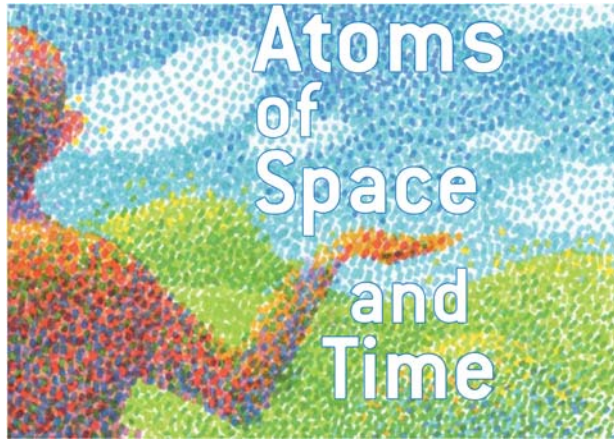


Loop Quantum Gravity and Spiritual Background Independence



**This article should be read in conjunction with "Spiritual Implications of Quantum Theory", the preceding article in this series*

While previously it was commonly thought that everything is happening within space and time (background dependent models), Einstein posited that space and time are not a background to reality, but intrinsic aspects of it. In Einstein's model, space and time are part of everything else, and they dynamically interact with the other elements which make up our universe. This is called 'background independence', a concept which also has significant spiritual import.

Loop quantum gravity is a theory that extends the idea of 'background-independence' from general relativity, but proposes a different solution to the concept of space. In classical physics, space is imagined as a continuum that can be divided arbitrarily into increasingly smaller volumes. In loop quantum gravity, however, space is seen to be composed of minute elementary units called 'quanta'. These quanta are called 'loops' that cannot be subdivided any further into smaller elements. Such finite discrete loops of space link together to make up an extremely fine fabric, which they call a 'spin network'.

What is Space Made of?

Initially, people thought that space was made of air, but when they realized there is no air in a vacuum, they had to look for other solutions. While space is not ordinary matter or energy, it is still



composed of something. And whatever this ‘something’ is, it is in a dynamic relationship with everything around it and within it. Before special relativity, it was common among scientists, such as Newton, to believe that space was filled with a substance called aether, which was a medium for the transmission of electromagnetic and gravitational forces. For instance there was a concept of luminiferous aether (light-bearing aether), which was used to describe the mysterious substance responsible for the dissemination of light (electromagnetic radiation). Although this idea was later rejected by the scientific community, some scientists continued to believe in the existence of aether.

Einstein, who had originally abandoned the concept of aether in 1905, began to reintroduce it again as part of the framework of special and general relativity. He wrote in 1920:

“To deny the aether is ultimately to assume that empty space has no physical quality whatever. The fundamental facts of (quantum) mechanics do not harmonize with this view . . . we may say that according to the general theory of relativity space is endowed with physical qualities; in this sense, therefore, there exists an aether. According to the general theory of relativity space without aether is unthinkable; for in such space there not only would be no propagation of light, but also no possibility of existence for standards of space and time (measuring-rods and clocks), nor therefore any space-time intervals in the physical sense.”

In loop quantum gravity theory, there is no aether, only units of space. However, it could still be theorized that these particles of space contain aether or are made of it. When we say that space is not a mere background but a net of loops interacting with everything else, the question as to what these loops are made of still remains. One could say that space is made of space, but this sidesteps the issue rather than solving it.

Loop Space-Time: The ‘Stage’ Disappears

According to loop quantum gravity theory, loops do not exist in space – they *are* space. Space is seen as a net of intersecting loops. That space does not have a location per se: only the loops in the net have a location. These loops do interact with other particles (like photons or electrons), but they do not interact *in* space, for here space-time is not a background. As one scientist aptly phrased it, “The stage disappears and becomes one of the actors.”

Because loop quantum gravity utilizes the principles of general relativity, it views space and time as two aspects of the same reality – space-time. Therefore time, like space, is also quantized. It is seen



to be composed of infinitesimal particles of time that are so tiny they can only be measured in so-called 'Planck units'. A Planck length is so small that many trillions of them would fit across the diameter of an atom. One unit of Planck time is the time required for light to travel the distance of one Planck length in a vacuum. Although these minuscule particles of space and time are so tiny as to be beyond imagination, and have no practical consequences in normal everyday life, the concept of them has profound implications for how we view our relationship with what we take for granted, namely space and time.

What matters for our purposes here is to use loop quantum gravity's vision of reality to transform our conditioned idea of space and time as an objectified background in which our lives – and the rest of manifested reality – are played out. Space and time are integral parts of who we are, and they are directly and actively engaged in the living process of our existence.

Background Independence in Pure Subjectivity

If we look at various spiritual teachings, they can be also seen in the context of background dependency and independency. Are the traditions of Buddhism and Advaita background dependent or independent? They are peculiar mixtures of both.

When one realizes emptiness in Buddhism but fails to embody it through one's individual subjectivity, that emptiness appears to be all there is. Hence, it is background independent. In other words, not only is there no one outside that emptiness, there is no background to it and there is also no one within experiencing unity with it. This is what could be called 'negative background independence'. It is not a true background independence because 'someone' must be there, aware of the emptiness. That someone is simply not in touch with himself, and thus he fails to realize true non-separation from the universal background of emptiness.

Indeed, in a deeper sense, both Buddhist and Advaita realizations are background-dependent because they are based on the misguided notion that there is *only* background. This background is usually conceptualized as the self, Brahman, supreme consciousness, Shiva, sunyata, or Buddha nature.

In order to go beyond the realization of inner reality as a background, we must transcend the division between experiencer and experience, and this is obviously not done by pretending that



there is no experiencer. Rather, we must realize our inherent unity with universal subjectivity, which should not be confused with merging into sameness.

The issue is further complicated by the fact that in the process of realizing the universal space of existence, our me is expanding into higher levels of its own subjectivity. For instance, when one experiences a sudden opening into universal consciousness, that opening has to be matched through an equivalent level of awakening of pure me. Otherwise, the duality between the observer and universal consciousness cannot be bridged. We transcend the perception of the beyond as our background by continuously merging with it. Here, we gain progressively deeper access to universal reality (samadhi), and we match that access with an increasingly deeper realization of our individual subjectivity (awakening). So it is a process of the constant balancing of awakening with samadhi, samadhi with awakening.

In this way, we can realize true unity with universal reality, of which we are an indivisible part. This is the kind of unity which does not result in forming a static, homogenous state of existence, but one in which all the aspects of the inner reality are in a dynamic relationship with each other. As such, loop quantum gravity – whose dynamic modal of reality posits our containers, space and time, to be integral, active parts of the whole ecosystem – is a closer reflection of our inner reality than that of classical background dependent modals. Space-time, or in spiritual terms, 'universal subjectivity', is not happening in the background of individual subjectivity. Rather it is a different yet integral aspect of the ever-evolving and expanding reality – the living one. This is the true realization of the living totality.

Blessings,

Anadi

For a full glossary of terminology please visit our website www.anaditeaching.com/glossary

