The Dao of Quantum Mechanics: A Comparative Study of Chinese Yin-Yang Theory, Taijitu, Wujitu and Quantum Principles

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Funding: No specific funding was received for this work.

Potential competing interests: No potential competing interests to declare.

Abstract

This research explores *Dao*, the influence and application of *yin* and *yang* theory, and the five elements, emphasising their foundational role in Chinese philosophy over the past two millennia. 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. We critically examine the work of *Zhou Dunyi* and *Chen Tuan*, focusing on their Diagrams of Supreme Polarity (*Taijitu Shuo*) and the Non-Polar (*Wujitu*), respectively. These texts offer a renewed understanding of the relationship between the infinite and finite, or the One and many. This concept is embodied in the *yin-yang* dialectic, the five-element transformation, *qian* and *kun*, and *wanwu* (myriad things) that are spawned from the interactivities.

This investigation bridges ancient philosophical ideas with contemporary elements of quantum theory, including entanglement, complementarity, superposition, and superfluid quantum space, the latter perceived as the primordial energy permeating the universe. By delving into these conceptual correlations, we further our comprehension of venerable theories while underlining their enduring applicability within the purview of modern scientific postulations. The research forwards the concept of a three-dimensional *Taijitu*, intimating the flow of energy and *qi* within a torus-like

configuration.

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Keywords: *Dao*, *Yin/Yang*, Quantum physics, *Taiji*, *Wuji.*

Introduction

> *In the recent past, there has emerged a manifestly greater openness and an enhanced permeability between the traditions of East and West, which has led to an intensely critical examination of traditional Western misconceptions of the East (Clarke, 2002, p. 2-3).*

This paper undertakes a comprehensive exploration of *Dao*, illuminating the fundamental precepts of *yin* and *yang* and the *wuxing*, or the five elements, underscoring their essential roles within Chinese philosophy for more than two thousand years. Notably, the *yin-yang* paradigm primarily offers a conceptual substrate for Chinese natural science, yet it also erects a theoretical scaffolding that underpins the Chinese worldview, marking its relevance in both the scientific and philosophical dimensions of understanding reality. The “West’s understanding of Eastern thought in general, and the cultural and philosophical traditions of Asia, continue to be viewed by many as locked in their past, objects of little more than historical interest. Nevertheless, a counter-movement has been under way for some time which has drawn Eastern ideas and practices with ever-increasing intimacy into the orbit of contemporary culture and debate” (Clarke, 2002, p. 3). When Western dialectics and Needham's (1956) correlative cosmology are juxtaposed with the Chinese concept of correlative thinking, as encapsulated by the yin-yang theory, it sets a transformative dialogue that reshapes Western understandings in motion. A central element of this dialogue is the concept of *xiangfan xiangcheng* or ‘complementarity in opposition’ (Cheng, 2008). This concept conveys the dialectical principle that two entities can simultaneously embody opposition and complementarity, forging harmony amidst apparent contradiction. Intriguingly, there seems to be a convergence of the ancient Chinese philosophical concept of *yin* and *yang* and modern supersymmetric quantum mechanics. The principle of *yin* and *yang* embodies the concept of dynamic complementarity, where two opposing elements exist in a state of constant interplay and transformation, sustaining a dynamic equilibrium reflective of nature's harmonious balance.

Similarly, in supersymmetric quantum mechanics, a fundamental principle is the existence of superpartners, where every particle has an equivalent counterpart with an opposite and equal charge (Witten, 1981). For instance, electron and positron states with opposite helicities are superpartners (Lee, 1994). This profound symmetry, much like the *yin* and

yang, highlights the inherent balance of the universe at the most fundamental level of reality.

Yin and *yang* are mutually defining, each containing the seed of its opposite and continuously transforming into one another; so are the particle and its superpartner, with "a conservation law of supersymmetry" (Haber & Kane, 1986, p. 58). "Supersymmetric particles cannot be produced alone; they must be produced in pairs" (Haber & Kane, 1986, p. 58). In the *yin-yang* perspective, *Wuji*, representing the ultimate nothingness, births *taiji*, the supreme ultimate, giving rise to the paired supersymmetric *yin* and *yang* (Cheng, 2008). In this context, supersymmetric quantum mechanics can be viewed as a realization of the philosophical concept of *yin* and *yang*, with particles and their superpartners illustrating the dynamic equilibrium of opposing forces. It demonstrates how, despite arising from vastly different epochs and disciplines, they converge on shared truths, enhancing the comprehension of our universe's fundamental principles.

However, while these parallels provide compelling insights, it is critical to underscore the metaphorical nature of this comparison. The complementarity in *yin* and *yang* primarily pertains to philosophical, ethical, and metaphysical realms, while supersymmetry is a rigorous mathematical framework underpinning quantum field theory.

The theory of *yin-yang* acknowledges that the interplay and transformation of antithetical components often precipitate dynamic changes in their relative positions or statuses, toggling between dominance and subordination (Li, 2016). It is clear that a transition from one form of asymmetry, such as *yin* prevailing over *yang*, to an inverse form of asymmetry, where *yin* is subordinate to *yang*, must necessarily pass through a phase of symmetry— a state of equality between *yin* and *yang*. This suggests that the principle of Confucius's *zhongyong*, embodying balance, accommodates symmetrical and asymmetrical states, further illustrating the complex dynamism and equilibrium inherent in the *yin-yang* theory (Wang et al., 2020). Therefore, while their comparison provides fertile ground for interdisciplinary discussion, their domains of applicability should not be conflated. Further research could illuminate the extent of this correlation and its potential implications for our understanding of the *Dao* philosophy and quantum mechanics.

While a substantial body of research into modern Chinese thinking relies on Western theories (Zhang et al., 2014), there is an increasing recognition of the value of integrating Chinese philosophical traditions, such as Confucianism and *Dao*, into the understanding of contemporary Chinese thinking (Jing & Van de Ven, 2014). In addition, it is acknowledged that Chinese philosophical systems, particularly Confucianism, have historically and continue to profoundly influence the Chinese diaspora communities (Chai & Rhee, 2010). "Daoism has begun to penetrate Western consciousness. Daoism's rising profile in the West is evident across a whole spectrum of domains ranging from the popular to the scholarly, from the spiritual to the philosophical" (Clarke, 2002, p. 3).

Critical attention is drawn to the scholarly works of *Zhou Dunyi* and *Chen Tuan*, primarily focusing on their Diagrams of Supreme Polarity (*Taijitu Shuo*) and the Diagram of the Non-Polar (*Wujitu*), respectively. The analysis of these seminal texts elucidates a revitalised comprehension of the interplay between the infinite and the finite—or the ontological relationship between *Wuji* and *taiji*. Instead of a diachronic perspective investigating phenomena over time, this study adopts a synchronous viewpoint, examining the entities concurrently in the wholeness of time and space. This notion is further embodied in the dialectics of *yin-yang*, the transformations governed by the five elements, the interplay of *qian* and *kun*, spurning *wanwu* (myriad things). All these elements intricately weave the fabric of Chinese philosophical

thought and present an elegant cosmology where phenomena continually interact and transform, reflecting the infinite diversity and unity of existence.

Taking this exploration a step further, this research probes the potential bridges between these traditional Chinese philosophical concepts and the axioms of modern quantum theory. Striking parallels emerge between *Dao* concepts and quantum notions such as entanglement—where distant particles exhibit connected behaviours, and complementarity (Yoon & Cho, 2021)—which posits the dual aspects of matter, superposition—where particles exist in multiple states simultaneously (Wineland, 2013), and Šorli and Čelan's (2021) superfluid quantum space (SQS)—viewed as the primordial energy infusing the universe. Such parallels offer a profound understanding of where the ancient wisdom of Chinese philosophy dovetails with the cutting-edge principles of quantum physics. Moreover, this integrated perspective allows for a deepened appreciation of the *yin-yang* and *wuxing* theories, reinforcing their enduring relevance in the continually evolving sphere of human knowledge.

The *Dao*, in essence, provides a lens to apprehend the dynamic interplay of opposites that pervades the universe, encapsulating the fundamental principle of transformation and cyclical change. Strikingly, quantum theory echoes these ideas, offering modern yet counterintuitive perspectives to this ancient wisdom.

Therefore, this conceptual paper enriches the dialogue between ancient Chinese philosophy and modern quantum physics, highlighting the intriguing areas where they intersect and interact. Through this comparative analysis, the timeless wisdom of the *Dao* and the concepts of quantum theory can be understood as resonating threads in the rich tapestry of common ideas, providing invaluable insights into the nature of reality, existence, and consciousness. Moreover, this exploration enhances our grasp of these ancient theories and accentuates their enduring relevance within modern scientific discourses. Indeed, such integrative and cross-disciplinary dialogues can stimulate fresh avenues of research and understanding, contributing significantly to the evolving narrative of human knowledge and wisdom.

This paper begins with a comprehensive exploration of *Dao* and its fundamental principles, the *yin* and *yang*, and the *wuxing*. Following this foundational groundwork, the paper delves into an in-depth analysis of the Diagram of Supreme Polarity (*Taijitu Shuo*) and the Diagram of the Non-Polar (*Wujitu*) by *Zhou Dunyi* and *Chen Tuan*, respectively. The aim is to unravel the meanings encapsulated in these diagrams and their philosophical implications concerning the relationship between the infinite and finite, or the *Wuji* and *taiji*. The subsequent section makes a pivotal transition, connecting these ancient Chinese philosophical ideas and modern quantum theory. Finally, the discussion examines the similarities and potential intersections between the *Dao* principles and quantum concepts, such as entanglement, complementarity, superposition, and superfluid quantum space.

The paper culminates with a synthesis of the findings and their practical implications. It also critically reflects on the potential for a broader, integrated perspective combining ancient philosophical wisdom with modern scientific understanding. This approach can potentially inform and enhance both fields, leading to innovative insights and expanding the horizons of our understanding of the universe.

Finally, the conclusion will summarise the key findings, reflect on their broader implications, and suggest avenues for

future research, hoping to inspire further dialogue between these two seemingly disparate but intrinsically interconnected fields of knowledge.

Dao and *yin-yang*

The *Dao* cosmological depictions elucidate the principle of a primal entity and its generative properties, particularly those of the *Taiji*, are inextricably linked to the philosophers who devised or propagated them, yet some permeated scholarly discourse on cosmology at unspecified junctures (Louis & Louis, 2011), their intellectual origins cloaked in the lore and legends of figures such as *Fuxi* and *Zhou Wenwang* (Collani, 2007). This study seeks to demystify the origin of one such *taiji* diagram, suggesting a shift from the traditional pursuit of identifying its creator, a quest that has pervaded the narrative around the diagram's inception. Instead, we propose considering traditional accounts as testaments to constructing an important intellectual lineage, facilitating the diagram's incorporation into cosmological discourse.

Figure 1 depicts the *taiji* emblem, central to Chinese cosmology, as a rich repository of metaphysical concepts that illustrate complex relationships between space and time. The diagram, distinguished by eight trigrams surrounding the central taiji symbol, is bifurcated into swirling light and dark halves symbolizing *yin* and *yang*. Furthermore, within each half, a central dot exists to signify the embedded presence of *yang* within *yin* and, conversely, *yin* within *yang* (Liu, 2010). The association of each trigram with spatial and temporal dimensions offers a compelling framework for understanding the cyclical and dynamic nature of the universe. As an illustration, the southern trigram corresponds to the *qian* hexagram or Heaven, symbolizing the day's zenith at noon. Directly opposite, the northern trigram is associated with the *kun* hexagram, indicative of the counterpoint of *qian*. Such assignment of time and space to each hexagram echoes the thoughts of *Zhuxi*, a prominent Neo-Confucian philosopher, expressing that the cyclical changes of*yin* and *yang*, the procession of the four seasons, and even the lunar phases of waxing and waning can be interpreted through the medium of these hexagrams (Wangeng, 2008). This multi-layered symbolism embodied in the *Taiji* diagram, surrounded by the eight trigrams, a distinct spatial and temporal framework, emphasises the organic wholeness and unity of the universe. The utility of this symbol in the broader understanding of Chinese cosmological beliefs underscores its integral significance (Robinet & Pregadio, 2011).

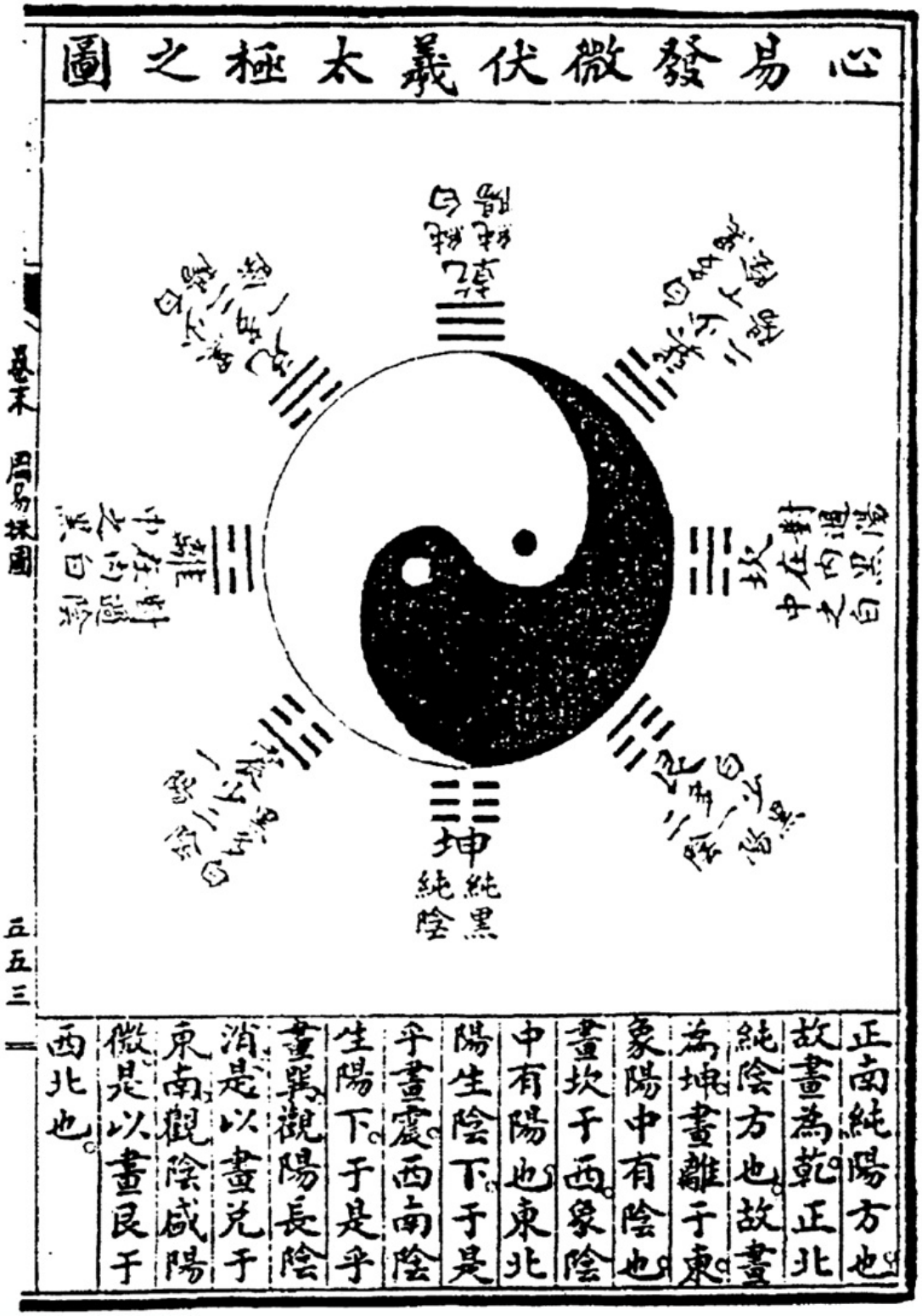

Figure 1. "The *Taiji* Diagram of the Heart of the Changes as Mysteriously Revealed by *Fuxi*" from *Lai Zhide*, *Yijing Laizhu Tujie* (1688; rpt., *Chengdu*: *Ba Shu Shushe*, 1989, p. 553)

Inherent to each hexagram in Chinese cosmology is a temporal symbolism that anchors the narrative of the *taiji* diagram. This paper posits that the *taiji* symbol transcends its common interpretation as a static two-dimensional emblem. Instead, it should be envisioned as a dynamic, three-dimensional vortex which stems from the ceaseless interaction and

transformation of *yin* and *yang*. This reconceptualization invites a deeper comprehension of the*taiji* symbol, not merely as a pictorial representation but as a vivid embodiment of the swirling interplay of *yin* and *yang* forces. By picturing the *Taiji* as a whirling vortex (Figure 2), we can gain novel insights into the intricate, ever-changing dynamics of these opposing yet complementary forces, which underpin the Chinese worldview where "the spirit (*shen*) of nature is the moving aspect of the *taiji*" (Ryan, 1996, p. 80). Ryan (1996) clarified *Shaoyong*'s view of the spirit "that eludes scientific representations, since, as the cause of action, it can't be still or in one space" (Ryan, 1996, p. 81). The concept of a vortex offers an insightful parallel to the *taiji* symbol as a spinning vortex. This conception resonates strongly with the dynamic transformation of *yin* and *yang* within the *taiji* symbol, suggesting a perpetual cosmic dance of life, continually fuelled by the moving aspect of *Taiji*.

> *Shao provides a metaphysical argument to support these strictures on rigorous science. The spirit (**shen**) of nature is the moving aspect of the **Taiji**. Spirit produces numbers, from which all things come. As we have seen, the workings of spirit cannot be obtained and measured. This is because spirit is nonspatial (**wufang**). If it were confined to one location, then it could not change and transform, so it wouldn't be spirit. Not being spatial, then, spirit can't be divided. Thus, it can't be measured (Ryan, 1996, p. 81).*

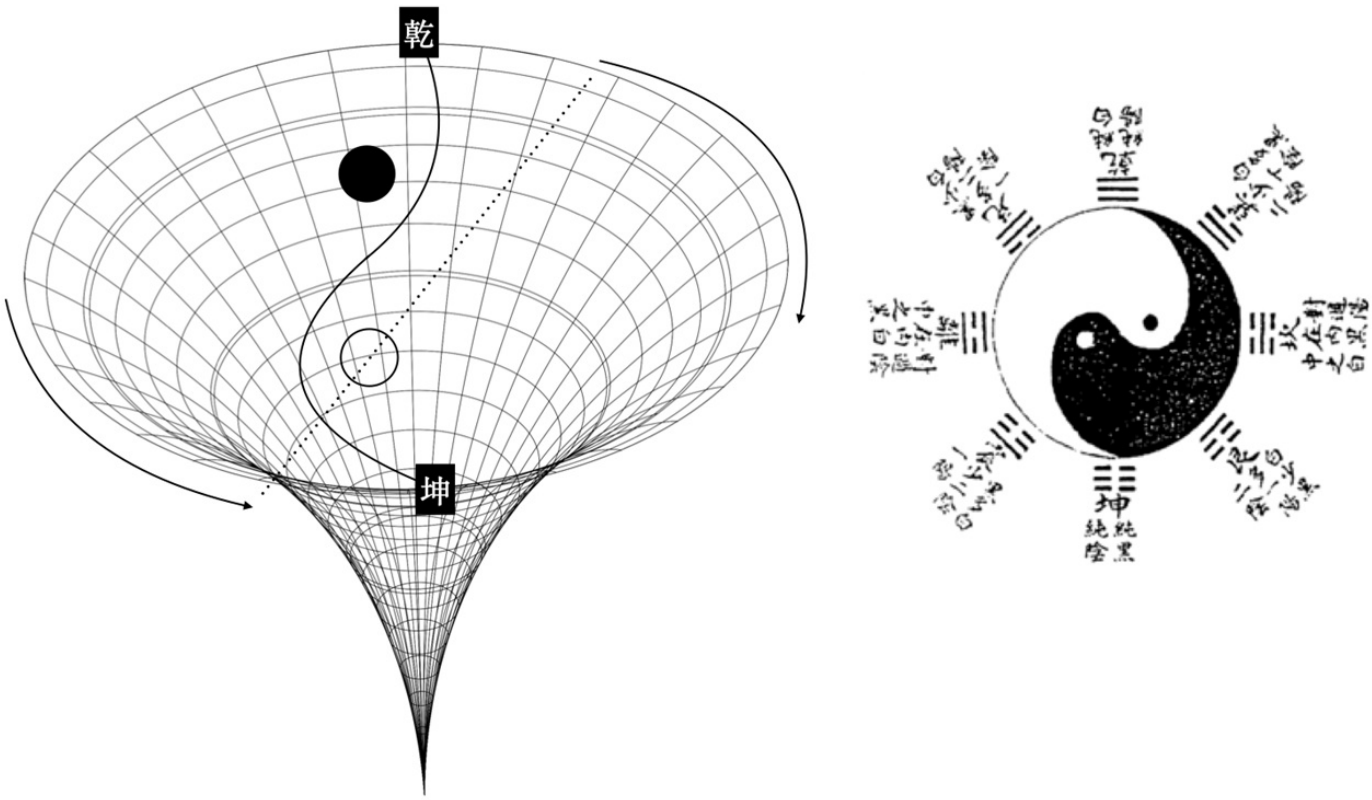

Figure 2. It illustrates *Taiji* as a whirling vortex

Shaoyong's perspective on the ineffable nature of the *shen*, as the dynamic aspect of the *Taiji*, can be juxtaposed with the quantum mechanical principles of nonlocality and entanglement. Furthermore, *Shaoyong* emphasised the nonspatial

quality of the *shen*; it is not confined to a specific location and, therefore, cannot be measured or divided (Ryan, 1996).

> *This is because spirit is nonspatial (**wufang**). If it were confined to one location, then it could not change and transform, so it wouldn't be spirit. Not being spatial, then, spirit can't be divided. Thus, it can't be measured (Ryan, 1996, p. 80).*

In other words, *shen* defies conventional notions of space and time, echoing the notion of 'nonlocality' in quantum physics, where particles (*yin* and *yang*) can be intertwined regardless of spatial distance, suggesting a deeper level of interconnection. This nonlocality principle, central to quantum mechanics, posits that entangled particles can instantaneously communicate their states across vast distances, transcending conventional spatial and temporal limitations (Barad, 2007; Bouwmeester & Zeilinger, 2000). This suggests an intrinsic interconnectedness in the invisible realm within the universe featuring nonlocality, nonlinearity, and indeterminism, resonating with *Shaoyong*'s conception of the *shen* as a ubiquitous and interpenetrating force in nature (illustrated in Figure 3). The entanglement of states comes under the rubric of 'nonlocality' or by more evocative terms like Einstein et al.'s (1935) 'spooky-action-at-a-distance' (Barad, 2007).

Moreover, the notion of quantum entanglement parallels *Shaoyong*'s portrayal of *shen* as the origin of all things arising from the entanglement of *yin* and *yang* (Adler, 2014). Quantum entanglement exhibits how fundamental particles, despite being seemingly separate entities, can be intrinsically linked to exhibit collective properties. The creation of all things from the *shen* mirrors this idea, as everything arises from this nonlocal, undivided, non-differentiated source (*Wuji*), underlining an inherent oneness (*Taiji*) in the cosmos. "The One becomes the many. In descending to the finite, the singularity of the Infinite splays out into multiplicity" (Rosemont & Smith, 2015, p. 9).

This three-dimensional perspective illuminates the inherent dynamism of *yin* and *yang*, underscoring their continuous transformation and mutual nourishment that propels the cosmic dance of life. Thus, reimagining the *taiji* symbol as a spinning vortex opens fresh avenues for understanding the fluid and transformative nature of *yin* and *yang* from the Chinese cosmological perspective.

This paper explores the potential parallels between the ancient Chinese concept of *shen*' and modern scientific understandings of superfluidity, quantum entanglement, and quantum vortices.

The *shen,* in classical Chinese cosmology, is conceived as a ubiquitous, nonlocal entity that serves as the primary generative principle for all forms of existence (Kohn, 2019). Analogously, a superfluid, in contemporary quantum physics, is a unique state of matter that, due to its zero viscosity, can flow indefinitely without dissipating energy, permeating all materials without resistance (Leggett, 2006). The remarkable resemblance between *shen* and superfluidity becomes even more apparent when one considers the characteristics of quantum entanglement, a fundamental concept in quantum physics. Entangled particles are inherently linked, instantaneously mirroring each other's states regardless of the physical distance separating them, a phenomenon Einstein famously described as "spooky action at a distance" (Einstein et al., 1935). Similarly, *Shaoyong*'s interpretation of *shen* postulates that all phenomena arise from the intertwined dance of *yin*

and *yang* (Schöter, 2010), which could be conceived as a form of cosmological entanglement. Everything emanates from this indivisible, non-differentiated source (*Wuji*), suggesting an intrinsic unity (*Taiji*) within the cosmos (Patt-Shamir, 2020). *Yin* and *yang* are central tenets of Chinese cosmology and embody a dynamic dichotomy of opposition and interdependence. They interlock in an endless cycle, each succeeding the other in a ceaseless rhythmic flow (Wang, 2012). This phenomenon, illustrated in Figure 3, can be conceived as a perpetual cycle, an infinite loop wherein *yin* and *yang* constantly transform, morphing into each other in a rhythmic cadence that encapsulates the essence of change and continuity in the natural world.

According to this framework, the generation of natural phenomena is a direct consequence of the transformative motion of *yin* and *yang* rather than the result of any arcane or mystical force (Cheng, 1991; Rhee, 1997). This is a crucial aspect of Chinese philosophy, which attributes natural events to discernible principles embodied in the interplay of *yin* and *yang*. Such a perspective shifts the focus away from metaphysical mystery towards a tangible and comprehensible pattern of ebb and flow intrinsic to all phenomena regulated by *Dao* in a sustained dance of *wu* and *you*, *yin*, and *yang* (Wang, 2017).

This understanding invites a nuanced appreciation of the interrelatedness and continuity inherent in the cosmos. Recognizing natural phenomena as manifestations of *yin* and *yang*'s cyclical dance (illustrated in Figure 3) encourages a holistic approach to understanding the world, placing seemingly disparate events within an interconnected and coherently woven cosmic tapestry.

Wuji and the Time-Invariant Superfluid Quantum Space as the Unified Field Theory

Superfluid Vacuum Theory (SVT) arose from Sinha et al.'s (1976) suggestion of aether as a superfluid state of particle-antiparticle pairs describable by a macroscopic wave function. “The visible matter in the universe appears as excitations from the underlying superfluid vacuum” (Sinha et al., 1976, p. 65). This perspective challenges the traditional notion of the vacuum as an empty background. Instead, SVT proposes that the vacuum is a medium with unique properties resembling a superfluid gas. By modelling spacetime as a superfluid gas, SVT provides an alternative approach to understanding the underlying fabric of the universe.

However, the microscopic structure of the physical vacuum remains largely unknown and is currently the subject of extensive research within SVT. Scientists are actively investigating the composition and characteristics of this vacuum, aiming to develop scientific models that can reconcile quantum mechanics with gravity (Genz, 2009). This endeavour aligns with the *Dao* principles of *Wuji* and *Taiji*, which emphasise the interplay of complementary forces and seek to comprehend the underlying essence of the universe. In relativistic quantum field theory, the physical vacuum is also considered a non-trivial medium (Kukuljan et al., 2020). According to quantum field theory, even in the absence of observable particles, the vacuum is teeming with pairs of virtual particles that continuously appear and annihilate (Butto, 2020). This understanding highlights the active nature of the background, reinforcing the notion that the vacuum is not an empty void but a dynamic entity associated with certain energy (Boi, 2011).

In *Dao* philosophy, *Wuji* represents the formless void, while *Taiji* embodies the interplay of opposing forces. These

concepts resonate with SVT's exploration of the physical vacuum as a superfluid medium. *Wuji* symbolizes the elusive nature of the vacuum, while the interplay of complementary forces in *Taiji* reflects SVT's endeavour to unify quantum mechanics and gravity.

Superfluid quantum space has been proposed as a fundamental, time-invariant field permeating the universe (Šorli & Čelan, 2020). It is not a passive void but an active entity that manifests particles and fields. This idea parallels *Dao*'s conceptualization of *Wuji*, which represents a state of time-invariant, undifferentiated potentiality before the emergence of the dualistic *yin* and *yang* forces. *Wuji* embodies the ultimate void, the timeless and spatially infinite state where no material differentiation has occurred, a "[p] rimal nothingness thus persists alongside *Dao* as its holistic plenum of creative possibility" (Chai, 2014, p. 664). In a cosmological sense, from *Wuji*, a state of absolute quiescence, emerges *Taiji*, the dynamic duality of *yin* and *yang*. This transition signifies the constant metamorphosis intrinsic to the cosmos, resembling the temporal fluctuations observed in the material universe. This conceptual transformation from absolute unity to dynamic duality is encapsulated in *Zhou Dunyi*'s phrase *Wuji er Taiji*, which can be interpreted as the sequential emergence of *Taiji* from *Wuji*. Thus, *Wuji* and *Taiji* can be seen as two phases in the continuum of cosmic evolution, with *Wuji* representing the undifferentiated beginning and *Taiji* symbolising the inception of change and multiplicity.

> *Non-polar and yet Supreme Polarity (**Wuji er taiji**)! The Supreme Polarity in activity generates **yang**, yet at the limit of activity it is still. In stillness it generates yin; yet at the limit of stillness it is also active. Activity and stillness alternate; each is the basis of the other. In distinguishing yin and yang, the Two Modes are thereby established.*
>
> *The alternation and combination of yang and yin generate water, fire, wood, metal, and earth. With these five [phases of] qi harmoniously arranged, the Four Seasons proceed through them. The Five Phases are simply yin and yang; yin and yang are simply the Supreme Polarity; the Supreme Polarity is fundamentally Non-polar. [Yet] in the generation of the Five Phases, each one has its nature (Adler, 2008, p. 68)*

Here, this paper argues that the transformative characteristic of *Taiji* can be correlated to the SQS's manifestation of particles and fields, signifying the transition from the time-invariant state (*Wuji*/SQS) to the time-variant state (*taiji*/material universe). The resonance between these philosophical and scientific concepts might open potential avenues for advancing physical theories, such as Einstein's unified field theory. Einstein's pursuit was to reconcile general relativity, a view of gravitation that treats space and time as a unified, four-dimensional structure, with quantum mechanics (Einstein, 1950).

By conceptualizing space as a superfluid quantum field, there is a potential to reconcile these seemingly dichotomous theories, contributing to the more extensive pursuit of a unified description of fundamental forces. Furthermore, when contrasted and compared with *Dao*'s perspective of *Wuji* (the undifferentiated absolute) and *Taiji* (the dynamic interplay of *yin* and *yang*), this approach further expands our understanding of these complex theories and principles.

This paper elaborates on Khalatnikov's (2018) theory of superfluidity, Einstein's (1950) general theory of gravity, and Dao's doctrines of *Wuji* and *Taiji*. This confluence suggests a compelling synthesis of physical and philosophical

discourses, a nexus that may offer valuable insights into our understanding of the cosmos and the laws that govern it. Volovik (2013) drew parallels between Khalatnikov's (2018) hydrodynamics of superfluids and Einstein's (1950) general theory of gravity. In Khalatnikov's (2018) superfluid model, the superfluid vacuum's inhomogeneous flow is an effective metric field influencing the dynamics of quasiparticles, representing the matter field. Consequently, this model exemplifies an effective field theory integrating both the gravitational field (the collective motion of the superfluid background) and matter (quasiparticle excitations). Viewing this through the lens of *Dao*, *Wuji* can be likened to the superfluid vacuum. *Wuji*, as an undifferentiated, timeless, and spatially infinite state, bears similarity to the superfluid vacuum's characterization as a time-invariant, fundamental field. Šorli and Čelan (2021) added that this fundamental field is "the primordial energy of the universe" (p. 201). Both entities represent a primordial, quiescent state before material differentiation and dynamism emerged. *On* the other hand, Taiji represents the ceaseless interplay of*yin* and *yang*, the two primal forces embodying dynamism and transformation over time.

This notion of ceaseless transformation is analogous to the description of quantum entanglement, a phenomenon that implies instantaneous changes across spatially separated systems (Favalli & Smerzi, 2020). Šorli and Čelan (2020) discussed that the entanglement between physical entities and gravity is facilitated by a shared medium - the superfluid quantum space. This time-invariant medium is seen as a conceptual bridge linking the *Dao* concept of *Wuji*, the state of quiescence, and *Taiji*, the state of dynamism and change. Furthermore, the perspective of Verlinde (2017) echoed the intertwined nature of *yin* and *yan*g in *Taiji*. Verlinde's (2017) theory posits that gravity arises as an emergent phenomenon from the underlying microscopic degrees of freedom in the fabric of space and suggests that gravity is an entropic force associated with the redistribution of information. "The concepts of *yin-yang* and information causality are central to *Yijing*'s understanding of change" (Leong, 2023, p. 1). In emergent gravity, the interaction between microscopic degrees of freedom gives rise to the emergent property of gravity, and they gravitate towards Earth as the manifestation of the *wanwu*. Similarly, in *Taiji*, *yin* and *yang* are interdependent and mutually constitutive, forming a dynamic whole giving rise to an emergent property *shenghua wanwu*.

This paper's findings resonate with the theory posited by Verlinde (2017), wherein gravity is seen as an emergent phenomenon where the superfluid quantum space (*Wuji*) framework allows us to envisage a unified platform where gravity and entanglement (of *yin* and *yang*) coexist in the *taiji* stage, offering a fresh perspective in the discourse on quantum gravity. This concept resonates with fluid hydrodynamics, where the dynamism arises from the interaction between the superfluid vacuum and the quasiparticles (made of *yin* and *yang* spins illustrated in Figure 3). Figure 3 shows a sustained dance of *wu* and *you*, *yin* and *yang* representing a dynamic interplay between the continuous interaction of*yin* and *yang* in *Taiji* and the dynamic behaviour of quasiparticles within the superfluid vacuum Šorli and Čelan (2020) highlighted that the superfluid quantum space acts as a medium for entanglement. The concepts of *Wuji* and *Taiji* act in concert on a unified platform where gravity and entanglement give rise to the creation of *wanwu,* representing the totality of cosmic phenomena. This notion aligns with quasiparticles' materialisation and collective dynamics within the superfluid vacuum. *Wanwu* encompasses a wide range of manifestations; the interactions among quasiparticles within the superfluid vacuum give rise to various emergent phenomena. The similarities between these concepts suggest that the entanglement of *yin* and *yang* within the *taiji* state facilitates the emergence of diversified phenomena, mirroring the formation of varied

manifestations resulting from quasiparticle interactions within the superfluid field.

This comparison links the continuous *yin-yang* interaction in *Taiji* with the dynamism of quasiparticles within the superfluid vacuum. The concepts of *Wuji* and *Taiji*, leading to the creation of *wanwu* (representing the totality of cosmic phenomena), resonate with the superfluid vacuum's materialization of quasiparticles and their collective dynamics. This suggests that the entanglement of *yin* and *yang* within the *Taiji* state might act as the catalyst for the emergence of diversified phenomena (*wanwu*), mirroring the formation of varied manifestations stemming from quasiparticle interactions within the superfluid field where "time-invariant superfluid quantum space is the medium for entanglement" (Šorli & Čelan, 2020, p. 2050007-8). Yet, the metaphorical alignment of scientific and philosophical ideas warrants careful consideration. While these comparisons offer insightful perspectives, the fundamental principles and methodologies underlying physics and philosophy remain distinct. However, such parallels stimulate innovative thoughts that may further our comprehension of the universe's essential aspects. However, further investigation is necessary to fully comprehend these intricate associations and their implications for our understanding of the universe.

Drawing parallels between the Eastern philosophical concepts of *Dao*, *Wuji*, and *Taiji* and the modern scientific notion of superfluid quantum vacuum or superfluid quantum space (SQS) opens intriguing dialogues in cosmology. Both frameworks appear to grapple with origins, transformation, and unity concepts, positing an underlying field or principle governing phenomena' manifestation.

However, it is vital to highlight that while these parallels exist, they should be cautiously approached. Quantum physics and *Dao* metaphysics operate within distinct ontological frameworks and epistemological traditions. While quantum physics is rooted in empirical observation and mathematical formalism, *Dao* metaphysics revolves around introspective inquiry and symbolic discourse. These intersections, therefore, should be viewed as metaphorical convergences rather than direct equivalences.

The discourse offers an integrative perspective, suggesting that ancient metaphysical insights and modern scientific discoveries can be mutually illuminating. Drawing from diverse knowledge systems, this exploration uncovers profound resonances, enriching our understanding of the cosmos and our place within it.

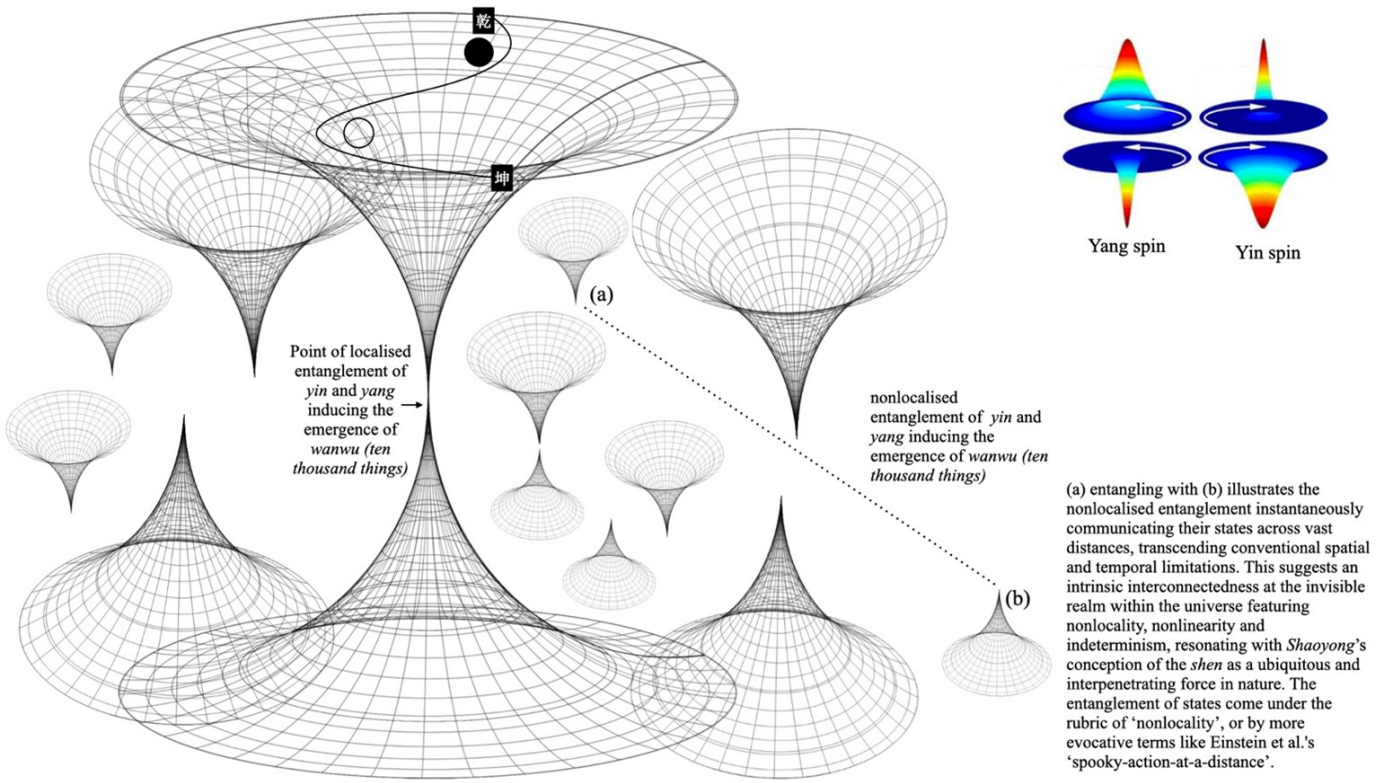

Figure 3. It illustrates the sustained dance of *wu* and *you*, *yin* and *yang*. Illustration credited to (Butenko et al., 2009)

Zhou Dunyi's Supreme Polarity (*Taijitu Shuo*) and *Chen Tuan*'s Non-Polar (*Wujitu*)

Taijitu Shuo

Zhou Dunyi, a prominent figure in the Song dynasty and considered the pioneer of Neo-Confucianism and the founder of *Daoxue*, introduced a diagram known as the Supreme Ultimate (*Taijitu*) and accompanied it with a succinct philosophical exposition of *Taijitu shuo* (Wang, 2005). *Zhou Dunyi*'s unique interpretation of the *yin* and *yang* theory holds relevance for contemporary discussions on the historical development of Chinese philosophy. This paper argues that *Zhou Dunyi*'s yin and yang principle encompasses the dynamic complementarity concept. Complementarity, an integral concept in physics, pertained to quantum mechanics and was deemed crucial by Niels Bohr. The principle of complementarity states that objects possess pairs of complementary properties, rendering it impossible to observe or measure all of them simultaneously. Position and momentum exemplify such a complementary pair (Bohr, 1937).

In the *yin* and *yang* interaction context, *yin* represents the dark unknown, symbolizing the probabilistic wave aspect. In contrast, *yang* represents the positive emerged and particularized reality, resembling the particle aspect. This explains how *yangdong* in the negative creativity of Dao (Chai, 2014). This duality of *yin* and *yang* can be conceptualised as a wave-particle reality, reflecting the inherent nature of complementarity. *Yin* symbolises the dark unknown, representing the probabilistic wave aspect. It embodies the realm of potentiality, where various possibilities and outcomes exist in uncertainty. This aligns with the concept of negative creativity in *Dao*, where the emergence of new possibilities arises from the underlying fluidity and transformative nature of the *yin* aspect. On the other hand, *yang* embodies the manifest

and observable world characterized by stability, activity, and discernible forms. *Yang* is associated with the actualization of potentials, the realization of intentions, and the external manifestation of creative energies through *yangdong* 'yang in motion' (Figure 4).

The interaction between *yin* and *yang* reflects the wave-particle duality. The probabilistic nature of the *yin* aspect corresponds to the wave nature of particles, while the particularized reality represented by yang aligns with the particle aspect. This interplay between *yin* and *yang*, reminiscent of the wave-particle duality, highlights these two aspects' intricate and complementary nature.

This interconnectedness and transformation, observed in the five-element cycle, parallels the probabilistic nature of quantum phenomena. The *yin* and *yang* interaction, thus, provides a philosophical framework that mirrors the underlying principles of complementarity and the intricate interplay of wave-particle reality in quantum mechanics. Furthermore, this perspective underscores the notion that the interplay of *yin* and *yang*, subject to the cycle of creation and destruction within the five-element system, engenders a fertile ground for manifesting possibilities.

Zhou Dunyi's *Taijitu*,, illustrated in Figure 4, is also known as the Diagram of the Supreme Ultimate and comprises five distinct images accompanied by six lines of inscriptions. The first image features a circle positioned directly below the inscription *Wuji er Taiji*, as interpreted by *Zhuxi*. The philosophical interpretation of *Zhou Dunyi*'s *Taijitu shuo* relies heavily on these two formulas (Wang, 2005). The second image depicts interlocking blank and shaded areas, forming six semicircles with a smaller empty circle at the centre. This image represents a combination of two trigrams from *Yijing*. The left part represents *li* (fire). The right part symbolizes *kan* (water). Fire and water are considered the two most significant trigrams after *qian* (heaven) and *kun* (earth) (Wang, 2015). Adjacent to these images, the words *yangdong* (*yang* is motion) appear on the left, and *yinjing* (*yin* is rest) appear on the right. The third image in the *Taijitu* represents the flow of the five elements (*wuxing*) - fire, water, earth, wood, and metal. The fourth and fifth images feature circles the same size as the first. An inscription accompanies each of these images. On the left, it reads, *qiandao chengnan* 'The Way of *qian* makes Male', and on the right, *kundao chengnu* 'The Way of *kun* makes Female'. The Taijitu is completed with the final circle where *wanwu huasheng* 'Everything becomes and transforms'. To fully comprehend the *Taijitu*, it is crucial to consider the entire diagram as a whole, reading it from top to bottom. Patt-Shamir (2020) suggested that *Taijitu* be read "synchronously instead of diachronically, which yields a new understanding of the relatedness between infinitude and finitude, or between the One and many" (p. 427). This holistic approach allows for a deeper understanding of the interconnections and interplay between the different elements and concepts represented within the *Taijitu*. The implications and significance of observing the *Taijitu* with a three-dimensional perspective offer avenues for further discussion.

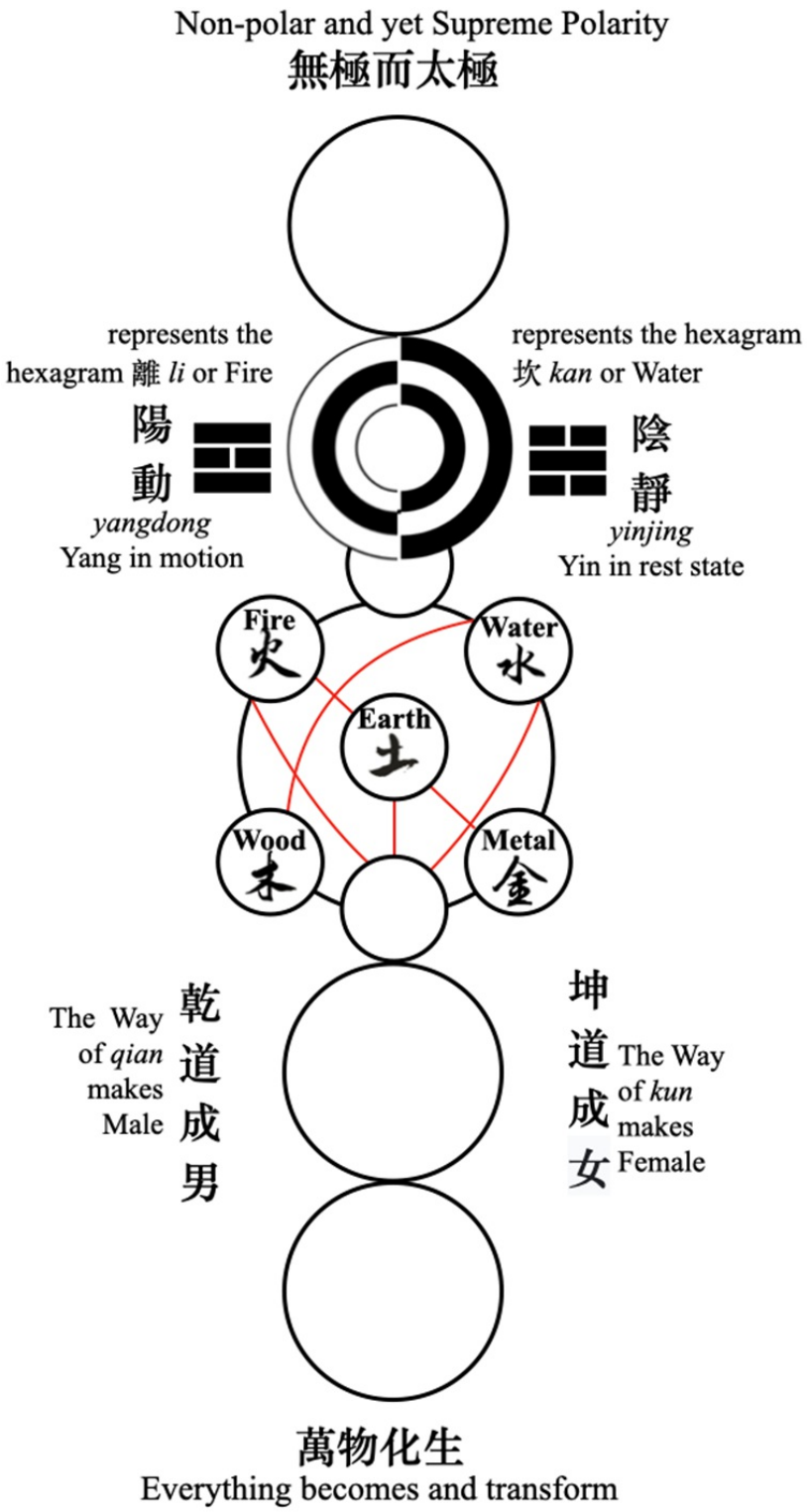

Figure 4. *Zhou Dunyi*'s *Taijitu*

Wujitu

The *Wujitu*, also known as the Diagram of the Great Void (Figure 5), was initially attributed to the *Daoist* hermit *Chen Tuan*, who lived during the years 906-89 CE. Legend has it that *Chen Tuan* inscribed the *Wujitu* in a cave on *Hua* Mountain near *Xi'an* (Wang, 2005). The remarkable similarity between this diagram and the *Taijitu* has sparked extensive

debate throughout the centuries regarding its original creator (Wang, 2005). Furthermore, there is additional evidence that points to a connection with *Chen Tuan* through a poem written by *Zhou Dunyi*, in which he expressed his belief that *Chen Tuan* possessed a profound knowledge of the creative transformations inherent in the concept of *yin* and *yang* (Ching, 2000). This further supports the association of *Chen Tuan* with the diagram and its symbolic representation of cosmic balance and transformation.

The *Wujitu* shares the same five images as the *Taijitu*, but there are notable differences in the inscriptions and the reading direction. Unlike the *Taijitu*, the *Wujitu* is read from bottom to top. The first image at the bottom, *kuanpin*), represents the gate of the mysterious female, symbolizing the starting point of alchemical cultivation and refinement. It refers to the elixir field and gate of life within the human body, where the original vital breath, *qi,*, is stored and inner alchemy takes root (Wang, 2005).

The second image describes a cyclic progression involving the cultivation of *jing* (material essence) into *qi* and further refining this *qi* (breath) into *shen* (spirit). This stage is known as self-refinement, where a post-existent *yin* substance is transformed into a pre-existent spirit.

The third image illustrates the connection between *qi* and the five elements, emphasising their harmonization and return to the origin.

The fourth image is formed by the *kan* and *li* trigrams of the *Yijing*, with the inscription stating 'taking *kan* (water) to fill in *li* (fire)'.

Finally, the fifth image represents the highest stage of inner alchemy, where the transformation of the kidney's water and the heart's fire leads to the emergence of a pure *yang* body. Finally, the topmost circle signifies the return to emptiness and the Great *Dao*.

While the *Taijitu* and *Wujitu* share similar images, reading the *Wujitu* from bottom to top offers a distinct perspective. The *Wujitu* reveals the practice of *Dao*'s self-cultivation, commonly known as 'inner alchemy'. This process encompasses three interconnected stages: the cultivation of *jing*, the transformation into *qi*, and the cultivation of *shen,* leading to a return to emptiness.

In conclusion, *Wujitu* provides valuable insights into the practice of *Dao*'s inner alchemy, highlighting the journey from *jing* to *qi* to *shen* and ultimately returning to *xu* and *wu*. This signifies the transformative movement between infinite and finite existence, culminating in a return to the infinite.

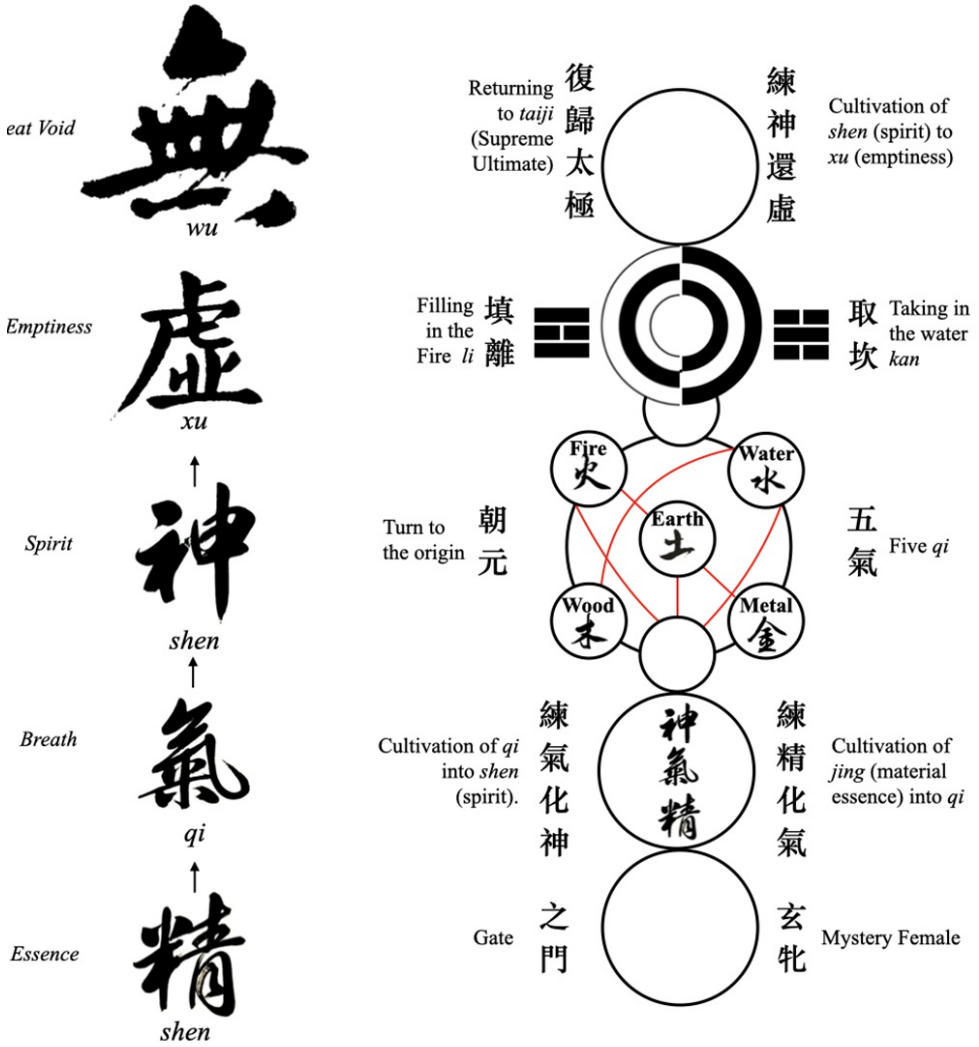

Figure 5. *Chen Tuan*'s *Wujitu*

Discussion

In the wake of advancements in relativity theory and quantum physics, there has been a paradigm shift in scientific thought. Traditional determinism has given way to concepts of nonlinearity, uncertainty, probabilistic emergence, and inherent imbalance (Davies & Gribbin, 2007). Such progress has enriched our comprehension of the universe's core nature, including the notion of 'superfluid quantum space' (SQS) as the fundamental energy permeating the universe (Šorli & Čelan, 2021).

Zhou Dunyi's *Taijitu* serves as a symbolic depiction of the universe's harmony and continuous flux. It graphically contrasts Heaven's ultimate perfection with the Earth's fragmented elements, leading to imbalance and uncertainty (Figure 6). This emblematic representation offers valuable insights into the intricate interplay and vitality of the cosmos.

Wuji represents the non-polar and undifferentiated wholeness of the universe, known as primal chaos (*hundun*), a concept emphasised in *Dao* philosophy. The negative creativity of *Dao* comes into play. *Hundun* exists in a superposition

state, lacking a well-defined identity at this level (Fengxian, 2018). It simultaneously encompasses multiple states, defying the constraints of linear time. This understanding resonates with quantum principles, where superposition allows for the coexistence of multiple possibilities before measurement or observation (de Ronde, 2018). *Hundun*, in its state of quantum superposition, serves as the locus of implicit 'disorder' or 'chaos'. However, rather than inhibiting or subverting the self-ordering and self-organizing process in the *taiji* stage, *hundun* stimulates it (Ames, 2015). This dynamic understanding of order recognises that the energy of change is inherent within the existing order (affirming the notion of *yangdong*), emphasizing that a richly vague and chaotic aspect always accompanies order. This perspective challenges causal reductionism and simplistic determinism, ensuring an open-endedness associated with freedom and creativity. *Hundun* represents the integral indeterminacy that permeates all conceptions of order, providing the foundation for the spontaneous emergence of novelty in the present moment.

Šorli and Čelan (2021) posited 'superfluid quantum space' (SQS) as the primordial energy that permeates the universe. This primordial energy represents a foundational substrate that gives rise to the emergent phenomena observed in the universe, showcasing the probabilistic nature of quantum reality and challenging traditional deterministic frameworks. Relativity theory and quantum physics advancements revolutionise scientific thinking, reshaping our understanding of the universe. The symbolic representation of cosmic unity and continuity in the *Taijitu* aligns with recognising nonlinearity, uncertainty, and probabilistic emergence in scientific frameworks. The concept of superfluid quantum space, introduced by Šorli and Čelan (2021), presents a conceptual framework for understanding the fundamental energy that permeates the universe and its dynamic interplay. The *Taijitu* symbolically encapsulates the dynamic interplay between the complementary forces of yin and yang, often visualized as spinning in a vortex formation. This visualization strikingly mirrors critical aspects of the superfluid quantum space framework. Su et al. (2023) observed the nature of ultrafast rotating superfluids. They found that the vortices in such a superfluid form isolated rings, with an outer superfluid ring and an inner vortex ring. Intriguingly, this configuration mirrors the dynamic equilibrium of *yin* and *yang*, fundamental principles in Eastern philosophy. This congruence offers a captivating perspective on the synergy between traditional Eastern thought and contemporary physics.

The *Taijitu*, in tandem with its graphical representation, encapsulates the harmony between opposing forces. It provides a visual conduit into the inherent dynamism and transformations within the primordial energy that permeates the universe. This interplay is further exemplified in the *Wujitu*, demonstrating how energy transitions through the stages of*jing*, *qi*, and *shen*, only to return to its original, primordial state. As such, these symbols offer a profound illustrative mechanism for understanding the intricate patterns and behaviours exhibited in quantum phenomena. Indeed, they could provide critical insights into the kinds of sophisticated patterns and behaviours identified in the work of researchers such as Su et al. (2023).

Zhou Dunyi's *Taijitu* integrates a diagram with succinct text to describe the cosmic interplay of forces. Figure 6 presents a reinterpretation of the *Taijitu* as a torus, a doughnut-like geometric form with a fluidly transitioning surface. In this perspective, *Taijitu*'s top image, indicative of Heaven's wholeness, aligns with the torus's probability space between Heaven and Earth. As we traverse down the torus, we encounter successive *Taijitu* images, signifying the shift from heavenly to earthly realms, mediated by the generative and destructive cycles of the five elements. Within this toroidal

framework, the *qi*'s flow within the torus's central tunnel emerges as the energy circulation's crux. Here, the five elements dynamically interact, giving rise to probabilistic emergence. These five elements—fire, water, earth, wood, and metal—are interrelated and mutually dependent within the torus. As the *qi* courses through the torus, it engages with these elements, each influencing the overarching dynamic process. This interaction of elements spawns myriad possibilities and outcomes, engendering new states and transformations.

This emergence's probabilistic nature stems from the intrinsic complexity and nonlinear interactions of the elements within the torus. These interactions fluctuate based on timing, intensity, and the specific combination of elements engaged. Consequently, outcomes become uncertain, resulting in a spectrum of potential manifestations.

The dynamic interaction of the five elements within the torus underscores the *qi* flow's inherent vitality and creative capacity, embodying the five-element framework's ongoing cycle of creation, transformation, and interdependence. This perspective highlights the complex and multifaceted nature of energy dynamics, contributing to a more comprehensive understanding of the interplay between *yin* and *yang* and the broader principles underlying the flow of *qi*.

As we progress along the surface of the torus, we witness the emergence of multitudinous materials and manifestations on Earth. The torus visually represents the continuous flow and interrelationship between Heaven and Earth. It highlights transformation and movement as energy and forces circulate within and around the torus. By reimagining the *Taijitu* as a torus, we gain a deeper understanding of its symbolic representation. The toroidal structure captures the essence of the *Taijitu*, illustrating the interplay between perfection and imperfection, unity and diversity, and the cyclical nature of existence. It is a visual metaphor for the profound philosophical concepts embedded within the *Taijitu*. It invites contemplation on the dynamic interplay of cosmic forces and the interconnectedness of all phenomena. Traditionally perceived within a two-dimensional plane, it embodies the dynamic interplay between *yin*, signifying the negative creativity of *Dao*, and *yang*, which represents activity and manifestation.

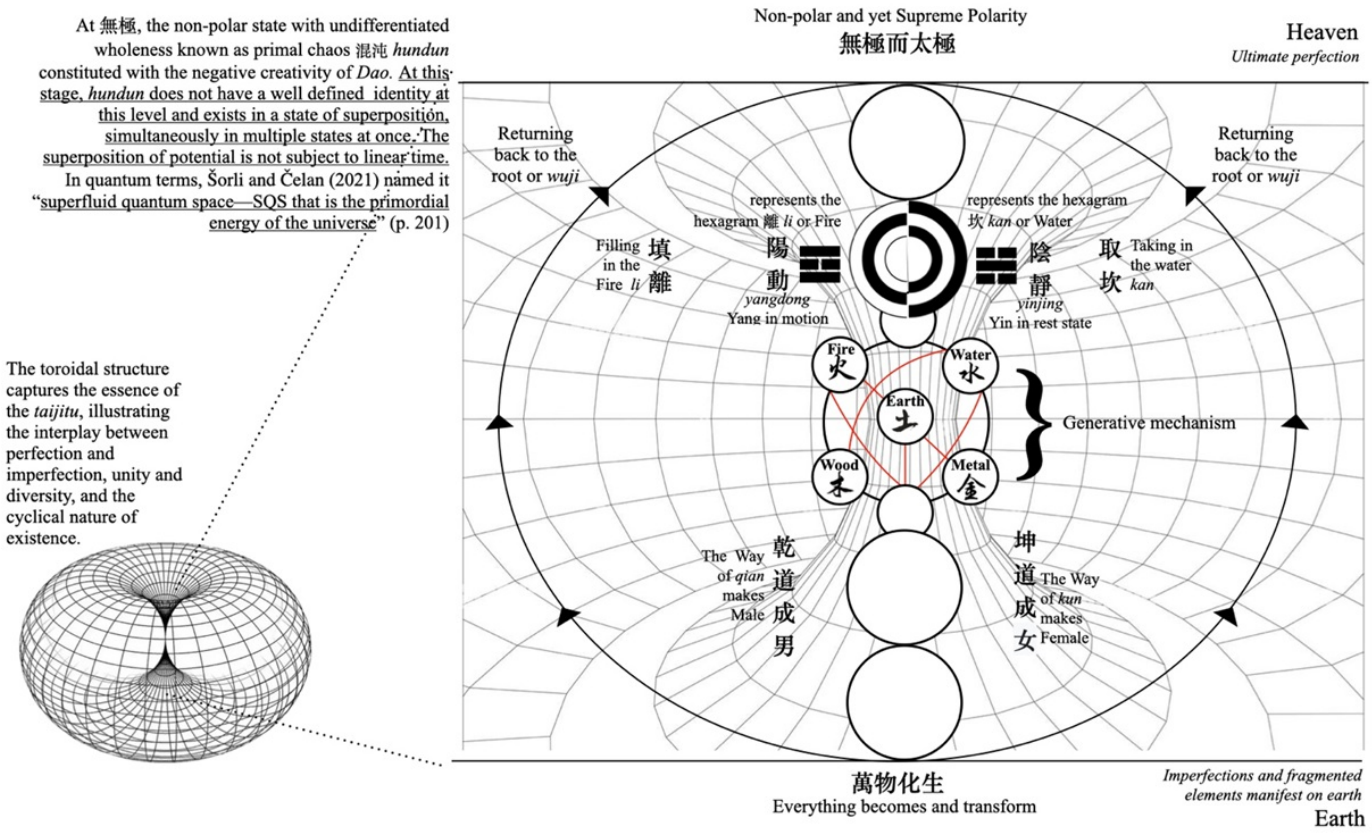

Figure 6. Reimagined toroidal-shaped *Taijitu*

This study suggests reimagining the *Taijitu*, positing a three-dimensional perspective yielding novel insights. This three-dimensional interpretation considers the symbol a sphere, symbolizing forces' comprehensive and multi-directional interaction. This perspective amplifies our understanding of cosmic equilibrium, emphasizing the indivisible, dynamically interactive characteristics of yin and yang, which resonate with the entanglement of quantum particles. Quantum entanglement, signifying the inseparability of quantum states, suggests an intriguing alignment with emergence (Hüttemann, 2005). According to Kronz and Tiehen (2002), 'dynamic emergence' describes a condition where an emergent entity, comprising contemporaneous parts, cannot be independently defined from its constituent parts. These emergent entities result from an ongoing, essential interplay among components. In this framework, 'characterization' denotes a comprehensive catalogue of an entity's instantiated properties, with independence meaning the elements within the catalogue do not fundamentally allude to another entity. Consequently, in the realm of quantum entanglement, emergence refers to systems transcending the mere sum of their parts, where the part properties are inextricably tied to the whole. This interpretation presents a compelling lens to scrutinize quantum mechanics, potentially reconciling the seeming dissonance between quantum nonseparability and emergent phenomena.

Quantum physics, founded on principles such as complementarity, superposition, and probabilistic emergence, resonates profoundly with the philosophical underpinnings of the *Taijitu*. The principle of complementarity, which posits that particles exhibit dual characteristics of being wave-like and particle-like, echoes the dual yet intertwined essence of *yin* and *yang* (Dai, 2015). The principle of superposition in quantum physics, which asserts that particles concurrently exist in multiple states until observed, finds a unique correspondence in the *Taijitu*. Superposition explains how particles occupy various

states simultaneously, with a definitive state emerging upon observation; yin and yang also embody diverse aspects simultaneously, their totality unveiled through interaction (Wang, 2012). Furthermore, the principle of probabilistic emergence in quantum physics, where specific particle properties only surface upon observation and measurement, parallels the *Taijitu* philosophy. Here, the manifestation of *yin* or *yang* is context-dependent, reflecting a comparable level of unpredictability observed in quantum particles (Avner, 2021); since “high-level indeterminism and contextuality (i.e., unknown positions and momenta of system and apparatus sub-particles) would cause the unpredictability of measurement outcomes” (Avner, 2021, p. 16). This comparison suggests that the universe's core, whether viewed through quantum physics or Eastern philosophy, is fluid and contingent, defying deterministic categorization.

The concept of *Wuji*, symbolising the indistinguishable absolute or the primal state preceding the emergence of *yin* and *yang*, shares fascinating parallels with the superfluid quantum space concept. This space, an infinite, non-particulate medium, is postulated to permeate the entire universe, serving as the foundation for every point in space-time. Similarly, *Wuji* represents the foundational reality within *Dao*. The fluidity inherent in superfluid quantum space reflects the nature of *Wuji*, underscoring the universe's interconnected and fluid nature.

In conclusion, reinterpreting the *Taijitu* from a three-dimensional perspective invites an exploration of Eastern philosophy's convergence with quantum physics. The resulting analogies unveil a striking intersection between age-old wisdom and contemporary scientific principles, enlightening us on the intricate, interconnected nature of the cosmos. This exploration also emphasises the potential for deep-seated synergy between metaphysical inquiries and scientific ones. Finally, it implies that the confluence of these fields can establish an exciting arena for future research, seeking to deepen our understanding of the universe.

Conclusion

The *Taijitu* is a central representation of *Dao*, signifying the equilibrium of contrasting yet complementary forces in the universe. A more comprehensive understanding of its philosophical and symbolic implications emerges by delving into the profound depths of the *Taijitu* and exploring its multi-dimensional aspects. The re-purposed three-dimensional *Taijitu* represents the dynamic interplay between yin and yang, encapsulating the transformative nature of existence and the cyclical patterns observed in the natural world.

Examining the *Taijitu* as a unified entity, considering its inscriptions, images, and sequential arrangement, provides deeper insights into its underlying concepts. It invites contemplation on the interrelatedness and harmonious balance of opposing forces and the continuous cycles of creation, transformation, and renewal that permeate existence. Taking a three-dimensional perspective on the *Taijitu* opens up new avenues for exploration, particularly in relation to the principles of quantum physics. Concepts such as complementarity, superposition, and probabilistic emergence find resonance in the dynamic interplay of *yin* and *yang* within the *Taijitu*. The metaphor of *Wuji*, the primordial state, can be further understood by drawing parallels with the superfluid quantum space concept, emphasising the universe's fluid and interconnected nature. The implications of this three-dimensional perspective of the *Taijitu* extend beyond its visual representation. It

beckons further investigation into its profound philosophical and metaphysical implications, fostering a deeper understanding of the intricate nature of *yin* and *yang* philosophy and its enduring significance in Chinese culture, philosophy, and cosmology.

While the alignment of Eastern philosophy, as exemplified by the *Taijitu*, and quantum physics offers compelling insights, certain inherent limitations and differences must be acknowledged. This discussion brings together two distinct fields - quantum physics, grounded in empirical evidence and mathematical formalism, and *Dao*, based on intuitive insight and meditative reflection. This blend results in ontological and epistemological differences, which could limit the applicability of this interdisciplinary approach.

Despite these differences, the interplay between quantum physics and *Dao* philosophy enriches theoretical dialogue by promoting interdisciplinary discourse. It underlines the potential for harmony between empirical science and philosophical introspection, spotlighting shared themes such as interconnectedness, fluidity, and dynamic equilibrium of complementary forces. Additionally, it urges the scientific community to contemplate alternative ways of understanding, potentially leading to more holistic and nuanced theories concerning reality's nature.

Future studies should delve deeper into these connections, exploring theoretical intersections and potential empirical tests. For example, the three-dimensional interpretation of the *Taijitu* could be modelled mathematically, allowing a quantitative exploration of this ancient symbol’s dynamics. Researchers could also draw from the field of quantum cognition, which applies quantum formalism to model cognitive processes, to investigate whether certain aspects of human thought mirror the principles of quantum physics and *Dao* philosophy.

Moreover, since energy and flow are central to quantum physics and *Dao*, empirical research can focus on quantum phenomena that explicitly manifest these characteristics. One such area could be quantum thermodynamics, which explores the energy flow in quantum systems. Through the lens of the *Taijitu*, researchers can investigate how the balance and flow of energy in these systems might reflect the dynamic equilibrium of *yin* and *yang*.

Lastly, more qualitative research should be undertaken, such as phenomenological studies exploring practitioners' experiences of the *Dao* concept of flow and gravity theorisations. This provides rich, experiential data to complement the more quantitative findings from quantum physics, ultimately aiming for a deeper, more integrative understanding of the universe's essence. The resonance of these seemingly disparate disciplines underscores the enduring relevance and universal applicability of ancient Eastern philosophical principles. It also emphasises the potential benefits of integrating these wisdom traditions into modern scientific and cultural discourse.

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.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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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.

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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.

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