



Today I'd like to talk about the scientific aspect of emptiness. Emptiness is a name in Mahayana Buddhism for ultimate reality, which is a theme in the Heart Sutra. These days, there are a lot of scientific experiment and discoveries which prove the words of the Buddha. Especially in quantum physics, what the Buddha taught 2500 years ago was authenticated very rigorously in many, many experiments.

I'd like to talk about the double-slit experiment. It's a very well-known experiment in quantum physics. In double-slit experiment, a series of photon, which is a light particle, is fired through a slit plate, which has two slits. A photographic plate is placed to record the result of the firing. If we randomly shoot some particle, whether it is some marble or what say, some golf ball, that at the back plate, it's common sense. We can see two bands of hits. When the waves hit this plate, which has the same two slits, then the wave radiate out and what we gain at the back plate is a so-called interference pattern. So many bands, bright and dark sides. Why?

You can recall what you learned in high school, when the top of the wave meets the top of another wave, they intensify. That's why you see the brighter side. When the top of the wave meet the bottom of the wave, they cancel each other out. That's why you see the dark side. As we know, photon, the light particle is a very small, very tiny, tiny particle. When a photon is fired to the slit, then what would we have at this back plate? A photon is a particle, but surprisingly what they get is this kind of interference pattern. How could a particle can pass through two slits simultaneously?

So many physicists in the early 20th Century could not understand this experiment, this result, so they conducted this double-slit experiment so many times, but the result was always the same. They always get the interference pattern. So they would like to know the behavior of a photon. Particularly when they pass through these two slits. They placed some measuring device by one plate. Then what is the result? What they got is not interference pattern, but just the two bands of it. Very strange. When they take away this measuring device, then they get interference pattern. Really strange.



They could not believe the result. Sometimes they thought electrons. Some physicists thought neutrons. Sometimes a molecule, especially big molecule, like a carbon 60 or 70. The result is always the same. So an observer's human consciousness have an effect on any observable with which it interacts. It's called the measurement problem. Probably you have heard of this. So physicists that encountered the field of human consciousness, the pure subjectivity at the basis of the objective reality of matter. And the quantum physics' so-called uncertainty principle says the atom only appeared to be located at a certain place when you measure it. Atoms spread all over the place until a conscious observer decides to look at it. The act of a measurement creates the entire universe. The three-dimensional physical world.

I would like to quote a very prominent physicists, Erwin Schrödingeris, one of the founders of quantum physics. He wrote:

“Subject and object are only one. The barrier between them cannot be said to have been broken down as a result of a recent experiment in the physical science. For this barrier does not exist.”

Or Max Planck:

“We must assume behind this force the existence of a conscious and intelligent mind. This mind is the matrix of all matter.”

Buddha said, this world is our mind creation, the manifestation of our consciousness. The object is opposed to our perceiving subject. It is just a concept. It's not reality. Perceiving subject and perceived object is just a convenient designation. It's not reality. That's not just Buddha, but all enlightened masters have said. How can the physical world, which we are so much used to, exist as objective? It's understandable that our thoughts or emotions are subjective. But why is the physical world—what you see, what you hear—not objective reality?



Let's think about that. Can you see my body? Okay. I wear today a white robe. I wear eyeglasses. My hair is black, et cetera. To you I appear in this way. But how about to the eyes of elephant, owl, dogs? How do I look? Who knows?

But we know they cannot perceive a color. Rhino, elephant, bulls cannot recognize a colorful world. Their visual perception of my body is very different from the perception of humans. Especially snakes or many reptiles who see things through ultraviolet. Their visual perception can be completely different from that of humans.

We also cannot tell if person A's visual perception of my appearance can be the same as person B's perception. It is said in the Buddhist scripture that the ocean looks like water to the eyes of a human. But to the hungry ghost, the ocean looks like a mixture of pus and blood. To angels, it looks like something crystal. Depending on our karma, what we see is very different.

How about the sound? Every person in this hall can say, “There is no sound at all.” Or all the humans in this world say, “In this hall, there is no sound.” Then is that the objective of reality? Existence, nonexistence. That can be pretty objective. But we already know the frequency range for humans is very limited. Dogs, cats, elephants—they have a great range of hearing. They can hear things that humans cannot hear. All people in this world saying that there is no sound in this hall, does not necessarily mean there is actually no sound in this hall.

Whether visual or auditory or mental, it's always the projection on our mind. Let's think about that.

Let's think about the visual consciousness. If we are in the completely dark cave, can we see? Even though we have eyes? (Or mind or consciousness or whatever you name that.) We cannot see. Why? Seeing means seeing *something*. Or even though we are not deaf, if there is no sound at all, can we hear things? Why? Because hearing means hearing *something*. Thinking



means thinking *something*. In other words, without an object, the subject—the perceiving mind—cannot exist. So object exists because of a subject. Our mind-perceiving subject can exist because of an object.

In other words, the division between subject and object is purely conceptual—not a reality. Subject and object are just two aspects, two names of one reality.

In the Avatamsaka Sutra, Buddha says: “There is neither a painting in the mind, nor a mind in the painting; And yet where else can one find a painting then?” In the mind. Or the Seng-t’san, the third patriarch of Zen Buddhism, said: “When no discriminating thoughts arise, the old mind ceases to exist. When thought objects vanish, the thinking-subject vanishes: As when the mind vanishes, objects vanish. Things are objects because there is a subject or mind, and the mind is a subject because there are objects. Understand relativity of these two, and the basic reality or the unity of emptiness. In this emptiness, the two are indistinguishable and each contains in self the whole world.” One day, Mr. Seng-t’san pounded a stick on the ground and asked his student, “Is this a staff sound?” Is your mind one or two? What should you say? Is that one or two? Or three? The staff, the sound. Some student said it is one. Another student replied, “It is two,” or three. But his answer was: he hit the ground with that staff one more time.

One or two? It’s just a concept. It is neither one nor two. When all these things come together, the sound is created.

Everything in this world, whether it is a mental thing or a physical thing or emotional thing, cannot exist in and of itself. In Buddhism it is called emptiness to describe the reality of all things. When we are dreaming, we are sometimes frightened, sometimes happy, sometimes frustrated, et cetera. What we see or hear in our dream sometimes is far more vivid. Why do we have a dream? Or why do we have wondering thoughts when we practice meditation? Behind our dream, behind our wondering thought, there is a main character, our sense of self. But the Heart Sutra says the five aggregates composing our body and mind are empty and will become

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free from all suffering and distress. The reality is that our sense of self is just a mental construct, not the reality. When we clearly see that truth, we can be free from all suffering and distress. That's the teaching of the Heart Sutra.

The Heart Sutra is the condensed form of the Diamond Sutra. The Diamond Sutra ends with this verse:

“I tell you, this is how you should think of this fleeting world: A star at dawn, a bubble in a stream; a flash of lightning in a summer cloud, a flickering lamp, a phantom, and a dream.”

When we see the empty nature of ourselves as well as this world of phenomena, that is the foundation of liberation. That's why the Heart Sutra, in the first passage, it says, which is the essence, “When the Bodhisattva of Great Compassion, when he realized the five aggregates are empty, he became free from all suffering and distress.”

Let's all together contemplate this verse, from time to time. Thank you.