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We Travel on the Sidereal Waves to Discover Our Origin and the Universe One

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Abstract: *The phenomenon of interaction between material substances is the basis of the natural evolution of all things. The interaction of matter occurs through contacts that physics has identified in electromagnetic, gravitational or other nature waves. Electromagnetic waves in particular have a dual corpuscular wave nature, one and the other are like two sides of the same coin, inextricably linked. The origin of the universe in space-time, according to quantum mechanics, is synchronous with the origin of the wave-particles themselves, but it does not reveal to us how they were generated. We must necessarily argue that at the very moment of the birth of electromagnetic waves, space-time also assumed a knowable dimension. This article investigates the evolution of the universe as an epiphenomenon of the mass-energy interaction of matter through the waves generated by it in cosmic space-time. In this investigation I let myself be carried by those same waves that move everything, in the hope that sooner or later they will illuminate my vision of the world.*

Keywords: properties of matter, Interaction between particles, the properties of the waves, music and brain, music of plants.

INTRODUCTION

According to quantum mechanics, waves mark the rhythm of our lives and that of the universe. Communication/interaction is the phenomenon that moves all matter in the universe, from atoms to galaxies, only the transmission mode changes. What is it that keeps the elementary particles that make up matter and all living creatures active and allows for their homeostasis and dynamic equilibrium?

And what happens with the decay of matter, the death of living beings that interrupts all activity?

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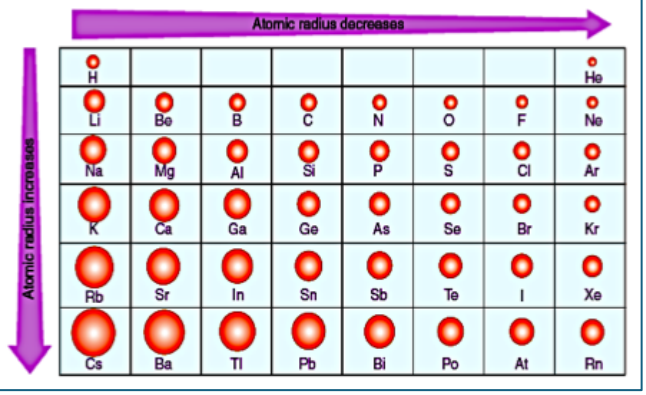
To understand the essence of matter and life we must be able to answer these and other questions. Science tells us that all matter, including living matter, is made up of elementary substances that we have called atoms. We have postulated that these atoms are different and in a definite number. To date we have recognized 118 of them, and they are represented in the periodic system of elements with which Mendeleev in 1871, described their chemical properties. Of these, only 15 elements are the fundamental compounds present in all living things Table 1.

Composition of the Lithosphere		Composition of the Human Body	
Oxygen	47	Hydrogen	63
Silicon	28	Oxygen	25.5
Aluminum	7.9	Carbon	9.5
Iron	4.5	Nitrogen	1.4
Calcium	3.5	Calcium	0.31
Sodium	2.5	Phosphorus	0.22
Potassium	2.5	Chlorine	0.03
Magnesium	2.2	Potassium	0.06
Titanium	0.46	Sulfur	0.05
Hydrogen	0.22	Sodium	0.03
Carbon	0.19	Magnesium	0.01
All others	<0.1	All others	<0.01



Tab 1 – The main elements present in living beings, on the left, and their size on the right

The next question is: where did they originate and how, by what mysterious mechanism, did such a limited number of fundamental elements produce the extraordinary variety of living forms that populate the earth?

To answer this difficult question, our cognitive system has adopted universally shared logical, or rather epistemological, tools.

We are talking about the scientific method, according to which we interpret natural phenomena within a system of laws and rules that are arbitrarily fixed and postulated, but which satisfy the essential principles of the method. The vivid and fascinating account of quantum mechanics in describing the events that created the universe, as we now know it, seems like an updated re-edition of the original matrix of the metaphysics of Greek philosophy. The story is based on the theoretical assumption of a sempiternal immaterial and energy-free quantum absolute vacuum that permeates the universe, but capable of transforming itself, with a metamorphosis from immaterial to a tangible and knowable material universe, a continuous transformation between being and non-being.

Thus conceived, quantum theory reveals all its theoretical transience based on a sempiternal indeterminacy. However, this absolute void of matter and energy is cyclically reified in a compelling and formally rigorous narrative of the corporeal world that we know and which constitutes our very essence. Everything happens thanks to the

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fluctuation of particles that are present in the void, in nothingness, and animate it in a state of perpetual dynamic transformation, which obeys Karl Heisenberg's uncertainty principle.

The most surprising aspect of this story lies in the effectiveness of the eloquence and the ability to tell a story that manages to transform absolutely abstract concepts, suspended in an imperceptible empyrean, into corporeal substance.

Thus, true matter is generated from the substratum of nothingness. We owe these extraordinary and daring, yet inscrutable theoretical conceptions to the theoretical physicist Julian Schwinger and his quantum field theory. And it is thanks to the use of esoteric formulas, introduced into physics by Schwinger himself , that these conceptions have assumed a representative dimension of reality.

In the late 1940s, the physicist postulated that extremely intense electric fields would be capable of exciting the vacuum and forcing it to generate pairs of material particles. And it is paradoxical how this conception introduced the origin of electric fields from absolute nothingness, cyclically postponing the problem of the origin of things. But, to escape from the dimension of total abstraction, while admitting Schwinger 's postulate of spontaneous generation, some descriptions present strident contradictions.

Like that of a universe made of vibrations, but what vibrations are we talking about? And vibrations of what? And generated by what forces?

Or that experiment that demonstrates the generation of material particles in the laboratory derived from graphene, with appropriate electrical stimulations. This experiment ignores the fundamental fact that it is an artificial condition, an artifact, which makes the particles themselves derive from pre-existing matter and energy.
Thus the universe is in continuous transformation from void into energy, from energy into matter, from matter into life forms which include man, who with his own speculation closes the circle of cosmic becoming.

Ultimately what we perceive as reality is nothing more than a distorted perception of it through our senses and our brain. There is an aspect of the quantum conception of the continuous fluctuation of fields and frequencies that move in the universe, which raises a question full of unknowns, and that is the one relating to the different forms that the reality that surrounds us assumes.The fact that until the moment in which the fields, the fluctuations of frequencies, and the interactions between particles do not take shape, we do not perceive their presence. We see reality concretely, only when the physical quantities collapse among themselves, as quantum mechanics wants, an instant before it is as if reality did not exist. In other words, the interaction between particles is necessary for reality to manifest and take shape.

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An even more puzzling principle of quantum mechanics is that of space-time, to which many properties of matter are linked, from energy, to universal gravitation, to the very cognitive experience with which we experience universal phenomena.

Well, this greatness also has evanescent, inconceivable, eternally and subjectively changing connotations. Ultimately, the perception of a universe in continuous becoming is a purely subjective phenomenon, which every human being experiences with his or her singular experience. But does the same happen for material things? Do elementary particles also undergo the effect of the everlasting flow of events?

From which it follows that reality as we perceive it would seem not to exist, since we are unable to stop the fleeting moment of a single event for even a billionth of a nanosecond.

Another of the fundamental laws of physics, thermodynamics, states that phenomena that occur in nature obey the mechanism of increasing disorder, or to use scientific language, increasing entropy.

According to this principle, natural phenomena occur in the universal system to increase the degree of freedom or disorder of the elements composing the system as a whole. This principle seems to contradict the presence and the very transitory existence of the universe with the immeasurable, infinite quantity of celestial bodies that occupy it, which seek and stably maintain their dynamic equilibrium. According to this principle, star and planetary clusters could not originate, formed by atoms held together by a precise order and by forces in constant equilibrium. Certainly, disorder does not reign in this system, even if everything happens according to completely unknown laws.

Even less realistic would be the agreement of the second principle of the increase of entropy, with the presence of living organisms that obey the rigorous order that regulates their existence.

Disorder in these systems would lead to the disintegration of life itself. Therefore, to maintain order in systems present in nature, there must be an indecipherable mechanism that regulates the mutual interactions between their constituent elements. We have only one certainty, and that is that the key event for the formation, however transitory, of the simplest aggregate between elementary particles, atoms or molecules, is the occurrence of a reciprocal interaction, which presupposes the recognition and direct or indirect contact between the constituent elements.

Interaction between particles

First question: how does the recognition and interaction between different elements of fields and frequencies occur in a system formed by an infinity of particles?

Surely the recognition of these physically relevant entities that form the fabric of the universe capable of interacting and uniting to form new structures, cannot be left to

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chance, because it would require infinite times, therefore it would have to follow precise patterns.

This passage raises another problem: how does the selection between the different elementary entities occur, and by what physically recognizable means do they transmit mutual information about their properties? Are they perhaps vibrations?

Secondly, once the elements have formed new entities and new molecular complexes, how do they maintain their internal structure and their harmonious and synchronized balance with the rest of the system?

Quantum mechanics has familiarized us with the fundamental particles that make up matter and the interactions of the fundamental forces that hold them together, which are described in the standard model Fig.1.

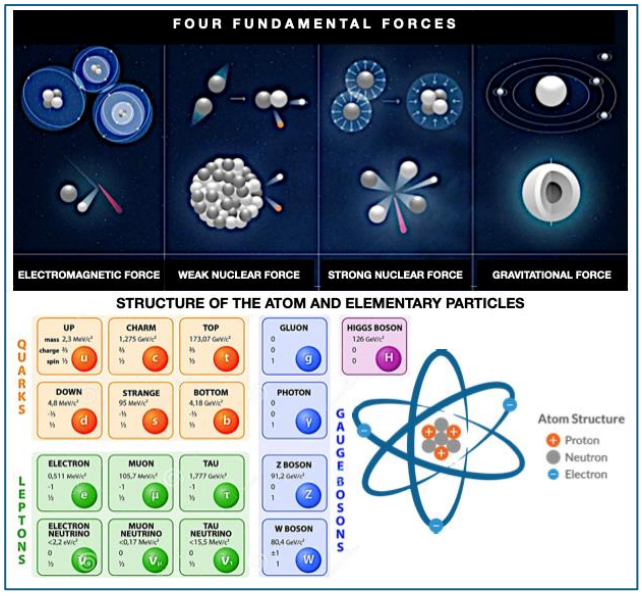

Figure 1- Standard model of interaction and particles

Again, according to quantum mechanics, the concept of wave-particle duality forever links the two quantities into a single entity so that one does not exist without the other.

The two quantities are inextricably linked, regardless of the characteristics of the wave the associated particle, their frequencies and their energy content. In the biological universe, where the only waves that dominate the field may be electromagnetic waves, and mechanical vibrations, it is essential to understand how these interact with the organized matter of living beings.

This entire article is dedicated to this topic, and also wants to support the thesis that interaction is the key event thanks to which particles and associated waves, frequencies and energy, can express the generative power of universal matter.The following

Print ISSN: 2517-276X

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Website: https://bjmas.org/index.php/bjmas/index

description of the biological world, starting from the most elementary forms and arriving at the most complex ones, and neglects the events that gave birth to material bodies and celestial bodies, a subject that goes beyond the scope of the present manuscript.

Since all living things are composed of the same fundamental atoms that form inorganic matter, as we mentioned at the beginning of the article, they are consequently subject to the same forces that move inanimate bodies.And so living beings also interact and communicate with each other and with the environment, using messages carried by chemical substances, electromagnetic waves, and mechanical frequencies that they receive and emit from each other, and represent their effective means of communication.

It is interesting to note that the chemical and electromagnetic messages carried by the waves contain unique and unmistakable information on the size, the steric conformation of the interacting atoms and molecules and, thanks to their modulation of the transmission frequency, they are able to express an infinite range of different interactions and messages Fig.2.

The same process occurs in written and spoken language, where the meaning of the message depends on the sequence in the interaction of individual phonemes.
If saying “black dog” is different from “dog” and “black” taken individually, it is because the meaning of the sentence arises from the interaction between its parts.

Interaction between living things and their environment.
All living things, from prokaryotes (organisms without a cell nucleus) to eukaryotes (all living things made up of cells with a nucleus), must communicate with each other and with the environment in order to survive.
Waves and frequencies are so crucial to the effectiveness of communication that they have played a key role in the ability of living beings to recognize and use them, both in mutual relationships and in environmental interactions.

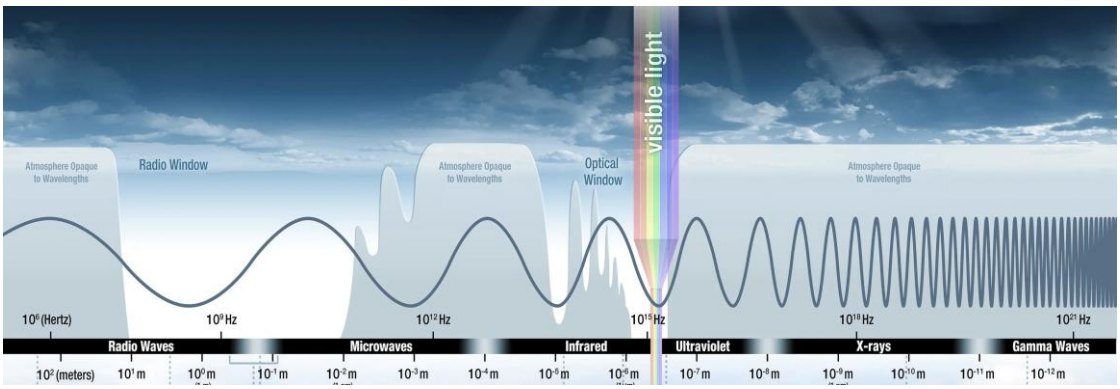

Figure 2- Electromagnetic interaction with the environment

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Interaction of waves with the environment and with living beings

Given that bodies emit and receive electromagnetic, mechanical and gravitational interactions from each other that impact their behavior, let's see what effects they produce.

Two different bodies communicate through the frequencies of the waves they emit, the effect produced by one on the other depends on their nature, property, type of interaction transmitted Fig.3.

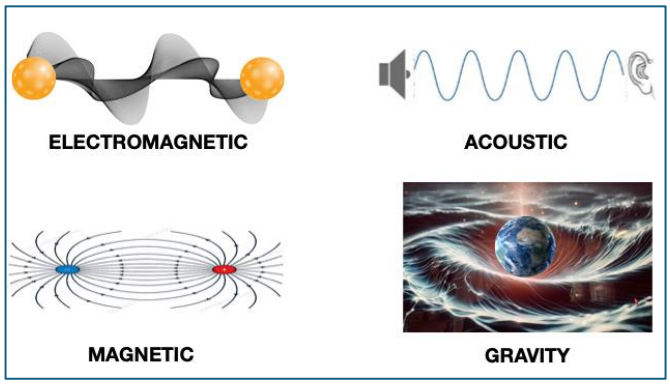

Figure 3 - Fields of interaction between material bodies

Properties of waves

The concepts we report below are taken from the laws of physics.In physics, a wave is an event produced by the propagation of an oscillation. According to this conception, therefore, a wave is the propagation of an oscillation, a vibration that moves and is not a motion of massive bodies, it does not have a trajectory and it does not have a law. temporal that describes its behavior. The trajectory of the wave is described by the particles it sets in motion; similarly, the wave does not "occupy" a position at a given instant, it is the particles it sets in motion that occupy it.

The same properties hold for the fields that form the fabric through which waves are transmitted and propagated. This definition does not explain, however, how waves can set particles in motion without having any material consistency. And again, how it is possible that a wave, of any kind, does not transport matter, and does not determine a net displacement of matter, but only sets it in vibration with its energy.

And furthermore, it does not explain what generates the oscillation of a wave, and where the energy it transmits comes from. The same indeterminacy of space-time is re-proposed, which we cannot recognize with our sensory data. And yet it moves!!In fact, we can notice the presence or absence of a wave, and we can trace its propagation within a medium: a wave, even if it does not move matter, is capable of moving energy, which produces the oscillation of the individual particles on which it acts.

Print ISSN: 2517-276X

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More precisely, a wave transmits energy, without moving matter. But it is difficult to explain how it is possible to transmit energy without having a material consistency, since as Einstein demonstrated, material mass and energy are two different expressions of the same quantity. As far as living beings are concerned, interactions can only be electromagnetic or mechanical (acoustic), since the gravitational force on our planet is the same for everyone.

The effects of electromagnetic and acoustic waves on various types of living things, from bacteria to humans, have been studied.
What emerged was a varied picture of the effects produced by the waves, based on their frequency, intensity and duration.

Starting from viruses, which are at the lowest levels of living species, some authors have hypothesized that the increase in their diffusion of 100 times in recent years, compared to the past, has occurred in conjunction with the introduction of electromagnetic waves with new technologies [1].

This study is susceptible to many criticisms, starting from the attribution to a single cause of the observed effects, which coincides, in this case, with electromagnetic pollution, while neglecting all the others, such as the globalization of trade and the consequent contagions through contact between populations and all the other anthropogenic causes.

Bacteria have also been reported to change their sensitivity to antibiotics when exposed to different electromagnetic frequencies [2-3].
If these observations were confirmed, we would have a simple and effective method to control their pathogenic power and antibiotic resistance.

Another study examined the effect of the frequencies emitted by a cell phone on a group of protozoa, of the species *Paramecium caudatum* . The authors found that the paramecia significantly slowed down their vital activities when the cell phone was turned on in their vicinity. The researchers concluded that the most evident effects occurred on their cell membrane [4].

Insects have also been shown to be sensitive to the action of electromagnetic fields, which with their increase caused by man, have seen a significant extinction in several species [5].

But to demonstrate that the phenomenon of the transmission of electromagnetic frequencies is universally widespread, there are the disconcerting experiments conducted by Nobel Prize winner Luc Montagner and colleagues, who have opened a new field of interest for biomedical investigation.

The authors summarize their research as follows [6]:

Print ISSN: 2517-276X

Online ISSN: 2517-2778

Website: https://bjmas.org/index.php/bjmas/index

"A novel property of DNA is described: the capacity of some bacterial DNA sequences to induce electromagnetic waves at high aqueous dilutions. It appears to be a resonance phenomenon triggered by the ambient electromagnetic background of very low frequency waves. The genomic DNA of most pathogenic bacteria contains sequences which are able to generate such signals. This opens the way to the development of highly sensitive detection system for chronic bacterial infections in human and animal diseases"

The study of the effects of electromagnetic waves has also been extended to humans, with particular attention to the effects produced on the brain, which is more sensitive than any other to this type of waves.

The brain itself produces different types of waves that depend on the degree of brain activity, so that they assume a diagnostic value to indicate its state of health, which is why some researchers have investigated what effects electromagnetic radiation produces on the organ [7-9].

The brain is also sensitive to the effects of sound waves, and music. This is transmitted to the brain through the anatomical-physiological pathway of the auditory system [10-14].

Many studies have shown that the nervous system is an important organic system sensitive to **Electromagnetic Resonance, EMR.** In recent years, a growing number of studies have demonstrated the neurobiological effects of EMR, on the metabolism and transport of neurotransmitters. As messengers of synaptic transmission, neurotransmitters play critical roles in cognitive and emotional behavior.

A separate discussion must be dedicated to the influence that sound waves assume when they are produced in the form of music, and to the effects they produce on living beings, animals and plants. Music is the wave phenomenon par excellence, composed of multiple elements, including **time (speed), rhythm, timbre** (sound quality), **dynamics** (volume), **harmony, melody (tone), pitch,** and sometimes lyrics. The rhythm of the waves carried by music is particularly influential as it appears to mimic the internal rhythms of the body, and is therefore an external signal that our brain recognizes and responds to promptly.

We still get excited when listening to the wonderful symphonies that great composers have produced over the centuries. What is the wonder and amazement, produced by a certain composition of sounds and silences, wisely alternated, and why do they excite us?

Lateralization of Sensory Processes (LSP).

Different aspects of music, such as rhythm, melody, and harmony, activate different areas of the brain and contribute to emotional regulation and mood improvement.

Some studies have revealed that listening to music mainly activates the prefrontal cortex (PFC), which processes the stimuli collected by the auditory area. On the contrary, active music production, such as singing and playing instruments, is associated with

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synchronization processes within the brain, involving the inferior frontal cortex (IFC) and the temporo -parietal junction (TPJ) Fig.4.

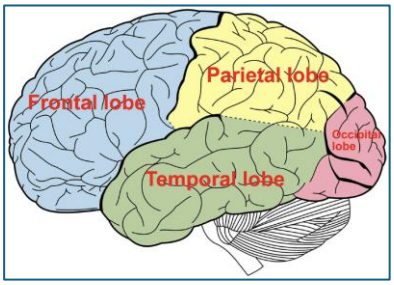

Figure 4 – The areas of the brain

And this is understandable because for these activities the motor areas and the auditory feedback systems for controlling the sounds emitted must be activated simultaneously. Furthermore, research has clarified how various musical characteristics, including content, are capable of exciting us, and how rhythmic intensity and the complexity of auditory input crucially influence the lateralization of sensory processing (LSP) in the brain.

Individual demographic and cognitive differences have been found to modulate responses to musical stimuli, demonstrating the personalized nature of musical perception and performance , as is the case for any other sensorimotor activity. Such differences manifest as differentiated neural responses and subjective musical experiences, which depend on factors such as age, gender, cognitive ability, musical competence, and personal preferences [15].

To complete the picture of bioelectric phenomena and the effects of electromagnetic radiation on living beings and produced by living beings, we must mention the behavior of plants.Plants also fall into the vast field of excitable cellular systems, as they have demonstrated a behavior similar to that of other classical excitable systems: neurons, muscles, endocrine cells, etc. Demonstrating that the mechanism of interaction/communication is universally widespread and is confirmed as a key event in the response to stimuli for the change and evolution of matter.

In addition to the well-known response to sunlight produced by the mechanism of photosynthesis, plants demonstrate a remarkable ability to respond to different stimuli, an ability that is aimed at the conservation of the species, and adaptation to environmental variations, but they are also able to communicate with other plants to signal situations of danger.

Numerous researches have been conducted to examine these aspects. Even more surprising is the fact that plants have developed their own language , made up of particular codes, so much so that some authors affirm that plants can compose real symphonies [16-17].

Print ISSN: 2517-276X

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Cicer was monitored arietinum (chickpeas) with exposure to Indian light music. It was observed that music promoted plant growth and development, including germination, while noise hindered it. It has been observed that specific audible frequencies and even musical frequencies facilitate physiological processes such as nutrient uptake, photosynthesis, protein synthesis, etc. which results in increased growth, increased leaf production and overall healthier plant development [18].

These results confirm what I wrote in the introduction to this article, that all matter in the universe, by the very fact of being formed by elementary particles, which vibrate and emit synchronous frequencies in resonance, allows it to communicate and interact in the infinite forms in which it expresses itself.

From what is reported in the description of the properties of matter, an essential aspect would seem to emerge with regards to the intimate mechanism that animates it, and which could be summarised in the vibratory capacity of the elementary particles from which it is formed. These particles, when immobile, do not produce any effect; they must vibrate to produce wave systems capable of transmitting changes in the surrounding environment and intercepting other particles with which to enter into harmony, or as quantum mechanics puts it, into resonance, to produce the phenomena that occur in nature.

CONCLUSION

In all the cases examined, the fundamental mechanism of transmission, the efficient cause of the events observed in nature, is the wave one, which is divided into electromagnetic waves or waves of another nature but it is always waves.
But what is so special about these oscillations that they can connect different substances and transform them?

Is it because of their content of particles and the energy they carry? Because that is ultimately what they are. How else could they interact with the other atoms and molecules in the matter they encounter and transform?

But the most disconcerting thing is that the effect produced by the union of distinct masses, which leads to the production of new matter, manifests itself, once again, in the form of waves.

Whether it is molecules, chloroplasts, bacteria, or cells, the response of matter will always be a vibration, a wave.

And when matter generates organs and tissues, such as the heart, muscles, brain, intestines, and similar complex anatomical structures, then these are able to spontaneously emit recordable waves, so specific that they can be used for diagnostic purposes.

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Thus, the electrocardiogram, the electroencephalogram, the electromyogram, the ultrasound, the CT scan or the MRI, record bundles of waves, frequency spectra, which give us precise information on the health conditions of the organs examined.

So, one conclusion emerges from all these considerations, and that is that the material universe is a complicated system of molecules that transmit waves directed at other molecules that in turn respond with waves, and so on.This is why I say that man, the most evolved living form that nature has produced, is lying on the crest of the waves and wonders where they will take him, Fig.5.

To conclude this imaginary journey on the waves and with the waves in all the forms they take in nature, I will try to define what life consists of and why waves are its most authentic expression.
The whole discussion could be summed up in Einstein's famous equation:

$$\mathbf{E = M \times C^{2}}$$

Each of these quantities expresses three different expressions of the same wave property.

Where E expresses the energy that takes on value only when the interaction between two masses occurs, because energy that does not produce effects cannot be considered energy.

The free energy of thermodynamics is also a quantity that expresses the potential capacity to produce work, and is manifested only by the effect produced by this. The M in the equation expresses the mass, the set of particles that make up matter. Even in this case, the mass, in order to produce the energy defined in the equation, must come into contact and interact with other masses, otherwise it remains a body that occupies volume in space-time and nothing more.

Finally, C2, the speed of light squared, expresses masses in motion, these are photons of extremely small mass, but still masses they are. The same applies here: to produce visible effects, light must strike, illuminate and come into contact with other bodies.
In all these cases it is an interaction of waves-particles-energy between material bodies, which assume a physical consistency only with their mutual impact. For this reason, all events that occur in the universe and life itself travel on waves, and move the particles they encounter along their path.

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Schrödinger gave us the mathematical expression to the question of the structure of waves and how they can be studied, and with his fundamental equation on electromagnetic waves, he could provide us with the answer, Fig.6. Ultimately it is just a matter of solving the equation:

Figure 5 – The human being rides the wave of time

$$\frac{\partial^2\psi}{\partial x^2}+\frac{\partial^2\psi}{\partial y^2}+\frac{\partial^2\psi}{\partial z^2}+\frac{8\pi^2 m}{h^2}(E-V)\psi=0$$

Figure 6 -Schrödinger's Fundamental equation on electromagnetic waves

Disclosure

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