A new approach to the big bang theory

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Abstract

The big bang theory of our universe is dealing with two fundamental questions that were confirmed by observations: the horizon problem of the Cosmic Micro wave Background (CMB) [1] and the flatness problem of space [2].In order to overcome these questions, the theory regarding a cosmological inflation was suggested by Alan Guth, Andrei Linde and Paul Steinhardt [3]. But this theory arises new problems since the inflation theory predicts an eternal inflation process [4] generating multiverse structure where anything can be expected and nothing can be predicted (the measure problem [5]). The concept of an expanding universe arises deep philosophical questions: what is the other space in which our universe is expanding into? Where did all this space and energy come from? What happened before the big bang? These challenging questions motivate us to suggest a new approach to the big bang theory.

Introduction

In the common big bang model the universe started from a Planck length seed and inflated in a Planck time to a macro sized space and it is expanding ever since (over 13 billion years) and even accelerates its expansion due to dark energy. But the model doesn't treat a basic question: If the universe (or multiverse) is expanding (or inflating), what is it expanding into? If we can't visualize the entire picture, how can we build a theory upon it? This paper introduces an extra non-local (fully entangled) three dimensional (3D) grid like dimension (grid dimension), that will enable our quantized universe to inflate and expand into it.

The Grid dimension

Let's imagine a uniform, symmetric, isotropic, homogeneous, non-local (in which all the points are entangled together) , 3D extra dimension of space with only minor non symmetrical fluctuations due to the quantum uncertainty principle [6].This extra dimension will be referred to as the grid dimension. Now let's imagine that out of this non local grid dimension,

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local quantized three dimensional (3D) space bubbles in the size of Planck's length in each dimension, filled with energy in the form of photonic radiation, pop into existence, uniformly spread throughout the grid dimension (figure 1).These local quantized Planck sized bubbles build the primary quantized space and energy of our universe, and this phase, will be referred to as the inflation period. Since the grid dimension is non-local and fully entangled, we can expect, due to symmetrical considerations, that the bubbles of space and energy are all at the same size of Planck length, uniformly spread, uniformly filled with energy (same temperature), with only minor fluctuations in the homogeneity due to the quantum uncertainty principle. This new approach of quantized space bubbles, floating in an extra non local entangled grid dimension, can overcome the CMB horizon problem (they are all entangled through the grid dimension just after the inflation phase), the flatness problem (they are uniformly filled with energy and uniformly spread throughout the grid dimension), and the basic questions regarding what lays beyond our universe and the structure of space before the big bang.

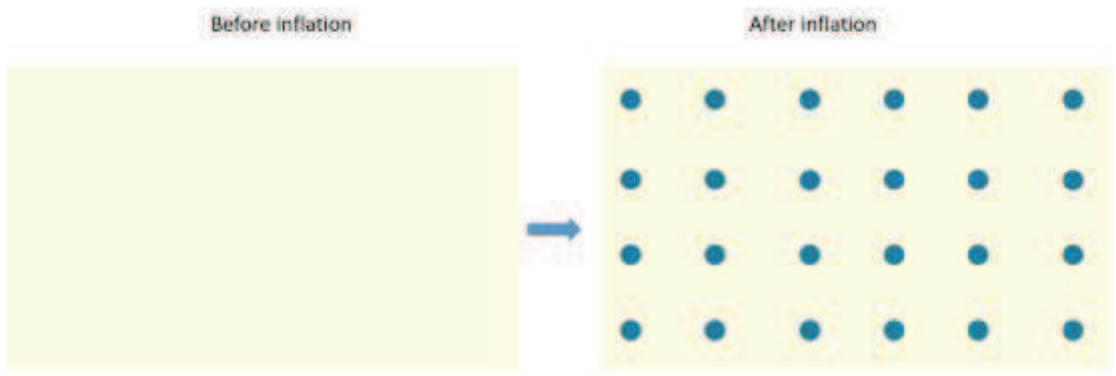

Figure 1: On the left is the pre inflation phase where all space is dominated by the non-local (fully entangled) extra 3D grid like dimension which is illustrated by the 2D yellow rectangle. On the right is the post inflation phase where Planck sized local 3D space bubbles filled with energy pop out symmetrically and simultaneously from the grid dimension and are illustrated by the symmetric structure of two dimensional (2D) blue circles. The yellow grid like space between them is the extra 3D non-local grid dimension. Immediately after the inflation phase, our universe can be imagined as Planck sized space bubbles, uniformly spread and uniformly filled with energy, floating entangled to each other in a 3D non-local grid dimension. This entanglement is the answer to the CMB horizon problem.

The expanding universe

During the inflation phase the quantized space bubbles, popped simultaneously from the non-local grid dimension. This simultaneity and uniformity can be explained due to the non-local fully entangled characteristics of the extra grid dimension. After that initial inflation phase, new empty space (vacuum state space) bubbles kept on popping into existence from the grid dimension. As the number of empty space bubbles increase, the entanglement between the space bubbles decreases and the photonic radiation undergoes a red shift transformation and loses its energy. As the energy decreases, plasma transforms to atoms and becomes transparent to the cosmic micro wave back ground. Due to the uncertainty principle the symmetry breaks into local matter nuclei regions. In these regions gravity pulls atoms together to eventually become stars, black holes and galaxies, forming the curved space time, which we observe today with the uniform cosmic micro wave background glow.

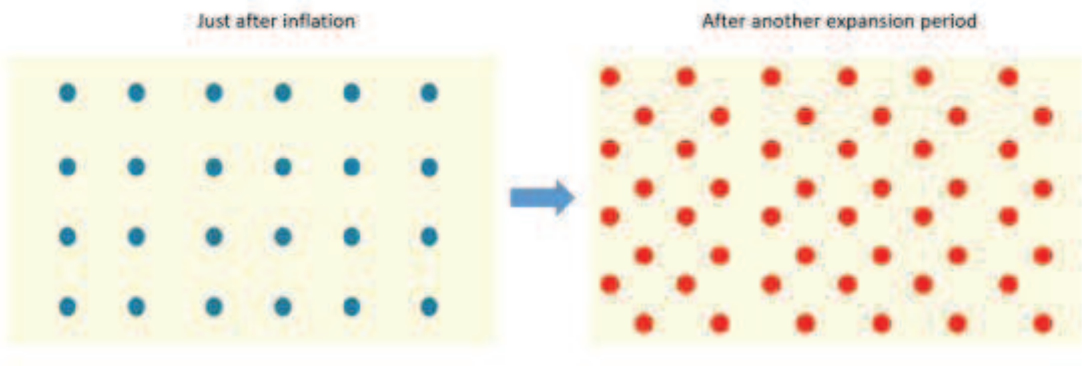

Figure 2: the illustration on the left is the post inflation phase (immediately after the inflation phase), where the blue colored 2D circles illustrate the Planck sized local 3D quantized space bubbles that build our universe and the yellow space between them illustrate the extra 3D non local grid dimension. The illustration on the right is the expanded space today due to multiplications of the empty space bubbles. The color of the quantized space bubbles (illustrated by red circles) changes from blue to red to indicate the red shift in the cosmic radiation due to the expansion of space. The yellow region between the red circles illustrates the grid dimension.

There is another optional model in which the space bubbles will also increase their size as space expands (figure 3). If that is the case it means that Planck length changes with time (since the bubbles are in the size of Planck length in each dimension). Since Planck length is dependent on the speed of light in vacuum, Planck's constant and the gravitational constant, these changes in the fundamental constants, due to the expansion of space, should be detected by advanced cosmological observations, from nearby stars, all the way to the cosmological microwave background (CMB).

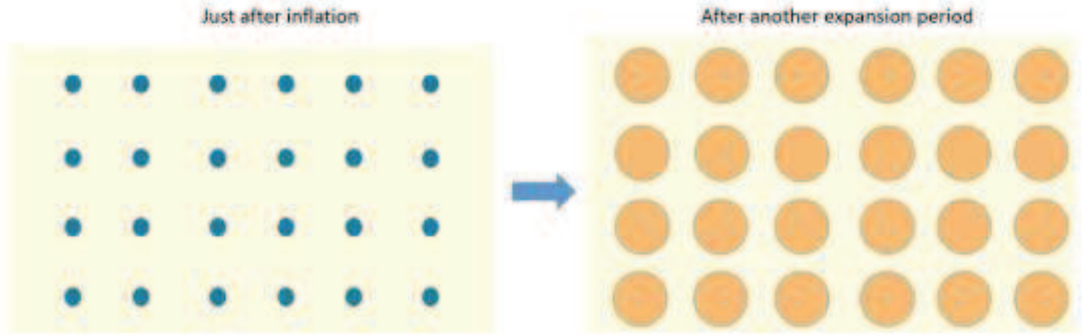

Figure 3: Just as in figure 2 but this time the expansion comes in the form of expanding space bubbles instead of adding new bubbles. This means a change in the Planck length with time and it can be observed since it influences the Planck constant, speed of light and the gravitational constant. A combination of both , the expansions of space bubbles as in figure 3 and space bubble multiplication as in figure 2 is also an option that should be taken into consideration as the expansion of space model, after the inflation phase.

Conclusion

This paper suggests an extra non local (entangled) grid dimension from which the quantized Planck length local space bubbles (the building blocks of our 3D quantized universe) pop into existence during the inflation phase. Vacuum state space bubbles are floating and multiplying ever since, as our space keeps expanding within the grid dimension. This new approach enables to explain the non-locality behavior of the CMB (horizon problem), the flatness problem, what is space expanding into, what happened before the big bang and where did space come from initially (popped out uniformly in a symmetric manner throughout the grid dimension as detailed in figure 1).The low entropy during the inflation phase explains the arrow of time, as entropy increases towards the future and decreases towards the past. The non-local grid dimension can also explain quantum entanglement since it enables a new non local connection between any two quantized local space bubbles floating within its 3D entangled space (figure 4). The non-locality in space and time of the grid dimension, which connects in a non-local way, between all the quantized local space time bubbles that build our universe, can also explain the Feynman path integral formulation, where all the possible paths from point A to point B are integrated together [7]. Assuming that for each quantized pulse of Planck time, light travels from one space bubble to its nearest neighbor, since each space bubble is in the size of Planck length, it explains the limitation on the speed of light and why should the speed of light be the same for each frame of reference. Since our direct measurements of space time is limited to our 3D space bubbles without any ability to measure directly the grid dimension, we cannot explain the physical behavior below Planck time and the Planck length. This extra grid dimension in which our quantized space is floating, might be the source to the dark energy and the dark matter which inhabits most of our universe, virtual particles that pop in and out of existence and even the Higgs field. The quantized floating space bubbles enable us to illustrate also a multiverse structure staggered next to each other (figure 4). Although the 3D grid dimension is non local and uniform, it has minor fluctuations due to the quantum uncertainty principle and this is the source for the minor non uniformities measured in the CMB which later on evolved into matter, stars, galaxies and black holes.

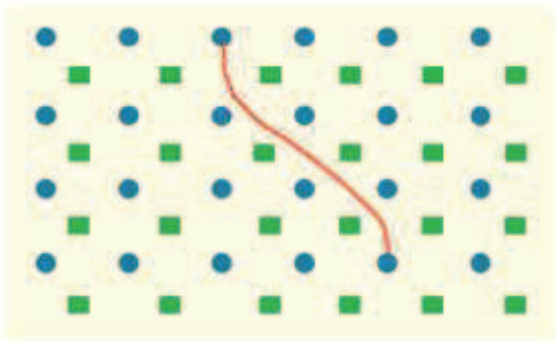

Figure 4: two parallel 3D quantized universes (illustrated by blue circles for first universe and green rectangles for second universe) floating staggered next to each other in the non-local 3D grid dimension. Since there is no limitation on the size of the grid dimension there is no limitation on the number of parallel quantized staggered universes that can fit in this model. The red line connecting between two separate space bubbles via the non-local grid dimension, illustrate the non-locality of quantum entanglement ("spooky action at a distance" – Albert Einstein).The non-locality of the grid dimension which connects between all the local space 3D bubbles is also reflected through the Feynman path integral formulation and the Einstein – Rosen bridge through space-time.

REFERENCES:

[1] https://en.wikipedia.org/wiki/Horizon_problem

[2] https://en.wikipedia.org/wiki/Flatness_problem

[3] https://en.wikipedia.org/wiki/Inflation_(cosmology)

[4] https://en.wikipedia.org/wiki/Eternal_inflation

[5] https://en.wikipedia.org/wiki/Measure_problem_(cosmology)

[6] https://en.wikipedia.org/wiki/Uncertainty_principle

[7] https://en.wikipedia.org/wiki/Path_integral_formulation