

# further analysis of the Schrdinger cat; who is the observer and why it sounds impossible to reach to the final theory of physics.

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## Abstract

In this paper we analyze the subject of the wave function and observer. we propose a solution to the problem of the Schrdinger cat. we elucidate the relation between consciousness, identity and the final theory of physics and finally explain the hardship that we face in reaching to the final theory of physics in passing from the quantum model to another mechanism that admit the final reasonable and universal answer to the paradox of the Schrdinger cat.

## 1 Introduction

consider that there is a box under a tree and there are two types of apple on the tree. one type is red and another type is green. one of the apples drops in the box and the worker put a shield on the box without looking in the box to know which type of apple has fallen in it. later you open the box. the most privileged and accepted idea among physicist is that on the base of Copenhagen interpretation of quantum mechanics (although it does not offer an answer that why in a specific time the observed apple is green or red and only it offers a probabilistic answer to the problem); exactly when you look inside the box, the wave function of the color of the apple collapse and your action determine and create the observed red or green color state of the apple in the box. in other words when you open the door of the box, the apple in priori, had no specific color or just a superposition of the red and green color. after you looked at the apple you created its observed color state.

now suppose that before you look into the box a photograph of the apple in the box was taken by an automatic camera, but the outcome of the photograph kept secret to all people or living entities until you examine the color of the apple. some people argue that recording any information by camera has collapsed the color's wave function of the apple. but the correct answer is that; the apple and camera made an entangled system and when you examine either apple or the taken photograph; the wave function of both of them will collapse simultaneously [1].

now consider another twist to the problem; one of your friends look at the apple before you know the apple's color. but he keeps the answer secret until you try the apple or ask the

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result from your friend. has the wave function of the apple's color collapsed when an alive entity (in this example your friend) has tested the apple's color and recorded an information about it in his brain? again, the answer is no. when he looks at the apple; his brain and the apple make an entangled system and when you ask him or look at the apple the wave function of the entangled system collapses simultaneously. in other words the Copenhagen interpretation of quantum mechanics expresses a strange fact.

**Theorem 1.** *the Copenhagen interpretation of quantum mechanics remain uncontradictory if and only if i assume that i am the only observer and wave function collapse in the world.*

in other words other people are not observer and can not sense any thing. they are only a dead collection of molecules, particles and energy that interact with their surrounding and obey laws of quantum mechanics. no one is able to observe and collapse the wave function except me. this fact is also the solution to the problem of Schrödinger cat. the cat never was alive, its normal reactions and usual activities before he goes to the poison box which was interpreted as the reactions of an alive animal, were only the results of the interaction of elements and particles of his dead brain with his surrounding. there is only one alive person in the world and it is me. other people can not sense any thing. put in other word; the Copenhagen interpretation expresses that; world is in my imagination!

now consider another problem; we want exactly to analyze what the mechanism of consciousness and identity can be created of. suppose we have the technology of cloning two identical observers that share the same consciousness. thus, either suppose there are two persons who are cloned molecule by molecule from each other or they have the same identity and shared consciousness not by exact copy of molecules by molecules but by an unknown technology that have made them the same identity and the same observer. in other words suppose we discover the relation between any existing law of the physics of matter and energy and quantum mechanism and the mechanism that this law has created the consciousness of a specific individual; for example we know exactly how to produce the identity of Mr rene decart that proposed he exist because he thinks.

we now suppose one of the created body (say Mr rene decart A) is on earth and another one (Mr rene decart B) is in a very remote distance. Mr A and B are the same identity, thus what Mr A on earth senses, must be simultaneously understood by Mr B on the very far distance. but as we know no information can travel this distance faster than the speed of light that creates a contradiction. again we face a paradox that ruin any possible relation between the consciousness and any existing but at this stage unknown physics law that can create this consciousness. on the other hand we do like to explain any phenomena by physics laws that obey the traditional known postulates of physics such as theory of relativity and quantum mechanics. again by referring to our theorem; the possible solution to this problem is that contrary to what Mr decart said; in my reference frame; he has no consciousness, in other words neither body, neither the one stand on earth nor the one stand on the far remote distance planet have consciousness. their physical behavior which I interpret as consciousness is only the interaction of the elements of their dead brains with their surrounding. I am the only person who has consciousness. this solve the issue. but again it ruin any relation between my consciousness and any physical law that can apply to elements of my brain. it assume the solution of this issue in the metaphysical realm that we must bring it back to the known physical realm by postulating new physics law that remained hidden by yet about quantum or creating a theory beyond the quantum mechanics. thus making the colon or hologram of an individual sounds only an unrealistic science fiction fantasy. but if we search more we can attest that the only candidate that can

go faster than the speed of light is any disturbance in the phase velocity of the entangled wave function. but this mechanism can not transfer any information faster than the speed of light from point A to the point B. whereby; this mechanism suggests that maybe there is a relation between consciousness, identity and wave function and quantum mechanics.

## 2 Is there any golden mathematical formula that creates an observer

how can we distinguish an observer from a subject? to answer this question we must consider several interesting philosophical but not physical aspects of the question. my identity that i interpret as (I) is a general phenomena and entity. (I) is what the world and universe is understand via. (I) is the only observer in the world that makes what happen in the world understandable or determine what must happen in the world and what must be observed. but on the other hand any physical and mathematical array of molecules and genomes for example such as the genome sequence T A G C T T C G or any special model and pattern that can be expressed by any mathematical models and is distinguished from other patterns and arrays is a special thing, pattern or array. why the general thing and the only observer (I) must be created by a special pattern or mathematical model. thus maybe we can suggest a conjecture

**Conjecture 1.** the array, pattern and distribution of molecules, genome, matters and energy in my brain, has no relation with the fact that why i must be the only wave collapse and observer in the world.

the situation becomes more complicated if we extend any array of matters and energy to any specification such as the pattern of firing electrical current between neurons or the way neurons connect to each others and want to determine its relation with the general identity that collapse the world wave function(I). ascribing any specific character to the general (I) will fail. it seems that achieving to the final theory of physics that explain this phenomena is not a nontrivial task.

now consider another philosophical but not physical issue. for a moment suppose this picture is incorrect and all people have consciousness and are observer. another problem appears; why i am so much lucky that my personal consciousness and identity is defined by physics law among billions of billions of other identities that can define other alive organism as observers. the logic says that any hypothetical number of identities and consciousnesses and observer that can be created in the world must not be a specific large number. it must be infinity. but the question is that the probability of choosing 1 (my personal identity) among infinite possible options (countably infinite set) is not even a very small fraction. it is exactly zero. as we know; the population of all alive organism on the earth is not infinity and also cosmological models predict that the size of the universe is not infinite too. thus, not only i am exceptionally lucky that i am defined, i exist, but also i am lucky that i exist as a species among all other species that have opportunity to discuss these issues. is good luck and chance only created by probability and chaos that its roots exist in the essence of quantum mechanics or there is a mysterious picture behind the scene of quantum mechanics that omit the probability and at the same time creates justice in the world. why the predator hunts the prey?

we said that other people except me have no consciousness now suppose i want to create some hologram of my consciousness at other location of universe. but we know that due to

the maximum limit of transfer of information this fact is impossible. thus the question is that; how my existence in point  $A$  prohibit any hologram of me in point  $B$ ?

there are several interesting points about the mechanism that how the brain can work. we said that when one of my friends look at the apple he does not collapse the wave function of the color of the apple but merely create an entangled system. this means that the brain must have the ability of creating the superposition of green and red color by a specific probability for example 41.11111... percent green and 39.88888... percent red. thus his ability and the states that he can create must be non enumerable and in other words he must be able to create an exact copy of any wave function of any abstract subject and record it. but on the other hand my brain must be different from other brains and it must collapse and keep the result of the collapsed wave function and make an entangled system simultaneously with it. what is the definition of the collapse of wave function in my brain? why only my brain has the ability to collapse the wave function.

another way to express this theorem is to postulate that there is not a golden array of molecules that creates a wave collapse or observer from an object. for example consider that there exist a laboratory and in this laboratory there are several objects and in addition to these objects there are frozen sperm and an egg. logically the frozen egg and sperm are not wave collapse. after a specific time the egg and sperm defrost, then they mix and after a specific amount of time an individual will be created. but it seems inappropriate to express that prior to the time 12:05:03 all objects in the room were undetermined states of wave function but after 12:05:03 that the individual was created, all of them become real and their wave function collapsed and they are manifestations of the real states and not an undetermined ones. some how it seems that the created individual collapses the wave function and probability resulted from the mathematical model of quantum mechanics of all stuff of the lab in his own brain rather than collapsing the wave function of the objects of the room. in other words the state of all objects were real and determined (in their own reference frames) before hand which is in contradiction with bell paradox. every one knows his own state although his state is a probability for others.

### 3 uncertainty principle

here we want to present the definition of a seemingly alive individual and define the principal boundary and difference between a classical computer and the brain of an individual. as we know; a computer has a specific and deterministic hardware that leads to a deterministic behavior. for example if we type  $2+2$  in its keyboard; we observe 4 in the monitor and if we repeat the process, again and again we reach to the same answer. but suppose you ask your friend to offer a long answer including several words to a question such as describing the city that he lives in. if you repeat the process, every time he offers a response that has a little difference with his previous response. similar to probabilistic outcome of double slit experiment with only one electron and the fact that as a postulate we never can predict why electron passed from slit A instead of B. in other words his future reaction will not be predictable for me. even if you repeat the experiment with several identical twin in identical conditions, their response will be different. in addition his brain has infinite number of options to respond and his brain is made in such a way that his behavior remains unpredictable. the only candidate of physical mechanism for infinite options and at the same time unpredictability is to postulate that the brain of an alive entity is made in such a way that it works via uncertainty principle and quantum mechanics. but at the same time

his behavior remains reasonable. in other words the hardware of the brain and a computer have a primary difference. the traditional computers do not use quantum mechanics and uncertainty principle and the possibility of infinite number of response in their hardware and algorithms. even quantum computers do not use uncertainty principles in their hardwares and they only use the superposition specification of quantum mechanics. thus not only computers should use the uncertainty principle in their hardware but also their reactions must remain reasonable and not merely probabilistic. as a result, the necessary condition to create a type of hardware that mimic the behavior of an individual is the option of infinite number of response and its unpredictability and at the same time its reasonability. we conclude that the necessary condition that we move forward in physics is to know why electron preferred slit A instead of slit B although its probabilistic pattern is well known for us due to quantum mechanics equations. this behavior merely will not be achieved by a software modification because any random reaction in the traditional computers produced by a new software is a function of other determined variables such as the time of the computer.

if you wish to predict the behavior of an individual, the necessary condition for this prediction is your ability to determine the position of all elements of his brain, in other words you must first have broken the uncertainty principle limit as a deadlock and limiting postulate for this analysis. similar to traveling faster than the speed of light as a serious barrier for interstellar journey. in other words if you had a traditional computer that could by a X ray or MRI records and analyzes the position and momentum of all particles in a lab including the elements of the individual then you were able to predict the next position of individual. thus you could conclude that the person in the room is not an observer and has no ability to make decision and all of his future actions will be principally predictable by you. but as we know it is not at all practical due to uncertainty principle. it seems that there is a crucial relation between not to be predictable but to be determinable words.

so i can say that although you can not calculate and guess his next movement in principle but maybe your friend's next action is determinable by you in principle on the base of Copenhagen interpretation of quantum mechanics.

on the other hand i can make decision because i am not in priori predictable by other people. thus it seems that uncertainty principle and quantum mechanics play crucial roles in consciousness mechanism. there is another interesting fact about considered example about the elements of the lab when we want to predict their next state by a classical computer. suppose that the computer was situated in the lab and it was a part of the system and its elements had interaction with other elements of the system and room. if there was no quantum mechanics; then still it was impossible for the classical computer to calculate the future states of all objects in the room including itself, because its calculations would ruin his own future state similar to a person that is tracking his own shadow and want to exceed it. maybe there are some eigenstates and eigenvalues that the above computer in that states manages to calculate his own future state but generally it seems an impossible action. thus quantum mechanics have offered us the ability to arrange our room in any way we wish.

## 4 discussion and conclusion

in final section we want to discuss about the specification of a possible and reasonable model to the problem that we studied in this paper.

we begin by similar events in the history of physics. we begin by the way Galileo Galilee resolved the complicated problem of Ptolemy model. before Galileo, people assumed that

all planets and universe rotate around the earth. but later Galileo resolved the issue by suggesting that earth (and all other planets) is rotating around itself and sun. another example is the story of relativity. before Einstein people assumed that there must be an ether and exceptionally ether is stuck only to the planet that people are living on (earth). but a smart question was; why ether must be stuck to my planet earth and if there is no ether why the speed of light is constant only for me and why only i am an exception. the clever answer to this question led to the formulation of the special theory of relativity and the mass energy equivalence and generally speaking what we obtain from the isotropy of space time and principles of special relativity.

as another topological and geometrical example we can ask where is the center of a sphere and we can respond that every where on the sphere can be considered as its center and pole or in other words it has no specific center due to its symmetry under rotation. thus the question is what kind of symmetry is responsible for the problem of observer and Schrödinger cat?

it seems that there must be another mechanism for the observation issue similar to the mechanism of above examples. on the other hand maybe nature is more complicated for this formulation because on the base of Mach's principle it does not make any difference that whether world is rotating around my head or i rotate around myself.

as we can see in this paradox "Schrödinger cat" the quantum mechanics does not question that why an observer (I) observes a specific fact (for example the constancy of the speed of light only for me or movement of all world only around my planet earth) in a specific or discriminatory way, but this time it attacks directly to the problem of observation (I) and want to respond to the problem that what is the essence of identity, observation and why i am the only person that observes.

there is a similarity with what we said in above and symmetry breaking in elementary particles physics. we know that we never can color a specific electron to distinguish it from other electrons. in other words all electrons are identical and have not different types of wave functions. so maybe the story of identity is the similar one's. in other words all people have the same identity and there is not more than one observer in the world. but the big question is that how this symmetry breaks and as a result of this symmetry breaking I am the only person who sense and only observer in the world. this fact maybe is not true and i can ask what is the symmetry law that leads to the conservation of my identity in my brain. although there is no proof that my brain had the same identity that it had one minute ago and it has only its past memory (note that also we do not exactly the definition of time). in other words maybe the chaos and uncertainty principle that are the by products of quantum mechanics are related to conservation of one quantity and it is my identity. maybe the random movement of electrons and particles are not so random and they have their own orders. even  $\hbar$  is a conserved quantity under Lorentz transformation. more analysis of this subjects needs a fundamental breakthrough in foundations of quantum mechanics and the definitions of concepts such as time and space. ironically quantum gravity seek to create a common model that unify general relativity and quantum mechanics into a unified theory.

one reason that it seems impossible to reach to the final theory of physics is the fact that as we can see the paradox that is addressed in this paper has not a trivial solution. thus the final theory of physics that is supposed to provide an answer to all unsolved physics problems including this issue sound out of touch. another reason is; maybe there can not exist a final super symmetry or theory for a famous mathematical theorem or express this fact simply ;there is not a superset of physics law that contain the sets of all phenomena in the world or we can not create a super key that open all doors. thus referring to Noether

theorem; further unification of forces that culminate to the existence of only one unique force that under different symmetries leads to different interactions may not be the solution to Schrödinger cat paradox. or we can never find a universal symmetry or super symmetry that contains all symmetry law that leads to a specific force under specific symmetry law. so the existence of a universal symmetry that unify all interactions under a super-symmetry must fail. if there is only one action in the world.

chaos behaviour and patterns of human brain indicates that people brains use quantum mechanics. if superluminal particles do not obey traditional laws of quantum mechanics means quantum decoding exist in tachyons? a model that predicts both relativistic and quantum? version of wave function collapse? There are two important criteria for a computer to exactly resemble the human brain. The first criteria is that it must makes mistake. Making mistake and creating error for any types of traditional or quantum computers with current design and algorithms is impossible. In other words the outcome and circuit of all types of known computers is created as a deterministic way that will leads to a deterministic result. i.e. it must be prove able mathematically that making mistake for any known computer is impossible. The necessary but not enough condition for the system to make mistake is that it determine its conclusions on the base of patterns. Mostly but not always patterns are repetitive pictures. Mostly but not necessarily revolutions devour their children. The creation of patterns needs wave like behavior of system such as double slit patterns and the uncertainty that the electron passed from which slit. The next criteria for a computer similar to a human brain is that it must works slowly. The slow process means that it is not created by a specific algorithm that is only able to subject specific types of problems. But it is also creative. In addition it must compute a huge number of calculations. Every system must obey statistical mechanics. The slow motion of system means that it must go a long way until it reaches to an equilibrium in the system. In other words

The fact that the behavior of each individual in economy or social life or has its own patterns means that its brain obeys probabilistic laws and only in quantum mechanics and chaos theory the chaotic outcome of system creates similar well known patterns. due to copenhagen interpretations am i the butterfly of universe? why time begin with me?

## References

1. M. Sharifi, Invariance of Spooky Action at a Distance in Quantum Entanglement under Lorentz Transformation. Quantum Matter Vol. 3, pp. 241-248(8) (2014) arXiv:1306.6071