The Apologetic Discourse towards the Convergence between Pure Land Buddhism and Science of the Contemporary Chinese Buddhist Monk Da An (1959-)

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Article

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Abstract: This article explores the apologetic discourse towards the convergence between Pure Land Buddhism and science of the contemporary Chinese Buddhist monk Da An (1959-). Faced with the formidable challenge posed by contemporary science towards public acceptance of Buddhism, Da An endeavors to employ science as a medium for propagating Pure Land teachings, seeking to accommodate the preferences of scientifically inclined individuals. He utilizes several theoretical physics concepts to validate that certain ostensibly miraculous accounts within Pure Land Buddhist texts are not incompatible with contemporary science. Further, he asserts that certain supernatural narratives therein indicate that some physical principles still residing in theoretical conjectures on Earth have already been validated and can be utilized at will by the celestial beings in Sukhāvatī, thus asserting the supremacy of Pure Land teachings over science. The article endeavors to examine the contemporary dialogue between Pure Land Buddhism and science, which has been overlooked in the current research realm of the interaction between Buddhism and science.

Keywords: pure land Buddhism; science; quantum mechanics; modernity

1. Introduction

The compatibility between Buddhism and science has been a subject of varying opinions, ranging from the belief that Buddhism's fundamental dogmas align seamlessly with scientific discoveries, to the notion that the Buddha's profound insights had already anticipated some of the most significant breakthroughs in modern science, predicting discoveries that would only come to light more than two millennia later. (Lopez 2009, p.2) The dialogue between certain Buddhist teachings and scientific theories has gained attention in current academia. Some scholars who adhere to Buddhism endeavor to showcase the coherence between certain Buddhist tenets and scientific principles or seek to establish the scientific veracity of Buddhism. Another faction of researchers concentrates exclusively on the scholarly scrutiny of the interpretive approaches towards the comprehensibility of Buddhism and science that have arisen in modern times. Their research areas encompass the crossroads of Madhyamika Buddhism and quantum physics (Balasubramaniam 1992), the confluence of Zen and psychology (Young-Eisendrath and Muramoto 2002), as well as the interconnection between emptiness and Relativity (Finkelstein 2003), among others.

Nonetheless, the dialogue between a prevalent Eastern Asian Buddhist tradition, Pure Land Buddhism, and science remains understudied by current academic circles. It may be due in part to the distinct doctrines and practices of Pure Land Buddhism. Pure Land Buddhist teachings are mainly associated with the practice of nanfo 念佛, or "buddha-recitation/contemplation," a practice wherein, at its simplest, the devotee recites the name of the Buddha Amitābha (Amituofo 阿彌陀佛) in the expectation of gaining rebirth in the western Pure Land (xifang jingtu 西方淨土) called Sukhāvatī upon their demise.(Jones 2009, p. 1) At first glance, such a devotionalism towards the deity Amitabha, fostered with the ultimate goal of rebirth in an ideal world known as Sukhāvatī, does not prioritize philosophical analysis of the world's manifestation and essence like Madhyamika, nor concentrates primarily on meditative psychological training like Zen Buddhism. Therefore, it may be difficult for the academics to fathom a Buddhist intertwining it with fields of science such as physics

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and psychology. Thus, even if some Buddhist adherents do have endeavored to reconcile Pure Land teachings with science, this field has been largely neglected by the academic community.

Indeed, there exists a Buddhist monk within contemporary Chinese Buddhist circles who has established dialogue between the tenets of Pure Land Buddhism and science. Da An 大安(1959-), currently serving as the abbot at Donglin 東林 Temple which is revered as "the patriarchal temple (zuting 祖庭)" of Chinese Pure Land Buddhism, has often incorporated scientific content particularly from modern and contemporary theoretical physics into his teachings and written works. As will be illustrated below, he attempts to reconcile these scientific principles with the doctrines of Pure Land Buddhism. This article will subsequently delve into Da An's apologetic discourse on the compatibility between Pure Land Buddhism and science.

2. Da An and His Response to Science

Da An, also known as Wei Lei 魏磊, was born in 1959 in Nanchang, Jiangxi Province. He earned his undergraduate degree in Chinese language and literature at Jiangxi University (now Nanchang University); subsequently, he enrolled at the Philosophy Department of Renmin University of China to pursue a master's degree and received his Master's degree in 1987. From 1994, Da An became a visiting professor at the Buddhist College of China, imparting knowledge on the Pure Land teachings; in 2000, he assumed professorship at the University of International Business and Economics, Beijing. In September 2001, Da An ordained under Chuan Yin 傳印(1927-2023) and committed himself to studying and advocating the Pure Land teachings exclusively. Since 2004, Da An has been invited to deliver lectures on religion, morality, education, and other topics for university students at institutions such as Nanjing University and Fudan University, and has traveled extensively to propagate Buddhism domestically and internationally, reaching regions including mainland China, Hong Kong, Singapore, Malaysia, Indonesia, the United States, and beyond. (Jiao 2020, p. 111）

From Da An's personal background, he acquired his formal education and teaching experience within secular universities. Consequently, it is plausible that he could gain insight into and harness knowledge related to some contemporary scientific concepts. Upon embracing Buddhism, whether prior to ordination or post-ordination, his primary pursuit was the practice and propagation of Pure Land teachings. His Buddhist teachings were not solely received by practitioners of Buddhism, but also encompassed individuals who were not wholly devoted to Buddhism such as university students. This may furnish him with the impetus to utilize secular knowledge such as science as a medium for promoting these teachings.

He employed science as a medium for disseminating Buddhist teachings, directly tied to the societal landscape of contemporary China. Since modern time, Chinese Buddhism has been subjected to criticism for being a constituent element of the array of superstitious notions and rituals that are incongruous with modern lifestyles and societal advancements. Hence, Buddhist innovators believed that the continued existence and lasting significance of Buddhism hinged upon its capacity to effectively adapt to contemporary society, characterized by the inexorable advance of scientific and technological progress, as well as the mounting emphasis on rationalism and societal advancement. (Poceski 2016, pp. 81-2) In contemporary China, an assortment of Buddhist clergy have also recognized that the progression of science will present a formidable obstacle for the social acceptance of Buddhism. For instance, Chuan Yin has articulated:

> In the contemporary era, science is flourishing and technology is advancing. Many individuals have developed a mindset that prioritizes scientific and technological advancements, erroneously branding Buddhism as superstition. They have constructed mental barriers and thus missed out on the profound wisdom of Buddhism, which is truly regrettable. (Chuan Yin 2002, p. 1; self-translation)

Likewise, according to Da An, contemporary individuals may struggle to embrace the teachings of Pure Land Buddhism as a result of the pervasive influence of natural scientific concepts and cognitive frameworks. (Da An 2006, p. 25) Due to this, Da An adopted a strategic approach to promote Buddhism that aims to reconcile the principles of Pure Land Buddhism with the tenets of natural science and demonstrate that they are, at their core, not incompatible. This approach serves

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to better accommodate the needs and beliefs of contemporary individuals who are significantly influenced by scientific concepts.

As a staunch advocate of Buddhism, Dao An uses scientific discourse as a medium to disseminate Buddhist principles beyond simply demonstrating the compatibility between these two realms. Rather, he advocates for the superiority of Buddhism over science. He posits that science possesses certain limitations and drawbacks, which can be rectified through Buddhist principles. For instance, he staunchly advocates that the doctrines of Pure Land Buddhism offer ethical checks and balance for modern science and technology. He points out that whilst science and technology significantly improve human life, they also present a myriad of detrimental facets:

> As science and technology relentlessly transforms humankind's existence in dynamic fashion, its adverse repercussions are increasingly apparent. While individuals luxuriate in the conveniences of advanced technology and robust material consumption, they concurrently endure the bitter fruit associated with it such as: environmental degradation, ecological imbalance, threats from nuclear weapons and biological weapons, and the depletion of spiritual sanctuary. These facts unequivocally underscore that technology is not the most dependable solution for alleviating human suffering. (Da An 2006, p. 22; self-translation)

In light if this, he maintains that the multitude of tenets upheld by Pure Land Buddhism, such as "a pure land created by a pure mind", harmony and equality among all beings, compassion and tolerance, "can undoubtedly effectively guide contemporary scientific advancement, enabling it to manifest positive effects for the betterment of humanity while minimizing deleterious repercussions against mankind, thereby achieving a harmonious interplay between morality and technology." (Da An 2006, pp. 25-26)

In addition, Da An believes that the superiority of Pure Land teachings in comparison to science is further demonstrated by the revelations contained within the Pure Land classics, which indicate some scientific technologies that currently remain theoretical but have not been fully realized or applied in Earth. For instance, he elucidated that the Pure Land of Sukhāvatī delineated in the Pure Land texts is a "miraculous land teeming with extraordinary scientific and technological prowess," capable of presenting profound insights for the evolution of advanced technologies on Earth. (Da An 2006, p. 27) This stance pervades his discourse on the dialogue between Pure Land Buddhism and contemporary science, which is further elaborated upon subsequently in this article.

3. Da An's Apologetic Discourse of the Compatibility between Pure Land Buddhism and Science

In Da An's works, he often employs theoretical physics theories such as superstring theory, relativity, time travel, quantum mechanics, and mass-energy interconversion to elucidate the enigmatic elements in Pure Land Buddhist texts. Da An posits that certain seemingly miraculous aspects within these texts do not contradict theoretical physics. He even asserts that some divine occurrences within there texts signify that principles of physics still residing in theoretical speculation on Earth have already been substantiated and can be freely employed by the deities in the Pure Land of Sukhāvatī. The subsequent discourse will illustrate through several instances the manner in which Da An employs a particular principle of theoretical physics to elucidate the paranormal aspects of Pure Land Buddhist texts.

3.1. The "High-dimensional Space" Elucidated in Pure Land Buddhist Texts

In the opinion of Da An, the accounts found in Pure Land Buddhist scriptures align seamlessly with the high-dimensional space hypothesis put forth by contemporary theoretical physics. Presently, the high-dimensional space hypothesis primarily stems from superstring theory. According to this theory, in order to unify the established laws of physics in a logical manner, it is imperative to postulate that the dimensionality of space is fixed at ten. (Kaku 1995, p.172) Michio Kaku points out that higher-dimensional space has become the last refuge for mystics, cranks, and charlatans given the difficulty of observation and comprehension of higher-dimensional space from individuals situated in a three-dimensional world. (Kaku 1995, p. 23) The concept of high-

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dimensional space often serves as a pretext for Buddhists to validate the "rationality" of enigmatic aspects of Buddhism. For instance, the modern Chinese scientist, Huang Nianzu 黃念祖(1913-1992), who is devoted to Buddhism, posits that as the dimensionality of space increases, its realm becomes increasingly unfathomable. Hence, scientific discourses on high-dimensional spaces can mitigate societal confusion about some unfathomable elements within Buddhism. (Huang 2002, p. 22) Similarly, Da An endeavored to elucidate the supernatural and enigmatic content in Pure Land Buddhist texts via the concept of high-dimensional space.

According to Da An, high-dimensional spaces are described in Pure Land scriptures. He illustrates this in terms of *The Sutra on Contemplation of Amitayus* (guan wuliangshou jing 觀無量壽經), where Shakyamuni Buddha, upon being requested by Queen Vaidehi, emanates a golden light from his eyes that shines across infinite worlds. An immense platform of light manifests at the top of the Buddha's head. The virtuous territories of all Buddhas are reflected within this platform, enabling Queen Vaidehi to witness and select her desired afterlife realm. In *The Immeasurable Life Sūtra* (wuliangshou jing 無量壽經), before Shakyamuni Buddha proclaimed the Pure Land teachings, he first dispatched an extraordinary display of light that manifest numerous Buddha realms in its radiance. During this teaching session, Ananda desired to witness Amitabha firsthand. As per Shakyamuni Buddha's request and in reverence, Ananda turned westward with clasped palms and a respectful kneeling demeanor. Instantaneously, Amitabha appeared suspended in space, emanating an infinite glow from his palm. At this moment, all Buddha realms, celestial palaces, and even the realms of hungry ghosts, hells, and netherworlds were vividly revealed. (Da An 2006, p. 296) Da An proclaims that the manifestation of various supernatural worlds in the Buddha's light and light platform is not solely a creation from Buddha's divine powers. Rather, it serves as an affirmation of the existence of high-dimensional spaces. These supernatural realms are spaces within higher dimensions that are coexisting with our own current world but are simply unseen by beings residing within this world. (Da An 2006, p. 296)

According to Da An, the existence of these supernatural realms concurrently with this world, yet unseen by ordinary individuals, can be elucidated through the concept of superstring theory:

> The superstring theory posits that there exist ten dimensions (or, occasionally, eleven dimensions) of spacetime. If that were the case, one could not resist pondering: where is the six remaining dimensions apart from our discernible four? To address this issue, the superstring theory introduces a concept called "compactification", suggesting that these other six dimensions are exceedingly compacted into a single point. Such points, in fact, are omnipresent within our three-dimensional space. This implies that those six dimensions are indeed present, but we simply fail to perceive them. Superstring theory is substantiated through purely mathematical methods, which evidently extend far beyond the conventional realm of empirical knowledge. In *The Avatamsaka Sutra*, it is frequently described that "in a mere speck there exists an unfathomable number of lands, each land contains an immeasurable multitude of Buddhas, and each Buddha is surrounded by an incalculable quantity of Bodhisattvas." Such vastness is encompassed within a speck or even within one pore of Samantabhadra Bodhisattva. In this light, superstring theory's proposition of multiple dimensions coiling into a compact point does indeed exhibit a tendency to align with the tenets of Buddhist scriptures. (Da An 2018, pp. 53-54; self-translation)

It becomes evident that Da An asserts that the supernatural realms in Pure Land Buddhist scriptures are higher dimensional worlds. To perceive them within this three-dimensional space, additional rigidly compacted dimensions must be unfolded. He postulates that Buddhas and Bodhisattvas in Sukhāvatī already possess the capacity to unfold other compacted spatial dimensions and move freely within multidimensional spaces:

> The Buddhas and Bodhisattvas in Sukhāvatī are capable of remaining static and simultaneously manifesting in various dimensions of spaces to enlighten sentient beings. The Sukhāvatī possesses no confinement of space. Each particle possesses infinite splendor of lands of the ten directions. Each tree displays the boundless Buddha lands of the ten directions. The immensity and narrowness of space can be regulated freely and coexist

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> seamlessly. The Sukhāvatī represents a realm of the Dharma Realm, which also encompasses the Dharma Realm and permeates the Dharma Realm. (Da An 2006, p. 296; self-translation)

The current impasse in verifying superstring theory lies in its essence as mere deductions from mathematical formulas and models, with human instruments incapable of observing strings and other spatial dimensions. According to Da An's perspective, the Buddhas and Bodhisattvas in Sukhāvatī have apparently verified the deductions of multi-dimensional space in superstring theory and can freely utilize it to unfold the dimensions that are curled up. Da An postulates that the Buddhas of the Pure Land can traverse multidimensional spaces freely, potentially rooted in the belief that the Buddha is omniscient. The scriptures of Mahayana Buddhism affirm the notion of the Buddha's omniscience and omnipotence. (Guang Xing 2005, p. 75) Da An likely believes that due to the omniscient nature of Amitabha, the chief Buddha of the Pure Land of Sukhāvatī, it is naturally within his capacity to comprehend and utilize the "fundamental principles" of high-dimensional space. As sentient beings who have not yet attained Buddhahood, they naturally lack this capacity. Thus, Da An fervently believed that upon attaining reincarnation in the Pure Land of Sukhāvatī, one could comprehend the truth of the high-dimensional space and acquire the capacity to traverse freely through various spatial dimensions. (Da An 2006, p. 296)

As evident, Da An has endeavored to demystify certain miracles within Pure Land Buddhist texts, advancing a viewpoint that these would be deemed as "scientific," if the high-dimensional space posited from theoretical physics were indeed tangible. This furnishes him with a compelling argument against prevalent public perception of Buddhism as superstitious and anti-science. The assertion of high-dimensional space, although postulated via intricate mathematical manipulations within string theory, is presently untenable due to the lack of conclusive evidence. This circumstance presents Da An with an abundance of interpretive latitude and facilitates his exaltation of Pure Land teachings as superior to theoretical physics - theories that are currently unverifiable by physics but have been fully validated and actualized by the divine entities in Pure Land texts.

3.2. The Relativity of Time and Time Travel Illustrated in Pure Land Buddhist Texts

Da An asserts that the theory of relativity of time and the concept of time travel in theoretical physics are manifest within Pure Land Buddhist texts. In modern times, Einstein's theory of relativity postulates that time and space are not absolute. For objects moving at a specific velocity, there is an effect known as "time dilation". For instance, the passage of time for individuals in a moving vehicle appears to be slower when compared to an individual standing motionless outside the vehicle. In daily life, this effect is hardly noticeable, however it becomes increasingly distinct when the speed is approaching the speed of light. (Greene 2000, p. 27) Since modern time, a number of theoretical physicists have proposed hypothetical feasibility for time travel. For instance, in I937, W. J. Van Stockum hypothesized an infinite, spinning cylinder. He postulated that if such a cylinder spun around at or near the speed of light, it would drag the fabric of space-time along with it. Anyone brave enough to travel around the cylinder would be swept along, attaining fantastic speeds. If the individual was exceeding the speed of light, he would have the potential to revisit past temporal points. The faster the cylinder spun, the further back in time one would go. (Kaku 2004, p. 128)

Currently, studies examining the juxtaposition and dialogue of relativity in physics and Buddhism often delve into the alignment between the relativity of everything elucidated by the doctrine of emptiness in Buddhism and Einstein's theory of relativity. (Mansfield1990; Finkelstein 2003) To date, the exploration of interactions between Buddhist perspectives of time and Einstein's theory of relativity remains sparse. Furthermore, research that amalgamates Buddhist principles with speculative time travel in physics is exceedingly scarce.

Da An points out that these astonishing concepts and hypotheses like time travel within theoretical physics are merely a facet of the commonplace experiences in the Pure Land of Sukhāvatī, where inhabitant "can transcend time, control time at will, or condense an infinite number of kalpas into a single instant, or extend a single instant into an infinite number of kalpas; or traverse from past kalpas into the future; or from present kalpas into the past; or from future kalpas into the present, unifying the past, present and future."(Da An 2006, p. 298)

 doi:10.20944/preprints202405.2039.v1

According to Da An, the Pure Land Buddhist classics also encompass content concerning the relativity of time, transcendence of temporal constraints and liberty to journey freely within time. For instance, Da An points out that within *The Immeasurable Life Sūtra*, Shakyamuni Buddha extols the virtues of all Buddhas to the attendees: "With the duration of merely one meal, he is capable of existing in a duration spanning over a hundred thousand kotis of kalpas." Da An contends that this appears to attest to the virtues of a Buddha's transcendence of temporal constraints and oneness of an instant and a kalpa (nianjie yuanrong 念劫圓融).(Da An 2006, p. 298) He articulated that the saints residing in the Pure Land of Sukhāvatī have the capacity to promptly escort a believer into the Pure Land of Sukhāvatī upon their death, owing to their transcendental abilities which surpass temporal limitations. They can discern precisely the past, present, and future occurrences across all worlds. They are also capable of predicting when sentient beings from every direction will attain enlightenment, be liberated, or achieve rebirth in the Pure Land of Sukhāvatī. (Da An 2006, p. 298) Furthermore, Da An opines that the Pure Land Buddhist scriptures demonstrate that the inhabitants of Pure Land of Sukhāvatī have transcended temporal constraints as they can instantly travel to various Buddha realms and offer homage to the Buddhas. Upon their return, they reappear in Sukhāvatī within a fleeting moment, which is testament to their liberation from time's shackles. (Da An 2006, p. 298)

According to Da An's interpretation, the Pure Land Buddhist texts not only illustrate the relativity of time to inhabitants of the Pure Land of Sukhāvatī, but also validate this notion among Pure Land Buddhist practitioners. For instance, though the Pure Land of Sukhāvatī lies a staggering distance of ten million billion Buddha realms from Saha world, upon death, devotees are escorted by Amitabha and instantly ascend to the Pure Land of Sukhāvatī. Da An contends that this exemplifies that for those engaged in Pure Land Buddhist practices, temporal boundaries cease to exist. (Da An 2006, p. 298)

In this light, Da An posits that comprehending the theories pertaining to time within contemporary natural science can significantly aid in understanding the profound realms of the Pure Land of Sukhāvatī; meanwhile, the realm of transcending temporal constraints as demonstrated in the Pure Land of Sukhāvatī has significant implications for contemporary scientific exploration of time. (Da An 2006, p. 299)

In fact, as elucidated in Pure Land texts, inhabitants of Sukhāvatī are capable of Instantaneous displacement solely due to their possession of an extraordinary divine power known as "divine leg (shenzu tong 神足通)" . This is distinct from Da An's assertion that it represents a transcendence of temporal constraints. In Buddhist parlance, "divine leg" denotes a supernatural ability to traverse at high speed. (Wu 1992, p. 132) *The Immeasurable Life Sūtra* illuminates that the inhabitants of Sukhāvatī harbor this specific capacity. This text stipulates that Amitabha, prior to his enlightenment, pledged a vow: "If, when I attain Buddhahood, all celestial beings in my land should not possess the supernatural power of "divine leg" which allows them to travel anywhere in one instant, even beyond a hundred thousand koṭīs of nayutas of Buddha-lands, may I not attain perfect enlightenment."(Chen 2008, p. 54) In contrast, Da An views the capability of inhabitants in Sukhāvatī to instantaneously traverse anywhere as a realization of the postulation of altering time duration within theoretical physics. he displays an inclination towards "demystifying" and "scientizing" these enigmatic elements within Pure Land Buddhist literature.

3.3. The Convergence of Quantum Mechanics and the Miracles in Sukhāvatī

According to Da An, narratives within the Pure Land classics also echo several propositions of quantum mechanics, such as quantum entanglement the Uncertainty Principle. Presently, several dialogues between Buddhism and quantum mechanics tend to focus on the correlation of the concept of emptiness with certain principles within quantum mechanics. (Balasubramaniam 1992; Bhatt 2019) Da An predominantly utilizes several principles of quantum mechanics to elucidate some divine narratives within Pure Land classics.

First, Da An endeavors to erect a communicative bridge between quantum entanglement and Pure Land teachings. Theoretical physicists have elucidated that the motions of subatomic particles

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are dominated by entanglement. It starts when they interact; in doing so, they lose their separate existence. No matter how far they move apart, if one is tweaked, measured, observed, the other seems to instantly respond, even if the whole world now lies between them. (Gilder 2009, p. 3) Modern physicists have proposed various hypotheses to explain this phenomenon, yet no definitive conclusion has been reached as of yet. (Gilder 2009, pp. 34-21) Da An has elucidated,

> Physicist Niels Bohr postulated that if a particle were to be bisected into two halves, the two subatomic particles would perpetuate reciprocal motions (one rotating clockwise, and another counterclockwise), moving to infinite distances (such as the cosmic extremities). If scientists were to observe one of these particles, it is proposed that this act of observation would prompt an immediate reaction from its counterpart particle which then would exhibit symmetric reactions (reactions of both positive rotation and negative rotation). This prediction by Bohr was corroborated by Alain Aspect's 1982 experiment, demonstrating the existence of a superluminal connection between distant spacetime regions. Two disjunct particles situated at opposite ends of the universe can somehow form a unified organic entity in real time, exhibiting instantaneous response. This experimental finding, which has left the scientific community perplexed and astounded, appears quite natural when viewed through the Buddhist len of "One dharma encompasses all dharmas (yifa ju yiqiefa 一法具一切法)" and holographic interpenetration theory. (Da An 2006, p. 299; self-translation)

"One dharma encompasses all dharmas (yifa ju yiqiefa 一法具一切法)" represents a tenet of Huayan Buddhism, often referred to as "the one is the all (yiji yiqie 一即一切)". In accordance with this doctrine, every single phenomenal instantiation of existence both contains, and is contained by, all other instantiations, so that one existence is subsumed by all existences and all existences by one existence; in this vision, all things in the universe are thus mutually creative and mutually defining. Each phenomenon constitutes a part of an organic whole that is defined by the harmonious relationship between each and every member: just as the whole is defined by all of its independent constituents, each independent constituent is defined by the whole with which it is integrated. (Lopez and Buswell 2014, p. 291) From this, it is evident that Da An asserts that quantum entanglement exemplifies the teachings of Huayan Buddhism pertaining to the interconnectedness between all entities, with such interconnection originating from the fact that every single entity in the cosmos reflects and encapsulates the attributes and information of the entire universe.

According to Da An, this concept of "the one is the all" is echoed in the texts of Pure Land Buddhism, notably in *The Sutra On Contemplation of Amitayus*. Da An points out, portions from *The Sutra On Contemplation of Amitayus* embodies the realm of infinite mutual penetration and mutual determination amongst all entities. For instance, this scripture articulates: "The Amitabha possesses eighty-four thousand physical characteristics, each having eighty-four thousand secondary marks of excellence. Each secondary mark emits eighty-four thousand rays of light; each light shining universally upon the lands of the ten quarters, embracing, and not forsaking, those who are mindful of the Buddha." (Da An 2006, p. 300) Similarly, Da An points out this sutra also signifies that Amitabha and infinite Buddhas in all directions are pervasively inter-connected. For instance, this scripture says, "When you see Amitabha, you will also see innumerable Buddhas of the ten quarters. Having visualized these innumerable Buddhas, you will receive from each the prediction of your future Buddhahood. This is the general perception of all the physical characteristics of the Buddha." (Da An 2006, p. 300)

As Da An posits, the concept of quantum entanglement or interconnectedness of all things is a novel idea in contemporary natural science. It transcends everyday experiences and has yet to be universally accepted by the populace. However, if avant-garde scientists can derive inspiration from the realm of Pure Land Buddhism, it may prove beneficial for the advancement of contemporary avant-garde science. (Da An 2006, p. 301)

Furthermore, Da An has endeavored to establish a correlation between the Uncertainty Principle of quantum mechanics and the tenets of Pure Land Buddhism. Modern theoretical physicist Werner Heisenberg proposed one can never know simultaneously, no matter how sensitive the measuring devices are, the exact position and velocity of a single electron. one can know one condition or the

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other, but not both at the same time. This is called Heisenberg's Uncertainty Principle. (Kaku and Thompson 1995, pp. 49-50) Niels Bohr utilized the complementarity principle to illustrate the operation of atomic and subatomic entities. This tenet elucidates that position and momentum, or wave and particle properties, are incapable of being observed or measured simultaneously; when one existed fully, its complement did not exist at all. (Gilder2009, p. 5) Da An possesses a certain comprehension of this physics concept and endeavors to reconcile it with Buddhist tenets:

> Heisenberg's Uncertainty Principle suggests that it is impossible to precisely ascertain both the position and velocity of an atomic particle with any predetermined degree of accuracy…Fundamental particles exhibit wave-particle duality. Depending on the observer's intent and methodology of observation, these particles may manifest as waves or particles. When one state is observed, the other becomes obscured; conversely, when the latter is observed, the former becomes concealed, demonstrating the coexistence of the hidden and the manifest (yinxian jucheng 隱顯俱成). (Da An 2006, pp. 301-2; self-translation)

Herein, Da An's concept of "the coexistence of the hidden and the manifest (yinxian jucheng 隱顯俱成)", is derived from the teaching of "the ten mysteries (shi xuanmeng 十玄門)" of Huayan Buddhism. The idea of "The ten mysteries" illuminates the interconnected, interdependent, and harmonious coexistence of all things from ten distinct perspectives. (Liu 2006, p. 99) Among these, "the coexistence of the hidden and the manifest" constitutes a pivotal perspective. According to Da An, quantum mechanics denotes that when one state of an atomic or subatomic entity is manifested, another state becomes concealed, and vice versa, mirroring the notion of "the coexistence of the hidden and the manifest".

Da An elucidates that "the coexistence of the hidden and the manifest" is illustrated in Pure Land Buddhist scriptures:

> The scriptures of the Pure Land Buddhism often employ a portrayal of the coexistence of the hidden and the manifest. In *The Immeasurable Life Sūtra*, Ananda, upon receiving instruction from the Buddha, prostrates towards the west in an attempt to see Amitabha. At this juncture, Amitabha's radiant light is very brilliant, which resembles a golden mountain, manifesting in the void of the assembly. Simultaneously, the lights of the arhats, bodhisattvas, and holy beings are obscured, and the radiance of all things fades as if gathered into a pool of ink. This mirrors the coexistence of the hidden and the manifest, akin to the moon emerging amidst stars. The waters of the Pure Land can disseminate an infinite number of Buddhist teachings. Despite being just one water, it can expound numerous profound doctrines simultaneously and concurrently... Those who bathe in these waters each hear the dharma they wish to hear, they can manipulate at will whether or not those voices are audible. For those wishing to hear, the water waves will articulate sublime Buddhist teachings; for those who do not wish to hear, the water remains silent. This is also true for the manifestations of buddha-lands the ten directions that appear amidst the jewel trees, on the ground, and on the pillars. If one wishes to observe other buddha-lands, they are instantly reflected on the pillars and jewel trees; if not, there is nothing to be seen. Music, precious incense, etc., all possess the virtues of the coexistence of the hidden and the manifest, manifesting according to one's thoughts. (Da An 2006, p. 303; self-translation)

Da An elucidates that the aforementioned transcendental phenomena in the realm of Sukhāvatī, where objects can manifest or vanish at will, are corroborated by the principles of quantum mechanics. He further asserts that comprehending the core tenets of quantum mechanics can foster faith in the tangible existence of Sukhāvatī. (Da An 2006, p. 303)

It becomes evident that quantum mechanics illustrates that atoms and subatomic particles can adopt a specific configuration as per an individual's observational intent, akin to the narratives in Pure Land scriptures in which entities can manifest corresponding forms based on the subjective intention of its inhabitants. Consequently, quantum mechanics is employed by Da An as a tool to "scientize" certain supernatural narratives within the Pure Land Buddhist texts.

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3.4. The Interconversion of Matter and Energy within Sukhāvatī

Finally, Da An has declared the presence of records pertaining to interconversion of matter and energy as proposed in modern physics within the texts of Pure Land Buddhism. In modern time, Albert Einstein showed that matter and energy are unified and hence can change into each other. If an object becomes heavier the faster it moves, then it means that the energy of motion is being transformed into matter. The reverse is also true—matter can be converted into energy. Einstein computed how much energy would be converted into matter, and he came up with the formula $E = mc^2$, that is, even a tiny amount of matter m is multiplied by a huge number (the square of the speed of light) when it turns into energy E. (Kaku 2004, p. 33) Da An possesses a certain degree of comprehension in this regard:

> In 1905, Einstein postulated the equation of mass-energy conversion: $E = mc^2$. This formula illuminates that matter is latent energy and energy is liberated matter; despite their contrasting phenomena, they have an identical essence. Hence, a process of reciprocal transformation between mass and energy is conceivable. The successful development of nuclear weapons validated in practice that minute quantities of mass can release immense amounts of energy. Converting energy into matter is theoretically possible as well, although it remains beyond the capacity of current human technology to actualize on Earth. (Da An 2006, pp. 303-4; self-translation)

Da An postulates that although the humankind remains incapable of converting energy into matter in practice, residents of the Pure Land of Sukhāvatī allegedly accomplish this effortlessly：

> The celestial beings and holy individuals of Sukhāvatī possess the capability to freely transform matter into energy and then concurrently convert energy back to material. For instance, when their thoughts turn to refueling with food, a jade vessel filled with various delicacies will manifest instantaneously (mater transformed into energy). Once satiated, the vessel vanishes seamlessly (matter reverting back to energy) without the slightest need for cleaning labor. Their dwellings and attire, including ornaments and tassels, are all conjured at will. To extend offerings to the Buddha across the ten directions, an array of offerings such as incense, flowers, canopies, etc., materialize in their hands. The inhabitants of this pure land, devoid of existential pressures and anxieties, are solely focused on spiritual cultivation, reveling in boundless freedom. (Da An 2006, p. 304; self-translation)

Since modern times, various advocates for Buddhism frequently perceive Einstein's theory of interconversion of matter and energy as capable of offering crucial validation to some fundamental tenets of Buddhism. For example, the Tibetan monk Gendun Chompel (1903–1951) has claimed that Einstein's equation $E = mc^2$ provides powerful empirical confirmation of the fundamental Buddhist insight on the ever fluctuating, impermanent nature of things. (Jinpa 2003, p. 73) Similarly, Da An sought to argue that as long as the transformation of energy and matter is feasible, certain enigmatic narratives in Pure Land texts could also be deemed "scientific," obviating any perceived mystery. Simultaneously, he proclaims that Sukhāvatī is a realm featuring "ultra-high scientific technology" surpassing even the most advanced earth science and techniques (Da An 2006, p. 305), demonstrating the superiority of Pure Land teachings over science.

4. Conclusions

In conclusion, faced with the formidable challenge posed by contemporary science towards public acceptance of Buddhism, Da An endeavors to employ science as a conduit for propagating Pure Land teachings, seeking to accommodate the preferences of scientifically inclined individuals. He utilizes several concepts of theoretical physics concepts to elucidate some enigmatic components within Pure Land Buddhist scriptures. Through his endeavour, he seeks to validate that certain ostensibly miraculous narratives within these texts are not incompatible with contemporary science. Further, he asserts that certain divine occurrence detailed therein indicate that some physical principles still residing in theoretical conjectures on Earth have already been validated and and can be utilized at will by the celestial beings in Sukhāvatī, thus advocating the superiority of Pure Land

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teachings over science. Notably, it is precisely because much of the physics content he employs remains hypothetical and unsubstantiated to date, which affords him more latitude to interpret and demonstrate the "scientific nature" of Pure Land teachings.

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