The Theory of Physical Particles and Yi Field

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By

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PREFACE

The Theory of Physical Particles and the Yi Field is also termed Li-Yi field theory or Liyi. Combining the traditional Yi concept and the five-element theory of Li Yin and Yang, it integrates the analytical results of Western natural science. It also forms the Liyi time-space concept of the theory of quaternions. In particular, four fundamental principles are based on the Li Yin-Yang/mass-energy-time-space four-image principle of nature and are supplemented by the conservation of field momentum, the Li Yin-Yang principle of interaction, and complex energy conservation. Arising from the basic conceptual dynamics of "matter, motion, time-space, energy, force, and equilibrium", the theory presents these so-called principles and rules in terms of a simple mathematical model utilizing the mathematical time-space principle and methods of basic derivatives/calculus. It explains Newtonian mechanics, relativity, and quantum wave dynamics and reveals the threefold nature of the particle/wave-particle-field. In the process, Maxwell's electromagnetic (rotary dynamics) equations are interpreted and spirit and matter are combined to achieve the Yi theory of the united field.

This theory has a simple mathematical basis and is conceptually clear. It is concise and easy to understand and is suitable for science curricula in liberal arts schools. It is ideal for self-education by students in liberal arts schools as a means of organizing and developing physical knowledge. It also provides a foundation for the future development of physics and practice. The theory as presented in this book can also be used in various types of seminars and is suitable for professionals and lecturers in colleges.

CHAPTER 1

INTRODUCTION

The *Theory of Physical Particles and the Yi Field*, also called *Liyi field theory* or *Liyi*, integrates the rational outcomes of Western natural sciences with traditional Yi theory and the Li Yin-Yang five-element theory of the East, forming the Liyi time-space concept of the theory of quaternions. Four basic principles of the dynamics are found in the four-image principle of Li Yin-Yang/mass-energy-time-space. They are supplemented by the Li Yin-Yang principles of interaction, field momentum conservation, and complex energy conservation. Using these four basic principles, the theory illustrates the so-called principles/laws and rules with a simple mathematical and physical model using the mathematical time-space principle and methods of basic derivatives/calculus and according to the fundamental dynamic concepts of "matter, motion, time-space, energy, force, and equilibrium". It provides a perspective on dynamics with which to discuss Newtonian mechanics, relativity, and quantum wave dynamics. Furthermore, it reveals the tripartite nature of the particle/wave-particle-field; in turn, Maxwell's equations of electromagnetic rotary dynamics can be interpreted and spirit and matter are combined to achieve the Yi theory of the united field.

Liyi contains ***Three Treasures***, i.e., the three-Yi principle, also called the ***methodology of "three-talent" thinking***. Reasonably, we can select the "duality sub-system" as a reference system for making further observation. This is described in the following.

1. The features of the three-Yi principle are: “unchanging”, which can be interpreted as meaning that it does not change and does not move in accordance with the standard rules and laws of the universe; “it becomes easy”, which can be interpreted as referring to the fact that everything in the universe changes and follows a set of rules; and finally “it is simple and easy,” which is interpreted as meaning that it has its basis in simplicity and easiness. Because it is *easy and simple*, people can easily follow the approach, enabling good results with less effort. Finally, it complies with causality.

2. The method of *three-talent thinking* is the cognitive method used to unite the three types of Yi, combining ‘connotation-physics’, ‘connotation-mathematics’, and ‘connotation-humanities’ into one; it has three aspects of meaning.

3. We can reasonably select the “duality sub-system” as an observational system. The instruction to “shun the complicated and tackle the simple” found in the concept of Liyi is conditional and is predicated on a set of principles. The *eight-rigid dialectics* of Liyi are also manifest. Here **eight-rigid** refers to: Yin and Yang; motion and rest; cohesion and divergence; and rigid and soft (with the overall principle founded on Yin and Yang). This eight-rigid concept provides an outline for the classification of everything.

In modern empirical science, the so-called *theory of the unified field* aims to “unify the four major forces”. Liyi field theory is not discussed as part of existing theory, but can be studied with modern science and modern language from the perspective of a principle/law/rule. The concepts of Western Newtonian mechanics, relativity, quantum mechanics, and Maxwell’s electromagnetic equations are studied in terms of dynamics, and their fundamental problems are discussed. The dynamic factors of mass-energy, time-space, electricity-magnetism, and equilibrium stability cannot be separated from the concept of the field; the field has a real existence, but is invisible and untouchable. These concepts are all manifestations of

energy. Chinese Yin-Yang five-element theory represents traditional physics and the five elements—water, fire, gold, wood, and soil—that constitute all things in this world. These five elements also have the feature of bearing a cardinal direction, as found in the five-element diagram, "round outside and square inside" (round sky and square ground), which is also the current form of the field and energy manifestation. The universe is essentially composed of energy, and material and spiritual characteristics are united, constituting a single property.

1.1 A new view of time and space

Field theory concerns the problem of time and space. We know that time and space (termed time-space for brevity) have a real existence that is invisible and untouchable. Chinese traditional culture considers "east and west" as time and space, while "north and south" are considered matter and energy. There is an old saying in China: "if east-west is not found, then look for south-north". What does this mean? *As a time-space frame, east-west* has shape without image, while *south-north*, as a mass-energy frame, has image without shape. Thus, the *concept of time-space-mass-energy* unites shape and image, giving us is the main idea of the theory. United in this way, it is possible to describe the idea of mass-energy-time-space using algebraic and geometrical approaches.

Liyi theory has a four-image nature and encompasses the quaternary multi-dimensional theory of the time-space concept; this can be illustrated using mathematical equations and graphs. The surrounding material world (substance) contains four basic mass-energy-time-space properties and features a corresponding Yin-Yang relationship. Herein, mass-energy and time-space dualisms are paired as Yin and Yang and constitute all existing things. Not even the smallest particles are excluded since they can be described by their carrier/environmental time-space (t, r) in addition to their time-space (T, D). This represents quaternary multi-dimensional time-space

theory, which is also associated with the dynamic relationship between Yin-Yang and motion-rest.

The mass-energy-time-space concept of the four-image nature for Li Yin-Yang indicates that time-space cannot exist without mass-energy. The idea of the Li Yin-Yang mass-energy-time-space concept can be represented by a four-image diagram, which has a circular outside and a square inside. In this image, we can see how momentum (p)-energy (E) and time-space are paired as Yin and Yang, forming four images that display four cardinal directions. The tripartite nature of the particle/wave-particle-field is shown in the center of the diagram, expressing the idea that what is located in the center is essential. The *Liyi mass-energy-time-space four-image principle* (also called the first principle of energy) reveals that energy is the essence of the universe. A human being has a material body and a spirit, but this matter and spirit are both manifestations of energy. Matter and spirit are united in a single property, with spirit playing a leading role. The Li Yin-Yang mass-energy-time-space four-image nature (matter nature) and the property of the wave-particle-field tripartite nature (spirit) are united in all life and objects. This combination manifests itself as one type of electromagnetic wave in our space.

1.2 The basic principle of Liyi dynamics

Macroscopic and microscopic time-space show coherence and thus mass, energy, time, and space are united within a particle (quantization). The time-space concept of quantization implies that time and space are matter and energy and that the time-space concept exists in the form of a field. The field is both invisible and untouchable and, therefore, mass-energy cannot be separated from time-space; *mass-energy-time-space* is a four-image representation in one entity. The four basic principles of the relevant dynamics are briefly described in the following.

1.2.1 The relativistic kinetic relationship between mass, velocity, and energy

We adopt the relativistic method of Feynman's physics and delineate the field's dynamic relationship with physical-mathematical activity as its center. In this model, the mass-velocity relationship is the key. To investigate the dynamic relationship between "mass, energy, time, space, field, and force", we established a connection between velocity, energy, and force, and listed the derivative/differential paired equations according to the existing theory of relativity. We have adopted a simple Newtonian method to calculate the original function from the derivatives and move towards the final mass-velocity-energy algebraic relationship. There are three things to note in this process: 1) we adopted Feynman's mathematical techniques to derive the full differential equation; 2) we determined the integral parameters for "full velocity"; and 3) we retrieve the separated time factor $1/\Delta t = 0$.

The four images were then combined to obtain the following equations:

$$\text{(Work)}\quad F \cdot v = \Delta E \,/\, \Delta t \tag{1-1}$$

$$\text{(Force)}\quad F = \Delta p \,/\, \Delta t = \Delta(mv) \,/\, \Delta t \tag{1-2}$$

knowing that

$$E = mc^2 \text{and}\ \ p = mv \tag{1-3}$$

which, when solved, yields

$$m^2c^2 = m^2v^2 + {m_0}^2c^2 \tag{1-4}$$

we can also write

$$F \propto (\Delta p)(1/\Delta t),\ \ \Delta t \propto \alpha T \tag{1-5}$$

$$F \propto (\Delta p)(1/\alpha T)$$

After deriving the mass-velocity-energy-force algebraic mathematical relationship for particles (which can be universally applied), we can further divide these particles into four types for more convenient analysis. This is connected to force and four time-space variables. (Note: the experimental law of empirical science is not relevant here!)

The original law of the universe is called the principle. This law is a description of this principle. The law and rule are linked to certain specific properties of matter. If we suppose that there is coherence between Liyi theory and the mathematical description of the physical principle/law, the Liyi time-space concept, and the first principle of energy, then they are also cohesive in the other principles/laws/rules mentioned in the following parts.

1.2.2 LY action and interaction principle

In physics, most theories mention a relationship of interactive potential/force between similar types of matter. First of all, the potential energy of an interaction can be expressed as:

$$V(r) \propto x_1 x_2 \,/\, r \qquad (1\text{-}6)$$

As for the gradient of the interactive potential function $V(r)$, $\Delta V(r)$, when r and Δr approach specific stable values, the expression of the interactive force between two particles is as follows:

$$V(r)/\Delta r = -k x_1 x_2 \,/\, r_2 \;\; [i.e. f(r) = -f(1\,/\,r_2)] \qquad (1\text{-}7)$$

Equation (1-7) show the *Li Yin-Yang law of interactive potential-equilibrium force* (also abbreviated as **LY**). Here, f and f' are two forces of different properties, $f(r) = \Delta V(r)\Delta r$, $f' = k x_1 x_2 \,/\, r_2$, where r is the distance between the two sides of the interaction. The smaller the distance, the larger the interactive force, which results in increased stability. Here, x could be matter, charge, or magnetic charge at the molecular level (or another level), while k is the conversion coefficient of the dynamics. Li Yin and Yang causality reveals that "potential" and "force" are a paired form of Yin and Yang, with potential as the cause (Yin) in the first place and force as Yang in the second place. The radial rate of variation of interactive potential energy is the interactive force.

Equation (1-7) derives, for the first time, the LY principle according to natural principles and is one of the four central dynamic pillars of Liyi. It plays an essential role in the Yi theory of the united field and yields many

new dynamic relationships or laws. We list two such relationships in the following part.

(*1*) *Two laws derived from the LY principle*

The first law is derived from the force (Yang/divergence) on the right side of equation (1-7), which yields:

$$f'(r) \propto (k)(x_1x_2)(1/r_2),$$
$$r \to \eta > 0,\ f'(r) = kx_1x_2 / r_2 \qquad (1\text{-}8)$$

Equation (1-8) reveals that only the interactive actions of absorption and repulsion exist when two objects with different Yin and Yang properties encounter each other. These two actions correspond to each other and lead to energy equilibrium. This is the mathematical expression of the law of equilibrium for the YN (universal) interactive force, which complies with the squared inverse-proportional law; η takes on a specific value (with a smaller value implying a larger interactive force) and there are also other factors involving mass, energy, time, space, and matter fields.

The second law is derived from the force (which does not exist in modern empirical science) on the left side of equation (1-8) as follows:

$$f(r) = \Delta V(r) / \Delta r$$
$$f(r) \propto \Delta V(r)(1/\Delta r);\ \ \Delta r \to "\xi" > 0 \qquad (1\text{-}9)$$

Equation (1-9) reveals that the spatial variation rate of interactive potential energy is a magnetic force or source force (Yin/cohesive). If ξ is smaller, the interactive potential force is larger, and this is the cause of the interactive force. These two laws constitute a causal relationship.

(*2*)*Renaming the "Universal Law of Gravity"*

Liyi replaces the current formulation of universal gravity in empirical science with the *YN equilibrium law of interactive force*. Why is that? First, both of them are significant, which is self-evident; second, universal gravity cannot be considered as a full explanation, as there is not only an attractive force that exists between things in the universe, but also a repulsive force, so that the law of relative equilibrium and stability can be achieved. These

attractive and repulsive forces are in a mutual causal relationship. Newton also described this in terms of an "interactive force" and claimed that it was similar to his other inventions—it is merely the "phenomenological description" of truth in the universe (because the origin of this type of force was not understood at that time).

1.2.3 The YN law of equilibrium force-uniform circular motion

The relationship of field momentum conservation ($\Delta p/\Delta t = 0$) can be expanded as follows:

$$\Delta p\ /\ \Delta t = \Delta(mv)/\Delta t = m\Delta v/\Delta t + v\Delta m/\Delta t = f + f^{'} = 0 \quad (1\text{-}10)$$

Furthermore, we have:

$$m\Delta v/\Delta t = -v\Delta m/\Delta t, \text{ namely } f = -f^{'} \ (\Delta m \leq 0) \quad (1\text{-}11)$$

where $f = m\Delta t/\Delta t$ and $f^{'} = v\Delta m/\Delta t$. f and $f^{'}$ are two forces with different properties. They are equal in magnitude, opposite in direction and act on the same object (with mass m). According to Newton's second law, a moving object with mass m is accelerated by an "external force". Eventually, we can derive the relationship of the equilibrium force as follows:

$$mv^2/r = -GMm/r^2 \ (i.e. f_{YN} = -f_{YN}^{'}) \quad (1\text{-}12)$$

This is the YN law of equilibrium force-uniform circular motion. This is also a principle/law and it has the following three important implications:

(1) The unification of gravity and electromagnetic force is achieved.

(2) One of the basic equations for the unification of electromagnetic force is obtained.

(3) In addition, three important differential relationships are obtained.

Table 1-1. Three differential relationships act across the entire Yi theory of the united field.

1	Rule of "no loss, no gain"	$\Delta m \leq 0 \quad \Delta E_k \geq 0$	"Bottleneck", which is absolute
2	Rule of energy conservation in the universe	$\Delta V(r) = \Delta E_k$	Originates from the law of energy conservation
3	Differential rule of magnetism-electricity equilibrium	$\Delta(mv^2) = \Delta V(r)$	Time-space is united and full differential achieved

1.2.4 The principle of complex energy conservation

In the principle of complex energy conservation, according to Noether's theorem, the law of motion is invariant (i.e., independent of time/space) under a particular transformation. In other words, it possesses a certain symmetry and there must exist a corresponding conservation law and a pair of conserved quantities. Liyi is invariant for the time-space of complex energy:

$$A = E - [E_k + V(r)] = 0 \qquad (1\text{-}13)$$

where A is complex energy; E is the energy of the system; $E_k$is kinetic energy; and $V(r)$is potential energy. By recognizing the concept of de Broglie matter-waves, we can obtain the algebraic expression for the wave function of electron particles, Ψ:

$$\Psi(t,\ r) = \Psi_0 exp\left[i\left(p \cdot r/\hbar'\right)\right] exp\left[-i(E_t)/\hbar'\right] \qquad (1\text{-}14)$$

Using the differential property of the wave function, we can calculate the partial differential of $\Psi(t,r)$, with respect to t and r, and derive the algebraic expression for complex energy as follows:

(a) Complex energy: $E = i\hbar' \partial/\partial t$

(b) Complex momentum: $p = -i\hbar' \partial/\partial r$

(c) Complex kinetic energy:

$$E_k = p^2/2m = (-\hbar'^2/2m)\partial^2/\partial r^2 \qquad (1\text{-}15)$$

(d) Complex (total) energy: $E = E(t,\ r) = E_k + V(r) = (-\hbar'^2/2m)\partial^2\partial r^2 + V(r)$

We can introduce complex energy into equation (1-15) and calculate the dot product of it and the wave function of the complex vector: $A \cdot \Psi = 0$. By implementing factorization and merging similar terms, we obtain:

$$i\hbar' \ \partial\Psi(\mathrm{t},\ \mathrm{r})/\partial t = \left[\left(-\hbar'^2/2m\right)\partial^2\partial r^2 + V(r)\right]\Psi(t,\ r)$$

$$E\Psi = \widehat{H}\Psi \qquad (1\text{-}16)$$

Equation (1-16) is the YX differential equilibrium law/equation of complex energy. The right side shows the complex energy associated with the partial differential with respect to time. The left side shows the complex energy related to the partial differential with respect to space. The interpretation of this principle/law covers the following three points:

(1) The principle of energy conservation/equilibrium law and self-similarity.

The Liyi first principle of energy reveals that the four-image nature of particle-mass-time-space and the tripartite nature of the wave-particle-field are united in one component and exist in a universal system. As such, the features of symmetrical harmony and order of this system are also inevitably reflected in the particle, indicating the similarity between the particle and the system; symmetry and conservation correspond to each other in the universe. When one law of conservation is found, we can discover a pair of conserved quantities.

As for the conservation principle/equilibrium law, Liyi describes the common mode. That is, at a certain time-space point(t,r), a particular object possesses a characteristic energy function $f(t,r)$, and "energy conservation" implies that there is a maximum in the variation of this function in time and space:

$$\Delta_{tr}f = \Delta_t f + \Delta_r f \to f + f' = 0\ (A = 0) \qquad (1\text{-}17)$$

where $\Delta_{tr}f$ is a variation of the function f in time; $\Delta_t f$, that in space, $\Delta_r f$. We can solve the equation for the law of equilibrium: $f = -f'$ $(E\Psi = \hat{H}\Psi)$. Here, the left side is time-invariant and the right side is space invariant. Such a rule provides an essential basis or criterion with which to interpret Maxwell's equations of magnetic and electric rotary dynamics. Noether's theorem means that symmetry and conservation correspond to each other in the universe—when we identify a law of conservation, we can also find a pair of conserved quantities. Particles exist in the time-space field. The discovery of a particle allows us to find out the particle, wave, and field properties. The rule involved in finding discrete particles concerns the conservation/equilibrium law of particles with respect to the time-space field.

(2) The corrected name of the Schrödinger wave equation.

In 1926, in relation to the comment of de Broglie that "a particle is a wave, and a wave is a particle", Schrödinger presented an ingenious equation with the imaginary number *i*, i.e., the "wave equation of the (electron) particle" (1-17). Consequently, those hazy concepts enveloped in Schrödinger's equation in the past century, such as the confusion of paired operators, the analogy of Schrödinger's cat, and conceptual confusion of Ψ^2 and Ψ, can be resolved. The wave function of the (electron) particle, $\Psi(\mathrm{t,r})$, offers a comprehensive description of the state of existence of the particle and should be properly described as a holographic wave function.

(3) The law of atomic light and electromagnetic radiation: $\left[\Delta E_{n'n} = \Delta_{n'n} V(r)\right]$.

Two work functions are related to each other. The work of an electric force is given by $\Delta E = (Fv)$, $\Delta t \to (\Delta p/\Delta t)\,(\Delta r)$ and the work of a magnetic force is given by $\Delta V(r) = f_{YN}^{'}\,(-\Delta r)$. Why should we make this distinction? This is because there is no such thing in modern empirical science. These concepts are all associated with particular principles and are very important, but they are rarely relevant to a more general discussion. Meanwhile, the law of light and electromagnetic radiation also involves the verification of Liyi's four basic principles/laws of dynamics.

1.3 Li Yin-Yang four-image and five-element diagram

In China's ancient physics, the five elements of gold, wood, water, fire, and soil constitute everything in the universe. This is not correct. Moreover, these five elements also have the feature of direction, as given in the five element diagram with a round outside and a square inside (or "round sky and square ground"), in which water, fire, gold, and wood occupy the four cardinal directions and the element of soil is found in the middle. Soil, at the center, represents a virtue, reflecting the idea that the element at the center is important. For example, faith is at the center of kindheartedness, righteousness, reasonableness, and intelligence, with faith as the first element. When these five elements in nature are compared to the Li Yin-Yang four-image and five-element concept, in which the four images of mass-energy-time-space are located in four cardinal directions with the particle at the center, the central element represents one image of five elements, i.e., it is the main entity that integrates the feature of the substance and spirit (i.e., the wave-particle-field's tripartite nature) into a single entity.

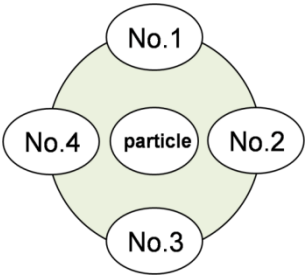

Fig.1-1. Four-image and five-element diagram of Li Yin and Yang

Fig.1-2. Pearls and jade combined

Furthermore, there are four fundamental principles of the dynamics concerning the particle/wave-particle-field's tripartite nature, which also constitute the four-image and five-element diagram of Li Yin-Yang. They form Yin and Yang pairs and are located in four cardinal directions with the particle at the center, as shown in Fig. 1-1. Based on these four fundamental principles/laws, we can further find the principle/law of a higher level, in section VII of field theory, where we discuss the principle/law for the dynamic resonance effect of matter-wave and the law of the rotary circular period.

In Fig. 1-1, "No. 1" denotes the principle/law of mass-energy-time-space four-image nature (particle/feature unity). "No. 2" represents the principle/law of action and interactive potential/force equilibrium (particle-field), while "No. 3" denotes the YN principle/law of field momentum (particle-field). Finally, "No. 4" denotes the Yi principle/equilibrium law of complex energy conservation (particle-wave-field) and "No. 5" denotes the particle/wave-particle-field's tripartite nature in the center, embodying the concept that the one in the center is important.

The rules of the universe are interconnected and continuously improve, as the implications of physical laws do. The amplitude of the vectors of resonant dynamic effects in the matter field are superimposed. The intensity is the squared scalar of the amplitude and the former manifests as complex time-space and is often not easy to observe. The former is Yin, while the

latter is Yang. One Yin and one Yang exhibit a dual dynamic effect and there is also the principle and law of the electromagnetic rotary circular periodic dynamic effect. Regarding the unity of the particle's wave-particle-field-resonance-spin, the particle is a wave and the wave exhibits rotation. Spin and rotation are manifestations of complex energy. Higher energy corresponds to a higher frequency (the reciprocal of time), while a shorter time cycle corresponds to a shorter particle wavelength. Resonance is one specific effect of the energy field, comprising "resonance", "assimilation", and "oscillation". Additionally, from the perspective of Yi theory, the nature of the resonant effect is found in the Yin-Yang combination and the resonance of everything. Yin and Yang combine and give birth to everything, reflecting the superposition effect of positive energy. The positive effect and positive energy are symmetric, harmonious, and ordered.

1.4 Maxwell's magnetic-electric rotary dynamic equations

Table 1-2. Maxwell's equations and interpretation.

Maxwell's magnetic (H) and electric (E) equations		**Preview of interpretation**
$\boldsymbol{\nabla \cdot E = 0}$	$\nabla \cdot H = 0$	Law of wave-rotary propagation for electromagnetic particle
$\boldsymbol{\nabla \cdot E = -\frac{\partial B}{\partial t}}$	$\nabla \cdot E = -\frac{\partial D}{\partial t}$	YM law of magnetic-electric equilibrium
$\boldsymbol{E = -\left(\frac{1}{\varepsilon}\right) D}$	$H = -\left(\frac{1}{\mu}\right) B$	Interpretation of the magnetic-electric state equation
The password to be decoded: $\boldsymbol{\nabla}$, $\boldsymbol{\partial/\partial t}$; $\boldsymbol{B}$, $\boldsymbol{1/\varepsilon}$, $\boldsymbol{1/\mu}$, $\boldsymbol{E}$, $\boldsymbol{H}$		Liyi four principles/laws

Through the four principles and laws of Liyi, we can connect the Yi theory of Tai Chi Yin-Yang and the Western theory of complex electromagnetic waves, integrating Maxwell's equations to reveal the rotational mechanism of particle-wave-field-spin unification of particles and deduce the law of magnetism-electricity equilibrium to obtain the rotary dynamic principle of electromagnetic waves.

Maxwell's equations (i.e., magnetic and electric equations) and a preview of interpretation are found in the following.

More than 150 years ago, the British physicist and mathematician James Clerk Maxwell achieved a great scientific breakthrough for humankind by formulating the classical theory of electromagnetic radiation. He expressed it using magnetic (H) and electric (E) equations that are simple, symmetric, harmonious, and ordered. Maxwell's equations integrate the beauty of Yi theory's physical and mathematical connotations, unite three into one, and bear many cardinal directions. This set of algebraic equations, in the form of a (3×2) matrix, has three features:

(1) Yin and Yang are symmetric, harmonious, and ordered, and form a system;

(2) Partial algebraic equations of vectors;

(3) There are eight password symbols, including *E* and *H*, and four spin, ∇, symbols.

These features provide a clue to solving the problem of the four principles/laws of Liyi. We need to keep two aspects in mind: first, since the number of unknown variables is higher than the number of equations, we must integrate other relevant algebraic equations to solve the problem; second, rotation connotes a cycle, the cycle of rotation, and the mechanism of rotary motion. This ensures that the interpretation of Liyi is different to any scientific method previously used.

Chinese people often look at things in terms of timely opportunities, geographical advantages, and popular support. Maxwell's equations, arising from a brilliant investigation, are like a lock that has to be opened with a set

of keys (passwords) from Li Yin-Yang four-image and five-element theory. In this, all the best—"pearls and jade"—are combined. The Maxwell magnetic and electric algebraic equations and the Liyi principle/law are united to solve electromagnetic particle-rotary circular periodic motion. Several conclusions can be derived from this:

(1) Electromagnetic waves are transverse waves, electric-magnetic amplitudes are perpendicular to each other, and the wave propagation direction of the particle.

(2) The electromagnetic wave-particle exhibits spiral propagation and a rotary circular periodic cycle, "S" (sinusoidal wave).

(3) Derivation of the YM magnetic-electric equilibrium law reveals that the electromagnetic rotary "S" sinusoidal wave is consistent with the "central curve" of the Tai Chi Yin-Yang "fish" (the Tai Chi symbol) and they represent a complex function with spin, ensuring that three rotary circles are united in one holographic function of an electromagnetic wave.

1.5 Liyi equations and diagrams of field theory

The physical laws developed in the later parts of this book do not completely comply with modern Western physics. The particle-physics-Yi field theory offers certain advantages that are manifested primarily in the following aspects.

(i) Liyi theory provides a definite view of time and space, the four-image nature, and the four multi-dimensional space-time concept/theory/equations. In this material world, all things consist of four basic mass-energy-time-space properties and have a corresponding Yin-Yang relationship. *Mass-energy* has an image without shape, while *time-space* has form without image. *Mass-energy* and *time-space* make a Yin and Yang pair and constitute all things, including particles. An electromagnetic particle must exhibit a carrier/environmental time-space (t, r) in addition to its time-space (T, D), which gives us the quaternary multi-dimensional