IS REALITY DIGITAL OR ANALOG

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Abstract. To answer this question I propose a Universe that is explained in a digital way; quantifying mass, energy, distance, and time using Planck units and qubits, and unifying certain concepts and laws like Universal Gravitation and the Lorentz Transform under the quantum gravity theory. As examples of its consistency, the proton mass, the electron mass, the Hubble constant, and other observational measures have been calculated. All this is explained in the context of a proposed Theory of the Probability of the Histories.

Author Bio
Juan Carlos Christensen is an Electronic Engineer from Buenos Aires University; was owner and President of Standard Electric Co. (an ex ITT Company) in Argentina and in Brazil; his main interest has always been R&D (he had a grant at MIT in 1975 with profesor Gerome Lettvin); has patents in Argentina and USA; is currently studying Physics at the IAFE (Instituto de Astronomía y Física del Espacio), and Philosophy at Buenos Aires University; and works as an independent researcher.

.1 Introduction

I think that I chose my career guided by the forces of the unknown. Maybe due to the experience of designing and making things that work, I tried to design a theoretical Universe that works, and model it through the use of mathematical constructs that verify against reality.
All quantities with an asterisk (e.g. m^*, l^*, D^*, t^*, w^*, F^* , T^*) are expressed in Planck units. The equations used represent proportions, in order to simplify them for this essay, but the real calculus has many decimals of precision.

.2 A Designed Universe

In the Universe proposed, each thing is interconnected/related/has a link with all other things contained inside it, and each thing is the sum of its connections with all other things. These connections are quantified in qubits, so that each thing and the Universe in itself are expressed in qubits.

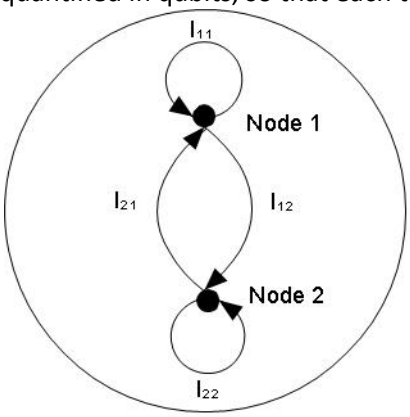

Diagram 1

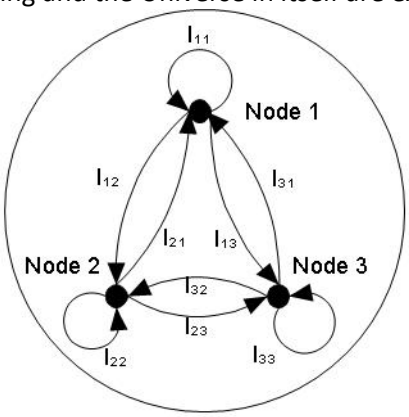

Diagram 2

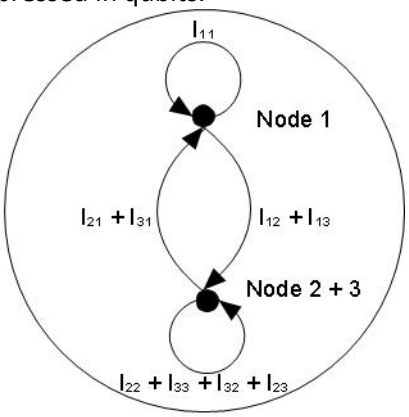

Diagram 3

For example in a Universe with two Nodes, which are interconnected as in diagram 1, the number of connections is 4, meaning that the number of qubits also is 4. In a Universe with three Nodes,

interconnected as in diagram 2, the number of connections would be 9, and the number of qubits would therefore also equal to 9. If we continue increasing the number of Nodes we would see that the number of connections (or qubits) equals the number of Nodes (N_0) squared, ($N_0{}^2$). Also each Node has a number of bits equal to N_0 and this number equals the number of connections related with that Node. The sum of connections that arrive to a Node is the same as the number of qubits of that Node. If we group Nodes creating a bigger Node in the same Universe, this new Node will have a bigger number of bits, and its connections with the remaining Nodes will have more qubits per connection as is illustrated in diagram 3.

The size of this Universe is defined by the number of Nodes contained by it. It is possible to arrange them in different ways/sets, while keeping the qubits' quantity constant. In this way, all possible existences inside a Universe are defined by their number of qubits $N_0{}^2$. If we consider this number as an integer and look a it from outside the Universe, this Universe is digital, but if we take the number of possible combinations inside it ($2^{N_0{}^2}$), that number is a real number and this Universe is something continuous. In mathematics the real numbers are the power of the integers and in algebra of sets they are the sets of the powers. They are not infinite numbers, but are very big numbers in our actual Universe. Those combinations of different sets are equivalent to the whole and that means that there are many ways to say the same thing. Conclusively this Universe is digital or analog depending on the point of view.

Qubits are used instead of bits because it is a quantum computational Universe that gives a response in bits in every actualization/refresh time. What we are/what we see, are bits, what we process/what we don't see are qubits.

This proposed Universe is similar to Mach´s idea because, everything is related, or connected, or has a link, with everything else. It is similar to Leibniz proposal of monads because each thing knows about all the others, but in this case with windows because the Nodes /the things are interrelated. The bits are similar to Plato's ideas that are projected on things, but the things here are made of ideas and the ideas made of bits. The projected things are similar to Aristotelic things, but in substance and form they are made of bits. The main difference of this proposed Universe is that what the thing is /what the it is /what we are, is the sums of the relations with all the others things that exist inside it, a quantified sum of qubits, that are processed inside the Universe.

.3 What is an Information Black Hole?

Normally a Black Hole is associated with a super dense entity in which everything collapses in a singularity. A Black Hole without charge and momentum is defined by its radius $N_0 l^*$ or its mass $N_0 m^*$or what I call actualization time $N_0 t^*$, and has a density $D_0 = \frac{D^*}{N_0{}^2}$, a radiation $\frac{w^*}{N_0}$ and an evaporation time or life $N_0{}^3 t^*$. Our observable Universe is isotropic and homogeneous with a D_0 density. That density defines an equivalent Black Hole, an Information Black Hole (IBH), with a density $D_0 = \frac{D^*}{N_0{}^2}$ and a radius $r_0 = N_0 l^*$, with an actualization time $t_0 = N_0 t^*$, a minimum frequency $w_0 = \frac{w^*}{N_0}$, an information in qubits $I_0 = N_0{}^2$, and a mass $M_0 = N_0 m^*$. It has the same parameters as a Black Hole, but does not have a singularity. That means that an observer who is far away from us inside our IBH has the same N_0 but sees different things. The IBH has no absolute center, there are as many centers as observers. An observer outside our IBH has also the same N_0 but we have no connection with him. What we have is same sort of consistency between our histories. What we are doing inside our IBH is counting our particular history which is one of the possible histories to be counted, and in the future with the expansion, those histories have to be consistent because they are going to be part of the same history and because they also are on the same surface. One way to understand this is to imagine that our IBH

Universe is in a much larger closed surface of the same density, where in every point in it there is an observer´s center, and when the surface density decreases N_0 increases. Then this is equivalent as to a Holographic Universe.

.4 The Hubble constant and the red shift in the IBH

A homogeneous medium of density D_0 has an escape velocity (v_G), that is proportional to $\sqrt{\frac{GM}{r}}$ and M is proportional to $D_0 r^3$ then v_G is proportional to $r\sqrt{G\,D_0}$ and with a generic r in Planck units $r = N\,l^*\,v_G$ becomes $l^*\sqrt{GD^*}\,\frac{N}{N_0} = c\,\frac{N}{N_0}$. That means that the escape velocity is proportional to the radius and that the Hubble constant is $H = \frac{c}{N_0}$ (the value of N for one MPC is $1{,}9\ 10^{57}$). Then higher velocity is necessary to compensate the bigger cosmological mass as we move away from an IBH center. It is analogous to the radial gravitation law inside a dense object. But this also means that a light ray trying to escape its IBH suffers a red shift proportional to the distance of its center, and that is why we see a red shift proportional to the source distance. Then there is no need for an expansion to see this phenomenon. Also, the Olber's paradox does not exist in this Universe because we see only what there is inside our finite IBH.

.5 History time of the IBH Universe

If instead of an evaporation time proportional to ${N_0}^3 t^*$ (as in a Black Hole) we think about it as a formation time, we can suppose that for example our IBH was formed in that time, which gives a very much older Universe than its $N_0 t^*$ refresh time is. And we are living in a history stage with a very low horizon expansion rate, proportional to $\frac{N_0 I^*}{{N_0}^3 t^*} = \frac{c}{{N_0}^2} = \frac{H}{N_0}$ that is the expansion velocity (v_e), with an acceleration proportional to $\frac{c^2}{N_0} = H\,c$ and with a temperature proportional to $\frac{T^*}{N_0}$.

The IBH actualizes its $I_0 = {N_0}^2$ in a actualization time $N_0 t^*$, meaning that it processes ${N_0}^2$ qubits in that time, giving a result that I call H_0 , one of the possible histories, that is a particular history of ${N_0}^2$ bits of length. All the processes inside the IBH are correlated with a history counted by different sub histories, as in different arrangements. In this Universe there is no need for an inflation to explain the regularity observed in the Cosmos, because everything is related as in a quantum computer and there is enough time for a light ray to cross the Universe in a refresh time. And also the Universe is expanding as observed.

In ${N_0}^3 t^*$ was counted one of the possible histories H_0 until today in our IBH. Every refresh time $N_0 t^*$ processes its $I_0 = {N_0}^2$ qubits and increments its quantity of bits in one bit. All the possible H_0 Histories are ${N_0}^2$ times H_0, and I call it H_t which has ${N_0}^4$ qubits. Then our IBH grows with H_t and we are surrounded by that amount of bits, but what we see is H_0, which is counted in $N_0 t^*$. What was counted could be interpreted as a filter.

Because working with bits reduces the number of spatial dimensions by one, it is possible to represent each history H_0 like the surface of a sphere and the successive stories in time as an onion, like surfaces forming the sphere. If the density taking H_0 is $D_0 = D^*/{N_0}^2$, then the density taking H_t is D^*, ${N_0}^2$ times higher. The density of all the possibilities is D^*.

.6 Mass/Energy re-expressed in qubits

In a digital Universe we have to rethink everything because it is a new Paradigm and as a consequence we have to reformulate everything that is known using the minimum quantity of constants and qubits and no more. An ideal target is to have the possibility to re-express everything of the classic world and

quantum world, with the minimum use of constants (e.g. using c, h, G) only which define the Planck units and qubits, and with more knowledge about the Universe and us.
If we take the minimum frequency as the frequency of one bit equal to $\frac{w^*}{N_0}$ then the unit of energy is $\frac{h\,w^*}{N_0}$ and the unit of mass is $\frac{m^*}{N_0}$. In this way it is possible to re-express the mass-energy Einstein equation as:

$$m_0 = \frac{Im^*}{N_0} \quad \text{and} \quad mc^2 = m_0c^2\gamma = \frac{Im^*\gamma}{N_0}$$

Where I is m_0 information quantity in qubits, m^* is the Planck mass, γ is the Lorentz transform and N_0 is what defines IBH size. This is a very important equation because it relates mass-energy Einstein equations with Planck units and qubits. For example, in our IBH to calculate the mass knowing $I_0 = {N_0}^2$ gives $M_0 = \frac{I_0 m^*}{N_0} = N_0 m^*$. In the same way it is possible to re-express length, time, force, velocity, and all units and laws in qubits.

.7 A new interpretation and adjust of Lorentz transform $\gamma = \frac{1}{\sqrt{1-\frac{v^2}{c^2}}}$

The bits change and the maximum velocity of change is c and is related to the Planck Frecuency w^*. If we rearrange the equation like this $\gamma = \frac{c}{\sqrt{c^2-v^2}}$ we see that the denominator is a velocity, interpreted as the velocity of time (v_t). Sounds strange to have a velocity of time, but things change not only in space from place to place at different velocities v, they also change without moving, they change in time because they are actualized in every proper actualization time, and these velocities are related in this equation. What that relation expresses is that with minimum velocity v in space we have the maximum speed v_t of change in time and with velocity v in space approaching c we have the minimum change in time or velocity in time. To be one step more precise in γ equation we have to introduce the expansion velocity $v_e = \frac{c}{{N_0}^2}$ in the equation, and the adjusted γ is:

$$\gamma = \frac{c}{\sqrt{c^2 - v^2 + {v_e}^2}}$$

And this is equivalent to say that the maximum velocity of change now is $\sqrt{c^2 + {v_e}^2}$, because the expansion velocity adds to c and this new maximum velocity is equal to $\sqrt{{v_t}^2 + v^2}$. Then if we take the minimum $v_{e=\frac{c}{{N_0}^2}}$ and replacing values, the range of γ is $1 < \gamma < {N_0}^2$, the range of v is $\frac{c}{{N_0}^2} < v < c$, and the range of v_t is $\frac{c}{{N_0}^2} < v_t < c$. We can interpret γ as a probability that goes from $\frac{1}{{N_0}^2}$ to 1 multiplied by ${N_0}^2$, and when that probability goes to one means that only one of the ${N_0}^2$ possible actualized histories H_0 is counted, and when the probability is $\frac{1}{{N_0}^2}$ means that every of the ${N_0}^2$ histories have the same chance to be counted. It means talking about a particle, that when it actualizes its I or (h_0) like a small history in a random way, its velocity is minimum, and when it counts the same history its velocity is maximum. Then in this model γ is equivalent as a measure of the randomness of the histories. When a particle defined with a quantity of bits I_p moves in a probable direction and speed v, what happens is a consequence of a change on the complex amplitudes of all possible histories and the modulus of the amplitude's sum is equal to the probability that we call γ. What γ represents is a modulus, a probability, it has no information about direction or about the alternative paths, and it only indicates a change in the probability. What moves things is reflected in γ.

.8 Newton Universal Gravitation Law re-expressed and adjusted in qubits

If we re-express gravitation energy $E_G = \frac{GMm}{d}$ in the new notation it becomes:

$$E_{G_0} = \frac{I_v E^*}{N_0} \text{ and } E_G = E_v = G\left(\frac{I_1 m^*}{N_0}\right)\left(\frac{I_2 m^*}{N_0}\right)\frac{\gamma_G}{Nl^*}$$

Where E^* is Planck energy, I_1 and I_2 are information quantity in qubits of each mass, N_0 gives the size of the IBH, γ_G is the Lorentz transform modified using v_G instead of v, Nl^* is the distance between both masses and I_v is the link information that is equal to the product of both masses, and E_v is the link energy. This is a more general equation and it expresses the link energy that defines a mass in relation with the others masses as it was presented in point 2. When a mass is closer to another mass it means that this link is stronger than the link with the others and this is equivalent as a change in γ_G. Then there is a difference with Einstein´s equivalence principle. When some mass is moving at v it is moving in relation with all other things in the Universe, and when some mass is closer to another mass it is as if it was virtually moving in relation with that mass. The escape velocity v_G from that mass is analogous to v, and it changes the energy of that link. Then there is a conceptual difference and the equivalent principle fails. It is not the same to be accelerated inside a lift by a rocket as it is to be accelerated by a gravitational force. Because with the rocket you are accelerated against the rest of the masses of the Universe $N_0 m^*$ and γ can go up to ${N_0}^2$, and with the gravitational force you are accelerated against a mass, for example Nm^2 and γ_G can go up to N^2. Then the limits are different and also the effects and the histories are. One thing represents trying to leave an IBH whereas the other represents trying to enter an IBH. And an interesting thing is that the γ_G limit to go inside an IBH is the same as the γ limit to go outside that same IBH, there is no discontinuity.
Also this equations shows that Newton Universal Gravitations Law is correct until γ_G starts to grow, and that happens when the distance between particles becomes closer to the particles IBH radius.

.9 A more universal γ equation

We have a γ that we use with v in a Minkowski empty space that does not exist, a γ adjusted with the expansion velocity v_e in a more real Universe with mass inside, a γ_G that we used in the Universal Gravitational equations with v_G that is the gravitational escape velocity in a gravitational Universe where everything is related. The escape velocity depends on mass proximity relations, and it depends also on cosmological mass that is a function of the distance from the center that we used to calculate Hubble constant and red shift in point 4, velocities that in equilibrium are related with v. If we now combine them in a universal γ (γ_U) we can work in a Euclidean space-time with a γ_U that expresses the changes in the probability of the histories. This is not a Field Theory, we can talk about gradients of probability, and proportional to these gradients we have forces; forces that can go up to F^*. As we have seen to move inside an IBH at velocity v or to be closer to a mass is equivalent to change γ ´s, and the probability of the histories are altered, and also the rate of change in space and in time. In this way it is possible to work only with γ_U and in a simpler way than with General Relativity using Euclidean space-time with modified Newton equations. Thus mixing γ and γ_G in one γ_U, supposing a orthogonal velocities case, gives

$$\gamma_U = \frac{c}{\sqrt{c^2 + {v_e}^2 - v^2 - {v_G}^2}}$$

In an equilibrium system like Mercury and the Sun, v and v_G are related and orthogonal, $v_G = 2v$ and $v = \sqrt{\frac{GM_\odot}{d}}$, where d is the mean orbit distance, and without taking into consideration the cosmological component of v_G, using γ_U with Sun mass, it coincides with the precession speed correction of Einstein TGR. And all is expressed in Planck units and in qubits.
This is also a very important equation because it is much more simple to use and easier to understand, and it is possible to extend its concepts and applications to many other subjects that are not possible to expose here.
This equation shows that a mass suffers the relativistic effects of γ_U with greater v and with greater v_G between extremes determined by the particular IBH range. So this is a quantum gravity equation that works with the structures that are going to be described.

.10 What are IBH Structures?

The properties are defined in bits, and with more bits there are more different properties possible. A thing is made of qubits, and they change during the processing /actualization time and give a new output in bits that means it changes a property. The things are correlated in a IBH Structure (IBHS), and they change one bit every refresh time and in conjunction they change the h_0 of that IBHS. And this h_0 belongs to a thing that is a bigger IBHS history. This looks like a hierarchical interrelated structure.
To expose it properly more space for this subject is needed, but it is possible to give a brief idea.
If we take integers $1, 2, 3, .. = n$ and if we make potencies of two with them $2^1, 2^2, 2^3, \ldots = m$ and if we make potencies with them again $2^{2^1}, 2^{2^2}, 2^{2^3}, \ldots$ well with those binary numbers it is possible to make IBHS hierarchical structures of qubits. Where the bigger structure contains the next smaller structure and this one contains its next smaller and so on going down and the same going up. This type of organization of structures is stable because the Hawking radiation of the smaller is in equilibrium with the temperature of the bigger. Those structures actualize in a refresh time that is proportional to its radius. There is an interesting number in these series $2^{2^6} = 2^{64}$, let us call N to this special structure, N is equal to the number of Nodes it contains. Our actual IBH Universe have N_0 Nodes inside and to be more precise $N_0 = N^3\Delta$ and Δ shows that it is expanding. This N structure has an internal information $I_N = N^2$ and a refresh time Nt^*. This structure is equivalent to N^2 substructures that actualizes one bit every t^* refresh time. The mass of the structure N employing the upper equations is $M_N = \frac{I_{v_n} m^*}{N_0} = Nm^*$ then I_{v_n} is equal to NN_0 that is its external information. Then each of the N^2 substructures has a qubit quantity that is $\frac{I_{v_n}}{N^2} = \frac{N_0}{N} = I_p$. And this is the quantity of bits of a particular particle with a mass $m_p = \frac{I_p m^*}{N_0} = \frac{m^*}{N}$ is a constant mass. And this is a calculated proton rest mass, with a small error. Then to be more precise we have to take into consideration the electric charge mass using α fine-structure constant, then

$$m_p = \frac{m^*\sqrt{2}(1 + \frac{\alpha}{3})}{N_0}$$

As this is a very precise equation, and the precision of α and m_p is greater than the precision of m^* what is calculated is $m^* = 2{,}176443027\ 10^{-5}$gr, a value more precise than Wikipedia
$m^* = 2{,}17644(11)\ 10^{-5}$gr that with $\alpha = \frac{1}{137{,}035999679(94)}$ gives $m_{p=}1{,}67262158\ 10^{-24}$gr that is the actual measured value of the proton rest mass.

Then the proton mass is calculated using this equations in Planck units, α and qubits, and is an important test of how this Theory works.

If the proton bit quantity is $I_p = \frac{N_0}{N}$, and it refresh time in Nt^* means that in $N_0 t^*$, that is the refresh time of the IBH Universe, it refreshes $\frac{N_0}{N}$ times, that means that if it refreshes one bit in each refresh time it refresh all its $I_p$bits in $N_0 t^*$. Then that is equal to what was said before, an instant /a refresh /a photo, actualizes the history, and what we measure what we try to see is in this case the state of a certain property in the proton history h_p. And the full proton history h_p equals l_p gives the proton rest mass.

The electron rest mass is equal to $\frac{m_p}{\Delta} = \frac{m^*}{N\Delta}$ where Δ is the expansion increment above N^3 IBHS in N_0, that means $m_e = \frac{I_e m^*}{N_0} = \frac{m^*}{N_0 \Delta}$ then,

$$I_e = \frac{N_0}{N\Delta} = N^2 \text{ and } m_e = \frac{m^*(1+\frac{\alpha}{3})}{N\Delta}$$

Then in this way we know how many qubits have a proton and an electron. And measuring the electron mass and charge we can know the Universe radius, Hubble constant, expansion rate… without using a telescope.

Another's examples of different IBHS influences /manifestations are:

The Coulomb Law seems to fail on distances of the order $10^{-14} cm$ that's $\frac{Nl^*}{\sqrt{2}}$ where the effects of γ_U appear.

The charge separation inside a neutron is in the order of $10^{-26} cm$ and that's $N^{\frac{1}{2}}\alpha l^*$.

The number of bits in a human genome is about 6 billons and that's $N^{\frac{1}{2}}2^{\frac{1}{2}}$.

The number of neurons in a human is in the order of $1{,}3\ 10^{11}$ and that's $N^{\frac{1}{2}}\Delta^{\frac{1}{2}}$, and the estimated number of Galaxies in our Universe is around the same number.

There are many more things interpreted and calculated, but this is possible because this Theory of the Probability of the Histories gives a simple and conceptual mathematics to check if the reasoning is right.

Some more precise calculations of above equations:

a) $N_0 = [\frac{N}{\left(1+\frac{\alpha}{3}\right)}]^3 \frac{\Delta}{\sqrt{2}} = 8{,}090728978\ 10^{60}$ with $\Delta = 1836{,}15267247$

b)$N_0 t^* = 4{,}36190617\ 10^{17}\ seg = 1{,}382204657\ 10^{10}\ sidereal\ years$ compared with WMAP data $1{,}375\ +/-0{,}011\ 10^{10}\ years$ there is a difference of $+0{,}00720465$ that is within the limits.

c) Hubble constant $H = \frac{c}{N_0} = 70{,}74160272 km/(seg\ MPC)$ compared with WMAP data $70{,}8\ +/-\ 1{,}6 km/(seg\ MPC)$ there is a difference of $-0{,}05839$ that is within the limits.

d) Cosmic acceleration $\frac{c^2}{N_0} = 6{,}872963678\ 10^{-10}\mathrm{cm/seg^2}$

More about how a particle moves in this Theory:

If a particle actualizes the same history why does it move at the speed of light, but when it maintains the same spin doesn't move at c? Because it actualizes one different property at each refresh time, not like the photon that actualizes the same property each refresh time.

A photon is a particular history /property /thing that only actualizes the same bit and that is why it moves at c; it is a particle of many histories that are actualized in a different property each time it

actualizes and the speed depends on the history probability change reflected in gamma. Then movement reflects how the particles are processing their information, how they interchange, and how their probability is altered. But all this happens at the IBHS level, and what we see is a projection of what happens there.
To make a measurement is equivalent to use bits, alter the probability and actualize a particular property. To move at c, the particle, needs to refresh the same property every actualization time, and that is the equivalent to counting the same history. To move at a velocity the actualization probability has to be altered. A particle refreshes a bit every Nt^*, and all its bits every $N_0 t^*$. The IBH refreshes one bit every $N_0 t^*$, processing ${N_0}^2$ qubits, and it does this ${N_0}^2$ times in ${N_0}^3 t^*$.

.11 How it expands and from where and to where

The Big Bang is different in a Digital Universe. If we follow the history to the beginning it seems that the density increases up to D^* as in a Big Bang, but in a much longer process. What happens is that this Digital Universe is ordered in structures. What we see is a part of what a structure counts from its level to the next level. In our Universe level a N^3 structure is counting what we see and will see. Inside this structure there are IBHS like $N, N^{\frac{1}{2}}$, … with their sub parts that are what we use to recount our history. It is an endless recounting of stories inside histories. When histories grow bigger they start to recount smaller ones that also may grow. And the bigger they are, the more bits and more properties they have, and those histories can recount more complex things and also smaller histories that start to grow and get bigger...an endless process.

.12 What is time in an IBH Universe?

Talking about time is an opportunity to talk more about this Theory of the Probability of the Histories (TPH).
As Mach said, time does not exists by itself; what exists is change. Then if there is no change it does not make sense to speak about time. But what is change and what are the things that change? Russell said that change is just a property variation in a time that is defined as a limit of durations. Mc Taggart said that change is when something had a certain property and now posses another. Then change is something that is related to property variations and since the thing is what changes, the thing is changing its properties and then the thing is a conjunct of properties that change. And this is independent of the size of the thing, it may be microscopic or macroscopic. Barbour said that the world is made by now´s in a sequence of possible configurations ordered in accordance to a minimum distance equivalent to a principle of minimum action. That is a position more related to Mc Taggart series B in which events are ordered in relations of anteriority, posteriori and simultaneity and not like Mc Taggart series A where events are in a history with past, present and future.
In this TPH what we see /perceive are histories and not isolated instants. A picture of an instant is the history actualized in this instant. The histories change its properties in different frequencies or actualization /refresh times. In this way all the Universe changes, the things, the relations, the ideas, the believing, we, … Our reality is in this change. Histories change and are related with bigger or smaller histories that also change. The thing that is observed, the subject that observes, the thing, the society where they live, the world that contains it,…, the Universe, the All, are all histories that are recounted in a interrelated way. A change of paradigm is equivalent in this model as a change in a significant property in society´s mind. The future diversity is equivalent to the potency of the different possible alternatives in relation to the history. The qubits become bits when they are related with the history. The bits act as a filter for the possible histories, they modify their probability. An event is described by its history, and between events there is a distance in space-time and an observer from his own history sees them and is related with them and depending on that relation he talks about it and sees it as past, present or future.

The histories change bit by bit in their refresh time, a picture is not the same picture, it changes, becomes older, we see it differently. The histories seen differently from different histories are a theory of relativity but within histories and about histories. Is relativistic and it does not need to change the space-time geometry; what changes is the relative probability of the histories. There are many ways to recount the same history. And the sum of all different histories that are lived recounts the same history that contains them. Our freedom is in the possibility and the ability to participate in the many different ways of recounting a part of the same thing within our own history. A thing is a history.
This Universe is a continuum of histories; it has no beginning it has no end. What we look at is what we see inside a history and what we see are histories, also we are a history. This is like a hierarchical imbricate interrelated set of histories which recount histories, which recount histories, which recount histories,…

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References

[1] Feynman, Leighton, Sands, “The Feynman Lectures on Physics”; Addison-Wesley Publishing Company.
[2] Feynman, “The strange theory of light and matter”, Princeton University Press.
[3] Lee Smolin, “The life in the Cosmos”, Oxford University Press, (1997).
[4] Seth Lloyd, “Programming the Universe”, Borzoi Book, Alfred Knopf, (2006).
[5] Julian Barbour, “The Nature of Time”, essay competition FQXi, http://www.fqxi.org/community/forum/topic/360 , (1/10/2011).
[6] Roger Penrose, “The Road To Reality”, Vintage Books London, (2005).
[7] Paul Davies, “About Time”, Touchstone Book, Simon Schuster, (1995).
[8] Peter and Neal Graneau, “In the Grip of the Distant Universe The Science of Inertia, World Scientific Publishing Co, Singapore, (2006).