The Duality of Relativity

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Abstract: Due to the superluminal quantum entanglement, emitted photons are entangled with their source or with a last-interaction object (it can be a detector). The superluminal quantum entanglement fixes the speed of photons ‘c’ in relation to source or a last-interaction object so it is not true that a photon has simultaneously the speed ‘c’ in relation to all frames of reference but it is true that all detectors (they are the last-interaction objects) always measure the speed ‘c’ - such is the correct interpretation of the Michelson-Morley experiment. Damping of protuberances of the dark matter and dark energy (so damping of radial speeds of protogalaxies carried by the protuberances as well) and the quantum entanglement cause that we can see galaxies with redshift higher than 1. Due to the protuberances of the dark matter and dark energy, there appeared the untypical radial speeds of groups of galaxies. Due to the dampened protuberances, we cannot define an exact value of the Hubble constant for observed redshift higher than about 0.6 (then, the Special-Relativity redshift is higher than 0.438). The initial period of evolution of galaxies cannot be seen. The quantum entanglement of photons with their sources causes that spatial distances can differ from time distances to galaxies - it is the duality of relativity. The duality of relativity shows that we can say about the observational, spatial and time Hubble constants because their origin is not the same. The Scale-Symmetric Theory (SST) shows that on the assumption that spacetime does not expand (according to SST, spacetime does not expand; there expand the dark matter and dark energy) the observational Hubble constant should be 70.52 whereas the real spatial and time Hubble constants are 45.24.

1. Introduction and the correct interpretation of the Michelson-Morley experiment

The General Relativity leads to the non-gravitating Higgs field composed of tachyons [1A]. On the other hand, the Scale-Symmetric Theory (SST) shows that the succeeding phase transitions of such Higgs field lead to the different scales of sizes [1A]. Due to the saturation of interactions via the Higgs field and due to the law of conservation of the half-integral spin that is obligatory for all scales, there consequently appear the superluminal binary systems of closed strings (entanglons) responsible for the quantum entanglement, stable neutrinos and luminal neutrino-antineutrino pairs which are the components of the luminal Einstein spacetime (it is the Planck scale), cores of baryons, and the cosmic structures (protoworlds)

that evolution leads to the dark matter, dark energy and expanding universes [1A], [1B]. The non-gravitating tachyons have infinitesimal spin so all listed structures have internal helicity (helicities) which distinguishes particles from their antiparticles [1A]. SST shows that a fundamental theory should start from infinite nothingness and pieces of space [1A]. Sizes of pieces of space depend on their velocities [1A]. The inflation field started as the liquid-like field composed of non-gravitating pieces of space [1A]. Cosmoses composed of universes are created because of collisions of big pieces of space [1A], [1B]. During the inflation, the liquid-like inflation field (the non-gravitating superluminal Higgs field) transformed partially into the luminal Einstein spacetime [1A]. In our Cosmos, the two-component spacetime is surrounded by timeless wall – it causes that the fundamental constants are invariant [1A], [1B].

The mentioned structures are not good understood or are neglected in both the General Relativity and Standard Model so there appear many wrong interpretations.

2. The origin of the redshift higher than 1

Due to the superluminal quantum entanglement, emitted photons are entangled with their source or with a last-interaction object (it can be a detector). The superluminal quantum entanglement fixes the speed of photons c in relation to source or a last-interaction object so it is not true that a photon has simultaneously the speed c in relation to all frames of reference but it is true that all detectors (they are the last-interaction objects) always measure the speed c - such is the correct interpretation of the Michelson-Morley experiment [1B].

SST shows that observed redshift of majority of most distant galaxies should be about $z = 0.64$ i.e. the Special-Relativity redshift calculated from following formula

$$z_r = (z^2 + 2z) / (z^2 + 2z + 2), \tag{1}$$

should be about $z_r = 0.46$ [1B]. But at the beginning of the expansion of the Universe (the "soft" big bang), there appeared the cascades of protuberances of the dark matter and dark energy that carried the protogalaxies [1B]. It caused that there appeared not numerous groups of protogalaxies and single protogalaxies with redshift much higher than 1. According to SST, such protogalaxies should not be seen by an observer on Earth. But with time, such protuberances (so the untypical radial motions of protogalaxies as well) were dampened to equalize the local radial motions of the dark matter, dark energy, and protogalaxies. It means that there was a deceleration of the protogalaxies with the untypical motions. On the other hand, the photons emitted earlier by such protogalaxies towards Earth, due to the quantum entanglement, should have the relative speeds in relation to their sources always equal to the c – it looks for an observer on Earth as "acceleration" of such photons, i.e. the damping of protuberances causes that with time such photons are redder and redder. We can see them on Earth when relative radial speed of decelerated protogalaxy becomes lower than the c but the redshift of such photons suggests that they were emitted by galaxies with initial relative radial speed much higher than the c.

As a conclusion we can say that the formula for the Special-Relativity relativistic redshift (formula (1)) is used in the mainstream cosmology in an unreasonable manner.

We can say as well that due to the protuberances of the dark matter and dark energy, there appeared the untypical radial speeds of groups of galaxies (it is consistent with observational facts). Such untypical motions do not result from attraction of some mass external to the expanding Universe.

Due to the dampened protuberances, we cannot define an exact value of the Hubble constant for observed redshift higher than about 0.6 (then, the Special-Relativity redshift is higher than 0.438).

3. Duality of relativity and Hubble constant

The Scale-Symmetric Theory shows that the inflation of the Cosmos (the big bang) was separated in time from the beginning of expansion of the universes (the "soft" big bangs) [1A], [1B]. It leads to conclusion that the initial period of evolution of galaxies cannot be seen [1B].

The quantum entanglement of photons with their sources causes that spatial distances can differ from time distances to galaxies – it is the duality of relativity.

The duality of relativity shows that we can say about the observational, spatial and time Hubble constants because their origin is not the same.

SST shows that on the assumption that spacetime does not expand (according to SST, the spacetime does not expand; there expand the dark matter and dark energy) the observational Hubble constant should be 70.52 [1B].

SST shows that the real age of the Universe since the beginning of the "soft" big bang is about 21.6 Gyr but due to the duality of relativity, we can see only the last period equal to 13.866 ± 0.096 Gyr. On the other hand, the radial speed of the front of the CMB is equal to the c so calculated the real spatial and time Hubble constants are 45.24.

4. Summary

Due to the superluminal quantum entanglement, emitted photons are entangled with their source or with a last-interaction object (it can be a detector). The superluminal quantum entanglement fixes the speed of photons c in relation to source or a last-interaction object so it is not true that a photon has simultaneously the speed c in relation to all frames of reference but it is true that all detectors (they are the last-interaction objects) always measure the speed c – such is the correct interpretation of the Michelson-Morley experiment.

Damping of protuberances of the dark matter and dark energy (so damping of radial speeds of protogalaxies carried by the protuberances as well) and the quantum entanglement cause that we can see galaxies with redshift higher than 1.

We can say also that due to the protuberances of the dark matter and dark energy, there appeared the untypical radial speeds of groups of galaxies (it is consistent with observational facts). Such untypical motions do not result from attraction of some mass external to the expanding Universe.

Due to the dampened protuberances, we cannot define an exact value of the Hubble constant for observed redshift higher than about 0.6 (then, the Special-Relativity redshift is higher than 0.438).

The Scale-Symmetric Theory shows that the inflation of the Cosmos (the big bang) was separated in time from the beginning of expansion of the universes (the "soft" big bangs). It leads to conclusion that the initial period of evolution of galaxies cannot be seen. The quantum entanglement of photons with their sources causes that spatial distances can differ from time distances to galaxies – it is the duality of relativity. The duality of relativity shows that we can say about the observational, spatial and time Hubble constants because their origin is not the same.

SST shows that on the assumption that spacetime does not expand (according to SST, the spacetime does not expand; there expand the dark matter and dark energy) the observational Hubble constant should be 70.52 [1B].

SST shows that the real age of the Universe since the beginning of the “soft” big bang is about 21.6 Gyr but due to the duality of relativity, we can see only the last period equal to 13.866 ± 0.096 Gyr. On the other hand, the radial speed of the front of the CMB is equal to the c so calculated the real spatial and time Hubble constants are 45.24.

The duality of relativity causes that time in groups of galaxies that radial speed is the same as the expanding local dark matter and dark energy is going the same.

References

[1] Sylwester Kornowski (2015). *Scale-Symmetric Theory*
[1A]: http://vixra.org/abs/1511.0188 (Particle Physics)
[1B]: http://vixra.org/abs/1511.0223 (Cosmology)
[1C]: http://vixra.org/abs/1511.0284 (Chaos Theory)
[1D]: http://vixra.org/abs/1512.0020 (Reformulated QCD)