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Quantum Theory of Soul

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Abstract

The scientific study of the soul has garnered increased attention but remains limited in progress. We propose to give the soul a scientific definition and use quantum physics to predict its character, qualities, and behavior. Our previous work indicates that everything at the deepest level is a quantum vibrational field carrying information, energy, and matter. Observed quantum phenomena and conscious experiences occur when an observer absorbs these vibrations. We define the soul as the information within one's quantum vibrational field. With this definition and quantum physics, we predict that: (1) The soul is the essence of existence, influencing energy and other system aspects. (2) The soul may persist beyond physical death. (3) The soul is eternal despite physical limitations. (4) Souls can connect and communicate remotely. (5) The "Akashic Records" exist as a universal quantum field. (6) Spiritual abilities like intuition and telepathy can be scientifically explained. We discuss mathematical calculations, measurements, and experimental verification of these predictions. This quantum theory supports monism, viewing the soul, spiritual heart, mind, energy, and matter as aspects of the quantum field, and endorses panpsychism, suggesting all things possess a soul. This work bridges science and spirituality, expanding scientific inquiry to include spiritual phenomena.

Keywords: Quantum Theory of soul, QTOS, scientific definition of soul, integration of science and spirituality, scientific theory of remote viewing, science of spiritual abilities

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1. Introduction

The Merriam Webster dictionary definition of soul includes four aspects: 1) the immaterial essence, animating principle, or actuating cause of an individual life; 2) the spiritual principle embodied in human beings, all rational and spiritual beings, or the universe; 3) a person's total self, an active or essential part; and 4) the moral and emotional nature of human beings or the quality that arouses emotion and sentiment, a spiritual or moral force. In many religious and philosophical traditions, the soul is believed to be able to survive physical death. In many traditional wisdoms, such as ancient Chinese wisdom, Native American Sharman wisdom, Hawaiian Kahuna's wisdom, everything has soul. In Buddha's teaching, soul can reincarnate. In Chinese Daoist's teaching, soul can have miraculous abilities and can reach immortality through cultivation.

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René Descartes is among the first scientists who believed that the soul should be subject to scientific investigation. In The *Meditations*, Descartes proposed the doctrine of Cartesian dualism: that the universe contained two radically different kinds of substances—the mind or soul defined as thinking, and the body defined as matter and unthinking [1]. According to Descartes, these two substances are distinct. Each can exist apart from the other. Humans are a union of mind and body [2]. In *The Passions of the Soul*, Descartes discussed the common contemporary belief that the human body contained animal spirits [3, 4]. These animal spirits were believed to be light and roaming fluids circulating rapidly around the nervous system between the brain and the muscles. These animal spirits were believed to affect the human soul, or passions of the soul.

The sharp separation between matter and mind or soul established by Descartes and others [5] in the seventeenth century has kept mind and soul from serious scientific pursuit until the dawn of quantum physics. Classical physics is deterministic and objective, thus cannot corroborate the existence of soul. Quantum physics provides the hope to include soul and consciousness into fundamental physics because of its uncertain, subjective, and non-local nature. There are several approaches to bring soul or consciousness into quantum physics. Wigner and Stapp suggest that consciousness is the fundamental element of the universe. He argues that quantum wave functions collapse when conscious minds select one among the alternative quantum possibilities through the quantum Zeno effect within the synapses [6, 7, 8]. Penrose and Hameroff postulate quantum computing in the microtubules in brain neurons which collapse the wave function [9, 10]. Karl Pribram and David Bohm propose holonomic brain theory with the idea that human consciousness is formed by quantum effects in or between brain cells [11, 12, 13]. David Bohm believed that observed quantum phenomena are "surface phenomena, explicate forms that have temporarily unfolded out of an underlying implicate order" [14, 15]. That is, the implicate order is the ground from which reality emerges.

It is generally accepted that no scientific evidence currently supports the existence of the soul [17, 18, 19, 20, 21]. Physicist Sean M. Carroll has argued that the idea of a soul is incompatible with quantum field theory (QFT) [22]. Some physicists indicate that quantum indeterminism is not enough to address how a disembodied soul might interact with the brain [23].

We think the lack of a scientific definition for the soul is one of the main reasons preventing scientists from studying soul scientifically. Major progress in science starts with giving a scientific definition to a previously vague concept. For example, the scientific definition of force by Issac Newton led to Newtonian Mechanics and scientific revolution. The scientific definition of energy in nineteenth century resulted in the industrial revolution. Claude Shannon's mathematic definition of information has brought about information theory and the information age. To study soul scientifically, we need to start with giving soul a scientific definition.

Another major reason preventing the scientific study of soul is the need of a deeper understanding about the metaphysical meaning of quantum physics. In our previous work [26] about quantum theory of consciousness (QTOC), we propose a new interpretation of quantum physics. We suggest that quantum physics reveals that at a deeper level, everything is a quantum vibrational field carrying information, energy, and matter. The quantum measurement is the

process that observer and the testing equipment used by the observer receive and process vibrations and the information, energy, and matter carried by these vibrations. This quantum measurement process brings about the observed quantum phenomena and conscious experience. We show that this new interpretation of quantum physics enables one to use quantum physics to scientifically study how the physical body can have conscious experience, thus address the hard problem and easy problem of consciousness. In this paper, we propose a scientific definition of soul in the context of QTOC, i.e. soul is the quantum information carried in one's quantum vibrational field. With this definition, we explore to use quantum mechanics and quantum information theory to study and make predictions about the quality, character, and behavior of soul and spiritual phenomena.

In the following, we first present the new interpretation of quantum physics and give a brief review on QTOC. Then we present the definition, calculation, and measurement about soul. Then we explore the possible predictions about soul from the quantum physics. We discuss how to solve the concerns raised by Peter Clark and Sean M. Carroll about the incompatibility of the existence of soul with the current laws of physics. We discuss the experimental validation of the soul and the predicted spiritual abilities. In the end, we point out that quantum physics describes a world with soul, spiritual heart (the heart mentioned in spiritual texts), mind, energy and matter as different aspects of existence. This makes it possible and pave a way to integrate science and spirituality together.

2. A New Interpretation of Quantum Physics

Quantum physics has led to copious advances in technology and discoveries in various fields from biology, cosmology, astrophysics, particle physics, condensed matter physics, chemistry, mathematics, and information technology and more.

We propose that quantum physics studies at a deeper level what everything is made of [24, 25, 26, 27, 28, 29]. It shows us that everything is a quantum vibrational field carrying information, energy, and matter.

The discovery of the wave-particle duality in quantum physics indicates that everything has wave nature even though it has specific energy, mass, or other characters as a particle. The wave nature is usually described by the frequency υ, wavelength λ, and amplitude. Quantum physics reveals that frequency denoted by ν is related to the energy E carried by a wave and wavelength λ is associated to the momentum P of the wave through the relations:

$$E = h\nu,$$
$$P = \frac{h}{\lambda}.$$

Wave function is the mathematic formula used in quantum physics to describe what kinds of waves inside an object and the probabilities to be at these wave states.

In classical physics, one solves the equations of motion, which describes the motion, the predictable trajectory of an object. In quantum physics, one solves the Schrödinger equation, or find the matrix or Feynman path integral to calculate the wave function, matrix, or Feynman path integral which describes the possible energetic and vibrational states an object can have internally and the probabilities at these states or at certain space and time.

We propose that the probabilistic nature of a wave function describes the information aspect of an object. To see why this is the case, let's take a dice with 6 sides of different colors as an example. A dice has the equal possibilities to be at the six different sides and colors. Just as one can use 0 and 1 to encode and send information, if one lets each side of the dice represent different symbols (such as words, good, bad, inspired, healthy, depressed, worry) or letters (such as A, B, C, D, E, F), one can use the dice to encode and send information. Each throw of the dice creates a single piece of information. With multiple throw of the dice, one creates a series of symbols, which is the information. Thus the dice can not only carry various information, it can also create a series of information. It can be a source of information. One can calculate the information the dice can carry each moment. The information theory tells us the information carried by the dice each moment or sent through each throw is $log_2 6$.

In the same way as the dice, the different energetic states of an object can carry, encode, or send information. The form of the possible vibrations and the probabilities to be at each state describe the information carried by an object. We will give more detailed discussion and give some examples on this shortly.

We conclude that according to quantum physics, just as everything contains energy and matter, everything also contains information. Information describes how unpredictable an object is or how many different possibilities and potentiality it has internally [30]. If a system has information, it is unpredictable. Information is intrinsically indeterministic and uncertain. Only a system that has zero information is completely predictable. One can thus see that the probabilistic nature of a wave function is not due to its inability to make precise predictions but due to its ability to describe the information aspect of an object. The certainty of classical physics is due to its inability to describe the information aspect of an object. As Richard Feynman has pointed out, classical equations of motion are the result of averaging out the different quantum states, the different informational states [27, 28]. From this perspective, classical equations of motion describe a system without information or it averages out the different possibilities and gives an average, crude, and approximate description of an object or phenomenon.

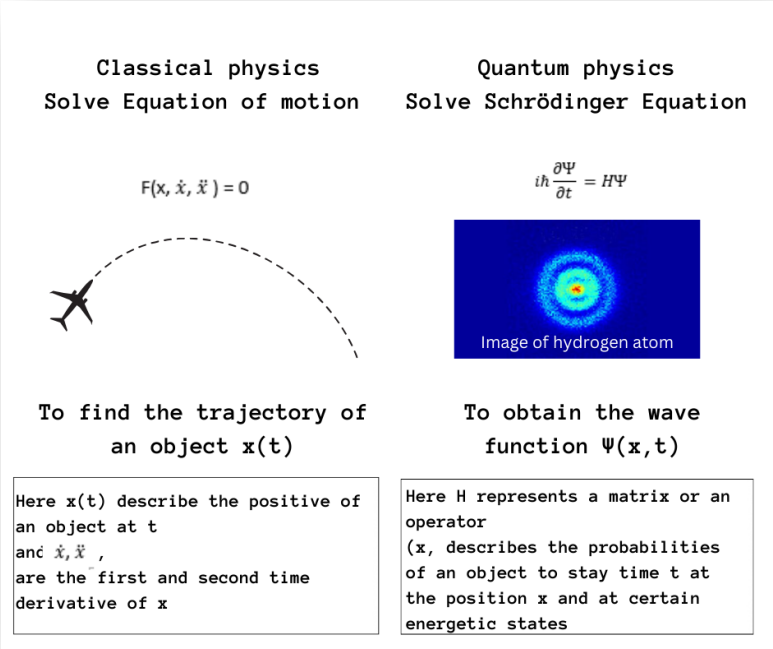

Fig 1. The difference between classical physics and quantum physics

In addition to the uncertain or probabilistic nature of quantum phenomena, they are also subjective, meaning it depends on the observer. How does the subjective nature of quantum physics come about? To answer this question, one needs to know how the observed quantum phenomena come into existence from the many possible vibrational states. Quantum physics tells us that the observed quantum phenomena are determined by the measurement process. What is involved in the quantum measurement process? The most common answer is that quantum measurement collapses the wave function from many possibilities to a specific state. But how the wave function is collapsed remains a mystery.

We propose that in all quantum measurement, detectors are used to initiate, create, and exhibit quantum phenomena [23, 31, 32, 33]. A detector is an instrument that can receive vibrations, including information and energy from an object and exhibit certain changes. For instance, a camera is a detector, which can absorb light and create a photo. A detector receives the vibrations related to a phenomenon or an object, consequently bringing in and processing energy and information, which leads to a certain noticeable change in the detector. This noticeable change is the observed quantum phenomenon. If one examines all quantum phenomena, one can see this is what happens in all observations. Detectors are what "collapse the wave function" through receiving vibrations from the object. Quantum measurement occurs through the detectors one uses for the observation. Quantum phenomena arise from quantum measurement, which are determined by the detectors an observer uses. If one changes the detectors, the observed quantum phenomena will be different. The type of detector one uses during the

observation determines what can be observed and experienced. This is how subjective quantum phenomena occur from seemingly objective physical objects.

One can only observe the quantum vibrations and the associated phenomena when the detectors one uses can resonate with the vibrations involved in the phenomena. For example, with normal camera that can capture the visible light, we can obtain a photo showing the image of visible light. With a camera that can capture infrared light, we obtain a photo showing the image of infrared light.

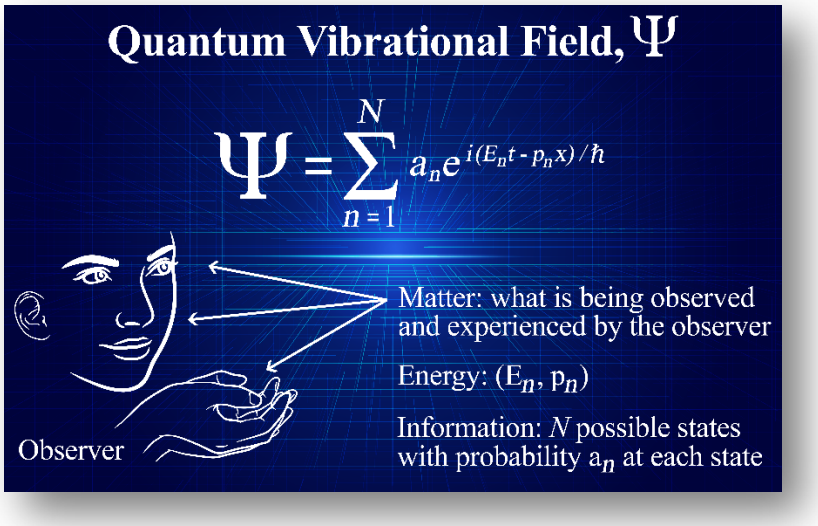

Fig 2. quantum measurement and quantum vibrational field

3. Relationship between Quantum Physics and Classical Physics

It is necessary to clarify the relationship between classical and quantum physics. Currently, most people mistakenly consider that quantum physics studies microscopic phenomena and classical physics studies macroscopic phenomena. This misunderstanding has prevented biologists, psychologists, neuroscientists, medical researchers, and many others from applying quantum physics to their disciplines. Quantum physics is the fundamental physics. It applies from the smallest to the largest objects in the universe. It can explain why the sun burns and where the large structure of the universe comes from. Classical physics is the approximation of and can be derived from quantum physics. Quantum vibrational fields are what everything is at the deepest level. An object or phenomenon can appear to be a classical object as a point rather than a vibrational field when the spatial and temporal scales of its vibrations are much smaller than the time and space used in the observer's observation. For instance, whether you use one minute to observe a plant or use one month to observe a plant, you will get completely different data and observations. To observe a surface of a metal at 1 nm, 1 mm, or 10 cm resolution, one gets completely different pictures of the metal. The observed phenomena depend on the detectors as well as the space and time resolution and length involved in the observation.

Classical physics provides an appropriate description of quantum phenomena when the observation scale is much greater than the space and time scale of the quantum vibrations associated with the phenomena. For instance, a beam of visible light may appear as a particle, following a straight path, rather than a wave, because it vibrates at a frequency so fast and at a wavelength so small that its quantum time and space scale are too small compared to the observation scale for its wave nature to be observed. In this case, the observation is the average over their possible quantum states, the classical mechanism description is sufficient. The light's quantum vibrational character can be observed at the atomic scale or at the double slit experiment where the observation space scale becomes comparable to the wavelength of the light. Whether it is observed or not, quantum physics, as the fundamental physics, is behind all observed phenomena.

To study the neural network and the human brain, classical physics may be adequate for studying some movement of ions or cells inside the body. However, classical physics become powerless in the following situations:

(1) Classical physics cannot help us understand at the fundamental level how a body can have a conscious experience since consciousness as shown above is a quantum phenomenon.

(2) Classical physics cannot explain the vast vibrations or waves inside brain. Brainwaves need to be studied with quantum physics, similar to the case of black body radiation, radiations from atoms and molecules. From the quantum physics and QTOC point of view, brainwaves encode the information of one's existence, just as radio waves contain the encoded information of a radio program from a radio station. Our brain can receive, encode, and decode the information carried in the quantum vibrational field, process it, lead to certain actions, and transform the internal or external state. This process should be studied with quantum physics.

(3) To truly understand any stable structure and its behaviors such as atoms, molecules, crystals, membranes, and DNA, one needs to use quantum physics. Classical physics cannot provide sufficient understanding about them. Quantum information theory reveals that even short-range interaction can lead to long range quantum entanglement, which can create new quantum phases. In our previous paper [23, 31], we show that quantum information theory may lead to a greater understanding of the formation and preservation of memory.

4. Review of the Quantum Theory of Consciousness

With the above understanding of quantum physics, we obtain two principles which offer a new interpretation of quantum physics and lead to a new quantum theory of consciousness. The first principle reveals what everything is made of at the quantum level. The second principle indicates how observed quantum phenomena and conscious experience occur.

Principle One

The basic constituent of all things is the quantum vibrational field, which carries matter, energy, and information.

This first principle tells us that everything is a vibrational field carrying three basic elements: matter, energy, and information. Here the term *matter* relates to anything that can be physically measured, detected, and observed, such as light, weight, and body. Energy is what moves and changes matter. Information is what informs. Information gives the form, shape, and direction to matter and energy. For example, the data for one's account in the database of a bank determines how much money one can get from the bank. The blueprint of a house, which is the information about the house, determines the shape and functionality of the house. To inform is to answer a question. Questions can be posed so that the answer is either "yes" or "no." Therefore, information can be represented as a sequence of "yes" and "no." For example, one can specify information by a series of 0's and 1's.

In quantum physics, everything can be represented by wave functions. From the wave function, one can calculate an object's possible states of matter, energy, and information.

Principle Two

An object absorbs quantum vibrations through resonance. The reception and processing of vibrations — including information, energy, and matter — lead to the observation of quantum phenomena and subjective conscious experience.

Observed phenomenon and conscious experience are manifested by the observer through reception of quantum vibrations. Conscious experience is determined by the vibrations, especially the information, received by the detectors chosen by the observer.

In this QTOC, one does not need the mysterious collapse of wave function as suggested by E. P. Wigner [6], H. Stapp [7, 8], R. Penrose [9, 10], K. Pribram [11, 12, 13] and others to explain quantum phenomena and consciousness. One also doesn't need to invoke the unknown implicate order suggested by D. Bohm [14, 15]. In fact, in QTOC, the implicate order is the quantum information. The observed quantum phenomena and conscious experience can be explained and calculated by determining the wave function of the vibrational field, and what detectors and processors the observer uses in observation and conscious experience. In our previous paper [23], we show that this QTOC provides the fundamental principles and mathematic formulation to address both the hard and easy problem of consciousness. The QTOC can explain the large-scale, nearly instantaneous synchrony of brainwaves among different parts of the brain, body, people, and objects, such as the correlation between Schumann Resonances and some brainwaves [34, 35, 36].

5. Quantum Theory of Soul

5.1 A Proposal for the Scientific Definition of Soul

The key insight of QTOC is to realize that everything at the deepest level is a quantum vibrational field carrying information, energy, and matter. Notice that the information has three related aspects:

(1) content of information
(2) receiver of information
(3) processor of information

We propose the following definitions [31, 32, 33]:

- **Soul is the content of information in one's vibrational field.**
- **Spiritual heart, the heart mentioned in spiritual texts, is the receiver or emitter of information.**
- **Mind is the processor of information.**

In this definition, soul is the information carried in our quantum vibrational field. Spiritual heart relates to the heart mentioned in spiritual texts. It is the detector involved in the quantum measurement and observation, which can receive and emit quantum vibrations. Spiritual heart plays a critical role in the observation of quantum phenomena and conscious experience. Here the mind is defined as the processor of information. Neuroscience studies how brain processes information and generates the human consciousness. It mainly studies the mind.

With this definition, if an object has information and it can receive and process information and vibration, it has soul, spiritual heart, and mind. For example, an electron carries certain information such as mass, spin, velocity, and possible spacetime coordinates. It responds to the force of gravity and electromagnetic fields, receives and processes the vibrations and information, and changes its path accordingly. An electron has its soul, spiritual heart, and mind. A hydrogen atom contains information, can absorb or emit a certain spectrum of light and change its states accordingly; it also has its own soul, spiritual heart, and mind. The spectrum of hydrogen represents the spiritual heart of a hydrogen atom. A human being's body contain billions of electrons, hydrogen atoms, molecules, cells, neurons. Each of the elements inside of our body can absorb or emit vibrations including matter, energy, and information, and all the elements inside the body can also work together to form new states to absorb or emit and process more vibrations carrying more complicated information, energy, and matter. The human soul, spiritual heart, and mind are much more sophisticated.

In QTOC and QTOS, soul, spiritual heart, and mind, just as energy and matter, are different aspects of one's existence. They can be mathematically calculated and experimentally measured.

5.2 Mathematic Expression and Calculation of Soul

In quantum physics, an object is mathematically described by wave function. Wave function denotes the possible energetic states and the probabilities at these states. It gives the complete description of the soul.

For instance, through solving Schrödinger equation, one finds that hydrogen atom has the possible energetic states with the energy in the form:

$$E_n = -\frac{13.6}{n^2}\ eV \quad (1)$$

Here n represents integers: 1, 2, 3, …. And eV is the energy that an electron carries in an electric field with 1 electric voltage. The state of a hydrogen atom is described by the wave function ψ in the form:

$$\psi = \sum_{n=1}^{N} a_n\, \varphi_n \quad (2)$$

Here φ_n is the mathematic formula describing the state when the hydrogen atom is in the energetic state n. The a_n is related to the probability for the hydrogen atom to stay at the energetic state $n. And\ \sum_{n=1}^{N} a_n\, \varphi_n$ represents summing over the possible energetic states starting from the state n=1 to the highest energetic state n = N. The sets $\{\varphi_n, a_n\}$ represent the information about the hydrogen atom. Therefore, it describes its soul.

Another simple example is a harmonic oscillator with the internal oscillating frequency of ω. Through solving Schrödinger equation, one finds that a harmonic oscillator has the possible energetic states with the energy in the form:

$$E_m = \left(m + \frac{1}{2}\right)\hbar\omega \quad (3)$$

Here m represents integers: 1, 2, 3, …. And $\hbar$ is Planck constant. The state of a harmonic oscillator is described by the wave function ψ in the form:

$$\psi = \sum_{m=1}^{M} b_m\, \chi_m \quad (4)$$

Here χ_m is the mathematic formula describing the state when the harmonic oscillator is in the energetic state m. And b_m is related to the probability for the harmonic oscillator to stay at the energetic state m. And M is the highest energetic state the harmonic oscillator can be at. The sets $\{\chi_m,\ b_m\}$ describe the information about the harmonic oscillator, thus denotes its soul.

The total information contained in a soul can be obtained through calculating the Von Neumann entropy S:

$$S = -\sum_i \rho_i ln\rho_i \quad (5)$$

Here i stand for the possible states in the object, Σ_i stands for summing over all possible states i, and ρ_i is the probabilities to be at the state i. In the case of hydrogen atom,

$\rho_i = |a_i|^2$,

the amount of the information that can be carried, encoded or sent each time by the hydrogen atom with the wave function (2) is:

$$S = -\sum_{n=1}^{N} |a_n|^2 \, log_2 |a_n|^2. \quad (6)$$

In the case of harmonic oscillator,

$$\rho_i = |b_i|^2$$

the amount of the information in the soul is:

$$S = -\sum_{m=1}^{M} |b_m|^2 \, log_2 |b_m|^2. \quad (7)$$

If an object stays at only one state, its total amount of soul, S = 0. If the soul has the possibilities to stay at N different energetic states, then its total amount of soul $S \leq 2 \, log_2 N$ (S= $2 \, log_2 N \, when \, it \, has \, the \, equal \, possibility \, to \, stay \, at \, the \, each \, possible \, state.$). Generally, the more possible states an object has, and the more equal the object can stay at each state, the more Von Neumann information it has, thus the greater its soul is.

The probabilities to be at an energetic state can be affected by the environment. For instant, for a hydrogen atom, the temperature and the surrounding environment can influence at which states a hydrogen atom is more likely to stay. Environment can affect one's soul and the total amount of information in a soul. A soul can also influence and change the environment through exchanging vibrations, information, and energy with the environment.

It's often taken mistakenly that the interaction of an object with its environment will cause decoherence, thus destroy its quantum information, or turn the quantum information into classical information. This is a misunderstanding. Quantum information is the fundamental element of everything. It cannot be destroyed or lost. The interaction with the environment will in fact bring about quantum entanglement of the object with the environment. It will broaden the spectrum of the possible energetic states of the object. It can enhance its soul and bring about more possibilities in the soul. However, this interaction with the environment will make an object less predictable and more difficult to control.

It is important to point out that the above formula (6) only calculates the information of hydrogen atom at the atomic level. At the nuclear level, there are more energetic and vibrational states. At smaller scale, a hydrogen atom can have higher frequency vibrations, and at larger scale, it can have more lower frequency vibrations. The contribution of these states is not included in the formula (6). The soul can have many layers. We only account for some layers of the soul, but not all of them.

5.3 Measurement of Soul

To measure a soul, one needs to measure its wavefunction, specifically, the possible energetic states and the probabilities at these states. Normally, to measure the possible states and the probabilities, one needs to take many sets of measurement. For instant, to measure the soul of a hydrogen atom, we can observe the vibrations that can be sent out from the hydrogen atom. One needs to get a lot of data about the possible vibrations that can be emitted from the atom to derive the information about the soul of the atom. To speed up the process, one can also shine a light beam with wide spectrum of frequencies and wavelength. Through measuring the light after it pass the atom, one can obtain which frequencies of light have been absorbed by the hydrogen atom/atoms and the absorbed quantities. Through this measurement, one can get some information about the soul of the hydrogen atom.

Measurement of soul will change the soul to certain amount. Furthermore, during the measurement of the soul, the quantum entanglement will be created between the measured soul and the soul of the measurement equipment and observer.

Quantum measurement is the measurement of soul. An important discovery of recent studying of quantum measurement indicates that quantum measurement brings about the quantum entanglement between the measured object and the measurement equipment.

One may measure the total information contained in a soul by measuring von Neumann entropy.

6. Comparison with other theory and models

Physicist Sean M. Carroll has argued that the idea of a soul is incompatible with quantum field theory (QFT) [18]. He reached this conclusion based on the assumption that "the laws of physics underlying everyday life are completely understood." This assumption is questionable considering the fact that the foundations of quantum physics are not completely understood by most physicists and more than 95% of matter and energy, dark energy, and dark matter remain unaccounted for by current science. This unsubstantiated assumption led Carroll to think that "a new collection of 'spirit particles' and 'spirit forces' that interact with the regular atoms" are needed to explain the existence of soul or spirit.

Quantum indeterminism is invoked to address how a disembodied soul might interact with the brain. In the Eccles–Beck model [37], the interaction between self (or soul) and brain is proposed and occurs at the level of synaptic exocytosis. Neuroscientist Peter Clarke [22] points out that

> "Heisenbergian uncertainty is too small to affect synaptic function, and that amplification by chaos or by other means does not provide a solution to this problem. Even if Heisenbergian effects did modify brain functioning, the changes would be swamped by those due to thermal noise. Cells and neural circuits have powerful noise-resistance mechanisms, that are adequate protection against thermal noise and must therefore be more than sufficient to buffer against Heisenbergian effects."

In the QTOS proposed here, soul already exists in current quantum physics and is described by the wave function. Soul, spiritual heart, and mind co-exist with energy and matter. They are different

aspects of the one existence, the quantum vibrational field. They are not independent or separate objects. It does not need additional "soul" particles to bring about the existence of soul. It also does not need to invoke the Heisenbergian uncertainty or other forces for the interaction between soul, mind, and body. The issues raised by S M. Carroll or P. Clarke do not apply here. The QTOS is not found to violate any existing experiments or theory known so far.

7. **QTOC's Predictions about Soul**

With the proposed definition of soul, one can see that the manifestation process [23, 31, 33] is:

(1) Soul gives the information;
(2) Spiritual heart receives information from the soul and the observed object
(3) Mind processes the received information by the spiritual heart and directs where energy goes;
(4) Energy moves matter and changes matter;
(5) The moved or transformed matter are related to what is being observed and experience.

This manifestation process suggests that soul and spiritual heart play an even more essential role than the mind in manifestation. This is the first prediction from QTOC.

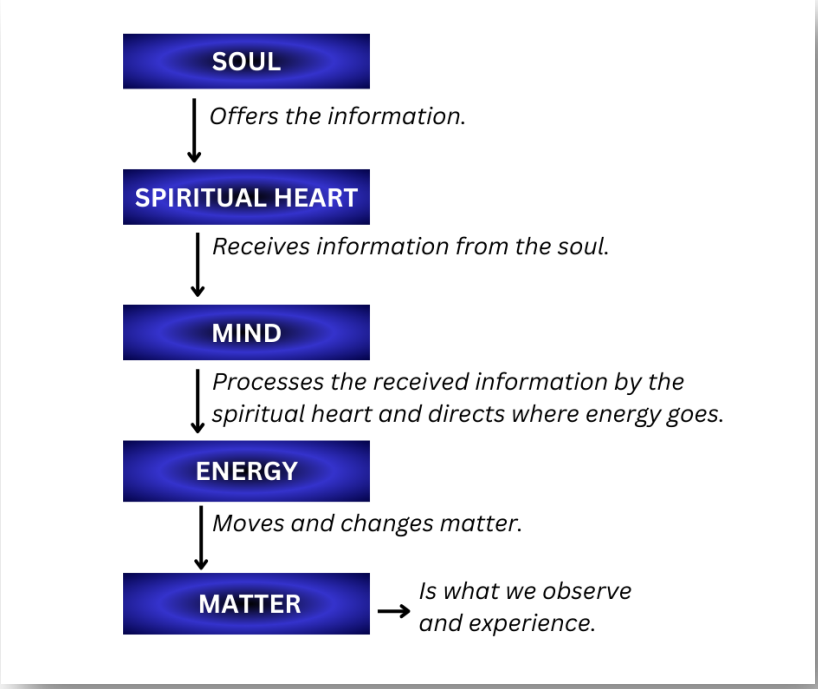

Fig 3. Manifestation process

Prediction I

Soul is one's essence, because the soul, the information carried in our vibrational field, is the determining factor for the observed phenomena and conscious experience. Spiritual heart, the receiver and emitter of information and vibrations, plays the critical role in starting the manifestation process and decides which of the soul potentials, the possible states and information, is manifested.

Heart is mentioned in many spiritual texts. The heart mentioned in spiritual texts corresponds to the spiritual heart defined here. For example, according to Buddha's teaching, everything that happens in physical reality comes from the heart. The Bible and many other spiritual texts present similar wisdom. This spiritual wisdom can be explained by this theory [33].

Prediction II

When the physical body stops functioning and dies, some of the quantum information in one's field still remains, and the soul can still exist and continue its journey.

In many spiritual wisdom traditions, physical death occurs when soul leaves the physical body and starts a new journey.

Prediction III

Soul can be eternal. The physical body is limited, but the soul, as defined as the quantum information stored in the quantum field, can extend over space and time. It does not have to be limited by space or time.

Prediction IV

One may connect with, communicate with, and affect other souls remotely.

This is due to the fact that the quantum vibrational field and the information carried by it extends over space and time. Through one's receiver and emitter of information, the spiritual heart, one can receive vibrations and information about other's soul. One can also emit and send vibrations and information to affect other's soul.

In quantum physics, if two systems are quantum entangled, the change within one system can instantly and automatically affect the other [38]. Quantum entanglement is the composite states formed by different objects that cannot be separated into independent parts. For the quantum entangled objects, the measurement made on one simultaneously affects the state of the other. Through the quantum entanglement, quantum information can be teleported remotely without physical movement. The more quantum entanglement a soul has with others, the more it may teleport or influence the state of others remotely through specifying its internal change.

Prediction V

There exists a universal quantum vibrational field carrying the information, energy, and matter of everything. This universal quantum vibrational field is like the “Akashic Records”, holding the information about everything and everyone.

Because everything’s quantum vibrational field extends over space and time, the summation of everything’s quantum vibrational fields make up a universal field. This universal field holds the information, energy, and matter about everyone and everything.

The concept of Akashic Records can be found in eastern religions and has been gaining more public attention in modern times. “Akasha” or “akasa” is the Sanskrit word for astral light or the ether element in eastern belief systems which is considered the fundamental fabric of reality from which all other elements emerge — the source of material reality [39, 40, 41]. The Sanskrit term *akasha* was introduced to the language of theosophy by Helena Blavatsky (1831–1891), as a sort of life force and "indestructible tablets of the astral light" recording both the past and future of human thought and action. Helena Blavatsky claimed that “Masters of the Ancient Wisdom” in Tibet taught her clairvoyance, psychic abilities, and astral projection. She used these tools to channel information from the akashic records. Edgar Cayce (March 18, 1877 – January 3, 1945), known as "The Sleeping Prophet", attributed his clairvoyance to accessing akashic records while in a trance-like state [40]. In Daoism, Buddhaism, Hindu, Sharman, Hawaiian spiritual tradition, trained masters can receive information about past and future or a remote object.

QTOS predicts theoretically the existence of Akashic Records as the universal quantum vibrational field carrying information, energy, and matter of everything. This Akashic Records influence everything every moment. They can direct people’s lives in a profound way. Just as one can tune the receiver of a radio to receive certain radio program, one may also tune one’s body to receive information and message from the Akashic Records.

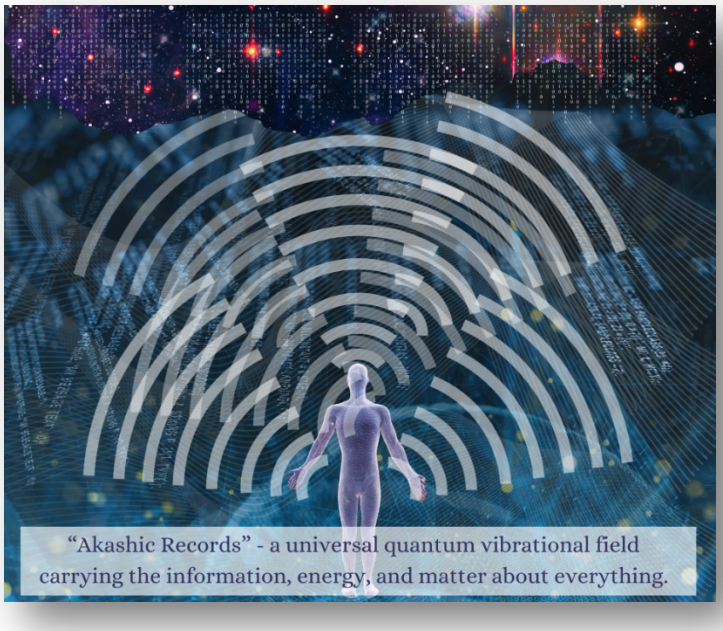
"Akashic Records" - a universal quantum vibrational field
carrying the information, energy, and matter about everything.

Fig 4. Akashic record, the universal vibrational field carrying information about everything

Prediction VI

Miraculous spiritual abilities, such as intuition, direct knowing, telepathy, teleportation, clairvoyance, and psychokenesis can be scientifically explained and is theoretically possible.

Prediction VI is a natural result from prediction V. If the universal vibrational field exists and is accessible to everyone, one can, in principle, receive information from it. Intuition, direct knowing, telepathy, and clairvoyance are the result of receiving information from the universal vibrational field. Psychikenesis is the result of sending information and vibrations to the universal field to affect others.

Teleportation is to send information remotely without physical movement. Teleportation can be accomplished through quantum entanglement. Research about the quantum entanglement indicates the possibility of teleportation. Teleportation can also be one of the extraordinary abilities of a soul. The greater quantum entanglement entropy a soul has, the greater abilities of teleportation it can have. In Chinese history book, it is recorded that some advanced spiritual masters could appear at the different places simultaneously. These are the examples of teleportation. Now these "super natural abilities" can be scientifically explained by QTOS.

Predictions about Karma and Free Will

In our book *Tao Science* [28], we show that QTOS can also account for karma, the cause-effect phenomenon, and free will. We will defer more detailed discussion on these important subjects to future papers.

The above predictions indicate that QTOS enables one to study spiritual phenomena with quantum physics and scientifically corroborate spiritual wisdom.

8. Experimental Proof

Quantum physics, including the wave function description of everything and quantum entanglement, has been proven experimentally for more than a hundred years. More experiments have been confirming its applicability from the smallest to the largest objects in the universe.

The most scientific study of spiritual abilities has been performed on remote viewing. Remote viewing obtains impressions about a distant or unseen subject purportedly through mind, direct knowing, telepathy, or intuition [41]. A variety of scientific studies on remote viewing have been conducted. Early experiments produced positive results [42], but they had been found to have invalidating flaws. More recent experiments have shown negative results when conducted under properly controlled conditions [43, 44, 45]. Currently, mainstream scientific community rejects remote viewing and regarded it as pseudoscience because of the absence of an evidence base,

the lack of a theory which would explain remote viewing, and the shortage of experimental techniques which can provide reliably positive results.

According to QTOC and QTOS, remote viewing, direct knowing, clairvoyance, telepathy, intuition, and even teleportation is theoretically possible. However, it also indicates that the possibility is close to zero for an ordinary human being to conduct remote viewing on specific unknow remote object. It is true that anyone can connect with the universal vibrational field. However, because it contains the information about everything in the whole universe including information of the past activities, it is nearly impossible to obtain specific information from this vast information database about an unknown remote object.

In the Taoism, Buddhism, and other spiritual traditions, the practitioners may gain extraordinary abilities such as remote viewing, clairvoyance, telepathy, direct knowing, and teleportation when they reach a certain higher spiritual state. In this state, their mind is still. In this state, one may connect, be aware of, and thus obtain the needed information.

From the QTOC and QTOS point of view, remote viewing is theoretically possible for everyone and everything. To have the ability in practice depends on whether one can specifically connect with, be aware of, obtain, and share the related information carried in the universal vibrational field. If one finds one person or animal or something that can do this, it is a demonstration that remote viewing is possible. One does not need to do double blind placebo-controlled experiments with statistical significance to prove the possibility of remote viewing. This is similar to the case about the existence of black hole. The existence of black hole has been theoretically predicted for a long time. The picture of a black hole was only discovered until recent years. One just needs to find one black hole to prove its existence. It is not necessary to conduct double-blind-placebo-controlled experiment to prove its existence. Over the history, there are many cases, such as Edgar Cayce and many others, demonstrating their ability of remote viewing. From this point of view, one can reasonably suggest that remote viewing is scientifically and experimentally proven. This reasoning and conclusion apply to direct knowing, telepathy, clairvoyance, intuition, teleportation, and other abilities.

9. Discussion and Conclusion

In this paper, we propose a scientific definition of soul. According to this definition, soul is the information carried in the quantum vibrational field of an abject. It can be mathematically described by the wave function. One can use quantum physics to mathematically study and predict the quality, character, and behavior of soul. This quantum theory of soul (QTOS) predicts theoretically the existence of Akashic records, the possibilities of spiritual abilities such as direct knowing, telepathy, clairvoyance, intuition, teleportation, and psychokenesis. We find that these predictions about soul agree with a lot of known spiritual wisdoms.

With this work, we demonstrate that with our new interpretation, quantum physics, QTOC, and QTOS describe a world with not only matter and energy, but also soul, spiritual heart, mind, and consciousness. QTOS expand scientific study from only physical matter and energy to include soul,

spiritual heart, mind, spiritual and conscious phenomena. This can help bring science and spirituality together at the fundamental level. This theory supports monism, in which soul, spiritual heart, mind, energy, and matter are parts and different aspects of one existence, the quantum vibrational field. It endorses panpsychism and suggests that everyone and everything has certain level of soul, spiritual heart, mind, energy, and matter.

This QTOS provides the general physics concept, theory, and mathematical formulation to study the specific mechanisms of how the brain receives information from the soul, encodes and decodes the information, processes the information, leads to action, and causes conscious experience, physical manifestation, and transformation in life. Further application of this QTOS is needed to study the specific mechanism of the brain and neural networks.

This theory predicts the higher abilities and potentials in everything. Further research studies are needed about how to develop and utilize these abilities to enhance life and wellness.

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Declarations

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All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript .
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References:

1. *Georges Dicker (2013). Descartes: An Analytic and Historical Introduction. OUP. p. 86. ISBN 978-0-19-538032-3*.
2. *David Cunning (2014). The Cambridge Companion to Descartes' Meditations. Cambridge University Press. p. 277. ISBN 978-1-107-72914-8.*
3. Robert Rethy, "The Teaching of Nature and the Nature of Man in Descartes' *Passions de l'Âme*", 53.3 (March, 2000): 657–683.
4. Lilli Alanen, "Descartes's dualism and the philosophy of mind", *Revue de Métaphysique et de Morale* 94e. Année no. 3 (July–September 1989): 391–395.

5. *Wigner, E. P. (1995), "Remarks on the Mind-Body Question", Philosophical Reflections and Syntheses, Berlin, Heidelberg: Springer Berlin Heidelberg, pp. 247–260, doi:10.1007/978-3-642-78374-6_20, ISBN 978-3-540-63372-3, retrieved 2021-12-01*
6. Stapp, H; Schwartz, J. M; Beauregard, M. (2005). *Quantum theory in neuroscience and psychology: A neurophysical model of mind-brain interaction*. Philosophical Transactions of the Royal Society of London, Series B. 360 (1458): 1309-1327.
7. Stapp, H; Schwartz, J. M; Beauregard, M. (2004). *The volitional influence of the mind on the brain, with special reference to emotional self-regulation*. In Beauregard, M. (Ed.). *Consciousness, emotional self-regulation, and the brain*, Philadelphia, PA: John Benjamins Publishing Company, Chapter 7. ISBN 90-272-5187-8
8. Hameroff, S. & Penrose, R. (2014) Consciousness in the universe: a review of the 'Orch OR' theory, *Phys. Life Rev*., 11 (1), 39–78, doi: 10.1016/j.plrev.2013.08.002.
9. *Penrose, R., Shimony, A., Cartwright, N. & Hawking, S. (2000) The Large, the Small and the Human Mind, Cambridge, UK: Cambridge University Press.*
10. *Pribram, Karl (1991). Brain and Perception: Holonomy and Structure in Figural Processing. Lawrence Erlbaum Associates, Inc. ISBN 0-89859-995-4.*
11. *Pribram K. H., Meade S. D. (1999). "Conscious awareness: Processing in the synaptodendritic web". New Ideas in Psychology.* ***17*** *(3): 205–214. doi:10.1016/S0732-118X(99)00024-0*
12. *Pribram K. H. (1999). "Quantum holography: Is it relevant to brain function?". Information Sciences.* ***115*** *(1–4): 97–102. doi:10.1016/S0020-0255(98)10082-8*
13. David Bohm: *Time, the implicate order, and pre-space*, In: David R. Griffin: *Physics and the Ultimate Significance of Time*, State University of New York Press, 1986, ISBN 0-88706-113-3, pp. 177–208, pp. 192–193
14. David Bohm: *Wholeness and the Implicate Order*, Routledge, 1980 (ISBN 0-203-99515-5).
15. *Santoro, Giuseppe et al. "THE ANATOMIC LOCATION OF THE SOUL FROM THE HEART, THROUGH THE BRAIN, TO THE WHOLE BODY, AND BEYOND: A JOURNEY THROUGH WESTERN HISTORY, SCIENCE, AND PHILOSOPHY." Neurosurgery 65 (2009): 633–643.*
16. Park, Robert L. (2009). *Superstition: Belief in the Age of Science*. Princeton University Press. p. 90. ISBN 978-0-691-13355-3
17. Hood, Bruce. (2009). *Supersense: From Superstition to Religion – The Brain Science of Belief*. Constable. p. 165. ISBN 978-1-84901-030-6
18. *Farah, Martha J.; Murphy, Nancey (February 2009). "Neuroscience and the Soul".* ***Science.*** ***323*** *(5918): 1168. doi:10.1126/science.323.5918.1168a. PMID 19251609. S2CID 6636610.*
19. *Santoro, G; Wood, MD; Merlo, L; Anastasi, GP; Tomasello, F; Germanò, A (October 2009). "The anatomic location of the soul from the heart, through the brain, to the*

whole body, and beyond: a journey through Western history, science, and philosophy". Neurosurgery. ***65*** *(4): 633–43, discussion 643. doi:10.1227/01.NEU.0000349750.22332.6A. PMID 19834368. S2CID 27566267.*

20. Carroll, Sean M. (2011). "Physics and the Immortality of the Soul" Archived 6 October 2011 at the Wayback Machine. *Scientific American*. Retrieved 2014-10-11.
21. Clarke, Peter. (2014). *Neuroscience, Quantum Indeterminism and the Cartesian Soul* Archived 10 September 2017 at the Wayback Machine. Brain and cognition 84: 109–17.
22. Zhi, G. and Xiu, R. (2023) Quantum Theory of Consciousness. *Journal of Applied Mathematics and Physics*, **11**, 2652-2670. doi: 10.4236/jamp.2023.119174
23. Bohr, N. (1958) *Atomic Physics and Human Knowledge*, New York: Wiley.
24. Born, M. (1927) Physical aspects of quantum mechanics, *Nature*, 119, pp. 354–357.
25. Bohr, N. (1928). The quantum postulate and the recent development of atomic theory, *Nature*, 121, pp. 580–590.
26. *Feynman, R., Leighton, R. & Sands, M. (1964) The Feynman Lectures on Physics. Vol. 3. California Institute of Technology. New York: Basic Books.*
27. Feynman, R.P. & Hibbs, A. (1965), *Quantum Mechanics and Path Integrals*, New York: McGraw Hill.
28. *Müller-Kirsten, H.J.W. (2006), Introduction to Quantum Mechanics: Schrödinger Equation and Path Integral, Hackensack, NJ: World Scientific, pp. 14.*
29. Shannon, C.E. (1948) A mathematical theory of communication*, Bell System Technical Journal*, 27, pp. 379–423, 623–656.
30. Sha, Z.G. & Xiu, R. (2017) *Tao Science: The Science, Wisdom, and Practice of Creation and Grand Unification*, Cardiff, CA, USA: Waterside Press and Richmond Hill, ON, Canada: Heaven's Library Publication Corp.
31. Sha, Z.G. & Xiu, R. A new interpretation of quantum physics based on a new definition of consciousness, *Reports in Advances of Physical Sciences*, 2 (1), pp. 1850002, doi: http://dx.doi.org/10.1142/S2424942418500020.
32. Sha, Z.G. & Xiu, R. (2018) Spiritual heart and the manifestation of physical reality, *International Journal of Current Research*, 10 (7), pp.71742-71744, doi: 10.24941/ijcr.30889.07.2018.
33. Pobachenko, S.V., Kolesnik, A.G., Borodin, A.S. & Kalyuzhin, V.V. (2006) The contigency of parameters of human encephalograms and Schumann resonance electromagnetic fields revealed in monitoring studies, *Complex Syst. Biophys*., 51 (3), pp. 480–483, doi: 10.1134/S0006350906030225.
34. Persinger, M.A. (1995) Sudden unexpected death in epileptics following sudden, intense, increases in geomagnetic activity: Prevalence of effect and potential mechanisms. *Int. J. Biometeorol.*, 38 (4), pp. 180–187, doi: 10.1007/BF01245386.
35. McCraty, R., Atkinson, M., Stolc, V., Alabdulgader, A.A., Vainoras, A. & Ragulskis, M. (2017) Synchronization of human autonomic nervous system rhythms with geomagnetic

activity in human subjects, *Int J Environ Res Public Health*, 14 (7), pp. 770, doi: 10.3390/ijerph14070770.
36. F Beck & J C Eccles (1992) Quantum aspects of brain activity and the role of consciousness, Proc Natl Acad Sci U S A.1992 Dec 1; 89(23): 11357–11361. doi: 10.1073/pnas.89.23.11357
37. *Ellwood, Robert S. (1996). "Theosophy". The Encyclopedia of the Paranormal. Prometheus Books. pp. 759–66. ISBN 978-1-57392-021-6.*
38. Friis, Nicolai; Vitagliano, Giuseppe; Malik, Mehul; Huber, Marcus (2019). "Entanglement certification from theory to experiment". *Nature Reviews Physics*. **1**: 72–87.
39. *Robertson, Robin (2009-02-19). "A Review of "Channeling Your Higher Self." (1989/2007). By Henry Reed". Psychological Perspectives. **52** (1): 131–134. doi:10.1080/00332920802458388. ISSN 0033-2925. S2CID 144635838*
40. Marks, David; Kammann, Richard. (2000). *The Psychology of the Psychic*. Prometheus Books. ISBN 1573927988
41. Alcock, James. (1981). *Parapsychology-Science Or Magic?: A Psychological Perspective*. Pergamon Press. pp. 164–179. ISBN 978-0080257730
42. *Marks, David; Scott, Christopher (1986). "Remote Viewing Exposed". Nature. **319** (6053): 444. Bibcode:1986Natur.319..444M. doi:10.1038/319444a0. PMID 3945330.*
43. *Mumford, Michael D.; Rose, Andrew M.; Goslin, David A. (29 September 1995). An Evaluation of Remote Viewing: Research and Applications (PDF). American Institutes for Research. Archived from the original (PDF) on 13 January 2017.*
44. *Wiseman, R; Milton, J (1999). "Experiment One of the SAIC Remote Viewing Program: A critical reevaluation"(PDF). Journal of Parapsychology. **62** (4): 297–308*. Retrieved *2008-06-26.*