



THE DUAL CONTINUUM

The end of Quantum Physics as a fundamental theory

ABSTRACT

Quantum Physics (QP) perfectly describes subatomic behaviour, yet it offers no fundamental explanation as to why it works. Moreover, it has weird asymmetric concepts like quanta, probability and entanglement and suffers from paradoxes. For nearly 100 years, physicists tried but failed to fundamentally grasp QP. This means either Nature is extremely complex or there is a crucial flaw in the physics we take for granted. Surprisingly, it is the latter:

Used to only the physics of the 'big', physicists implicitly assumed that the relation between the four functions of our continuum (Grid, Clock, Potential, Inertia) and the SI base units (Space, Time, Energy, Mass) also applies at the subatomic scale. This assumption is incorrect: In this paper we will unambiguously prove that functions and units pivot symmetrically at the Planck scale. In more detail:

1. At the subatomic scale, the function of 'Grid' is not defined by 'Space' but by 'Energy', while also 'Time' and 'Mass' switch orthogonally in their function of 'Clock' and 'Inertia'. This subatomic 'energymass (EM)' continuum is fully symmetric to our macro 'spacetime (ST)' continuum
2. To an observer, the grid of the opposed continuum always appears $\frac{1}{2} \pi$ orthogonally spiralled, which head-on view causes our 'quantized' and time invariant –thus spacetime 'probabilistic'- EM vision.
3. *Crucially, both orthogonal setups always apply to all objects, their influence getting equally strong near the border of the Planck scale. This explains all QP effects, particle-wave duality in particular. In practical terms: A high-energy particle will increasingly display its spiralled 'Energy as a grid' property, next to its 'Energy as potential' particle property.*

As demonstrated in this paper, this classic dual symmetric setup solves all QP paradoxes and explains gravity on all scales, linking it to electromagnetism. It solves macro issues like: dark mass, dark energy, corona heating, matter / antimatter asymmetry. It is consistent with elements of QFT and 11- dimensional string theory and comes with many falsifiable predictions.

With the discovery of the dual continuum, we have finally arrived at Einstein's dream of a symmetric construct for physics on all scales. Yet, it remains to be seen if our institutions are willing to accept that physics at its very core is governed by utter binary simplicity in stead of extreme QP complexity....

'...God does not play dice, he just plays on a double chessboard...'

SUMMARY

Quantum Physics (QP) has proven tremendously successful in describing the behaviour of subatomic particles, yet it cannot fundamentally *explain* particle-wave duality and other QP paradoxes. As a consequence, starting with Einstein, there has always been the suspicion that QP is merely a mathematical approximation of a deeper underlying physical reality, symmetric to the 'classical' physics of the macro world.

For nearly a century physicists tried to find the answer. Some attacked QP, others engaged in highly speculative theories or complex math. Yet, no deterministic structure was found and all QP paradoxes remained unsolved. This means one of two things: Either the fundamentals of nature are extremely complex or there is a flawed human assumption in the physics we take for granted. The answer comes from the Copenhagen interpretation of QP: With its well-established concepts of probability waves and quantum entanglement, it produces an axiom that can be phrased in two ways:

1. '...in the subatomic world there is no determinism and no locality...'
2. '...in the subatomic world there is no determinism and no locality, at least not in terms of space and time...'

If we postulate –like we are doing– that there *should* yet be an underlying symmetric physical reality including determinism and locality, then the first axiom logically must be false and the second correct. This implies that our classical human interpretation of the grid related concepts of 'determinism' and 'locality' is too narrow. Apparently we need other base units to define the grid when describing the subatomic world.

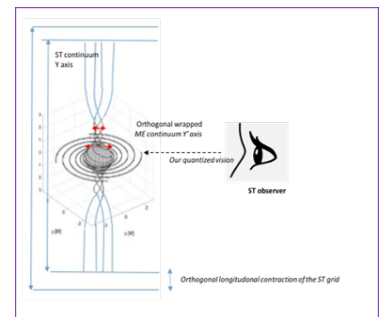
With Ockham's razor principle in mind, we next used the other two SI base units of Energy and Mass to fill in the 'grid functionality gap' of the sub-atomic world. After all, it is already common to express the distance between an atom's electrons and nucleus in eV's. With some additional checks and balances, this led to the following:

The dual continuum

Used to only the physics of the 'big', we humans *assumed* there is a *fixed* relation between the four 'functions' of a continuum –Grid, Clock, Potential, Inertia– and the four SI base units or 'dimensions' of Space, Time, Energy, Mass.

Yet it can be proven that this relation is actually a **binary** or **dual** one:

1. When crossing the Planck scale, the four dimensions 'pivot' in their role: The function of 'Grid' is no longer defined by 'Space' but by 'Energy', while also 'Time' and 'Mass' switch orthogonally in their function of 'Clock' and 'Inertia'.
2. This dimensional pivot includes an orthogonal spiralled wrapping of grid field lines and it is our head-on perspective of these Planck energy 'distanced' grid spirals, that causes the *illusion* of energy 'quanta' (*right; simulation singularity bending EM fieldlines*)
3. Crucially, both orthogonal dimensional setups always apply for all particles of both continuums, their influence getting equally strong near the Planck scale. This causes QP effects like particle-wave duality: A high energy particle will increasingly display its dual 'Energy as a grid' property next to its 'Energy as potential' particle property.



The validation of this dual continuum concept is done in multiple ways in this paper; most prominently by the following:

When smashing mass/energy objects like hydrogen nuclei onto each other, they fuse. Physically this means that their separating distance just before merging becomes so small –smaller than the Plank length– that for the last 'piece of the road' the movement laws of the dual ME continuum must emerge. Yet, we also know that Einstein's mass-energy 'equivalence' formula emerges as energy is released via $E = MC^2$. This implies that in order for the concept of the dual continuum to be congruent with classical physics, $E = MC^2$ should represent **movement** in dual terms. Let's check this:

SPACE-TIME Continuum			→	ENERGY-MASS continuum		
		Dimensions				Dimensions
Location:	Distance	Metres (m)		Location:	Energy	J(eV) or Nm
Inertia:	Mass	Kilogram (kg)		Inertia:	Time	(s)
Clock:	Time	Seconds (s)		Clock:	Mass	(kg)
Speed:	Distance/time	m/s		Speed:	Energy/Mass	Nm/kg = $\frac{kg \cdot \frac{m}{s^2}}{kg} * m = \frac{m^2}{s^2} = \text{'Specific Energy'}$
Substituting EM dimensions in the ST movement equation we get the EM expressed movement equation:						
ST Movement:	Distance = Time*Distance/Time = $t * v$ [m/s]		→	EM Movement	Energy = Mass * Energy/mass = Mass * $[\frac{m^2}{s^2}] = Mv^2$	
	Or: Distance = $t * C$ (in case of light speed)				Or: $E = MC^2$ (in case of light speed)	

Special relativity, $E = MC^2$

The consequences of unmasking the fundamental meaning of $E = MC^2$ as movement formula are substantial. Since:

1. the virtual dual speed notation of C^2 is the basis for the Lorentz transformation term $\gamma = \sqrt{1/(1 - v^2/c^2)}$ and
2. the dual continuum constitutes an inertial frame of reference relative to spacetime.

It follows that the dual continuum is the fundamental physical phenomenon behind Einstein's special relativity, exposing the additional effects of the dual continuum at various speeds. One can now complete the well-known, yet hitherto incomplete space-time diagram to the right, often used to explain special relativity.

γ is simply the correction term that expresses all ST macro movement additional to rest-mass into its corresponding dual C^2 speed term. We now also see why an object with Energy has slightly more mass; By means of functional compensation, it also moves in the dual continuum over a distance of E and 'time' period of M. This instant relativistic Mass ('inversed time') term is felt as extra inertia in our ST continuum.

Nuclear fusion

With $E = MC^2$ being a mere movement equation, we gain crucial insight (after 100 years of misconception) that Energy fundamentally relates to the amount of Space that Mass occupies, not to Mass itself. For instance; fusion reactions up to ^{56}Fe are all expansionary in that the atom of the fusion product occupies more spacetime than its original lighter atoms combined. Thus in our Sun, fusion leads to ME grid fieldlines expanding beyond the photosphere. But since these fieldlines can't exist in our ST dominated continuum, they disintegrate 'in situ' as charged particles, forming the Sun's immensely hot Corona. The dual continuum thus predicts there is no heat convection from our Sun's interior to the Corona. This has been confirmed time and again. Our mono-continuum cosmology can't explain this.

Gravity

Next, one notices that movement in the ST continuum is offset by a dual speed notation of $-\frac{m^2}{s^2}$ constituting a virtual accelerating grid surface contraction opposite to the vector of motion: As demonstrated in this paper, the underlying mechanism is that energy fieldlines spiral orthogonally to the vector of the speeding particle, leading to a longitudinal ST fieldline contraction as displayed on the previous page. This length contraction is a known phenomenon in special relativity. The same phenomenon happens on a smaller scale within 'rest mass'; Here the fast spiralling sub atomic particles in and around the nucleus of atoms cause a similar orthogonal longitudinal contraction effect in ST. It is only due to the fact that the various 'electron' planes inside the atoms of an object are utterly unaligned, that we experience their collective contraction effect - gravity- to be radial and weak. Nevertheless, fundamentally it is always the dual offsetting effect of movement that is the basis of spacetime contraction or 'gravity'.

Next, it appears that in order to correctly assess the fundamental meaning of Mass and Energy in ST field constants, we need to swap their symbols: [s] for [kg] in Mass and [m] for [J] in Energy. This renders Planck's constant into a spatial flux constant $[m^3/s]$ while G takes on $[m^2/s^2]$ eyeing a role as virtual dual speed limit. These and other revised constants render both the electromagnetic and gravitational 'field forces' dimensionless quotients of pi in Riemann space.

String theory, the atomic model, dark energy and dark matter

In all, Quantum Physics may be a great mathematical approximation, fundamentally it is a flawed mono-continuum human perception of a world that is inherently governed by the symmetric dual continuum set-up. The implications of the dual setup are far-reaching. It solves all QP paradoxes and aligns with string theory as it provides $2 \times 4 = 8$ base dimensions and 3 encapsulated brane singularity levels, consistent with 11 dimensional string theory. In addition, when applying the dual setup at the atomic level, an improved 'Bosonic' atom model emerges, shattering our classic view of especially the atom bound 'electron'. Finally, the physical and very tangible fundamentals behind electromagnetism, mass and gravity on all scales are now exposed, as are the solutions to dark energy and dark matter on the cosmic scale.

The dual continuum literally adds the missing 50% of our classical physics, offering the solid foundation for physics on all scales, solving the QP paradoxes that have blocked progress in fundamental physics for nearly a century...

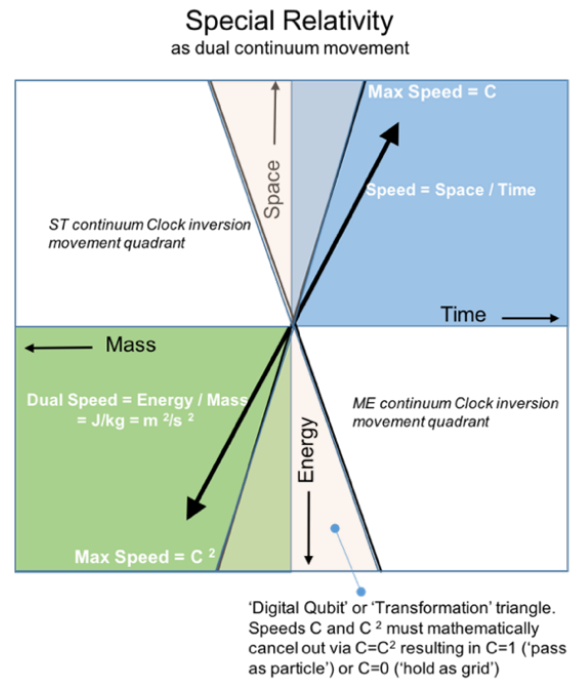


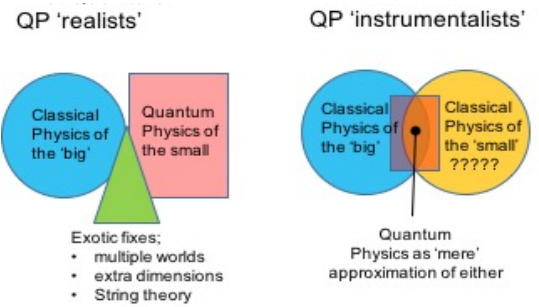
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1. Introduction to the dual continuum

1.1 Success and failure of QP as a fundamental theory

There is no question quantum mechanics (QM) or quantum physics (QP), though counterintuitive and 'ugly', is highly effective at describing the behaviour of subatomic particles. However, 'description' does not equal 'explanation' and starting with Einstein there has always been the lingering suspicion that QP is a mere mathematical approximation of an underlying deterministic and symmetric physical reality ruling the world of the very small. The group of scientists that calls for QP as a physical reality are referred to as 'realists' while the group that suggests a deeper underlying deterministic reality would be the 'instrumentalists'.



Einstein, throughout his entire life objected to the notion of QP being of fundamental value and famously attacked QP via his Einstein Podolsky Rosen (EPR) paradox predicting non local entanglement, which was deemed impossible. The answer to the EPR paradox came in the early 1970's as Bell's theorem laboratory tests confirmed entanglement is real. This outcome proved once and for all that it is futile to argue with QP: It may be ugly, a-symmetric and non-real, but apparently it works perfectly. But does that qualify it as *the* fundamental theory of the sub-atomic world?

- If the criterion is that a theory should produce confirmed predictions, the answer is 'yes'
- If the criterion is that such a theory should be symmetric, local and deterministic, the answer is 'no'.

Most scientists agreed that preference for symmetry is the lesser argument. As such, from the 1970's onward the scientific consensus was -and largely still is- that the 'shut up and calculate' approach of QP is fundamental. Although defensible at the time, 50 years later it is time to evaluate whether QP has lived up to its promises as a fundamental theory: Science did make progress discovering new 'elementary' particles by smashing ever more energetic particles onto each other. In addition, bright minds developed complex new math, most notably around untestable string theory. On the down side, there is still no quantum theory for gravity and the century-old QP paradoxes all remain unsolved: *Loschmidt's paradox, particle-wave duality, entanglement, the dead cat paradox, the double slit experiment, unification of gravity, dark energy and matter/ anti-matter asymmetry.*

One may argue our technological advancement has been extraordinary, but this involves new applications of old science, brought to us by the individual genius of the likes of Maxwell, Planck, Einstein, De Broglie and Tesla. On the whole, we must admit fundamental progress has been sluggish at best, making top-physicists increasingly doubt whether QP is the fundamental theory for the sub-atomic world after all. In line with this, we will pivot once more to the instrumentalist's view of things and revive the quest for a physical deterministic reality underlying QP.

1.2 Copenhagen QP as design requirement for the dual continuum

The instrumentalists had 100 years to look for their suggested symmetric classical structure underlying QP, yet they wasted precious time attacking QP itself. This attitude was both futile and irrational from the start: if one is of the opinion that QP is just the mathematical approximation of a deeper underlying symmetric and deterministic reality, then why fight QP at all? What Einstein should have done, and what we will now do, is to reverse-engineer the underlying physical structure by combining our self-imposed requirement of symmetry with classical physics, with the strict conditions that follow from the Copenhagen interpretation of QP:

Step 1. First of all, the Copenhagen interpretation of QP with its well established concepts of probability waves and quantum entanglement, teaches us that in the subatomic world we do not have determinism and locality, at least not in terms of space and time. So if we are to suggest that any underlying physical structure should yet have locality and determinism due to symmetry with classical physics, then we must define this locality and determinism in other terms than space and time. There is no other way.

Step 2; Next we must neutralize the asymmetry between classical physics and QP in its entirety. We need to keep QP since it works, but we must strip it of its fundamental status. This means we have no choice but to suggest an intertwined orthogonal (=invariant) copy of our spacetime continuum governing the sub-atomic world and place QP in the middle as a mere mathematical approximation of *either*. This is the only way to restore full symmetry in physics which was so dramatically lost upon the introduction of QP in the early 1920's. The above figure displays the discussed setup of the dual orthogonal continuums with QP in the middle. The influence of one continuum on the particles of the other actually covers the entire spectrum, but would get miniscule when getting further away from the Planck scale.

Step 3: Next, one needs to define in what way one continuum is orthogonal to the other. Following Ockham's razor principle, we do not want to invoke extra dimensions, parallel universes or other recent 'scientific' inventions. In stead, the answer can be construed contemplating the core relation between the existing building blocks of:

- a. The four functions of our continuum: *Grid, Clock, Potential, Inertia*
- b. The four SI base units ('dimensions') in our continuum: *Space, Time, Energy, Mass*

Used to only think in terms of 'the big', we humans have has always implicitly assumed the relation between the above 4 functions and 4 units is 'fixed' or 'synonymous'. Remarkably, we humans stick to this assumption knowing full well the resulting laws of physics break down beyond the Planck scale, leaving mathematical 'voids' at the other side of the asymptote plots of our base units.

To restore this broken mathematical symmetry and explain the unsolved QP effect of particle-wave duality, we will suggest and shortly prove the relation between the four continuum functions and the four base units, is actually a 'binary' or 'dual' one; When passing the Planck scale, the function of Grid is no longer performed by 'Space' but by 'Energy'. Likewise, also 'Mass' and 'Time' switch orthogonally in their functions of Clock and Inertia. In table form:

	1_Grid Locator	2_Grid Clock	3_Particle Potential to move	4_Particle Resistance to move ('Inertia')
ST continuum > Planck length (Energy singularity)	Space	Time	Energy	Mass
ME continuum < Planck length (Spatial singularity)	Energy	Mass	Space	Time

Additional clarifications:

- a. *Since the Copenhagen interpretation of QP allows neither Space or Time to define the dual grid, Energy and Mass take their place. It is already common to express the distance between nucleus and electron orbits in eV's, hence the base unit of Energy is given the 'grid' function leaving the 'clock' function for Mass. Combined one may speak of the the 'ME' or 'EM' grid as opposed to the ST grid.*
- b. *Depending on what side of the Planck scale we are at, one continuum setup dominates, but the other is always orthogonally present, able to yet influence the particles of the dominating continuum. Both setups get equally strong near the Planck scale which is why we see 'QP effects' occurring there.*
- c. *Besides the singularity induced orthogonal switch in base units, we will later show this switch also involves the physical orthogonal spiralled 'wrapping' of field lines into their orthogonal dimensional setup. This wrapping phenomenon is simulated during several academic studies of singularities (See below, intensifying from left to right, explained later). It is precisely this spiralled wrapping of grid fieldlines that is the fundament behind the 'quantized' perspective for an observer inside the other continuum (far right).*

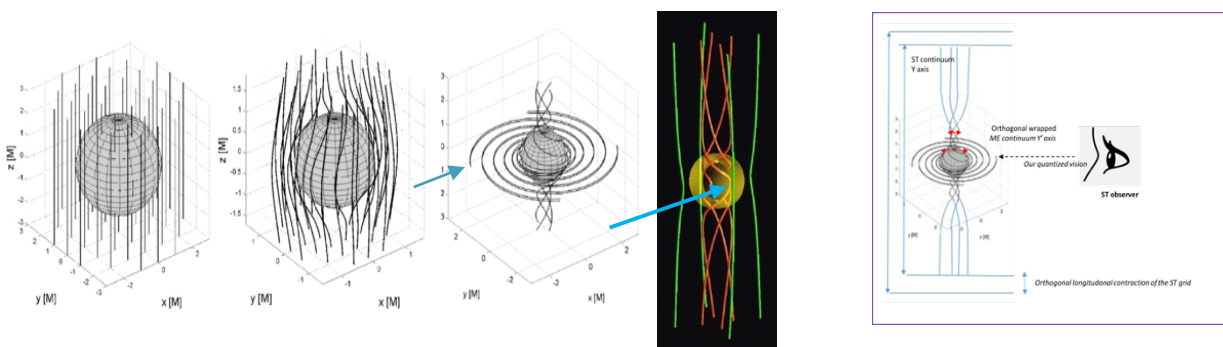


Figure 1.7 Left; V.Karas, O. Kopacek, D. Kunneriath, 17 jan 2012, © IOP publishing.
Right; PIA 04207 Japan's National Institute for Fusion science; Black hole twisting electromagnetic fieldlines. 1999

Step 4: Recapitulating; the dual continuum is the design outcome of three principles or 'design requirements':

1. The strict Copenhagen interpretation of QP relating to locality and determinism
2. The self imposed requirement of perfect symmetry with classical physics
3. Ockham's razor principle

In paragraph 1.4 we will validate the dual continuum dimensional setup. First, to get a quick 'feel' of its applicability, we will shortly describe how the dual continuum delivers classic explanations to major QP effects:

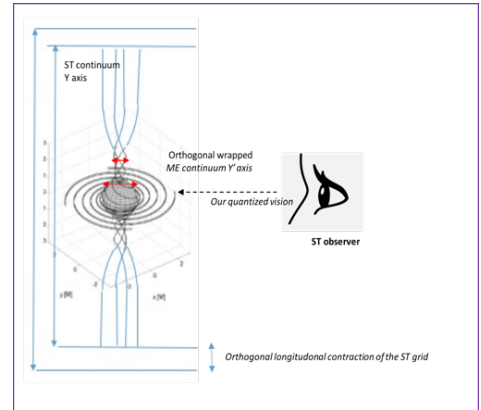
1.3 Dual continuum: classical explanations for QP effects

1.3.1_Particle wave duality

The dual continuum ('DC') setup offers a clear physical explanation for 'particle-wave' duality. It suggests that any high energetic particle will increasingly display its dual 'Energy as a grid' ME continuum functionality next to the dominant 'Space as a grid' functionality of our ST continuum. Thus, the attribute of Energy is a 'point' in ST and a 'wave' in ME terms. In slightly different terms: wave-particle duality is not an intrinsic particle property but a dual continuum property. (also see the dual continuum explanation of the single slit experiment at par. 1.10)

1.3.2_The origin of 'quanta'

As shortly touched upon and later explained; the switch in 'dominance' from one continuum to the other, includes an orthogonal pivot of physical grid fieldlines: The straight ST fieldlines get bent and next wrapped into orthogonally spiralled 'equal-energy distanced' windings. To the observer of the opposed continuum this results in a 'heads-on' view of grid spirals which constitutes a vision of 'quanta'. Values in between exist, but the ST observer can only observe 2π rotated integers of either the x, y or z axis, which appear to him or her to form a straight but 'quantized' line (see right, simulation of a singularity bending EM fieldlines). This is the fundament behind all observed 'quantized' behaviour. Due to symmetry, any ME observer will observe our ST continuum grid in an equally quantized space and time manner. We will come back to this in more detail discussing the atom.



1.3.3_The probability wave function, measurement collapse, Heisenberg's uncertainty principle

The conceptual introduction of the dual 'mass clock' allows us to classically explain the QP wave function: In our ST grid the clock of 'time' dominates. The Mass Energy (ME) continuum clock of 'mass' also ticks (backward even), but it is orthogonally aligned to the flow of our 'time'. Effectively this means that when we observe a particle, we cannot distinguish *movement* of this particle in the dual ME continuum: From our perspective all possible energy-mass positions come 'time instantly' at the same 'tick' of our clock. The QM wave distribution ψ simply represents the underlying classical movement functions in Energy-Mass terms 'sped up to infinity' in our terms. Continuing, also *Heisenberg's uncertainty principle* becomes classical: It is the distancing operator between the two grid locators of Energy and Space. These are always separated by an orthogonal $1/2 \pi$ polar notation based grid spiral- see above-. It also suggests we can not detect the ST spatial position of a particle by measuring its *Energy* since Energy is the locator of our *dual* continuum. By measuring its Energy, we effectively and classically change its locator into the detector related position in our ST continuum. With this, one can now also classically explain entanglement, double slit, dead cat etc. as demonstrated later on.

1.3.4_The structure of oscillating singularities, the arrow of time, abolishing dark energy

The dual grid setup offers a classical concept to physically 'wrap up' an entire ('dark') energy universe inside a spatial singularity, simply by replacing the grid unit of Planck Length with the orthogonal spiralled grid unit of Energy. Next, the symmetric consequence of having both a winding (mass) and unwinding (time) clock is that the inversed situation must than also happen, meaning singularities would typically and perpetually *alternate* between their max spatial and max energy state under constant total dual entropy. The reversals must then entail a reversal of the arrow of time and thus -seemingly!- of gravity. By logical extension, this means that an encapsulated singularity (e.g. a galaxy) may experience an opposite arrow of time relative to the bigger and slower oscillating singularity (our 'big bang' universe), observing an ever faster expanding universe with seemingly 'repelling gravity', **whereas in fact it is contracting, abolishing the need for dark energy**. Finally, due to symmetry, at the other side of the big bang singularity there would need to be an equivalent entangled anti-matter ST universal lobe 'expanding and shrinking' just like ours. One day both lobes would merge again to form the next 'big bang'. Chapter 4 will explain such fascinating logic consequences for cosmology in detail.

1.3.5_String theory

Remarkably, the dual continuum setup appears consistent with string theory as well. Using the dimensional table, we get to 8 base dimensions (3 spatial, time, 3 energy, mass) and 3 relevant nested singularity levels: universe, galaxy, atoms (?), totalling 11 dimensions. In addition, actual academic singularity simulations presented in this paper suggest field lines are actually closed strings stretching and oscillating in both continuums.

1.3.6_The Energy-Mass 'equivalence' formula of $E= MC^2$

From the very first days of its discovery by Einstein, this iconic and *mathematically* correct equation, was thought to represent the fundamental 'interchangeable' relation between mass and energy. Indeed, in extremis -during fusion- mass *does* seem to convert into pure energy. However, the relation between Mass and Energy is an *indirect* one: Looking at the dual table, Mass fundamentally relates to Time, while at the same time (*and hence the confusion!*) it is the *Space* that Mass occupies that relates to Energy, not unlike Archimedes' Principle. *There is no Energy in Mass.* More concrete: During fusion processes up to ^{56}Fe , the fusion product typically occupies more space than the original atoms, causing the ME grid to physically expand into the ST grid around the fusion product. Since ME-grid field lines can't exist in ST, these next disintegrate as charged particles, radiation and heat right *outside* of the fusion product. In stars this is called 'corona heating' which cosmology is unable to explain (see *Chapter 4* for more detail). As such, part of the mass that was 'lost' or rather 'wrapped' during the fusion itself, re-emerges as the mass of charged particles. Next, we will do a reality check of the dual continuum as we determine what $E= MC^2$ actually *does* fundamentally stand for:

1.4 Dimensional validation of the dual continuum

When smashing mass/energy objects like hydrogen nuclei onto each other, they fuse. Physically this means that their separating distance just before merging becomes so small -smaller than the Planck length- that for the last 'piece of the road' the movement laws of the dual ME continuum must emerge. Yet, we also know that Einstein's mass-energy 'equivalence' formula emerges as energy is released via $E= MC^2$. This implies that in order for the concept of the dual continuum to be congruent with classical physics, $E= MC^2$ should represent *movement* in dual terms. Let's check this:

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Inertia:	Mass	Kilogram (kg)		Inertia:	Time	Seconds (s)
Clock:	Time	(s)		Clock:	Mass	(kg)
Speed:	Distance/time	m/s		Speed:	Energy/Mass	Nm/kg = $\frac{\text{kg} \cdot \frac{\text{m}}{\text{s}^2} * \text{m}}{\text{kg}} = \frac{\text{m}^2}{\text{s}^2} = \text{'Specific Energy'}$

Substituting EM dimensions in the ST movement equation we get the EM expressed movement equation:

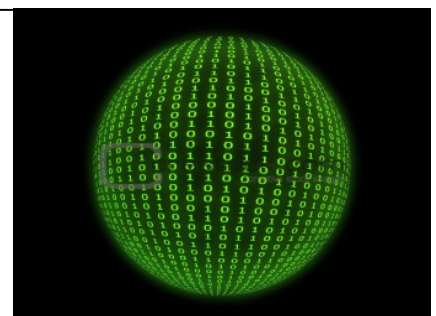
ST Movement:	→	EM Movement
Distance = time*distance/time = $t*v$ [m/s]	→	Energy = Mass * Energy/mass = Mass * $[\frac{\text{m}^2}{\text{s}^2}] = Mv^2$
Or: Distance = $t*C$ (in case of light speed)		Or $E= MC^2$ (in case of light speed)

Indeed, Einstein's ST Mass Energy 'equivalence' formula *does* equal 'movement' in dual physical terms. The dual continuum concept thus offers an easy derivation of $E= MC^2$ and gives a fundamental explanation why something that holds energy automatically also holds a small amount of extra (relativistic) mass in ST terms: By means of dual functional balance, all objects simply also move in the $\frac{1}{2} \pi$ orthogonal spiralled dual continuum over a distance 'E' involving an instant 'time spent' of 'M', which is felt as an instant extra 'relativistic' mass term in our continuum. Of course, from the viewpoint of the ME continuum, there is no way either E nor C^2 in their *spatial* terms can be linked to grid movement of $E= MC^2$, which is why Energy (E) has its alternative grid notation of [J] or $[Q*\Delta V_{\text{olt}}]$, and C^2 changes into an electrical constant in Coulomb's constant $k_e = c^2 * (10^{-7} \text{ Hm}^{-1})$. Extrapolating, most of our constants in physics are actually a mixture of both grid notations and we will soon demonstrate we need to dimensionally translate [kg] and [Joules] into the corresponding ST terms [s] resp. [m], in order to see their true fundamental effects in ST. This leads to a whole range of simplified definitions for e.g. G and k_e , effectively rendering *both* the gravitational *and* the electromagnetic force dimensionless, while Planck's constant changes into a spatial flux constant $[m^3/s]$.

Dual speed implications:

At the border of a singularity the dual speeds (c and c^2) must be equal, implying $c=1$ or $c=0$. Such a digital representation is often used to describe the 'entropy' of the event horizon of a singularity in terms of 'information'. It directly relates to the amount of wrapped ether fieldlines, determining the size of the pulsating singularity

For any other value of speed, the constants C and C^2 would be the imaginary component of any speed which would yet allow for speeds to cancel out over both continuums via $i^2 = -1$

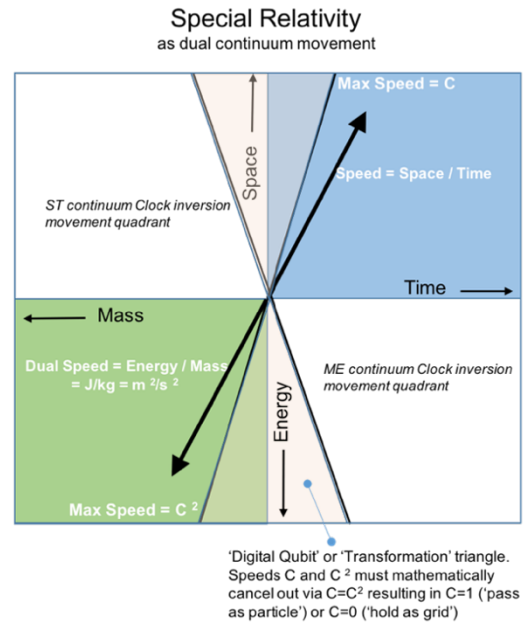


1.5 The dual continuum and special relativity

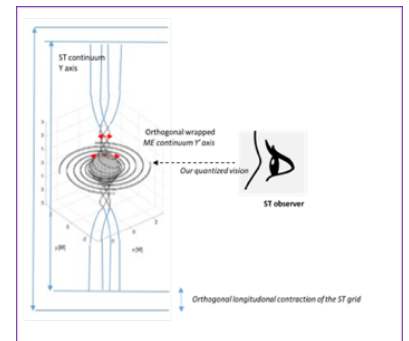
Another interesting aspect is that the dual speed notation of C^2 is the

$$\text{basis for the Lorentz transformation term } \gamma = \sqrt{1/(1 - \frac{v^2}{c^2})} .$$

Moreover, since movement in the ME continuum is non-spatial, it constitutes an inertial frame of reference relative to spacetime. Combined, this suggests that the dual continuum is **the** fundamental physical phenomenon behind Einstein's special relativity, exposing the additional effects of the dual continuum at various speeds. One can now complete the well-known, yet hitherto incomplete space-time diagram to the right, often used to explain special relativity: It illustrates how each movement inside the ST grid, is automatically balanced out in its opposite *functions* in the ME continuum quadrant: As such it is not correct to say an object travels 'through time' as a 4th grid dimension. Rather it moves 'through Energy' while mass and time also cancel out. This symmetric relation to the right, maintains the (zero) entropy equilibrium of all functions, with the Lorentz factor $\gamma [E_{tot}/E_{restmass}]$ operating as the fine-tuning factor adjusting for all macro object speeds between 0 and C.



The effect of the dual continuum will materialise for processes at the subatomic scale or nearing C. As such; Any macro object nearing C will start to display its dual 'energy as a grid' functionality in the form of an ever wider spiralling 'energy plane' orthogonal to the vector of movement. By wrapping up fieldlines horizontally, the *vertical* ST fieldlines thus get increasingly shorter along the vector of movement. This leads to a virtual inward acceleration of the grid represented by the $[-m^2/s^2]$ term. This in turn results in the object appearing ever more contracted in length, which is a known phenomenon in special relativity. (see also paragraph 2.1)



This motion induced grid-length contraction effect comes close to describing 'gravity'. Yet since also macro objects at 'rest' in ST display the property of gravity, we get a first hint that gravity is primarily the result of movement inside the *ME quadrant*, namely the 'time instant' spiralling movement of subatomic particles in and around the nucleus of the object's atoms. It leads to a similar longitudinal ST contraction effect orthogonal to the electron plane. It is only due to the fact that the various electron 'orbits' of the numerous atoms inside an object are utterly unaligned, that gravity yet *appears* to work radially and weak. But whether ME or ST based, the ST contraction effect always stems from the dual continuum offsetting effect of **movement**! In extremis one would add up the movement of all the objects' individual particles of spin 0, 1/2, 1, 2:

$$\Psi = \int e^{i\lambda} \left(\frac{R}{16\pi G} - \frac{1}{2} \dot{r}^2 + \vec{v} \cdot D\vec{\psi} - \lambda H \vec{\psi} + |DH\vec{\psi}|^2 - V(H) \right)$$

spin 2 spin 1 spin 1/2 spin 0

The reversed must then also hold true; By generating an electric field, one enhances the energy density around particles (J/kg) in the ME continuum. Since this constitutes an increase in *linear* speed in the ME continuum, the particle must then display a virtual and opposite inward *spiralling* movement trajectory in the ST continuum. This predicted effect is of course well known and photographed in bubble chambers.

In addition and at a larger scale, we can *locally* manipulate Earth's weak radial grid contraction by producing an orthogonal ME *gradient* in the movement of sub-atomic particles by using magnets or by forcing an electric current to run through a wire. This artificially aligns the movement of (subatomic) particles, producing overlapping orthogonal ST contraction effects in the direct grid around it. Given the short distance and gradient overlap, these effects are far stronger than the collective contraction effect of Earth's unaligned atoms, allowing Earth's curvature of spacetime to be locally either 'un-curved' or 'extra curved' which we call the 'electromagnetic' force.

As such, the 'electromagnetic force' and the 'gravitational force' are really the same thing; they are instances of movement, leading to the sensation of curving and un-curving the dual grid structure (ST and ME grid always in orthogonal and opposite phase). Neither 'gravity' nor the 'electromagnetic force' are therefore true forces and we will shortly prove they are physically dimensionless. Moreover, we *suspect* the same applies inside the atom's nucleus at a smaller scale, in which case there would be **no fundamental forces at all in nature**, only the virtual and intertwined curvature of the dual spatial and energy grids, induced by oscillating singularities at the various, nested scales.

Gauge bosons

Getting back to the dimensional table at page five, the dual continuum suggest the particles of the ME continuum are made of space/time in stead of energy/mass. They don't have (rest)mass and since their spin is effectively not time based, they cannot have an anti-particle in ST terms. These would be the 'gauge bosons' although symmetry suggests there will be a lot more. There is even a prominent conceptual place for the 'graviton' literally 'discharging space' as we will see in chapter 2. But we will first take a step back and produce observational underpinning of some of the concepts we mentioned in the previous paragraphs.

1.6 Movement inside the ME continuum; the 'electron/photon' quantum leap

At this stage, one may once more take a look at the formulation of movement inside both continuums

'...In our continuum it takes **TIME** for a **MASS/ENERGY** object to move from one **SPACE** location (or 'state') to another...'

'...In our dual continuum it takes **MASS** for a **TIME/SPACE** object to move from one **ENERGY** location (or 'state') to another...'

The formulation of movement in the ME continuum may seem strange but it is actually familiar: In atoms it does not take 'Time' but relativistic 'Mass' of an incoming photon to move an electron time *instantly* to a higher ENERGY state. The 'electron leap' thus appears to be a ME continuum movement process. There are two intriguing consequences:

- ME continuum movement between the electron orbit and the nucleus suggests there would be a singularity-like situation present inside atoms even though an atom is considered too light to be an actual micro singularity.*
- Since an electron actually does have mass, it is a ST continuum particle and therefor could not possibly make the time instant 'electron leap'. Only a ME continuum particle, in this case a photon, can do this.*

Combining both remarks above, and however awkward spin-wise, the concept of the dual continuum thus leads to the **falsifiable prediction** that **an electron is a ST continuum superposition of an ME continuum atom bound photon.**

If so, the dual geometric consequences are clear: It implies an atom bound electron is not a continuous 'orbiting' particle. Rather; inside the atom there would be *time instant* in-out moving photons, that would become visible only at the various energy (=distance) radii from the nucleus where they 'turn around' in ST during which time we call them 'electrons'. If so, 'electron orbits' would merely be 'stroboscopic' collections of equal distanced (energy) discharges. Although seemingly exotic, there is a way to verify this; Since we are considering singularity-like behaviour in combination with photons (quantum leaps) one could look at actual simulations of singularities impacting electromagnetic field lines. This should then represent the supposed intra-atom photon behaviour in 'wave' terms.

1.7 Fieldline wrapping and the electron

Two actual computer generated simulations are presented below, showing how a singularity bends vertical electromagnetic field lines into spiral arms as it intensifies from left to right. In the next chapter we will show that the dual continuum motion formula describes this orthogonal grid spiralling and we will therefor keep this figure as a good approximation of reality. Notice the consistency with what was predicted in the previous paragraph.

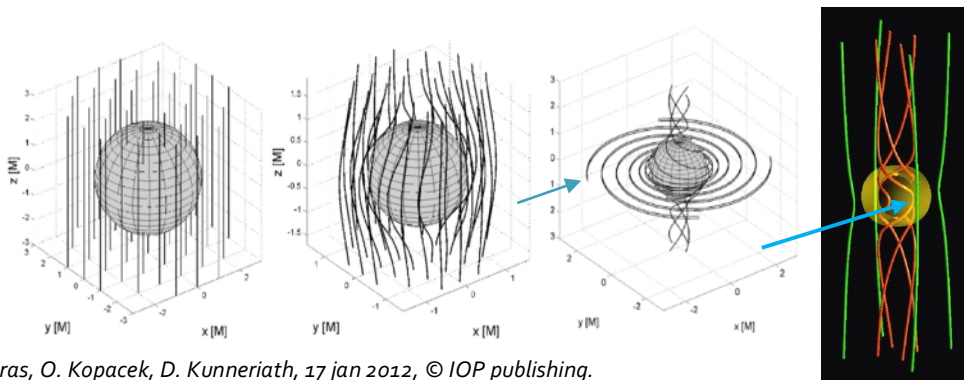


Figure 1.7 Left; V.Karas, O. Kopacek, D. Kunneriath, 17 jan 2012, © IOP publishing.

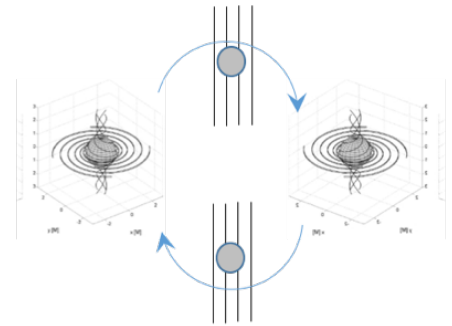
Right; PIA 04207 Japan's National Institute for Fusion science; Black hole twisting electromagnetic fieldlines. 1999

The most important aspect of the pictures above is highlighted by the blue arrow in the picture to the far right, showing how field lines first get **folded** into U-turns, which next get stretched into orthogonal **double** lines forming spiral arms. As such, field lines run uninterrupted and simultaneous in both continuums. Since symmetry suggests that the vertical field lines will then also be connected in a fold higher up, we should actually speak of closed big **strings** which at several positions are constantly getting folded, wrapped and straightened by micro singularities constituting atoms.

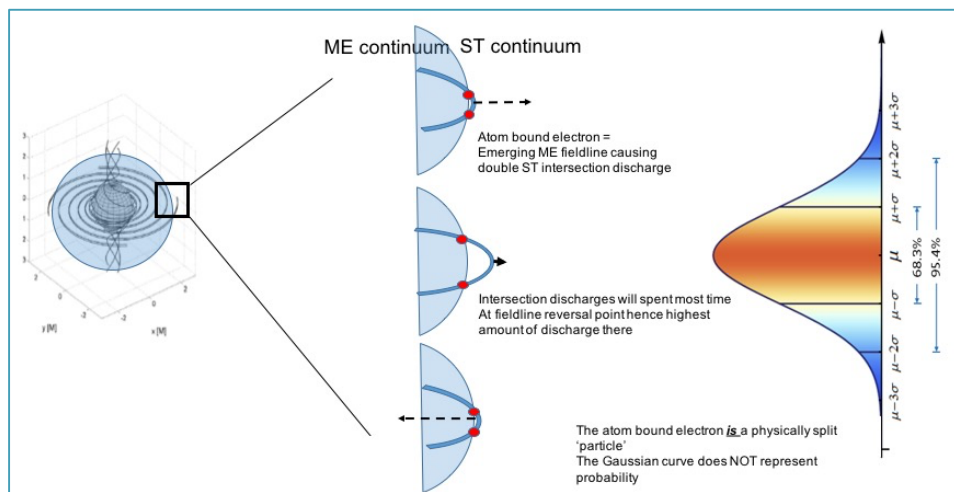
Next, in order to conserve momentum such wrapped field lines would perpetually and harmonically oscillate between clockwise, straight and counter-clockwise positions. Their individual momentum determines the number of windings for each spiral arm, which would reflect the quantized energy (eV) level of the corresponding electron 'orbit'. This perpetual oscillation between max spatial and max energy state was already predicted at paragraph 1.3.4 as a direct consequence of the dual continuum concept. As such we now have two 'predictions':

1. The electromagnetic fieldline oscillation to the right represents the mechanism behind 'electron' occurrence in the atom in general
2. The electron is a ST superposition of an atom bound photon.

Combining both, the micro singularity would constantly bend fieldlines into loops and next stretch them inside-out into the ST realm 'discharging as space'. Upon returning these loops will next intersect outside-in with the atom's EM border again, causing a double energy discharge ('electron') before moving time-instantly to the atom's other side and repeat the same process. This would look as follows:

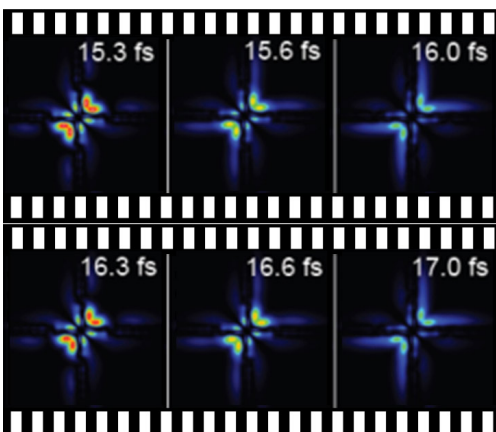


Perpetual oscillation, between mirrored spiraled states keeping electrical momentum



Summarized, the dual continuum suggests that each atom-bound electron actually consists of a double electric inward discharge intersection. In 'particle terms' one would say a photon heads along the EM fieldline towards its spiral end, taking the U-turn where its spin changes from +1 to 0 back to +1, constituting an average of spin 1/2 and with absolute spin change of -2 (!). In the next chapter we will see how this aligns with the concept of emitting of a graviton, marking a change in the arrow of time in the middle, making the electron symmetrically engage with its future self from our outer ST perspective! This in turn gives fundamental meaning to the fine structure constant.

Remarkably, the dual continuum prediction of the atom bound 'electron' being a split discharge was recently confirmed at the Max Planck institute! Below, a Helium atom showing a symmetric split discharge -simultaneously at each side-, as both field lines perpetually change their piercing position from one side of the atom to the other. The unwinding in between takes place in the ME continuum of the atom, which is *time instant* and therefore not noticeable. This is nothing short of a predicted and next observed overhaul of the Bohr-Rutherford model!



MAX PLANCK INSTITUTE DECEMBER 18, 2014

Phys.org / MPI Prof Dr. Thomas Pfeifer

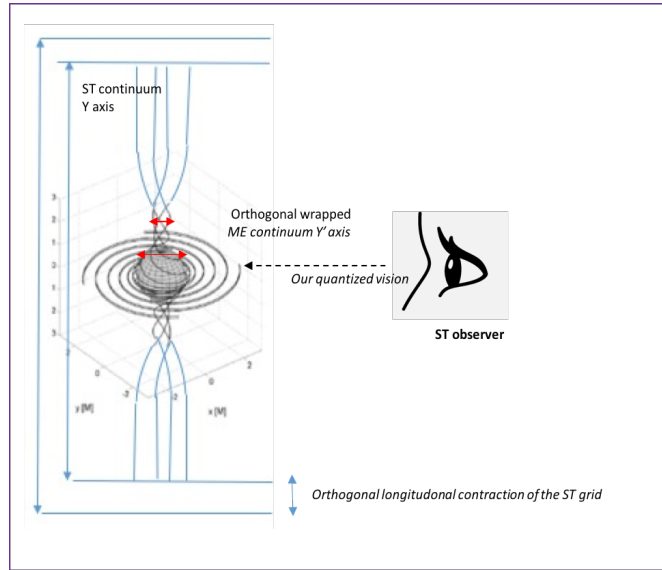
'...Electronic pas de deux: Physicists in Heidelberg have filmed the pulsing motion of the electron pair in a helium atom. At 15.3 femtoseconds (fs) the two electrons are close to the nucleus (center of image) and then move away from it. The colour indicates the probability of finding one electron at position....'

Notice that, lacking the knowledge of the dual continuum, the Max Planck Institute can't fundamentally explain the split.

Also; in the above scheme, one may notice that the dual red intersection points constantly converge and diverge over a section of the outer shell of the atom. Such behaviour is similar to observed granules at the Sun's photosphere, suggesting a fractal nature of the dual continuum concept, further solidifying its applicability on all scales.

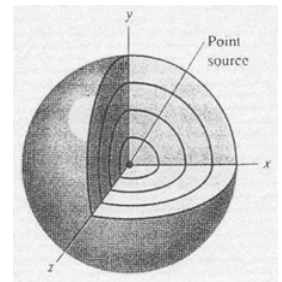
1.8 The quantized atom, quantized grid, gravity and electromagnetism

From the previous paragraph, it is only a small step to next fundamentally visualize and understand quantized behaviour in classical terms:



Suppose we are able to observe a (Beryllium) atom travelling along 4 ST field lines in the Y- axis direction. While moving from top to bottom, it will constantly wrap an unwrap the 4 fieldlines. Close to the heart of the atom, the 4 field lines are increasingly distorted relative to each other, as indicated by the red arrows. Effectively this constitutes a Gaussian probability curve reflecting the uncertainty of the relative ST position of the vertical spacetime field lines, not so much the particle itself! At the centre this uncertainty is maximal as the ST position of the 4 grid lines are indistinguishably blurred in ST terms. In contrast, it coincides with an optimum *orthogonal* ME view for the ST observer, as the 4 field lines form a distinct constellation of equal 'distanced' energy windings, always a fixed manifold of Plank Energy distance.

This perfect orthogonal grid view combined with the now irrelevant ST grid is the fundament behind Heisenberg's uncertainty principle. Moreover, we now understand that *it is our 'headson' ST perspective of ME spiralled field lines that constitutes all 'Quantum' behaviour*. This instant orthogonal and quantized energy view also holds true for the wrapping of the x and z axes. Therefore, if we superimpose the additional wrapping of these x and z spatial axes at the same spot, we get an e-Energy distanced concentric 3D sphere (*right*) for our dual grid. Movement inside this ME grid is time instant forming the basis for 'non local' entanglement. However, if field changes are induced by objects (partly) propagating in the ST continuum than this generates a 'refresh rate' per ST point appearing limited to C.



As discussed before, if we next assume the 4 vertical ST field lines (part of closed strings) above have a fixed total length, then **both** the clockwise and counter clockwise entangling will result in shorter vertical ST field lines (*see above in blue*) and as such bend spacetime, 'pulling' distant objects closer to the oscillating singularity. Arguably, when entangled to their maximum, the vertical fieldlines would physically 'touch' discharging alternatively as energy and space, causing the entire fieldline to dis-entangle and next entangle counter-clockwise. This alternating space/energy discharge generates transverse EM radiation in the grid. Notice that the end result is that regardless whether counter-clockwise or clockwise, there is always a net-shortening longitudinal ST effect combined with net transverse electromagnetic energy release. **This** is the very *tangible* fundament behind Einstein's spacetime curvature (gravity) and electromagnetism, as explained in more detail later.

1.9 Fieldline coatings, quantum fluctuations and EM radiation.

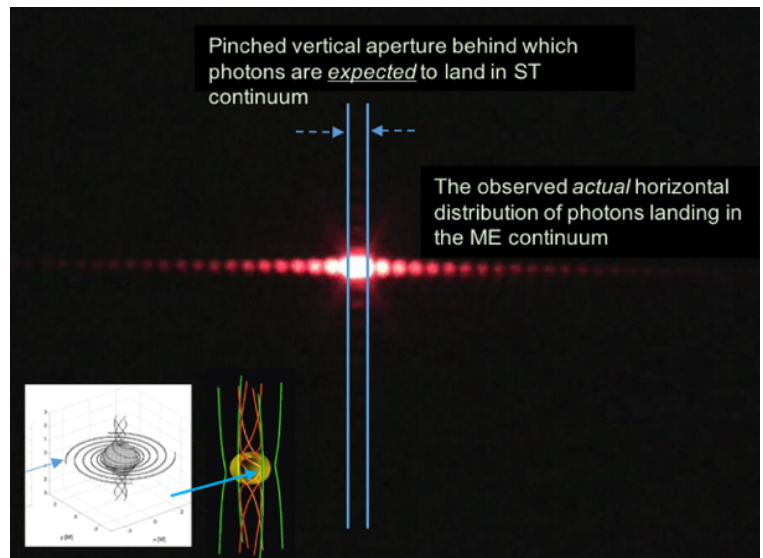
To describe how the dual grid would change from a ME into a ST dominated grid structure, one might use the analogy of a 'coating' of space/time particles covering field lines'. Under extreme singularity induced grid curvature, this coating of our ST grid would 'come lose' and be replaced by a coating of mass/energy particles, forming the orthogonal ME continuum grid. The 'lose' space/time particles would then shape particles inside our dual continuum. Extrapolating, it would not be 'allowed' for the 'moving particles' of one continuum to enter the grid of the other, as both are made of the same material. The particle would 'collide' with the grid causing noticeable field distortions. Particles of our continuum -e.g. hydrogen nuclei- would collide and release **Energy** in the ME grid, while particles from the other continuum (gluons, gravitons) would release **Space** in our ST grid, defining e.g. the contours of our atoms.

Most of such 'illegal' interactions would happen randomly, causing quantum fluctuations occupying 'empty' space. However, particles that carry an **exact** integer of the grid defining Planck Length (or Energy) of the opposite grid would be 'materially synchronised' allowing them to 'bump' along the grid at fixed distances while releasing quanta of energy (ME grid) and space (ST grid) at fixed orthogonal 'clock' intervals. This would describe Electromagnetic radiation, releasing a fixed ratio of 'space quanta' released per time unit defining C, whereas the energy quanta released per mass unit defines field intensity.

1.10 Heisenberg's uncertainly principle classically explained.

Heisenberg uncertainty principle' is a quantum law that states that it is impossible to know both position and momentum of an object at the same time. To demonstrate this effect, a single slit experiment is often conducted whereby a vertical slit aperture is gradually closed. As the slit almost closes, rather counter intuitively, the photons start to land horizontally (see picture to the right).

The prevailing QP explanation is that '...by knowing increasingly well where the photons are, their momentum 'spreads out' in the horizontal position..' There are however serious inconsistencies in this QP 'explanation' and the Dual Continuum can explain Heisenberg's uncertainty principle far better than QP:



The QP explanation:

1. QP attributes duality and the uncertainty principle to the particles themselves and states it is just 'not allowed' to know both location and momentum. This however, is not an explanation but a mere problem description.
2. QP suggests the uncertainty of momentum is expressed by the horizontal photon projection above. But momentum in ST terms is defined as $[kg \cdot m/s]$ which is not consistent with the cm-scale of the x-axis projection.
3. QP suggests the horizontal projection line represents the uncertainty of momentum of all photons coming through. But there is no explanation why this horizontal dilation only happens at the centre and not over the entire Y axis. An orthogonal projection seems part of the solution, but there is no such mechanism within QP.
4. QP mathematically correctly relates the equal-distanced photon 'diffraction' pattern to the relation between slit aperture and photon wave length. Diffraction caused by edges is however is not a strong physical explanation.

The Dual Continuum explanation:

1. Duality and the uncertainty principle are not related to particles but to the dual continuum setup. Δx is related to ST grid movement while Δp is an energy term, related to its orthogonal ME grid movement. Thus the ME movement aspect simply never coincides with just one point in ST and vice versa, hence the 'uncertainty'.
2. In our world, the ST continuum is dominant but the ME continuum is still present. By narrowing the vertical slit aperture, we artificially disable x-axis propagation of photons in the ST continuum after passing the slit. One could say the photons experience a near-spatial singularity in the x-axis direction. In contrast, ME grid propagation of the photons remains unaffected since all photons that *do* pass, still have full energy.
3. As a logic consequence, the photon x-axis propagation of the ME continuum now starts filling the void of the blocked photon x-axis propagation of the ST continuum. Since this always involves 'orthogonal wrapping' of field lines (see caption above) the Y axis photons are used, causing the x-axis 'smear' to appear only at the centre.
4. Effectively, the x-axis now displays the spiralled ME energy field windings of photon propagation in the ME continuum 'heads on', explaining the 'diffraction' pattern! The number of windings is a function of λ and the slit aperture. Each single photon runs time-instantly through the entire spiral, which is why the 'diffraction' pattern' also occurs if fired one by one.
5. The windings become less in number but get more stretched out and better observable as Δx decreases further. Effectively there is now a 'virtual and sliding x-axis cm-scale' combined with a fixed y-axis cm-scale.

There are a few additional things to consider;

- First of all, the narrowing slit experiment is unique in the sense that it 'collapses' *space* grid propagation of photons, if only in the x-axis direction. This transfers the particles into the ME continuum. Normally QP experiments do the opposite: They measure *energy* of photons and thereby 'collapse' their ME continuum grid propagation or 'QM probability wave function', transferring the particle into our ST continuum.
- The inversed photon propagation along the X-axis is time instant, unless limits are imposed by the y- and z-axes.

Heisenberg's uncertainty principle classically explained.

This key principle entails the inner product of the two orthogonal continuums; Δx is the locator of the ST continuum, while Δp is an energy related term, representing the locator of the ME continuum.

ST term	ME term	
Δx	* Δp	$\geq \frac{1}{4\pi} * h$
Δx	* $[\Delta M * v]$	$\geq \frac{1}{4\pi} * h$

Since the equation involves both continuums, the ME terms of 'mass' and 'velocity' first need to be adjusted to their dual dimensions to reflect consistent interpretation in ST terms:

Δx	* $\Delta t[s] * v_{dual} \left[\frac{m^2}{s^2} \right]$	$\geq \frac{1}{4\pi} h$
$\Delta x [m]$	* $\Delta x_{dual \text{ surface}} \left[\frac{m^2}{s} \right]$	$\geq \frac{1}{4\pi} h$

In dual terms ST momentum is now expressed as 'surface' per sec. Earlier it was demonstrated how vertical ST field lines wrap into an ME orthogonal spiralled 'surface'. By approximation, the radius is then defined by a multitude of 2π rotations, whereby r equals $1/2 * \Delta x$. This 4π 'momentum to Δx ' adjustment is why Planck's constant is divided by $\frac{1}{4\pi}$.

- The above synchronised formula can explain the actual experiment; When narrowing the slit until the orthogonal projection on the x-axis gets visible, each further ST Δx narrowing will mean an equal relative widening of the x_{dual} axis projection representing the diameter of the spiralled ME surface.
- Notice Planck's constant dimensionally changes in $[m^3/s]$ reflecting 'space time' itself.

*To confirm, one could measure the time delay between production and landing of 2 photons; one near the centre versus the other further away. There should be **no time difference** regardless of distance from the centre!*

1.11 Dual notations of h, G and gravitational force.

In pure ST terms, Planck's constant thus appears to have the dimensions of spatial flux $\left[\frac{m^3}{s} \right]$ as derived above. With this we get a clear physical meaning: A photon oscillates between the ST and EM continuum and each time it enters the ST continuum it can only create extra cubic space with a fixed amount per second, equal to Planck's constant. If its amplitude is low (producing a smaller sphere per cycle) than it must have a higher frequency to deliver the same amount of 'displaced space' per second. Inversely, in the ME continuum it must deliver a same amount of energy per mass unit. We can now also express the gravitational constant in ST dimensions only; it changes as follows:

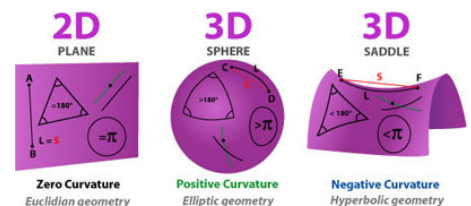
$$\ell_P = \sqrt{\frac{\hbar G}{C^3}} \rightarrow \ell_P = \sqrt{\frac{h \left[\frac{m^3}{s} \right] G}{2\pi C^3 \left[\frac{m^3}{s^3} \right]}} \rightarrow G = \ell_P^2 * \frac{2\pi C^3}{h} \left[\frac{m^2}{s^2} \right] = k_{gr} \left[\frac{m^2}{s^2} \right]$$

G is a (radial) surface deceleration term expressed in $\left[\frac{m^2}{s^2} \right]$ or in 'native' terms: $\left[\frac{J}{kg} \right]$. In the next paragraph we will derive that the dual or 'shadow' effect of an object's 'inertial mass' [kg] is a particle induced field-clock effect expressed in **seconds**, not kg's. Dimensionally we get:

$$F_{grav} = G * \frac{M1 * M2}{Dist^2} \text{ or: } F_{grav} [...] = G \left[\frac{m^2}{s^2} \right] * \frac{M1[s] * M2[s]}{m^2} = [\text{dimensionless}]$$

Thus, corrected for the dual dimensional settings, the gravitational force becomes dimensionless. Since we actually have a $4\pi m^2$ in the surface denominator at the right side this suggests F_{grav} is a geometric function of π in which case any π value different from 3,14159 determines the local curvature in Riemann space.

DIFFERENT TYPE OF GEOMETRIES



(studied by Omar Khayyam, Girolamo Saccheri, Bernhard Riemann, ...)

Dual shadow functionality

In the continuum setup table, one can see what the off-setting dual effect is per base unit in the ME continuum. It appears there are two rules for this 'shadow application' in our ST continuum:

1. The ST base unit carries into the ME continuum, and translates back with particle-field inversion
2. The ST base unit carries into the ME continuum, and translates back with base unit function inversion

Examples:

Mass & Energy: In the ST continuum the function of 'mass' is 'inertia' as in Newton's force law. Its ME dual functionality is time. Applying the setup rules above, the shadow ST effect of mass is the dual function of clock, expressed in time (seconds) and it does not impact the **particle** but the **grid** directly around it. Given that the clocks of mass and time always have opposite signs, this clock influence must be negative. In other words; To the ST observer we experience a 'time' contraction in the space around the massive object.

Space & Time: Analogous, the shadow effect of the particle property of 'energy' will be a negative radial **spatial** contraction in the grid around it. Combined mass & energy of an object will thus cause a spacetime contraction around it, describing the effect of gravity. Another application is the energy or 'relativistic mass' of photons:

$P = M_{rel} * C$ and $P = \frac{h}{\lambda C}$ And since Planck's constant of 'h' was earlier derived to be spatial flux $\frac{m^3}{s}$ we get: $M_{rel} = \frac{h}{\lambda c^2} = [s]$. Earlier we already arrived at the conclusion that shadow effect of mass results in 'seconds' which in turn renders the 'gravitational force dimensionless given $G = [\frac{m^2}{s^2}]$. This is symmetric to the shadow effect of a particle's energy in radial 'meters' contraction, which renders also the electric force dimensionless; In HLU terms (Heaviside-Lorentz Units) $F_{electr} [...] = \frac{q_1 * q_2}{4\pi r^2}$. Notice the inversed radial surface component of 4π -the surface of a sphere- in the denominator. This is the shape of the ME grid we earlier derived as we depicted the quantized spherical ME grid \mathfrak{z} wrapping all \mathfrak{z} axes. With respect to singularities we can now also derive entropy in a short by substituting the dual terms for h and G;

$$S_{Black\ h} = \frac{Area * C^3}{4G \hbar} = \frac{[m^2] \left[\frac{m^3}{s^3} \right]}{4 \left[\frac{m^2}{s^2} \right] \left[\frac{m^3}{s} \right]} = \text{dimensionless, with only Area as variable}$$

This in turn means the entropy is an integer of the smallest unit of length (squared Planck length).

In closure: 3D vision

The concept of the Dual Continuum is comparable to the known concept of 3D stereo vision using dual coloured glasses. We all know the double 2D prints of objects in red and cyan. These prints look blurry, yet when using the red-cyan glasses a 3D image appears as by magic. We may compare the 2D picture to QM: It looks strange and double but it is actually correct. We *think* our ST vision is working just fine, but we need to augment our vision by putting on our 'dual continuum' coloured glasses if we want to see what is behind the QM picture.

For those who are still somewhat reluctant to accept that besides Space also Energy can function as grid locator: If prompted to choose whether humans live in a Spatial world or an Energy world, we are inclined to say everything revolves around space and distances in our lives. Yet...there are no yardsticks growing on our limbs and our eyes do not measure distance but *energy* of incoming photons. Our ears measure *energy* of incoming air pressure waves. Our skin measures kinetic and electric *energy* to gauge heat and touch. Our brain next produces a primary energy grid picture and computes it into a derived spatial grid picture which may or may not be a reality. Apparently our brain is already programmed with dual continuum logic without us realising it.

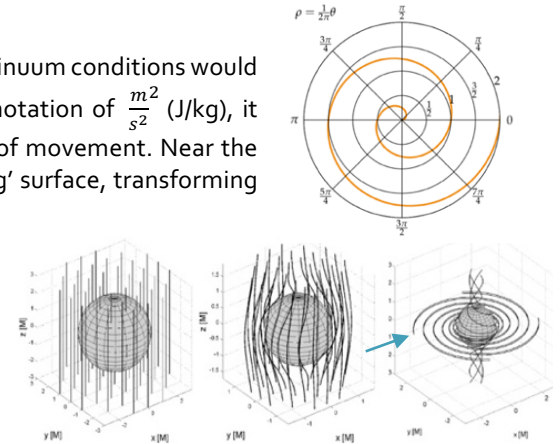
2. The dual continuum and the atom

In this chapter, we will discuss the expected consequences of the dual continuum setup for sub-atomic particles and structures. These will more in term of 'open' suggestions as limited observational material exists.

2.1 Particle transition

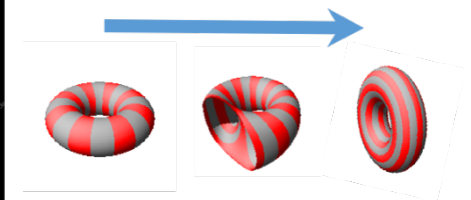
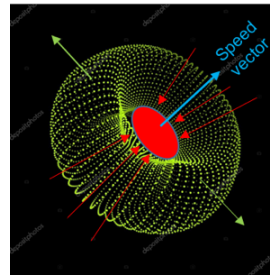
As discussed in the previous chapter, an individual particle nearing ME continuum conditions would increasingly be forced to move in dual terms. Given the dual ST speed notation of $\frac{m^2}{s^2}$ (J/kg), it would start moving in an orthogonal and spiralled grid around its vector of movement. Near the final Planck length winding the spiralled surface would become a 'pivoting' surface, transforming into an orthogonal spiralled energy grid with equal Planck energy spacing, with mass stretched along it as orthogonal clock. Equal windings imply a $\frac{1}{2}\pi$ based 'Archimedean' spiralled grid (right).

The phenomenon of a pivoting surface from ST to ME is reflected by the definition of Planck's constant in $E = h * f$, [$m^2 kg / s$]. The predicted top-down inward ST spiralling movement followed by the ME pivoting surface is indeed what the actual singularity simulations to the right display.



A larger object comprised of many atoms –say a red sphere- would start shaping as the accumulative of the above, with a length contraction (red arrows) in the direction of the speed vector and an orthogonal and growing EM torus around it (green arrows).

In theory, if such an object would become tachyonic, the length contraction would get smaller than the Planck length at which time the torus would 'implode' and invert. Interestingly, precisely a torus has the topological trait of inverting, resulting in an interchange between the lines of latitude (ME fieldlines) and longitude (ST fieldlines). This might explain how (micro) singularities form. Wikipedia has a beautiful animation of the inversion of a torus on its website (see static representation to the right).



Topology of inverting torus (Wikipedia)

2.2 The Bosonic atom model; Fields vs. force carrying particles

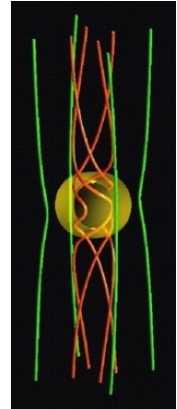
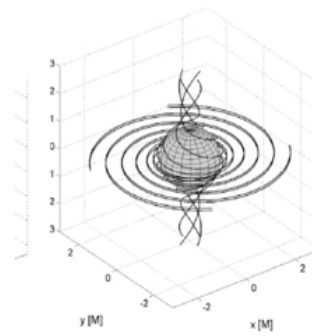
This chapter will highlight the potential consequences of the Dual Continuum (DC) for the atom. The current view of an atom gravitates between the ancient Rutherford-Bohr model of 1913 and the modern 'charged cloud' model. Relating to the electron orbits, neither model was fundamentally satisfying. In the previous chapter we showed that given the the nature of 'electron leaps' the DC came to a radically different atomic model in which electrons are super-positions of atom bound photons. It is the logic follow-up of Einsteins 'photo-electro effect' and we got support from simulations and recordings of the Max Planck institute. There are a few more general remarks to make from here on:

- Fieldlines, not particles.** Quite clearly, the DC concept is about the wrapping of fieldlines, either in ST or EM. For the atom this leads to concrete shapes and deterministic events such as bend spiral arms piercing the atom's outer sphere-shaped border, resulting in dual intersection discharge points we call 'electrons'. The DC is no supporter of 'free moving' particles. Connectivity is key and for this the DC views particles as (dual) excitations of fields.
- Fractal nature.** The strength of this new DC atom model is that it brings us back to 'tangible' shapes, whereas QP was hopelessly vague. In addition, it would seem that the very same fractal shape of the atom resembles the shape of galaxies and potentially even our Big Bang singularity.
- No forces.** Finally, the DC simplifies physics, suggesting there are no fundamental forces at work, neither in electromagnetism or gravity. This gives a sobering view on the concept of 'force carrying particles'.

It would seem that elementary particles, including 'force carrying particles' can be best thought of as intersections between higher order 1D,2D,3D shapes, which are all built from excitations (spatial or energy wise) of an omnipresent field we might call 'Higgs field' or 'Quantum Field' or 'New Ether' or whatever one prefers. Although such intersections may have complex characteristics (mass, various spins, charge, size) we are fundamentally mixing up cause and effect by speaking of physically detached 'force carrying particles'. Nevertheless, in this chapter we will use the 'particle' oriented approach, just to show that the new DC model is also congruent with particle physics.

2.3 The atom bound photon trajectory

As mentioned earlier; following simulations of singularities bending electromagnetic field lines, we take the resulting spiralled (folded) and oscillating model as the default shape for our atom. We will now take the particle position and imagine a photon coming in from above (e.g. coming from an above situated identical atom forming a chemical bound via field line connection) and follow its path;

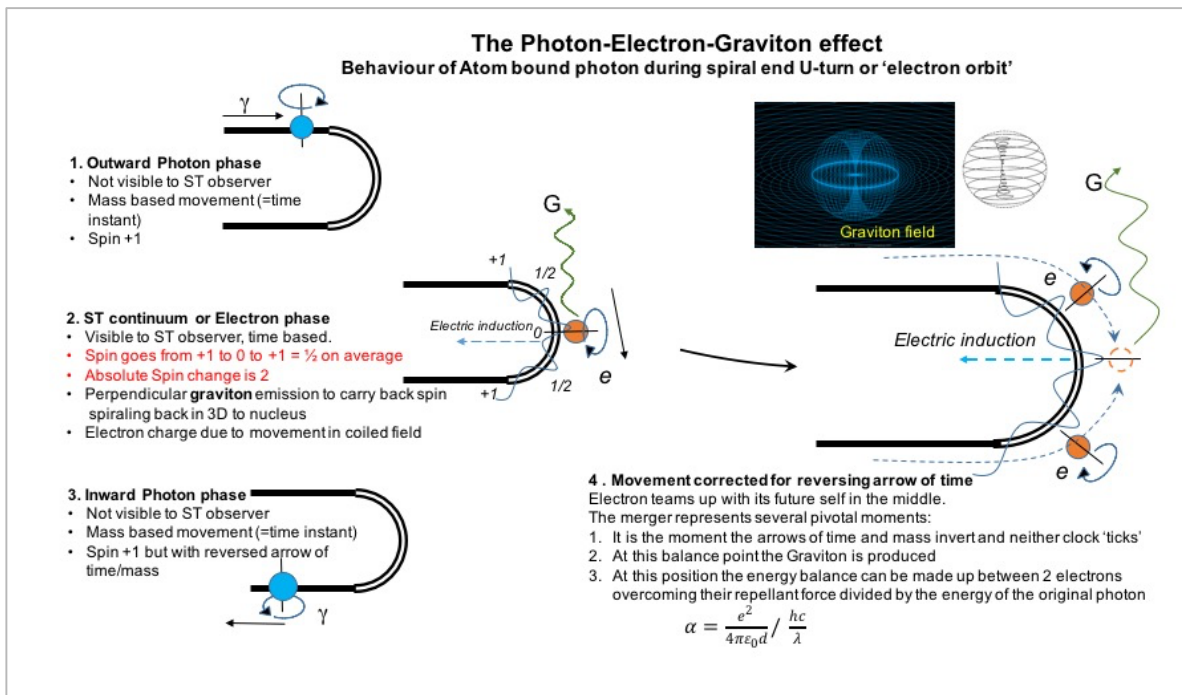


As such:

1. The vertical field lines represent ST continuum conditions;
2. The orthogonal horizontal spiralled fieldline arms represent its trajectory in the ME continuum
3. The 'U-turn' at the spiral-end is again vertical and thus subject to ST continuum conditions (!!). After this it moves spiralling inward again

The spiral ends or 'U-turns' have identical and fixed distances from the centre (expressed in Planck Energy units). A photon would travel time instantly in the ME continuum to the outer U turn. Arriving at the spiral ends, the photon would next make the U-turn, during which it would travel *vertically* (thus in ST!), becoming visible as it electrically discharges in time, before heading back time instantly. As such, there is no such thing as an 'electron orbit', only the stroboscopic and orthogonal collection of equal distanced electron discharges. This U-turn is the most interesting event: Particle-spin wise, as illustrated below, three important events would happen during this period:

1. The photon-electron mutation 2. Reversal of its arrow of time 3. Emission of a graviton



a. The photon-electron mutation and the illusion of electron orbits

The photon will change its spin from +1 to 0 and back to +1 again, resulting in an **average spin of ½**, suggesting an electron superposition, as discussed earlier. To the ST observer only the electron phase is visible as the entire internal photon spiral phase is time instant.

b. Reversal of arrow of time

At the middle of the electron turn there is a spin-zero moment relative to the electron plane, marking the reversal of the arrow of time for the electron. This suggested changing arrow of time is an element of the dual continuum logic for all singularities as already mentioned in chapter one. It simply means that from a certain point in time all future movement (flow of ST position slices) comes in at reversed order from 'our' perspective. Effectively this means that for the outside ST observer, the electron seemingly arrives and merges here together with its future self in reversed time, overcoming its own repelling force, but using the two different trajectories of the double spiral arm! This phenomenon

in general would solve Loschmidt's paradox. Notice this is quite consistent with the earlier description of two intersection points of a bend EM fieldline crossing the ST boundary.

c. Release of a graviton

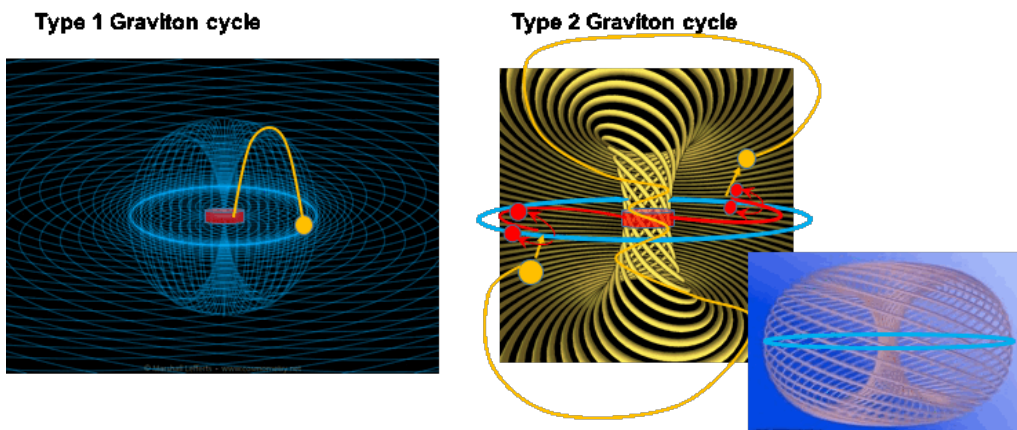
As a next point of attention; although the electron's average spin is $\frac{1}{2}$ during the U-turn, its **absolute spin change is -2** which would have to be compensated by emitting a spin 2 gauge boson (graviton) spiralling in 3D back to the centre. We will coin this process the '**Photon- electron- graviton effect**'. Finally, during its coiling movement the electron itself generates an electric charge leading to an electric 'force' pointing towards the nucleus.

2.4 Graviton functionality: defining the atom's space and mass

Gravitons have never been detected as individual particles (in terms of mass or energy at least) and as such are not officially part of the standard model of particle physics. In the 'Bosonic' atom model the graviton would be a key particle, carrying back and forth 'spin' much like 'blood transports oxygen in the human body'. Additionally, the ST observer cannot see a graviton move as it would have a mass based clock. We see all of its positions at the same time. As such gravitons would appear as stretched strings forming the atom's spatial hull and inertial mass as discussed next:

a. The graviton's trajectory and spin exchange

If indeed gravitons next carry back the surplus photon spin, there might be two types of trajectories: An orthogonal trajectory (type 1) ending at the centre. Or a more skewed trajectory (type 2) spiralling around the centre but ending up at the other side of the 'electron' orbit.



Perhaps both trajectories occur. The key difference is that in type 2 the graviton (yellow) would have a photon vertex interaction with two different photons (red); first with a photon arriving at the electron orbit (generating the graviton) and next with a photon departing from the electron orbit at the opposite side (absorbing the same graviton). In the 'straight' type 1 trajectory the graviton would transmit its spin onto a circular shaped central boson (Higgs) through which all field lines run. The Higgs boson would next transmit the spin upon creating pairs of W, Z, gluons or photons. In all cases, due to symmetry, any secondary graviton interaction should again involve a change in the arrow of time for particles involved. The graviton itself does not have a time reversal, explaining its renormalization problem.

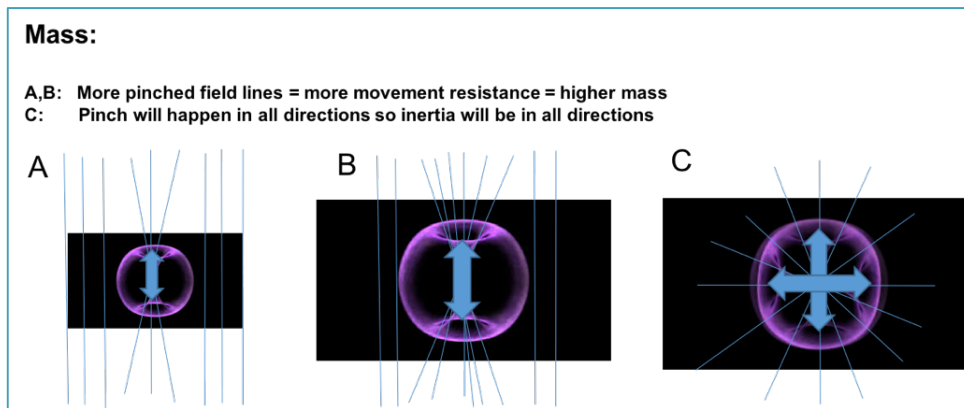
b. The spatial shape of the atom

The dual continuum setup suggests ST field lines and gravitons are made of identical material: Space and Time. This means that during the inward spiralling towards the nucleus, there will be an element of grid interaction as the graviton - loosely- 'sticks and slides' along ST field lines. Thus, both type 1 and 2 Graviton-Grid interaction will release Space while interacting with the ST grid the same way we earlier argued hydrogen nuclei release Energy when interacting with the ME grid. **This released space would constitute the outer shell of every atom!** 'In retro-action' it creates spatial distance between the outer electron 'orbits' and the nucleus, giving the atom a temporary spatial 'exo-skeleton'. As such, the most illusive particle of all may actually be the most observed ever.

c. Pinched field lines, mass and gravity

The interaction of the inward spiralling gravitons with vertical ST field lines would cause a 'drag' or '**pinch**' of vertical fieldlines, making them run through the middle of the atom, with potentially only the outer field lines actually being bend into horizontal spirals. This pinching effect would then have three important effects:

- 1) Pinching the field lines through the centre effectively 'clears' the area between nucleus and electron orbit from all vertical ST field lines; this explains why atom bound photons can next spiral outward time instantly.
- 2) With pinched field lines running through its centre, it will be more difficult for the entire atom to move along the otherwise straight field lines of the ST continuum, hence the pinch constitutes inertia or **Mass**. The un-pinching would happen instantly once the gravitons reach the centre, but on average there will always be a net 'distorted' convex situation. Below a simple convex illustration is provided. In reality the 'electron orbits' continuously vary in angle so the pinches would occur over the entire atom sphere causing inertia in all directions (C).



One may imagine that an object that manages to keep the electron 'orbits' of its atoms aligned (B), would develop a strong pinch gradient. Nearby objects with a similar pinch gradients would align to this field, which would in effect describe magnetism. Moreover, since magnetism, like ST, is orthogonal to the ME continuum, it would coincide with the direction of ST field lines.

- 3) The periodic pinching and wrapping of ST field lines would also mean a *shortening* of the vertical ST field lines which would be felt in all directions and over great distances. Again, this would be the mechanical principle behind curved spacetime and thus *gravity*.

The suggested semi-loose interaction of gravitons with field lines ('strings' when assuming the ST field lines also connect in a U-turn) is actually similarly discussed in string theory:

Gravitons in speculative theories (Wikipedia on gravitons:)
 ...A feature of gravitons in string theory is that, as closed strings without endpoints, they would not be bound to [branes](#) and could move freely between them. If we live on a brane (as hypothesized by [brane theories](#)), this "leakage" of gravitons from the brane into higher-dimensional space could explain why gravitation is such a weak force, and gravitons from other branes adjacent to our own could provide a potential explanation for [dark matter](#). However, if gravitons were to move completely freely between branes, this would dilute gravity too much, causing a violation of Newton's inverse-square law. To combat this, [Lisa Randall](#) found that a three-brane (such as ours) would have a gravitational pull of its own, preventing gravitons from drifting freely, possibly resulting in the diluted gravity we observe, while roughly maintaining Newton's inverse square law.^[13] See [brane cosmology](#).

The above rather closely describes what is argued in this paper; The graviton rotates around and pinches the ST field lines, yet as a self inflicted secondary effect the increasing flux density towards the atom's core will cause the graviton to move to the core as well.

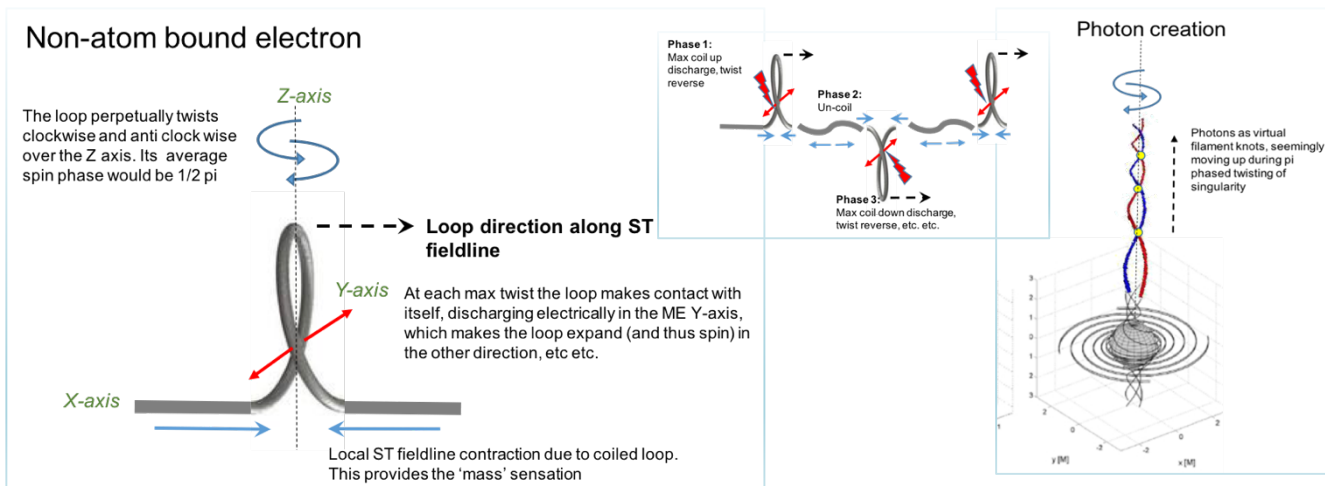
Neutrino's

Looking at the Torus shaped geometry of the 3D graviton trajectories at the previous page, gravitons would be the only particles to combine 'horizontal' ME and 'vertical' ST movement, suggesting it combines all traits; It loses energy, creates space, loses mass and gains time. Its trajectory would be an observational 'nightmare': Its virtual ST speed may exceed C, yet at the 'top' of its vertical trajectory towards the atom's core it would be near zero in ST terms, before accelerating again in the opposite direction downward toward the nucleus. In addition, and as discussed before, during the split electron discharge it would in retrospect create space (distance) between the electron 'orbit' and the atom's nucleus. From our perspective it would thus seemingly travel backwards in time, carrying the spin property of the couple of particles it created 'in the future' (in this case electrons, as in electron neutrino's). If we look at all these versatile traits, many appear consistent with what is attributed to the Neutrino, hence it may very well be that the Neutrino is the ST superposition of the Graviton in so far we can observe it in ME energy terms and analogous to the photon-electron superposition.

2.5 The free electron, free photon, Dual Quantum Field Theory

Since we depicted the atom bound electron as a $\frac{1}{2}$ pi spin ST piercing fieldline, the question is whether the 'knocked-out' electron would be a cut-off piece of fieldline, becoming an autonomous closed (?) loop string, leaving a damaged open string at the atom's end. This is non-desirable as we'd like to think of field lines (strings) as 'nearly' indestructible shapes. Moreover, in string theory the electron is not a closed loop.

Alternatively, we may be able to design a more suitable shape; preferably it would still have the pi U-turn and half pi on-average property. But it also has to contain an element of autonomous ST grid contraction since the electron has mass. Given its net-convex inertia, this ST contraction has to be compensated by an opposite net-concave electrical discharge ME effect. Combining all these properties one could construct the hypothetical electron picture below left:



The electron loop twist above looks good. However, 'free' electrons are measured as having only spin up or spin down, which might imply the discharge needs to be at opposite points. In that case the stronger phased version in the middle might figure might apply.

Similarly, we want to design a string-like fieldline representation for the photon: Since the photon has no mass, it cannot have a ST contracting loop, and its ME propulsion would need to originate from the winding and unwinding of a bigger connected structure, e.g. the atom (to the right). Quite likely whenever the atom's vertical fieldlines get too far entangled, they touch, leading to a discharge which would cause the wrapped fieldline to normalise and wrap counter clockwise. Like a AC motor, the intersection points would virtually move upward (yellow dots), powering transverse EM radiation in the near grid. In all we get to a perpetually balanced 8 dimensional interaction (3 energy, mass, 3 space, time) field, where each particle has its own specific vibration signature. The 3 Different groups (families) of particles may next use different scaled singularity induced versions (string theory: 'brane level') of a similar **dual field design setup**. Yet a particle would not have its 'own field', as this goes against the concept of balanced dual functionality. We may coin this the **Dual Quantum Field Theory (DQFT)**, given its similarity to the idea of QFT.

2.6 The nucleus of the Bosonic atom model; gluons, Higgs, W, Z bosons

Though *highly* speculative, the frequency with which photon/graviton carried spin would be incoming and outgoing at the atom's centre, could very well cause physical ME grid vibration 'compartments' through which the pinched ST field lines run perpendicularly. As such, one may look at the amazing figures below where grains are evenly distributed over a plate that's starts vibrating forming changing compartments as frequency increases.



<https://youtu.be/wvJAgRU>

Similar sliced compartments might confine the pinched ST field lines running perpendicular through the centre. Depending upon a compartment being open or closed, these might define the differences between the various 'glued nucleons' of 'protons / neutrons / quarks'. In addition, Gluons, W and Z bosons could then be the specific 1D and 2D ME fieldline intersections at these compartments. The Higgs boson might have a key role, balancing and distributing the spin in- and outward. As with electrons and photons we would much prefer to express all gauge bosons as the result of oscillating ME/ST field intersections at smaller scales, not so much as 'loose' particles that 'carry' a force.

2.7 The atomic nucleus in relation to the dual continuum and string theory

Although QP perfectly describes the mechanics of nuclear particles, it is interesting to see if we can yet reduce complexity by describing nucleons in underlying dual terms: In the first chapter we derived that one should think of the area between nucleus and electron orbit as EM continuum dominated. In addition, we suggested that the nucleus itself *could* be a **ST** area, but on a smaller scale. This means we would have:

- 1) Two ST dominated worlds (the nucleus and our macro world), with a photon based EM continuum in between.
- 2) In the EM area, fieldlines are being wrapped forming the outer electrons while being straightened at the centre

We will focus on the moment the fieldlines are temporarily 'straightened' at the centre, before they get wrapped again to produce an electron at the atom's other side. Given the momentum (Energy) that the fieldline has, it is logical to assume this will manifest as a corresponding (charged) spatial expansion at the centre upon straightening. As such it would be a central spatial expansion with positive charge: the Proton. So the very same oscillating fieldline would then produce alternatively **both** an electron and proton, although never 'at the same time'. *Hypothetically* it might thus be:

- ***There would be no 'electrical force' between proton and electron; both elementary particles are just alternating manifestations of exactly the same fieldline, which never co-exist. They are 'virtually bound' by the fieldline string itself***

Additionally, if indeed we have nuclei with spatial dimensions; then what if yet another fieldline is incoming at the centre, looking for a spot to 'straighten out' but first gets confronted with the ST area of an existing proton? It may just be that such a fieldline would then spontaneously materialise as an electron inside the existing proton. This would produce a neutron. If matching in frequency it may even seem a continuous neutron. With this we have a concept whereby both electrons, protons and neutrons can be explained in dual terms.

Hypothetically, it might even be that fieldline(s) that comprise heavy atoms, simply oscillate at a much higher frequency relative to e.g. a hydrogen atom which may be the slowest possible atomic oscillation. If so, then atomic mass in the sense of more nucleons, may very well only mean the same fieldline is oscillating at a much higher frequency, manifesting as a virtual set of additional nucleons. After all, frequency is inverse time $[1/T]$ which according to the dual continuum equals mass. As such, string theory may yet get a useful and testable application in the build of the atom itself. This is an interesting area to say the least, quite possibly with string theory forming the essential bridge between the dual continuum and nuclear particle physics.

2.8 The photon quantum leap, EM radiation

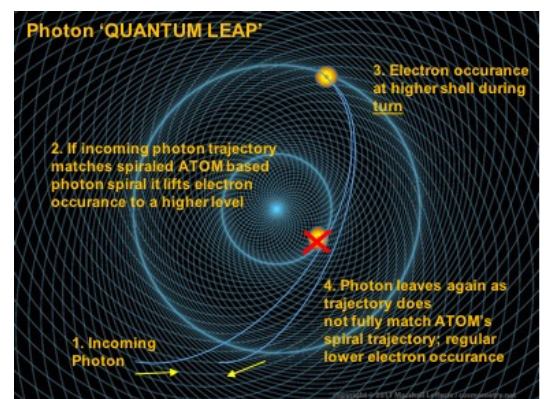
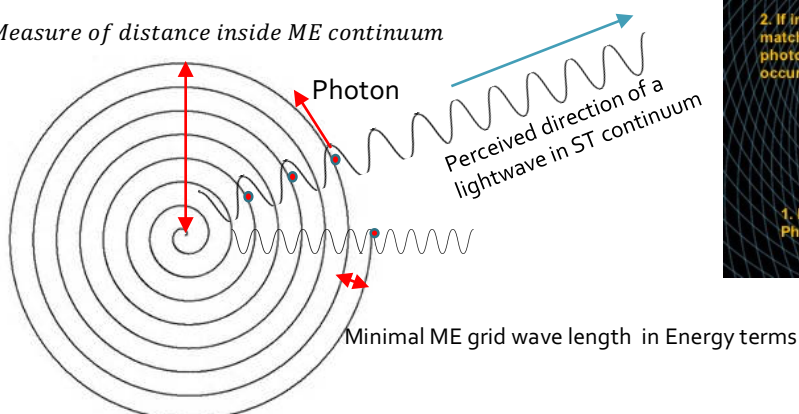
In closing a some additional figures on photons and electromagnetic radiation.

a *Photon quantum leap*; Below right, a visual how the process of 'photon' quantum leaps would unfold according to the dual continuum setup:

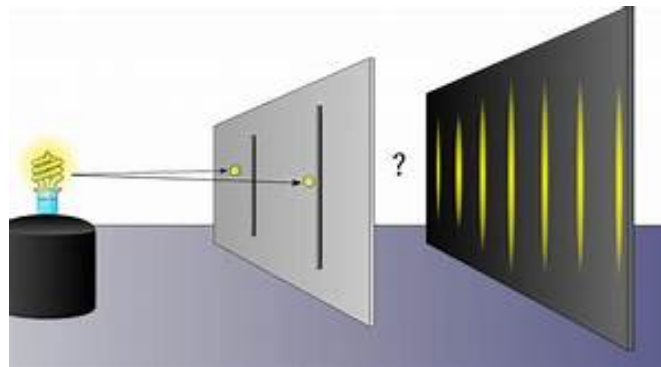
b. *The (atom bound) photon*

Below, in terms of the ST continuum, 'light' or electromagnetic radiation in general, is arguably a special case in the sense that they form an exact manifold of Plank Energy, allowing us as ST observers we see them. This would be true for all things 'quantum'.

$E = \text{Measure of distance inside ME continuum}$



2.9 Solving the double slit experiment

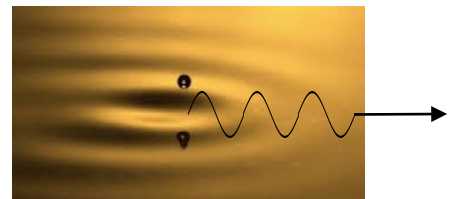


The double slit experiment can be solved in the almost the same manner as the single slit experiment earlier:

Explanation

The solution to the double slit experiment lies in the acknowledgement that there are 2 grid locators, not one. Fundamentally, the landing of the particle in the ME world (the visible electromagnetic discharge) is **not** fundamentally linked to the landing of that same particle in the ST world (a tiny invisible space time distortion). So the 'magician's trick' is our mono-continuum flawed assumption that by measuring the energy locator of the particle, we would also know where the particle is in spacetime terms.

If *unobstructed*, both may more or less coincide along the pilot wave concept that De Broglie proposed back in the 1927. However, this is no longer true when placing the double slit screen. At that moment, the area right behind the slits is inaccessible for the particle in ST terms, but not in the wave terms of the ME locator. As such the ME locator dominates and puts on the separate 'show' of ME discharge interference. Meanwhile the **SAME** particle in ST terms would either bounce off from the obstruction or yet land exactly behind any of the two slits making a tiny 'spacetime' dent.



Detectors

The completely separated ME interference 'show' may be manipulated into endless distracting complications which are totally irrelevant for the spacetime landing of the particle. The complications involve switching detectors 'on' or 'off' or using delayed choice manipulations.

Although not relevant for ST landing, all these complications can be explained by the typical traits of ME movement: It is time instant and its position slices come in reversed order for the ST observer due to its reversed arrow of time. This means that the ME location pattern behind the slit partially comes back *through* the slit towards the emitting source of the photon / electron, even before the photon leaves its source on the left. This 'fork' of ME location is the suppressed locator for as long as the photon travels in ST towards the slits, but it becomes dominant behind the slits. Notice the ST passing of the slit is **not** detectable with an 'Energy detector', only with a theoretical spatial distortion detector. All that an energy based sensor does -whether in front or after the slit-, is to instantly destroy the ME fork.

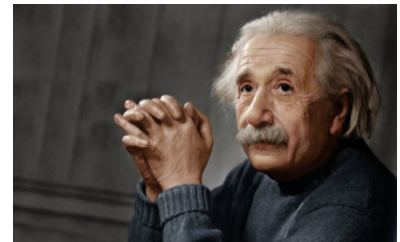
3. The dual continuum and gravity

Gravity may well be the single most contemplated aspect of physics. Although Einstein's general relativity (GR) provides the undisputed and correct mathematical description of its remote working via curved space time, the exact tangible mechanism is still not understood. The dual continuum corrects and completes GR.

3.1 Mass, general relativity and the ether problem

Since Einstein, there has been a lot of debate on gravity but close to no progress. A century of QP did not deliver a quantum theory of gravity and leading physicists recently started renewed interest in ether: There simply has to be some medium for electro-magnetic waves to 'wave' in and a fabric that accounts for 'bent space'. Concepts like 'fields' or 'force carrying particles' are mathematically nice but only add complexity. In stead we need a simple, direct and tangible grid related mechanism which brings us back to the realm of -new- ether, something Einstein was actually a strong proponent of. To illustrate, below are his closing words from a lecture on ether in Leiden (1920):

'...Recapitulating, we may say that according to the general theory of relativity space is endowed with physical qualities; in this sense, therefore, there exists an ether. According to the general theory of relativity space without ether is unthinkable; for in such space there not only would be no propagation of light, but also no possibility of existence for standards of space and time (measuring-rods and clocks), nor therefore any space-time intervals in the physical sense. But this ether may not be thought of as endowed with the quality characteristic of ponderable media, as consisting of parts which may be tracked through time. The idea of motion may not be applied to it....'



It is deeply ironic and historically incorrect that Einstein came to be known as 'the man who did away with ether', whereas in fact he was a strong proponent. True, he deprived of this ether the idea of motion, but this would be a 'relative' restriction which has no meaning in case all 'ponderable' objects we observe –including ourselves- are mere excitations of the very fabric the ether is made of (see *DQFT*)...Einstein correctly felt the solution to gravity had to lie in some sort of ether, but he just never got to solve the inherent energy problem that comes with it. More specific:

Mass impacts the movement of other objects either directly via 'contact' transfer of momentum or via curved spacetime. Given the effects are in essence similar, it follows it must take energy to bend spacetime and next require unlimited energy –time wise- to resist normalisation of that same curvature, something which would conceptually be needed for General Relativity to work. There is an implicit but obvious energy deficit here. As an analogy we may think of holding a bar magnet inside a copper coil and expect perpetual electricity to float as a result.

So basically Einstein had to choose between two evils; either his theory of GR could not entirely be explained via mass induced curving of spacetime, or he had to give up on his equivalence principle of $E=MC^2$ stating that Mass equals a large but **finite** amount of energy. It appears Einstein did not want to risk losing either achievement and basically ever since tiptoed around the subject using evasive intricate wording as did those who studied gravity after him.

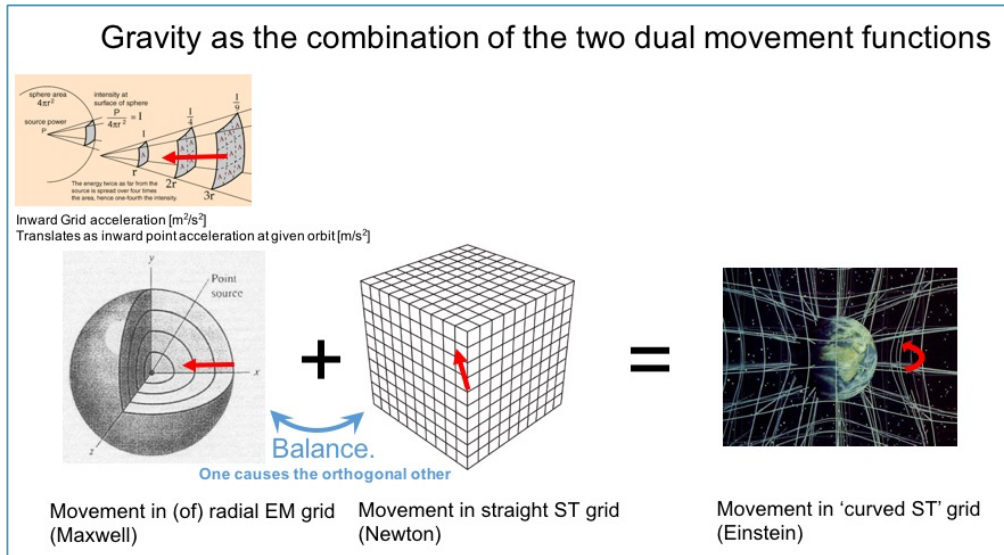
With the dual continuum concept, we can now see that the entire riddle is based on two flawed human assumptions:

1. $E=MC^2$ is **not** an 'equivalence' relation. Fundamentally Energy is as much equivalent to Mass, as Distance is to Time in the formula: Distance=Time*Speed. Both are mere *cyclical* 'movement equations' and nothing more.
2. It is **not true** that spacetime is constantly curved by Mass; There are two **cyclical** harmonizers in place. First there is the time instant 'normalisation' of spacetime (not noticeable for the ST observer). Secondly, there is a balanced Energy grid expansion in reaction to the spatial contraction effect of Mass. In addition, we may notice that the ME observer will have a reversed arrow of time and see both events inverted. For example; we observe our big bang galaxy as an expanding spatial gravity field while energy-wise we see it as a contracting field.

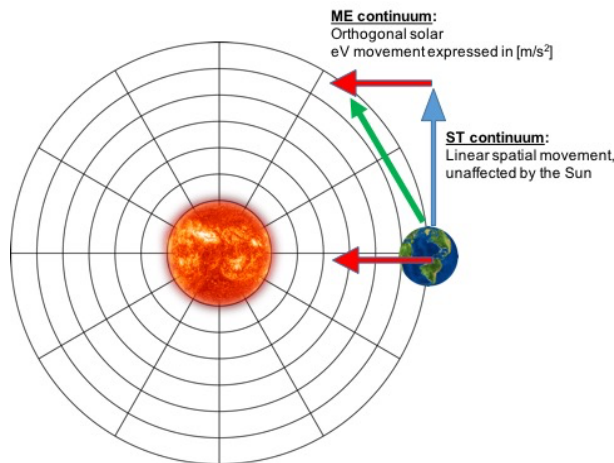
Einstein may be forgiven for not questioning his own tremendous achievements of $E=MC^2$ and GR, but all who came after him, should have noticed that besides the mass 'blamed' contraction of space time we also must deal with the energy coming from atoms in the form of 'perpetual' radiation of photons. In slightly different terms: we have a mass based continuous electromagnetic Energy field **surplus** whereas we also have a mass based continuous Energy **shortage** in relation to the energy needed for contraction of spacetime. Is it such a strange idea that both mass induced breaches of the 'Law of conservation of Energy' would cancel out in perpetual oscillations? From there it is only a small step to link electromagnetism to gravity via the cyclical wrapping of tangible 'strings of ether', rather than sticking to the physically detached concept of 'force carrying' particles. It is somewhat of a mystery why for over a century we do not embrace this perfect dual symmetry which is so clearly put on display by Nature...

3.2 Gravity as dual continuum movement

In chapter one, we already explained the fundament behind gravity, namely the offsetting dual ST contraction effect of movement, both in rest mass (the movement of subatomic particles) as in macro movement of fast objects. As a next question we want to know how gravity mathematically translates into grid movement. Einstein's General Relativity (GR) perfectly describes this via the relation between mass and the bending of spacetime. Nevertheless, it is fundamentally more correct to explain the working of gravity as the combined influence of ST movement and its orthogonal contracting radial ME movement as displayed below.



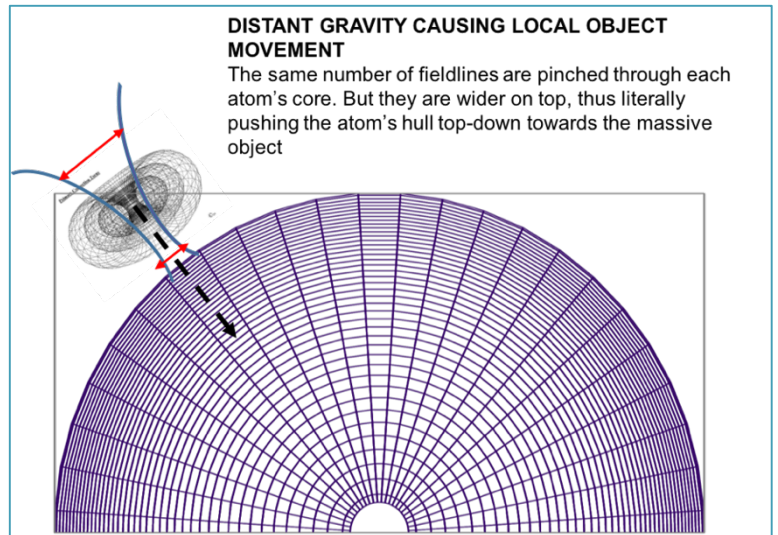
The native unit for speed inside the ME continuum is J/kg, which translates into m²/s², representing a virtual inward accelerating radial **grid** contraction around the massive object. For a 'point-object' orbiting this massive object (e.g. Earth orbiting the Sun), this effect comes down to m/s². We can now see that gravity is simply dual continuum movement: The dual or 'Maxwell' movement incrementally and immediately compensates for any delta eV change which the straight ST movement would otherwise have caused. Effectively, this results in an imaginary rotation of the ST vector, keeping the object in an equal eV orbit. One can display that as follows:



Interestingly, if we derive the dual locator from the dual speed notation we get: $D_{istance} = \text{Dual speed [m}^2/\text{s}^2] * \text{Time [s]} = [\text{m}^2/\text{s}]$, which is none other than Kepler's second law, meaning an orbiting object will cover the same squared distance per time unit, describing an ellipse. Consequently, for the EM observer standing on the Sun, an object is at complete rest (in eV terms) if it follows a circle in spacetime. If orbiting along an ellipse, Earth would also be at rest yet 'vibrate' at its energy position, since Earth must make cyclical adjustments (via perpetual discharging and charging) of its own eV charge in order to align with its elliptical eV grid trajectory. Since Earth's orbit is indeed slightly eccentric, this explains Earth's constant charging and discharging in the form of *Solar connected* Alfvén aurorae, van Allen Belt, high/low atmospheric lighting etc. More prominently, we see this (dis)charging in the tails of comets. Another example would be 'anomalous' anisotropic radiation pressure which the pioneer 10 en 11 space-crafts experienced.

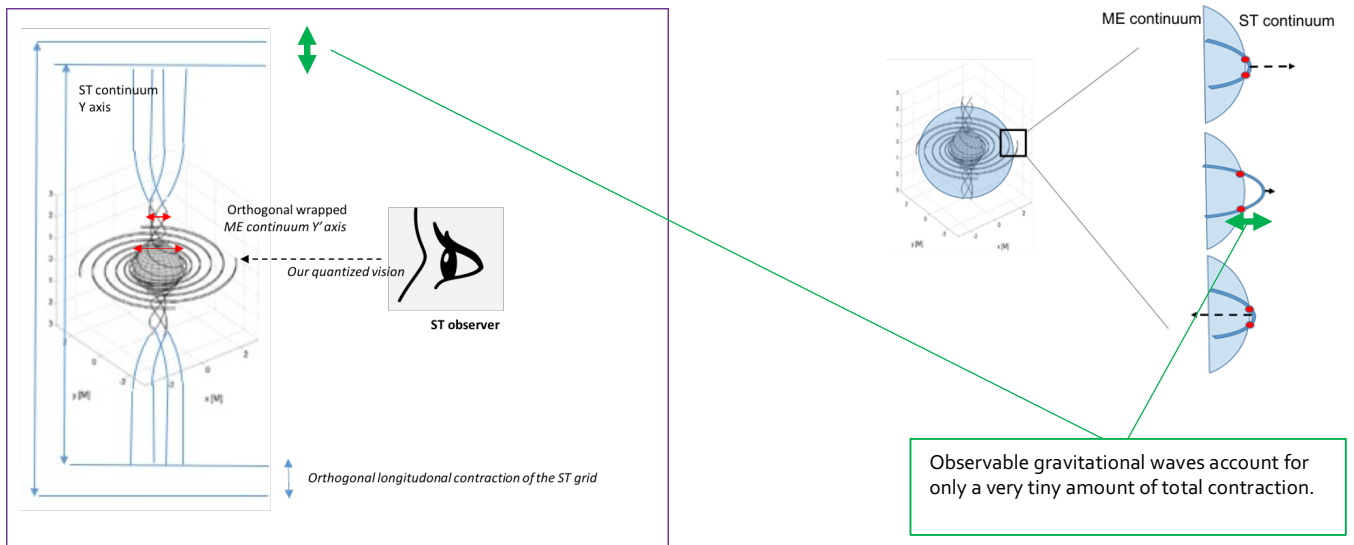
3.3 Gravitation transmission mechanism

As the last piece of the puzzle, one may wonder how the curved grid 'graps' any object in it and forces it to move. The transmission mechanism for the 'gravitational force' onto objects would be the flux density difference of the pinched ST field lines running through the atoms of an object. On average there will be a slight gradient as displayed on the right where locally pinched field lines would have more distance (energy) facing away from the heavy remote object. Trying to pinch all field lines equally, the oscillating atom would feel this as a bigger counterforce on its hull, thus pushing itself (and with it the entire object) towards the heavy object.



3.4 Gravitational waves and the passing of time

As discussed earlier, the wrapped position of ME field lines leads to an orthogonal spatial contraction, which is not time based and therefore we cannot see them develop in time. They are 'instant' standing waves from our perspective. The only part of the contraction we can actually observe in spacetime is a moving gravitational wave, equivalent to the tiny portion of the orthogonal wrapped EM fieldline that pierces and discharges electrically in spacetime (see the green double arrow below). Therefore we can only observe a very weak gravitational AC-like wave travelling at the speed of light, whereas the bulk of the spatial contraction is fixed and instant -unless field lines are longitudinal elastic-. We as ST observer will therefore observe gravitational contraction (near) time instant whereas the accompanying observable but secondary gravitational waves would be limited to the speed of light.



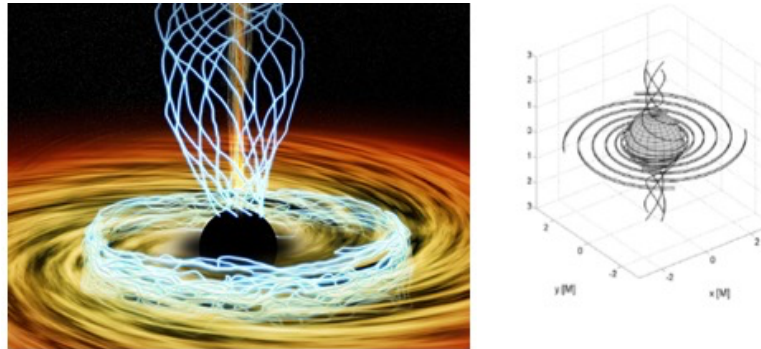
In literature, there is the philosophic question of whether Earth would instantly depart from its orbit if the Sun were to disappear or whether it would face a delay of 8 minutes (the time it takes for the Sun's light to reach us). The answer must first and foremost be that a mass-based object like our Sun can never disappear instantly since this would require bigger than light speed which is not possible. So this would never materialise this way. However, in the theoretical case the Sun *would* vanish instantly, the bulk of spacetime contraction *would* disappear instantly, with a time based ripple of secondary gravitational waves following 8 minutes later by which time Earth would long have departed from its orbit...

In case spatial field lines are indeed longitudinal elastic, then we would not have a 100% instant spatial contraction. It would likely also lead to a relative passing of time; To explain; elasticity means there will be (temporary) differences in tension of ST field lines, which the ST universe would seek to neutralize. Areas with little mass would typically be areas with 'loose' ST field tensions since only little fieldline length is wrapped up by atoms there. As a consequence, it would

be logical that the atoms that *are* present there would be 'allowed' to wrap up more fieldline length in more windings in order to yet absorb their $kg \cdot J/kg$ oscillation momentum. This in turn would lead to longer atomic oscillation times, which in turn would mean a slower local mass based 'ME clock'. To the ST observer however, more 'instant' windings would have to be compensated by more spatial displacement, meaning in ST terms the local orthogonal time clock would tick relative FASTER since it is restricted by fixed oscillation per sec by Planck's constant. Mass deprived areas would thus have a blue shift which would translate into a red shift, corrected for an inversed continuum view as we seem to have relative to our universe.

3.5 Gravity and magnetism

As suggested earlier, the entangling and disentangling of ST field lines would be similar for singularities of all levels, from atoms to universe. When looking at massive black holes, like Sagittarius A below, we get another display of this principle.



[Physicsworld IOP publishing 4 dec 2015 Blue haze: the magnetic-field lines that surround SgrA*](#)
 The first direct evidence of magnetic fields near a black hole has been found by researchers using the [Event Horizon Telescope](#) (EHT), who have seen such fields around Sagittarius A* (Sgr A*) – the black hole at the centre of our Milky Way galaxy. While such magnetic fields have long been predicted, this is the first time that they have been detected close to the "event horizon" of the black hole. Magnetic fields near a black hole are thought to power the huge relativistic jets that emerge from many accreting black holes and blast across thousands of light-years – shaping entire galaxies along the way

Magnetism is a curious phenomenon also in respect to the dual continuum setup. The spatial grid is orthogonal to the energy grid but so is magnetism if we define the dual energy grid as 'electrical grid'. As such it combines elements of gravity (no dipole) and electricity (charge related) as discussed at paragraph 2.4. Obviously more research is welcome.

3.6 Direction of gravity

One can now make assertions on how gravity would work at each of the various scales of the nested singularities that cause them and quite likely we are experiencing the accumulative working of all of them, constituting local G: There would be at least 3 scales:

- At the atomic level, the photons within atoms oscillate many times per second in several 'planes' and objects have many atoms oriented in all directions. As such 'atomic' gravity (the bulk of which we experience) is radial.
- Distant galaxies, apart from their atomic mass, would provide an extra longitudinal 'galaxy' contraction through their centre if their disk would be perpendicularly pointed towards us. As long as we are in the spiral arms our own Milky Way galaxy arguably would not influence us with additional 'galaxy' rotation gravity. We may also see more mass as in 'dark objects' at the outer spiral arms (see chapter 4) . Minor black holes would add to such additional mass pull.
- 'Big bang' gravity would always apply, due to its directional 'lobe' setup as discussed in the final chapter.

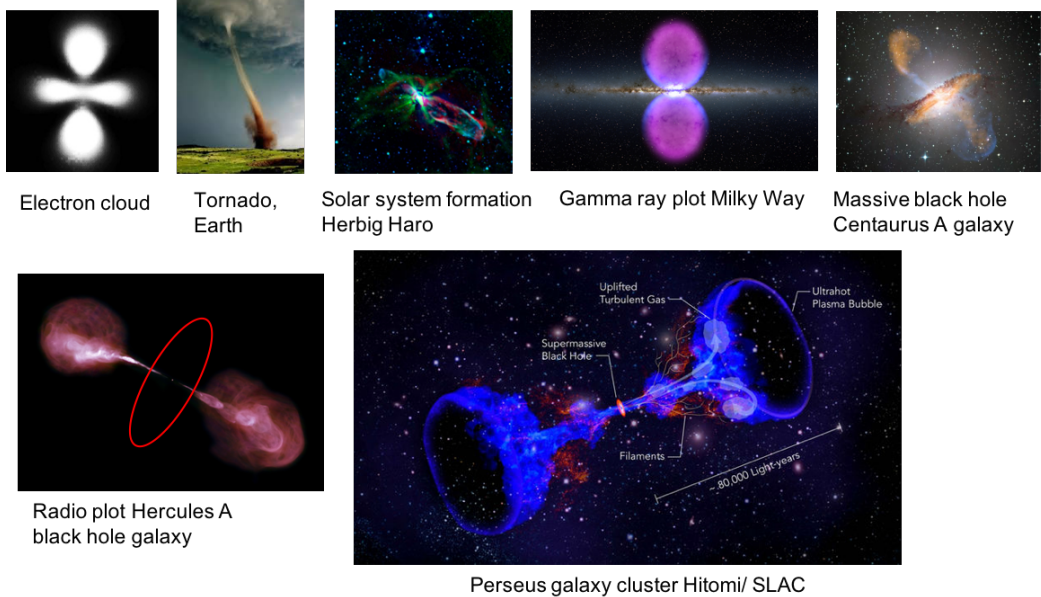
4. Consequences on the cosmic scale

It is only recent that astronomers developed an estimate of the age and dimensions of our universe and next observed it to *apparently* be expanding at an ever faster rate, as per interpretation of observed redshift. In the previous chapters we already mentioned the dual continuum concept leads to a radically different interpretation of this red-shift.

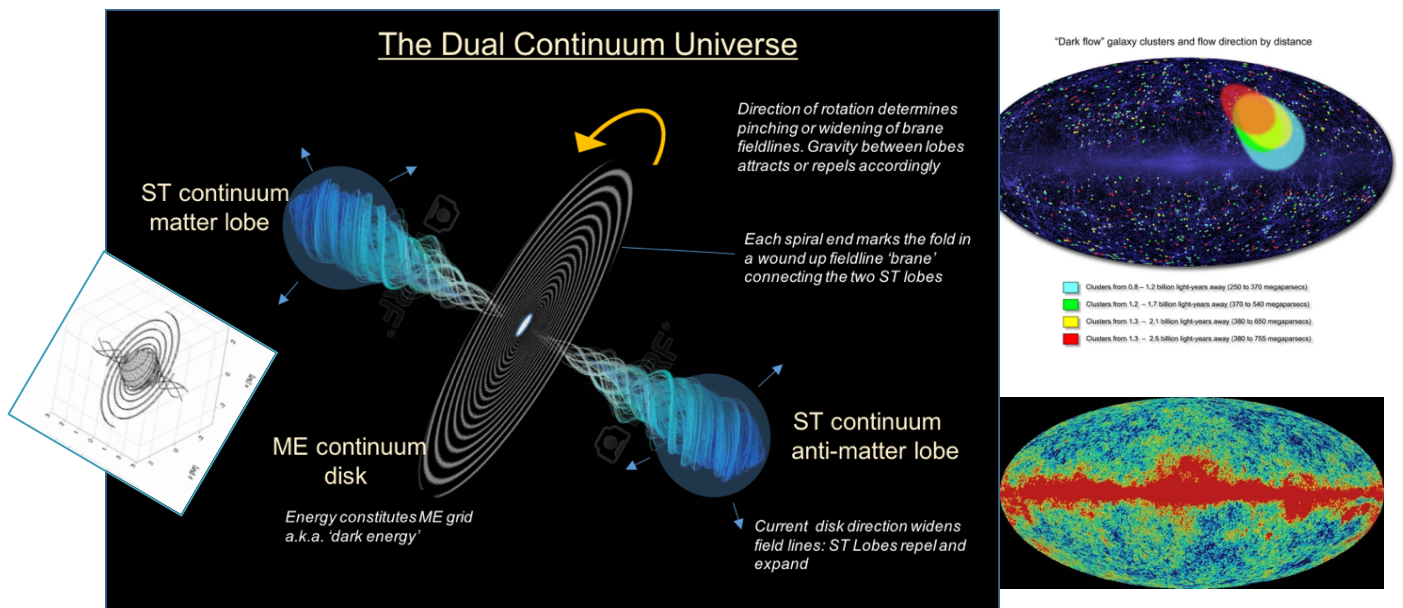
4.1 General structure of the dual continuum universe

General consensus is that our Big Bang universe would be more or less sphere-like. Although largely consistent with observations, a simple exploding sphere would offer no answer to the observed matter-anti matter a-symmetry. In contrast, there is a recurring 'Universal Fractal Format (UFF)' below representing singularities on all scales from atom to galaxy: It can be described as:

1. A rotating 'ME disk', home to particles that appear to have no matter / anti-matter preference and which separates:
2. Two ST sections ('lobes') of opposed matter connected by fabric (strings or 'field lines') which the disk in the middle would constantly wrap and unwrap: Examples of the UFF include:



It would appear better for cosmologists to let go of the default idea of an 'isolated sphere'. Given the UFF examples provided and the obvious dual lobe solution to the matter – antimatter dissymmetry one would presume the default shape below: It is consistent with the 'Dark Flow' WMAP data (*right*), which would represent the 'connective cord' to the 'other side' being the anti-matter lobe. The concentration pattern in the CMB map is another indication the UFF is likely the correct universal shape (*right below*).



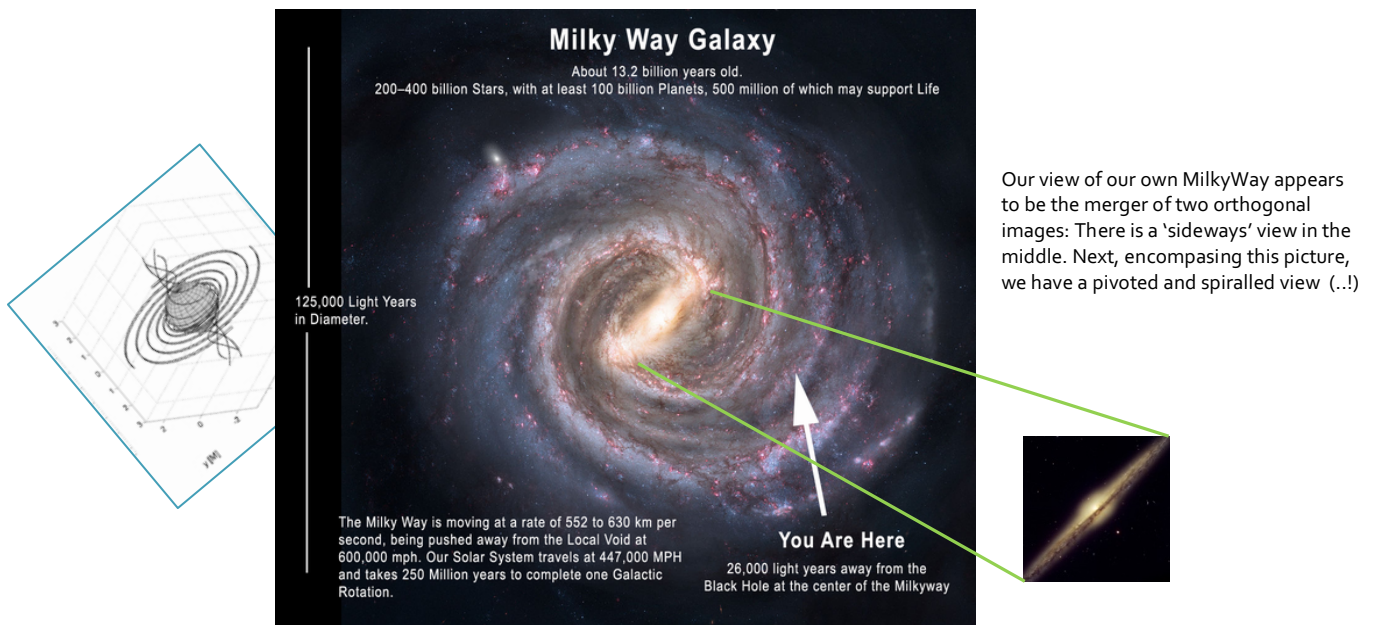
The big-bang UFF universe shape would constantly wind and unwind the field lines ('strings') that connect the outer matter and anti-matter lobes, allowing the lobes to constantly oscillate between minimum spatial singularity (maximum disk energy) and maximum spatial extension (minimum disk energy). The strings suspended between the lobes would be the string-like 'ether' material from which galaxy singularities can next display the same oscillating behaviour only at a smaller level. These in turn deliver the string suspension with which minor black holes, stars(?) and next atoms can do the same at ever smaller scales.

4.2 The expanding universe; Dark Energy or just a reversed arrow of time?

The observed red shift of the light of distant galaxies has been known for quite some time. Consensus interpretation is that this would point to an ever faster expanding Universe. The fundamentals of nature however suggest gravity can only repel, not attract. Moreover, the structure of our physical formulas are invariant to the arrow-of-time suggesting nature is open to a reversed arrow of time. Unfortunately, both these physical facts are discarded by astronomers and collectively one prefers to invoke hypothetical 'dark energy' to explain 'repelling gravity' for which there is no evidence at all. So is it 'dark energy' or just a 'reversed arrow of time'? The Dual Continuum offers a clear indicator which can tell us whether or not we are looking at our universe in reversed time. If indeed we see our universe in reversed time than this requires there be a spatial singularity (an encapsulating ME continuum) between us and the wider ST continuum of our universe. If so, then this in-between ME continuum dominated singularity that has 'swallowed' us would appear spiralled to us. So, is there anything between us and the rest of the universe that appears spiralled to us...?

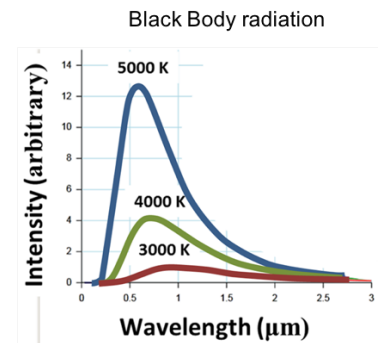
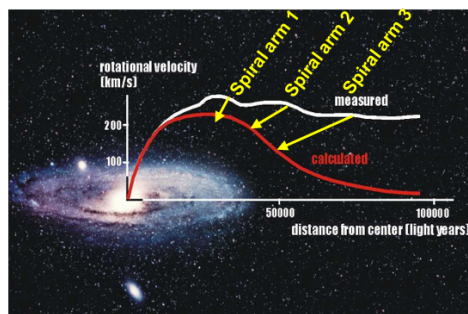
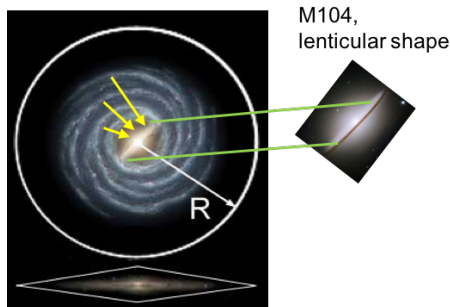
4.3 Our galaxy; Answers to dark energy and dark matter

Earlier we showed via actual simulations how singularities bend field lines into an orthogonally spiralled plane in which not the 'spacetime' but the 'energymass' grid dominates. This allowed us to explain quantum leaps in atoms. If we look at this simulation below left, then we must admit the stunning similarities with our own galaxy. This has implications.



The fact that our own galaxy appears spiralled to us as ST observers, implies we are looking inside-out through a ME dominated structure (e.g. wider Saggiarius A) -and doing just fine as such-. Taking a closer look at the Milky Way image above, it is indeed the text book image of what we would expect to see after 'falling' into such a singularity: At the centre we have the 'time-frozen' *sideway* image of our galaxy. Around it, 90 degrees rotated we get an outward developing spiralled view. One may look at the singularity reconstruction to the left to verify how our spiralled vision is congruent with such a developing view. Given we seem to have travelled little over two spiral arm rotations from the centre, our entering a singularity would have happened some 500 My ago. By no means did this transition 'impede life' on Earth because around this period the 'Cambrian Explosion' started, which is the period of biggest growth in variety of new (amphibious) species on Earth. But regardless, our view outward is *definitely inverted*. This implies that our arrow of time is indeed inverted relative to the universal arrow of time, which in turn means our observed redshift of furthest galaxies is actually a blue shift, which in turn means we have a *contracting* universe, which in turn means there is no 'repelling' gravity which in turn means there is no (need for) 'dark energy'. Case closed. Even better; an energy based grid of our spiral arms also explains the 'dark matter' issue: It is known for quite a while that the outer

stars inside galaxy spiral arms are travelling much faster than they physically should, given Kepler's law of orbital motion. There are two ways cosmologists tried to explain this phenomenon; either via hypothesising 'dark matter' inside galaxies that would yet hold the stars together. The other way of cheating is via 'Modified Newtonian Dynamics' (MOND).



The dual continuum now provides the third –and arguably correct- answer: Since the spiral arms imply domination of the **energy grid** (ca. 5x more dominant than the spatial grid), this means we need to correct for the 'empty space' between the spiral arms since this is **not** an actual spatial grid. As such we must transpose the spiral arms back onto the centre of the universe in order to come to the shape the rest of the universe actually 'sees' our galaxy. This correction of *energy* as a spatial distance equals a correction of *matter* ($E= MC^2$) which would precisely be the sought-after 'dark matter' which is then accounted for !

The result of the transposing correction of our spiral arms onto the centre, would make our universe look something like the lenticular shape of the Sombrero nebula (M104) above. Given that the ST distances of the arms are then far less than the spiral picture would suggest, so would the actual rotation speeds of its stars be. To be precise: the stars' actual speed would be slower to the square root of relative radial change, which results in the correction picture in the middle where our measured speeds would match again with the predicted Kepler speed (in red).

Alternatively, one may see the number of windings as a galactic wave length. With the widening of the spiral arms so would the wavelength of the galaxy increase and so would the (virtual) rotation speed grow and next diminish over the years. From the first chapter we know that our dual speed expression is 'specific energy'. As such we may now look at the identical graph for wavelength and specific energy of black body radiation to the upper right. It seems the dual continuum allows us to also apply thermodynamics on all scales.

4.4 Our Solar system

4.4.1 Fusion inside stars

Stars can be described as both a fusion (spacetime) and electric phenomenon; Both are literally orthogonal explanations of the same thing:

In our Sun, the fusion of 4 hydrogen atoms results in a helium-4 atom which has an 'extrinsic' volume slightly *bigger* than four individual hydrogen atoms. As such, it now occupies more spacetime, meaning a *loss* of spacetime from the perspective of the ST observer. To compensate, according to the table, the energy grid inside the fusion product has to physically expand into the ST continuum, its bend energy fieldlines only just piercing the ST continuum at the Sun's photosphere, defining it as such. More powerful eV fieldlines head further out into our ST continuum where they cannot exist other than by disintegrating as high kinetic charged particles ('solar wind') at the Sun's corona, solving the 'corona heating problem'. With the release of these particles in ST not only Energy but also Mass re-emerges, in part making up for the mass that was lost by the hydrogen atoms.

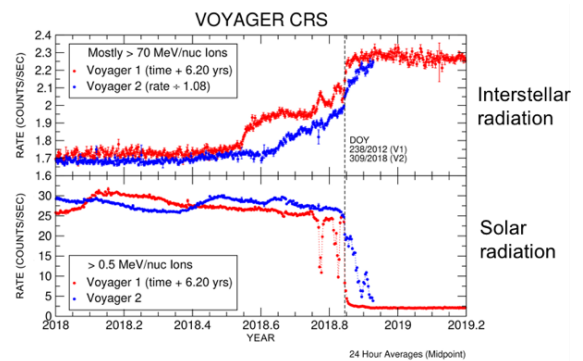


In contrast, at a later stage of a star's life, the fusion of heavy atoms beyond Fe^{56} actually cause a *decrease* of extrinsic volume of the fusion product and thus an *increase* of spacetime, which according to the table must result in absorption of an equal amount of energy. Our ST fieldlines now pierce into the photosphere outside-in. The external ST effect would be that the star literally becomes dark while cooling its spacetime environment and *increasing* its grid related mass. One would typically find such dark older objects at the *outer* spiral arms of galaxies.

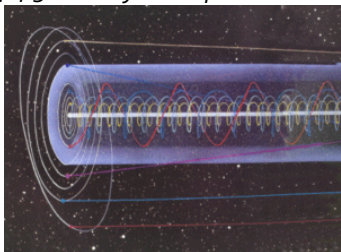
4.4.2 The nature of the wider solar system

With the recent data of Voyagers 1 and 2 leaving the (hybrid) heliosphere we get confirmation that indeed our interstellar space has a strong energy based grid as the rate of high energy particles increases after passage (see right). This means that at least to some extent we can interpret our heliosphere as being a large hollow but charged spherical conductor. From physics it is known that inside a spherical conductor all outer electric potential cancels out, leaving only the limited electric potential produced by our Sun itself. The heliosphere is not entirely spherical given 'leakage' of interstellar radiation, but it comes reasonably close.

Over all, it would appear our Sun itself is a kind of energy singularity with a double Schwarzschild radius, with the photosphere being the inner and the heliosphere being a hybrid outer one, perhaps even extending all the way to the outer Oort cloud. This explains why we experience the smallest unit of charge to be so much larger than the smallest unit of spatial distance. In all, on the cosmic scale the dual continuum concept calls for a complete rethinking of physics on all scales as we appear to live in a Matryoshka universe, where identical singularity fractals recur on several encapsulated scales.



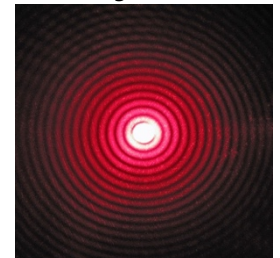
4.4.3 Solar system speed and emerging spacetime



Our Sun is said to orbit the MilkyWay at an estimated speed of 225 km/s and does so with its planets orbiting *orthogonally* to its vector of galactic speed. Any object moving that fast through spacetime would to some extent display a length contraction in combination with an orthogonal torus of energy around it. However, we previously argued that our Galaxy is likely dominated by the ME continuum, in which case our Sun would not move through spacetime but through the energymass continuum. If so then we must invert 'special relativity' effects into their orthogonal SI base units. We then get the following:

Due to its galactic movement our Sun would display an **energy contraction** along its vector of movement, analogues to a **length contraction** when moving through Spacetime. This energy contraction would manifest as more radioactivity around the Sun's equator, which is in fact observed.

This energy contraction would then be accompanied by spiralling orthogonal **spacetime** fieldlines, constituting an 'ellipsoid spacetime cocoon' in which all of the planets move. It would stretch up to the heliosphere and potentially in hybrid form as far as the outer Opik-Oort cloud. This would mean that the very act of movement of our Sun and its neighbour stars through the electric galaxy grid, would produce orthogonal overlapping ellipsoid cocoons of spacetime, allowing planets to exist and orbit. There is an inversed analogy in the form of the circular slit experiment of photons to the right: In this experiment, the aperture of the slit is made extremely narrow in both x- and y-axis direction, inhibiting a particle's straight ST X axis and Y axis movement behind the slit. This results in a radial and quantized dominance of the ME continuum after the aperture.



4.4.4 The dual continuum and energetic locality

In closing, there is an important observation to make regarding locality ('local realism') and the concept of the dual continuum: In spacetime grid terms, locality means that based on spatial proximity, we recognise the physical and chemical interactions of atoms and molecules and with it we may observe any emerging higher order shapes or functionalities as the result of this very proximity.

De dual continuum concept implies we must then equally attribute local realism based on **energetic** proximity. This implies that irrespective of spatial distance or time, any collection of entities that have similar energetic signatures (e.g. regarding wavelength, intensity or phase) would classify as forming a local coherent collective with potentially extra emergent functions on top of it. Since all atoms radiate EM radiation, there is a basic scale on which to define locality for any and all atoms in the universe, quantum entanglement being a clear exponent of this. But more interestingly, there are higher forms of shared energetic signatures between entities; For instance, it is well known that the human brain operates at certain EM wave lengths (alpha / beta waves). In so far these would be in phase with others, this suggests human brains -at times- may very well form a collective, stretching instantly over unlimited distances, connecting perhaps even to unknown entities. Potentially such a collective would extract or add shared knowledge not unlike the internet has done for humanity in terms of automation. One may speculate as to what extend such connections actually exist, yet the physical foundation is irrefutable if one accepts the dual continuum.

Predictions of the Dual Continuum (DC)



Prediction 1. The atom bound electron must display as a double discharge phenomenon.

Background: According to the DC concept –and following actual simulations how EM fieldlines are bent by singularities- individual electromagnetic field lines inside an atom, are continuously being bent and wrapped towards the border of the atom and back again to the opposite side. At the very end of the 'electron orbit' such a bent field line will leave and next enter again the spherical ME continuum of the atom, in a double intersection point. The resulting double electrical discharge is what we call 'electron'. As such; the 'electron' orbit is a mere stroboscopic 'collection' of equal distanced double inward discharges. The distance from the nucleus is expressed in integers of Planck Energy. There is no object physically orbiting the nucleus at the 'electron orbit'.

Test → Whenever photographed, we should observe an atom bound electron always as a double intersection discharge

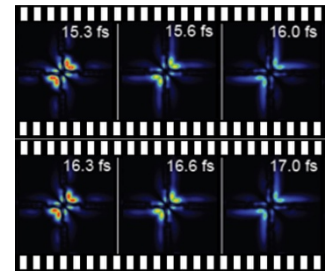
Test → There should be no observed movement along the electron 'orbit'

To the right; the electron (in this case inside a He atom) at each side displays as predicted a split electric discharge; The Max Planck Institute cannot explain the physical split other than 'probability'.

MAX PLANCK INSTITUTE DECEMBER 18, 2014

Phys.org / MPI Prof Dr. Thomas Pfeifer

'...*Electronic pas de deux: Physicists in Heidelberg have filmed the pulsing motion of the electron pair in a helium atom. At 15.3 femtoseconds (fs) the two electrons are close to the nucleus (center of image) and then move away from it. The colour indicates the probability of finding one electron at position....*



Prediction 2. The energy released by fusion (e.g. in our Sun) originates in the ST grid directly outside of the fusion product



The DC suggests that Einstein's formula of $E=MC^2$ is mathematically correct, but physically the '=' sign does not represent an equivalence relation between mass and energy. As explained in the paper Energy relates to Space while Mass relates to Time. As such $E=MC^2$ is the movement equation inside our dual grid. As a direct consequence: It is the increased *extrinsic* volume of a fusion product (up to ^{56}Fe) relative to the volume of its participating original atoms that is responsible for the energy release. More concrete: The dual continuum setup suggests that during fusion the energy grid expands into our spacetime grid. Yet since energy fieldlines cannot exist in spacetime, they will next disintegrate- in reversed order- into individual charged particles, radiation and heat outside of the fusion product. As such, part of the mass that was lost during fusion would re-emerge as charged particles. More importantly: There is no internal heat source within the fusion product itself and consequently no convection outward.

Test → Our Sun should show the origin of its most intense fusion heat forming not underneath but above its surface (photosphere) and there should be no meaningful mechanism hinting at convection from inside.

This is confirmed in recent observations: Our Sun's (distant) corona is millions of degrees, while its surface is relative cool. There is no convection mechanism observed and until now cosmologist can't explain this (most essential) aspect of our Sun.



Prediction 3. At the double / single slit experiment, particles would move 'time instantly' behind the slits.

The DC suggests that there are always two locators at work: Our dominant ST grid locator of 'space' and the orthogonal time instant subdued ME grid locator of 'Energy'. Upon firing a single photon towards the slits, its ME locator has already formed the wave pattern behind the slit and these paths stretch back to the emitter in reversed order from our ST perspective. The ST observed does not notice this since ST is dominant in the area up to the double slits.

Once the photon in ST passes the slit the subdued ME locator becomes dominant since its wave form can yet fill up the total area behind the two slits, while the ST locator can't. Consequently, when we see an energy discharge at the screen it is the ME locator only that discharges. It is not indicative of where the photon has landed in ST. If the photon (or electron for that matter) did pass one of both slits, it would land straight behind them causing a spatial distortion only. Since time is not a factor in ME movement, this means that the discharges behind the screen have no time delay, regardless the distance from the centre.

Test → when the interference pattern is active, all particles should have exactly the same time between firing of the individual particle and its landing on the screen, regardless how far to the left or right of the centre. When the interference pattern is not active (e.g. with sensor active) there *should* be a time difference if landing is further from the screen's centre relative to the source.

Prediction 4 Gravity works longitudinal and is fundamentally caused by movement

According to the DC, gravity is a longitudinal spacetime contraction caused by spiralling movement orthogonal to its vector of movement. In atoms it is the high speed movement of subatomic particles in/around the nucleus that causes such a longitudinal contraction. Since electron planes inside a body are unaligned, this gives the perception that gravity would work radially and be weak.

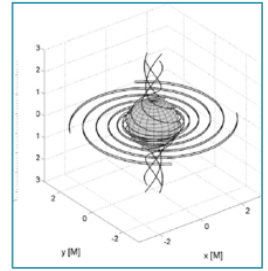
Test → In our solar system Saturn's north pole has a hexagon with fast rotating clouds, especially at its exact north pole; The Cassini spacecraft flying directly over it must have experienced a longitudinal contraction, disturbing its orbit.

Test → During an intense hurricane on Earth, a plane (or satellite) flying directly over the eye, should notice a ST distortion downward (an extra 'Earth pull'). It should be measurable as a temporarily [mGal] gravitational anomaly.

Prediction 5; Dark matter in our galaxy is accounted for in the form of spiralled grid distortion

The DC concept suggest that (grid) oscillating singularities determine the shape of our universe from atom to the universe itself. Given how singularities typically bend EM fieldlines (see right), it would appear that our view of our own galaxy is distorted in a spiralled bias. This means we would be inside a larger spatial singularity looking outward. This has two interesting consequences:

- d. Our arrow of time relative to that of our universe would be inverted (explained in this paper), which means our universe is actually contracting not expanding. Hence we do not need 'dark energy', which would be an immense relieve for cosmology.
- e. Secondary; it is estimated that inside our galaxy there would be about 5 times more 'dark mass' than 'normal mass' to account for the too high speed of stars in the outer spirals. If the DC is correct however, then what we see as 'space' between the spiral arms would actually be a manifestation of the 'energy grid' causing the spiralled distortion. As such; only 20% of the distance between the galaxy centre and outer spiral would be actual 'spatial' grid, meaning in spatial terms it is much smaller then we think.



Test→ If we transpose the spiral arms back onto the centre (with a 5:1 spatial correction), de facto making our galaxy appear more lenticular shaped, do we indeed get the correct rotational speeds again for our outer 'spiral' stars?