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Exploring Transformation in Flux-Like Pattern – A Review of The Chinese Biantong in Yijing

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Abstract

One of the central features of the *Yijing* is its use of *yin-yang* correlative cosmology, a fundamental concept in traditional Chinese philosophy. This cosmology involves the idea that all things in the universe are interconnected and interdependent, each possessing *yin* (negative, feminine) and *yang* (positive, masculine) energies. Moreover, these energies are constantly in flux and transformation, with their balance continually shifting.

Bohm's wholeness, also known as Bohm's holomovement, is a concept developed by physicist David Bohm as part of his interpretation of quantum mechanics. According to Bohm, the universe is fundamentally interconnected and interdependent, with all aspects of the universe influencing and being influenced by one another. This interconnectedness is reflected in the behaviour of subatomic particles, which can exhibit non-local correlations that classical physics cannot explain. Bohm's wholeness is similar to other physics and philosophy theories that emphasise the universe's interconnectedness. For example, one such theory is non-dualism, which posits that there is no fundamental separation between the self and the universe and that the self is an expression of the underlying unity of all things. Finally, the concept of entanglement in quantum mechanics also suggests a fundamental interconnectedness between particles, with changes in the state of one particle instantaneously affecting the state of another particle,

regardless of their spatial separation.

The significance of *biantong* in Chinese philosophy is explored in relation to*yin* and *yang* energies constantly transforming and balancing each other in a continuous cycle. Similarly, Bohm's holomovement concept highlights the universe's interconnectedness and constant flux. The flux-like variables provide insights into the system's macroscopic and microscopic details, where transformation and change are fundamental aspects of reality. The probabilistic nature of human affairs and subatomic particles implies that their properties continually change and transform in response to the surrounding environment, reflecting the integral interdependence of all things. This paper emphasizes the significance of transformation and changes in comprehending reality by examining the concepts of yin and yang energies, Bohm's wholeness, and flux-like variables. The dynamic and interconnected nature of the universe necessitates an understanding of this constant state of flux, whether on a macroscopic or microscopic scale. This knowledge is vital for understanding the behaviour of subatomic particles and the natural world.

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Introduction

Yijing emerges through the prolonged observation of natural phenomena over a prolonged period and is developed over time (CHENG, 2008). It is a foundational text of Chinese philosophy and thought, providing a primordial strand of *dao* philosophy that has influenced many different schools of thought in Chinese culture. Cheng advocated that “Yijing and the tradition of comprehensive observation of changes *tongbian* that it represents are the very source of inspiration for the later developments of Chinese philosophy” (Cheng, 2008, p. 202). Adler explained: “*Bian* ( ) and *hua* ( ) are often used together (fluctuation and transformation). Another word often paired with *bian* ( ) is *tong* , which most often means “penetrate,” or “permeate,” but as a pair I translate *biantong* ( ) as “fluctuation and continuity,” the latter meaning continuity through time as a process, as opposed to permanence, which implies something unchanging” (Adler, 2020, p. 22). Leong (2023) added and re-contextualised with a

> *reinterpretation of the Chinese worldview on equilibrium/nonequilibrium andyin-yang in the context of science and drew the correlative aspects with irreversible thermodynamics and quantum reality, such as instability, nonlinearity, nonequilibrium, and temporality… Instability, far-from-equilibrium, irreversibility, probability, bifurcation, and self-organisation are intrinsic properties of nature appearing at all levels. Information is the basis*

> *of all changes. The agency of change is the human with a consciousness interpreting the information existing in the probability space between heaven and earth (p. 1).*

Yijing is a fundamental text in Chinese philosophy and is regarded as a compendium of wisdom and knowledge. It contains a series of hexagrams, each composed of six stacked horizontal lines representing different yin or yang energies. These hexagrams represent various aspects of the universe, including natural phenomena, human affairs, and personal experience. Its origins can be traced back to the mythical figure, *Fu Xi*, who created the eight trigrams and 64 hexagrams. The second substantive development occurred during the 11th century BCE when King Wen and the Duke of Zhou wrote about the hexagrams in greater detail (Cheng, 2008). The third intellectual addition and augmentation happened between the 5th and 2nd century BCE and incorporated seven writings. These writings, collectively known as the 'Ten Wings', are divided into ten segments, presumably by Confucius and his disciples. They provided a framework for understanding the complexities of the universe and the underlying patterns (Adler, 2020).

Thus, understanding the universe's complexities and underlying patterns requires observation. In the *Yijing* philosophy, *biantong* is about adapting to changes and transforming according to the situation through observation. The observer effect in quantum mechanics explains that the act of measurement alters the behaviour of the observed quantum system (Sassoli de Bianchi, 2013). The system adapts to environmental changes, and its behaviour transforms according to the situation. In quantum mechanics, the observer effect refers to the phenomenon where the act of measuring or observing a quantum system changes the state of the system being observed. This is because the act of observation necessarily involves interaction with the system, which can cause it to collapse into a particular state. This effect has been observed in various experiments, including the famous double-slit experiment. Passon and van Strien (2022) further argued that the object of observation exists as physical matter, and "we tend to think that matter is being composed of some fundamental building blocks, be it atoms or subatomic particles. Quantum mechanics indicates- rather independent of any choice in the interpretational debate- that on the quantum scale, the part-whole relation is not aggregation (as in the simple picture of 'fundamental building blocks') but superposition[1]" (p. 11). Therefore, the observer effect in quantum mechanics can be understood as a manifestation of *guan.* The hexagram *guan* in the Commentary on the Judgement states: "The great observer is above, compliantly penetrating; central and correct in order to observe all under Heaven. *Guan*: The ablution is made but not the offering; honest and respectful. Those below observe and are transformed" (Adler, 2020, p. 130). The text categorically states that those 'below observe and are transformed', concurring that observing or measuring a system alters its behaviour and state. One example of the observer effect is the double-slit experiment. In this experiment, a beam of particles, such as electrons, is fired at a screen with two slits in it. On the other side of the screen, a detector measures where the particles land. If the particles are fired one at a time, they create an interference pattern, as if they are waves interfering with each other. However, suppose the detector is turned on to measure which slit each particle passes through. In that case, the interference pattern disappears, and the particles behave like classical particles, travelling through one slit or the other. This phenomenon occurs because the act of measurement, in this case, which slit the particle passes through, alters the state of the particle. Pradhan (2015) explained that the

> *conscious observer(s) can influence the outcomes of an experiment by sending in advanced waves from the*

> *detector (absorber) to the source (emitter) and thus eliciting the corresponding offer wave from it that is required for the completion of the transaction, thus completing the measurement process. The observer effect is thus not a psycho-kinetic (PK)[2] effect per se but is rather associated with a rearrangement of the quantum mechanical probabilities by means of willful suggestions effected via appropriate advanced waves (p. 324).*

The critical part is the *ren* (the conscious observer) in , *san cai*; *san cai* represents the three fundamental aspects of the universe, namely, heaven, earth, and human; the human is positioned in the centre, observing and interpreting the world around them (between heaven and earth). This concept emphasises the crucial role of human observation in understanding and interpreting the uncertainties and complexities of the world. The act of observation is not only a physical process but also a conscious one, and it plays a crucial role in determining the state of awareness of the observer. In this sense, the part-whole relation in quantum mechanics is not one of aggregation, as in classical physics, but rather one of superposition. Observing a quantum object can profoundly affect its behaviour (Koçaslan, 2014). This is known as the observer effect or measurement problem in quantum mechanics. When a quantum object is observed or measured, its wave function, which describes its state, collapses into one of the possible states that have been measured. This means that the act of observation changes the quantum system being observed. Thus, in quantum mechanics, the fundamental building blocks of matter are not deterministic particles but quantum objects that exhibit wave-like behaviour. The part-whole relation in quantum mechanics is one of superposition, meaning that quantum objects can exist in multiple states simultaneously (Passon & van Strien, 2022). Observing a quantum object can change its behaviour and collapse its wave function into one of the possible states that could have been measured. This has profound implications for our understanding of the nature of matter and the role of observation in shaping the physical world. The observer's awareness and understanding of the situation are critical in interpreting the uncertainties arising from the universe's constantly fluctuating chaos. Through careful observation and interpretation, humans can gain insights into their world's underlying patterns and principles. This concept is further illustrated in the following text from *wenyan zhuan* (section 1), translated by Adler Adler (2020):

> *Originating [**yuan**] is the beginning of living things,*
> *the virtue of Heaven and Earth;*
> *nothing is prior to this.*
> *Therefore in regard to seasons it is spring,*
> *in regard to people it is humanity [ren];*
> *it is the chief of all things good.*
> *Penetrating" [heng] is the penetrating power of living things;*
> *the perfection of things lies in this,*
> *and everything is excellent and beautiful (p. 59)*

These texts emphasise *yuan*'s importance as the substance of things, which cannot be seen directly but resides within since 'the perfection of things lies in this'. The term 'originating' *yuan* can be linked to a flux-like quality, which implies that

it constantly flows and changes and imbues all living things with its penetrating power (*biantong* , to transform for advancement flexibly). *Yuan* is often associated with the concept of *qi*, a vital force or energy flowing through all living things. This vital force is said to be constantly changing and transforming and is the source of all life. The idea of yuan as a flux-like quality is also related to the concept of *yin* and *yang*, which are opposing but complementary forces that are present in all things. Cheng (2008) further explained:

> *This source or origin is called "**taiji**" in the **Xici**, but in the **Yi** text is referred to as the **yuan** ( ) (the ultimate source). But it manifests itself in **yin** and **yang**, and thus has two dimensions which are respectively referred to as **qianyuan** ( ) (the source power of **qian**) and **kunyuan** ( ) (the source power of **kun**); the former is the moving and creating power, and the latter is the preserving and sustaining power. But the two also belong to each other and form a unity, with an undifferentiated and yet interrelated identity. This is the great ultimate (**taiji**), the ultimate beginning of existence and hence the inceptive creativity. Hence, the root source of being and existence is a matter of unity, duality, and eventually diversity. It is a whole body, with reality of parts, which we can call the **ti** ( ) (the body, the organic wholeness). In other words, all events and resulting state of being form one body (**yiti**)( ) in the universe, even though there are indefinite number of individual things and events in the universe, in that they are organically related in one way or another (p. 207).*

In this way, the concept of *yuan* as a flux-like quality imbues all living things with the power to change, adapt, penetrate, and connect with the world around them. This is the essence of *biantong*, which refers to the ability to transform and adapt to changing circumstances and connect with the natural world's deeper rhythms and patterns. The sage (an astute observer), who observes and interprets the world, resides in the centre, able to perceive the underlying patterns and principles that govern the universe. The sage's ability to perceive the image is essential in gaining insights into the uncertainties and complexities of the world, which are constantly in flux. Under the Treatise on the Appended Remarks (*xici zhuan*, A2.4)(Adler, 2020, p 265): Fluctuation and transformation are images of advance and withdrawal. The firm and yielding [lines] are images of day and night. The movements of the six lines are the Way of the Three Ultimates [*san ji*]. Adler (2020) explained:

> *The yielding [line] fluctuates and moves toward the firm; withdrawal reaches its ultimate and advances. The firm transforms and moves toward the yielding; advance reaches its ultimate and withdraws. After fluctuating into the firm, it is day and yang; after transforming into the yielding, it is night and yin. Of the six lines, the first two are Earth, the third and fourth are Humanity, and the fifth and top are Heaven. "Activity" is fluctuation and transformation. "Ultimate" is the utmost. The "Three Ultimates" are the utmost principles of Heaven, Earth, and Humanity. These "Three Powers" [**san cai**] each is the unitary Supreme Polarity [**taiji**]. This clarifies how the firm and yielding displace each other in producing fluctuation and transformation, and how the extremes of fluctuation and transformation again become firm and yielding. This [process] flows forth throughout the six lines of each hexagram. What the diviner receives according to what [hexagram] he comes upon determines the auspicious or ominous [prognostication] (p. 365).*

This paper has examined how the movements of the firm and yielding lines in the *Yijing* reflect the interplay between advance and withdrawal, which ultimately results in the formation of the hexagram, detailing the transformation to a sub-state (from one state to another) and underscoring the transience of things. This highlights the role of humans in mediating the uncertainties and chaos between Heaven and Earth and underlines the need for *biantong* to advance.

In summary, the concept of penetrating wave and flux-like wholeness is a central theme in the *Yijing* philosophy, as evidenced by various passages in the Treatise on the Appended Remarks (*xici zhuan*). This study has specifically examined relevant sections of the text and analysed how the concept of flux-like wholeness relates to the scientific understanding of waves. The *Yijing* philosophy greatly emphasises comprehending the dynamic interplay between different elements and the concept of flux-like wholeness as a fundamental aspect of the universe. This approach is in harmony with the scientific understanding of waves, which describes them as dynamic systems in constant flux. An in-depth examination of the similarities between the philosophical principles of *Yijing* and the scientific comprehension of wave phenomena leads to a better understanding of the intricate and interdependent characteristics of the cosmos.

Wave and Flux-Like Concepts in Science

At both the quantum and complexity science levels, many wave-like and flux-like concerns relate to the concepts of wholeness, interdependence, and interconnectedness (Dudziak, 1993). At the quantum level, one of the most notable wave-like concerns is the concept of wave-particle duality, which suggests that particles can exhibit both wave-like and particle-like properties depending on how they are observed (Chang, 2021; Yoon & Cho, 2021).

This idea is reflected in Bohm's interpretation of quantum mechanics, which suggests that the universe is fundamentally interconnected and interdependent, with all parts of the universe influencing and being influenced by one another through a dynamic and holistic wave-like movement (Bohm, 2002). Another wave-like concern at the quantum level is the concept of entanglement, which suggests that particles can become correlated in a way that classical physics cannot explain. When two particles become entangled, they form a single system described by a wave-like function that spans the entire system. This wave-like function allows for instantaneous communication between the two particles, regardless of their spatial separation, and is a crucial aspect of Bohm's (2002) interpretation of quantum mechanics with the concept of holomovement. According to Bohm (2002), the universe is a holistic system in which everything is connected and affects everything else. At the heart of this interconnectedness is the holomovement, which refers to the inseparable wholeness of the universe that is constantly in motion and never static. The holomovement encompasses the physical and non-physical aspects of the universe, including matter, energy, and consciousness. It is not restricted to any specific location or time but is a timeless and universal process that permeates all levels of existence. Bohm (2002) proposed that the holomovement can be observed in the behaviour of subatomic particles, which exhibit a non-locality or interconnectedness that defies traditional Newtonian physics. He argued that this interconnectedness is a fundamental aspect of the universe and that our current understanding of reality is limited by our ability to perceive only a small part of the whole:

> *To generalize so as to emphasize undivided wholeness, we shall say that what 'carries' an implicate order is the holomovement, which is an unbroken and undivided totality. In certain cases, we can abstract particular aspects of the holomovement (e.g., light, electrons, sound, etc.), but more generally, all forms of the holomovement merge and are inseparable. Thus, in its totality, the holomovement is not limited in any specifiable way at all. It is not required to conform to any particular order, or to be bounded by any particular measure. Thus, the holomovement is undefinable and immeasurable (p. 191).*

In Bohm's (2002) framework, he introduced the concepts of implicate and explicate orders to describe different aspects of reality. The implicate order refers to reality's underlying and enfolded nature, which is not directly observable. This order represents the potential for all that exists and is a source of creativity and transformation. According to Bohm (2002), the implicate order can be considered an 'unbroken wholeness' that contains all possibilities for manifestation. On the other hand, the explicate order refers to the observable and manifest aspects of reality. This order results from unfolding the implicate order and represents the actualization of potentiality. The explicate order is the world experienced with the observers' senses, including everything from physical objects to thoughts and emotions. Bohm (2002) believed that the implicate and explicate orders are interconnected and inseparable. He saw the universe as a dynamic, self-organizing system in which the implicate order continually informs and shapes the explicate order. At the same time, the explicate order feeds back into the implicate order, contributing to its ongoing evolution. From Bohm's (2002) holomovement perspective, the implicate and explicate orders are both critical aspects of reality and are necessary for a complete understanding of the universe. The implicate order provides the potential for creativity and transformation, while the explicate order represents the actualization of this potential. In this sense, the implicate order can be seen as the source of all possibilities, while the explicate order represents the manifestation of these possibilities in the world we experience.

In essence, Bohm's (2002) holomovement is a radical reimagining of the way we understand the universe, emphasizing the interconnectedness of everything and the need for a new paradigm that transcends the limitations of classical physics.

At the quantum level, wave-particle duality is a fundamental concept that suggests particles can exhibit wave-like and particle-like properties depending on their observations (Chang, 2021). This concept challenges classical physics, which assumes that particles always exist in a definite state. However, in quantum mechanics, particles exist as a wave function that describes the probability of finding the particle in a particular state (Yoon & Cho, 2021). Furthermore, entanglement is a concept in quantum mechanics that suggests particles can become correlated in a way that classical physics cannot explain. When two particles become entangled, they form a single system described by a wave-like function that spans the entire system (Hacker et al., 2019). This wave-like function allows instantaneous communication between the two particles, regardless of their spatial separation (Ma et al., 2012).

Most importantly, Einstein's latest theory of relativity is also closely related to wave-like properties, specifically in the context of gravity.

> *In his 'miracle year' of 1905, Albert Einstein demonstrated that atoms exist, showed that light comes in discrete packets, and proved by elegant arguments that space and time are not absolute. All of these ideas were to profoundly influence the development of physics, but here we focus on his recasting of our understanding of space and time. Using thought experiments, Einstein argued that the flow of time and the measurement of length have to depend on the relative state of motion of the observer if the speed of light in a vacuum is to be the same for all observers. His special theory of relativity therefore amended Newton's classical mechanics through the introduction of a new four-dimensional continuum, a flexible spacetime. However, a new insight was required to describe gravity (Miller & Yunes, 2019, p. 469).*

In his general theory of relativity, Einstein proposed that gravity is not a force that acts between masses but rather a curvature of spacetime caused by the presence of mass and energy. This curvature can be considered a wave-like distortion of the fabric of spacetime itself (Kornreich, 2020). Einstein first predicted the existence of gravitational waves in 1916 as a natural consequence of his theory of relativity. One of the key predictions of general relativity is the existence of gravitational waves, which are ripples in the fabric of spacetime that travel at the speed of light. "Consistent with Einstein's theory, a model of space-time curvature modes and associated curvature quanta in slightly warped space-time generated by a light photon is derived" (Kornreich, 2020, p. 1977). The acceleration of massive objects, such as colliding black holes or neutron stars, produces these waves. They can be detected by sensitive instruments on Earth, such as the Laser Interferometer Gravitational-Wave Observatory (LIGO) (Vitale, 2021). However, it was not until 2015 that the LIGO collaboration made the first direct detection of these waves, marking a significant milestone in astrophysics and opening up new avenues for studying the universe (Abbott et al., 2016).

The mathematics of general relativity describes the wave-like nature of gravitational waves, which uses the concept of a metric tensor to describe spacetime geometry. This tensor is a mathematical object that describes how distances and angles change as one moves through spacetime. It is affected by mass and energy ("Gravitational Waves in General Relativity III. Exact Plane Waves," 1959). For example, when massive objects accelerate, they create ripples in the metric tensor that propagate outward as gravitational waves. These waves are characterized by their frequency, wavelength, and amplitude, and they can be described mathematically as sinusoidal oscillations of the spacetime curvature.

The detection of gravitational waves by LIGO in 2015 provided strong evidence for the wave-like nature of gravity predicted by Einstein's theory of relativity (Dhurandhar & Sathyaprakash, 2017). In addition, detecting these waves opened a new window into the universe, allowing astronomers to observe and study the most violent and energetic phenomena in the cosmos, such as black hole mergers and supernova explosions.

In conclusion, the wave-like nature of gravity, as described by Einstein's theory of relativity, is a fundamental aspect of our understanding of the universe. The detection of gravitational waves provides a new way of studying the cosmos, opening up new avenues for exploring the mysteries of the universe. The concept of the gravitational wave is an elegant example of how the wave-like properties of the universe can provide insight into the underlying nature of reality.

There are similarities between Einstein's wave-like property of gravity and *Yijing*'s idea of a unified flux where everything is

connected to everything else. Both concepts suggest an interconnectedness and interdependence between all parts of the universe, with wave-like movements and fluctuations playing a fundamental role in the dynamics of the cosmos. For example, Einstein's theory of relativity suggests that massive objects like planets and stars can warp the fabric of spacetime, causing a ripple effect that propagates through the universe as gravitational waves. Similarly, *Yijing*'s idea of a unified flux suggests that all things in the universe are interconnected and interdependent, with each part influencing and being influenced by all other parts through a dynamic and holistic process of wave-like movement. The recent discovery of gravitational waves by the LIGO experiment provides further evidence for the wave-like nature of the universe and its interconnectedness. By detecting the tiny distortions in spacetime caused by the merger of two black holes, LIGO has shown that the universe is full of these gravitational waves, constantly propagating through space and time and connecting all parts of the universe.

Einstein's theory of relativity and *Yijing*'s idea of a unified flux highlight the wave-like nature of the universe and the interconnectedness of all things. The discovery of gravitational waves by LIGO provides further confirmation of these ideas, opening up new avenues for exploring the mysteries of the universe and deepening our understanding of the underlying nature of reality.

Discussion

The notion of penetrating wave and flux-like wholeness is expressed in *Yijing* in various sections: These are the relevant texts based on the Treatise on the Appended Remarks *xici zhuan*:

> *[A1.1] Heaven is honourable [**zun**], Earth is lowly [**bei**]; thus are **Qian** and **Kun** determined. The lowly and high [**gao**] being set out, the honoured [**gui**] and humble [**jian**] are positioned. Activity and stillness are constant, determining the firm and yielding [lines]. Tendencies [**fang**] cluster in categories and things are distinguished in groups, giving rise to auspicious and ominous [prognostications]. Images come about in Heaven and forms come about on Earth, and fluctuation and transformation [**bianhua**] appear (Adler, 2020, p. 262).*

The reference to wave or field or flux-like perturbations in the Treatise on the Appended Remarks ( ) is a metaphorical description of the dynamic interactions between Heaven and Earth, giving rise to the images and lines used in divination. The text suggests that Heaven and Earth provide a gradient of values - an ‘honourable’ high value and a ‘lowly’ value - which form the basis of the fluctuations and transformations that occur in the natural world. The metaphor of wave or field or flux-like perturbations can be understood in modern physics, where the concept of a field pervading space is used to explain the behaviour of particles and the interactions between them. In the same way, the Treatise on the Appended Remarks suggests that a pervasive ‘field’ of energy underlies the natural world and gives rise to the images and lines used in divination. The text further describes how these fluctuations and transformations manifest in the natural world as images and forms. This is reminiscent of the concept of emergence in complex systems, where simple interactions between individual components give rise to complex patterns and behaviours on a larger scale (San Miguel et al., 2012).

The images and lines used in divination are seen as symbolic representations of these emergent patterns and are interpreted to provide insight into the underlying dynamics of the natural world. The text also suggests that these patterns are not immutable and static but are subject to constant fluctuation and transformation, reflecting the ever-changing nature of the world around us. Johnson (2012) argued that

It has become customary to conceptualize the world by drawing on computational symbols and metaphors and to imply that the world is, in essence, a type of cosmological computer. Johnson (2012) added that the divination process is where the rule-governed nature of one system is employed to establish dependable correlations with another rule-governed system.

Overall, the metaphor of wave- or field- or flux-like perturbations in the Treatise on the Appended Remarks highlights the interconnectedness of all things in the natural world and emphasizes the importance of understanding the underlying dynamics of these interactions to gain insight into the future.

This paper argues that Bohm's (2002) implicate and explicate order and *YiJing*'s concept of implicate order in Heaven and explicate order on Earth are ways of understanding the interplay between different levels of reality.“ , , “ , A1 , interpreted by Adler (2020) as “Images come about in Heaven, and forms come about on Earth, and fluctuation and transformation [*bianhua*] appear” (p. 262). Bohm's (2002) implicate and explicate order posits that reality has two orders, the implicate order, which is a deeper level of reality, and the explicate order, which is the surface level of reality. The implicate order is the underlying source of all physical manifestations in the explicate order. Bohm (2002) advocated that the implicate order is a holistic, interconnected, and undivided whole. In contrast, the explicate order is the realm of separateness, where objects and events exist as distinct entities.

Similarly, *YiJing* describes the relationship between the implicate order in Heaven and the explicate order on Earth. The implicate order in Heaven is a level of reality where the archetypes and patterns of the universe reside. These patterns are then explicated and manifest on Earth. One way to understand the relationship between Bohm's (2002) implicate and explicate order and *YiJing*'s implicate order in Heaven and explicate order on Earth is to see them as two different frameworks for understanding the same underlying reality. Both systems posit that reality has a deeper level of interconnectedness and wholeness, which underlies the surface level of separate objects and events. The difference between the two systems is that Bohm's (2002) implicate and explicate order is primarily scientific and philosophical, while the *YiJing* is spiritual and philosophical. However, both systems are concerned with understanding the fundamental nature of reality and the relationship between different levels of existence. Overall, both Bohm's (2002) implicate and explicate order and *YiJing*'s implicate order in Heaven and explicate order on Earth offer valuable insights into the nature of reality and the relationship between different levels of existence.

> *[A2.2] The firm and yielding [lines] displace each other, giving rise to fluctuation and transformation (Adler, 2020, p. 265).*

In the Treatise on the Appended Remarks context, the notion of fluctuation and transformation arises from the interaction

of the firm and yielding lines in the hexagrams of *Yijing*. The hexagrams are formed by stacking six solid or broken lines on each other, representing a firm or yielding force, respectively. When two hexagrams are compared, it is observed that the firm and yielding lines are displaced, resulting in a different configuration of the hexagram. This displacement gives rise to a state of fluctuation and transformation, in which the hexagram represents a new situation or state of affairs. In this context, the reference to wave, field, or flux-like perturbations refers to how these fluctuations and transformations occur. It can be likened to a wave or field that propagates through the hexagram, displacing the firm and yielding lines and giving rise to new configurations. This process can be understood as a perturbation of the original state of the hexagram, which then leads to a cascade of changes and transformations.

The concept of wave-like perturbations is also related to a gradient of values, as discussed in the previous passage [A1.1]. The gradient of value is provided by the 'honourable' high value of heaven and the 'lowly' value of earth, which give rise to a fluctuation and transformation of the lines in the hexagram. This process can be understood as a kind of field or gradient that pervades the hexagram, influencing the placement of the firm and yielding lines. This reference to wave, field, or flux-like perturbations in the Treatise on the Appended Remarks emphasizes the dynamic and interactive nature of the hexagrams in the *Yijing*. Furthermore, it highlights that the hexagrams are not static symbols but represent a continuous process of fluctuation and transformation influenced by various forces and gradients.

> *[A4.1] The Yi is a model of Heaven and Earth. Therefore, it can stitch together threads [milun] of the Way of Heaven and Earth (Adler, 2020, p. 267).*

The reference to "stitching together threads of the Way of Heaven and Earth" implies that the*Yijing* serves as a means of connecting the principles of Heaven and Earth, achieved through the use of symbolic language that describes the movement and interaction of energy and matter, creating a dynamic and interconnected fabric of reality. The *Yi* is believed to be a tool for understanding and manipulating these forces and weaving together the universe's various threads to create a harmonious whole. The idea of stitching together threads of the Way of Heaven and Earth is symbolic of how the various forces of the universe are interconnected and interdependent. Just as each thread in a fabric is connected to the others, so too are the various forces of the universe connected. When one part of the fabric vibrates or is affected in some way, it can cause a ripple effect that impacts the rest of the fabric.

> *[A4.2] Looking up [**Fuxi**] contemplated the Heavenly patterns [tianwen]; looking down, he examined the Earthly order [dili]. In this way, he understood the reasons for [the alternation of] dark and light [i.e., yin and yang]. Tracing things to their beginnings and going back to their ends, he understood the explanations of death and life. Essence [jing] and qi make things; the hun [yang soul] floating away causes fluctuation [bian] [death]; in this way, he understood the dispositions and circumstances of ghosts and spirits (Adler, 2020, p. 267).*

In this passage, *Fuxi*'s contemplation of the heavenly patterns and earthly order allowed him to understand the reasons for alternating dark and light, or *yin* and *yang*. This understanding of the cyclical nature of the universe can be seen as a reference to wave- or field-like perturbations that give rise to the images in the *Yijing*. The essence and *qi* of things, as

well as the *hun*, are seen as the energies that make things and cause fluctuation or change. From the field- or flux-like perturbations perspective, the *Yijing* can be seen as a model that describes the flow of energy and matter in the natural world. These perturbations can be observed in the movements of celestial bodies, the behaviour of water and wind, and the growth and decay of plants and animals. By understanding these patterns and the principles that govern them, we can gain insight into the natural world and our place within it.

In the context of ghosts and spirits, which can be seen as energies that exist but are not directly observable, their effects can still be felt through fluctuation. This idea can be related to wave-like perturbations that can be observed indirectly through their effects on the surrounding environment. Therefore, this passage highlights the importance of understanding the subtle energies that give rise to the fluctuations and transformations observed in *Yijing* and the world around us. Metaphorically, ghosts and spirits (unobservable) influence the world through their energy. This idea is similar to how subatomic particles can interact with each other through the exchange of energy and produce observable effects.

> *The operation of fundamental forces in quantum field theory is explicated here as the exchange of particles, consistently with the standard methodology of particle physics. The particles involved are seen to bear little relation to any classical particle but, rather, comprise unified collections of compresent, conserved quantities indicated by propagators. The exchange particles, which supervene upon quantum fields, are neither more fundamental than fields nor replace them as has often previously been assumed in models of exchange forces (Jaeger, 2021, p. 12).*

The quantum indeterminacy principle, also known as the uncertainty principle, states a fundamental limit to the precision with which certain pairs of physical properties, such as position and momentum, can be simultaneously known (Heisenberg, 1949). This principle has profound implications for the behaviour of quantum particles and the forces that govern their interactions. Wick's (1938) work focused on the relationship between the quantum indeterminacy principles and the operation of exchange forces. Exchange forces arise due to the indistinguishability of identical particles in quantum mechanics. Wick's research showed that the quantum nature of exchange forces is intimately connected to the quantum indeterminacy principles. Overall, Wick's work highlights the fundamental role of the quantum indeterminacy principles in the behaviour of quantum particles and the forces that govern their interactions (Wick, 1938).

The concept of essence and *qi*, believed to be the building blocks of all things in traditional Chinese philosophy, can be compared to how subatomic particles make up all matter in modern physics. Both concepts suggest that there is an underlying energy or force that gives rise to the physical world and its various manifestations. However, it is essential to keep in mind that these are two distinct systems of thought, and while there may be some parallels between them, they should not be conflated. Chinese philosophy is based on a holistic worldview that emphasizes the interdependence of all things. In contrast, modern physics is based on a reductionist approach that seeks to break down the world into its smallest components.

Overall, the *Yijing* can be seen as a model of Heaven and Earth, stitching together the threads of the Way of Heaven and

Earth and providing insight into the underlying energies and fluctuations that shape the universe.

> *[A4.4] He encompasses the transformations of Heaven and Earth and does not transgress. He completes all things without omission; he penetrates the Way of day and night and understands it. Therefore spirit has no location and change [**yi**] has no [fixed] structure (Adler, 2020, p. 268).*

In the Treatise on the Appended Remarks (*xici zhuan*), 'He encompasses the transformations of Heaven and Earth and does not transgress' refers to the harmonious balance between human actions and the natural order of the universe. The text further explains that this balance is achieved by completing all things without omission and by understanding the Way of day and night, which implies an awareness of the cyclic patterns of nature.

The statement 'Therefore spirit has no location and change [*yi*] has no [fixed] structure' suggests that the concept of spirit or energy is not bound by physical location or fixed structure. Instead, it resembles a wave or field-like perturbation constantly in flux. The concept of energy as a perpetuating wave or field is not unique to this text. Still, it has been explored in many fields of study, including physics, biology, and philosophy.

In physics, the wave-like nature of energy is evident in phenomena such as light and sound waves. These waves are not fixed in space and time but instead propagate through a medium, creating patterns of energy that are constantly changing. In biology, energy flow is essential to understanding the complex interactions between organisms and their environment. Energy is not a fixed substance but flows through ecosystems (Odum, 1968), providing the basis for all life.

In philosophy, the concept of energy or *qi* is often associated with the idea of a universal life force that permeates all things. Furthermore, this life force is not fixed in space or time but is in constant flux, manifesting in different forms and patterns.

The reference to wave or field-like perturbations in the Treatise on the Appended Remarks suggests a dynamic and ever-changing *qi* or energy. This concept is not limited by physical location or fixed structure but instead is more akin to a constantly evolving wave or field that permeates all things.

> *[A5.1] The alternation of yin and yang is called the Way (Adler, 2020, p. 269).*

Here, this paper argues that the concept of *yin* and *yang* can be interpreted as analogous to the behaviour of waves. *Yin* and *yang* represent opposing forces in the natural world, such as light and dark, hot and cold, or male and female. *Yin* and *yang* are complementary yet opposing principles central to Chinese philosophy and cosmology. They represent the fundamental forces that shape the natural world and are often depicted as complementary halves of a whole. These forces are constantly in flux, with one force ebbing as the other flows.

Similarly, the concept of fields is often used in physics to describe the behaviour of energy and matter. A field is a region of space where a physical quantity, such as the electric or magnetic field, exerts a force on a charged particle. Fields are characterized by their strength and direction, and they can also interact with each other to create complex interference

patterns.

The concept of *yin* and *yang* can also be understood through the lens of fields. *Yin* and *yang* represent opposing fields in the natural world, with one field exerting a force as the other field opposes it. The alternation of *yin* and *yang* can be seen as a dynamic system of opposing fields interacting to create balance and harmony in the natural world.

> *[A5.8] Maximizing numbers to know the future is called prognostication. Penetrating [understanding] the fluctuations is called affairs (Adler, 2020, p. 270).*

The statement 'Maximizing numbers to know the future is called prognostication. Penetrating [understanding] the fluctuations is called affairs' contrasts two different approaches to understanding the natural world: one based on quantitative analysis and prediction and the other based on qualitative understanding of the complex dynamics of natural systems.

The reference to wave- or field-like perturbations can help us understand the concept of 'penetrating the fluctuations' in a qualitative sense. In physics, the behaviour of complex systems is often described using the language of waves and fields. Waves are disturbances that propagate through a medium, while fields are regions of space that exert a force on matter. The behaviour of waves and fields is characterized by their amplitude, frequency, wavelength, and interactions with other waves and fields.

In the context of the Treatise on the Appended Remarks, fluctuations are understood as the dynamic behaviour of natural systems, including the cycles of the seasons, the growth and decay of living organisms, and the interactions between different elements of the natural world. Penetrating the fluctuations means understanding the complex dynamics of these systems, including their interdependence, sensitivity to initial conditions, and emergent properties.

This understanding can be seen as analogous to the behaviour of waves and fields in physics. Waves and fields are characterized by their complex interactions and emergent properties, and their behaviour is often difficult to predict using simple quantitative models. Similarly, the behaviour of natural systems is characterized by their complexity and sensitivity to initial conditions, and understanding these systems requires a qualitative understanding of their dynamics and emergent properties.

Overall, the reference to wave- or field-like perturbations in the context of the Treatise on the Appended Remarks can help us understand the importance of qualitative understanding in studying natural systems. Rather than relying solely on quantitative analysis and prediction, understanding the natural world requires a deep appreciation of natural systems' complex dynamics and emergent properties, which can be described using the language of waves and fields.

> *[A5.9] When **yin** and **yang** are unfathomable, we call it spirit (Adler, 2020, p. 270).*

The statement 'When *yin* and *yang* are unfathomable, we call it spirit' suggests a deeper, more mysterious aspect to the

interaction between yin and yang that transcends our ability to understand it using conventional categories and concepts. The reference to wave- or field-like perturbations can help us understand the concept of 'spirit' in this context. Waves are disturbances that propagate through a medium, while fields are regions of space that exert a force on matter.

In the Treatise on the Appended Remarks, the interaction between*yin* and *yang* can be understood as a complex, dynamic system that exhibits wave-like and field-like behaviour. When *yin* and *yang* are unfathomable, they operate at a level of complexity beyond our ability to understand or predict using conventional categories and concepts entirely. For example, within the field of quantum mechanics, the uncertainty principle, also referred to as Heisenberg's uncertainty principle, encompasses a range of mathematical inequalities. These inequalities establish a fundamental restriction on the precision with which the values of certain pairs of physical properties, such as position (x) and momentum (p), can be predicted from their initial conditions for a given particle (Gelman & Betancourt, 2013). As a result, the position of the *yin* or *yang* and the momentum of change of these*yin* or *yang* lines are equally unfathomable. This complexity can be seen as analogous to the behaviour of waves and fields in physics, which can exhibit unpredictable, emergent behaviour that is difficult to understand using simple models.

In this context, the concept of 'spirit' can be seen as a way of acknowledging the mysterious, ineffable aspect of the natural world that transcends our ability to understand it using conventional categories and concepts. It represents the recognition that aspects of the natural world are beyond our ability to comprehend fully.

> *[A6.1] As for the Yi, it is vast; it is great. In terms of being far-reaching, nothing can resist it. In terms of being near, it is still and correct. In terms of filling Heaven and Earth, it is complete (Adler, 2020, p. 270).*

The passage 'As for the *Yi*, it is vast; it is great. In terms of being far-reaching, nothing can resist it' suggests that the*Yi* is a powerful force that extends throughout the universe. The reference to wave or field-like perturbations helps us understand the concept of the *Yi* in this context. Waves and fields are frequently used in physics to describe the behaviour of matter and energy in the universe. While waves are disturbances that move through a medium, fields are regions of space where the forces acting on matter are exerted. These waves and fields can interact with each other in complex ways, giving rise to emergent phenomena that are difficult to predict or understand. It represents a powerful, pervasive force that extends throughout the universe.

The passage 'In terms of being near, it is still and correct. In terms of filling Heaven and Earth, it is complete' suggests that the *Yi* is not just a powerful force that extends throughout the universe but also a force that is still and complete, like a perfectly balanced wave or field. This balance and completeness can be seen as analogous to the behaviour of waves and fields in physics, which can exhibit a stable equilibrium state characterized by a state of rest or minimal energy. Leong (2023) explained:

In Yijing, equilibrium and disequilibrium are represented by the balance between yin and yang lines. When the hexagrams are in equilibrium, the yin and yang lines are balanced, and their relationships are stable. However, when the hexagrams are in disequilibrium, the balance between yin and yang lines is disrupted, and their relationships are unstable (p. 16).

> *[A6.3] Being vast and great [the **Yi**] matches Heaven and Earth; its flux and continuity **biantong**] match the Four Seasons; the meanings of its **yin** and **yang** [lines] match the sun and moon; the goodness of its ease and simplicity matches the utmost virtue (Adler, 2020, p. 271).*
>
> *This section states that 'Being vast and great [the **Yi**] matches Heaven and Earth; its flux and continuity **biantong**] match the Four Seasons; the meanings of its **yin** and **yang** [lines] match the sun and moon; the goodness of its ease and simplicity matches the utmost virtue'.*

This paper argues that wave- or field-like perturbations caused by the unpredictable alternation of*yin* and *yang* represent the natural world's underlying patterns and forces. Therefore, the hexagrams, composed of these binary lines, can be interpreted as wave-like perturbations or fluctuations within this field, representing the dynamic interplay of different forces and energies. Thus, *Yijing's* imagery can be seen as a manifestation of these underlying patterns and forces.

In the context of wave propagation, the concepts of*yin* and *yang* can be seen as representing the complementary, yet opposing, forces that give rise to waves. These forces can be understood as superposed probabilities with other waves, giving rise to an indeterministic wave function. The idea of wave superposition is central to the probabilistic nature of waveforms. When two waves are superimposed, the resulting wave is determined by the interaction between the two waves, which can lead to interference patterns that are difficult to predict in advance. As a result, the wave functions become indeterministic, and the emergent phenomena can manifest as constructive or destructive interference patterns. This emergent behaviour is akin to how the hexagram lines in the *Yijing* determine an occurrence's auspicious or ominous nature. The waves, or ripples, generated by the interaction are transient and ever-changing, while the body of water from which they arise represents the underlying *Yi* that remains constant. This analogy highlights the transitory nature of the emergent state, which is never permanent, while the underlying *Yi* remains stable. The emergence of complex patterns from the interaction between waves underscores the importance of understanding the underlying dynamics and impermanence.

> *[B9.1] The material of the Yi as a book has its origins in beginnings and its essentials in endings. The six lines intermingling are simply temporal things (Adler, 2020, p. 297).*

The Treatise on the Appended Remarks statement suggests that the *Yi* originates in beginnings and its essentials in endings. This can be interpreted as referring to the transient nature of all things, including quantum vibrations. Each quantum vibration can be considered a temporal thing constantly evolving from one substate to another, never static or fixed in its essence.

In quantum mechanics, a quantum vibration or oscillation refers to the motion of a particle or system of particles in a quantum state. The behaviour of quantum systems is described by wave functions, representing the probability of finding the system in a particular state. The wave function constantly evolves as the system interacts with its environment and transitions between states.

In this sense, the intermingling of the six lines in the *Yi* can be seen as a metaphor for the dynamic interplay of quantum states, each constantly evolving and transitioning into other states. Furthermore, *Yi*'s emphasis on beginnings and endings highlights the importance of understanding the temporal nature of these quantum vibrations and the need to approach them as ever-evolving processes rather than fixed or static entities.

Transformation seeking equilibrium, harmony and balance

In both quantum science and *Yijing*, harmony, balance, and equilibrium are fundamental for understanding the natural world and our place within it. To achieve this balance, transformations are necessary, and the ability to adapt to these transformations is what *biantong* refers to.

In quantum science, everything is in a constant state of change and transformation. Particles can exist in multiple states simultaneously, and their behaviour is unpredictable and uncertain. However, despite this apparent chaos, an underlying order and balance emerge from these transformations. The principle of complementarity is an example of this, which suggests that seemingly contradictory properties, such as the wave-particle duality of light, are necessary for the overall balance and harmony of the system.

Similarly, in *Yijing*, the concept of *biantong* is central to understanding the natural world and our place within it. The *Yijing* describes the world as a constantly changing and evolving system where everything is interconnected and interdependent. The ability to adapt to these changes and transformations is what allows us to maintain harmony and balance in our lives. The hexagram *kun* represents the earth and the receptive, and its lines suggest the importance of flexibility and adaptability in achieving balance and harmony.

The concept of *biantong* is mentioned throughout the *Yijing*, but one particular reference can be found in the *xici* section 6:

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Translated, this passage reads:

"The greatness of heaven and earth lies in their vastness, and the uniqueness of all things lies in their variety. This is how they are able to achieve greatness. *Dao* is where they exist, and it is what carries them. Virtue lies within them, and it is what shines upon them like the sun and the moon. Wherever the way exists, change and adaptability are necessary."

This passage emphasizes the importance of adaptability and changes in achieving greatness and balance in the natural world. It suggests that the way *Dao* exists within all things and that the ability to adapt and change is necessary to maintain balance and harmony in the world. This aligns with the concept of *biantong* as a means of achieving harmony and balance through adaptability and flexibility.

Conclusion

In *Yijing*, *qi* is fundamental to understanding the natural world and how it undergoes transformations.*Qi* suggests that everything in the world is composed of a fundamental energy constantly in flux. This energy can be seen as the driving force behind all transformations and changes in the natural world. In *Yijing*, the interplay of *yin* and *yang* is used to describe the different aspects of this energy. Together, these two forces interact to create a harmonious balance necessary for the proper functioning of the natural world.

In contrast, modern science has also recognized the importance of transformations and changes in the natural world. In particular, the early 1900s saw the inception of quantum physics, which debunked the notions of Newtonian determinism and asserted the principles of nondeterminism, nonlinearity, and probability.

In quantum physics, it is recognized that particles can exist in multiple states simultaneously and that their behaviour is unpredictable and uncertain. This contrasts the classical Newtonian view of the world, where everything was seen as deterministic and predictable. However, despite this apparent chaos, an underlying order and balance emerge from these transformations. The principle of complementarity, for example, suggests that seemingly contradictory properties, such as the wave-particle duality of light, are necessary for the overall balance and harmony of the system.

Therefore, both *Yijing* and quantum physics recognize the importance of transformations and changes in the natural world and the need to embrace them with adaptability, flexibility, and an understanding of the interconnectedness of all things. While *Yijing* focuses on the interplay of *yin* and *yang* and the concept of *qi*, quantum physics recognizes the principles of nondeterminism, nonlinearity, and probability. Both provide different perspectives on the same underlying principle of the constant transformation of energy and the need for balance and harmony in the natural world. The idea of *qi* as a dynamic force that moves and changes is sometimes compared to the movement of waves, which also involve energy transmission through space. However, it's important to note that *YiJing* does not use the concept of waves in the same way that modern physics does. Instead, the text describes the movement of *qi* in more metaphorical terms, using images and symbols drawn from the natural world.

Together, quantum science and *Yijing* suggest that transformations are necessary for achieving balance and harmony but that these transformations must be approached with adaptability, flexibility, and an understanding of the interconnectedness of all things. Adapting and transforming allow systems to maintain their balance and equilibrium despite the constant changes and transformations. By embracing the principle of *biantong*, we can navigate the complexities of the natural world and achieve a state of equilibrium that allows growth and evolution.

In conclusion, the concept of *biantong* plays a crucial role in both quantum science and *Yijing* in achieving harmony, balance, and equilibrium. By recognizing the importance of transformations and adapting to them with flexibility and adaptability, we can navigate the complexities of the natural world and achieve a state of equilibrium that allows for growth and evolution.

About the Author

David Leong, Ph.D., is an entrepreneurship theorist with over twenty-five years of practical experience as a serial entrepreneur. His entrepreneurial journey commenced shortly after obtaining his Bachelor of Business Administration degree from the National University of Singapore in 1994. He has two PhDs – one from Charisma University and the other from the University of Canberra.

Dr. Leong has been the driving force behind the inception of no fewer than fifteen ventures, traversing sectors that include corporate finance, consultancy in business and marketing, technology solutions, asset management, and human resources.

Acknowledged as an authoritative figure and thought leader in the business domain, Dr. Leong's expertise is frequently solicited by local media outlets like The Straits Times, Business Times, Lianhe Zaobao, and Channel News Asia, particularly for his insights on economic trends, political analyses, and human resources developments. His academic endeavours are focused on the study of entrepreneurship, while he also has a scholarly interest in the ancient Chinese Yijing (Book of Changes), exploring its intersections with contemporary scientific fields such as quantum physics.

Dr. Leong is a prolific contributor to academic and professional literature, authoring numerous articles and book chapters that span his diverse research interests. He has also penned a book titled “Uncertainty, Timing and Luck on Quantum Terms in Entrepreneurship”, which delves into the nuanced interplay of chance and strategic decision-making in the entrepreneurial landscape- https://www.amazon.com/Uncertainty-Timing-Quantum-Terms-Entrepreneurship/dp/1636483534

For a more comprehensive overview of his work and contributions, please refer to https://peopleworldwide.com/davidleong.html

Statements and Declarations

Conflict of Interest Statement

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Footnotes

[1] In quantum mechanics, superposition is a state in which a quantum system is in a combination of two or more states simultaneously.

[2] Psychokinesis was coined by an American author Henry Holt in his book *On the Cosmic Relations* in 1914; psychokinesis describes the use of mental strength to influence external objects or events with no physical exertions. The subject of psychokinesis has been criticized for lacking repeatability and controls. There is also not enough evidence to show that this phenomenon is real. It is regarded as pseudoscience.

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