Quantization and Infinity as intrinsic properties: Entities are either quantized or infinite

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Abstract:
In this paper, I put forth a philosophical argument that an entity can be either quantized or infinite, but not both; and that only a quantized entity can integrate into a system; the integration will be deterministic, and at each stage, the entity may have different emergent properties; the system thus formed settles in an infinite-loop in an infinite arena made up of non-quantized entities. Based on these, it is proposed that the universe is a system made up of matter, a quantized entity; and the arena is made up of space and time, non-quantized (infinite) entities.

Key words: Quantization, Infinity, Infinite-loop, Determinism, Emergence, Causality

1. Introduction:

Can there be an infinite number of finite things? We can say either 'yes' or 'no', and give logical explanations, but may never be able to prove it. So we have to be philosophical. Here, I take the philosophical view that '*there cannot be an infinite number of finite things*'. The only logical argument in its favor is that the addition of any number of finite numbers will give only a finite number, unless we impose the condition that adding up is to be continued infinitely. That is, it requires 'one' infinity to create 'another' infinity. Or, finite things can never add up to infinity, because finiteness is inbuilt.

Space, time and matter are the three entities with which the physical world can be explained. Of these, space and time appear to us as infinite. But whether matter is finite or infinite cannot be inferred from direct observations. The classical Newtonian view is that bodies made up of matter move in absolute space and interact with each other using forces. These bodies have finite masses, and so based on the above philosophical view, it is proposed that these cannot add up to infinite mass, and so matter is finite. However, philosophy cannot be a substitute to scientific theory; so, it has to be shown that the adding-up process terminates after a finite number of steps [1], if the above proposal is to be called a theory.

2. Quantization and Infinity:

An entity having finite or bound properties (properties that do not extend to infinity) can be called a quantized entity. If the properties extend to infinity, then it is a non-quantized entity. Any entity requires a '*frame*' for its existence, a frame having zero properties and zero restrictions, and so stretching to infinity. The frame is a non player, and the entity is destined to play in the limitless frame. However, it is the nature of the entity that decides how it plays. A non-quantized entity fills the entire frame, and thus becomes part of the frame, and the

frame acquires the property of the entity. The entity can no more play, or becomes a non-player. A number of such non-quantized entities can be taken in a frame, and the frame becomes a combination of sub-frames, each having different properties. However, the frame always remains a non-player.

A quantized entity occupies only a finite region of the infinite frame. However, as it cannot impart its properties to the frame, the frame should already have the required properties, if it is to accommodate that entity. The quantized entity occupies finite intervals of the sub-frames, and always remains a player, and does not in any way affect the frame. The infinite nature of the frame implies that the frame cannot place any restrictions on the entity. However, there will be restrictions because being finite implies restrictions; only that, the restrictions are self imposed by the entity. Thus quantization (finiteness) is an inbuilt property of the entity; the entity is either quantized or non-quantized, and is destined to be so. Based on these, the following philosophical argument is put forth:

"*Quantization and infinity are immiscible properties*; *an entity can either be quantized or infinite, but not both*."

3. Integration and systems:

Only a quantized entity can maintain its separate identity in a frame; or the discreteness of an entity shows its quantized nature. Depending on its properties, a quantized entity may integrate into a system. A non-quantized entity, on the other hand, can only impart it qualities to the frame; it can exist only as a sub-frame, and cannot integrate into a system. The frame represents emptiness, as it cannot be identified. But the presence of a quantized entity brings something that exists in the frame, and the frame is empty no more.

A frame may contain one or more quantized entities. Each entity will have a fundamental unit, and all the units of an entity will have the same finite properties. When these units integrate, larger units are created, which integrate further. This step by step integration becomes complete in a finite number of steps, because finiteness is inbuilt in them, and the boundary thus gets closed. Thus it becomes a closed system existing in the given frame. All systems are made up of quantized entities and are finite; something that extends to infinity is not a system [2].

4. Looping:

A quantized entity may or may not integrate into a system, but any process that involves it will be finite and will terminate in a finite interval. That is, the process will not proceed infinitely in any of the sub-frames. Thereafter, and the entity may remain static if the properties permit it; otherwise, the process gets looped, that is, the process repeats again and again. Here, each loop is a finite process involving only finite intervals of the sub-frames. The static state and the looping state are similar, and continues infinitely; so both can be regarded as 'infinite-loops', a static-loop and a dynamic-loop. If a sub-frame allows only one

direction, the loop follows that direction infinitely in that frame, and if any frame permits reversal of direction, then the loop oscillates back and forth in that frame. The infinite-loop implies the infinite nature of the frame as well as the finite nature of the entity. Thus we can arrive at the following conclusion:

"In an infinite frame, a finite (quantized) entity settles in an infinite-loop."

5. Determinism and Emergence:

The fundamental units will have some basic properties. To integrate into a system, at least on of the properties has to be integrative in nature. During integration, the properties get added up, and this is governed by mathematical laws [3], which are completely deterministic, and so the integration follows a step by step deterministic path, and it will be possible to predict the nature of the system formed, if the basic properties of the units are completely known. Based on this it is proposed that:

"*Any independent system is basically deterministic*."

When the fundamental units integrate, the properties may add up linearly or non-linearly. In the case of linear addition, the property of the system will be the sum of the properties. That is, there will be no emergent properties. In the case of non-linear addition, the entity acquires different emergent properties, in each step of integration. However, if the entity has only a single property, or the properties are inter-convertible and hence cancel out, it will not acquire any emergent property. Though emergent properties may appear to be entirely different from the basic properties, these are manifestations of the same basic properties, and so are predictable.

6. Causality:

In a system made up of quantized units, causality can be both top-down and bottom-up. It is the basic properties of the units that cause the integration and decide the emergent properties. Therefore, bottom-up causality is fundamental and prominent at lower levels. As the entity integrates, it acquires emergent properties that can cause further changes, and thus top-down causality also becomes possible. Once the integration is complete, the system becomes stable, and the bottom-up causality loses its prominence. If the system formed is static, causality has no further relevance. If the system is dynamic, it falls into an infinite-loop involving different but stable states of the system, and does not go back to the initial stage where bottom-up causality is the rule. So, as far as the system as a whole is concerned, top-down causality is more fundamental. But at an intermediate level, both the causalities can exist simultaneously. Since the system will be in a state of dynamic equilibrium, any process is reversible, and at the intermediate level a process can get reversed due to small variations in the parameters concerned. That is, both the causalities can exist simultaneously at the intermediate level in a dynamic system, provided one of the sub-frames in which it exists allows reversal of direction.

7. Space, time and matter:

Space, time and matter are the three entities that are present in the infinite frame in which the physical world exists. It is proposed that space and time are non-quantized, and matter is quantized. The non-quantized entities merge with the frame giving rise to two sub frames: the space-frame, which is three-dimensional, but not directional, and the time-frame, which is directional. Matter is the only quantized entity present in the frame, and so there is only one type of fundamental particle [4]. Mass is its unique property that we can say matter is mass, or mass is the real entity; volume and motion are its properties. So the entity requires a space-frame to exist, and in addition, a time-frame to move. Space and time without matter represents the reality of nothingness; but without these, matter cannot exist.

The universe, the finite system formed by the integration of matter particles, remains in an infinite-loop in both space and time frames. The time-frame being directional, the loop moves forward in time, and the space-frame being non-directional, the loop oscillates back and forth in space. That is, the universe exists infinitely in time as a pulsating system [1].

8. Conclusion:

The concepts that quantization and infinity are inherent properties of entities, and that only a quantized entity can integrate into a system have been explained in this paper. Based on these, it has been postulated that the universe is system formed by matter, a quantized entity; and that space and time, non-quantized entities, remain as the frame (arena) in which matter exists. This view is in agreement with classical Newtonian physics and our common sense, and if we can explain everything based on this, it would be logical to reject the present complicated models, which defy commonsense. However, the proposals that there can be only one type of fundamental particle, and that motion is its basic property have to be validated further by proposing suitable models [4].

Reference:

[1]. A paper proposing a '*closed, three-dimensional, pulsating universe having no external field*' will be posted subsequently in viXra.org

[2]. Jose P Koshy, *Redefining 'system' and 'entropy' in physical terms,* **viXra: 1312.0002** (thermodynamics and energy)

[3]. Jose P Koshy, *Physical Reality and the Mathematical laws – a new philosophical approach,* **viXra: 1311.0118** (history and philosophy of physics)

[4]. A paper proposing that '*the fundamental particle of matter moves at the speed of light*' will be posted subsequently in **viXra**.