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Quantum Entanglement Enables The Mind during Lifetime to Exist Forever

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Abstract

The mind is one of human brain's activities known as brain wave, which is essentially an electric impulse of neurons in brain. The mind's characteristics are highly similar and closely correlated to the quantum entanglement's features, such as superposition, non-local correlation, instantaneous connection, monogamy and so on. Through series conversions, including amplifying, modulation and quantum entanglement, an oscillating electric impulse in brain is converted to a quantum entangled electromagnetic wave carrying brain activity's signals, namely a carrier wave with the mind's activity's signals. The carrier wave can transmit in free space and can be detected, recorded and retrieved the original brain activity data by demodulation in other places, no matter how far away, therefore the mind during lifetime can be preserved forever.

Keywords: The Mind; Brainwave; Electric Impulses; Carrier Wave; Quantum Entanglement; Nonlinear Optical Media; Ion Channel; SPDC

Abbreviations

EEG: Electroencephalography; MEG: Magneto encephalography; SPDC: Spontaneous Parametric down-conversion.

Introduction

The mind is one of human brain's activity, which had been discovered known as brainwave by German psychiatrist Hans Berger in 1924 [1-3]. The brainwaves are essentially electric impulses from neurons in brain. The brainwave covers frequency in range of delta (0.5-4 Hz), theta (4-8 Hz), alpha (8-13 Hz), beta (13-30 Hz), and gamma(30-100Hz) and describes brain's activities in cognitive aspects such as consciousness, imagination, perception, thinking, intelligence, judgement, language, and memory as well as noncognitive aspects such as emotion and instinct. These activities can be increased in amplitude via meditation or neurostimulation [4-9]. The mind's characteristics are very similar and correlated to quantum entanglement's features in many aspects, such as superposition, non-local correlation, instantaneous connection, monogamy and so on.

Through series conversion, brainwave is changed from a localized electrical impulse to a quantum entangled electromagnetic wave carrying brain activity's signals, namely a carrier wave, which can transmit in free space. The original brain activity signals on carrier wave can be detected, recorded and retrieved by demodulation. The mind during lifetime is possible to be preserved and exist forever.

High Similarity and Correlation Between Quantum Entanglement's Features and the Mind's Characteristics

A quantum entangled electromagnetic wave carrying brain signals has dual properties of brainwave and entangled carrier wave.

Quantum superposition and the mind's time and place disorder.

The Schrödinger equation in quantum mechanics is a linear differential equation

$$i\hbar\frac{\partial}{\partial t}|\psi(t)\rangle = \hat{H}|\psi(t)\rangle$$

For a quantum system with a set of orthonormal basis states $|1\rangle,|2\rangle...,|n\rangle$. a general quantum state ψ can be expressed as a linear combination of these basis states.

$$|\psi\rangle = c_1|1\rangle + c_2|2\rangle + ...c_n|n\rangle$$

The c_1, c_2, c_n are complex numbers called probability amplitudes.

$|c_1|^2, |c_2|^2, |c_n|^2$ are probability to find the state of $|1\rangle,|2\rangle...,|n\rangle$.

$|c_1|^2 + |c_2|^2 + ... + |c_n|^2 = 1$ ensures that the total probability is normalized to 1.

As $|1\rangle,|2\rangle...,|n\rangle$. represents the quantum states of entangled photons in the electromagnetic wave carrying brain activity's signals, the $|1\rangle,|2\rangle...,|n\rangle$. certainly represent the brain activities states.

Corresponding to the quantum superposition principle, the mind can think only one thing or several things at the same time, in different places.

Quantum entanglement's non-local correlation and the mind's spatial infinite

When an entangled photon pair is separated by large distance, they are always keeping connection regardless the distance between them. The mind is not constrained by space from the world of microscopic fundamental particles to the vast Universe, no matter how big or small the distance between them.

Quantum entanglement's instantaneous connection and the mind's rapid changing

When one of two entangled photons changes state, the other one immediately follows to change its state too no matter how far away between them.

The mind changes thinking from one event to another can be accomplished instantly.

Quantum entanglement's monogamy and the mind's organization and orderliness in random states

In quantum entanglement, if two particles are entangled with each other, they cannot be entangled with the third particle. This is known as the monogamy of entanglement. The mind is constantly changing, but it is organized in an orderly way, not at all disordered.

Quantum Entanglement in Biological System

Brainwave is electric impulses in neurons, that communicate through action potentials which are rapid changes in voltage across the cell membrane. These action potentials travel along the neuron's axon. When an action potential reaches the end of an axon, it triggers the release of neurotransmitters into the synapse, leading electrical changes in the post-synaptic neuron.

The combined effect of many post-synaptic potentials creates local field potentials, which are detectable electrical fields generated by the synchronized activity of large groups of neurons, an electrode placed on the scalp can detect these electrical fields as EEG signals [10]. A moving electric charge or a steady electric current, according to the Biot-Savart law [11], produces a magnetic field, which is very weak but can be detected using sensitive equipment like magnetoencephalography (MEG) [9,12].

According to Maxwell's equation [13], the interaction of electric and magnetic fields produces electromagnetic wave, which can propagate through space, despite the short distance and can be detected by wireless EEG [14].

The electromagnetic waves received by wireless EEG system are processed through amplifying and modulations to be a carrier wave with brain wave's signals and ready for following quantum entanglement. The ion channels [15] in neurons of brain are pore-forming protein embedded in cell membrane that allow ions to pass in and out of the neurons, creating electrical signals.

In response to the intensity of light, the ion channels or the nearby molecules can change their molecule conformation and therefore change the refractive index and the lipid bilayer or the surrounding membranes can change the light propagation. All these changes make ion channels and membranes in neurons to be act as a biological nonlinear optical medium.

Through a process analogous to the spontaneous parametic down-conversion-SPDC process [16] a higher-

energy photon could interact with the nonlinear optical medium-ion channel and surrounding membrane to produce a pair of lower-energy entangled photons in an entangled electromagnetic wave carrying brain activity's signals.

Achieving Quantum Entanglement by Contactless Brain-Machine Connection

In recent years, wireless EEG systems have been developed that can transmit brain activity signals over a short distance without need of wired connection [14]. The brainwave signals are modulated onto a higher frequency carrier wave usually in the radio- frequency range (MHz to GHz) in a wireless EEG system. This modulation process encodes the brainwave data on the carrier wave. The modulated carrier wave is then transmitted wirelessly using an antenna. A receiving antenna captures the transmitted carrier wave, in which the brainwave data is extracted through demodulation. The receiver processes the incoming RF signal to retrieve the original low- frequency brainwave signals.

In some medical and research applications, telemetric systems are used to remotely monitor brain activity. These systems involve capturing EEG signals and transmitting them wirelessly for analysis. The wireless EEG technique and its modification make it possible for brainwave signals to travel through space and be detected and recorded in other places.

To achieve quantum entanglement, the brainwave signals coming from EEG or another device are processed (filtered, amplified, and digitized) to make them suitable for quantum entanglement. The processed brainwave signals are used to modulate an infrared （430THz-300GHz） or visible light(400THz-790THz), usually using a laser or an LED, to generate a high frequency carrier wave with brainwave's signals [17].

An incident photon from this high frequency carrier wave, interacts with a nonlinear optical media crystal [18] to split into two entangled photons in the spontaneous parametric down- conversion (SPDC) [16] these two photons are entangled in properties such as polarization, spatial modes, or time-frequency correlation. The quantum entangled photon pair can be separated far away but is still keeping connection, therefore the mind during lifetime can be preserved forever.

Conclusion

The high similarity and correlation between the mind's characteristics and quantum entanglement's features make it possible to preserve the mind forever by converting brain wave to a quantum entangled carrier wave with brain activity's signals. The conversion from brainwave to quantum entangled carrier wave in biological system is signality and needs further exploration, however this conversion by contactless brain-machine connection is entirely possible.

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