Special relativity and dark energy

Corresponding author: Eran Sinbar, Ela 13, Shorashim, Misgav, 2016400, Israel,

Telephone: +972-523-713024, Email: eyoran2016@gmail.com

Abstract

Special relativity can be explained mathematically and can be confirmed by applying

laboratory measurements, but it is not intuitive and sometimes confusing. This paper

will combine dark energy with the length contraction of special relativity, and the

outcome will lead to a revolutionary model of quantized space time and staggered

frames of reference (sometimes will be referred to in this paper also as reference frame).

Introduction

The distance from planet earth to Alpha Centauri is $9.461 * 10^{12}$ Km or 4.367 light

years. Bob leaves earth towards Alpha Centauri at a velocity relative to earth of

Alice stays behind on planet earth. At this high relative velocity, we can define that Bob

and his spaceship are at reference frame B and Alice, Earth and Alpha Centauri are at

reference frame A. Based on special relativity, at reference frame A, Alice will measure

Bob's travelling distance to Alpha Centaury to be 4.367 light years and since Bob's

speed is close to the speed of light (compared to reference frame A), Bob's travelling

time measured by Alice will be slightly above 4.367 years. From Bob's frame of

reference B, due to special relativity length contraction [1], the distance between Earth

and Alpha Centauri is only 4.231 km and the travelling time from his frame of reference

1

is only 0.00006 seconds. If the source of dark energy [2] comes from the cosmological constant [3] in empty space, there should be the same amount of dark energy per volume unit of empty space in all frames of reference. Bob will measure in his frame of reference, less dark energy between Earth and Alpha Centaury, compared to Alice dark energy expectations between earth and Alpha Centauri, in her frame of reference. This is a paradox.

Conclusion

If Alice and Bob measure different dark energy levels of the same empty space between earth and Alpha Centauri, it leads to the understanding that Alice and Bob do not share the same empty space characteristics in their two separate frames of reference. To visualize a model in which different frames of reference represent different empty space characteristics, we need to visualize a new structure of reference frame dependent spacetime. This paper suggests a structure in which each of the infinite number of reference frames represents a different quantized spacetime, staggered next to each other (figure 1). The size of the quantized building blocks is universal (same in all frames of reference), probably in the universal constant size unit of Planck length and Planck time [4]. All the staggered quantized frames of reference probably share a universal extra nonlocal grid like dimension (grid dimension), that we cannot measure directly since we always measure in only one specific quantized frame of reference. The nonlocal grid like dimension connects between all frames of reference and can explain the non-local behavior of quantum mechanics like the non-locality behavior of quantum entanglement "spooky action at a distance" [5].

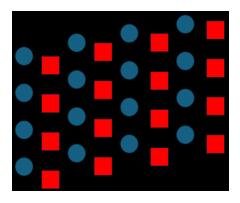


Figure 1: illustration of The staggered matrix approach. Alice quatized local reference frame (space,time,matter,energy,dark energy,dark matter) is illustrated by blue circles while Bob's quantized local reference frame (space,time,matter,energy,dark energy,dark matter) is illustrated by red rectangles. The size of each quantized local unit is the Planck length. The black background illustrates the non local grid dimension between them. In this figure only a small part of Alice and Bob staggered frames of reference is illustrated. The real expected structure of space time is infinite in size, three dimensional, symmetrical and there is an infinite number of reference frames staggered next to each other floating in the non local grid dimension, and the relation between them is defined by Einstein's special relativity. Light travels through the grid dimension and this is why it is massless and has the same velocity for all frames of reference. Non local connections like quantum entanglement can be visualized as connections through the non local grid dimension.

REFERENCES:

- [1] https://en.wikipedia.org/wiki/Length contraction
- [2] https://en.wikipedia.org/wiki/Dark_energy
- [3] https://en.wikipedia.org/wiki/Cosmological_constant
- [4] https://en.wikipedia.org/wiki/Planck_units
- [5] https://en.wikipedia.org/wiki/Quantum entanglement