The Physical Aspect of Some Magic Rites. Spin Supercurrent

By Liudmila B. Boldyreva

Abstract- Some of so-called miracles accomplished by ancient and contemporary magicians (they are often called "psychics") are considered: (1) the selective action on remote objects (in particular, "contagious magic"); (2) the locating of hidden cavity structures (underground reservoirs of water, buried treasures, and the like), including dowsing; (3) the structuring of space around a psychic (the so-called magic rings or charmed rings, allegedly protecting against malicious influence); (4) the change in a person's own weight (in particular, levitation); (5) the ability to become invisible.

These miracles might be a result of processes taking place in the physical vacuum, the latter having the following properties: (1) it consists of quantum harmonic oscillators having the so-called zero-point energy; (2) a quantum entity creates in this vacuum a pair of oppositely charged virtual particles having spin (virtual photon), the virtual photon has precessing spin and consequently may be classified as a spin vortex, (3) spin vortices in this vacuum may interact by means of spin supercurrent whose value is determined by mutual orientation of spins of interacting spin vortices. The physical vacuum with the above-mentioned properties is called the vortex-type physical vacuum.

Keywords: contagious magic, magic circle, dowsing, levitation, invisibility, spin supercurrent, spin vortex, vortex-type physical vacuum.

THEPHYSICALASPECTOFSOMEMAGICRITESSPINSUPERCURRENT

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I. Introduction

Researchers of magic rites can be divided into two groups: those who look upon these rites as caused by people's ignorance (for example, the well-known anthropologist E. Tylor [1]), and those who think that the origin of the rites is the existence of some physical processes in nature. It is known that great mathematician and philosopher Pythagoras and his followers had strong views on magic rites [2]. As concerns the rituals aimed at search of underground water, buried ores, etc. (they were often performed with the use of a dowsing rod), Albert Einstein wrote in a letter to Dr. Herman Peisach [3]: "I know very well that many scientists consider dowsing as a type of ancient superstition. According to my conviction, this is, however, unjustified. The dowsing rod is a simple instrument which shows the reaction of the human nervous system to certain factors which are unknown to us at this time."

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The famous anthropologist James George Frazer was the first who addressed the properties of physical vacuum to explain some peculiarities of magic rites; in particular, the rites of the contagious magic based on people's belief that things which once contacted with each other could continue interacting as well after they have been separated. Concerning the physical principles which could underlie the contagious magic, Frazer wrote: "things act on each other at a distance through a secret sympathy, the impulse being transmitted from one to the other by means of what we may conceive as a kind of invisible ether…." [4].

In this work, the properties of that "kind of invisible ether" are considered, and it suggests that the "invisible ether" may consist of quantum harmonic oscillators having the so-called zero-point energy. For the first time, the concept of physical vacuum, free from magnetic and electric fields (without regard to gravitational energy) but characterized by non-zero energy was developed in Germany by a group of physicists including Max Planck, Albert Einstein, and Otto Stern. In 1913, using the formula derived by Planck [5] for energy ε of atomic oscillator vibrating at frequency ν: $\varepsilon = h\nu/2 + h\nu/\left(\exp\left(h\nu/(kT)\right)-1\right)$, Albert Einstein and Otto Stern published a paper [6] in which they classified the energy $h\nu/2$ (h is the Planck constant) as "residual energy" that all atomic oscillators have at absolute zero. Later, "residual energy" was called "zero-point energy", and the atomic oscillator became called "quantum harmonic oscillator" (in this paper the abbreviation QHO is used). It is shown in this work that energy $h\nu/2$ may be the energy of spin vortex; the spin vortex is an area of physical vacuum in which precession of spin takes place. Consequently, the physical vacuum that consists of QHOs, that is, consists of spin vortices may be called the vortex-type physical vacuum.

According to postulates of quantum mechanics, the quantum entity that is a singularity in electric or magnetic fields produces in the vortex-type physical vacuum a pair of oppositely charged virtual particles having spin (a so-called virtual photon) [7, 8]. The virtual photon has precessing spin and consequently may be classified as a spin vortex. Spin supercurrents may emerge between spin vortices [9-11].

The author shows that two factors determine the effectiveness of many magic rites and "miracles": (1) the

properties of the vortex-type physical vacuum and (2) the properties of spin supercurrent arising between spin vortices created by quantum entities that constitute magician's organism, on the one hand, and by quantum entities that constitute the object being influenced, on the other hand. From the second factor it follows that the ability of a magician to perform "miracles" is determined by efficiency of his/her influencing the characteristics of spins of spin vortices created in the vortex-type physical vacuum by quantum entities that constitute the magician's organism.

In this work, the following "miracles" performed by both ancient and contemporary magicians ("psychics") are considered:

1. the selective long-distance (some tens of kilometers) action on remote bodies (living and non-living);
2. the locating of hidden cavity structures (for example, underground reservoirs of water, underground caves, etc.), this is often performed with the use of a dowsing rod;
3. the structuring of space around the psychic: production of periodically repeating areas characterized by an increase in energy radiated by the psychic (the ancient people called these areas "magic rings" or "charmed rings", allegedly protecting the person against malicious influence);
4. the ability to change the psychic's weight (in particular, levitation);
5. the ability to become invisible.

Under the aim of the research, the work is divided into two parts: the theoretical and experimental.

II. THE THEORY

The properties of the vortex-type physical vacuum and properties of spin supercurrents are considered in this section. As the vortex-type physical vacuum consists of quantum harmonic oscillators (QHOs), the properties of the vacuum are determined by characteristics of QHO [12].

a) The Characteristics of QHO

1) The quantum entity that is a singularity in electric and/or magnetic fields may create a pair of oppositely charged virtual particles (a virtual photon) in the physical vacuum. The virtual photon has precessing spin and consequently may be classified as a spin vortex. The fact that the quantum entity may create a virtual photon having spin, while preserving the value of its own spin, suggests that spin of virtual photon must be "formed" in the physical vacuum, that is, it may consist of spins of QHOs [7].

2) The existence of electric polarization of physical vacuum suggests that QHO is an electric dipole (its electric dipole moment is denoted here as $\mathbf{d}_{QHO}$). Consequently, QHO has an electric component $\mathbf{E}_{QHO}$ and according to [13]:

$$\mathbf{E}_{QHO} \uparrow\downarrow \mathbf{d}_{QHO}. \qquad (1)$$

3) The existence of electric dipole moment means that the QHO has a mass m_{QHO} formed by two unlike charged particles.

4) The expression for energy of QHO, $\hbar\Omega_{QHO}/2$, may be interpreted as the energy of mass m_{QHO} performing the circular motion with frequency Ω_{QHO} and with angular momentum $J=h$ [14].

5) As spin of QHO is connected with its mass, the circular motion of mass with frequency Ω_{QHO} means the existence of precession motion of QHO spin with frequency Ω_{QHO}. Thus QHO may be considered as an area of physical vacuum with precessing spin, that is as a spin vortex.

6) The neighboring QHOs interact with each other. The following interactions between QHOs may take place: the gravitational one (QHO has a mass); the electric dipole-dipole one (QHO has an electric dipole moment); the one by means of spin supercurrent (QHO has a spin).

Such characteristics of QHO as the existence of precessing spin, electric component, mass are similar to the characteristics of spin vortices that constitute photon and pair of virtual particles (a virtual photon) created by a quantum entity [15]. Consequently, it may be supposed that this analogy is valid for other properties of these spin vortices [7, 8, 15] and the following conditions hold true for QHO as well:

$$\mathbf{E}_{QHO} \uparrow\uparrow \mathbf{S}_{QHO}, \qquad (2)$$

$$\Omega_{QHO} \, \mathrm{II} \, \mathbf{u}, \qquad (3)$$

$$\sin\theta = u/c, \qquad (4)$$

where u is the speed of QHO, c is the speed of light, θ is the angle between $\mathbf{S}_{QHO}$ and Ω_{QHO} (the deflection angle). The diagram of characteristics of QHO is given in fig. 1: $\mathbf{J}$ is the angular momentum, α is the precession angle relative to the reference line (ref. line).
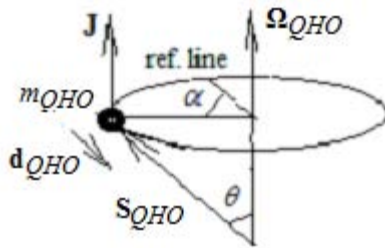
Fig. 1: The characteristics of QHO: $\mathbf{S}_{QHO}$ is spin; m_{QHO} is the mass; $\mathbf{d}_{QHO}$ is the electric dipole moment; Ω_{QHO} is the precession frequency; $\mathbf{J}$ is the angular momentum associated with m_{QHO}; θ is the deflection angle; α is the precession angle (phase); ref. line is the reference line.

b) *The Properties of Spin Supercurrent*

Spin supercurrent was discovered in experiments with superfluid ^{3}He-B. The spin supercurrent arises between regions with identically oriented and coherently precessing spins (in the case of superfluid ^{3}He-B such region consists of ^{3}He atoms [9-11]). Let us consider some characteristics of spin supercurrent.

1. The value of spin supercurrent is determined by characteristics of precession of spin of objects between which the supercurrent emerges: the precession angle (phase) α and the deflection angle θ (see figure 1). For example, the value of spin supercurrent j_z in the direction of orientation (axis $\mathbf{z}$) of precession frequencies of spins of ^{3}He atoms in superfluid ^{3}He-B is determined as follows:

$$j_z = -g_1 \partial\alpha / \partial z - g_2 \partial\theta / \partial z , \qquad (5)$$

where g_1 and g_2 are coefficients depending on θ and the properties of the superfluid.

2. The spin supercurrent tends to equalize the respective characteristics of spins of interacting objects. As a result of equalizing, a change in the frequencies of precession of spins of the objects may take place. Let us prove it. Precession angles α_1 and α_2 of spins of these objects are related to the respective precession frequencies ω_1 and ω_2 (in the case of independence of frequencies of time *t,* that is before the action of spin supercurrent*)* as follows:

$$\alpha_1 = \omega_1 t + \alpha_{01} , \quad \alpha_2 = \omega_2 t + \alpha_{02} , \qquad (6)$$

where α_{01} and α_{02} are the values of precession angles at *t*=0. As a result of the action of spin supercurrent at an arbitrary moment *t,* the following holds: $|a_1 - a_2| > \left| a_1' - a_2' \right|$, where α_1' and α_2' are the values of precession angles of spins of interacting objects after the action of spin supercurrent. Using this inequality in (6) we obtain:

$$|\omega_1 - \omega_2| > \left| \omega_1' - \omega_2' \right| , \qquad (7)$$

where ω_1' and ω_2' are precession frequencies of spins of interacting objects after the action of spin supercurrent.

3. At a definite difference in precession phases of spins of interacting objects, a precession phase slippage (drop) by the value of $2\pi n$ takes place. As a result of phase slippage, the drop in value and change in sign of spin supercurrent may take place. Consequently, equation (5) holds in the absence of phase slippage. The possibility of phase slippage is negligible if difference $\Delta\omega = |\omega_1 - \omega_2|$ between precession frequencies of spins of the objects between which it arises satisfies the following:

$$\Delta\omega \to 0 . \qquad (8)$$

4. The effectivity of action of spin supercurrent between objects having spin does not depend on the distance between the objects. For example, the action of spin supercurrent in superfluid ^{3}He-B throughout the volume of superfluid [9-11] does not vary. It may be explained by that the spin supercurrent is a dissipation-free process, i.e., it is not accompanied by the emergence of mass.

5. The spin supercurrent may emerge between spin vortices in the physical vacuum. One of the arguments in favor of this possibility is the existence of correlation of phases of spatially separated photons of the same frequency [16]. In the study by L. Boldyreva [17], it was shown that this correlation is accounted for by the emergence of spin supercurrents between spin vortices that constitute interacting photons.

6. Since spin supercurrent is a physical process responsible for quantum correlations and the latter are independent of using electromagnetic screens, then spin supercurrent is not shielded by electromagnetic screens.

7. As spin supercurrent is a physical process responsible for quantum correlations between separated photons, the speed of spin supercurrent must be greater than that of light. The experiments exist [18] in which it is shown that the speed of quantum correlations is 10^4 times greater than the speed of light. This does not contradict the second postulate of special relativity as this postulate holds true only for *inertial process* [19]; at the same time spin supercurrent is *an inertia-free process* (it is not accompanied by emergence of mass, see the above considered property 4, and consequently its speed may be greater than the speed of light.

c) The Properties of the Physical Vacuum Consisting of QHOs (the Vortex-Type Physical Vacuum)

In quantum field theory, the physical vacuum is defined not as an empty space but as consisting of QHOs characterized by zero-point energy. This physical vacuum may be called "the vortex-type physical vacuum". Based on the properties of QHO, let us determine the properties of the vortex-type physical vacuum as a continuum.

i. The density of vortex-type physical vacuum

As QHO has mass, the medium consisting of QHOs has a positive density ρ. Let us show that ρ is not constant. According to equations (3) and (4) (see also fig. 1), projection $\left(S_{QHO}\right)_u$ of spin $\mathbf{S}_{QHO}$ on the direction of velocity $\mathbf{u}$ of QHO (that is the velocity of vortex-type physical vacuum consisting of QHOs) depends on the deflection angle θ as:

$$\left(S_{QHO}\right)_u = S_{QHO}\sqrt{1-\sin^2\theta}\ . \qquad (9)$$

According to equations (4) and (9), the motion of QHO results in its contraction in the direction of motion, and the factor of contraction is equal to $\sqrt{1-u^2/c^2}$, that is, under the Lorentz transformation of length of bodies in the direction of their motion [19]. The change in the size of QHO, in turn, may result in a change of density ρ of vortex-type physical vacuum as consisting of QHOs.

According to equations (4) and (5), two factors can affect the deflection angle θ: the change in speed of QHO and spin supercurrent. Thus the density of vortex-type physical vacuum is a function, φ, of speed u and spin supercurrent j:

$$\rho = \varphi(u,j)\,. \qquad (10)$$

If the speed of spin supercurrent is greater than the speed of propagation of contraction in the vortex-type physical vacuum, the zones of jumps of density appear in this vacuum [14]. At the same time, a shock wave may arise in the vortex-type physical vacuum (similar to that which occurs when the speed of a moving object exceeds the speed of sound in a molecular medium).

ii. The force arising in the vortex-type physical vacuum with oriented spins in a nonhomogeneous electric field

According to conditions (1) and (2), in the area of vortex-type physical vacuum with oriented spins of QHOs the emergence of total nonzero electric dipole moment $\mathbf{d}_t$ of QHOs that constitute this area takes place

$$\mathbf{d}_t \uparrow\downarrow \mathbf{S}_t\,, \qquad (11)$$

where $\mathbf{S}_t$ is the total spin in the area of vortex-type physical vacuum with oriented spins of QHOs. In a nonhomogeneous electric field $\mathbf{E}$, the force $\mathbf{F}_d$ will act on these QHOs. This force is determined [13] as:

$$\mathbf{F}_d = \left(\mathbf{d}_t \nabla\right)\mathbf{E}\,, \qquad (12)$$

where ∇ is the nabla.

iii. The vortex-wave-spin process in the vortex-type physical vacuum

The first equation describing the vortex-wave-spin process

The photon may decay into a pair of oppositely charged particles in the electric field of heavy nuclei [20]. In this case, the total spin of emerging particles equals the photon spin, which suggests that the principle of conservation of angular momentum holds true in the vortex-type physical vacuum.

Due to conservation of angular momentum, the Einstein-de Haas effect takes place in this vacuum [21]; a change in the total spin $\mathbf{S}$ of a unit volume of vortex-type physical vacuum ($\partial\mathbf{S}/\partial t \neq 0$) results in the rotation of the vortex-type physical vacuum ($curl\,\mathbf{u} \neq 0$). That is the following holds true:

$$\partial\mathbf{S}/\partial t = -\left(1/k_1\right)\cdot curl\,\mathbf{u}\,, \qquad (13)$$

where t is time, $k_1 < 0$ is a proportionality factor.

The second equation describing the vortex-wave-spin process

According to equations (3) and (4), at the emergence of $\partial\mathbf{u}/\partial t$ in the vortex-type physical vacuum the following cases may take place:

1) at a change in the direction of velocity $\mathbf{u}$ the precession motion of $\mathbf{S}$ relative to a new direction of $\mathbf{u}$ arises;

2) at a change in only the value of u, the angle θ changes and consequently a precession motion of $\mathbf{S}$ emerges in the new area of vortex-type physical vacuum.

Thus at any change in velocity $\mathbf{u}$, the precession motion of $\mathbf{S}$ emerges in the new area of vortex-type physical vacuum. As a result, the following equation may be taken to be true:

$$\partial\mathbf{u}/\partial t = k_2\,curl\,\mathbf{S}\,, \qquad (14)$$

where $k_2 < 0$ is a proportionality factor. If to introduce factor $y = \sqrt{k_2/k_1}$, then equations (13) and (14) may be rewritten as:

$$\partial\left(k_1 y\mathbf{S}\right)/\partial t = -y\,curl\,\mathbf{u}\,, \qquad (15)$$

$$\partial\mathbf{u}/\partial t = y\,curl\left(k_1 y\mathbf{S}\right)\,. \qquad (16)$$

The dimension of factor y is the same as that of speed. If in the vortex-type physical vacuum there is a mechanism that suppresses the vortex at a point of space and simultaneously transports the vortex energy to adjacent areas, then a vortex-wave-spin process (described by equations (15) and (16)) will propagate at speed y in the vortex-type physical vacuum. It should be noted that the speed of vortex-wave-spin process may change at its interaction with an inertial system due to interaction of spin vortices that arise in this process with the virtual photons (as with spin vortices) created by quantum entities that constitute the inertial system.

Note. According to condition (2) and conclusions of work [22] (the latter contains a proof that the vortex-type physical vacuum is a magnetic medium), the vortex-wave-spin process described by equations (15)-(16) is an electromagnetic process, *y* is the speed of light and the vortex-type physical vacuum is a luminiferous medium [23].

The condition of disappearance of vortex-wave-spin process

Equation (15) describing the vortex-wave-spin process contains $\partial \mathbf{S} / \partial t$. Consequently, this process could not spread in the area where the spin orientation cannot be changed, that is, where the following takes place:

$$\partial \mathbf{S} / \partial t = 0, \qquad (17)$$

and spins can be considered to be "frozen". The equality (17) means that in this area of physical vacuum the processes causing a definite orientation of spins (for example, spin supercurrent or rotation of vortex-type physical vacuum acting on spins due to the effect of Barnett [24]) suppress the vortex-wave-spin process.

The Properties of Cavity Structures

The processes that take place in the physical vacuum in the area of location of cavity structures were considered by Boldyreva in [25]. Like all quantum entities that are singularities in electric and/or magnetic fields, the quantum entities that constitute the substance of cavity structure create virtual photons, i.e., spin vortices in the vortex-type physical vacuum. According to equation (3), the orientation of precession frequency of spin of the spin vortex created by the quantum entity is determined by the direction of entity's velocity. Consequently, the orientations of precession frequencies of spin vortices created by the quantum entities (at least, electrons) of the substance are oriented along their orbital velocities. The mutual space arrangement of orbits of quantum entities that constitute the substance of the cavity structure depends on the form of the latter. Thus the mutual orientation of precession frequencies of spins of spin vortices created by these quantum entities cannot be arbitrary, in particular those precession frequencies may not be

oriented along one line. An example of possible configuration of precession frequencies ($\boldsymbol{\omega}_1, \ldots, \boldsymbol{\omega}_p, \ldots, \boldsymbol{\omega}_q, \ldots, \boldsymbol{\omega}_r$) of spins of spin vortices created by quantum entities that constitute the substance of a cavity structure is shown in fig. 2 (the directions of frequencies $\boldsymbol{\omega}_1, \ldots, \boldsymbol{\omega}_p, \ldots, \boldsymbol{\omega}_q, \ldots, \boldsymbol{\omega}_r$ are tangential to a ring). In this configuration, according to the definition of spin supercurrent (see equation (5)), spin supercurrent $\mathbf{J}_{pq}$ between arbitrary spin vortices *p* and *q* will never be zero, that is:
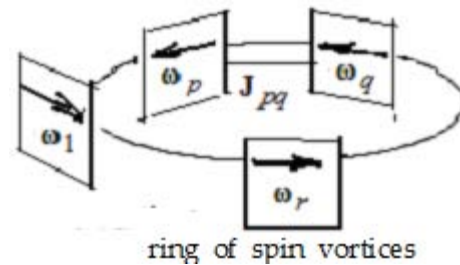
$$\mathbf{J}_{pq} \neq 0. \qquad (18)$$

ring of spin vortices

Fig. 2: A ring of spin vortices with respective precession frequencies $\boldsymbol{\omega}_1, \ldots, \boldsymbol{\omega}_p, \ldots, \boldsymbol{\omega}_q, \ldots, \boldsymbol{\omega}_r$; $\mathbf{J}_{pq}$ is spin supercurrent.

Thus the space inside the ring will constantly be "filled" with spin supercurrents. According to property 2 (section II.b), the action of the spin supercurrent results in changes in the characteristics of spins of interacting spin vortices, which in turn (according to equations (15)-(16)) results in the emergence of vortex-wave-spin process in the vortex-type physical vacuum. Thus the cavity structure will be filled with energy fluxes.

The validity of those theoretical conclusions is proved by experimental evidence. For example, in 1952, Czech researcher K. Drbal was granted a patent for maintaining razor blades and straight razors sharp without an auxiliary source of energy, the razors being placed in a pyramid [26].

III. Experimental Data

In this section, experimental data are compared with the above-considered properties of vortex-type physical vacuum and spin supercurrent.

a) Selectivity of Mental Influence on Remote Objects

Under the classification of James George Frazer, there exist two types of magic [4]: (1) homeopathic magic based on the principle of similars: "*similia similibus curantur*"; (2) contagious magic based on the belief in that "the things which have once been in contact with each other continue to act on each other at a distance after the physical contact has been severed", and it was believed that the distance between the things being interacted was of no importance. For example, a

custom could be found among primitive peoples to thoroughly hide baby-teeth that had fallen out, or severed hair, nails, or pieces of food, so that whoever got possession of these could not work his or her ill will upon their former owner. In Australia, there was a custom to steal one's enemy's things (e.g., garment) in order to beat them soundly or roast them in fire thus harming the enemy. Doubtless that the cases of remote mental influence by contemporary psychics on various physical objects also must be classified as contagious magic since: first, for a successful psychic's influencing an object, the stage of "establishing the contact" is necessary; secondly, the efficiency of influence does not depend on the distance.

The main peculiarity of action of both ancient and contemporary magicians (psychics) on remote objects is selectivity of action; the control group of similar objects located near the object being influenced upon did not respond to the influence.

Preceding to the stage of influencing is a stage of "establishing the contact". The contact may be established by two methods. In the first method, the magician (psychic) contacts directly with the object of future influence or with things belonging to the object. In the second method, the psychic "tunes" his or her own organism in such a way that the effect of influencing the object chosen be maximum. This method is most often used in experiments. For example, in experiments conducted by V. Kartsev [27, 28], influencing mice by a psychic at a distance of 30 km was the most effective when the psychic played "harmonica" (a kind of button accordion). The famous psychic E. Dubitskiy described his method of tuning for cancer treatment (the treatment was conducted successfully by Skype from Moscow to New-York) [29] in such a way: the psychic mentally materializes "elementary" particles (electrons, protons, neutrons) and/or gamma-rays and directs the beam to a target, on which cancer cells have been placed mentally. In the experiments with microcalorimeter for changing the temperature of a piece of semiconductor inside the microcalorimeter, E. Dubitskiy mentally compressed the atoms and changed their speed [30]. Unique psychic A. Vdovin cured multiple sclerosis over the phone imaging that he is a snake squirming inside the body of the patient and eating the bacteria covering the nerves.

The necessity of establishing the contact is in accordance with property 3 of spin supercurrent: effective interaction of spin vortices by means of spin supercurrent takes place under condition (8), that is, under equality of precession frequencies of spins of interacting spin vortices. Thus the stage of establishing the contact is necessary for equalizing the precession frequencies of spins of spin vortices created by quantum entities that constitute the psychic's organism, on the one hand, and spins of spin vortices of quantum entities that constitute the object being influenced, on the other hand.

The mental influence on remote objects has the following characteristics:

– Independence of the distance

The variation of the distance between the psychic and the object influenced did not affect the result; for example, in experiments conducted by K. Korotkov [31], also by G. Gurtovoy and A. Parkhomov [32, 33] the distance varied in the range of 0.5 m to 2,000 km.

This characteristic is in accordance with property 4 of spin supercurrent (section II.b): the spin supercurrent is emerging between spin vortices independent of the distance between them. Note that the independence of the distance rules out the hypothesis of the thermal or acoustic nature of psychic's influence.

– Independence of the presence of electromagnetic screens

The screening of the object being influenced from electromagnetic radiation did not affect the result produced by the psychic, in some cases made it even more distinct [27-28, 31-32].

This characteristic of mental influence is in accordance with property 6 of spin supercurrent (section II.b): spin supercurrent is not shielded by electromagnetic screens.

– The ability to transmit information

The psychics showed an ability to transmit information to the objects. For example, while influencing a noise generator the psychic could, on the one hand, suppress at will the signal at the output of the generator, and, on the other hand, the psychic could also produce a train of pulses [27, 32]. While influencing concentrations of gas emitted by cucumber's slices (experiments were conducted by H. Kokubo, et al. [34]) the psychic could make the odor of cucumbers higher or suppress it.

This characteristic of mental influence is in accordance with property 1 (section II.b) of spin supercurrent: according to equation (5), by changing the characteristics of spins of spin vortices it is possible to change the sign of spin supercurrent emerging between these vortices.

Based on analogies between the action of psychic on remote objects and the properties of spin supercurrent (section II.b) the action of psychic may be represented by the scheme given in figure 3. The spin supercurrent emerges between the spin vortices created by quantum entities that constitute the psychic's organism, on the one hand, and spin vortices created by quantum entities that constitute remote objects, on the other hand.
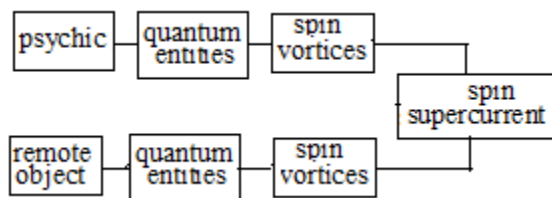
Fig. 3: The diagram of action of a psychic on devices by means of spin supercurrent

b) The Locating of a Hidden Cavity Structure. Dowsing

Analysis of experimental evidence on locating ground water, buried ores, etc. (sometimes performed with the use of a dowsing rod) makes it possible to specify the main features of locating [35, 36] and compare them with the properties of spin supercurrent. With this aim in view, let us represent spin supercurrent j_z emerging in a cavity structure as three summands:

$$j_z = (j_z)_1 + (j_z)_2 + (j_z)_3, \qquad (19)$$

where $(j_z)_1$ is spin supercurrent between spin vortices created by quantum entities of cavity wall substance, $(j_z)_2$ is spin supercurrent between spin vortices created by quantum entities of substance contained in the cavity, $(j_z)_3$ is spin supercurrent between spin vortices created by cavity wall substance, on the one hand, and spin vortices created by the substance contained in the cavity, on the other hand.

– The dependence of effectiveness of locating on the form of the cavity structure

The dependence of effectiveness of locating on the form of the cavity structure containing a substance under study (assume that the substance fills all the structure) may be explained using the properties of spin supercurrent $(j_z)_1$, see equation (19). As the mutual orientation of spins of spin vortices created by quantum entities that constitute the substance of cavity structure wall depends on the form of this structure (see section II.d), then from equation (5) it follows that the values of spin supercurrent $(j_z)_1$ depend on the form of cavity structure.

– The dependence of effectiveness of locating on the cavity wall substance and the substance contained in the cavity

The effectiveness of dowsing connected with the cavity wall substance and with the substance contained in the cavity is determined by values of spin supercurrents $(j_z)_1$ and $(j_z)_2$, see equation (19). It follows from equation (5) that the values of $(j_z)_1$ and $(j_z)_2$ are determined, through coefficients g_1 and g_2,

by the properties of the substance where spin supercurrent emerges.

– The dependence of effectiveness of locating on the difference in the characteristics of the cavity wall substance and the substance contained in the cavity. In many cases the effectiveness is the highest when the substances are in different phase states: solid and liquid, solid and gas, etc.

It may be explained by the following: the less is the difference between respective characteristics of substances of cavity wall and substance contained in the cavity structure, the less the structure is one of the cavity type and, consequently, the less is the possibility of meeting the inequality (18). The latter results in decreasing the effectiveness of locating this cavity structure.

– The dependence of effectiveness of dowsing on the substance and form of the dowsing rod

The use of substance of rod or auxiliary object similar to that being searched for (for example, while searching a cavity containing oil it is useful to hold in hand a vial with oil [36]) may "tune" the dowser's organism to searching the substance. Then the following inequality will be justified: $|\omega_d - \omega_c| > |\omega_d' - \omega_c|$,

where ω_c is the precession frequency of spins of spin vortices created by quantum entities that constitute the substance being searched for, ω_d is the precession frequency of spin of spin vortices created by quantum entities that constitute dowser's organism, ω_d' is the value of frequency ω_d while using the substance of rod or axillary object similar to that being searched for. Consequently, according to condition (8), the effectiveness of dowsing increases.

Note that according to equation (5) the action of spin supercurrent on spins is analogous to the action of a moment on these spins. It may explain why while locating with the use of a rod the latter *rotates* in the area of cavity structures.

c) The Structuring of Space by Psychics

In 2013, Japanese researcher H. Kokubo et al. conducted unique experiments on psychics' non-contact effect on bio-sensors. The cucumber slices were used as bio-sensors and concentrations of gas emitted by slices were measured [34]. The recurring zones of increased concentrations of gas emitted by slices were observed. The characteristics of the recurring zones (the number, form, and thickness of zones, the distances between them) were determined by the ability of psychic to create these zones. A schematic picture of observed recurring zones is shown in figure 4: the radius *r* of the external zone in these experiments is limited only by the size of setup (*r*~250c*m*), the thickness of a zone of

maximum concentration is $\delta \sim 15cm$. The zones of maximum concentration are black.

Fig. 4: Schematic picture of observed recurring zones created by a psychic: *r* is the radius of the external zone ($r \sim 250cm$), the radius in these experiments is limited only by the size of setup, δ is the thickness of zone of maximum concentration ($\sim 15cm$).

The structuring of space by living and non-living objects was observed in many experiments. For example, in experiments with rotating magnets conducted by S. Godin and V. Roshchin (in 1990-1993) the emergence of recurring zones of elevated magnetic field strength (so-called walls) was observed [37-38]. In 1968-2000, V. Grebennikov studying bee combs discovered that empty beer combs were embanked by a system of invisible "shells" which seemed to be like a compression of air [39]. Jumps of the density of air are observed near the output of the nozzle of a jet engine (for example, de Laval nozzle) [40]. In all experiments, the emerging structures are not screened by electromagnetic screens.

This structuring of physical vacuum may be explained by the properties of spin supercurrent. Any person (and any non-living object as well) may interact with other objects by means of spin supercurrents. From this point of view, any person (and any non-living object as well) "radiates" spin supercurrents. According to property 6 (see section II.b), spin supercurrent is not screened by electromagnetic screens. According to property 7 of spin supercurrent (see section II.b), the speed of spin supercurrent is greater than the speed of light. If the speed of spin supercurrent is greater than the speed of propagation of contraction in the vortex-type physical vacuum, the zones of jumps of density and shock waves appear in the vortex-type physical vacuum [14]. As the characteristics of spin supercurrents "emitted" by a person are determined by the characteristics of spins of spin vortices created by quantum entities that constitute the person's organism, the person may influence the characteristics of those jumps of density by changing the state of their own organism.

d) The Changes in Weight. Levitation

According to memoirs of witnesses [41], Russian Orthodox saint Seraphim of Sarov (1759-1833) raised into the air from the ground during a fervent prayer, one of the witnesses being Russian emperor Alexander I. Shamans of Buryatia with 30 kg of metallic objects attached to them, after 24-hour fasting and dances including rotations, can hover for several seconds in the air at the height of 0.5 m. It is known [42] that a cocoon of ichneumon of the Ichneumonidae family, belonging to Bathyplectes anurus species (cocoon of parasitic fly or wasp), could jump upon exposing it to sunlight (the jumps were 30 mm long and 50 mm high, that is, exceeding the cocoon width by factor of 30); such jumps were performed even when the cocoon had been placed on a "cloud" of loose cotton wool [39].

Experimentally the changes in weight were also observed for non-living objects. One of the most striking examples of such experiments is a series of experiments conducted by J. Searl in 1940-1950 [43, 44]. In the experimental setup, there was a magnetic ring (stator) creating rotating nonlinear magnetic field. At the critical value of speed of rotation, the levitation of setup was observed. Similar experiments with rotating magnets were conducted by S. Godin and V. Roshchin in 1990-1993 [37, 38]: at the clockwise rotation of the rotor, a force arose directed oppositely to the gravitation vector (which is levitation), at the counter-clockwise rotation the arising force was directed along the gravitation vector. In 1977-1987, one of the pyramid researchers Joe Parr experimented with the pyramids rotating in an alternating magnetic field, and he observed the weight loss of pyramid [45, 46]. In experiments conducted by Japanese researcher H. Havasaka ($\sim$1989), a decrease in weight of right-hand rotating gyroscope with rotations around the vertical axis relative to the Earth was observed [47]; the magnitude of the decrease in weight did not depend on shielding the gyroscope from the external magnetic field (0.35 G). That is, the change in weight was not of magnetic nature.

The above experiments may be explained if to take into account the properties of the vortex-type physical vacuum (section II.c.ii). If spins of spin vortices created in the vortex-type physical vacuum by quantum entities that constitute an object are oriented uniformly, then, according to condition (11), this area of vortex-type physical vacuum will have a non-zero electric dipole moment. As the surface of the Earth has a negative charge, then force $\mathbf{F}_d$ determined by equation (12) will act on spin vortices in this area and consequently on the object that creates these spin vortices. At the orientation of spins downwards to the Earth, force $\mathbf{F}_d$ is directed from the Earth, that is, oppositely to the vector of gravitation; at reversed orientation, force $\mathbf{F}_d$ is directed towards the Earth, that is, along the vector of gravitation. Due to the Barnett effect [24], the orientation of spins of the spin vortices in the vortex-type physical vacuum may be caused by rotation of the object creating those spin vortices: at the right-hand rotation, levitation takes place.

e) Short-time Invisibility

Gospel of Luke [48] states that when Nazarites wanted to shove Christ off the mountain, where the town was situated, for his preaching in the synagogue, Christ became invisible and thus escaped.

It should be noted that "Invisibility Cloak" ("Mantle of Invisibility") and "Cap of Invisibility" are magical items found in folklore and fairy tales [49-50]. But these items remained not only as attributes of myths and legends: short-time invisibility is observed in contemporary experiments both with living and with non-living objects. For example, Grebennikov studying the behavior of the cocoon of an ichneumon of the Ichneumonidae family, belonging to Bathyplectes anurus species discovered that during the above-mentioned jumps of the cocoon, the invisibility of the cocoon took place for a short time [39]. Short-time invisibility was observed in experiments conducted by J. Searl [43-44] with magnets creating rotating nonlinear magnetic field, and in experiments conducted by S. Godin and V. Roshchin with rotating magnets [37, 38]. Note that in the experiments mentioned the short-time invisibility was observed simultaneously with levitation.

The above experiments may be explained if to take into account the properties of the vortex-type physical vacuum (section II.c.iii). If in the location of the object studied the spins of spin vortices created in the vortex-type physical vacuum by quantum entities that constitute this object are "frozen" (that is, equation (17) holds), then the vortex-wave-spin process will not spread in this location. As according to condition (2) and conclusions of work [22] the vortex-wave-spin process is also an electromagnetic process, then light will not spread in the location of the object mentioned. If "frozen" spins are oriented to the Earth or oppositely, then invisibility of object and changing in its weight may occur simultaneously.

IV. DISCUSSION

The spin supercurrent may emerge not only between spin vortices that constitute different objects but also between spin vortices that constitute an object, on the one hand, and spin vortices that constitute the vortex-type physical vacuum, on the other hand. As follows from equation (7), as a result of the action of spin supercurrent the difference in values of respective characteristics of interacting spin vortices decreases. Consequently, it can be said that the area of vortex-type physical vacuum where the object is located "acquires" the properties of the object. After removing the object from the area of vortex-type physical vacuum, the characteristics of spins that constitute this vacuum in the area may not return to initial values. In this respect, one may say about "memory" of the spin system of vortex-type physical vacuum. It is possible that belief in that the soul of a deceased person remains for some days in the premises where the deceased lived is based on these properties of the physical vacuum. For example, the outstanding psychic L. A. Korabelnikova while identifying people by their belongings perceived the deceased as being alive for nine days after the person's death [27].

V. CONCLUSION

The following "miracles" accomplished by both ancient and contemporary magicians (at present they may be called "psychics"): the selective action on remote objects (for example, "contagious magic"); the locating of hidden cavity structures (in particular, dowsing); the structuring of space (the so-called "magic rings" or "charmed rings"); the changes in one's own weight (in particular, levitation); short-time invisibility, can be the results of the processes taking place in the physical vacuum having the following properties.

1. It consists of quantum harmonic oscillators (QHOs) characterized by zero-point energy.
2. The vortex-wave-spin process which is simultaneously an electromagnetic process may emerge.
3. The quantum entity creates a pair of oppositely charged virtual particles (virtual photon or spin vortex) in this vacuum.
4. Spin supercurrent may emerge between spin vortices in this vacuum. The spin supercurrent is determined by mutual orientation of spins of interacting spin vortices; it does not depend on the distance between the vortices, is not subject to electromagnetic screening, and its speed is greater than the speed of light (the latter does not contradict the second postulate of SR because the spin supercurrent is *an inertia-free process*). The effectivity of action of spin supercurrent is maximum if the difference between precession frequencies of spins of the spin vortices between which it arises is negligible.

Based on the properties of the vortex-type physical vacuum, the above-mentioned miracles accomplished by magicians may be explained in the following way.

1. The action of magicians on remote objects (in particular, "contagious magic") is due to spin supercurrents emerging between the spin vortices created by quantum entities that constitute magician's organism, on the one hand, and the spin vortices created by quantum entities that constitute the remote object, on the other hand.
2. Detection of hidden cavity structures, for example, underground water or buried treasures (in particular, dowsing) may be accomplished due to the action of spin supercurrent filling the cavity structure on the

spin vortices created by quantum entities that constitute the magician's organism.

3. The structuring of space around a magician (the so-called "magic rings" or "charmed rings") may take place, because the speed of spin supercurrent emerging between the spin vortices created in the vortex-type physical vacuum by quantum entities that constitute the magician's organism, on the one hand, and spin vortices that constitute this vacuum, on the other hand, is greater than the speed of propagation of contraction in this vacuum. The contraction is caused by spin supercurrent.

4. The changes in the weight of a magician may take place as a result of spin polarization of vortex-type physical vacuum at the location of the magician: if spins are oriented downward to the Earth, the weight decreases (levitation), if oppositely to the Earth, the weight increases. The orientation may take place, for example, due to the Barnet effect at the rotation of the magician.

5. The short-time invisibility of magician may be accounted for by the impossibility of spreading the vortex-wave-spin process (the electromagnetic process) in the area of location of the magician due to the impossibility of changing the orientation ("freezing") of spins of the vortex-type physical vacuum in this area.

From the physical point of view, the ability of any person to accomplish a miracle is determined by his/her ability to control the characteristics of spins (orientation, precession frequency, etc.) of spin vortices created in the vortex-type physical vacuum by quantum entities that constitute the person's organism.

Acknowledgements

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