Original Article

# New Quantum Spin Perspective and Space-time of Mind-stuff

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**ABSTRACT**

The fundamental building block of the loop quantum gravity (LQG) is the spin network which is used to quantize the physical space-time in the LQG. Recently, the novel quantum spin is proposed using the basic concepts of the spin network. This perspective redefines the notion of the quantum spin and also introduces the novel definition of the reduced Planck constant. Implications of this perspective are not only limited to the quantum gravity, but also found in the quantum mechanics. Using this perspective, we propose the quantization of the space-time of the mind-stuff. Similarity between the physical space-time and the space-time of the mind-stuff provides novel notions to study the space-time scientifically as well philosophically. The comparative study between the physical-space-time and the space-time of the mind-stuff is also given.

**KEYWORDS:** *Quantum gravity, quantum spin, quantum theory of Yoga, space-time of mind-stuff, spin network*

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## INTRODUCTION

Since the dawn of the scientific and philosophical study, some questions regarding the origin of the universe, the origin of the life, and the nature of the consciousness have baffled humans. Both at the macroscopic and microscopic scales, the external universe is studied in the physics. After the discovery of quantum physics, philosophy of the physics has played an important role to solve questions regarding the measurement problem, the interpretation of the quantum mechanics, and the quantum entanglement. However, the profoundness, uncertainty, and the probabilistic nature of the quantum mechanics demands more research. These problems of the quantum physics have removed the boundary between the community of the physics and the community of the philosophers. Physics and the philosophy do not oppose each other, rather complement each other. Sometimes the solution of the deepest question of the physics resides in philosophy, while the discovery of new phenomenon or a law in the physics furnishes a clue to philosophers to solve the problem regarding the nature in philosophy itself.

In quantum mechanics, the nature of the quantum spin is one of the unsolved questions. The study of the quantum spin is very important in physics, since the implications of quantum spin are found almost in every branch of the modern physics. Why nature tends to show the quantum spin at microscopic scale in the unit of $\frac{1}{2}\hbar$?, is itself a biggest question and a research topic. What are the mutual relations of the quantum spin with temperature, mass scale, and length scale, is still unknown.

Recently, a novel perspective of quantum spin was proposed (Vyas and Joshi, 2022), whose implications are far-reaching in the field of quantum gravity, quantum physics, and Yogic philosophy. This proposal establishes the relation of the quantum spin with the physical quantities such as temperature, mass, and length. This proposal also redefines the reduced Planck constant in a novel way. The basic principle of novel perspective of quantum spin can be directly applied to Yogic philosophy. Since physics and philosophy complement each other, here the order is not important. It means which comes first among the Yogic philosophy and the proposed novel perspective of

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the quantum spin, does not matter. Hence, with the help of one theory, the other can be explored. In the yogic tradition, everything that is in the outer universe is also resided in the inner being. The Yogic philosophy is one of the ancient philosophies as well as the classic philosophy for psychology. [In Yogic philosophy, Sanskrit word of the mind-stuff is चित्. The detailed description regarding the mind-stuff is given in the third section.]) The way it treats the mind-stuff is elegant, because it demystifies the structure of the space-time of the mind-stuff.

## Brief Overview of the Loop Quantum Gravity

Loop quantum gravity (LQG) is one of the supposed quantum gravity theories, whose one of the integral parts is the spin network. The LQG starts with the general theory of relativity (GR) and then takes some ideas from quantum field theory (QFT). As an outcome, one can find that the fabric of space-time is not continuous, but quantized (Rovelli, 2004; Rovelli, 2008; Thiemann, 2008).

Moreover, the LQG has three important traits: (1) it is the nonperturbative theory of the quantum gravity, (2) it is the background independent, and (3) it is also the diffeomorphism invariant theory. Since the LQG is emerged out from the GR, it does not require background (space-time) priory; rather, it generates the quantized space-time. The diffeomorphism invariance of the action manifests as the background independence in the LQG (Rovelli, 2004; Rovelli, 2008; Thiemann, 2008).

The LQG unifies the GR (that defines gravity as the space-time deformation whose space is dynamic) and the QFTs (that tells that every field must be quantized) (Rovelli, 2004; Rovelli, 2008; Thiemann, 2008).

### Introduction to the spin network

In 1971, Penrose (Penrose, 1971; Penrose, 1972) gave a discrete model of space that relies on the concept of the quantized angular momentum with the purpose to create a consistent model from which continuous, classical geometry emerged at a limit. The spin network can recreate a three-dimensional (3D) Euclidean space that is known as the spin-geometry theorem.

Thus, the basic idea is to create both space-time and quantum mechanics simultaneously from combinatorial principles of the angular momentum (Penrose, 1971; Penrose, 1972).

Quantum physics implies that a quantity that is discrete and connected with the space-time structure intimately is the angular momentum (Penrose, 1971; Penrose, 1972).

In other words, the spin network is the theory of the quantized space-time in which the quantized space-time is created; hence, the concept of the direction of the macroscopic space is not known a priory due to quantum indeterminacy. Therefore, one has to deal with the total angular momentum ($j$-value) instead of specific direction ($m$-value of the angular momentum). Hence, the total angular momentum is more important than the concept of angular momentum in the spin network (Penrose, 1971; Penrose, 1972).

The lines of the spin network create the quantized space-time and this space-time is necessary to create the classical geometry of the universe. These lines can be also seen as the world line of particles (analogous to the QFTs) (Penrose, 1971; Penrose, 1972).

We assign a number to each line and it is known as a spin number. The spin number should be an integer number. This spin number is defined as twice of the actual angular momentum value $\left(\frac{n\hbar}{2}\right)$ in terms of the reduced Planck $\hbar$ (Penrose, 1971; Penrose, 1972). Figure 1 shows the two-dimensional (2D) diagram of the spin network.

$$J = 2 \times \frac{n\hbar}{2} \quad (1)$$

Where $n = 1,2,3,....,n$. In the 2D diagram of the spin network, the time flows in one direction, for instance, from the bottom to the top. However, any other direction can also be assigned for the time (Penrose, 1971; Penrose, 1972).

In Figure 1, the 3-unit at the bottom on the left splits into a 2-unit and another 3-unit. It is the topological relationship between the various segments, with the values of the spin number (Penrose, 1971; Penrose, 1972).

Each line of the spin network represents any compound system that distinguishes itself from other system.

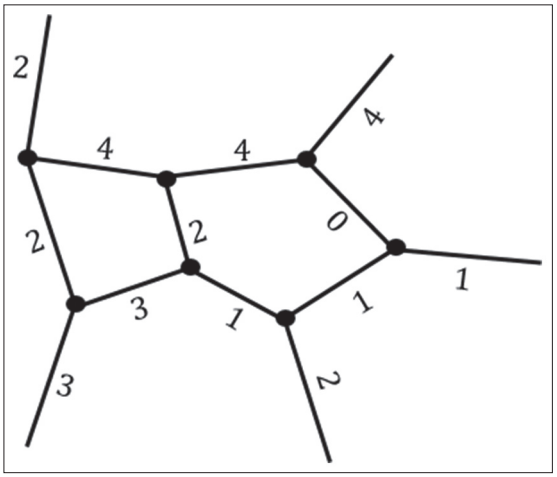


**Figure 1:** The two dimensional diagram of the spin network

In the spin network, the particles or systems transfer the angular momentum by regrouping into different subsystems, by annihilating one another or by producing new units (Penrose, 1971; Penrose, 1972). Figure 2 shows the vertex of the trivalent spin network.

In the spin network, the relation between the edges is important. Single spin network line has no meaning. Hence, the spin network follows the relational approach of the GR. In Figure 2, the given spin network has trivalent vertex in which the dashed circle implies the structure of the spin network at the vertex, with internal labels *j,k,l* being positive integers governed by the external labels *b,c,d* (Penrose, 1971; Penrose, 1972).

$$j = \frac{b + d - c}{2},\ k = \frac{c + d - b}{2},\ l = \frac{b + c - d}{2} \quad (2)$$

To conserve the angular momentum, some conditions regarding the triangular inequalities are compulsory. For instance, the triangle inequalities have to be satisfied by the external labels and it is added up to an even integer (Penrose, 1971; Penrose, 1972).

In the LQG, the spin network is useful to understand the physical significance of *'the Wheeler Dewitt equation'*, i.e., $H|\psi\rangle = 0$ (where $H$ is the Hamiltonian constraint and $\psi$ is the wave function) through the loop representation. The Wheeler–Dewitt equation is a Schrödinger's equation without time variable. The solution of the Wheeler–Dewitt equation can be found in the atom of space at nodes using the spin network. In the LQG, without the presence of nodes, there will be no quantized volume and hence no quantum space (Rovelli, 2004; Rovelli, 2008; Thiemann, 2008).

The closed line (loop) in space is necessary to understand these solutions (Rovelli and Smolin, 1990; Rovelli and Smolin 1995). The LQG can solve the Wheeler–Dewitt equation through the loop space representation for every loop with the aid of the spin network (Rovelli, 2004; Rovelli, 2008; Thiemann, 2008).

The LQG also studies that how these lines weave in 3D space. In the quantum space generated by the LQG, the lines of the spin network intersect and create nodes at points of intersection. These lines in the LQG are known as links. A set of intersecting lines produces a graph (Rovelli and Smolin, 1990; Rovelli and Smolin, 1995). Similar to the quantum of light, quantum of matter, and other quantum, the quantum of space in LQG is known as the atom of space (Rovelli, 2004; Rovelli, 2008; Thiemann, 2008). Figure 3 shows a schematic diagram of atom of space.

In the LQG, two nodes are separated by a small surface and the size of this considered surface is the area. The area and the volume operator are associated with this atom of space (Ashtekar and Lewandowski, 1997a; Ashtekar and Lewandowski, 1997b; Rovelli and Smolin, 1995). If one considers the evolution of the spin network, one gets spin foam that is the result of summing over geometries generated by the spin network of the LQG (covariant approach) (Rovelli, 2004; Rovelli, 2008; Thiemann, 2008).

The spin network defines the quantized state of the field of gravity, i.e., the quantum space, in which the area and the volume are also quantized space (Ashtekar and Lewandowski, 1997a; Ashtekar and Lewandowski, 1997b; Rovelli and Smolin 1995).

The other quanta of physics reside on the space, while the quanta generated by the spin network in the LQG is itself creates space (Rovelli, 2004; Rovelli, 2008; Thiemann, 2008).

The space quanta exhibit only the information that characterizes it spatially (the information about the

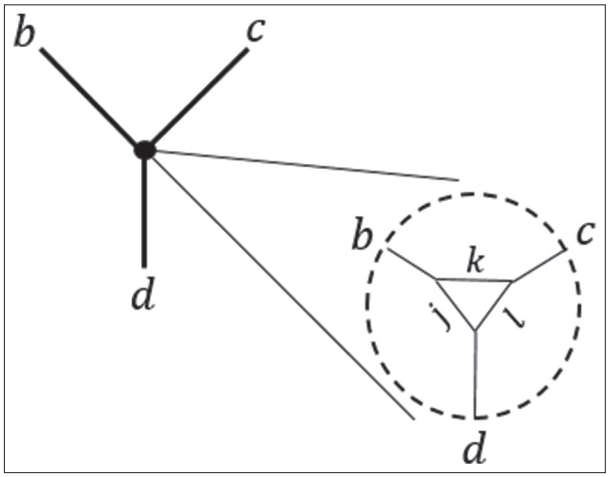


**Figure 2:** The vertex of the trivalent spin network

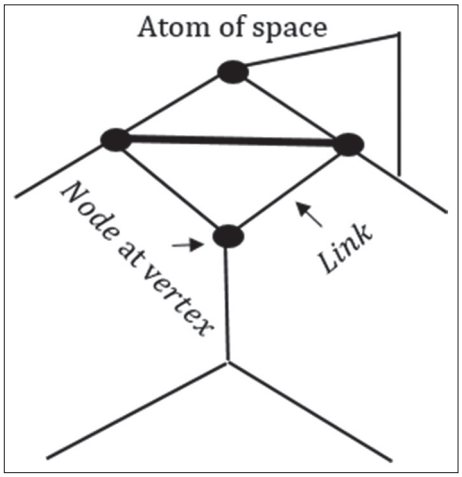


**Figure 3:** A schematic diagram of atom of space

quanta of space which is adjacent to the other and vice versa). In short, single quantum of space has no importance, but it becomes important relative to another quantum of space (Rovelli, 2004; Rovelli, 2008; Thiemann, 2008; Penrose, 1971; Penrose, 1972).

### New quantum spin perspective

Thermodynamically speaking, the motion of small particles in the isolated system makes the system chaotic or agitated. The measurement of energy of each particle is not possible for such systems. Therefore, the average kinetic energy of the system of particles is measured. Due to this probabilistic nature of system, statistical mechanics is needed. In statistical mechanics, the temperature is defined as the average kinetic energy for any considered system of particles (Greiner et al., 2012), i.e.,

$$\frac{1}{2}mv^2 = \frac{3}{2}k_\beta T \tag{3}$$

Where $k_\beta$ is the Boltzmann constant. If the equi-partition theorem is used, the kinetic energy is $\frac{1}{2}k_\beta T$ for each degree of freedom ($1D$). Here, multiplying the numerator and denominator of left hand side by mass and after multiply both sides by $r^2$, one obtains (Vyas and Joshi, 2022).

$$\frac{p^2r^2}{2m} = \frac{1}{2}k_\beta Tr^2 \tag{4}$$

In the scalar form, the angular momentum is given as $l = rp$; hence, the equation becomes (Vyas and Joshi, 2022).

$$\therefore l^2 = k_\beta Tr^2 m \tag{5}$$

This discussion is only applicable to the classical domain. By considering Bohr's hypothesis (Bohr, 1913), regarding the quantization of the angular momentum, one gets into the quantum realm, i.e.,

$$l^2 = n^2\hbar^2 = k_\beta Tr^2 m \tag{6}$$

where, $\hbar = \frac{h}{2\pi}$ is the reduced Planck constant. At the Planck scale (Planck, 1978; Tomilin, 1999; Adler, 2010), and are replaced by $r = l_p$, $T = T_p$ and $m = m_p$ respectively; hence, one enters into the realm of the quantum gravity. Thus, the equation becomes,

$$l^2 = n^2\hbar^2 = k_\beta T_p l_p^2 m_p \tag{7}$$

In the spin network, the total angular momentum $J$ is more emphasized than the angular momentum $l$, because $z$-direction is unknown a priory. Hence, the total angular momentum $J$ is necessary. Therefore, from equation (1) one gets (Vyas and Joshi, 2022),

$$J^2 = 2^2 \times \left(\frac{n\hbar}{2}\right)^2 = k_\beta T_P l_P^2 m_P \tag{8}$$

This formula is validated in (1). Hence, in the spin network, the quantum spin $J$ is defined as the square root of product of the Planck temperature $T_p$, the Boltzmann constant $k_\beta$, the Planck area $l^2_p$ and the Planck mass $m_p$ (Vyas and Joshi, 2022).

In equation (8), if $n = 1$ is chosen, the one gets an equation for the reduced Planck constant $\hbar$ (Vyas and Joshi, 2022), i.e.,

$$\hbar = \sqrt{k_\beta T_p l_p^2 m_p} \tag{9}$$

## The Space-time of the Mind-stuff

In this section, first, the introduction to various types of space-time of the universe is given according to Yogic philosophy. Thereafter, the space-time of mind-stuff and its quantization are explained. This is the junction point of physics and Yoga philosophy. Then, the comparison between the physical space-time and the space-time of the mind-stuff is given.

### Various types of space-time

In Yogic philosophy, there are three types of the space-time: (1) the physical space-time, (2) the space-time of mind-stuff, and (3) the space-time of consciousness. Here, some characteristics of these space-time are explained (Vivekananda, 2020).

#### *The physical space-time*

The physical space-time is a space-time of five basic elements (space, air, fire, water, earth (matter). In other words, it is made of space, time, matter, and radiation. All physical phenomena occur at this level. This is the boundary of modern science based on five elements. It covers the study of macroscopic objects such as the universe, galaxies, stars, planets, other stellar objects, earth-based science, and many others. It also covers microscopic objects such as molecules, atoms, fundamental particles, quarks, and many others. Whatever is perceived by humans at sensory level belongs to this space-time. All the phenomena under study in the physical space-time are local (it follows the constancy of the speed of light). Careful study of the structure of the physical space-time leads toward the study of the space-time of the mind-stuff. As mentioned, the LQG unifies the GR (the study of classical space-time) and the QFTs (the study of the various quantum fields). Hence, by unification, one gets the quantum of space-time in which various other fields (defined by QFTs) reside on the gravitational field (that is quantized by LQG and it is relativistic in nature). In essence, in LQG, loops of 1D objects form

the quantum space. It means that before the formation of the quantum space by loops, nothing exists (from a physical point of view). Therefore, the LQG is itself background independent that is mentioned earlier. The quantized space-time is subject to the uncertainty, probability, granularity, discreteness, and many other quantum characteristics. Beyond this space-time, the space-time of the mind-stuff begins. The physical space-time is governed by the space-time of mind-stuff. The quantum enigma can be understood if the relational quantum mechanics is considered for its comprehension. In the relational quantum mechanics, the quantum states are observer dependent. There are many similarities between the physical space-time and the space-time of the mind-stuff that are covered in the next section.

### *The space-time of mind-stuff*

All psychological events happen at this level. Everything that is there in the physical space-time is also there in the space-time of the mind-stuff; however, its form is different. In other words, every physical object is resided in the space-time of the mind-stuff (In [18], firstly "चित्त" is translated as the "mind-stuff".) (Clifford, 1878) without physical manifestation. In the philosophy of Yoga, there are three types of bodies of observers: (1) the physical (or macroscopic) body, (2) the microscopic body (the creator of the physical body), and (3) the causal body. Here, the causal body is the polarizing agency for rest of the bodies. The physical world cannot be comprehended without these bodies (macro, micro, and causal body). This emerging picture is analogous *QBism,* i.e., the approach regarding the interpretation of the quantum mechanics in which the agent's action and experience is the crucial guiding principle. In the presence of consciousness, the mind-stuff begins to create all these physical objects that were once without physical manifestation. This space-time is the boundary of the intellect that governs the mind and the ego on the mind-stuff. The space-time of the mind-stuff can also be quantized in which all characteristics of the quantum physics can be applied. However, the methodology of the quantization of the space-time of the mind-stuff differs from the quantization of the physical space-time. Each and every phenomenon that occurs at the space-time of the mind-stuff is nonlocal. Similar to the physical space-time, this space-time is also background independent. The space-time of mind-stuff is governed by the space-time of consciousness.

### *The space-time of consciousness*

The space-time at which the eternal joy or the holy emotion of self-existence only stands. At the space-time of consciousness, the existence of the physical space-time and the space-time of mind-stuff ceases. The consciousness that governs the physical space-time and the space-time of mind-stuff resides here. Due to measurement problem and collapse of the wave function, *one cannot define the characteristics of the consciousness*. In quantum physics, the wave function is collapsed because of observation or measurement, while in the space-time of the consciousness the consciousness disappears when attempted to be studies by the conscious being. In other words, the consciousness (similar to the wave function) can be felt but cannot be studied, while the conscious being is involved in its study (in the meditative state). Therefore, from modern physics point of view, the space-time can only be understood. Hence, at present, the study of the space-time of the consciousness is beyond the limit of the modern physics. However, it does not mean that the effect of the consciousness cannot be observed, but one does not know the final quantum physical tool at present that defines it up to necessary extent. In other words, when a particle is observed in the quantum mechanics, its wave function is collapsed and similar to this, the outcomes of the consciousness can be seen (i.e., the universe and the life); but, when the consciousness is being studied to characterize, it behaves in such a way that it cannot be comprehended.

Hence, the space-time of the consciousness is the universal set whose subset is the space-time of the mind-stuff and the physical space-time is the subset of the space-time of the mind-stuff as well as the space-time of the consciousness.

$$P_{st} \subset M_{st} \subset C_{st} \tag{10}$$

where $P_{st}$ is the physical space-time, $M_{st}$ is the space-time of the mind-stuff, and $C_{st}$ is the space-time of the consciousness. Figure 4 shows a schematic Venn diagram for $P_{st} \subset M_{st} \subset C_{st}$ .

## The space-time of mind-stuff and its quantization

*Patanjali's Yoga aphorism* is one of the top classic texts that describes the mind-stuff and its characteristics in concise and lucid way. However, till today, it was only seen as a reference book for practitioners of yoga. However, it is an invaluable treasure to understand the classical as well the quantum aspects of the space-time of the mind-stuff (Vivekananda, 2020; Clifford, 1878). When the mind-stuff is studied as the space-time (classical as well as quantum, at least in principle), similar to the physical space-time, it gives birth to a new branch of physics, i.e., *Physics of Yoga* (or *Yogic Physics*) that gives "Q*uantum Theory of Yoga*." The Yogic physics differs from the actual physics by its dimensions, the subject of the study, the auxiliary tools, and many other ways; however, it may bring

new concepts to the actual physics and may solve the existing problem of physics (especially in the quantum domain). In other words, in physics, the subjects of study are space, time, matter, and radiation, while in the physics of the Yoga, the subject of the study is the mind-stuff (or sometimes, mind).

As per circumstances and spiritual upward movement, the mind-stuff transforms into the mind, the intellect, and the ego. In Yoga philosophy, the observer is consciousness (or the observer that exhibits consciousness) and the object that is being observed is nature (the external universe and physical body). The function of the mind-stuff is to know or identify the external (and internal) object with the aid of the physical body (brain, i.e., nervous system) in the presence of consciousness. It happens in three steps: (1) the external object creates an information signal for sensory nerve of the particular organ (for instance, music-ear) that brings the information to the brain (the mind-stuff is converted into the mind); (2) the brain checks this information in its database and send a responding information to the sensory organ through the motor nerve (the mind-stuff is converted into the intellect); and (3) thereafter, the mind-stuff identifies or knows particular object in the presence of consciousness (the mind-stuff for a while, is converted into the ego). In this whole process, all three space-time types are involved (Vivekananda, 2020). The physical space-time behaves as external agency to comprehend the space-time of the mind-stuff by the mind-stuff, in the presence of consciousness. The mind-stuff (or the mind) itself comprehends the space-time of the mind-stuff through this procedure. In other words, the external object creates a form (Sanskrit word for "Form" is "वृत्ति." *A form* is like *an oscillation* in the space-time of the mind-stuff) of a word in the mind-stuff that produces a meaning in the presence of consciousness; at last, it gives the knowledge of particular external object (*word* → *meaning* → *knowledge*!). Hence, to study the space-time of the mind-stuff, the mind-stuff uses the physical space-time to explore its own characteristics, because the nature tends to show similar structure in both

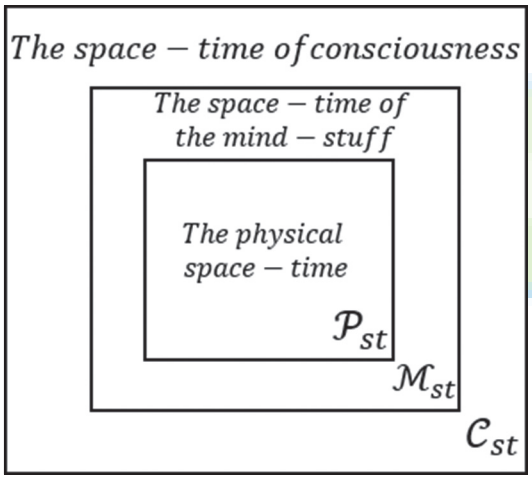


**Figure 4:** A schematic Venn diagram for $P_{st} \subset M_{st} \subset C_{st}$

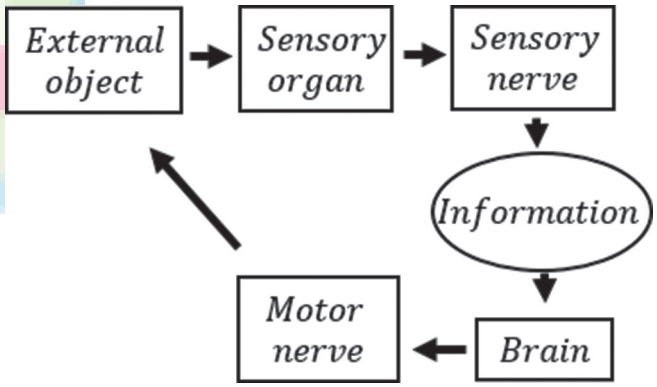


**Figure 5:** The functioning of the mind-stuff through the physical body

**Table 1: The physical space-time versus the space-time of the mind-stuff**

| The physical space-time | The space-time of the mind-stuff |
|---|---|
| The quantum field of massive particle tells the quantized space-time how to curve and the quantized space-time tells the quantum field of the massive particle how to move | Various forms (the quantum of the mind-stuff) tell the quantized mind-stuff how to curve and the quantized mind-stuff tells various forms (the quantum of the mind-stuff) how to move |
| It follows locality | It does not follow locality |
| It is relational in nature | It is also relational in nature |
| The 1D loops creates the quantum space | The forms (the quantum of the mind-stuff) create the quantum space of the mind-stuff |
| The space-time singularity occurs when stellar or galactic object is converted into the black hole. It is resolved by the big bounce model in the LQG | The space-time singularity of the mind-stuff occurs when the mind-stuff reaches to the super consciousness state. This singularity can also be resolved by quantization of the space-time of the mind-stuff. |
| The solution of the Wheeler–Dewitt equation in the LQG is found at nodes of the spin network (when this process is extrapolated in the backward direction) | The solution of the quantum space of the mind-stuff is found at first form (where this process is extrapolated in the backward direction) in the meditative state |

LQG: Loop quantum gravity

the space-time (the physical as well the space-time of the mind-stuff). In the whole procedure, consciousness does nothing, but without its presence, the mind-stuff cannot function. Figure 5 shows the functioning of the mind-stuff through the physical body.

According to the definition of the Yoga (from Patanjali's Yoga aphorism) in the Yogic philosophy, Yoga means **{In Sanskrit, the aphorism (Verse: 2, chapter: 1) is written as "योगश्चित वृति निरोध} (Vivekananda, 2020)**,

*To restrain the mind-stuff from taking various sort of forms*.

*-Verse: 2, chapter: 1*

In Yogic tradition, the mind-stuff is like a pure curtain or a multifaceted diamond or a mirror which takes the form of the body that resides outside it. In other words, the mind-stuff is like the pond. If a stone is thrown inside the pond, the disturbance (in the form of a wave) is created. When this disturbance decays, the pond again becomes stationary. Each form is like a stone which makes the mind-stuff nonstationary. Therefore, the mind-stuff will take various forms which is responsible to create the space-time of the mind-stuff (Vivekananda, 2020).

*The space-time of the mind-stuff* is analogous to *the spin network* (as mentioned, it is the building block of LQG) which was discovered by Roger Penrose. *The form* is analogous to *the quantum spin* of the spin network. As mentioned, the LQG is one of the supposed and convincing theories of quantum gravity that defines the classical space-time in a discrete way. The quantum spin of the spin network is the fundamental unit of LQG that discretizes the classical space-time. *Forms* are *quantum units of the space-time of the mind-stuff* that quantize the mind-stuff.

The formation of each form in the mind-stuff makes it restless. This restlessness makes the mind-stuff trembled and this trembling generates one type of energy that creates the chain of such type of forms. Hence, the stationary mind-stuff is now no longer stationary.

The procedure described in *(2.2)* also happens in the space-time of the mind-stuff. Various types of forms (which are actually disturbance) that creates the space-time of the minds-stuff makes the mind restless (*this restlessness* is analogous *the average kinetic energy*). Therefore, it is these forms which generates the space-time of the mind-stuff. In the state of super-consciousness (highest meditative state), there are absence of the forms; hence, the space-time of the mind-stuff is merged into consciousness. The Wheeler–Dewitt equation is the time-independent equation, whose solution could be found at nodes of the spin network (the order of time is created when the evolution of the spin network is considered– spin-foam), while the state of super-consciousness makes the conscious being free of the order of time (*where the mind-stuff is merged into the consciousness when the forms are gradually decreased through meditation*). Without the evolution of the spin network, the quantum space can never be the quantum space-time. Similar to this, it is *these forms* which converts *the quantum space of the mind-stuff* into *the quantized space-time of the mind-stuff*. If *the quantum space-time* in the LQG is extrapolated in *the backward direction*; one gets a point where *a single node* of the spin network exists (which has no physical significance). Similar to this, if *the quantized space-time of the mind-stuff* is extrapolated *backward direction* one gets a point where only *a form* exist from which *other forms* are created and that generates *the psychological arrow of time* at the space-time of the mind-stuff.

### Comparison between physical space-time and space-time of mind-stuff

Here, in the Table 1, the comparison between the physical space-time and the space-time of the mind-stuff is given.

## Conclusions

Finally, it is concluded that:

- *The new quantum spin perspective* of *quantum gravity* is crucial to comprehend the *spin network of the LQG* as well as *the space-time of the mind-stuff*
- This novel quantum spin perspective not only modifies the present notion of the quantum spin; further, it can also quantize the space-time of the mind-stuff
- These are the basic results of the quantization of the mind-stuff using the new quantum spin perspective of the spin network
- Here, *one-to-one correspondence* between *Yoga philosophy* and *LQG* (using new quantum spin perspective of the spin network) is proposed
- This proposal provides "*a quantum theory of Yoga"* using the framework of *the new quantum spin perspective*, *the spin network, the LQG,* and *Patanjali's Yoga aphorism*. Hence, this proposal will give a new dimension to Yoga philosophy
- Gradually, the successful quantization of the space-time of the mind-stuff will also bring several novel notions in the quantum physics as well in the various branches of the philosophy (QBism, phenomenology, philosophy of the space-time, philosophy of mind, and philosophy of consciousness).

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## Conflicts of interest

There are no conflicts of interest.

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