This work is dedicated to my dear daughter Liz Katsman

Some Common Principles of Physical Worlds

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A substantial number of phenomena obtained in special scientific experiments, starting from investigations of William Crookes [1] and Oliver Lodge [2], and up to modern EVP experiments, show that, parallel to our material world, another real world does exist. Let's call it the Ethereal World (in the word "ethereal" we stress its quite real nature). I would like to mention, that this is not a "psychic world" of our thoughts, emotions and imaginations which, for example, Felice Masi describes in his excellent paper "The World and non-causal Phenomena" [3]. The Ethereal World has all features of the material world. It is inhabited by conscious beings having a body, energy, memory ("We also have a body", "Our body is made of a different kind of electricity", "We feel heat and cold"), which may contact us in accordance with their desires ("We use the electromagnetic waves of your brain to communicate with you by telepathy"), may exchange information with us, pass to our world a certain quantity of energy (examples: moving of subjects at mediumistic séances, materialization and dematerialization of small subjects, Poltergeist, etc.).

What is this World? Where is it located? By what physical laws is it governed? In order to answer at least part of these questions, let us check whether the main principles, true for our world, are also valid for the Ethereal World?

1.) First of all, this is the cause/effect law. It is considered in detail, in particular, in the paper of Felice Masi [3] in the part "The world of matter". This law says that there is a cause for every effect, every transformation. Any change occurs in such a way that the process has a beginning and an end. The cause appears always *before* the effect provoked by this cause. The physical state after transformation differs from the state before transformation. In order to describe any phenomenon, any change of physical state of the matter, we should use the concept of time, a linear continuum proceeding irreversibly forward. Every phenomenon, every event

has an initial moment and a final moment in time, and thus it has a *duration* in time.

Without the concept of time we cannot describe any process, any change of material world. This is the method of our thinking.

The cause/effect law should operate also in the Ethereal World. Otherwise, we could not describe any processes in that world, any intentions or actions of conscious beings inhabiting the Ethereal World (ethereal people) or any contact with that world. But if the cause/effect law is valid, it means "they" live "in time". The statement that "they" are "outside of time" immediately makes a description of the Ethereal World meaningless, because such a world cannot change. It may be that etherians have a different duration of life, that their bodies are much more stable than ours, and because of it they have a different sense of time? This is possible. But the real world cannot exist "outside of time".

2.) The second principle: every complex object consists of more small and simpler objects interacting with each other. The more complex the object, the more small objects it consists of.

The conscious beings (in our world as well as in the Ethereal World) appear to be very complex objects. They have a body which can affect and change another objects; the body is the carrier of a tremendous quantity of information (memory) which must be saved by corresponding changes in its internal structure. We have a brain for this purpose. An analogue of such a brain should exist in every conscious being. It is not excluded, of course, that an external carrier of information – a sort of super-computer – also exists, and our brains can be linked to it. But in this case all our reasoning about complex internal structure can be applied to this super-computer.

Using this line of reasoning, it is not difficult, just as Democritus did, to come to the conclusion that all material bodies must consist of small, indivisible particles interacting with each other (as Democritus said: “Everything - even the soul - is composed of atoms”). Today we know that atoms, in turn, are also complex objects consisting of even smaller, elementary particles.

Thus, the complexity, and moreover the consciousness, of the ethereal beings necessarily leads to the conclusion about the atomic structure of their bodies, and their world in general. Size and structure of etheric atoms might not be the same as in our world. However, they should interact with each other in the same way: they should attract each other at sufficiently large distances – otherwise the complex object will disintegrate into single atoms

– and repulse each other at small distances: that provides stability of sizes and forms of complex (solid) objects.

3.) The third principle: two different objects may occupy simultaneously the same place in the space, only if they both (or at least one of them) are of field (wave) nature.

It is widely accepted that the matter exists in two different forms: corpuscular form and a field. Both of them possess a certain quantity of energy. The matter in corpuscular form occupies a space in such a way, that two corpuscular particles cannot occupy the same place simultaneously: "we cannot put the table into the place where the similar table is already placed". From the other side, different fields can occupy the same place simultaneously (with or without interference depending on their nature and amplitude/frequency characteristics).

Actually, modern physics has come to conclusion that the matter and fields are the same. Corpuscular form of the matter is simply a condensed, "petrified" form of the field. A corpuscular particle is a clot of field. But if so, why we cannot put "two tables at the same place"? The reason is that their "field clots" have the same amplitude/frequency characteristics and interact in such a way that strong repulsive forces appear not allowing to come within short distances of each other.

If two kinds of "field clots" would have very different amplitude/frequency parameters, they would not interfere with one another, and bodies made of such different "field clots" could occupy the same place without mutual influence.

Taking into account these three principles, can we imagine that in our space an additional world exists, very similar to our own ("We are physically in your world", "We are always with you")? A world which cannot be detected by our senses (eyes, ears or touch) or even by our best devices, at least, until the moment the other side wants to manifest itself ("We use the electromagnetic waves of your brain to communicate with you by telepathy").

Can we construct a non-contradictory physical model in which two different (but similar) material worlds co-exist in the same place and do not influence each other? (An attempt to place the second world into another space or another, additional dimensions of the space I don't consider here – this possibility always remains for the case we aren't able to manage with our 3-dimensional space.)

My reasoning is as follows.
If the parallel Ethereal World is located in our space, it has the same nature as our material world. Namely it is built from elementary particles, which, in turn, are the "field clots" – wave objects. Unitary field forming elementary particles is originated by physical vacuum, and this physical vacuum is the same for both worlds – for ours and the Ethereal one.

Both worlds have a field nature, and consequently, may occupy the same place. The question: why they do not interact? The answer: they have different amplitude/frequency characteristics. By the way, such assumption was made as far back as by Sir William Crookes [1]. However, today this statement does not appear very convincing for physicists: with the help of modern devices we are able to detect photons in the frequency spectrum from 0 up to $\sim 10^{20}$Hz and higher (for example, γ-quants with energies ~1Mev and frequencies $\sim 10^{20}$Hz are detected in nuclear reactions). Our world is permeated by fluxes of photons of different frequencies. The Ethereal World, if it is similar to ours, must also radiate photons at all frequencies, including the frequencies accessible, if not to our eyes then to our devices.

The explanation, in my opinion, is the following: photons irradiated by the Ethereal World at "our" frequencies have too small energy, and, because of it, are not recognized by our devices.

How can that be?
It is known that the energy of photon with frequency $\boldsymbol{\nu}$ is equal to:

$$\boldsymbol{\varepsilon} = h \cdot \boldsymbol{\nu} \quad , \qquad (1)$$

where **h** is the Planck's constant. It was found experimentally that in our world the Planck's constant is the same for all frequencies and equals $6.67 \cdot 10^{-34}$J·s. However, in the Ethereal World it may have another value.
The physical meaning of the Planck's constant was not elucidated up to now. It is clear only that it is related to the internal structure of photons.

A photon is a moving package of electromagnetic waves, with close wavelengths. Photons move at a constant velocity named the speed of light, *c*.*

Let us assume that in the Ethereal world the corresponding Planck's constant, $\mathbf{h}^{et}$, is much smaller, than our constant, **h**:

$$h^{et} << h \quad . \qquad (2)$$

* For electromagnetic waves in vacuum the phase and group speeds are identical and equal *c* – this is a reply to the comment of Raul Valin

Then ethereal photons, having “typical” frequencies that we are used to, would be invisible to our devices (and, of course, to our eyes), because their energy would be much smaller than that of our photons. Possibly, in specially designed fine experiments we’ll be able to detect such very low energetic photons. But up to now no one has looked for them. Therefore, our assumption does not contradict available experimental data.

The photon is one of the basic elementary particles determining the energy exchange between atoms (and bodies, as a whole) and the energy spectrum of excited atoms inside complex bodies. Does it follow from our assumption (2), that the energy of ethereal bodies is much smaller than in our world?

The answer is: "No!" It is reasonable to assume that energy spectra of similar atoms as well energies of similar bodies should be of the same order in both worlds. It follows from our first assumption about unitary basis of these two worlds: unitary physical vacuum filling our space.

Photon is an excitation of physical vacuum, with certain energy, $\boldsymbol{\varepsilon}$, and with certain geometrical (spatial) parameters: the width of the wave package, Δz, and average wavelength, $\boldsymbol{\lambda}$. If the spatial size of excitation, Δz, is the same in both worlds, the relation between $\boldsymbol{\varepsilon}$ and $\boldsymbol{\lambda}$ should also be the same. Taking into account that $\boldsymbol{\lambda}=c/\boldsymbol{\nu}$, one can write for the photon energy:

$$\boldsymbol{\varepsilon} = \frac{h \cdot c}{\boldsymbol{\lambda}} = \frac{h^{et} \cdot c^{et}}{\boldsymbol{\lambda}} \quad . \tag{3}$$

It is easily seen from here, that

$$h \cdot c = h^{et} \cdot c^{et} \quad \text{and} \quad c^{et} = c \cdot \frac{h}{h^{et}} >> c \ . \tag{4}$$

The frequency of the corresponding etheric photon:

$$\boldsymbol{\nu}^{et} = \boldsymbol{\nu} \cdot \frac{h}{h^{et}} >> \boldsymbol{\nu} \tag{5}$$

By this means we come to concept of the Ethereal world having new "universal" constants, h^{et} and c^{et}, for which, however, their product is conserved, eq.(4). The product $(h \cdot c)$ determines the elementary electrical charge, e: $e^2=(h \cdot c)/137$, so e is the universal constant for the both worlds. It leads to the same energy levels of elementary particles, atoms and complex bodies consisting of the atoms.

What is different? First of all, the carrying frequencies of all elementary particles (eq.(5) is written for photon, but the similar relationships are valid for all elementary particles). Masses of particles as well as of complex bodies also change. From the conservation of energy one can easy obtain:

$$E = m \cdot c^2 = m^{et} \cdot (c^{et})^2$$
$$m^{et} = m \cdot \left(\frac{c}{c^{et}} \right)^2 << m \qquad (6)$$

So, masses of the ethereal bodies would be much smaller than in our world. Detail consideration and discussion of various consequences following from this model can be found in my paper [4]. Here I wanted to discuss only main principles used by me in developing this model. I would be glad of any discussion or critique of these principles as well as results of the model and possible experimental methods of its examination.

I hope such discussion will help us to move from an illusion of understanding to actual understanding of the structure of the universe.

References

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2. Sir Oliver Lodge FRS, The Mode of Future Existence, 1933 Lecture.
3. Felice Masi, TheWorld and non-causal Phenomena: Significance, Synchronicity, Attraction, ITC Journal, **21**, March 2005.
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