σ*** (surface matter density)
λ (line charge density)	***λ*** (line matter density)
φ (scalar potential)	***φ*** (scalar potential)
A (vector potential)	**A** (vector potential)
J (convection current density)	**J** (matter current density)
I (electric current)	***I*** (matter current)
m (magnetic dipole moment)	***m*** (matter-magnetic moment)
E (electric field)	**E** (matter field)
B (magnetic field)	**B** (matter-magnetic field)
ε_0 (permittivity of space)	ε_0 (permittivity of space)
μ_0 (permeability of space)	μ_0 (permeability of space)
$-\frac{1}{4}\pi\varepsilon_0$ or $-\mu_0 c^2/4\pi$	$-\frac{1}{4}\pi\varepsilon_0$ or $-\mu_0 c^2/4\pi$

Given a matter-charge that is equivalent to electric charge, we can produce a table with the equivalent electric and neutral terms and symbols as shown in Table 1. The neutral Maxwell terminology can be made identical to the electrical terminology except for the different type of charge involved. If there is some confusion between two otherwise identical terms, a subscript ***m*** may be added for clarification to the neutral force terms. The neutral Maxwell force terms will need to be in units of matter-charge but the definitions of those units should be kept as similar as possible to the electrical terms.

9. Tests of General Relativity

Because a flat space and variable speed of light model of gravity has been tested by numerous scientists including Einstein, it is already known that the proofs of general relativity can be accounted for in such a model.[14][15][16] That said, some of those approaches, and there are many more than those cited, do not comply with all the conditions set by quantum field theory.

The addition of the neutral Maxwell force makes that job even easier as it adds forces that are missing from general relativity such as a neutral Lorentz force that accounts for the structure of spiral galaxies, and likely a big percentage of the "missing matter" in galaxies and galactic clusters.

Gravitational red-shift occurs in any theory that explains clock-rate slowing due to the presence of stable matter. The interaction does not need to be gravitational, and it isn't. The quantum van der Waals torque theory has the advantage in that it is physically real and explains clock slowing. There is no accepted physical theory about how general relativity causes clock-rate slowing.

With regard to deflection of light, Einstein showed that he could compute half the deflection from three different interactions, speed of light slowing, clock slowing, and length contraction.[5][6] But if all three were correct, he would get the wrong answer, $\theta = 6GM/rc^2$ instead of $\theta = 4GM/rc^2$.[1] Clock-rate slowing is experimentally confirmed so the second correct term is either speed of light slowing or length contraction. Since the quantum field determines physical dimensions, length contraction is not possible. These same arguments are true for gravitational lensing.

The Shapiro delay is similar, as part of it can be computed as a speed of light slowing or length contraction but not both. Speed of light slowing is the choice that satisfies the conditions set by quantum field theory.

The precession of elliptical orbits is a consequence of the neutral Maxwell force. One form of the precession occurs due to the field that propagates due to the rotation of the Sun. Since the neutral Maxwell force must exist, the general relativity computation can be considered an unnecessarily complicated way to compute the same thing.

Lense-Thirring precession, also called frame dragging, is the same in that it is an overly complicated way to compute an effect that arises naturally from the neutral Maxwell force. Frame-dragging is also physically impossible as the quantum field cannot be dragged. The quantum field's dimensions are set in its rest frame. Precession due to rotating bodies is a natural consequence of the neutral Maxwell force.

Expansion of the universe is another test that is better explained by the neutral Maxwell force. The neutral Maxwell force includes a term whereby matter accelerates away from matter. Thus, it explains expansion and the accelerating expansion of the universe, while general relativity explains expansion, but not accelerating expansion.

These tests of general relativity show that general relativity fails the tests as it violates conditions set by the quantum field and the existence of the neutral

Maxwell force. The Maxwell force model on the other hand is superior with respect to each test.

10. Conclusion

Due to the necessary existence of a neutral Maxwell force and an attractive yet neutral form of electromagnetic acceleration that can be described as a Fatio-Casimir effect, all the effects that are considered part of the gravitational force are better explained as part of the quantum electromagnetic Maxwell force. Quantum field theory describes the physical mechanism responsible for those force interactions, including clock slowing and speed of light slowing effects due to the presence of stable matter.

Because the neutral Maxwell force is a subset of the electromagnetic Maxwell force, gravitational and Maxwell forces, both electric and neutral, may be combined into a single Maxwell stress-energy tensor. The Maxwell stress tensor must include terms to modify the electric and magnetic constants in the vicinity of stable matter and in quantum cavities. And, instead of the usual Minkowski metric tensor, the quantum field metric tensor must be put in its place that only includes changes to clock-rates.

Then, since the strong nuclear force and weak interactions can also be shown to be part of quantum field theory, the Maxwell stress-energy tensor is a unified force theory. It not only accounts for the electromagnetic, strong, weak, and gravitational forces, it includes mechanical forces such those that are active with inertia, and gyroscopes.

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