SCIREA Journal of Physics
https://www.scirea.org/journal/Physics
August 31, 2019
Volume 4, Issue 5, October 2019

An interesting model of annular elementary particle

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Abstract:

In the Theory of System Relativity, we adopt the research methodology "from small to large" and propose the concepts of the shuon and the cnon based on the assumption of the quantum nature of matter; then, we use the cnon to gradually construct particle models for the photon, electron, proton, atom, and molecule and eventually to construct the colorful material world that we see.

Keywords: the Theory of System Relativity, view of matter in terms of monism with two-state, energy quanta, shuon, cnon

1. Introduction

Nature is based on matter, and matter is quantized. Matter has two states: a fluid state and a rigid-body state. These two states of matter depend on each other, interact with each other, and convert into each other. This is the **view of matter in terms of "monism with two-state"** in the Theory of System Relativity[1].

2. Several basic concepts of matter

In the Theory of System Relativity, existing physics terms are adopted for many concepts, but the meanings of these terms are not entirely identical to their accepted meanings in modern physics. When such terms and concepts are mentioned in this book, unless otherwise specified, they refer to their definitions in the Theory of System Relativity.

2.1. Energy quanta

In the Theory of System Relativity, all matter consists of **energy quanta**, and the energy quantum is the most basic unit that constitutes matter. This is the so-called "monist nature" of matter. Every energy quantum has an energy e_0, and energy is the most basic property of matter.

In the Theory of System Relativity, the energy quantum differs from the definition given by M. Planck. M. Planck defined the energy quantum as the energy quantum of the photon, namely, the basic unit that constitutes the photon, which is only applicable to the photon. The energy quantum in the Theory of System Relativity is the basic unit that constitutes matter, which is applicable to all matter (including the photon).

2.2. The shuon and space

The energy quantum of the fluid state (continuous state) of matter is called the **shuon**. A free-state (static-state) shuon is an endoplasmic uniform near-sphere with an extremely large elastic modulus and without a nucleus. The free-state shuon is the basic form of the existence of the energy quantum, namely, the ground state of matter.

The matter that consists of shuons is a type of fluid-state matter, which is called the shuon fluid(it is a type of "**superfluid**"). The shuon is the fundamental unit that constitutes the shuon fluid. Similar to the structure of alveoli, shuons in the shuon fluid are connected together without gaps, as shown in Figure 1.

The shuon fluid is invisible and fills the entirety of space. In other words, the shuon fluid is the noumenon that constitutes geometric space. Absolutely free space does not exist. Thus, **Space** is an alternative name for the shuon fluid, and it is the same concept that was historically known as the "ether." Let the volume of a shuon be V_s; then, the space energy density ρ_s and the space density ρ can be expressed as follows:

$$\rho_s=e_0/V_s \quad (1.1)$$

$$\rho=1/V_s \quad (1.2)$$

The concept of space in the Theory of System Relativity is different from the concept of space (i.e., space) in modern physics. In modern physics, the ground state (the state with the lowest energy) of the quantum-field system is space, which is a special state of the quantum field; in the Theory of System Relativity, space is the fluid state of matter (i.e., a continuous state), and it is the general state of matter. Therefore, their physical meanings are completely different.

In both the Theory of System Relativity and modern physics, fields and space are considered to be unified. In the Theory of System Relativity, space is a means of expressing the geometric properties of the shuon fluid, and a field is a means of expressing the dynamic properties of the shuon fluid. The underlying noumenon of both concepts is the shuon fluid.

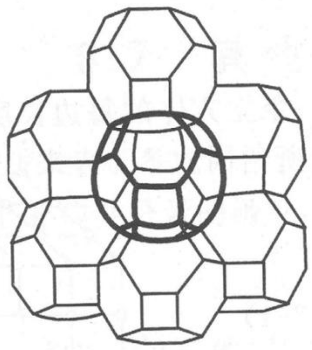


Figure 1. Schematic diagram of shuon structure

2.3. The cn particle and objects

The energy quantum of the rigid-body state (discrete state) of matter is called the **cn particle** (or **cnon**). The cnon is a circular rigid body in the shape of a bracelet, and it is a special state of existence of the energy quantum (see Figure 2).

Matter that consists of cnons is called rigid-state matter, which, in short, is called an **object**. An object is the collective name for the cn particle, the photon, the electron, the proton, atoms, molecules, normal objects, and celestial bodies; the cn particle is the most basic unit that constitutes all objects and is also the smallest object.

In particle physics, the Standard Model defines 62 types of elementary particles that cannot be further divided, including the photon, the neutrino, the antineutrino, the electron, and the positron. However, the fact that the photon and the electron can convert into each other and the fact that the Compton effect demonstrates that the energy of a photon can be changed are not compatible with the definition of an 'elementary particle.' These experimental phenomena are sufficient to indicate that neither the photon nor the electron is truly a so-called elementary particle.

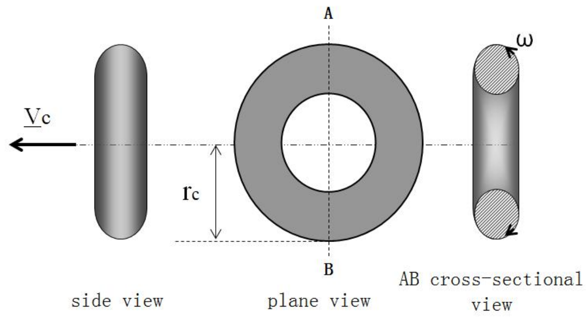


Figure 2. Structure and state of the cnon

The cnon in the Theory of System Relativity differs from the concept of an elementary particle in modern physics. The cnon has uniqueness and is a concept that is equivalent to the energy quantum of M. Planck. The cnon is the most basic unit that constitutes the 62 types of elementary particles defined by the Standard Model. The cnon is the true "building block of the Universe."

3. Shuon field

A vortex is a collection of microscopic fluid mass rotating around a common center, and it has an eddy structure with vorticity accumulation, which is called a **vorticity field**. The vorticity field formed by the shuon fluid is called the **shuon field**.

3.1. Vortex tube and vortex ring

In the theory of vortex motion, a vorticity field can be described in terms of a vortex line and a vortex tube. A vortex line is a line in the vorticity field that is tangent to the vorticity vector **ω**. The equation of a vortex line is

$$\boldsymbol{\omega}\times\delta\mathbf{r}=0 \tag{2}$$

where δ**r** is the position vector. If we randomly choose one retractable loop in the vorticity field (not a vortex line) and draw a vortex line from every point on the loop, these vortex lines compose the **vortex tube.**

The intensity of the vortex tube is expressed by the vortex flux $\Phi(=\iint\omega\bullet n\delta S)$, where S is any cross-sectional surface of the vortex tube and n is the unit vector of this cross section. According to Stokes' Law, the intensity of the vortex tube can be expressed by the vorticity velocity $\Gamma(=\oint v\bullet\delta\mathbf{r})$ on the periphery of the cross section.

Based on the discussion above, a vorticity field is a tube-type vector field, i.e.,

$$\nabla \cdot \boldsymbol{\omega}=0 \quad (3)$$

where ∇ is the gradient tensor. From this equation, we find that the intensity of a vortex tube is the same everywhere along the tube, i.e., Γ= constant; the vortex lines and the vortex tube do not terminate in the fluid. We can calculate the spatial integral of the vorticity field, $\int \nabla \cdot \omega dv$ (where v is the velocity at a certain point in the field) and apply Gauss's Law to derive the following expression:

$$\int \boldsymbol{\omega} dv=0 \quad (4)$$

which is called the principle of total vorticity conservation. This result reflects the fact that a vortex tube, as the geometrical description of a vorticity field, is always a closed vortex ring in three-dimensional space.

If we consider a vortex tube as a rigid body, the vorticity is equivalent to the relative speed of motion, v_s, between two adjacent vortex tubes. Suppose, as shown in Figure 3, that the angular motion (ω) and linear motion (v) of a vortex tube obey the left-hand rule (which is a postulate in the Theory of System Relativity). In other words, if one were to hold the vortex tube in one's left hand, straighten the thumb, and bend the other four fingers, then the fingers would curl in the direction of the angular motion and the thumb would point in the direction of the linear motion.

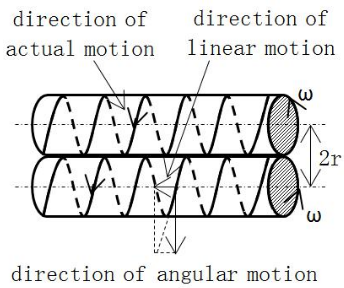


Figure 3. Motion of a vortex tube

In general, the directions of linear motion of adjacent vortex tubes inside the shuon field are the same, and therefore, the velocity of the relative motion between adjacent vortex tubes v_s can be expressed as follows:

$$v_s=2\omega r \quad (5)$$

Therefore, the vorticity can be understood as twice the angular velocity of the rigid rotation of the microscopic fluid mass around its center.

3.2. State function of a vortex ring

By combining the aforementioned rigid model of a vortex tube with the theory of vortex motion, we can determine the relationship among the angular velocity of a vortex ring, ω; its linear velocity, v; and its curvature radius, R: ω and v are both inversely proportional to R. Assuming that R is positively proportional to the radius of the cross section of the vortex ring, r, we find that both ωr and vR are constant, i.e.,

$$r/R=k \tag{6.1}$$

$$\omega\times r=k_1 \tag{6.2}$$

$$v\times R=k_2 \tag{6.3}$$

where k, k_1, and k_2 are all universal constants, and the curve that illustrates their relationship is presented in Figure 4.

The variation in the states of the angular motion and linear motion of a vortex ring with the radius of curvature R is collectively known as the **state function** of a vortex ring, which is expressed as T(R). T(R) can be written as follows:

$$T(R)=\{\omega r,\ v\} \tag{7}$$

As shown in Figure 4, when R is relatively large, then ωr>v; the rotation dominates, and the state is called a rotational state. When R is relatively small, ωr<v; the linear motion dominates, and the state is called a **linear state.**

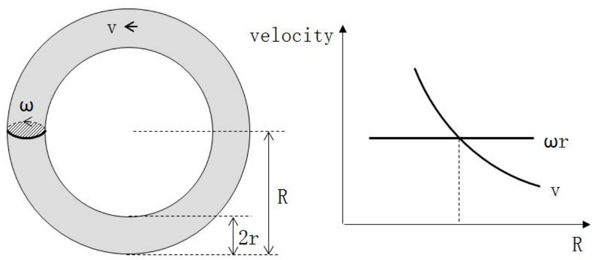


Figure 4. Relationship between the angular motion and linear motion of matter on a vortex ring

3.3. Solitary wave solutions of the nonlinear Schrödinger equation

The shuon field is a vortex field that consists of a number of vortex rings. Because of the self-induced vortex motion, the shuons in the vortex ring are subject to continuous deformation and movement. On the one hand, the spatial dimension of the vortex continues to decrease; on the other hand, the shuons in the vortex are constantly stretched, forming many small vortex lines in the vortex ring. In other words, one vortex ring can be decomposed into many smaller sub-vortices, as shown in Figure 5.

The number of shuons contained by every sub-vortex ring is less than the number contained by the original vortex ring. Similarly, because of the self-induced motion of the sub-vortex ring, each sub-vortex ring can be further decomposed into sub-vortex rings with even fewer shuons, to eventually form a circular vortex ring composed of a single shuon. Because the shuon is indivisible, this single-shuon vortex ring cannot be further divided. Therefore, the self-induced motion of the shuon field does not continue infinitely because it must end with the generation of a single-shuon vortex ring. The so-called singularity of the vorticity field in the theory of vortex motion does not exist.

It is readily apparent from Figure 5 that at the apex of the vortex of the shuon fluid, like bubbles continuously blown from a bubble machine, single-shuon vortex rings in the rigid-body state can be continuously generated and spread outward.

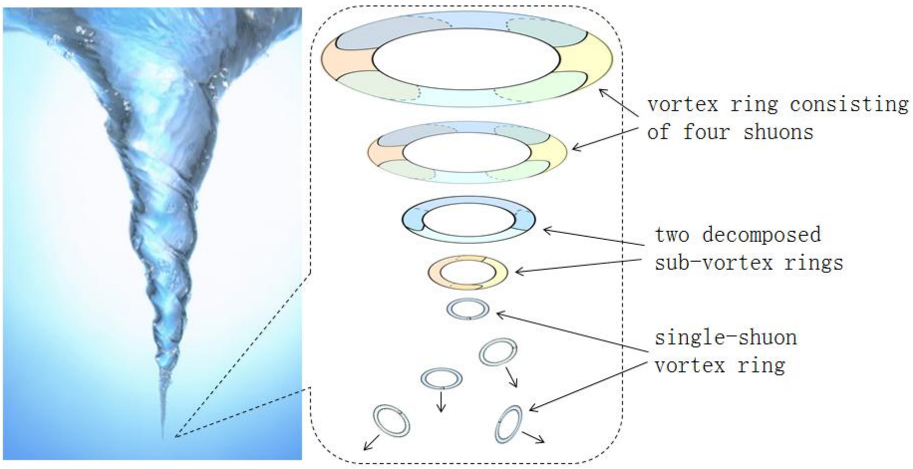


Figure 5. Self-induced motion of vortex rings in the vorticity field of the shuon fluid and the isolated wave solution

The single-shuon vortex ring is the **solitary wave solution** to the nonlinear Schrödinger equation in the shuon field, and it moves in the axial direction at a constant speed without changing shape. This is a typical example of a closed analytical solution derived from the Biot-Savart law.

The aforementioned process is called the **mutation** of shuons. A single-shuon vortex ring moves in the manner of a rigid body, and the angular velocity ω_c, linear velocity $\underline{v}_c$, and volume V_c are all constant. A vortex ring in the rigid-body state that has mutated from the shuon field is called a **cn particle**.

3.4. Evidence for shuon mutation

The theoretical evidence for shuon mutation is provided by the nonlinear Schrödinger equation. Is there similarly evidence for the presence of shuon mutation in reality? Because of technological limitations, we have not been able to observe the structures of Fermi-level particles, and cnons mutated from shuons are much smaller than Fermi-level particles. Therefore, no direct evidence for shuon mutation can yet be found, but what about indirect evidence?

According to the nuclear hair-growing principle of the Theory of System Relativity, there is shuon mutation on the surface of the nucleus. The indirect evidence for this shuon mutation can be seen in atomic spectral lines, incandescent light, and frictional heat.

4. cnon field

To avoid singularities, the concept of the **vortex core** has been introduced into the theory of vortex motion. In fact, the single-shuon vortex ring is the vortex core in the vortex-line model, and it is the vortex core of a **sub-vortex** generated by the self-induced motion of the shuon field. This vortex core was defined above as the cn particle, and correspondingly, this sub-vortex is referred to as the vorticity field of the cnon (i.e., **cnon field**).

4.1. The structure of the cnon field

The streamlines of the cnon field are depicted in Figure 6 The vortex ring, which consists of shuons, enters from one face of the cn particle and departs from another face. The end at which the vortex ring enters is called the **negative pole**, and the end at which the vortex ring departs is called the **positive pole**. The negative pole and positive pole correspond to the magnetic south pole and magnetic north pole in electromagnetism; therefore, they are denoted by S and N, respectively. It is evident that the cn particle is actually a tiny ideal magnet.

In section 2.1, the energy e_0 of the energy quantum manifests through the vortex flux Φ_{cn} of the cn particle . In other words, the energy of the energy quantum in the fluid state is implicit and cannot be detected; the energy of the energy quantum in the rigid state is explicit and can be detected.

The poles of the cnon field are symmetrically distributed; this type of field is called a **polar field.** By contrast, other fields may be composed of many sub-poles of both N and S types such that the sub-poles of different polarities are uniformly distributed, this type of field is called a **neutral field.**

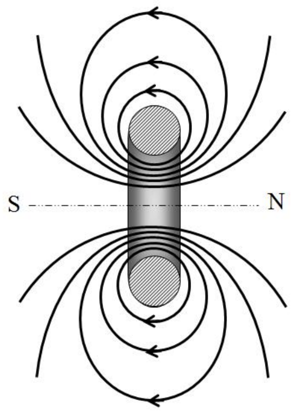


Figure 6. Streamline diagram of a cross section of cn particles

4.2. Stress tensor in the cnon field

In the shuon fluid, the stress tensor σ_{ij} is isotropic, i.e., $\sigma_{ij} = -p\delta_{ij}$, where δ_{ij} is the Kronecker delta and p is a scalar called the intensity of stress (typically known as the pressure). In other words, the stress tensor in any direction at a given point in the cnon field, σ_{ij}, can be written as follows:

$$\sigma_{ij}=-p \tag{8}$$

If we use the space density ρ to replace the mass density of the gas, then this description of the shuon fluid is equivalent to that of an ideal gas at constant temperature. According to the ideal gas law, the intensity of stress at a given point in the cnon field, p, can be expressed as follows:

$$p=k_s\rho \tag{9}$$

where k_s is the stress coefficient of the shuon fluid. We can see that there is a positive correlation between the stress intensity p and the space density ρ. Because the space density ρ is always greater than 0, we find that

$$p>0 \tag{10}$$

We can see that the world of matter is a strictly positive-pressure system.

In essence, the intensity of stress of the shuon field, p, originates from the relative motion between adjacent vortex tubes and is proportional to the square of the velocity of the relative motion between adjacent vortex tubes, v_s, i.e.,

$$p=k_{s1}v_s^2 \tag{11}$$

where k_{s1} is the coefficient of conversion between v_s and p.

4.3. Relationship between the cn particle and the cnon field

A cn particle is subject to the stress generated by its vorticity field, and this stress determines the structure and volume of the cn particle. This stress is mutual, namely, the cn particle and its vorticity field interact with each other. In other words, fluid-state matter and rigid-body-state matter interact with each other and depend on each other. The cnon field is also called the associated field of the cn particle.

In nature, the cn particle is a single-shuon vortex ring generated by the self-induced motion of the field. In other words, the vortex motion of the shuon fluid generates cnons, which are a special form of shuon; the vortex motion of the cn particle itself also creates the vortex field. Therefore, the cn particle and its vortex field are a coexisting, coupled system.

Based on the above discussion, we conclude that space (fields) and objects are dependent on each other and are inseparable.

5. Cohesion of cnons

In the previous section, we mentioned that a cnon is a small ideal magnet. Thus, just as magnets can become attached to each other, cn particles can agglomerate to form a large particle.

5.1. Vortex-tube coupling principle

Disregarding external influences, when two cnons are infinitely separated, we usually consider their fields to be independent of each other and to exert no mutual influence; when they are separated by a finite distance, however, their exterior vortex rings will contact each other.

As shown in Figure 7, the direction of polarity of two cnons with a coincident axis is consistent, namely, the different polarities are opposite to each other. As seen in Figures 3 and 6, the direction of the angular motion of the vortex rings of the two cnons is the same at the contact surface, and the direction of linear motion is opposite. Therefore, the velocity of the relative motion between the two vortex rings, v_s, is twice the linear velocity v, i.e., $v_s=2v$.

According to Figure 4, when cnons are separated by a relatively far distance, the state function T(R) of their vortex rings in contact corresponds to the rotational state, i.e., $\omega r>v$. According to equation (11), the intensity of stress at the contact surface of two vortex rings, p’ (corresponding to $v_s=2v$), is smaller than the value of p (corresponding to $v_s=2\omega r$) prior to contact, i.e., p’<p. Because of their respective internal stresses p, the two vortex rings begin to merge with each other, as shown in Figure 7.

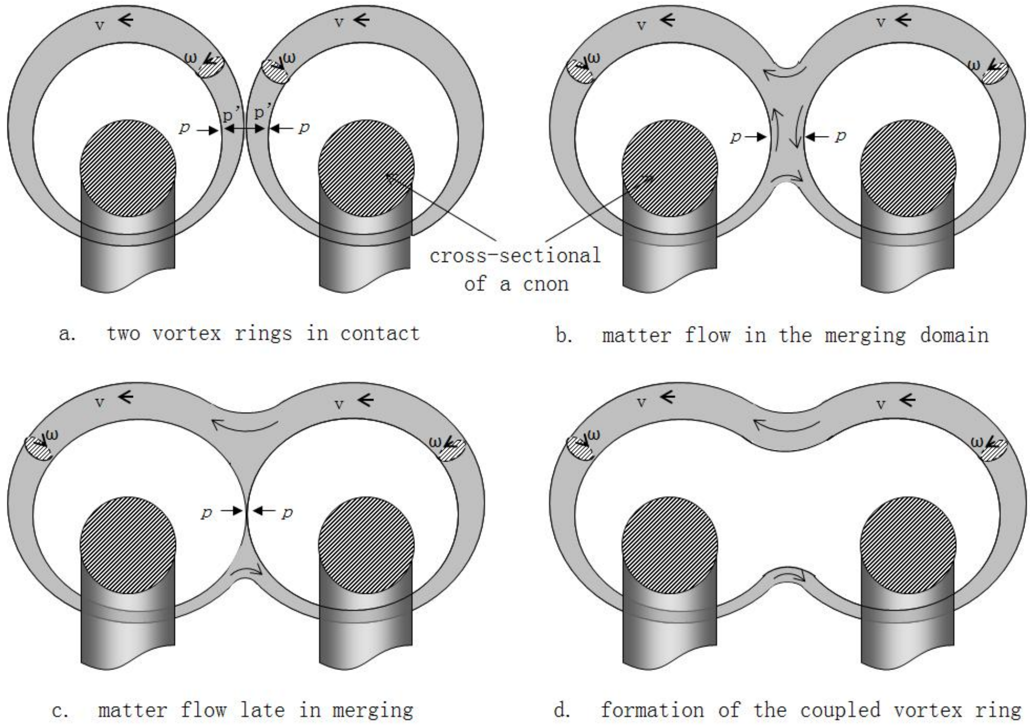


Figure 7. Diagram of the coupling of vortex tubes

During the merging of the two vortex rings, the two vortex tubes on the upper side of the fusion point (and those on the lower side) generate matter flows between the two vortex rings, as shown in Figure 7b; in the fusion region, under the joint action of external stress and internal self-induction, the matter-flow component in the original vortex ring continuously decreases, and the matter-flow component between the two vortex rings continuously increases. Eventually, the matter-flow component in the original vortex ring is entirely replaced by the matter flow between the two vortex rings, and the fusion region becomes laterally disconnected in the middle; therefore, the two originally independent vortex rings become coupled to form a large vortex ring, which is called a **coupled vortex ring**.

5.2. Cohesion of cnons

As mentioned above, a coupled vortex ring is a vorticity field with two cnons as the vortex core, and the stress of the coupled vortex ring manifests as the traction force between the two cnons (proportional to the intensity of stress p), which is called the **coupling force** and is denoted by $\mathbf{F_q}$. The coupling force $\mathbf{F_q}$ can be written as follows:

$$\mathbf{F_q}=\int p\times ds_q \quad (12)$$

where s_q is the coupling surface, as shown in Figure 8.

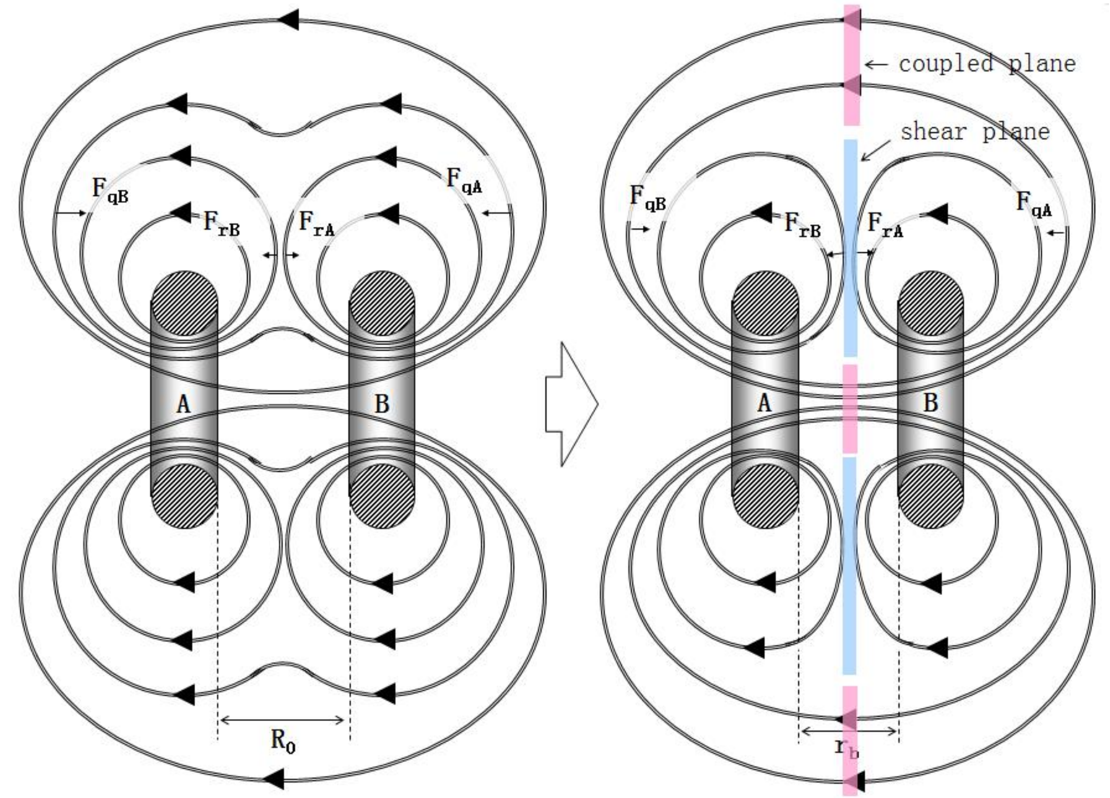
Under the coupling force of the vortex ring, the two cnons continue to approach each other and form a more strongly coupled vortex ring. When the rotation velocity ωr and the linear velocity v of the adjacent vortex rings between the two particles are equal, i.e., ωr=v, the intensities of stress inside and outside the two vortex rings, p and p', are equal, i.e., p=p'. At this time, the vortex tubes are no longer coupled; F_q reaches a maximum, F_{qmax}; and the gap between the two particles is $d=R_0$, as shown in Figure 8a.

Under the action of the coupling force F_q, the distance between the two cnons continues to decrease. On the one hand, the coupling surface gradually decreases, and the coupling force F_q begins to decline; at the same time, the vortex rings of the two particles in contact compress each other, causing deformation and forming a shearing surface s_r from point to plane. Therefore, there is a repulsive stress called the **shearing force**, which is denoted by $\mathbf{F_r}$. As shown in Figure 8, the shearing force $\mathbf{F_r}$ can be written as follows:

$$\mathbf{F_r}=\int -p\times ds_r \tag{13}$$

As the distance between the cnons continues to decrease, F_q also continues to decrease, and the magnitude of F_r continues to increase as the shear plane s_r and the intensity of stress p' increase. Eventually, F_q and F_r become equal in magnitude, i.e., $F_q=-F_r$. At this time, the cnons will no longer continue to approach each other, and the distance between the two particles is $d=r_b$. The cnons have reached an equilibrium state, as shown in Figure 8b. This process is called the cohesion of cnons.

As mentioned in section 2.3, the cn particle is the "building block of the Universe." The



As the distance between the particles becomes smaller than R_0, F_q begins to decrease from F_{qmax}, and F_r begins to increase from zero

Finally, when $F_q = -F_r$, the distance between the particles ceases to decrease, and an equilibrium state is reached; r_b is the equilibrium gap between particles

agglomeration (coupling) property of cnons drives the step-by-step construction of the colorful world around us (including ourselves).

5.3. The composite-force nature of the cohesive force

When two cnons agglomerate to form a new particle, the binding force between the cnons is called the **cohesive force.** The two cnons in the agglomerated state are subject to the coupling force $\mathbf{F_q}$ and the shearing force $\mathbf{F_r}$, which are equal in magnitude and opposite in direction; in other words, their cohesive force **F** is zero. At this time, the force (note that the gravitational force is positive) borne by the cn particles can be expressed as follows:

$$\mathbf{F}=\mathbf{F_q}+\mathbf{F_r}=0 \tag{14}$$

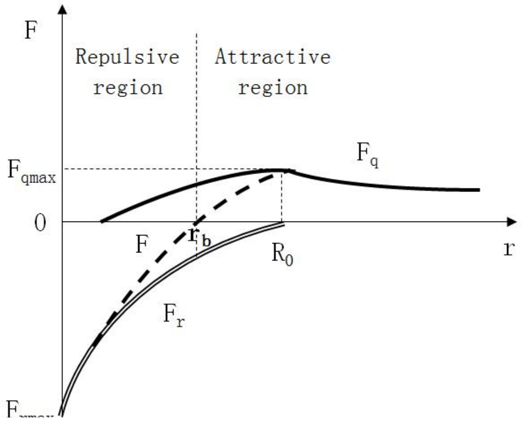


Figure 9. The composite-force property of the interaction between cn particles

As shown in Figure 9, when the distance between two cnons in an equilibrium state decreases, according to the discussion presented in section 5.2, $|F_r|$ increases and F_q decreases; in other words, $\mathbf{F}=\mathbf{F_q}+\mathbf{F_r}<0$. At this time, the two cnons are pushing away from each other because of their mutual repulsive force. By contrast, when the distance between two cnons in an equilibrium state increases, $|F_r|$ decreases and F_q increases; in other words, $\mathbf{F}=\mathbf{F_q}+\mathbf{F_r}>0$. In this situation, the two cnons approach each other because of their gravitational attraction. This is the composite-force nature of the cohesive force.

The composite-force nature of the cohesive force is universally present. In the microscopic environment, the equilibrium among atoms in a molecule and the equilibrium among nucleons in a nucleus are both manifestations of the composite-force nature of the cohesive force. It is worth noting that the concepts of asymptotic freedom and confinement that are proposed in the quark model are also embodiments of the composite-force nature of the cohesive force.

6. Annihilation of cnons and antiparticles

In quantum field theory, the collision of an accelerated particle and antiparticle will cause annihilation. That is, they annihilate to become a virtual photon, and the virtual photon is subsequently converted into other particles according to the laws of energy and momentum conservation. In short, the particle and antiparticle collide and are converted into other particles. Obviously, this annihilation actually represents conversion between different particles, where the particles before and after the conversion are all so-called "elementary particles." Therefore, the so-called "elementary particles" are not elementary, and nothing is annihilated in the so-called "annihilation."

6.1. Cnon annihilation principle

For two cnons in relative motion, if their auto-revolutions (the revolutions of the cnon rings) are opposite, namely, their polarities are opposite to each other (as shown in Figure 10), then these two cnons cannot be coupled through their vortex tubes, and therefore, there is no bonding force $\mathbf{F_q}$ between them, i.e., $\mathbf{F_q}\equiv 0$; there is only a shearing force $\mathbf{F_r}$ between them, i.e., $\mathbf{F_r}<0$. The force between these two cnons, $\mathbf{F}$, is $\mathbf{F}=\mathbf{F_q}+\mathbf{F_r}<0$. Therefore, the two cnons repulse each other. In this situation, the two particles can approach each other only by taking advantage of some external force to overcome the repulsive force between the two cnons.

As mentioned above, when the surfaces of two cnons are in direct contact, the vortex rings of the cnons are then mutually blocked, and the cnon field disappears; without the stress protection of the field, the volume of the cnons rapidly expands. Therefore, the single-shuon vortex ring in the rigid-body state returns to an elastic ball, namely, the cnon annihilates and undergoes reverse mutation into a shuon.

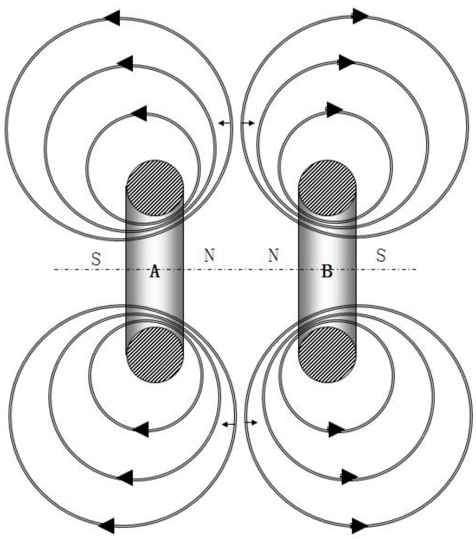


Figure 10. Repulsion when the two same-polarity poles of two cnons are oriented opposite to each other

As for a conglomeration of two cnons, if we apply an external force to bring the surfaces of the two cnons into direct contact, the cnons will similarly annihilate and undergo reverse mutation into shuons. This phenomenon might serve as evidence for the presence of the equilibrium gap r_b (see Figure 8). Apparently, the annihilation of particles not only occurs between so-called particles and antiparticles but could also occur between particles of the same type. Using this idea, we can clarify the mystery of the nature of "antiparticles" and "antimatter."

It is worth mentioning that unlike the concept of annihilation as defined in modern physics, the annihilation considered here is the conversion of rigid-state matter into fluid-state matter; it is simply conversion between different morphologies of matter. It should be emphasized that matter does not disappear. There are no so-called "virtual particles," and matter is conserved. This is the mass-conservation principle of the Theory of System Relativity; it is also called the energy-conservation principle.

6.2. Seeking evidence for the annihilation of cnons

As mentioned above, the key to achieving the annihilation of cnons is to overcome the repulsive force between the cnons, and the simplest approach is to use a particle collider to study cnon annihilation. According to the Theory of System Relativity, electrons and protons both consist of cnons. If we view the cnon as a small magnet, then the electron and the proton are both accumulated bodies of many small magnets. The various particles produced through the collision of two protons represent the re-grouping of two collections of small magnets, while the cnons themselves remain intact during this process. However, at present, we still do not have the technology to extract and accelerate cnons, and therefore, we cannot find direct evidence for the annihilation of cnons using particle colliders.

Another possibility is that if we can establish an environment in which the repulsive forces between cnons are eliminated, then the annihilation of cnons will become easy to achieve. According to the Theory of System Relativity, such an environment is one with extremely high pressure, which also seems to be beyond the reach of current technology.

However, from the black-hole Big Bang theory, we can find evidence for the annihilation of cnons. According to the Theory of System Relativity, a black hole is a spindle-shaped hypernucleus with extremely high internal pressure. In particular, the distance between cnons in such an environment, r_b', is much smaller than the separation distance r_b in a proton. As the internal pressure of the black hole slowly increases, it eventually causes annihilations because the distance between cnons becomes zero, leading to a chain reaction that results in the Big Bang of the black hole. Evidently, the Big Bangs of black holes may serve as the evidence for the annihilation of cnons.

6.3. The relativity of contact

According to the discussion presented above, there is no stable state of real contact between two cnons. By extension, there is no real-contact state of physical significance between any two objects. According to section 5, there is an equilibrium gap (r_b) between two cnons in any aggregation of cnons, namely, a **contact gap**. In other words, any contact between cnons (cohesion) is based on the concept of relative contact; by extension, the collisions and contact between any and all objects have the physical meaning of **relative contact**.

Consequently, we come to the following conclusions: regardless of the state of motion of an object, there is always a contact gap between objects. Therefore, any contact between real objects is relative.

7. Closings

In the Theory of System Relativity, we adopt the research methodology "from small to large" and propose the concepts of the shuon and the cnon based on the assumption of the quantum nature of matter; then, we use the cnon to gradually construct particle models for the photon, electron, proton, atom, and molecule and eventually to construct the colorful material world that we see. The Theory of System Relativity adopts a brand-new conceptual system that is different from past concepts. Through the establishment and updating of concepts, the Theory of System Relativity establishes a new approach to understanding nature and a new method of describing nature and, in the process, paints a brand-new picture of the world.

References

[1] Liu Taixiang, *the Theory of System Relativity*, SCIENTIFIC AND TECHNICAL DOCUMENTATION PRESS, Beijing: China, 2012.