

Cosmological relevance of microtubules to the size of the electron as conformal wormhole quantization in quantum geometry

The quantum scale advocated by Stuart Hameroff in his presentations ([View: https://www.youtube.com/watch?v=iXBfXNW6Bxo](https://www.youtube.com/watch?v=iXBfXNW6Bxo)) relates the number of microtubules to the actual scale of the classical electron radius, as this might be a missing link to relate your theory (and Roger's CCC btw) to the cosmology and the underpinning fact of physical consciousness relating to the cosmological spacetime matrix.

Using this conformal mapping from the Quantum Big Bang 'singularity' from the electric charge in brane bulk space as a magnetic charge onto the classical spacetime of Minkowski and from the Planck parameters onto the atomic-nuclear diameters in $2R_e c^2 = e^*$ from the Planck length conformally maps the Planck scale onto the classical electron scale.

This is addressed in my comment on Roger's CCC -Weyl model below.

But watching your presentation as indicated in the screenshots below; added to this conformal scale mapping in your scale of 2.5 fm, which is of course close to the classical electron radius and as defined in the alpha electromagnetic fine structure and the related mass-charge definition for the eigen energy of the electron in $m_e c^2 = ke^2/R_e$.

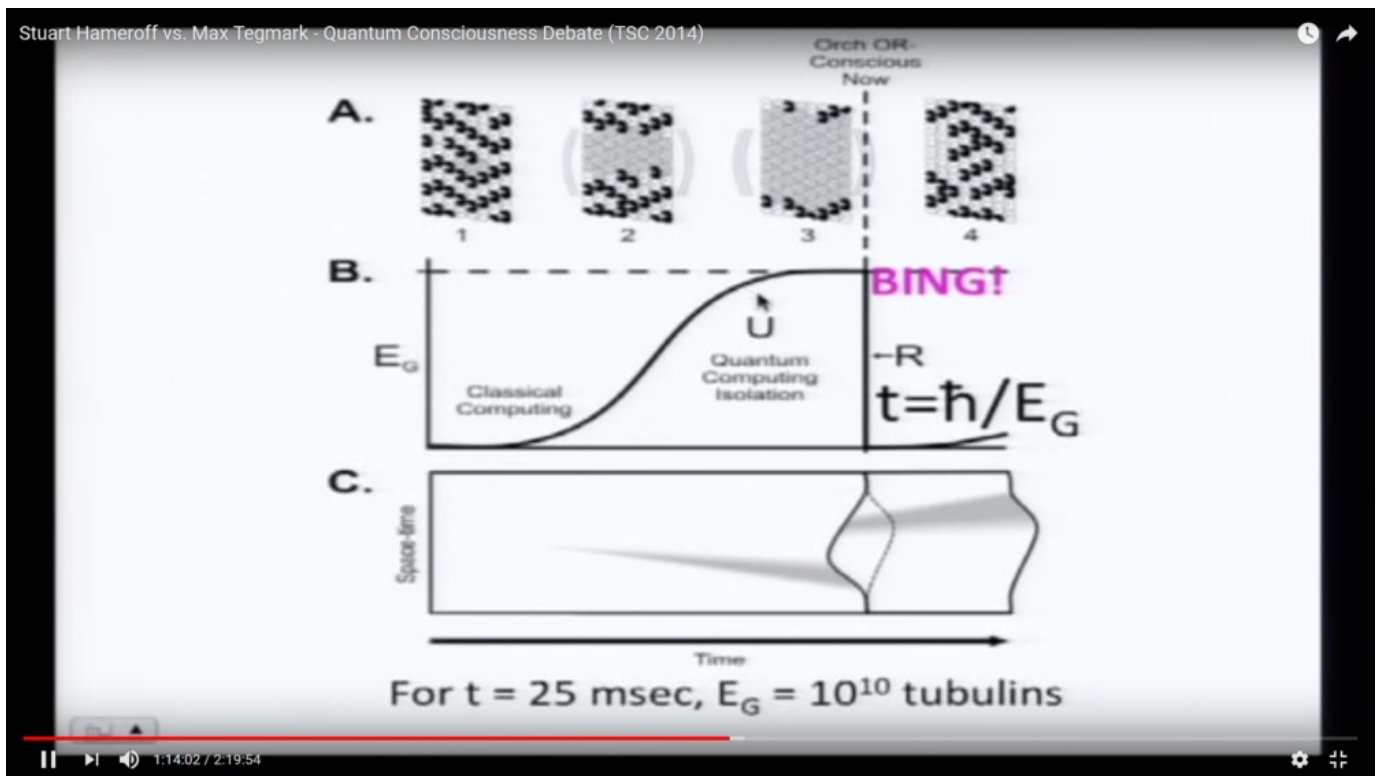
Also in my model of quantum relativity there is a quantization of exactly 10^{10} wormhole 'singularity-bounce' radii defining the radian-trigonometric Pi ratio as $R_{\text{wormhole}}/R_{\text{electron}} = 360/2\pi \cdot 10^{10}$ or $10^{10} = \{360/2\pi\} \{R_e/r_{\text{wormhole}}\}$ as a characteristic number of microtubules in a conformal mapping from the classical electron space onto the 'consciousness' space of the neuron-cell intermediate between the Hubble scale of 10^{26} m and the Planck scale of 10^{-35} m as geometric mean of 10^{-4} to 10^{-5} metres.

Applying $E_G = \hbar/t$ to microtubule quantum computing terminated by OR

Gravitational self-energy E_G of a superpositioned tubulin is given by $E_G = Gm^2/a_c$ where a_c is the superposition separation distance, a carbon nucleus sphere radius equal to 2.5 fermi distances (2.5 femtometers, 2.5×10^{-15} meter)

For $t = 50$ msec (gamma synchrony), E_G of 10^{10} superpositioned tubulins is required

Hameroff and Penrose, 1996



Conformal Cyclic Cosmology (CCC) and the Weyl Curvature Hypothesis of Roger Penrose

View: <https://youtu.be/FVDJJVoTx7s>

The pre-Big Bang 'bounce' of many models in cosmology can be found in a direct link to the Planck-Stoney scale of the 'Grand-Unification-Theories'. In particular it can be shown, that the Squareroot of Alpha, the electromagnetic fine structure constant, multiplied by the Planck-length results in a Stoney-transformation factor $L_P\sqrt{\alpha} = e/c^2$ in a unitary coupling between the quantum gravitational and electromagnetic fine structures $\{G_0k=1$ and representing a conformal mapping of the Planck length onto the scale of the 'classical electron' in superposing the lower dimensional inertia coupled electric charge quantum 'e' onto a higher dimensional quantum gravitational-D-brane magnetopole coupled magnetic charge quantum 'e*' = $2R_e \cdot c^2 = 1/hf_{ps} = 1/E_{Weyl}$ wormhole by the application of the mirror/T duality of the super membrane $E_{ps}E_{ss}$ of heterotic string class HE(8x8).

The standard model postulates the Big Bang singularity to become a 'smeared out' minimum space time configuration (also expressible as quantum foam or in vertex adjacency of Smolin's quantum loops). This 'smearing out' of the singularity then triggers the (extended) Guth-Inflation, supposedly ending at a time coordinate of so 10^{-32} seconds after the Big Bang.

If the Guth-Inflation ended at a time coordinate of 3.33×10^{-31} seconds coordinate, the Big Bang became manifest in the emergence of space time metrics in the continuity of classical general relativity and the quantum gravitational manifesto and say from a Higgs 'False Vacuum' at the 'bounce-time' reduced in a factor of so 11.7.

This means, that whilst the Temperature background remains classically valid, the distance scales for the Big Bang will become distorted in the standard model in postulating a universe the scale of a 'grapefruit' at the end of the inflation.

The true size (in Quantum Relativity) of the universe at the end of the inflation was the size of a wormhole, namely at a Compton-Wavelength (λ) of 10^{-22} meters and so significantly smaller, than a grapefruit.

Needless to say, and in view of the CMBR background of the temperatures, the displacement scales of the standard model will become 'magnified' in the Big Bang Cosmology of the very early universe in the scale ratio of say $10 \text{ cm}/10^{-20} \text{ cm} = 10^{21}$ i.e. the galactic scales in meter units.

A result of this is that the 'wormhole' of the Big Bang must be quantum entangled (or coupled) to the Hubble Horizon.

And from this emerges the modular duality of the fifth class of the superstrings in the Weyl-String of the 64-group heterosis.

The Big Bang wormhole becomes a hologram of the Hubble Horizon and is dimensionally separated by the Scale-parameter between a 3-dimensional space and a 4-dimensional space.

Then the 5-dimensional spacetime of Kaluza-Klein-Maldacena in de Sitter space forms a boundary for the 4D-Minkowski-Riemann-Einstein metrics of the classical cosmology. This can be revisited in the multi-dimensional membrane cosmologies.

The outer boundary of the second Calabi Yau manifold forms an open dS space-time in 12-dimensional brane space (F-Vafa 'bulk' Omnispace) with negative curvature $k=-1$ and cancels with its inner boundary as a positively curved $k=1$ spheroidal AdS space-time in 11 dimensions to form the observed

4D/10-dimensional zero curvature dS space-time, encompassed by the first Calabi Yau manifold.

A bounded (sub) 4D/10D dS space-time then is embedded in a Anti de Sitter (AdS) 11D-space-time of curvature $k=+1$ and where 4D dS space-time is compactified by a 6D Calabi Yau manifold as a 3-torus and parametrized as a 3-sphere or Riemann hypersphere.

The outer boundary of the 6D Calabi Yau manifold then forms a mirror duality with the inner boundary of the 11D Calabi Yau event horizon.

The Holographic Universe of Susskind, Hawking, Bekenstein and Maldacena plays a crucial part in this, especially as M-Theory has shown the entropic equivalence of the thermodynamics of Black Holes in the quantum eigenstates of the classical Boltzmann-Shannon entropy mathematically.

The trouble with the Susskind googolplex solutions is that the 'bulk landscape solutions' fail to take into account the super string self transformations of the duality coupled five classes. They think that all five classes manifest at the Planck-scale (therefore the zillions of solutions), they do not and transform into each other to manifest the Big Bang in a minimum space time configuration at the Weylian wormhole of class HE(8x8).

Roger Penrose has elegantly described the link of this to classical General Relativity in his "Weyl Curvature Hypothesis".

Quote from: "The large, the Small and the Human Mind"-Cambridge University Press-1997 from Tanner Lectures 1995"; page 45-46:

"I want to introduce a hypothesis which I call the 'Weyl Curvature Hypothesis'. This is not an implication of any known theory. As I have said, we do not know what the theory is, because we do not know how to combine the physics of the very large and the very small. When we do discover that theory, it should have as one of its consequences this feature which I have called the Weyl Curvature Hypothesis. Remember that the Weyl curvature is that bit of the Riemann tensor which causes distortions and tidal effects. For some reason we do not yet understand, in the neighbourhood of the Big Bang, the appropriate combination of theories must result in the Weyl tensor being essentially zero, or rather being constrained to be very small indeed.

The Weyl Curvature Hypothesis is time-asymmetrical and it applies only to the past type singularities and not to the future singularities. If the same flexibility of allowing the Weyl tensor to be 'general' that I have applied in the future also applied to the past of the universe, in the closed model, you would end up with a dreadful looking universe with as much mess in the past as in the future. This looks nothing like the universe we live in. What is the probability that, purely by chance, the universe had an initial singularity looking even remotely as it does?

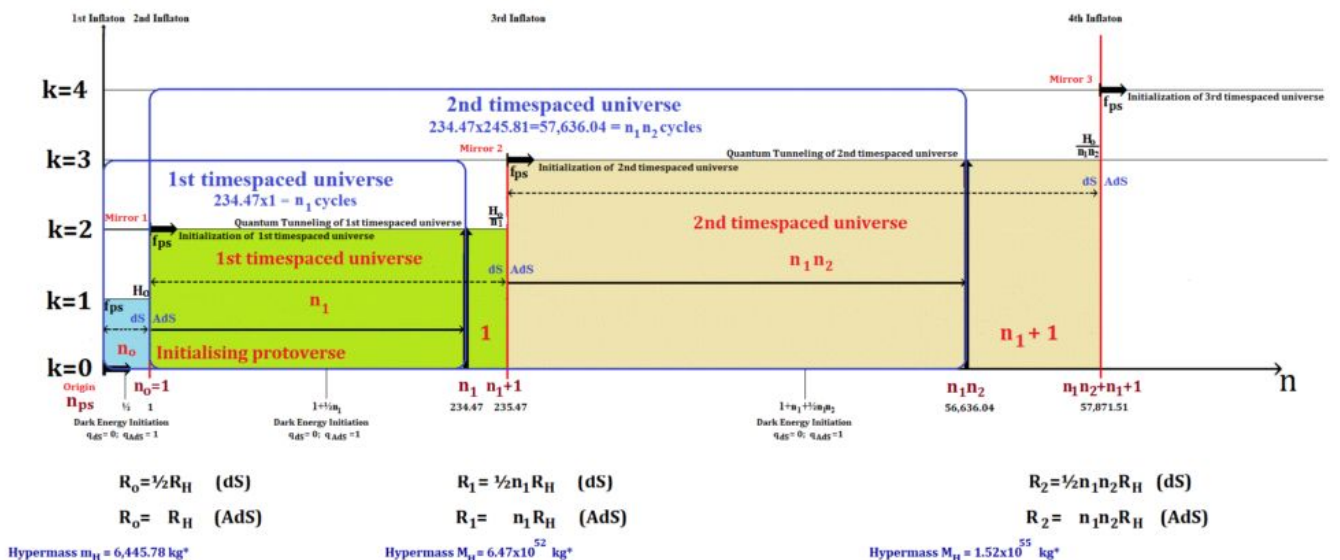
The probability is less than one part in $(10^{10})^{123}$. Where does this estimate come from? It is derived from a formula by Jacob Bekenstein and Stephen Hawking concerning Black Hole entropy and, if you apply it in this particular context, you obtain this enormous answer. It depends how big the universe is and, if you adopt my own favourite universe, the number is, in fact, infinite.

What does this say about the precision that must be involved in setting up the Big Bang? It is really very, very extraordinary, I have illustrated the probability in a cartoon of the Creator, finding a very tiny point in that phase space which represents the initial conditions from which our universe must have evolved if it is to resemble remotely the one we live in. To find it, the Creator has to locate that point in phase space to an accuracy of one part in $(10^{10})^{123}$. If I were to put one zero on each elementary particle in the universe, I still could not write the number down in full. It is a stupendous number". End of Quote

Then the 'phase spaced' de Broglie inflation is in modular quantum entanglement with the Weyl-Wormhole of the Zero Curvature of Roger Penrose's hypothesis.

The Hubble-Universe consists of 'adjacent' Weyl-wormholes, discretizing all physical parameters in holofractal selfsimilarity.

Penrose's Weyl-tensor is zero as the quasi-reciprocal of the infinite curvature of the Hubble Event Horizon - quasi because the two scales (of the wormhole and Hubble Universe) are dimensionally separated in the modular coupling of the 11D super membrane boundary to the 10D superstring classical cosmology of the underpinning Einstein-Riemann-Weyl tensor of the Minkowski (flat) metric.



"The idea of an antigravity force has had a bad rep ever since," says Kirschner. "People sort of sniggered when it was mentioned, usually because it meant they couldn't explain their results." So when Riess,

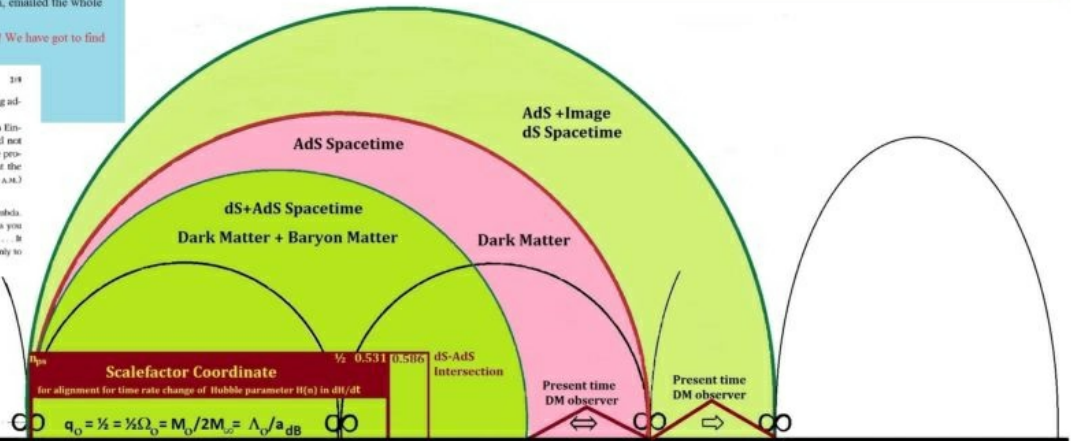
"In your heart you know this is wrong." Really, it just seemed like a terrible result, a horrifying thing

having checked his figures, suggested this might be the reason he kept showing negative mass, Kirshner, in quiet desperation, emailed the whole team, saying, "In your heart of hearts, you know this can't be right! We have got to find out where the error is."

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the writing assignments. So we all gave him advice. Conflicting advice. After all, this was a collaboration, not an arm- I didn't like the result. I didn't think we were smarter than Einstein and he had tripped on the cosmological constant. I did not want to make a mistake. I hadn't liked being wrong about the progenitor of SN 1987A and I did not want to be wrong about the history of cosmic expansion. On 12 January 1998 (at 10:18:51 A.M.) I wrote,

I am worried that the first cos looks like you might need some lambda. In your heart, you know that is wrong, though your head tells you that you don't care and you're just reporting the observations. ... It would be very silly to say "we MUST have nonzero lambda" only to retract it next year.



$q = 1$	$q_o = 1/2$ $n = n_{ps}$ $q_{AdS} = 2n_{ps}$	$n = 1/4$ $q_{AdS} = 1/2$	$q_{ds} = 0$ $n = 1/2$ $q_{AdS} = 1$	$q_{ds} = -0.4235$ $n = 0.8673$ $q_{AdS} = 1.7346$	$q_{ds} = -1/2$ $n = 1$ $q_{AdS} = 2$	$q_{ds} = -0.5586$ $n = 1.13271$ $q_{AdS} = 2.26542$	$q_{ds} = -0.75$ $n = 2$ $q_{AdS} = 4$	-1
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Limit = {0} Cyclic Closed 11/5D Witten Membrane MIRROR Spacetime Limit = {∞}

Eternal Open 10/4D Einstein Minkowski Spacetime

Continuity in Cyclic Resets of the Initial-Boundary parameters

$$q_{ds} = 1/2n - 1$$

$$q_{AdS} = 2n$$

$$q_{ds} \cdot q_{AdS} = 2n(1/2n - 1) = 1 - 2n$$

$$\frac{q_{ds} + q_{AdS}}{q_{ds} - q_{AdS}} = \frac{1 - 2n + 4n^2}{1 - 2n - 4n^2} = \frac{4\{n - 1/4(1+i\sqrt{3})\} \cdot \{n - 1/4(1-i\sqrt{3})\}}{-4\{n - 1/4(1-\sqrt{5})\} \cdot \{n - 1/4(1+\sqrt{5})\}}$$

Roots for T(n)=-1 in n(n+1)-1=0
 $n = -1/4(1+i\sqrt{3}) ; n = -1/4(1-i\sqrt{3})$
 Roots for T(n)=1 in n(n+1)+1=0
 $n = 1/4(\sqrt{5}-1) = 1/2X ; n = -1/4(\sqrt{5}+1) = -1/2Y$

The cosmological observer is situated simultaneously in 10/4D Minkowski Flat dS spacetime, presently at the $n=0.8676$ cycle coordinate and in 11/5D Mirror closed AdS spacetime, presently at the $n=1.1327$ coordinate.

Observing the universe from AdS will necessarily result in measuring an accelerating universe; which is however in continuous deceleration in the gravitationally compressed dS spacetime for deceleration parameter $q_{ds}=2n$. Gravitation is made manifest in the dS spacetime by Graviton strings from AdS spacetime as Dirichlet branes at the 10D boundary of the expanding universe mirroring the 11D boundary of the nodally fixed Event Horizon characterised by $H_o = c/R_H$

The Dark Matter region is defined in the contracting AdS lightpath, approaching the expanding dS spacetime, but includes any already occupied AdS spacetime. The Baryon seeded Universe will intersect the 'return' of the inflaton lighpath at $n=2\sqrt{2}=0.586$ for (DM=22.09%; BM=5.55%; DE=72.36%).

The Dark Energy is defined in the overall critical deceleration and density parameters; the DE being defined in the pressure term from the Friedmann equations and changes sign from positive maximum at the inflaton-instanton to negative in the interval $L(n)>0$ for n in $[n_{ps} - 0.18023]$ and $L(n) > 3.4008$ with $L(n)<0$ for n in $(0.1803 - 3.4008]$ with absolute minimum at $n=0.2389$.

This DE (quasi)pressure term for the present era (1-0.1498 for 85% DM and 4.85% BM and 27.48% DM and 67.67% DE) is positive and calculates as $6.696 \times 10^{-11} \text{ N/m}^2$, translating into a Lambda of $1.039 \times 10^{-36} \text{ s}^{-2}$ and $1.154 \times 10^{-53} \text{ m}^{-2}$. This pressure term will become asymptotically negative for a universal age of about 57.4 Gy, and for the zero curvature evolution of the cosmos.

The 'naked singularity' can be defined as the ratio of the minimum to the maximum and calculates as the genetic 'NullTime' $n_{ps} = \lambda_{ps} / r_{ps,max} = 6.259093485 \times 10^{-49}$ in dimensionless cycletime units (Tau-Time in General Relativity).

This NullTime precedes the Planck-Time $t_p = h/2\pi c^2 m_p = 6.9653035 \times 10^{-44}$ seconds (s*) by a factor of 111,283, should timeunits be assigned to n_{ps} .

The 'naked singularity' can then be redefined as the GENESIS-BOSON with a pre-Planck energy spectrum of $6.59 \times 10^{24} \text{ GeV}$, an effective 'size' of $3 \times 10^{-41} \text{ metres (m)}$ and a preBig Bang temperature of $7.67 \times 10^{37} \text{ Kelvin (K)}$.

Timeinstantaneity ends the 'Bosonic Epoch' of the superbranes at $t_{ps} = 3.3301 \times 10^{-31} \text{ s}$ and renders the Guth-Linde-Inflation as 'classically dynamic' in General Relativity. The negative curvature of 10D-C-Space is 'flattened' in the positive curvature of 11D-M-Space and an overall observed Euclidean flat cosmos is realised.

Hubble Parameter	$H(n) = \{c/[n+1]^2\} / \{R_H/[n(n+1)]\} = H_o / T(n) = H_o / \{n(n+1)\}$
Timerate change Hubble Parameter in AdS without dS	$d(H(n)/dt)_{AdS} = \{dH(n)/dn\} \cdot \{dn/dt\} = -H_o^2 / n^2$ by $H(n) = c/nR_H$ with $A(n) = 0$
Timerate change Hubble Parameter in AdS with dS	$d(H(n)/dt)_{AdS+dS} = -H_o^2 \cdot \{2n+1\} / \{n(n+1)\}^2 = -4\pi G\{\rho + P/c^2\} = \rho_{B/DM} + \rho_{A/DE}$
Dark Energy Parameter with $\Lambda_{(E)instein} = 0$	$\Lambda(n)/R(n) = \Lambda_E/3 - 4\pi GP/c^2 = \rho_B + \rho_A = G_o M_o / R(n)^3 - 2H_o^2 / \{n(n+1)\}^2$

(1) $q(n) = -\ddot{a}/\dot{a}^2 = -\{-2cH_oR_H/[n+1]^3\} \cdot \{nR_H/[n(n+1)]\} / \{c^2/[n(n+1)]^2\} = 2n$ for AdS spacetime and dS spacetime for $H_o = c/R_{(H)ubble/max}$
 $r(n) = r_{...}(1 - 1/(n+1))$ (Parametric Scalefactor for Distance)

max

$$\dot{t}(n) = c/(n+1)^2 \quad (\text{Parametrisation for Velocity})$$

$$\ddot{t}(n) = -2cH_0/(n+1)^3 = a_0(n) \text{ [Milgrom]} \quad (\text{Parametrisation for Acceleration})$$

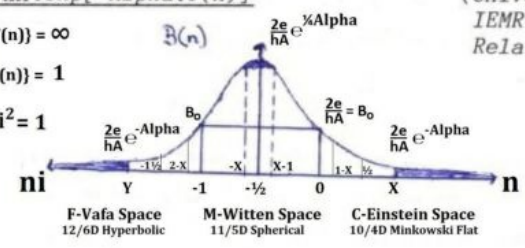
$$n = H_0 t \text{ with } c = f_{ps} \lambda_{ps} = H_0 r_{max} \text{ and } H_0 = dn/dt = \text{constant} = 1.879564359 \times 10^{-18} \text{ 1/s}$$

(2)

with $T^2(n) = 1 = X(X+1) = -i^2 = -XY$ in the Feynman-Path-Integral as alternative quantum mechanical formulation for the equations of Schrödinger, Dirac and Klein-Gordon by: $T(n) = n(n+1) = |-n| + \dots + |-3| + |-2| + |-1| + 0 + 1 + 2 + 3 + \dots + n$

$$B(n) = 2e/hA \cdot \exp[-\text{Alpha} \cdot T(n)] \quad (\text{Universal Cosmic Wavefunction or IEMR=Inverse-Energy-Magnetocharge-Relation for Superstring HE(8x8)})$$

Aleph-Null: $\lim_{n \rightarrow \infty} T(n) = \infty$
 Aleph-All: $\lim_{n \rightarrow -\infty} T(n) = 1$
 $|X+Y| = |XY| = -i^2 = 1$



The universe is 'frozen' in M-Space at the X-coordinate for which $T(n)=1$ and imaged in the Y-coordinate as imaginary time n_i as function $B(n)$

$T(n)=n(n+1)$ defines the summation of particle histories (Feynman) and $B(n)$ establishes the v/c ratio of Special Relativity as a Binomial Distribution about the roots of the $XY=i^2$ boundary condition in a complex Riemann Analysis of the Zeta Function about a 'Functional Riemann Bound' $FRB=-\frac{1}{2}$.

The CCC Penrose model becomes compatible with the inflation scenarios; should the multiverse cosmology become defined as occurring parallel in time-continuity and not as parallel in space in a manner envisaged by Roger Penrose.

<https://cosmosdawn.net/index.php?lang=en>

Quantum Consciousness in the Penrose-Hameroff Model

View: <https://www.youtube.com/watch?v=Xx0SsfidMBw>

In the DNA

The DNA molecule, the program for all life, is based on the Golden section. It measures 34 angstroms long by 21 angstroms wide for each full cycle of its double helix spiral. 34 and 21, of course, are numbers in the Fibonacci series and their ratio, 1.6190476 closely approximates Phi, 1.6180339. It is interesting to note as the technology improves and we get more accurate dimensions the ratio keeps getting closer to phi. It now appears that the ratio of the width to the vertical offset may also converge to the same ratio.

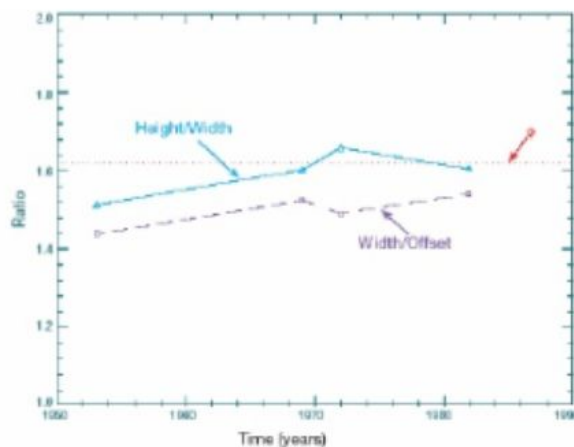


Figure 1

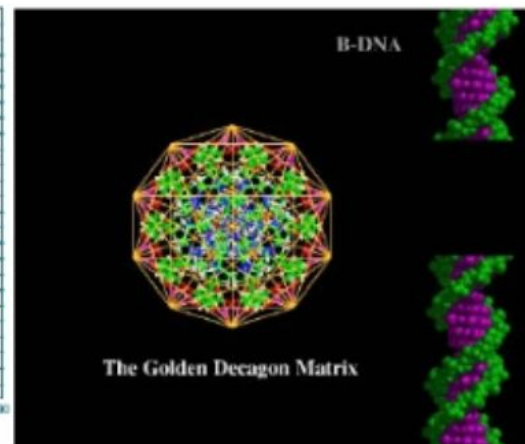


Figure 2

Figure 2 shows how a cross-section of the DNA perfectly fits into a decagon formed of golden elements.

The ratio becomes apparent in the frequency of bases in the DNA. Selvam (2002) using statistical tools has shown that the frequency of A,T,C,G bases in the Drosophila genome. His paper reads:

“The observed fractal frequency distributions of the Drosophila DNA base sequences exhibit quasicrystalline structure with long-range spatial correlations or self-organized criticality... The dominant peak periodicities are functions of the golden mean.”

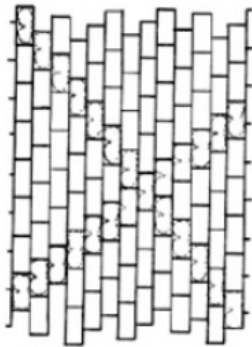
This way non-reductionist studies are opening new avenues for science to explore.

In the Cell structure

The ratio appears in certain very important structures of the cell. The hexagonal pattern of microtubules exhibits the Fibonacci feature and it is found that this pattern is made up of 5 right-handed and 8 left-handed helical arrangements.



View down a microtubule! The 5 + 8 = 13 spiral arrangement of the tubulins in this microtubule can be seen.



Imagine a microtubule slit along its length, and then opened out flat into a strip. We find that the tubulins are ordered in sloping lines which rejoin at the opposite edge 5 or 8 places displaced (depending upon whether the lines slope to the right or to the left).

It is curious, also, that the double microtubules that frequently occur seem normally to have a total of 21 columns of tubulin dimers forming the outside boundary of the composite tube - the next Fibonacci number. Koruga (1974) argues for a special efficiency in the case of Fibonacci-number-related structure of microtubules that may provide advantage in its function as a "information processor". There must indeed be some good reason for this kind of organization in microtubules, since although there is some variation in the numbers that apply to eukaryotic cells generally, 13 columns seems to be almost universal amongst mammalian microtubules.

Figure 3

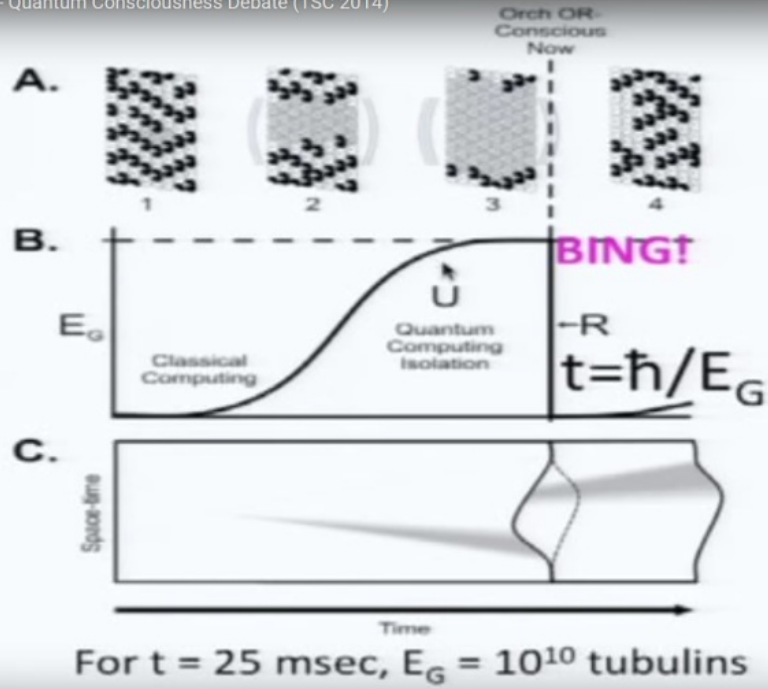
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Dear Stuart!

I watched your presentation

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and would like to comment on this page, relating the number of micro tubules to the actual scale of the classical electron radius, as this might be a missing link to relate your theory (and Roger's CCC btw) to the cosmology and the underpinning fact of physical consciousness relating to the cosmological spacetime matrix.

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It is so the geometry of the architecture of the microtubules and the nature of their construction utilizing the pentagonal quasi-crystalline pattern in its application for maximising the compression of information in the Fibonacci geometrical pattern-sequencing. This then results in the conformal mapping of this geometry as a quantum geometry and defining physical consciousness as a conformal mapping of the quantum of spacetime in the form of Weylian 'Quantum Big Bang' wormholes of the cosmogenesis.

The pre-Big Bang 'bounce' of many models in cosmology can be found in a direct link to the Planck-Stoney scale of the 'Grand-Unification-Theories'. In particular it can be shown, that the Squareroot of Alpha, the electromagnetic fine structure constant, multiplied by the Planck-length results in a Stoney-transformation factor $L_P \sqrt{\alpha} = e/c^2$ in a unitary coupling between the quantum gravitational and electromagnetic fine structures $\{G_0 k=1$ and representing a conformal mapping of the Planck length onto the scale of the 'classical electron' in superposing the lower dimensional inertia coupled electric charge quantum 'e' onto a higher dimensional quantum gravitational-D-brane magnetopole coupled magnetic charge quantum 'e*' = $2R_e \cdot c^2 = 1/hf_{ps} = 1/E_{\text{Weyl wormhole}}$ by the application of the mirror/T duality of the super membrane $E_{ps} E_{ss}$ of heterotic string class HE(8x8).

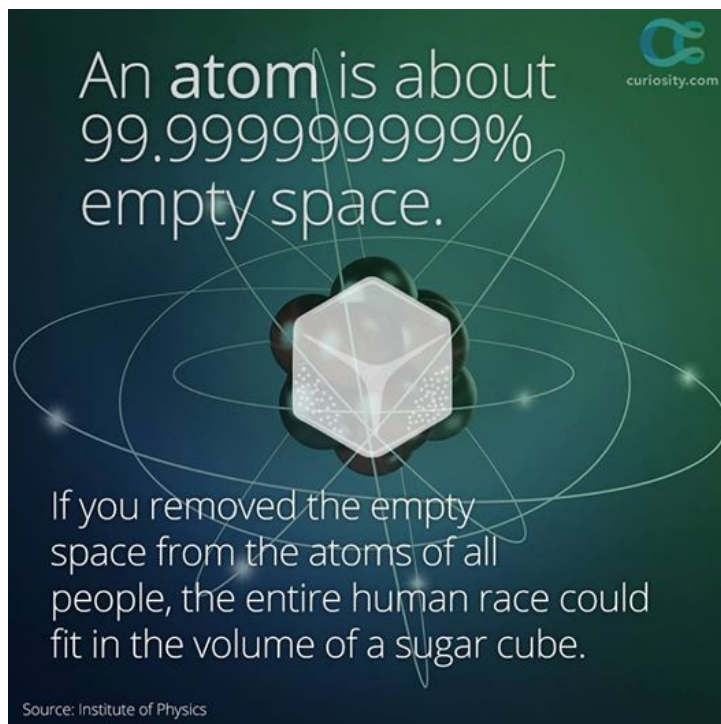
What is Consciousness?

Answer: The dynamic occupancy of spacetime by physicalised quantum conglomerations.

[Uwe Uehle:](#)

[December 1 at 2:27pm](#)

Just for perspective. Of course no space is truly empty - but this is symbolic for the miracle you're bathing in right here - right now



[Margo Callaghan](#)

Wow what a mind bender-

[Tony Bermanseder](#)

Space is consciousness related via an advanced quantum mechanics. Therefore you can figure out what the metaphysics or spirit concept really relates and points to. Its not dieu ex machina but machina ex dieu.

Calculation:

7.4 Billion people weigh about 518 Billion kilograms for an average weight of 70 kg. As one proton has a mass of about 1.7×10^{-27} kg; the total mass of humanity in weight are so 3×10^{38} protons. One proton has a volume of so $4 \times (1.4 \times 10^{-15})^3 = 10^{-44}$ cubic metres and for all the protons of humanity the volume adds to about 3×10^{-6} cubic meters or 3 cubic centimeters which is a cubic size for a cube about _____ that long.

[Andrew Bellon](#)

so what is all that empty space doing...is there direct interaction between nucleons and virtual particles relating to the nature of "spin," or how the universe actually sustains itself from moment to moment?

[Tony Bermanseder](#)

This is an appropriate question, which leads directly into the deepest nature of what energy is and it relates on a most fundamental way to the reality of universal consciousness. Firstly, the 'empty space' of an atom manifests as a form of 'force field' in that the interaction 'Goldstone' bosons mediate a 'force', which then manifests as the appearance of solid state physics. So tapping a table actually taps an energy field etc. The problems with this mainstream physical interpretation and model begin right here , because the 'Goldstones' (photons, weakons, gravitons, gluons, higgs) are said to be 'virtual' that is not having a real physical existence.

This is erroneous, just as the mainstream notion of consciousness and mind being nonphysical is also not supported by a higher dimensional

cosmology and physics. As an example consider Einstein's $E=mc^2$ applied to the total mass content of the universe. For a mass of say 10^{50} tons you will have an energy summation of so 10^{70} Joules. But if you now use the quantum energy, also well defined in Planck parameters, you calculate the quantum energy per space quantum and you get far higher values for this energy.

Using the conventions (Planck Length, Holographic bounds etc) and using the Event Hubble extent of the universe, you get something like $(\text{Number of space quanta}) \times 2 \times 10^9 = 2 \times 10^9 \times (10^{147}) \sim 2 \times 10^{156}$ Joules. Now the string physics tells you that the energy per string quantum is something like 10^{64} Joules per cubic meter as a physical manifesto of this quantum energy; whilst the energy of all matter in space is something like 10^{10} Joules per cubic meter. So the 'discrepancy' between quantum energy and matter energy is in a factor of so 74 (and 87 in the quantum-Planck limit). This number then becomes associated with the 'Dark Energy' and the 'Dark Matter' to explain the discrepancy.

The 'empty space' of the atom so is in fact 'spanned' by the 'virtual' energy which is dark and has a dark matter component which is defined in physical consciousness parameters based on the quantum energy parameters and especially the physical size of the electron.

This naturally allows a refined approach to fundamental physics, such as the difference between the Hydrogen atom and the neutron and how radioactive beta/neutron decay allows the primordial universe to build the table of the chemical elements. This transformation then relates to the interaction probability between matter and light in electromagnetic parameters so showing the basic electron to be a 'point particle/string' of a minimum size; but also a 'smeared out' or extended circular membrane characterised by the Fermi scale of the 'Goldstones'.

The spacial extent of the differences then defines physical consciousness as a modular dual or mirror property of the space quantum itself; namely whatever is measured as energy derived from the macro-physics becomes a reciprocated magneto-polar 'supercharge' in the form of the electronic diameter maximised multiplied by the time differential of frequency as inversed time. But this change of string/brane vibration over time is also an angular acceleration without radial extent and so you find the innermost nature of the quantum spin, which is radially independent.

Those physical definitions for consciousness then carry enormous implications of course. Namely space itself is conscious in a physical sense and any dynamic occupying space adds to a space inherent base consciousness independent of the dynamics and living entities moving about within it.

Collapsing a hydrogen atom that is forcing the electron to overcome its weakon force field of the beta decay results in a neutron star of 'degenerate electrons' and you then can observe the quantum physics in the astrophysics. So your original question regarding the empty space resolves in the transformation of energy density in space. Then you should adapt the quantum theory to the holographic universe and the multidimensional membrane physics to resolve the wave-particle duality and the quantum entanglement on both the micro-cosmic and the macro-cosmic scales to find the universal unification. The quantum entanglement can easily be seen to be the effect of the modular duality inferred at the beginning to resolve a number of apparent paradoxes, such as the Schrödinger Cat and the Chicken-Egg DNA/RNA etc paradoxes.