

Faster than the Speed of Light Is a Quantum Phenomena

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Abstract

Classical Mechanics using Einstein's theories of relativity places a limit on speed as the speed of light. Quantum Mechanics has no such limitation. To understand space accelerating faster than the speed of light and information being exchanged instantaneously between two entangled electrons separated by huge distances, one uses Planck's length, Planck's time, and Planck's mass to indicate that space and time are discrete and therefore along with masses smaller than Planck's mass are Quantum Mechanical in nature. Faster than the speed of light $c = 3 \times 10^8$ m/s is a classical effect only in dimensions of space lower than our 3-D Universe, but it is a Quantum effect in all dimensions of space. Because space can oscillate sending out ripples from the source, it is the medium used for transporting light waves and gravity waves.

Keywords

Faster than the Speed of Light, Classical, Quantum, Planck's Units, Space as a Medium, Comparison with String Theory

1. Introduction

In my paper [1], I have used the 10 dimensions of String Theory as the final dimension of space where $10! = 3,628,800$ single dimensions come together to form the final 10^{th} dimension but that is where the similarity with String Theory ends. It is not really a similarity, because my theories indicate that different Multiverses can exist with different number "n" of final dimensions, and hence the 10^{th} dimension has been picked only as a special possible case. In my theory, Dark Energy from the different levels of the void is used to create the final n^{th} matter dimensional Universe, all of which is sent into the $(n + 1)$ st dimension of the void as Dark Energy, and out of the Dark Energy of the $(n + 1)$ st dimensional void comes out the n^{th} dimensional antimatter Universe and since antimatter

is matter moving backwards in time, the process reverses itself in time by sending all the Dark Energy back into the void of the 0th level where space, time, matter, and charge do not exist, because the Dark Energy of the void consists of photons.

String Theory on the other hand takes the approach that the additional dimensions have already been created and are curled up hidden in our 3rd dimension. Hence, String Theory does not make use of Dark Energy and therefore it cannot be used to explain the accelerated expansion of the Universe while my theory of Dark Energy can since it is the Dark Energy coming out of the $n = 2$ level of the void that is responsible for creating and expanding our 3rd dimensional Universe until four different 3rd dimensions come close to one another and are pulled together by their mutual gravity to form the surface of the 4th spatial dimension. In Reference 1, I also theorize that Dark Matter exists as part of the matter sent through our Black Holes into our 4th dimension and that this Dark Matter in our 4-D space is needed to explain the rotation curves of galaxies, the Bullet Cluster experiment, and the Gravitational Lensing experiment. My theory is based on understanding the current experimental results of Cosmology while String Theory cannot do so, and hence remains a speculative theory with no experimental evidence as it tries to combine Quantum Mechanics with General Relativity unsuccessfully. String Theory was developed to override the infinities that arise in Quantum Electrodynamics by replacing point particles by finite length strings, the vibrations of which give electrons and quarks their particle like nature which is an assumption that is not based on experimental evidence. The wave particle duality is based on the experimental evidence of the two-slit experiment. No such experimental evidence exists for String Theory. Vibrations of a string such as a guitar string give rise to a sound wave whose quantum mechanical particle nature is called a phonon much like the photon which is the quantum mechanical particle of a light wave. Both photons and phonons have zero mass and zero charge. This totally contradicts the assumption that different vibrations of a string can correspond to an electron or a quark, both of which have a mass and a charge to prove String Theory an incorrect theory based on no experimental evidence and incorrect theoretical hypothesis of comparing different objects that do not have similar physical properties.

2. Main Text

To examine if faster than the speed of light $c = 3 \times 10^8$ m/s, that is Classical in lower dimensions of space [2] but Quantum in our 3-D Universe as too in all dimensions, let's examine why space can accelerate so fast and why quantum entanglement allows particles to share information instantaneously. Think of our galaxies as points on the surface of an expanding balloon. The galaxies themselves are not moving but they are going further apart as the balloon keeps on expanding. The surface of the balloon is the space between the galaxies. When Dark Energy is not creating galaxies according to $E = mc^2$, Dark Energy begins to create space expanding faster than the speed of light since the same amount of

Dark Energy is provided in both instances, and that is also the reason vacuum space of each dimension has energy density in it. The accelerated expansion of the Universe has been analyzed both experimentally and theoretically using classical mechanics for Redshift z from $z = 0$ to $z = 1$ [3]. But for higher z where the acceleration exceeds the speed of light experiments still needs to be performed to determine how the acceleration of the Universe varies with z and theoretical calculations using quantum mechanics need to get done. Information being exchanged instantaneously by two entangled electrons is a quantum effect because when they get entangled, they both have the same wave function and so a change in one is also experienced by a change in the other. If the spin of one electron is observed to be clockwise, then we know that the spin of the other electron must be counterclockwise to preserve Angular Momentum. If the two electrons are not entangled, then that will not be the case since both electrons would have different wave functions. Einstein's theories are classical in nature and classical mechanics says that speed is limited by the speed of light while quantum mechanics works on different principles that says such a limit does not exist. Dark Energy comes from the different levels of the Quantum void and therefore Dark Energy is quantum in nature which is being used to build the classical multiverse along with quantum space-time and quanta of mass. While most matter is classical according to $E = mc^2$; space, time, and minute quantities of matter such as the elementary particles viz. the electron, the muon, the tau and their quarks and neutrinos are quantum mechanical. Neutrinos are quantum because they can change flavor, something that ordinary matter cannot do.

Planck's units are Universal [4]. They apply to all parts of the Universe because they contain only the three constants of nature viz. G , c , and \hbar . Hence space is formed in discrete amounts of the Planck length of $\sqrt{G\hbar/c^3} = 1.62 \times 10^{-35}$ m which is the smallest length of space, and the ticks of a clock indicate that time is quantum with the smallest unit of time being the Planck time of $\sqrt{G\hbar/c^5} = 5.39 \times 10^{-44}$ s. Planck's mass of $\sqrt{\hbar c/G} = 2.18 \times 10^{-8}$ kg separates the quantum and the classical nature of matter.

Classical Mechanics is local meaning that what happens at one place has no effect on what happens at another distant place. Quantum Mechanics is non-local meaning that its effect can be spread out over large distances as in the case of two entangled electrons.

Sound and water waves, and waves on a string instrument need a medium to travel through, but it has been stated in the Physics literature that light does not need a medium because electric and magnetic fields regenerate each other to propagate light which is an electromagnetic wave. However, this does not explain how gravity waves propagate since gravity does not have two components that can regenerate themselves. Originally it was proposed that ether filled all of space and was the medium that light used. However, the Michelson-Morley experiment proved that ether does not exist. **The medium for light and gravity waves is space itself which can oscillate sending out ripples throughout**

space from the source, just as space can be stretched faster than the speed of light, and space can be bent in the direction of the fourth dimension by a Black Hole.

Space becomes the medium for transporting light and gravity waves because it has a smallest unit of the order of Planck's length that oscillates just as air molecules oscillate for transporting sound waves and water molecules oscillate for transporting water waves. While sound waves are generated by horizontal vibrations of air molecules, space waves are generated by vertical vibrations of space which is like a thin, transparent elastic medium, very much like the surface of a balloon. Each medium has its own characteristic wave speed. For our 3-D space it is the speed of light $c = 3 \times 10^8$ m/s.

3. Conclusion

The difference between Quantum mechanics and Classical mechanics is that the Quantum world is small, discrete, and non-local with no limitations on speed while the Classical world is big, continuous, and local with a limitation on speed which is the speed of light. The sinusoidal disturbance of space is necessary for light and gravity waves to propagate. Matter greater than the Planck's mass that we are used to dealing with in our everyday lives is classical while space, time and elementary particles are quantum mechanical. Dark Energy, which creates matter, charge, space, and time, is quantum mechanical, because it contains photons of different energy levels within different levels of the Quantum void. Hence Dark Energy in the void has the same properties as photons and is devoid of space, time, matter, and charge.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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