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# A Physical Process Underlying "Alternative" Vision: Spin Supercurrent

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**Abstract** The aim of this work is to show that the rare cases of reading texts and distinguishing colors by blind persons, that is, the manifestation of so-called "alternative" vision observed by some researchers, are not occasional events and there exists a physical process "enabling" the alternative vision. The analysis of the underlying physical process is based, first, on the results of experiments conducted in 1931 by Hieronymus and demonstrating the possibility of growing plants without sunlight in the dark, and, secondly, on the results of experiments investigating alternative vision and conducted in the latter half of the last century by Bongard with Smirnov and the group of Bekhtereva (the Russian Academy of Science). The following conclusion is made in this paper: the alternative vision exists due to transformation of energy of external "primary" light into the energy associated with spin supercurrent emerging in human organism, and the latter is transformed into the energy of "secondary" light detected by the brain's visual cortex, without projection of the image to the eyes' retina of a human subject.

***Keywords:*** *"alternative" vision, "skin" vision, visual cortex, spin supercurrent, virtual photon*

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## 1. Introduction

As of 2015 [1], there were an estimated 253 million people with visual impairment worldwide. Of these, 36 million were blind and a further 217 million had a moderate to severe visual impairment.

All kinds of vision impairment are categorized into two groups: vision impairment with an integrity of eyes and vision impairment with a loss of eyes as a result of an accident. Scientists and physicians do their utmost for the treatment of people of the first category, develop medicines and conduct complex operations using the latest technologies. But people of the second category can hold out little hope for a miracle to acquire the ability to recognize colors or see objects without eyes. However, such miracles can be found sometimes in the history of mankind. As far back as in the 17th century, famous scientist P. Boyle [2] published for the first time a story of the man who became blind at the age of two; however, he could distinguish colors of the objects by merely touching them with his fingers. Since then, the studies of the possibilities of dermo-optical perception have been conducted constantly [3]. In 1962-63, Bongard and Smirnov [4] at the Institute of Biophysics of the Russian Academy of Science (RAS) were investigating outstanding capabilities of Rosa Kuleshova (at the age of 22). She was sighted, but while using a lightproof blindfold she could read, distinguish colors and reproduce drawings, having not been given a preliminary training by anybody. The uncommon vision was successful when, first, Rosa Kuleshova touched study object by fingers of the right hand, and, secondly, the experimentalists were calm and showed goodwill to her. If somebody descanted critically or somebody's behavior became too nervous, Kuleshova' capability could disappear for some days. As Rosa Kuleshova touched a study object by fingers of her hand, Bongard and Smirnov called her uncommon vision by "skin" vision.

A unique phenomenon was observed in 2000 at the RAS Institute of Human Brain by RAS academician N. Bekhtereva**.** She observed the performance of many visual functions (after training using Bronnikov's techniques [5]) by a 30-year old woman whose eyes were put out by bandits 20 years before [6].

Further experiments carried out by Bekhtereva showed that visual functions could be performed by sighted people wearing lightproof masks on their faces (they could read, distinguish colors, reproduce drawings and walk in the rooms filled with pieces of furniture). A brief characteristic of the test subjects is given below.

The number of test subjects was 7 at the age from 10 to 17; out of this number 4 subjects were males, 3 subjects were females. Two subjects had problems with their vision; the rest of the subjects were healthy. All subjects were trained using Bronnikov's techniques.

Pictures demonstrated to test subjects were displayed on the screen of a portable computer using Power Point software. In total, 48 pictures were shown. The computer was placed in such a way that none of the people present could see the picture. There was a usual natural ambient illumination in the room.

In EEGs tests for uncommon vision and especially in tests for reading a pronounced decrease in $\alpha$-rhythm and the presence, mainly in frontal areas of brain, of $\beta$-rhythm with frequency exceeding 20 oscillations/s were observed. It was discovered that measured values of changes in $\alpha$-rhythms and $\beta$-rhythms were similar for all test subjects, allthough initial values of these rhythims were different. It follows that the phenomenon in question is not unique, but is reproducible, and can be achieved through a training process.

Based on the results of these studies, Bekhtereva concludes as follows [6]: "The phenomenon exists, it is reproducible". Bekhtereva called this vision an "alternative" vision.

Thus, alternative vision may take place in people independently on whether they have eyes (healthy or affected) or not, and whether they were preliminarily trained or not. This speaks in favor of the existence of a physical process responsible for alternative vision.

In this work, a physical process that may enable alternative vision is discussed. In this process, the energy of external "primary" light is transformed into the energy associated with spin supercurrent, and then the latter is transformed into the energy of "secondary" light detected by brain's visual cortex of a human subject, without projection of the image to the eyes' retina.

The spin supercurrent is process transferring angular momentum. The action of spin supercurrent tends to equalize the values of the respective characteristics (angles of precession and angles of deflection) of precessing spins of spin structures between which it emerges. For the studies of spin supercurrents in superfluid $^3$He-B Y. Bunkov, V. Dmitriev and I. Fomin were awarded the Fritz London Memorial Prize in 2008 [7,8,9]. The properties of spin supercurrent used in this work are considered in Section 2.

In this work, the mechanism of transformation of primary light into secondary light with the use of spin supercurrent is considered in detail; the mechanism is based not only on the experiments conducted by Bongard with Smirnov and the group of Bekhtereva (the Russian Academy of Science), but also on the experiments conducted in 1931 by Hieronymus (USA) [10,11] and demonstrating the possibility of growing plants without sunlight in the dark. All considered phenomena may be characterized by one property: the perception of sunlight without its direct action.

*Note*. The quantum objects constituting human skin take part in the transformation of energy of external "primary" light into the energy of "secondary" light detected by brain's visual cortex of a human subject, therefore, alternative vision may be called also "skin" vision.

## 2. The Properties of Spin Supercurrent

1) The spin supercurrent performs the transferring of angular momentum. The first works introducing the process of transfer of angular momentum in descriptions of physical phenomena were works by J. C. Maxwell describing a model of luminiferous ether in 1861-1873 [12]. In hundred years, the investigation of process of transfer of angular momentum was continued (with taking into account the quantum object characteristic opened in the 20th century, - spin) by M. Vuorio [13], A. Borovic-Romanov [7], Yu. Bunkov [8], V. Dmitriev and I. Fomin [9]. In these investigations the process of transfer of angular momentum is called "spin supercurrent".

Spin supercurrent arises between spin structures possessing precessing spins. The value of spin supercurrent is determined by the following characteristics of precession of spins: the mutual orientation of their frequencies of precession, the precession angles (phases) $\alpha$ and the deflection angles $\beta$. For example, the value of spin supercurrent $\left(I_{ss}\right)_z$ in the direction of orientation (axis ***z***) of precession frequencies of spins of $^3$He atoms in superfluid $^3$He-B is determined as [7,8,9]:

$$\left(I_{ss}\right)_z = -g_1 \partial\alpha / \partial z - g_2 \partial\beta / \partial z, \tag{1}$$

where $g_1$ and $g_2$ are coefficients depending on $\beta$. and the properties of the superfluid.

The investigation of such physical phenomena as quantum correlations [14,15,16] has shown that photons and virtual photons (consisting of virtual particles) are spin structures between whom spin supercurrent may emerge. The virtual particles created by quantum objects were introduced by Nobel Prize winner R. Feynman in 1949 [17] to denotate the force fields in his diagrams. The properties of the virtual particles depended on the interaction in which they were involved. For example, a quantum object which is a singularity in electric or magnetic fields (electric charge or/and magnetic dipole) creates a pair of oppositely charged electric particles, the so-called a "virtual photon" since it is like a photon transfers electric and magnetic interactions. The virtual photon like a photon in pure state (having transversely precessing spin [15,18,19]) has a precessing (with frequency $\boldsymbol{\omega}_v$) spin $\mathbf{S}_v$ and electric component $\mathbf{E}_v$.

$$\mathbf{E}_v \uparrow\downarrow \mathbf{S}_v. \tag{2}$$

From the physical point of view the creation of virtual photon by a quantum object may be a consequence of interaction of the quantum object's spin with the physical vacuum, which is analogous to Barnett's effect [20]. Then the orientation of precession frequency $\boldsymbol{\omega}_v$ is associated with the orientation of spin $\mathbf{S}_q$ of the quantum object creating this virtual photon as:

$$\boldsymbol{\omega}_v \uparrow\uparrow \mathbf{S}_q; \tag{3}$$

if the speed of quantum object is much less than the speed of light, then [15]:

$$\mathbf{S}_v \uparrow\downarrow \mathbf{S}_q. \tag{4}$$

The analogy between characteristics of a photon and of a virtual photon is spreading respectively on the relations between main virtual photon's characteristics:

$$\mathbf{S}_v = \hbar, \tag{5}$$

$$U_q = S_v \omega_v, \tag{6}$$

where $U_q$ is energy of a quantum object creating the virtual photon.

2) The spin supercurrent tends to equalize the values of respective characteristics of spins of interacting virtual photons. For example, as a result of action of spin supercurrent between two virtual photons presented in Figure 1 the following inequalities will take place:

$$\left|\alpha_1 - \alpha_2\right| \geq \left|\alpha_1^{'} - \alpha_2^{'}\right|, \tag{7}$$

$$\left|\beta_1 - \beta_2\right| \geq \left|\beta_1^{'} - \beta_2^{'}\right|, \tag{8}$$

where $\alpha_1$ and $\alpha_2$ are the values of precession angles of the spins of interacting virtual photons before the action of the spin supercurrent; $a_1^{'}$ and $a_2^{'}$ are the values of precession angles after the action of the spin supercurrent; $\beta_1$ and $\beta_2$ are the values of deflection angles of the spins of the interacting virtual photons before the action of the spin supercurrent; $\beta_1^{'}$ and $\beta_2^{'}$ are the values of deflection angles after the action of the spin supercurrent. The precession frequencies, $\boldsymbol{\omega}_1$ and $\boldsymbol{\omega}_2$, of virtual photons are oriented along axis z,

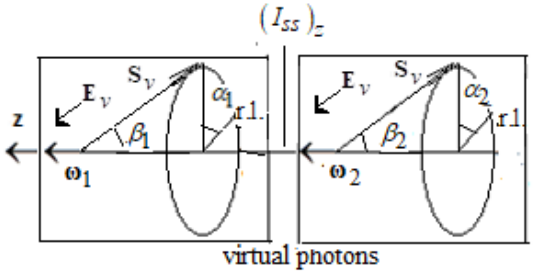


**Figure 1**. The characteristics of. $(I_{ss})_z$ is spin supercurrent between virtual photons with the following characteristics: $\alpha_1$ and $\alpha_2$ are precession angles, $\beta_1$ and $\beta_2$ are deflection angles, $\boldsymbol{\omega}_1$ and $\boldsymbol{\omega}_2$ are precession frequencies oriented along axis z, $\mathbf{S}_v$ is spin, $\mathbf{E}_v$ is electric component of virtual photon, r.l. is a reference line

3) As a result of action of the spin supercurrent, a change in the frequencies of precession of spins of interacting virtual photons may take place. Let us prove it by the example of two virtual photons, see Figure 1. Assume that before the action of spin supercurrent the precession angles $\alpha_1$ and $\alpha_2$ of spins of these virtual photons are associated with the respective precession frequencies $\boldsymbol{\omega}_1$ and $\boldsymbol{\omega}_2$ ($\boldsymbol{\omega}_1$ and $\boldsymbol{\omega}_2$ are independent of time *t*) as:

$$\alpha_1 = \omega_1 t + (\alpha_1)_0, \tag{9}$$

$$\alpha_2 = \omega_2 t + (\alpha_2)_0, \tag{10}$$

where $(\alpha_1)_0$ and $(\alpha_2)_0$ are the values respectively of $\alpha_1$ and $\alpha_2$ at *t*=0. The Eqs (9)-(10) may be transformed as: $\alpha_1 - \alpha_2 = (\omega_1 - \omega_2)t + \left((\alpha_1)_0 - (\alpha_2)_0\right)$; then it follows from Condition (7):

$$\left|\omega_1 - \omega_2\right| \geq \left|\omega_1^{'} - \omega_2^{'}\right|, \tag{11}$$

where $\omega_1^{'}$ and $\omega_2^{'}$ are precession frequencies of spins of interacting virtual photons after the action of spin supercurrent.

4) Spin supercurrent is not an electric or magnetic process and consequently it is not shielded by electromagnetic screens.

5) The effectivity of action of the spin supercurrent may decrease at an increase in the number of interacting virtual photons. Let us assume, for example, that one virtual photon with precession's frequency $\boldsymbol{\omega}_{ex}$ interacts with a great number ($w$) of virtual photons, the precession frequencies of their spins being aligned with $\boldsymbol{\omega}_{ex}$. Then the total spin supercurrent $I_{sum}$ is determined to be $I_{sum} = \sum_{i-1}^{w} I_i$, where $I_i$ is the spin supercurrent between the virtual photons with frequency $\boldsymbol{\omega}_{ex}$, on the one hand, and an arbitrary *i*-th virtual photon $(i = 1,...,w)$, on the other. Using Eq. (1) and introducing factor *K* to replace partial derivation in Eq. (1) by gradients in linear approximation, we obtain:

$$I_{sum} = -K\sum_{i=1}^{w}\left(g_1\Delta\alpha_i + g_2\Delta\beta_i\right),$$

where $\Delta\alpha_i$ and $\Delta\beta_i$ are the difference in the precession angles and the difference in deflection angles of arbitrary i-th virtual photon and virtual photon with precession frequency $\boldsymbol{\omega}_{ex}$. If all the values and signs of $\Delta\alpha_i$ and $\Delta\beta_i$ are respectively equiprobable and $w \to \infty$, then

$$I_{sum} \to 0. \tag{12}$$

6) The effectivity of the action of the spin supercurrent between the spin structures is not significantly depend on distance between them. For example, the region of the action of spin supercurrent in superfluid $^3$He-B is only limited by the volume of the superfluid space.

## 3. The Transformation of "Primary" Light into "Secondary" Light in Experiments with Plants

Let us consider the experiments conducted in 1931 by Hieronymus [10,11], demonstrating the possibility of growing plants (grain) without sunlight in the dark (see Figure 2).

Hieronymus placed the test-plant in a wooden lightproof box containing two aluminum foil's plates inside. The first plate called "radiating" was placed above the plant; the second earthing plate was placed under the plant. Besides, one metallic plate called "accumulating" plate was placed above the wooden box and was connected with the radiating plate (inside the box) by a metallic insulated copper wire ("waveguide"). The control plants were used in these experiments as well: one control plant was outside the box, the other control plant was in the box without the radiating plate.

After opening the box, it appeared that the plant which was in the box with the radiating plate was properly developed, produced chlorophyll and was of green color like the control plant outside the box. The control plant placed in the box without the radiating plate, but with the accumulating plate, was “thin”, “pale” and “without formation of green color”. Thus, it can be said that the plants placed in the light-proof box could “see” the light (we will refer to the radiation emitted by the radiating plate as “secondary” light). Thus, in the experiments by Hieronymus the transformation of external “primary” light into internal “secondary” light took place.

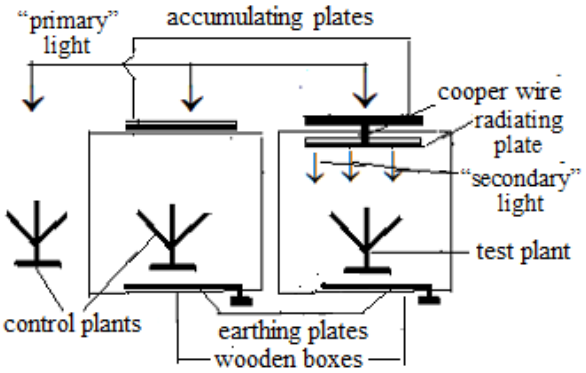


**Figure 2**. The diagram of the experimental setup in the experiment by Hieronymus

At present, there is no physical explanation (no physical process was proposed) or biological explanation of results of Hieronymus’s experiments. According to contemporary biology, only some bacteria, water plants or moss are capable to produce chlorophyll in the dark.

In this work it is shown that the transformation of “primary” light into “secondary” light may be accomplished by spin supercurrent and it has three stages.

*The first stage*.

The photons of external “primary” light interact with quantum objects of the accumulating plate. It is essential that this plate is metallic, because metal has free electrons creating virtual photons with nonzero total spin, which in the second stage interacts with virtual photons created by electrons of the radiating plate.

As a result of the interaction of a photon with an electron of the accumulating plate, the energy of the electron increases by $\hbar\omega_{ph}$, where $\omega_{ph}$ is photon’s frequency. According to Eqs (5) and (6), the frequency of precession $\omega_a$ of a virtual photon created by an electron is determined by the expression:

$$\omega_a = \left(kT + \hbar\omega_{ph}\right)/\hbar, \tag{13}$$

where $kT$ is the energy of thermal motion of electron, $k$ is the Boltzmann constant, $T$ is the Kelvin temperature. At “room" temperature $T \approx (273+20)$ K (which is responsible for circular frequency $kT/\hbar \approx 4\cdot 10^{13}$ Hz) and in the range of visual spectrum (circular frequencies $\omega_{ph} = (2.5 \div 5.0)\cdot 10^{15}$ Hz) one can accept that in all visual spectrum, according to Eq. (13):

$$\omega_a \approx \omega_{ph}, \tag{14}$$

*The second stage.*

According to Eq. (1), spin supercurrent should emerge between spins of virtual photons created by quantum objects of the accumulating plate, on the one hand, and those of the radiating plate, on the other hand. As a result of the action of spin supercurrent, according to Eqs (8), (11) and (14), we obtain the following:

$$\left|\beta_a - \beta_r\right| \geq \left|\beta_a^{'} - \beta_r^{'}\right|, \tag{15}$$

$$\left|\omega_{ph} - \omega_r\right| \geq \left|\omega_{ph} - \omega_r^{'}\right|, \tag{16}$$

where $\beta_a$ and $\beta_a^{'}$ are the values of the angle of deflection of a virtual photon created by a quantum object of the accumulating plate respectively before and after the action of spin supercurrent; $\omega_r$ and $\beta_r$ are respectively the frequency and angle of deflection of a virtual photon created by a quantum object of the radiating plate before the action of spin supercurrent; $\omega_r^{'}$ and $\beta_r^{'}$ are respectively the frequency and angle of deflection of a virtual photon created by a quantum object of the radiating plate after the action of spin supercurrent.

*The third stage.*

As a result of the action of spin supercurrent, according to Eqs (15)-(16), spin’s characteristics of a virtual photon created by a quantum object of the radiating plate change: the angle of deflection changes as $\beta_r^{'} - \beta_r$, the frequency of precession changes as $\omega_r^{'} - \omega_r$. As a result of a change in the characteristics of a virtual photon created by a quantum object of the radiating plate the following inequality holds (see Figure 1):

$$\partial \mathbf{S}_v / \partial t \neq 0. \tag{17}$$

Then, according to Eq. (2), $\partial \mathbf{E}_v / \partial t \neq 0$ holds, and consequently the electromagnetic oscillations with frequency $\omega_r^{'}$ may emerge [21]. According to Eq. (16), $\omega_r^{'}$ can be written in the form:

$$\omega_r^{'} = \omega_{ph} \pm \left|\Delta\omega\right|, \tag{18}$$

where:

$$\left|\Delta\omega\right| \leq \left|\omega_{ph} - \omega_r\right|. \tag{19}$$

In the experiments conducted by Hieronymus, the following phenomena were observed.

1) The optimal relation between the sizes of the accumulating and radiating plates is the following:

$$V_r / k_1 \leq V_a \leq k_2 V_r, \tag{20}$$

where $V_r$ is the volume of the radiating plate, $V_a$ is the volume of the accumulating plate, $k_1 = k_2 = 2$. If $k_1 > 2$ the plant may be underdeveloped; if $k_2 > 2$ the plant may be burned.

It may show that Condition (20) essentially is condition of optimal value of spin supercurrent emerging between the virtual photons of the accumulating plate, on the one hand, and the virtual photons of the radiating plate, on the

other. With this aim, let us introduce the values $n$ of a specific number of free electrons (and, consequently, virtual photons created by them) of the accumulating plate and of the radiating plate; then Condition (20) may be rewritten in the form:

$$nV_r / k_1 - nV_r \le nV_a - nV_r \le nk_2V_r - nV_r . \qquad (21)$$

The difference between the number of the virtual photons of the accumulating plate and of the radiating plate ( $nV_a - nV_r$ ) influences the difference between spin's characteristics of these virtual photons and, consequently, according to Eq. (1), the value of spin supercurrent emerging between the plates. Thus, an increase in $k_1$ $(k_1 > 2)$ means a decrease in the minimal admissible value of spin supercurrent and, possibly, a change in its sign; an increase in $k_2$ ( $k_2 > 2$ ) means an increase in the maximal value of spin supercurrent. In the first case, the plant may be underdeveloped, in the second case the plant may be burned.

2) The energy passed in a copper wire between the accumulating and radiating plates is not electric, though it has common properties with electricity and with light.

This property is in accordance with the properties of spin supercurrent. On the one hand, according to Eq. (1) spin supercurrent is not of electric and magnetic origin and is determined only by the characteristics of spins of interacting objects; on the other hand, according to Eqs (2) and (17) spin supercurrent has common properties with electricity. In the third stage of the alternative vision the energy connected with spin supercurrent may be transformed into the energy of an emerging electromagnetic radiation (into the energy of "secondary" light).

3) The magnetic field may influence the energy passed between the accumulating and radiating plates.

This property is in accordance with the properties of spin supercurrent: according to Eq. (1), the value of the current is determined by the characteristics of spins of virtual photons created by quantum objects of the interacting plates. The magnetic field, acting on spin magnetic moments of quantum objects constituting interacting plates, acts on spins of the objects as well and, consequently, according to Eqs (3)-(4), on spins of virtual photons created by the quantum objects. Thus, magnetic field may influence the spin supercurrent emerging between the interacting plates.

4) Independence of the "law of the distance square".

This property is in accordance with property 6 of spin supercurrent: the effectivity of the action of the current is not significantly depend on distance between the interacting objects.

Thus, the phenomena accompanying the experiments and demonstrating the possibility of growing plants without sunlight in the dark, are explained by the properties of spin supercurrent.

## 4. The Transformation of "Primary" Light into "Secondary" in a Biological System in "Alternative" Vision

The alternative vision of human subject (taking place without projection of the image to the eyes' retina) may be performed according to the same mechanism as the emergence of light in a light-tight wooden box in the experiments by Hieronymus (see Figure 2). That is, it may be due to the transformation of the outer "primary" light into the inner "secondary" light as a result of the action of spin supercurrent. In this case, the role of virtual photons created by quantum objects of the accumulating plate is fulfilled by virtual photons created by quantum objects of human's skin. The role of virtual photons created by quantum objects of the radiating plate is fulfilled by virtual photons created by quantum objects of human's organism.

Let us analyze the experimentally observed properties of alternative vision.

1) Under the twilight emission, the senses perception decreases; in the dark it can be altogether lost [4].

This is in accordance with the proposed model: the light taken by the test subject emerges as a result of the transformation of external "primary" light.

2) If a multilayer aluminum foil is used as a screen between the "primary" light and the test subject, the alternative vision may disappear [22].

This property is in accordance with property 5 of spin supercurrent. The multilayer aluminum foil (as a metal) consists of a great number of free electrons which create respectively a great number of virtual photons. Two situations are possible in this case: (1) according to Eq. (12), the total spin supercurrent in this case is negligible; (2) spin supercurrent will mainly emerge between virtual photons created by a free electron of the accumulating plate, on the one hand, and the virtual photon created by quantum objects of the multilayer aluminum foil, on the other; not between the virtual photon created by a free electron of the accumulating plate, on the one hand, and the virtual photon created by a free electron of the radiating plate, on the other. In both cases the transformation of "primary" light into "secondary" is missing.

3) The light's colors registered by alternative vision are usually analogous to the outer light's colors. At the same time, there are cases when the person with alternative vision sees objects that radiate infrared or ultraviolet light and these cannot be seen by "ordinary" vision.

The light's colors registered by the alternative vision are determined by Eqs (18)-(19). It follows from Eq. (18) that if registered frequency $\omega_r^{'} = \omega_{ph} + \Delta\omega$ is in the range of visual spectrum, then the test subject may perceive external light the frequency $\omega_{ph}$ of which is not in the range of visual spectrum. If $\Delta\omega > 0$ , then $\omega_{ph}$ may be a frequency of infra-red light, if $\Delta\omega < 0$ , then $\omega_{ph}$ may be a frequency of ultraviolet. If the alternative vision may function simultaneously with ordinary vision, the human subjects would see objects simultaneously in the range of visual spectrum and in infra-red or ultraviolet spectrum. For example, known Polish-American biochemist K. Palczewski working at the University of California Irvine wrote that he could see in infra-red light [23]. Russian mathematician A. Vdovin carrying out training according to methodology analogous to Bronnikov's methodology [5] could see the radiation of human organism [16].

4) A spontaneous capacity of a human for alternative vision is a very rare phenomenon. All men and women taking part in the experiments conducted by Bekhtereva [6] acquired alternative vision only after special training.

According to the discussed model of alternative vision, the effectivity of transformation of "primary" light into "secondary" with the use of spin supercurrent is determined by Eqs (17)-(19); that is, it is directly proportional to the value $\partial \mathbf{S} / \partial t$ and inversely proportional to the value $\Delta\omega$. Both values depend on the characteristics of virtual photons created by quantum objects of human organism where this transformation takes place.

One of the methods to increase the effectivity of the transformation is to increase the total spin of virtual photons created by quantum objects of human organism. The latter may be achieved in two ways: (1) by using external factors; (2) by using internal possibilities of human organism.

External factors may include the use of magnetic field or/and rotation of a test subject. Magnetic field fulfills magnetization, that is, spin polarization of quantum objects and, consequently, according to Eqs (3)-(4), spin polarization of virtual photons created by the objects. The rotation of human organism, due to the Barnett's effect [18], also leads to the uniform orientation of spins of quantum objects of the organism.

There is no doubt that the well-known successful training by Bronnikov [5,6] is aimed at making the test subjects enable their organisms to accomplish the following: (1) to perform the uniform orientation of spins (spin polarization) of virtual photons created by quantum objects of their organisms, that is, to increase the value $\partial \mathbf{S}_v / \partial t$; (2) to change in the values of precession frequencies of spins of their virtual photons to reduce the difference between the frequencies of "primary" and "secondary" light, that is, to decrease the value $\Delta\omega$ in Eqs (18)-(19).

## 5. Discussion

It is worthwhile to discuss the principles of construction of a device helping to acquire "alternative" vision. This device may be analogous to the experimental setup of Hieronymus. The role of the accumulating plate may be fulfilled by test subject's skin; the metallic radiating plate and wire connecting the accumulating and radiating plates may be fulfilled, for example, by means of Fe nanoparticles and be delivered (as targeted drug delivery) to the organs of visual cortex inside the human's brain. It is known that the use of nanoparticles is a method for transporting drug molecules across the blood-brain barrier (BBB) to the brain [24]. According to Maher [25], the magnetite particles which are $\leq 200$ nm in diameter can enter the brain directly via the olfactory bulb. Their presence in the brain, experimentally detected, proves that the externally sourced iron-bearing nanoparticles can be transported directly into the brain.

It should not be excluded that the effectivity of the of alternative vision. may be higher if a metallic plate is attached to the test subject's skin as an additional accumulating plate. (That is, wearing metallic bracelets may increase the effectivity of alternative vision.)

## 6. Conclusions

The alternative vision, performed without projection of the image to the eyes' retina, exists due to the transformation of energy of external "primary" light into the energy associated with spin supercurrent emerging in human organism; then the latter is transformed into the energy of "secondary" light detected by the brain's visual cortex, without projection of the image to the eyes' retina of a human subject.

## Declaration

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## Statement of Competing Interests

The authors have no competing interests.

## References

[1] Ackland, P.; Resnikoff, S. and Bourne, R. "World blindness and visual impairment: despite many successes, the problem is growing". *Community Eye Health Journal*, 30(100). 71-73. 2017.

[2] Boyle, R. *Experiments and Considerations Touching Colors, with Observations on a Diamond that Shines in the Dark.* 1664.

[3] Duplessis, Y. "Dermo-optical sensitivity and perception: its influence on human behavior". *Biosocial Research*, **7**, 76-93. 1985.

[4] Bongard, M.M. and Smirnov, M.S. "About 'skin vision' of R. Kyleshova". *Biophysica*, X(1). 148-154. 1965 (in Russian).

[5] Bronnikov, B.M. *Know yourself*. Moscow, Culture 144K, 46 p. 1998 (in Russian).

[6] Bekhtereva, N.P.; Lozhnikova, L.Yu.; Dan'ko, S.G.; Melyucheva, L.A.; Medvedev, S.V. et al. "On the So-Called Alternative Vision or Direct Vision Phenomenon". *Human Physiology*, 28(1). 16-26. 2002.

[7] Borovic-Romanov, A.S.; Bunkov, Yu.M.; Dmitriev, V.V.; Mukharskii, Yu.M. and Sergatskov, D.A. "Investigation of Spin Supercurrents in $^3$He-*B*". *Phys. Rev. Lett.*, 62(14). 1631-1634. 1989.

[8] Bunkov, Yu. M. "Spin Superfluidity and Coherent Spin Precession". *Journal of Physics: Condensed Matter*, 21(16). 164201 (6pp). 2009.

[9] Dmitriev, V.V. and Fomin, I.A. "Homogeneously precessing domain in $^3$He-B: formation and properties". *Journal of Physics: Condensed Matter*, 21(16). 164202 (9 pp). 2009.

[10] Hieronymus, T.G. *Detection Emanations From Materials and Measurement of the Volumes thereof.* Patent US 2482773. (Sept. 27 1949).

[11] Hieronymus, T.G. "Growing plants without sunlight". *Journal of Borderland Research*, 44(03). 1988.

[12] Maxwell, J.C. "On Physical Lines of Force. Part II: The Theory of Molecular Vortices Applied to Electric Currents." *Philosophical Magazine*, 21 & 23, Series 4. 1861.

[13] Vuorio, M. "Relaxation by magnetic counterflow in superfluid $^3$He". *J. Phys. C: Solid State Phys*., 9(11). 267-270. 1976.

[14] Klyshko, D. "Quantum optics: quantum, classical, and metaphysical aspect". *Phys-Uspekhi*, 37. 1097–1122. 1994.

[15] Boldyreva, L.B. *A theory of spin vortices in a physical vacuum consisting of quantum oscillators.* Cambridge Scholars Publishing. https://www.cambridgescholars.com/product/978-1-5275-6455-8. 2021.

[16] Boldyreva, L.B. “Quantum correlation – Spin supercurrents”. *International Journal of Quantum Information*, 12(1). 1450007 (13 pp). 2014.

[17] Feynman, R. “Space-time approach to quantum electrodynamics”. *Phys. Rev.*, 76. 769-789. 1949.

[18] Weber, M. and Kelvin, L. “Three Photon Annihilations of Positrons and Positronium in Solids with Two Detectors in Coincidence”. *Radiat. Phys. Chem.*, 58(5-6). 749-75. 2000.

[19] Wichmann, E. *Quantum Physics. Berkeley physics course*, v. IV, 415p, New York: McGraw-Hill Book company. 1971.

[20] Barnett, S.J. “Gyromagnetic and Electron-Inertia Effects”. *Rev Mod Phys*, 7**(**135). 129-166. 1935.

[21] Purcell, E.M. *Electricity and Magnetism, Berkeley physics course*, McGraw-Hill Book company, Volume *2*, 1965.

[22] Medvedev, S.V. et al. “On the So-Called Alternative Vision”. *Vestnik of the Russian Academy of Sciences*, 75(6). 558-559. 2005.

[23] Polans, A. “Introducing Krzysztof Palczewski. Recipient of the Friedenwald Award”. *Investigative Ophthalmology & Visual Science*, 55(10). 6649-50. 2014.

[24] Kreuter, J. Nanoparticulate systems for brain delivery of drugs. Advanced Drug Delivery Reviews, 47(1). 65-81. 2001.

[25] Maher, A.B.; Ahmed, I.A.M.; Karloukovski, V.; MacLaren, D.A.; Foulds, P.G. et al. “Magnetite pollution nanoparticles in the human brain”. *Proceedings of the National Academy of Sciences*, 113(39). 2016.