A new quantum field theory

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Because all electrons, nucleons, and other particles or quanta (because quantum mechanics is applied to all particles, these should be known as quanta) undergo a persistent spin motion without having any source of infinite energy, they should have a unique structure that keeps them persistently spinning and provides all the properties that they display. In addition, there should be some reason or purpose why they show a persistent spin motion, because, in nature, nothing occurs without a reason or purpose. Therefore, the unique structures of electrons and nucleons, and purpose why all electrons, nucleons, and other particles, or quanta possess persistent spin motion have been determined. The results of these determinations, named "a new quantum field theory", provide the knowledge of a new force possessing characteristics of nuclear force and both attractive and repulsive components, and provide very clear and complete explanation of: 1) all the phenomena; 2) all the properties and effects of their systems; and 3) structures of their systems, e.g., deuterons, alpha particles, and nuclei; those are generated due to these particles.

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1 Introduction

The portion "quantum field" of the title "A new quantum field theory" has two interpretations: 1) the field of quanta; 2) the field of that, the quanta (i.e. electrons, nucleons, and all other particles, because quantum mechanics is applied to all these particles; these particles should be known as quanta) possess themselves, for example, electric and magnetic fields.

The current quantum field theories are all based on the first interpretation of "quantum field". In these theories, it is assumed that a force of attraction is generated between particles of the systems due to continuous exchange of force carrier particles, a field of which is assumed occurring between particles of the systems. For example, in Yukawa's meson field theory [1], a force of attraction is assumed generated between nucleons of nuclei due to continuous exchange between nucleons of virtual π mesons, a field of which is assumed occurring between nucleons in nuclei. In BCS (Bardeen–Cooper–Schrieffer) theory [2], a force of attraction is assumed generated between free electrons of the substances at their superconducting states due to continuous exchange between free electrons of phonons, a field of which is assumed occurring between free electrons of the substances.

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 concepts of force carrier particles and the generation of a force of attraction due to exchange of force carrier particles are very difficult to believe or imagine, because these concepts give rise to several very fundamental questions, for example:

1) How can a particle – photon, or gluon, or virtual π meson, or phonon be a force carrier particle? For the time being, if the concepts of force carrier particles and the generation of a force of attraction between particles due to continuous exchange of force carrier particles between former particles are, somehow, assumed to be true, then the electromagnetic force should be produced in all the substances

possessing free electrons and always due to continuous exchange of photons between their free electrons, because, in those substances, some photons, which are emitted from their orbiting electrons, occur always inside them between their free electrons (see Section 4, [3], and Section 1.1, [4] for verification). Is the electromagnetic force produced always and in all the substances due to continuous exchange of photons between their free electrons? If yes, is there any evidence of it? And if not produced, why?

2) Due to continuous exchange of force carrier particles between particles, only a force of attraction is assumed produced, for example, in BCS theory, due to continuous exchange of phonons between free electrons of the substances, only a force of attraction is assumed produced between free electrons of the substances, whereas, in substances, a magnetism (diamagnetism), and around the substances, magnetic fields are also simultaneously produced (see Section 4.4, [4] for verification). How are these produced?

3) The concept of production of a force of attraction between particles, due to continuous exchange of force carrier particles between former particles, gives rise to the questions, for example: i) What does happen to force carrier photons when, in substances at their superconducting state, a field of phonons is assumed occurring between free electrons of the substances (BCS theory)? ii) Can/do the exchange of both photons and phonons take place between free electrons of the substances? If both can/do not take place, then which one does take place, and why?

4) What does happen to electric and magnetic fields, which the electrons and nucleons possess? The role of their fields can neither be neglected nor can be ruled out, because we observe that:

i) In electron, proton etc. beams, they are held together in their respective beams despite similar charges on them. It means, between electrons, between protons, and so forth, in their respective beams, a force of attraction, stronger than the Coulomb repulsive force is also generated. This force cannot be generated due to interactions between their electric fields. It should obviously be generated due to interactions between their magnetic fields (see Section 3, [3] for detail information). In their beams, electromagnetism, and around their beams, a magnetic field, which possesses direction and occurs in a plane perpendicular to the direction of flow of their particles (electrons, protons etc.) in their beams, are also generated due to interactions between magnetic fields of their particles (see Section 3, [3] for detail information).

ii) In substances carrying electric current and substances carrying persistent current (which flows at superconducting state) also, a force of attraction is generated between their free electrons, and in them (substances) electromagnetism, and around them, a magnetic field, which possesses direction and occurs in a plane perpendicular to the direction of flow of electrons through them, are generated (for detail information, see Section 4, [3] for electric current carrying substances, and Section 4.4, [4] for persistent current carrying substances). When no current (neither electric nor persistent) flows through the substances, no electromagnetism is generated in them, and around them, no magnetic field is generated. It means, when current starts flowing through the substances, during flow of their free electrons through them, their free electrons are oriented, and subsequently magnetism and magnetic fields of their free electrons, which they possess (see Section 3.1, [5] for detail information), are oriented such that: a) due to orientation of magnetism of their free electrons, a magnetism is generated in them; and b) due to orientation of magnetic fields of their free electrons, and then interactions between magnetic fields of their free electrons, a force of attraction is generated between their free electrons, and a magnetic field is generated around them which possesses direction and occurs in a plane perpendicular to the direction of flow of free electrons through them. {How all these, i.e. bullets a) and b), occur in electric current carrying substances, see Section 4, [3], and in persistent current carrying substances, see Section 4.4, [4].} Due to generation of a force of attraction between free electrons of the substances, the energy of their free electrons is decreased when the substances are at their superconducting state (see Section 4.7.1, [4]). When the substances are at their normal state, the energy of their free electrons is also decreased. However, due to increase in energy of their free electrons because of the external voltage, which is applied to make their free electrons flowing, the occurrence of decrease in energy of their free electrons cannot be observed.

iii) In deuterons, alpha particles, and nuclei too, their nucleons are so oriented and arranged that, due to interactions between their magnetic fields, a force of attraction is generated between their nucleons, and the nucleons are bound together in them (see Sections 3.1, 3.2, 3.3, 3.4, and 3.5, [6] for detail information). In nuclei, a repulsive force is also generated. However, this repulsive force is not generated normally. It is generated when, in nuclei, the mass number (A) becomes > 200, and, due to this repulsive force, alpha and beta particles are emitted from the nuclei {see bullets a), and b) of Section 3.6.2, [6]}.

In addition to above faults, if we investigate the current quantum field theories, for example, the BCS theory and Yukawa meson field theory, in their rigorous mathematical proofs, numerous logically and practically unbelievable assumptions have been accepted in order to arrive at the desired results (see Sections 3.1.1, and 3.3.1). Otherwise, these theories fail to give the desired results.

The present quantum field theory is based on the second interpretation of “quantum field”, because:

1) When the electrons and nucleons themselves possess field (electric and magnetic fields), how can in the presence of their fields, other quanta, for example, virtual π mesons occur as a field between nucleons in nuclei in Yukawa’s meson field theory, and phonons occur as a field between free electrons in substances at their superconducting state in BCS theory?

2) As we know, all electrons, nucleons, and other particles or quanta (quantum mechanics is applied to all particles; thus, they should be known as quanta) possess a persistent spin motion without having any source of infinite energy, some reason or purpose should exist why they show a persistent spin motion (because, in nature, nothing occurs without any reason or purpose). In addition, such quanta should have unique structure that keeps them persistently spinning and provides all the properties that they display, e.g., electric and magnetic fields etc.

Therefore, the unique structure of electrons, and nucleons (Section 3, [5]), and purpose why all electrons, nucleons, and other particles, or quanta possess persistent spin motion (Section 2, [5]) have been determined. The results of the determination of their unique structure [bullets i), ii), and iii), Section 2], together with the results of the determination of the purpose why they possess persistent spin motion [bullets 1), and 2), Section 2], named "a new quantum field theory", provide:

1) the knowledge of a new force which is generated between particles and possesses the characteristics of nuclear force and both attractive and repulsive components (see Section 3.1);

2) very clear and complete explanations of:

i) all the properties and effects generated due to their (particles) properties in their systems, e.g., their beams (see Section 3.2), substances at normal state (see Section 3.2), substances at superconducting state (see Section 3.3), deuterons, alpha particles, and nuclei (see Section 3.4), including properties which could have never been explained before;

ii) structures of their systems, e.g., deuterons, alpha particles, and nuclei, generated due to their (particles) properties (see Section 3.4).

2 Present quantum field theory

Because the purpose (see Section 2, [5]) why quanta possess the property of persistent spin motion is to generate in them:

1) linear velocities (v) along the directions of their respective L_S, where v varies with their frequency of spin motion (ω) (see Section 2.1, [5] for detail information);

2) motional energy E_M [= kinetic energy (E_K) + spin energy (E_S)] and motional momentum p_M [= linear momentum (p_{LIN}) + spin momentum (p_S)] (see Section 2.2, [5] for detail information);

quanta are always found in a state of linear motion oriented along their respective L_S directions. The energy (E_M), momentum (p_M), and spin angular momentum (L_S) of quanta are always conserved during their motion, even when the rate of velocity increase in electrons accelerated by a large voltage (see Bertozzi's experiment [7] for example) starts decreasing after they attain their relativistic velocity, or when electrons move along their elliptical orbits (see Section 2.2, [5] for detail information).

Moreover, because of the unique structure of quanta {electrons and nucleons (see Section 3, [5]}:

i) the planes of their magnetic rings and magnetic ring's magnetic fields occur always in a plane perpendicular to the directions of their respective velocity v;

ii) the directions of their spin magnetic moments (μ_S) occur always opposite to the directions their respective v;

iii) the directions of spin motion of their rings of magnetism and magnetic ring's magnetic fields occur always in clockwise direction (if the direction of their v is opposite to the face of clock).

3 Present quantum field theory applications

In addition to determine how the new force is generated (Section 3.1), the important properties, effects, and structures, those have been included in this study, are listed in Sections 3.2, 3.3, and 3.4.

3.1 Generation of a new force possessing the characteristics of nuclear force and both attractive and repulsive components

1) How and when the force of attraction is generated between, e.g., two electrons (see Section 3.1, [8]), and how that force varies with respect to distance between them (see Section 4.1, [8]).

2) How and when the force of repulsion is generated between, e.g., two electrons (see Section 3.2, [8]), and how that force varies with respect to distance between them (see Section 4.2, [8]).

The attractive component of this force provides very clear and complete explanation of: 1) how electrons, protons, and so forth are bound together in their respective beams despite similar charges on them (see Section 3, [3]); 2) how an energy gap is generated between free electrons of substances at superconducting state and of substances at normal state (see Section 4.7.1, [4]; 3) how neutrons become stable in deuterons, alpha particles, and nuclei, and nucleons are bound together in them (see Sections 3.1, 3.2, 3.3, 3.4, and 3.5, [6]).

The repulsive component causes the emissions of alpha and beta particles from the radioactive nuclei (see bullets a), and b) of Sections 3.6.2, [6]).

This force gives rise to a potential of super soft core nature (see Section 7, [8]).

3.1.1 Discussion

Currently, the known force, which possesses the characteristics of nuclear force, is the Yukawa's force, but it has only the attractive component, and no repulsive component. Second, it has been assumed generated due to continuous exchange of virtual π mesons between nucleons of nuclei, where the concept of virtual π mesons gives rise to several very fundamental questions. For example:

1) Virtual means which physically does not exist, then how can the exchange of such π mesons occur between nucleons?

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 the charge has been assigned, and the mass has not been assigned. Why is this inconsistency?

4) As it is believed that, in universe, only matter and energy occur, in which category- matter or energy, do the virtual π mesons lie?

Further, does the field of virtual π mesons occur between protons, between neutrons in their respective beams, and they are held together in their respective beams due to continuous exchange of virtual π mesons between them, especially protons in their beams against the repulsive Coulomb force, which is generated between protons due to similar charges on them?

If not, then why is this inconsistency? When the field of virtual π mesons can occur between nucleons in nuclei and the nucleons are bound together in them, it should/can occur between protons in proton beams and between neutrons in neutron beams too, and they should be bound together in their respective beams.

If yes, then: 1) 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. While on the contrary, the neutron beams do not survive even as long as the proton beams survive. It is believed that this happens because neutrons start decaying after their mean life time and consequently the neutron beams are destroyed. Then why do neutrons not decay in deuterons, alpha particles and nuclei? If some situation is created in deuterons, alpha particles, and nuclei such that the neutrons become stable in them, what is that situation? Why is that situation not being created in neutron beams? 2) The field of virtual π mesons should occur between electrons in electron beams too, and the electrons should be held together in their beams due to continuous exchange of π mesons between electrons. Can/does it happen so? If not, then how are the electrons held together in their beams against the repulsive Coulomb force?

3.2 Generations of: 1) a force of attraction between electrons in electron beams and electric current carrying substances; 2) electromagnetism in them (beams and current carrying substances); 3) magnetic fields around them which possesses direction and occurs in a plane perpendicular to the direction of the flow of electrons through them; 4) north and south poles in electron orbits, and electric current carrying close loops; 5) two possible effects in electric current carrying close loops

1) How the electrons are bound together in their beams (see Section 3, [3]), and in electric current carrying substances (see Section 4, [3]) despite similar charges on them.

2) How electromagnetism and magnetic moment are generated in electron beams (see Section 3, [3]), and in electric current carrying substances (see Section 4, [3]).

3) Which type of magnetism (electromagnetism) is generated in them (see Sections 4.2. and 4.3, [3]).

4) How a magnetic field is generated around them, which possesses direction and occurs in a plane perpendicular to the direction of flow of electrons through them (see Sections 3, and 4, respectively, [3]).

5) How a magnetic field is generated around an electron orbit such that its north and south poles are generated, and the orbit behaves like a magnetic dipole (see Section 6.1, [3]).

6) How a magnetic field is generated around an electric current carrying close loop such that there are generated north and south poles, and the loop behaves like a magnetic dipole (see Section 6.2, [3]).

7) How the possible Meissner effect can be generated in electric current carrying close loop (see Section 7.1, [3]).

8) How the possible effect of levitation of a magnet above the surface of an electric current carrying close loop can occur (see Section 7.2, [3]).

3.2.1 Discussion

Currently, it has been presumed hypothetically that, due to flow of charge of electrons through the electron beams and current carrying substances, electromagnetism is generated in them, and a magnetic field is generated around them. No explanation is found as to: 1) how these are generated; 2) how the generated magnetic field possesses direction and occurs in a plane perpendicular to the direction of flow of electrons through them (see Section 1, [3]) for detail information).

Regarding generation of magnetic fields around electron orbits and current carrying close loops such that the north and south poles are created and the electron orbits and the current carrying close loops behave like magnetic dipoles, currently no explanation is found as to how all these take place (see Section 6.3, [3] for detail information).

3.3. Generations of resistance-less state, superconductivity, properties, and effects exhibited by substances at their transition temperature T_c

1) How resistance-less state is generated in substances at their transition temperature (at which the substances becomes superconducting) T_c (see Section 1.1, [4]).

2) How superconductivity is generated in substances at their T_c (see Section 3, [4]).

3) How entropy of substances decreases at their superconducting state (see Section 4.1, [4]).

4) How T_c varies from substance to substance (see Section 4.2, [4])

5) How substances like copper (Cu), gold (Au), and silver (Ag) do not superconduct even down to very low temperatures (see Section 4.3, [4])

6) How Meissner effect is generated (see Section 4.4, [4])

7) How the levitation of a magnet above the surface of superconductor occurs (see Section 4.5, [4])

8) How the diamagnetism generated in substances at their superconducting state persists, whereas, that generated at their normal state does not persist (see Section 4.6, [4])

9) How: i) energy of free electrons of the substances is decreased at their superconducting state (see Section 4.7.1, [4]); ii) the decrease in energy of free electrons of the substances goes on increasing as their temperature decreases below their T_c (see Section 4.7.2, [4])

10) How in ferromagnetic substances, superconducting state does not occur (see Section 4.8, [4]).

11) How: i) the normal state of a substance is restored applying a critical value of an external magnetic field H_c across that substance at that's superconducting state (Section 4.9.1, [4]); ii) H_c increases as temperature of the substance decreases beyond its T_c (Section 4.9.2, [4]); and iii) H_c varies from substance to substance (Section 4.9.3, [4]).

12) How: i) thermal conductivity of a substance is discontinuously increased when superconducting state of the substance is destroyed by the application of an external magnetic field H_c (Section 4.10.1,

[4]); ii) thermal conductivity of the substance changes continuously between its two phases, and at superconducting phase, thermal conductivity is found to be lower (Section 4.10.2, [4]).

13) How: i) the substance absorbs heat when superconductivity of the substance is destroyed isothermally by an external magnetic field (Section 4.11.1, [4]); ii) the substance's temperature becomes lower for the adiabatic case (Section 4.11.2, [4]).

14) How specific heat of a substance is discontinuously increased when temperature of the substance is brought down to its T_c (Section 4.12, [4]).

15) How the Josephson's tunnelling is generated (Section 4.13, [4]).

3.3.1 Discussion

To explain how superconductivity, and properties and effects exhibited by the superconductors, are generated, several theories have so far been proposed (see Section 1, [4] for detail information). For BCS theory, it is claimed that it provides better quantum explanation of superconductivity and accounts very well for all the properties exhibited by the superconductors. However, these theories fail to explain several very important properties of superconductors, for example: 1) variation of T_c from substance to substance; 2) decrease of entropy of the substances at their superconducting state. Moreover, if we investigate the rigorous mathematical proof of the BCS theory, we find that, in order to arrive at the desired results, numerous logically and practically unbelievable assumptions have been accepted in that. For example:

In BCS theory, it is assumed that, at temperature T_c of the substance, when an electron approaches a positive ion core, the core suffers attractive Coulomb interaction and that sets the core in motion and consequently the lattice is distorted. Can it logically and practically ever be possible that an ion core, which is obtained as the consequence of ejection of electron(s) from a neutral atom and happens to be approximately $1.84A\times10^3$ (where A is the mass number, and $1.84\times10^3 = m_n / m_e$ where m_n and

m_e are the mass of nucleon and mass of electron respectively) times massive than an electron, is attracted by an electron? Can that attraction set the ion core in motion? Can the motion of core distort the lattice, which is a regular periodic array of number of atoms?

Further, the above assumption contradicts two well-observed facts:

1) Due to attractive Coulomb interaction between electrons and ion cores of the substance, if its ion cores are set in motion and consequently its lattices are distorted, then disturbance and hence disorderness in the substance should be increased, that means, entropy of the substance should be increased. While on the contrary, according to experimental observations, entropy of the substance decreases.

2) Due to setting of ion cores into motion and consequently distortion of lattices of the substance, resistance of the substance should be increased. While on the contrary, resistance of the substance reduces to zero.

Furthermore, the concept of Cooper pairs, their formations, and flow of persistent current due to flow of Cooper-pairs through the substances too gives rise to several very basic and fundamental questions. For example, at temperature T_c of the substances:

1) How and from where do the Cooper pairs obtain their initial linear velocity with which they start flowing?

2) How is their linear velocity maintained for indefinitely long time against the gravitational force, which acts on them continuously during their flow?

3) How are the directions of motion of all the Cooper pairs oriented and aligned in one direction (along the direction of flow of persistent current)?

4) Are the Cooper pairs broken? and are the electrons separated from their respective pairs? when a critical value of an external magnetic field (H_c) is applied across the substances and their normal states

(i.e., when the persistent current stops flowing) are restored? If yes, then how does it happen so? Moreover, if not then how does the persistent current stop flowing?

3.4 Generation of properties in deuterons, alpha particles, and nuclei, exhibited by them, and their structures

1) How a proton (P) and a neutron (N) combining with each other constitute a deuteron, and neutron in this combination becomes stable (see Section 3.1.1, [6]).

2) How deuteron (N P) only exists in nature, and the systems di-proton (P P) and di-neutron (N N) do not exist in nature (see Sections 3.1.2 and 3.1.3, [6])

2) How, due to the addition of one P in system N N, the resultant system tritium (^{3}H) becomes stable, while the system N N is not stable and hence does not exist in nature (see Section 3.2.1, [6]).

3) How the binding energy per nucleon (E_b) of the nucleus of ^{3}H, i.e. $(E_b)_{H^3}$ becomes $> 2 \times (E_b)_D$, where $(E_b)_D$ is the E_b of deuteron (see Section 3.2.2, [6]).

4) How, due to the addition of one N in system P P, the resultant system helium-3 (^{3}He) becomes stable, while the system P P is not stable and hence does not exist in nature (see Section 3.2.3, [6]).

5) How the E_b of the nucleus of ^{3}He, i.e., $(E_b)_{^3He}$ becomes $> 2 \times (E_b)_D$ (see Section 3.2.4, [6]).

6) How the $(E_b)_{^3H}$ happens to be > the $(E_b)_{^3He}$ (see Section 3.2.5, [6]).

8) How, despite the $(E_b)_{^3H}$ > the $(E_b)_{^3He}$, the ^{3}H happens to be radioactive (unstable) and decays into ^{3}He through beta (β) decay (see Section 3.2.6, [6]).

9) How two-neutrons and two-protons are arranged in alpha particles (α), and their nucleons are so strongly bound together that they (α) behave like particles (see Section 3.3.1, [6]).

10) How the E_b of α particle is increased to > $6 \times (E_b)_D$, instead of increasing to $2 \times (E_b)_D$ (see Section 3.3.2, [6]).

11) How nucleons are arranged in nuclei having mass number A = integer multiple of 4 [e.g., nuclei of helium-4 (^{4}He), beryllium (^{8}Be), carbon (^{12}C), oxygen (^{16}O), neon (^{20}Ne), magnesium (^{24}Mg), and so forth] such that they (nuclei) are most strongly stable, and how their E_b increases as their A increases in multiple of 4 (see Sections 3.4.1 – 3.4.9, [6])

12) How the E_b of the nucleus of beryllium (^{8}Be) < the E_b of the nucleus of helium (^{4}He), while the E_b of nuclei increases as their A increases by integer multiple of 4 {see bullet a) of Section 3.4.2, [6]}.

13) How nucleons are arranged in nuclei possessing A ≠ integer multiple of 4 such that these are not strongly stable, for example: i) lithium-6 (^{6}Li), and lithium-7 (^{7}Li) of which E_b increases as their A increases but the E_b of ^{6}Li and ^{7}Li are happened to be < the E_b of ^{4}He, while the A of ^{6}Li and ^{7}Li > the A of ^{4}He (see Section 3.5.1, [6]); ii) boron (^{11}B) of which E_b increases as it's A increases but its E_b happens to be < the E_b of ^{8}Be though the A of ^{11}B > the A of ^{8}Be **(**see Section 3.5.2, [6]); iii) nitrogen (^{14}N) of which E_b increases as it's A increases but its E_b happens to be < the E_b of ^{12}C though the A of ^{14}N > the A of ^{12}C (see Section 3.5.3, [6])

14) How the E_b of nuclei, after becoming maximum near A = 62, gradually starts decreasing as A of nuclei increases **(**see Section 3.6.1, [6])

15) How the nuclei become radioactive when their A > 200, and how alpha (α) and beta (β) particles are produced and emitted from them {see bullet a) of Section 3.6.2, [6]}.

16) How beta particles emitted from radioactive sources have a continuous energy spectrum {see bullet b) of Section 3.6.2, [6]}.

17) How γ (gamma) and ν (neutrino) are emitted from the nuclei, and how they obtain particle like physical existence {see bullet c) of Section 3.6.2, [6]}.

18) How γ and ν obtain so high energy and momentum {see bullet d) of Section 3.6.2, [6]}.

3.4.1 Discussion

Several nuclear models have so far been proposed but, regarding the structures of deuterons, alpha particles, and nuclei, e.g., how neutrons and protons are arranged in them such that the neutrons become stable and the nucleons are bound together in them, no explanation is found anywhere.

Regarding properties of deuterons, alpha particles, and nuclei too, as listed in Section 3.4, almost no explanation is found anywhere how they are generated.

4 Conclusion

As we know, properties of a person depend upon his physical and mental structures, and a work performed by him depends upon his properties, and condition(s) under which the work is performed. In the same manner, properties of quanta should depend upon their structures, and the phenomena, properties of their systems, and structures of their systems, generated due to them, should depend upon their properties, and conditions under which the phenomena, properties of their systems, and structures of their systems are generated. Therefore, if a theory is developed to explain the phenomena, and properties and structures of their systems, which are generated due to them, that theory should be developed taking into account their properties [e.g., see bullets 1), and 2), and bullets i), ii), and iii) of Section 2], and condition(s) under which, for example: 1) presence of photons in substances, which colliding with free electrons of the substances produce resistance in their flow, in significant amount at their normal state (see Section 4, [3]); 2) presence of photons in substances in insignificant amount at their superconducting state (see Section 1.1, [4]); 3) no presence of photons in electron, proton etc. beams, and nuclei; the phenomena, properties of their systems, and structures of their systems are generated due to them. Otherwise, the developed theory, e.g., the quantum wave theory, and current quantum field theories, such as Yukawa meson field theory, and BCS theory, cannot be true. Consequently, if the rigorous mathematical proofs of the quantum wave theory and current quantum field theories are examined, in them, numerous logically and practically unbelievable assumptions have been accepted (see Section 1, [9] for quantum wave theory, and Sections 3.1.1, and 3.3.1 for quantum field theories) in order to arrive at the desired results. Further, despite accepting numerous logically and practically unbelievable assumptions, the quantum wave theory fails to explain numerous phenomena, e.g., see Section 1, [9], and current quantum field theories fail to explain, for example: 1) properties listed in Sections 3.2, and 3.4, and several properties of the list of Section 3.3; and 2) structures of deuterons, alpha particles, and nuclei.

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References

1. H. Yukawa, On the interaction of elementary particles, Proc. Phys.-Math. Soc. Japan **17,** 48 (1935).
2. J. Bardeen, L.N. Cooper, J.R. Schriefer, Theory of superconductivity, Phys. Rev. **108** (5), 1175 (1957).
3. Kunwar Jagdish Narain, Understanding electromagnetism: A new approach, vixra: 1111.0072v6 (Condensed Matter) (2011).
4. Kunwar Jagdish Narain, Understanding superconductivity: A new approach, vixra: 1111.0097v5 (Condensed Matter) (2011).
5. Kunwar Jagdish Narain, Why and how electrons and nucleons possess persistent spin motion, viXra: 1512.0331v9 (High Energy Particle Physics) (2015).
6. Kunwar Jagdish Narain, Understanding deuterons, alpha particles and nuclei: A new approach, vixra: 1203.0105v4 (Nuclear and Atomic Physics) (2012).
7. W. Bertozzi, Speed and kinetic energy of relativistic electrons, Am. J. Phys. **32**, 551 (1964).
8. Kunwar Jagdish Narain, A new force with characteristics of nuclear force and both attractive and repulsive components, vixra: 1207.0109v6 (Nuclear and Atomic Physics) (2012).
9. Kunwar Jagdish Narain, A new quantum theory, viXra:1512.0327v9 (Quantum Physics) (2015).