

# Quantized Space-Time and the Quantized Multiverse

Eran Sinbar

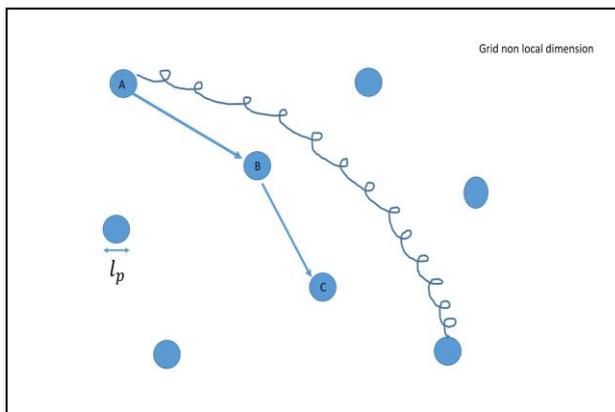
**Abstract-** The many world interpretation of Quantum Mechanics, the extra dimensions of string theory, the unexplained entanglement in quantum theory, the mysterious dark energy and dark matter, all link together to the possibility that our three dimension universe is not the entire picture and that we need to find an improved model of space time that can deal with these new concepts. This paper will suggest a new way of looking at our three-dimension universe.

**Keywords-** *quantized space-time, Multiverse, Grid dimension*

## 1. Introduction

There is a fundamental constant of Planck's length where it seems to limit the resolution of our known physics. From that size on the uncertainty and chaos rules, .This paper suggests that space-time are quantized and the building blocks of space are 3D cells in the size of Planck's length ( $l_p$ ) in each dimension and the building blocks of time is a pulse in the size of Planck's time. Every pulse of Planck time energy can move no more than one-step from one space cell to its nearest neighbor. The void in which these space cells are floating is the Grid dimension. Non-local phenomena's like entanglement are being coordinated through the Grid dimension (1).

Figure 1: the two dimension blue circles (A, B, C ...) illustrate three-dimension space cells in the size of Planck's length in each dimension. The white void between them illustrate the non-local Grid dimension that coordinate non-local activities like entanglement. The spiral shaped connection between space cell A and E illustrate entanglement between them through the non-local Grid dimensions. The arrow between space cell A and his nearest neighbor B illustrate a movement of photonic energy, one-step of Planck's length in one pulse of Planck time. In the next pulse of Planck time, photonic energy can move from space cell B one Planck length to its nearest neighbor space cell C. This is the upper limit of energy movement and by definition, a movement of Planck length in one Planck time is the speed of light. We will refer to this universe as the



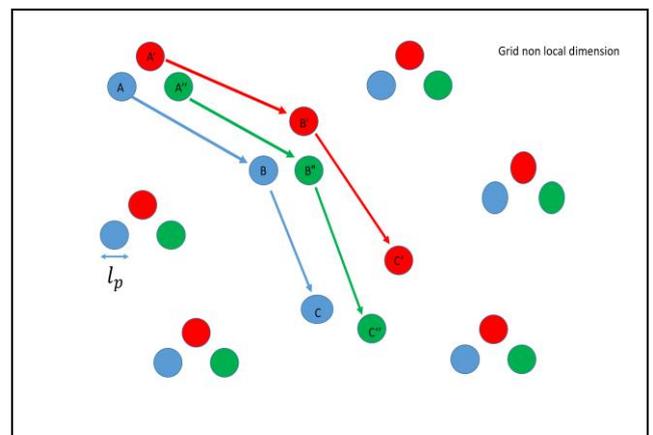
“blue” universe and assume that it represents our known universe. The white region between the blue space cells is the non-local Grid dimension.

In our daily observation, we cannot see or measure the Grid dimension since we live in the 3D quantized cells illustrated in figure 1. It is similar to the way we grasp matter without a strong microscope. Matter building blocks are atoms where most of the atom is void and only a small portion of it is matter built from protons, neutrons and electrons. We find it hard to grasp that most of the matter surrounding us is void. In the same manner, we cannot grasp that most of the three dimensions space surrounding us is the void of the Grid dimensions and our known space is limited to the discrete space cells illustrated as blue circles in figure 1(the “blue” universe).

## 2. Adding new dimensions

Let us Assume that we can duplicate our three dimension quantized space in the void of the non-local Grid dimension ,than we can build a model of multiple universes (multiverse) staggered in the void of the Grid dimension (figure 2) .The Grid dimension can be one or more non local grids combined together .

Figure 2 illustrates the quantized multiverse. Three quantized universes ,”blue”(A,B,C,...), “red” (A',B',C',...) and “green“(A'',B'',C''...), are staggered together in the void of the Grid dimension without one “colored” universe knowing about the existence of the other or knowing about the large void of the Grid dimension between them. The white region between the colored space cells is the non-local Grid dimension. This is an easy to grasp symmetrical model of the multiverse.



## Conclusion

- (1) <https://www.slideshare.net/eransinbar1/quantization-of-photonic-energy-and-photonic-wave-length>
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Quantized space-time model of the universe, floating in a non-local Grid dimension, enables in our standard three-dimension visualization of space ,to add symmetrical structures of multiple universes which are quantized and floating in the same Grid dimension as described in figure 2.

Our “blue” quantized universe might never interact or know about the “red” universe or the “green” universe or even about the void of the Grid dimension. In this paper, I illustrated three universes but since the void of the Grid dimension is unlimited in its space there can be infinite number of these quantized “colored” universes and the beauty about it that now we can visualize it in the standard three-dimension symmetrical model. The basic rules of physics, or the fundamental constants might defer from one universe to the other.

The Grid dimension reveals its existence through non-local behavior of entanglement, quantum tunneling, Schrodinger’s wave equation, the Cosmic Microwave Background perfect uniformity throughout the universe and the virtual particles popping in and out of existence. The quantized nature of space-time, in the size of Planck’s length in each dimension, reveals itself through the Heisenberg uncertainty principle and by the quantized nature of the black holes entropy, (the area of the event horizon divided by the Planck area). The multiverse structure as illustrated in figure 2 might be revealing itself through the probabilistic non-deterministic behavior of the Schrodinger’s wave function (many worlds interpretation of quantum mechanics). The Einstein theory of relativity revealed that space and time defer from one observer to the other based on velocity, acceleration and gravity. By assuming that each observer has its own “colored” quantized world (as in figure 2), relativity can now be visualized in our three dimensions symmetric understanding of space-time. Gravity might be a unique force in which one quantized universe can induce its force on another quantized universe and this can be the source of “dark matter”. The beauty about this model is symmetry.

If we take two observers one on earth and one a billion light years away from earth, both observers will expect to be at the center of the universe from symmetry considerations. With this model, it is easy to visualize in figure 2, since one can be the blue universe and the other can be the red universe. Each one will see his own unique “colored” quantized universe. Another example can be one observer at a velocity  $V_1$  and the second observer at a velocity  $V_2$ . Both observers will claim that their time runs normal and the others runs slower and that they are not moving. Based on the model detailed in figure 2, one can be the “blue” universe while the other the “red” universe and each one will see only his unique colored universe perspective. This beautiful symmetry and the intuitive three-dimension description of the multiverse is the strength of the quantized multiverse model.

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