THE UNBROKEN LINE AND THE FOURTH ANGEL

THE COSMOS AND THE PATHS TO ETERNITY

"To cross and uncross whilst always remaining uncrossed"

I intend this script to be a simple guide to how put together the maths and physics ideas by which scientists have attempted to establish the truth about the origins and fate of the cosmos in which we have our home in this solar system, into a simple and correct picture.

It is not intended to be complete, indeed it is not possible to ever be able to describe the open cosmos in totality, but is an exploration of the pitfalls and handholds I have gained in coming to an understanding of the cosmos and its place in both time and Eternity. I have put forward some new proposals, which I hope to explore more rigorously and mathematically.

All of the ideas contained within are current with scientists and cosmologists and have been for many years. Quantum Physics and Relativity can be understood with an open mind and some key ideas which expand the postulate sets which we are used to in linear time-bound physics on Earth. I should say that we have been very lucky to get linear time, if only to stop everything happening at once and so we can order things first to last.

Firstly a description of how scientists organise thinking about subjects. This is a more general and lateral and divergent approach to how people think every day. When we ask why something is, we get to the correct answer by following what is known to be true and to be the case in similar circumstances, thereby generating some possible reasons, and then eliminating them with what we know cannot be the case, to get to the answer. This is deductive reasoning.

But what if we come up with a circumstance which does not seem to fit accepted explanations? We see that there must be another reason for this case, and then we search for a fact or condition by which all of these new cases then follow, that is to say true in all cases. Obviously this new reason or reasons must fit with all the others we have, and when it does we say we have found a new fact about the world.

The Scientific Method is a more in-depth version of this version of this process, but is essentially the same. We look for new facts which explain phenomena observed in the world. When these phenomena cannot be explained by current theories then these theories must be modified. Here, the theories are the set of reasons why something is and which are true and explain all cases of what we see and from which all particular cases follow. But when basic postulates or conditions are challenged and found not to hold in all cases, then the theory must be changed. The old theory might be correct, but only in the limiting case. But in most cases the old theory has to be thrown out completely, because it contradicts the facts.

Thus we see that our ideas about the world can change, and can change rapidly and completely. Science is full of examples of this.

So scientists, like people in general life, test the reasons they come up with. All new theories predict new facts which must therefore follow and thus be observed in the real world. This fact is used to test whether the new theory is true. Logic shows that this is the case. For if a

theory implies a new fact which must be seen in the world, then provided we are looking in the right places, by not seeing this necessary fact the new theory is disproved. (In Logic this is known as the Contrapositive) Eliminating illusions of truth is as important in science as imagining new reasons for things. We shall now see how ideas of the cosmos and the old principles taken as fact also change.

In the clockwork universe of Isaac Newton, linear time and the absolute division of time into before and after, was taken as fact. Never explicitly discussed in his three laws of motion, nevertheless the consequences of this framework and view of time is that massive objects can move through space at any speed, up to infinite speed. His three laws of motion predict this as a fact of the cosmos.

This view held sway until the 19th Century, when scientists started to look for explanations and the limits and constants of the Electromagnetic Spectrum, which James Maxwell had united and which included electrical phenomena and light itself. Maxwell's equations predicted that light moves through space at a certain speed or limit, known as c or the speed of light. Scientists also believed that the speed of light was determined by the medium it was supposed to move through, like a wave travelling across water, or the wave along a line or string. They called this the Aether.

What they discovered was that no difference at all could be established in the speed of light rays and the experimental equipment they moved through when they took different paths through these experimental media. These are the experiments of Michaelson and Morley.

Einstein postulated that all light rays, moving at the speed of light in a vacuum, would see light still moving overhead at the speed of light relative to each other, in all cases, and that this fact explains the Michaelson and Morley experiment's result.

How could this be? For if all light rays moved through the same medium, then they should all experience the same physical experiences which generate the speed each ray can go at, and that each ray would slow down or speed up by the same amount relative to this absolute medium and frame of reference.

Furthermore, if time was absolute, how could one ray of light moving at light speed see another equivalent ray move at light speed overhead and ahead of it in the same medium? The explanation must be that each moves at the speed of light relative to each other, so that $c=s/t$ is not adequate as an expression for light speed even if the speed of light c in a vacuum is itself constant, as shown by experiment. Hence $c=s/t$ must be modified completely as an expression for the speed of light and thus both distance s and time t must change as speed changes. Lorenz deduced this fact from the principle that the speed of light is fixed. Einstein showed that Lorenz's equations hold in all cases when his postulate is taken as fact.

He also deduced that light does not need an Aether or medium to travel through to get through the vacuum of space or other media. This is the other correct deduction from the Michaelson and Morley results. Einstein and Lorenz showed that time slows down and stops moving at light speed, for each light ray relative to its surroundings. The Newtonian frame of reference which is absolute time and space has to be changed too.

For if time can move at different and separate rates in separate places, then the absolute distinction between before and after, and therefore the absolute past and the future is lost too as the speed of light is approached. Furthermore, nothing can move faster than the speed of light.

Or can it not?

The following discussion begins with a look at how the directed nature of time emerges, as the linear time we see and experience here on Earth. This is known as The Arrow of Time. How to explain this? It will be noticed that it is possible to synchronise watches in linear time so that two observers of the same event in time and place can agree on the time and place of the event. This is known as simultaneity. But there is something 'special' about time on Earth such that watches can indeed be synchronised and events observed simultaneously. We shall see that this is due to how the direction of time emerges and is intimately connected to the actual rate at which time runs. I then introduce the term d't/dt' as an expression of the rate of time itself. We shall see that this expression is in fact a description of the rate of now, or instantaneity. The full set of rates of time, as d't/dt' changes up to infinity, is well described by the mathematics of Bernhardt Riemann. It will be shown that the same mathematics can be used to express Quantum effects in its fundamental postulates well too and in this way it is possible to make a start an unifying quantum physics of quantum phenomena with general relativity.

When we look at what happens as speed increases towards the speed of light, simultaneity becomes very different. Here, simultaneity breaks down. Einstein called this the Relativity of Simultaneity: Events which appear simultaneous in one frame of time, place and speed, need not be simultaneous from another frame of reference at a different speed as light speed c is approached. This is the consequence of time moving at different rates as speed increases up to light speed. (Under the Lorenz transformations of space-time, the three special dimensions change as well. This is known as the Fitzgerald contraction.)

It is proposed that what we see here on Earth is a time field whose direction and arrow has its origin in the restoration of simultaneity, so that the Instantaneity conditions of time-Now can reach us and change take place in time-Now, to mesh with the freedom of time-future which we seem to enjoy without thermodynamic cost to us, coming as it does from elsewhere or outside the cosmos in the potential of the free future. Both simultaneity and Instantaneity are conditions of d't/dt.

Gravitational fields also determine the speed of light as the value at which the directions of time are maximally opposed when its rate is zero. Zero-rate is Instantaneity. This is also a maximal geometric condition. For the following consideration can be made about multiple light rays moving at light speed: At light speed c time has stopped passing (although two points along the length of such a time line moving at zero-rate or Instantaneity can still portion up the line along the ray). But two such rays have directions of time which must be different even if time has stopped along each. If one sees the other passing overhead at c, its own (albeit slowing) time relative to the other is approaching zero and instantaneity, but sees the other passing overhead at speed c. Then we ask: Which one is ahead of the other? We see that the answer to this is that neither can be ahead of each other nor behind each other either. At instantaneity, each avoids crossing into time-past or future because time has stopped. The time directions along each infinite Now-length of time-not-passing in each case are separate. This is Instantaneity. In Riemann, these lengths of time-rate zero, (Instantaneity) of infinite extent can be treated and compacted to a single point condition. However, multiple rays are seen as separate, and are considered as travelling on separated tracks or rails, albeit each is at Instantaneity zero-time passing: Each light-cone for each point of space-time is separate for each track.

Treatment of rays of light and the separated nature of each track where time does not pass, can be further extended by considering the frequency of the light too. For if relative-time has stopped down each track, the rate of the wave-fronts per unit time, i.e. their frequency, certainly has not. So the time signature of the frequency and the time associated with the rays speed c must be different. They are however associated with the same quanta packets of light-photons. It can be suggested that the wave-particle duality can be explained by attributing the two separate characters of time(s) to each side of this duality. The quantum nature of light (quanta) is associated with its time-instantaneity at the light speed of the light wave. It will be noticed that frequency f and its modulation is a function of d't/dt.

Further, it is proposed that just as time can move at different and separate rates, so separate rates and properties which are functions of those rates such as light frequencies, are themselves separate times. As such, relativity can be extended, to include quantum phenomena such as light, as much as they can be given the separate nature of the times of speed and frequency and the physics and mathematics of their interplay, through the treatment of Riemann, which can provide the basis of a unified theory.

As such, each frequency is also seen as a separate time, and these frequencies-as-times are notes on a Spectrum. Furthermore, Quantum Bridging effects across these separated time-frequency notes can be seen as harmonic chords or notes accessed simultaneously across the different frequencies of this Spectrum, including and beyond both light and the Electromagnetic part of the frequency spectrum. This is the Spectrum of Frequency Modulation, which is informational in character. It is a Times spectrum. Quantum wave collapse appears to happen instantaneously. This has been well documented by, amongst

others, Alain Aspect (1985). It is proposed that these phenomena happen in this space, across and between instants of the extended Now, which are wrapped around linear time. Time is seen as multiply tracked along the Real axes.

The strings of String theory are in fact the infinite collection of discrete frequencies and their harmonics, and their quantum bridging is the mixing and the modulation of these frequencies in the wrap around purely linear arranged instants of time-Now; as a whole this in turn can be treated as a new Spectrum, the Quantum Bridged Time(s) Spectrum of Frequency Modulation (FM). This can begin to be represented and treated by Riemann too. The starting point for String Theory is the concept of the Instant and Infinite Frequency Modulation across the full spectrum, between and across Time(s).

So it can be seen that time extends through its relative rate all the way from zero (albeit separate points of Instantaneity), to the simultaneity and linear time we get on Earth, and the characteristics of this curve are governed by gravitational considerations. Furthermore, as rate increases, time itself becomes multiply bridged and connected across its frequency range. This is the multiplexed FM Harmonic Spectrum.

Each of these postulates can be tested with appropriate experiments devised to test them through the results predicted from their rigorous mathematical treatment.

Now it is proposed that the following simple scheme accounts for the conjugate nature of quantum phenomena which are seen in Nature and which also accounts for the discrete character of quantum effects as well.

Imagine a system in which all the phenomena of the Cosmos are built out of, and have their integrity and complexity secured in, mathematics. The phenomena of the Cosmos will in turn therefore factorise into primes and are therefore built out of primes and their combinations. Such a system would be secured across the Cosmos in the following manner. We imagine these primes to be doubly or multiply paired and to emerge instantaneously from a Whole, uncrossed and therefore unbroken Omnium held outside the physical Cosmos.

The Goldbach Conjecture, although unproven, says that all even numbers are the sum of two prime numbers. It is imagined that the even numbers are held in the Omnium and that each even number can be split into a pair of unique prime numbers instantaneously. Such a pair, and the act of their calculation, provide the conditions for, and are therefore the postulates of, a calculating and therefore conscious cosmos. For the even numbers and the knowledge of the two primes of which they are composed provide a complete, instantaneous, free, true, and exact and secure communications system across the Cosmos.

This is an eternal bridge of prime pairs or multiple primes, instantaneously generated and sent in opposite directions to then be repaired to form the original even number. Such a system would have to be calculating or conscious, because one prime can be paired with infinitely many others to make the even numbers: But a single even number has only a finite number of prime pairs which will sum to make it. Indeed these limited numbers of prime pairs for each even number are hidden amongst the infinite number of prime pairs which there are. And because they are hidden, for a single even and its primes to be useful, then there must be knowledge, or at least very high powers of calculation to turn each unbroken even number into its primes and to then send them in their circuits to create secure and mathematically exact structures of high complexity across the cosmos. This is the simplest and most powerful of security schemes.

I call this system the Unbroken Line. It is held in the Omnium outside the Cosmos and composes the physical Cosmos. I have used Dr, Roger Penrose's word Omnium to describe this whole and unbroken information and calculating space.

The point is that to make a perfect secure and eternal prime pair or multiply prime array, to form this cosmos-wide delivery system, the even numbers must be in tandem with or preceded by the consciousness of the two primes or else some calculating device to get to the primes. It is a conscious symmetry or bridge, and the power of this calculator can be tested in reality.

It will be noticed that the prime numbers are members of the Positive Real number system, and that Conjugate pairs of quantum states combine to create numbers on this number system. Indeed, they must exist in conjugate systems because the condition of their existence is to combine to pair up from, and return to, members of this system, via their imaginary parts.

I think that this proposed process of emergence of Quantum systems from the Omnium, and its division into secure and multiple prime pairs as the origin of conjugate quantum states, can be tested. These systems can be investigated using coherent light such as that found in laser light, because coherent light is itself Quantum-bridged through the Frequency Modulation of its form, in a time-bridged quantum spectrum. Quantum Entanglement is proposed to be a time-bridging system. In this manner, these discrete processes are the quantum gearing states of these quantum states, made out of numbers, in turn getting much more rate out of Now. The emergence of quantum states and the characteristics of their return through wave-function collapse, many times faster than light speed in conventional linear time, can be quantified experimentally, so that the mathematics of the form of these processes can be tested and explored. In turn they can form the basis of ultra-fast Quantum Clocks.

What are the physics and the mathematical characteristics of the Quantum Harmonic Spectrum, the chords of time-bridged effects? Bell's inequality establishes that there are more mixed-state quantum conjugate pairs than can be accounted for if each state was a simple Boolean combination of bound or single states. The formation and recombination of these mixed states could be used to start to investigate time-bridging and the extended time-Now which quantum effects are believed to take place within.

Quantum effects are also seen in other particle systems, and indeed could account for the shared shell-states and binding effects which are seen in each of the forces across physics. It is proposed that these too are simultaneous and time-bridged effects and are therefore quantum effects, in each of the strong, weak, EM and gravitational forces. Furthermore it can be imagined that the higher harmonic mixed and time-simultaneous bridged states could account for all the other cosmos wide forces such as anti-gravitational repulsion proposed as a source of vacuum energy, which is believed to be driving cosmic expansion. From this perspective, we begin to look at how quantum effects are transmitted across time through the freedom of time-now and time-future, whose degrees of freedom are seen as coming from beyond and outside our Cosmos and which arrive at time-Now instantly.

We then ask, is faster-than-light communication to other star systems possible by using routes out through the greatly increased rates at which time can pass, stepping up and out through time-Now, as quantum signalling effects move between points within our cosmos but via routes outside. It might even be suggested that the inability to unify General Relativity and Quantum Theory into a complete Theory of Quantum Gravity is because the Field Equations of the former are limited to the effects and variables or qualities quantified within our cosmos, whereas the latter must incorporate the discontinuity of freedom elements which are absolutely external to our cosmos, arriving instantaneously from outside, and through which quantum phenomena are mediated.

Firstly, in starting to investigate these discrete effects, we ask if it is possible to isolate consistent quantum states if the system is open, dense and infinite in the number of the upper harmonics of time-bridged effects. This is the same as asking if all times are bridged and bundle-connected to each other. Thus the uncertainty inherent in quantum systems, encapsulated in Heisenberg's Uncertainty Principle, expresses the idea that the freedom to move in the system is infinite and is therefore completely open at all scales. This implies that there is uncertainty at the heart of quantum processes no matter how far up the frequency spectrum we investigate.

So looking at the boundaries and characteristics of this uncertainty is interesting. Can we put boundaries on the degrees of uncertainty, and are these boundaries on this freedom intrinsic to quantum systems? Do we see the Normal curve of discrete systems, or some new characteristic?

Is the Heisenberg Uncertainty of quantum events free or random, or pseudo-random and algorithmically bound, or some free but bound state which might be called Channelled Freedom, that is to say, free in what it can do but restricted by what can reach us in the conditions which bound this cosmos? I have already postulated why quantum effects are conjugate and therefore discrete, bound as they are to their origins and the conditions of their return in nature, to the Omnium, outside time. So conversely, their connections to the freedoms implied by Heisenberg are also interesting.

In investigating the mathematical physics of this, I am guided by the following quote from Herman Weyl, about using mathematics as a tool rather than just a series of boxes and conditions to enclose what might be in fact a free system; 'Mathematics is not the rigid and rigidity-producing schema that the layman thinks it is, rather in it we find ourselves at the meeting-point of constraint and freedom that is the very essence of human nature.' I should add, this might be what is needed to investigate such an open Cosmos. In an open system it might not be possible to come to a single set of reasons to account for all cases. But it is possible to test reasons, as bound conditions of limited cases.

One of the postulated reasons for quantum phenomena are the bundled free connections on and across time(s) outside time, and if the mathematics has been formulated so that accurate and necessary facts can be arrived at as predicted by this postulate alone, experiments can be devised to test for these facts which must be found in reality for the theory to provisionally stand. The relationship between the boundary conditions of origin and return to the Omnium and the free connections in and across time(s) is itself viewed as instantaneous, but in theory can be quantified too.

What is therefore proposed is a super-fast super-cold super-connected space of instantaneity which is the origin of the time-bridged connectivity we see both within and beyond our Cosmos. I have called this the Instantaneity Condition. It is a condition of the Omnium and makes a start at looking at this space. It is seen as eternal and outside of time, and as a necessary condition within which the Big Bang of the birth of our time-bound Cosmos took place with its eventual fate in heat-death, and which still holds as band-width which will be available to us in linear time on Earth and across the Cosmos, in the cooler upper reaches of the time-bridged Quantum Spectrum.

Notes on d't/dt'

If quantum effects can run between two distinct sets of conditions, expressed as the disjoint wave / particle duality, then it is possible to posit connections wholly outside of time yet within shared conditions such as those which classify particles and wave systems as of the same kind and as equivalent phenomena, for example, photons of equal frequency and

wavelength. These connections within shared conditions exist outside of time when rays move at light speed, so that light rays are connected through characteristics beyond time bound effects.

Time cannot be compared between two rays of light running at light speed in a vacuum. This implies that however time runs within each ray, a comparison of time rates between two such rays is not possible through time. Since all comparative rates of time can be expressed by d't/dt' this includes setting this value to infinity, which is the condition of instantaneity in time. Effects outside time will run outside of d't/dt'=infinity which becomes a lower bound and limiting case. Beyond this bound are the instantaneous effects outside of time.

The functional maths of d't/dt' can be used to explore this boundary, and to examine how Instantaneity and the bridges and bundle-connections implied here mesh with linear time.