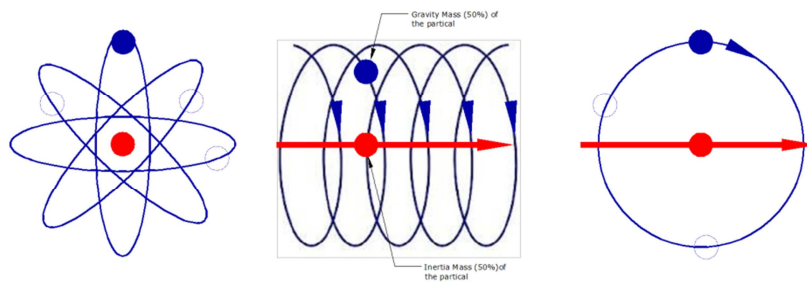


# The Spin Linear Mechanism Of Matter

A Theory Of Matter Presented By Paul Thurgood



This is the third in a series of papers. The preceding two papers should be read prior to reading this for continuity.

In this paper we describe a number of mechanisms based upon Spin Linear particle (SLP) theory principles to explain why certain aspects of Special Relativity might occur. The basic premise of this theory is that all matter particles are at a fundamental level travelling at the speed of light, either linearly as with photons outside of atoms or in circular orbits within general matter. Whilst Gravity SLPs (described in the gravity paper) are able to spin in empty space after impacts with matter, photons exist in spin mode only when inside atoms. This model enables us to explain the Weak Equivalence Principle, to demonstrate that the kinetic energy equation is one specific case of Einstein's  $E=MC^2$  equation and it provides an intuitive mechanism for time dilation, and length contraction. We also discuss the action of mass dilation (relativistic mass increase).

The concept of the atom goes back to the ancient Greeks as it was known that the atom was a fundamental particle of any element. The word Atom means indivisible. Rutherford, Neils Bohr and others split the concept of the atom into Protons, Neutrons and Electrons and these became the new fundamental particles of matter. In 1964 the proposition of quarks arrived and these became the new fundamental particles that made the protons and neutrons. It is possible that the quark is the final chapter in the book and no smaller particle will ever be found, but who can say for certain. In 100 years we might have a list of particles that scale down from the quark, each of which will have been called fundamental at some point.

In the SLP mechanism of matter, at a sub atomic level (possibly within the quark or possibly several tiers down from that level if such a thing exists) all matter is effectively mass particles travelling at the speed of light and generally constrained to circular orbits. If we were to release those orbits and allowed the constituent particles to travel together in a straight line, then effectively the whole of the object would be travelling linearly at the speed of light. We might reasonably expect the kinetic energy of that object to accord with the kinetic energy equation  $KE = \frac{1}{2} MC^2$ . Einstein's equation states that the actual energy is exactly double this amount ie  $E=\frac{1}{2} MC^2$ . The kinetic energy equation is derived by considering the work done, in accelerating a piece of mass to a certain speed. It should be applicable here unless sub-atomic kinetic energy is fundamentally different to every day energy. We will come back to this shortly.

**The Weak Equivalence Principle (WEP)** states that the gravitational mass of an object is identical to the inertial

mass. This has been tested on many occasions in Eotvos and other similar type experiments and always the gravitational mass has been shown to be substantially the same as the Inertial mass.

## Photon Mass

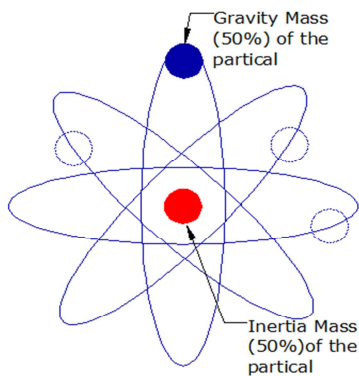
According to Special Relativity, energy and matter are interchangeable and effectively the same thing. Mass is simply condensed energy. Einstein states that photons are massless particles as nothing with mass can travel at the speed of light. We now know that muons can travel at speeds approaching the speed of light and they are far from massless.

We know that when an object emits photons it loses mass and when an object absorbs photons, it gains mass. If photons impact with matter they exert a momentum impulse upon that matter and so they act as though they have mass and yet we say that they have no mass. Momentum is the product of mass and velocity and this relationship is fundamental in our general understanding of physics. No experiment has ever been carried out that demonstrates that photons do not have mass. Photons are not the same as general matter. As photons have energy, General Relativity claims that they are gravity producing particles as space time curvature is caused by mass and energy. But if photons are self gravitating rather than simply be attracted by gravity then they should clump together when travelling across the universe. This has never been seen to occur.

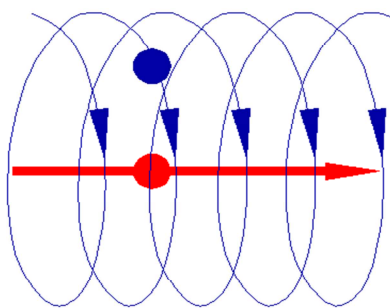
## Time and Time Dilation

We are all familiar with the increments that we use for time. The units we have adopted like the year, month, day, hour, and second are just the relative movement measurements but they do give a little clue as to what time actually is. The first stage of understanding time may be to consider what happens when we slow time to a stop. If we take the analogy of a photograph, this gives a visual image of time being stopped. Quite simply, nothing moves. If we stopped real time throughout the universe, nothing would move and if anything was moving then time would not have completely stopped. For real stopped time, all of the planets would cease to move in their orbits, gravity would cease to act, the stars would sit still within the galaxies, electric currents would no longer flow and so all of the chemical reactions produced by electron interactions in our bodies would stop. Our thoughts would stop and nothing would age. So time starts to look like a very simple thing, it is simply movement and our perception of time is simply relative movement.

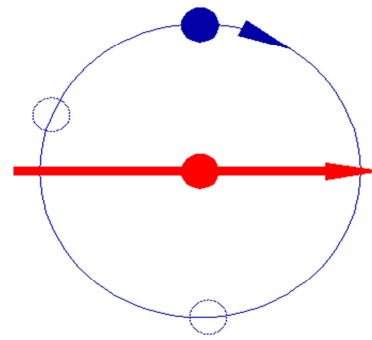
# The Spin Linear Mechanism Of Matter



Inertia Mass & Gravity Mass stationary



Inertia Mass & Gravity Mass moving. Circular Plane perpendicular to movement becomes a helix. Orbital time increases.



Inertia Mass & Gravity Mass moving. Forward path of Gravity mass slows relative to Inertia mass, backwards path goes faster relative to Inertia Mass. Orbital time increases.

If the electrical interactions in my body happened much faster, my thoughts would happen more quickly, the chemical reactions in my body would occur more quickly and I would age and die more quickly compared to another person whose time was running at normal speed.

When matter moves it is predicted to incur time dilation, length contraction and mass dilation. The equations for these transformation are as follows:

$$T = \frac{T_0}{\sqrt{1 - \frac{v^2}{c^2}}} \quad L = L_0 \sqrt{1 - \frac{v^2}{c^2}} \quad m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

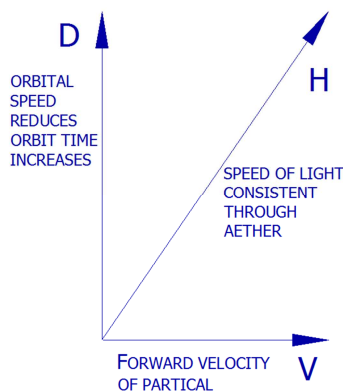
In the spin linear mechanism of matter, at a sub-atomic level, (either within the quark or possibly several tiers down from that level, if such a thing exist) general matter is made from two fundamental particles. Referring to the images at the top of the page, the central particle shown in red is the Inertial mass and orbiting it, is the gravitational mass. The two particles have identical mass. Whilst each may be a single particle as shown, each of the 2 masses could quite possibly be made up of a cloud of particles. Both have precisely 50% of the full mass of the particle. The gravitational mass is the part that interacts with all other external particles. **It is also the gravitational mass that gives the beat of time to all sub-atomic matter. The rate of time is in exact proportion to the orbiting time of the gravitational mass around the Inertial mass.**

What we think of as 1kg of matter actually always comprises 1kg of gravitational matter and 1 kg of Inertial matter.

When this full matter particle containing equal numbers of gravitational mass particles (GPs) and inertial mass particles (IPs) is at rest, the orbits of the GPs will be in a multitude of directions as shown top left. The GPs always travel at the speed of light relative to the Aether or other matrix. If we look at the middle image, it shows a GP in which the plane of orbital movement of the gravity particle is perpendicular to the overall movement. The circular movement has therefore become a helix as the overall particle moves to the right. As the overall speed of the GP has to remain at C, the orbital time must increase as the helical orbit is longer than the original circular orbit. As the orbital time indicates the actual clock time for this piece of matter, time will dilate as follows:

Time dilation based upon the spin linear matter particle is equivalent in magnitude to that of the Lorentz transformation and Special Relativity as derived hereon.

D is the original circular path  
H is the longer helical path  
V is the forward velocity  
 $t_0$  is the orbit time when stationary  
 $t$  is the dilated time which increases with velocity  
C is the speed of light and the constant speed of the GP



H is the helical path as the circular orbit moves forward

$$H = \sqrt{D^2 + (V \Delta t)^2}$$

$$\Delta t = H/C$$

$$\Delta t = 1/C \sqrt{D^2 + (V \Delta t)^2}$$

$$D = C \cdot \Delta t_0$$

$$\Delta t = 1/C \sqrt{(C \Delta t_0)^2 + (V \Delta t)^2} \quad \text{squaring both sides}$$

$$\Delta t^2 = 1/C^2 [ C^2 \Delta t_0^2 + V^2 \Delta t^2 ]$$

$$\Delta t^2 = \Delta t_0^2 + \frac{V^2 \Delta t^2}{C^2}$$

$$\Delta t^2 - \frac{V^2 \Delta t^2}{C^2} = \Delta t_0^2$$

$$\Delta t^2 [ 1 - V^2/C^2 ] = \Delta t_0^2$$

$$\Delta t^2 = \frac{\Delta t_0^2}{(1 - \frac{V^2}{C^2})}$$

$$t = \frac{t_0}{\sqrt{(1 - \frac{V^2}{C^2})}}$$

In reality not all GPs will be traveling in the plane perpendicular to the movement to start with. They will initially be travelling in a multitude of directions.

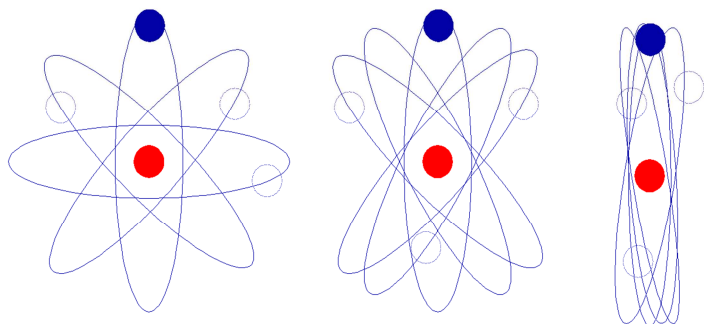
And so the change in orbital velocity might appear to be different for each orbital plane. From the Michelson Morley analysis in the introduction paper we saw that the slowed time duration for a beam of light traveling perpendicular to the movement through space turns out to be exactly equal to the time duration of light traveling back and forth in the direction of travel, once the length contraction has been taken into account. This principle will equally ensure that time dilation in all planes occurs evenly.

Time dilation is a local effect on the moving body. If Joe climbs into his space ship and travels at 80% of the speed of light for a week or so and then returns to Earth, his watch will have slowed, he and the ship will have aged more slowly. The operation of the on-board computer will have slowed, but the rest of the Universe will be completely unaffected.

The mechanism for going back in time is quite simple. We relocate all of the particles in the Universe to where they were at the earlier point, and we ensure they are all traveling with the same speeds and in the same directions as they were. Whether it is possible to go back in time at a quantum level, I have no idea, but on a macroscopic level it is of course not realistic and best kept in the realms of science fiction. The mechanism for going forward in time is a much more realistic proposition. To do this you would fly off in a very fast spaceship for a few years at a speed approaching the speed of light and then return to earth. If you went fast enough, you might have only been gone for a few months of your local time, but when you returned you will find that the world had moved on by many years or decades. The problem is that it is a one way ticket. Once you have jumped forward, there would be no going back.

### The mechanism of Length contraction

As the full particle described moves, the multitude of orbital plane directions of the gravitational 50% mass will gradually flatten toward the plane perpendicular to the motion as indicated in the image below. This is analogous to a flat profile parachute always tending to be perpendicular to the motion of fall. Whilst drag aligns the parachute, this alignment must come from a frictionless interaction with some form of medium or aether. This will happen in accordance with the Lorentz length contraction equation.



By the time the full particle is hypothetically travelling at the speed of light, it will have contracted to a tiny fraction of its original length. The Lorentz equation states that it would be infinitely foreshortened, but as this would not leave anything at all, let's stick with "a tiny fraction of its original length" as this seems a little more realistic.

Hopefully it has become apparent that as we moved our full matter particle from left to right through space or the Aether

if such a thing exists, the GP maintained constant speed  $C$ , and so we didn't accelerate it at all. Whereas we did accelerate the Inertial particle. Had we needed to accelerate both of the 50% mass particles, the effective mass would have been double. In other words instead of having to put in  $1/2 MV^2$ , we would have had to put in the full  $MV^2$  and hence the difference, or the connection if you prefer it, for the two equations  $E=MC^2$  and  $KE=1/2 MV^2$ .

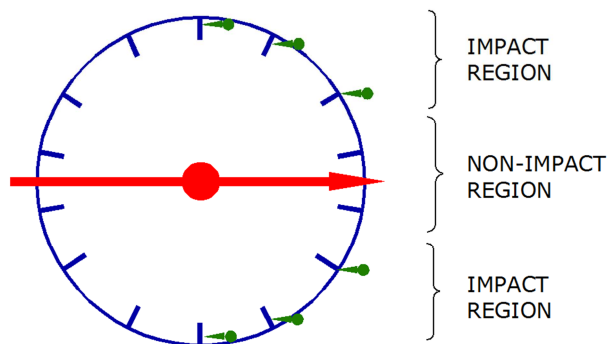
The Rainville et al experiment in 2005 was one of many experiments since the original Cockcroft and Walton experiment to measure  $E=MC^2$ . All have shown the equation to be correct when considering photons.

Whilst I assume that  $E=MC^2$  is equally valid when looking at atoms rather than just photons, I am not aware that any test has been carried out to demonstrate this. For example, in a fission bomb only about 0.03% of the fissile core mass is turned into energy and so this gives no inkling as to whether  $E=1/2 MC^2$  or  $E=MC^2$  actually applies.

If the total energy of matter was only  $1/2 MC^2$  then this would infer that the inertia particle is some form of stationary inert energy-less entity. On the assumption that this is not the case and the  $E=MC^2$  equation applies to full particles then inertial masses must also have the energy of  $E=MC^2$  and must also be traveling at the speed of light. When the overall particle starts to move, the inertial particle must gain further energy and therefore further velocity, over and above that of  $C$ . It is likely that the inertia particles in inner circular orbits gain additional spin energy which relates to their increase in frequency. This is analogous to photons travelling at the speed of light and gaining or losing additional frequency energy. Photons contain energy in accordance with  $E=MC^2$  but then gain or lose energy through frequency changes.

GPs are the 50% part of matter that interacts with the Spin Linear Gravity particles described earlier. Occasionally converting them from linear motion to spin motion. They do this because they are in rotational orbits. It is my assumption that photons in linear motion, do not knock SLPs into spin and do not therefore create any gravitational force of their own. Photons are deflected by gravity because there will always be a net flow of SLPs towards a massive object. More SLPs impact on the far side than on the near side when in a gravitational field.

*Proposed image of a moving full particle in which impacts with external particles always occur with the with the gravity particle as it moves approximately towards them..*



When the GPs impact with any other particles, such as the gravitational field SLPs, these impacts always occur with the GP as it is moving almost directly towards them as indicated in the image above. This ensures that impacts always occur

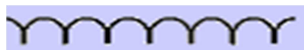


with the same overall combined velocity. However fast or slow the matter is moving, it always has the same impact speed. This is why the gravity field doesn't impede the motion of the Earth as it travels through space. There are equal numbers of impacts on the front of the Earth as there are on the rear surface and the velocity of the impacts is identical in both directions.

This avoids the analogous situation of the rain hitting the front of your face harder than the back of your head. (As Feynman described it when discussing the Shadow Theory of Gravity in the Feynman Lectures in the early 1960s).

We unfortunately have to face up to certain difficulties here. How are photons able to pass through the SLP field unimpeded? They probably do this in exactly the same way that they pass through the Higgs field unimpeded. (ie We know they do it but we don't know exactly how).

We know that photons must be able to pass through the SLP gravity field unimpeded when travelling through space in a forward direction but at the same time, we know that they are deflected by side impacts with SLPs, as light is bent when passing massive objects. Perhaps they are string like Wavicle objects that wiggle through the various fields showing an almost infinitesimal frontal area to the fields head on.



Why is a photon deflected twice as much by side impacts with the gravity field when compared to general matter when Newton gravity would predict identical deflection of photons and general matter?

It may result from the  $\frac{1}{2} MC^2$  Versus  $MC^2$  double ratio and that a photon somehow becomes a full gravity particle with only half an inertial particle. Whilst that may turn out to be the case, another possibility exists that is so simple and so obvious, that it seemed to me to be almost ridiculous when it first occurred to me. Nevertheless, just because something is simple should not rule it out.

This is that the side cross sectional area of a photon compared to its mass, happens to be twice as large as for an atom or a quark ie general matter particles compared to their mass. If this is the case, photons absorbed within matter may become small and possibly spherical and unravel when travelling linearly.

Whilst this is so simple, Newton couldn't predict this because "Action at a Distance" has no particles and no mechanism. General Relativity gets around the problem in a different way as space time is said to double the gravitational curving of light beams.

There is still a further anomaly to resolve. If photons can pass through the SLP field head on, without being impeded, how do they lose energy when rising through gravitational fields head on. Why do these two different actions occur? General Relativity doesn't incur this problem as the curvature of space time is only significant adjacent to massive bodies. Newton doesn't have this problem as he gives no model to concern ourselves with. In the SLP model, light could easily incur a similar impediment in empty space as it does in a gravitational field and quite obviously this cannot happen as photons would no longer be long range particles.

Does it take a photon some time to unravel into its full linear motion shape and therefore any photon escaping a massive object, only incurs gravitation energy loss during this short time? Is the Aether compressed close to massive objects and this causes the photons to impact in a normal gravitational way within a certain proximity and then travel unimpeded later on? When electrical current flows through a wire at a temperature approaching absolute zero, the resistance becomes negligible due to the absence of molecular vibration. It may be that light isn't impeded by the gravity field throughout space due to this lack of spin SLP vibration.

In Richard Feynman's book QED he explains why light slows when passing through air, glass and water and other denser media. He explains that light photons when passing through these media, are repeatedly absorbed and re-emitted by atoms encountered along their path. This is where I believe the gravitational Redshift occurs, when they are within the atoms rising up from a gravitational mass. Once away from general matter, they would no longer be impeded.

### Mechanism Of Mass Dilation With Velocity

Whilst gravitational time dilation and gravitational length contraction do occur, there is no such thing as gravitational mass dilation. This is because SLPs impacting with and accelerating a matter particle, are not absorbed by it, they impact and bounce off.

Mass dilation is the phenomenon in which any object should experience an increase in mass with velocity reaching an infinite mass when hypothetically reaches the speed of light. What does it mean for an object to increase in mass? Are we talking about an increase in gravitational mass of inertial mass or both in equal quantities. If I was to somehow propel the earth at 70% of the speed of light and placed an apple on a spring operated weighing machine on the earth, would it show an increased mass? Mass has two slightly different meanings in that it might imply the quantity or a particular material but mass is also a measure of inertia and a resistance to acceleration.

If we consider the kinetic energy equation  $KE = \frac{1}{2} MV^2$  this means that it takes 50 joules to accelerate 1kg of mass to 10m/s but it takes a further 150 joules to accelerate it from 10m/s to 20m/s. However no one would say that the Kinetic Mass of that object has increased.

Whilst Mass Dilation is one of the three Lorentz transformations, and shares a similar equation to the other two, its mechanism is quite different and so I have described it here separately. When a proton is accelerated in a particle accelerator, the force is provided through electromagnetic waves. The process is more complex than I am describing but effectively it is like throwing photons at the proton that is to be accelerated. They are thrown at the speed of light and some are absorbed by the proton on impact, adding to its mass and slightly accelerating it. Every extra added photon increases the velocity but also increases its mass, making it harder and harder to accelerate. This is the action of Mass dilation.

To give increased velocity, the action of applying force always entails collisions which transfer energy which is mass

in motion. As the proton goes faster, the relative speed between it and the impacting photon gets smaller and so a case of diminishing returns occurs. When the proton finally makes its impact at the end of its run, the full mass of the proton with all of the added mass from the acceleration process, is involved in the final collision.

Einstein's iconic equation  $E=MC^2$  tells us that if we were to accelerate a proton in a particle accelerator by bombarding it from behind with photons, it would increase in relativistic mass. However, if we were to bombard this accelerated

proton from the front to decelerate, its relativistic mass would decrease and by the time it was stationary, its mass would be back to where it started.

This has never been tested and would be the ultimate test of special relativity because if the proton simply gained mass because it had gained the accelerating photons and then gained further mass by absorbing the decelerating photons, then this element of Special Relativity would be floored.