Gravity & Spacetime

Beyond Einstein

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Abstract

This paper makes the following predictions:

1. Spacetime is quantum in nature
2. Spactron is the quanta of spacetime
3. A Spactron is made up of three spatial and one time dimension
4. Spacetime, matter, energy, force and everything in our material universe are all made up of Spactrons
5. Gravity is the product of the Spactron density differential between mass and the surrounding spacetime

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What is Gravity?

Gravity has been a source of curiosity perhaps since the first philosopher fell off a tree trying to gather some fruit. I can quite imagine him wondering why he fell down and not up? While Aristotle, Galileo, Newton and Einstein helped progress our understanding of gravity, it continues to be an elusive and mysterious phenomenon.

For example, some of the questions about gravity which defy any rational explanation are:

- What is Gravity?
- Why does it always accompany mass?
- How does it bend space?
- How does it influence objects across vast cosmological distances?
- Why does it only attract?
- Why is it so weak?
- Why is it difficult to unify gravity with the other three forces of nature?

To answer these questions, let us first gather some simple facts about gravity:

1. Gravity is the attractive force which objects or particles with nonzero mass exert towards each other.
2. Anything which has mass exerts a gravitational force
3. The more massive or dense an object is, the stronger its gravitational force
4. The strength of the gravitational force is strongest near the mass exerting gravity
5. The strength of the gravitational force weakens with distance

Einstein described gravity not as a force but a consequence of the warping of spacetime due to the presence of matter. The more massive an object, the greater the warping and stronger the resulting gravitational force. In other words, the presence of mass affects changes in spacetime which manifest as gravity.

From this we can safely assume that gravity is always the result of an interplay between

- Mass and
- Spacetime

Of the two, we have some idea about mass but how much do we know about spacetime? The answer is very little, verging on nothing.

Spacetime

It always comes as a shock to most people when they realise how little we know about spacetime. For the purpose of this paper we are treating space as the Spacetime *defined* by Einstein as a composite made up of a three spatial and one time dimension.

10 Unanswered Questions about Spacetime

Some of the unanswered questions about spacetime are:

1. What is Spacetime?
2. What is it made of?
3. Where did it come from?
4. Is it real or an illusory construct of human consciousness?
5. Is it material, immaterial, continuous, discreet or just a relationship between objects?
6. Can it be created or destroyed?
7. What is it in spacetime that bends, warps, ripples and expands?
8. Can it have any existence without matter and energy or vice versa?
9. What do we mean when we talk about empty space?

The simple answer to almost all these questions is that we do not know! Yes, we have some theories which are either speculative, inconsistent or outright weird none of which qualify as legitimate spacetime theories.

With the categorical rejection of the once popular theory of *luminiferous aether* by Albert Michelson and Edward Morley in 1887, any serious investigation into the nature of spacetime has taken a backseat, making only occasional guest appearances in developing theories like Loop Quantum Gravity.

It is clear that any investigation into the nature of gravity has to initially start with dealing with the challenge of establishing the nature of spacetime.

Investigating spacetime

If we consider the question of spacetime in isolation the following facts emerge:

1. It is unobserved and perhaps unobservable
2. It is everywhere
3. No material thing can exist outside spacetime

Is Spacetime real?

Here are some facts to validate the reality of Spacetime:

1. Our experience of, and existence in three-dimensional space and time points to the reality of the four-dimensional Spacetime

2. Gravity is the result of the warping of spacetime as per the General Theory of Relativity, one of the most validated modern theories in science which must surely qualify as incontrovertible evidence of the reality of spacetime

3. The generally accepted ongoing expansion of the universe means the expansion of nothing else but spacetime

4. The maximum allowable speed of light at 300,000 km per second in a vacuum is proof of the existence of spacetime as the absolute against which speed is measured

5. The gravitational lensing of light is direct evidence of the warping of spacetime and its existence

6. Evidence of the expansion, bending, rippling, warping and tunnelling are attributes of spacetime proving its existence

Accepting the reality of spacetime leads us to following safe conclusions:

1. Spacetime is everywhere because perhaps nothing “material” can exist without it

2. This makes spacetime not only “something” but also omnipresent

3. If spacetime is something, it must be made up of something.

4. The failure of any attempt to detect or observe spacetime might point to its possible status as the most fundamental entity of our material existence

5. The status of spacetime as the most fundamental entity of our existence is also inferred by the fact that, as far as we know, nothing material can exist outside spacetime

6. If spacetime is the most fundamental entity of our material existence than it would be logical to assume that everything in the universe must be made up of spacetime, making it undetectable due to the problem of circular self-detection

Spacetime as the most fundamental building block of the universe

Once we accept the reality of spacetime, the natural next step is to explore its potential as the most fundamental entity of the universe. The first question that needs answering to understand the nature of spacetime is whether it is quantised or a continuum?

How do we find out if something that is undetectable and unobservable is a continuum or discrete? The only tools available for us to settle this question are the tools of logic, inference and looking for hierarchical symmetries and patterns in nature.

In the absence of my awareness of many credible arguments supporting the continuum of spacetime, I have taken the liberty to present some strong arguments supporting its discrete quantum nature:

1. Quantum theory supports the quantum nature of everything even if it appears to be a continuum

2. Albert Einstein in his 1905 paper on Brownian motion made a major shift in proving the quantised nature of liquids which many at the time believed to be made up of a natural continuum

3. Our current knowledge of everything including solid, liquids and gas points to everything being made up of particles at its most fundamental level. For example, we know that sea and air, despite their appearance of a continuum, are made up of discrete particles

4. We do not know of any material substance in nature which is a continuum

5. A spacetime continuum would take almost an infinite amount of energy for matter to warp it and create gravity. This is easily validated by imagining how much energy it would take to create a wave in an ocean that was a continuum instead of being made up of water molecules

6. It would be simpler for spacetime to warp, ripple and expand if it was discrete

7. If gravity is the result of a change in the geometry of spacetime then that can only be if it is discrete since the concept of change in the geometry of a universe sized continuum leads to absurdities

8. Loop Quantum Gravity or the Theory of Quantum Gravity proposes an intriguing concept of a Quanta of Gravity as the most fundamental particle making up the universe. According to this theory quanta of gravity do not exist in space but create space itself

9. In a little publicised paper published in 2014, the French Scientist Pierre Peretto made an interesting claim that the universe was made up of discrete particles called “cosmic bits” and that all the objects in the universe were created from spacetime made up of these discrete “*cosmic bits*”

10. The logic of Zeno's paradox of Achilles, the world’s fastest runner and the tortoise illustrates the logic of time not being infinitely indivisible, which if true would never allow Achilles to catch the tortoise with a 100-metre start. So, if time is discrete it must make spacetime discrete as well

11. The discrete nature of reality was also brilliantly proved by Democritus (460 BC) through logic proving that matter was not infinitely divisible because at that stage it would have to be without any dimension to prevent any further division. However, anything *without* any dimension is immaterial and cannot combine with anything, thus eliminating the possibility of a material continuum

12. John Archibald Wheeler made a bold assertion in his 1989 essay “*Information, Physics, Quantum: The search for links”* stating that there is “*No continuum in mathematics and therefore no continuum in physics.”* I take this further to assert that *“No known continuum in nature and therefore No unknown continuum in nature either.”*

Based on the above arguments, we can safely conclude spacetime to be discrete and quantised. This takes us to the next question about the nature of the quanta of spacetime. What might this quanta of spacetime be? What would be its properties? What would its relationship with spacetime, matter and energy be?

Spactron the Spacetime Particle

If Spacetime is discrete then it must be made up of a fundamental particle and this theory designates this particle *Spactron*. Some of the attributes of Spactrons can be *inferred from the observed nature of Spacetime* for example,

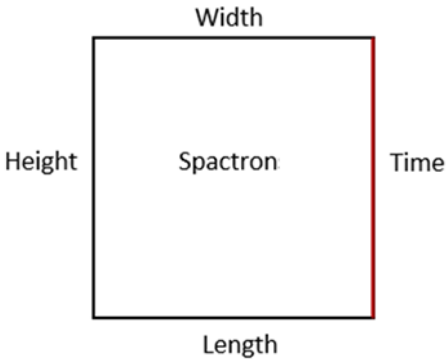
1. It has three spatial and one time dimension
2. It pervades the universe as Spacetime giving the impression of continuum which can be likened to water molecules in an ocean
3. It is able to exist without matter and energy
4. Since matter and time cannot exist without spacetime, it makes Spactrons the most fundamental entity in the universe
5. It must be able to compress, warp and change its geometry

This theory proposes the following additional attributes of Spactrons:

1. The compression of a Spactrons only changes its size but not its shape
2. The warping is always a result of the compression of its time dimension which changes its shape due to the proportional expansion of its spatial dimensions
3. The expansion, contraction and warping of Spactrons is always at the cost of proportional compensatory expansion, contraction and warping of surrounding spacetime Spactrons
4. Spactrons are always attracted to high density Spactrons

The adjacent image hypothetically represents a Spactron as a square with its three sides representing space and one side, shown in red, representing time.

It should be noted that all the images in this paper are mere representations and do not reflect the true reality in shape, size or scale.



From Spactrons to the Universe

The above attributes of Spactrons lead us to the following possibilities about some of the fundamentals of the universe:

1. Almost an infinite number of Spactrons create Spacetime in the same way that water molecules combine to create the seeming but illusory continuum of an ocean

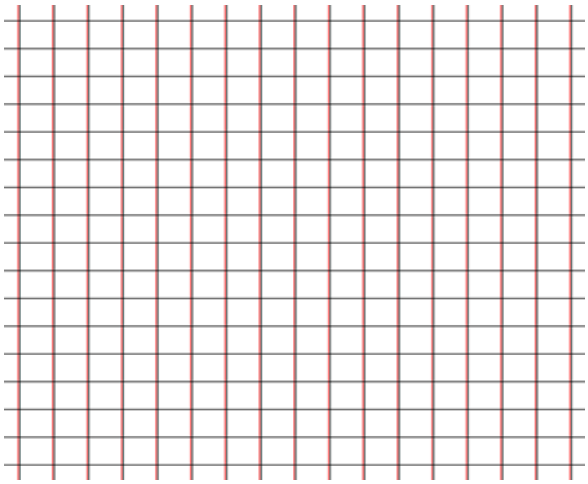
2. Spactrons which make up spacetime also manifest as matter, energy, forces and force fields and everything material that exists in the universe

3. Spactrons are the common fundamental entities which transform from energy to matter and vice versa as per Einstein's famous equation $e = mc^2$

This obviously leads us to the question of how Spactrons manifest in their different guises of Spacetime, Matter and Energy, Force and Fields?

Spactrons as Spacetime

In their normal configuration Spactrons represent Absolute Spacetime against which everything is measured. It can be graphically represented as a sea of Spactrons as shown in the adjoining image.



Sea of Spactrons

The image of spacetime on the right represents what we commonly call *Empty Space* without any matter or energy. This is also the *Absolute Spacetime* which can only exist in the absence of matter and energy since, according to this theory, both these distort spacetime Spactron.

The *Absolute Spacetime* of this theory could also be the *Absolute Spacetime* envisaged by Einstein against which the absolute speed of light is measured.

Normal Spacetime

We will frequently use the term *Normal Spacetime* in this theory representing relative spacetime density and geometry instead of an *Absolute Spacetime*. This is because the presence of matter and energy has an ever-diminishing infinitesimal subtle impact on the density and geometry of spacetime Spactrons which extends throughout the universe.

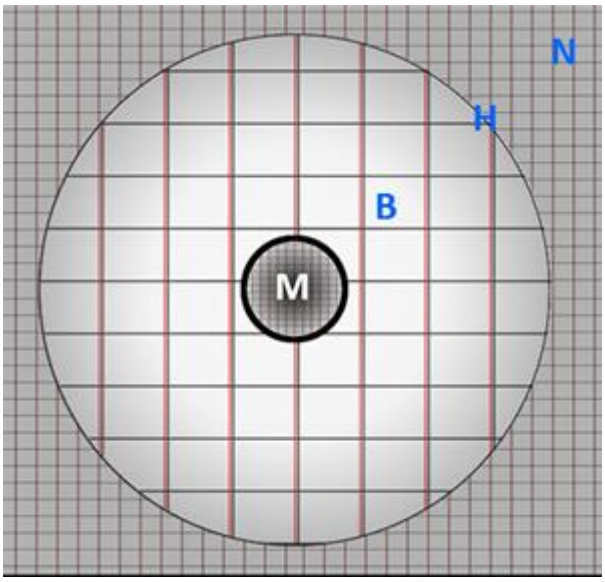
Normal Spacetime of this theory represents the average density and warping of spacetime in a region.

Matter

Matter is always the manifestation of densely bunched up Spactrons where all their dimensions retain their shape irrespective of how densely they are compressed and bunched up.

The compression of Spactrons comes at the cost of their rarefaction in the surrounding spacetime. In other words, the high density of matter Spactrons result in the low density of surrounding spacetime Spactrons.

The difference between the density of the Spactrons around matter and the density of normal spacetime is termed as **Spacetime Density Differential.**



Spactrons Matter Representation

M – Matter created by densely bunched up Spactrons

B – Area of low density spacetime Spactrons

H – Gravity Horizon

N – Normal Spacetime Spactrons

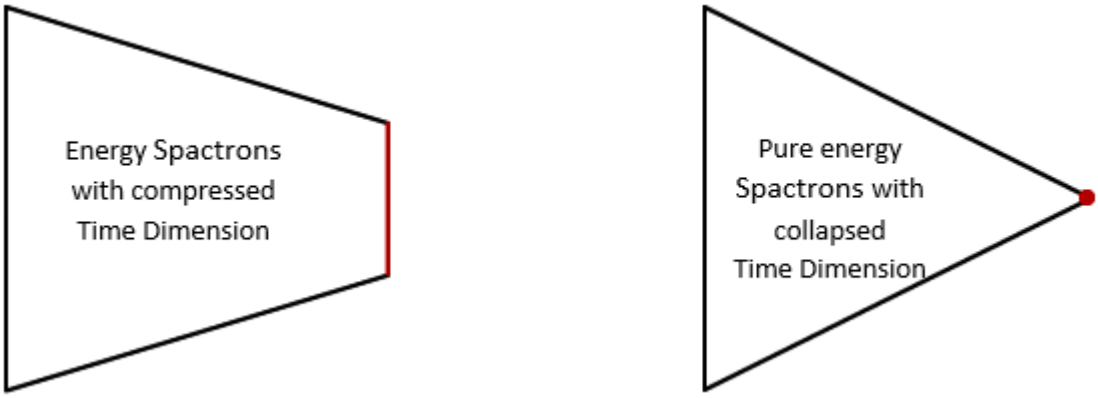
The greater the mass (M) the greater the *Spacetime Density Differential* in surrounding spacetime. In the case of very low mass this differential would be almost undetectable.

The outer limit of the *Spacetime Density Differential* is defined as ***Gravity Horizon*** (H). This is the limit to which the matter *directly* exerts its influence. At this horizon the *Spacetime Density Differential* is negligible to have direct impact on any object with Spactron density becoming the same as that of Normal Spacetime (N).

It should be noted that even in matter (M) the density of Spactrons is highest at the core and reduces as we move away towards its surface. This is represented by the gradual shading of matter with dark shade representing higher density.

Energy

Energy is the manifestation of high density bunched up Spactrons where their time dimension starts compressing incrementally depending on the strength of the energy. The greater the time dimension compression in energy Spactrons, the stronger the energy and greater the warping and rarefaction of surrounding spacetime Spactrons. When the time dimension is fully collapsed, we get pure energy Spactrons, the core constituents of photons.

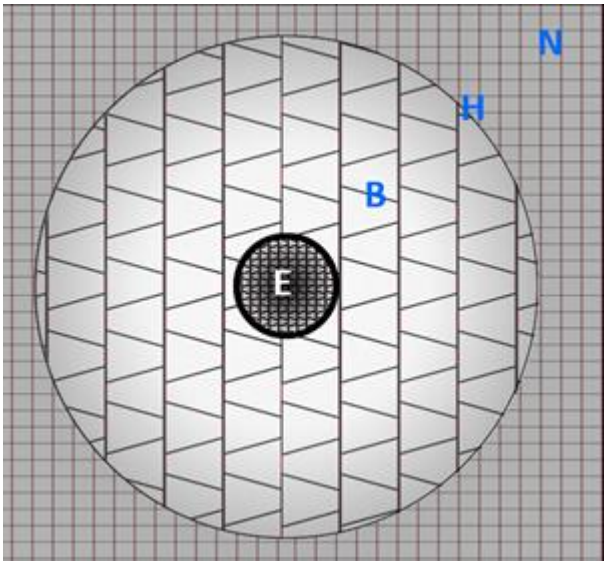


This compression of time dimension in energy Spactrons results in their warping. This warping directly affects the surrounding spacetime Spactrons which also warp to adjust to the warped energy Spactrons. This process continues in surrounding spacetime Spactrons which incrementally diminishes as we move away from the energy Spactrons, reverting to normal spacetime Spactrons geometry at a suitable distance.

The high-density compression of Spactrons in energy results in both the rarefaction and warping of surrounding spacetime Spactrons. Thus, the spacetime around energy is made up of both low density and warped Spactrons.

One obvoius validation of this theory arises from the fact that the General Theory of Relativity confirms the slowing down of time with energy. Greater the energy, greater the compression of time dimension, hence slower the time.

Energy also creates a **Spacetime Density and Warping Differential** in the spacetime around it on account of the low density and warping of spacetime Spactrons surrounding it.



Spactrons Energy Representation

E – Energy created by densely bunched up and warped Spactrons

B – Area of low density spacetime Spactrons

H – Gravity and Warping Horizon

N – Normal Spacetime Spactrons

The greater the energy (E), the greater the *Spacetime Density and Warping Differential* in the surrounding spacetime. In the case of very low energy this differential would be almost undetectable and unobservable.

The outer limit of the *Spacetime Density and Warping Differential* is defined as ***Gravity and Warping Horizon*** (H). This is the limit to which the energy directly exerts its gravitational and warping influence. At this horizon the *Spacetime Density and Warping Differential* is negligible to have direct impact on any object with Spactron density warping becoming the same as that of Normal Spacetime (N).

It should be noted that in the same way as matter, in energy (E) the density and warping of Spactrons is highest at the core and reduces as we move away towards its surface. This is represented by the gradual shading of energy with the dark shade representing higher density

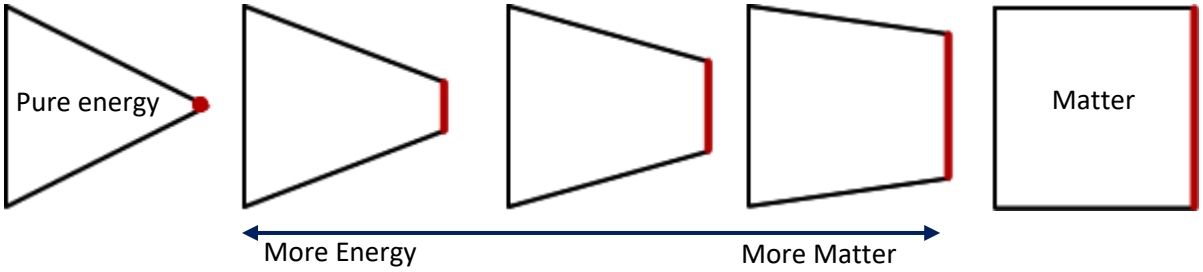
Validating $e = mc^2$

From our above explanation of matter and energy we see that they are almost alike except for the state of their time dimension. That being the case tweaking the time dimension should allow for transformation of matter into energy and vice versa.

Let us see if this explains the energy and matter equivalence of Einstein's famous equation $e = mc^2$.

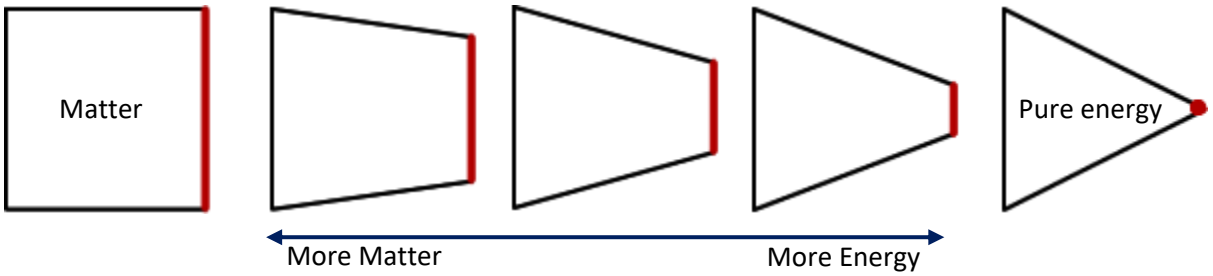
Energy to Matter

Energy is converted to matter when energy Spactrons time dimension *unfolds* to its full size transforming the energy Spactron into a matter Spactron



Matter to Energy

Matter is converted to energy when matter Spactrons time dimension is *compressed* incrementally, ending up as a pure energy Spactron with its time dimension fully collapsed. These Spactrons combine to form photons.

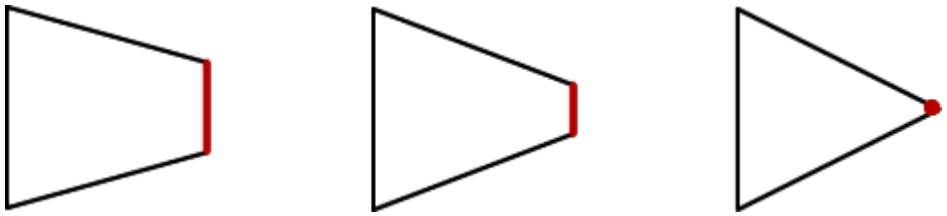


From the above figures we can see that to covert energy to matter we need to *unfold* its time dimension whereas to convert matter to energy we need to *compress* it. This is the process that coal goes through when it is burned to produce energy.

Both processes need energy to start the process, which at a critical stage become self-sustaining due to the huge amounts of energy being released during the process.

Slowing of Time

As the Time dimension incrementally collapses with high energy, the size of spatial dimensions increases proportionally resulting in the increase in the size of spatial dimensions, which is observed by us as the slowing of time.



Since the speed of light is possible only for massless particles, and according to this theory light particles have no time dimension, this leads us to an interesting insight that perhaps it is the time dimension which is responsible for mass and even the Higgs Boson field.

Explaining Quanta, Particles, Waves and Strings

With the above concepts about matter and energy, this theory seamlessly integrates and provides a foundation for all existing theories by proposing Spactrons to be the *fundamental building block* of every material entity in the universe be it Quanta, Particles, Waves, Strings or spacetime itself.

This theory provides a gateway to integrate all the existing theories about the fundamental nature of the universe perhaps opening a gateway to the long sought *Theory of Everything*.

Explaining Gravity

The General Theory of Relativity proposes spacetime to be flat in which a small mass will rest or travel at a constant speed. However, in the presence of large mass the spacetime warps and manifests as gravity around mass.

This theory differs from the above interpretation of gravity by suggesting that spacetime is only flat in the *total absence* of matter and energy. This flat spacetime can be called empty space or *Absolute Spacetime*. Since matter and energy are created by densely bunched up Spactrons which borrow from surrounding spacetime, they always create a *Spacetime Density and Warping Differential* which explains why we always find gravity or other forces accompanying matter and energy.

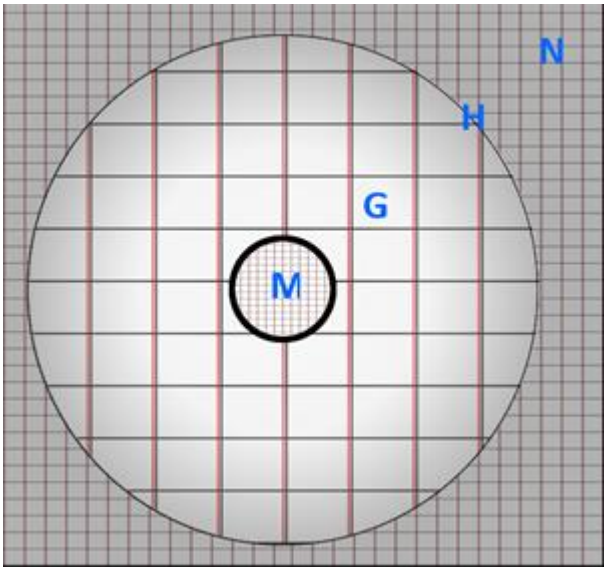
The connection between gravity, electromagnetic force and the density of mass is well established. Consider the case of a neutron star with a mass of almost 1.5 solar mass concentrated in a small diameter of 10 kilometres. The fact that this results in the gravity of the neutron star being 2×10^{11} times stronger than on earth with an equally powerful electromagnetic field surely must qualify as almost slam dunk evidence of density of spacetime being a strong contender for the phenomena of Gravity.

So why has such an obvious link been overlooked by science? The answer may perhaps lie in the fact that the concept of spacetime has always been shrouded in ambiguity. Einstein's suggestion about Gravity being a function of the distortion in the curvature of spacetime may have been the result of his visualisation of spacetime as a continuum in which case curvature is the only possible explanation for gravity.

Interestingly, Einstein's warping of spacetime curvature proposition may also be indirectly supported by this theory of gravity being the product of a change spacetime density. The confusion arises mainly due to the popular, *but deceptive*, two-dimensional spherical mass on a trampoline representation of Einstein's spacetime. If you imagine this same representation in *4D spacetime,* you immediately end up with what looks like a density distortion replacing the 2D curvature distortion.

The visualisation of gravity radically changes as soon as we accept a granular Spactron based nature of Spacetime which makes the concept of curvature redundant, leaving density differential as the only explanation for Gravity.

Accepting *Spacetime Density Differential* as the source of gravity results in the following picture of gravitational force:



Spactrons Gravity Representation

M – Matter with dense bunched up Spactrons

G – Gravitational field with low density stretched Spactrons

H – Gravity Horizon

N – Normal Spacetime

It is useful to note that there is almost no difference in the images representing matter and gravity because both are two sides of the same coin and this theory clearly explains why you can't have one without the other.

Does this theory Answer all the Questions about Gravity?

- What is Gravity?
  Gravity is the result of rarefaction of spacetime Spactrons around mass

- Why does gravity always accompany mass?
  It always accompanies mass because both mass and gravity are the products of spacetime with mass being the product of bunched up Spactrons and gravity the product of rarefaction of Spactrons

- How does it bend spacetime?
  Bending of spacetime is nothing but the density differential created by the bunching up of Spactrons in mass

- How does gravity influence objects across vast cosmological distances?
  The density differential depends on the size and density of the mass and extends in surrounding spacetime over huge distances with ever diminishing strength

- Why does gravity only attract?
  It only attracts because any object in the Gravity Horizon of rarefied Spactrons is always attracted towards the high-density mass Spactrons

- Why is gravity so weak?
  It is weak because the density differential is spread over a huge area where its strength is dependent on the density of the matter Spactrons

- Why is it difficult to unify gravity with the other three forces of nature?
  Gravity is the product of rarefaction of spacetime Spactrons around matter with their time dimension intact. All the other forces, on the other hand, are the product of *both rarefaction and warping* of spacetime Spactrons around energy with the warping of their time dimension. It is this difference between gravity and other forces which prevents their unification

The above answers clearly validate this theory which suggests Gravity to be the result of spacetime density differential in the presence of mass, and not a consequence of the curvature of spacetime as proposed by Einstein's Theory of General Relativity.

Explaining Forces

Forces are the same as Gravity except for the fact that they are always generated by energy or *energised matter* which is made up of both matter and energy Spactrons. Since energy is created by densely compressed and time dimension compressed Spactrons, the surrounding spacetime Spactrons go through both rarefaction and warping.

We have already seen that the low density of spacetime results in the manifestation of Gravity. In the same way the compression *and* warping of Spactrons results in the creation of *all the other* forces known to us including

- Electromagnetic Forces
- Strong Nuclear Force
- Weak Nuclear Force

Due to the change in both the density and geometry of Spactrons around energy, they form patterns of low-density warped Spactron spacetime which we can see in the familiar iron filing patterns of a magnetic field.

While Gravity is purely the result of the low density spacetime, all the other forces are the product of both the *low density and warped* spacetime patterns.

The strength of these forces and manifestation of their fields due to warping of Spactrons is dependent on density and warping of the source energy Spactrons.

Unification of Forces

The four fundamental forces which govern the behaviour of almost all matter and energy in the universe are:

- Electromagnetic Force
- Strong Nuclear Force
- Weak Nuclear Force
- Gravitational Force

One of the biggest challenges of modern science has been to unify all these forces of which the first three are close to being unified. Gravity on the other hand is stubbornly refusing to cooperate in this effort for unification. Why?

This theory resolves this dilemma by dividing the four forces into the following two categories:

1. **Cosmological Force**
   - Gravitational Force which exists around all matter and energy
2. **Energy Forces**
   - Electromagnetic Force
   - Strong Nuclear Force
   - Weak Nuclear Force

   These three forces *only* emerge around energy, or energised matter, due to both rarefaction and the warping of spacetime Spactrons.

The unification of all the forces is supported in this theory as follows:

a. All forces are the product of the low-density and geometric arrangements of Spactrons surrounding matter and energy

b. The link between matter and energy ($e = mc^2$) supports the concept of all forces being a different manifestation

c. n of the same spacetime Spactrons

d. Gravity resists unification due to the non-compression of its time dimension which is requisite feature in all energy forces

With the proposal of Spactrons at the core of all forces, this theory manages to not only unify them but also explain their different behaviour.

Force Fields

The area of influence of a force is called its field. It extends to huge distances with diminishing strength.

1. Energised matter like magnets and electrical cables produce both gravity and electromagnetic force in the surrounding spacetime. The same thing happens with stars and planets with their gravitational and electromagnetic forces

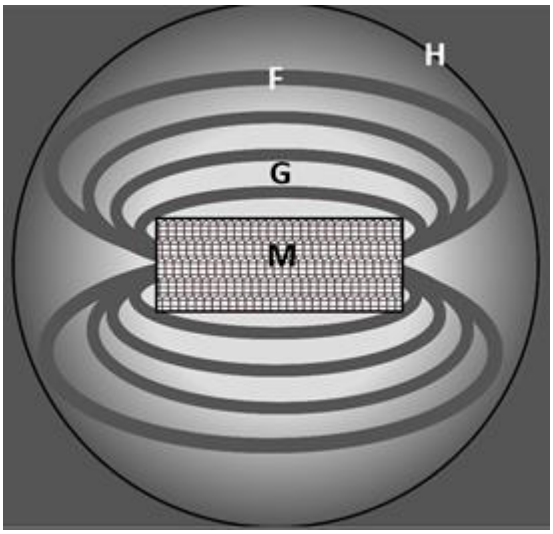
2. It is the difference in the configuration of the time dimension in energy which is at the root of the difference in the *cosmological and energy forces*

3. Force fields always consist of both the *cosmological and energy forces*

4. The area over which the energy Spactrons affect the density and geometry of surrounding spacetime manifests as a force field

5. According to this theory the Magnetic field we see with the iron filings around it is nothing but the geometric manifestation of *Spacetime Density and Warping Differential* which manifests in two ways:
   - Gravitational Field on account of the spacetime density differential
   - Magnetic Field on account of the pattern created by warped spacetime STs

6. The space between the magnetic field patterns are representations of areas of normal gravitational force created by the mass of the magnet



Spactrons Magnetic Field Representation

M – Magnet with densely compressed matter and energy Spactrons

G – Gravitational Field

F – Electromagnetic Field

H – Gravitational and Electromagnetic Field Horizon

Gravity & Acceleration

In developing his General Theory Relativity, Einstein assumed that the force you feel when you are pushed against the seat of an accelerating car or pushed down towards the floor of an upwardly accelerating elevator is the same as gravity. But is it? Where is the link between acceleration, gravity and the curvature of spacetime created by mass? The fact that the influence of acceleration and gravity on spacetime is very different implies that either there are two kinds of gravity or there is something fundamentally wrong with Einstein's equivalence principle.

We are reasonably certain about gravitational force being the result of the presence of mass in spacetime, a fact validated by the whole universe. However, how sure are we about the force felt due to acceleration also being gravity?

Let us consider a rocket in space accelerating at the speed of 9.8 meters per second. This creates the same sense of downwards gravitational pull for the astronaut as the gravitational force felt on earth. Is this perceived gravitational force due to the change in the spacetime curvature?

First let us remind ourselves that acceleration is nothing but the rate of change of velocity of an object.

We should keep in mind that it could be that the astronaut in the rocket feels pushed down to the floor of the rocked due to the speed differential between the rocket and the astronaut. We must remember that due to acceleration, the speed of the rocket is constantly changing creating a speed differential with the speed at which the astronaut inside the rocket is travelling. Not being an integral part of the rocket, the astronaut is caught up in a continuous cycle of catch-up with the speed of the accelerating rocket. Greater the acceleration of the rocket, greater the speed differential between the astronaut and the rocket and greater the astronaut's sense of gravitational pull.

However, as soon as the rocket stops accelerating it gives the astronaut the time required to catch up with the speed of the rocket. As soon as this happens the gravitational pull being felt by the astronaut disappears.

From the above we infer that the perceived gravity felt by the astronaut in the accelerating rocket was nothing but the push of the rocket on account of its greater speed. Is this perception gravity or an illusion of gravity?

Variation in Gravitational Pull due to change in Acceleration

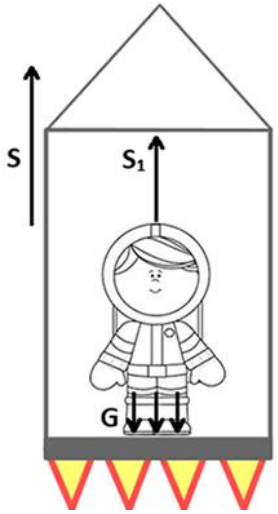
Accelerating Rocket Gravitational Downward Pull

S – Speed of accelerating rocket at a specific time

S_1 – Speed lapse of the Astronaut in comparison to the speed of the rockets

S > S_1 - The Astronaut feels the force of being pushed down due to moving at slower speed than the rocket

G - The strength of the downward pull *against* the direction of movement which is proportional to **S - S1**

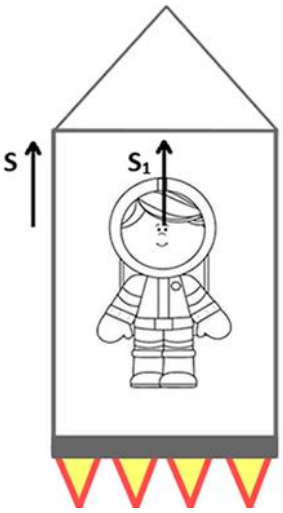


Non-accelerating Rocket Gravitational Downward Pull

S = S_1 - Speed of accelerating rocket & astronaut is the same

G - The force of being pushed down against the direction of acceleration disappears as soon as **S = S1**

G = 0



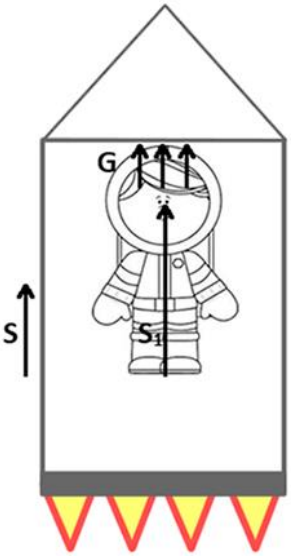
Decelerating Rocket Gravitational Upward Pull

S – Speed lapse of the decelerating (negative acceleration) rocket at a specific time

S_1 – Speed of accelerating Astronaut in comparison to the speed of the rockets

S < S_1 - The Astronaut feels the force of being pushed up due to moving at faster speed than the rocket

G - The strength of the upward pull *against* the direction of movement of the rocket which is proportional to **S_1 - S**



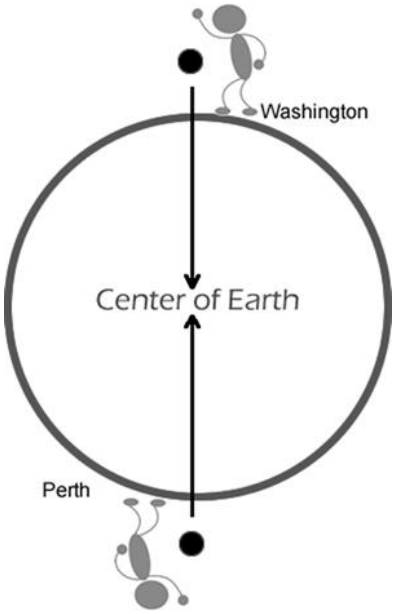
This clearly establishes the experience of gravity due to acceleration being entirely a function of *speed differential* resulting in the experience of forces of *push and pull,* which is not very different to what you would feel if you were being pushed or pulled by somebody.

You have a similar experience when you are pushed back when a train suddenly moves, or a car takes a sharp turn. Conversely you are thrown forward when a moving car brakes sharply needing your forward movement to be restricted by your seat belt.

To illustrate the difference between real gravity and perceived gravity due to acceleration, consider the case of a ball being dropped at opposite ends of the earth.

The ball dropped in Washington, USA will be attracted towards the centre of the earth in the same way as the ball dropped at the opposite end of the earth in Perth, Australia.

The direction of the movement of the ball is unaffected by *acceleration, relative speed or direction of movement* of anything.



However, a ball dropped in an accelerating rocket will always fall away from the direction of its acceleration due to its speed differential.

This clearly establishes a difference between the force felt due to acceleration and the gravitational pull of a mass.

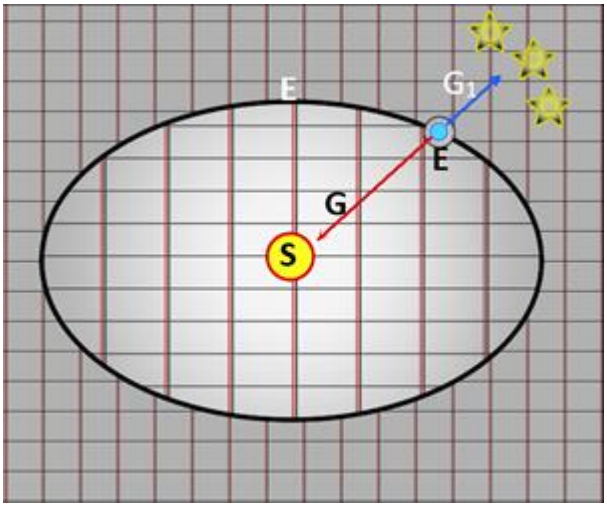
According to this theory the Einstein's equivalence principle suggesting gravity and acceleration to be the same is a misinterpretation of two different forces, although the force felt due to acceleration does a pretty clever job of mimicking gravity.

Explaining Orbits

Orbits are the sweet spots around astronomical bodies where the gravitational attraction of a body orbiting it including surrounding matter and energy are in balance and neutralised.

According to this theory it is not the curvature of spacetime but its density that creates gravity and resulting planetary orbits. Each planet has a sweet spot in the spacetime surrounding the star where the gravitational pull of the star is cancelled out by the gravitational pull of the planets' own gravity combined with the gravity of surrounding stars and sources of energy.

This neutral gravitational horizon creates a kind of Absolute Spacetime for the planet where once in motion it continues to be in motion in an almost frictionless manner. And it is this neutral gravitational horizon we call a planetary orbit.



Spactrons Spacetime Earth Orbit

S – Sun

G – Sun's gravitational pull on earth

E – Earth with its gravitational field

G_1 – Gravitational pull of other surrounding matter and energy on earth

H – Earth's orbit around the sun

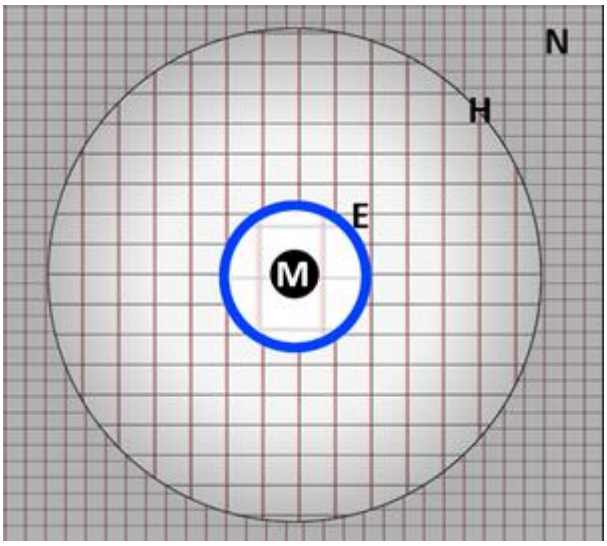
Black Holes

We have established that greater the mass density, stronger the gravity, an assumption which is strongly validated in a neutron star. According to this theory at a critical level of extreme mass and density, the surrounding spacetime Spactrons undergo extreme rarefaction. Beyond this critical level, the rarefaction of spacetime Spactrons becomes unstable and unsustainable resulting in the rupture of spacetime creating a Black Hole.

With the rupturing of Spacetime the high-density mass falls into a void that we call a *Singularity*. Spacetime, matter, energy, time and all our known physical laws breakdown in this Singularity disintegrating into their immaterial constituents (Covered in more details in the forthcoming book).

According to this theory Black Holes have the following properties:

- The size of the rupture in spacetime depends on the mass which resulted in the creation of the Black Hole.
- The time taken for this rupture in spacetime to heal dictates the life of the Black Hole.
- The mass of the Black Hole depends on the matter sucked into the Black Hole
- The size of the event horizon depends on the mass of the Black Hole



Spactrons Spacetime Black Hole Representation

M – Black Hole with spacetime rupture

E – Event Horizon

H – Gravity Horizon

N – Normal Spacetime

Since the blackhole singularities exists outside spacetime, by implication they are also outside our known universe placing them firmly beyond the scope of normal scientific enquiry. However, a credible philosophical theory about Black Holes is proposed in greater details in my forthcoming book *The Philosophy of Universal Fundamentals*.

Gravitational Waves

The General Theory of relativity predicted the existence of Gravitational Waves generated by *High Energy Source Events* such as violently energetic catastrophic events like *symmetric supernovas* or relative movement of extremely large and high-density mass like *neutron stars orbiting each other*. Such events result in rapid changes in the gravity of the surrounding spacetime creating waves which are propagated outwards at the speed of light.

We see something similar in nature in the form of outwardly travelling water ripples when we drop a pebble in a pond. However, these ripples are surface waves as only the water molecules of the few top few inches of water are being moved by the waves. The strength and distance to which these water ripples travel is dependent on the strength of the disturbance created by the pebble. Within certain parameters, greater the disturbance greater the strength of the ripples and the distance travelled.

Gravitational waves are similar to these water ripples except for their scale and multidimensionality. They are created by *High Energy Source Events* which involve very rapid and massive changes in the gravity of the surrounding spacetime.

This theory explains Gravitational waves in the following way:

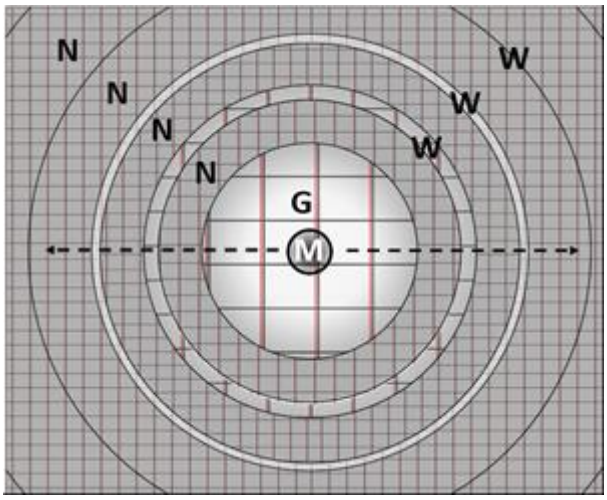
Every change in the mass or energy of the source results in a change in surrounding gravity through an adjustment wave generated for proportional compensation of the surrounding spacetime density. This wave contains information about the adjustments required in surrounding spacetime Spactrons to assimilate the changes necessitated due to the changes in the *High Energy Source Event*.

It should be noted that Gravitational Waves are created in all cases of a change in mass of an object. However, the waves created by normal changes in mass are infinitesimal which makes them almost imperceptible.

On the other hand, in a *High Energy Source Events* the waves are not only very strong but also repeated at a very high frequency. The strength and rapidity of these waves does not allow enough time for the surrounding spacetime Spactrons to adjust their density and geometry to the new mass and energy configuration.

A bit like a shockwave, each new density adjustment wave arrives before the previous one has been assimilated. This results in a small sliver of unadjusted spacetime being pushed out in three dimensional concentric circles to make way for the new configuration of spacetime. This process continues till the source of this rapid variation in mass and energy stabilises.

However, since these waves, made up of low density spacetime, are neither matter nor energy, they move uninterrupted and frictionlessly through spacetime. Since the configuration of these waves and that of *Normal Spacetime* is almost the same they move through spacetime at the fastest allowable speed – the speed of light travelling over huge distances and time.



Spactrons Spacetime Gravitational Waves Representation

M – High Energy Source Event

G – Gravity area constantly adjusting to changes in spacetime density

W – Gravitational Waves

N – Normal Spacetime

Validation by Nature

Besides the scientific and philosophical arguments put forward to support this theory, nature also provides some uncanny clues to its potential validity.

Consider the following similarities between a water molecule and Spactron:

Water Particle H_2O	Spacetime Particle Spactron	Manifestation as
Ocean	Spacetime	Apparent continuum
Ice	Matter	Solids
Steam	Energy	Energy
Tides and Osmosis	Forces including Gravity	Force
Waves and Currents	Force Fields	Force Fields
Whirlpool	Blackhole	Intense Force

The above clearly illustrates the capacity of one simple water particle to manifest in a multitude of ways. If water particle can manifest in many forms why shouldn't the same happen at the most fundamental level of our reality? Logically the parallel of water particle supports the concept of the spacetime particle Spactron being the most fundamental entity of the universe manifesting as spacetime, matter and energy and everything else in our material universe.

It may be useful to note that in the above table comparing the similarities between Water and Spacetime particles the similarities do not in any way imply sameness.

Conclusion

How does one know if what you consider a brilliant idea is founded on deep insight or ignorance? I am sure I am not the first one to wrestle with this question with little possibility of finding an answer. The only course open in such a situation is to put the idea out in public domain even if it risks ridicule and disdain.

The simplicity of this theory, based on a few assumptions, leading to the demystification of some unexplained and mysterious phenomena must surely qualify as credible evidence of its possible validity.

The theory makes the following ground-breaking predictions:

1. Spacetime, matter and energy and everything in the material universe are made up of Spactrons

2. All the forces and forcefields, including gravity, are the manifestations of density and/or warping differential of spacetime

The capacity of these predictions to explain the fundamental unity of the universe, spacetime, working of gravitation and forces, unification of forces, orbits, slowing of time, black holes and gravitational waves borders on to the impossible and magical. It surely can't be this simple!

The validity of the fundamental concepts of this theory are further strengthened when, in my forthcoming book *Philosophy of Universal Fundamentals*, they successfully take on the challenge of explaining other Big Questions like,

1. The origin of the universe
2. Explaining the duality of light
3. Time etc.

The real strength of this theory lies in the fact that it holds together without the need of dreaming up any new esoteric concepts to paper over any cracks or contradictions. This is especially remarkable considering that all the assumptions in this theory are, or have been, a part of existing scientific and philosophical knowledge, some going back to ancient times.

Some of the concepts in this theory may be unfalsifiable which should not prove to be a barrier in evaluating its validity considering it is not an uncommon feature of most scientific theories dealing the fundamental nature of reality.

In the final analysis I am satisfied having shared my idea in the public domain without any pressure or attachment to the need for it to be accepted or proved right. I would be perfectly happy if it was proved wrong as it would still have been instrumental in a learning experience for me and perhaps the reader.

Satyameva Jayate
Truth alone triumphs

About the Author

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Anil graduated with a Physics BSc (Hons) degree in 1971. He is a former Indian Air Force officer, Businessman and Legal Business Manager. He currently occupies himself as a freelance management consultant and a fulltime amateur philosopher.

From an early age he took the Socratic dictum of "*An unexamined life is not worth living*" to heart and has spent a lifetime musing about life, science, religion and philosophy. He considers his strongest attributes to be idle curiosity and a very fertile imagination.

He likes to write down his musings to better articulate his thoughts. The stark and illuminating clarity of a thought written down helps him identify contradictions and falsehoods, which otherwise might elude detection in the hidden crevices of mental bias and ignorance.

He sometimes shares these thoughts in a blog at www.museweek.co.uk. However, in the last twelve months his preoccupation with exploring the mysteries of the universe has kept him from contributing much to the blog.

Most of all he finds joy in exploring the new frontiers of human knowledge and the never-ending wonders of existence. As the inimitable Hercule Poirot would say it also helps him keeps his *grey cells from slacking off*.

He can be contacted at the following link: Contact Anil Gupta

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