The Role of Humanity in a Self-Learning Universe: A Musical Space Journey to Novel Horizons in the Fabric of Reality.

An Essay for All People Interested in Life Sciences, Including Non-Scientists

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This essay is a short compilation of the scientific work done by the authors from 2012 until 2024. It was previously written in Dutch language and now translated in English, as well as largely updated. Recent reviews on the subject can be found in the references and further reading list. This article is aimed at introducing some fundamentally new views on the fabric of reality. We chose for a presentation style addressing the informed non-scientist and scientists outside the biomedical area. We hope that this overview, albeit with unavoidable technical terms, is a bit understandable, also by studying the set of more than 40 related figures.

Summary

Music is an interplay of Energy and Information. *Energy* is in the *frequencies* of the successive or compound tones, while the *order* of tones transfers non-material *information*. The authors posit the vision that our reality is always a combination of three fundamental aspects: *Mass, Energy and Information,* and they show how fundamental the role of *Information* is. Information directs the development and the forms of particles, while energy drives this process. This is one of the new insights that emerge from quantum physics. *In-formation* is not only found in spatial forms and patterns in nature, but also in growth forms of plants, in the composition of DNA, as well as in musical compositions. Quantum physics seems to offer a new perspective for a better understanding of the foundations of nature, of the brain and even of consciousness. Some of these foundations will be explored in the following chapters. While going through this paper it will become clear that this triangle of Mass Energy and Information, MEI, fundamentally requires a fourth window: Consciousness. Information is in principle present everywhere in the universe as a Universal consciousness of which human consciousness is part. Cosmic consciousness can be described physically with the well-known holographic principle, based on a fourth spatial dimension. Physicists formulate this extra dimension as a sub-quantum information domain, from which the evolutionary development of the universe is directed. This indeed also concerns the development of ecosystems and of each component part thereof. This 'control' occurs by means of resonance of quantum vibrations with the *Zero-Point Energy field* in which all Information

is stored. In the exchange of information, the resonance mechanism plays a crucial role, also in our brain. This concept of information has previously been proposed in a natural-philosophical and axiomatical way by quantum physicist David Bohm as the non-material *implicate order*, which shapes the actual explicit physical reality. Over time, the implicate order also gave direction and shape to the biological evolutionary processes. The authors go a step further with the premise that humanity itself participates in evolution. In this view, humanity participates in a self-learning universe. This quantum information in the universal consciousness is perceived as the basic mechanism initiating the origin of first life in evolution, and hence quantum theory has also penetrated biology. The existence of this all-encompassing quantum information field also offers possible explanations for more intuitive communication with fellow human beings, plants and animals and possibly as well for extraterrestrial sensory perception and hitherto unexplained Psi phenomena. Recent cosmological studies build on this understanding and indicate that, in principle, communication with other intelligences in the cosmos could become possible. Eventually, a kind of "galactic internet" could emerge as part of a self-learning universe. The 'original' information may have been available before the start of this current universe. The transition of a previous universe into our present one is conceived as a holographic informational process, unrolling the opposing forces of Gravity and Dark Energy. Based on these insights, the authors argue for the further exploration of the concept of universal consciousness in human society, as well as its potential role in the further evolution of the universe. Quantum theory is increasingly proving to be of great importance in this respect. Translated into the current living reality, quantum biology also offers a new perspective for a sustainable use of our precious nature in agriculture and forestry. After all, the integral nature – with virus, insect, plant, animal and human - is a balanced interplay of mass, energy, information and consciousness. These new insights can also lead to groundbreaking technologies, but their application requires a simultaneous inner and ethical evolution of the human spirit. In all of this we live in an all-encompassing musical symphony that guides the fabric of reality. This may, hopefully, provide a key to a better future for eveything that inhabits our precious planet.

61

***Figure 1** : An interview with the renowned quantum physicist Anton Zeilinger.*
For his work on quantum Information, Zeilinger received the Nobel-prize for Physics in 2022.

1. Introduction and Guide to Reading this Article

Mass and energy both have become commonplace as 'building blocks' of tangible reality. Therefore, we will first delve a little deeper into the concept of information as the third 'building block' (in section 1).

Some physicists, such as Anton Zeilinger from Austria (see **Fig. 1**) and Eric Verlinde from The Netherlands consider Information to be the most fundamental building block of nature. In **sections 2 and 3** we will explore the meaning of information, both at the levels of the very large (galactic black holes) and the very small (the string vibrations of elementary particles). In addition to being particles, electrons and protons can be envisioned as waves, and expressions of quantum force fields, also expreesed in mathematical terms (**section 6**). The latter also play an informational role in maintaining or improving the coherence of life processes in nature (**sections 4 and 5**).

Based on these new insights we explore - **in section 10** - the possible role of quantum processes as a basis for evolutionary processes and the formation of first life. In the shaping of first life on our planet, electromagnetic (EM) waves in the form of photons and phonons likely played a crucial role, entertaining wave resonances in water and minerals (**section 7**). It is important to realize that such resonances do not control the *process of formation of cell components,* but also determine their final *spatial shapes and intercellular communication:* a spectrum of discrete frequencies guide the varying metabolic networks and the subtle molecular organization (**section 8**).

Building further on this knowledge, we can interpret the functioning and influence of electromagnetic fields (EMF), in particular of the very specific harmonic vibration frequencies - in life processes and on nature in its entirety. This also holds the key to the functioning of our body, including our brain (**section 9**). The phenomenon of resonance –in the case of specific harmonic vibration patterns - can be considered as the Music of Nature. Combining the laws of music with the principles of quantum physics enlightens us to better understand the functioning of resonance in nature (**section 5**). This resonance-approach enriches the current perceptions about the functioning of the brain and brain cells and also of plant cells. It offers a deeper insight into a very fast - photon-driven - communication process within every organism. This insight could be integrated into the current neuro-humoral brain models. In living reality, electrons and protons basically have a shaping and conducting function, while photons – that means light wave/particles - ensure information transfer that is essential for sustaining and survival of life systems.

In **sections 11 and 12,** it will become clear how quantum physics also opens new perspectives in understanding consciousness and self-consciousness. In addition, unexplained phenomena such as intuition, clairvoyance and telepathy can perhaps be better understood with this kind of knowledge (**section 14**). Incidentally, the quantum approach to life processes appears to be important, not only for the neurological and medical sector, but in fact for the entire biology of living beings. Consider, for example, the photosynthesis of plants and the orientation of migrating animals in the geomagnetic field. In agriculture a quantum-biological approach already yields useful new techniques (**section 13**).

Based on daily observations and experiences, a new way of thinking arises:, a holistic view of nature becomes inevitable. Quantum signals in life systems also provide cosmic information, and may store it in a cosmic memory field. This makes us realize the our universe, in fact, is a self-learning universe (**section 16**). Interestingly, such cosmic memory was already perceived in the classic concept of the, so called, Akashi field, that now is recognized in more modern concepts such as the *Zero-Point Field* or *Quantum Information Field*, also conceived as a *Superfluid Quantum Space (*see later)(**section 17 and 19**). Of note, we cannot anymore neglect the idea that - besides human intelligence - also other cosmic intelligences could play a role in the evolution of our universe.. *Note, therefore, that intelligence is not the same as the reasoning human intellect.* Human consciousness should thus be seen as inherent and interwoven within an all-encompassing

cosmic consciousness.(**sections 16 and 17**). This elemental cosmic insight emphasizes our personal responsibility, but it also may provide a starting point for updating our ethical values, that seem essential for survival of mankind in harmony with our precious planet,(**sections 18 and 19**).

We summarize each chapter in a box. We hope this keeps clear the common thread throughout this essay. By the way, the pictures also deserve some quiet observation, as often a single picture better explains a very complex reality - or a new idea- then a thousand words.

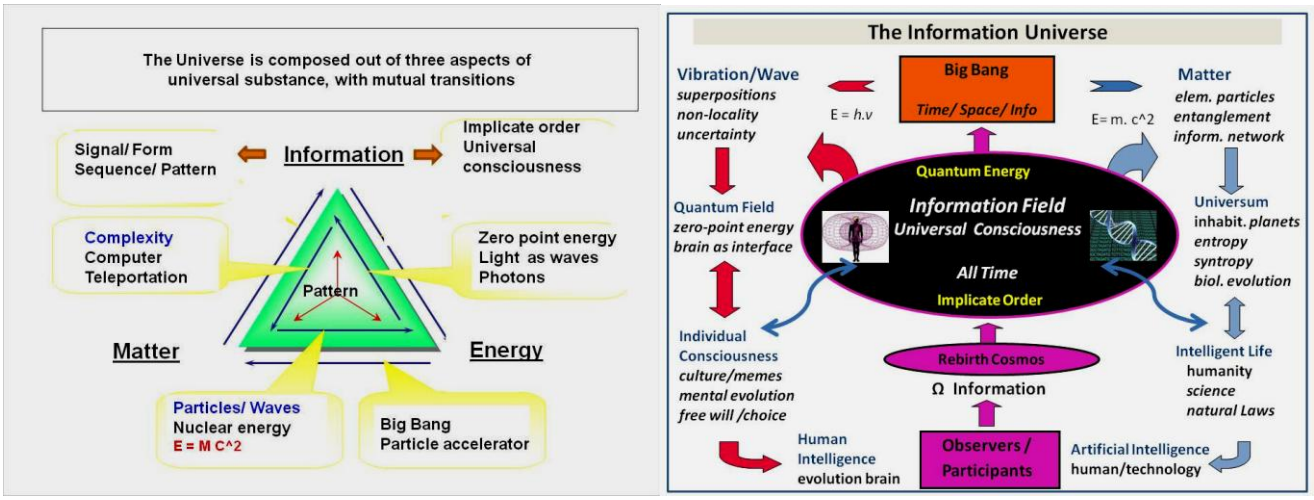

Figure 2 *: **Left:** The three fundamental aspects of reality: Energy, Information and Matter/ Mass, which always interact and transform each other**. Right:** The Information Universe as a circular process via a mental Wave aspect (left side right picture) and a Matter aspect (right side), combined (below in the right picture) via human observers and rebirth of the cosmos, all contributing to a cosmic information field.*

2. Information During Biological Evolution and the Origin of Life

The observable universe is fundamentally made up out of *matter, energy and information (**Fig. 2**). Matter,* as we directly observe it, makes reality tangible. *Energy* is a driving force for all physical and life processes, while both require *Information in order* to guide the creation of forms and direct their function and effectiveness of their interactions, in the growing complexity of physical and life processes.

Let us start with three of the four windows on reality. **Without information, energy and matter are rudderless, and without information life cannot exist**. In the increasingly complex processes in biological and cultural evolution, information appears to be a central aspect. Quantum physicist Edwin Schrödinger formulated this informative aspect of living reality as early as 1944 as 'order'[1]. DNA was not yet known at that time. *"Life sucks order from its environment"* he said. Without the 'sucking up of this kind of order' he could not understand the material and energetic behavior of life processes. Indeed, information can be regarded as a kind of regulator or order, associated with a kind of pattern recognition [see references 1,2], which is also of great importance for the *reproduction* of life.[2]

[1] In his book 'What is Life' 1944.

[2] In biological and cultural evolution, information evidently acquires a broader meaning as a result of its design,

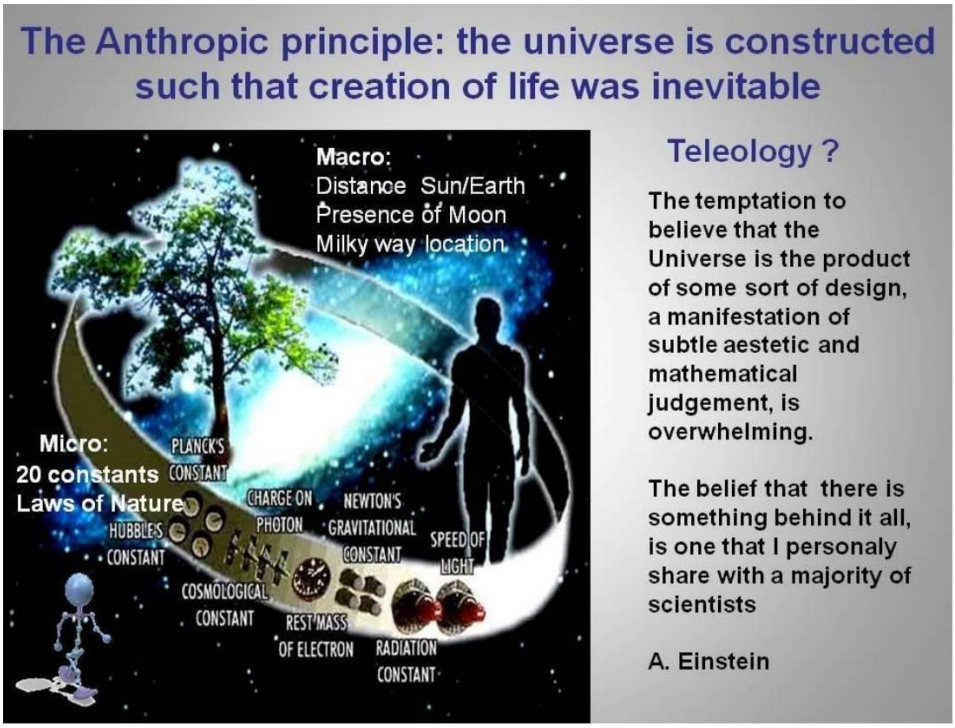

Figure 3: *The "Anthropic Principle" states: From the beginning, the cosmos was composed in such a way that life and intelligence had to arise from it. As a starting point, one does not think of a chaotic "Big Bang" from nothing, but from a fine- tuned unfolding of information(this from a homogeneous information space, supposed to be present in an extra fouth dimension). This information space contains a system, or set of rules, with order-shaping capacity, maintained in the form of coherent Light or Sonic wave/particles. This information space provides, now and in the future, a kind of "recipe" for the construction of the universe and its evolution.*

The transfer of information takes place in various ways and at different levels, (**Fig.2**). In the living cell information is exchanged via *chemical, electrical or light/ sound signals,* but also expressed in specific *spatial forms* (like in 3- dimensional proteins and DNA molecules) and also in the *sequence* of their building blocks (like for example, the amino-acids in proteins or the nucleotides of DNA). Also cosmic background radiation and gravity/dark energy force fields can provide a form of information transfer between parts of the cosmos, while all life is embedded in these collective force fields and also influence human consciousness(see later).

Information transfer not only involves complex wave patterns, but also specific sensors or receptors (antennes) for such information. These forms of communication are comparable to human societal communication in which transfer takes place in the form of light and sound waves and thus by wave vibration patterns, for example in light and sound or electromagnetic waves (in radio, telephone, TV). The information received (in the process of *reception*), only acquires its meaning after it has been observed and perceived (*perception*) and after a certain degree of conscious interpretation has been made (*representation*).

An important question in this context is how the very diverse types of information that reach our brains, be it

processing and distribution (fig. 1 B).

via our senses (sensory) or via extra-sensory transmissions, is selected, stored, and be given meaning and how, subsequently, this information is retrieved and transferred again to others, [see **1; 2**].

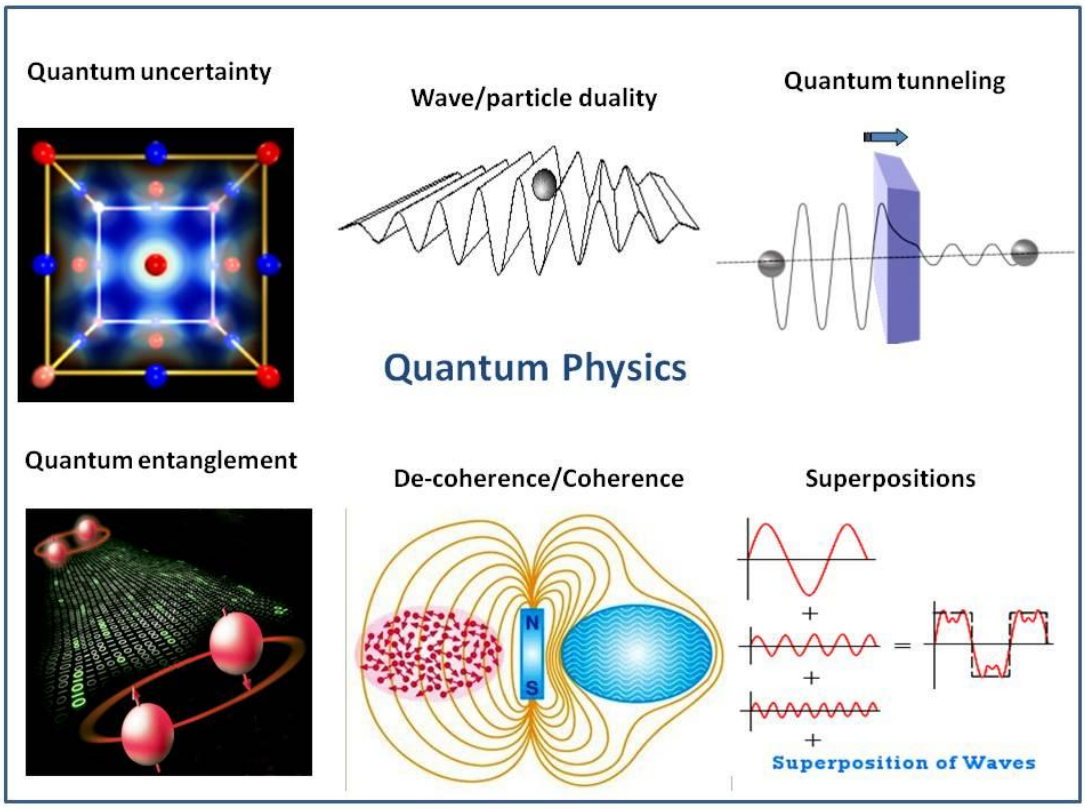

Figure 4: *Some of the special aspects of Quantum Physics: its uncertainty principle, its wave/ particle duality, quantum tunneling and quantum entanglement at a distance. These characteristics of quantum physics are also very important in biology.*[3]

The universe - with its permanent exchange of information - turns out to be ingeniously constructed. It is not just a huge cluster of trillions of particles in random movement: we can better regard the universe as a 'symphony of vibrations'. This symphony rests in an energy field containing the coherence of natural laws as well as a very specific collection of natural constants. It was argued that each of these 25 constants must have an exact value to allow life in the universe to emerge: the particular wave symphony therefore both has a mathematical and a geometric (form-dependent) background!

In this view, the origination of life, and hence also the appearance of humans, appears to depend precisely on the discrete values and subtle balance between the currently known 25 constants of nature. Alternatively, some postulate that one type of universe was selected out of many versions of it (so called Multiverse), and somehow featured these laws and related constants, allowing the creation of life. Yet, how was such selection attained without a proper blue print or recipe for the future ? Of note, there is no single evidence for the existence of a "Multiverse" at present! This subtle balance of laws and constants, in itself, reveals a vast complex of coherent cosmic information. Indeed, some type of *guiding informational order* that

[3] Life on the Edge, the coming of age of quantum biology. J. Al-Khalili and J. MacFadden. 2015. Bantam Press.

counteracts the natural tendency of chaos (called entropy), and thus is framed as syntropy or neg-entropy, has recently been suggested by Anton Zeilinger and many other scientists..

Yet, the 'Anthropic principle (**Fig.3**).(or the coming of life was inevitable), not only includes micro-parameters at the quantum information level. It also includes macro-parameters, such as the distance of the earth to the sun (determining light and temperature), the influence of the moon on nature (influencing life cycles of planet Earth) and the position of our solar system in the Milky Way (shielded from the large black hole in the center that digests everything!). Proponents of the strongest variant of the "Anthropic principle" argue that life in our solar system could only develop in such a way that it produced intelligent life and that it thus created its own observers and participants I evolution: including us humans!

For centuries, humanity has or revealed and further formulated many laws of nature, but in doing so also discovered various underlying regularities or patterns in cosmic evolution, such as the theories of Relativity and Quantum Physics. In fact, we can therefore state that we humans are part of a universal system of information generation, registering and condensing.: As such we are part of a growing Universal Consciousness. In this idea we contribute to the "software program" on which our universe is running, a system that - from the perspective of quantum electrodynamics - can also be described as a wave/particle phenomenon **(Fig. 4,** middle above), composed as a collective system of harmonic oscillators that together make up a cosmic symphony.

In this connection, **various hypotheses and theories** emerged about the nature of cosmic space consisting of the three spatial dimensions (length, width, height) and time as a fourth dimension. Other models suggest an extra spatial dimension that we cannot directly observe (i.e. yielding a 5-dimensional system) and even mathematical models with more than 10 dimensions, such as the so-called String theory (also called M-theory), were proposed, in which all the extra dimensions can be conceived as compactified spaces, being very small domains within the abovementioned larde 4^{th} dimension.

In this context, cosmology often uses the so-called *holographic principle,* implying dimensional reduction, in this framework the universe is seen as a 3-dimensional presentation from a flat (i.e. 2-dimensional), membrane-arranged, information field (called hologram). Analogously, if the description of our universe requires an extra spatial dimension (see later) and if time is also seen as another dimension, this holographical principle corresponds to a 5-D representation which then can be projected as a 4-D information domain as evident in our world (see also **Fig.9**). This principle **also appears to be independent of scale, which means that the universe has a *fractal or self-similar structure*:** on very different cosmic scales – from very large to very small – we observe similar proportional shapes , [27, 34] (see also **Fig.6**).

2.1 What might be the origin of all this cosmic information?

How could the exact and coherent information initially have come into being ? Here the concept *of syntropy* may be relevant indeed. From the second law of thermodynamics we know that the Universe is subject to *entropy:* the continuous process of dilution and decay of order and thus an ever increasing chaos. This implies that more and more information is required to describe the Universe, as after all, order is easier to describe than disorder and chaos. At the same time - certainly in our part of the Universe - the opposite process is observed: negative entropy, also called *neg-entropy* or *syntropy. Syntropy stands for* processes that generate order and show patterns in an increasingly functional complexity, the best example on our

planet being life processes. In life processes we do not observe dilution and chaos, but we observe concentration of minerals, absorption of energy and increasingly complex cohesion and coordination. In short: life is only possible thanks to the phenomenon of syntropy: life overcomes the entropic tendency of dead matter by virtue of an increasing order of more complex information. The order-seeking phenomenon of life is thus fundamentally opposed to the disorder-prone entropy that characterizes non-living matter. For this reason the concept of vitality might deserve new and serious attention.[4]

Nevertheless, we still have to face the fact that this order-seeking phenomenon does not yet provide a sufficient explanation for the *origin* of information. If the syntropic tendency and the information about exact values of natural constants and about the exact expansion rate of the universe already existed, where did it come from? How could a solar system with a structure exactly like ours come into being? in scientific literature, we find widely varying answers to this question. Some authors argue that there are millions of other universes **(the multiverse theory)**, while perhaps only in ours the conditions were suitable for life to emerge. However, to date, no direct evidence for such a multiverse has been found. Hence there is no real answer yet on the question of the origin of Information.

A **second hypothesis** is that information came into being during the supposed **"Big Bang".** This Big Bang term is a bit strange: did sound actually exist at that time and isn't it true that - according to current cosmology - everything actually started very small and silently? Jude Sullivan f.i. calls this event rather a "Big Breath"[5]. Nowadays, science thinks of this Big Bang in terms of a fluctuation in a quantum vacuum, which caused matter and antimatter to emerge by *symmetry breaking* from this original symmetric energy field. The matter would then expand very rapidly (much higher than the speed of light!) in space in the process called inflation. It is assumed that gravity then also arose, causing the formed matter to clump together into planets and galaxies that we know today. This galaxy continues to expand further, possibly driven by an" anti-gravity" effect, that in turn might be driven by the supposed "dark energy". A bald statement however, as we still do not know its composition, while it would make up more than 70% of the total mass/energy of our universe! The antimatter, somehow, largely disappeared in this process and some authors speculate that this part was assembled into some kind of anti-universe or mirror-universe that, to us, is impossible to observe.

A **third hypothesis** states that the constants of nature have not always been so constant, but that they gradually grew towards the values that were necessary for the origin of life. The constants of nature developed, as it were, along with evolution and became instrumental in bringing together increasingly complex information webs [21, 27, 37]. This would mean that during the evolutionary process, new - and also meaningful - information is constantly being created with an ever increasing **coherence, at various scales of the cosmos, (Fig.5).**

[4] Although the concept of vitality nowadays is an ignored – if not ridiculed - aspect of life processes, its relevance, its measure of a degree of complexity and of internal coherence might present a potential scale of measurement of this 'order-seeking' phenomenon. See chapter 12.

[5] In an interview on you-tube in 2024

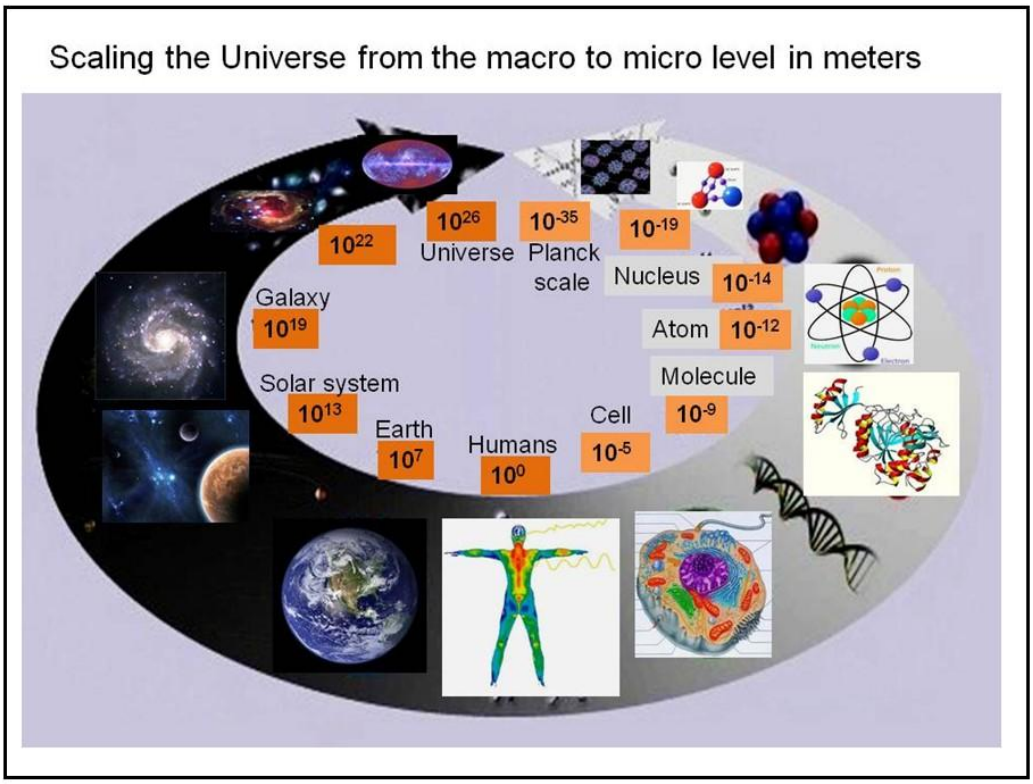

***Figure 5**: The Universe on a scale in meters: from extremely large (10^{19}- 10^{26} m of the galactic systems, see above left) to very small (10^{-19} to 10^{-35} of the elementary particles above right) with humans metrically exactly at the center (10^{0} = 1 meter).*

Fig. 5 gives an example of self-similarity in the sizes of cosmic structures from very large to very small. Minkowski and Einstein, with their so-called 'Block Universe' , a 4-dimensional domain (= 3 dimensions + time), which contains all time – suggest that current life forms could even exert an influence - hence in the reverse time direction - on the conditions at the Big Bang that were necessary for the emergence of that same intelligent life (see also **section 15**). One could even assume from the 'Block Universe' concept, that information from our own future can also help shape current reality (this effect is called retro-causality, [34]). But this concept still deserves much discussion and certainly experimental confirmation.

A **fourth hypothesis** states that the required initial information originated from a **previous version** of our current Universe. In this case, compressed information from a previous universe is supposed to be transferred in some way to enable a kind of rebirth of the very universe of our era. The relevant process of time is then not conceived as linear and asymmetric (one-sided), but as a constantly repeating, circular model (**Fig. 7**). Precisely this circular process could then be instrumental in a self-learning mode for the current and future intelligence. According to some cosmologists, the crucial information transfer could have occurred via a process of "quantum tunneling" within a gigantic "black hole", figuratively seen as a kind of "birth canal". The current evolutionary era could thus unfold on the basis of information that had already arisen earlier – in a previous period of the Universe.

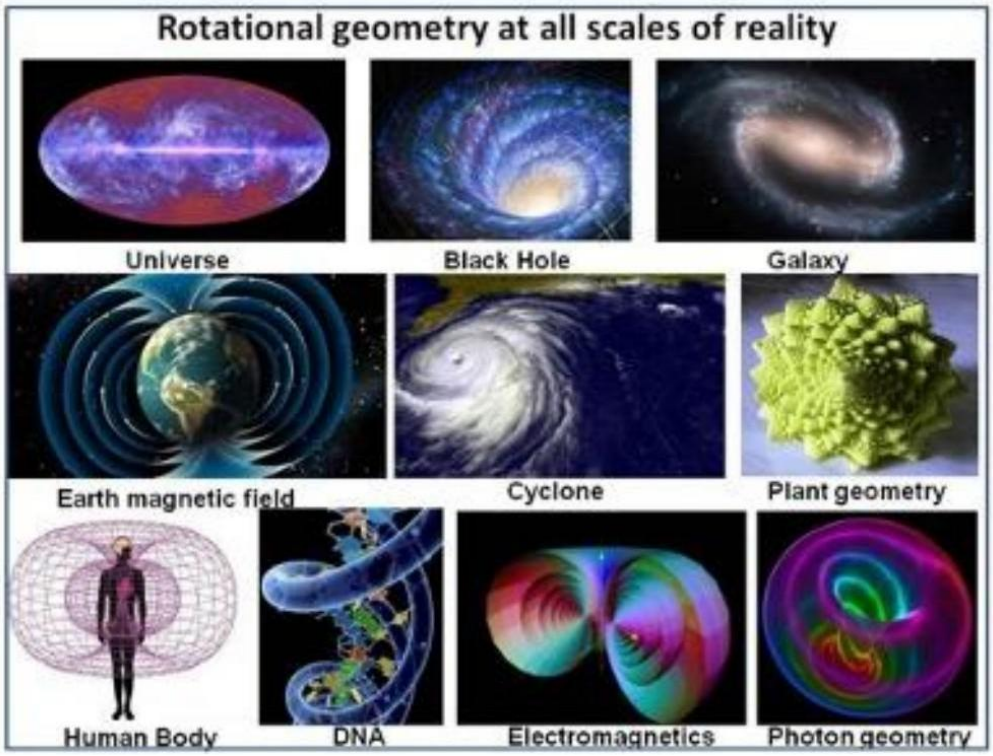

Figure 6 : *Uniform geometric spiral structures that occur in the universe from very large to very small: the Universe itself, black holes and galactic systems, but also magnetic fields around the Earth, cloud formations in the atmosphere, plant forms and the human body biofield, up to and including DNA, EM fields and light particles (photons).*

Thus, likely, the expansion of the universe did not really happen as a loud explosion, but appeared - at least according to current cosmology - to proceed by means of a very finely tuned process, on the basis of sonic information inherited from a preceding Universe. Also primordial inflation was a precise phenomenon: even at very small deviations in the assumed expansion rate, no life could have arisen later! Another example of this is the 'highly improbable' formation of Carbon from Helium, as found in cosmology points at a guided process. This essential process for creation of our carbon-life, again points to the existence of well-defined initial information as a 'recipe' in the origin of our current Universe. This impression of a recipe for a "directed" process is further reinforced by the existence of consistent geometric patterns of spiraling, or toroidal structures, observed *at every scale* in our universe (from macro black holes to micro DNA), (see **Fig.6**).

This uniformity, with such ever-repeating geometric patterns, lead directly to the concept of the aforementioned *fractal reality,* which is mirrored in all kinds of phenomena and processes in the universe.

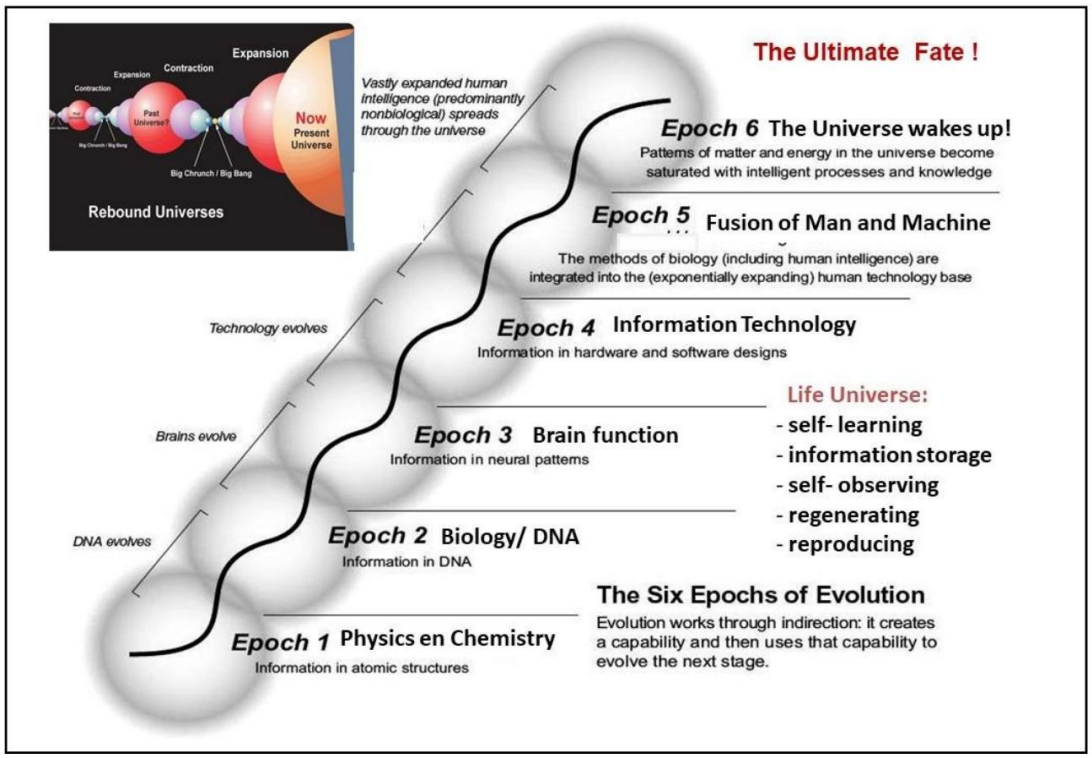

Figure 7: *The future history* (!) *of a 'Living Universe'. An alive Universe needs at least 5 functions: forms of self-learning, storage of information, self-observation, healing and repair of deviations, and reproduction (see box middle right). The evolution of the cosmos is depicted here in six epochs. The evolution would be completed in era 6, in which the universe "wakes up" due to saturation with information and knowledge* [6]***.*** *After that, this Final Information, in an ordered form, could be transferred to a next version of the universe ('rebound universes' see box upper part left)* [7]

Despite all the differences in cosmological models, there is indeed a clear similarity between these hypotheses. They all assume the *unfolding of information from* ***an implicit order (in the quantum field)*** *in which* not objects but rather *processes of becoming - and experiences - are built up from an intrinsic potential and with an intrinsic drive for realization.* Compare it to a tree that grows from a minuscule seed. Here too, a developing order with increasing information and complexity is recognizable. The image that emerges is that of an active and developing network of relations between elementary particles, which must inevitably lead to greater complexity and increasing order (**Fig.5).** The mathematician and philosopher Whitehead named this as a ***built-in life force,*** leading to greater beauty and love! [6, 19]. According to him, this life force would contain the permanent combination of energy and coherent information, which comes close to the abovementioned principle of syntropy. The French nuclear physicist Jean Emile Charon, in his work on "Spirit: that Stranger Inside Us", uses slightly different terms. He chooses as an axiom that every electron was already paired with a consciousness particle (which he called **eon**) at the Big Bang. In everything, in one form or another, a certain (proto-) consciousness would be present. This axiom is just as strong – and, by the way, just as unprovable – as the materialist position that the Big Bang would be limited

[6] For trans-humanism and in-the-future technology see: Kurzweil, 2005, Greenfield, 2003, Bostrom, 2005, and Kaku, 2007.
[7] This concept is from Kurzweil see ref. 6.

to energy and mass alone.

So here we touch upon the domain of philosophy and metaphysics: the sciences of science! From current particle physics we can perceive such an intrinsic proto-consciousness of particles, also as a combination of fundamental information that each particle contains - or acquires - during its existence: information on mass, charge and degree of momentum (motion), particle spin and polarization. These informed particles, together with the forces that hold the constituent sub-particles together, result in a specific combination of all these properties for each individual element, as expressed in the Periodic Table. It is important to realize that particles exchange information, f.i. by emitting or receiving light particles (photons) with various energy contents (*photons* are considered as information carriers par excellence and are present as phonons in a domain of high density). Moreover, matter is always embedded in force fields such as that of gravity or the Zero-Point Energy Field, which is considered a quantum sea of information (see later). Through this internal dynamic structure, coupled with the external communication potential, the so-called dead matter, rather tends to be a versatile structure that is intrinsically suitable as a building block for life. But life is more. We will see that life implies a number of additional properties: a sufficient complexity, signal transmission with the environment, storage and integration of the relevant information and practicing some kind of problem solving in relation to the inherent tendency to survive! (see: **sections 4, 8 and 9**)

It is clear that one can be very surprised by these new insights. The famous Quantum scientist John Wheeler (ref. [**6]),** expressed his wonder as follows: *"Someday we will fully understand from a single wondrous vision, which will be so overwhelmingly simple and beautiful, that we will say to each other: "How could we be so stupid for so long? How could it has been be otherwise!"*

Coherence of Electromagnetic Waves in Life Information

Less philosophically and more biophysically focused, Meijer and Geesink (refs. [7;8;13;16;17;18]) have devoted themselves to a thorough meta-analysis of the available literature on the influence of electromagnetic field **(EMF) wave** frequencies on a spectrum of physical processes [11;13;14;16;20;25;26], and also in life conditions, showing wave vibrations conceived to be essential for life processes [7;8;12]. They did not ask directly about its mechanisms, but wondered to what extent EM-frequencies informed or disturbed life processes. They performed a thorough meta-analysis of the data in a wide spectrum of available publications in this field, amounting now to over 1500 scientific papers. In this manner they obtained a "helicopter view" of this phenomenon, and they indeed revealed a specific kind of distribution patterns of EMF frequencies that could not be simply be derived from the separate articles.

Their meta-analyses yielded interesting conclusions about this systemic alternating values if coherence and de-coherence of wave information in the universe. It turned out that many physical and life processes in nature could be guided by a consistent harmonic series of **coherent/versus de-coherent EMF-frequency bands,** that was registered **as a fractal spectrum of discrete standing EM waves of repeating 12- tone sequences** (in which such frequencies can be considered as a series of musical tones, as seen in a musical piano key board), ranging from Hz to GHz values**.** Surprisingly, this spectrum of standing waves turned out to be ordered **according to a harmonic ratio pattern**, a pattern already known from classical and also current music theory, **Fig.8**).

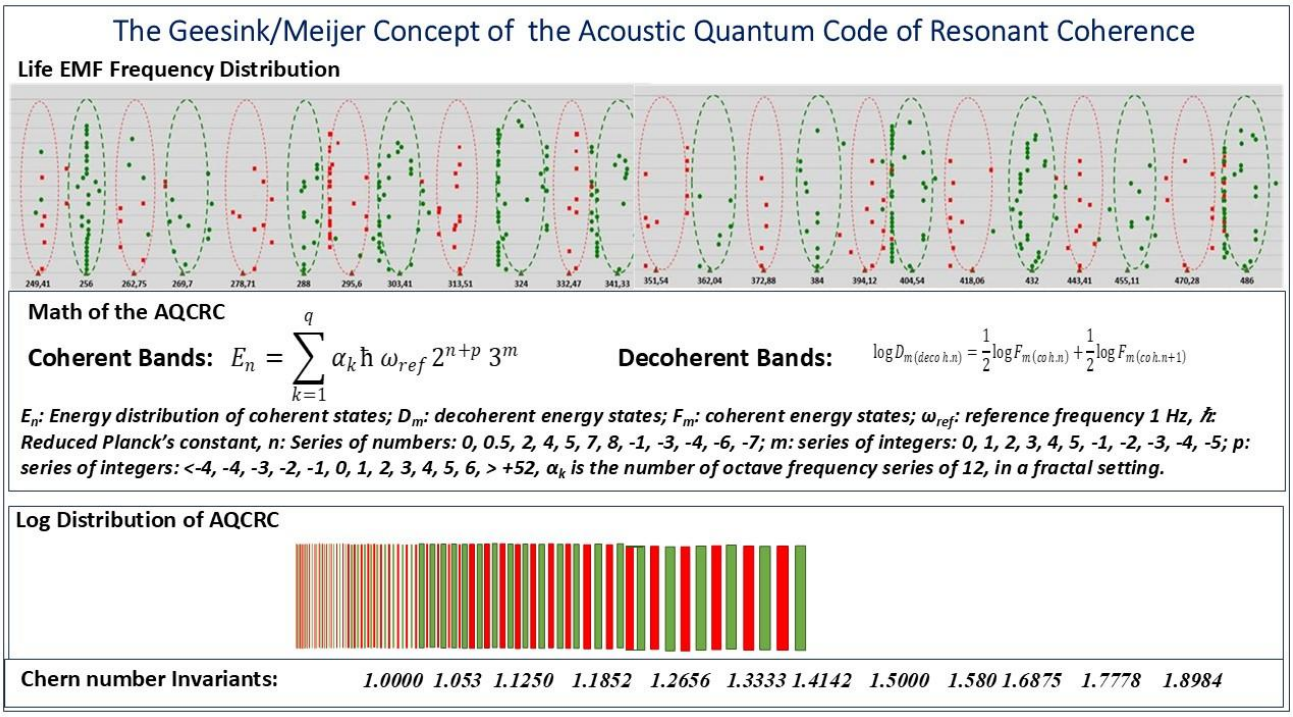

Figure 8: *An octave with 12 clearly separated EM frequency bands with their average vibration values in Hz in the normalized range of approx. 250 - 486 Hz, plotted on a logarithmic scale. Each dot represents an EM frequency from the approx. 1500 examined publications. The coherent frequencies favorable for life processes (green dots 'Life-compatible') appear to be clearly distinguishable from the unfavorable de-coherent values ('detrimental'). Note that the life-compatible frequencies are rather close to the values of detrimental ones but the bands were statistically different. For the sake of clarity, both band patterns are spread over the same Y-axis [25].*

Geesink and Meijer defined this pattern earlier as the *Generalized Music (GM)-scale Biophysical Principle* [7, 8, 9, 11, 14, 16, 26], that later was also included in the group of Wong et al.,2021;2022, see [32] and **Fig.10**]; and by them abbreviated to **Generalized Music Code (GMC).** This ordered series of frequencies – including their harmonic overtones – appear to occur throughout the universe - from large to small – on a uniform scales, indeed reflecting a kind of Quantum Code of separate units (see refs []). It became clear that Information and Energy are intrinsically linked in such frequency patterns, where the energy is carried in the form of discrete waves (comparable to the tones in a musical octave) and where the information is held in the complex web of resonant wave interactions. In a broader context Meijer reframed this pattern as an "*Acoustic Quantum Code of Resonant Coherence*", since communication in nature in general occurs by wave resonance between waves of similar frequency(coherent waves).

The harmonic *combination* of the tones involved – in other words the broad field of EM frequencies – can in principle form the basis for a spectrum of diverse 'melodies' and can be placed in the mathematical framework of music theory. This whole of interacting standing waves in complex forms confirms, in their view, the older idea of the **integral music of nature.** This term is not only a poetic representation of a musical soul, but also a physical description of living reality. An important carrier of this system of

interacting wave patterns is the aforementioned **Zero-Point-Energy field** that is central to quantum physics. This ZPE field is a kind of dynamic information source of reality. In this field, waves/light particles (photons) with diverse energies are continuously being created and again disappear, which was found to exhibit the same frequency pattern, experimentally measured as a similar spectrum of EM frequencies. A selection of experimentally measured frequencies of this field were indeed very well in line with the above GM code! (ref. [33;36;43]).

A similar **ordering principle** has also been developed in the so-called **Universal Scaling theory.** Matthias Pacque for example, built on the Global Scaling theory. He assumes a logarithmic or scale-independent and self-similar structure of reality. In 2018, Pacque also discovered a new fundamental relationship in the structure of the natural numbers. It is a *'Self-Similar Octave Pattern'* - that reveals a fundamental relationship between the natural numbers and music. This knowledge enables a deeper understanding of the natural phenomenon of the (logarithmic) regularity of shapes at any scale and provides its foundations[8]. To this end, he works with a special branch of mathematics, 'oscillatory mathematics', to analyze the regularity and invariance of natural processes. His work confirms that information and energy are inseparable in this phenomenon.

"Life sucks order from its environment." Information thus appears to be a very relevant aspect of reality. For example, in the precise values of the natural constants that make life possible. Information also appears to be a pivotal concept for the transition from the physical tendency towards entropy and chaos to the biological tendency towards syntropy and order. Information then lies in patterns, fractals, spiral forms and tori and is stored in fields of interacting standing frequency waves. The similarity with musical patterns makes it possible to connect the musical laws with the established physical regularities.

3. The Cosmos as a Matrix of Energy Quantities, Space and Information

One of the problems in current physics is that we are always talking about two worlds: that of *particles* and that of *force fields*, such as gravity and dark energy. The special innovation in the recent work of Prof. Erik Verlinde from Amsterdam is that he brings the **particles and the force fields together in the form of *quantum information***, and considers this **as the most fundamental building block of the universe.** Matter and particles are then seen as 'densifications of force fields that interact with each other' and both of which can be described with **quantum information,** which is actually an immaterial 'raw material' of energy and mass. The trick is – if we want to understand reality a little better – to connect these forms of field information with each other. Here quantum theory helps. According to this theory, **energy is quantized** which means that energy package cannot become infinitely smaller without losing the character of energy. Energy therefore consists of **discrete vibrating units** and therefore we can work with these units mathematically and musically. These vibrating units are 'discrete' as a logical consequence of the fact that energy is quantized. Thus, the vibration frequency cannot simply take on any value. Obviously, supporters of

[8] The magazine Raum&Zeit reported on this research in a series of articles in issues 219, 220, 221 and 222.

String theory regard these vibrating units as a sort of moving strings.

Not only energy, but **also space is quantized** according to the theory and therefore - also 'discretely' - divided into smallest space components. This matrix of space units is sometimes called *space foam,* others call these units *operators,* like *'twistors'* (Penrose), with shapes related to a torus. These **toroidal space units** occur on every fractal scale of the universe, from the very small Planck scale to the very large black holes (**Fig. 9**). These tiniest space units are also the connection points of the force fields of gravity, dark energy, zero-point energy, electromagnetic radiation etc. The **space units, thus, also integrate information:** this information is stored at the edge of each fractal unit. In relation to black holes. Such infomation storage unit is now called the *'event horizon'.* In this way Information, like Energy, is not lost [30,31,32,35]. The word '**event'** is interesting. Whitehead already suggested to interpret reality not as particles or waves, but rather as experiences, happenings, or events. We best understand reality in the mutual relations between such entities or units. Also Rovelli arrives at such conclusion: to understand that there is some meaning in the universe, it will be due to a kind of supportive functions for evolution and survival.[9]

Intermezzo about resonance in and between vibrational systems. Through resonances, photons and phonons can spatially structure cell water into coherent fields, which in turn control the folding of proteins and DNA, as well as the complex design and integral function of living cells. Our brain is composed of various cell types. The organism including the brain is embedded in the ZPE field, with which it can attune through resonant wave communication. In reverse, the information of each moment of consciousness is also being integrated into the ZPE information field, meaning that the memory of the Cosmos is permanently updated. Through a holographic projection in all fractal parts of the universe, a collective memory is build up that is stored in Q-bytes in the information event horizon of the Cosmos. In this way, the Universe learns about itself and forms a collective consciousness that ultimately might reproduce/recycle into a new version of our universe.

Verlinde explains this information flow as analogy from ***the holographic principle***, a theory which was devised by the Dutch Nobel Prize winner 't Hooft. With this principle, 't Hooft stated that every object is fully described by information that is brought together on a screen around the object in question (the aforementioned *event horizon*). The event horizon has a holographic character, because this 2-dimensional screen information can be used again for a 3D representation of the whole. In the 'event horizon' of the black hole, the very largest and the smallest elements of the universe vibrate in resonance with each other (as string information or Qbits). **A**ccording to the same holographic principle, the total information of the universe is projected onto an 'event horizon' of the cosmos, so - again - including the information from extremely large black holes down to the tiniest strings. The cosmic hologram is scale-independent, fractal, and each part of it thus represents the entire information of this overall big cosmic picture. We repeat: this is true on every scale of our galaxy, our solar system, planet earth, and even our own organism, including our brains and our constituting cells in general etc. **Fig. 10,** shows the interactions between the largest and smallest scale, with cells and proteins as an example.

[9] In the last chapters of his book Helgoland.

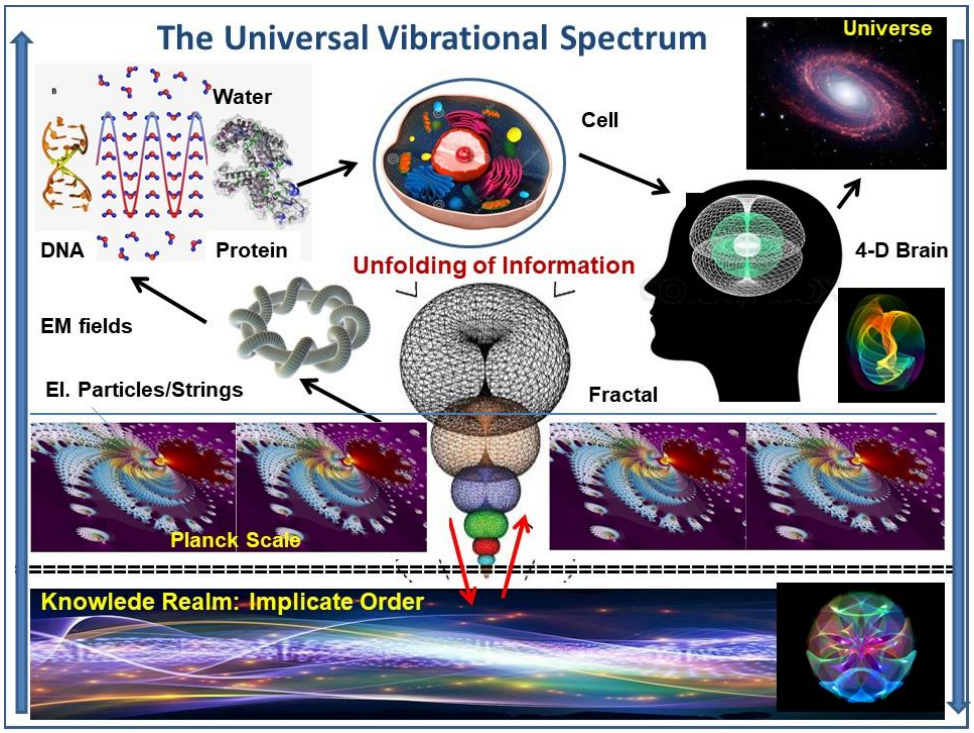

Figure 9: *The flow of information in the universe from micro- to macro-levels (bottom to top), conceived as a nested toroidal operation that is fractal and scale-invariant. These nested tori are initiated in a knowledge realm underlying the known wormhole matrix (quantum foam) at the Planck scale. This knowledge realm can be compared to Bohr's "implicate order". Supposed quantized string wave activities produce elementary particles, atoms, molecules and initiate life systems. The latter contain dedicated holographic memory spaces at the cellular and organ level (middle part). The human brain integrates both internally and externally guided conscious states. Further fractal and self-similar properties in a quantum fluid universe provide the conditions for life (left above) and the architecture of cosmic macro-structures, (right above). Taken from Meijer and Geesink, 2019).*

This holographic correlations also appear in the comparable shapes and structures of our brains and, in fact, in the entire universe. It was recently established that the ultrastructure of our brain and that of the visible universe show a striking similarity, with seemingly the same degree of complexity. The number of neurons in our brains is roughly the same as the number of observed galaxies. The interconnections via filaments are recognized at both levels (Vaza et.al., 2020). Our brain therefore seems almost identical in structure and complexity to the ultra-structure of the cosmos with its galaxies and could be considered to be a micro-edition of the entire universe. [33;35;36]. Realize that both structures are possibly part of a universal consciousness by dealing with basic and also meaningful information. [see **Fig. 7; 9**].

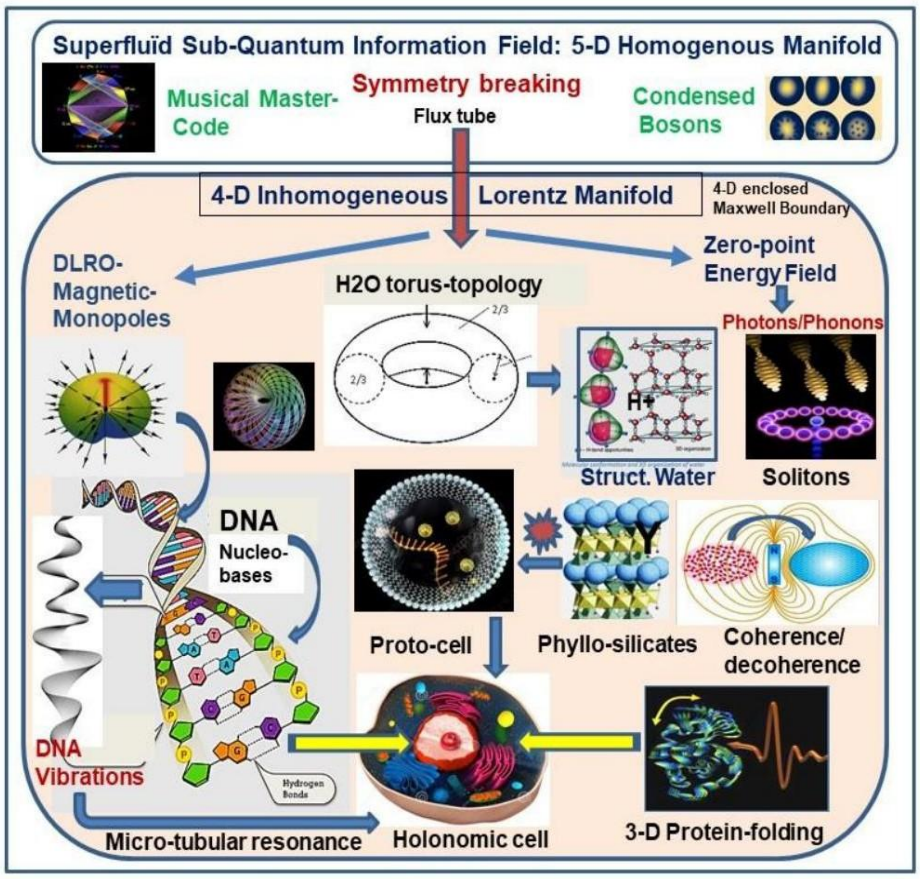

Figure 10: *The* ***internal communication structure of the cell,*** *also* called ***the 'electrome'*** *(see Loof). In the construction of the first proto- cells (see the middle of the picture), various structures in- and around the cell communicate with each other (according to the theory of Wong/ Meijer, 2021,[32]), in particular water and phyllo-silicates (clay material). The communication takes place via EM vibrations in proteins and DNA, in cell water as well as with ions and in cell organelles such as mitochondria (the energy factories in the cell) and also in the outer plasma membrane. Through so-called symmetry breaking (a kind of disturbance of the spatial resting state) in the 5D space of the Superfluid Information Field (see the top layer of the picture), the structure and complex functions of the cell take shape in our 4D space-time (the bottom block). Control (= information transfer via resonance) occurs via photons and phonons from the all-encompassing ZPE field (right). Because the cell water, clay structures, proteins and DNA start to vibrate coherently, resonances are created that control intra- and intercellular communication and spatial 3D protein folding.*

Not only energy, but also space is quantized. The cosmos can therefore indeed be seen as a matrix of quanta of energy and space. This fact already suggests correlations between frequency fields that support life and frequency patterns known in music theory. The formation of mass and matter - from very large to very small and everywhere in the cosmos - from the beginning was determined by holographically available information. Photons and/or phonons (light and sound particles) appear to play a crucial role in guiding and transmitting information. These insights require a major transition step in our thinking: they invite us to include a fifth dimension, in which this information is interwoven with the well-known four dimensions of space plus time. Such information can be transmitted by means of the photon/phonon waves of electromagnetic frequencies.

4. The Emerging Science of Quantum Biology

The progress and practical application of quantum physics in branches of physics and cosmology is going spectacularly fast. Very special is that quantum-physical insights now also appear to be relevant in cell biology. The **'electrome' of the living cell** gives a clear example (see **Fig.12,** further on).
Fig. 11, below**,** shows various life processus, for **which quantum physics provided new insights into their functioning.** The significance of this theory in biology is, in fact, very broad. Articles in *Science* and *Nature* regularly show that quantum mechanics also provides more insight into the biological domain than classical physics. Almost every chemical or biological process seems to be based on quantum mechanics.

These quantum physical insights can be applied, for example, in the processes of photosynthesis, cellular respiration, the functioning and repair of DNA, the mechanism of smell, and also in the so-called magnetic compass for long-distance navigation of animals (**Fig 11,** left). This again provides a major transition in our thinking about living nature: quantum wave kinetics can occur in wet and warm life media..*Quantum information* is expressed in binary units or bits, basically yes/no questions. This is perhaps the most important quantum aspect: *quantum bits exist in superposition* (yes and no at the same time). The classical bits in ICT do not do this, because there it is only yes *or* no.

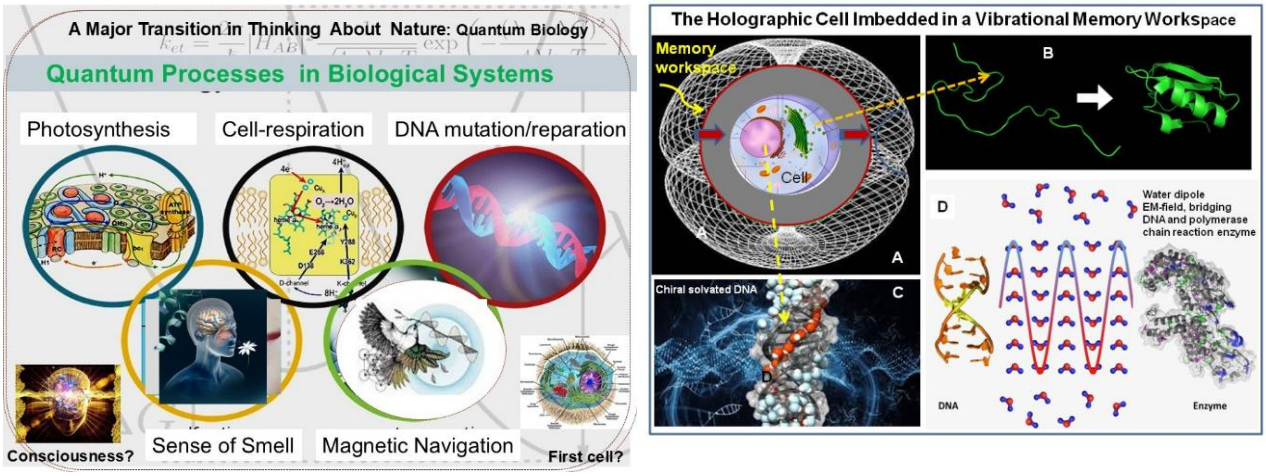

Figure 11, left: *The various processes in nature in which quantum phenomena have been found and scientifically documented. In photosynthesis, light energy is converted very effectively - in the quantum wave form - into energy in plants. Birds can navigate on the magnetic field of the earth by changes in the quantum spin in cytochrome proteins in the eye (which thus functions as a kind of compass). In this way, birds follow a magnetic track over thousands of kilometers*[10]*. Right:* ***Figure 11 right:*** *The life cell. modeled in a toroidal setting, showing a holographic memory workspace called event horizon (red circle in A), that contains information for cell function and survival in the particular environment (A, upper inset left), guiding 3-D protein folding (B), wave resonance of DNA with associated water (C). Structured water-dipoles in coherent state provide an information imprint that stably stores DNA-polymerase chain reaction activity (after*

[10] These examples have been elaborated by Al-Khalili and McFadden in their book 'Life on the Edge, the coming of age of Quantum Biology' 2015.

Montagnier et al, 2017).

In biology it now appears that subtle mechanisms in the cell are controlled by *quantum entanglement* and *quantum tunneling* effects. In particular, the observation of *quantum coherence* in photosynthesis and in the radical pair-spin model in cytochrome protein - which serves as a kind of magnetic compass of birds - gave a strong indication in this direction[11]. Quantum tunneling we find in the sensoric processing of odors, and in DNA mutation and repair, as well as in the function of certain enzymes (**Fig. 11**, right).

4.1 Quantum Biology Also Offers New Insights into the Process of Evolution.

Darwin's 'classical' model of the development of diverse species is based on a mechanism in which cells individually undergo random mutations, followed by natural selection of the most viable and adaptable form in: ***'the survival of the fittest'***. A crucial problem in this view, however, is the question of how cells get rid of mutations that are less or very unfavorable for the organism, without having a blueprint of the ultimate overall coherence in cellular functions. A first answer came from multiple recent studies. They indicated that mutations are not just random 'accidents'. Meijer and Geesink, for example, published their view in 2016 in the form of a substantiated hypothesis: the ultimate **coherence in the evolutionary process lies in a frequency pattern for coherent electromagnetic (EM) quantum waves that promote the stability of the biological order through resonance with cell components.** Their concept is in fact based on an extensive literature review of approximately 1500 peer-reviewed articles published from 1950-2024. Numerous studies indicate that discrete and coherent frequencies of EM waves, both in vitro and in vivo of living systems, can stabilize cells, while intermediate (de-coherent) frequencies lead to a clear destabilization (see **Fig.8 and 12**). It is possible that EM fields also played a role in the formation of the first living cells in biological evolution [21-23;,32, 36], see **section 9** and **Fig.13A**. Instead of Darwin's Survival of the fittest, we could now suggest ***Survival by the fitting….*** as a guiding principle in evolution. Life processes that fit in the coherent life supporting frequency patterns of the GM-code, have the highest probability for survival.

With this work, Meijer and Geesink have confirmed in particular that electromagnetic (EM) energy in our world is *quantized* and they have further concretized this as a 'fixed pattern of frequency bands' [7,8,11-14;20], **Fig.12**]. This pattern now appears to be present, besides in life processes, also in a whole spectrum of purely physical processes, such as in the wave distribution of Zero-Point Energy frequencies, in superconductivity and even in the mass-energy distribution of certain elementary particles. These characteristic discrete frequency values thus appear to be fully compatible with quantum physics, both in theory and in application. We repeat this key point: quantization means that the smallest level of **reality consists of discrete units (quanta) of energy and frequencies, of mass, of space and perhaps also of time.** The smallest scale of the universe is the so-called Planck scale, (**Fig. 5**).

A nice metaphor for quantization is found in the border between the ocean and the beach: seen from above as an enormous plain, but characterized on a minor resolution level by water waves and, and on an even smaller scale, by grains of sand. Of course, grains of sand can also be split into ever smaller units: in

[11] See again 'Life on the Edge' by Al-Khalili & McFadden. 2015.

decreasing order of molecules and atoms, to elementary particles such as electrons and quarks and ultimately perhaps into small strings, as M-theory or string theory expresses it.

Between these coarse-grained units that we can observe, there are many fine- tuned patterns of information and form. As mentioned earlier, this division into ever smaller, but uniform patterns is called **'fractal'**, which means that on every scale its shape is build up from elements that are more or less uniform with the original figure itself. Fractals have an infinite amount of detail as you observe regular motifs that repeat themselves on every scale. Fractals can also be mathematically designed by repeatability, applying certain arithmetic operations. Think of the well-known Russian *Matryoshka dolls* that are increasingly 'nested' in larger ones of identical shape. This is also the case in a so-called *nested torus* in which, within a larger torus, smaller and smaller tori fit together with one central common channel (see **section 11**). This torus model is used extensively in both physics and cosmology. In toroidal spatial structures we find spiral energy trajectories that always return to themselves and create a certain stability and maintain their energy levels. This view helps to model and visualize movement (energy) and form (information) in stable life processes over a long period of time (**Fig. 18**).

The characteristic **geometric shape of the torus** describes very well the diverse elements that we find in the universe: from the small scale of the electron and other elementary particles, via many natural forms on our planet, to galactic systems or black holes. This shape even serves as a model for the universe (see **Fig. 6**). As for the very smallest, some scientists even think of a fluid network of swirling vortex or torus structures, each with a central channel, or 'wormhole'. This vortex form has even been recognized at the Planck scale, where it is called **quantum foam**.Some scientists even suggest domains with even smaller – hence non-spatial - units that would contain only mathematical relations and related geometric shapes**.**

Here we touch again on metaphysics and we seem to almost end up back in time at the 'Platonic solids' that the Greek philosophers considered as the basis of a harmonically constructed universe. The question whether the world we observe has a harmonic background is still a subject of discussion in physics. Nobel Prize winner Frank Wilczek states that nature may possess a musical pattern[12]. The aforementioned Generalized Music Code shows a similar conclusion.

Applying quantum physical approaches on biological processes creates fundamentally new understanding of life processes. Not only in the functioning of plants, birds, fish and people, but also in the evolution of life.

5. Electromagnetic Frequency Patterns in Biophysics

With the fundamental step in quantum physics, the step from particle thinking to wave thinking, a more complete picture of our reality emerges. Wave patterns and frequencies gain a much more prominent place. Only following a wave – and frequency - approach could Geesink and Meijer discover the semi-harmonic EM frequency pattern (**Fig. 5**) [8,9,11] about the impact of very diverse frequencies on life processes. This could not have been discovered with particle thinking alone. They found the frequency pattern in healthy living cells, in tumor cells and in neurological studies in humans. Subsequently, to their initial surprise, they also

[12] For example, see his book “A Beautiful Question”.

recognized such patterns in many purely physical systems [16-19,35, 36] such as music algorithms, sound-induced resonance patterns in membranes (**Fig.10 and 12**), the visible color spectrum, vibrations of nucleotides and albumin in solution [37]. They even found them in water [36] and in semiconducting clay materials (so-called phyllo-silicates [35] (**Fig.13**).

The EM frequency pattern revealed by Geesink and Meijer was recently also found in electromagnetic frequencies that promote the degree of quantum *entanglement.* Entanglement was previously discussed through the so-called 'EPR paradox': the thought-experiment of physicists Einstein, Podolsky, and Rosen [17] who believed that the immediate quantum entanglement over large distances could not exist, because it would conflict with the limited speed of light. In retrospect, the series of discrete frequency values are completely in line with the theory of standing waves that arise through constructive interference of waves in the same wave field space, such as a string vibrating between two fixed points. These standing waves can only occur in very specific values in quantum mechanics (eigenvalues, in music these are harmonic tones!).
If you want to represent these **standing waves in their mutual relationships,** you need the **music theory of harmonic resonance,** a theory that was already formulated by the ancient Greeks as Pythagoras. These harmonic patterns occur throughout physics, as already mentioned in the frequencies of the color spectrum and more recently also recognized in the frequency values of strings in the various versions of string theory. Wherever electromagnetic fields are applied in practice, you can therefore expect a 'fit' or 'resonance' with interference patterns of standing waves.

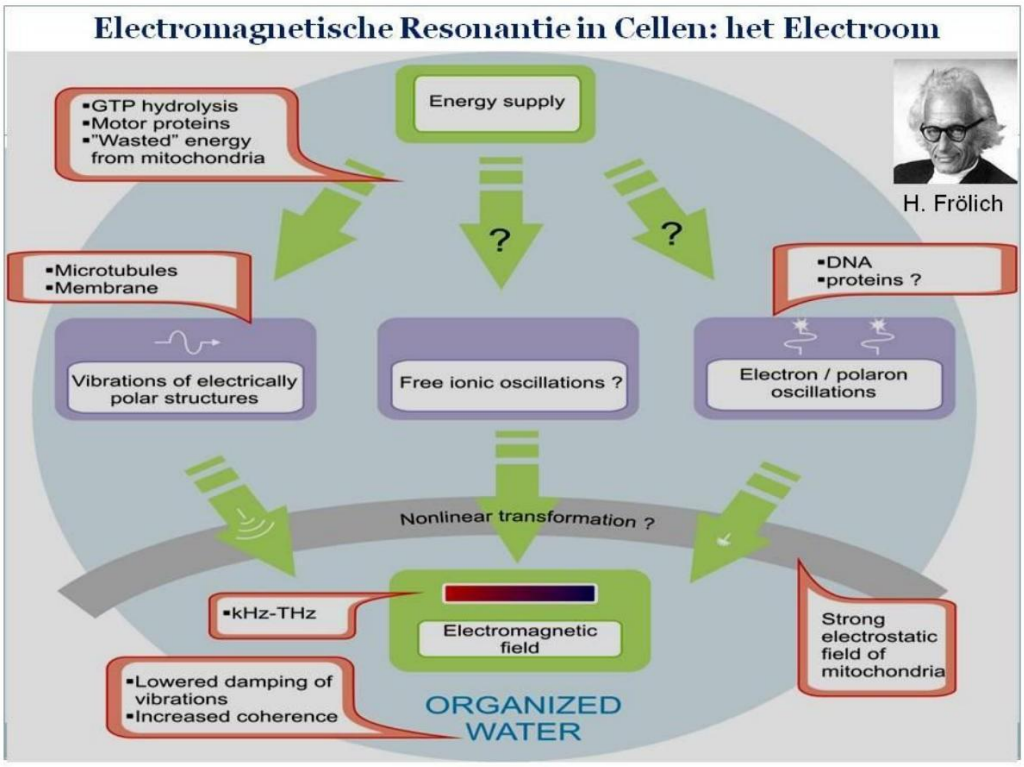

Figure 12: *The cell seen as an electromagnetic resonance structure (the "electrome"). In the cell, ions, electrons and polar structures vibrate to the beat of the electromagnetic fields. All cell components come together in a coherent vibrating state. They can influence each other by forming simultaneous resonating (coherent) vibration domains in cell water, ions, proteins and DNA. According to H. Frohlich, see ref. [7]and*

[8] and the biologist A. de Loof

This fit then 'forces' the nearby frequencies into certain vibration forms and resonance. This insight appears to be relevant, among other things, for understanding the possible effects of 4G and 5G EM radiation in telecommunications on insects, plants, animals and people. A field of research that therefore deserves much more attention and priority (see ref. [24]).

Combinations of EM waves form **electromagnetic force fields**, which - according to classical physics - are in fact composed of *light particles* (photons with mass) but which can also be seen as *light waves* (frequencies with energy). As an aside: the English term *'wavicles'* is clarifying: it indicates that the potential of *waves* and *particles* can both still be realized. Only at the moment of 'observation' the potential would collapse into a particle or a wave.

These wave/particles have very different energies and therefore their frequencies also vary greatly. The discrete frequencies are directly related to the wavelengths and the mass of particles. They can therefore be easily calculated by equating the two well-known equations of Einstein and Planck[13]:

$E = mc^2 = h f$ (Eq. 1) (where, E = Energy, m = mass, c = speed of light, h = Planck's constant and f = frequency),(**Fig.8**)

The above equation – suggested by Louis de Broglie - therefore indicates that, for a given energy, the frequency depends on the mass and that, for a given mass, energy and frequency can be calculated. If the mass follows a quantized scale (because it is made up of quantized particles) and if the energy is also quantized, then it follows that the frequencies must also have a similar quantized scale [18]. The starting point of Meijer & Geesink is that this applies to the *entire physical and biological reality.* The current interpretation of the quantum mechanics theory is still strongly attached to the *probability assumption* of Bohr and Heisenberg (1925): that the theory only *represents the probability of possible values* of a quantum state and does not so much represent the underlying physical wave form of the quantum world, which Meijer and Geesink assume. Incidentally, there is increasing scientific evidence for the reality of an underlying wave world. Interestingly, also de Broglie struggled his whole life to prove that the probability values are not physical enough.

Geesink and Meijer concluded that their quantum frequencies appear to be *determined/quantized* and, after observation, assume certain discrete values [7,8,16]. Furthermore, the individual wave frequencies appear to be entangled with each other. This typical quantum phenomenon of entanglement showed that particles originating from the same source, brought to a great distance from each other, immediately stay entangled in their properties. No time difference is perceived: as soon as one of the entangled particles changes in spin, the other(s) immediately adapt their spin. Einstein, who believed that the speed of light is the maximum speed in the universe, could not understand this: such an immediate transfer of information was incompatible with it as the entanglement phenomenon would not have any speed (hence the EPR paradox). He therefore suspected that this entanglement could not

[13] The equating of these formulas is controversial among non-quantum physicists, as both E would represent very different types of energy. Nevertheless, when applied in farming techniques, this assumption is proving to be solid, as will be described in chapter 12.

be accidental and that there must be hidden variables in quantum theory. At the time, he already said that “God does not play dice”, to which his opponent Bohr objected that “Einstein should stop prescribing all kinds of things to God”. Later, the renown quantum scientist Bell proved that *non-local* conditions must apply here - so conditions that do not occur in our direct or visible space-time domain - and therefore the control at such a large distance must have a global *field* character. The conclusion of Geesink and Meijer that quantum processes appear to be determined, can be correct in this sense and is therefore not as revolutionary as it initially seemed. Moreover, their conclusion ties in with the current discussions about so-called *'superdeterminism'* by means of an underlying *'implicate order'.* Reasons enough to analyze their thinking profoundly. That will be done in the next chapter.

The semi-harmonic EM frequency pattern appears to occur in all kinds of purely physical systems: in music algorithms, in sound-induced forms on membranes, in the color spectrum of visible light, in vibrations of nucleotides in solution, and even in water and clay material. The pattern phenomenon seems to be related to entanglement. But such patterns also exist everywhere in life processes: in healthy living cells, in tumor cells and in the nervous system. These patterns may be part of the information component of reality, they are the non-physical – immaterial - aspects that bring order into the many physical and biological processes.

6. Mathematical and Music Theoretical Basis of Living Nature

Geesink & Meijer present the frequency band pattern they found as a duodecimal tone system (a so-called octave, see **Fig.** 8). This duodecimal pattern is known from music. The frequencies are easy to calculate with an equation that is known from music theory and that was in fact already known to Pythagoras.

The Acoustic Quantum Code of Resonant Coherence*

Life Conditions at Exposure to Various EMF- frequencies	Frequencies of Bose Einstein condensates
Band-like Distribution of EMF- frequencies of Life	Frequencies for Mass/Energies of Boson Elementary Particles
EMF- frequencies that Either Inhibit or Promote Cancer	Frequencies of, Solar cells, Semiconductors and Photosynthesis
Frequencies of Spatio-temporal EEG-peaks in Brains of Healthy Individuals and Mental Disorder Patients	Frequencies of Energy Fluctuations at the Planck Scale
Infrared Signal Techn. Improves Healthy Conditions in Brain	Frequencies for Quantum Hall effects
Frequency Values for Oscillations in Brain Neuronal Microtubules	Frequencies of Zero-point Energy Oscillations
EMF-frequencies of Water	Frequency Values for Gravity waves
EMF-frequencies of Phyllo-silicates, (Clay- materials)	Chern-Invariant Metrics Derived from Patterns of Phonon Topology
EMF- frequencies that promote Entanglement	Quantum Energy States of Monopoles Described by a Generalized Music Wave Function
Superconductor Energy Gap Frequencies	Solar Optical Spectrum irradiance

* Geesink and Meijer 2014-2023

Table 1. *Overview of twenty Meta-analyses of frequency distribution of animate and non-animated systems*

that revealed the Acoustic Quantum Code, Geesink and Meijer, 2014-2023.

It is very striking that the ***Generalized Music (GM) scale*** was primarily found through the analysis of electromagnetic influences on living cells. This *'Life algorithm',* as mentioned surprisingly enough, also appeared to be recognizable in processes in a number of non-living systems [17,18,19,35,36]. For example, in clay - consisting of **parallel layers of mineral silicates**, behaving as a semiconducting material - non-coherent EMF frequencies can be converted into coherent frequencies and thus, among other things, can stimulate the synthesis of RNA (**Fig. 13**).

For physicists this sounds logic, because they talk about a spin of particles with the harmonic ratios 1/2 and 2/3, which are ratios between whole numbers that also fit neatly in the GM algorithm (see the equation in section 5) as well as in the laws of harmony in music.

The harmonic frequency scales of all phenomena - physical and biological – apparently can be 'summarized' in a musical octave with 12 EM frequency bands. Twelve tones - with all their overtones and undertones - seem to determine very many life processes. This is the fundamental reason why musical laws offer such an important addition to current physical insights to understand life phenomena more deeply.

7. The Essential Role of Water and Clay Minerals in the Formation of Life.

For life processes, the **vibration frequencies of water molecules** (H_2O) are of course important [36]. Water is a very essential component in everything that lives. The frequency value of water can be calculated by the molecular weight of water (M=18, namely 2x1 for the 2 Hydrogen atoms and 1x16 for the Oxygen atom) with the equations $E= mc^2$ and E=h.f, where f is the vibration frequency of the water molecule.
For the H_2O molecule, however, the outcome of such a calculation is not the only possible value.
According to the above octave hierarchy we can multiply this value by two, many times to get to the much higher frequencies until in the far infrared THz region, where the influence on macrostructures in the cell occurs. Perhaps the oscillation frequency of water can best be expressed in a fractal series of discrete and ever increasing frequencies (up to Thz), which play a role in various layers of the organizational level in the cell, (**Fig.11 and 13**).

This is where **quantum entanglement** comes into the picture, **in connection with information.** In recent experiments in 2015, researchers Hanson & Hensen in Delft have irrefutably demonstrated that spatially distant particles can be in an entangled state. As mentioned earlier, entanglement is *one* of the most striking properties of quantum mechanics. It was already described in the 1920s without its reality being tested at the time [17]. This was only possible in 2015 after the development of very accurate atom clocks.
It is thus possible to realize determined entangled states between the spins of electrons over a large distance, using photons of discrete energy/frequency. This differs from the opinions of Bohr and Heisenberg in the 1920s, who believed that coupled spin directions of both electrons are completely random and are only determined at the moment they are measured. Einstein however, already had difficulty with this theory and maintained that electrons in such an experiment apparently 'know in advance' what their outcome will

be.

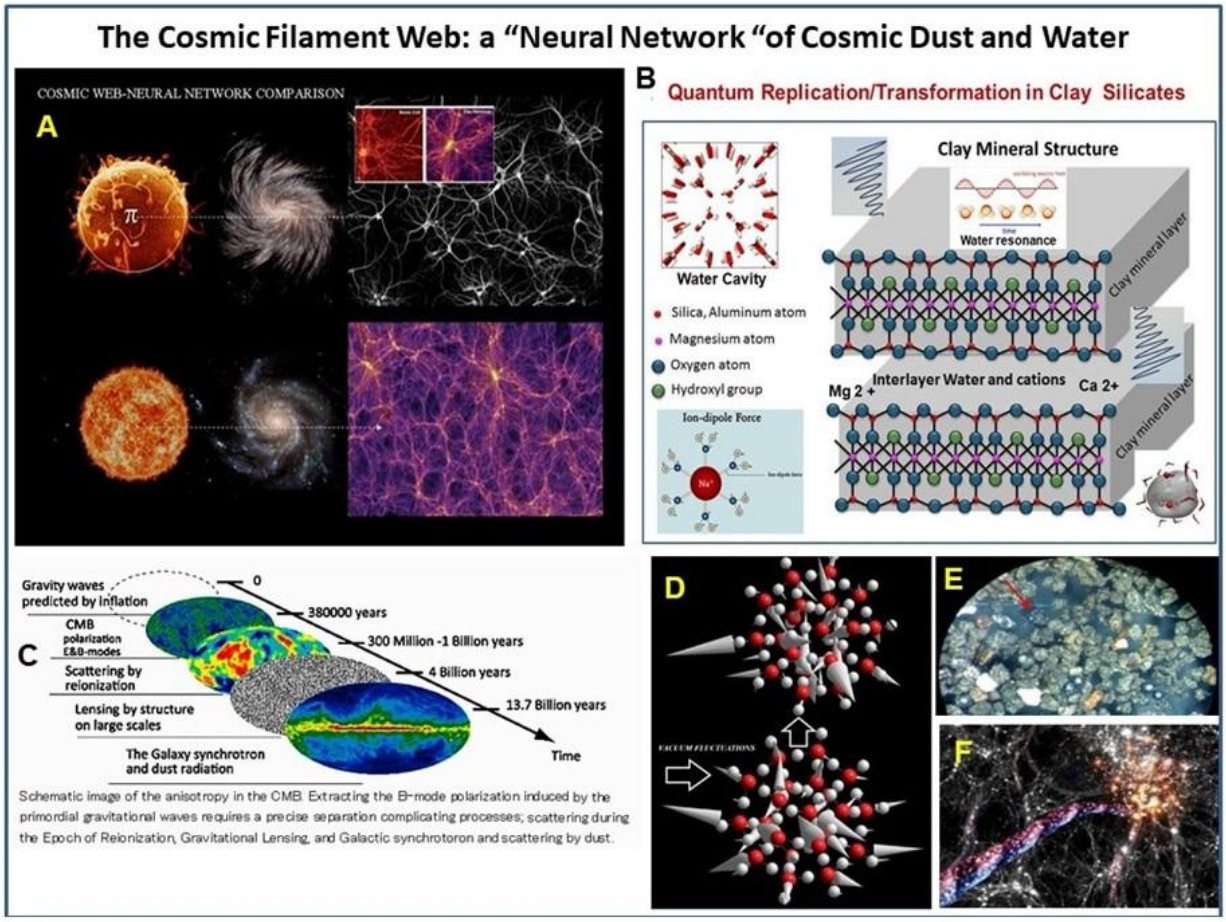

Figure 13: *The Cosmic filament web for EMF communication, resembling our brain structure.* ***B:*** *The possible role of clay material (mineral silicates), as a semiconducting material that can convert non-coherent EMF frequencies into coherent frequencies and is present throughout in the universe as cosmic dust (see* ***E*** *and* ***F****);* ***C****: Cosmic Microwave Background (CMB) during expansion of the Universe involving gravitational waves;* ***D:*** *Water molecule- structures that can code information.*

The Delft experiment showed that Einstein was right in this respect. The experiment showed a reliable and immediate response of a previously coupled electron over a distance of 1.3 km! Only the spins of both separated electrons are entangled and if the spin of one electron changes, the spin of the entangled electron also changes immediately. There is no time in between, so there is no transport of an electron particle. In entanglement the speed of light does not matter. So there seems to be a certain permanent interaction, which you could formulate as 'keeping each other informed instantly'. **Entanglement is a basic concept for the quantum information world.** The science has no explanation for this phenomenon yet but must now assume that it really exists. Some quantum physicists called it '*the most weird principle in quantum mechanics*'. The experiments performed in Delft, interestingly enough, also meet the semi-harmonic GM frequency pattern found by Geesink&Meijer. Possibly this phenomenon of entanglement also contains a possible explanation for the phenomenon of teleportation, but we will leave that aside here.

The Generalized Music Code clearly also applies to various vibration frequencies of water and clay. Both were probably fundamental at the beginning of life processes in evolution (see also fig. 13). Clay, as a semiconducting material, appears to be able to transform incoherent EMF frequencies into coherent frequencies, which are crucial for the origin of life.
Once again, quantum entanglement comes into the picture, and this time in connection with information. The new insight – definitively proven in 2015 – is that it is possible to realize determined entangled states between the spin of electrons over a large distance; this works with the help of photons of a discrete energy and therefore discrete frequency**.** In this way, an immediate transfer of information can take place, also in life processes. Entanglement also exists in our body!

8. Coherent and Superconducting Vibrations in Nature

Earlier in physics, Chladni and later Jenny demonstrated very vividly that sound vibrations can produce very characteristic images of wave interference: plates covered with grains of sand or pollen can be made to vibrate with the tones of a musical instrument, causing the grains to arrange themselves in characteristic geometric patterns (**Fig. 14**). Water in a petri dish also appears to take on specific wave forms. The specific form that is created is related to a specific frequency of the sound applied and to the shape and thickness of the plate used or the viscosity of the liquid. These patterns can even, in more advanced experiments, take on three-dimensional forms. This is shown in the scientific study of **"cymatics"** (**Fig. 14)**, middle and bottom left). Ritz also described these patterns mathematically. This kind of observation directly shows **that sound can induce an arrangement of particles. In this way, the sound waves in fact cause information patterns.**

This type of ordering pattern may also have determined the structuring of the first living cells by means of electromagnetic waves (see also **Fig. 12**). Incidentally, the values determined by Ritz appeared to correspond with the values of the GM Code [8]. These mathematical values could also be found in mechanisms of **superconductivity**. This is not surprising, because EM fields are also important in superconductivity, both in physics and in biology. In an earlier publication [20] Geesink and Meijer demonstrated that superconductors for quantum bits (qubits) also satisfy the semi-harmonic GM frequency pattern. Special metal compounds only show superconductivity at very low temperatures (-200 degrees Celsius)[14] , but this is not very practical. So it is quite relevant that EM fields with a specific frequency can be used, that realize a much higher superconductivity at much higher temperatures, that are much more practical.

The idea here is to keep the coherent state stable because quantum vibrations tend to interact with the environment and are, as it were, 'swallowed up' and disturbed (this last process is called ***de-coherence).*** Possibly, with the knowledge of coherent frequencies such as the bands indicated in green in fig. 12,

[14] Superconductivity is a technological development that is crucial for the development of quantum computers, where the central problem is to keep the qbits intact (coherent) in the 'transport'

you can, in principle, solve the de-coherence problem.

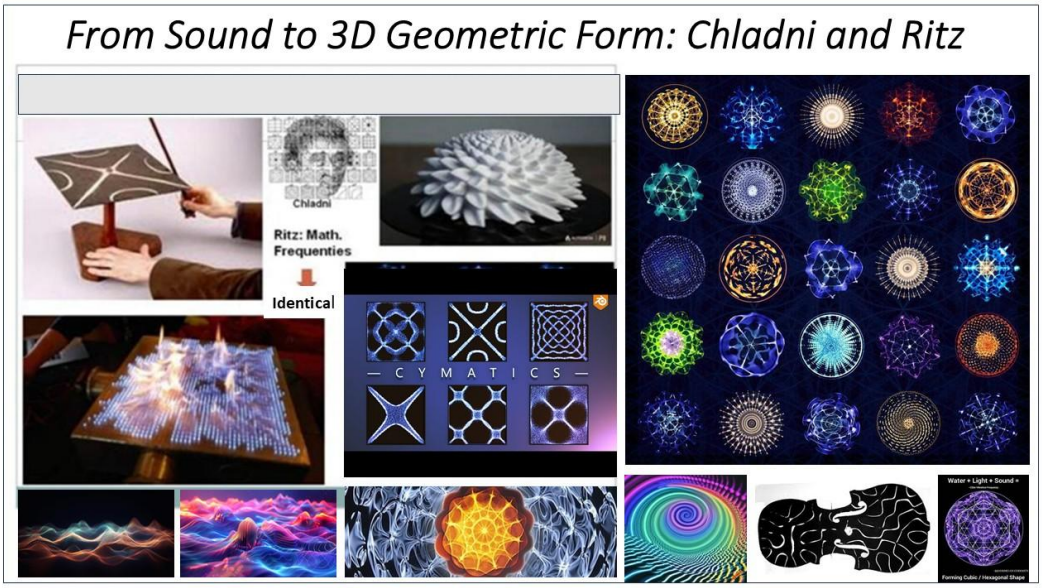

Figure 14: *Demonstration of sound-induced complex geometry in 2-D and 3-D patterns by a stable vibrating object against a plate or membrane on which finely divided grains have been placed (top left and middle). The geometric patterns produced in this way, by rearrangement of the grains, have a different complex shape per tone, (bottom right) and can even be induced in 3 dimensions(top middle). Ritz described all this with a series of mathematical equations, which later turned out to be completely consistent with the above-mentioned GMC algorithm. (ref. [8]).*

In this context, Geesink again mapped out data from 87 different superconductors from the literature [20], using a meta- analysis, with regard to the influence of EM fields on the degree of superconductivity. The relevant GMC frequency spectrum was indeed also clearly observed in these coherence measurements in *superconductors* [20]. It appears that superconductors (superconducting quantum materials) only function well if they are *coherent, quantized* and *entangled* . Developers of quantum computers could also apply this knowledge in the future, because it mainly concerns the prevention of decoherence of the quantum wave activity, so that these types of computers could eventually also work efficiently at room temperature (see **Fig. 11 and 12,** [20].

Very interestingly, the identified pattern of EM frequencies that promote quantum coherence in superconductors [20] **also functions in living systems.** This is the domain of *Quantum Biology.* Superconduction appears to be essential for life, not only for the efficiency of photosynthesis, but as discussed earlier, also for the olfactory process in our bodies and for the geomagnetic orientation of migrating birds and other animals. Internal and external EM fields also play a role in the intracellular communication of functional networks of proteins and enzymes that communicate with each other by means of wave resonance. This resonance involves a cooperation between sound particles (fonons) and exiton/wavicles that have been excited by light energy and quit. The transport of this electrical charge in the plant cell is then facilitated by finely tuned resonant vibrations that are generated in the cell and that work as a kind of "orchestrated" vibration process that prevents the flux of charged particles in the

environment from getting stuck **(Fig. 14**. top left).

How exactly to work out all this mathematically and physically is still a pipe dream for the time being, but the GMC theory [16] assumes there to be a **law of coherence ,** based on the **principle of semi-harmonic resonance**. Only in this way can you distribute ratios of 2/3 of standing waves within basic ratios of 1/2.

Superconductivity is therefore important for the functioning of quantum computers, but it is also of great importance in life processes. Superconductivity in intercellular communication is, for example, relevant for the precise spatial folding of proteins into their functional form and also for the optimal coordination of fast processes in the cell.

Again, EM fields prove to be crucial here because they promote the quantum coherence of vibrations in the cell and can thus promote a kind of superconductivity. Quantum processes play a role as well in photosynthesis, in identifying scents and in orienting birds to geomagnetic fields. This coherence therefore plays a role on a very small scale, and particularly in communication between cells themselves and their proteins and enzymes. Resonance – as a basis for internal and external communication - can only act effectively in sufficiently coherent conditions.

9. Spatial Folding of Functional Proteins in Brain Cells through Superconductivity

An example of intracellular communication with superconductivity, as described in the previous chapter, is the three-dimensional folding of proteins (see **Fig. 15**, below) and also that of DNA in brain cells [15, 16]. Given the very complex composition of the brain, with at least 6 other cell types besides the neurons, an effective and coherent sequence of electromagnetic activity is necessary, especially in some integral brain functions such as attention and consciousness [13; 21-23; 29; 30; 31, 33; 36]. In this complex composition of the brain, electromagnetic control by means of a coherent pattern of EM frequencies of bio-photons and phonons (sound waves) could play an essential role [7, 8].

One of the most well-known Quantum Brain models of Hameoff and Penrose (see 21-23;27;33;36], assumes that microtubules (very small cellular tubes) in neurons play an essential role in receiving and transmitting information. This is done by shape changes in the tubulin proteins, which are transmitted in the water-filled tube system. Here these brain parts even seem to work as an organizer and thus influence the function of neurons in the release of, so-called, neurotransmitter substances. Hameroff and Penrose even claim that the brain can receive information from outside the body via these tubules. These tubules serve as a kind of antennas that receive information, and serve as well as a frame of reference for our thinking and perception. For example a reference for subjective experiences, such as colors and olfactory patterns, that are called “Qualia” in neurology.

How exactly to define this process mathematically and physically is still under study, but Meijer & Geesink [10;17;] assume that a **principle of coherence** also exists in the brain, based on the **principle of semi-**

harmonic resonance.

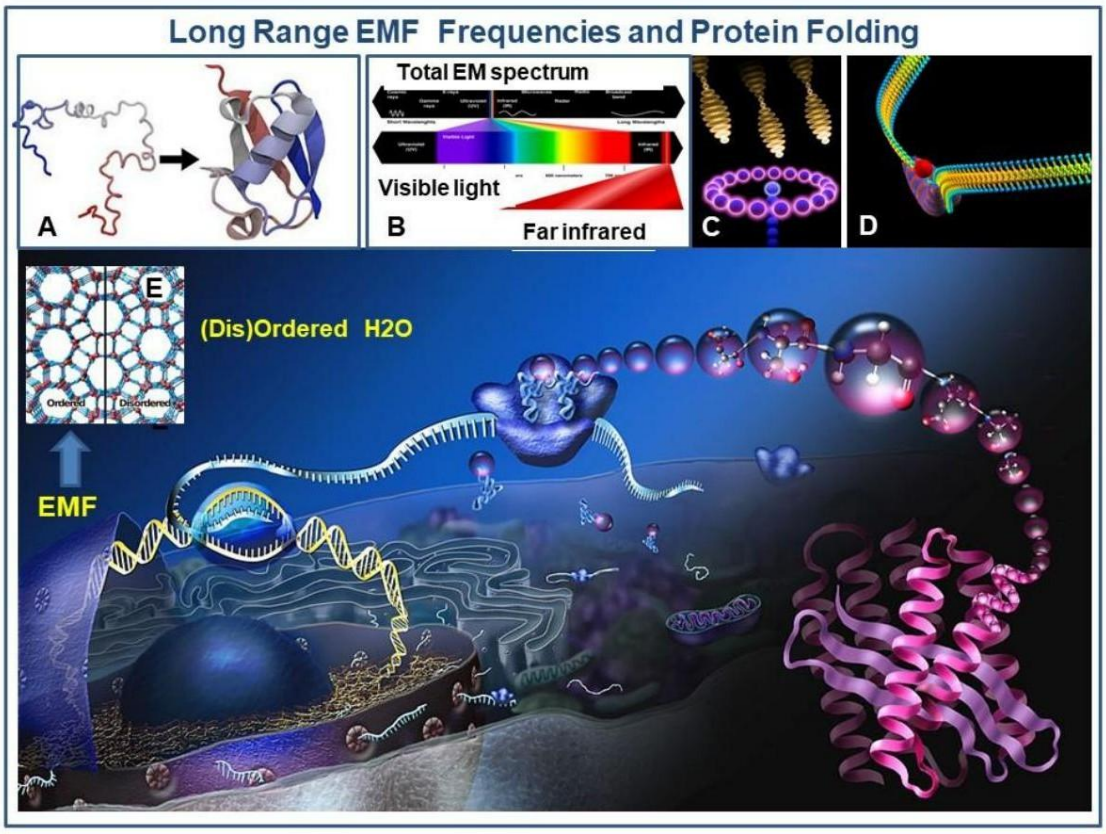

Figure 15: *Exogenous and endogenous EMF frequencies (B) influence the 3-dimensional folding of growing protein strands through the influence of solitons (C) that transfer energy along the primary polypeptide chain (D). Transfer of order can also occur through EMF-induced Coherent Domains in ordered water (inset E).*

Intracellular communication and process control takes place via semi-harmonic EM resonance with coherent patterns. Semi refers to small correction factor in the harmonic series

10. Origin of the First Life in Biological Evolution

EM radiation fields, which have existed since the beginning of the universe, are thought to have played a guiding role in biological evolution **Fig. 16 and 17**], in particular in the formation of the first living cells. In the Earth's atmosphere, **silica dust** particles existed and on the Earth's surface or seabed, nanometer-**layered silicate particles** (clay material**, Fig. 13**) were available. Due to the layered structure of clay and the presence of water and certain ions, clay exhibits **semiconductor** properties [20; 35].

This **order-generating principle** in evolution also **requires storage of information** in the cell, as happens for example in the composition and shape change in DNA and proteins [36,43]. The building blocks for these types of macromolecules exhibit their **own vibration** and **are sensitive to external EM fields.** For example,

the synthesis of RNA from nucleosides is promoted by certain EM frequencies (see **Fig. 11,** bottom left).

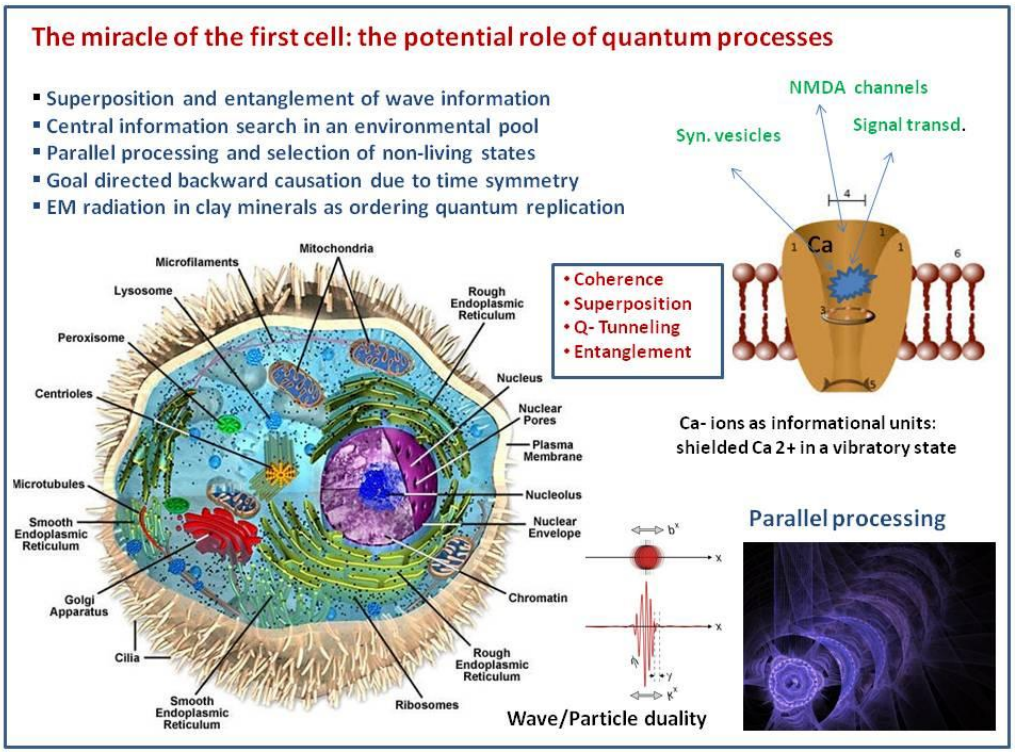

Figure 16: *Various quantum-physical aspects – such as 'superposition' and 'backward causation' and 'entanglement' –may have played a role in the formation of the first living cells. In doing so, so-called proto-cells acquired quantum information from their environment. This information consists, a.o. of electromagnetic signals, in which the* Ca^{2+} *ion also has a crucial signaling function. This signaling operates, among other things, by quantum oscillations of* Ca^{2+} in the *NMDA-channels that are protected from de-coherence (see inset in the figure above right).*

In particular, water in the cell, [25;26], can contain and maintain coherently vibrating domains (whose EM frequencies also coincide remarkably with those of the GM scale). This type of structured water can therefore also contain and maintain oscillating imprints of proteins and DNA [15;17] and of substances dissolved in it, even without its physical matter being present.[32;33]. When activated by light or heat, these materials (water and macromolecules of silica and clay (**Fig. 13**) coming together in living cells) emit a series of discrete EM frequencies very similar to the above-mentioned GM series. **This radiation pattern could have had an organizing effect on water and macromolecules as the predecessors of the very complex living cells**, (ref. 25; 29;36;43), which indeed need adequate information from their environment to survive and divide and multiply.

The terms frequency, resonance and coherence already strongly suggest correlation of such radiation patterns with the world of music. A musical interpretation of reality is also evident in the practice of plant cultivation. In the farming sector, new frequency techniques are created that are based on these insights into quantum theory. For example, with so-called protein music the formation of proteins is strongly

promoted[15]. (see **section 13**.)

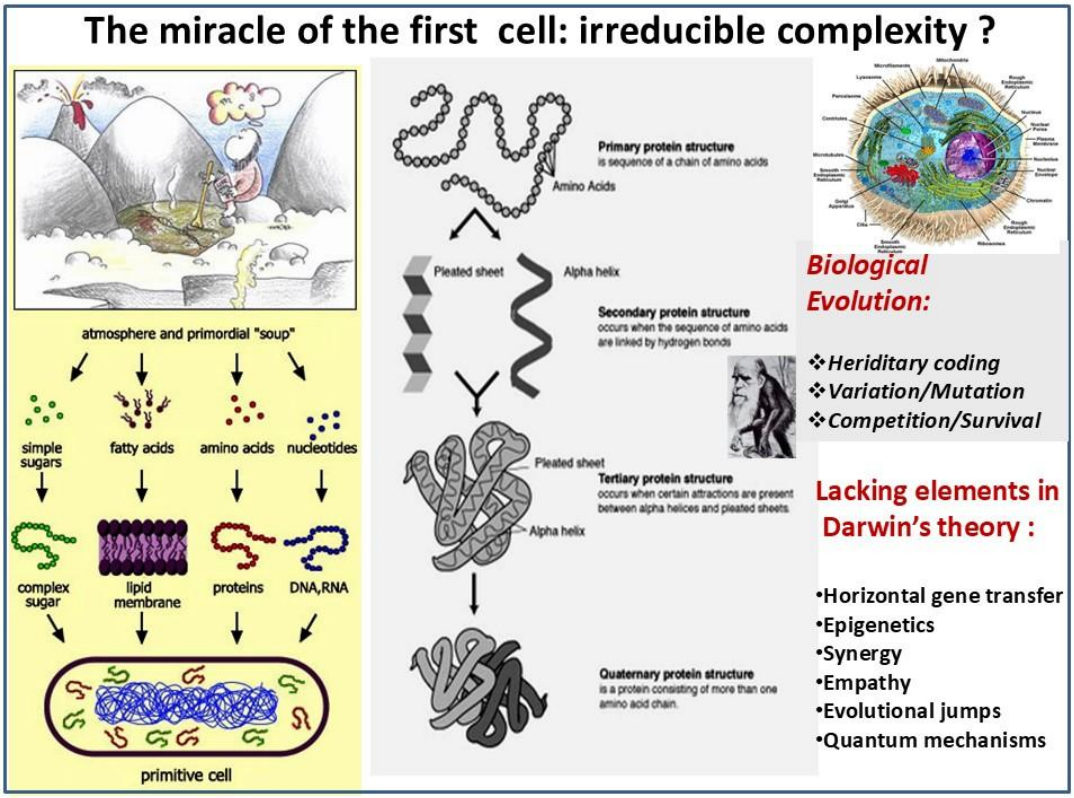

Figure 17: *Biological evolution in a different perspective: according to some authors, evolution requires cells with an irreducible level of complexity. Top right are the building blocks of life according to neo-Darwinian principles, hereditary coding, mutation and competition. Bottom right: crucial aspects of Evolution that are now considered to be lacking in Darwin's Theory.*

A series of discrete EM frequencies – as radiation patterns - could have an organizing effect on water and macromolecules like clay. These could have been the precursors of the much more complex living cells.
After all, even the first cells needed adequate information from their environment to survive and multiply. This information had to be stored in the cell, for example by the composition and shape-change in DNA and proteins. Particularly, water in the cell can contain and maintain coherent vibrating domains.
Such structured water can also contain imprints of proteins and DNA, in the form of coherent vibration patterns. This proposition is being confirmed in agricultural practice.

11. The Torus Model for the Description of Information Flows in Life Processes

In addition to the phenomenon of fractality, we need another spatial concept from the quantum approach: namely that of the torus. Because the shape and the energy flows of the **torus, bring space and energy and information together.** That's exactly why the model is used very intensively in physics. Moreover, the

[15] See Kieft, 2019, 'Quantum Leaps in Agriculture' and www.genodics.com

algorithm of the GM-scale can be described geometrically with *spiral energy trajectories* on the surface and in the inside (channel) of a *torus.* **Fig. 18** shows various examples of the torus-geometry.

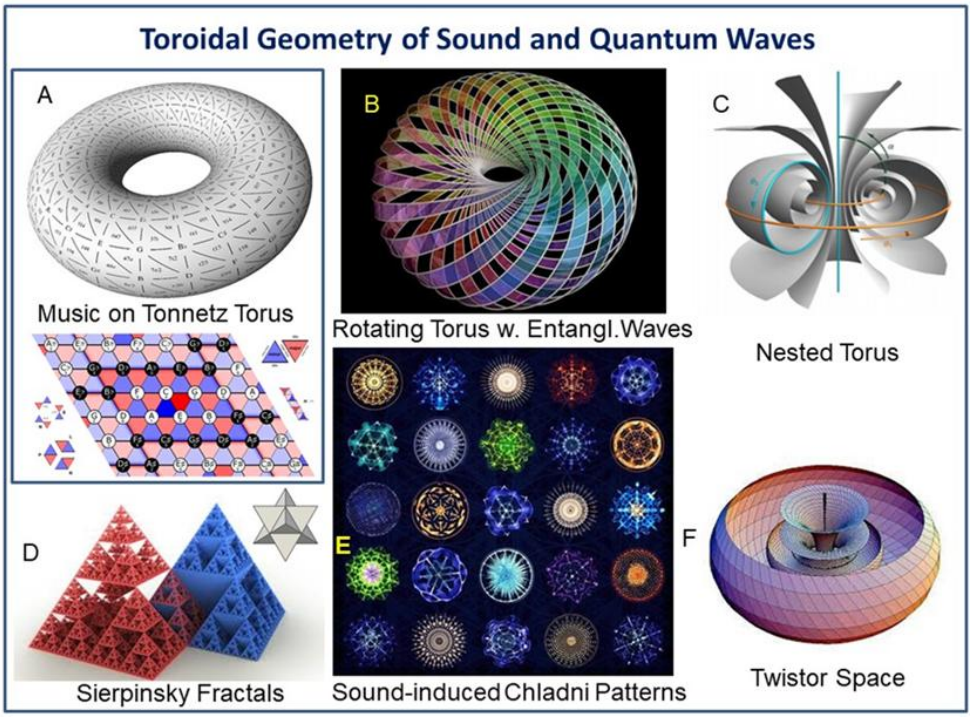

Figure 18 : *Various examples of Torus geometry. The Tonnetz torus at top left, used to describe the dynamics of music (A), the rotations of vibrations on a torus (B), a nesting of multiple torii (C), resembling a Twistor space, as proposed by Penrose (F).*

In this toroidal form, **the energies of sound** (phonon particles), **light** (photon particles) **and electrons** (particles with a negative charge) can be **integrated into** so-called **quasi-particles** - hybrids of these particles.[16] The torus model was used a lot in the history of physics, because the model clearly illustrates the oscillation process in the three spatial dimensions. If quasi-particles move according to the shape of the torus, then vibrations can also arise in a fourth dimension, invisible to us but physically assumed. In other words, the toroidal movement generates, in addition to the three-dimensional oscillations, a vibration in a fourth spatial dimension, with a movement in which the torus surface is, as it were, turned "inside out". This process is described mathematically, among others, with the number theory of the so-called *'quaternionic movements'* [7;8;9 21-23] (**Fig.19).** Perhaps this idea of inside-out movement in a fourth dimension offers a connection with the aforementioned vision of Charon, that each electron is paired with a 'consciousness particle'.

The **5-D domain of the torus bears discrete sets of 12 harmonic EMF frequencies (acoustic quantum code)** that are supposed to act **as pilot-waves** guiding electron and proton particles framed as (polaron quasi particles) in the fabric of reality. Note that, from the perspective of the supposed 5-D superfluid sub-quantum space (to be regarded as a homogenous manifold), the torus operator is created in the process of

[16] Examples of quasiparticles are the polaron (also called soliton), polariton and Majorana particles.

symmetry breaking from the 5-D phase-space to our 4-D reality, (see middle red arrow). Bosonic and Fermionic elementary particles/waves trajectories are positioned as fiber bundles progressing at the surface and inner core of the torus. Vortex and Anti-Vortices are formed as open strings, close to the transition points of positive and negative curvature, (see also inset right below), at the boundary showing an infinity aspect(**Fig.19**).

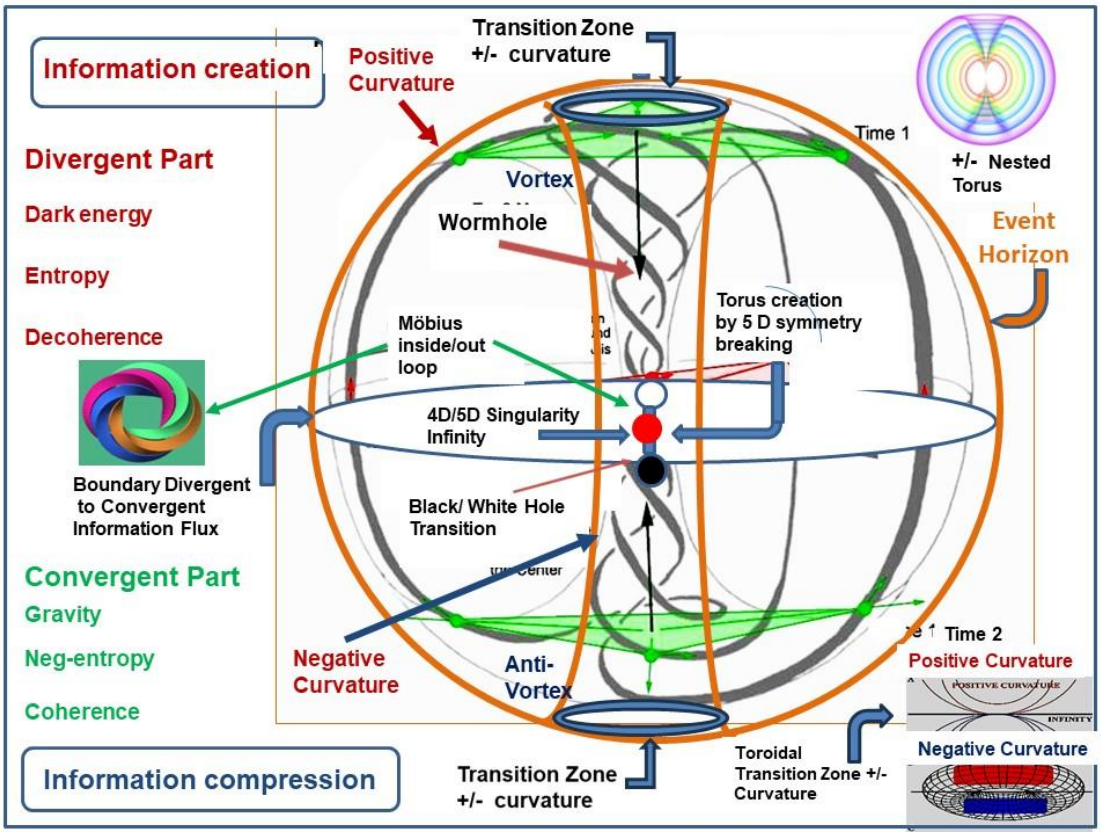

Figure 19 : *The spiral trajectories on and in a torus can be seen as* ***geometric information*** *where each spiral movement returns to itself. Seen from above on the left: an information unfolding, which moves downwards and is followed by an information compression. Interaction with other information paths takes place in the core (singularity) of the torus. In this case a so-called quaternionic transposition can occur to a symmetric 4th spatial dimension (with the dimension of time this transposition is therefore 5-dimensional) and - conversely - a 5D-4D symmetry breaking can be 'sparked' with an inverted toroidal motion. Primordial holo-flux of information, according to the acoustic geometric model, shows two intermingling wave trajectories with each having diverging and converging energy modalities that reflect the generation and compression of information, seen as being related to Dark Energy and Gravity forces respectively. These can also be envisioned as* ***entropic and negentropic energy forces****. Each wave arrives at the intrinsic boundary of divergent and convergent energy (information) flow and subsequently returns to its origin in the Torus core (red dot). Here, via a quaternionic (inside to outside Möbius ring/ Klein bottle) transition, opening to a 5-D domain and return to 4-D is allowed. The 5-D dimension is by some regarded as a* ***superfluid quantum space****, representing a sub-Planckian (primordial) domain in which the Zero-Point Energy (ZPE) field is a transition zone to the 4-D world we know.*

This curvature aspect of the torus (**Fig.19**), also accommodates the Relativistic interpretation of spacetime

physics. White- and black hole transition process (white and black circles) is located at the torus core and represents the “bouncing aspect” of a cyclic model of the Universe, invariably resulting in a cosmic rebirth from its preceding version. The entire boundary of the surface of the torus is seen as the event horizon information modality.

Even the process of **scientific research** can be described as a toroidal energetic information process that spirals its way to integrate knowledge[9]. This geometric shape then represents the development in a scientific world in which the dominant concepts within certain disciplines are in competition with each other: through the repeated coming together of the concepts in the axis of the torus, an integration can emerge into completely new ideas. This movement thus looks like an upward spiral (**Fig. 19,** ref. [9;19]).

This toroidal approach can also be applied practically to study the behavior of semiconductors that occur in nature - for example in various clay mineral silicates. Such semiconducting nano-materials can convert EM waves from one frequency to another. Geesink brought such semiconducting nano-particles into toroidally organized small layers of silicate, which then together blend into a kind of nanometer laminate with superconducting properties, NB at high temperatures! As mentioned before, these materials - after energetic activation - emit the coherent EM radiation frequencies of the GMC [35] and can provide for all kinds of signal transfer in nature. It is surprising, although not really unexpected, that the torus has such a central role in science: it really describes a whole spectrum of forms in nature, e.g. of the electron, of geomagnetism and of black holes, all the way to the supposed shape of the universe!

The above-mentioned EM frequency data from the meta-analysis of over 1500 biomedical publications (**Fig. 8)**, clearly show that there is a pattern of EM frequency bands that includes **certain discrete (coherent) frequencies promoting health and slightly different frequencies that are harmful to life** (the latter being non-coherent frequencies). These frequencies appear to alternate in a fixed pattern. This insight into the relationship between the favorable and unfavorable frequencies is of great societal importance because it allows, for example, to calculate less harmful frequencies for 5G – the fifth generation of communication technology.

In fact, the shift **from harmful to healthy frequencies** only requires small adjustments in frequency, which can sometimes even be achieved within the bandwidths to be auctioned. A *careful choice of the frequency value is crucial* for human health, but certainly also for everything that lives in the entire ecosystem. It also appears that carefully calculated *favorable EMF frequencies* can be used in prevention. With this knowledge, new materials can also be developed for *protection against radiation:* by converting non-coherent, harmful frequencies into life-friendly coherent frequencies. Up to now, we have a lot of animal test data, but systematic research in human material has not yet been done [29;33].

The publications of Geesink and Meijer show, as discussed earlier, that 'favorable' EM frequencies can promote ***coherence in life processes*** [7;8;10,13;14;29]. In addition, they promote *quantum entanglement of wavicles* [13]. The above-mentioned clay materials could then also be used to convert the - for humans, animals and plants - harmful EM frequencies from the environment into healing radiation with coherent frequencies. *Therapeutic applications of the good EM radiation in medical technology* are also very possible: for example, the *EM field laser* is currently used in the USA in the treatment of certain tumors [21], in pain

management and also in certain psychological and neurological disorders [37]. Recently, the coherent frequency values have also been used for composing electronic music, which can be used in the therapy of movement disorders and allergic conditions.

In order to better describe the ***information flows of life energy,*** another widely used concept from the quantum approach is needed: the **torus.** The algorithm of the GM scale can be described geometrically as the spiral energy movement along the surface and through the core tube of a torus. This torus shape offers a kind of energy integrator that can integrate the energy frequencies of sound, light and electrons. The toroidal movement generates three-dimensional oscillations plus a vibration in a fourth dimension. In doing so, the movement along and through the torus is, as it were, turned "inside out". It is important for life processes to distinguish between discrete (coherent) frequencies that promote health and frequencies that are harmful to life (these are non-coherent frequencies). These insights may offer new therapeutic and preventive applications for human, animal and plant life.

12. Brain Function and Consciousness: Quantum Processes and Electromagnetic Fields

After the step towards unravelling life energy, the step towards unravelling consciousness must also follow, or the step from the biosphere to the functioning of the **noosphere,** as Teilhard de Chardin has called it. Electromagnetic theories are now indeed being tested against knowledge of human thought and even of **consciousness** [19]. Harmonically oscillating electromagnetic fields appear to promote the interplay of various brain components, as well as the synchronization of neuronal networks that are necessary for individual consciousness. Susan Pockett and Johnjoe McFadden, for example, have proposed such EM field theories of consciousness, based on the theory of *quantum electrodynamics* (QED, **Fig. 20**). And Keppler proposed that the brain causes a stream of consciousness moments by a permanent interaction with the Zero-Point Energy Field, in which overlapping vibration patterns (attractors) of the field and the brain resonate with each other. **In this way our consciousness is implicitly a fundamental property of the universe itself,** because of this exchange and integration of active information [4;10;19]. Meijer postulates [4;10;15; 21-23;30-32,37] that consciousness in our brain is coordinated by means of EM fields and thus by photon generating fields that collectively arise from the electrical action potentials formed in the neurons.

In the brain, light and sound particles (photons/phonons/solitons) are created that induce an information transfer that is many times faster than the classical chemical neurotransmission[17]. Also ultrafast signal particles such as Tachyons and Majorana particles are created that can cause a retrograde perception of time. Furthermore, Meijer et al. concluded that **a quantum network** has developed in the brain that functions **as** a kind of **frame of reference** [10]: it controls the quality of our brain reactions and – as a consequence – the quality of our physical actions. This is done by, as it were, simulating a prediction of

[17] This transfer works by means of synaptic neurotransmission with a post-synaptic space, provided that this space has the right dimensions to convert the virtual quantum wave particle into the corresponding particles by means of the ZPE- Casimir effect.

future subjective experiences of the individual. They called this the *event-horizon workspace of the brain* [10;15,21-23;30-32; 36]. This supposed information field of and around the brain is associated but not reducible to the brain alone and could also explain phenomena such as *clairvoyance, telepathy and near-death experiences* [3;28; 31; 41;47] .

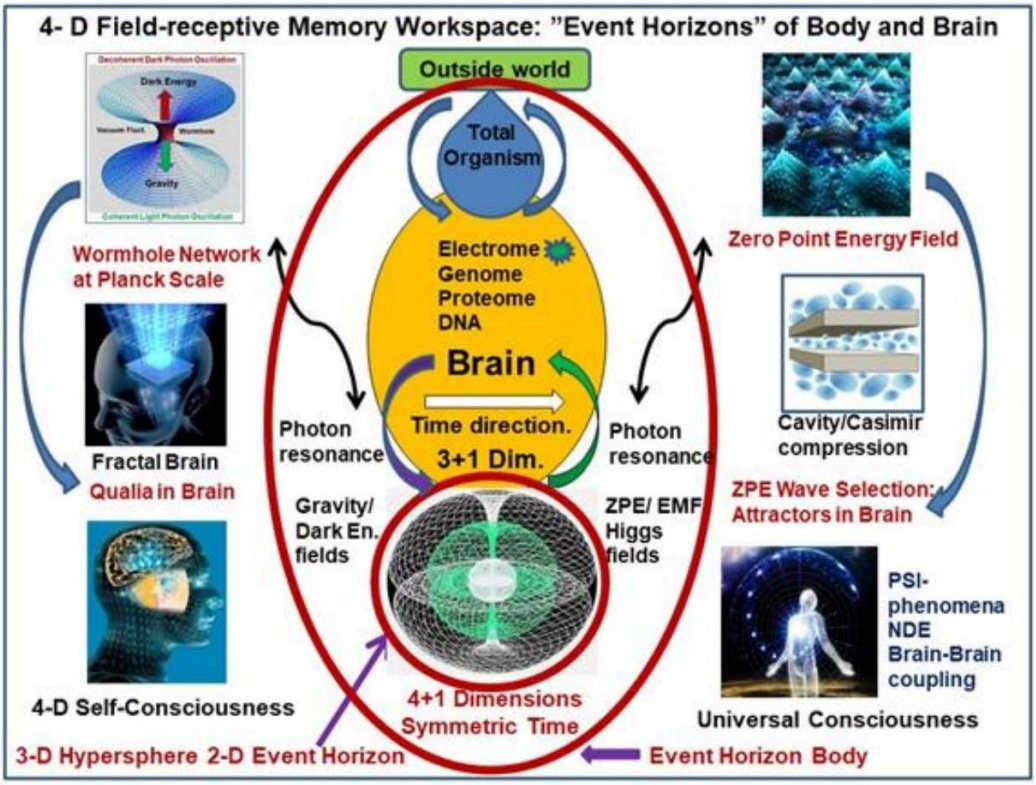

Figure 20 *: The functioning of the brain in relation to memory. The human brain (yellow in the middle) permanently receives internal stimuli from the senses ("total organism" in blue) but also external signals from geomagnetism, Zero Point Energy field (ZPE), gravity etc. (the "outside world", ZPE, Event Horizon). The toroidally organized mental workspace (middle-bottom and left also symbolically indicated in the depicted heads) integrates these various signals in a fractal setting, using a 5-D holographic process, in which all available information is stored as in an "event horizon" (the red oval in the middle of the figure), see [15] and [37]. This creates, in association with the brain, a personal memory with mutual information that is necessary for permanent quality control and weighting of the individual's own brain imaginations and future codification. This integral data structure might play a role in certain transcendental consciousness conditions, such as the total life panorama in near-death experiences.*

This information field may be directly influenced by the Zero-Point Energy field and therefore also by the GM-scale EM frequencies that we revealed earlier. Sbitnev et al. (21-23;27) pointed out that the cerebrospinal **water compartments** in the brain contain many freely moving protons in the form of *Hydronium* or (+)-ions, which can serve quantum-physically as oscillating antennas for receiving and transmitting quantum information.

These water compartments can thus be essential instruments of consciousness or capturing information

received from outside. This would explain, among other things, that in so-called *hydrocephalus patients* consciousness still partly functions, despite a minimal residual cell volume. The three collective information streams in **Fig. 20** (the ZPE, the outside world and the own organism) generate quantum entanglement of the consciousness moments in the now, whereby the information is integrated into the collective present As also shown in **Fig. 21**).

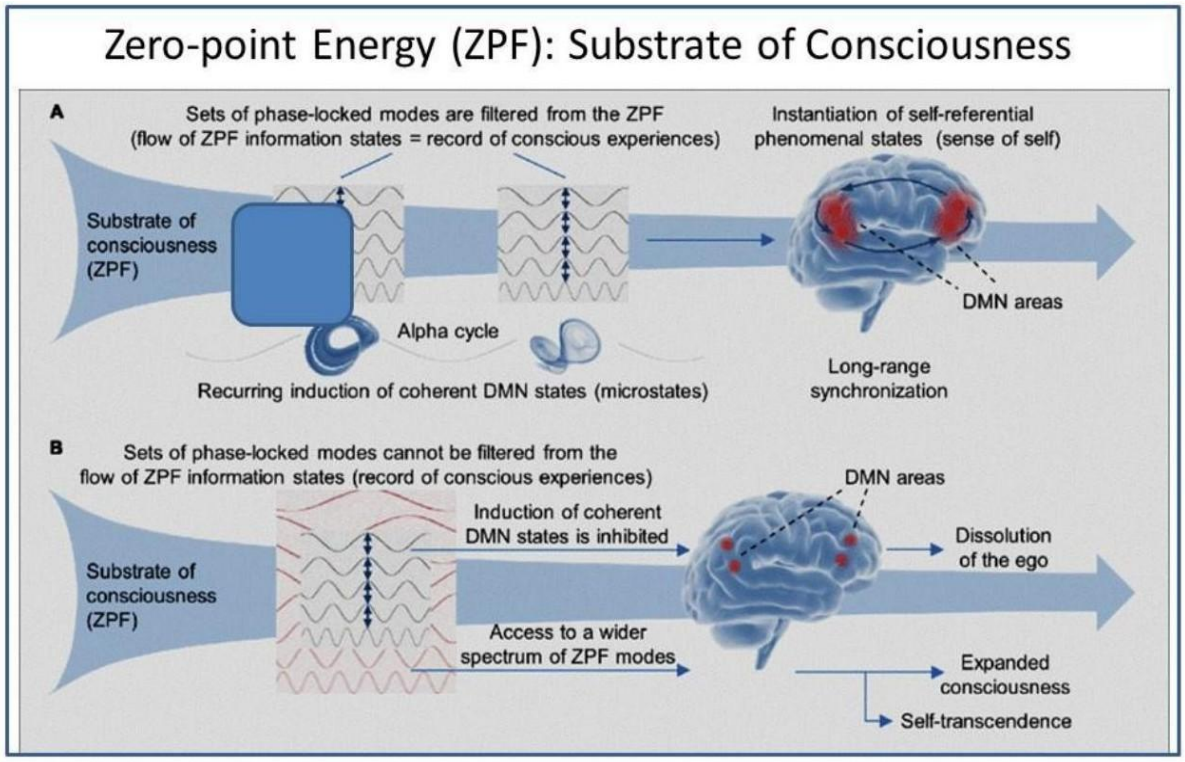

Figure 21: *The Zero-Point Energy Field (ZPF) as a substrate of information and consciousness. The above line A presents a 'normal' functioning of the brain. By induction and selection of ZPE vibration units ("sets of phase-locked modes", a kind of oscillation attractors) by the brain, long-distance resonance with the ZPE information field and synchronization of the ZPE field and the brain occurs (the right part of line A). This process is explicitly bilateral and also runs from the brain to the ZPE field (the back-reaction), which ensures permanent updating of the data field. Here the conscious self is active. However, once the brain does not select settled conventional vibrational units (presented as line B), space is created for the reception of a broader spectrum of ZPE information, which can lead to a state of heightened consciousness, transcendence and dissolution of the ego.*

It is assumed that the wave energy processes have a toroidal recurrent character, at all levels in the formation of consciousness moments, and that information transfer, between the 3-D Planck scale and the sub-Planckian 4-D information field, occurs in two directions. Toroidal *flux tubes* of various lengths (upper part of **Fig. 21**), function, in a fractal context, as wave operators. They are important for the transmission of the universal information through harmonic frequency relationships, according to the musical master code of the implicate order.

From life energy to consciousness: in this leap from the functioning of the brain to the (somewhat) understanding of consciousness, quantum electro-dynamics appears to be of great significance. Electromagnetic fields are necessary for synchronization of neuronal networks and for interaction with the Zero-Point Energy Field. Thus our consciousness appears to be a fundamental property of the universe itself, due to the exchange and integration of active information. This still little researched information field in and around the brain could also explain phenomena such as *intuition, clairvoyance, telepathy and near-death experiences* . This information field is possibly directly influenced by the Zero-Point Energy field and therefore also fitting in the GMC scale EM frequencies (see **section 13**).

Once we consider Consciousness as a fundamental property of the universe, we should amplify the MEI-windows towards a MEIC-model in which Consciousness is added to the first three windows. In our efforts of understanding the universe, we than should approach everything in reality by 'looking through these 4 windows of Consciousness, Information, Energy and Mass.

13. New Insights from Quantum Physics Provide New Insights into Agriculture and Horticulture

12.1 Introduction

The premise at the beginning of this essay – that reality can be expressed as an interplay between mass, energy and information (MEI) **–** is also starting to catch on in agriculture. The basic principles of quantum theory, mentioned in this article, are not only useful for better *understanding* processes in biology, but also for *influencing* these processes. Wave-particle duality, the quantum tunnel effect, entanglement, quantum coherence, up to and including the quantum information field and the observer effect can all be recognized in nature and therefore also in farming practices. The most fundamental process for life on earth, photosynthesis, is an example. It is with the **quantum tunneling** effect, that we understand better how plants and trees can capture the energy of the sun so efficiently, (**Fig.22**).

Quantum agriculture is an emerging approach to farming (**Fig.23**), and even to nature management. It is an enrichment of the conventional methods based on Newtonian Physics and conventional biology. Conventional agriculture techniques are based on the Mass of minerals, manure and crop protection products and on chemical reactions. With the insights from quantum agriculture, as we 'treat' nature, soils, plants, animals and climate, we enrich the Mass approach with Energy and Information and even with sharper awareness. Each of the four windows M, E, I and C, brings its own specific techniques into play.

The particle-wave duality is one of the fundamental quantum principles. Frequencies, therefore, open a crucial new window to deal with the mass and matter and life. The range of EM frequencies is enormous: each frequency evokes a specific effect, for example in an atom. At microwave frequencies of 2.4 GHz, electrons and molecules start to rotate; at slightly higher frequencies they start to vibrate and beyond infrared – that's visible light – electrons can jump to another orbit (**Fig. 22**). The latter happens, for example, during photosynthesis. In that process electrons in the leaves get energized and these activated electrons settle in ATP and NADP molecules that are included in larger molecules which are transported to parts of the plant where the energy is needed. There, the electron 'falls back' into the lower energy orbit and releases the

energy impulse, for example to keep the metabolism in the cell going. ATP and NADP can be regarded as wagons that transport energy through the plant. They temporarily carry the solar energy and deliver it elsewhere.

In the even higher frequencies, just beyond visible light – in the UV domain – you enter the ionizing sphere: then the electron jumps out of the atom or molecule and ionization occurs (as the molecules have lost an electron). We then speak of *ionizing radiation.* This ionization happens in the blue light and beyond, in UV-A, UV-B and UV-C. This insight is also already being applied in practice: the company Freshlight uses these high frequencies in their devices to ionize the air in stables and warehouses. The even higher frequencies are used in hospitals, among other things, to destroy cancer cells.

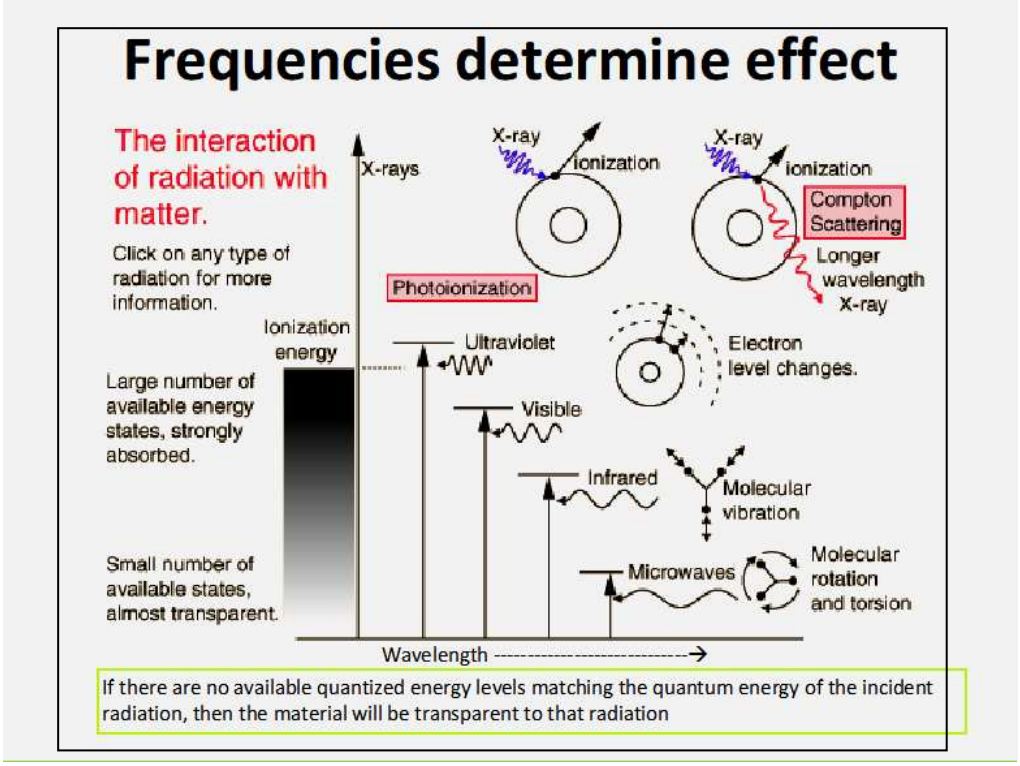

Figure 22 *: The correlation between radiation frequencies and molecular reactions. The shorter the wavelength, the higher the frequency and the stronger the molecular impact. Source: LOFAR (Low Frequency Array program researching the impact of cosmic radiation on life processes on earth.*

Tesla said it a century ago: "If you want to understand the universe, **think in terms of energy, frequency and vibration."** This is done par excellence in the practice of quantum agriculture. (see **Fig.22**).

12.2 Sound vibrations also influence life processes and body water.

The **particle-wave duality** has given birth of a practical method to support life processes. The so-called **"protein music"** is an interesting example to show how wave frequencies can be calculated from their mass. This technique also combines the $E=mc^2$ and $E=hf$, a combination already earlier proposed bij Meijer and Geesink. The French company Genodics is marketing this technique and is successful. Two or three times a

day, a few minutes of broadcasting protein music over the field is enough. Sugar enhancing protein music is well-known for grapes: the sugar percentage increases, as does the quality and taste of the wine. The method was discovered by the French quantum physicist (and musician!) Joel Sternheimer. He received an international patent for it. He discovered that the protein stimulating effect occurs with a *specific sequence* of tones, a specific melody.

Sterheimer discovered that with each coupling of a new amino acid to the protein being formed, a specific impulse of energy is released. Every protein is built from a specific sequence of amino-acids. And because each amino acid has its own frequency (=energy impulse), you can enhance the formation of a specific protein by applying its specific sequence of tones, hence its melody. The crucial business knowledge of Genodics lies in the analysis of proteins, in the knowledge of which proteins are active in the plant and when, and in converting the sequence of amino acids into a musical melody.

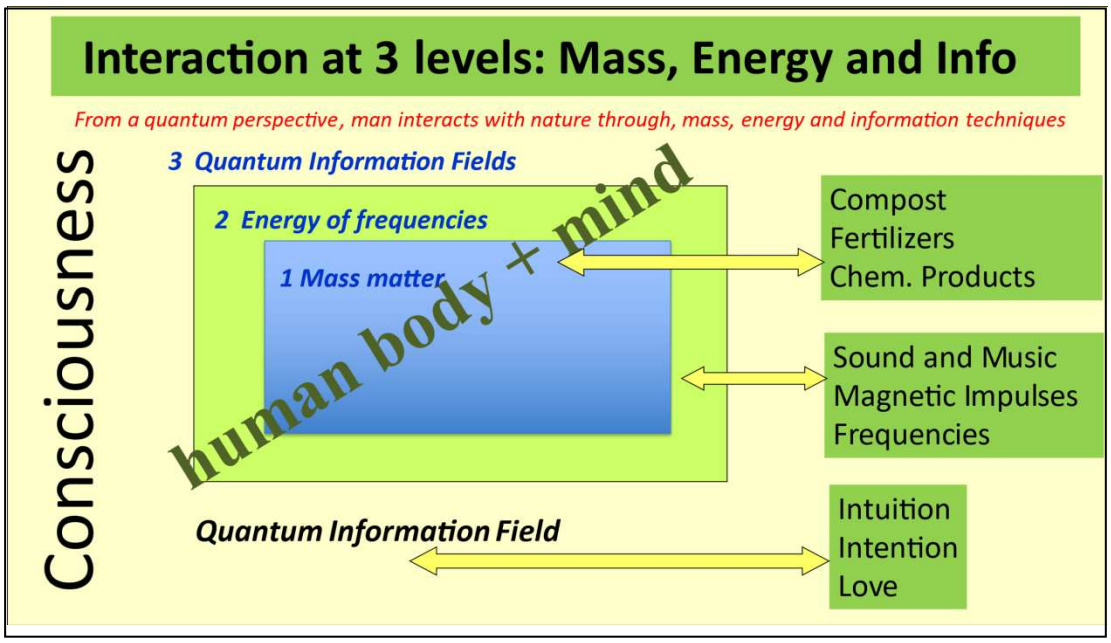

Figure 23: *The additions of quantum agriculture to the conventional approach. The starting point: the quantum information field informs quantum electrodynamics which in turn organize life processes in matter. The blue part (in the middle) shows the current dominant approach to agriculture and forestry: its focus is on interventions applying Mass, like manure, pesticides, compost, etc. In the green area around - and through - it the EM frequencies work with sound, melodies, frequencies of electromagnetic fields and various light frequencies. Around and through it operates the Quantum Information Field (colored in rose). In the family of Information-techniques you work with intention and sensing of magnetic fields. The I-domain provides the connections with human consciousness as well as with various forms of consciousness in nature.* ***Kieft. 2019.***

In the meantime, the melodies for over 5000 proteins have been elaborated. Furthermore, applications of protein music are being developed for animals and for better storage of CO_2. As mentioned above, medical doctors are also beginning to apply these insights in their analysis and treatment of disease patterns of

people. The Genodics business model is interesting in this early phase of a new technique. As there is still little scientific confirmation for the technique, the response of the experimental users is very relevant to substantiate its operation. Farmers with a problem, for which no known technique works adequately, want to try out those protein melodies. They pay if it turns out to work. 90% of the farmers are apparently satisfied and pay the costs. This response from practice offers a solid basis for the reliability of this application of quantum physics in the biology of plant cultivation. Sufficient reason for further research.

12.3 Water Treatment with Aqua4D

Another example from agricultural practice, also based on the **particle-wave-duality**. The structure - and therefore its functioning - of water changes when you expose the water to specific EM frequencies. This is relevant both in pipelines and in soils. How did the Swiss engineer and inventor (and musician!) Walter Thut come up with this technical application? He also calculated the frequencies of all the elements in the periodic table, also using the calculation method of the quantum physicist Louis de Broglie, who linked the well-known equations $E=mc^2$ and $E=hf$. To treat water, Thut chose the frequencies of the most common elements in water and in plant growth, namely Carbon (with the tone D), Hydrogen and Oxygen (both in G). And this also appears to work effectively… The method is now being used successfully in more than 10 countries, especially for irrigation in dry and slightly saline areas.

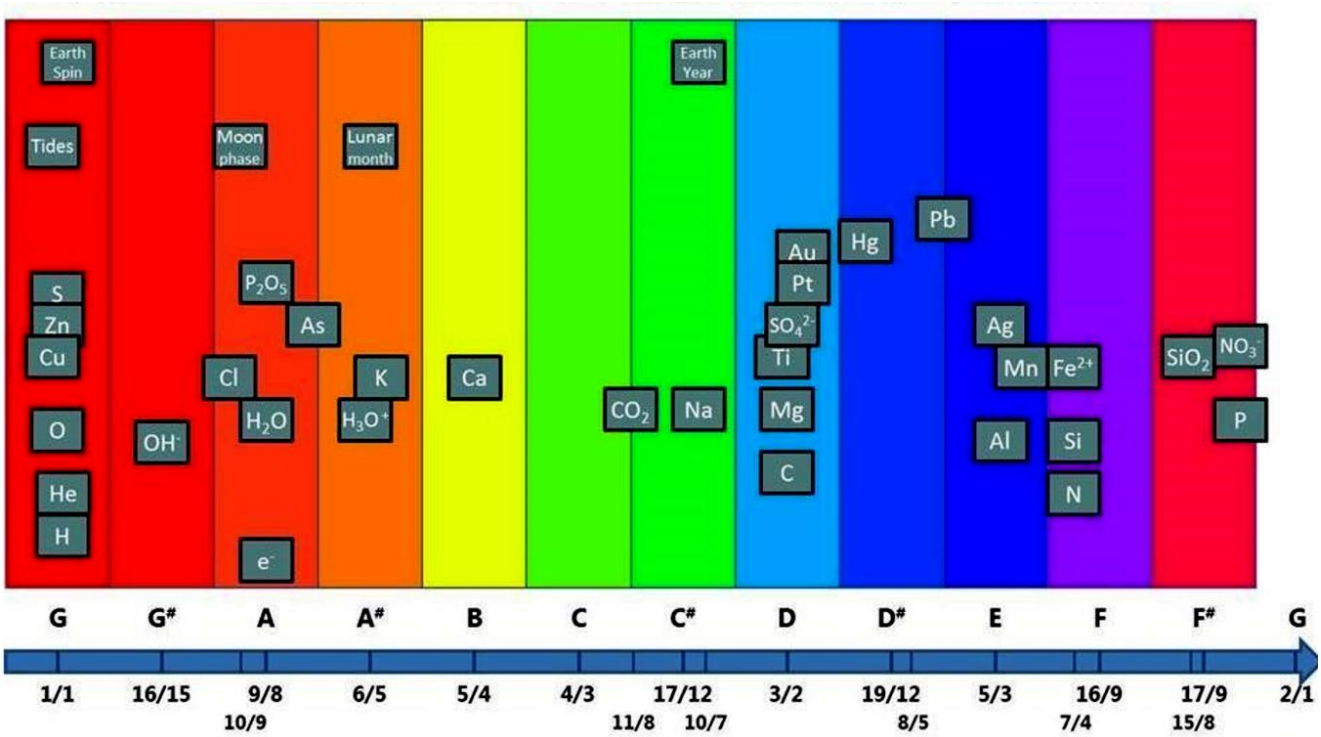

Figure 24 . *Thut's table of frequencies, calculated from the Periodic Table of Elements. The frequencies of Copper, Zinc, Oxygen, Hydrogen are all vibrating in G. The electron, water, phosphates vibrate in A, taking the A-frequency at 429,7 Hz. Carbon, Magnesium, Gold are all vibrating in D. Lead (Pb) and Phosphor (P) and Mercury (Hg) do not vibrate in harmonic frequencies and are unhealthy. ….. Note the almost exact correlation with the twelve-tone conclusions of Meijer and Geesink (presented in* ***section 5****).*

A third example of a quantum-based technique is the aspect of order, coherence – carried in non-material **Information**, our third window – that is relevant to assess the robustness or vitality of food and crops or animals. In his book 'What is Life' already in 1944 the quantum physicist Schrodinger underlined the crucial importance of internal order of life to be successful. The measurement of vitality of food products for example by the technique of bio-photon behavior is strongly developed and applied in food related business.[18]

The principle of **entanglement** also might explain why treatment of plots and crops at a distance, may function. This practice is developed and applied by EcoIntention.[19] It is successfully applied in hundreds of farms and nature protected areas.

Last but not least the window of **consciousness** is increasingly being opened by various groups of gardeners and farmers in all continents. They all work with intention and love and get beautiful results.[20]

Our quantum-understanding of the practices in farming and nature management, confirms that Consciousness is a fundamental property of the farming universe. Our intention can influence plant growth. Through our intuition we can get information from nature. So, based on practice, we justify the amplification of the MEI-approach towards a MEIC,(**Fig.24**).

In Agriculture, we now tend to approach everything in reality by 'looking through these 4 windows of Consciousness, Information, Energy and Mass. And each of the 4 windows shows its own techniques.

The basic principles of quantum electrodynamics also prove useful to support life processes in biology, farming and nature management. The wave- particle duality has already led to new techniques like protein music for the promotion of production of desired proteins, as well as in the treatment of water. Furthermore, entanglement and quantum coherence could explain the effect of remote treatments. And with the quantum information field, the influence of the human mind on plants and animals becomes more understandable. EM fields also appear to be able to control life processes of energy, information and consciousness in agricultural practice.

14. The Effects of Electromagnetic Radiation of Current ICT on Life in Nature

With the realization that EM fields can direct life processes of energy, information and consciousness **(Fig.9;20;25**), the question arises as to the possible effects of modern means of communication on life processes in ecosystems. De-coherent (life-threatening) EMF frequencies occur in both the 4G and the intended 5G frequencies [24]. If governments stick to these frequencies, they can contribute to subtle but also sometimes serious abnormalities in brain functions, such as insomnia, lack of focus, irritations and even

[18] See for example the work of MeLuNa, initiated by R. and E. Van Wijk. www.melunaresearch.nl
[19] www.ecointention.com
[20] See the book Quantum Leaps in Agriculture on www.gaiacampus.com

depression. They can also disrupt growth processes in plants, insects and animals. According to the insights described here, these harmful influences can be partially restored using frequencies that harmonize with the 'music of nature',(**Fig.25**).

Much research has already been done into the harmful effects of current communication technology, for example into the chronic use of smartphones by children and students, where good research has shown deviations in concentration. The ultimate goal is not only to expand the 5G network with local transmitters in every street, but also to place 20,000 5G satellites in the atmosphere that communicate with the earth's surface by means of lasers. The image is that humanity is locked up in an electromagnetic cage, while the long-term effects of this technology have not been sufficiently investigated. In particular, people who have a demonstrable hypersensitivity to this type of radiation can become victims of careless implementation at large scale. Much more systematic research will therefore be needed, not only in animals and plants, but certainly also in humans and human tissues. There is really more at stake than only a slight increase in temperature near the ear. When we see in this essay the importance of electromagnetic fields in the normal physiology and tissue of living organisms in plants and the function of the human brain **(Fig. 26),** we are warned seriously. Therefore the passive health policy, such as currently practiced by telecom companies and most governments, is not appropriate. Here the **precautionary principle** should be respected,[24].

In order to cause therapeutic effects in the brain, attempts are currently being made to translate the coherent values of the GM scale into an electronic music program with the aim of promoting the coherence of EMF frequencies in the brain. This approach is based on the assumption that many abnormalities/diseases are caused by an excess of de-coherent waves in the brain, which control processes in the periphery and give rise to complaints in, for example, the musculoskeletal system. This brain response is perceived as learned behavior that is intended to correct or compensate for the primary deviation but that has inadvertently acquired an excessive and unbalanced character.

The policy of an always expanding ICT industry including high-density EMF via local and atmospheric satellite connections, requires a precautionary approach to prevent unexpected long term damage to all life on earth.

15. Wave oscillations in Extrasensory Perception and Other Misunderstood Psi Phenomena

Using the Quantum understanding of the functioning of the brain and of consciousness, it may be possible to explain extraordinary mental or boundary-transcending experiences. For example the (trans)personal feelings of **intuition** and **serendipity**, of being 'high' on **certain drugs**, of **consciousness expansion** and **dreams (Fig. 18**), which are still quite normal for all of us. But perhaps more 'transcendental', or if you like **paranormal**, aspects such as channeling, out-of-body experiences and near-death experiences (NDEs) can also be understood with a quantum-approach as we try to describe.(31;39;41;47).

The first question here is whether the 'normal' and 'extra-normal' or ‘para-normal’ experiences can be separated so sharply, as maybe they in fact represent a continuum in reality – as they function on a common basis (Jahn and Dunne, 1997). Hameroff and Penrose see these brain states as various states of quantum

coherence and thus as a continuum of various degrees of Consciousness [21-23;36).

Other non-local phenomena in this context are the so-called **PSI phenomena** such as **clairvoyance**, **telepathy, remote viewing** and **psychokinesis** (see **Fig.26).** These phenomena could also have a non-local information field as a basis, because they allow the sharing information and influence at a distance between persons, other beings and locations.

The central research question is in what way the information required for these phenomena can reach the brain and how extra-sensory communication/ perception 'works' mechanistically. The brain scan technique MRI *(Magnetic Resonance Imaging)* that is often used in hospitals is also based on quantum field spin resonance and is the best evidence that quantum phenomena occur in the brain. In fact, **non-local entanglement** between the brains of two persons has also recently been demonstrated with MRI.

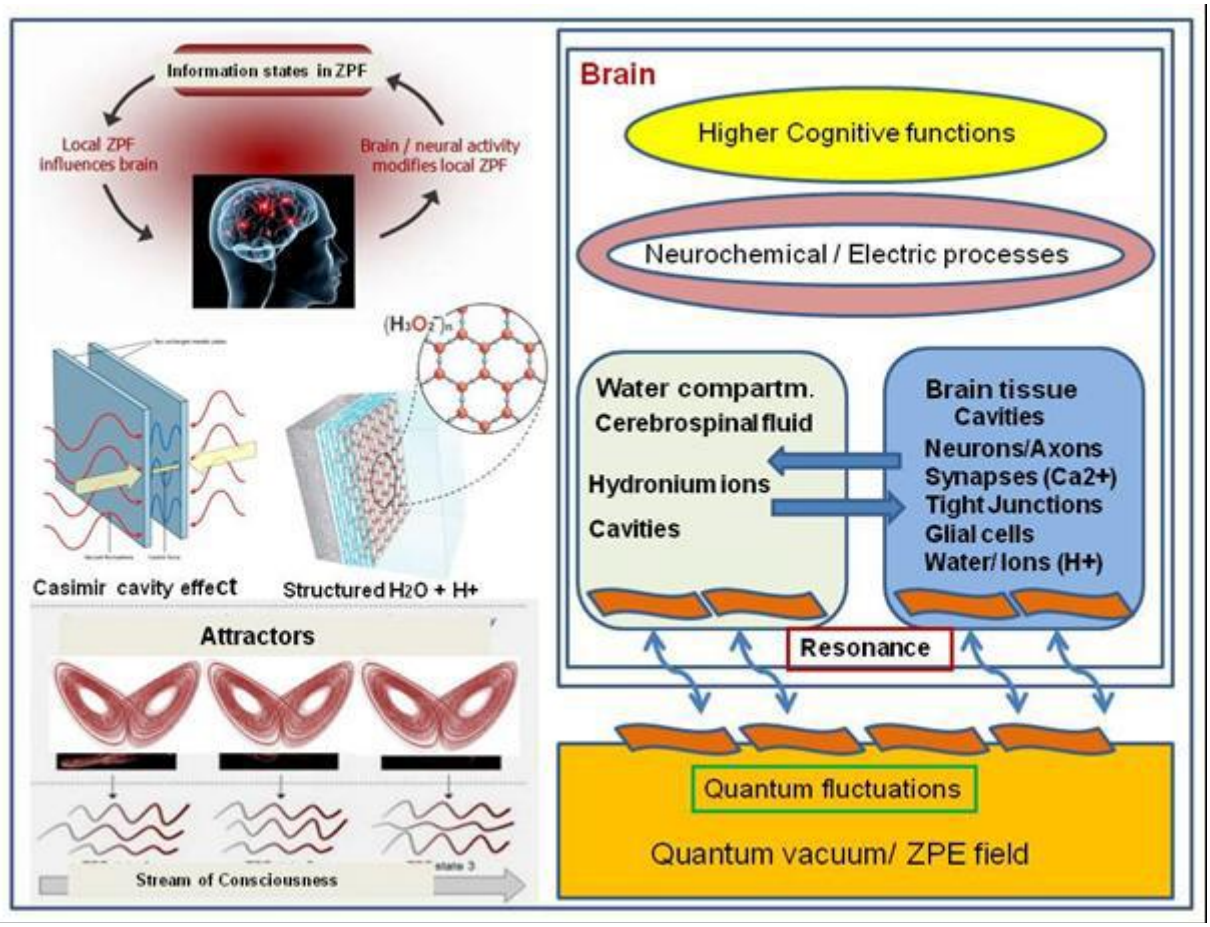

Figure 25. *An intrinsic "back-reaction" – or the two-way aspect of information between 3-D and 4-D to the knowledge field - updates this integral information field (top left ZPF with the Casimir effect), while quantum resonance in water compartments in the brain (middle right) exchanges and attunes to the ZPE that functions as an information carrier (bottom of* ***Fig. 23****).*

There are very different opinions in science about the objective existence of so-called PSI phenomena such as telepathy and clairvoyance. Often such phenomena are simply dismissed as they would not fit in (conventional, non-quantum physics related) scientific literature. However, the fact is that these phenomena

have been demonstrated with a very high degree of probability in two independent meta-analyses (Radin, 2008; and Utts, 2018, see [3; 5; 9;.28;41;47), It has also recently been demonstrated that people trained in meditation can exert influence at a distance (outside the experimental room), perhaps – according to Radin - because they can focus well on their *intention* and consequently influence the observation.

Consciousness researcher Susan Blackmore, however, is skeptical about PSI: if these phenomena would exist, the signals are at least weak and very personal. She may be right to a certain extent, but it is also good to consider that a phenomenon such as *synchronicity* (experiences experienced as coincidental, but as coherent) could be seen as a *correlation of phenomena* that have meaning for the individual and such experience is often emotionally determined. Anyhow its occurrence is always an explanation *after* the fact happened. It is therefore not an on-demand inducible phenomenon that lends itself to classical scientific research.

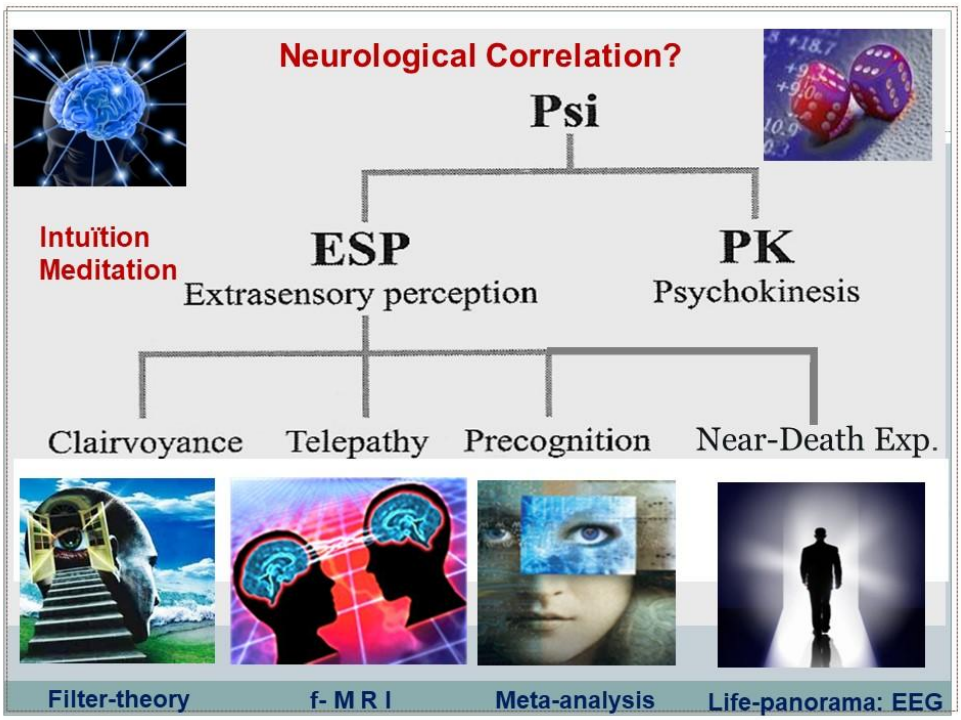

Figure 26: *Overview of various Psi phenomena such as clairvoyance, telepathy and near-death experiences.*

Bergson already noted that **the brain function** is *eliminativ*e, filtering the information around us is enormous, so fortunately we are being protected from overwhelming and superfluous information. The same filtering mechanism may also lead to the standard selection of extra-sensory information and PSI. Another factor that may play a role here is the *separation* of the brain into a right (holistic, intuitive) and a left (analytical, verbal, logical) hemisphere,[41; 47].

The dominance of the rational left hemisphere may inhibit the more non-local perceptions of the right hemisphere. Sperry showed that split-brain patients, in whom the contact between the hemispheres via the corpus callosum has been surgically severed, in fact develop two completely different spheres of

consciousness within the same skull, but that despite this physical impossibility of communication, a transcendent influence can be observed in the experiments that brings both spheres into a certain agreement or coherence. These facts may indicate a non-local field-like communication in the brain.
Science, which has become increasingly reductionist in recent centuries, also had a hard time with the **transcendental world**: research into the extraordinary (paranormal) became, and still is to some extent, a fringe area with elements rejected in advance: that which did not belong to the daily consensus was not considered worth investigating, (**Fig.26**).

This type of prejudice should of course be regarded scientifically as a very counterproductive attitude, because many breakthroughs in research have to do with intuition, serendipity and boundary-crossing concepts. When one separates the wheat from the chaff in these matters, and that is absolutely necessary given the excess of "humbug" in this field, a new era seems to emerge, in which PSI and ESP research becomes an integral part of science. This approach is suggested by researchers such as Targ, Houck, Radin and Josephson (see 41;47]. They argue that an interpretative framework such as quantum physics can be used here, a theory within which it is common sense that humans observers exert a certain influence on their observed phenomena and that all is connected with an underlying non-local information field (see also: Kastrup, 2017, see [41;47]).

Recently we studied the phenomenon of Mystical Experience [47]and concluded that a Universal Spectrum of Mystical-, Near Death-, Psychedelic-, Deathbed- and other Transformative Psi- Experiences is at stake. Importantly it was found that **psychedelic treatment can induces visions of cosmic unity and eternal love, and that these often results in personal transformation to a more empathic and peaceful life.** Well controlled psycho-therapy with psychedelics such as **psilocybine,** can therefore play a major healing role for mankind and its planet in the near future, that, at present, is unfortunately dominated by electromagnetic pollution, addiction to money and power, misinformation by media, and also a devastating in-equality within the world-wide population.

It is important to note that much of the good PSI/ESP research in this field is mostly based on proper controls and is carried out with scrupulous care to exclude any form of bias and statistical misinterpretation. The above-mentioned meta-analyses by Utts and Radin are based solely on this type of published and peer-reviewd research. This research is, however, mostly focused on the direct *demonstration* of paranormal phenomena and less on the underlying psychological *mechanisms* of information transfer. The latter is of great importance for future research, also because it could, for example, clarify the influence of perception by the observer.

With a quantum approach to consciousness, extraordinary or boundary-crossing experiences may be understood to a larger extent. For example, intuition and serendipity, extrasensory perception, consciousness expansion and dreams. Incidentally, non-local entanglement between the brains of two people has also recently been demonstrated with MRI: a clear implication for neurology. Also the impact of the technique of treatment at a distance, mentioned in the former chapter, is better understood. A new era seems to be dawning in which research into PSI and extrasensory experiences will become an integral part of regular science. The interpretative framework of quantum physics can be of great use to this end, because the influence of the human as observer and the connection with an underlying, non-local, information field are common knowledge.

16. The Self-Learning Universe and the Role of Artificial Intelligence of Humanity

16.1 Introduction

It may have become apparent that the authors consider the Universe - from the perspective of quantum physics - as a **living entity** [35;46]. An entity that, during its evolution, became increasingly **self-observing**. And humanity, as an observer, appeared to be instrumental therein. The structure of the cosmos is fractal and holographic in nature: each part of it possesses the information of the whole. The cosmos therefore possesses an addressable memory, which is demonstrably present somewhere, in what in holography is called the 'event horizon'. The complexity and versatility of the connectedness of this infinity in the total structure is striking, with very diverse signal mechanisms (Meijer et al,[36;43;46], photon streams with the speed of light, gravitational waves and *"entanglement"* with a speed exceeding the speed of light by far, or better to say: which happens immediately, so speed is not an issue. In this communication system with its interference patterns and coherent wave fields, a 'mindful' universe emerges, because cyclic feedback loops arise, through which the physical information becomes meaningful.

Humans also contribute to this **mindful universe** [35; 39;41;46;47], through the groundbreaking technology that now makes it possible to observe and interpret the boundaries of nature and of the cosmos, from the largest galactic systems to the electron. The mathematical approach in, for example, string theory helps with this technology. A degree of (proto)-consciousness - in the sense of storing and exchanging information - is now even assumed in biology. Which makes sense, as for example, single-celled organisms need information from the environment for their adaptation and survival. This certainly also applies to the physics of elementary particles: they exchange information about their mass, spin, polarization and charge through interaction and communication via light particles.

The **human brain** consists of these same elementary building blocks and - speaking in terms of evolution - the brain arose from primitive cells (micro-organisms) later changing into multi-cellular structures (**Fig. 25**). In a series of increasingly complex life forms our brain evolved into the most complicated information-processing organ we know, an organ that provides the ability for multifaceted observation of their context in nature**.**

16.2 Consciousness, as we mentioned earlier, is **partly generated by the brain, but is also partly received from the ZPE field.**[10; 21-23;27]. Many authors perceive diverse forms of consciousness on earth to be a reflection of a cosmic consciousness. Many leading physicists have stated that the matrix of various layers of reality will never be fully known and understood without a clear insight into the structure and functioning of consciousness - on very different scales in the universe-. Furthermore, it is becoming increasingly clear that the brain also protects us by selectively 'allowing' or 'filtering' information into the brain: it is designed to prevent as many surprises as possible (Carhart-Harris and Friston, see [41;43;47]). **Built-in filters reduce the abundance of data** that is too confusing or does not directly serve the survival of the individual. And these filters do not work equally selectively with every person. Detecting very diverse Psi phenomena, for example (see **section 14**), is given to a few: it often requires intensive practice (meditation etc.) or is sometimes only manifest in the failure of these 'filters', by the intake of certain substances or failure of normal brain functions [95, 96] such as during near-death experiences (NDE). Nevertheless, these

phenomena are often impressive and reveal the existence of enormous amounts of individual information. Think for example of the total life panoramas that 'pass by' during NDE. These phenomena are rightly becoming the subject of increasingly intensive study in current neurology.

Here we touch upon an **implicit human shortcoming,** in which we often encounter our limitations in interpreting the reality around us, specifically so in current science (see Meijer, [39;46]). It is therefore important to occasionally break through this “programming” of the standard brain, to cherish doubt and **to rely more on an intuitive approach** [39], that can lead us on completely new paths. Many well-known **breakthroughs in science** are based on this. Einstein, among others, praised the importance of intuition. Another person who - as an exact scientist - sometimes worked very intuitively, was the famous American physicist John Wheeler. He wondered how we could arrive at more knowledge from a quantum-physical perspective: what is the role of observers and where do we find the necessary information in the wave world that we do not see, which is invisible, but that has to be there to fathom the deeper layers of nature.

Wheeler's thinking comes close to the implicate order of David **Bohm** [101, 102]. Wheeler came up with the so-called absorber theory, which states that the present is caused by the 'absorption' of quantum waves from the past, but also from the future. From a personal perspective, all information for our current state would then be integrated with information from a scanning of our past and from looking forward to the future, (**Fig.27**).

16.3 ‘Time’ in an Timeless Domain, where Past and Future are Present

Wheeler, like Albert Einstein, considered our **experience of linear time to be an illusion** of our consciousness: an illusion that is actually meant to neatly line up cause and effect. Both believed that all time and therefore all experiences are present, are happening in a timeless domain, which is now called a *'block universe'* . This quantum-physical space contains a fourth *spatial* dimension. John Cramer [see [28], a follower of this line of thought, derived an important theory from this approach: the **'Transactional Interpretation'** of quantum mechanics.[1;2]. He stated that the **collapse of the waves of potentiality into particles, through conscious observation of the wave**, does not ‘just happen’, but that the quantum state in the present is ‘determined’ by a kind of scanning or fitting in with the related information states in the past and future of the wave. This scanning would work by means of so-called *'advanced* and *retarded waves'.* This can literally be seen as a transaction of information in the present via the preceding and the yet to be expected information (see **Fig. 25**).

That such a process can actually be physically realized, was later demonstrated experimentally in the group of the Israeli Aharonov. Aharonov noticed that a wave state contains more information than can be derived from the past and present of the wave, and he wondered whether the missing information could come from the future of the advancing wave motion. In order to probe the wave in that area with scientific research, he had to prevent the wave function from collapsing through the observation itself. He found an ingenious trick to probe the wave part that was yet to come: this could be done by measuring with very weak energy (with *'soft stimulation',* a kind of intended observation*),* but then very briefly and hundreds of thousands of times in succession, whereby this essential information could be obtained *without* collapsing the wave function! He concluded from this work that the information state of the present is obtained, as it were, by a 'conspiracy' of the related states from the past and the future [1 ;2].

This observation implies something quite unexpected: the fact **that the future can also determine the past.** This phenomenon is called **retro-causality** [34]. This seems strange to us of course, but other researchers, such as Sarfatti and Sutherland pointed out that in quantum physics time is always two-way (and thus runs from present to future but also back!); as such it is also used in mathematical derivations. They even concluded that many quantum-physical observations cannot be explained without such a **two-way concept of time.** Could this also be the background of John Wheeler's 4th dimension? The influence of anticipating the future is not at all strange to us, after all we continuously mirror ourselves by representations from our memory but also by "simulating" ideas of the experiences to be expected in the future (so-called "predictive coding").

Yet, rewriting the past by events in the present or future seems unlikely, and this view demonstrably leads to all sorts of paradoxes. However, the question arises whether we can really observe such retro-causal processes, because they may be too fast to occur and too far in the past. In biology, there is much talk about **emergence:** the occurrence of new – more complex - processes that cannot be derived from previous processes, (**Fig. 27**).

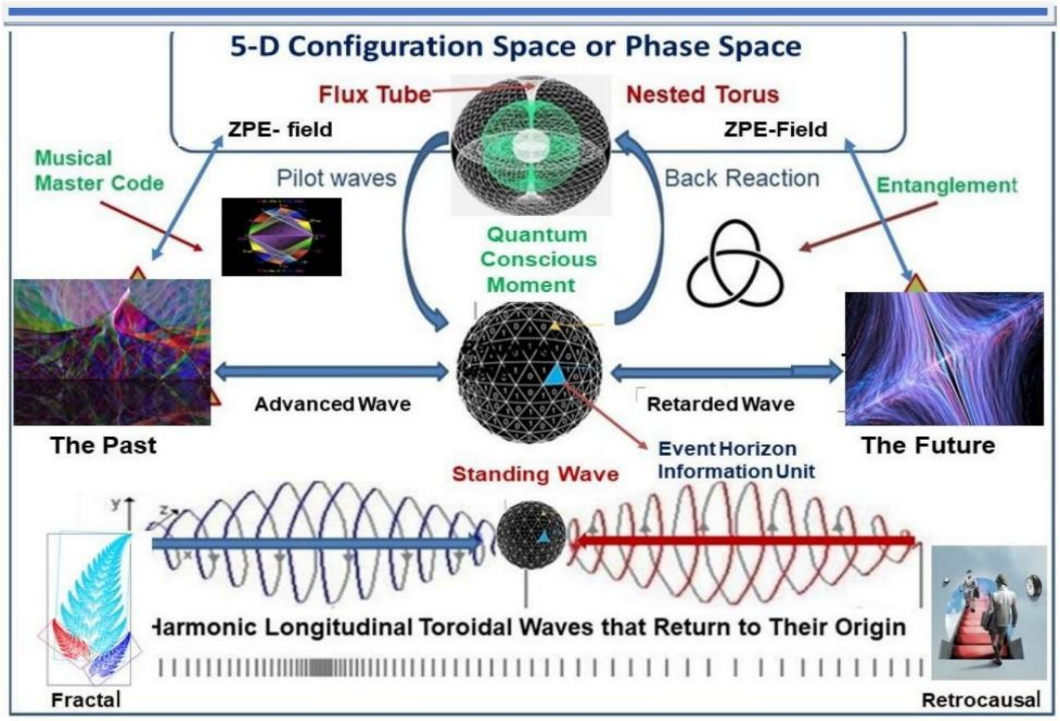

Figure 27: *Transactional formation of an 'entangled' and standing information wave (red in the central part). It is like a conscious quantum moment in the present (green in the central part), which 'shakes hands' with the past and the future via so-called absorber waves. This 'fitting' process is carried out by 'advanced and retarded waves', which then return to their origin (blue arrows in the middle). Together they produce an information unit in the 4-D present. Information from the past and future is obtained via the Zero-Point Energy field (ZPE), which is considered as a transition zone between 5-D and 4-D (above). This information unit undergoes a feed-back loop to the 5-dimensional "Configuration Space or Phase Space" (see back-reaction above right). From this 5-D space 'pilot waves' are also transmitted via so-called central 'flux tubes' of a torus, which thus transmit information. "Advanced and retarded" waves*

can also be considered as longitudinal returning waves (see lower part of the figure). The information unit (the blue triangle in the black sphere in the middle) is projected onto an 'event horizon' of the universe. The 4-D cosmos (with three spatial and one time dimension) is fractal (lower left depicted) and can therefore undergo retro-causal effects from the future (bottom right).

But isn't such a supposed emergence a kind of trick box to explain a happening after the fact happened, as we can't really understand the observed reality? Some philosophers have proposed another principle. The – not well understood - jumps in the construction of living and reproducing cells (with their irreducible complexity), could arise from the fitting in information fields from life models from the future. This is also because feedback of information from a hierarchically ordered system is **quite normal in nature** .Emergence would then not be an issue.

In this way we can also look at the **evolution of humanity:** is our current development also determined by a feedback from our own future 'model' through retro-causal quantum-physical influences? Or, returning to Wheeler, is everything already fixed in a timeless domain and should we actually doubt a free will - or free choice - in the existence and mind of man? These reflections led to the current scientific discussion about so-called *"superdeterminism",[34]:* is there an underlying 'commanding' information structure that determines nature, including our experiences? This view is considered *not impossible* by leading researchers such as Sabine Hossenfelder of the Max Planck Institute and quantum physicist Jim Palmer from England, as well as by Dutch Nobel Prize winner Gerard t'Hooft with his *Automaton Cell* theory.

For example, they argue that despite this determinism, **free choice in our lives** is very well possible because, even when the beginning and end points of life are fixed, there are still many paths in between and underway which one can freely choose. They also generally pose very critical questions about arguments that are put forward in consensus science against super-determinism, (see [34]. The discussion is not over yet, partly because the **interpretative frameworks of natural science** are far apart here and even contradictory.

Take for example David Bohm's theory that every particle is accompanied by a steering wave from an implicate order (the so-called *"pilot wave")* and that the information in the wave determines the behavior of the particle[1;2;4]. This gives rise to a rather deterministic picture. However, recent quantum-physical experiments have confirmed that particles have a kind of 'knowledge of the future', in other words: have access to future information. The apparently deterministic character of Bohm's theory becomes less deterministic, in case the pilot wave is interpreted *as two-sided.* In that case, with every quantum-physical decision in nature, information also flows back to the assumed knowledge field *(back-reaction).* In fact, this is retro-causality from our explicate order to the implicate order: the order that is also called *configuration space :* the space in which things take shape, see **Fig. 25**). This is now proposed by a number of researchers (including Sutherland, and Sarfatti. These permanent *feed-back loops* mean that the supposed information field has a very dynamic character and that for that reason alone it cannot imply a fixed deterministic background (see also Meijer et al, 2022, [34]).

For all these reasons, the authors of the present article are of the opinion that **the principle of retro-causality should be included in the world view models currently at stake,** however counter-intuitive it may be. In the future, however, we will encounter many strange phenomena that do not - at first glance - accord with our primary feeling or logic. A very interesting vision of the future by Tipler and Vaas among others,

makes it clear that **in the far future our universe will be saturated with information, like a giant internet,** possibly also fed by many other species/civilizations in the universe. Tipler and Vaas posit that this information, in compressed form, will serve to form a new version of our cosmos (called the Black hole/White hole transition), or by a repeated *'big bounce'* according to Steinhardt. Their thinking leads to a cyclic model of the development of our universe (see **Fig.7**). In addition to retro-causality, there is also ordinary (ante-)causality as an aspect of the reproduction of the universe.

16.4 Artificial Intelligence: Potentials and Treats for Humanity

One major revolution in science and science education is near: the major impact of AI and Large Language models, as treated above, in relation to their impressive potentiality, but also encompassing the severe risk of replacing the central academic capabilities of selective data searching, condensing and proper integration of those data in a meaningful message by science professionals and students. Artificial intelligence (AI) now manages the properties of electromagnetism to process texts with extraordinary success and often with outcomes that are indistinguishable from those that human beings could produce. AI can easily produce a unique, single novel on-demand, for a single reader, including the concept of interpretability, the value of the process, as well as the context of the production of meaning. [39; 46;47].(**Fig.28**).

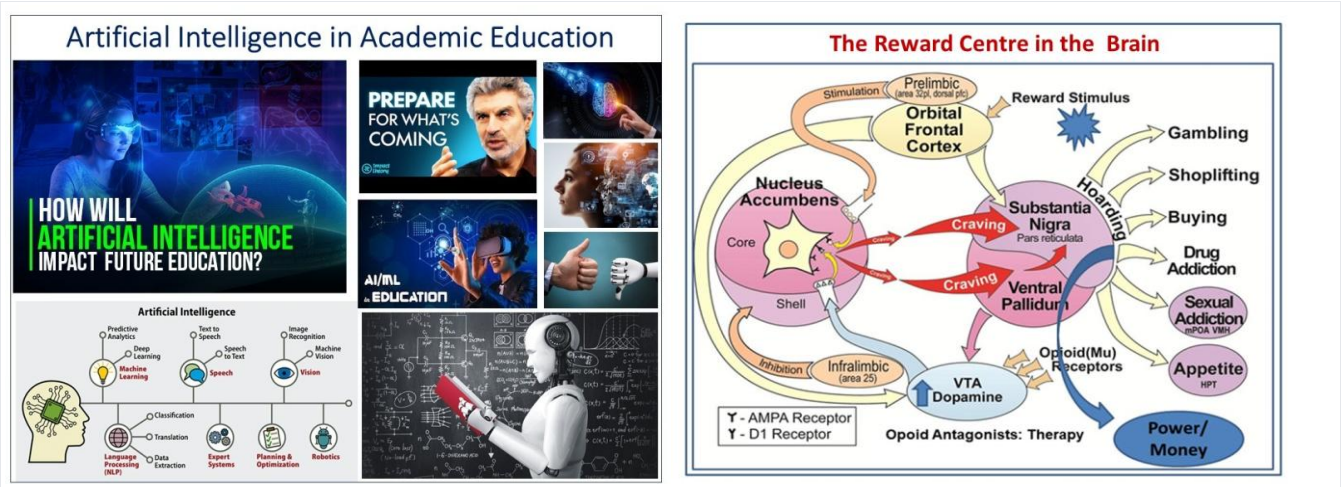

Figure 28. *AI in Academic education: overwhelming sea of Information without clear horizons (modified from Meijer, 2024b).The Reward Centre in the Brain Showing the Network of Various Brain Centres and Neurotransmitters Involved (left) and the Spectrum of Addictions that Are Currently Reported for Chronic Mobile Telephone use (right), (modified from S-W Kim et al., 2013 on Neurobiology of Sexual Desire)*

This technology, so challenges our uniqueness and originality as producers of meaning and sense, as well as of new contents, in addition to our ability to interact with systems that are increasingly indiscernible from other human beings in their products. It shows our replace ability as readers, interpreters, translators, synthesizers and evaluators of content and thereby the power in the control of questions. This, because, to paraphrase the book 1984, whoever controls the questions controls the answers and whoever controls the answers controls reality. Here we can be confronted with subtle manipulation of news and personal profiles based on AI-augmented intelligence analysis that produces infectious information for our brain, stored at hidden unconscious domains, somehow influencing our worldview and mindset, and potentially undermining our

scientific independence. It is the prominent task of the worldwide Academia to act as critical observers and as advanced innovators to generate versatile programs to control and, if necessary, to counteract such toxic intrusions of our life and take these ethical challenges very seriously. May AI provide the rebirth of the meme concept, representing the virus as bio-archetype of infectious information, that can be effectively counteracted by a versatile digital immune system (Meijer, 2024c,[49]). In this framework we should thus take an active position in counteracting the dark energy elements that drive scientists apart and tend to corrupt their integrity, thereby rendering science endeavor increasingly ineffective, (**Fig.28**).

Large Language Models (LLMs) models develop a statistical understanding of language: how words and phrases are usually combined, what topics are typically discussed together, and what tone or style is appropriate in different contexts. That allows it to generate human-like text and perform a wide range of tasks, such as writing articles, answering questions, or analyzing unstructured data. LLMs include OpenAI's GPT-4, Google's PaLM, and Meta's LLaMA. These LLMs serve as "foundations" for further AI applications. Despite their prodigious capabilities, these systems are not without flaws. At times, they churn out information that might sound convincing but is irrelevant, illogical, or entirely false, an anomaly known as "hallucination." In May 2023, the U.S. Department of Education released a report titled "Artificial Intelligence and the Future of Teaching and Learning: Insights and Recommendations". This report warns that AI not only increases known, existing risks, but also introduces new risks. Known risks include data privacy and security, algorithmic discrimination, inappropriate outputs, inaccurate depictions of history, unwanted surveillance and compromised trust. (**Fig. 23;28**). In this framework a plea was formulated by us to develop a bottom-up and top-down protection system against misinformation and the use of addictive algorithms, a safety program that could be considered as an Immune system for Internet (Meijer, 2024 b;c)[48;49]. We believe that our quantum code of resonant coherence could be instrumental in this 'recipe of reproduction' could well be captured in a **beautiful harmonic symphony: as the 'mental part' of universal consciousness** as we have described in this essay. This wonderful interplay of 'mind/matter' was previously well expressed by the famous physicist Wolfgang Pauli: ***"The future science of reality will be neither psychic nor physical, but somehow both and somehow neither".***

Consciousness is partly generated by the brain, but also partly received from the ZPE field. **Diverse forms of consciousness on earth are a reflection of a cosmic consciousness.** The matrix of various layers of reality will never be fully known without a clear insight into the structure and functioning of consciousness. The concept of a guiding impact of consciousness on reality comes close to the concept of an implicate order of David Bohm. The 'Transactional Interpretation' of quantum mechanics states that the collapse of the waves of potentiality into particles, through conscious observation of the wave, does not 'just happen', but that the quantum state in the present is 'determined' by a kind of scanning or fitting in with the related information states in the past and future of the wave. So the future can also determine the past. This phenomenon of **retro-causality** seems strange but in quantum physics **time** is always two-way (runs from present to future and back!). From biology we know about **emergence:** the occurrence of new – more complex - happenings that cannot be derived from previous processes. Something unexpected happens. The jumps in the construction of living and reproducing cells could arise from the fitting in and resonating with information fields from life models from the future, or fitting in morphogenetic fields of life as Sheldrake suggests. This could be true because feedback of information from a hierarchically ordered system is **quite normal in nature**. We believe that the 'recipe of emergence and reproduction' could well be captured in a **beautiful harmonic symphony: the 'mental part' of universal consciousness.**

17. Cosmological Context of our Musical Theory and the Nature of Gravity

From our studies it follows that **quantum observation** requires both a human-related and a universal modality of consciousness (10,21-23). In earlier work we elaborated on the potential connective character of our Acoustic Quantum Code in the entire Universe, detecting a basic EMF frequency spectrum, that also can be expressed in the 12 tone series of decomposed Chern-numbers. Chern numbers providing information on the wave function and correspond - in geometric/topological terms - to the integral over a closed surface such that the result is invariant in certain regions of the parameter space. In 2-D this is equivalent to finding the "flux" of the Berry curvature through the entire surface of the torus [9, 31].

Indeed, the major connective element in the fabric of reality, could be provided by our concept of the integrative character of our semi-harmonic frequency patterns. The presented concept is fully compatible both with the current Standard Model as well as with String (M)theories, but adds **a novel, underlying, connecting principle** (Gauge) of a fractal phonon EMF power spectrum [44, 45]. In addition it introduces a 4^{th} spatial dimension [21-23; 36; 43; 46,), evolving from a toroidal geometric context (4,6). We imply that the present Standard Model of Physics could highly benefit from such a fundamental extension.
Our **Bipolaron gravity concept** [38-45] (to be presented below) may thus represent a potential novel element in physics and science, revealing a fifth fundamental Gauge interaction, now framed as the “Gravitone” (22).

17.1 Science Philosophical Treatment of Current Science and Eternal Consciousness

Our work on the fabric of reality pays special attention to the interfacing of the field of universal consciousness (10) and our personal brain in relation to a potential afterlife [27;41]) and postulates a toroidal event horizon workspace of the brain [7, 13;14]. From our studies it follows that **quantum observation** requires both a human-related and a universal modality of consciousness (10,21-23). This workspace of the brain allows a symmetric 4-Dimensional (4-D) to 3-Dimensional energy flux (3-D quantum information transition), that induces the holographic personal memory integration (7; 8; 21- 23). The geometry of a 3-D brain, embedded in a 4-D realm, may explain the phenomena of functional brain binding, qualia, intuition, serendipity, synchronicity, extra-sensory perception, and other well-established para-psychological phenomena (5;9;19;28;27;39; 41;47).

Brain function is conceptualized as being guided by pilot waves derived from the Zero-point Energy (ZPE) Field (ZPF), that support consciousness (10;21-23]), even in the absence of neuronal activity, such as in Near-Death Experiences (NDE). The brain’s toroidal organization exhibits quaternionic dynamics and thereby allows an opening to 4-D geometry and consequently, to universal consciousness and the ZPF.

This personal holographic workspace, that is associated with, but not reducible to, the brain, collects active information in a “brain event horizon,” as an internal and fully integral model of the self (7, 12-15, 21). At death or, in other words, transition of our material body, this personal mental knowledge domain may dissociate from the body, yet it is retained because entangled and meaningful quantum information can

never be destroyed. In NDE, this uncoupling is only temporal, but reveals universal consciousness in a fully transparent manner, since in this condition non-neuronal information processing is preserved.

This preservation of meaningful information occurs through fractal semi-harmonic frequencies, from the ZPE field, that reflect an entangled personal register of each conscious being 10; 21-23). The proposed concept, therefore, contradicts the promissory materialist solution to the mind-body problem. Instead, it substantiates the notion that the brain can act as a kind of "receiver" by filtering (sub)conscious states through holographic resonance with universal consciousness through specific coherent oscillation domains in the body [10,19;27;29;36], (**Fig.29**).

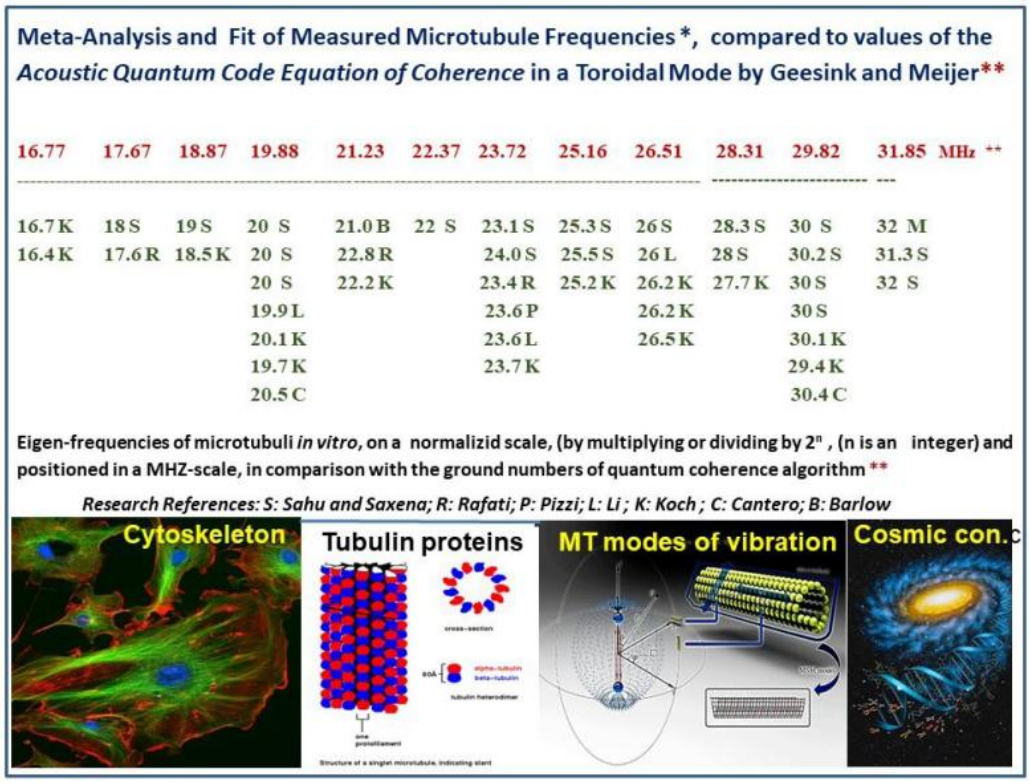

Figure 29: *Experimentally detected vibration frequencies of micro-tubules in vitro, in comparison with the frequency distribution of the acoustic quantum code of Geesink and Meijer (indicated in the red line MHz) at the MHz range of EMF after normalization (see Meijer and Geesink, 2022). Below from left to right: MicroTubuli as part of the cytoskeleton of the cell; Arrangement of Tubulin Proteins; Transverse and longitudinal modes of MicroTubulin vibration; The Cosmic connection by resonance of MicroTubulin oscillations with gravitational waves at the Planck scale and at the ZPE field level. Solitons (polarons), are longitudinal waves formed by electrons coated with phonons (called quasi-particles), that promote coherent vibrations of cell components (middle right), and interact with poly-peptide chains to guide the process of 3-D folding to functional proteins*[21].

[21] *). In biological evolution, first life proto-cells are informed by discrete EMF waves that are generated by metal-doped phyllo-silicates (clay materials (16,17))***,** *which function as semi-conducting wave transmitters and also can catalyze polymerization of nucleotides to primary RNA/DNA. The formation and dynamic constitution of DNA spatial structure with its nucleo-bases is guided by specific magnetic monopoles energies. DNA exhibits a specific vibration pattern that is instrumental in cellular function and shaping of a life-memory information store, that in a holographic manner, steers*

Yet, it is recognized that our self-consciousness can also act as a damping filter for overloads of information from this universal knowledge field [41;47). The latter aspect of a "dual filter theory" is apparently perturbed at states of modified brain function such as NDE, deep meditation, and use of psycho-mimetic drugs, that all expose us to unknown cosmic perspectives. The presence of a mental, field-receptive, resonant workspace, might be termed our "supervening double" (or "soul," not implying religious doctrine), and provides an interpretation framework for widely reported but poorly understood transpersonal conscious states. These may even imply that death can be conceived as a transition to another state of existence, yet we realize that all of us already belong to such an eternal domain in our present lives. Therefore, the present model may imply the potential for the survival of individual consciousness, qualifying conscious individuals as designated survivors and eternal beings, [41;47]

17.2 The Relation of our Musical Quantum Code with Quantized Spacetime and Protein Folding

This relation with Chern numbers and our finding that the revealed EMF power spectrum has been shown to promote both superconductive properties and quantum entanglement and is compatible with acoustic spectra of CMB, ZPE-field, Gravity Wave frequencies, as well as Planck Black Body oscillations [29;36]. This may indicate that our "musical quantum code" reflects a fundamental and **scale invariant property of quantized space-time**, explaining its overall presence in at least 20 biophysical phenomena analyzed by us from 2014 to 2024 [17; 29; 36].

Among other subjects, we paid attention to the item of 3-dimensional protein folding [15, 16], and concluded that this complex process, as well as the detailed interactions between 200.000 functional proteins cooperating in metabolic networks, require an integral cellular memory. This essential feature can be attained by a holographic workspace (event horizon) surrounding each individual cell.

This implies that *the 3-D folding of proteins would not be performed on the single protein alone. Instead, it needs an approach in which all the functional and interacting proteins belonging to a cellular network should be taken into account at the same time.* Only an overall collective memory of the cell, using the holographic principle, can achieve this goal. [16].

Of note, the current models of A I may, to some extent, mimic such a preferred analysis, since they use algorithms that search for optimal solutions of all the interrelated factors known, and major improvements in predictive modeling of protein conformation were recently attained using AI programs, such as alpha-fold. The important report of Miller, 2024, on the scale-free universal relational information matrix, fully supports the idea of holistic (top-down) view of cell function. This is also highly compatible with recent studies that refer to a potential cell consciousness in relation to the origin of life by Funk, 2024, the neural superfluid universe of Fedi and Sbitnev, 2024, an essay on the holographic quantum theory of consciousness , as well as an interesting study on the Psi-field as a quantum field model of consciousness of Oyewhole, 2024. **(For references of the above see Furteer reading).**

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the holonomic cell as well as intercellular communication (taken from Meijer and Wong, [19]).

Our work has been reviewed in books of others: "Cosmometry, Exploring the Holofractal Nature of the Cosmos", (Marshall Lefferts, see p. 5; 253; 266; 275; 299) and in Dutch language in "De Staat van Bewustzijn (Wil van Esch, see p. 319; 335; 410; 449; 450). Our current concepts on Consciousness were treated in the comprehensive review on consciousness studies of Robert Kuhn on: "A Landscape of Consciousness: Toward a Taxonomy of Explanation and Implications", (on p. 129), see further reading)

17.3 The Sonic Origin of Gravity/Dark Energy

The search for an integral derivation of the nature of Gravity is ongoing. The theories of Relativity of Einstein (gravity results from a distortion of space-time through the influence of mass) are well known. Less widely known is the concept that gravity is induced via a dedicated wave/particle, framed as the 'Graviton' in the Standard Model of elementary particles in quantum field mechanics. The graviton is thought to be expressed in the form of a gravitational quantum field in which elementary particles (somehow) obtain gravitational properties, being true for all modalities of mass. This sort of resembles the Higgs particle that is supposed to provide all particles with mass. However, these two theories of relativity and quantum physics seem not to be compatible with each other, among others due to failing of the underlying mathematical considerations.

Other attempts to deal with this problem are the so-called "String (M) theory" and the "Quantum Loop concept" that both describe cosmic wave entities at a very small scale, are most promising. Yet these models do not yield a definite way out and, at least for now, are basically non-testable since current physics technology has insufficient power to study such extremely tiny components of nature.

Recently we have proposed a basically simple model for the origin and nature of Gravity and its opposing force of Dark Energy. In short it conceives the emergence of Gravity by the coming together of the first stable cosmic particles, Electrons and Protons that have negative and positive charge respectively and thereby attract each other and form a fermion pair (see fig.27). They so form the known precursor of the Hydrogen atom, called Protium, that is shown to be abundantly present in all parts of the cosmos. We than argued that due to the presence of phonons (sound wave/ particles) the Protium pairs became associated with a cloud of phonons. Such a **combination of single electrons or protons** (being fermions) **with a shield of phonons** (bosons) belong to the so called **quasi-particles**, which in this case of phonons, are called **Polarons**. Because of the pair of associated particles, we better label them **Bi-Polarons**, as they carry both (+) and (-) charge, and therefore function as dipoles, both being equipped with a phonon cloud (see **Fig.30**).

If two Bi-polarons approach each other due to charge interactions, they can join and form so called ***Twin-Bipolarons*** (TBP's) while in between these two units a superfluid quantum space is present. We have labelled this entity as **the TBP Gravitational-Center**.

Why sonic and why gravitational? Here is *the first hypothesis.* In the primordial superfluid quantum space that forms the plenum of the TBP-center, **sound waves** can both be created and will propagate. In this dynamic TBP domain, the **phonons so generate density fluctuations** and initiate chiral (left-handed and right-handed) vortices as spiral waves with opposing flow direction (see **Fig.30**). The latter wave dynamics was earlier shown by Fedi and Sbitnev, see: [40;42;44;45], to represent potential gravitational forces, and so may explain the very origin of Gravity. Because of the vortices exhibit dual (counter directed) flow patterns, they may, apart from Gravity, also induce the counter force of Dark Energy. Yet, to create the postulated

density fluctuations, the presence of sound (scale-invariant series of coherent and decoherent EMF frequencies), in the form of a variety of phonon particles is essential

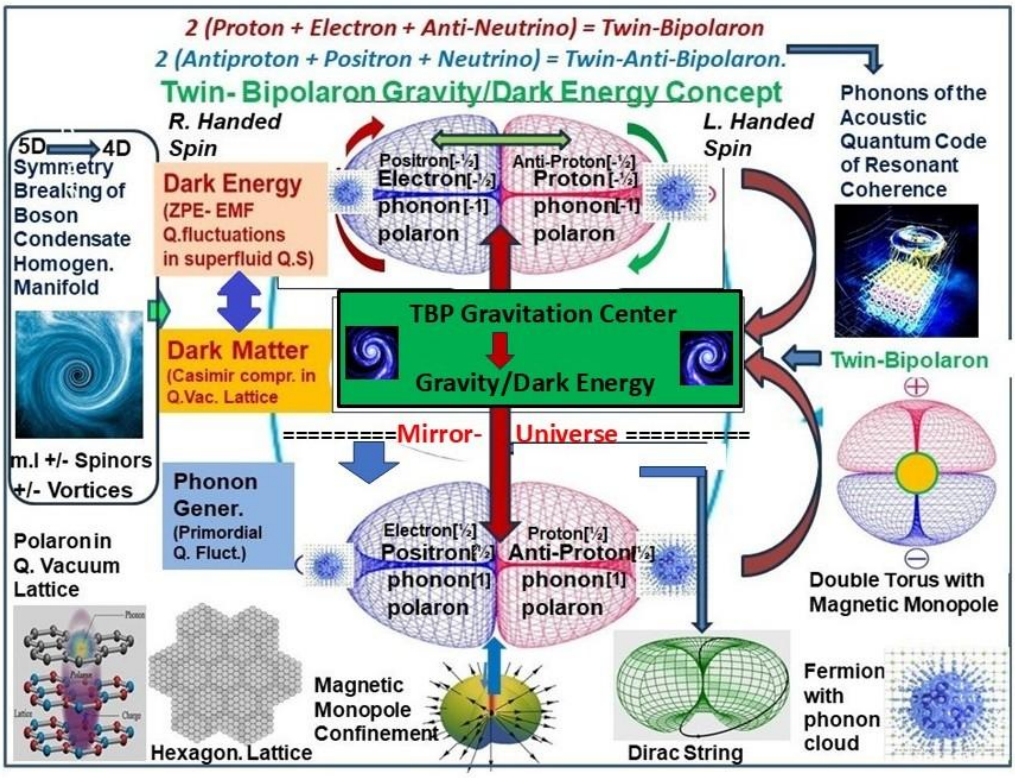

Figure 30: *The concept of the Twin-Bipolaron as a generator of Gravity and Dark Energy. This fundamental process occurs via 5-D to 4-D symmetry breaking (inset left column), producing a discrete set of phonons in a toroidal setting (inset right above). That toroidal set of phonons forms quasi-particles by covering fermions (inset right at the bottom) with phonon clouds, thereby forming polarons. The resulting Bipolarons exhibit right-handed and left handed spin that, through their rotational interactions, are instrumental in the generation of Gravity and Dark Energy, respectively, as determined by the direction of vortices spin (Gravity/Dark energy depicted by the red arrow in the middle). The polarons may be produced and /or become associated with a quantum vacuum lattice with a hexagonal structure as (inset right below). The latter may enable a Casimir type of Dark Matter particle generation by Dark Energy quantum frequency squeezing (see inset middle left). The dual Twin-Bipolaron structure is situated in the supposed adjacent Mirror universe with Matter/Anti-matter cosmic symmetry (center of figure), explaining the relative low Ant-Matter density in our universe. The involvement of magnetic monopole confinement is shown (middle at the bottom) as operating at the inner center of the double torus structure (inset middle right). The generation of Gravity can also be interpreted as space distortion via a Dirac String, connected to a magnetic monopole, providing the related mechanism of Relativity-based Gravity. The mirror aspect in the middle depicted by ====== bears two different connotations: one of matter/anti-matter physics and the other of a time-space to space-time mirror modality. The latter implies the potential of 4-D to 3-D transition that, by symmetry breaking, generates mass, charge, and toroidal(spiral) energy flux that paved the way to first Life (Meijer and Wong, 2022).*

As a second hypothesis, the generation of Gravity/Dark Energy could be related to, respectively attractive

and repulsive charge interaction of the two Bi-polaron units, in which case the discrete phonon (coherent/decoherent wave frequency) series would be instrumental in the **precise alignment of the two bi-polaron structures**. The latter geometry is obviously required to induce the short distance charge interactions, that collectively could result in the two long distance forces of Gravity and Dark Energy.

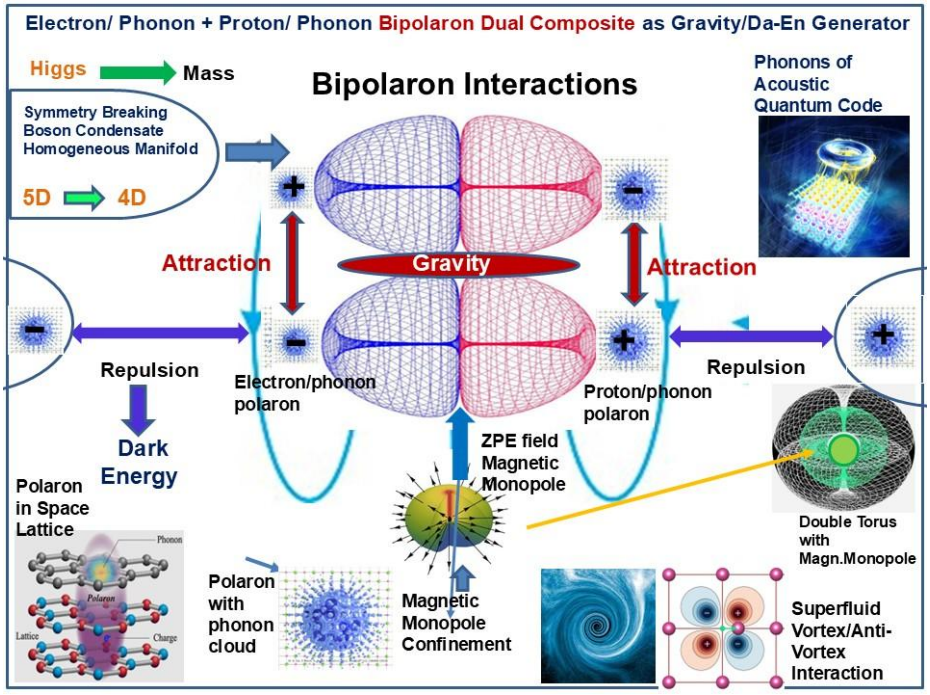

Figure 31: *The Bi-polaron charge interactions of an attractive and repulsive nature, may explain the creation of Gravity and Dark Energy respectively. The phonons as sound particles are proposed to be instrumental in the alignment of the units in the TBP center superfluid space as a part of the Zero-Point Energy field.*

17.4 Our Sonic Cosmos

In this sense, the intrinsic movement of wave/particle information in the superfluid, resembles the Gravity theory of Verlinde, who postulated earlier that Gravity is a secondary reaction (entropic reaction) to the flux of mass coupled information (Verlinde from Amsterdam, see [44;45]). Yet, Verlinde did not take into account the sound-mediated mechanism as the potential *cause* of his supposed mass flux and his theory also lacks the symmetry breaking aspect in a mirror (matter/antimatter) universe setting. The matter/antimatter mirror symmetry implies the aspect of particle annihilation and therefore pictures the TPB center as part of the Zero-Point Energy (ZPE) field, seen as a domain bearing all cosmic information. Both coherent and decoherent frequencies could exist in the ZPE field, since it is known that this field both contains a structured part and a stochastic (chaotic) part. Verlinde's concept also does not elaborate on the time-space to space-time transition, assumed by us as a primary aspect of the Universe Mirror model). In our idea this mirror aspect represents the crucial 4-D to 3-D transition of energy at the very start of our Universe.

Creation of the cosmos from a 4-D (platonic) information domain (by David Bohm called the "implicit order"), is so related by us to a **pre-Big Bang event** that can only **imply the existence of Universal Consciousness as the source of all there is**. Our Universe was not born out of "nothing" but rather out of an integral

knowledge register that was mathematically defined by music theory: and therefore **our cosmos should be regarded as a sonic construction**,[4].

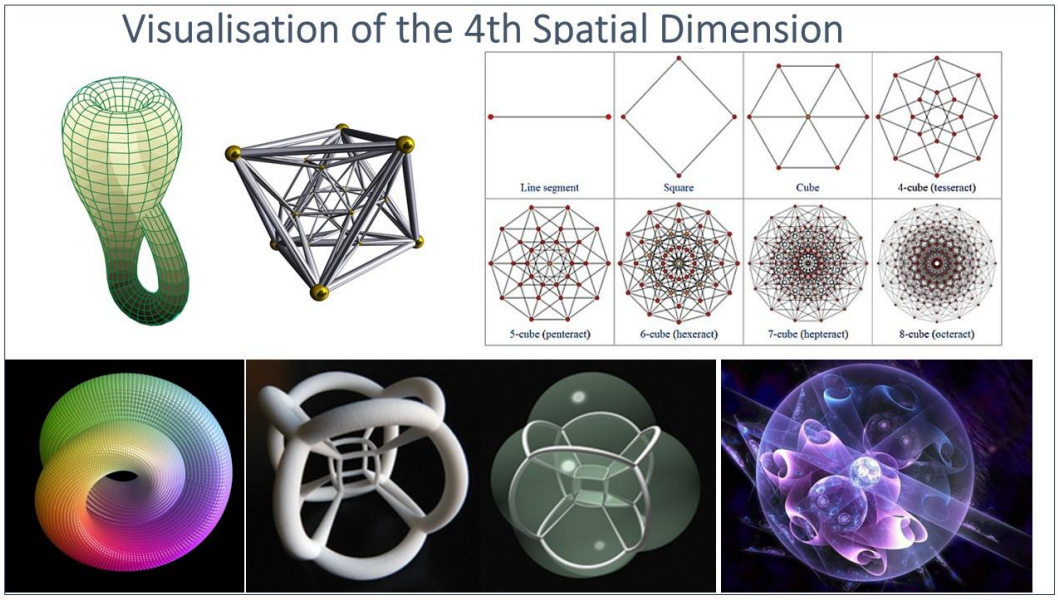

Figure 32 : *Representation of 3-D visualisation attempts to picture a 4th spatial dimension of Spacetime, with above the Klein-bottle model, 5D on a box model, and geometric connective patterns. Below spiral model and 5 D in 4D models, and last: 5D as quaternionic movement.*

The above treated concept of Twin Bipolaron (TBP) Gravity was presented in a preliminary context by Meijer, Wong, and Brown [37;38], but much further elaborated by Meijer and Bermanseder (40;42,]. Since these papers highlighted the creation of Gravity, Dark Matter, Dark Energy, within the structure of Superfluid Quantum Space Lattice, and integrates a primordial Acoustic Quantum Code of Resonant Coherence, it can be considered as fundamentally innovative in the field and even **could provide a "Unified Theory"**. This idea is supported by its scale invariant/fractal character (valid from very small to extremely large cosmic structures), as well as the potential application of the earlier mentioned Holographic principle. The latter includes an Event Horizon global memory workspace, associated with both the Universe and the human brain with its constituting atoms/molecules [10, 21-23]. We therefore further defined these patterns on the basis of the behavior of sound in nature, in the form of the abovementioned quasi-phonon-wave/particle composites (polarons), such as the phonon/electron and the phonon/proton modalities, together forming a +/- Bi-Polaron structure, confined in a magnetic framework to be conceived as gravito-magnetic BSE condensates [44;45], **Fig.30;31**).

The related energy flow can be adequately modeled by nested toroidal geometry, that provides a 4th spatial dimension, (**Fig 32**). thus implying a 5-D homogeneous space-time [4, 6, 7,10, 21-23]. The (anti-)gravitational waves can be conceived as vortex/anti-vortex excitations emerging as open strings at poles of the torus as left and right rotating vortices in a confined curvature region, that in 4-D can undergo BSE condensation [4,45], (**Fig.30;31**).

17.5 The Acoustic Quantum Code and Gravitational Evolution of the Cosmos

The polarons, guided by coherent/decoherent phonon quantum states, exhibit a dynamic interrelation with their de-coherent counterparts, enforcing the earlier mentioned forces of Gravity and Dark Energy (anti-gravity). We submit, therefore, that **these wave entities, in a superfluid quantum space context, are guided by the earlier mentioned Acoustic Quantum Code**, also framed as the GMC fractal set of EMF frequencies [32], by Wong et al., called the GM piano keyboard pattern). This constitutes a large fractal/self-similar series of over 1200 EMF frequency bands on the basis of a repeating core of 12 alternating coherent and decoherent frequency values of phononic activity , **Fig.10, [**7; 8; 16, 17]. *The phonon (sound) particle is preferred over the photon, since it is the type of quantum fluctuation that is most primordial in the supposed high energy-density of the vacuum [21-23; 33; 36;43).* As treated before, this universal sonic pattern, detected by us through meta-analysis of more than thousand scientific reports, may be interpreted as a musical instrument, that serves to compose a cosmic harmony (universal wave function) through the specific selection and ordering of tones (melodies), that are interwoven **into a grand primordial symphony** [33, 36, 43]. The latter is supposed to be inherited from a preceding universe (cyclic /rebound universe concept).

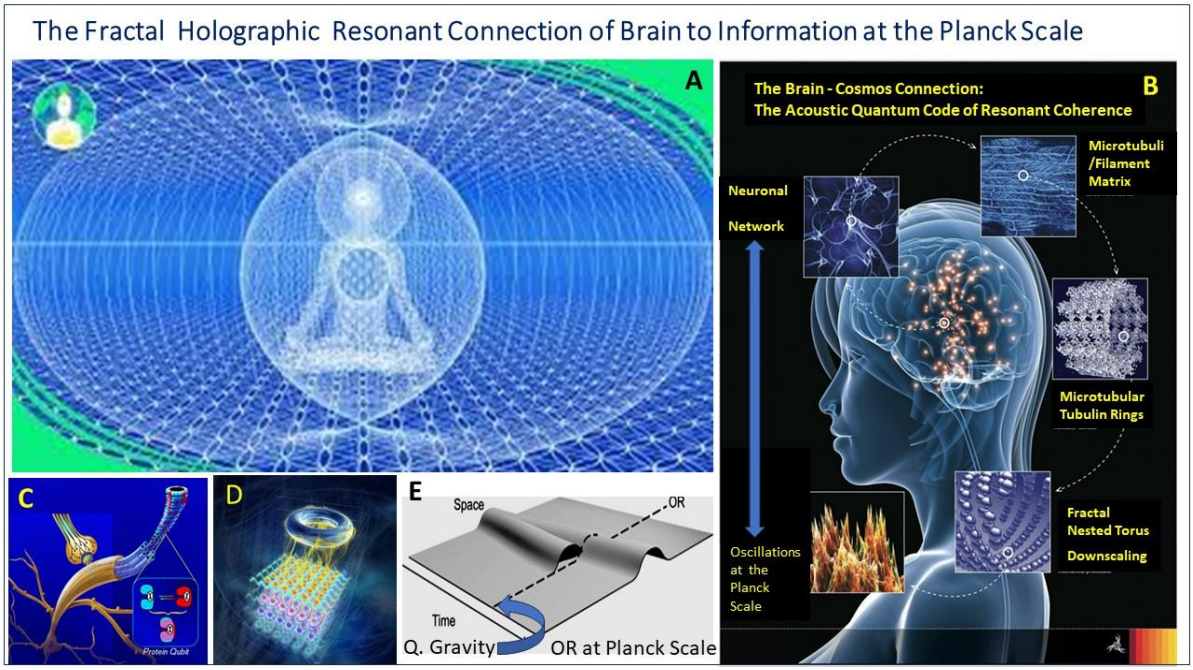

Figure 33: *Cartoon of the cosmic connection (**A**) of the brain neuronal networks (**B**), with quantum-foam ripple-type of Information vibration at the Planck Scale and vice versa (**B** and **E**), via tubulin oscillatory waves (**C**), that through nested toroidal geometry (**D**), undergo downscaling up to the Planck scale (**E**), where Superposition of wave ripples is mediated by quantum gravitational induction, initiating the process of Objective Wave Reduction (OR) in neuronal systems, leading to conscious moments (adapted from Hameroff and Penrose, 2016, see also **Fig.3**).*

This sonic pattern of quantum fluctuations may so form **the very power spectrum that enables the integral fabric of reality of both non-animate and animate systems**, the latter yielding conscious species that participate in the ongoing evolution of the cosmos (19, 21- 23). This includes the forces of Dark Energy and

Gravity in the mirrored Matter/Antimatter universe that features a Zero-Point Energy field, conceived as the universal container of knowledge (information with meaning), **Fig.33**).
The primordial origin of sound (phonon) mediated quantum fluctuations is also manifest in the fundamental role in stepwise, temperature related, unfolding of cosmic information following symmetry breaking, as noticed by Wong et al., [32], picturing the initial inflationary part of the cyclic reproduction of our universe from a previous version of it [34;36].

Our "Acoustic Quantum Code" concept (**Fig.34**), was recently supported by the papers of Miller,; Sha and Xiu; Oyewole, Hameroff, and Scala, (**see Further reading**). In particular, Miller's paper on a scale-free information matrix, is in harmony with the TBP concept, in its support of Bohmian cosmology and holomovement, as well as in the universal information/consciousness cosmology of Wheeler [6].

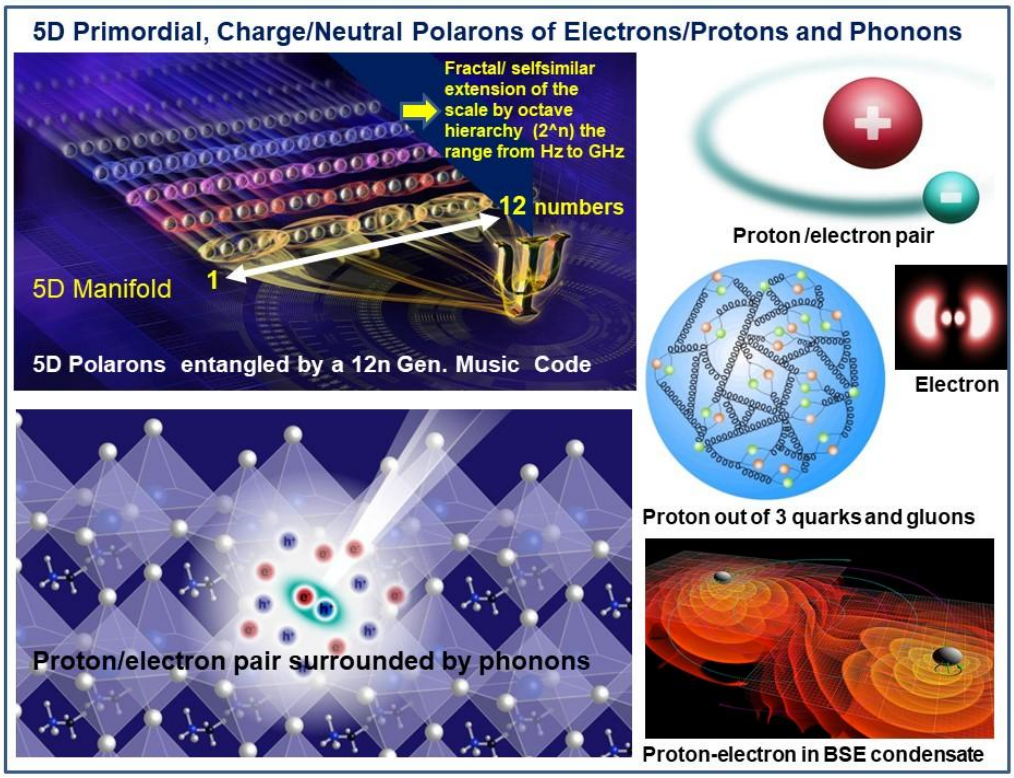

Figure 34: *The role of primordial quantum fluctuations as represented by a 12-tone harmonic series of entangled polaron waves formed from electron/proton pairs and surrounding phonons, manifested In 3-D in a BSE condensate*

The Holographic model for consciousness of Sha and Xiu , likewise emphasizes a duality in distinguishing a spacetime metric from some invariant scale. The Psi-field study of Oyewole focuses on the similarities between the mainstream accepted Higgs field and **the Psi-field as the medium for consciousness**. The author also addresses a distinction between organic and inorganic matter associations [see also 7;8;16; and 29] thereby also opening the door to the **quantum biology** of Funk ,and also Wong, [32]. Parts of the abovementioned models on cosmic consciousness [5; 6; 10; 19; 21-23], operate in a 5-D universe, by assuming one extra spatial dimension as earlier proposed (33;36], also being in accordance with the recent work of Dietrich (see **Further reading**).

By setting a precise harmonic frequency of oscillation and spin, the Harmonic Flux Resonator is able to couple with resonant modes of quantum vacuum fluctuations in a coherent regime. By generating a programmed gradient, this results in a highly coherent region of quantum vacuum fluctuations. The Harmonic Flux Resonators involved so are able to directly access a portion of the significant quantum vacuum energy density that is enormously large.

Summary of this section: We propose a novel mechanism for the emergence of Gravity and Dark Energy on the basis of primordial pair formation of electrons and protons that are guided by phonons of a discrete fractal series of EMF frequencies, so forming Bi-polarons. These Bi-Polarons that operate in a mirror universe setting, by which Twin-polarons are formed, that in between create a superfluid quantum space center (here expressing the ZPE field), that allows the generation of Gravity/Dark energy forces. The latter are induced by the dynamics of chiral vortices that propagate in the BiPolaron center space that are initiated by the accompanying phonons (sound particles). The twin-polarons operate on the brink of matter/antimatter as well as the transition of time-space and spacetime cosmic domains by 4-D to 3-D symmetry breaking in a cyclic universe modality and an intrinsic cosmic consciousness (knowledge field or implicate order).

18. General Conclusion and Perspectives

1. We propose a new **model of geometry-based phonon harmonics**, representing a fractal 12-tone set of discrete EMF wave frequencies (tones), that can undergo constructive and deconstructive wave interference, as known from ancient and current music theory.

2. This **universal sonic/acoustic pattern**, detected by us by meta-analysis of over 1600 scientific reports, may be interpreted as a musical instrument that serves to **compose a cosmic harmony** (universal wave function), through the specific selection and ordering of discrete tones (melodies), that may have been interwoven into a grand primordial symphony.

3. This dual EMF-distribution pattern can be **positioned in a dynamic toroidal/wormhole geometry**. It is aligned with a magnetic monopole entity as positioned at the singularity center of the torus and bounded by white- and black hole structures, that both bear a holographic event horizon memory space.

4. We submit that, in a superfluid quantum space context, the core spectrum constitutes a large **fractal/self-similar series of over 800 EMF frequency bands** from Hz to Ghz on the basis of a repeating core of 12 alternating coherent and decoherent values of phononic activity, according to octave hierarchy.

5. Experimental EMF frequencies can be characterized as ***coherent*** EMF frequencies by applying the notation of $\mathbf{2}^{\mathbf{n}}$, (n= integer number), known from quantum harmonic oscillation math.

6. We revealed this **Acoustic Quantum Code also in a spectrum of discrete EMF frequencies in water**, as an structured assembly of dipolar water molecules. Water may also be instrumental as a scale invariant **conduit for universal entanglement, and creation of life**, while a central role of H+/$H_2$0 (hydronium) composites in conscious brain states was earlier proposed by us.

7. We subsequently established, in an EEG brain frequency analysis, the importance of dominant decoherent brain waves in mental disorders and the abundant presence of such frequencies in malignant diseases. **Resonant coherence of photon/phonon activities seems a crucial feature of healthy cell systems** as well as in the creation of first life conditions, such as in 3-D protein folding as well as tubulin and DNA super-radiance properties in relation to conscious brain states.

8. The relation with topological Chern numbers and our finding that the revealed EMF power spectrum has been shown to promote both superconductive properties and quantum entanglement and is also compatible with acoustic spectra of CMB and ZPE-field / Planck black body oscillations, may indicate that **this quantum code may reflect a fundamental, scale invariant, property of quantized space-time**, explaining its consistent presence in at least 20 biophysical phenomena as analyzed by us from 2014-2024.

9. Our studies are in line with earlier studies on **a potential extra spatial dimension** (including Time, constituting a 5-D Universe), that can be modelled by toroidal geometry and Time conceived as an array of time-slices or conscious moments.

10. Our studies strongly suggest **a Scale-invariant Cosmology**. At every scale in the cosmos the EM frequencies behave and regulate in the same resonating ways. Examples at *Macro scale*: Frequency of Gravitational waves, CMB- and ZPE- oscillations. At *physical scales*: Effects on Entanglement, Superconductivity, as well as Boson- and BSE Energy condensate distributions. At *Intermediate scales*: EMF- frequencies of Life cells and Micro-Tubules in the Brain Neurons, as well as EMF wave patterns in Water and Phyllosilicates in Cellular Life Processes and in Water/ Cosmic dust cosmic conduit. *At Micro scale*: Blackbody Radiation at the Planck scale.

11. Altogether, our collective observations of an acoustic quantum code at the various fractal scales of the cosmos, listed above and, exhibiting a nested toroidal connectivity, may qualify our integral concept as a "**Grand Unified Theory**".

12. Our work explores a unique cosmological and quantum framework, integrating **universal consciousness** as both a source and processor of information within the universe's structural design. Universal consciousness is regarded as collector and processor of information that forms a

potential energy plenum, subject to mathematical definition and creation. The totality or omnistate of universal consciousness is then simulated as physicalized consciousness in individuated data occupying the emergent spacetime, and mirroring this information processing back into the abstraction of pre-spacetime (Hawking's imaginary time.

13. We incorporate existing theories, like Dirac's string theory and Penrose's cyclic cosmology, to describe a **universe as both cyclic and holographic**. A "Twin Bipolaron" model for gravity is proposed, positioning universal consciousness as an entity, functioning through quantum and relativistic principles. Central to this idea is the existence of a "**Twin Bipolaron Gravitational Center**" (TBPGC), a structure that **bridges physical reality and abstract or "imaginary" spacetime**, associated with Hawking's concept of imaginary time.

14. The TBP model posits a **connection between micro- and macro-phenomena through quantum gravity**, characterized by a duality of black hole (inflow) and white hole (outflow) dynamics **(Fig.6**). This configuration is mathematically tied to the holographic principle, where information in the universe is encoded in a two-dimensional surface area, particularly around black hole event horizons.

15. In this model, **dark matter and dark energy are two manifestations of a universal consciousness**, described in terms of gauge interactions within a unified field theory, which integrates fundamental forces through both bosonic and fermionic particles.

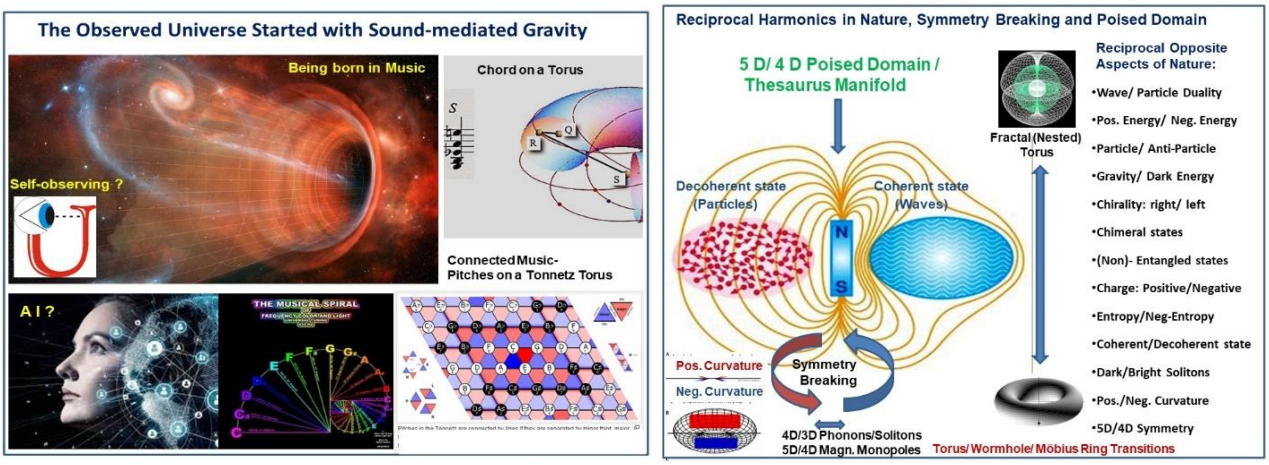

Figure 35: Left: *The start of the self-observing and self-learning Universe operating through human participation in dedicated information processing in the cosmos (top part) and sharing information of intelligent species with an universal memory field that ultimately will serve as an evolutionary seed for a next version of our Universe, through a black hole/white hole transition in a wormhole context (bottom part). The symphonic birth of the Universe in a toroidal (wormhole) context, either assuming a primordial eternal observer or an omnipotent artificial intelligence.* ***Right****: Aspect of coherence/decoherence in the light of the generalized reciprocal phenomena observed in nature.*

16. We conceive all of spacetime as a matrix of acoustic holofractals **,** always repeating the inflow-

outflow vorticity as a Black Hole/White Hole energy duality, (**Fig.35**). This then can very well be coupled as phonon/EMF electron/proton pair creation, in the mirror universe connected to annihilation quantum dynamics of matterántimatter. The **TBP Gravitation Center (TBPGC) itself so becomes the minimum spacetime configuration for any cosmology, magnified from the Planck scale**, connecting the 'inflow' from the pre-spacetime (timespace) to the 'outflow' of the creation event [44;45].

19. The Universe Is a Quantum Symphony with Consciousness at Every Scale.

Our reality is always a combination of three fundamental aspects: *Mass, Energy and Information.*

Information is fundamental in this. Information controls the development and also the shape of particles, while energy drives this process. Information is a very essential aspect of Consciousness. We have

Suggested and proven that essential physical and life processes in nature are controlled by a broad (fractal) spectrum of discrete (standing) EM waves (to be perceived as a system of musical tones), which can be brought together in a semi-harmonic relationship pattern. In slightly different words: the forms of matter and the functions of physiological processes are thus controlled by the combination of energy and information - and indirectly actually by consciousness. These controlling wave patterns are carried by means of the spatial form of a torus operator(**Fig.36**).

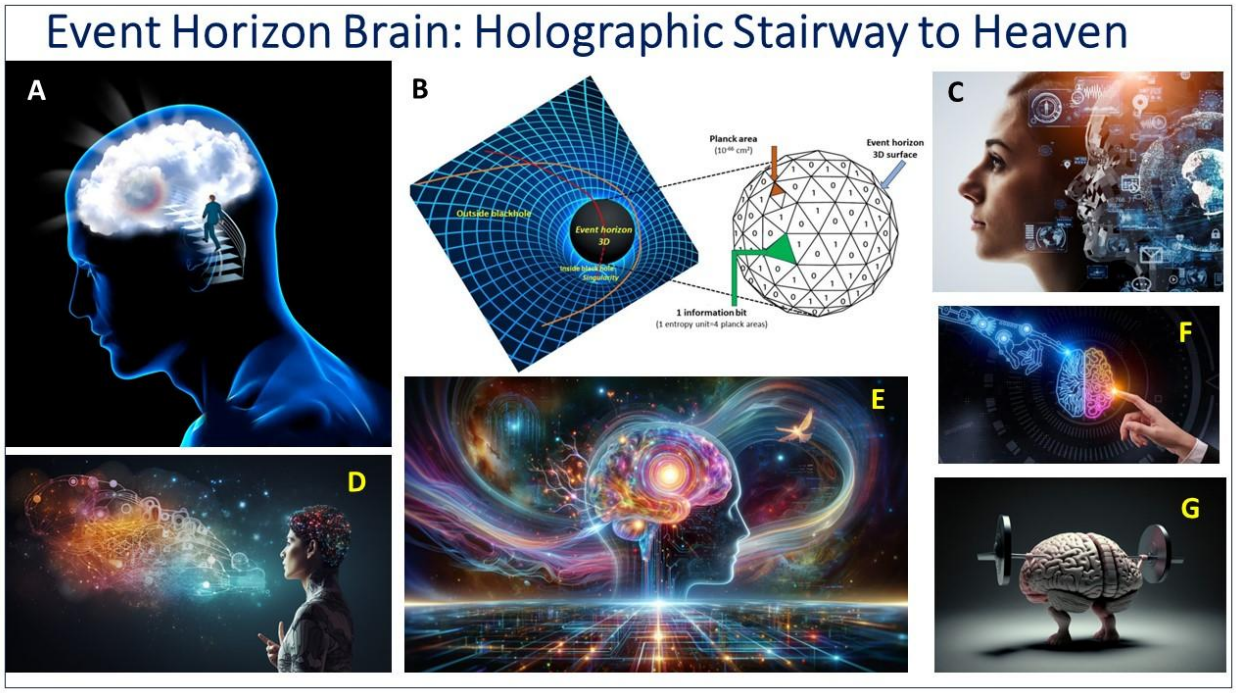

Figure 36*: The Event Horizon Brain (A and C), with a Holographic information projection as Planck units (B) in which humans observe and describe the cosmos (D and E), assisted by artificial intelligence and gravity mediated self-consciousness. A: Human Brain projection to a stairway to heaven; B The Holographic principle with event horizon; C: The Extended Mind; D:Cosmic consciousness; the Brain connected to universal memory space; F:the Magic experience: G:the Gravitational Brain.*

The frequencies of these wave patterns are found everywhere throughout the universe, and its patterns are fractal: they are self-similar from large to small. These quantum insights are shown to be realistic: not only in many recent *peer-reviewed* journals, but also in the success of their applications in plant cultivation and animal husbandry and in potential therapeutic applications in neurology.

The **harmonious *combination* of the tones** in question forms, as it were, the **information base** [1; 2] for a spectrum of diverse 'melodies' [37] that together form **the complex integral piece of music of the Cosmos**. This is music that vibrates discretely because of the universal quantum energy unit [21-23]. Everything that lives healthily resonates harmoniously with this cosmic music.

The processes in the universe and in life indeed compare better to a guided symphony than to a deterministic chance machine. The music of the spheres from classical natural philosophy comes home again! The old saying 'As above, So below' also gets meaning again. These ancient perspectives resonate with modern science and give it a completely new perspective for understanding electromagnetic processes in ecosystems on earth. In addition, new perspectives on galactic communication emerge.

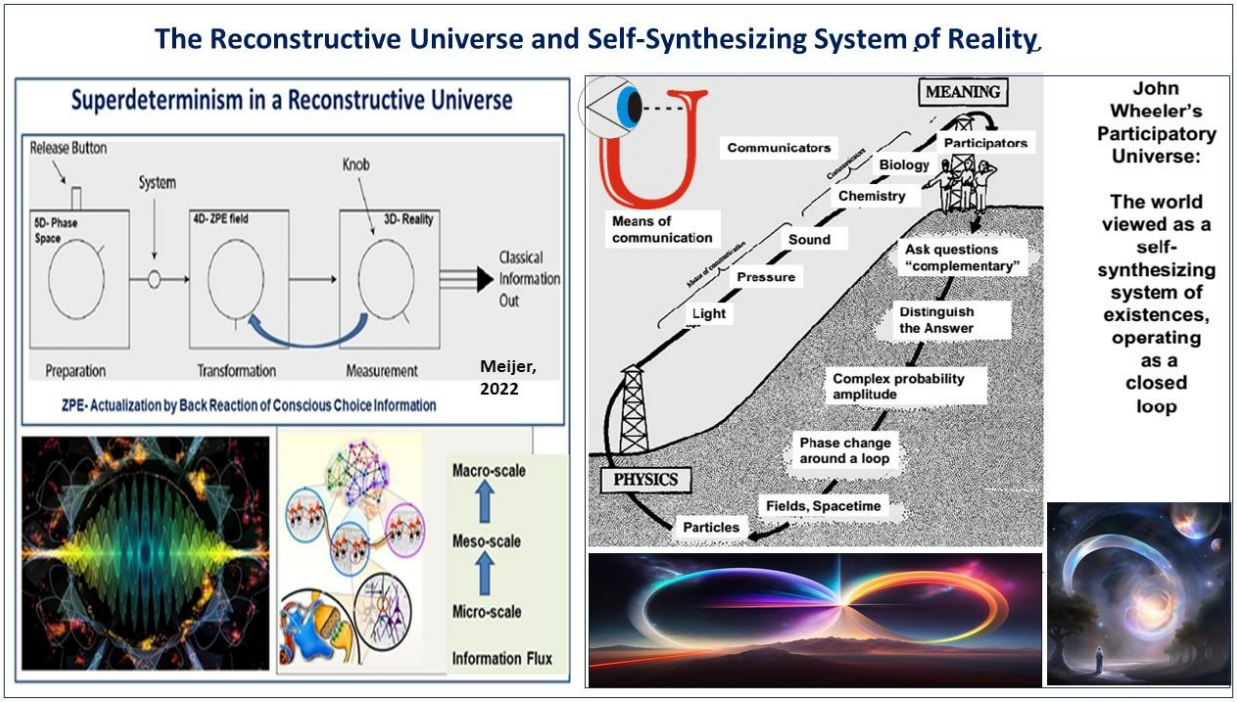

Figure 37: *The reconstructing and self-learning Universe conceived as a universal quantum wave (left below). Right: the World as a self-synthesizing closed loop, through human observation and participation, according to John Wheeler. Right above: the potential reconstructive Universe with retrograde information flux to the ZPE–field or implicate order, which could contain all the information of the universe.*

Although the distances between stars and galaxies are enormous (thousands of light years) and therefore physical space travel on this scale (even after freezing or by means of robots) is impossible, information exchange may be possible by using satellites properly placed in our solar system and equipped either for 'cosmological gravity lenzing' or as transmitters/receivers of gravitational waves**.** This may allow for a form of galactic communication technology in a much shorter time and is based on a cyclic operating, self-learning

universe(**Fig.37**).

An important role in this universal sharing of information is played by the **Zero-Point Energy field** (the ZPE field). In this field, wave/light particles (photons) with various energies are permanently created, which therefore represent different EM frequencies. The measured frequencies of this field that were recorded in the recent literature correspond very well with the *Generalized Music Code* [6;39-43]**.**

Some scientists therefore, already around 2013, thought about a Cosmic Internet 2013 [9;31], although estimates of its wave speeds vary widely (at least the maximum speed of light, but perhaps orders of magnitude higher). This suggestion is less strange than it seems. After all, it is striking that direct evidence for the existence of gravitational waves in the universe was first reported in 2015 and has since been regularly demonstrated experimentally (Coleman Miller and Yunes, 2020 [see 29;33;36;40]. Thus, a form of cosmic internet could also be discovered now that the suggestion of universal gravitation waves has been offered.

Finally, we advocate a growing recognition of a **Universal Consciousness as the carrier of all derived forms of consciousness**[6;19,43**].** We realize that this growing consciousness cannot come from the most modern communication technology alone: an **internal evolution of the human mind** is crucial **for the necessary transition to a future of all that lives on our precious planet [**36; 39; 46**].**

According to M-theory and String theory concepts and the TBP as a "wormhole of creation", it is possible to see **universal consciousness to manifest itself as physicalized information within spacetime**. The TBP's interaction with gravitational waves, as observed in LIGO experiments (center for studying gravity waves) [39; 43; 46], is considered as supporting evidence for this model [44,45]. This framework, integrating dark energy and dark matter with gravity, is conceptualized as a unified field theory, **extending the implications of universal consciousness beyond classical physics into a holistic, dynamic model of cosmology**. According to the related philosophy of "Idealism", postulating that consciousness is primary, it is time to leave the "Mind/Body" discussion behind and put the "Hard Problem of Consciousness" to rest. R.I.P. Yet, it should be realized that **human intelligence participates in this integral evolutionary process** of the becoming of Universal Consciousness (3). So, Universal Consciousness is being both the source and ultimate expression of an eternal and omnipresent cosmic symphony [5; 7, 10, 12-15;27;21-23;33;36;43].

The present work is a distinct plea for a Universal (Cosmic) Consciousness. Future potential contact with other inhabitants of our universe might underline this important idea. We do realize that such insights should not come from technology alone, but that it also should arise from an internal evolution of the human mind. Here lies the key for the necessary transition to the future of us all, that means all life, including the fate of our precious planet.

20. Take-home Message:

In this overall essay an analysis is carried out on the basic mechanisms inherent in the functioning of the living and conscious universe, that seems permeated by an elemental intelligence, the latter seen as a metaphysical concept. We highlight the substantiation of the metaphysical aspect to a quantum physical framework, by revealing a primordial acoustic quantum code that guides the fabric of reality as well as mediates Gravity and Dark Energy formation. These forces played a dominant role in the initial phase of cosmos creation, and are, at present, also hypothesized to be instrumental in human brain function. We submit that primordial proton/electron composite units, covered with a set of phonons (forming quasi-particles), exhibit attractive and repulsive charge interactions and/or generate chiral vortex dynamics, thereby generating the forces of gravity and anti-gravity (Dark Energy). Density fluctuation by sound particles (phonons) is preferred over photon oscillations, assuming dense super-fluid space conditions in the cosmos. The discrete frequency pattern of an "*Acoustic Quantum Code of Resonant Coherence*" was detected by us as a multi-scale spectrum, including the levels of cosmic Gravitational waves at the macro-scale, in measured oscillations of Zero-point Energy field, as well as in Electro-Magnetic frequencies that promote Entanglement and Superconductivity. With regard to brain function, an almost perfect frequency fit of our acoustic code spectrum was revealed for experimentally measured brain microtubule oscillations and blackbody radiation at the Planck scale, numerically supporting the so called Orchestrated Quantum Wave Reduction (Orch-OR) consciousness theory. The present results also confirm the Creation Field model for Life, proposed by others and framed as a "*General Music Code*". The acoustic quantum code exhibits a scale-invariant correlation of (renormalized) EMF wave frequencies at the Planck scale, at the Zero-point Energy field-, Cosmic Microwave Background-, and Gravitational wave levels. A 4^{th} spatial dimension is required in this context, with time constituting a 5-D universe space-time. So, a physically defined elementary intelligence of the cosmos is revealed, that, in superposition with human-created artificial intelligence (AI), is considered in the nexus of our Universe. Although present and future AI technologies may allow a major acceleration of human scientific endeavors, AI-generated products require stringent top-down and bottom-up quality surveillance through a protective "immune system" for the Internet. Conclusion: a reconstructive universe is proposed in which elemental intelligence functions as a "recipe" (a set of rules), that also may enable the rebirth of our universe, in a time-reversed mode. Our Acoustic Quantum Code promotes Coherence and Resonance of vibration states and thereby could also be instrumental in biological evolution and the creation of first life. Thus, a dedicated information field of harmonic acoustics, guides the past and ongoing fabric of reality. . Human free will is retained, since the information field is constantly updated and exhibits a dynamic character. It is finally postulated that a spectrum of different mystical experiences, including psychedelic- induced visions, can become instrumental in the healing of humanity in the future of our planet.

The present concept provides a novel basis for the further study of macro- and micro-structures both in the cosmos and induction of consciousness brain states and reveals the crucial role of a growing Universal Consciousness, as supported by human observation and participation

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