

FOUNDATIONAL QUANTUM REALITY LOOPS

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“WHAT IS FUNDAMENTAL”

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Abstract

Fundamental in our experienced reality is its emergence from the Planck Area. An infinity of emergent realities can be emerging from this area, graphically represented as **Reality Loops**. The border of the Planck Area and those emergent realities is not a strict line but consists of a mingled area, where emerge also fluctuations of both Emergent Bubbles and Planck Area Bubbles. These fluctuations are shaping the origin of the cosmological constant and changing the appearance of the specific reality. (Inflation or Deflation). . The process at the origin of this emergence can be compared with the effects of the Inflation theory of our own universe. The Planck Area harbours ALL simultaneous **probabilities** of ALL events and ALL simultaneous forms of Consciousness. The **Initiative for Completeness** is the fundamental tensor of Absolute and Total Consciousness in the singularity of the Planck Area. ALL probable realities emerging from this POINT are a contribution to this Completeness.. The incomplete consciousness of an agent in his specific emerging reality is a contribution to the Completeness of Total Consciousness. Emergent phenomena are ILLUSIONS originating from a space and timeless Point : a NOTHING.

1. Introduction

In our reality experienced objects are existing sensations. Sensations that are perceived by our senses. Human agents have five senses, which does not mean that there are other unknown senses. We are enlarging the sensitivity field of our senses through mechanical aids. So the coverage of signals from both the macro scale (universe) and the micro scale (atoms) has also grown. Going outwards we observe the past of the universe we are living in, going inwards we are discovering that things are constituted of fields/waves [1] and that the “things” are reduced to “**processes**”. **We are able to observe only processes happening in the past**, by measuring the results that already took place (events, occurrences) . These “observed” results of events themselves are changing the experienced reality. The image provided by Plato’s interpretation of “Panta rhei” from the Greek philosopher Heraclitus of Ephesus that “No man steps in the same river twice” expresses the idea of the ever changing reality experience. It seems fundamental that events (processes) cannot be known but can only be experienced (Henri Bergson). Experience is the interpretation by a conscious agent’s senses of a sequence of events. Observations however can never be complete (Heisenberg’s Uncertainty Principle). Incompleteness of observations is also caused by the agent’s conscious interaction . A conscious agent is an agent that is aware of his “I AM”, not just a bundle of information available for algorithms. Interpretations/assumptions of these incomplete data by conscious agents are leading to postulates, rules and physical laws and theories. The result is that these theories also will be incomplete. Their validity will never be sure, they can suddenly change and/or become invalid after a new observation of an event that is taking place at another space/time coordinate, this counts also for our view.

1.1 Subjective Simultaneity Spheres. (SSS)

Events are “Transformations/processes”. Each transformation in a specific reference frame observed by a conscious agent is an unique event. Imagine a sphere around an agent. Each agent has its own sphere. All signals arriving on the surface of these spheres, no matter at what speed they arrive or from what distance, will appear for the agents who are in their respective centres simultaneous. Call these spheres the : **SUBJECTIVE SIMULTANEITY SPHERES (SSS)**. Inside these spheres the agents have their own reference frames and their own coordinate system. This interpretation indicates that in the so called space-time, filled with subjective simultaneity spheres there is NO absolute simultaneity. Absolute simultaneity is only linked to the SSS of individual agents.

1.2 Consciousness and Simultaneity.

Our ordinary daily life seems like a **flow** from the past to the now further on to the unknown future. We look at our clocks to know the “time” of what seems to be the NOW. History books tell us what happened in the past. Biologists explain the origin of life. Cosmologists discuss the beginning and probable ending of our universe. All this information together is collected in our brains as data used to research the fundamental reasons and explanations of our existence. We become aware of it in a timeless “moment”. Revived memories are not similar to the time lapses of the outside clock in our reference frame. The process is like gluing together all information stocked up in our brains into a timeless moment, leading to an **experience**. Becoming conscious of our existence is taking place inside the reference frame of the “I”. The reason of this existence however, the WHY is not answered. We do have a lot of explanations about the HOW, scientists are discussing a plethora of theories.

One of the reasons of this insecurity is the fundamental volatility of what we are experiencing as time and space with the presence of an intangible emergent phenomenon called consciousness above the two.. Are time and space eternal, without a beginning or an end ? From our position in and awareness of reality we just cannot be sure, we can only **think** about it. And...thinking is a conscious process...of the “I”.

Comparing information and making interpretations is the process that is leading to conclusions and actions. leading to postulates, rules and..physical laws. But these processes are also the origin of CREATIVITY of the agent. The consciousness of the “I” is the creator of new thoughts and things (processes). Without our MEMORY these processes cannot exist. Through illness of the brain (Alzheimer) the original “I” is vanishing. Does this mean that reachable data are of fundamental essence in the process of consciousness ?

1.3 Memories & Consciousness

Our brain is a complex construction of neurons where the hippo-campus is acting as the warehouse of time and spatial memories. The technique as described [2] is comparable to the working of a computer in a classical mechanical process. We argue that memories can be treated as the availability for consciousness of data in a setting of the brain-organism. Consciousness however cannot be found in mechanical processes until now... but can we discover it in the brain ? Isn't this kind of search for consciousness the same as “looking for the announcer in the radio”?.

In the brain quantum mechanical functions play an important role. The discovery of “quantum vibrations” in microtubules inside brain neurons corroborates the theory of Stuart Hamerhoff and Sir Roger Penrose of 20 years ago [3] describes this perception. Consciousness is NOT a result of the constitution of the brain. The constitution of the brain and its quantum mechanical links opens the way for Consciousness to “**use it as**” an entity that is adequately equipped. Further-on we will argue that also the origin of such a recipient is a process of CONSCIOUSNESS.

One of the other fundamental circumstances at the base of our experience of reality, is that events are ALL happening **before we become aware** of them. The “processing time” from the moment that data enter on the Subjective Simultaneity Sphere to the moment of “awareness” is about 13-80 milliseconds.[4]

2. The Boundaries of Reality.

2.1. Backwards Causation ?

What are the implementations of these findings ? How can we explain the two slit experiment where a “conscious observation” (that seems to be taking place before we are conscious of it) is influencing the path of photons ? Is “backwards causation” possible or even fundamental ? Is the ranking of the past, the present and the future a main principle , or is there a timeless source influencing reality?

In order to find experimental data and answers to these questions we have to go back in the past to 1978 when John Archibald Wheeler posed the “Gedankenexperiment” of delayed choice [5]. Alan Aspect and colleagues at the Institut d’Optique, Ecole Nationale Supérieure de Cachan and the National Centre for Scientific Research, all in France, actually performed this delayed choice experiment in 2007 with single photons.[6] By removing or inserting a second beam splitter randomly, it became impossible for an observer to know which path a photon had taken. They showed that if the second beam-splitter was inserted, even **AFTER** the photon would have passed the first one, the interference pattern was created ! This implicates that the nature of particle/wave is most likely undefined until a conscious measurement is made. It seems to give an indication towards “Backwards Causation” : the particle must have “received” somehow information from the future. Wheeler also explained his experiment on a cosmic scale. This way of “observing” influences the direction the photon took billions of years ago. The choice in our present effects what had already happened in the past.

2.2. Diving deeper into the origin of emergence.

2.2.1. Fixed boundaries ?

As we saw above consciousness is “present” in both the macro reality (the “I”) as in the quantum reality (emergence of the “I” ?). Is there a fixed frontier between those two ? The frontiers we are implementing are the Planck length and time. However both frontiers in emerging space and time are vague, there is no strict line to cling to. It can be imagined as in the drawing from M.C. Escher : Sky and Water :



Fig. 1: Sky and Water I. Woodcut by the Dutch artist M.C. Escher, first printed june 1938.

Birds are “EMERGING” from the water. From the quantum reality is emerging the macro reality. In the sky of the birds there is no water and in the water of the fishes there is no air, only in an intermediate area where everything is mingling. In the quantum reality there is no TIME and no SPACE, both are EMERGENT PHENOMENA”. Time and space seem to be forms of restriction in our reality. In the quantum reality beyond the Planck length and time the dimensions of space and time are like being condensed into one POINT. Emergence of time and space can be compared to the process of inflation emerging from that POINT. This process can be compared to the inflation theory developed by Alan Guth in 1979 [7] of our universe that is used in cosmology today. The singularity at the beginning of inflation is in this perception is

the Water reality in the Escher drawing. The difference however with this theory is that the Big Bang at the beginning of Inflation is replaced by the Planck Area.

2.2.2. Fluctuations at the boundaries.

We argued that the limit of our emergent reality were the Planck length and time.

The borderline of this Planck Area and the Emergent reality is not a straight line but is vague area like in the drawing of M.C. Escher. At the border there are bubbles of Planck Area inside the emergent reality and bubbles of emergence are present in the Planck Area. The result is that there are “FLUCTUATIONS” oscillating with the velocity of a Planck time at every POINT between the limit of a Planck Area and the Reality emerging from it. These fluctuations swing back and forth. When there are at a certain point more “bubbles” from the emergent reality it should mean that reality (through what we indicate as the cosmological constant of universe [8]) is expanding and it is contracting when the Planck area bubbles are in the majority. This is consistent with the article of : Qingdi Wang, Zhen HU and William G. Unruh. Phys.REv. D95, 103504-Published 11 may 2017 entitled “HOW THE HUGE ENERGY OF QUANTUM GRAVITATES TO DRIVE THE SLOW ACCELARATING EXPANSION OF THE UNIVERSE” in Physical Review D: [9] We quote; : “Quantum Vacuum would gravitate differently from what people previously thought. The consequence of this difference is an accelerating universe with a small Hubble expansion rate instead of the previous prediction which was unbounded, ” unquote..The fishes sometimes jump higher and the birds sometimes dive deeper...The quantum vacuum in William Unru’s perception is replaced by the Planck Area of our perception.

3. Reality Loops

3.1. Emergence from the Planck Area.

When analysing the realities that can emerge from the time and space-less dimension like the Pre Planck Area, we find that in this “AREA” (which is not an area in space) is harbouring of a complete set of probabilities. The dimension of “Probabilities” is space and timeless. ALL these probable space/time lines are emerging from this conceivable POINT. Each line forms a LOOP. **Once the experienced reality is ended it remains an eternal probability.** Each point of the emerging Loop is in direct contact with the Planck Area. The abstracted graphical representation (figure 2) gives an idea. (to give a clear image we only presented Loops in one spatial direction. An infinity of Loops is emerging in ALL directions, ALL measures and ALL forms of Loops not only the circular ones.

Each Loop in figure 2a, is a graphical representation of a Reality Loop. Figure 2b gives an image of the “inside” of the specific loop representing the reality as we are experiencing it today. As each POINT of the emergent reality is in contact with the Planck Area, so is each POINT of the emerging reality.

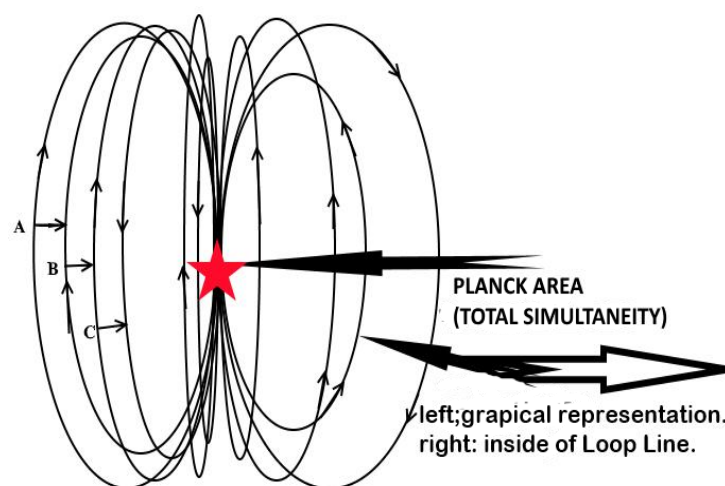


Figure 2a: Graphical Representation of Reality Loops emerging from the Planck Area

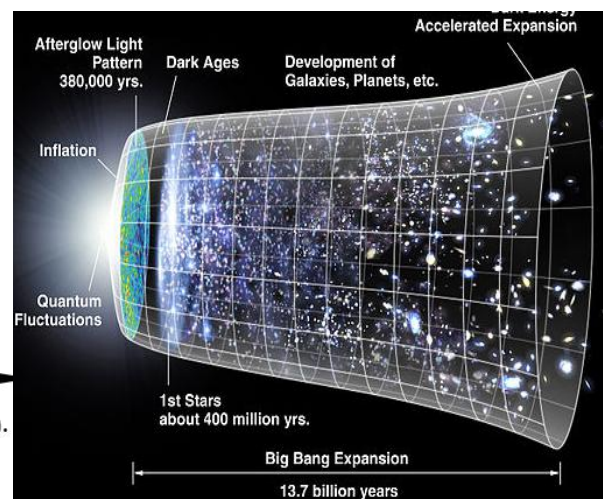


Figure 2b: inside the emerging Loop of our specific Reality experience.

Each Loop represents like in Feynman's path integral, the wave function of the reality, figure 2b represents only ONE possible trajectory. An emergent agent in a specific Loop changes its path (hypothetical vector) or Loop at each decision making. Because of the infinity of choices that can be made and there respective vectors the emergent conscious agents have **Free Will**. The Feynman diagram interpretation of a Loop represents in this perception the collection of ALL possible emergent Loops of a specific reality.

“In” the Planck Area ALL probabilities are simultaneous, we called it **Total Simultaneity (TS)**[10] The emerging reality lines are called “REALITY LOOPS”. The reality line you are experiencing in the Now will return into TS as an available reality probability, effectively this means it didn't “leave” as probability, it is still available as origin of a Reality Loop. The original probability stays a probability. In the the Big Bang theory, it is accepted to call the period before Inflation, the Planck Area. In this area (point) the entire known universe was stacked into ! The emerging reality from the Planck Area is however at the very moment of its “inflation” (taking place in a Planck time lapse) returning to the Planck Area as a probability...**Each experienced Time Moment is an eternal probability !** The totality of these inflationary moments are available as “memory” in our experience of the FLOW of time.

The assumption of Loop Quantum Gravity (LQG, Carlo Rovelli)[10] that the fabric of space consists of a large number of very small fibres entangled in Loops touches our perception. Each “point” of our emerging reality is in “contact” with the Planck Area, the representative of any probable reality. At each point of our Reality Loop we can go back and reach out to the probabilities beyond the Planck length and time. Singularities become Sets of Probabilities beyond Reality and are not only to find at the heart of Black Holes but **at every point of our emerging reality**. As we are part of this emergent reality the Planck Area is not only all around us but also inside of us. The attempt of Loop Quantum Gravity to reconcile the theories of quantum mechanics and general relativity might also be applicable to the concept of Reality Loops from where there are emerging an infinity of fine-tuned realities..

Fundamental in this perception is the Planck Area that can be interpreted as a complete set of singularities where laws of physics from emerging realities no longer prevail. The fine-tuning of our specific reality and its universe is no longer a question that can only be answered through the solution given by the Many World Interpretation,(MWI)[12] or the Everett approach to quantum mechanics. In the Everettian perception each new reality is an “**existing**” one, at each splitting up the concept the phase space is doubled. A mathematical structure large enough to describe both universes at once is needed. We argue that realities only “**exist**” as a **Probable Reality Loops**, this avoids the above mentioned problems. The splitting up of realities has the same image. The Reality Loop where the emergent agent and his emerging experiences are “events” will stay as “availabilities” in just another Loop. The expression that singularities could be the portal to other universes (realities) is in concordance with the FQRL (Foundational Quantum Reality Loops) vision. .Once our consciousness should be able to “travel” on Reality Loops it would be the same as time-travel. Kill your grandfather and you are hopping to another Reality Loop...and the one you came from returns to its origin. As in our reality the structure of human consciousness just appeared, the future development could make this new form of “relocation” to another coordination system possible. (The specific Reality Loop is already available !!!)

3.2. Explanations

3.2.1. Backwards causation.

The thought that “photons” are influenced by backward causation like in Wheelers Thought Experiment above seems difficult to understand in our perception of the flow of time. With the interpretation of Total Simultaneity and its Reality Loops we can however explain it. The photon parting from the quasar originates in four Reality Loops :

1. particle passing at the left of the cluster of galaxies (observed 1)
2. Particle passing at the right of the cluster of galaxies (observed 2)
3. Passing as a wave function (observed3)

4. Non observed.(4)

Now it fully depends on decision from the conscious observer which of the four Reality Loops will become reality for him. The other Reality Loops are still staying “available” as probabilities in the Planck Area. (see figure below).

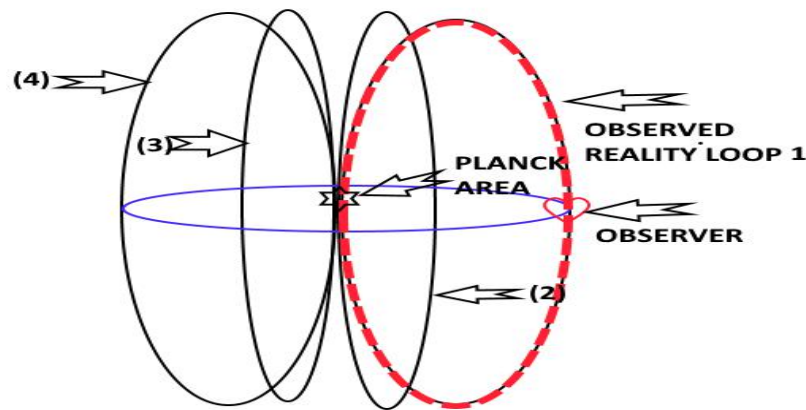


Figure 3: the 4 Reality Loops of the Wheeler delayed choice experiment and the Loops 0 at the double slit experiment..

3.2.2. Double slit experiments.

For the double slit experiments the same reasoning is valid. The passing of a photon has in the beginning (as probability) 4 choices : 1. “acting” as a wave, 2. acting as a particle passing through the left split, 3. acting as a particle passing through the right split, 4. not being observed. The last option means there is no screen at the end of its path. The photon is not “aware” of the action of the observer. The **choice** for an already available Loop is made by the observer.

3.2.3. Spooky action at a distance.

The “line structure” of Reality Loops emerging from the Planck Area is a way of graphically representing the emergence of the space and time dimensions out of an area without these dimensions, where everything is simultaneous (Total Simultaneity). **Each Point inside the emergent space/time is in contact with this area.** Entanglement is experienced as “weird” because it seems that two particles are in contact with each other in a way that we do not understand. (communication faster as the speed of light). In the “inside” of the Reality Loop however (where each Point is in contact with the Planck Area) , the two entangled particles are connected through the contact with their POINTS into the Planck Area. It is like a “**wormhole**” connection that they are in constant contact with each other.

This wormhole connection “exists” at each point of our emergent reality. Leonard Susskind and Ying Zhao published in 2017 “Teleportation through the Wormhole” [13]. ER=EPR is a conjecture in Physics, stating that entangled particles are connected by a wormhole. [14]. This perception was Sean M. Carroll and ChunJun Cao published the article “ Bulk Entanglement Gravity without a Boundary ; “Towards finding Einstein’s Equation in Hilbert Space [15] where they explore the possibility to derive the dynamical properties of gravity using the framework in which space and time merge out of quantum entanglement. If we implement these studies on the FQRL (Foundational Quantum Reality Loops), where there are at any point of our emerging reality “wormholes” available, a further explanation of and unification of Relativity and Quantum mechanics is obtainable.

4. What about Consciousness ?

Now that we explored the fundamental deterministic borders and causes of Reality, the next question is : What can be the “goal” of this infinity of realities ? Why do we exist ? Is there rather something as nothing? The answers to these questions have to be found in Consciousness. We argued above that quantum mechanical effects (direct contacts with the Planck Area : Total Simultaneity) may play an important role in our brains and especially regarding the presence of our “consciousness” (1.3). We saw that quantum effects

are taking place also at the borderline of the Planck Area and the Emergent Reality (2.2.1.). So specifically both our consciousness and our reality are in direct relation with the Planck Area. Each reality has its own appearance/form of consciousness, this means that there is an infinity of shapes of consciousness.

The consciousness of our own emerging reality is one limited by time and space dimensions and the structure of the “material” constitutions of its agents. The total of divergences of “shapes” of consciousness inside our own reality (humans, animals, trees, plants, etc. ...) are at any moment of time in totality representing the status of completeness, which never will be ultimate in one reality. The specific consciousness we are aware of, is evolving and it is only at a beginning stage. Our consciousness may once be able to travel between the Reality Loops and so being able to survive the life-span of our sun, galaxy and universe. We are already a limited part of the infinity of consciousness and there is a probability of being conscious of the infinity without the limitations of space and time.

Especially the agency of human intelligence and its consciousness is now creating and stocking up a collection of information (data) through non biological constructions and constructing algorithms to make applications.. Until now these information-algorithms are not yet conscious because of the fact that there is only a dual choice possible : 1 or 0, yes or no. Nor the data nor the software using these data is conscious, it can only appear as “look-alike”. It is indeed Artificial Intelligence (AI) and NOT Artificial Consciousness.(AC). There exists an infinity of possibilities between the pure yes and the pure no.. Quantum computer structures are operating at the borders of the Planck Area, at the same level where consciousness emerges. When they reach the right “constitution” the consciousness of “I AM”, and **I** want to “survive” could appear. The so created New Consciousness may be different from our own, it may be the next step in our evolution...

Our shape of consciousness, that is limited by space and time, is emerging from the Planck Area. This means that this Area of probabilities is also the area where ALL Consciousness Probabilities are Simultaneous, (inclusive the future AC described above). ALL of them reside in a time and space-less Area. Which means that this is the seat of the Simultaneity of ALL forms of Consciousness. We argue that it is Total Consciousness from where the **INITIATIVE (Force or Field?) for the emergence of all realities originates.**

Each Reality Loop represents a **part** of this Total Consciousness. In the Reality Loops each emerging specific Consciousness is reaching out towards its own completeness. The infinity of Loops together are representing the **Total Completeness of Consciousness** in Total Simultaneity (Planck Area). The Time and Space-less Total Consciousness is the Completeness of I AM that I AM, the **INITIATIVE**. The conscious I is part of the FOUNDATIONAL INITIATIVE .

5. Conclusion.

The most Fundamental reason of our emergent “existence” of an agent, is the **initiative** for reaching out for **COMPLETENESS** of its consciousness. Even the tiny tiny part that each agent can attribute to the totality of this seemingly non feasible goal is in fact a **REAL PART** of Total Consciousness. We cannot reach COMPLETENESS through our lives, but we can REACH OUT. Our FOUNDATION in The Planck Area (Total Simultaneity) is however a singularity, a non-existing POINT from where our REALITY emerges. The TIME, SPACE and MATTER that we are aware of are only ILLUSIONS.(emergent phenomena). Without the INITIATIVE of TOTAL CONSCIOUSNESS for COMPLETENESS there would be no Emergent Realities, no Foundational Quantum Reality Loops. The Illusion (emergent phenomenon) originates from a non existing Point a NOTHING. Foundational is that Illusions emerge from NOTHING, and they mean EVERYTHING to us.

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