

# Triternary Balance Law and ternary Balance System

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**Abstract:** In the movement of a single pendulum, a person is often used to represent the trajectory of a waveform diagram. The "wave peak" and "wave valley" in the waveform diagram of this express single pendulum motion trajectory are actually the positions of the two non-equilibrium states of the single pendulum motion. When the single pendulum is in both non-equilibrium positions, the kinetic energy is completely converted into potential energy. The whole process of single pendulum swing is actually the process of single pendulum returning to the balance state. Single pendulum swing is a process of repeated conversion between potential energy and kinetic energy, which is also a state of dynamic equilibrium. The process of swinging alone is a process of the movement of the ternary balance system, which is a common normal thing of energy under the action of the ternary balance law. Whether it is water waves, or electromagnetic waves, or even the formation of electrons, basic particles, are inseparable from the action of the ternary equilibrium law on them, so they are a kind of ternary equilibrium system. This paper is from a global perspective of natural systems to explain some of the common phenomena in nature and to explain how things in the micro world act on the macro world through the law of ternary equilibrium.

**Key words:** system; fluctuation; energy; electromagnetic waves; electron; quantum mechanics; electric field; magnetic field; ternary balance law

## Introduction

In the end of the 19th century, the deficiencies of classical mechanics and classical electrodynamics became increasingly apparent in describing microsystems, and it was founded at the beginning of the 20th century by a large number of scientists. However, in the research of quantum, almost all use the scientific laws of the macro world discovery to understand the micro world, so it is inevitable to become like a kind of philosophical thinking. The law of ternary equilibrium provides a brand new perspective for the study of quantum mechanics. The ternary equilibrium law of the micro world and other scientific laws of the macro world can complement each other. One is the scientific law applicable to the micro world found through global philosophical thinking to the macro world. One is the scientific study of local phenomena in the macroscopic world, the scientific law of discovery. There is a slight difference between the two, that is, the law of ternary balance, studying the macro world in a systematic and global way, will sometimes be like a philosophical study. Other scientific laws derived from local phenomena in the macro world are also like a philosophical thinking in the application of the micro world. For example, Einstein said that "God won't roll the dice", Schrodinger's cat, and so on, are all examples similar to philosophical thinking in such cases.

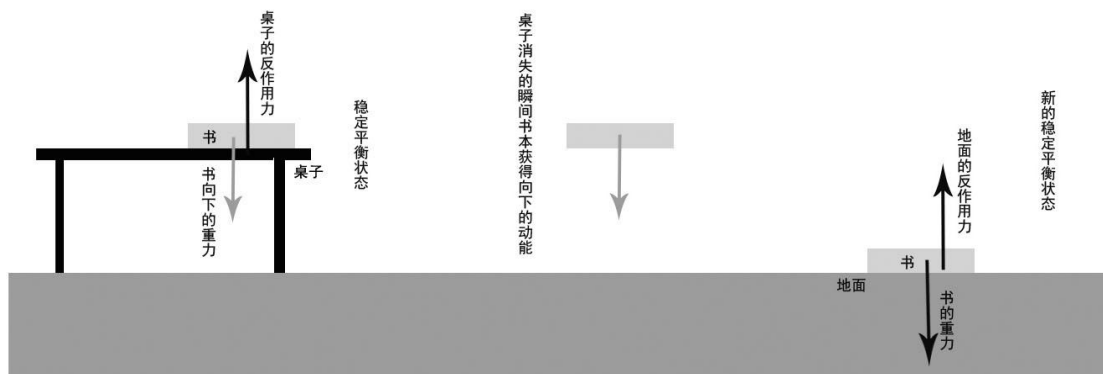
## 1. Overview of ternary equilibrium law and ternary equilibrium state

### 1.1 ternary Balance Law

We imagine a scene in a room with a table with a book when the gravity of the book and the counteraction of the table on it are in a macroscopic stable equilibrium between the two.

We assume that one moment the table suddenly disappeared out of empty air, when the book originally placed on the table suddenly lost the reaction force of the table on its gravity, and the balance state between the original gravity and the reaction force of the table on it was suddenly broken, making the book into a non-equilibrium state. At this time, the books will fall from high to the ground, and the books will regain a new state of stable balance. That is, the new steady equilibrium state between the gravity and a ground reaction on it.

Throughout the process from the original equilibrium state to the new equilibrium state, the book obtains the potential energy, which then transforms into the kinetic energy, and eventually disappears after hitting the ground. In this whole process of the book falling, the book is from a non-equilibrium state to another new macroscopic equilibrium state, this process from non-equilibrium to equilibrium state, the energy changes.



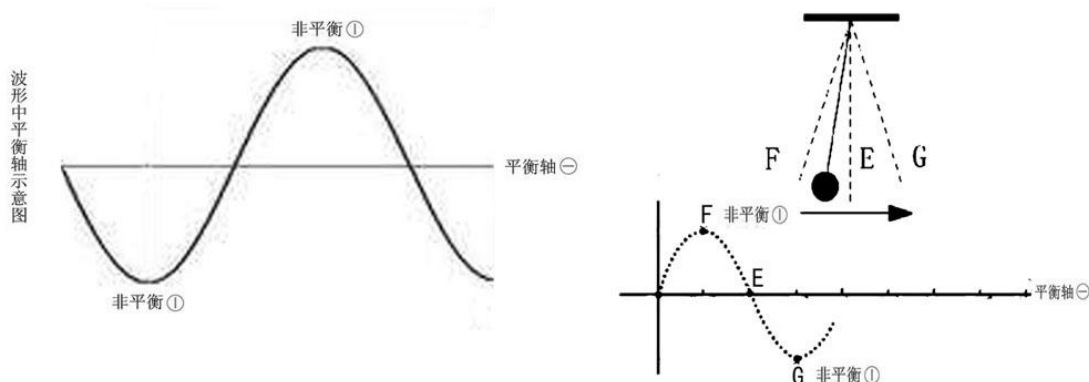
The process of energy change that occurs in the process from non-equilibrium state to equilibrium state is the process of ternary equilibrium. The process of ternary equilibrium is actually a ternary equilibrium state in some sense. The ternary equilibrium state, the three most basic states that must follow by the system formed between all things in the universe.

### 1.2 ternary balance state

The fluctuation of water is the most common macrodynamic ternary equilibrium state in nature, and also the most basic ternary equilibrium state model in nature.

If there is a piece of wood floating on the water, when the water is calm, the gravity of the wood and the buoyancy of the wood is a pair of balance. When the water surface forms a water wave, the gravity of the wood and the water buoyancy on the wood, the dynamic balance state appears. When the wood is located at the peak, the downward gravity is greater than the upward buoyancy, which is in a non-equilibrium state. When the wood is located in the trough, the downward gravity is less than the upward buoyancy, and the gravity is also in a non-equilibrium state with the buoyancy. The motion of wood and water waves back and forth between these two nonequilibrium states is the macrodynamic triplet equilibrium of the water waves.

The periodic swing of a single pendulum is also a common state of ternary equilibrium. In traditional physics, the periodic swing of the single pendulum is often expressed in terms of a particular waveform diagram. The periodic swing of a single pendulum is actually a state of ternary balance of the macro world, this waveform diagram is actually more accurate, should be a kind of three-dimensional balance diagram.



水波和单摆的三元平衡关系示意图

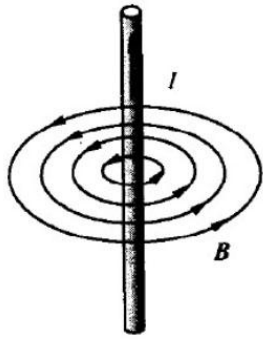
## 2. Superposition of the ternary balance system and the system

### 2.1 ternary balance system

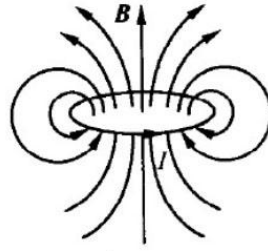
Through the interpretation of the water wave and the single pendulum ternary equilibrium state, we can actually know that everything that exists in the form of the wave, is a dynamic ternary equilibrium state. The dynamic ternary equilibrium state is one of the most basic states of the ternary equilibrium system. The ternary equilibrium system is a system formed by following the ternary equilibrium law.

Electromagnetic wave, as a wave, also follows the equilibrium law of ternary elements. Electromagnetic waves are shock particle waves emitted by a mutually perpendicular electric field and a magnetic field in space, converting to each other. Electromagnetic waves are similar to fluctuations, but in the transmission process, there are no fluctuations in the morphological sense, but transmitted along the direction of the electric field, the electric field and magnetic field form the "similar fluctuation" in the form of energy conversion.

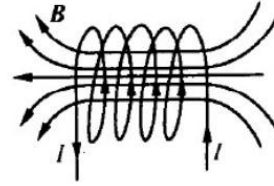
The current produces a magnetic field perpendicular to it, and the conductor cutting magnetic field also forms a current. That is, the flowing electron ons produce a magnetic field perpendicular to it. The conductor cuts the magnetic field, the changing magnetic field, which causes the conductor to form a current. The current formed by the conductor is an electron flow formed under the action of the electric field. That is, the changing magnetic field forms an electric field perpendicular to it. Similarly, the changing electric field forms a magnetic field perpendicular to it. This relation between the interaction and coexistence, which is the electric and magnetic field interactions.



长直导线的磁力线



圆电流的磁力线



螺线管的磁力线

Due to the changing electric field it forms a magnetic field perpendicular to it. Similarly, the changing magnetic field forms an electric field perpendicular to it. According to this relationship of the electromagnetic fields, a wave morphology model of the electromagnetic waves can be introduced. That is, the electromagnetic wave in a fluctuating frequency, the electric field from strong to weak and again from weak to strong, showing a periodic change, changing the electric field around a magnetic field around it. When the electric field becomes strongly weak, the magnetic field surrounding it changes from weak to strong, and when the electric field changes from weak to strong.

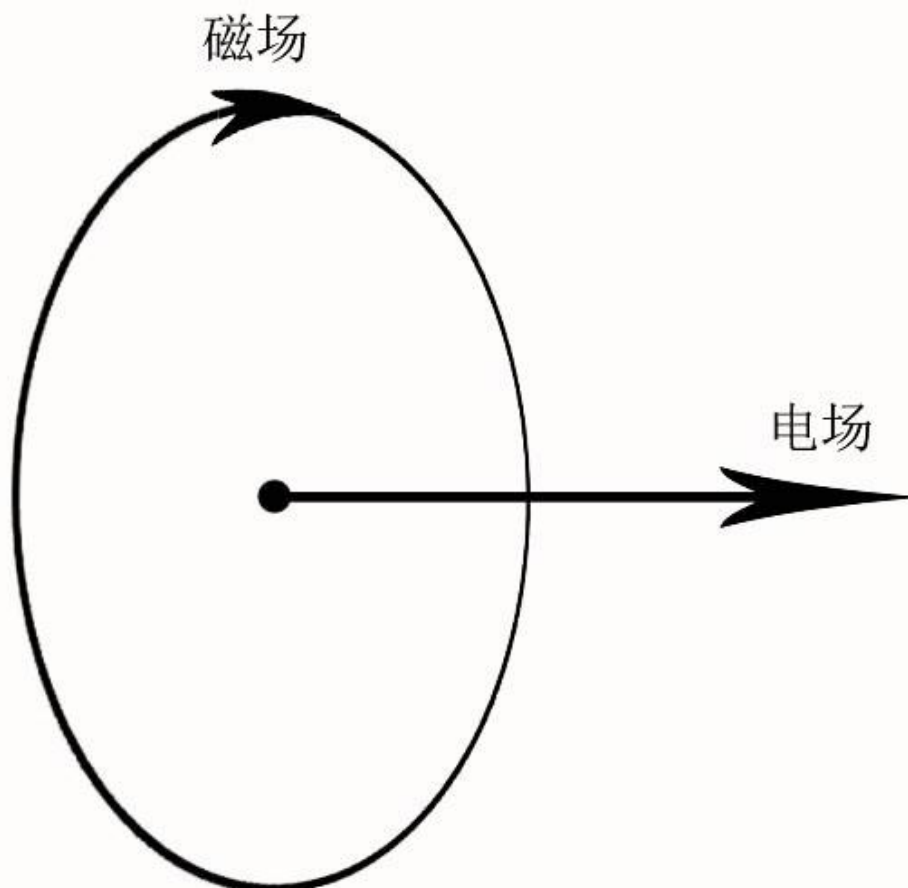
In the ternary equilibrium of the electromagnetic waves, the electric and magnetic fields are two non-equilibrium factors, respectively. Both energies of the electric and magnetic fields in the electromagnetic waves, are similar to the potential energy present in the water waves. In the water wave equivalent to the peak, the downward potential energy due by gravity, and at the wave valley, at the buoyancy. While the changing electric field and the changing magnetic field, this energy in the electromagnetic waves, are similar to the kinetic energy present in the water waves. The process of conversion of electric field to magnetic field and the conversion of magnetic field to electric field are the changing magnetic field and the changing electric field (the process of energy transfer or conversion), similar to the changing kinetic energy (energy transfer or conversion) in water waves. That is to say, in the water wave, the downward kinetic energy from the wave peak to the wave valley, and the wave valley to the wave peak upward momentum, the size of the kinetic energy and the size of the potential energy show a relationship.

The two non-equilibrium factors of electromagnetic waves are also similar to the relationship between the gravity of the water and the buoyancy of the water falling into the water. These two forces, in nonequilibrium states of the peak or valley size, form two potential energies, which are two nonequilibrium factors. The size of the two non-equilibrium factors forms water waves through the mutual conversion of kinetic energy.

In the electromagnetic waves, the electric and magnetic fields are actually equivalent to two different forms of energy. The wood forming the water wave, in the peak position, the gravity is greater than the buoyancy, equivalent to the downward potential energy brought by a gravity. When in the wave valley position, the buoyancy is greater than gravity, equivalent to an upward potential energy brought by a buoyancy. The motion and kinetic energy in the process of fluctuations are the process of non-equilibrium state tends to equilibrium.

Water waves are actually the waves formed by the mutual conversion of the two potential

energy under the action of the kinetic energy. Electromagnetic waves, on the other hand, form from electric and magnetic fields, from energy to two different forms. Because this fluctuation propagation state is similar to that of the macroscopic world, the mutual dynamic transformation of the electric field to the magnetic field is called electromagnetic waves.



电磁波波动形态模型图

Electromagnetic wave is not morphological fluctuations, but a kind of particle with electric field and magnetic field periodic changes, so the electromagnetic wave has wave-particle duality. The electric and magnetic fields alternately enhance or weaken, and the two fluctuation relationship is a mutually transformed relationship, and the change is causal to each other. Electromagnetic waves propagate in the form of particles, but such particles will present a periodic change, namely the periodic transformation of the magnetic field and the electric field, so the electromagnetic waves present a wave particle duality.

form of fluctuations. This state in the form of fluctuations is non-equilibrium tends to equilibrium. So the electromagnetic waves are actually the three-way balance state of the electric field and the magnetic field. This is a most fundamental triplet equilibrium state, and also the most basic ternary equilibrium system. In the general sense, the wave (horizontal wave, longitudinal wave) is also a state of ternary equilibrium, so there are many similarities between the two.

Electromagnetic waves are the most basic ternary equilibrium system in the universe, so it is also the most basic system forming all things in the universe. The most basic ternary balance

systems can also have mutual influence and superposition, but this system superimposed by multiple systems, its characteristics will appear more complex.

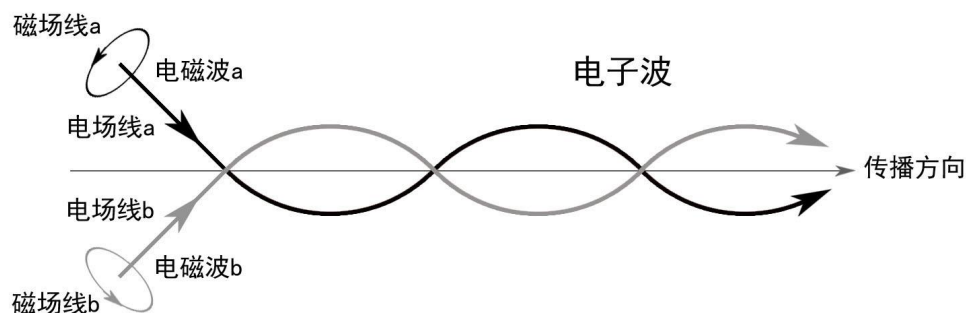
## 2.2 Superposition of the ternary balance system

Through the interpretation of electromagnetic waves by the law of ternary equilibrium, it is known that electromagnetic waves are particles of electric and magnetic field. This particle is characterized by periodic changes, so the electromagnetic waves have a wave-particle duality. The propagation path, direction and velocity of the electromagnetic waves are only related to the electric field, regardless of the magnetic field. A magnetic field is something similar to some kind of "potential energy" in the presence of an electric field in the accompanying electromagnetic waves.

Then the magnetic field transforms in electromagnetic waves except with the electric field. The magnetic field in the electric field wave will also form a magnetic field force, which meets certain conditions, will change the motion trajectory of the electromagnetic waves, causing the electromagnetic waves to form more complex electronic waves.

We assume that when two electromagnetic waves (photons) with the same frequency, the two meet at a certain angle, and at some point in the rendezvous, when the two electromagnetic waves are completely converted from the electric field to the magnetic field, the propagation direction of the two electromagnetic waves has changed due to the action of the magnetic field force.

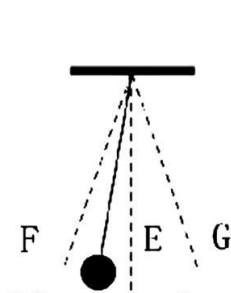
The two electromagnetic waves after the direction changes, soon the magnetic field decay rapidly, while the electric field increases sharply simultaneously, and the two electromagnetic waves after the electric field enhancement propagate with the changed direction. When propagating to a certain distance, the electric field in the two electromagnetic waves attenuate again and turns into a magnetic field, and once again due to the magnetic field force, the propagation direction of the two electromagnetic waves will change again. Thus reciprocating, a superposition state of two ternary equilibrium systems is formed. After superposition formed a new ternary equilibrium system, this new ternary equilibrium system is electron waves, electronic waves are actually electron.



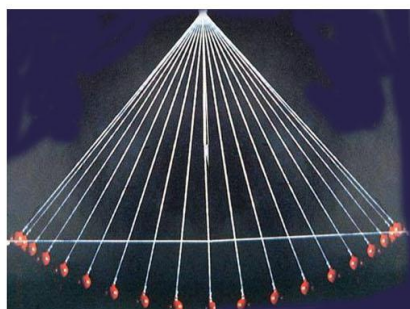
两个电磁波相互影响 形成新的三元平衡状态

Electrons, as a relatively complex ternary equilibrium system, can naturally

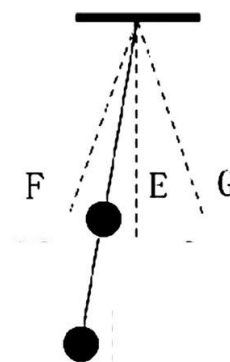
use further superposition to form a more complex ternary equilibrium system, which may be some of the elementary particles. However, after the superposition of such multiple systems, the resulting new system will present a chaotic state, a chaotic state that is difficult to describe laws and predict. Like two three-way equilibrium systems with a single pendulum, with a chaotic pendulum created by superposition, the trajectory of the chaotic pendulum is difficult to predict.



单摆



单摆摆动轨迹



混沌摆



混沌摆摆动轨迹

### 3. Conclusion

The law of ternary balance can not only provide a brand new perspective for the study of quantum mechanics. It can also provide a new perspective for other scientific fields, especially in the research of quantum mechanics, astronomy and other phenomena, will come to some new scientific theories, and these theories can just get through some connection between various disciplines, the whole disciplines of natural science into a whole.

#### Literature:

[1] 《三元平衡定律》, <https://zenodo.org/record/4925298#.YMLB96gzZPY> (June 8, 2021)

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