A NEW QUANTUM FIELD THEORY

Kunwar Jagdish Narain[a) b)]

(Retired Professor of Physics)

The word "quantum field" in "quantum field theory" has two interpretations: 1- the field of quanta; 2- the field of that the quanta, i.e. electrons, nucleons etc. (as quantum mechanics is applied to electrons, nucleons etc., these should also be the quanta) possess, e.g., magnetic field. The present quantum field theory is based on the second interpretation. Because, when the quanta themselves possess field, how can other quanta occur as a field between the fields of former quanta? Secondly, as electrons, nucleons etc. possess persistent spin motion without having any source of infinite energy and magnetic field etc. properties, there should positively be some purpose as to why they possess persistent spin motion and they should have some special structures, unlike simple balloons of charge that keeps them spinning persistently and provides all the properties they possess. Similarly as 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. Further, as all the phenomena/activities related with our hearts, e.g., persistent blood circulation etc. taking place in our bodies are the effects of persistent beating and special structure of our hearts, similarly, all the phenomena/activities related with electrons and nucleons etc. taking place in their systems should be the effects of the purpose behind their persistent spin motion and their special structure. And therefore, presently, that purpose and their special structures have been determined and taking their accounts, the present quantum field theory has been developed. The present quantum field theory enables to give very clear and complete explanation of all the phenomena related with electrons, nucleons etc. taking place in their systems, e.g., their beams, nuclei, electric current and persistent current (flowing at superconducting state) carrying specimens.

[a)] kjnarain@yahoo.co.in ; kjn.jaiswal@gmail.com
b) Former address: Department of physics, Govt. Bilasa Girls P.G. (Autonomous) College, Bilaspur (C.G.) 495001, INDIA

1. INTRODUCTION

The word "quantum field" in "quantum field theory" has two interpretations: 1- the field of quanta; 2. the field of that the quanta, i.e. electrons, nucleons etc. possess, e.g., electric and magnetic fields. The present quantum field theory is based on the second interpretation. Because:

1.   When the electrons and nucleons etc. themselves possess field, how can in the presence of their fields in their systems, other quanta, e.g. the virtual π mesons occur as a field between nucleons in nuclei in Yukawa's meson field theory[1], and phonons occur as a field between free electrons in specimens at their superconducting state in BCS (Bardeen–Cooper–Schrieffer) theory[2]?

2.   As electrons, nucleons etc. possess persistent spin motion without having any source of infinite energy and magnetic field etc. properties; there should positively be some purpose as to why they possess persistent spin motion and they should have some special structures, unlike simple balloons of charge that keeps them spinning persistently and provides all the properties they possess. Similarly as 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. Further, as all the phenomena/activities related with our hearts, e.g., persistent blood circulation etc. taking place in our bodies are the effects of persistent beating and special structure of our hearts, similarly, all the phenomena/activities related with electrons and nucleons etc. taking place in

their systems should be the effects of the purpose behind their persistent spin motion and their special structure.

Therefore, presently, that purpose (see Sec. 2), their special structure that keeps them persistently spinning and provides magnetic field etc. all the properties to them (see Sec. 3) have been determined. And taking their accounts, the present quantum field theory has been developed (see Sec. 4). The present quantum field theory enables to give very clear and complete explanation of all the phenomena related with electrons, nucleons etc. taking place in systems constituted by them, e.g., their beams and nuclei, or in systems containing them, e.g., electric and persistent current (flowing at superconducting state) carrying specimens (see Sec. 5).

The current quantum field theories are based on the first interpretation of the word "quantum field" in "quantum field theory". In these theories, it is assumed that the force of attraction between the particles of the systems is generated due to the continuous exchange of the particles, of which the field is assumed between the fields of the particles of the systems. For example, in Yukawa's meson field theory, it is assumed that the force of attraction between the nucleons of nuclei is generated due to the continuous exchange of virtual π mesons between their nucleons. And, in BCS theory, it is assumed that the force of attraction between the free electrons of specimens at their superconducting states is generated due to the continuous exchange of phonons between their free electrons.

The preferred meaning of exchange force is in particle physics, where it denotes a force produced by the exchange of force carrier particles, such as the electromagnetic force produced by the exchange of photons between electrons and the strong force produced by the

exchange of gluons between quarks. But the concept of photons and gluons as force carrier particles is logically unbelievable. Because it gives rise to questions: How can these particles (photons and gluons) or virtual π mesons or phonons be the force carrier particles? For the time being, if the photons are assumed as the force carrier particles, the electromagnetic force should be produced between free electrons of all the substances possessing free electrons, because, the photons, emitted from the orbiting electrons of the substances reside inside the substances before their emission from the surface of the substances. Is the electromagnetic force produced between free electrons of the substances? If yes, is there any evidence of it? And then what does happen? And if not produced, why?

Secondly, due to the continuous exchange of particles of the assumed field between the particles of the systems, only the force of attraction is generated between the particles of the system, whereas in systems, e.g. specimens at superconducting state, magnetism (diamagnetism) and around them magnetic field are also simultaneously generated (see Sec. 7.4, Ref. 3). How?

Thirdly, the concept of the generation of force of attraction between the particles of the systems due to the continuous exchange of particles of the field existing between the particles of the systems, gives rise to the question: Then what does happen to the magnetic fields the electrons and nucleons possess? Because:

We observe that in electron, proton etc. beams, the electrons, protons etc. are held together in their respective beams despite similar charges on them. It means, between electrons, protons etc. in their respective beams, some force of attraction, independent of their charge and stronger than the Coulomb repulsive force, is also generated. This force

cannot be generated due to interactions between their electric fields. Then obviously it should be generated due to interactions between their magnetic fields. In electron, proton etc. beams, electromagnetism, and around them (beams) a magnetic field, which possesses direction and occurs in a plane perpendicular to the direction of flow of electrons through them are also generated (see Sec. 4.1, Ref. 4).

In specimens carrying electric current and persistent current (at superconducting state) too electromagnetism, and around them (specimens) a magnetic field, which possesses direction occurs in a plane perpendicular to the direction of flow of electrons through them are also generated (see Sec. 4.2, Ref. 4 and Sec. 7.4, Ref. 3 respectively). In specimens, when no current (neither electric nor persistent) is flowing, no electromagnetism is generated in them, and around them no magnetic field is generated. It means, when electrons of the systems (specimens- carrying electric and persistent currents, electron beams) start flowing; their (systems) electrons are probably so oriented that interactions between magnetic fields of their electrons become possible. And consequently, a force of attraction is generated between their electrons, and magnetism in them and magnetic field around them are generated (see Sec. 4.2, Ref. 4, Sec. 7.4, Ref. 3 respectively). Due to generation of force of attraction between electrons of persistent current carrying specimens, the energy of their free electrons is decreased and consequently an energy gap between electrons at their superconducting state and electrons at their normal state is observed (see Sec. 7.9, Ref. 3). The energy gap is not generated due to the Cooper pairing because the concept of Cooper pairing cannot be true (see onwards). [Due to generation of force of attraction between electrons of electric current carrying specimens (see Sec. 4.2, Ref. 4), the energy of their electrons is also decreased, but

it cannot be determined because of increase in their energy due to application of voltage to make them to flow.]

In deuterons, alpha particles and nuclei too, such situations are created that the interactions between magnetic fields of their nucleons start taking place and consequently a force of attraction is generated between their nucleons (see Sects. 4. 5, 6, 7 and 8, Ref. 5). In nuclei, such situations are created that the force of attraction (see Sec. 4.1, Ref. 6) and the force of repulsion (see Sec. 4.2, Ref. 6) both are generated between their nucleons. But the situations such that repulsive force may be generated are not created normally. Such situations are created when in nuclei; mass number (A) becomes > 200. And due that force of repulsion, alpha and beta particles are emitted from the nuclei (see Sec. 9.2.1, Ref. 5).

Since the magnetic fields of electrons, nucleons etc., and the generation of a force between them due to interactions between their magnetic fields etc. cannot be ruled out, the generation of a force between electrons due to electron-phonon-electron interactions in BCS theory, and the generation of a force between nucleons due to nucleon-virtual π meson-nucleon interactions in Yukawa meson field theory cannot be possible, because the same force cannot be generated simultaneously due to two different means.

Further, if we examine, e.g., the BCS theory and the Yukawa meson field theory closely, we find that:

1. These theories fail completely to explain, e.g.: i. How electromagnetism is generated in electric current carrying specimens, electron beams and how magnetic field is generated around them; ii. Structures and properties of deuterons, alpha particles and nuclei.

2. These theories fail to explain all the phenomena/properties and completely, e.g. the BCS theory fails to explain all the properties exhibited by superconductors.

3. In these theories, in order to attain the objectives, i.e. to arrive at the desired results, numerous logically and practically unbelievable assumptions have been taken. For example:

If we go through the BCS theory and its rigorous mathematical proofs closely, we find that it is based on such concepts which are logically and practically not possible (see bullet i of Sec. 1, Ref. 3). And consequently these concepts contradict two well-observed facts (see bullet ii of Sec. 1, Ref. 3), and give rise to numerous very basic and fundamental questions (see bullet iii of Sec. 1, Ref. 3).

Most importantly, in BCS theory, no account of the effect of collisions of free electrons of specimens with photons (emitted from the orbiting electrons of the specimens and remain in specimens before their absorption again in the specimens or emission out from the surfaces of the specimens), which produce resistance in the flow of their free electrons and decreases as their temperature decreases, has been taken. This effect becomes negligible at their temperature $\leq T_c$ and consequently the resistance-less state is obtained (see Sects. 5 and 5.1, Ref. 3). Otherwise, the Cooper pairs cannot move freely through the specimens without facing any resistance at their temperature $\leq T_c$.

The concept of Cooper-pairs too gives rise to several very basic and fundamental questions. For example:

1. According to the concept of Cooper pairing, the Cooper pairing starts at T_c and their number goes on increasing till $T = 0$ K. Therefore, if the persistent current flows due to the

flow of Cooper pairs, the strength/intensity of persistent current should go on increasing as the temperature of specimen decreases below T_c. Does the strength/intensity of persistent current increase as the temperature of specimen decreases and becomes maximum at $T_c = 0$?

2.   At temperatures $\leq T_c$ of specimen, if the persistent current is obtained due to the flow of Cooper pairs, how and from where do the Cooper pairs obtain their initial linear velocity with which they start flowing? And how is that maintained for indefinitely long time against the gravitational force acting on them during their persistent flow?

3.   At temperatures $\leq T_c$ of specimen, if the persistent current is obtained due to the flow of Cooper pairs, how are the directions of motion of Cooper pairs are oriented and aligned in one direction, i.e. along the direction of flow of persistent current?

If we go through the Yukawa's meson field theory and its rigorous mathematical proofs closely, we find that it is based on such concepts those are practically not possible and logically unbelievable. For example: 1. Virtual means which does not exist physically, then how can the field of such π mesons occur? 2. How can such π mesons possess charge, that too positive or negative? 3. The real π mesons possess charge and mass both, while to virtual π mesons, only charge has been assigned, not any mass, why is this double standard? 4. As far as the author's knowledge is concerned, it is believed that there exist only matter and energy in the universe, in which category- matter or energy, do the virtual π mesons lie?

Secondly, does the field of virtual π mesons occur in proton and neutron beams and they are held together in their respective beams against the repulsive Coulomb force due to the continuous exchange of virtual π mesons between them? If not, then:

1.   Why is this inconsistency? When the field of virtual π mesons can occur in nuclei, it should occur in proton and neutron beams too because these are also nucleons.

2.   How electrons, protons etc. are held together in their respective beams against the repulsive Coulomb force?

      And if yes, then:

1.   The field of virtual π mesons should occur in electron beams too, and due to the exchange of π mesons between electrons, the electrons should be held together in electron beams. Can it happen so? If not, then how are the electrons held together in their beams?

2.   The neutron beams should exist in nature similarly as nuclei exist in nature, even with more strong stability. Because, in neutron beams, there occur no protons and hence no repulsive Coulomb force comes into play. But the neutron beams do not survive even as long as the proton beams survive. Here some people may argue that it happens because neutrons start decaying after their mean life time and hence neutron beams are destroyed. This argument is true but it gives rise to questions: Then why and how do neutrons not decay in deuterons, alpha particles and nuclei? What does happen in deuterons, alpha particles and nuclei such that neutrons become stable in them. [For detail, see Sec. 1, Ref. 6.]

2. DETERMINATION OF THE PURPOSE AS TO WHY QUANTA POSSESS PERSISTENT SPIN MOTION

      The spin motion of electrons, nucleons etc. 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. 7). 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 expression[7]

$$v^2 = h\omega/m$$ ……………………………………………………………. (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. 7].

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. 7), and due to its spin energy, it obtains

spin momentum ($p_S = h\omega/v$, see Sec. II, Ref. 7). [For verification of the truth that the particle obtains p_S due to its spin motion, see Sec. I C, Ref. 7.]

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. 7. And for how E_M, p_M and L_S conserve, see Sec. 3.1.1, Ref. 8.] 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 along its elliptical orbit, where the velocity of electron varies; 2. During motion of electron (accelerated by a large voltage), after attaining relativistic velocity by it, when the rate of increase in its velocity starts decreasing (see Sec. 2.2, Ref. 8).

3. DETERMINATION OF SPECIAL STRUCTURE OF ELECTRONS, PROTONS AND NEUTRONS THAT KEEPS THEM SPINNING PERSISTENTLY AND PROVIDES ALL THE PROPERTIES THEY POSSESS

3.1 Determination of the special structure of electrons

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 the spin motion of its ball of charge is not true (for verification of its truth, see Sec. 1, Ref. 4).

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, around the planet Saturn, there occurs a ring. 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, Ref. 8) 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 ($= v_{ES} - v_{EM}$ 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[8] (2).

The 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} (for detail, see Sec. 3.1.1, Ref. 8), 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.

3.2 Determination of the special structure of protons

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.

Proton possesses all the properties similarly as the electron possesses. And hence the ball of charge and material 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 it 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}).

3.3 Determination of the special structure of neutrons

For the special structure of neutrons, see Sec. 2, Ref. 9.

4. THE PRESENT QUANTUM FIELD THEORY

As electrons, nucleons etc. possess v, L_S, E_m and p_m due to their persistent spin motion, where their v occurs along the directions of their respective L_S (see Sec. 2), and due to their structures (see Sec. 3), the planes of their magnetic fields occur in a plane perpendicular to the directions of their respective L_S, in their systems, e.g.:

1.   In electron beams and electric current carrying specimens, due to the applied external magnetic field, the directions of v (i.e. L_S) of their electrons are oriented opposite to the direction of the applied external electric field (for confirmation of its truth, see Sec. 4.5, Ref. 4), and consequently, the planes of their magnetic fields are oriented in a plane perpendicular to the direction of flow of electrons through the beams and the specimens.

2.   In specimens at their transition temperatures T_c, due to the presence of an external magnetic field, keeping in which the specimens are cooled down to their temperatures T_c, the directions of v (i.e. L_S) of their free electrons are oriented along the direction according to the

Lorentz force acting on them due to the external magnetic field (for confirmation of its truth, see Sec. 4.1, Ref. 3). And consequently, the planes of magnetic fields of their electrons are oriented in a plane perpendicular to the direction of flow of electrons through the specimens.

3.　　In deuteron, tritium (H^3), helium (He^3) and alpha particle, the directions of linear velocity (v) of their nucleons are happened to be oriented in one direction, and consequently, the planes of their magnetic fields are happened to oriented in a plane perpendicular to that direction (for detail, see Sects. 4, 5 and 6, Ref. 5).

And therefore, in the systems of electrons, nucleons etc., the planes of magnetic fields of electrons, nucleons etc. are oriented in one plane. Then, between the magnetic fields of their every two particles, having position as shown in Fig. 2, Ref. 6, due to interaction between their (two particles) a force of attraction is generated between them, and the magnetic fields, occurring around them, acquire the shape as shown in Fig. 2(b), Ref. 6, and described in Sec. 4.1, Ref. 6. And thus, between the magnetic fields of particles of the systems having positions as shown in, e.g.: Figs. 2 and 4, Ref. 4; Fig. 3, Ref. 3; and Figs. 2(b), 3(c), 3(f) and 4(e), Ref. 5, due to interactions between their magnetic fields, a force of attraction is generated between all the particles and the magnetic fields, occurring around them, acquire the shape as shown in Figs. 3 and 5, Ref. 4; Fig. 4, Ref. 3; and Figs. 2(c), 3(g) and 4(f), Ref. 5 respectively.

5. IMPORTANCE OF THE PRESENT QUANTUM FIELD THEORY

The present quantum field theory enables to: 1. Determine a new force with characteristics of nuclear force and both attractive and repulsive components (see Sec. 5.1); 2. Give very clear and complete explanation of all the phenomena related with electrons,

nucleons etc, those take place in their systems, and the structures and properties of their systems, e.g.: i. Generation of electromagnetism and the related properties in electron beams and electric current carrying specimens (see Sec. 5.2); ii. At transition temperature (T_c), generations of resistance-less state, superconductivity, related properties and effects exhibited by superconductors (see Sec. 5.3); iii. Structures and properties of deuterons, alpha particles nuclei, and emission of alpha and beta particles from the nuclei when their mass number (A) becomes more than 200 (see Sec. 5.4).

5.1 Determination of a new force with characteristics of nuclear force and both attractive and repulsive components

1.   For the explanation of how and when the force of attraction is generated between, e.g. two electrons, and how that varies with respect to distance between them, see Sects. 4.1 and 5.1 respectively, Ref. 6.

2.   For the explanation of how and when the force of repulsion is generated between, e.g. two electrons, and how that varies with respect to distance between them, see Sects. 4.2 and 5.2 respectively, Ref. 6.

5.2 Explanation of the generations of electromagnetism and the related properties in electron beams and electric current carrying specimens

5.2.1 Present explanation

1.   For the explanation of how electromagnetism and magnetic moment are generated in electron beams and current carrying specimens, see Sects. 4.1 and 4.2 respectively, Ref. 4.

2.   For the explanation of which type of magnetism (electromagnetism) is generated in them, see Sects. 4.3. and 4.4, Ref. 4.

3.   For the explanation of how a magnetic field is generated around them in a plane perpendicular to the direction of flow of electrons through them and how that magnetic field possesses direction, see Sects. 4.1 and 4.2 respectively, Ref. 4.

4.   For the explanation of how a magnetic field is generated around an electron orbit such that there are generated north and south poles and the orbit behaves like a magnetic dipole, see Sec. 6.1, Ref. 4.

5.   For the explanation of how a magnetic field is generated around an electric current carrying close loop type of specimen such that there are generated north and south poles and the loop behaves like a magnetic dipole, see Sec. 6.2, Ref. 4.

5.2.2 Current explanation, and faults in it

Currently, it has merely been assumed that due to the flow of charge of electron through the electron beams and specimens, electromagnetism is generated in them and a magnetic field is generated around them. No explanation is found as to how these are generated, how the generated field occurs in a plane perpendicular to the direction of flow of electrons through them and how that field possesses direction (for detail, see Sec. 1, Ref. 4).

Regarding generation of magnetic field around electron orbits and current carrying close loops such that north and south poles are created and they behave like magnetic dipoles too, currently no explanation is found as to how all these take place (for detail, see Sec. 6.3, Ref. 4).

5.3. Explanation of generations of resistance-less state, superconductivity, related properties and effects exhibited by superconductors at transition temperature T_c

5.3.1 Present explanation

1.	For the explanation of how the resistance-less state is generated at transition temperature (T_c) of the specimens, see Sec. 5, Ref. 3

2.	For the explanation of how superconductivity is generated, see Sec. 6, Ref. 3.

3.	For the explanation of how the entropy at superconducting state of the substance decreases, see Sec. 7.1, Ref. 3).

4.	For the explanation of how the transition temperature (T_c) varies from substance to substance, see Sec. 7.2, Ref. 3.

5.	For the explanation of how the substances like Cu and Au etc. do not superconduct even down to very low temperatures, see Sec. 7.3, Ref. 3.

6.	For the explanations of: i- how Meissner effect takes place, see Sec. 7.4.1, Ref. 3; ii- how a magnet is levitated above a superconductor, see Sec. 7.4.2, Ref. 3.

7.	For the explanation of how diamagnetism generated in substances at their superconducting state persists, while generated at normal state, that does not persist, see Sec. 7.5, Ref. 3.

8.	For the explanation of no occurrence of superconducting state in ferromagnetic substances, see Sec. 7.6, Ref. 3.

9.	For the explanations of: i- how normal state of specimen is restored applying an external magnetic field H_c across it at its superconducting state, see Sec. 7.7.1, Ref. 3; ii- how H_c increases as temperature of specimen decreases beyond its T_c, see Sec. 7.7.2, Ref. 3; iii- how H_c varies from substance to substance, see Sec. 7.7.3, Ref. 3.

10.   For the explanations of: i- how the thermal conductivity of specimen is discontinuously increased when superconducting state of the specimen is destroyed by the application of an external magnetic field H_c, see Sec. 7.8.1, Ref. 3; ii- how thermal conductivity of specimen changes continuously between its two phases, and how at superconducting phase, it is found to be lower, see Sec. 7.8.2, Ref. 3.

11.   For the explanations of: i- energy gap between electrons at normal state and electrons at superconducting state of the specimen, see Sec. 7.9.1, Ref. 3; ii- how energy of electrons goes on decreasing as temperature of specimen decreases below T_c, see Sec. 7.9.2, Ref. 3.

12.   For the explanation of Josephson's Tunnelling, see Sec. 7.10, Ref. 3.

13.   For the explanations of: i- how the specimen absorbs heat when superconductivity of specimen is destroyed isothermally by a magnetic field, see Sec. 7.11.1, Ref. 3; ii- how the specimen's temperature becomes lower for the adiabatic case, see Sec. 7.11.2, Ref. 3.

14.   For the explanation of how the specific heat of specimen is discontinuously increased when the temperature of specimen is brought down to its T_c, see Sec. 7.12, Ref. 3.

5.3.2 Current explanation (i.e. assuming wave nature of electrons)**, and faults in it**

To explain as to how superconductivity and properties, effects etc. exhibited by superconductors are generated, several theories have so far been proposed. For BCS theory[2] it is claimed that it provides better quantum explanation of superconductivity and accounts very well for all the properties exhibited by the superconductors. The BCS theory no doubt provides better quantum explanation of superconductivity and accounts very well for all the properties exhibited by the superconductors, but if we examine the BCS theory and its rigorous mathematical proofs closely and intently, we find that it is based on such concepts

which are practically and logically not possible and contradict two well-observed facts (for detail, see Sec. 1, Ref. 3). Secondly, the BCS theory does not explain all the properties exhibited by the superconductors. It fails to explain several very important properties.

5.4 Explanation of nuclear phenomena, structures and properties of deuterons, alpha particles and nuclei

5.4.1 Present explanation

1.   For the explanation of how a proton and a neutron combining with each other constitute a deuteron and neutron in this combination becomes stable, see Sec. 4.1, Ref. 5.

2.   For the explanation of why and how deuteron (*NP*) only exists in nature, not the systems di-proton (*PP*) and di-neutron (*NN*), see Sects. 4.2 and 4.3, Ref. 5.

3.   For the explanation of why and how due to the addition of one *P* in system *NN*, the resultant system, i.e. the nucleus of H^3 becomes stable, while the system *NN* is not stable and hence does not exist in nature, see Sec. 5.1, Ref. 5.

4.   For the explanation of why and how the binding energy per nucleon (E_b) of the nucleus of H^3, i.e. $(E_b)_{H^3}$ becomes $> 2 \times (E_b)_D$, see Sec. 5.2, Ref. 5.

5.   For the explanation of why and how due to the addition of one *N* in system *PP*, the resultant system, i.e. the nucleus of He^3 becomes stable, while the system *PP* is not stable and hence does not exist in nature, see Sec. 5.3, Ref. 5.

6.   For the explanation of why and how E_b of the nucleus of He^3, i.e. $(E_b)_{He^3}$ becomes $> 2 \times (E_b)_D$, see Sec. 5.4, Ref. 5.

7.   For the explanation of how $(E_b)_{H^3}$ happens to be $> (E_b)_{He^3}$, see Sec. 5.5, Ref. 5.

8.   For the explanation of despite $(E_b)_{H^3} > (E_b)_{He^3}$, why and how H^3 happens to be radioactive and decays into He^3 through beta (β) decay, see Sec. 5.6, Ref. 5.

9.   For the explanation of how two-neutrons and two-protons are arranged in an alpha particle (α) such that its nucleons become so strongly bound together that it starts behaving like a particle., see Sec. 6.1, Ref. 5.

10.   For the explanation of why and how E_b of α particle is increased to $> 6 \times (E_b)_D$ instead of increasing to $2 \times (E_b)_D$, see Sec. 6.2, Ref. 5.

11.   For the explanations of how nucleons are arranged in nuclei having mass number A = integer multiple of 4 (e.g. nuclei of He^4, Be^8, C^{12}, O^{16}, Ne^{20}, Mg^{24} etc.) such that they (nuclei) are most strongly stable and how their E_b increases as their A increases in multiple of 4, see from Sec. 7.1 to Sec. 7.9, Ref. 5.

12.   For the explanation of how E_b of Be^8 is reduced to $< E_b$ of He^4 while A of $Be^8 = 2 \times$A of He^4, see. Sec. 7.2.1, Ref. 5.

13.   For the explanations of: i- how nucleons are arranged in nuclei having A $\neq$ integer multiple of 4 (e.g. Li^6, Li^7, B^{11} and N^{14}) such that these are not strongly stable, and how E_b of Li^6 and Li^7 increase as their A increases but their E_b are happened to be $< E_b$ of He^4 though A of Li^6 and $Li^7 >$ A of He^4, see Sec. 8.1, Ref. 5; ii- how nucleons are arranged in the nucleus of B^{11} such that its E_b becomes $< E_b$ Be^8 though A of $B^{11} >$ A of Be^8, see Sec. 8.2, Ref. 5; iii- how E_b of N^{14} becomes $< E_b$ of C^{12} though A of $N^{14} >$ A of C^{12}, see Sec. 8.3, Ref. 5.

14.   For the explanation of why and how E_b of nuclei, after becoming maximum near A = 62, gradually starts decreasing as A increases, see Sec. 9.1, Ref. 5.

15.   For the explanation of why and how nuclei become radioactive when A > 200 and α and β particles start emitting from them, see Sec. 9.2.1, Ref. 5.

16.   For the explanations of how γ (gamma) and ν (neutrino) are emitted from nuclei and how γ and ν obtain particle like physical existence as photons possess, see Sec. 9.2.2, Ref. 5.

17.   For the explanations of how γ and ν obtain so high energy and momentum, see Sec. 9.2.3, Ref. 5.

5.4.2 Current explanation, and faults in it

Several nuclear models have so far been proposed but none has been able to give clear picture of how nucleons are arranged in deuterons, alpha particles and nuclei. Regarding their properties too, very little is known.
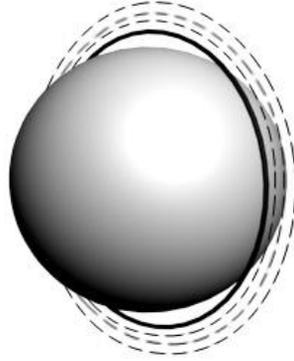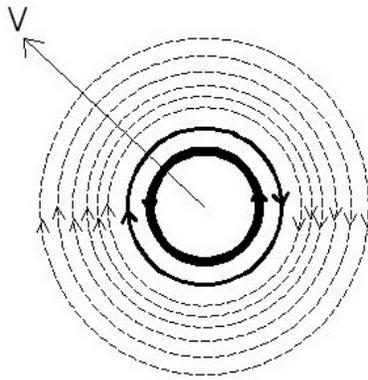
REFERENCES

1. H. Yukawa, On the interaction of elementary particles, Proc. Phys.-Math. Soc. Japan **17** (1935) p. 48.

2. J. Bardeen, L.N. Cooper, J.R. Schriefer, Theory of superconductivity, Phys. Rev. 108 (5) (1957) p. 1175.

3. Kunwar Jagdish Narain, Understanding superconductivity: A new approach, vixra: 1111.0097 (Condensed Matter), http://vixra.org

4. Kunwar Jagdish Narain, Understanding electromagnetism: A new approach, vixra: 1111.0072 (Condensed Matter), http://vixra.org.

5. Kunwar Jagdish Narain, Understanding deuterons, alpha particles and nuclei: A new approach, vixra: 1203.0105 (Nuclear and Atomic Physics), http://vixra.org.

6. Kunwar Jagdish Narain, A new force with characteristics of nuclear force and both attractive and repulsive components, vixra: 1207.0109 (Nuclear and Atomic Physics), http://vixra.org.

7. Kunwar Jagdish Narain, A new interpretation to quantum theory, Phys. Essays 22 (2009) p. 47. Also available at http://physicsessays.aip.org.

8. Kunwar Jagdish Narain, Why and how do electrons, nucleons etc. all the particles possess persistent spin motion, vixra: 1512.0331 (Nuclear and Atomic Physics), http://vixra.org.

9. Kunwar Jagdish Narain, A new neutron model, vixra: 1512.0330 (Nuclear and Atomic Physics), http://vixra.org.

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