

Essay

Implications of Emergent Spacetime

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Abstract

In this essay, I discuss the implications of emergent spacetime. Emergent spacetime has also shattered two myths of the atheists, that nothing can be spaceless and timeless and that nothing can be immaterial.

Keywords: Emergent entity, spacetime, implication.

If an entity is emergent, then in general that will imply these three things:

- 1) The emergent entity cannot have any existence prior to its emergence;
- 2) The emergent entity (A) cannot emerge from just anything or everything or nothing; it can emerge from some particular entity or entities only (B); and
- 3) B must pre-exist before the emergence of A.

The first and the third one are just simple common sense. For the second one we can give the example of water. We know each water molecule contains two hydrogen atoms and one oxygen atom. So water can emerge from the chemical combination of two hydrogen atoms and one oxygen atom only; water cannot emerge from the chemical combination of any two elements in the periodic table e.g. water cannot emerge from the chemical combination of hydrogen and chlorine or from the chemical combination of carbon and oxygen or from the chemical combination of copper and sulphur.

The above three implications will be true for any emergent entity. So they will be true for emergent spacetime also. But emergent spacetime will imply some more things that will not be true for other emergent entities. What are those special implications of emergent spacetime?

We have already said that an emergent entity cannot have any existence prior to its emergence. So emergent spacetime would imply that it has emerged from some entity/entities that was/were not within any spacetime. This implication is very very special for emergent spacetime only; the entity that has emerged (A) and the entity/entities from which it has emerged (B) cannot be within the same spacetime.

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In every other case both A and B would be within the same spacetime. In case of spacetime only B would be neither in space nor in time. Scientists are describing it as non-spatiotemporal; in brief we will call it NSE (Non-spatiotemporal Entity/Entities).

Emergent spacetime would also imply some more things. It would imply that the universe cannot have its origin from nothing. The reason that can be given for this is that at the beginning of the universe spacetime also comes into existence. Spacetime being emergent cannot come into existence from nothing; it can emerge from NSE only. So the prior presence of this NSE is a necessity before the beginning of every universe.

NSE would also be eternal and everlasting. Two reasons can be given for this; one is pure reason and the other one is practical reason.

Practical reason: We have already seen that NSE must already be there before the beginning of any universe so that spacetime can also come into existence along with the beginning of the universe. So, if it is the case that big bang has taken place not only once but many many times, that is, if it is the case that the universe has gone through unending cycles of big bang and big crunch, then NSE would also have to be eternally there, because spacetime being emergent cannot emerge from anything else other than NSE. Similarly for every future cycle of big bang and big crunch also the prior presence of this NSE would be required.

Pure reason: There is also one pure reason as to why NSE would be eternal and everlasting. An entity that is not within any spacetime cannot change. Any change can occur either in space or in time. Being not in space we cannot say about NSE that it was at that place earlier and it is at this place now. Being not in time we cannot say about NSE that it was in that state earlier and it is in this state now. Thus NSE will be changeless. An entity that cannot undergo any change can neither cease to be, because ceasing to be is also some sort of change. I am very much alive at this moment, but at the very next moment I may die. But for NSE this very next moment will never come, because it is not in time. So NSE can never cease to be; thus it will be eternal and everlasting.

Emergent spacetime has also shattered two myths of the atheists, that nothing can be spaceless and timeless and that nothing can be immaterial. Scientists are already saying that there is something non-spatiotemporal (or, spaceless and timeless) from which spacetime has emerged. This something non-spatiotemporal cannot in any way be material, because GR forbids it.

There is one deep philosophical reason as to why spacetime cannot be fundamental, because in that case there would be an infinite regress. I have already discussed it here [1].

Reference

1. <http://www.11prompt.com/?q=node/537>