



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].

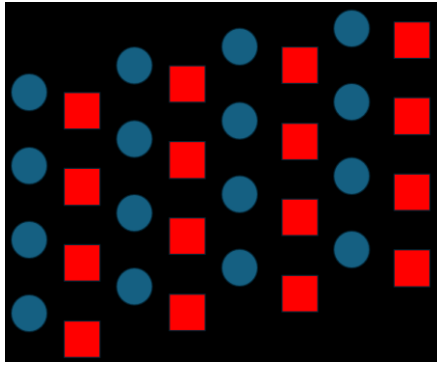


Figure1: illustration of The staggered matrix approach. Alice quantized local reference frame (space,time,matter,energy,dark energy,dark matter) is illustrated by blue circles while Bob's quantized local reference frame (space,time,matter,energy,dark energy,dark matter) is illustrated by red rectangles. 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](https://en.wikipedia.org/wiki/Length_contraction)
- [2] [https://en.wikipedia.org/wiki/Dark\\_energy](https://en.wikipedia.org/wiki/Dark_energy)
- [3] [https://en.wikipedia.org/wiki/Cosmological\\_constant](https://en.wikipedia.org/wiki/Cosmological_constant)
- [4] [https://en.wikipedia.org/wiki/Planck\\_units](https://en.wikipedia.org/wiki/Planck_units)
- [5] [https://en.wikipedia.org/wiki/Quantum\\_entanglement](https://en.wikipedia.org/wiki/Quantum_entanglement)