Buddhism and Quantum Physics: Sharing the Path

Bailey DuBois

Albert Einstein is famously quoted as saying that "if there is any religion that is acceptable to the modern scientific mind, it is Buddhism."[1] Today, most authorities of Buddhism or science say that with the development of quantum mechanics theory, that relationship has only grown stronger. The world is now better poised to communicate on these two topics than ever before. What is the basis of this claim? More importantly, what are the implications of fostering a conversation between Tibetan Buddhism and modern physics? Before the most recent decades, a problem of anti-Buddhist or anti-Western sentiment on both sides of the equation has arisen from unfamiliarity with each other, concern about the threat the other might pose, and belief on both sides that the other lacked authority (in their scientific or spiritual perspective). This hostility prevented scientists and monastics from fully engaging in conversation. Professor Jose Cabezon, Ph.D., argues that this changed because of a new "mode of interaction" which he calls "complementarity," or the idea that "Buddhism is science: that the objects of investigation, the results, aims, and methods of the two are identical."[2] Of course, differences and challenges remain. Buddhism tells that our reality is composed of both physical and mental phenomena, so a total picture of the world can only appear if we represent both in our studies of reality. Science (through the field of psychology) is beginning to expand its conclusions about the possibility of mental phenomena, but it has not reached all the same conclusions about the power of meditation and mind that Tibetan Buddhism recognizes. Basic categorizations—religious vs. atheistic—separate the two philosophies and can create an immediate language barrier. But today many people see possibilities for cooperative growth.

Changing theories in modern physics make new modes of communication

---

1 Pinit Ratanakul, "Buddhism and Science: Allies or Enemies?" *Zygon: Journal of Religion & Science* 37 (2012): 116.

2 Jose Ignacio Cabezon, "Buddhism and Science: On the Nature of the Dialogue," *Buddhism & Science: Breaking New Ground* (New York: Columbia University Press, 2003), 44.

possible and open a new door between east and west. The spiritual leader of the Tibetan Buddhists, the Dalai Lama XIV has used this portal to usher in an era of philosophical conversation on a global scale. Today, the world needs new and innovative collaborations. Scientific and Tibetan Buddhist worldviews bring different perspectives and skills to the table, helping to foster a greater awareness of the need for universal citizenship. The Earth is in a precarious position; it is badly damaged by humanity's irresponsible resource consumption and its ecosystems are rapidly deteriorating. Scientists are just beginning to engage with environmental problems, but Buddhists have always advocated for the Earth's intrinsic value as a basic part of the interdependent web of life. As the people of the Earth begin to understand their position of responsibility toward this homeland, science expands into new fields to answer the call. How do we fix the environment? It is a question that no one yet can fully answer. But there may be some solutions in the Dalai Lama's groundbreaking scientific and philosophical exchanges. A Buddhist understanding of a dynamic, interconnected world which no longer pits planet against human could be a more successful model for encouraging cooperation in the caretaking of our planet. A mission to understand the universe and enrich the lives within it is common to both parties. There is no surer way to encourage the citizens of this world to become responsible stewards of the earth than through a partnership of these philosophies.

In both figurative and literal terms, Tibetan Buddhism and modern (Western) science have had trouble understanding one another for some time. It's difficult to have a conversation in mutually unintelligible languages. The evolution of physics theory in the modern age is the key factor in recent communication. "In the 1970s it was discovered that Buddhism…constitutes something akin to what we think of as physics, the study of the material universe."[3] Whereas Buddhist worldview remained unchanged, modern physics only recently accepted the flaws of classical Newtonian physics.[4] Today, quantum mechanics theory reigns. Remarkably, the latest discoveries in quantum physics (and the emerging field of contemplative science) continue to substantiate 2,500-year-old Buddhist philosophies about the physical nature of the universe. The Dalai Lama comments that, "if on the quantum level, matter is revealed to be less solid and definable than it appears, then it seems to me that science is coming closer to the Buddhist contemplative insights of emptiness and interdependence."[5] But he admits that Buddhist thought

---

3 Walt Anderson, *Open Secrets: a Western Guide to Tibetan Buddhism*, 107.

4 The Dalai Lama XIV, *The Universe in a Single Atom: the Convergence of Science & Spirituality*, 43.

5 The Dalai Lama XIV, 50-55.

insights only hint at the complexity revealed through scientific methods, growing outdated against contemporary definitions: "When one listens to descriptions of subatomic particles…in modern physics, it is evident that the early Buddhist atomic theories and their conception of the smallest indivisible particles of matter are at best crude models." Most dialogues hope to come to some understanding about the nature of physical phenomena and the universe, and where spirituality fits in this equation.

Quantum physics may be the field best equipped to understand Tibetan Buddhism because of its similar conclusions, but it is also a threshold for skeptical scientists to enter into the exchange. Those similar conclusions show that this religious understanding of reality has some legitimacy by scientific standards. The Dalai Lama certainly goes beyond similarities in physics theory in his own inquiry.

Discussions show thus far that it is easy to talk about experiment, theory and the nature of phenomena, but when the topic of morality or spirituality is approached, the conversation hits a wall. French Monk Mattieu Ricard states that Buddhism isn't centrally concerned with science, but has "long been asking similar [scientific] questions," such as, "are the laws of physics immutable, and do they have an intrinsic existence?"[6] Ricard notes that Buddhism is flexible enough to accept new theories about reality which are "perceived as authentic" by modern science, but that it realizes that "since scientific knowledge has no connection with goodness or altruism, it cannot create moral values." Science is, by definition, study and experiment for the sake of knowledge; yet historical examples abound of unethical practice. Moral codes of practice exist to prevent harm, not to create good. Others may use that knowledge for public benefit, but the scientist does not typically bear a humanitarian mantle. It is not a necessary part of her role in Western culture. Tibetan Buddhist practitioners and monastics cultivate compassion and the wisdom to know how to do right, especially in relation to others or the environment. It is an active responsibility and commitment. This is the most important difference to keep in mind during any comparison of modern science and Buddhism.

The Dalai Lama supports and extends efforts for communication between these two bodies of knowledge, but claims that this dialogue must address the need for ethical conduct in human relationships and scientific exercises. "Granted," he states, "strictly speaking, science does not deal with questions of ethics and value judgments, but the fact remains that science, being a human endeavor, is still connected to the basic question of the well-

---

6 Ricard, Mattieu and Trinh Xuan Thuan, *The Quantum and the Lotus : a Journey to the Frontiers Where Science and Buddhism Meet*, 190-191.

being of humanity."[7] The motivation here is clear. Study creates knowledge and knowledge has consequences. The greater the information, the greater its implications—for good or for worse. So encouraging a larger awareness of beneficial inquiry may be able to empower those who already work toward direct human/world assistance and inspire those who are not currently involved—even if their work is not connected to environmental topics or problems. Physicist and comparative religion professor Ravi Ravindra writes:

> It is possible to hope that modern science and ancient spiritual traditions can be integrated in some higher synthesis. I would even say that such a task is the most important of all that can be undertaken by contemporary intellectuals, for on such a synthesis depends not only the global survival of man but also the creation of the right environment, right both physically and metaphysically, for future generations.[8]

In addition, facing possible extinction on this planet, it is logical that the scientific community should endeavor to search for knowledge that could save this habitat. It is the best equipped international body, and it operates as a system rather than a hierarchy, allowing room for independent leadership and action. The scientific community is enormously influential with citizens and policymakers. Its involvement in any Buddhism initiatives lends much credibility to the Buddhist message of compassion and responsible action. But before it is possible to conclude whether or not the Dalai Lama XIV's request is as practical as it is wise, the underlying commonalities, differences and definitions that currently support this ongoing dialogue must first be explored.

Buddhist theories underwent rigorous debate for thousands of years. The relatively recent development of Quantum Mechanics theory in the last century finally opened up a portal for scientists to enter into this discussion. Quantum physics understands reality as a dynamic system of interactions. This disputes classical Newtonian mechanics, which was so popularly accepted by science. Until Einstein's theory of relativity was declared, people considered Newton's conceptualization of a rigid reality to be an immutable law. Despite the fact that "no other theory in physics has been subjected to more meticulous experimental scrutiny, and no other theory has proven so exact and reliable in its predictive power,"[9] the invisible realm of quantum theory is still difficult for most people to grasp. Belief depends on some faith. The nature of reality,

---

7 The Dalai Lama XIV, 51.

8 Vic Mansfield, *Tibetan Buddhism and Modern Physics: Toward a Union of Love and Knowledge*, 5.

9 L English, "On the 'Emptiness' of Particles in Condensed-matter Physics," *Foundations of Science* (12): 158.

based on personal, physical interaction, is much easier for the average human to conceptualize than atomic characteristics. In response to the pervasiveness of the idea of solid reality (despite realizations about the interdependence of matter), Buddhism teaches that the universe is beyond comprehension. Even well-educated people can easily forget that classical beliefs about matter have been unsubstantiated by quantum theory: "The old physics is still with us," Walt Anderson explains. "Our everyday consciousness still dwells in the world of subjects and objects, hard bodies, and simple location—or thinks it does….We seem to have accepted a perpetual split between the world of ordinary human experience and the incomprehensible truths of modern science"[10] This simple confusion motivates Buddhist practice, which suggests that men and women must train their minds to grasp (illusory) reality as it is, despite knowledge about the ultimate (Buddhist) nature of reality.

This illusory world is relative to every person, not fixed or absolute. Even scientists or Buddhists may see reality within different definitions. So before even venturing into questions of Buddhist/scientific commonalities at the atomic level, it's possible to examine the definition of a human's basic sensory experience within both understandings. Through study of sensory cognition, science finds that people of one nation, one religion, one neighborhood or even one family have totally different ideas about the shape of the world. Basing his argument on the discoveries of modern science, Professor William S. Waldron, Ph.D. sees a process in which humans are incapable of sensing (without instruments) all the things that exist in the world. Their conception of the "world" is limited to things within their own sensory range. "Human eyes, for example, do not respond to ultra-violet or infra-red light, nor can most of us hear a dog whistle, we are blind and deaf to what other species can see and hear." Therefore, "Our everyday awareness of the world, what we see and hear and touch and smell, critically depends upon the distinctions our sense faculties are capable of 'drawing'—indeed, the world ordinarily only appears in the forms they draw."[11] What our sensory organs recognize is what we believe is there. We consider this vision to describe a single world identical to the world in every other human's experience. The consequence of this is that many realities, not one singular world, develop in the human understanding, according to what each individual perceives at the most local level of their conscious experience.

Waldron discusses how "these considerations radically challenge our ordinary notion of the 'world,' making it a phenomenon that must be understood

---

10 Anderson, 117.

11 William S Waldron, "The Co-arising of Self, Object, World and Society," *Buddhism & Science: Breaking New Ground*, (New York: Columbia University Press, 2003), 4.

interactionally rather than a reality that exists unilaterally."[12] 'Interactional' is key here. But this brings up the almost inconceivable idea of the existence of a subjective reality. Both Buddhist and scientific understanding suggests that if different worlds exist for different people, then there may be aspects of reality that can be determined on an individual level. "Biological philosophers Maturana and Varela…conclude that 'the domain…of interactions into which an organism can enter constitutes its entire cognitive reality' (1980). An organism's 'world' is thus not a simple reflection of some external, pre-existing objective reality. Rather, its cognitive reality…is defined by the range of its possible interactions." This suggestion refers to both interdependence and subjectivity. And, "much like our biologists, the Buddha defined our 'world' in terms of the cognitive capacities of our sense faculties (plus mind)."[13] This example illustrates the new frontiers of debate and study. Yet with these conclusions we may be venturing into dangerous territory. The Dalai Lama describes how meditative practices can reveal a different "realm of reality," but that they fall within a subjective, personal framework. They cannot be discussed in the same way that objective theories about the physical realm can. Here the language barrier is present again. Every term in a conversation must be identically defined to yield true conclusion, otherwise the participants will be unable to convey any real meaning. He warns, "All the discussions about the nature of reality that take place in the scientific context should be incorporated within [an objective] type of discourse."[14] When drawing conclusions between science and Buddhism, it's important to emphasize their respective positions on the quantifiable nature of reality and avoid trying to understand subjective Buddhist experiences through an objective scientific lens (though other scientific studies, such as psychology and neuroscience, may be better equipped to explore this phenomena). That is why quantum physics and Tibetan Buddhism provide the best opportunity for discussion at this time.

Both understandings share two core principles: the Tibetan Buddhist philosophies of interdependence and emptiness are well-substantiated by quantum physics. Interdependence in quantum physics "can be expressed by the key words 'complementarity,' 'four interactions' and entanglements.'" These principles communicate the scientific concept of reality.[15] First, the four interactions are the fundamental principles of electromagnetism, strong interaction, weak interaction (both relating to forces at the nuclear level) and gravitation. These forces do not require direct contact between the particles

12 Ibid., 7.

13 Ibid., 7-8.

14 The Dalai Lama XIV, 92.

15 Christian Thomas Kohl, "Buddhism and Quantum Physics: A Strange Parallelism of Two Concepts of Reality," *Contemporary Buddhism* 8, (2012): 74.

they act on, but create a complex system of reactive forces between matter. Upon this finding, "two-body systems or many-body systems were established as the base of matter. Between the bodies, interacting forces are effective in keeping the bodies together."[16] Thus reality is an interdependent network of dynamic forces.

Second, complementarity means, most simply, that the way people understand phenomena can change depending on what measuring instruments, or tools, they use to examine it. One tool may show results that another does not. Identical specimens may yield opposite results. Therefore the specimen (or phenomenon) and the instrument are complementary, affected by each other. If a scientist were to understand the principles of a particle through classical physics concepts, determining (through use of one instrument or another) that that particle always behaves in a certain way (for example, a wave-like or particle-like way) she does not see that it is possible for a particle to exhibit both behaviors. "In the long prehistory of quantum physics it could not be proved experimentally whether the smallest elements of light were particles or waves….Only one or the other could actually apply; but paradoxically both appeared."[17] This is the concept of wave-particle duality, and it further demonstrates the Buddhist principle that people are limited by their own senses and perceptions, and increase their own misunderstanding of the nature of reality by trying to put absolute labels on things.

Quantum physics principles of non-locality and entanglement are related. Entanglement is the process by which particles that have at one time interacted with each other are forever associated, and their properties and state become contingent on the others', united as if they were no longer two separate particles. Non-locality then describes how these particles are capable of predicting each others' position and movement. Principles of non-locality conclude that wave-particle duality "points to a radical interconnectedness imposed by quantum mechanics and by direct consequence a lack of separate identity. This conclusion is very reminiscent of the Buddhist notion of universal connectedness."[18] It also supports Nagarjuna's idea of the double nature of phenomena: "two bodies constitute a system of two material or immaterial components that complement each other. One of the components cannot exist without the other one; each forms the counterpart of the other."[19] This is the Buddhist theory of cause and effect.

---

16 Ibid., 77.
17 Ibid., 75-76.
18 L English, 160.
19 Kohl, 73.

Non-locality helps to scientifically illustrate the Buddhist philosophy of cause and effect, which states, "in reality, nothing is free-standing, because everything exists in dependence on its cause and gives rise to its effect."[20] Therefore if a particle lacks individuality, then an action upon it will create an equal action on the system of connected particles. This study may also lead to proof of the Buddhist concept of dependent origination,[21] or that nothing arises from nothing. Non-locality and entanglement negate the notion that, "according to traditional metaphysics, substance or own being is something that has independent existence, something unchangeable, eternal and existing by itself. Substance is the underlying basis for everything else."[22] This ignorance of interdependence in traditional metaphysics reflects a parallelism in Buddhism, which finds that the cause of suffering is clinging to an insistence that the self is a separate entity, rather than part of an integrated whole.

Deeper examination of even the most basic quantum physics principles evidence further support for many Buddhist precepts, especially emptiness. Emptiness shows that phenomena is empty of concept, or lacking inherent identity. Traditional ideas of matter and self are turned upside-down. A "table," a "chair." Anything familiar has been previously labeled. Labels designates identity, but where in an object's characteristics is the true nature? No integral part of a table makes it "Table." Though four legs and a top may shape an idea, they do not create identity. All those indistinguishable pieces, "scraps" when separate, merge to create something that does exist in space; it is only a concept in reality. "The essence of a particle is seen as inseparable from its interactions,"[23] states English. "It is impossible to find an elementary quantum object that is not dependent on other quantum objects or dependent on parts of itself,"[24] argues Kohl. From a Buddhist perspective, this paradox is clear—if its essence is obtained through interaction, then "it" does not have an individual essence. Physical phenomena are thereby empty of distinct characteristics, and can only be understood as part of a system. Tibetan scholar Gendün Chöphel sees the modern concept of relativity as proof of Nagarjuna's teachings that "all notions of absolute—whether of time, matter, or consciousness—are rejected and all things, in terms of their existence and even their identity, are understood within the framework of utter contingency."[25] This is shunyata, or emptiness of all phenomena. The quantum mechanics concept of dynamic

---

20 L English, 157.

21 Thupten Jinpa, "Buddhism and Science: How Far Can the Dialogue Proceed?," *Zygon: Journal of Religion & Science* 45, (2012): 873.

22 Kohl, 70.

23 English, 161.

24 Kohl, 79.

25 Jinpa, 873.

matter describes how particles and systems are in constant flux, changing through interactions.

It is impossible to identify a permanent situation at the atomic level, no matter how stable something appears to the human eye. Additionally, nothing in the world, including the world, escapes change, evolution or disintegration, though these processes occur at different rates for different matter. This is equivalent to the Buddhist idea of impermanence.[26] Both dynamic matter and the interconnected system of particles help to support the Buddhist idea of emptiness at the physical and the atomic level.

> It would be wrong to think that electrons, protons, or phonons did not exist at all. They positively exist as abstractions or designations within "conventional reality". However, when we look for the particles' "ultimate reality", when we investigate their ontological or epistemological basis, we find that they are less substantial than we first guessed.[27]

So, Buddhist precepts about the nature of reality are strongly supported by modern physics. But an enduring difference remains: science, which seeks to define and characterize the physical world only to better develop and clarify human understanding, lacks the moral, spiritual, and ethical concerns of Buddhism. What are the practical benefits of re-examining these issues which science tends to neglect? Perhaps more important than any other topic is how we have and will continue to treat the environment. In this regard, Buddhism values stewardship and respect, while science simply seeks to understand. With a climate crisis looming, science may have no choice but to consider its moral responsibility and engage in greater activism. On a more personal scale, these values may provide tools to understand human nature and society. Waldron states that, "There is a growing consensus that we may understand ourselves and our world more deeply and fully if we conceive of things in terms of interconnected patterns of relationships rather than as reified entities existing somehow independently of their own development history, their internally differentiated processes or their enabling conditions."[28] Scientists continue to struggle to persuade humanity on two points: that human activity has had a profound and destructive impact on the earth; and that humans are to blame for acting upon our (passive) planet and producing the effects of climate change and global warming. These arguments are rejected by a significant percentage

---

26 Jinpa, 873.

27 English, 169.

28 William S Waldron, "Common Ground, Common Cause: Buddhism in Science on the Afflictions of Self-Identity," *Buddhism & Science: Breaking* New Ground, (New York: Columbia University Press, 2003), 2.

of Earth's inhabitants. A Buddhist understanding of the interrelatedness of humans and the earth could help us move past the attitude of casting blame and avoiding responsibility by showing that as much as we are responsible for the effect we create, we are also a part of each other, and should unite to resolve problems, even if our individual impact on them was small. As a group, humanity is a powerful force. A more healing approach would be to recognize that this creates great negative impact as well as potential for great change. By understanding that reality is inherently integrative, that sensory perceptions limit the extent of human sensitivity and that the notion of self-identity derives from evolutionary necessity, reinforced by these incomplete perceptions, it becomes impossible to ignore that "reality" is a construct.

Today the conclusions being drawn about the nature of reality, the creation of a greater, more informed and involved citizenship, and the interconnectedness of humanity increase with every new conversation and examination. The fact that modern physics has done so much to support the Tibetan Buddhist's beliefs about the nature of reality lends it much credit on a global scale. But a great part of the world is still ignorant of these developments or unwilling to embrace an understanding of the world and humanity that contradicts most popular culture. Greater participation in the transmission of Buddhist/scientific conversation is necessary to increase attention and awareness of the conversation. The world stands to benefit from the study of these two highly intellectual fields and from Buddhism's message of interdependent existence. "Nonlocality and Middle Way emptiness," Vic Mansfield claims, "deeply concur on the nature of reality, not just in broad outline, but in the details."[29] This relationship can lead to a greater level of peace within human relationships and a healthier give-take with the environment. "A realization of emptiness, of our profound interdependence with each other and the world surrounding us, decreases egotism and increases the genuine concern for all life."[30] In the 21st century, war, apathy, greed and violence against humans, animals and nature are still rampant. No matter how well we understand why these problems occur, if we do not involve the whole citizenship in a conversation about the necessity of compassionate resolutions instead of short-term compromises, a universal culture of unequal rights, segregated classes and xenophobia will ultimately prevail.

---

29 Mansfield, 45.

30 Mansfield, 90.

Bibliography

Anderson, Walt. *Open Secrets: a Western Guide to Tibetan Buddhism*. New York: The Viking Press, 1979.

Cabezon, Jose Ignacio. "Buddhism and Science: On the Nature of the Dialogue." In *Buddhism & Science: Breaking New Ground*, edited by B. Alan Wallace, 35-70. New York: Columbia University Press, 2003.

Capra, Fritjof. *The Tao of Physics: An Exploration of the Parallels between Modern Physics and Eastern Mysticism*. Boston: Shambhala Publications, Inc., 1999.

English, L. "On the 'Emptiness' of Particles in Condensed-matter Physics." Foundations Of Science 12, no. 2: 155-171. 2007. Academic Search Complete, EBSCOhost (Oct. 4, 2012).

Jinpa, Thupten. 2010. "Buddhism and Science: How Far Can the Dialogue Proceed?." Zygon: Journal Of Religion & Science 45, no. 4: 871-882. Academic Search Complete, EBSCOhost (Oct. 4, 2012).

Kohl, Christian Thomas. 2007. "Buddhism and Quantum Physics: A Strange Parallelism of Two Concepts of Reality." Contemporary Buddhism 8, no. 1: 69-82. Academic Search Complete, EBSCOhost (Oct. 4, 2012).

Mansfield, Vic. *Tibetan Buddhism and Modern Physics: Toward a Union of Love and Knowledge*. West Conshohocken: Templeton Foundation Press, 2008.

Ratanakul, Pinit. "Buddhism and Science: Allies or Enemies?" Zygon: Journal Of Religion & Science 37, no. 1: 115-120. Academic Search Complete, EBSCOhost (Oct. 20, 2012).

Ricard, Mattieu and Trinh Xuan Thuan. *The Quantum and the Lotus : a Journey to the Frontiers Where Science and Buddhism Meet*. New York: Three Rivers Press, 2001.

The Dalai Lama XIV. *The Universe in a Single Atom: the Convergence of Science and Spirituality*. New York: Morgan Road Books, 2005.

Waldron, William S. "Common Ground, Common Cause: Buddhism in Science on the Afflictions of Self-Identity." In *Buddhism & Science: Breaking New Ground*, edited by B. Alan Wallace, 145-191. New York: Columbia University Press, 2003. Gampo Abbey (Sept. 27, 2012).

Waldron, William S. "The Co-arising of Self, Object, World and Society." In *Buddhism Thought and Applied Psychological Research: Transcending the Boundaries*, edited by D. K. Nauriyal, Michael S. Drummond, Y. B. Lal. London: Routledge, 2006. Gampo Abbey (Sept. 27, 2012).

Wallace, B. Alan, ed. *Choosing Reality: a Buddhist View of Physics and the Mind*. Ithaca: Snow Lion Publications, 1996.

Zajonc, Arthur, ed. *The New Physics and Cosmology : Dialogues with the Dalai Lam*a. New York: Oxford University Press, 2004.