

WHY AND HOW DO ELECTRONS, NUCLEONS ETC. ALL THE PARTICLES POSSESS PERSISTENT SPIN MOTION

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As we know, in nature, nothing occurs unnecessarily, e.g., our hearts beat persistently without having any source of infinite energy, not unnecessarily; there is an important purpose as to why they beat persistently, and they have special structure, unlike simple balloons of blood, that keeps them beating persistently and provides all the properties our hearts possess. And therefore, as electrons, nucleons etc. all the particles possess persistent spin motion without having any source of infinite energy and several properties; there should positively be some important purpose as to why they possess persistent spin motion, and they should have special structure, unlike simple balloons of charge, that keeps them spinning persistently and provides all the properties they possess. Further, as we know, all the phenomena/activities related with our hearts, e.g., continuous blood circulation etc. taking place in our bodies are the effects of the purpose behind persistent beating of our hearts and their special structure, similarly, all the phenomena/activities related with electrons, nucleons etc. taking place should be the effects of the purpose behind their persistent spin motion and their special structure. Presently, that purpose, their special structure and how their special structure keeps them persistently spinning etc. all have been determined and their importance have also been described. Their accounts enable to give very clear and complete explanation of all the phenomena related with electrons, nucleons etc., structures and properties of their systems etc.

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1. INTRODUCTION

As we know, electrons, nucleons etc. all the particles possess persistent spin motion without having any source of infinite energy and several properties; there should positively be some purpose as to why they possess persistent spin motion, and they should have special structure, unlike simple balloons of charge, that keeps them spinning persistently and provides all the properties they possess. Because, as we know, in nature, nothing occurs unnecessarily, e.g., our hearts beat persistently without having any source of infinite energy, not unnecessarily; there is an important purpose as to why they beat persistently, and they have special structure, unlike simple balloons of blood that keeps them beating persistently and provides all the properties our hearts possess. But currently no knowledge is available about the purpose as to why electrons, nucleons etc. possess persistent spin motion.

Further, as we know, all the phenomena/activities related with our hearts, e.g., continuous blood circulation etc. taking place in our bodies are the effects of the purpose behind persistent beating of our hearts and their special structure, similarly, all the phenomena/activities related with electrons, nucleons etc. taking place should be the effects of the purpose behind their persistent spin motion and their special structure.

And therefore, presently, the purpose as to why electrons, nucleons etc. possess persistent spin motion (see Sec. 2), their special structures and the special characteristic in their special structure that keeps them spinning persistently (see Sec.3.1), how that special characteristic keeps them persistently spinning (see Sec. 3.2) etc. all have been determined. Finally, the importance of: 1- that purpose (see Sects. 4.1 and 5); 2- their special structures (Sec. 4.2); and 3- the special characteristic (Sec. 4.3) have also been described.

2. DETERMINATION OF PURPOSE AS TO WHY ELECTRONS, NUCLEONS ETC. POSSESS PERSISTENT SPIN MOTION

The spin motion of electrons, nucleons etc. all the spinning particles generate the following two properties in them:

2.1 First property

The spin motion of spinning particle generates the tendency of linear motion in it along the direction of its spin angular momentum L_s (for verification of its truth, see Sec. I B, Ref. 1). And as electron, nucleon etc. all the particles possess spin motion, a tendency of linear motion is generated in them along the directions of their respective L_s .

If the frequency of spin motion of such a particle is increased by some means, a stage comes when the particle starts moving itself along the direction of its L_s . Then after, as the frequency of spin motion of particle increases, the velocity of particle goes on increasing in accordance to expression¹

$$v^2 = h\omega / m \dots\dots\dots (1)$$

where m , v and ω respectively are the mass, linear velocity and frequency of spin motion of the particle, and h is Planck's constant [for verification of the truth of expression (1), see Sec. I A, Ref. 1].

Electrons, nucleons etc. all the particles probably possess such amount of frequency of spin motion that keeps them always moving with some linear velocity (v). And consequently, they are found always in moving state, not in position of rest, and their

motions are always oriented along the directions of their respective L_S . Their linear velocity (v) varies as the frequency of their spin motion (ω) varies, according to expression (1).

2.2 Second property

As a particle, due to its linear motion, obtains kinetic energy (E_K), and due its kinetic energy (E_K), obtains its linear momentum (p_{LIN}), similarly, due to its spin motion, it obtains spin energy ($E_S = h\omega/2$, for detail, see Sec. II, Ref. 1), and due to its spin energy, it obtains spin momentum ($p_S = h\omega/v$, see Sec. II, Ref. 1). [For verification of the truth that the particle obtains p_S due to its spin motion, see Sec. I C, Ref. 1.]

And therefore, electrons, nucleons etc. all the particles possess motional energy (E_M) $= E_K + E_S$ and motional momentum (p_M) $= p_{LIN} + p_S$. And whenever arises the situation of conservation of energy and momentum etc. of electrons, nucleons etc. during their motion, their E_M , p_M and L_S actually conserve, not their E_K and p_{LIN} . [For verification of the truth of conservation of p_M , see Sec. I D, Ref. 1. And for how E_M , p_M and L_S conserve, see Sec. 3.1.1.] Due to conservation of E_M , p_M and L_S of electrons, nucleons etc., no violation of the laws of conservation of their energy and momentum etc. happens to be possible, even, e.g.:

1. During motion of electron accelerated by a large voltage, after attaining relativistic velocity by it as the rate of increase in its velocity starts decreasing, which causes decrease in its E_K and p_{LIN} , there is created such situation that the rate of increase in its frequency of spin motion starts increasing. That causes increase in its E_S and p_S . The increase in E_S and p_S of electron compensates the decrease in its E_K and p_{LIN} and thus E_M and p_M of electron are

conserved. The rate of increase in frequency of spin motion of electron takes place in such a manner (see Sec. 3.1.1) that there occurs no violation in the law of conservation of its L_S .

Currently, it is believed that after attaining relativistic velocity by the electron when the rate of increase in its velocity starts decreasing, its moving mass (m_{mov}) starts increasing in order to conserve its E_K and p_{LIN} . But it cannot be true (for reasons as to why, see Sec. 5.4.2, Ref. 2). The expression for moving mass $m_{mov} = m_e / \sqrt{(1 - v^2 / c^2)}$ (where m_e is the rest mass of electron and c is velocity of light) of electron is correct but m_{mov} is not the moving mass of electron. It (m_{mov}) is actually the effective mass (m_{eff}) of electron. And the relativistic kinetic energy $E_K = [m_e c^2 / \sqrt{(1 - v^2 / c^2)}] - m_e c^2$ and the relativistic linear momentum $p_{LIN} = m_e v / \sqrt{(1 - v^2 / c^2)}$ of electron are actually its $E_M (= m_{eff} v^2 / 2)$ and $p_M (= m_{eff} v)$ respectively obtained as the consequence of superposition of the effects of E_S and p_S of electron on its $E_K (= m v^2 / 2)$ and $p_{LIN} (= m v)$ respectively [how these are obtained, see starting from the last but one paragraph (column-1, page-69) to second paragraph (column-2, page-70), i.e., up to the end of Sec. IV C, Ref. 1].

2. During motion of electron along its elliptical orbit, since the velocity of electron varies, E_K and p_{LIN} of electron also vary accordingly. Then ω of electrons varies such that the variations caused in its E_S and p_S due to variation in its ω may balance the loss/gain occurred in its E_K and p_{LIN} due to variation in its velocity. And thus E_M and p_M of electron remain conserved throughout its orbital motion. The spin angular momentum of electron also remains conserved (how, see Sec. 3.1.1).

NOTE: During motion of electrons along their elliptical orbits or during their motion after attaining relativistic velocity by them, the variation between their velocity (v) and frequency of spin motion (ω) does not take place according to expression (1), but takes place according to expression:

$$v^2 = h\omega / m_{eff} = h\omega / m_{mov} \dots\dots\dots (2)$$

3. DETERMINATION OF THE SPECIAL STRUCTURE OF ELECTRON, NUCLEON ETC. AND THE SPECIAL CHARACTERISTIC IN THEIR SPECIAL STRUCTURES THAT KEEPS THEM SPINNING PERSISTENTLY

3.1 Determination of the special structure of electron, proton and neutron and the special characteristic in their special structures

3.1.1 Determination of the special structure of electron and the special characteristic in that's special structure

The current concept about the structure of electron that it is like a ball of charge ($-e$), and the magnetic field, spin magnetic moment (μ_s) etc. properties it possesses are obtained due to spin motion of its ball of charge is not true (for verification of its truth, see Sec. 1, Ref. 3).

The electron has special structure, unlike simple ball of charge ($-e$). It possesses a bundle of magnetism too by the virtue of nature as it possesses a bundle of charge ($-e$) by the virtue of nature. And the magnetic field the electron possesses occurs due to this magnetism. The magnetism the electron possesses occurs in the form of a circular ring, shown by a dark solid line circle around the charge of electron, Fig. 1(a), where charge has been shown by a spherical ball, as for example, there occurs a ring around the planet Saturn.

Around the ball of charge of electron, there occurs its electric field (which has not been shown in figure), and around the ring of magnetism of electron, there occurs its magnetic field shown by broken line circles, Fig. 1(a). The ring of magnetism and the ball of charge of electron both spin with frequencies ω_{EM} and ω_{EC} respectively, but in directions opposite to each other, shown by arrows in opposite directions, Fig. 1(b), where the ball of charge has been shown by quite a thick dark line circle and the ring of magnetism by comparatively a thinner dark line circle.

The spin motion of the ring of magnetism and the ball of charge of electron in directions opposite to each other is the special characteristic of the special structure of electron, because when they spin in directions opposite to each other, there is created such situation (see Sec. 3.2) and their fields interact (electromagnetic interaction) with each other such that their spin motion persists.

When the ring of magnetism and the ball of charge of electron spin with frequencies ω_{EM} and ω_{EC} respectively, due to their spin motion, the linear velocities v_{EM} and v_{ES} respectively are generated in them according to expression (1) along the directions of their respective spin angular momentum L_{SM} and L_{SC} . And consequently, the electron obtains linear velocity $v_E (= v_{ES} - v_{EM} \text{ or } = v_{EM} - v_{ES})$ along the direction of its spin angular momentum L_S which (L_S) is generated in electron due to the frequency of its spin motion ω_E , where ω_E is corresponding to v_E of the electron obtained according to expression (1). During motion of electron along its elliptical orbits or after attaining relativistic velocity by it, the frequency of spin motion ω_E of the electron corresponding to its linear velocity $v_E (= v_{ES} - v_{EM})$ is obtained according to expression (2).

During motion of electron along its elliptical orbits or after attaining relativistic velocity by it when its v varies, i.e. decreases/increases, in order to conserve its E_M , p_M and L_S , it contracts/expands. Because, then its radius (r) decreases/increases which causes decrease/increase in its moment of inertia $I (= m_e r^2)$. The decrease/increases in I of electron causes decrease/increase in $L_S (= I d\theta/dt$, where $d\theta/dt$ is the angular velocity of its spin motion) of electron. Therefore, in order to conserve L_S of electron, $d\theta/dt$ of electron increases/decreases which causes increase/decrease in ω of electron according to expression (2). The increase/decrease in ω of electron causes increase/decrease in E_S and p_S of electron which conserve respectively E_M and p_M of electron by compensating the decrease/increase in its E_K and p_{LIN} caused due to variation (decrease/increase) in its v . [The concept of expansion/contraction of electron is though hard to believe but it cannot be ruled out because as proton shrinks in size⁴, electron can also shrink. Secondly, as we know, photons which are bundles (quanta) of radiation energy and behave like particles (for detail, see Sec. 3, Ref. 2), are emitted from the orbiting electrons; it can be possible only if in electrons, during their excitation, the radiation energy is filled and due to that, they expand. And after their excitation, they suddenly contract (shrink) and the radiation energy filled in them during their excitation, is emitted from them collectively at a time in the form of photons (for detail, see Sec. III B, Ref. 1). How many times an orbiting electron expands and contracts during its complete orbital motion along its elliptical orbit, same number of photons of different frequencies and intensities are emitted from that electron. These photons give the number of fine lines in the fine structure of spectral lines, their frequencies and intensities accordingly as the number, frequencies and intensities of the photons are (for detail, see Sec. III, Ref. 1).]

When ω_{EC} and ω_{EM} of electron are happened to be such that the generated v_{EC} in the ball of charge due to its spin motion along the direction of its L_{SC} is greater than the generated v_{EM} in the ring of magnetism due to its spin motion along the direction of its L_{SM} , i.e. $v_{EC} > v_{EM}$, the electron obtains v_E along the direction of L_{SC} , i.e. L_S of electron lies along the direction of L_{SC} . When ω_{EC} and ω_{EM} of electron are happened to be such that the generated v_{EC} in the ball of charge due to its spin motion along the direction of its L_{SC} is lesser than the generated v_{EM} in the ring of magnetism due to its spin motion along the direction of its L_{SM} , i.e. $v_{EC} < v_{EM}$, the electron obtains v_E along the direction of L_{SM} , i.e. L_S of electron lies along the direction of L_{SM} . The former condition (i.e. the electron possesses its v_E along the direction of L_{SC}) normally occurs. The later condition (i.e. the electron possesses its v_E along the direction of L_{SM}) occurs very rarely and under special circumstances (see Sec. 2, Ref. 5).

The spin magnetic moment (μ_s) the electron possesses, is generated due to the spin motion of its ring of magnetism and occurs along the direction of L_{SM} . As normally v_E occurs along the direction of L_{SC} , and L_{SC} occurs in direction opposite to the direction of L_{SM} , v_E occurs in direction opposite to the direction of μ_s .

3.1.2 Determination of the special structure of protons and the special characteristic in their special structure

Since the proton possesses the same amount of charge (+e) as the electron possesses (-e) but it is about 2×10^3 times more massive than electron, it means, proton possesses something more, probably some material along with its charge (+e). Its charge and material

probably exit together in the form of a ball as the charge of electron exists in the form of a ball. (For convenience, we shall express the ball of charge and material as the ball of charge.)

Proton possesses all the properties similarly as the electron possesses. And hence the ball of charge and the ring of magnetism of proton too spin with frequencies ω_{PM} and ω_{PC} respectively in directions opposite to each other, and it is the special characteristic of the special structure of proton that keeps proton spinning persistently.

Proton possesses frequency of spin motion ω_p and linear velocity v_p along the direction of its spin angular momentum (L_s) in the same manner as the electron possesses ω_e and v_e along the direction of its spin angular momentum L_s . And μ_s the proton possesses, is generated due to the spin motion of its ring of magnetism and occurs along the direction of spin angular momentum of its ring of magnetism (L_{SM}).

The occurrence of linear velocity of proton (v_p) along the direction of L_{SM} does not happen to be possible because of large mass of its ball of charge (about 2×10^3 times) as compared to that of the ball of charge of electron.

3.1.3 Determination of the special structure of neutrons and the special characteristic in their special structure

See Sec. 2, Ref. 5.

3.2 How the special characteristic in the special structures of electrons, protons and neutrons keeps them spinning persistently

As electron (and similarly proton) spins persistently without having any source of infinite energy, and its charge and magnetism remain intact as such and are not being utilized

in the spinning of electron (and similarly of proton), it can be possible only if the ball of charge and the ring of magnetism of electron (and similarly of proton) both spin in directions opposite to each other. Because, then the direction of spin magnetic moment of the ring of magnetism (occurring along the direction of spin angular momentum of the ring of magnetism) and the direction of spin electric moment of the ball of charge (occurring along the direction of spin angular momentum of the ball of charge) of electron (and similarly of proton) occur in directions opposite to each other, and in this situation, the interaction between their fields takes place such that, during their spin motion, no energy- neither electric (i.e. charge) nor magnetic (i.e. magnetism) of the electron decays. For example, as we know, when two bar magnets are placed parallel to each other with their opposite poles one upon the other, i.e. when their magnetic moments lie in directions opposite to each other, the interaction between their fields takes place such that the magnetism of both the bar magnets remains intact as such and that does not decay. If the bar magnets are placed in any otherwise manner, their magnetism does not remain intact but starts decaying and vanishes after some time. [Over the concept of electric moment of electron (and similarly of proton) people may express doubt, because there is no evidence of its occurrence. But this concept cannot be ruled out.]

Regarding how the special characteristic in the special structure of neutrons keeps them spinning persistently, see Sec. 2.1, Ref. 5.

4. IMPORTANCE OF THE DETERMINED PURPOSE, SPECIAL STRUCTURES AND SPECIAL CHARACTERISTIC IN THE SPECIAL STRUCTURES OF ELECTRONS, PROTONS ETC. THAT KEEPS THEM SPINNING PERSISTENTLY

4.1 Importance of the determined purpose

The account of the determined purpose as to why electrons, nucleons etc. possess spin motion enables to give very clear and complete explanation of all the phenomena related with them, for example: 1. Phenomena of interference and diffraction of photons and electrons (see Sec. 5.1, Ref. 2); 2 Phenomena of spectroscopy (see Sec. 5.2, Ref. 2); 3. Phenomenon of transmittance $T = \text{finite}$ for particles possessing energy $E < V_0$, where V_0 is energy of the potential barrier (see Sec. 5.3, Ref. 2); 4. Decrease in the rate of increase in velocity of accelerated electron after attaining relativistic velocity by that (see Sec. 5.4, Ref. 2).

4.2 Importance of the determined special structures

The account of the determined structures of electrons, protons and neutrons together with the account of the determined purposes as to why they possess persistent spin motion enable to: 1. Determine a new force with characteristics of nuclear force and both attractive and repulsive components (see Sects. 4 and 5, Ref. 6); 2. Give very clear and complete explanation of all the phenomena take place in their systems, e.g.: i- in their beams and in electric current carrying specimens (see Sec. 5.2, Ref. 7); ii- in persistent current carrying specimens at their transition temperature (see Sec. 5.3, Ref. 7); iii- in deuterons, alpha particles, nuclei (see Sec. 5.4, Ref. 7).

4.3 Importance of the special characteristic in the special structures of electrons, protons etc. that keeps them spinning persistently

The determined special characteristics in special structures of electrons, protons etc. enable to resolve numerous very important mysterious problems. For example:

1. Why and how neutron survives for about 15 minutes (mean life time of neutron) and then decays, while the rest of all the unstable elementary particles decay within fraction of second (see Sec. 2, Ref. 5).

2. Why and how neutron has unstable and stable both the states, while the rest of all the elementary particles have only one state, either stable or unstable (see Sec. 2, Ref. 5).
3. How neutrons become stable in their systems, e.g. deuterons, alpha particles and nuclei (see Sec. 2, Ref. 5), while in their free state, they are unstable.
4. How neutron possesses magnetic moment = $-0.00966236 \times 10^{-24}$ J/T (see Sec. 3.1, Ref. 5).
5. While it is believed that the electrons do not reside inside the nuclei, then why and how the electrons are emitted from the nuclei during β decay (see Sec. 3.3, Ref. 5).
6. Why and how energy of the emitted β particles varies in the form of a continuous energy spectrum (see Sec. 3.4, Ref. 5).
7. Why and how neutrons have high penetrating power and distinguishable low and high-energy ranges (see Sects. 3.5 and 3.6, Ref. 5).
8. Reality of positrons what they are and how they are produced (its complete information shall be given very shortly).

5. APPLICATION OF THE DETERMINED PURPOSE IN ENERGY SAVING

As the electron (similarly proton, neutron etc.), without having any source of energy, obtains linear velocity v_E along the direction of its L_s due to spin motion of its ball of charge and the ring of magnetism in directions opposite to each other, and the magnitude and the direction of v_E vary as the situation arises by variation in its ω_{EC} and ω_{EM} , this technique can be applied in generating linear velocity (v) in the system to which we supply energy for generating v in them.

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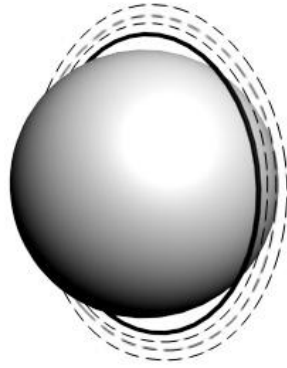
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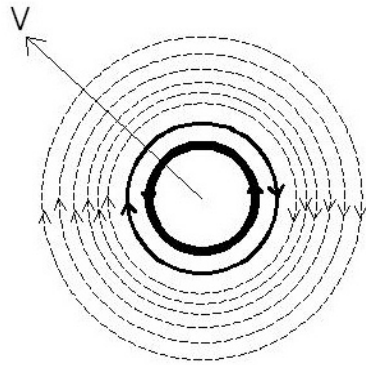
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FIGURE CAPTIONS

Fig. 1: (a) Spherical ball, dark solid line circle and concentric broken line circles respectively represent the charge, magnetism and magnetic field of electron. (b) Transverse cross sectional view of electron, where, in order to introduce arrow marks with the ball of charge to show the direction of its spin motion, the ball of charge has been shown by a dark thick solid line circle in place of a dark disc.



(a)



(b)

Fig. 1