Journal of Marine
Technology and Environment
DOI: 10.53464/JMTE.01.2023.04

ISSN (Print): 1844-6116
ISSN (Online): 2501-8795
https://www. jmte.eu

HURDLES IN APPROACHING SCIENCE AND IN SOLVING CLIMATE AND ENVIRONMENT ISSUES

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Abstract: Showing complicate issues in science, like the strange facts and realities pertaining to the quantum world, this paper explains why it is so difficult to understand and to solve those complicate issues. This paper also stresses the important fact, that in order to understand these strange realities pertaining to the quantum phenomena but also in order to solve other complicate problems of science such as the climate change issues, one should give up the traditional way of thinking of the science and should also renounce the false idea of the rationalism, stating that the entire reality can be known and understood by using scientific reasoning.

Keywords: quantum phenomena, rationalism, binary logic, multivalent logic, limitations due to human senses, multidimensionality, thresholds, extra dimensions, weights assigned to dimensions.

1. INTRODUCTION

This paper is based on a previous paper of the author [12], which has been updated and completed with additional information pertaining to other published work of the author, [13], [14] and [15].

In the Greek and Roman ancient worlds, the scientific knowledge was found in the philosophic schools pertaining to those cultures.

After the fall of the Roman Empire and the rising up of the Christian faith, the scientific knowledge has been transferred to the churches and monasteries, the science found there being always based on the explanations accepted and given by the Church.

The age of the humanism has brought forward the importance of the rationalism and its false conclusion that almost anything could be explained by using the human reasoning.

This conclusion has also determined the schism between the science and religion.

The discovery of quantum phenomena more than hundred years ago has proven that the rationalism alone cannot explain the weird phenomena belonging to the quantum world.

The relationship within this paper between the religion and science, although not an explicit one is an implicit relationship.

Without admitting the limits of the rationalism and without admitting the existence of unknown forces and hidden truths escaping our senses and rationality, one cannot adequately approach the world of quantum scale phenomena.

In order to approach and explain the quantum phenomena, the link between them and the normal scale and large scale phenomena should be somehow established first.

The work is concerned with the difficulties in detection of links between normal scale and small scale phenomena, that is to say common features and characteristics exhibited by both, normal and quantum scale phenomena.

These common features which are namely the link between the quantum world and the real world are permitting to connect the small and the normal scale phenomena. They are useful to understand better the quantum phenomena and they are also showing that many of the quantum world rules are applying also for real world systems.

The last evolutions and discoveries in the present day science, and especially the phenomena pertaining to quantum world, have proven that the unilateral and one dimensional traditional way of thinking of the pure rationalism is not sufficient anymore to explain the facts and realities of the science.

The work also shows that, when dealing with quantum phenomena a “special” kind of thinking is required, mathematics should be used at its highest peak and some of the “usual” and “absolute” truths and the “sound” judgments of the plain and blunt rationalism which may hinder the understanding of the quantum world are to be renounced.

The approach of the work is to explain in the first instance, in a more descriptive way what are the reasons lying behind the writing and the similarity between the quantum world and the normal scale world, analysing

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and explaining why the restrictive limitations of the pure rationalism should be abandoned.

These limitations are to be replaced by newer, more modern and more adapted kinds of thinking, while the next part is representing the prescriptive part, being a little bit more technical and concerned with providing and finding solutions, explanations and theory based prediction methods of the quantum world phenomena, as well.

Throughout the work a special feature of the quantum systems and phenomena will be addressed, that is to say the feature of multidimensionality, feature which is also exhibited by most of the real world (normal scale) phenomena, and therefore easier to be dealt with.

The evolution in quantum systems (more dimensional systems) may follow variation laws pertaining to the theory of *Time Series* or to the theory of *Signal Processing*, which could be systemized along with possible norms to be applied to those more dimensional quantum systems.

Because our present state of knowledge related to the quantum phenomena is related to the knowledge of the existing probability wave function of the respective quantum phenomenon, the transition between the states of the quantum system can be derived using the characteristic function of the probability density function, which is in this case, exactly the Fourier Transform of the probability density function.

Since there are serious limitations caused by our limited senses, perceptions and thinking (that is to say there are hidden dimensions for us), another issue to be approached is to retrieve the information pertaining to those dimensions hidden to our abilities and senses.

One of the methods we could use for this is to reconstruct those hidden dimensions based on the *spectral analysis* (Fourier Analysis), this kind of techniques being actually nowadays successfully applied in Quantitative Phase Imaging, where the image is reconstructed out of its spectrum.

Unconventional thinking is almost always required when is necessary to address complicate issues such as certain intricate problems in science or the complicate issues related to climate and environment.

Using these methods, one could infer about the facts and phenomena underlying to the observed effects of the quantum world phenomena and could also find explanations for them, but could also identify patterns in the evolutions of the quantum phenomena.

2. HURDLES IN LINKING RELIGION AND SCIENCE

Some scientists are criticizing new science as being fiction, science fiction of philosophy. But, many of the fiction and the science fiction facts, not so far back in time (such as Jules Verne's books or more recently the Star Trek movies) have already become nowadays' technology.

A lacking capacity to dream may seriously impair the work of the scientist, since it is leading to a diminished creativity.

A very good example on how the science is approaching more and more the science fiction is the evolution in the field of the molecular machines, categorized in the early '80s, by many scientific researchers as being phantasmagorias without any future. As it is already known the Nobel Prize for Chemistry 2016 has been awarded exactly for these so called "phantasmagorias" from around 1980.

That is why we can further infer that much of the nowadays' science fiction and philosophy is the science of tomorrow.

Another good example on how the scientists should be always prepared to understand and accept new ideas is related to other "classical" ideas, which are nowadays confronted with contradictions pertaining to the new discoveries in the field.

According to the laws of the chemistry, until recently was well known the fact that he cannot form stable compounds with Na. But recent research has shown that at extremely high pressures, these "classical laws" of the chemistry are not valid any more, and at very high pressures, within the gas planets He and Na could form stable compounds, contrary to the general "classical" belief.

Affirmations like: "Two bodies cannot simultaneously occupy the same volume of space" which are valid in the world of normal scale phenomena, are not anymore valid in the world of quantum phenomena. Also the rule regarding time, which is supposed to flow only in one single direction, it also loses its validity in the realm of quantum phenomena, exactly like in the case of the dark matter which is supposed to obey completely inverse rules than normal matter.

Without reading, understanding and eventually using philosophy and philosophic ideas, the most recent new theories and science, such as the *Theory of Relativity or Quantum Mechanics*, would not have been probably discovered.

Complicate scientific issues such as quantum theory or solving climate and environment issues cannot be approached only based on a narrow rational thinking. That is why they have to be addressed not only using new original creative solutions, but also using ways of thinking which may sometime contradict the usual logic or they may very well be counterintuitive.

So, when one issue is so big or it has grown to become so big (as in the case of climate issues), cannot longer be approached in a classical strictly logical manner, but merely by using unconventional solutions and new ways of scientific thinking.

The future of the science belongs to those who will have the ability to see something where nobody sees it, or to see the things otherwise than others do.

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In order to do this, the future scientist will have to have additional backgrounds in various different fields of sciences.

Because a singular science is representing only one limited and narrow way of thinking, the only limit of the science is the respective science itself.

If you are anchored in only one science then you are more prone to limitations than those who are thinking in more than in one singular way, corresponding to their own single science.

The present days science problems can be solved only by approaching them in a more complex and holistic way, or if can cite A. Einstein: "the complex problems we are confronting today with, cannot be solved remaining at the same level of knowledge where we were when they have been generated" or in his other different words "it is stupid to do the things repeatedly, in the same way and to expect different results".

The use of the "pure rationalism" in science has reached its limits and the weird quantum phenomena the science is facing, cannot be explained anymore only by using the limited view of the rationalism.

The link between the large scale phenomena described by the Theory of Relativity and the small scale phenomena, the science is still struggling to understand, that is to say *the Quantum Theory*, as it is presented in [1], [2], [3], [4], [5], [6], [7], [8] and [9] cannot be found unless the missing link between the normal scale and small scale phenomena is previously detected.

3. SOLUTIONS FOR SOLVING THE HURDLES ENCOUNTERED

This section presents potential successful ways to approach complicate science issues

3.1 Conventional logic, paradoxes and complicate science issues

In order to somehow grasp and understand quantum phenomena, it can be remarked that one of the rules of the quantum world is also applying to the normal scale phenomena and systems (real world systems), and that rule is the rule of *multidimensionality*.

In order to sustain this remark one can name at least two examples proving this remark: the so called paradox of the truth machine belonging to Kurt Gödel and the so called paradox of the rationalists: "could God create such a huge stone that He Himself cannot lift?"

In the paradox of the K. Gödel's binary logic truth's machine, this machine enters into contradiction with the simple binary human logic and is silenced since cannot make any further statement, because it would contradict this logic. One another interesting point of view regarding the muting of the truth's machine is provided by B. Marchall in his paper [11]. The silence of the machine is based on the fact that the machine is intelligent enough to understand and to know that "the truth is bigger than itself and she develops the intuition that there is something transcending her" and the only reaction she can have is to remain mute and be silent, this reaction showing her own humbleness and modesty with regard to all what she does not know.

A beautiful definition of science is given by the same author above in [11]: "Science is modesty. It is born with doubt, lives with doubts and always leads to more doubts and more questions".

This definition should also help man to approach more humble and hence more successfully the today's complex problems of science and of Earth, if they really want to solve these issues.

Both of these paradoxes are based on the simple rules of binary logic, and they are both demonstrating the same thing, namely the limits of the binary logic system itself.

As mentioned before, K. Gödel and also A. Einstein not only observed that such kind of paradox problems cannot be solved using the same system of thinking that has generated them, but they also pointed to the limits of the scientific rationalism itself, that since the discovery of the quantum phenomena is getting into more and more troubles.

That is why, one of the first things should be done when dealing with and when approaching quantum phenomena is to throw away the "simple and clear" one dimensional binary logic and even the trivalent logic introduced by the polish Jan Lukasiewicz in 1917, which are clearly proving not to be valid anymore in the quantum world.

So when dealing with quantum phenomena, we should give away the "usual" way of thinking and look at the truth as to a more complex concept than it is viewed according to the binary and trivalent logic. We should rather adopt the multivalent logic or even the fuzzy logic inspired by Lotfi Zadeh, according to which, between the 0 and 1 there are a finite number of possible values or, as it is considered in the fuzzy logic systems, there are an *infinity* of possible values and solutions.

The multivalent logic and the fuzzy logic as well, are both solutions to the problems stated by the previous paradoxes. In this way, it shall be discovered that the truth is in reality, almost always, more complicated to express than in terms of "yes/no", "zero/one" or "white/black" and the truth could be often determined only using much more than only one dimension.

Expressing truth using two, three, four or more dimensions could be made using laws, rules and limits but also weights for each of those dimensions.

If for the rational (human) world system the rules and the limits could be established as being the same for all humans, the weights associated to each of those dimensions of truth (rules and limits) are obviously different from human to human, as it is known everybody has his own sense for how important different things are.

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In this manner we are coming closer to one of the main characteristics and features of the quantum world: the fact or the observation (the knowledge or truth) is *depending on the observer* (by means of the weights the observer is assigning to each dimension of truth/ knowledge, at a certain moment, and truth is becoming thus relative to observer.

This is meaning that, what is true for someone could be false for someone else, and also that the same thing could be both true and false at the same time for different observers, or could be both true and false, at different moments, even for the same observer.

This is again, obviously, one of the main features the quantum world and phenomena is exhibiting.

Hence, one of the first main remarks which has to be done related to the truth/ knowledge when dealing with of the quantum world phenomena is that the "rationalistic absolute truth" has to be firstly thrown away and in henceforth no one among humans could claim to possess the "absolute" truth.

When assessing truths and facts in more dimensional real world systems or in quantum systems as well, one should have to know the variation (or evolution) *laws of the respective dimensions*.

These are forming the system of truth, the weights assigned to each of those dimensions, but also the formula of the norm of the respective system.

The norm is linking the values of the respective dimensions with their respective weights, thus resulting the aggregate value corresponding to one particular state of the system.

An explanation to the different values (of truth) observed by more observers, fact which is also exhibited by the quantum phenomena, is the fact that the observations should comply with the rules within the systems of these observers.

A second idea linked to the characteristics of the quantum phenomena is that, there are certain dimensions pertaining to the multidimensional structures corresponding to these phenomena, which are hidden to the eyes and senses of the man.

These dimensions are usually called *extra dimensions*. This is an additional explanation for the facts and results perceived during the quantum experiments, namely that they appear to have no logic and they make no sense for the human mind.

In reality this could be, on the one hand, the wrong interpretation of the result generated by the multidimensional structure, and on the other hand could be the effect of the existence of those hidden dimensions combined with the limitations caused by our senses.

In the same manner as explained before, it may be very possible that the observed quantum particles are moving also in dimensions which are extra dimensions for the observer.

For the quantum phenomena this fact could mean that there may be extra dimensions of ourselves (all human observers of the quantum world) and, as already stated in the scientific literature of the quantum mechanics, the pilot wave of the respective quantum particle could be a real wave pertaining to a dimension hidden to the human eyes and senses.

Consequently, other methods of measuring of the realities in the quantum world should be implemented.

Another third concept producing the facts observed in the more dimensional systems pertaining to the quantum scale is the concept of the *threshold.*

This concept could be applied in normal scale multidimensional systems in the following sense: if the aggregated value of the system, at a particular moment in time is smaller or is exceeding a certain value (threshold value), then the value of the system in that particular moment cannot be read.

The difference to the previous idea is that this concept of threshold is regarding, in this case, only the "measured" result caused by the multidimensional structure.

For the case of real world systems there are indeed such thresholds for which the values cannot be read due to our limitations caused by our limited senses.

For hundreds of years the man has put himself and his own thinking in the center of the Universe. He made this applying the very same way of thinking when he has firstly put his planet, then the Sun in the center of the Universe. Then, with the expansion of his own knowledge he was gradually forced to admit that neither the Earth nor the Sun are lying in the center of the Universe, but are only small dots in a Universe map much bigger than originally thought. Unfortunately and mostly due to his own vanity he was not able to transfer the same way of understanding and wisdom upon his own thinking, and presently he is still thinking himself as the ultimate thinker, being able to understand all without any limitations and surely convinced that he can explain and understand all using only his limited binary reasoning.

The next step in order to better understand the reality of the quantum world and its phenomena is to renounce such narrow, limited and absolutistic way of view and thinking. He has to admit truths that are nowadays escaping to such self-sufficient "normal" and "sound rational" judgment and to also renounce the judgment according to which the man's binary logic and reasoning is the best tool to understand the world.

The first step toward such a way of thinking has been already done by means of technology, that carries us out away beyond our senses and it gives us a good idea about both, on the one hand, the very serious limitations we are exposed due to our senses and on the other hand, our rather small place in the Universe.

Although the observation of the real world systems and especially of the quantum world is seriously limited by our senses, the actual main limitation could be caused by our own "absolute" way of reasoning.

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We are more and more close to the level where our limited senses are assisted and completed by the available and continuously improved technology.

However, in spite of this nowadays improved technology the stumbling stone for man may be represented by his own way of reasoning. The human's reasoning has remained somehow far more behind the technology, somewhere back in time, in the thinking ways of the XIX century.

In [10], a very interesting book of Friedemann Schulz von Thun regarding the psychology of communication, the scientist was expressing the idea that the man is very badly outfitted with his only two ears, since the communication process is a much more complicated process, having at least four main aspects that could be considered during the communication process.

In the same manner, the scientist, with his one brain and five senses seems also to be very poorly outfitted for perceiving and understanding the science facts. In the very same way, his five senses and the one brain seem not to be enough for approaching more complicated phenomena such as the quantum phenomena, fact which is a serious foothold to stumble.

At the time of the pure rationalism, the man had the very "unusual" and strange idea that he could explain almost anything using only his limited true/false logic. Unfortunately, the strange phenomena happening in the quantum world, recorded based on the latest technology, are already, again and again, proving that this non-productive way of thinking has remained behind both, the new technologies and the corresponding recorded facts. Hence, change of this manner of thinking is strongly recommended and required.

The time of the rationalism, able to solve any problem and to answer any question is off.

We have already entered an era in which, as the things get more and more complicated, the science phenomena cannot be explained anymore by using the traditional manner of the narrow rationalism.

The human rationalism pertaining to the XIX century and the beginning of the XX century should be redefined. From the perspective "the man could discover and explain almost anything using only his own reasoning and senses" into: "we are human beings not only limited in space and time, but also in our knowledge".

A man of science should be a man of the reality, trying to observe, analyze, understand and describe the reality but also admitting that often the reality is far weirder and more astonishing than the expectations of man. Many times the men of science are lacking the capacity to understand and to explain it.

Expressing his opinions on the difficulties met in the science, A. Einstein said that God did not created the world around us with the intention to be easily understood by man. Hence, huge efforts are necessary in order to exceed limits and the limitations imposed by our own minds.

As Niels Bohr has declared in one of his statements: "It is decisive to recognize that, however far the phenomena transcend the scope of classical physical explanation, the account of all evidence must be expressed in *classical* terms".

The term used here, *"classical"*, Bohr is using, should be interpreted as referring to the new stage of science which should be reached, in order to explain the quantum phenomena, and not to the present stage of "classical" knowledge in physics.

Another feature of both, normal scale and quantum phenomena is the *interdependence* of each of the both. Interdependence is usually called correlation in regard to normal scale phenomena and entanglement, with regard to quantum phenomena. When presented to him, A. Einstein named the quantum entanglement "spooky action at distance", because it is so hard to understand it and to represent it.

We could easily imagine that the law of interaction between objects in the macroscopic world, the Law of gravity discovered by I. Newton , has been seen by many scientists of that times, at its discovery, also as a "spooky action at distance".

Even now, after centuries of science, although the gravity is the first force that has been discovered (out of the 4 main forces of interaction known), it is nowadays, actually the least known and understood force of interaction.

3.2 Basic rules to address and to deal with hurdles encountered in science

The previous presentation of facts regarding the "classical" view in science is sustaining and enforcing the statement and the viewpoint according to which, the "classical" is almost always meant as referring to the certain stage reached by the human knowledge, understanding and science. This present stage is nowadays not able to explain the phenomena encountered in scientific experiments.

In order to better understand the facts within the quantum world and to succeed in explaining them we should change not only the view on the "classical" theory of physics and the interpretation of measured results. Instead, we should change the whole way of thinking with regard to science when dealing with quantum phenomena.

The classical rationalism is operating mainly in deterministic ways. This fact is both convenient and easy to perform and understand by every human mind, on one hand, because it is in accordance with the human limitations and hence, it fits better to our limitations, and on the other hand is more likely and more easily accepted by others. It is also more easily accepted by the science community than other "unconventional", non-

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deterministic alternatives that are trying to deal with more solutions or even an infinity of possible solutions.

As we all know, the infinite is a more difficult concept to grasp and to deal with, and at the same time much more difficult to describe and represent. The accepted solution is in many cases to split the infinite number of possible solutions into a finite number of classes with infinite solutions. In this manner one can reduce the infinity to certain finite number of classes, each of them containing an infinite number of solutions. The great difficulty in this case is usually to find the rule (or the algorithm) describing each of the classes.

This is the also the case of the fractals, the fractal although infinite is based on a (very often) simple rule of generating very complicated structures. The fractal systems are, in the very same way as the quantum systems, dynamic systems.

In order to better understand the quantum phenomena and how they are related to the normal scale (macroscopic world), more actions could be performed. In that sense one could use the possible change of the existing measuring devices, the possible change of the measuring methods, and the reinterpretation of the obtained results. The change of much of the way of thinking should be also seriously taken into account.

The high computational capacities from nowadays are permitting better the simulation and comparison of results linking the quantum scale and a normal scale phenomena, in the sense of the present work.

One could systemize the laws of evolution (laws of variation) of the dimensions taken into consideration for the multidimensional structure of both (quantum and normal scale systems).

This can be made by taking into consideration both, the multidimensionality and the dynamicity of the systems as well, using, for example, recursive rules for the evolution.

4. CONCLUSIONS

The difficulties related to the understanding of the quantum phenomena or other complicate science issues, are mainly deriving out of a certain limited human way of view and thinking.

The difficulties the man is struggling with, more than hundred years, regarding the quantum phenomena, could be already considered as an opportunity to reconcile science and religious belief.

The re/convergence of science and religion could be the most adequate way to address those phenomena, since everything else has failed to explain them.

These difficulties in understanding the quantum world can be attributed to the limited rationalism working based on the simple binary logic, which is not able and cannot explain the strange things happening within the quantum scale phenomena.

Man should understand that today, although much better technically equipped in comparison with the past, he is seriously impaired not only by his senses, by the number of his senses but also due to his own brain's and his own technology's limited processing capacity.

Instead of this way of thinking which is not valid anymore when dealing with the quantum phenomena, the multivalent and the fuzzy logic but also other "non/conventional" methods should be used to understand the obtained results.

Multidimensionality and threshold are further concepts that could explain a great deal of the weird results obtained in the experiments pertaining to the quantum world.

The humanism and its consequent rationalism have determined the schism between the science and religion. The discovery of quantum phenomena more than hundred years ago has proven that the rationalism alone cannot explain the weird phenomena belonging to the quantum world.

The dialogue between the religion and science within the paper, although not an explicit one it is assuming an implicit relationship between the two.

Without admitting the limits of the rationalism and without admitting the existence of unknown forces and hidden truths escaping our senses and rationality, one cannot adequately approach the world of quantum scale phenomena or other serious issues of science.

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