The Scientific Exegesis of Terminology in the Buddhist Scripture

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Abstract: The study and dissemination of Buddhism are two sides of the same coin of the exegesis of Buddhist scriptures. This paper sought to investigate the interpretation of Buddhist scriptures through two distinct approaches.

Firstly, Buddhist scriptures often contain metaphorical usage of scientific concepts. It was argued that by making use of popular science, a deeper comprehension of these scriptures could be attained, leading to a profound realization of dharma within its appropriate context. Secondly, by using popular science as an analogy to elucidate the teachings of Buddha, a better understanding of Buddhism could be fostered in modern societies that highly value science, resulting in a more effective dissemination of Buddhism.

This paper examined four scientific terms mentioned in the *Diamond Sūtra*, aiming to uncover the underlying concepts they represent. Additionally, it presented three examples from contemporary science that illustrated the philosophy of Emptiness (interconnectivity of polarities) embedded in the sūtra. Furthermore, by applying the notion of interconnectivity, it was possible to bridge the physical and mental domains, thereby enhancing the practicality of Buddhism. My argument was based on Model-Dependent Realism.

Keywords: Falsification Principle, Geometric Series, Conformal Cyclic Cosmology, Dialectics, Model-Dependent Realism, Place-value Principle

Preface

It is conceivable that one may already possess some basic understanding of the subjects presented in science classes. However, the question of 'what is science?' proves to be a more complex matter to address. I suggest that science, in practice, can be defined as a knowledge system that relies on observation, experimentation, inference, and verification. Initially, science was employed in the Western world to comprehend the laws of nature and astronomy. More recently, it has been utilized to unravel the intricacies of the human mind and brain.

In the twentieth century, philosopher Karl R. Popper introduced the Falsification Principle as a definition of science. According to this principle, scientific theories should be capable of being refuted through experimentation, rather than solely confirmed through verification.[1] While this theory gained popularity for a time, it solely pertains to the pivotal moments of scientific theories and fails to encompass the entirety of the scientific research process. Hence, I shall refrain from delving into it further. Ultimately, whether a theory is proven or disproven rests on factual evidence and experimental findings. Thus, there is no need for an excessive use of words to define science, which tends to neglect the essential while only pursuing superficial dimensions.

I argue that our focus should be directed towards the utilization of factual evidence for exegesis. For instance, in ancient Greece, Empedocles classified the constituents of the physical world into four elements: earth, water, air, and fire.[2] This notion had a profound influence on the development of Western science for an extended period. Similarly, the Four Great Elements (earth, water, fire, and wind) in ancient India symbolically depicted the three states of matter and energy: solid, liquid, gas, and thermal energy. Someone with a secondary school education can perceive this scientific notion. However, if the understanding of these concepts is solely limited to

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1 Popper, *Conjectures and Refutations*, 48.

2 Heisenberg, *Physics and Philosophy*, 64.

philosophical and literary approaches (as a Buddhist dictionary may offer explanations spanning 1,850 words), it becomes quite stressful, particularly for readers untrained in literary basics.

This paper suggests that the integration of scientific knowledge, in conjunction with literary and philosophical knowledge, can profoundly augment the comprehension and efficiency of Buddhism's dissemination. This paper aims to substantiate this proposition by dividing it into three distinct sections. The first section draws upon four examples from Kumārajīva's (Ch. Jiumoluoshi 鳩摩羅什, 344–413) translation of the *Diamond Sūtra* (Ch. *Jin'gang jing* 金剛經, *T* no. 235) to illustrate that the utilization of scientific terms as metaphors was a prevalent practice in ancient India. Significantly, these scientific notions not only align with modern science but also serve as catalysts for inspiring profound contemplation and understanding of Buddhism. The second section employs three scientific examples as analogies to interpret the principal underlying theme of the sūtra: Emptiness. Thus, this section will provide an exegesis of its philosophy in a more substantiated manner. Finally, the third section encompasses the conclusion. It reveals that by applying scientific knowledge, not only can we substantiate the comprehension of Dharma through an exploration of scientific terminology within Buddhist scriptures, but also be more efficient in disseminating Buddhism in the modern era.

1. Exegesis of the Scientific Terms in Buddhist Scriptures

The *Diamond Sūtra* is a well-known Buddhist scripture among the Chinese populace. Due to the constraints of this paper's scope, I shall refrain from providing an extensive introduction to the sūtra. However, it is worth noting that this scripture contains numerous scientific elements that are often overlooked. The following discussion will be based on some examples from the Chinese version translated by Kumārajīva.

1.1 The Three Realms

> All sentient beings, whether born from eggs, or from wombs, or from moisture, or from spontaneity; whether they have forms or do not have forms; whether they have perceptions or do not have perceptions; whether they have neither perceptions nor non-perceptions, I will lead them all to the ultimate Nirvana to be completely extinguished. 所有一切眾生之類, 若卵生、若胎生、若濕生、若化生, 若有色、若無色, 若有想、若無想、若非有想非無想, 我皆令入無餘涅槃而滅度之.[3]

The phrase 'born from eggs, or from wombs, or from moisture, or from spontaneity' mentioned in the citation reflects the primitive observation made by ancient Indians regarding biological reproduction which categorized the four ways in which life comes into being. Buddhism further divides the activities of life into three levels: the desire realm (born from eggs...from spontaneity) (欲界), the form realm (have forms) (色界), and the formless realm (not have forms) (無色界), collectively referred to as the 'three realms of existence' (三界). This classification enables us to observe various mental activities in a more systematic manner, and finds relevance in the modern and ancient contexts as well. For example in a modern context, Popper also divided the world into three levels:

> In this pluralistic philosophy, the world consists of at least three ontologically different sub-worlds. Or, as I shall say, there are three worlds: the first is the physical world or the world of physical states; the second is the mental world or the world of mental states; and the third is the world of intelligible, or of idea in the objective sense; it is the world of possible objects of thought: the world of theories in themselves, and their logical relations, arguments in themselves, and problematic situations in themselves.[4]

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[3] *Jin'gang jing*, *T* no. 235, 8: 0749a06–09. Unless otherwise indicated, all English translations are the author's own.

[4] Popper, *Objective Knowledge*, 154.

In Popper's proposition, the first world is the physical world, while in Buddhism it is the desire realm, which satisfies biological instincts. The second world, in his proposition, is the world of mental states, while in Buddhism it is the form realm, which is the level of focused mental and physical activities. The third world, in his proposition, is the world of theoretical thought, while in Buddhism it is the formless realm, which is devoid of tangible objects and is the level of pure conceptual concerns. It may be difficult to define or distinguish these worlds using mere words. Here, we borrow a metaphor from the ancient Greek mathematician Pythagoras to explain the three levels of mental activity, which may help readers to better understand them.

He once said:

> In this life, there are three kinds of men, just as there are three sorts of people who come to the Olympic Games. The lowest class is made up of those who come to buy and sell, the next above them are those who compete. Best of all, however, are those who come simply to look on. The greatest purification of all is, therefore, disinterested science, and it is the man who devotes himself to that, the true philosopher, who has most effectually released himself from the 'wheel of birth.'[5]

The ancient Greeks used to refer to science as natural philosophy. Like Indians, they were also believers in reincarnation. Pythagoras believed that if a philosopher could reach the level of 'disinterested', then they could transcend reincarnation. On the other hand, Buddhism believes that within the three realms there is no radical liberation, and one has to cultivate mindfulness in order to embark on the path of liberation; otherwise, thoughts will still be contaminated with delusions and not be purified thoroughly.

It is imperative to note that the translation and analogy of Buddhist terminology should not be expected to correspond exactly, as there are cultural differences between different eras and regions. Hence, it is essential to analyze these terms from various perspectives

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[5] Russell, *A History of Western Philosophy*, 41.

to grasp their significance within relevant cultural contexts. This approach will enable our understanding to be deeper and have more comprehensive coverage.

1.2 A Thousand-to-the-Third-Power Great World

> Subhuti, what do you think? If someone filled the a thousand-to-the-third-power great world with the seven treasures and gave them away as offerings, would his merit gained be great? 須菩提! 於意云何? 若人滿三千大千世界七寶以用布施, 是人所得福德, 寧為多不?[6]

The 'a thousand-to-the-third-power great world' mentioned in the scripture does not refer to the number of three thousand as the Chinese translation may suggest, but rather to a thousand-to-the-third-power; namely, a billion. The *Aṅguttara Nikāya* collection III, sutta 80 says:

> The Blessed One said this: 'A thousand times the world in which the sun and moon revolve and light up the quarters with their brightness is called a thousandfold minor world system. In that thousandfold world system, there are a thousand moons, a thousand suns...
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> A world that is a thousand times a thousandfold minor world system is called a thousand-to-the-second-power middling world system.
>
> A world that is a thousand times a thousand-to-the-second-power middling world system is called a thousand-to-the-third-power great world system.
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> Ānanda, the Tathāgata can convey his voice as far as he wants in a thousand-to-the-third-power great world system.'[7]

The expression is used to show the numeric growth of a geometric series, of which the mathematical concept is much more complex than basic arithmetic. Moreover, I argue, the complexity of the con-

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[6] *Jin'gang jing*, *T* no. 235, 8: 0749b18–19.

[7] Bhikkhu Bodhi, trans., *The Numerical Discourses of the Buddha*, 313.

cept can affect one's worldview.

Isaac Newton (1642–1727) titled his seminal work *Mathematical Principles of Natural Philosophy*, commonly known as *Principia*. Galileo Galilei (1564–1642) believed that the book of nature was written in the language of mathematics. Pythagoras (ca. sixth–fifth c. BCE) proclaimed that all things were numbers. Whether their assertions are valid or not, it is certain that mathematical concepts can significantly influence our understanding of natural philosophy and the universe. If one is able to grasp the concept of geometric series, it is not difficult to reckon that the universe is similarly composed of hierarchies such as planetary systems, galaxies, and clusters. On the contrary, if mathematical concepts are confined to an arithmetic level, it may be difficult for the mind to develop the corresponding hierarchical complexity. This confinement may reduce one's imagination and acceptance of science, and even lead to resistance and suppression. For instance, Giordano Bruno (1548–1600) proposed a revolutionary cosmological view in the medieval period, arguing that the universe was boundless and without any fixed centre; the world is one of multiple, and Earth was just one of the planets orbiting the Sun, which is but one of countless stars in the cosmos. Although his ideas align with modern cosmology, they conflicted with the theology of the time (a single world with a centre), and he was deemed a heretic by the Church and burned at the stake in Campo de Fiori in Rome.[8] Comparatively fortunate was Galileo, who, after signing a recantation document acknowledging that the Earth does not move, was placed under house arrest until his death in 1642 (the same year Newton was born). In 1992, the Roman Catholic Church officially admitted that the trial of Galileo had been a mistake.[9]

Science demands objectivity, while Buddhism emphasizes equality and inclusivity. Buddhism suggests we see ourselves as part of the universe and therefore must abide by the laws of the cosmos. Failure to do so would result in facing the consequences (another set of laws of morality). Conversely, one should not view oneself as the centre

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[8] White, *The Pope and the Heretic*, 181

[9] Hawking and Mlodinow, *The Grand Design*, 56.

of the universe and attempt to bend the cosmos to fit one's subjective views. Such an approach distorts our worldview, obstructs the progress of knowledge, and eventually brings additional suffering to humanity.

1.3 Counting the Ganges Sand

> Like the number of all the grains of sand of the Ganges, there is the same number of the Ganges. The number of worlds of the Buddha is the same as the number of all the grains. Aren't the worlds of Buddha plentiful? 如一恒河中所有沙, 有如是等恒河, 是諸恒河所有沙數佛世界, 如是寧為多不?[10]

This passage uses the number of grains of sand as an analogy to describe the vastness and infinity of existence. Again, it employs the concept of geometric series, which involves exponential growth. The text needs no further explanation. The Chinese idiom 'as numerous as the sands of the Ganges' (恒河沙數), is derived from Buddhist scriptures, similarly denotes an immeasurable and vast quantity, even though the wording of the idiom itself does not explicitly convey the concept of geometric series.

1.4 Kalpa

> Subhūti, if there are men and women of good family, they give alms in the number of Ganges sand of their forms in the first of a day, in the number of grains of Ganges sand of their forms in the middle of a day, and in the number of grains of Ganges sand of their forms in the last of a day. Such an infinite number of kalpa they will give alms of their forms. 須菩提! 若有善男子、善女人, 初日分以恒河沙等身布施, 中日分復以恒河沙等身布施, 後日分亦以恒河沙等身布施, 如是無量百千萬億劫以身布施.[11]

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[10] *Jin'gang jing*, *T* no. 235, 8: 0751b22–24.

[11] *Jin'gang jing*, *T* no. 235, 8: 0750c07–10.

The term 'kalpa' in the scriptures does not necessarily imply a catastrophe but rather signifies the cycle of birth and death of the cosmos. The original meaning of kalpa in Sanskrit is a formation or creation, and often encompasses an extremely long period of time equivalent to the lifespan of the universe (or to that of Brahma: 4.32 billion years). In Indian religions, it is widely believed that the universe has its own cycle of life; namely, arise, abide, decay, and annihilation. This concept appears to have been inferred from the cycle of human life: birth, ageing, illness, and death. Even nowadays, this belief is not uncommon. We still use anthropomorphism to describe nature and revere it as Mother Nature. For example, James E. Lovelock, a former scientist at NASA, proposed the Gaia Hypothesis: all life on the whole Earth and its surface is a self-regulating whole, constituting an interconnected biosphere.[12] Gaia is the respectable Earth Goddess in Greek mythology, holding a very prominent position. From this perspective, one could remark: encountering an epidemic compels humanity to slow down production and reduce carbon emissions, giving the Earth Goddess a brief rest. It seems that no matter whether they are humans, universes, or even elements (radioactive with half-life), they are all under the pressure of cycles of creation and destruction. Returning to the discussion on kalpas, we will talk about the correspondence between its cyclic notion and modern cosmology shortly.

Numerous theories of cosmology with the cyclic lifespan of the cosmos can be found on the internet (search for the keywords 'cycle model'). Of particular note is the book *Cycles of Time: An Extraordinary New View of the Universe* by Roger Penrose, a Nobel laureate scientist. The fifth page of the preface states: 'The expected ultimate fate of our accelerating, expanding universe can actually be reinterpreted as the "big bang" of a new one...'.[13] He proposes a theory of Conformal Cyclic Cosmology (CCC). He uses the term 'aeon' to describe the stages of cosmic evolution, which is indeed the English translation of kalpa, indicating a conceptual similarity between the

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[12] Lovelock, *Gaia*, 11.

[13] Penrose, *Cycles of Time*, v.

two. Those science theories involve very complicated mathematics, which go beyond the comprehension and judgment of laymen. Therefore, I can only provide a brief, metaphorical introduction here: the universe is likened to a 'Big Bounce', oscillating between the 'Big Bang' and the 'Big Crunch', constantly undergoing cycles of creation and destruction. In addition to the 'Big Crunch', three more potential endings of our universe are depicted by scientists, namely, 'Big Chill', 'Modified Big Chill', and 'Big Rip'.[14] In sum, my perception from those theories is that the universe does not have eternal existence and is therefore impermanent. It undergoes the process of arising, abiding, decaying, and annihilating—stages that gradually lead to its extinction. These stages are most unfortunately deemed inevitable.

1.5 Summary I

The *Diamond Sūtra* contains many terms that hold scientific implications. Interpreting them accurately can deepen our understanding of the Buddhist scriptures. These concepts—timeless, yet ever relevant—share significant parallels with scientific discoveries. Therefore, comprehending them can foster open-mindedness and prevent resistance or rejection of science based on religious beliefs. Although it is currently more common to witness the exclusion of faith due to science, there are still instances where science is rejected based on religious beliefs. From the perspective of education, I believe that delving into the concepts of both religion and science not only allows us to uncover their similarities but also promotes their mutual integration, benefiting the development of human civilization. As Einstein aptly stated, 'Science without religion is lame, religion without science is blind'.[15]

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[14] Rees et al., *Universe*, 58.

[15] Jammer, *Einstein and Religion*, 31.

2. The Scientific Exegesis of Emptiness

As Sengzhao 僧肇 (384–414) once eloquently remarked, 'To speak the reality goes against the secular, and adhering to the secular contradicts the reality' (夫談真則逆俗, 順俗則違真).[16] Dharma preachers often face this dilemma. I propose to transcend this predicament by incorporating an understanding of science alongside literature and philosophy. Science may serve as a bridge that connects reality to the secular, as science is commonly used in academia to express reality (at the very least, partial reality) and is readily disseminated in secular society. For acquiring popular science knowledge, documentary videos could be useful, which are more engaging and comprehensive for laypeople. Although people may initially find it challenging, once they grasp the fundamentals of popular science, the teachings in the scriptures will appear more accessible, and they will be better equipped to explain them to others. The following examples use scientific findings as analogies to explain reality in a secular way. Although some readers may feel that this activity is a bit difficult at first, if one grasps the knowledge of popular science, the meanings of the scriptures should become relatively easy and, in turn, easier to expound. Below are illustrations of the concept of Emptiness in the *Diamond Sūtra* by using scientific discoveries.

2.1 Thesis, Antithesis, and Synthesis of Electromagnetism

The principal theme of the *Diamond Sūtra* is usually regarded as a philosophical exploration of Emptiness, as it was praised in its later verses as a way to 'unlearn the notion of self and dharma all of a sudden and thus attain true Emptiness' (頓忘人法解真空).[17] Howev-

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[16] *Zhao lun*, *T* no. 1858, 45: 0151a15–16.

[17] Verses for chanting by the disciples to express their sincerity of dharma seeking added at the end of *Diamond Sūtra* in later days, e.g., in the book *Fojiao jingdian puji congshu zhi zhuyin ban Jin'gang bore boluomi jing* 佛教經典普及叢書之注音版金剛般若波羅蜜經 [The Phonetic Version of the Diamond Sūtra from the Popular Buddhist Classics Series].

er, in the sūtra, no such word 'emptiness' is used explicitly to purport its theme. Therefore, some scholars reckon this is due to the philosophy of Emptiness not yet fully mature in the early period of Mahāyāna Buddhism. Historically speaking, this scenario is indeed plausible. However, considering the edition of the *Mahāprajñāpāramitā Sūtra* (Ch. *Da bore boluomiduo jing* 大般若波羅蜜多經) by Xuanzang 玄奘 (602–664), the *Diamond Sūtra* is the 577th out of 600 volumes, belonging to the ninth of the sixteen assemblies. This indicates that the sūtra belongs to the Prajña School, which has Emptiness as its principal theme. Therefore, it is legitimate to consider the principal theme of the sūtra is Emptiness too.

Since Emptiness has not been explicitly expressed in the *Diamond Sūtra*, how then is the idea purported? The sūtra emphasizes that prajña cannot be conveyed through words nor thoughts. In order to prevent disciples from attaching to linguistic logic and concepts, the sūtra uses a dialectical sentence pattern (thesis, antithesis, and synthesis) to purport the idea. Therefore, it can be reasonably inferred that the emptiness of philosophy manifests itself in the dialectical form of sentences, rather than in their specific content. This is also why it baffles ordinary people, as the sūtra says, 'no dharma to be preached, that is the preaching of dharma' (無法可說, 是名說法).[18] In the sūtra, the Buddha often first raises a thesis, then negates it as antithesis, and finally integrates the two to form a synthesis. For instance: 'All Dharma that was said; are to be Non-Dharma; hence called All Dharma' (所言一切法者, 即非一切法, 是故名一切法).[19] There are over ten repetitions of this sentence pattern in the sūtra on topics like personal growth, adorning the Buddha's land, all hearts, complete body features, and so on. The text of the sūtra implicitly shows that Dialectics is of utmost importance because Emptiness is embodied by it.

Because Dialectics itself is, per se, the negation of linguistic logic,[20]

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[18] *Jin'gang jing*, *T* no. 235, 8: 0751c14–15.

[19] Ibid., 0751b02–03.

[20] Here, Dialectics refers to the sentence patterns reflecting the interconnectivity of polarities, which is opposite to classical logic. The latter concerns pre-

if we simply apply the literary approach to explain those sentence patterns, the explanation will become more abstract. It is also easy to fall into illogicality, like committing the fallacy of tautology or circular reasoning. Can we use examples of science instead of literature to explain Dialectics? Engels might have been the first one to make such an attempt. In his book *Dialectics of Nature*, he proposed the law of mutual penetration of polar opposites, and explained it with scientific evidence:

> Attraction and repulsion. Polarity begins with magnetism, it is exhibited in one and the same body; in the case of electricity it distributes itself over two or more bodies which become oppositely charged.[21]

The book does not directly employ the dialectical logic of thesis, antithesis, and synthesis. Instead, it utilizes the form of 'negation of the negation'. Buddhism refers to it as double negation in the general form of 'neither-A-nor-non-A form', such as 'neither-dharma-nor-non-dharma' (非法、非非法) specified in the *Diamond Sūtra*.[22]

The author goes on to provide several examples and then offers a summary:

> The character of mutual opposites belonging to the thought determinations of reason: polarization. Just as electricity, magnetism, etc., become polarized and move in opposites, so do thoughts. Just as in the former it is not possible to maintain any one-sidedness, and no

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scribed thinking and expression of linguistic concepts: the law of identity, the law of excluded middle, and the law of non-contradiction. These are effective for static objects. However, for ever-changing dynamic phenomena (where A becomes non-A), those laws become obstacles and require dialectic logic to resolve. Modern physics also considers that classical logic is incapable of expressing the reality of the microscopic world. Heisenberg once said, 'In quantum theory this law "tertium non datur" (a third possibility does not exist) is to be modified.' Heisenberg, *Physics and Philosophy,* 181.

[21] Engels, *Dialectics of Nature*, 211.

[22] *Jin'gang jing*, *T* no. 235, 8: 0749b16.

> natural scientist would think of doing so, so also in the latter.[23]

Not only is the statement 'maintain any one-sidedness' applicable to scientists, but it is also applicable to Buddhists (with the practice of non-clinging). Engels therefore praised Buddhists as at a higher stage of development:

> On the other hand, dialectical thought – precisely because it presupposes investigations of the nature, of concepts themselves – is only possible for man, and for him only at a comparatively high stage of development (Buddhists and Greeks), and it attains its full development much later still through modern philosophy – and yet we have the colossal results already among the Greeks which by far anticipate investigation![24]

The use of magnetic polarity—the attractive and repulsive forces between poles—to analogize the dialectical relationship between opposing aspects of phenomena is an illuminating example comprehensible to laypersons. It is indeed impossible to isolate just one pole of a magnet, for however its end is cut, the polarity will persist and retain its two-sided nature.

Buddhism perceives all phenomena as existing interdependently within an intricate network of conditions. This notion is often expounded in the Buddhist verses of Dependent Origination: 'When this exists, that comes to be; with the arising of this, that arises. When this does not exist, that does not come to be; with the cessation of this, that ceases.'[25] The underlying notion of interconnectivity is arguably similar to that of Entanglement in Quantum Mechanics. 'Quantum entities that have interacted with each other remain mutually entangled, however far they may eventually separate spatially.'[26] That implies that closely related subatomic particles retain correlated

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[23] Engels, *Dialectics of Nature*, 213.

[24] Ibid., 223.

[25] Bhikkhu Bodhi, trans., *The Connected Discourses of the Buddha*, 579.

[26] Polkinghorne, *Quantum Theory*, 82.

states—the state of one particle will change accordingly and instantaneously when its entangled partner is observed, regardless of spatial separation. Larry Dossey et al. applied the entanglement property to the interconnectivity of consciousness for discussion:

> Schrödinger, one of the fathers of quantum mechanics, coined the term 'entanglement' (Schrödinger, 1935) and later proposed that the consciousnesses of all individuals are united (Schrödinger, 1969, 1983). 'Entanglement' is a property of a quantum-mechanical system containing two or more components that have once been in contact. Even though they may later be separated, they remain linked in such a way that the quantum state of any one of them cannot be adequately described without full consideration of the others (Schrödinger, 1935). Though resisted by Einstein as 'spooky action at a distance,' quantum entanglement has been demonstrated experimentally, including over kilometer distances (Tittel et al. 1998; Nadeau & Kafatos, 1999, pp. 65-82).[27]

Drawing upon these inquiries, it is justifiable to propose that since all particles in the universe were once contained within a singular black hole, they retain a coherent interconnectivity. A similar proposition can be put forth for human consciousness. In an attempt to bridge the physical and mental domains, Penrose and Hameroff hypothesized the theory of Orchestrated Objective Reduction (Orch OR):

> According to Orch OR, the (objective) reduction is not the entirely random process of standard theory, but acts according to some non-computational new physics (see Penrose 1989, 1994). The idea is that consciousness is associated with this (gravitational) OR process, but occurs significantly only when the alternatives are part of some highly organized structure, so that such occurrences of OR occur in an extremely orchestrated form. Only then does a recognizably conscious event take place. On the other hand, we may consider

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[27] Dossey et al., '12. Consciousness -- What Is It?'.

> that any individual occurrence of OR would be an element of proto-consciousness.[28]

Here, I refrain from delving into their proposition and the concept of proto-consciousness as they remain speculative and lack empirical validation at present. Nevertheless, owing to the constraints of human cognition, individuals are unable to perceive this intricate interconnectivity. Consequently, phenomena are often mistakenly perceived as independent entities with no coherent relationship among them. This is reflected in the law of contradiction in classical logic that A cannot also be non-A. Similarly, magnetism and electricity were once viewed as disparate, with magnetism as A and electricity as non-A. They are seemingly unrelated. However, since the seminal work of Faraday and Maxwell, science no longer considers electricity and magnetism as separate subjects, but integrates them to better comprehend the relationship between magnetic poles and electron spin.[29] In other words, science integrated electricity (the thesis) and magnetism (the antithesis) into a new subject electromagnetism (synthesis) to further deepen the investigation. Linking the A and non-A in this manner to produce a fresh unification mirrors the progression of thesis, antithesis, and synthesis described in the *Diamond Sūtra*, serving likewise to detach from 'maintain[ing] any one-sidedness'.

In Engels' aforementioned quote, the phrase 'so do thoughts' indicates that he already noticed the existence of two different domains of the physical and the mental. This raises the question: what is the relationship between these two domains? Apart from Penrose's Orch OR hypothesis, I suggest a more practical answer: even physical reality needs to be based on cognitive models in the brain. My rationale stems from the Model-Dependent Realism posited by Hawking and Mlodinow. Here, I will make a brief introduction to it. The theory suggests one's perception of reality fundamentally relies on the intrinsic cognition model within one's mind (commonly employed by scientists are mathematical models). Whether something is real

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[28] Penrose and Hameroff, '1. Consciousness in the Universe'.

[29] Greene, *The Elegant Universe*, 23.

or not depends on its observational data aligning with the computations or predictions from the model. In brief, 'reality' is not solely dependent on material particles' objective existence, but rather correlates with the subjective cognition model in the mind. The notion of objective existence is therefore questionable. The authors use quarks as an example for illustration:

> Quarks, which we also cannot see, are a model to explain the properties of the protons and neutrons in the nucleus of an atom. Though protons and neutrons are said to be made of quarks, we will never observe a quark because the binding force between quarks increases with separation, and hence isolated, free quarks cannot exist in nature. Instead, they always occur in groups of three (protons and neutrons), or in pairings of a quark and an anti-quark (pions), and behave as if they were joined by rubber bands.[30]

Hawking illustrates that 'isolated free quarks cannot exist in nature', quarks' existence is considered truthful merely because their observational data conform to the mathematical models in the scientists' minds.

Returning to magnetism and electricity discussed previously, their synthesis in electromagnetism also signifies that Dialectics is not merely an objective description of phenomena, but rather portrays scientists' practices in investigating nature, aptly demonstrating how the cognition model evolves. In other words, the polarity of a positive and negative (A and non-A) is like a cognitive model originating from the mind and projecting upon the external landscape, rendering aspects of humanity and physics more comprehensible.

As the Buddhist idiom says: 'An opacity in the eye makes the sky flowery' (一翳在眼, 空花亂墜).[31] However, the effect of opacity is not entirely negative; it can also be positive. If there was no opacity in the eyes of untrained ordinary people, the world would be too complicated for them to cognize. The Buddhist term 'hindrance by the known'

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[30] Hawking and Mlodinow, *The Grand Design*, 65.

[31] *Liandeng huiyao*, *X* no. 1557, 79: 0070b24.

(所知障)[32] could better be explained by neuroscience: in order to promptly form a certain perception of the external world, the brain needs to block certain information to avoid energy loss caused by excessive processing. This could have an insidious impact on one's cognitive function, which would hinder the holistic comprehension of the object. The philosopher Abraham Kaplan said: 'I call it the law of the instrument, and it may be formulated as follows: Give a small boy a hammer, and he will find that everything he encounters needs pounding.'[33]

His metaphor is similar to that of Maslow's Hammer. Should we cling to the hammer or abandon it? This is the ultimate concern of the philosophy of life!

2.2 Quantum Fluctuation and Existence from Emptiness

As previously discussed, Emptiness in the *Diamond Sūtra* refers to the interconnectivity of polarities between phenomena. The most discernible are positive and negative polarities presented as thesis and antithesis to our observation. Ordinary people tend to grasp just one pole, forming contradictions with the other pole. However, with a deep comprehension of the dialectic relation, the polarities could be synthesized together and, in turn, new knowledge created. In other words, Emptiness encompasses both poles, yet people perceive phenomena as individual entities. Buddhism thus proposes 'double negation', in other words, no clinging to any of the two poles. In Dialectics, it is called 'negation of the negation' equivalently.[34]

From Emptiness emerges the positive and negative polarities, and they then form all the things in the universe. This is unthinkable to ordinary people as they are used to equating 'empty' with 'nothing'. Yet modern science reveals that an empty vacuum is not genuinely nothing. I use a scientific example from the book *A Universe From Nothing: Why There Is Something Rather Than Nothing* to illustrate

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[32] *Fodi jinglun*, *T* no. 1530, 26: 0291b12.

[33] Kaplan, *The Conduct of Science*, 28.

[34] Engels, *Dialectics of Nature*, 62.

this point. Lawrence M. Krauss, the author, says: 'By *nothing*, I do not mean nothing, but rather *nothing* — in this case, the nothingness we normally call empty space.'[35] In Buddhism, Emptiness is also translated as Nothingness, or Voidness. This philosophy may have some metaphorical resemblance with this scientific finding.

Quantum mechanics is a modern science that studies the microscopic world, denoted in layman's terms as The Theory of Very Small. Special relativity, which studies phenomena near the speed of light, is denoted as The Theory of Very Fast. In 1929, Paul Dirac successfully combined quantum mechanics with special relativity to enable the accurate depiction of the behaviour of electrons in high-speed motion. In the Dirac equation, the electron has spins, which can rotate either clockwise or counterclockwise like a toy top. Accordingly, the equation predicts the existence of a new particle with a different spin direction. In the subsequent experiment of cosmic rays passing through the earth, evidence was found of new particles (positrons) that are the same as electrons except with positive charges. Later, it was also found that other particles (such as protons and neutrons) generally have antiparticles, as predicted by the equation.[36] Amazingly, these particles seem to have emerged from nothing and have become the basis for creating everything.

The emergence of particles is based on Heisenberg's Principle of Uncertainty. The principle points out that for certain paired quantities (such as position and velocity), it is impossible to make accurate measurements of both at the same time. In other words, if the position of a particle is accurately measured, its velocity measured cannot be accurate, and vice versa. This principle further implies that in a very short period of time, particle motion may exceed the speed of light. According to special relativity, if the speed exceeds the speed of light, then the motion of particles is like regressing in time, with a mathematical likeness of antiparticles advancing in time.[37] Krauss quotes Richard P. Feynman's vivid explanation of the situation in

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[35] Krauss, *A Universe from Nothing*, 59.

[36] Ibid., 61.

[37] Ibid.

his book: A single electron moves forward, then at another point in space, a pair of positive and negative electrons are born out of nothing, and then the positive electrons encounter the first electron, causing the two electrons to annihilate. As before, only one electron was left to move on. He further quotes Feynman's wartime analogy:

> It is as though a bombardier watching a single road through the bomb sight of a low-flying plane suddenly sees three roads and it is only when two of them come together and disappear again that he realizes that he has simply passed over a long switchback in a single road.[38]

Then in Chapter 6, Krauss says:

> On very small scales, for very short times, empty space can appear to be a boiling, bubbling brew of virtual particles and fields wildly fluctuating in magnitude. These 'quantum fluctuations' may be important for determining the character of protons and atoms, but generally they are invisible on larger scales, which is one of the reasons why they appear so unnatural to us ..... And if inflation indeed is responsible for all the small fluctuations in the density of matter and radiation that would later result in the gravitational collapse of matter into galaxies and stars and planets and people, then it can be truly said that we all are here today because of quantum fluctuations in what is essentially nothing...if inflation happened, that we all, literally, emerged from quantum nothingness.[39]

The above quotation from the chapter titled 'The Free Lunch at the End of the Universe' appears most apt. I personally envision the resplendent cosmos arising from emptiness as all existence partaking freely without cost, like at a never-ending banquet. Alternatively, I use a metaphor of management: the universe's operations resemble

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[38] Feynman, 'Space-Time Approach to Quantum Electrodynamics'. Quoted in Krauss, *A Universe from Nothing*, 63.

[39] Krauss, *A Universe from Nothing*, 84.

a company's year-end accounting wherein net worth equals zero despite multitudinous transactions occurring because the total amount of income and expenses offset each other, so balances simply cancel out.

However, conventional wisdom tells us that there is no free lunch in this world. While objectiveness exists and seems free, the related debts are actually footed by the subjects' minds. Just like how a company settles its accounts at the end of the year, at the end of one's life, a feeling of much ado about nothing within one's heart is inevitable.

Here is an explanation of the above quotation from Krauss that 'empty space can appear to be a boiling, bubbling brew of virtual particles'. Within infinitesimal durations and spaces, uncertain yet intensely fluctuating energy can arise spontaneously from the vacuum, capable of conjuring particle-antiparticle pairs, like positrons and electrons that swiftly recombine and annihilate with energy returned into the vacuum. I make use of this as an analogy for inference: our mind (as an empty vacuum) creates polar dichotomies, and thus generates perception and subsequently constructs our worldview. Philosophically speaking, polar dichotomies denote relations between subject and object (A and non-A). In Buddhism, that denotes 'self' and 'mine', and establishes a worldview based on the dichotomy of subject and object, which is essentially the root of suffering. One obvious form of suffering is the various mental and physical problems that people develop in pursuing a modern life. Therefore, the pursuit of pleasure in worldly matters (state of conditioned) cannot lead to a true understanding of life; we must be enlightened to realize the essence of life (state of unconditioned) through the understanding of the contradictions and dichotomies. This is why the Buddha preached about 'suffering' at the outset of his dissemination.

2.3 Emptiness and Zero

In the previous discussion, two examples of science were used to explain the Emptiness of the *Diamond Sūtra*. We can further explore this topic: is it true, as Engels said, that 'so do thoughts' become polarized and move in opposites? This issue involves epistemology, which is profoundly complex and difficult to express through

language. Next, I will try to describe how human thoughts become shaped by employing numerical systems and the concept of emptiness. Moreover, through this we can reflect on whether the dichotomy of positive and negative stems from thoughts within the mind, enabling people to perceive the world. Some may argue this echoes Buddhist teachings on 'all is mind-made' (一切唯心造).[40] However, I will not use classic Buddhist texts for proof, but rather scrutinize this according to the Model-Dependent Realism previously mentioned.

As discussed above, the standard model of modern physics is based on mathematical models constructed within scientists' minds. Then what is the origin of Western mathematics? Or rather, what are the foundations on which modern mathematics emerged? Inarguably, it is the Arabic numeral system. The following will demonstrate that its emergence is closely related to the philosophy of Emptiness. This numeral system originated from India, but it was the Arabs who spread it to the West via trading groups, which is why it became known by their name. In the book *From One to Zero: A Universal History of Numbers*, the author George Ifrah said:

> Our modern written numeration, of Indian origin, seems so obvious to us that it is difficult for us to realize its profundity and importance. Our civilization uses it unthinkingly, so to speak, and as a result, we tend to be unaware of its merits. But no one who considers the history of numerical notations can fail to be struck by the ingenuity of our system, because its use of the zero concept and the place-value principle gives it an enormous advantage over most of the other systems that have been devised through the centuries.[41]

The invention of zero made the place-value principle feasible, which allowed numbers to be simply arranged consecutively to indicate values without needing additional place values for hundreds, thousands, or tens of thousands. Once there is no numerical value for a certain place, a 0 can be filled in instead. This made the numeri-

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[40] *Dafangguang Fo huayan jing*, *T* no. 279, 10: 102b01.

[41] Ifrah, *From One to Zero*, 428.

cal system highly succinct, using just ten numerals (0–9) to represent any value. Further, no matter how large the value, numbers can be broken down into corresponding place values for calculation. For example, place values of ten or hundred only require addition and subtraction with their corresponding place numerals. This simplified arithmetic is easily manageable, even by primary school students. In *Technopoly*, Neil Postman says:

> Without the zero, you will find it difficult to perform any of the calculations that are quite simple to do with it. If you should try multiplying MMMMMM by MMDCXXVI, you will have this point confirmed.[42]

Perhaps not many people today still memorize the quantitative values represented by Roman numerals, but they can now easily find answers online. Indeed, the concise Indian numerical system made complex calculations with large numbers possible. This freed up brain capacity to think about mathematical issues and indirectly propelled the complexity of their cosmic worldviews (as I discuss above in section 1.2), thereby laying the groundwork for the development of mathematics in Europe.

Regarding the importance of zero in the development of mathematics, Ifrah remarked:

> We appreciate the importance of that discovery when we realize that it was made only three times in history: by Babylonian scholars, by Mayan astronomer-priests, and by Indian mathematicians and astronomers.[43]

However, other scholars might believe that zero was invented by the Greeks, and then spread to India and further developed there. Ifrah points out in his book that their theories were not supported by any serious reasoning:

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[42] Postman, *Technopoly*, 127.

[43] Ifrah, *From One to Zero*, 433.

> ... are based only on a desire to corroborate the 'Greek miracle' by any means; assertions made in their favour are not supported by any evidence.[44]

In addition to these counterarguments, the book includes a citation from the French mathematics historian Jean-Étienne Montulca:

> The Greeks were too intelligent not to realize the merit of that invention; they would have promptly adopted it if it had originated among them, or if they had even known about it.[45]

In other words, given the mathematical genius of ancient Greeks, it is inconceivable that they would have ignored or discarded zero even if they had invented or encountered the concept. This could possibly be due to the ancient Greeks' resistance towards contemplating nothingness. Heisenberg once quoted the argument of Parmenides:

> One cannot know what is not – that is impossible – nor utter it; for is the same thing that can be thought and that can be.[46]

The ancient Greeks regarded emptiness as nothing worth considering in the first place, thus missing the opportunity to invent and apply the concept of zero. Ifrah's reference to the 'Greek miracle' was based on Europeans' adoration of ancient Greek civilization that led them to eagerly trace its historical roots. This kind of subjective motivation for cultural heritage-seeking is not difficult to understand.

Ifrah also mentioned that, in Sanskrit, zero is symbolically referred to as 'śūnya' or 'kha', but he did not delve into its philosophical implication. Robert Kaplan has a more detailed philosophical discourse in his book *The Nothing That Is: A Natural History of Zero*, which states:

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[44] Ifrah, *From One to Zero*, 440.

[45] Ibid.

[46] Heisenberg, *Physics and Philosophy*, 64.

> For the Hindus there is no unqualified nothingness. In the same spirit as our Law of the Conservation of Matter, substance for them cannot disappear but can only change its form or nature: this fullness - brahman - pervades the universe, and can no more increase or decrease than can the 'absolute element' that plays a similar role in Buddhism, which is empty (śūnya) only of the accidental.
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> Or put it this way: it is as if there were a layer behind appearances that had no qualities, but took on the character of its surroundings, accommodating itself to our interpretations, as ambergris acquires and retains fugitive fragrances, giving us perfume.[47]

The term 'Hindus' in the text should be understood as broadly referring to Indian religionists (also known as *samaṇabrāhmaṇā* as in Buddhist scriptures) being influenced by the domestic philosophy. Converse to Western traditions, Indians did not overlook or ignore emptiness by regarding it as entirely nothing. On the contrary, they cherished and symbolized this profound concept to study it. Dhrubajyoti Mukhopadhyay, the president of the Breakthrough Science Society in India, is convinced that 'the discovery of zero occurred during the Buddhist period, after the Vedic age'.[48] It is not difficult to reckon that the philosophical conception of emptiness changed cognitive models and also promoted the acceptance and popularization of zero. This was actually a hugely important cognitive evolution for modern civilization, establishing the foundations of modern mathematics and physics. However, modern people take it for granted without much consideration.

As an analogy of Emptiness, the Law of the Conservation of Matter mentioned in the above quotation demonstrates how the total quantity of polarity dichotomies remains constant. Modern physics has expanded this law to encompass matter and energy, as Einstein put it:

> We might say that the principle of the conservation of energy, having

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47 Kaplan, *The Nothing that Is*, 59.

48 *Science in Ancient India*, 37.

> previously swallowed up that of the conservation of heat now proceeded to swallow that of the conservation of mass—and holds the field alone.[49]

This is the deduction he based on the law of mass-energy equivalence ($E = mc^2$). In other words, due to the interchangeability of matter and energy, the laws of conservation could thus be expanded to become the law of conservation of mass and energy. It is also reasonable for Kaplan to identify the subject of 'the law of conservation' (不生不滅, no more arising or deceasing) and no more increase or decrease (不增不減) to the absolute element (自性) in Buddhism. As for how inherent nature and emptiness manifest changing phenomenal events, this awaits philosophical scrutinization and interpretation. In the next section, from a scientific perspective, I will use an analogy from string theory to explain its conceptual similarities with the inherent nature mentioned previously.

String theory suggests that the shape of fundamental particles is not really ball-like but rather like extremely tiny strings. Strings produce vibrations of different frequencies when going through space,[50] and accordingly, they exhibit different physical properties and represent various particles as in the standard model of modern physics. String theory is also known as superstring theory because it incorporates supersymmetry.[51] Because of strings' indivisibility, strings are arguably equivalent to the 'absolute element', and the multi-dimensional space is like 'its surroundings', as in the above quotation from Kaplan. The vibration of a string corresponds to '[taking] on the character of its surroundings', the phenomenon of which conforms

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[49] Einstein, *Out of My Later Years*, 53.

[50] Ordinary cognition in daily life occurs within the three spatial dimensions of length, width, and height, as well as a single temporal dimension of time. However, the mathematical framework of string theory proposes to have ten spatial dimensions and one dimension of time, totalling eleven dimensions. It is important to note that string theory remains at the theoretical stage and has yet to be experimentally verified.

[51] Greene, *The Elegant Universe*, 232.

to the description of modern physics, in other words, 'accommodating itself to our interpretations'.

Returning to the discussion of the relationship between mathematical models and cognitive models, according to Postman:

> Statistics makes possible new perceptions and realities by making visible large-scale patterns. Its uses in science are too well known to warrant notice here, except to remark that if, as the physicists tell us, the world is made up of probabilities at the level of subatomic particles, then statistics is the only means by which to describe its operations. Indeed, the uncertainty principle ensures that in the nature of things physics is unable to do more than make statistical predictions.[52]

Thus, the concept of zero not only shaped mathematics and cosmology, but also influenced notions of the atom that constitute modern science's viewpoint on the microscopic. As Postman put it:

> I speak of the zero for two reasons: First, to underscore that it is a kind of technology that makes both possible and easy certain kinds of thoughts which, without it, would remain inaccessible to the average person. If it does not exactly have an ideology, it contains, at least, an idea. ... like the use of zero, these are examples of how symbols may function like machines in creating new mindsets and therefore new conceptions of reality. Second, the use of the zero and, of course, the Hindu numbering system of which it was a part made possible a sophisticated mathematics which, in turn, led to one of the most powerful technologies now in use: statistics.[53]

Zero is not merely a numeral; it is also a 'technology' that shapes thoughts. In addition to establishing numerical principles, zero interacts very differently with other numerals. Zero has no value in itself but affects the values of other numerals. During practical calculations, it often produces unexpected results, especially when a

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[52] Postman, *Technopoly*, 128

[53] Ibid.

number is divided by zero, which renders the operation problematic and ill-defined according to many mathematicians. In the passage, Postman pointed out the mathematical relationship between this 'technology' and quantum mechanics. Indeed, the superposition principle—one of quantum mechanics' pillars—would be unimaginable without statistics. Superposition refers to subatomic particles existing in multiple locations simultaneously until their position is defined upon measurement. Prior to measurement, the probabilities of a particle's possible positions can only be expressed through probability amplitudes. Statistics provides an indispensable means for the calculation of probability.

2.3 Emptiness and Zero

Below are my points on the three examples just provided:

1. The *Diamond Sūtra* uses the sentence pattern of Dialectics to express Emptiness in a way that helps us transcend the predilection of polar dichotomies and detach from preconceived notions.
2. All phenomena return to emptiness as they originated from emptiness, just like how the quantum vacuum contains polar dichotomies and gives birth to phenomena in myriad forms of duality. Unfortunately, people often grasp onto single-sided perspectives rather than comprehending the wholeness of duality, and this results in rigid mindsets. Then all kinds of antagony are derived and become the source of suffering.
3. Realization of Emptiness enables individuals to reconstruct cognitive models (in other words, a shift of paradigm). Based on the philosophy of Emptiness, people can better appreciate the interconnectivity of polarities. This indirectly promotes mental developments, such as the zero and place-value principles in early times, which further spurred mathematical and scientific growth. By the same token, by realizing Emptiness, we can attain a better understanding of ourselves and the coherent interdependence of dichotomies, and subsequently attain liberation through non-clinging.

3. Conclusion

Science as a New Dimension of Exegesis

Due to the constraint of length, this paper does not provide a thorough examination of all the terminology in Buddhism, nor does it present all the scientific terms in the *Diamond Sūtra*. The discussion does not delve into the validity of Buddhist philosophy. The extent to which interconnectivity serves as the underlying philosophy for Dependent Origination, Emptiness, Quantum Fluctuation, and Quantum Entanglement may still be debatable. Nonetheless, employing popular science as metaphors in exploring the philosophy proves to be a thought-provoking and inspiring approach, and fosters a meaningful and well-founded discourse in the process. Therefore, this paper should be considered a study of methodology. My objective is to provoke discussions on a methodological issue; that is, how to study and disseminate Buddhism in modern society? The study and dissemination of Buddhism are two sides of the same coin of exegesis. On the one hand, exegesis is the understanding of the study of scriptures for oneself; on the other hand, it is a public elucidation for others. Incorporating a new dimension like science can make interpretations of Buddhist texts more multi-dimensional. Building communicative frameworks in this way would create a more holistic and truly multi-faceted understanding better suited for modern society.

It is undeniable that comprehending ancient texts requires a strong literary education and that realizing the underlying ideas of the text requires philosophical comprehensibility. To be accomplished in these two domains is no easy feat indeed. However, if one's comprehension of Buddhist scriptures comes from these two dimensions and is accordingly confined by them, it may become plain and verbiage. If the interpretation of the scriptures continues to be pure textual recitation, it will certainly create a burden for an audience without sufficient literary education. As for the audience in modern society, where science is largely valued, mere verbiage interpretation may not sound convincing enough. This is because when the interpretation is overly literary and philosophical, it turns out to be just paraphrasing. Consequently, it is detached from reality and appears

to be too abstract. Such preaching will lose the simplicity and practicality of Buddhism, thus making its significance more incomprehensible to the audience.

With the addition of a new dimension of science, our interpretation of scriptures could be enriched to become three-dimensional. This is because the substantive nature of science adds depth and height to the interpretation, thus enabling it to go with diversity and complexity. In fact, many Buddhist terminologies are closely related to that of science, reflecting the usage of scientific terms and religious philosophy at that time. This also indicates that interpreting scriptures with science is both innovative and legitimate. Furthermore, if scientific evidence is used in the dissemination of Buddhism, even just for metaphors, it can make comprehension easier than resorting to mythical explanations. Had one known that Buddhism and science were closely related, one would feel Buddhism is not so distant from daily life. This would greatly foster an affinity for propagation and enhance the general public's acceptance of Buddhism. Therefore, for the purpose of either studying or disseminating, we should try to incorporate the dimension of science to display the updated visage of Buddhism in modern society, most importantly without forfeiting the underlying Buddha's spirit.

Historically speaking, the philosophy and mathematics of ancient India spread across large regions of the world as a cultural exchange via monastics and trading groups. In this process, the simplicity of the numerical system and the complexity of worldview have direct or indirect influences on the progress of Western civilization. Regarding individual development, exposure to new concepts in scriptures may alter the cognitive model in one's mind, which leads to a more complex and authentic worldview. For instance, Dialectics is the principal theme of the *Diamond Sūtra*; if its philosophy of interconnectivity of polarities is grasped, one is able to transcend the limitations of logic; that will restructure one's cognitive model, resulting in a better comprehension. This argument is based on Model-Dependent Realism. Buddhists should also try to further apply it to the study of religious practice. By integrating scientific concepts and religious philosophy, our understanding of ourselves and the world could be enhanced, and the practice could then be deepened.

Regarding the dissemination of Dharma, Buddhism emphasizes 'teaching the Dharma according to the audiences' levels' (對機說法).[54] This reminds us not to ignore the compatibility between the preacher and the audience. Faced with the modern advancement of knowledge, preachers who take the initiative to present dharma scientifically will facilitate Dharma's dissemination more effectively. Since most of the content is at the level of popular science, it is quite necessary and not too difficult to spend some time acquiring knowledge of popular science. Of course, I do not expect congregants to accept all of these ideas at once, and neither should one make a hasty judgement on the acceptance. However, emphasis on science is an irreversible global trend. Hence, it is equally important for congregants to value-add themselves with science knowledge. For instance, when facing today's global issues such as climate change or nuclear pollution, ordinary people should also grasp sufficient knowledge to consider the pros and cons of the subject matter independently. Therefore, I suggest watching popular science documentaries. This is a potent way of acquiring knowledge of popular science, and is also suitable for Buddhists, who value both faith and wisdom equally. Using science to popularize Buddhism can help create a more diversified and approachable environment, allowing disciples to study Buddhism intellectually. I am convinced that this should better meet modern society's appeal for religious wisdom.

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Abbreviations

T	*Taishō shinshū daizōkyō* 大正新修大藏經. See Secondary Sources, Takakusu and Watanabe, eds.
Mv-ṭ	*(Wan) xu zangjing* (卍) 續藏經. See Secondary Sources, Xinwenfeng chuban gongsi, comps.

[54] *Guan wuliangshou Fo jing shu*, *T* no. 1753, 37: 0246b26.

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