Qeios

The Dao 道 of Yunqi 運氣: A Comparative Study of Chinese Energetic Force Qi 氣 with Penrose's Twistor

This paper examines the *Dao* (道) as a fundamental principle in Chinese philosophy, underscoring its role as the source and guiding force behind the harmonious interaction of *yin* (陰) and *yang* (陽) and the *wuxing* (五行) or five elements. The *Dao* shapes the natural world and informs moral, philosophical, and cosmological thought, providing a holistic framework for understanding life and the cosmos. This integration of *yin-yang* theory offers a conceptual foundation for Chinese natural science while establishing a theoretical and practical basis for the broader Chinese worldview.

The study further explores fields and forces, focusing on the relationship between potentiality and actuality within a scientific framework. By translating traditional concepts rooted in *yin-yang* and *wuxing* into modern scientific discourse, the research aims to bridge ancient wisdom with contemporary understandings of space, time, and force, demonstrating these ideas' ongoing relevance in explaining the universe's dynamics.

Additionally, the paper discusses Roger Penrose's twistor theory, which proposes that space and time emerge from a deeper, more fundamental level of reality. This concept resonates with *qi* (氣), an underlying force orchestrating existence. The paper draws parallels between twistors and *qi*, suggesting that both frameworks propose a universe shaped by deeper, interconnected processes. The research also compares the concept of *yun* (運) in Chinese philosophy, expressed in this paper as a vital carrier field akin to bosonic properties, with the Higgs field in physics, emphasizing the parallels between *yin-yang* duality and the symmetry-breaking processes in particle physics.

This interdisciplinary study seeks to reconcile Eastern philosophical traditions with Western scientific theories, offering a nuanced understanding of reality that enriches ancient and modern paradigms. Through this dialogue, the paper contributes to a deeper appreciation of how traditional insights can inform contemporary scientific thought.

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Introduction

This paper explores *Dao* (道), emphasizing its foundational role in Chinese philosophy over the past two millennia. The *Dao*, as the ultimate source and guiding principle of all things, underpins the harmonious interaction between yin (陰) and yang (陽) and the *wuxing* (五行), thereby shaping not only the natural world but also the moral, philosophical, and cosmological understanding in Chinese thought. This integrative perspective forms the basis for a holistic approach to life, where alignment with the *Dao* leads to a balanced and virtuous existence, reflective of the inherent order and cyclical nature of the cosmos. While this *yin-yang* theory primarily provides a conceptual grounding for Chinese natural science, it also lays a theoretical and practical basis for the Chinese worldview.

This paper explores the notion of entelechial forces[1], delving into the intricate relationship between potentiality and actuality as mediated by these forces, and offers explanations grounded within a scientific framework. Through this investigation, the study seeks to clarify these traditional philosophical concepts, particularly those rooted in the *yin/yang*and *wuxing*, in a manner that bridges ancient wisdom with contemporary scientific discourse on the nature of space, time, and force. By translating these age-old constructs into the language of modern science, the research endeavours to demonstrate their continued relevance and applicability in understanding the fundamental dynamics governing the physical universe and human experience.

Roger Penrose's twistor theory, proposed in the late 1960s, offers a distinctive framework for understanding the underlying structure of reality, suggesting that space and time emerge from a more fundamental level rather than existing as primary constructs (Penrose, 1968). This idea aligns with *qi* (氣), an underlying, unseen force orchestrating the observable aspects of existence. The paper explores how Penrose's twistors, by focusing on the geometric properties of spacetime, offer a unifying framework for quantum mechanics and general relativity, paralleling how *qi* (氣) governs growth, transformation, and regulation in life. The comparison between twistor theory and *qi* (氣) offers a compelling dialogue between Western scientific innovation and Eastern philosophical tradition. Both frameworks propose that the observable universe is a manifestation of deeper, more fundamental processes. In Penrose's theory, the twistors are mathematical objects that encode spacetime information, suggesting that the fabric of reality is interwoven with a deeper geometric structure.

In Chinese philosophy, *yun* (運) functions as a vital carrier field, akin to bosonic properties, that maintains the harmonious balance between *yin* (陰) and *yang* (陽). This paper argues that *yun* (運) represents an intrinsic energy field that regulates life and the cosmos. This concept parallels the role of the Higgs field in physics, which, through its 'Sombrero potential'[2], takes a nonzero value everywhere, breaking the weak isospin symmetry[3] and giving mass to elementary particles in the Standard Model, including the Higgs boson itself (Schaf, 2015). The breaking of symmetry in the Higgs field involves two electrically charged components that form a doublet (Djouadi, 2008), a structure that can be seen as analogous to the *yin*/*yang* (陰/陽) duality in Chinese philosophy. As the *yin*/*yang* interplay represents opposing but complementary forces that maintain balance and harmony in the cosmos, the two charged components in the Higgs field doublet interact to break the weak isospin symmetry, a fundamental aspect of the electroweak interaction (Quigg, 2007). This symmetry breaking is crucial in giving mass to elementary particles, much like how the dynamic

balance of *yin* and *yang* drives growth, transformation, and regulation processes in life and the universe.

By examining the interplay between potentiality and actuality through the lens of entelechial forces, this paper seeks to bridge these two seemingly disparate worldviews. The research provides a scientific explanation for traditional Chinese concepts, making them accessible to contemporary scientific discourse. The study enhances our understanding of space, time, and force through this interdisciplinary approach. It fosters a deeper appreciation of how ancient philosophical insights can inform and enrich modern scientific paradigms.

Dao (道) nourishes life and cultivates nature (Chan, 2009). *Dao* sustains the asymmetrically differentiated yet interconnected elemental body of life among the myriad entities while simultaneously maintaining a responsive engagement with other life forms, thereby animating movement and interaction (Nelson, 2020). The continuous nourishment the *Dao* provides ensures that each entity retains its unique characteristics while participating in the larger web of existence, facilitating a harmonious and animated interplay within the natural world. This concept underscores the *Dao*'s integral function in balancing individuality and interconnectedness, driving the perpetual motion and vitality

致虛極，守靜篤。萬物並作，吾以觀復。夫物芸芸，各復歸其根。歸根曰靜，是謂復命。復命曰常，知常曰明。不知常，妄作凶。知常容，容乃公，公乃王，王乃天，天乃道，道乃久，沒身不殆。

As interpreted by Ames and Hall (2003)

In the process of all things emerging together (*wanwu*)
We can witness their reversion.
Things proliferate,
And each again returns to its root.
Returning to the root is called equilibrium.
Now as for equilibrium—this is called returning to the propensity of things,
And returning to the propensity of things is common sense.

According to chapter 16 of the *Daodejing* (道德經), all things arise from and return to the *Dao.* This interpretation highlights the interconnectedness of all things and the necessity of recognizing and adhering to the natural order. This *Dao*'s disposition is neither passive nor quietistic but synergistic and responsive, where all elements are harmoniously integrated into a fluid whole. Figure 1 illustrates a scene where everything returns to its root, characterized by a dispositional flow that moves as an interdependent whole and responds fluidly. This flow pattern resembles Roger Penrose's twistor theory, which captures reality's interconnected and dynamic nature. In this context, the flow and return to the root are not merely cyclical but reflect a deeper, intrinsic harmony and responsiveness like the geometrical descriptions of the twistor space. This analogy highlights the underlying unity and fluid interdependence within the natural world and theoretical constructs.

This paper explores the concept of *yunqi*（運氣）, an unobservable field often perceived on a sociological level as fate, destiny, or luck. This force, entangled with larger interactions and interferences unknown to the observer, is frequently attributed to luck or stacked odds. The dispositional flow described in Figure 1, where all elements return to their root and move as

an interdependent whole, exemplifies the fluid and responsive nature of *yunqi*（運氣）. The distinction between *yun* (運) and *qi* (氣) in Chinese philosophical literature is profound, reflecting two fundamental aspects of Chinese metaphysics and cosmology. *Yun* (運) generally refers to the dynamic process or the principle of movement and change within the cosmos (Woolf, 2022). It encompasses the ideas of fate, destiny, and events unfolding over time. *Yun* signifies the flow and transformation that govern the occurrences and trajectories in the universe, orchestrating the interactions and interdependencies among various elements.

On the other hand, *qi* (氣) is understood as the vital life force or the fundamental substance that pervades the universe (Wang, 2010). *Qi* is often described as an energy or breath that animates and sustains all life forms. It is the intrinsic substance from which everything is constituted, and all processes and transformations occur. *Qi* is the underlying energy that gives rise to both the material and immaterial aspects of existence (Zhang & Rose, 2001). The concept of *yunqi (*運氣) emerges as an entity that acts as an energy carrier. Operating as a dynamic system, the movement of energy facilitates the actualization of potentialities. In this framework, *yunqi* embodies the synergy between movement and energy, orchestrating the harmonious flow and transformation within the cosmos. *Yun* directs and modulates the change pathways, while *qi* supplies the necessary force for these processes. *Yunqi* thus creates a system wherein the directed movement of energy brings forth potentialities into actuality.

Separately, the investigation into entelechial forces offers a thorough comprehension of how potentialities are actualized, establishing connections between the philosophical constructs of *qi*（氣） and the theoretical constructs of twistors. It is important to clarify, however, that the intent of this paper is not to equate *qi* directly with the energy within the twistor framework nor to identify the entelechial force strictly as *qi*. Instead, the paper highlights the intriguing similarities in how these forces are described within their respective scientific and philosophical contexts.

By examining these parallels, the paper seeks to provide a deeper understanding of the processes through which potentialities become actualized. The goal is to explore how both concepts, while distinct in their origins and applications, share commonalities in their descriptions of fundamental forces that govern the dynamics of existence. This comparative approach will clarify the complementary insights offered by the *Dao* traditions and modern scientific theories, fostering a richer interdisciplinary dialogue. The research question thus centres on how the flow of *yunqi* (運氣) or entelechial forces can be influenced to transition from a state of potentiality to actuality through deliberate action, particularly within social contexts and in addressing the vicissitudes of life. This study explores whether specific methodologies or interventions can alter the trajectory of *yunqi* or entelechial forces, thereby enabling a shift from latent potential to realized actuality. The research further investigates the mechanisms through which these forces interact and coalesce to produce impactful manifestations and emergent occurrences. By comprehending the principles that govern the dynamic interplay between potentiality and actuality, the study seeks to identify strategies that can effectively steer the flow of these fundamental forces.

In applying these insights to social contexts, the research examines how deliberate actions can mitigate the challenges and uncertainties of life. This approach aims to contribute to the development of a theoretical framework for influencing complex adaptive systems, thereby offering a deeper understanding of how to harness and direct these forces to achieve desired

outcomes. This investigation is particularly relevant in understanding how traditional philosophical concepts can be integrated with contemporary scientific and sociological paradigms to inform practical interventions in various fields.

To develop this paper conceptually, this paper first establishes a comprehensive understanding of *yun* (運) and *qi* (氣) by reviewing historical and contemporary interpretations of *yin*/*yang* and *wujing* in Chinese philosophy. Next, the paper explores Penrose's twistor theory, highlighting its potential to bridge quantum mechanics and general relativity. This paper then analyzes the parallels between twistor theory and the concept of *yun*, emphasizing the geometric and dynamic aspects of the field that unify them. Finally, the paper presents a scientific framework for interpreting entelechial forces, integrating these interdisciplinary insights to provide a cohesive understanding of how potentiality and actuality interplay within the broader context of space, time, and force. Through this approach, the paper aims to offer a novel perspective on the interrelation of ancient philosophical doctrines and cutting-edge scientific theories.

Twistor Space: The Underlying Structure

In the late 1960s, the University of Oxford physicist and mathematician Roger Penrose introduced an approach to developing a unified physics theory. He has received numerous prestigious prizes and awards, notably the 1988 Wolf Prize in Physics, which he shared with Stephen Hawking in recognition of their work on the Penrose–Hawking singularity theorems. In addition, he was awarded the 2020 Nobel Prize in Physics for his seminal discovery that black hole formation is a robust prediction of the general theory of relativity (Penrose et al., 2020). Diverging from the conventional quest to explain the movement and interactions of particles within the frameworks of space and time, Penrose posited that space and time are emergent phenomena arising from a more fundamental layer of reality (Musser, 2010).

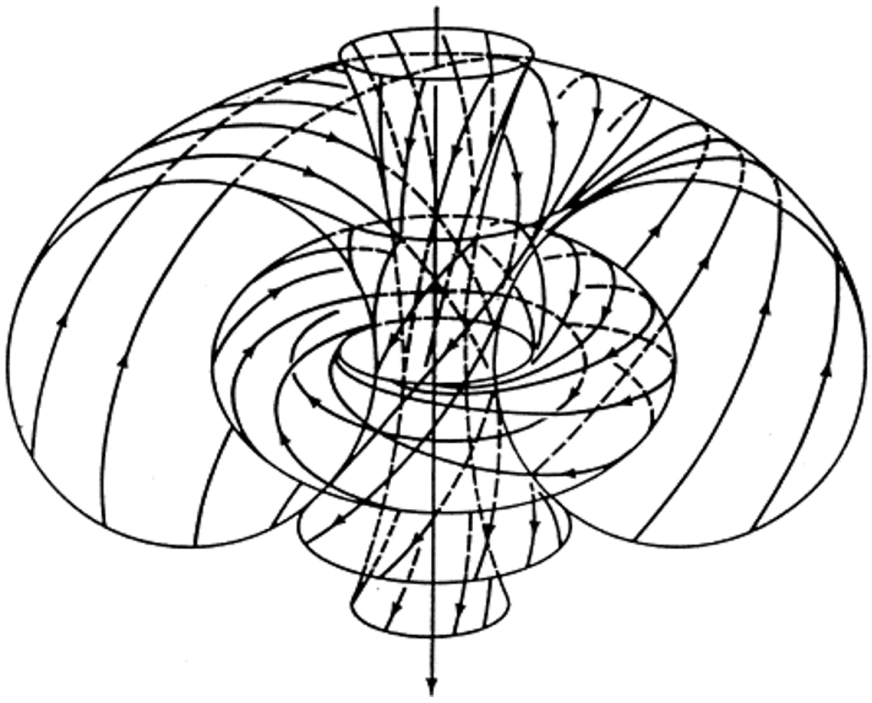

Figure 1. Penrose's twistor illustrating the flow within the twistor space in the centre

Roger Penrose's twistor theory represents a bold and innovative approach to the foundations of theoretical physics, proposing that the traditional notions of space and time may not be the primary constituents of reality. Instead, these concepts are seen as emergent properties arising from a more fundamental, underlying structure. Twistor theory offers a unique framework that challenges conventional perspectives on the nature of spacetime and particle dynamics, suggesting that a deeper level of reality governs the phenomena we observe (Penrose, 1967).

The central idea of twistor theory is that the fundamental entities of the universe are not traditionally assumed points in spacetime but rather more abstract mathematical objects called ‘twistors’. These twistors are elements of a complex four-dimensional space that Penrose (1992) defined, and they encode information about spacetime in a novel way. In conventional physics, spacetime is a smooth, four-dimensional manifold within which the dynamics of particles and fields unfold (Acharya, 2002). It offers an alternative by positing the apparent structure of spacetime from a more fundamental level of reality described by twistor space (Huggett & Tod, 1994).

Penrose’s (1992) twistor theory can be understood as a conceptual shift in how we perceive the fundamental nature of the universe. Rather than viewing space and time as the primary building blocks of reality, twistor theory posits that these are emergent properties arising from a deeper, more fundamental structure known as twistor space. In this framework, space and time are analogous to the surface of an ocean, shaped by the underlying currents that represent the true foundation of reality. The core idea of Penrose’s theory is that instead of points in spacetime, the fundamental entities of the universe are ‘twistors,' which are abstract geometric constructs that correspond to energetic motion or trajectories. The flow of reality, therefore, is not merely particles moving through spacetime; instead, it is the result of the intricate interactions of twistors within this deeper structure. Penrose’s theory elegantly suggests that the observable structure of spacetime dimensions, intervals, and geometry manifests the underlying dynamics of twistor space. Just as unseen currents influence the ocean's surface, the fabric of reality emerges from the deeper, more fundamental interactions within twistor space, offering a profound reimagining of the universe's foundational nature.

Rethinking Reality

In the *Dao* philosophy, space and time are similarly viewed as emergent from the *Dao*, the underlying principle governing the universe. The dynamic interplay of *yin* and *yang*, driven by *qi*, creates balance and transformation, much like the emergent properties in twistor theory. *Qi* is the vital energy that underpins the manifestation and functioning of life within the universe. The correspondence between Penrose’s twistor theory and the *Dao* is further illustrated by the concept of *yun*, which interacts with *qi* to form *yunqi* (運氣). *Yun* is perceived as a field harmonizing the flow of *qi*, ensuring a balance between *yin* and *yang*.

In particle physics, the concept of isospin symmetry, which treats protons and neutrons as two states of the same particle under a strong force, provides an analogy. However, this symmetry is imperfect due to differences in mass and charge, becoming notably asymmetric under weak interactions. The weak force, through the exchange of W and Z bosons, reveals disparities in particle behaviour (Weinberg, 1967). The Higgs mechanism, integral to mass acquisition, breaks the electroweak symmetry, differentiating between massless particles like photons and massive ones like W and Z bosons (Higgs, 1964).

This symmetry-breaking in particle physics parallels the *Dao* formation of the 'ten thousand beings' (萬物, *wanwu*) through the interaction of *yin* and *yang*. While *yin* and *yang* generally maintain balance, their dynamic interaction occasionally creates an imbalance, leading to new forms and phenomena. Similarly, breaking isospin symmetry results in distinct particles with different properties. Both frameworks emphasize the role of imbalance and asymmetry in driving change and differentiation, whether in the physical world or the *Dao*.

Yin and *yang*, like the weak force, are responsible for the ongoing transformation of all things in the universe. The symmetry-breaking interactions of the weak force give rise to particles with varying properties, while the dynamic interplay of *yin* and *yang* ensures the continual generation of *wanwu*. Both systems recognize that perfect symmetry is not the norm; instead, it is the source of differentiation and diversity in the universe. Thus, the breaking of isospin symmetry mirrors the *Dao*'s understanding of the balance and imbalance between *yin* and *yang*. Both describe the interaction of complementary forces as essential to creating new forms. In physics, symmetry breaking leads to particles with distinct masses and charges, while in *Dao* thought, it gives rise to *wanwu*. This shared concept of creation through symmetry-breaking underscores a universal principle where imbalance and interaction are key to reality formation.

Drawing parallels between the scientific framework of symmetry-breaking and the *Dao* philosophy, *yin* and *yang* can be viewed as analogous to electrical charges in the context of isospin symmetry. *Yin* and *yang* represent opposing yet complementary energies that drive transformation, just as electrical charges contribute to symmetry-breaking in physics (Khlopov, 2012). The *yun* field, comparable to the Higgs field, regulates the balance between yin and yang, ensuring cosmic harmony. *As* the carrier of *qi*, *yun* functions similarly to how the Higgs field breaks weak isospin symmetry, leading to the emergence of distinct particles (Chen, 2010).

Both scientific and philosophical perspectives highlight the importance of imbalance in driving change. In physics, symmetry breaking results in distinct forces and particles, while in the *Dao* philosophy, it leads to the interplay of opposites that underpins natural processes and human life.

Symmetry Breaking and the Yin/Yang Interplay: An Interdisciplinary Exploration

The interplay between symmetry breaking in the Higgs field and the *yin*/*yang* duality in Chinese philosophy provides a fascinating parallel that bridges Eastern metaphysical concepts with Western scientific principles. In quantum field theory, the Higgs mechanism is a pivotal process where symmetry is spontaneously broken, resulting in the emergence of mass for elementary particles. This symmetry breaking occurs when the Higgs field, visualized as having a 'Sombrero potential', reaches a nonzero vacuum expectation value (Djouadi, 2008). The Higgs field contains components that form a doublet, where the interaction between these components causes the symmetry to break, differentiating the weak force from electromagnetism and endowing particles with mass. This process is crucial to the Standard Model of particle physics, as it explains why certain particles have mass while others remain massless (Arbey et al., 2018).

This scientific phenomenon of symmetry breaking shares notable similarities with the *yin*/*yang* framework in Chinese philosophy. *Yin* and *yang* represent dual yet complementary forces foundational to the universe's structure and function. The Higgs field's

components interact to break symmetry and produce mass. The interplay between *yin* and *yang* leads to the continuous creation and transformation of all things in the cosmos. *Yin* and *yang* are not static entities but are dynamic and interdependent, much like the interaction of the components in the Higgs field. This dynamic balance between *yin* and *yang* is essential for maintaining harmony in the universe, driving the processes of change and development, and regulating the flow of *qi* (氣), the vital life force in Chinese thought (Needham, 1956).

Moreover, the Chinese five-element theory further enriches this analogy by providing a framework for understanding the combinatorial possibilities arising from these dual forces' interaction. The five elements—wood, fire, earth, metal, and water—are seen as different states or phases that cyclically transform into one another through the influence of *yin* and *yang* (Law & Kesti, 2014). This theory posits that all phenomena in the natural world arise from these elements' various combinations and interactions governed by the underlying forces of *yin* and *yang* (Osgood & Richards, 1973).

The transformation among the five elements in *Dao* philosophy parallels the phases particles undergo due to symmetry breaking in the Higgs field. While the Higgs field governs the emergence of mass through quantum symmetry breaking, the five elements control the emergence of forms in the natural world via cyclical interactions. Both frameworks describe how disruption in an underlying symmetry or balance manifests new forms and properties. In the Higgs mechanism, symmetry breaking results in the differentiation of forces and mass, while in *yin*/*yang* theory, the dynamic interplay of dual forces creates the diversity of life and nature. This correspondence between Eastern philosophy and Western science highlights the dynamic, non-static nature of the universe, shaped by balance and imbalance, symmetry and asymmetry. Integrating these perspectives fosters a deeper understanding of reality's fundamental forces, bridging cultural traditions and intellectual disciplines. By recognizing these connections, we can create a more holistic worldview that combines scientific rigour with philosophical insight, enriching our understanding of the nature of existence.

Discussion

The *Dao* views the universe as a continuous flow of experiences without a permanent essence (Chai, 2014); twistor theory conceptualizes the cosmos as a complex interplay of geometric entities—twistors—whose interactions give rise to the phenomena we perceive as spacetime matter. The *Dao* views the universe as not having a fixed essence; instead, it is seen as an ever-changing process where forms and events are transient manifestations of an underlying flow.

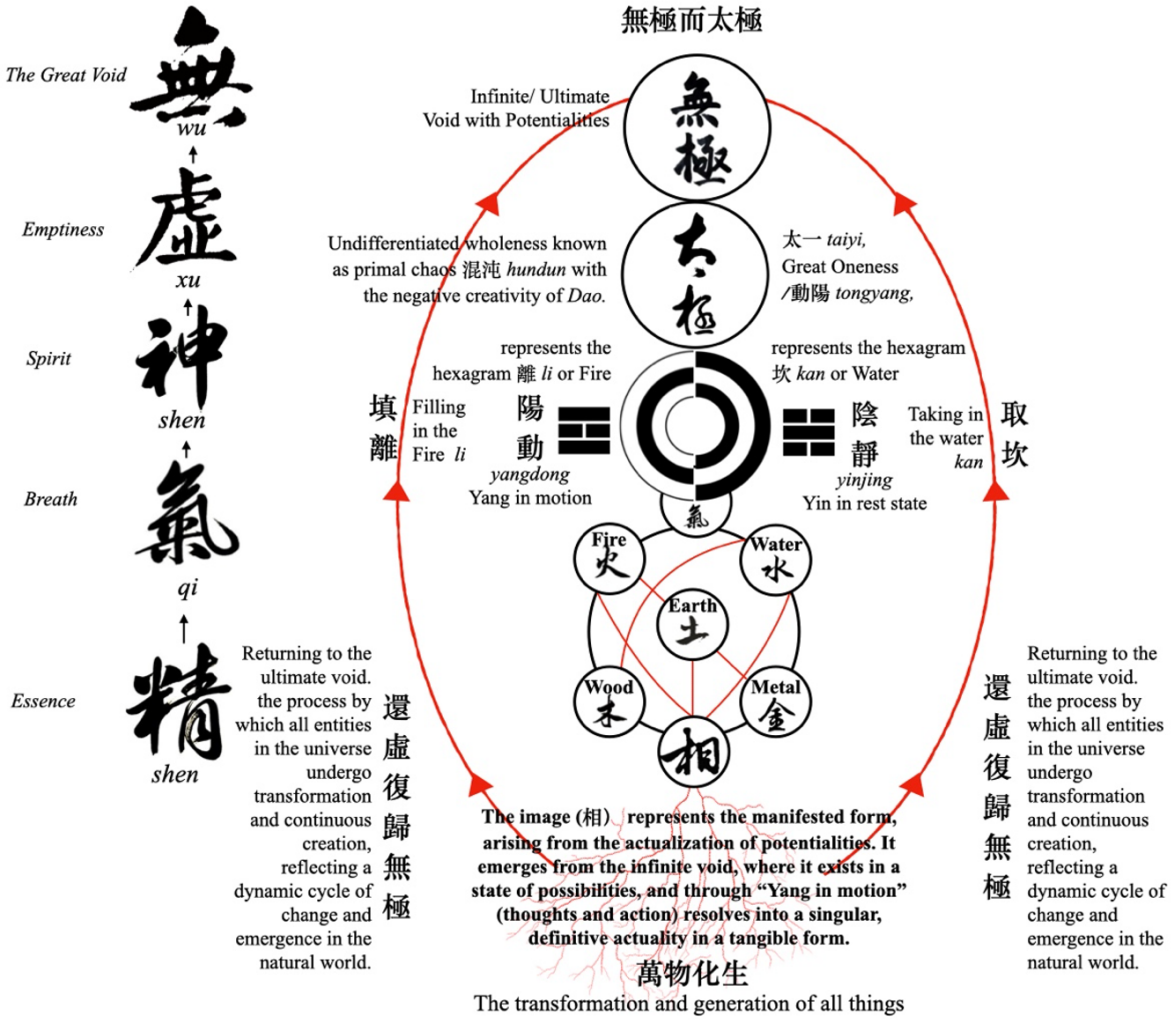

Figure 2. It is an adaptation of the Taijitu and Wujitu with a re-interpretation of the dynamic cycle of change and emergence in the natural world

Figure 2 presents a conceptual framework integrating the *Dao* cosmology, re-interpreted from the 無極圖*wujitu* and 太極圖*taijitu* (Patt-Shamir, 2020) with modern theoretical ideas, particularly Penrose's twistor theory and principles from quantum science, emphasizing the process of form and transformation within a cyclical flow of energetic forces. The diagram depicts a movement from the abstract, formless void to the manifested, tangible world, aligning with the *Dao* and the quantum field's notion of potentiality and actualization.

From the Great Void to Potentiality

At the top of the diagram lies 'The Great Void' (無, *wu*), symbolizing the ultimate state of emptiness from which all things originate. This void represents the undifferentiated source where the *Dao* resides beyond any form, structure, or distinction. The first passage from the *Daodejing*—"道可道也，非恒道也。名可名也，非恒名也。无名，万物之始也；有名，万物之母也。故恒无欲也，以观其眇；恒有欲也，以观其所徼。两者同出，异名同谓。玄之又玄，众眇之门"—provides a profound philosophical foundation that aligns closely with both the *Dao* and modern scientific interpretations. The void represents a pre-manifest state that transcends dualities and distinctions, containing the potential for the

dynamic interplay of *yin* and *yang*, which generates all forms and phenomena. This void is not a negation of reality but a generative potential from which the myriad things (*wanwu*, 万物) arise.

Similarly, in modern quantum field theory, the vacuum is not truly 'empty' in the conventional sense. Still, it is instead a seething space of energy and potential, filled with quantum fluctuations and virtual particles (Boi, 2011). However, while there are significant correspondences between these two concepts, there are also distinct differences in how they are framed and understood in metaphysical and scientific contexts. The Great Void thus serves as the backdrop for the continuous generation and dissolution of all things, much like the quantum vacuum serves as the backdrop for the creation and annihilation of particles in modern physics (de Vega & Sanchez, 2023).

In quantum field theory (QFT), the vacuum is similarly not a state of complete nothingness (Wright, 2024). Instead, the quantum vacuum is filled with virtual particles that pop in and out of existence due to quantum fluctuations (Boi, 2011). These fluctuations occur because even in the lowest energy state, quantum fields still exhibit activity, constantly exchanging energy between virtual particles (Amico et al., 2008). This is a central tenet of QFT, where fields are the fundamental constituents of reality, and particles are excitations of these fields (Harlander et al., 2023). While the vacuum appears empty at the macroscopic level, it is teeming with energy at the quantum level, and this vacuum energy is responsible for phenomena such as the Casimir effect and Hawking radiation (Liberati et al., 2012). This dynamic nature of the vacuum resonates with the *Dao* concept of the 'Great Void' being full of potentiality rather than mere absence. The vacuum in QFT is an active, energetic space, providing the foundation for particle creation and interactions (Fredenhagen et al., 2007)—similar to how the *Dao*, in its state of void, underlies the transformation of all things.

Dao Beyond Naming and the Quantum Vacuum

The first lines, "道可道也，非恒道也。名可名也，非恒名也" (The *Dao* that can be spoken is not the eternal *Dao*; the name that can be named is not the eternal name), emphasize the ineffable and transcendent nature of the *Dao*, which cannot be fully grasped or confined by human language or conceptualization. *Dao* represents the ultimate source of all things, beyond form and distinction, much like the quantum vacuum in physics, which exists as an underlying field of pure potentiality beyond the manifest world. *Dao* remains beyond naming. The quantum vacuum is beyond direct observation but contains latent possibilities for all forms of matter and energy (Zeiger & Bischof, 1998). The 'Great Void' and 'Emptiness' provide a rich framework for understanding the underlying dynamics of the universe, one that finds resonance in the concept of the quantum vacuum in modern physics. The *Dao*'s void and the quantum vacuum represent spaces of potentiality from which all forms arise, though they differ in their metaphysical and physical interpretations. The 'Great Void' is a metaphysical principle of infinite potential, while the quantum vacuum is a scientifically defined space of fluctuating energy. Despite these differences, both frameworks highlight the dynamic and evolving nature of the universe, where creation emerges from apparent nothingness.

The Unnamed and the Named: Potentiality and Manifestation

The following lines, “无名，万物之始也；有名，万物之母也” (The nameless is the origin of Heaven and Earth; the named is the mother of all things), further develop this parallel. The ‘unnamed’ refers to the state of potentiality from which all things arise, which can be seen as analogous to the quantum superposition—where all possible outcomes exist simultaneously before any observation collapses the wave function into a single, named reality. The ‘named’ represents the manifest forms of the world (illustrated at the bottom of Figure 2), the tangible entities that emerge from the primordial formlessness. In quantum terms, this would be the definite states of particles and forces that arise from the collapse of superposed quantum states, giving form to the physical universe. This distinction between the unnamed (potentiality) and the named (manifestation) reflects the process of quantum observation, where an unmeasured system exists in a state of indeterminacy, and only through interaction or observation does it take on a specific, measurable form (Jaeger, 2009). Similarly, in its unmanifest form, the Dao is the source of all things, while the named world represents the concrete expressions of this formless potential.

Duality and Unity: The Cycle of Existence

The lines, “故恒无欲也，以观其眇；恒有欲也，以观其所徼” (Therefore, one who is without desire can see the subtle essence; one who has desire can see its manifestations), illustrate the dynamic relationship between the observer’s perspective and the manifestation of reality. From a quantum perspective, the notion of desire (or observation) is crucial to collapsing superpositions into definitive outcomes. When no observation arises from want (无欲), the system remains in its subtle, indeterminate state, akin to quantum superposition. When desire (observation) is present (有欲), the system collapses into a concrete manifestation, observable and measurable in physical reality.

The line “两者同出，异名同谓” (These two arise from the same source but have different names) underscores the unity of potentiality and manifestation. The unmanifest *Dao* and the manifest world stem from the same ultimate source, just as in quantum mechanics, the underlying field of possibilities and the observed physical universe are fundamentally connected.

The Gateway to All Mysteries

Finally, the passage concludes with “玄之又玄，众眇之门” (Mystery upon mystery, the gateway to all subtleties). The profound nature of the *Dao* is the gateway to understanding the universe. In contrast, in quantum mechanics, the mysterious nature of quantum states and their interactions opens the door to understanding the foundational structure of reality. Both traditions emphasize that ultimate reality—whether the *Dao* or the quantum vacuum—exists beyond ordinary perception and understanding yet governs the unfolding of all phenomena. The cosmos and all phenomena emerge from this formless state, echoing the *Dao*’s understanding that the universe is born from an undefined, boundless potential. From a scientific perspective, this concept corresponds closely to the quantum vacuum, a field of pure potential from which particles and energy fluctuations arise (Zeiger & Bischof, 1998) with the twistor space illustrated in Figure 3. Though devoid of manifest matter, the quantum vacuum contains the latent possibilities for all physical phenomena, reflecting the *Dao* notion of creation emerging from formlessness (or nothingness).

Below the ‘Great Void to Potentiality’, illustrated in Figure 2, lies the concept of ‘Emptiness’ (虛, *xu*), which refers to the primordial state of existence where distinctions and forms have not yet emerged. This state can be compared to the scientific idea of quantum superposition, where all possible states of a quantum system exist simultaneously in a state of potentiality. In this sense, *xu* represents the coexistence of multiple possibilities, waiting for an external force—such as an observation or interaction—to cause the collapse into a singular, definite outcome. Quantum mechanics describes this process as wave function collapse, where the probabilistic states of a system resolve into a specific reality when observed or measured (Pearle, 2024). The correspondence between *Dao* and quantum theory lies in their shared emphasis on transitioning from potential to actual. The *Dao* represents the source of all potentiality, much like the quantum vacuum in physics, which gives rise to all matter and energy. The process by which the world of forms emerges from the formless void in *Dao* mirrors how quantum systems, governed by the superposition of states, collapse into observable reality through interaction or observation. Both systems highlight a dynamic and interconnected universe driven by the interplay between latent potential and manifested reality.

In the *Dao* context, this flow from formlessness to form is not a one-time event but a cyclical process where forms return to the void and re-emerge (illustrated in Figure 2 as the circulating motion), much like the continuous fluctuations in the quantum field where particles are constantly appearing and disappearing. The ‘Great Void and Emptiness’ thus provides a rich metaphysical framework that finds resonance in contemporary scientific thought, particularly in quantum field theory and the study of the fundamental nature of reality.

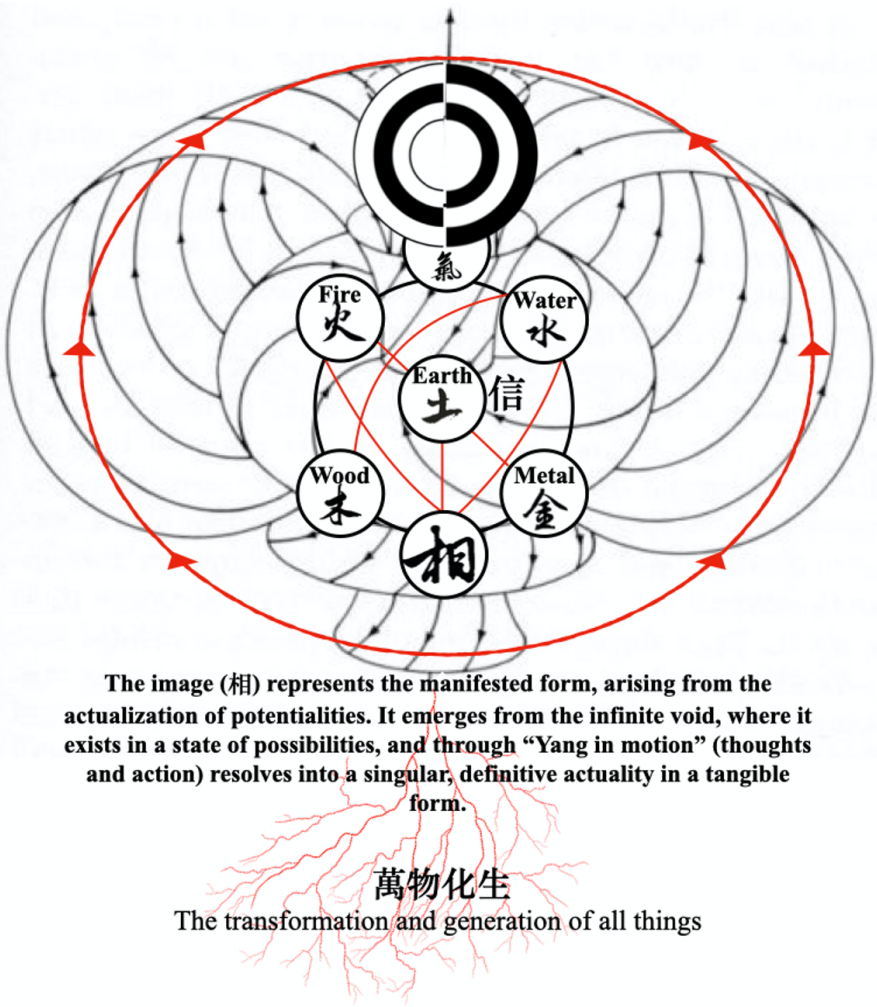

Figure 3. It features the twistor space and how the binary *yin*/*yang* and the *wuxing* produce the permutations of the *wanwu* 'ten thousand beings'

Figure 3 is a detailed section of Figure 2, focusing on the twistor space at the centre to illustrate the dynamic interaction between *yin* and *yang* along with the *wuxing* (五行, five elements), which together generate the multiplicity of phenomena, or *wanwu* (万物). The interaction of *yin* and *yang* initiates motion and transformation. Below, the five elements—Wood, Fire, Earth, Metal, and Water—symbolize dynamic processes that cyclically transform through creation (生*sheng*) and destruction (克*ke*). This illustration is a metaphorical representation rather than a direct correlation between quantum interactions and metaphysical concepts. The phases of energy and matter depicted are not intended to be literal reflections of the interactions within twistor space, but they demonstrate strong correspondences in the processes described. While metaphorical, the transformation cycles of the five elements parallel how particle interactions in quantum physics drive the emergence of all forms in the observable universe. This paper explores these parallels to highlight the similarities in the underlying principles of transformation and emergence in *Dao* and quantum theory. At the bottom, *wanwu*, or the 'ten thousand beings' represent the universe's diversity, manifesting through these continuous interactions. The cyclical nature of the process reflects the *Dao* principle of transformation, where all forms arise from and return to the void. This concept parallels quantum physics, where particles continuously emerge from and return to the total energy system. These particles undergo various permutations, manifesting in

different forms, while the system's total energy remains conserved (Limmer, 2024). This reflects the dynamic and evolving nature of the universe, where constant transformation occurs without violating the principle of energy conservation (Ván, 2023). Such processes emphasize the cyclical nature of physical phenomena and the fundamental stability of the universe's energy system. Figure 3 demonstrates how the binary interplay of *yin* and *yang* and the cyclic transformations of the five elements lead to the generation of all forms akin to the interactions within Penrose's twistor space that give rise to spacetime matter.

The Emergence of Spirit and Energetic Forces

In Figure 2, the Spirit (神, *shen*) emerges from this emptiness as a precursor to form, reflecting the beginning of differentiation. In this stage, the energetic forces take shape but remain abstract and intangible. As the flow continues downward, *qi* (氣) is introduced as the active force through which spirit begins to manifest in tangible forms. *Qi*represents the life force or energy permeating the universe, animating everything. This force can be likened to the fundamental forces in quantum physics governing particle interactions, such as the strong and weak nuclear forces. Penrose's twistor theory could correspond to the interactions within twistor space (illustrated in Figure 3), where energy is exchanged, and forms begin to take shape through the permutations of these interactions. Moving down to Essence (精, *jing*), the diagram enters the realm of actualization, where potential becomes reality. Here, quantum potential collapses into a singular actuality, creating distinct, manifested forms. In quantum terms, this stage corresponds to the wave function's collapse, where the particles' probabilistic nature is resolved into a definite state. Similarly, the image (相) emerges as the manifested form, derived from the interaction of forces and the energetic flow of *qi*, paralleling how quantum particles form matter through their interactions in twistor space.

The illustration also emphasizes a cyclical flow, as seen in the red arrows forming a loop. This movement signifies the perpetual cycle of emergence and return, reflecting the *Dao* beliefs in the endless transformation of all things. After form is manifested, it eventually returns to the void, echoing the concept of 'Returning to the Ultimate Void' (還虛復歸無極). In twistor theory, this could represent the cycle of interactions where forms emerge from twistor space and eventually reintegrate into the fabric of spacetime.

Symmetry Breaking and the Dynamic Interplay of Opposites

At the centre of the diagram, the interplay between *yin* and *yang* is central to both the *Dao* and quantum conceptualizations. This interaction represents the duality and balance of opposites—analogous to the particle-antiparticle dynamics in quantum mechanics. The forces of '*yang* in motion' (陽動, *yangdong*) and '*yin* in rest state' (陰靜, *yinjing*)are crucial in the process of creation and dissolution, much like how energy fluctuations in quantum fields give rise to the formation of matter and anti-matter.

The concept of symmetry breaking, central to Penrose's theory and the Standard Model of particle physics, finds its philosophical counterpart in the *Dao* duality of *yin* and *yang*. In *Daodejing* Chapter 2, the interdependence of opposites is emphasized. Symmetry, in its broadest sense, refers to the invariance of a system under a set of transformations. When a symmetry is broken, the system no longer remains invariant, leading to distinct properties or behaviours that were not previously differentiated. This concept is particularly significant in studying fundamental particles and their interactions, where broken symmetries can explain

the diversity of particles observed in nature and the forces that govern them. Manoukian (2024) studied the intricate world of high-energy physics, exploring the myriad of particles, their classifications, and the symmetries that underlie their existence. At higher energies, particles exhibit greater symmetry, meaning that the distinctions between various types of particles and forces are less pronounced. However, as the energy decreases, certain symmetries are spontaneously broken, resulting in the differentiation of particles and the emergence of distinct forces. This symmetry-breaking process explains why certain particles acquire mass while others remain massless and why different forces—such as electromagnetic and weak forces—are observed as distinct phenomena in the low-energy universe. In Penrose's twistor theory, symmetry breaking is similarly crucial for understanding the distinctions between massless and massive particles and between different forces (Penrose, 1998). Twistor theory posits that the fundamental structure of spacetime is based on points in space and time but on more abstract entities known as twistors (Witten, 2004). In this framework, the distinctions between particles and forces can be viewed as arising from an underlying symmetry broken under specific conditions. For instance, when energies were extremely high in the early universe, the distinctions between different particles and forces were not apparent, reflecting a higher symmetry state. However, as the universe expanded and cooled, symmetries were broken, forming the particles and forces we observe today. Manoukian's (2024) exploration of high-energy physics and the role of symmetry provides a foundational understanding that complements the principles of twistor theory. The breaking of symmetry, whether in the context of particle physics or twistor theory, serves as a mechanism by which the diverse and complex structure of the universe emerges from a more uniform and symmetrical state. The classification of particles and the distinctions between massless and massive particles in twistor theory underscore the importance of symmetry breaking in the universe's evolution (Holman, 2015).

Thus, symmetry breaking is a unifying theme that bridges the gap between abstract theoretical frameworks and the observable phenomena in the physical world. Through this process, the universe's inherent symmetries, which govern the behaviour of particles and forces, are translated into the rich and varied tapestry of reality we experience.

With the emergence of a myriad of high-energy particles that travel with speeds comparable to that of light, and for a proper description of their underlying dynamics in high-energy processes, it became necessary to consider these particles as living in a four-dimensional pseudo-Euclidean space, referred to as Minkowski spacetime really imposed by nature at high energies, it has become essential as well, not only to provide a classification scheme for them, based on symmetry principles, but also to "search" for the few fundamental particles as the ***building blocs*** that make up the myriad of high-energy particles created, which have been ***referred*** to as the basic particles of the ***standard model*** (Manoukian, 2024, p. 55).

This symmetry breaking allows for the differentiation of particles and interactions, as the dynamic tension between *yin*and *yang* leads to the continual creation and transformation of all things in the *Dao* universe. The concept of symmetry breaking provides a shared framework for understanding the emergence of complexity and diversity in *Dao* and particle physics. The *wuxing* (五行) describes the dynamic transformation between wood, fire, earth, metal, and water, driven by the interactions of *yin* and *yang*. These cyclical transformations bear similarities to the symmetry-breaking processes in physics, where interactions in the Higgs field lead to the differentiation of particles and forces. In the same way that the interplay of *yin* and *yang* creates the myriad forms (万物, *wanwu*) of the universe, symmetry

breaking in the physical realm results in the emergence of distinct particles and fundamental forces (Higgs, 1964).

The passage from Chapter 40 of the *Daodejing*—"反者道之动，弱者道之用。天下万物生于有，有生于无"—can be interpreted as a philosophical reflection on the fundamental nature of transformation and creation in the universe, offering profound insights that align with the *Dao* and modern scientific principles, particularly regarding the concept of symmetry breaking.

The first phrase, "反者道之动" (reversal is the movement of the *Dao*), suggests that transformation in the universe occurs through a cyclical process, where apparent opposites continuously reverse into one another. This dynamic interplay between opposites—such as *yin* and *yang*—is fundamental to the functioning of the *Dao*. In this context, the idea of reversal mirrors the concept of symmetry breaking in physics, where a symmetrical, undifferentiated state gives way to asymmetry, resulting in distinct particles and forces emerging. The *Dao* manifests through continual transformation and reversal. Symmetry breaking disrupts balance in the physical world, creating complexity and diversity.

The phrase '弱者道之用' (Weakness is the function of the *Dao*) emphasizes the *Dao*'s ability to manifest through qualities of softness, subtlety, and non-resistance. This can be understood as expressing the *Dao*'s field-like behaviour, which operates gently and unobtrusively. This concept parallels quantum field theory in modern physics, particularly in the Higgs mechanism. Though seemingly subtle and pervasive, the Higgs field interacts with particles in a way that imparts mass to some, such as W and Z bosons, while allowing others, like photons, to remain massless (Higgs, 1964). The *Dao*'s function through 'softness' can be likened to the field-like influence of the Higgs field—both operate through subtle, almost imperceptible interactions that nonetheless have profound effects on the fundamental structures of reality. Though not forceful or overt, these interactions are essential in shaping the nature of existence, much like how the Higgs field determines the mass of particles in the universe.

Creation from Existence and Non-existence

The second part of the passage, "天下万物生于有，有生于无" (All things under Heaven are born from being, and being is born from non-being), reflects the *Dao* understanding that the multitude of things in the universe (*wanwu*, 万物) arises from a state of 'being' (*you*, 有). Still, this state of being originates from 'non-being' (*wu*, 无)—the formless and undifferentiated source. This mirrors the process described in particle physics and twistor theory, where the manifest particles and forces of the universe arise from an underlying field or space of potentiality. In Penrose's twistor theory, for instance, spacetime emerges from twistor space, an abstract, pre-manifest state, much like in *Dao*, all forms emerge from the *Dao*, which is beyond form and distinction.

Similarly, in quantum mechanics, particles and physical forms arise from the quantum vacuum, a state of 'non-being' or pure potential, where energy fluctuates, allowing particles to come into existence (Harlander et al., 2023). The Dao's expression that 'being is born from non-being' parallels the scientific understanding that observable matter and energy emerge from an underlying, formless quantum field (Manoukian, 2024).

The *Dao* of *Yunqi* 運氣

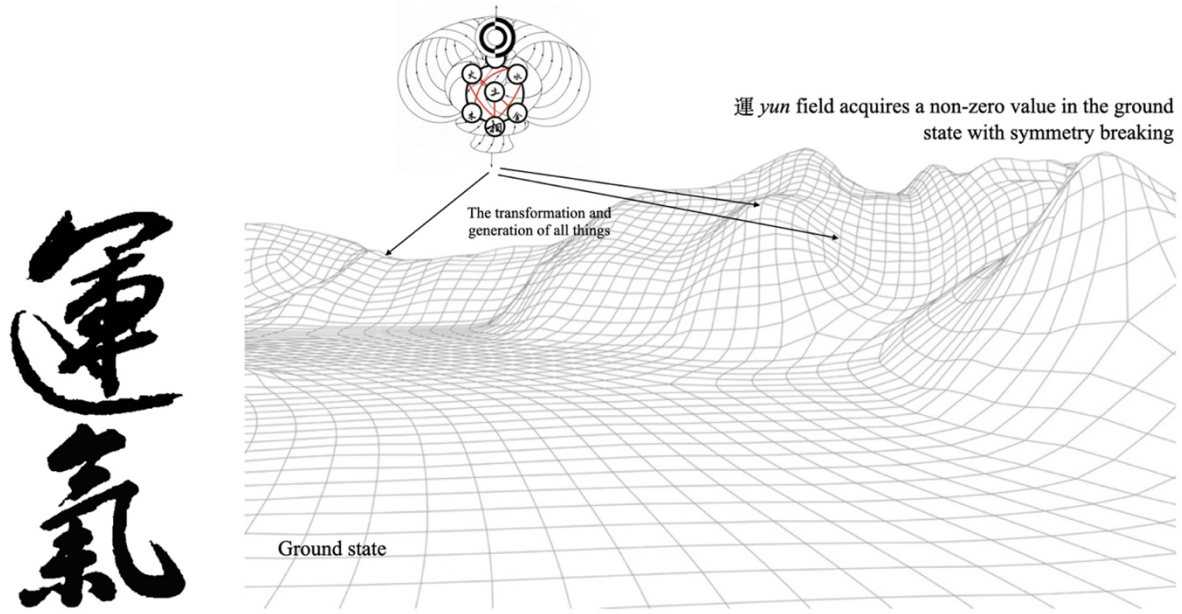

Figure 4. It features how the binary *yin*/*yang* and the *wuxing* cause the asymmetry with the generation of *wanwu* 'ten thousand beings'

Figure 4 represents an illustrative and conceptual integration of the *Dao*, quantum field theory, and Penrose's twistor theory, focusing on the transformation and manifestation of *wanwu* (萬物), or the 'ten thousand beings', through dynamic processes of symmetry breaking and the regulatory influence of *yunqi* (運氣). At the top of the illustration, the transformation and generation of all things emerge from a state of potentiality. This is visualized as a dynamic system influenced by *yin* and *yang*, representing the fundamental forces of the *Dao* philosophy responsible for the continuous cycles of creation and dissolution.

These forces act in harmony to facilitate the emergence of forms in the universe, much like the fundamental interactions in quantum field theory. The central portion of the illustration visualizes how *yunqi* acts as a field, acquiring a nonzero value in the ground state, a critical moment when symmetry is broken. This concept parallels the Higgs mechanism in quantum field theory, where the Higgs field spontaneously breaks the symmetry, resulting in certain particles acquiring mass while others, like photons, remain massless. In this context, *yunqi* can be seen as the underlying field that regulates and directs the emergence of all forms in the universe, much like the Higgs field influences the fundamental properties of elementary particles. This symmetry breaking is essential for manifesting *wanwu*, or the myriad forms, in the *Dao* cosmology and quantum physics. In quantum field theory, symmetry breaking transforms an undifferentiated state into a system where distinct particles and forces arise. Similarly, in *Dao*, the balance and interplay between *yin* and *yang* drive the generation of life and the diversity of natural phenomena. The 'ground state' in the illustration, represented by the undulating grid, signifies the baseline energy state from which all transformations arise, symbolizing the quantum vacuum in physics or the undifferentiated Dao.

The lower part of the illustration depicts this grid-like field that highlights the continuous nature of transformation, emphasizing how symmetry breaking leads to the creation of complex forms and structures regulated by the flow of *qi*(氣) and *yunqi* (運氣). This pattern reflects Roger Penrose's twistor theory, which explores how geometric properties of spacetime lie in the interconnected nature of reality (Penrose, 1968). Twistor theory provides a framework for understanding how causal sequences remain invariant and how geometric relationships give rise to the universe's complexities.

The illustration effectively bridges the ancient wisdom of the *Dao* with modern scientific theories, particularly through the lens of symmetry breaking and the regulatory role of *yunqi*. By depicting the ground state as a landscape where symmetry is broken, and complexity emerges, the illustration highlights how ancient philosophical concepts and contemporary scientific ideas converge in understanding the fundamental processes that shape the universe. Both frameworks recognize the dynamic, interconnected nature of reality and the subtle forces that govern its continuous transformation, whether through the flow of qi or the geometric properties of twistor space.

Conclusion

This study examines the *Dao* concepts of *yunqi*, revealing their significance as fundamental forces that regulate energy flow and the emergence of life or *wanwu*, both in natural systems and social contexts. This research highlights how both frameworks understand the emergence of complexity and form from underlying forces by drawing analogies between these ancient metaphysical ideas and contemporary scientific theories, such as quantum field theory and Penrose's twistor theory. The symmetry-breaking process in quantum physics, which differentiates particles and imparts mass, parallels the *Dao* understanding of how *yin* and *yang*, mediated by *yunqi*, generate the diversity of all things (*wanwu*, 萬物). In this way, *yunqi* operates as a passive flow and an active carrier of energy that directs potential transformation into actualized forms.

Applying these insights to social contexts, the study suggests that life, much like physical systems, is governed by dynamic and often subtle forces that influence outcomes in significant ways. Understanding *yunqi* as a regulatory force allows a deeper comprehension of how deliberate actions can mitigate life's inherent challenges and uncertainties by aligning with these natural energy flows. This perspective provides a theoretical framework for influencing complex adaptive systems, emphasizing the importance of harmonizing actions with the underlying dynamics of these systems to achieve desired outcomes. For instance, in organizational settings, leaders who recognize the fluid nature of *yunqi* can better navigate the complexities of human interactions, fostering resilience and adaptability within their teams.

Furthermore, this research illustrates the relevance of integrating traditional philosophical concepts with modern scientific and sociological paradigms. By translating the principles of *yunqi* into contemporary contexts, the study not only enriches our understanding of the universe but also offers practical applications for managing complexity in various fields, including leadership, social policy, and environmental sustainability. The concept of *yunqi* as a dynamic system that facilitates the actualization of potentialities becomes particularly valuable in these applications, providing a framework for understanding how small, deliberate actions can influence larger, interconnected systems.

Ultimately, this paper explores *yunqi* as an unobservable field, often perceived on a sociological level as fate, destiny, or luck. This force, entangled with larger interactions and interferences beyond the observer's perception, is frequently attributed to luck or the odds. The dispositional flow described, where all elements return to their root and move as an interdependent whole, exemplifies the fluid and responsive nature of *yunqi*. The concept of yunqi emerges as an entity that acts as a carrier of energy, orchestrating the harmonious flow and transformation within the cosmos by modulating the pathways of change (*yun*) and supplying the vital force (*qi*) necessary for these processes. By understanding *yunqi* as a system where the directed movement of energy actualizes potentialities, this research contributes to a deeper understanding of how traditional philosophical concepts can be integrated with contemporary scientific and sociological paradigms, informing practical interventions in various fields.

Statements and Declarations

Conflict of Interest Statement

The author declares that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

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Footonotes

[1] Entelechial force, rooted in Aristotelian philosophy, is a hypothetical agency posited as an intrinsic, guiding principle in the development and functioning of an organism (Johnson, 2005). Though not demonstrable by contemporary scientific methods, this concept remains central to certain vitalist doctrines, which argue that life processes are directed by more than just mechanical and chemical interactions. The term 'entelechy' itself is derived from the Greek 'entelecheia', meaning the realization of potential, and is used to describe the actualization of an organism's inherent capabilities toward its natural end or 'telos' (Aristotle, *Metaphysics*). Despite its speculative nature and lack of empirical validation, the notion of entelechial force persists in some philosophical and theoretical discussions, particularly in areas exploring non-reductive explanations for biological complexity. It is invoked to explain the cohesive and purposeful organization observed in living systems, suggesting a form of self-regulation and adaptation that transcends purely physical causality (Sumner, 1910). While contemporary science largely regards this concept as a philosophical construct rather than a scientific principle, it continues to inspire debate at the intersection of biology, philosophy, and the study of life's fundamental processes.

[2] The 'Sombrero potential', or 'Mexican hat potential', is a potential energy function used in quantum field theory, particularly within the Higgs mechanism. It features a circular rim of minima surrounding a central peak, resembling a sombrero. This shape facilitates spontaneous symmetry breaking, essential in the Standard Model, where the Higgs field acquires a non-zero value in the ground state, providing mass to elementary particles (Englert & Brout, 1964; Higgs, 1964).

[3] Isospin, also known as isobaric or isotopic spin, is a quantum number in nuclear and particle physics that reflects the up- and down-quark composition of a particle. Though it is mathematically analogous to angular momentum, particularly in its coupling (such as the proton-neutron pair coupling in states of total isospin 1 or 0), isospin is a dimensionless quantity and does not represent actual spin (Horváth & Trócsányi, 2019). It is a specific case of the broader flavor symmetry observed in baryon and meson interactions.

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