Origin of Inertia, Radiation Reaction, Planetary Spin and 'Time-Dilation' Effects

HenokTadesse, Electrical Engineer, BSc. Ethiopia, Debrezeit, P.O Box 412
Tel: +251 910 751339 or +251 912 228639
email: *entkidmt@yahoo.com* or *wchmar@gmail.com*

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Abstract

Inertia of a body is due to electromagnetic interaction of the body with all matter in the universe. If there is coil B nearby a current carrying coil A whose current is varying with time, voltage and current will be induced in coil B, whose magnetic field will in turn act on coil A, creating a back EMF in coil A, resisting changes in current in coil A. Inertia is fundamentally the *same* phenomenon. Inertial mass of a body varies with the distance of the body from celestial objects. Inertial mass also varies with absolute velocity. This theory may resolve some long standing mysteries in physics.

Introduction

Despite all claimed advance of modern physics, many mysteries remain unresolved. One of the long standing mysteries of physics is inertia. Current physics only describes inertia as a reaction to change in the velocity of an object. It cannot explain why physical objects resist change in their state of motion in the first place. Perhaps the only scientist who came close to reveal the mystery of inertia was Ernst Mach. Mach proposed that inertia is a result of interaction of an object with all matter in the universe. However, physicists didn't pursue Mach's line of thought and abandoned it in favor of Einstein's theory of relativity. But even Mach's idea was incomplete because it didn't reveal what the nature or mechanism of that interaction was.

Another mystery of physics is the rotation of planets and stars on their own axis. Mainstream physics has no convincing explanation on the origin of planetary rotation. It is thought that planetary rotation is a result of an initial angular velocity imparted at some time in the past and the planets continued rotation due to inertia, which is not a satisfactory explanation at all.

Einstein's theories of relativity predict gravitational and kinematic time-dilation effects. Apparently, these effects have been observed in GPS system, Hafele-Keating experiment, muon 'time-dilation' experiment and the Shapiro-delay experiment. If these effects really exist, they need an explanation. The problem is that mainstream physics claims that these effects have been observed with a high level of precision as predicted by Special and General theories of relativity. The theory of relativity has been disproved in many ways, logically and experimentally[1]. If relativity is wrong, then how can it predict ‘time-dilation’ effects with high precision? Moreover,

it is not time itself that is dilated or contracted (whatever that means), it is the rate of the physical processes that changes with speed and in a gravitational field.

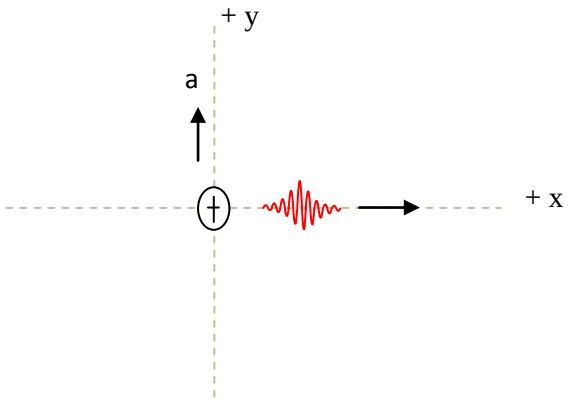
This paper proposes a new theory that connects these seemingly unrelated phenomena: inertia, radiation reaction, planetary spin and 'time-dilation' effects. In my previous paper [1][2], I have proposed an explanation of inertia. This paper presents a more precise explanation.

The new theory proposed in this paper was developed in an attempt to understand 'time-dilation' effects according to my previous theory of inertia [1][2].

Inertia as radiation-reaction

In my previous papers [1][2], I proposed that inertia is nothing but radiation reaction. When a physical body accelerates, it will radiate electromagnetic energy and its inertia is nothing but the associated electromagnetic radiation reaction.

However, some problems remained unsolved. One is as follows. We know that an accelerating charge radiates photons in a plane perpendicular to the direction of its acceleration, not along the line of acceleration.



If radiation reaction was strictly caused by the emission of the photon, then its direction would be in the -x direction, because the photon was emitted in the +x direction. Conventionally, if a particle with mass is thrown it the +x direction, then the reaction force will be in the -x direction, according to Newton's third law. In the case of photon emission, however, the accelerating force is in the direction of the +y direction, where as the radiation reaction would be in the -x direction, which violates Newton's third law. This shows the view that photons have momentum is wrong.

Therefore, the idea I proposed earlier [1][2] that inertia is radiation reaction is not precise and should be improved (not discarded) because, nevertheless, it is a compelling idea.

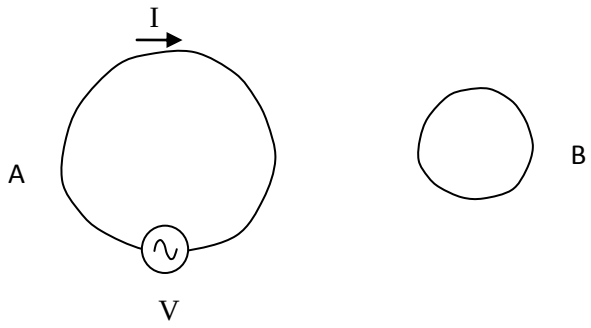
The other problem regards the mechanism of radiation reaction of an accelerating electron, in the framework of conventional knowledge. How can an electron resist its own acceleration? In mainstream physics this is known as interaction of an electron with its own field, which does not sound logical at all. I tried to understand the mechanism by which an electron resists its own acceleration by applying Apparent Source Theory (AST) [1], but I did not get a satisfactory explanation.

It was when I was trying to explain gravitational 'time-dilation' that I found a more precise explanation of inertia. The improved theory turns out to be in line with Mach's principle. Mach's principle states that inertia of a body is a result of interaction of the body with all matter in the universe. However, Mach's principle does not reveal what the nature of that interaction is.

Inertia and electrical inductance are fundamentally the same phenomenon

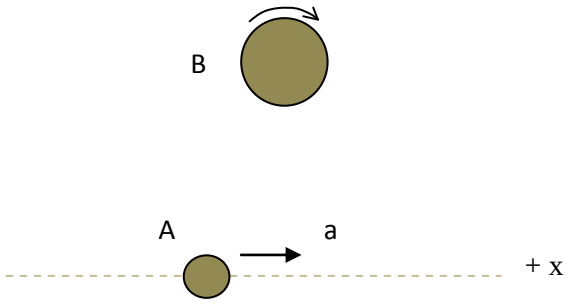
It has been shown above that my previous theory that inertia is electromagnetic radiation reaction is not strictly correct, but not wrong. The improved theory is as follows.

Consider a current carrying coil A and another coil B nearby, as follows.



We know that a DC current in the first coil (A) will have no effect on the second coil(B). However, if the current in the first coil is varying with time, a time varying magnetic field will be created, which will produce voltage and current in the second coil. The current in the second coil will, in turn, create back EMF on the first coil, thereby *reacting to (opposing) the change in current in the first coil*.

It is proposed here that inertia of a body is fundamentally the same phenomena as electrical mutual inductance. Imagine a universe in which only two steel balls, A and B, exist. One of the balls (A) is moving in the direction of +x direction relative to the other ball (B), as shown below.



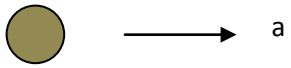
Suppose that ball A is accelerating in the +x direction. Each charged particle in ball A will create a time varying magnetic field, which will create a time varying electric field at the location of ball B. This will cause time varying spin of all charged particles in ball B, analogous to the induced current in coil B above. The combined spin of all charged particles in ball B will result in rotation of ball B about its own axis which is perpendicular to the page, as shown. Just as the induced current in coil B created a reactive EMF in coil A, the induced time varying spin of charged particles in ball B create a reactive force on ball A, *resisting its acceleration*.

But, even if ball A is moving with constant velocity, there will be a continuous change of distance between balls A and B, hence a continuous change of magnetic field at the location of ball B, which in turn will create a counter EMF on ball A, resisting its motion. This is a new result because conventionally we know that inertia is resistance to change in velocity, not a resistance to velocity itself. Therefore, according to the new theory, inertia is resistance not only to change in velocity, but also to velocity. Conventionally, inertial force is created when a body is accelerated. With the new theory, inertial force always exists when an object is in *absolute* motion. Inertial force completely disappears only when a body is at absolute rest. However, the inertial force at constant velocity may be much less than the inertial force due to acceleration.

Clearly, the above theory is not correct conventionally because the effect of all positive charges and all negative charges of ball A on particles of ball B will cancel out. I have already proposed[1] that gravity is a net electrostatic force, i.e. the attractive force of opposite charges is slightly greater than the repulsive force of similar charges. Similarly, the interaction between opposite charges of ball A and ball B (between positive charges of ball A and negative charges of ball B, and, between negative charges of ball A and positive charges of ball B) is slightly greater than the interaction between similar charges of ball A and ball B (between positive charges of ball A and positive charges of ball B, and, between negative charges of ball A and negative charges of ball B). Therefore, ball A will feel a *net* reaction force from ball B and this is the inertia of ball A. This means that inertia of ball A is caused by ball B.

In the above hypothetical universe, we assumed only the two balls existing in the universe. In our real universe in which billions of stars and other celestial bodies exist, the inertia of a body is caused by the counter EMF on the body due to all matter in the universe.

Consider an object accelerating in our real universe.



Due to the *absolute* motion of the object, the charged particles of the object will create magnetic field. If the object moves with constant velocity, there will be no changing magnetic field of one particle seen by other particles of the object. When the body accelerates, however, each particle will see a changing magnetic field of other particles. The changing magnetic field of one particle creates a spin of the other particle, according to the new theory. The collective spins of the elementary charged particles result in spin of the object. Therefore, an accelerating object will spin about an axis perpendicular to the direction of acceleration, in this case out of the page (or into the page ?). The direction of the induced angular momentum (into the page or out of the page) will be determined by which of the two effects is greater: interaction between similar charges or interaction between opposite charges. I guess that the interaction between opposite charges is slightly stronger than the interaction between similar charges, just like in the case of gravity. In fact, we can call this effect ‘rotational gravity’.

This theory solves both problems described previously. If only a single electron existed in the universe, then it would have zero inertia. Strictly speaking, self inductance does not exist. Only mutual inductance exists. An electron cannot logically interact with its own field. The inertia of an electron is only due to its interaction with other objects in the universe, not due to interaction with its own field.

Inertia is not strictly radiation reaction, because of the problem described already. A more precise theory is that inertia and radiation reaction always accompany acceleration. Inertia is a *net* electromagnetic counter EMF caused by all matter in the universe on an accelerating body. ‘*Net* ‘ refers to the difference between the interaction between opposite charges and the interaction between similar charges.

The new theory can also explain 'time-dilation' effects.

Both velocity and acceleration are relative to matter in the universe.
Absolute velocity is velocity relative to all matter in the universe.
Absolute acceleration is rate of change of absolute velocity.

Consider a hypothetical universe in which only the Sun and a small steel ball of mass 1Kg exist. In my previous papers[1], I have proposed that the *absolute* velocity of the steel ball is the same as its velocity *relative* to the Sun. If the ball and the Sun are moving relative to each other, the Sun's absolute velocity is almost zero, but the ball's absolute velocity is equal to its velocity relative to the Sun. The absolute velocity of a body is determined by its velocity relative to another body and by the mass of the other body[1].

Therefore, absolute velocity is velocity relative to all matter in the universe[1]. Absolute acceleration is the rate of change of absolute velocity.

In the hypothetical universe with only two steel balls discussed above, it is not only ball A that is accelerating, ball B is also accelerating. This is because ball A is accelerating relative to ball B. Therefore, ball B should also be accelerating relative to ball A. This does not mean that the two balls have equal absolute velocities and absolute accelerations. Absolute velocity and absolute acceleration of each ball depends on the relative masses of the two balls[1].

Therefore, absolute velocity and absolute acceleration arise from relative motion of the two balls.

' Time-dilation' effects

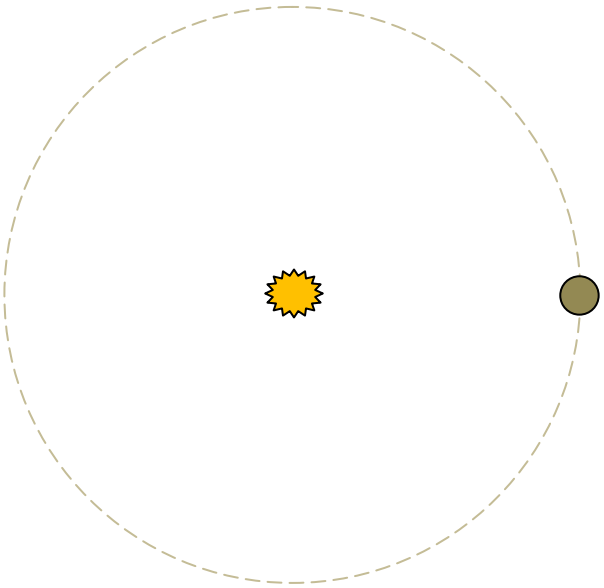
The new theory explains ' time-dilation' effects qualitatively as follows. Gravitational time-dilation effect is caused by the change in mass of atoms (electrons and nucleus) of the atomic clocks with distance from Earth, in the same way that the distance between the two coils above determines the strength of their interaction. For atomic clocks on the Earth's surface, the interaction of the Cesium atoms with the Earth is strong and hence the mass of Cesium atoms will be larger than when the atomic clock is at high altitude. The change of inertial mass of the electron and the nucleus will change the emission lines of the atoms.

The cause of kinematic time-dilation effect is change in mass of Cesium atoms with velocity of the atomic clock. I have already proposed that mass increases with increase of *absolute* velocity[1].

Planetary rotation

What is the origin of planetary spin?

The new theory also sheds light on the mystery of planetary spin. Consider the Earth in its orbit around the Sun.



The Earth in its orbit around the Sun is continuously accelerating towards the Sun, which will cause Earth's rotation. As already explained, all the charged particles of the Earth will produce changing magnetic fields, due to their acceleration. The changing magnetic field of one particle will make the other particles spin. The spin of all the particles will result in spin of the Earth. As already stated, the axis of spin is perpendicular to the direction of acceleration, in this case out of the page (or into the page ?).

Conclusion

It has been proposed in this paper that inertia of a body is a result of its electromagnetic interaction with all matter in the universe. This paper and my previous papers [1][2][3] reduce all physical laws of the universe to electromagnetism.

Thanks to God and His Mother, Our Lady Saint Virgin Mary

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