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REVIEW | THEORETICAL PHYSICS

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## BIBLIOGRAPHY

He has studied and taught the Physics of Matter and Mathematics for over twelve years. He is also interested in other areas of Physics connected with Astronomy and Dark Matter. He is an Electronics and Communications Engineer by profession and was worked in various fields of engineering including, Reliability Modelling, Radiation Testing, microcontrollers, Product Development and Environmental Testing.

# The True Nature of Matter

## (A new theory about the atomic structure of the electron and Dark Matter)

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# Abstract

This paper puts forward a new theoretical model for the Real Electron and postulates where Dark Matter is located and why it has remained hidden from view.

The mysterious electron is postulated to comprise of three parts. Two are identical and have the properties that we associate with a normal electron as it is known today. The third part though is a very exotic particle from the Dark Matter realm that has been called a Dark Matter Electron. The Dark Matter Electron is a positively charged electron but with a negative mass equal in magnitude to a classical electron. This is equivalent to a Positron with negative mass. Thus, the overall mass and charge of the new Real Electron remain unchanged. The existence of a new family of Dark Matter particles is then discussed. One example considered in this paper is a Dark Matter Real Electron containing two Dark Matter Electrons and one Normal Electron. Such a Dark Matter Real Electron thus has an overall negative mass. The gravitational attractions and gravitational repulsions between two Real Electrons are considered and these suggest an increased overall gravitational attraction between the two of six times. In a similar comparison, the net gravitational attraction between a Real Electron and a Dark Matter Real Electron is shown to be zero. The overall mass of the universe is thus postulated to equal zero, which may help to explain the existence of the universe. The concept of another family of negative mass atomic particles is also considered. Finally, explanations of Electron Spin and Young's Slit Experiment are considered.
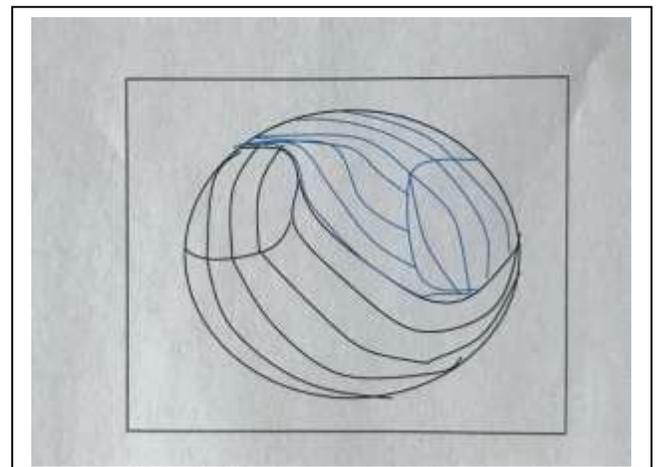
The possible shape of a Real Electron, showing two of its three parts: A Classical Electron and a Dark Matter Electron. The third part is a second Classical electron. Essentially this would appear as three tadpole shapes nesting together in a roughly three-dimensional oblate spherical form.

# 1 Introduction

Have you ever wondered why the current theory of an electron is so hard to grasp? For instance, is it a wave or is it a particle? And what is a 'hole' (that place where we have a 'missing' electron) in a semiconductor? An imaginary positive particle that does not exist, or that is what we are asked to accept. What is the size of an electron? No one knows for sure. The size of an electron is said to be about 2.82 x 10-15 m, but is this only an approximation for it has yet to be measured, although no spatial structure has been detected down to 10-18m, [1].

When reading articles on particle physics one does become suspicious as the theories presented are twisted and turned to fit special cases.

Add to this conundrum the riddle of Dark Matter. Dark Matter was thought to make up the 'missing' two thirds of the mass of the Universe. But despite over twenty years of searching for it no one has ever knowingly seen it, and some physicists are more confused by this than they might wish to say. However measurements have been made and Astrophysicists today say that the ratio of Dark Matter to Matter is 6:1, according to the observed gravitational attraction between distant galaxies.

All models are useful but there are times when a new model may be needed. This is a new model of what a Real Electron is. So, like the early scientists trying to figure out what was wrong with their model of the early solar system, with the Earth at the center and those circular orbits of the planets, it is probably time to stop and reflect upon the problem.

One new atomic particle is introduced called the 'Dark Matter Electron' along with the new concept of 'negative mass sub atomic particles'. (Indeed a whole new set of dark matter sub atomic particles is thus introduced.)

Along with the Real Electron another new atomic particle is introduced called the Dark Matter Real Electron, together with a whole new set of Dark Matter atomic particles.

The idea of negative mass helps to solve the problem of energy balance in the universe, allowing the creation of matter from nothing at the start of the Universe. It does make more sense if the total mass in the Universe equals zero.

# 2 Background

What are some of the properties we know about the classical electron? Our basic understanding of a classical electron includes the following points: It orbits the atom's nucleus. Electron spin is described in half integers of Plank's constant, [1]. An electron is thus a 'fermion' family member. (These have spins of ½, 3/2, 5/2 etc.) It is negatively charged, [3]. The charge of an electron is 1.6021766208 x 10-19 Coulombs, [3].The Coulomb is a unit of electric charge in the SI system of physical units. It is abbreviated as C. The coulomb is defined as the quantity of electricity transported in one second by a current of one ampere. Named after the 18th–19th-century French physicist Charles-Augustin de Coulomb, it is approximately equivalent to $6.24 \times 10+18$ electrons, [4].

It travels in a straight line, when free of electric and magnetic fields.

It can break free from a metal's surface if the metal is heated enough or light of a high enough frequency falls upon it.

It produces X rays when it hits a metal target if it is going fast enough. X rays have  wavelengths of 10-9  to 10-15 m and can pass through most materials if they are not too thick.

The mass of an electron is 9.10938356 x 10-31 kg

The size of an electron is estimated to be about 2.82 x 10-15 m −  but it has never been measured.

It can appear as a waveform or as a particle at different times. Some formulas related to classical electrons.

$eV = \frac{1}{2} mv^2$

where

e = charge on an electron

V = potential difference that it passes through

m = mass of an electron

v = velocity of an electron.

$1eV = 1.602 \times 10^{-19}$ Joules, [4].

The energy of a photon of light, $E = h v = \phi + \frac{1}{2}mv^2$

Where h= Planck's constant = $6.62607004 \times 10^{-34}$ J and v = frequency of the light

While $\phi$ = work function.

Here $\frac{1}{2} mv^2$ is the kinetic energy of the electron released after the photon has hit the metal's surface. $\phi$ is the minimum energy required to liberate an electron, which equals $h f_o$ where $f_o$ is the threshold frequency of the incoming light, and h is Planck's constant, [1].

Other related data.

A positron is an antimatter electron with a positive charge and mass $e_m$.

An electron and a positron, whose total charge is zero and whose total mass is $2 m_e$ (twice the mass of an electron) may simultaneously be annihilated. The large energy of the destroyed mass appears mainly as a gamma ray with an energy of $e_m c^2$.

The Positronium is an antielectron (positron) with an electron locked in a semi-stable arrangement.

A Muon is similar to an electron but with a much greater mass equivalent to 207 $e_m$. Its mass may be stated as 105.7 MeV / $c^2$, where c is the speed of light. It can penetrate the Earth to great depths due to its small size, high mass and high energy.

The Muonium (Mu) is an anti-muon, a semi-stable positive muon with an electron. It has a lifetime of 2.2 micro seconds.

Quarks, which are always bound within larger subatomic particles such as protons and neutrons, have charges of 1/3 or 2/3 of the charge on an electron, [1].


# 3 The Three Parts of the Real Electron


The Real Electron is made up of three parts:


Part 1: The "Normal electron".

A classical electron as it is presently known.


Part 2: The Dark Matter electron (New particle.) (e-m)

This is a Positron but with negative mass – which thus cancels the mass and charge elements of 'Part 1'. It has a positive charge equal to e.


Part 3: The second "normal electron."

Identical to 'Part 1', the classical electron as it is presently known, but this is 'nested' with the previous two parts in an oblated, near spherical, arrangement.


Thus the total charge of the Real Electron is indeed e, 1.602 x 10-19 Coulombs, [3] while the total mass of the Real electron = em = 9.10938356 x 10-31 kg. There is thus no change to the present theory here, which is probably, at least in part, how the electron has hidden its true nature for so long.


If a Dark Matter electron meets a normal electron outside of the stable arrangement, then as the masses cancel out there is no energy given off. This is possibly another reason that it has remained undetected for so long.
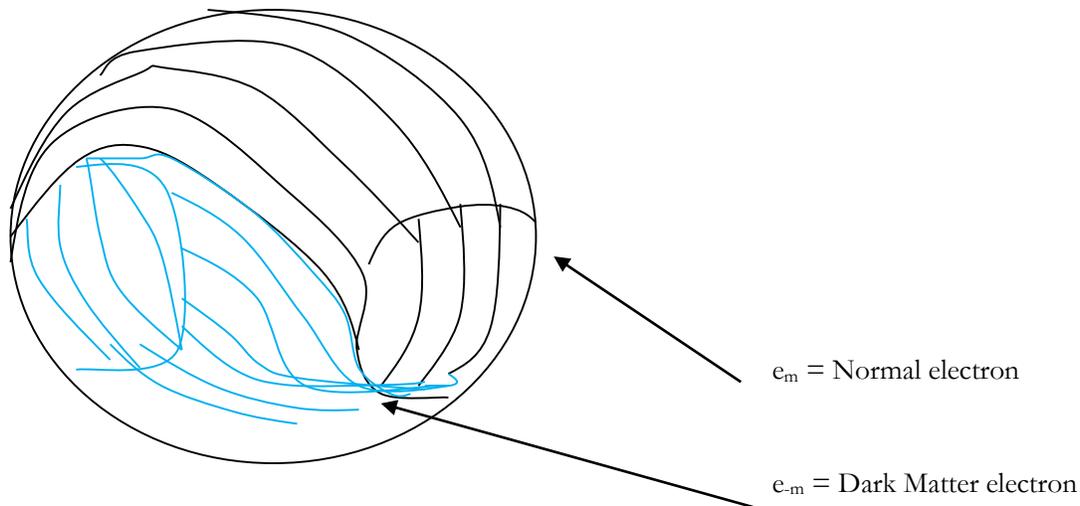


$e_m$ = Normal electron

$e_{-m}$ = Dark Matter electron

**Figure 1** | The possible shape of a Real Electron, showing two of its three parts


Essentially this would appear as three tadpole shapes nesting together in a roughly three dimensional oblated spherical form. The third tadpole shape is out of sight on the far side of the sphere. This is the second normal

electron which does not touch the other normal electron as like charges repel. There is thus probably an open curved slot in the sphere on the far side between the two normal electrons.

The two normal negative electrons repel each other while equally attracting the single Dark Matter electron thus keeping the Real Electron stable.

## 4. The force of gravity on two Real Electrons due to Matter and Dark Matter

Here we look at the multiples of the forces of gravity, including repulsive gravity, that act on just one Real Electron, but if the whole of an atom were to be considered the concept here may be extended for all the other known particles of atomic and sub atomic physics, by nesting two of them with their own Dark Matter equivalent particle which has a negative mass, equal in magnitude to its normal matter equivalent, but always with an opposite charge.
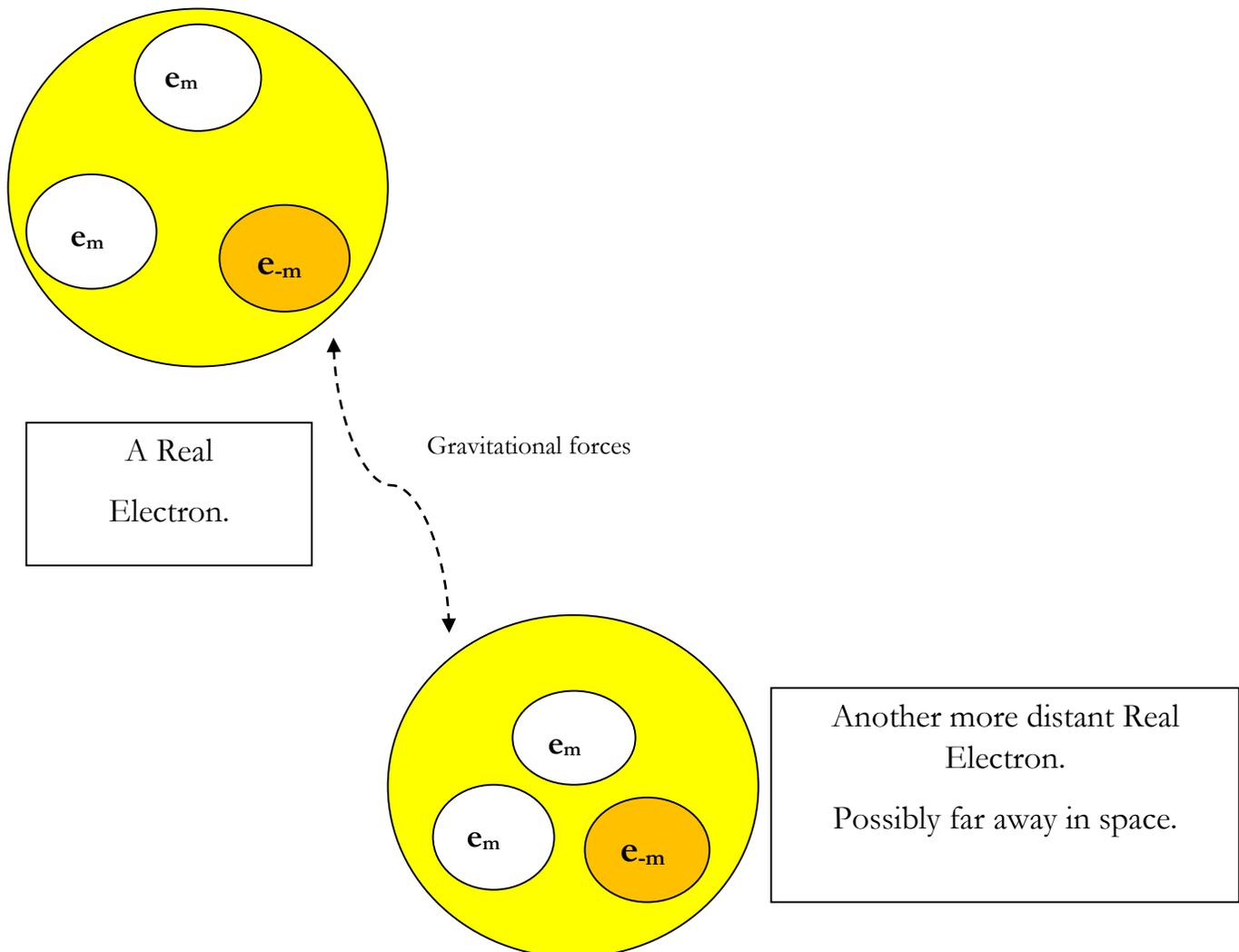


A Real Electron.

Gravitational forces

Another more distant Real Electron.

Possibly far away in space.

**Figure 2** |Two Real Electrons

Here then, the gravitational attraction and repulsive forces between the two particles are as follows:

em to em = Two units of mutual gravitational attraction = 2A

em to e-m = No gravitational attraction = 0

e-m to e-m = Two units of gravitational repulsion = 2R

Where 'A' equals one unit of gravitational attraction, while 'R' equals one unit of gravitational repulsion.  Here  A  = - R

Then, considering the previous diagram, the number of cases of each is as follows, with respect purely to the more distant Real Electron:

em to em : We have four cases = 4 x 2A = 8A

em to e-m : It does not matter how many cases there are here as these are zero.

e-m to e-m : We have one case = 1 x 2R = 2R

Thus the total gravitational force = 8A + 2R = 8A - 2A = 6A

The total force of gravity is thus six times greater than our present theory would suggest, accounting for the apparent six times more dark matter than matter in the Universe which fits the predicted ratio figure of 6:1 that has been anticipated.

## 5. The force of gravity on a distant Real Electron due to Another Real Electron and one Dark Matter Real Electron containing two Dark Matter Electrons

Here again we look at the multiples of the forces of gravity, including repulsive gravity, that act on just one Real Electron, but this time we consider what would happen if another new particle, a Dark Matter Real Electron was present as well. This new particle is postulated to have two Dark Matter Electrons and one Normal Electron. Would this upset the gravity calculation? If the Real Electron exists it is highly probable that this particle could also exist, [2]. Whether it is near the local Real Electron or the distant Real Electron makes no fundamental difference to the calculation.
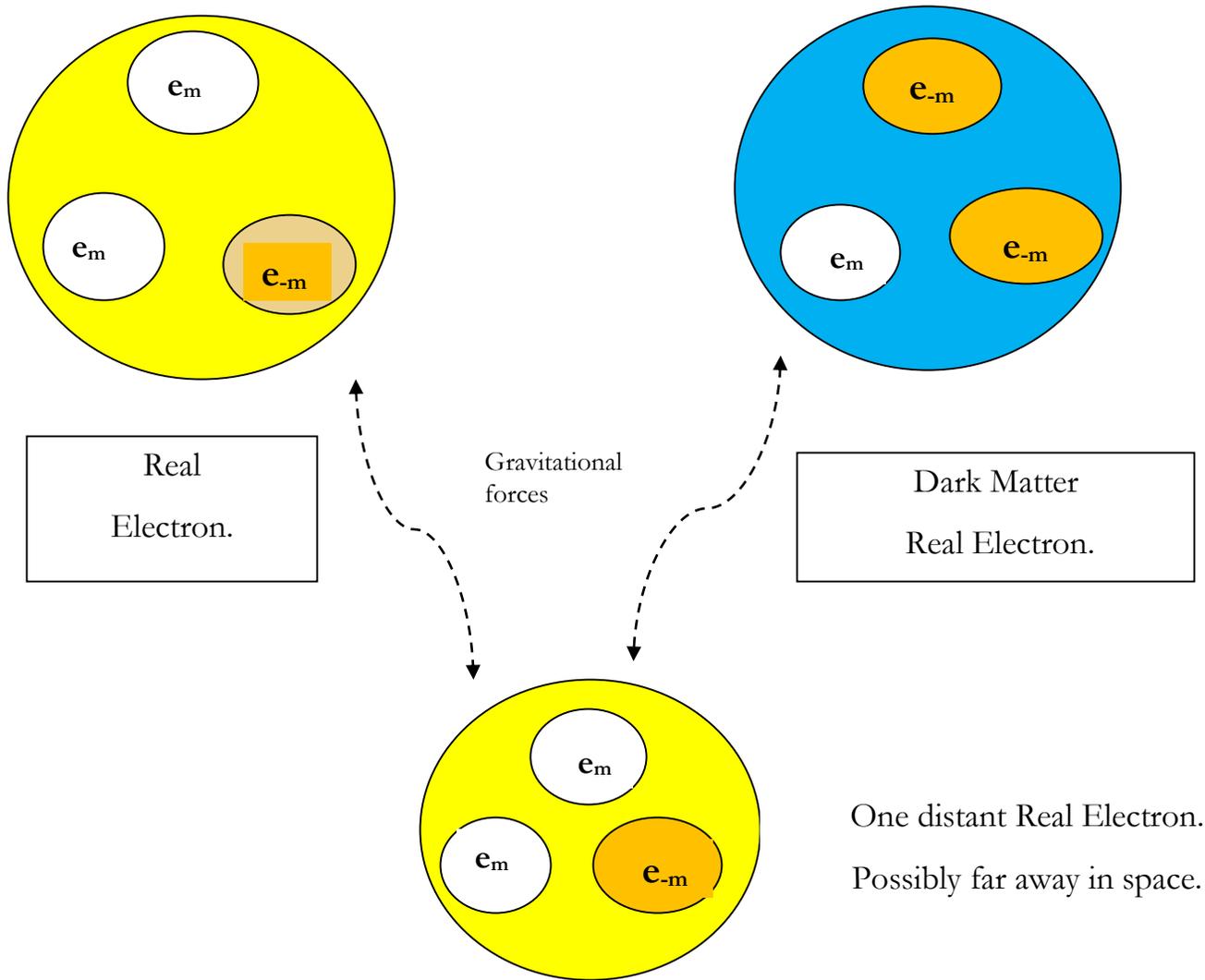


Real

Electron.

Gravitational forces

Dark Matter

Real Electron.

One distant Real Electron.

Possibly far away in space.

**Figure 3** |Two Real Electrons and a Dark Matter Real Electron model to illustrate the gravitational forces at work

Here then the gravitational attraction and repulsive forces between any two particles is as follows:

em to em = Two units of mutual gravitational attraction = 2A

em to e-m = No gravitational attraction = 0

e-m to e-m = Two units of gravitational repulsion = 2R

where again A = - R

Then, considering the previous diagram, the number of cases of each is as follows, with respect purely to the more distant real Electron:

em to em : We have six cases = 6 x 2A = 12A

em to e-m : It does not matter how many cases there are here as these are zero.

e-m to e-m : We have three cases = 3 x 2R = 6R


Thus the total gravitational force = 12A + 6R = 12A - 6A = 6A

The total force of gravity is thus again six times greater than our present theory would suggest, accounting for the apparent six times more dark matter than matter in the Universe which fits the predicted ratio figure of 6:1 that has been anticipated.

The reason for this is that the net gravitational attraction between a Dark Matter Real Electron and a Real Electron is zero. This is because between the two of them:

em to em : We have two cases = 2 x 2A = 4A

em to e-m : It does not matter how many cases there are here as these are zero.

e-m to e-m : We have two cases = 2 x 2R = 4R

Thus the total gravitational force = 4A + 4R = 4A - 4A = 0.

# 6. Young's Slit Experiment

This model of a Real Electron also helps to explain Young's slit experiment, where the electron can appear as a wave when there is only one electron involved. (Although this experiment does require a large number of electrons to pass through the plate for this effect to be detected.) An interference pattern is formed on a screen behind a plate with two slits in it, suggesting that an electron is a wave. Here the Real Electrons have been fired against the metal plate with the two identical slits in it and yet still produce a wave pattern on the screen on the other side of the plate, [5].
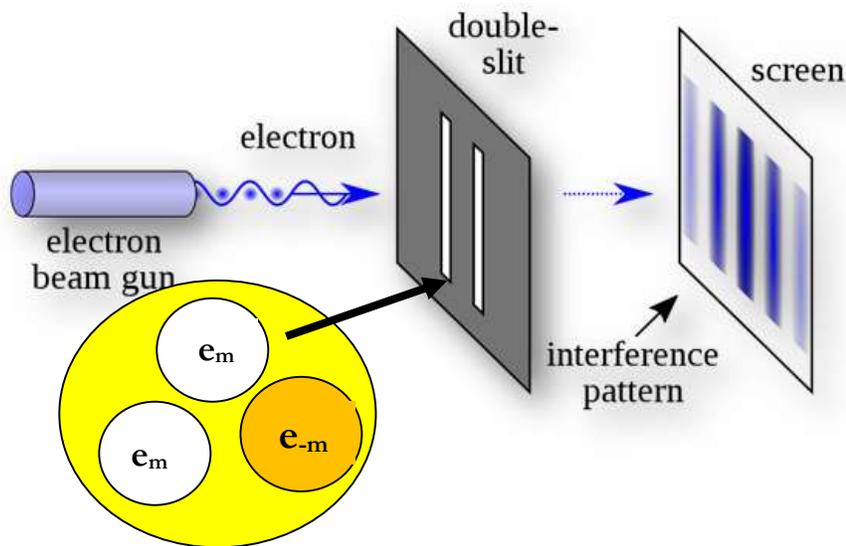
**Figure 4 |** Young's Slit Experiment, [5].

What has probably happened here is that a normal electron from the surface of the metal plate and a Dark Matter electron from the impinging Real Electron with its negative mass have annihilated each other during the collision.

Although no energy was released by this, the triboluminesence, the light given off by two electrons splitting apart, moves through the two slits and thus forms the classic interference pattern on the screen on the other side of the plate.

## 7.  The Gravitational Attraction between the Moon and the Earth

One point that might arise with this theory of a Real Electron is that should the forces of gravity between the Earth and the Moon be six times stronger than had been thought?  This is not the case as the masses involved have not been changed by the theory presented here.  They remain the same, just as the actual masses of the distant observered galaxies remain unchanged. The force of gravity calculated between the Earth and the Moon already included these new forces, where as the force of gravity calculated to exist between the galaxies did not.

What has increased is the force of gravity that these particles now exact on one another. The force of gravity between the Earth and the Moon has been calculated from local data, while the force of gravity amongst the stars and the galaxies has had to be calculated by extrapolation of our local data. The forces that have been measured locally already include all the forces of gravitational attraction and repulsion postulated here.

## 8.  Electron Spin

When a silver atom which has just one electron in its outer shell passes through a non-uniform magnetic field (Stern – Gerlach experiment, 1921) so that the inner 46 electrons shield the single outer electron from the nucleus we can see how the electron reacts to a magnetic field. Half of the atoms (electrons) were deflected up a certain amount and half are deflected down by the same amount. Four years later the idea of a spinning electron, and the term 'spin, were developed, [6]. One model of electron spin today states that it needs to rotate twice, or by 720 degrees, to return to its

original spin state of $-\frac{1}{2}$ or $+\frac{1}{2}$. The reason for this could be as follows. Once a Real Electron has rotated once (360 degrees) it flips upside down, so it then needs another rotation, in the same direction as it was rotating before, after which it again flips upside down, so returning to its original state; h equals Planck's constant:
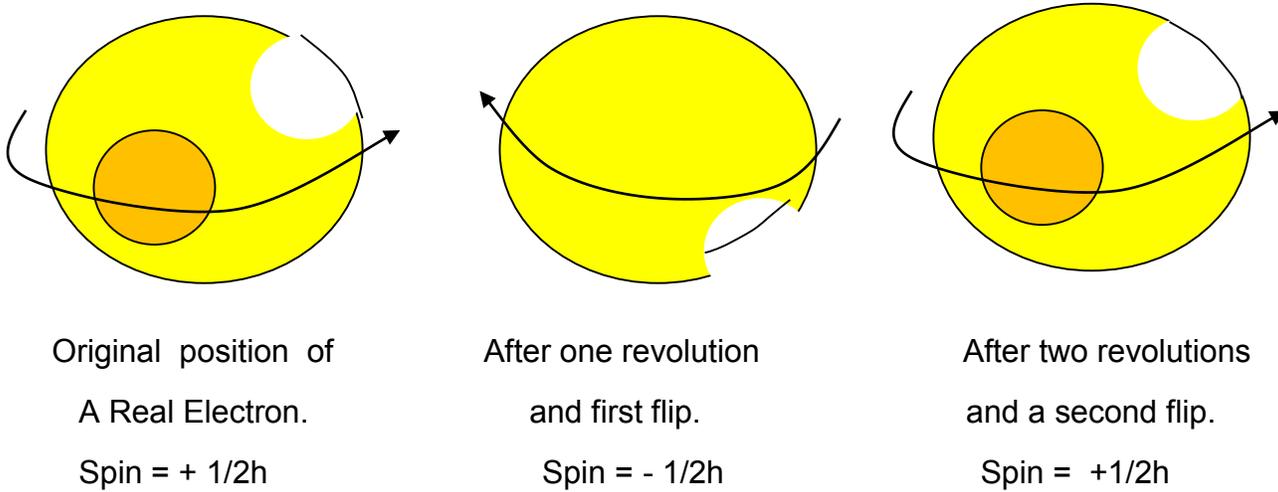
Original position of
A Real Electron.
Spin = + 1/2h

After one revolution
and first flip.
Spin = - 1/2h

After two revolutions
and a second flip.
Spin =  +1/2h

**Figure 5** | Electron Spin Diagram.

One may well ask why should it flip upside down? With a positive component now included within a Real Electron this could occur when it meets a corresponding positive component in another Real Electron, like charges repel, and so it flips over. In free space, this would not happen and so it remains as it is in its current spin state.

Alternatively, it could be that sometimes a Real Electron rotates simultaneously about two perpendicular axis. If the two rotation periods were the same then the same effect would be seen, as shown below:
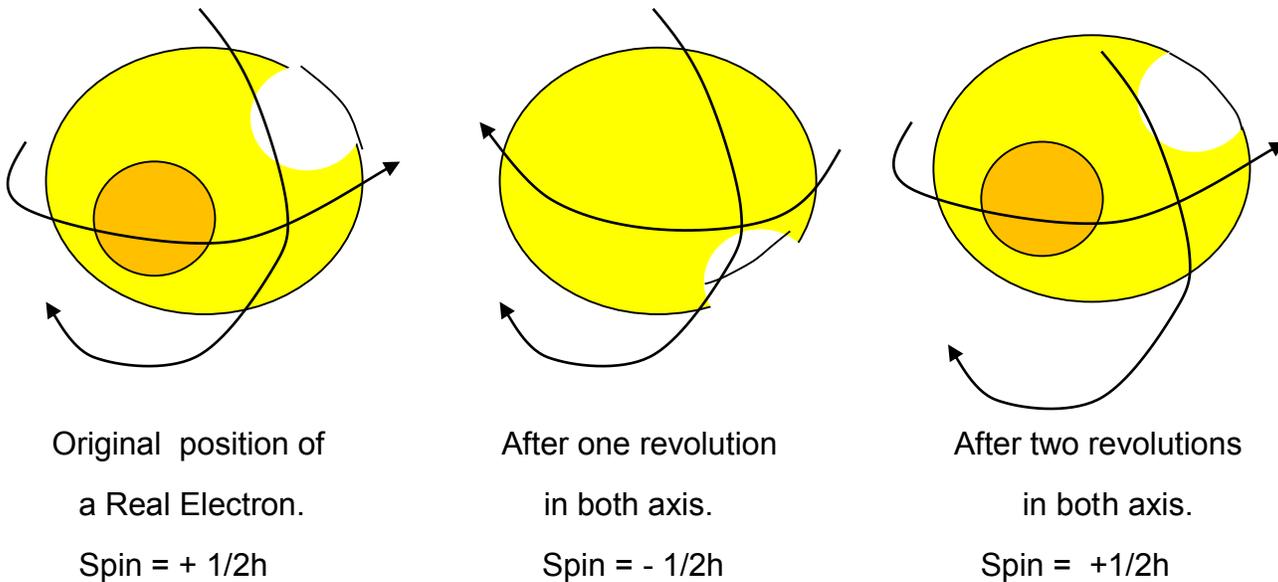
Original position of
a Real Electron.
Spin = + 1/2h

After one revolution
in both axis.
Spin = - 1/2h

After two revolutions
in both axis.
Spin =  +1/2h

**Figure 6** | Electron Spin Diagram with continuous rotation about two perpendicular axis at the same rate.

It may well be that both forms of rotation exist under different circumstances.
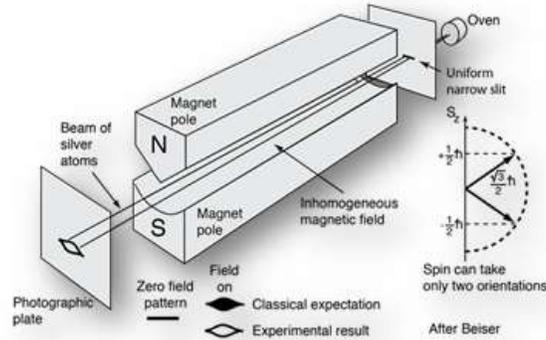
**Figure 7 | The** Stern–Gerlach experiment. [6]

# Conclusion

In conclusion, it is hoped that these new models of matter will assist in future developments. While only the Electron has been used here as an example, mathematically the same principles can be applied to most atomic and some of the subatomic particles, hopefully bringing into focus two families of particles. One family of (known) atomic particles containing a 'single negative mass subatomic particle' with an overall positive mass and the second family of Dark Matter atomic particles containing two 'negative mass subatomic particles' which thus have an overall negative mass.

The Electron is considered not to be a single entity but to have three parts. Two Normal Electrons and one negative mass positively charged Dark Matter Electron, all nested together in an oblate spheroid form. This is put forward as a speculative model although of course, no one has ever seen an electron despite many attempts to do so. Another form of the Real Electron could be a negative mass Dark Matter Electron, which is 'stationary', sandwiched between two Normal Electrons, which rotate around it. A third model would be all three particles rotating together about a common center of gravity. The idea of the electron being considered as a waveform has only been touched on in this paper, but the possible rotating nature of the Real Electron (Spinning simultaneously about two axes) have been described and lends itself to this idea.

The gravitational attraction between two Real Electrons and between a Real Electron and a Dark Matter Real Electron has been considered in this paper and shown that while the gravitational attraction between a Real Electron and a Dark Matter Real Electron is zero, the gravitational attraction between a Real Electron and another Real Electron, be it far away in deep space would be six times greater than might otherwise be expected. The amount of missing matter in the Universe termed Dark Matter, has been calculated to be six times greater than the mass of all the known matter in the Universe, correlates with this paper's results.

Dark Matter is thus considered as a matter with a negative mass, which resides in all atoms and molecules, together with double the amount of normal matter, which resides with it and in effect cancels out the properties of the Dark Matter. Dark Matter was extremely well named, for by its nature it avoids detection.

The new concept of atomic particles and subatomic particles with negative mass opens a doorway that may lead to the 'holy grail' of anti-gravity. It should perhaps be mentioned that the author came to write this paper not out of a desire to discover the true nature of an electron, but while considering the idea of an anti-gravity device. The theories and design of such a device did not fit together well using standard theories. Such a device, if ever made to function, would, of course, reduce fuel usage by airlines reducing travelling costs and greatly reduce global carbon emissions.

The complexity of theories regarding the electron may be assisted by this paper. For example, Young's slit experiment and the Stern-Gerlach experiment outcomes may be explained using these new theories. The Stern-Gerlach experiment relates to electron spin which is a much-discussed topic. Here electron spin is considered in terms of not just one dimension but in terms of two dimensions. Two spin axes at right angles to each other can be shown to produce the desired results although two separate mechanisms for this are considered to exist independently.

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