

# The Reality and Application of *Yin and Yang*

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## Abstract

Ancient Chinese philosophers discovered *Yin and Yang* and the laws of *Yin and Yang* movement during their exploration and practice of nature more than two thousand years ago, and applied them to life, science, philosophy and medicine, playing an important role in the achievement of ancient Chinese civilization. Through historical changes, yin and yang have gradually been regarded as a concept or theory, thus making it difficult for people to understand the connotation of Yin-Yang and make new discoveries and progress. Nowadays, many scholars in China and the West are interested in studying the treasures of ancient Chinese civilization. We illustrate the actual function of Yin and Yang by explaining the essential state of matter, the law of physical movement, the transformation of energy, and then illustrate the practical application in life and science. In conclusion, yin-yang is a key to unlocking the treasures of traditional Chinese civilization, which can help to bring into play its original values, and continue to provide new insights and directions for the development of modern science and the advancement of humanities.

## Keywords

Yin and Yang, Material Properties, Physical Movement, Energy Transformation, Practical Applications

## 1. Introduction

Yin-Yang is a system of concepts developed by Chinese philosophers in their discovery of the unified laws of movement of all things in nature and the methods used to describe the laws of nature. It originated from ancient Chinese sages' understanding of nature. The movement law of yin and yang was introduced in The Tao Te Ching (道德經). It is used to explore the origin of life in the universe [1]. Hawley and Holcomb [2] define cosmology as “the study of the formation, structure, and evolution of the universe as a whole”. In the Yellow

Emperor's Classic of Internal Medicine (黃帝內經), yin and yang were applied to the medical treatment and health care of the human body, establishing a sound theoretical system of Chinese medicine, and in the Jin Kui Yao (金匱要略), which used yin and yang to build a system of discriminatory treatment in Chinese medicine. In the technical work Kao Gong Ji (考工記), the methods and principles of yin and yang are used in many manual techniques. In agricultural production and climate forecasting, the laws of movement of yin and yang were used to achieve production management and security. In ancient China, the principles and methods of yin and yang were used in various fields of science and technology, health care and philosophical research, as well as in many disciplines such as agriculture, geology, astronomy and mathematics. It is clear that the use of yin and yang and its laws of motion have profoundly influenced the historical development of Chinese natural science and technology, and that many achievements have been made under the guidance of yin and yang and their laws of motion.

In traditional Chinese civilization, yin and yang is the description of the fundamental factor that drives the development and changes of natural laws, and is the source of motivation for the conception, development, maturation, decline and demise of various things. Through the application of yin and yang and their laws of motion, it is possible to analyze the laws of nature and physical changes, predict the tendency and results of movements, and constantly update the concepts and methods of survival and life so as to achieve mutual adaptation between human and nature. Therefore, the creation of yin and yang is a method for ancient Chinese philosophers to understand things and discover the laws of nature, which is generalized, summarized and sublimated from the discovery of the movement of natural things and physical changes. In addition, it was used to explore the unknown of science and to obtain many meaningful discoveries, which promoted the progress of science and technology, philosophy and humanities, and health care, and profoundly influenced the cognition and the way of thinking of the Chinese people. For example, the discovery of the correspondence between heaven and man, the transformation of movement in nature, cold and heat, and the cycle of day and night, as well as the response of breathing, qi, meridians, growth and death in human beings, not only have the basic form of correspondence and unity, but also maintain the consistency and mutual coordination of the laws in the movement. These are important tools for TCM medical practice and research [3]. They explain various physiological and pathological phenomena of the human body [4].

Chinese philosophers discovered the correspondence and the consistency of the laws in the movement of nature, and thus put forward the concepts of the correspondence of heaven and man, the unity of heaven and man, and the homogeneity of heaven and man, which provided a feasible method for traditional civilizations to discover the mysteries of nature and the analysis of the human body. It is not only through the discovery of nature that one can inspire the discovery of oneself, but also through the discovery of oneself that one can refer to

the discovery of nature. Yin and Yang originated in ancient Chinese civilization more than 2000 years ago. In the first stage, ancient philosophers discovered yin and yang and their laws of motion and expressed them in simple language, which can be found in many classics. In the second stage, yin and yang and the laws of yin and yang movement are used to explore methods and techniques.

Nowadays, due to misconceptions and misunderstandings, yin and yang and the laws of yin and yang movement are often understood as a concept or theory. Just as Quantum Field Theory (QFT) is a different story though, since the formalism is drastically different to classical mechanics [5]. The conceptual understanding forms a limitation of thought, which makes it difficult to grasp the actual connotation and hinders the practice and application of yin and yang in reality, and even the essence inherited from ancient civilizations cannot be understood in depth. By digging into the essence of traditional civilization, we can find that the philosophers used its movement as a kind of understanding and method to discover and summarize the changing characteristics of things on the basis of natural things and objective laws, and making predictions and judgments on the development of objective things. Therefore, yin and yang are created to describe the properties of natural substances, and the movement of yin and yang is to illustrate the change patterns of natural substances. Then, in the field of natural science nowadays, many physical experiments can confirm the existence of yin and yang and their movements, which are of practical application to reveal the nature of matter, physical movement and energy conversion processes. Yin and Yang are used in traditional Chinese medicine to explore the physiological function and pathological changes of human body based on the phenomena and laws of natural movement and changes of heaven and earth [6].

## 2. Yin and Yang Reveal the Nature and State of Matter

The composition of matter is not a single property, nor does it remain fixed. Within the composition of matter, there are two internal properties of yin and yang, that is, there are two aspects of yin and yang. The monist holds that the whole is prior to its parts [7]. For example, there are planets and space in the universe, heaven and earth in nature, and the human body has soul and matter. Physics research shows that matter exists in two forms, a solid composed of elementary particles and a field state that cannot be perceived by the senses. Form and field are inseparable and can be transformed into each other under certain conditions. The properties of Yin and Yang are not absolutely fixed [8].

There is a very fundamental symmetry in the material world. In the microscopic material world, all particles have their counterparts in the antiparticle, and under certain conditions, the transformation of particles occurs. The discovery of this positive and negative phenomenon is similar to the theory of yin and yang, in Chinese medicine, just like the Taoist Laozi's idea that "all things have yin and hold yang, and the impulse is for harmony", and all things have yin and yang, universal, opposites and unity. Chaos theory is an important theory of nonlinear system research. The self-similar property of chaotic system is similar

to the Yin-yang concept of endless cycle and infinite separability [9].

The human body consists of soul and matter, the yin and yang sides of man. The soul, which dominates the human mind, consciousness, and emotions, has a flexible character and belongs to yang, while matter supports human life and sustains life, has a physical character and belongs to yin. Under the joint composition of soul and matter, the human body is formed. The physiological structure and organ properties of the liver belong to yin, while the physiological functions and actions of the liver belongs to yang. Liver's yin and liver's yang are two aspects of liver performance, and the physiological structure and physiological function reflect the different states of liver's yin and yang.

Yin and Yang explain the nature of matter, reflecting the reality of nature, which contains both yin and yang, with a pair of opposing and unified properties inside.

### **3. Yin and Yang Reveal the Laws of Physical Motion**

Chinese philosophers explored the initial dynamics of movement and found that the movement of things is not the result of external dynamics, but the result of the action of things themselves. In other words, the yin and yang within things move, grow and transform each other, thus contributing to the formation, development and decline of natural things. In all stages of physical change, the movement of yin and yang is real and non-repetitive, thus forming the non-repetitive nature of the development and change of things.

All matter is in constant motion with certain laws, and there is no such thing as absolute immobility. The study of mechanical motion forms the system of knowledge of mechanics, which can be divided into two systems: Newtonian mechanics and relativistic mechanics. Newtonian mechanics is adapted to objects moving at low speeds, while relativistic mechanics is adapted to objects moving at high speeds. Then, a large number of molecules and atoms that make up an object are still in irregular motion, also called thermal motion. The study of the "fields" of matter has revealed electromagnetic motion, the movement of matter between two field forms: electric and magnetic. In recent years, the discovery of quantum mechanics has led to the discovery of elementary particle motion through microscopic particle motion patterns inside atoms or nuclei. On a large spatial and temporal scale, the study of the forms of celestial and cosmic motion has led to the formation of a body of knowledge about the motion of the celestial universe.

Natural things, as large as the celestial universe and as small as microscopic particles, are constantly in motion in their own yin and yang, and do not remain permanently fixed in their properties in motion, but shift and change as they move. For example, the course of human life has the natural law of formation, growth and decline.

### **4. Yin and Yang Reveal the Transfer of Energy Conversion**

Western natural science has discovered that there is a transfer of energy in na-

ture. In the various processes that take place in nature, energy is transformed from one form to another, transferred from one place to another, over and over again [10]. In terms of the law of conservation of energy, energy neither arises nor disappears out of thin air, but is transformed from one form to another. The energy possessed by an object is not fixed, but is constantly in the process of transmission. In the process of transfer, the object with high energy transfers energy to the object with low energy, and the object with low energy absorbs energy from the object with high energy, in which the process of energy transfer is realized. Yin and Yang are reflected as functional attributes in space dimension and process stages in time dimension [11].

A study on the characteristics of solar radiation and water temperature in Taihu Lake [12] found that solar radiation provides heat for water bodies and “food” for algal blooms, and an increase in solar radiation will transfer more heat to expand the temperature threshold for algal blooms during the year. Adequate light provides the basis for algal blooms, which leads to the conversion of more solar energy into bioenergy in the ecosystem. The conversion between light energy and bioenergy is the process of yin and yang conversion. The sun belongs to yang, and radiation releases light energy, and organisms receive light energy to promote growth, which can be transformed into intrinsic bioenergy. Before receiving light energy, plants belong to yin, and after receiving light energy, they get energy to carry out photosynthesis, which is the transformation from yin to yang. By converting energy, organic matter is generated and stored intrinsically, thus the conversion of yin and yang can prompt plants to continuously absorb solar radiation and carry out energy conversion so as to grow continuously. As Chalmers and Jackson [13] said: “One of the questions at issue is whether phenomenal truths-truths concerning states of phenomenal consciousness are implied by microphysical truths.”

Therefore, yin and yang can represent the property characteristics of an object for a period of time, and the conversion of yin and yang realizes the transfer of energy. In the process of transfer, before releasing energy belongs to yang, after releasing energy belongs to yin, before absorbing energy belongs to yin, after absorbing energy belongs to yang. In the conversion of yin and yang, there are two sides of energy transfer, which complete the transfer in the interaction, and also complete the conversion of yin and yang to each other. It is in the process of continuous transformation of yin and yang that endless changes and movements are taking place between natural things.

## 5. Practical Application of Yin and Yang

The determination of the properties of yin and yang is not determined by human subjectivity, but by the state of nature, the stage of movement and the result of energy transfer in nature. Through yin and yang and their movements, all changes, phenomena and laws of nature can be revealed, and the principles and methods discovered can be applied to scientific and humanistic progress.

A study of heat transfer in different aquifer media in a conductive heating process at different groundwater flow rates [14] proved that increasing the groundwater flow rate is beneficial for expanding the heating zone area, accelerating stability, and also for remediation of pollution. The high groundwater flow rate indicates the different states of yin and yang properties, which affect the energy transfer efficiency and time. The higher the groundwater flow velocity is, the more active the yang state is, and the more quickly the energy transfer in the heating process will be stabilized. When the groundwater velocity is lower, that is, it belongs to the relatively negative state, the energy transfer in the heating process is relatively slow, so the heating time to reach stability will be longer.

The study of efficient solar thermoelectric conversion through movable molten salt charging [15] confirmed that the efficiency of photothermal-electric energy conversion can be improved by using a magnetically responsive solar thermal network as a movable charging source that converts incident concentrated sunlight into high-temperature heat, causing a solid-liquid phase transition of molten salt. The fabrication of the instrumentation depends on physical changes, and natural physical changes follow the law of yin and yang, and the efficiency of energy transfer can be improved through the transformation of the yin and yang states of matter. In this study, multiple energy conversion processes involving light, heat, and electrical energy are involved. After increasing the magnetic field, the interfacial movement of the molten salt and the solid-liquid phase transformation are increased, and the solid is transformed into a liquid by using thermal energy, and the liquid is transformed into a solid after releasing thermal energy, which is the phase transformation of yin and yang. By increasing the number and process of yin and yang transformation, the efficiency of energy transformation is thus increased.

The discovery of binary led to the invention of the electronic calculator and the computer, which then gained rapid popularity and entered all walks of life, becoming an important tool for human life and production. The essence of binary is to describe events by two numbers “0” and “1”. In many areas of human production and life, computers can be used to virtually describe events in reality, and can simulate the law of events by given conditions and parameters. Binary simulates various experiments in the real world according to the given conditions, no matter how complex the changes are, its origin is simply “0” and “1”, and through different combinations and recombinations, a colorful and complex, all-inclusive virtual world is simulated. Leibniz acknowledged the process and the way his binary originated from the I Ching (易經). By using binary to displace the concepts of yin and yang, using yin to represent “0” and yang to represent “1”, the binary of numbers is equivalent to the two opposing and unified energies that exist in nature. The two energies of yin and yang in nature are the same as the binary in computers, which constitute the world of everything. The difference is that the yin and yang in the natural world exist in a unified relationship of opposites, and the two types of yin and yang energy have their own characteristics and laws, and constantly interact and influence each other, while

the “0” and “1” in the computer can only operate according to the conditions given by us humans, and cannot reflect the characteristics of the unity of the yin and yang energy in the real world, therefore, they cannot fully replicate all the characteristics and laws of the yin and yang in the real world.

In the process of changing states of matter, physical movement and energy transfer, yin and yang are constantly transforming and forming complex changes. The yin and yang things and movements presented according to the objective movements are not the result of subjective and arbitrary regulations of yin and yang properties, but the result of the objective facts formed in the movements. As long as motion exists objectively, that is, transformation is taking place, in the process of motion and transformation, the division of yin and yang also appears, and it is possible to distinguish the role of yin and yang, as well as to understand the transformation of yin and yang into transmutation. Thus, yin and yang arise from natural reality and objective movement. The application of yin and yang and their laws of motion are discovered based on the reality of the objective things and movements that exist. Thereby, the understanding of yin and yang coexists with reality and becomes something yin and yang with a basis in reality. Western philosopher Slotter proved that traditional Chinese Yin and Yang have important theoretical significance in reconstructing contemporary ethics, epistemology and philosophy of mind [16].

## 6. Conclusions

Modern science proves the existence of the soul through quantum experiments, foreseeing the situation in the world after the death of some beings. This universality suggests that near-death experiences may have a biological origin and purpose [17]. A surgeon describes the process of near-death experiences in detail [18].

Mankind has been exploring the question of consciousness for thousands of years [19]. Human being is a collection of soul and matter. Human body matter is active, has soul support and belongs to special matter. The yin and yang changes that exist in the special active matter of the human body have another difference from the yin and yang changes of the natural matter. Therefore, the changes of yin and yang in the human body are generally the same as the changes of yin and yang in natural things in terms of laws, but they are more active and representative. From the human body, soul belongs to yang and matter belongs to yin. The soul can dominate the matter, but it needs the matter as a carrier to function; the transformation of the matter needs the soul to give power and direction. As an important part of nature, human beings certainly cannot escape the scope defined by yin and yang [20]. The movement of yin and yang exists in nature, so does the movement of yin and yang in the human body. The movement of yin and yang in the human body and the movement of yin and yang in nature are interconnected, echoing and influencing each other.

When we determine the science of macroscopic laws, we can use such laws to observe and speculate on the directionality of experimental science, speculate on the future, predict the results, reduce blindness, and use rational guidance; we

can receive twice the result with half the effort. People gradually accumulate experience in life, scientific exploration, and medical practice, constantly unlocking the secrets of the human body, unraveling the relationship between the human body and nature, and releasing light in the infinite source of truth. Time and facts will give the answer, and being able to verify yin and yang and their movements, then human beings will have a longer term understanding of the exploration of nature on earth.

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### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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