THE GLOBAL UNIVERSE IS LIKE A 3D-RAINBOW OR THE "MATRYOSHKA" DOLLS

A FANTASTIC VOYAGE

Everyone has present the movie **"Fantastic Voyage"** (based on the novel by Isaac Asimov, 1966) which reduces the size of a submarine (Proteus) and crews to be introduced into the blood circulatory system of a person so they can correct the condition that it has (blood clot in the brain).

The film has good scientific basis as always Isaac Asimov do, but also has some important conceptual errors, both from the standpoint of medicine / biology, and physics / mechanics: Circulation of the submarine in the blood (difference of the blood and water density, visibility, ...).

But possibly the most obvious paradox, and possibly the least understand by the reader / viewer is that, by the fact of reducing a person's body is supposed to also reduce the component parts of the same way (cells, molecules, atoms, protons, ...). How it is possible that equivalent elements (Ex: water molecule) can coexist in the same system with different dimensions (up to 10 exp 5: 100,000 times)?. How the intruder would fit within the universe tiny that has been implanted?. What laws of physics / chemical / biological would be applicable (micro, macro, or a combination of both), and How they interact with each other?

This is what we could call Systems Theory for Spatial Scales (xyz Dimensions).

In physics and engineering there is also the **Theory of Scale Models** (to test prototypes at small scales), to simulate the behavior of certain variables from the starting parameters, to latter extrapolated to the actual dimensions and establishing the corresponding model-prototype similarity (Geometric, Kinematics and Dynamics) between real and scale models.

THE NEW CONCEPT OF THE GLOBAL UNIVERSE

Even with their errors and paradoxes, this book / movie gives us an idea of what could be traveling between different scales (powers of 10) of the space dimensions (XYZ). This is what we might call **"Matryoshka Travels"** in reference to the famous "Russian Dolls" called Matryoshka.

Likewise, we also evidence the difficulty and strangeness of these trips to smaller scales (Powers negative: cells, molecules, ...), where we cannot travel otherwise than by making as small as the size of the scale where we want to travel . For this film the reduction is 100,000 times, but if we move to the scale of the electrons, we would have to reduce our size 1,000,000,000,000 times (10 exp -18).

Instead travel to larger scales (Positive Powers: galaxy, universe, ...) always we imagine without having to change the scale or dimension. It is assumed that a spacecraft is used (inter-stellar or inter-galactic) and we move at high speeds (maximum speed of light). But we never imagine to travel there making larger (increasing) our size as well as we do in the case of travel to the small.

If we make this effort and we made this change of mind (although the concept itself is not scientifically feasible) we can visualize what could be a new concept / image of the Global Universe: **3D Rainbow** or **"Matryoshka" Dolls.**

Usually, when we conceive beings from other worlds (other stars, galaxies or universes), we imagine them in a human scale. Or, what is the same, coming from the same spatial scale that we (humans). But we never imagine them coming from other different spatial scale (major or

minor) to ours. That in the event that it was very different, we would impede viewing or perceived them.

THE SCALES OF THE UNIVERSE

It is normal to visualize the different scales of the known universe in powers of 10 and taking as a base measure meter (see table below):

- Negative Powers: For smaller scales (till 10 exp -35 meters for the "strings").
- Positive Powers: For larger scales (till 10 exp+35 meters for "multiverses").

See link: http://www.microsiervos.com/archivo/ciencia/escala-universo-interactiva.html

This give us a Global Universe compound or divided into different zones (bands, stripes, levels, spectra, ranges, ...) that form the different space scales of the universe.

Based on a scale of one meter (this is the power 10 exp 0), as we increase the exponent of 10 positive (1,2, ..., n), we will show larger sizes (10 exp 3 is 1 km, 10 exp 9 is a million km, and 10 exp 16 is a light-year, the distance light travels in one year).

Concept	Exp	Discovery
Man	0	
Earth	7	II BC (Eratosthenes measured
		diameter)
Sun	9	
Solar System	13	XVI (Galileo & Kepler)
Galaxy	21	XVIII (Herschel)
Universe	27	XX (Big-Bang of George
		Gamow)
Multiverse	35 (¿)	XXI (to prove and see)

Some dimensions of reference (m exp 10):

If instead, we make powers 10 negative, we will define measures under (10 exp -3 is a millimeter, 10 exp -9 is a nanometer and 10 exp -35 is the Planck Unit).

Some dimensions of reference (m exp 10):

Concept	Exp	Discovery
Man	0	
Cell / red blood cell	-6/7	XVII (Robert Hooke)
DNA	-9	1953 (Francis Compton-
		James Dewey)
Water Molecule	-10	XIX (Amadeo Avogadro)
Protón	-15	1919 (Ernest Rutherford)
Electrón/ Quark	-18	1897 (JJ Thomson) &1950
		(M.Gell-Mann)
Neutrino	-24	1930 (Wolfgang Pauli)
String	-35	Siglo XXI (to prove and see)

Knowledge of the composition and the laws governing the various levels of scales (both positive and negative) has been discovered through the ages (Ages History) as scientific and technological advances. The advances in large (classical physics) have been produced earlier

by the ease of being observed (for the last five centuries), while the small (quantum physics) have occurred mostly during the last century.

THE GLOBAL UNIVERSE AREAS / BANDS

In each of these areas / zones (bands, stripes, levels, spectra, ranges,...) are supposed to act or apply (in a greater or lesser extent) different physical laws. These laws that would make that the elements and form structures coexist with a certain harmony and logic, as it does in our own area or stretch of **Our Universe**.

We could say that **Our Universe** covers scales from 10 exp -35 (length or Planck scale, the smallest allowed by the current physics models due to the emergence of quantum gravity effects) to 10 exp +27 meters (which is longer than is considered is **Our Universe**).

The visual or graphical observation of these elements (both positive and negative scales) requires augmentation systems:

- **Telescope** (optical, x-ray, infared,...) for the observation of large bodies to long distances (electromagnetic waves).
- **Microscopes** (optical, electronic, nuclear,...) for the observation of small bodies at very short distances.

In both cases, further the ability to increase (produced by the lens), one of the factors that hinder their vision is the lack of light (or other waves) as we increase the scale of vision.

In both cases, it is required high power glasses, and increased sophistication of technology or a long exposure to capture light (electromagnetic wave) needs to be viewed or recorded. And even in some cases requires the use of other wave detection systems (Telescope: X-ray, infrared, ... and Microscope: electrons, forces, ...) to better detect these bodies.

It is like if to move away within this **<u>Rainbow</u>** (both positive and negative) from our reference range/strip, we ran out of the stimulus (waves) that requires humans to observe or record a form or body. It's the same that occur when we move in one of the spatial dimensions (XYZ) ,that it is becoming smaller and blurred the body or form that we move away.

OTHER UNIVERSES WITHIN OTHER SPACE SCALES

For centuries humanity has been assumed that the universe was Earth (flat or not) and Sky (with stars and planets) going around. The Earth was the center of the Universe on which revolved the other bodies.

Something similar happens to us now where we assume that the area (stripe, level, range, scale, ...) where we are within the **Global Universe** is the only real, but there may be other universes in other areas within this **3D-Rainbow** that will have their own physical laws, and other types of forms or bodies, and even, why not, other living things.

If we can imagine that an electron is the equivalent to the Earth revolving around the nucleus of an atom, like do the Earth around the Sun. How we would see our universe if we lived in this electron? We would imagine that we are part of another body or entity? As much as we travel with a spacecraft of this scale (10 exp -20), it would be very difficult for us to observe the entity that we belong to. And also it would be very difficult to receive the waves to display or capture the required information.

Possibly at this scale (**negative powers**), the waves are much smaller (both in frequency and scope) and undetectable to us now. These waves are what we would be able to detect if we were living in an electron, and of course, the waves we mean by light (electromagnetic) would be undetectable for us and the instruments that we would have in these dimensions (10 exp - 20).

Likewise, we can extrapolate this experience to large scales (**positive powers**). Imagine that a galaxy is a type of cell (neuron) of a Superior Entity, and that the interaction between these type of neurons (Galaxies) with other galaxies (neurons) make a thought (set of bits) of this Superior Entity.

OUR UNIVERSE IS A VIRTUAL MODEL

As that happened to our ancestors, we are slaves of the information we receive through the senses (sight, hearing, smell, taste and touch) and we process this information according to the knowledge we have.

The universe as we know or perceive is a virtual model (illusion) that shapes our brain from the stimuli we receive from him through our senses (sight, hearing, smell, taste and touch). These senses have developed and evolved through natural selection for survival as the stimuli that exist in our universe (electromagnetic waves, pressure waves, ...) as well as in other animals have developed other ways as other stimuli (ultrasound waves, ...).

We could imagine entities (some already exist) that have organs (senses) sensitive to other stimuli such as X-rays, infrared or ultraviolet rays, radio waves, etc..

But it seems clear that the stimuli may be different in each zone or area of the M-Dimension. There will be the same stimuli (waves, ...) at quantum scales (<10 exp -10) that at large scales (> 10 exp +10). And they will be more different to much further scales from our universe (scales smaller than 10 exp -50 and greater than 10 exp +50). Although these scales are difficult to assimilate for us, and possibly they will be not feasible, according to current scientific and physical models.

On the other hand, if we consider that an atom measured on average 1 Ångstrong (1 Å = 10 exp -10 meters) and the nucleus is 10 exp -14 meters, means that the nucleus of an atom (where there it is the mass of the atom) has a diameter 10,000 times smaller than the atom itself. If the atom had a diameter of 100 meters (a football field) the nucleus would measure 1 centimeter (a button). Put another way, in an atom fits 10,000,000 (10 exp 7) nucleus. So that for every 1 volume of mass is 10,000,000 vacuum.

Therefore, what we perceive or recognize as forms of <u>Matter</u> in the Universe (bodies) as a stimulus of the sense of touch, are but forms nearly empty (with a mass per volume of 10,000,000 of vacuum), but with electrical charges (positive and negative), which are what really give us the sensation (touch) consistency of the bodies or different states of matter (solid, liquid and gas). These are the electrical charges that prevent solid objects transferred. If we can neutralize the electrical charges of a body (ball), this could, with varying degrees of difficulty, pass another solid (walls).

And, if we consider that the <u>**Colors**</u>, which are what allow us to visualize and get a spatial composition of the forms of the universe around us (using the sense of sight), there are only electromagnetic waves ranging from red (700 nm = 7 10 exp -7) to violet (400 nm = 4 10 exp - 7), which are produced by altering the orbits of electrons in molecules by excitation of photons colliding with them. If they do not photons (light) waves are not issued and do not see the body. According to the molecule, there are different waves giving different colors we see.

All this reflects a somewhat virtual universe in which we live, and we do a composition according to the stimuli we receive.

EACH AREA HAS ITS OWN LAWS OF PHYSICS

We are pure energy properly conjoined and harmonized by the physical laws that govern this range or zone (scale) of the Global Universe. If we move to other areas (paths, levels, spectra, scales,...) for this Global Universe, we will find other physical laws to explain and harmonize these spectra or other areas (although they may have theories that encompass several areas or spectra, as M-theory).

And these areas may even be (in some bands or scales) parallel universes with their laws, forms, beings (living or not), just as you would for a universe of three dimensions (X, Y and time) if appear the Fourth Dimension (Z). Assuming a sheet of a book like this in the Flat (3D) Universe entities that move across its surface XY, every leaf of a book could be a different flat universe (parallel universes), and could be as many universes as leaves.

If we see the diagram represent the different spectra (bands, zones, levels, ...) from the scale 10 exp -1000 to 10 exp +1000 in intervals of 10 exp 100, we can get an idea of how big the **Global Universe** can be compared to **Our Universe** (known one) that moves only in the central strip (10 exp -50 to 10 +50) which, at best, really get to know or intuit from 10 exp -35 (strings) to 10 exp +35 (multi-universes).



As discussed above, it is not strange to assume that in each time there will be some laws, waves, forms, materials ... that will form and shape the various universes of this M-Dimension. Clearly these concepts are not limited exactly these boundaries, but some will only cover a part of a level (pressure waves), and others will cover various levels (**electromagnetic waves**).

THE LIMITS OF OUR UNIVERSE

Although scientists today are more open than before to accept or consider (at least not easily reject) any proposal or theory out of the usual guidelines, there is always some resistance to its acceptance, approval and distribution.

Nowadays, to be consistent with existing physical models, our universe has its limits within this dimension M:

- <u>A lower limit</u>: the **Planck Scale** of about 10 exp -35 meters (the estimated length of the superstring). An expected lower dimension can not be treated adequately in current physics models due to the emergence of quantum gravity effects.
- And other top limit: the proper size of Our Known Universe about 10 exp +27 meters.

So our known **Strip or Zone of the Universe Global** has a total size of **10 exp 62 meters**, less than a Googol (10 exp 100) meters.

The Hubble Space Telescope detected during 2003 and 2004 the area known as the **Hubble Ultra Deep Field (HUDF)**, which displays what is believed to have been the first galaxies after the Big Bang, and it is supposed to include more than 13,000 million light years away. So they are the most distant objects ever observed by humans.

Even against what is **the theory of isotropic expansion of the universe** (which assumes that the universe has no center and no defined borders, and expands equally in all parts), what would happen if we explore just the opposite field universe, the field of Hubble telescope turning 180 degrees?

It is assumed that would focus to the outside of **Our Universe**, and we could see objects that were at these distances, but in the opposite direction to the Big Bang, or possibly to the outside of the borders or better horizons of **Our Universe**. Although, according to the **current physical models of curved space-time do not allow it theoretically**. And not allow us to visualize anything outside of **Our Universe** (??).

It has long been considered many nebulae and galaxies visible to the naked eye as simple stars or nebulae, respectively. until the instruments allowed us to discern, and detected many galaxies. Currently it is believed that there are so many galaxies (10 exp 11) and stars (10 exp 11) in our galaxy (Milky Way).

It is possible that one day, some of the forms we consider galaxies, nebulae and black holes, it will be proved to be other universes outside the boundaries or horizons of **Our Universe**.

HOW WE COULD EVIDENCE THIS THEORY?

Clearly, a way to test this theory, would be able to detect signals (waves) of these bands inside and outside the spectral band of Our Universe. The only known signals that allow this are electromagnetic (EM) waves, which can interact in different spectral bands.

Electromagnetic waves have theoretically no limit to their wavelengths, so that waves may have in theory wavelengths smaller than 10 exp 10 -35 meters (Planck length) and also larger than 10 exp +26 meters (length Our Universe).

And these waves should be generated by elements of these dimensions, so if we were able to detect some of these waves in these ranges of length, we could prove/evidence that there are elements of these dimensions in this range of scales. Although this will not be an easy task.

For EM fields of small dimensions, there is the problem of high energy of these waves, in which a single wavelength (photon) with the wavelength of Planck (10 exp -35), carries the energy of about 3 tons of TNT. So to detect this type of electromagnetic radiation, we remove our bunker and wait for a very loud bang outside.

Also, to detect large waves (also called "DC EM waves"), would have the opposite problem, they low energy. In these waves (frequency almost zero to our scale) the energy of the photons would approach zero.

The electromagnetic waves of wavelength 10 exp +10 would be a frequency 30 MHz (This is only one wave 30 seconds, nothing special in fact, similar to magnetic resonance frequency of the field line in the Earth's magnetosphere).

They could be detected, measured and recorded with a **multimeter connected to a strip chart recorder, and with very good insulation** any kind of interference, which may involve entering interstellar space.