

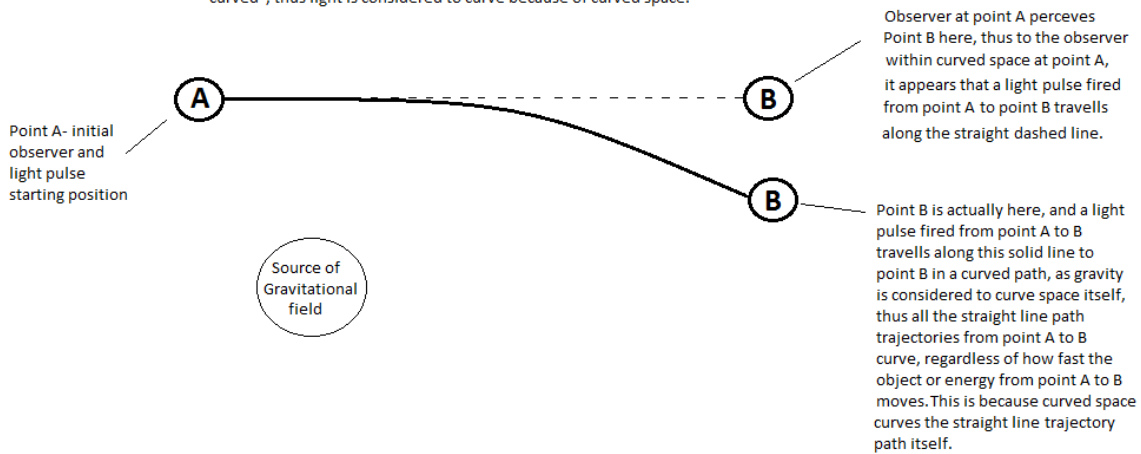
## **Light (the Photon) has mass- Deductions**

**Abstract:** McMahon field theory (2010) tells us that as a mass approaches the speed of light, it appears as energy. Once mass reaches the speed of light and appears as energy, if this mass tries to move faster, we observe changes in frequency. Below are a number of deductions indicating that energy, such as light, has mass.

### **Light has mass, Deduction 1 part A:**

This deduction has two parts- which I am splitting into part A and B for clarity- although I feel that part B is the more convincing proof that light has mass. It is thought that gravity curves space, thus it is thought that this is why gravity bends light. Refer to **Wikipedia (2014) Gravitational lens**. However, if a beam of light travelling in a straight line curves only because the space through which it is travelling is curved relative to the observer, then anything travelling along the same path will also curve to the same degree as the light, regardless of velocity. Unfortunately, this is not what we observe in the physical world. Slower moving objects tend to be deflected to a greater degree by gravity. For example, lets perform a thought experiment: Imagine a slow moving spaceship moving through the outskirts of a gravitational field. Relative to the occupants on board this spaceship, it appears the spaceship is travelling in a straight line. However, relative to a stationary observer on a nearby planet, it appears that the spaceship is moving in a curved path. The slow moving ship then fires a pulse of light ahead of itself. The pulse of light experiences some deflection due to gravity, but ultimately escapes the gravitational field. The slow moving spaceship, however, although it is initially travelling along the same path as the light, begins to move towards the source of the gravitational field, and does not escape the gravitational field, because it does not have the same “escape velocity” as the beam of light. **Now, if the only reason the pulse of light was deflected by the outskirts of the gravitational field was because space is curved in that region, then the slow moving spaceship should also move along the exact same curved path, and curve to the exact same degree, because the space through which it is moving is curved to the same degree as the path taken by the light pulse.** However, this is not what we observe. The spaceship experienced more deflection in its trajectory because it did not have the velocity required to escape the gravitational field, thus it could not escape the gravitational field as the light pulse did. From this, we must be fair, and admit that light is not deflected by gravity because gravity curves space, but that light is deflected by gravity for another reason. Since we know gravity acts on mass, the most logical deduction would be that light (the photon) has mass, but we haven’t detected it yet. Refer to figure 1.

To an observer within the outskirts of a gravitational field, space is considered to be "curved", thus light is considered to curve because of curved space.



**Figure 1:** Unfortunately, in real world observations, it has been found that if an object is moving from point A to point B more slowly, it will experience more deflection due to gravity, and may even fall directly into the source of the gravitational field, thus not reach point B at all. This should not be able to happen if the curved trajectory path is due to curved space- as curved space ensures that all objects travelling through curved space from point A to B travel along the same curved path- as straight lines are curved in curved space. Thus light curves in the presence of gravity not because the space through which it moves is curved, but because light has mass we have yet to detect. Thus gravity is a force that acts directly on light that causes it to curve because light has mass we have not yet detected.

Now, I would like to consider mass from the point of view of Sir Isaac Newton, via the equation:

$$W=Mg \quad \dots\dots\dots\text{Equation (1)}$$

Where:

W = Weight force (Kg x Metres/second<sup>2</sup>)

M = Mass (Kg)

g = Gravitational acceleration (Metres/second<sup>2</sup>)

Re-arranging equation 1 gives us:

$$M = W/g \quad \dots\dots\dots\text{Equation (2)}$$

If we consider equation 2 and apply it to light (the photon), we find something interesting. We know that light is deflected by gravity, thus we could say the photon experiences the force of gravitational acceleration (g). Thus, a "Weight force" (W) is exerted upon photons which causes this deflection. Thus, both "g" and "W" as in equation 2 apply. Since both parameters apply, we could say Photons must have mass, assuming equation 2 holds true.

**Light has mass, Deduction 1 part B:**

Next, I will describe how the relative observation of compressed or curved space does not exert force (relative or otherwise) on the object experiencing relative compression or curvature of space- thus gravity cannot be explained as curved space.

From Einsteins work on relativity, we know that as an object approaches the speed of light relative to a stationary observer, the object is observed by the observer to undergo what Einstein and others call “length contraction”. If this object moves left to right near the speed of light relative to the stationary observer, what is thought to happen is that the “length” of the moving object is observed by the observer to be “compressed” from left to right. In other words, the object looks like it has been squashed or compressed from the left and right sides. This is because under relativity, the space occupied by the object moving close to the speed of light appears to be “compressed” relative to the stationary observer.

Next, we must realize that this relative observation of compressed space is relative only. In other words, if the object were to slow down relative to the stationary observer, the relative space occupied by the object would be observed by the stationary observer to expand and return to its original size.

Also, if the observer were to speed up and move alongside the fast moving object which is moving near the speed of light, the observer would state that as he approached the same velocity of the object the effect of length contraction is removed from the object- the object would be reported by the observer to have expanded back to its original size.

**Now- here is the important point: The length contraction effect- which is compressed space, does not exert a force (relative or otherwise) on the object observed to be undergoing compression or length contraction.** If it did, as an object moved faster, it would be physically compressed and destroyed. However, as explained, the observation of compressed space is a relative observation- if you moved at the same speed as the object so that relative to you it is now stationary; the length contraction effect is removed and the object now appears to have expanded back to its original size.

Now that we have proof from Einsteins work that relatively contracted or altered space, curved or otherwise, exerts no force on an object (relative or otherwise), we must realize that if an object is stationary in a gravitational field relative to the source of the gravitational field, then if gravity is nothing more than relatively curved space, it should exert no force, relative or otherwise, on the object. Unfortunately, stationary objects in gravitational fields relative to the source of the gravitational field do experience force. As explained in figure 1, an observer within curved space, moving from point A to B, observes his journey as being in a straight line, however relative to an external observer, this journey from point A to B is curved- thus the observation of space itself is relative.

Since stationary objects in gravitational fields relative to the source of the gravitational field do experience force, we cannot say that gravity is caused by curved space. Since force is experienced, gravity is not curved space- but something else- more likely gravity is nothing more than a proton field (as opposed to a magnetic field) as described in McMahon field theory (2010). Thus, if gravity is not caused by curved space, and we

**Light has mass, Deduction 2:**

Redshift effect: If an energy form is acted upon by gravity in a direction opposite to the propagation of that energy (eg: if light moves away from us, but gravity pulls it toward us), we observe what is called a redshift. This means that an energy form such as light will continue to decrease in frequency if it continues to experience redshift until frequency = 0 hz. Since the energy forms of the electromagnetic spectrum move relative to us on Earth at the speed of light, we can say, according to **Wikipedia (2013)** *frequency*:

$$c = f\lambda \quad \dots\dots\dots \text{Equation (3)}$$

Where:

c = The speed of light (299,792,458 metres/second)

$\lambda$  = wavelength (metres)

f = Frequency (1/seconds)

So, if equation 3 continued to experience redshift until frequency =0 hz, equation 3 would no longer be valid. Since equation 3 holds for energy and is no-longer valid when frequency = 0 hz, this means we are no-longer dealing with energy, but something else. **McMahon, C.R. (2013)** *“Review of Einsteins E=Mc<sup>2</sup> papers- Einsteins own validation of the McMahon field theory”* Tells us that this would cause us to begin to detect mass.

**Light has mass, Deduction 3:**

From the paper, **McMahon, C.R. (2013)** *“Review of Einsteins E=Mc<sup>2</sup> papers- Einsteins own validation of the McMahon field theory”* we derive the equation:

$$L(\text{light energy, or just energy}) = Mc^2[(1-v^2/c^2)^{0.5}] \quad \dots\dots\dots \text{Equation (4)}$$

Where:

v = observed velocity (metres/second)

M = Rest mass (Kg)

c = the speed of light (metres/second)

Equation 4 is known as the “remaining available rest mass to energy equation”. It shows that as a mass approaches the speed of light (v increases), the amount of detectable mass that can be converted into energy decreases. Refer to figure 2 below:

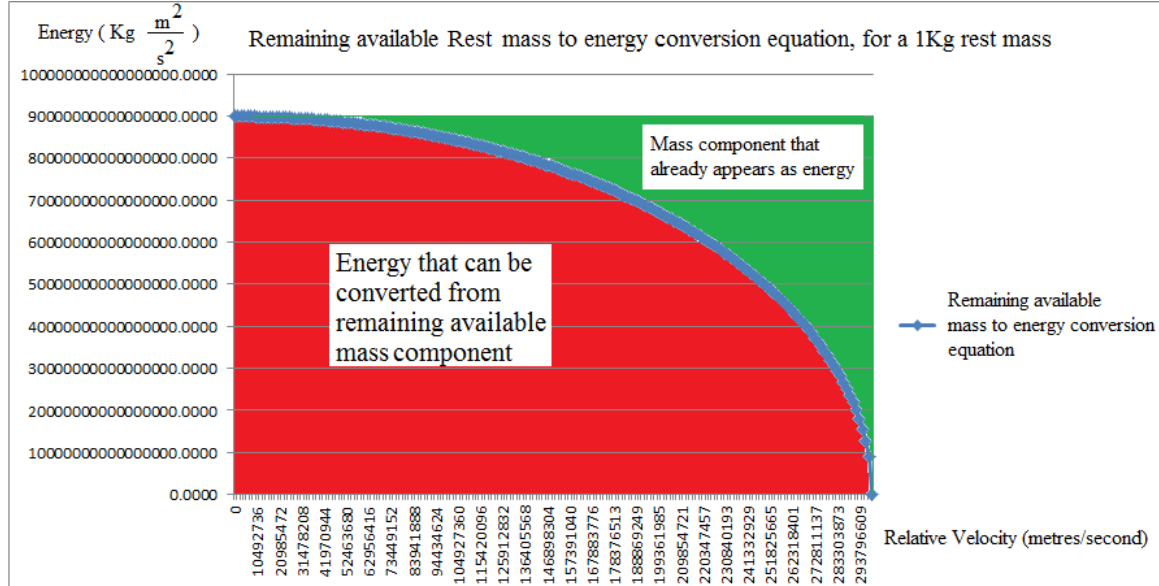


Figure 2: The remaining available mass to energy conversion equation, in its component parts.

From figure 2, we see that at any point on the blue graph, the red area below any point + the green area above any point = Einsteins  $Mc^2$ . At a relative particle velocity of 0, all of the rest mass of the particle can be observed. As a result, all of this observed rest mass is available for conversion to energy. This is why there is no green area above the point at velocity = 0 m/s. On the other side of the graph, at a relative particle velocity of light (299,792,458 m/s), we see that all of the rest mass of the particle already appears as energy. As a result, there is no remaining observable rest mass that can be converted into energy (No red area below the point  $v=299,792,458$  m/s)

This equation shows that, as a particle approaches the speed of light, its rest mass begins to appear as energy to us as stationary observers, thus even though it has rest mass, we can't detect this mass at the speed of light. Thus, all energy forms of the electromagnetic spectrum, including light, have mass- we just can't detect it. We know from Einsteins work that the mass of a particle is supposed to increase as it approaches the speed of light, which I agree with, but what I'm saying is that we as stationary observers can't actually detect this mass, which is why the graph in figure 1 for rest mass curves downward. According to McMahon field theory (2010), Einsteins time dilation equation allows a particle to exist in multiple places at the same time as it approaches the speed of light, which is why Einstein thought that the mass of particles increase as they approach the speed of light. In fact, all we are doing is mathematically measuring the same mass over and over again because the particle appears in more than one location at the same time. Equation 4, however, shows us that because the particle experiences altered time to allow it to exist in more than one place at the same time as it approaches light speed, we observe energy instead of mass as a particle approaches the speed of light. See deduction 5 for more details.

**Light has mass, Deduction 4:**

From the paper: **McMahon, C.R. (2013)** “*The McMahon equations*”. We derive the equation:

$$E_{(max)} = \frac{\text{Einsteins Particle energy at light speed } M_{rest} c^2}{\sqrt{1 - \frac{v^2}{c^2}}} + \frac{\text{Additional energy above Einsteins Particle energy at light speed, which we observe as a change in frequency } M_{rest} c \left(\frac{f}{R}\right)}{\sqrt{1 - \frac{v^2}{c^2}}}$$

..... Equation 5)

Where:

$E_{(max)}$  = maximum possible energy (Kg(m<sup>2</sup>/s<sup>2</sup>))

$M_{rest}$  = Rest mass (Kg)

$v \leq 299,792,457.893735$  (m/s)

$c$  = the speed of light = 299,792,458 (m/s)

$f$  = frequency (1/s)

$R$  = Rydberg constant = 1.097373156853955 x 10<sup>7</sup>. units = (m<sup>-1</sup>)

**Note: if  $f=0$ , only then  $v$  can be  $< 299,792,457.893735$  (m/s), otherwise  $v = 299,792,457.893735$  (m/s).**

**Also Note:**  $v \leq 299,792,457.893735$  (m/s), as time dilation and length contraction effects appear to stop increasing at this velocity, even though the observed object may be moving faster than this. This prevents the appearance of infinite mass or energy. This was found in the paper: **McMahon, C.R. (2013)** “*Fine structure constant solved and new relativity equations– Based on McMahon field theory*”.

From this, we see that energy above Einsteins particle energy equation is observed as a change in frequency. Thus, if an energy form continued to experience redshift, we would eventually begin to detect mass once  $f$  drops to 0 hz. This indicates that energy, like light, has mass.

**Light has mass, Deduction 5:**

This section is a large one, it is a summary of McMahon field theory (2010), which indicates that all energy is composed of moving mass.



**McMahon field Theory (2010) summary:**

**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.

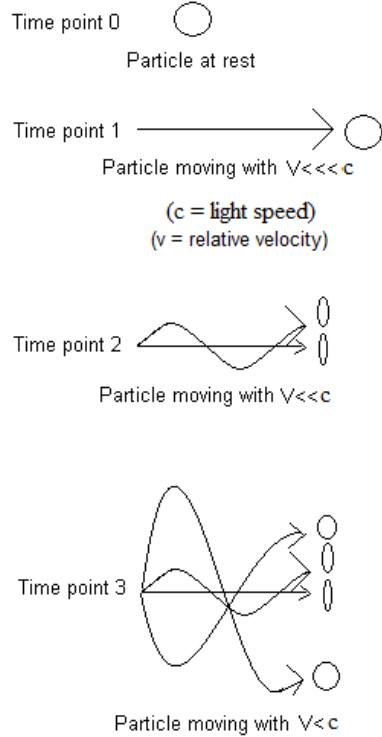
First, allow me to present a new understanding of energy, as already presented in McMahon field theory: Theoretical unification of relativity and quantum physics, thus methods to generate gravity and time. (2010).

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 it 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 Einstein’s 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. I.e: 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-dimensional 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-dimensional. 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

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coils at different distances from the electrical wire. Please refer to figure 3 on the following page.



Arrow = path particle has taken

Einstein's length contraction and time dilation equations take effect at time point 2, when the coiling effect starts. Time dilation allows the electron to exist in multiple places at the same time, so here we see the electron in two places at once. The electron on the original particle path appears very compressed, because the space it occupies on its straight line path appears compressed due to length contraction. However, the other position the electron now also occupies also experiences length contraction, but it appears less compressed because its path coils.

As the particle moves faster, it appears in more coil orbitals at the same time, rotating around the original particle, and further from the original particle. The bigger the coiled path, the less compressed the particle appears in that coiled path.

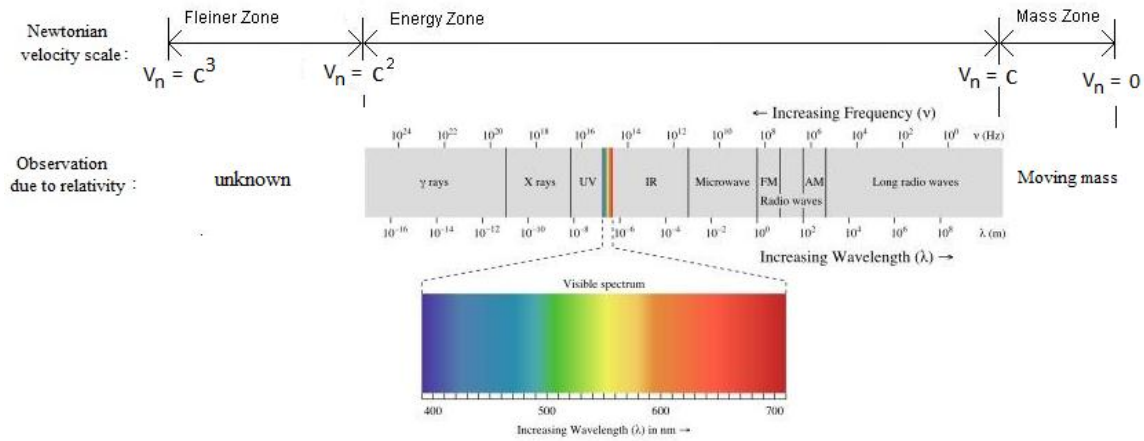
This is why the mass of the particle appears to be increasing mathematically according to Einstein's relativity theory- we are simply mathematically adding the mass in all the positions the particle occupies. The particle mass has not actually changed, but because it exists in more than one place at a time, mathematically it appears to be gaining mass as it approaches the speed of light.

This is also why we observe magnetic flux around wires carrying electrons which move close to the speed of light.

**Figure 3: particle relativity-** Taken from the McMahon field theory (2010): What we observe as relative stationary observers of a particle as it travels faster.

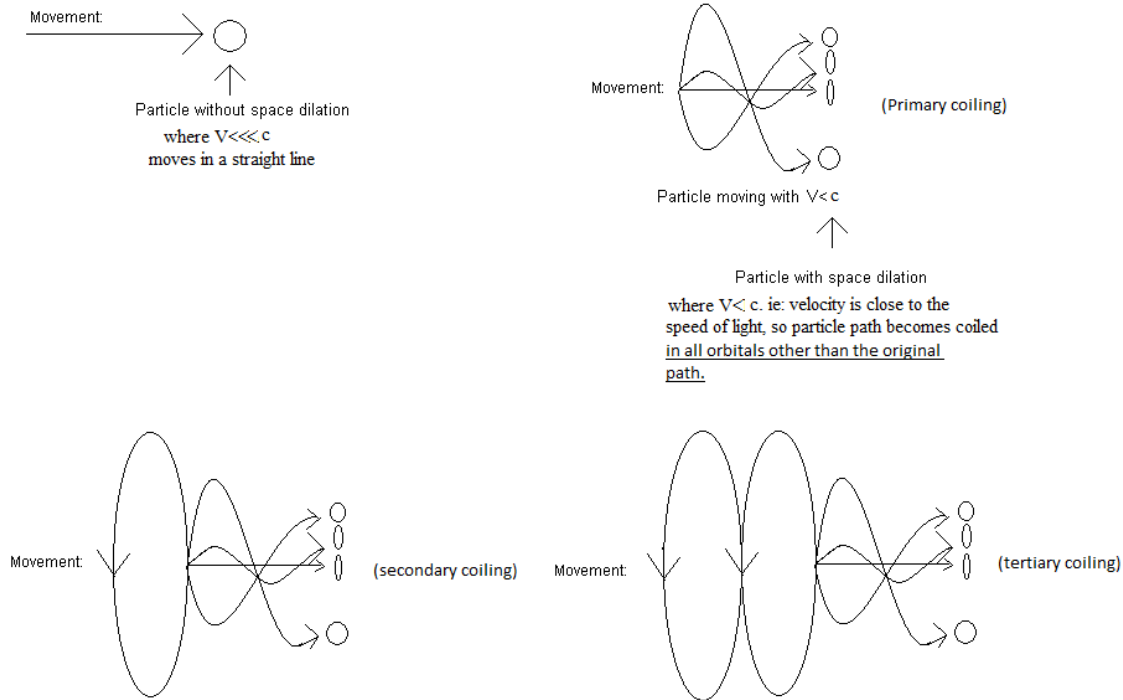
However- the McMahon field theory goes on to explain much more, including the electromagnetic spectrum- hence light, which I will briefly cover now. Refer to figure 4 below:





**Figure 4: 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 6) 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  $V_n$  as in figure 6, 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  $V_n=c$ . 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 4, 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 5, 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 5.

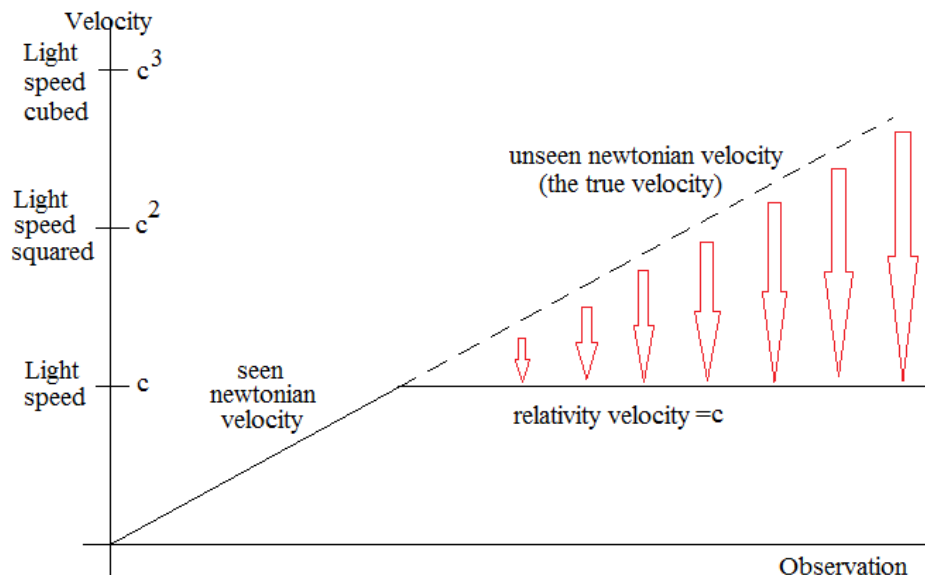


From the paper: **McMahon, C.R. (2013)** "Fine structure constant solved and new relativity equations—Based on McMahon field theory", we are told that Einsteins time dilation and length contraction effects stop occurring and reach their maximum effect at a velocity of 299,792,457.894 m/s. Thus once a particle reaches the speed of light, the mass of the particle system mathematically is the same as at the 299,792,457.894 m/s velocity. Also, if the particle tries to move faster than light, the entire system then coils upon itself, something I call secondary coiling. This prevents us from ever seeing velocities greater than light. This is what energy is- particles moving as coiled coils. When secondary coiling is complete- and tertiary coiling begins- this is the state of Fleiner.

**Figure 5:** 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 4). 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 6 below.

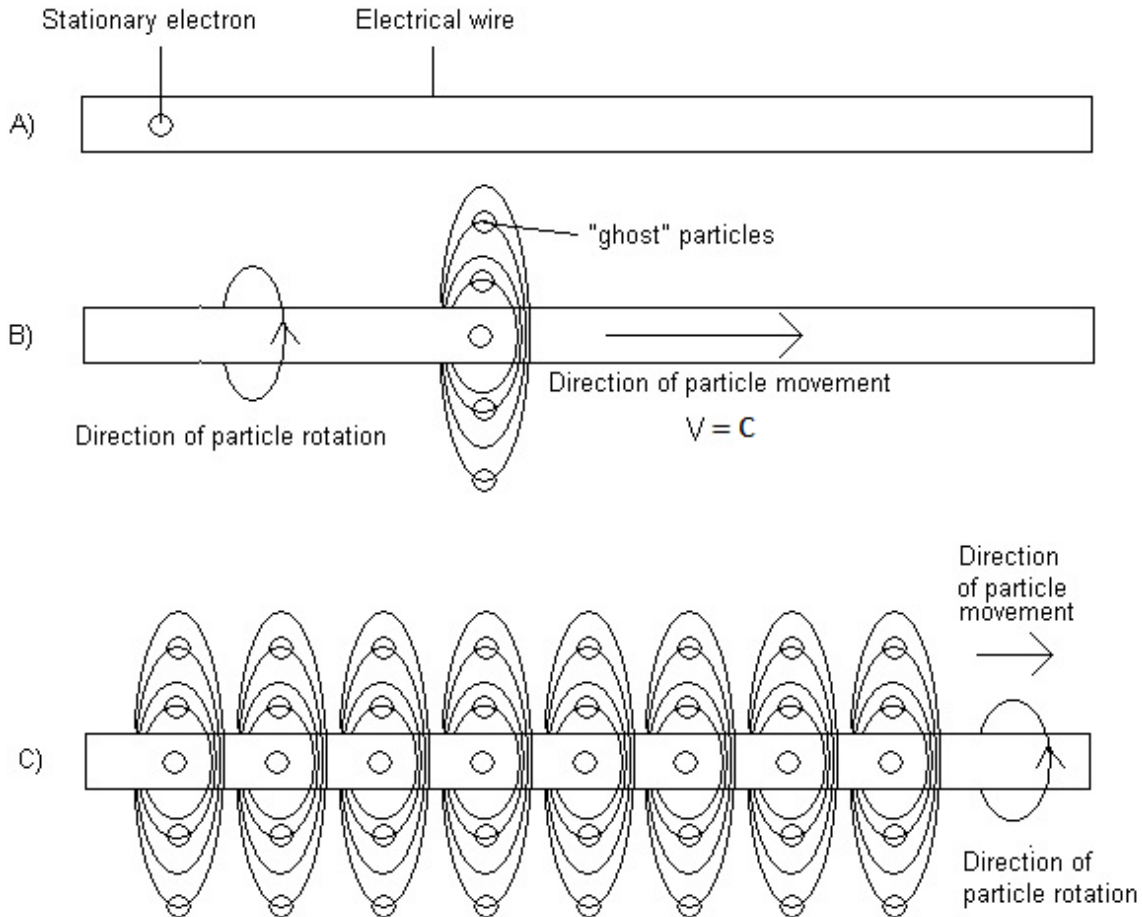


**Figure 6:** The dilation of the true velocity or Newtonian velocity by relativity. Here, we see that the dotted line represents the true velocity of particles travelling faster than the speed of light, but relativity dilates this velocity down to the speed of light which coils the path of the particle, 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 3 and 5 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 7 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  $V=c$ ,  $t' = \text{undefined}$  (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  $t' = \text{undefined}$ , 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



**Figure 7:** 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,  $t' = \text{undefined}$ . 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. Note that conventional current moves in the opposite direction to electron flow.

From figure 7, 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. Thus from this, we see that all energy, including light, is just moving mass.

**Light has mass, Deduction 6:**

Consider Einsteins  $E = Mc^2$ . In deduction 5, I explained how a particle or mass experiences coiling relative to stationary observers as it approaches the speed of light. **Coiling indicates two velocity components**- an inward component toward the centre of rotation, and a tangential component, offset 90 degrees from the inward component. This is why mass is multiplied by the velocity of light twice in the equation  $E = Mc^2$ , as two velocity components are present because of coiling at the speed of light! When a mass approaches the speed of light, it coils relative to stationary observers, thus it appears to have two components of velocity. If we take a photon, and slow it down to the point where relative to us it has no velocity, then this effectively removes the  $c^2$  component from  $E = Mc^2$ , leaving us with just M, Mass!

Also, if we were to slow a photon down below the speed of light and observe it until it is stationary relative to us as observers, we would see it lose its coiling and behave more like a particle travelling in a straight line before coming to a complete stop. This explains why photons behave like both particles and waves in the double slit experiment- the photon behaves like a particle when it interacts with a detector which slows it down, but behaves like a wave (coils) when the detector doesn't act on the photon. This is because a physical interaction with the moving photon is required in order to detect it, which slows the photon down. Refer to the paper: **McMahon, C.R. (2013)** "*Possible double slit and delayed choice quantum eraser experimental explanations*".

The paper **McMahon, C.R. (2012)** "*Calculating the true rest mass of an electron – Based on McMahon field theory.*" The general science journal, determines that from the McMahon field theory, the photon is nothing more than an electron dilated by relativity, hence its mass seems undetectable. Hence the paper **McMahon, C.R. (2012)** "*Calculating the true rest mass of an electron – Based on McMahon field theory.*" The general science journal, explains that:

The observed mass of an electron (moving) bound in an atom due to relativity =  
 $9.109\ 382\ 15(45) \times 10^{-31} \text{Kg},$

Free Electron rest mass with no motion relative to the observer =  
 $hR / c = 2.42543489361 \times 10^{-35} \text{Kg}$

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