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Fine structure constant solved and new relativity equations– Based on McMahon field theory.

Abstract: The Original McMahon field theory was developed and written over a period of almost 14 years, between the 31st of December 1996 and the 20th February, 2010. As time goes on, I am constantly coming up with more data to add to it- data that explains observations made in the real world. In the paper **McMahon, C.R. (2012)** *"Calculating the true rest mass of an electron – Based on McMahon field theory"*, I found that the rest mass I calculated for a free stationary electron is much smaller than the currently accepted conventional mass of an electron (which is bound in an atom, moving at high speeds hence has a higher mass due to relativity). In fact, the difference was a factor equal to precisely $0.5(\alpha^2)$, or half the value of the fine structure constant squared. The fine structure constant is therefore part of a factor to convert electron rest (stationary) mass to the electron mass observed in an atom due to the effects of relativity. It also has within it a factor that prevents a particle from reaching infinite mass as it approaches the speed of light. This paper shows that the physical definition of the fine structure constant is that it is a factor representing the degree of coiling due to relativity. Since it's a factor, it has no units. When $\alpha = (2^{1/2})$, no coiling is present. As the α factor decreases in value, the degree of coiling increases.

Theory:

Special relativity applies to particles or masses moving close to the speed of light, which is the case for electrons moving as electrical current in a wire, as shown in the paper: **McMahon, C.R. (2015)** *"Electron velocity through a conductor*". Thus, special relativity applies to such particles, which allows us to observe special relativity in the real world as the magnetic field. Thus, through the magnetic field, McMahon field theory explains that particles moving near the speed of light appear as energy fields.

First, allow me to present a new understanding of energy, as already presented in McMahon field theory: Theoretical unification of relativity and quantum physics, thus methods to generate gravity and time. (2010).

This theory begins explaining the nature of light using an example of electrons moving through an electrical wire. Since the velocity of these electrons can be considered as at or near the speed of light, we can assume that they are affected by both time dilation and length contraction, effects predicted by Albert Einstein's famous theory of relativity.

Let's perform a thought experiment: Let's imagine a stretched out spring. Let the straight stretched out spring represent the path of electrons moving in an electrical wire. Now, since length contraction occurs because of relativity, the electron path is affected. As a result, the straight line path of the electron is compressed. This is the same as allowing a spring to begin to recoil. As a result, the straight line path of the electron begins to become coiled. I call this primary coiling. This is the effect length contraction has on mass as is approaches the speed of light and is dilated by length contraction. When a particle such as an electron reaches the speed of light, it becomes fully coiled or fully compressed, and Einsteins length contraction and time dilation equations become equal to zero and "undefined". This particle, now moves as a circle at the speed of light in the same direction it was before. If this particle tries to move faster still, it experiences secondary coiling. Ie: the coil coils upon itself, becoming a secondary coil. This is why energy is observed on an Oscilloscope as waves: we are simply looking at a side on view of what are actually 3-dimentional coiled coils or secondary coils. Waves are not simply 2 dimensional; rather, they are 3 dimensional secondary coils. It was easy for scientists of the past to assume waves were 2 dimensional in nature, as the dimensional calculations and drawings for relativity were carried out on flat pieces of paper which are also 2-dimentional. The human imagination, however, is able to perform calculations in multiple dimensions. Now, let’s consider the effect of time dilation.

When an electron approaches the speed of light, according to relativity, it undergoes time dilation. What does this actually mean? I believe this is the effect: time dilation allows a body, particle or mass- in combination with the effects of length contraction, to exist in multiple places at the same time. This is why we observe magnetic flux. Electricity is composed of high speed electrons, so these electrons would be affected by time dilation and length contraction. As a result, the electron is both inside the electrical wire, and orbiting around the wire as magnetic flux (because of full primary coiling at the speed of light). Magnetic flux is the combined effect of length contraction and time dilation on the electron. The coiling effect is why electrical wires carrying electricity exhibit magnetic fields- the electron path is compressed into coils, and time dilation permits the electron to occupy multiple positions at the same time, which is why magnetic flux is detected as coils at different distances from the electrical wire. Please refer to figure 1 on the following page.

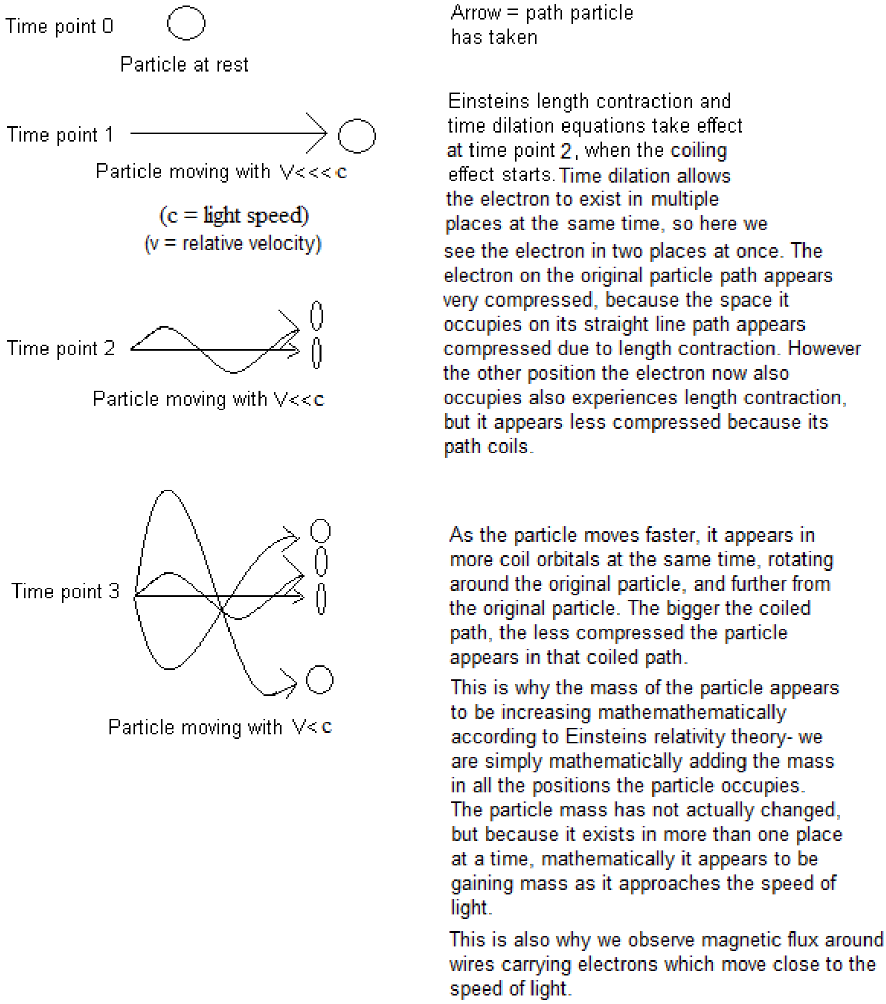

Figure 1: particle relativity- Taken from the McMahon field theory (2010): What we observe as relative stationary observers of a particle as it travels faster.

However- the McMahon field theory goes on to explain much more, including the electromagnetic spectrum- hence light, which I will briefly cover now. Refer to figure 2 below:

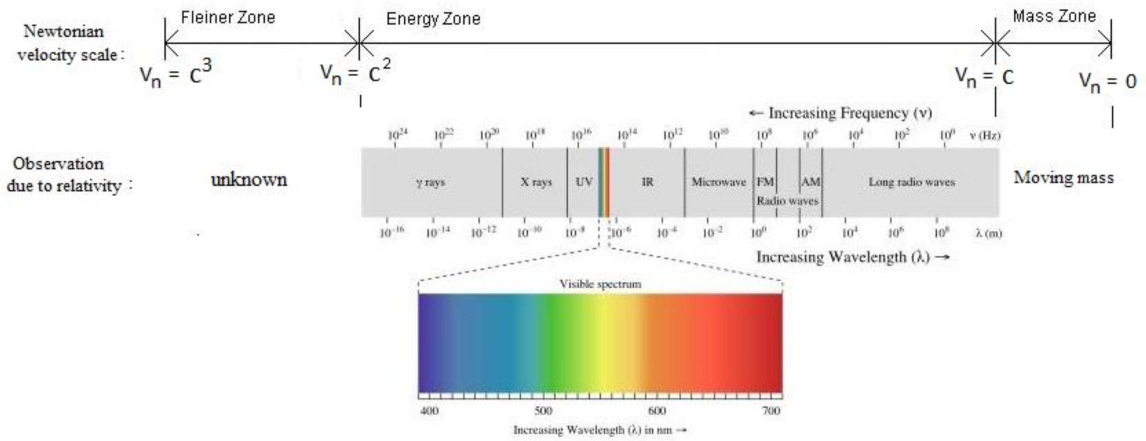

Figure 2: How an electron is observed at different Newtonian speeds: modified from the McMahon field theory (2010): Here, we see that as an electron moves with increasing speed according to Newtonian physics (although the speed we observe is dilated back to that of light because of relativity as in figure 4) and becomes a coil because of relativity, as the electron speed is increasingly dilated back to light it is observed as different types of energy. This is because the electron becomes more coiled (more velocity dilation) as it tries to move faster, so we say that the frequency increases and wavelength decreases. In this diagram, let the value of true, un-dilated Newtonian velocity due to relativity be Vn as in figure 4, and let the velocity of light be equal to c. I believe that electrons are on the boarder of mass and energy, so in the diagram above electricity would be at the point where Vn=c. If the electrons in electricity tried to move faster, they would be compressed further into a secondary coil to become long radio waves, then AM radio waves, then FM radio waves, then microwaves, then Infra-red (IR), then X-rays, then y-rays. Hence, the electromagnetic spectrum is nothing more than an electron dilated by different magnitudes of relativity. Other particles, such as protons and neutrons, will also have their own spectrums, which may be different or similar to that of the electron.

From Figure 2, we see that if electricity or electrons in an electrical wire tried to move faster, the electrons path would be compressed further, making it coil upon itself again creating secondary coiling or a coiled coil path. Hence it would be further affected by length contraction. As a result, the electron will be observed as different forms of energy. In the figure above, we see that an electron is considered as mass when it has an undilated velocity or Newtonian velocity between 0 and c. If an electron tries to travel faster than this, it enters the energy zone, where the electron path becomes fully compressed and moves as a full primary coil or circle which undergoes secondary coiling or coils upon itself. A particle moving as energy or a secondary coil has an un-dilated velocity or Newtonian velocity range between c and c^2. In this range, the particle now experiences secondary coiling, so the coil now coils upon itself. Figure 3, taken from the McMahon field theory (2010), also explains what happens if an electron tries to move faster than C^2: The secondary coiled or coiled coil path becomes overly dilated, and the length contraction effect becomes so great that the particle now undergoes tertiary coiling- ie it becomes a coiled coil coil. As a result, because of excess coiling the particle becomes undetectable or unidentifiable. These undetectable states are what are known as dark matter and/or dark energy. See figure 3.

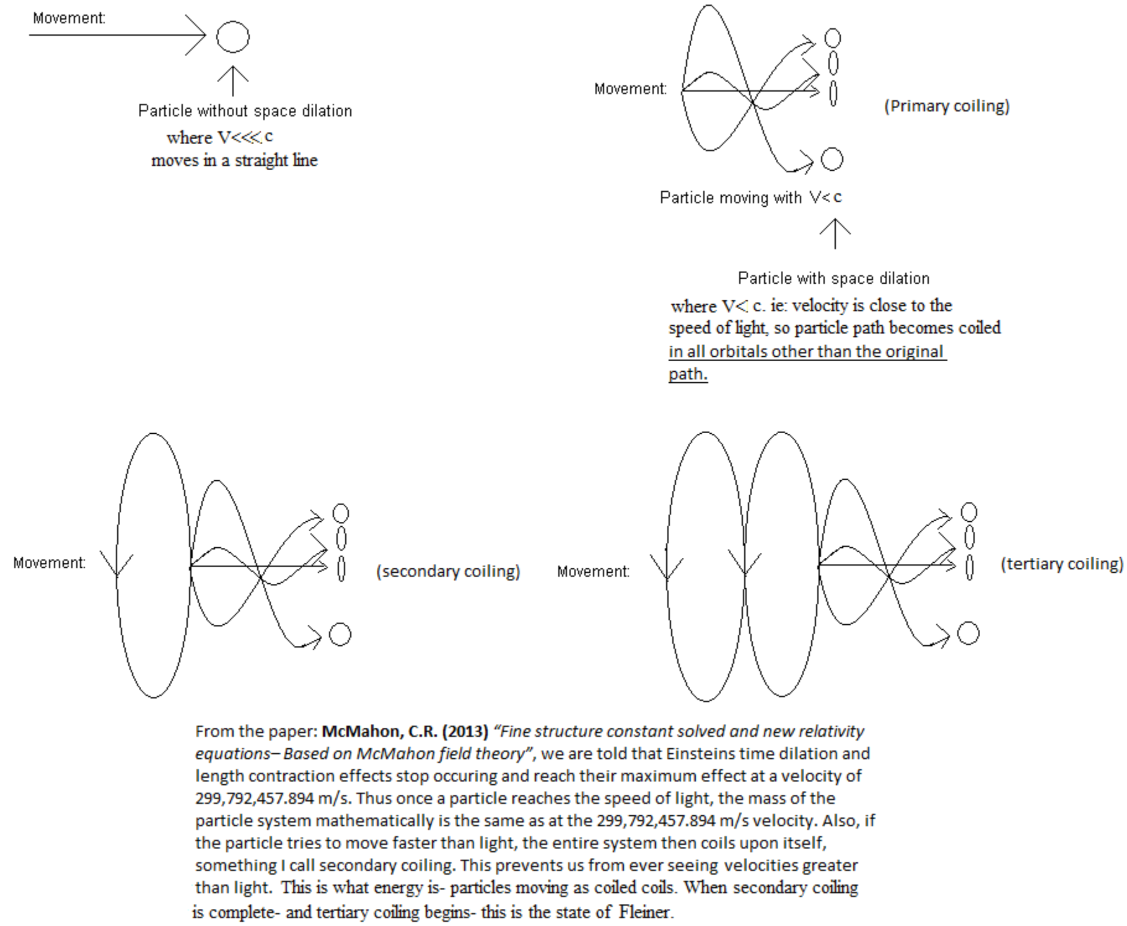

Figure 3: The actual affect Einsteins relativity theory has on the movement of a particle, causing it to first appear as mass during primary coiling, then energy during secondary coiling, and Fleiner during tertiary coiling, during which it becomes dark matter or dark energy. Einstein was unaware of this.

Now, we must consider conventional science of the current day. Conventional oscilloscopes are used for energy only. Therefore, the "waves" we see on oscilloscopes are in fact, the side views of secondary coils and higher degrees of coiling. Once full primary coiling is achieved, the fully compressed primary coil remains as it is, but with more momentum it begins to coil upon itself, which is secondary coiling. Thus, "wavelength" and "frequency" according to the science of this day are measurements from the reference point where a full primary coil forms.

Lets consider McMahon field theory (2010). From the McMahon field theory, we realize that magnetic flux arises due to the length contraction and time dilation of the electron. We observe this flux differently depending on the Newtonian velocity of the electron (ie: the electromagnetic spectrum in figure 2). Keep in mind that relativity prevents observers from measuring the true velocity (Newtonian velocity) of the electron- relativity dilates velocities greater than light back down to the speed of light. Refer to figure 4 below.

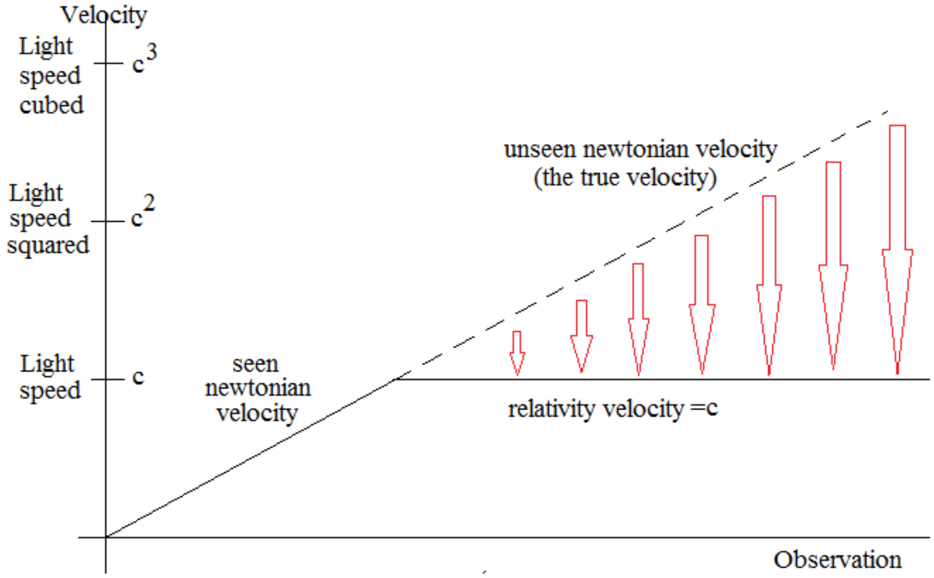

Figure 4: The dilation of the true velocity or Newtonian velocity by relativity. Here, we see that the dotted line represents the true velocity of particles travelling faster than the speed of light, but relativity dilates this velocity down to the speed of light which coils the path of the particle, so observers don't ever see particles travelling faster than light. The degree of velocity dilation is represented by the red arrows. Hence, the solid lines represent that which is seen, but the dotted line, which is the true velocity above light, is unseen due to dilation by relativity.

Now, figures 1 and 3 depict the length contraction effect on the electron, but the length contraction effect occurs simultaneously with the time dilation effect, which causes the electron to exist in multiple places along-side itself at the same time. As a result, as a particle approaches the speed of light, the original electron remains in its original linear position, but it also exists tangentially to itself, which rotates around its original self.

From figure 5 in A), we see a stationary electron in a wire. If this electron moves to the other end of the wire at speeds much less than N, or C for us on Earth, the particle obeys the laws of Newtonian Physics. In B), we see our electron now moves through the wire with a speed of c, so as discussed earlier it undergoes full primary coiling, which results in the appearance of a magnetic field (the magnetic field is the primary coiling) so it obeys the laws of relativity. From Einstein, when the electron moves at a speed where V=c, t'= undefined (time dilation = undefined) and s'= 0 (length compressed to zero). This means that to us, the particle no longer experiences time as in Newtonian physics, and now moves as a full primary coil or circle which propagates along with a speed equal to c. Because t'=undefined, the electron is able to be in more than one place at a time. Because s'=0, the particle is seen to move as a full primary coil or circle, which moves along the wire, always with a relative speed equal to c. this means that the electron is both inside the wire, and orbiting around the wire in multiple orbits multiple distances from the wire at the same time.
These "ghost or flux particles" which are all one particle that exist in different places at the same time, are responsible for the strange observations and theories made in quantum physics. These theories arise from the fact that ghost particles appear in their experiments

involving high speed particles, such as the double slit experiment, and physicists cannot explain what they observe.

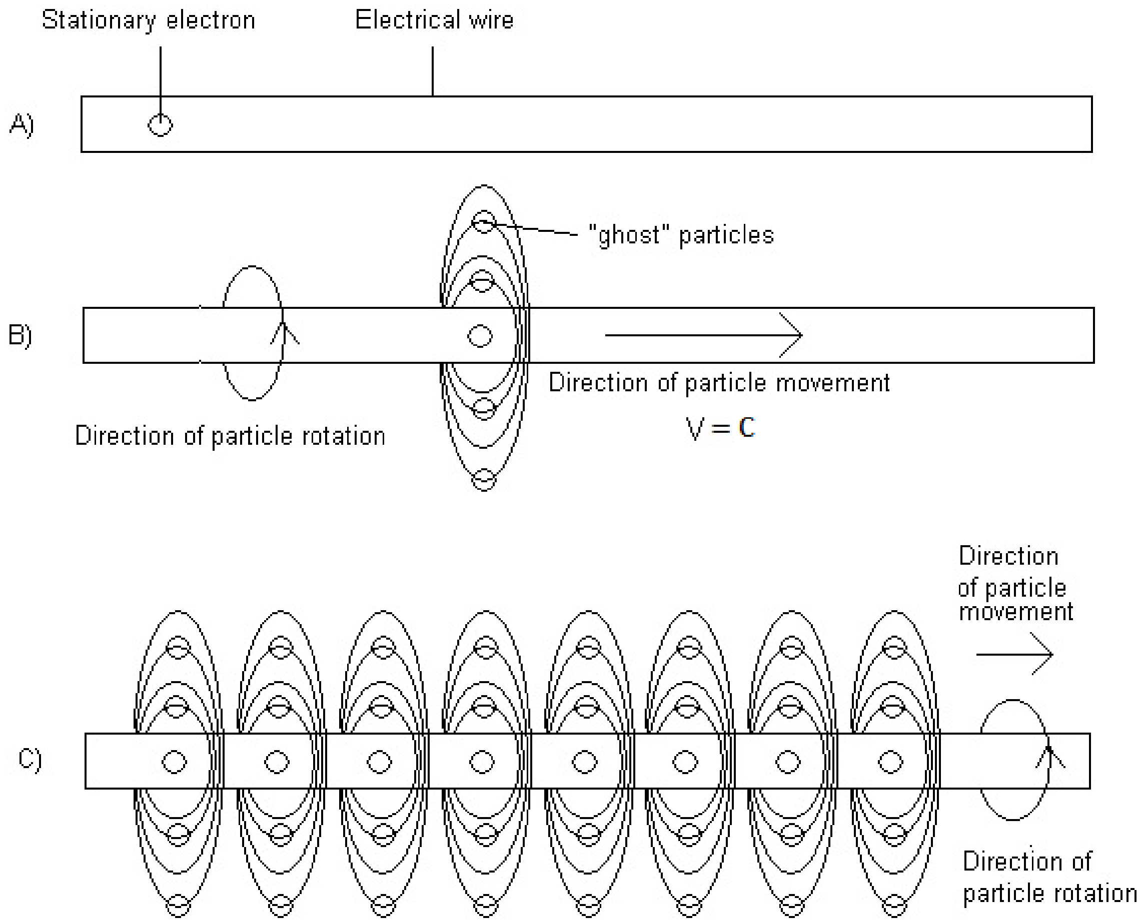

Figure 5: In A), we see a stationary electron in a wire. If this electron moves through the wire at speeds far below c, then the particle simply moves in a straight line through the wire, and no magnetic field is observed.
In B), our electron is now moving at c, so space dilation is occurring, causing the electron to now move as a circle (full primary coil) rather than in a straight line. As a result, the entire primary coil is always seen to move at a relative speed of c. However, the particle is experiencing maximum time dilation, t'=undefined. As a result, relative to us as stationary observers, the electron is in more than one place at the same time. In fact, the electron is both inside the wire, and orbiting around it in multiple orbital positions at the same time. As a result, we observe a magnetic field around the wire, which is just the electron orbiting around the outside of the wire. This is explained in section II table 1 of the McMahon field theory. When a particle is seen in more than one place at the same time, I call this a ghost or flux particle.
In C), the situation described in B) is exactly what is observed when electricity moves through an electrical wire. <u>Note that conventional current moves in the opposite direction to electron flow.</u>

From figure 5, we see that the original moving electrons we observe as electricity still exist inside the wire, but the length contraction and time dilation effects allow these electrons to simultaneously exist tangentially to their direction of movement outside the wire.

According to McMahon, C.R. (2012) *"Calculating the true rest mass of an electron – Based on McMahon field theory."* The total physical circular area occupied by an electron moving at the speed of light (relativity effect) over a 1 second interval is equal to:

Total coil area covered in 1 second = 27.3190988979 Metres^2/second.
(same as c/R)
and, the true electron rest mass is given as = hR /c = 2.42543489361 x 10^{-35}Kg

This is the most exact rest mass of an electron ever calculated. It is closer to the conventional value other scientists have calculated experimentally which was $9.109\,382\,15(45)\times10^{-31}$Kg, only its about 10^4 times smaller. The reason for this difference is simple: The conventional rest mass of an electron is the apparent mass it has when bound in an atom (and moving at high speed.) Recall from Einstein that the mass of a body increases as it approaches the speed of light? For this reason, the mass of electrons bound in atoms appear higher than the rest mass for free electrons. This is the reason for the existence of the fine structure constant- it corrects for this difference in observed mass due to relativity. (Difference is a factor of = $0.5(\alpha)^2$, where α = The fine structure constant.)

Therefore: We can say:
Observed mass of an electron (moving) bound in an atom = $9.109\,382\,1545\times10^{-31}$Kg,
Free true Electron rest mass = hR /c = 2.42543489361 x 10^{-35}Kg

When this true electron rest mass (hR/c) value is inserted into the equations used to determine the fine structure constant, all the main terms balance out! This can only occur if this rest mass were, in fact- the true rest mass. I shall explain.

I will now present the fine structure constant.

According to Hensley, J.M. (2001), "The fine structure constant α is a dimensionless number that describes the strength of the electromagnetic interaction between matter and light. It was originally introduced by Sommerfeld in 1916 to describe the size of the relativistic correction, termed fine structure., to the energies levels of the Bohr hydrogen atom." So, basically, it is a term used as a "correction" for relativity.
According to **Wikipedia (2013):** *Fine-structure constant*, No-one can agree on the actual physical meaning of the fine structure constant, which is approximately equal to 1/137.

Hensley, J.M. (2001), determines the value of the fine structure constant experimentally. He makes use of the following equation to do this:

$$\alpha^2 = \frac{2R_\infty}{c} \frac{m_p}{m_e} \frac{m_{Cs}}{m_p} \frac{h}{m_{Cs}}$$ ……….(equation 1)

Where:
α = The fine structure constant,

R_∞ = Rydbergs constant
Mp = proton rest mass
Me = electron rest mass
MCs = cesium mass
h = Plancks constant.

To begin, lets group the main terms or parameters in equation 1 that effect its value.

$$\alpha^2 = 2\left[\frac{R_\infty}{c} \frac{m_p}{m_e} \frac{m_{Cs}}{m_p} \frac{h}{m_{Cs}}\right]$$ ....(equation 2)

This is still the same equation as equation 1, only I am highlighting the most important parameters.
If we examine the definitions of the terms within the brackets, we see that they cancel each other out perfectly. Allow me to show this.

According to McMahon, C.R. (2013**)** *"Rydbergs constant solved"*, The Rydberg constant can be expressed as:

$$\text{Rydberg constant } (M^{-1}) = \frac{\text{The total circumference of the coils covered per second } \left(\frac{M}{s}\right)}{\text{The total circular area covered by an electron per second } \left(\frac{M^2}{s}\right)}$$

……….(equation 3)

According to **McMahon, C.R. (2013)** *"Plancks constant solved"*, The Planck constant can be expressed as:

$$\text{Plancks constant } \left(Kg\,\frac{M^2}{s}\right) = \begin{array}{c}\text{The total circular area covered}\\ \text{by an electron per second}\end{array} \left(\frac{M^2}{s}\right) \text{ x electron rest mass } (Kg)$$

……….(equation 4)

If we insert the definitions of Plancks constant and Rydbergs constant, as in equations 3 and 4 into equation 2- we see that the terms in the brackets cancel each other out. (note that the speed of light per second = Electron circumference per second). In other words, everything inside the bracket = 1. See equation 5 below.

$$\alpha^2 = 2\Bigg[\frac{1}{\text{Speed of light per second}\ \left(\frac{M}{s}\right)} \times \frac{\text{Electron circumference per second}\ \left(\frac{M}{s}\right)}{\text{Electron area per second}\ \left(\frac{M^2}{s}\right)} \times \frac{\text{Proton mass (Kg)}}{\text{Electron rest mass (Kg)}}$$

$$\times \frac{\text{Cesium mass (Kg)}}{\text{Proton mass (Kg)}} \times \frac{\text{Electron area per second}\ \left(\frac{M^2}{s}\right) \times \text{Electron rest mass (Kg)}}{\text{Cesium mass (Kg)}}\Bigg]$$

……….(equation 5)

This is extremely significant, because of one point and one point alone- electron rest mass. Plancks constant contains within it the true stationary rest mass of an electron, as shown in equation 4. If we insert the value for electron rest mass into equation 2, it should cancel out perfectly the electron rest mass value within Plancks constant, as shown in equation 5.

If we insert the value for electron rest mass (hR /c) from the paper McMahon, C.R. (2012) *"Calculating the true rest mass of an electron – Based on McMahon field theory."* Into equation 2, The terms within the bracket of equation 5 do indeed cancel each other out. (McMahons Electron rest mass = hR /c = 2.42543489361 x 10^{-35}Kg). As a result, the fine structure constant becomes unnecessary- it becomes $\alpha = (2^{0.5}) = 1.41$, because all the important parameters cancel each other out.

If, however, we instead insert the conventionally accepted rest mass of an electron into equation 2, which is given by "**Wikipedia (2013)** *Electron rest mass"* as: 9.109 382 15(45)×10^{-31} Kg, equation 5 by definition becomes equal to:

(When we cancel like terms):

$$\alpha^2 = 2\left[\frac{\text{Electron rest mass term within plancks constant (Kg)}}{\text{Conventional Electron rest mass (Kg)}}\right]$$

……….(equation 6)

$$\alpha^2 = 2\left[\sim 0.00002662567\right]$$

……….(equation 7)

$$\alpha = \frac{1}{137.035999074(44)}$$

Since these values for electron rest mass don't cancel each other out in equation 7, we can say with certainty that the conventionally accepted value for electron rest mass is incorrect. Notice the value of approximately 0.00002662567 in equation 7- this should be equal to 1. Therefore, the "Electron rest mass term within Plancks constant" value as in equation 6 (and 5) is the true rest mass value of the electron. This value was shown in McMahon, C.R. (2012) *"Calculating the true rest mass of an electron – Based on McMahon field theory."* To be equal to hR /c = 2.42543489361 x 10^{-35}Kg.

This means that if we divide McMahons electron rest mass value by the conventionally accepted rest mass value, it should be equal to the 0.00002662567 value within the brackets of equation 6. Lets see:

$$\alpha^2 = 2\left[\frac{\text{McMahons Electron rest mass } (\text{Kg})}{\text{Conventional Electron rest mass } (\text{Kg})} \right] \qquad \text{..........(equation 8)}$$

$$\alpha^2 = 2\left[\frac{\frac{hR}{c}}{9.109\,382\,15(45)\times 10^{-31}} \right]$$

$$\alpha^2 = 2\left[\frac{\sim 2.42543489361 \times 10^{-35}}{\sim 9.109\,382\,15(45)\times 10^{-31}} \right]$$

$$\alpha^2 = 2\left[\sim 0.00002662567 \right]$$

$$\alpha = \frac{1}{137.035999074(44)}$$

It does!

So, basically the conventional rest mass is actually the observed mass of an electron in an atom, and McMahons value is the true rest mass. In fact, re-arranging equation 8, we see that:

$$\text{McMahons Electron rest mass (actual stationary electron mass)}\ (\text{Kg}) = \frac{\alpha^2}{2} \times \frac{\text{Conventional Electron rest mass}\ (\text{Kg})}{(\text{Mass of moving electron in an atom due to relativity})} \quad \text{..........equation (9)}$$

Equation 9 is further verified by the Compton scattering equation. According to Wikipedia (2013) *"Compton scattering"*, Comptons scattering equation is given as:

$$\lambda' - \lambda = \frac{h}{m_e c}(1 - \cos\theta),$$

Where:

λ is the initial wavelength,

λ' is the wavelength after scattering,

h is the Planck constant

c is the speed of light

θ is the scattering angle.

m_e is the Electron rest mass = The larger moving mass due to relativity

$$= \left[\frac{\text{true rest mass}}{\left\{ \frac{\alpha^2}{2} \right\}} \right]$$

$$= \left[\frac{2.42543489361 \times 10^{-35}\text{Kg}}{\left\{ \frac{\alpha^2}{2} \right\}} \right] = 9.1093821545 \times (10^{-31})\text{Kg}$$

In Comptons scattering equation, the electron rest mass he uses is the conventional rest mass (the larger mass of a moving electron in an atom, since the electron orbits the atom at relativity velocities), so it is actually "larger" than the true electron rest mass due to the $0.5(\alpha^2)$ factor in equation 9! This is because Compton carried out his work using x-rays to strike electrons bound to atoms, so these electrons had a higher observed mass due to relativity. The fine structure constant is therefore part of a factor to convert electron rest (stationary) mass to the electron mass observed in an atom due to the effects of relativity.

Now, since we have been fortunate enough to discover a factor that transforms electron rest mass to the observed mass of the electron in the atom, we have discovered a way of determining how fast an object must move before it reaches its maximum detected mass before reaching light speed due to relativity. Also, since time dilation causes a particle to be in multiple places at the same time, we can work out how many places a single particle occupies at any one time when travelling at light speed or just below it.

Re-arranging equation 9 gives us:

$$\underset{\text{(actual stationary electron mass)}}{\text{McMahons Electron rest mass (Kg)}} \times \frac{2}{\alpha^2} = \frac{\text{Conventional Electron rest mass (Kg)}}{\left(\text{Mass of moving electron in an atom due to relativity}\right)} \quad \text{..........equation (10)}$$

Thus, $2/(\alpha^2) = 2/(7.297352569824 \times 10^{-3})^2 = 37557.7300843$

<u>This means that at the speed of light, an electron exists in 37557.7300843 places at the same time because of time dilation.</u> This value may have decimal places because the electron may be able to only partially exist in some locations, or there are errors in the experimentally determined fine structure constant.

This also means that when an object moves close to or at the speed of light, the maximum mass we detect for the system is equal to 37557.7300843 x the objects rest mass.

Thus, from this we can figure out at what observed speed maximum observed mass is reached for the primary coil. From relativity, we see that:

$$M' = \frac{M}{\sqrt{1 - \frac{V^2}{C^2}}} = \frac{2M}{\alpha^2} \quad \text{..........equation (11)}$$

Where:

M' = Maximum electron mass observed at full primary coiling due to relativity

M = electron rest mass

V = velocity at which maximum full primary coil mass is reached

α = Fine structure constant

Thus:

$$M' = \frac{M}{\sqrt{1 - \frac{V^2}{C^2}}} = 37557.7300843M$$

$$\frac{M'}{M} = \frac{1}{\sqrt{1 - \frac{V^2}{C^2}}} = 37557.7300843$$

Solving for v = 299792457.893735 m/s

<u>Thus, at this velocity, the maximum mass for full primary coiling is reached.</u> Electrons in the hydrogen atom, according to the paper "**McMahon, C.R. (2013)** *"The McMahon equations"* move within the Newtonian velocity (V_n) range of $V_n \le c^2$. However, if we try to determine how fast electrons move in atoms, based on the appearance of electron mass alone, it appears that electrons in atoms are moving at speeds within the observable range of 299,792,457.893735 (metres/sec) $\le V \le$ 299792458 (metres/sec). Time dilation that results in higher mass being observed therefore stops occurring at the speed of light, so at the speed of light if the particle tried to move faster, although it would have a higher Newtonian velocity, relativity dilates the velocity we observe back down to c, and the mass either doesn't seem to change or we cannot properly detect it. This is a logical deduction; otherwise particles very close to light would have infinite mass. <u>The fine structure constant therefore encompasses within it a limit for the maximum detectable mass</u>, to prevent the appearance of infinite mass so secondary and higher order coiling can occur. The fine structure constant should therefore not be used to find the true Newtonian velocity (V_n) of particles, but rather the observed velocity (V) as it contains within it a limit to account for observable mass, and we know that energy like light, although is an electron, has undetectable mass.

<u>I can now demonstrate that the straight line path of a particle coils as it approaches the speed of light, to verify the McMahon field theory (2010).</u>

From basic geometry, we know that the area of a circle is related to its circumference by the equation:

$$\text{area of circle} = \frac{\text{circumference}^2}{4\pi} \quad \text{..........equation (12)}$$

If we re-arrange equation 12, this gives us:

$$2\pi \text{ x area of circle } = \frac{\text{circumference}^2}{2}$$

Inverting both sides gives us:

$$\frac{1}{2\pi \text{ x area of circle}} = \frac{2}{\text{circumference}^2} \quad \text{..........equation (13)}$$

If we consider equation 11, which relates the fine structure constant to Einsteins relativity, notice equation 11 can be simplified to:

$$\frac{1}{\sqrt{1 - \frac{V^2}{C^2}}} = \frac{2}{\alpha^2} \quad \text{..........equation (14)}$$

Note that $2/(\alpha^2)$ is the relativity factor from equation 10. Equations 13 and 14 are not similar in form by chance- they are similar because the straight line path of a moving particle is converted into coils as a particle approaches the speed of light. We must also be aware that these coils are of different sizes (imagine magnetic flux coils), hence we have different coil areas and circumferences. With this in mind, if we equate equation 13 to equation 14 we see that <u>the circumference value is a coiling factor value, and the area value is a coil area factor value.</u>

Thus we finally understand the physical definition of **<u>the fine structure constant- it is a factor representing the degree of coiling. Since it's a factor, it has no units. When $\alpha = (2^{1/2})$, no coiling is present. As the α factor decreases in value, the degree of coiling increases.</u>** ($\alpha = 7.297352569824 \times 10^{-3}$ within the relative electron velocity range: 299,792,457.893735 (metres/sec) $\leq V \leq$ 299792458 (metres/sec)). Therefore, solving for the electron coil area factor using equations 13 and 14:

Electron coil area factor = $4.2376081497604 \times (10^{-6})$ (no units- it's a factor)
α (fine structure constant or coiling factor) = $7.297352569824 \times 10^{-3}$ (no units)

$$\text{Note that electron coil area factor due to relativity} = \frac{\sqrt{1 - \frac{V^2}{C^2}}}{2\pi} \quad \text{.......... equation (15)}$$

Where v ≤ 299792457.893735 metres/sec

Re-arranging equation 14, the fine structure constant will vary with electron velocity according to:

$$\alpha = \text{electron coiling factor due to relativity} = \sqrt{2\sqrt{1 - \frac{V^2}{C^2}}} \quad \text{.......... equation (16)}$$

Where v ≤ 299792457.893735 metres/sec

To prevent the appearance of infinate mass at light velocity, α remains constant from 299792457.893735 metres/sec to 299792458 metres/sec, or lightspeed.

Lets test out equation 16 with equation 10.

Test 1: If an electron is stationary, its relative velocity is zero. In this case, α in equation 16 is equal to ($2^{0.5}$). Hence $\alpha^2 = 2$. Inserting $\alpha^2 = 2$ into equation 10, and we observe the same electron mass as the electron rest mass (=$2.42543489361 \times 10^{-35}$Kg). Thus we have the expected result.

Test 2: When an electron is moving at the speed of light (299792458 meters/sec), we see that we must use a slightly smaller value of 299,792,457.893735 metres/sec for our velocity in equation 16, as this is the maximum value allowable. This prevents the detection of infinite mass. This is because primary coiling becomes complete over the Newtonian velocity range 299,792,457.893735 (metres/sec) ≤ V ≤ 299792458 (metres/sec), when the coils begin lining up on top of each other, so we don't observe a change in mass over this velocity interval. Hence $\alpha = 7.297352569824 \times 10^{-3}$, so $\alpha^2 = 5.3251354528317 \times 10^{-5}$. Inserting $\alpha^2 = 5.3251354528317 \times 10^{-5}$ into equation 10, and we observe the electron mass due to relativity which is higher, which is equal to $9.109\,382\,1545 \times 10^{-31}$Kg. Thus we have the expected result.

Notice that α is a factor value, as is the corresponding area. Also, when comparing equations 13 and 14, we see that

$$\sqrt{1 - \frac{V^2}{C^2}} = 2\pi \text{ x area of circle}$$

So when V=0, (2π x area of circle) = 1. For this reason, when there is no coiling, α will be equal to ($2^{1/2}$). So as coiling increases, α will decrease in value, as will the electron coil area factor (equation 15).

Thus, the equations in this paper further demonstrate that Einsteins relativity actually causes coiling, as in the McMahon field theory (2010).

Important note: **Wikipedia (2013)** *Fine-structure constant* tells us that the fine-structure constant is known to approach 1/128 (increase in value) at interaction energies above 80 GeV, suggesting it is not constant, providing evidence for equation 16. Note that equation 16 tells us that as the velocity decreases, the fine structure value increases. Larger interaction energies are therefore causing a decrease in particle velocity, such as the velocity of an electron striking an atom which is to be expected, so the fine structure constant increases in accordance with equation 16.

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