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Short Communication

Non-Expanding Universe Model

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Abstract *- The author opposes the expanding universe model in the present contribution. He argues that the redshifting effect observed in light spectra of distant galaxies shall be interpreted according to Einstein's field equation given in the general theory of relativity rather than the Doppler Effect. In the logic of the presented model, the redshift of the spectra of distant galaxies has been caused by the gravitational curvature of spacetime. Following the authors earlier presented model in which the universe reassembles a two-dimensional membrane at the event horizon of the black hole, it seems obvious that spacetime flattened according to the Lorentzian contraction law must have a curvature. Yet these distant galaxies are not moving away from an observer. The farther these galaxies are located in relation to an observer, the increasing curvature of spacetime (within the observable horizon) makes them seen as undergoing increasing pressure of gravity acceleration forces, causing the redshift effect. The author proposed a simple test to confirm the finding.*

Keywords *- Einstein's field equation, Model of universe, Non-expanding universe, Space expansion, Universe origin.*

1. Introduction

The problem of the nature of the universe had probably troubled the minds of people since the moment when abstract thinking gave rise to reflection on the meaning of existence. It was elaborated with more details in [1-14, 16-19]. However, the most significant achievements were noticed within the XX century. In 1929, Edwin Hubble showed that the universe might not be as stable as previously thought and displayed a strange effect in the appearance of light spectra of distant galaxies. Those light spectra show increasing light waves shifting them towards the red band and increasing this effect proportionally to galaxies distant from the observer [34]. Measured redshifts of those spectra with the interpretation of this phenomenon by the Doppler Effect show distant galaxies running away from us. The farther they are to be found, the faster they seem to appear, running away with increasing speed proportional to their distance.

This discovery was based on the Big Bang theory, which was a kind of counterbalance to the Steady-State theory. The very name of this theory was coined by the staunchest critic of the concept, Fred Hoyle, in 1949[21], which was developed from earlier results by Einstein, Friedman, and Hubble [22 -24].

The universe's expansion speed, as described in the Hubble constant, increases by about 74 km/s/Mpc, or 74 km/s for every million parsecs (1pc ~ 3 light years). The idea is based mainly on the study of the redshift of the spectra of distant galaxies interpreted based on the Doppler Effect, which was adopted to support the official cosmological doctrine of expanding the universe accepted by most researchers of the 20th century [35]. This doctrine approves that the expansion of the universe has not yet been confirmed by independent methods allowing to direct measure of the difference in the distance of receding galaxies over a period of time.

However, such confirmation tests are feasible using already existing methods, and high hopes can be placed in future measurements using more precise tools. Such tools include the giant space telescope named after James Webb, which has already started work in orbit around the sun, and the SPHEREx telescope, scheduled for launch in 2025, which is expected to continuously map 99% of the observable universe in repeating cycles of six months.

The problem with measuring the real picture of distant galaxies moving away is the low precision of current measurements. As a result, the measured change in the redshift of the spectra of galaxies is extremely small over vast distances of space, about 10^{-8} m in 100 years, while our measurement error using modern redshift measurement techniques is much larger and averages 10^{-4} m, and in the most favorable conditions, the measurement error can be reduced to a value of 10^{-6} m, which is still two orders of magnitude higher than the measured values of the supposedly receding galaxies (T. Davis, personal communication).

According to a model in the present contribution, it is possible. Instead of using the Doppler law interpretation of the redshift of light spectra from distant galaxies, the law

promulgated in the General Theory of Relativity and described by the Einstein field equation has to be used [24]. Einstein's field equation concludes that the forces of gravity, inertia, and acceleration are related to how space and time are bending. I the simplest form, this equation may be:

$$G_{\mu\nu} + \Delta g_{\mu\nu} = kT_{\mu\nu}$$

Where Gμν - Einstein tensor, $g_{\mu\nu}$ - metric tensor, k – constant ($2{,}0767 \times 10^{-43} N^{-1}$), $T_{\mu\nu}$ - stress-energy tensor, Δ - cosmological constant.

As perceived from Einstein's field equation, gravity tells how mass bends spacetime and how bent spacetime forces mass to adjust its acceleration to match the spacetime bending. The distribution of mass and energy within time-space directly and synonymously define its curvature.

2. Results and Discussion

To answer the abovementioned concerns, the author presented a universe model based on the earlier published hypothesis in which the universe reassembled a two-dimensional membrane located at the event horizon of the Black hole [26].

As elaborate in [2, 26], this assumption, the universe we observe around, within the presented model, places us as internal observers in the center of the observable universe horizon at the two-dimensional membrane of the black hole. This view happens as a result of the well-known relativistic cosmology effect described by the Lorentzian contraction law (Lorentz-FitzGerald contraction, also called space contraction, in relativity physics, the shortening of an object along the direction of its motion relative to an observer. Dimensions in other directions are not contracted [27], which allows the shrinking of almost 0 two of our four spacetime dimensions, as independent observers see. The spacetime which builds our universe is the quantum-based medium of energy fields. This vacuum energy was for the first time measured in 1948 by Cassimir [28].

There must be an effect of accelerating these bodies displaying redshift. The farther galaxies are located from an observer placed at a spherical membrane, the greater curvature of spacetime may be measured relative to the internal observer. Accordingly to Einstein's equation, greater acceleration forces are needed to cause such curvature increase. Observers notice this effect as the redshift of light spectra increases from distant galaxies located with the internal observer at the spherical membrane.

If the internal observer looks around, he can see distant space objects. The farther away they are, the greater redshift in their light spectra they may measure. There, the "peculiar light" of singularity could be seen beyond the veil of microwave background radiation. So, all those objects in understanding the presented model are not running away from us but seem to be falling towards the singularity surrounding us as internal observers. Getting there, all galaxies seem to be moving away from us to falling with increasing acceleration towards the singularity whose picture is painted all around, on the cosmological event horizon.

Of course, in the presented model, the galaxies do not fall to the cosmological event horizon, where they would reach a speed of light, but like those spinning on carousel chairs, feeling the acceleration, they do not fly away from the carousel axis (unless the cable holding the chair breaks) but circulate around. If we place flashing lights onto seats circulating on the carousel, then their spectrum observed from the axis of the carousel would indicate a redshift adequate to the centrifugal accelerations that are felt on the chairs of the carousel. If add more chairs fixed on ropes of various lengths and set in motion the whole constellation of chairs with flashlights, the observer placed on the axis of the rotating carousel would see that the light spectra of flashlights, located further from the axis of rotation, subject to greater acceleration of the centrifugal force, show greater redshift compared to those located closer to the axis and thus subject to lower acceleration. Despite the observation of greater elongation of light waves emitted from flashlights, none of the chairs moves away from the axis of rotation of the carousel. In the case of interpretation of this constellation of flashlights, according to the Doppler law, they should move away with increasing speed the further they are from the axis of the carousel. Using Einstein's field equation interpretation, one can understand that acceleration forces are causing light waves to elongate, so their spectra are subjected to redshift.

3. Testing Proposal

Laser diodes placed on a rotating arm of the centrifuge would send light towards its axis of rotation, from where light would be sent to a spectrometer recording the spectrum of those lights. As the spin speed increases, the light emitted from the lasers, subject to increasing acceleration of the centrifugal force, should show an increase of redshift in their spectra.

Thus, the surrounding galaxies located at the Black hole's event horizon membrane will never fall to the singularity. However, from any point on that membrane, observing the same picture around where cosmic objects' light spectra will be subject to redshift may be possible.

In the presented model, the universe's spacetime reassembles a spherical membrane which obviously must display curvature. From the internal observer's point of view, placed at the two-dimensional membrane, the further

objects are located, the greater force is needed to band membrane fragments between the observer and observed objects. The greater the curvature the observer notice, the greater redshift shall be expected in the light spectra sent from observed objects. It happens because greater acceleration forces are required to cause such curvature seen by the internal observer.

Can a black hole be the equivalent of a carousel? Carousel is presented here as an example that is a nice metaphor to illustrate the cosmological phenomenon. However, from what we already know about black holes, they can spin and be endowed with an electric charge, which can have a significant impact on the construction of electromagnetic in nature the large structure of the universe where galaxies build cellular structures in the universe as was observed in [28 - 33].

The model of the universe shown here may be seen as a variant of the Big Bang theory. In the discussed model, the Big Bang and inflation phenomena are not questioned and understood as the universe's origin.

The appearance of singularity destroys fragments of spacetime and laws of nature within the ancestry universe and introduces new laws for the newly born universe. In the short epoch of inflation, the universe is not breaking the laws of physics but establishing them. After the end of inflation, the laws were already fixed; the physical constants from then on were established. Inflationary universe increase has nothing to do with the further spreading or shrinking of space between distant galaxies.

In this context, the Hubble constant can be regarded as the value of gravitational acceleration on the cosmological event horizon of the universe. In other words, it can be a scale for measuring the spacetime curvature of the universe. In the meter, of fact, it may seem extremely small because the acceleration is roughly speculating about 10 picometers/s^2.

4. Conclusion

The author, arguing with the expanding universe model, believes that the law resulting from the Einstein field equation given in the general theory of relativity, and not the Doppler law, should be used to interpret the redshift of the light spectra of distant galaxies. Applying the logic of Einstein's equation will change a completely confusing picture, revealing a concise and easy-to-imagine model of the origin and nature of the universe where the gravitational curvature of spacetime has caused the redshift of the light spectra of distant galaxies. At the same time, the presented model supports the Big Bang theory, which is an expressive metaphor rather than a scientific term. The rapid growth of the universe during the inflation epoch is associated with the Big Bang phenomenon.

According to the presented model, our universe is not expanding, and distant galaxies do not intend to run away from us and are also connected in a common network of fibrous, highly porous spatial structures. These structures are electromagnetic in nature and form a super-organism of an unknown destiny.

References

[1] H. Bondi, *Cosmology*, Cambridge University Press, by Lowe & Brydone, LTD, London, 1961.

[2] Marek S. Żbik, "The Nature of Universe," *SSRG International Journal of Geoinformatics and Geological Science*, vol. 9, no. 1, pp. 21–27, 2022. [CrossRef] [Publisher Link]

[3] Leonard Susskind, *The Cosmic Landscape: String Theory and the Illusion of Intelligent Design*, Back Bay Books, 2005. [CrossRef] [Google Scholar] [Publisher Link]

[4] David L. Wiltshire, "Timescape Cosmology: Modifying the Geometry of the Universe," Physical Review D, vol. 88, p. 083529, 2013. [Google Scholar]

[5] Edward Witten, "String Theory Dynamics in Various Dimensions," *Nuclear Physics B*, vol. 443, pp. 85- 126, 1995. [CrossRef] [Google Scholar] [Publisher Link]

[6] Wolszczan A. "Discovery of Pulsar Planets," *New Astronomy Reviews*, vol. 56, pp. 2-8, 2012. [CrossRef] [Google Scholar] [Publisher Link]

[7] Camille Flammarion, "*The Atmosphere: Popular Meteorology*," Paris: Hachette, p. 163, 1888. [Google Scholar] [Publisher Link]

[8] T. Bührke, *Forces that Rule in Galaxies*, Max Planck Research, vol. 1, pp. 34-41, 2015. [Google Scholar]

[9] Stephen William Hawking, and Roger Penrose, "The Singularities of Gravitational Collapse and Cosmology," *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*, vol. 314, pp. 529-548, 1970. [CrossRef] [Google Scholar] [Publisher Link]

[10] Stephen Hawking, *A Brief History of Time*, Cox & Wyman Ltd, Reading, Berkshire, 1996.

[11] W. Heisenberg, "About Quantum Theoretical Reinterpretation of Kinematic and Mechanical Relationships," *Magazine for Physics*, vol. 33, no. 1, pp. 879–893, 1925. [CrossRef] [Google Scholar] [Publisher Link]

[12] Andrei Linde, "The Self-Reproducing Inflationary Universe," *Scientific American*, vol. 9, no. 1, pp. 98–104, 1998.

[13] Max Born, “On the Quantum Mechanics of Collision Processes,” *Magazine for Physics*, vol. 37, no. 12, pp. 863–867, 1926. [CrossRef] [Publisher Link]

[14] H.B.G. Casimir, “On the Attraction between Two Perfectly Conducting Plates,” *Royal Dutch Academy of Westenchapp, Proceedings Series B, Physical Science*, pp. 793-795, 1948. [Google Scholar] [Publisher Link]

[15] T. M. Davis, Ch. H. Lineweaver, “Expanding Confusion: Common Misunderstanding of Cosmological Horizons and the Superluminal Expansion of the Universe,” *Astronomical Society of Australia*, vol. 21, pp. 97-104, 2004. [CrossRef] [Google Scholar] [Publisher Link]

[16] David L. Wiltshire, “Timescape Cosmology: Modifying the Geometry of the Universe,” Physical Review D, vol. 88, p. 083529, 2013. [Google Scholar]

[17] Michael Perryman, *The Exoplanet Handbook*, Cambridge University Press, 2011. [CrossRef] [Google Scholar] [Publisher Link]

[18] P. Pesic, “*Unheard Harmonies, Music and the Making of Modern Science*,” Massachusetts Institute of Technology Press, 1914.

[19] H. Bondi, and T. Gold, “The Steady-State Theory of the Expanding Universe,” *Monthly Notices of the Royal Astronomical Society, Cambridge University Press*, vol. 108, 252, 1948. [CrossRef] [Google Scholar] [Publisher Link]

[20] A. E. Ringwood, *Origin of the Earth and Moon.* Springer-Verlag, 1979. [CrossRef] [Google Scholar] [Publisher Link]

[21] E. L. Ruskol, *Origin of the Moon*, Nauka, Moscow, 1975. [Google Scholar]

[22] Maarten J. Van der Burgt, "Accelerated Expansion of a Matter-Antimatter Universe," *SSRG International Journal of Applied Physics*, vol. 8, no. 1, pp. 5-13, 2021. [CrossRef] [Publisher Link]

[23] F. Hoile, “A New Model for the Expanding Universe,” *Monthly Notices of the Royal Astronomical Society*, vol. 108, no. 5, pp. 372-382, 1948. [CrossRef] [Google Scholar] [Publisher Link]

[24] A. S. Eddington, *The Expanding Universe*, Cambridge, 1933. [CrossRef] [Google Scholar] [Publisher Link]

[25] A. Einstein, "The Foundation of the General Theory of Relativity," *Annals of Physics*, vol. 354, no. 7, p. 769, 1916. [Google Scholar] [Publisher Link]

[26] Albert Einstein, *The Theory of Relativity*, Methuen, 1936. [Google Scholar] [Publisher Link]

[27] Lucas W. L., Joseph I. K., Chifu E. Ndikilar, N. Yakubu, "An Extended Study on the Precession Equation in the Gravitational Field of Spherical Mass," *SSRG International Journal of Applied Physics*, vol. 7, no. 2, pp. 16-19, 2020. [CrossRef] [Publisher Link]

[28] Marek S. Żbik, “The Universe as Two-Dimensional Membrane on the Event Horizon of Singularity,” *SSRG Int. J. Geoinf. & Geol. Sci*, vol. 7, no. 2, 2020. [CrossRef] [Google Scholar] [Publisher Link]

[29] B. A. Schreiber, *Lorentz-FitzGerald Contraction*, The Editors of Encyclopaedia Britannica, 2021.

[30] J. Richard Gott III et al., “A Map of Universe,” *The Astrophysical Journal*, 624, pp. 463–484, 2005. [CrossRef] [Google Scholar] [Publisher Link]

[31] Rainer Beck, “Magnetic Fields in Spiral Galaxies,” *Astronomy and Astrophysics Review*, vol. 24, no. 4, 2016. [CrossRef] [Google Scholar] [Publisher Link]

[32] F. Fontani et al., “Magnetically Regulated Fragmentation of a Massive, Dense, and Turbulent Clump,” *Astronomy & Astrophysics*, vol. 593, 2016. [CrossRef] [Google Scholar] [Publisher Link]

[33] U. Klein, A. Fletcher, *Galactic and Intergalactic Magnetic Fields*, Springer, Heidelberg, 2015. [Google Scholar] [Publisher Link]

[34] G. Rüdiger, R. Hollerbach, *The Magnetic Universe*, Wiley-VCH, Weinheim, 2004.

[35] Marek S. Żbik, “Flocculated Universe is the Universe an Electromagnetic Entity?,” *SSRG International Journal of Geoinformatics and Geological Science*, vol. 51, no. 3, pp. 24-29, 2018. [CrossRef] [Publisher Link]

[36] Edwin Hubble, “A Relation between Distance and Radial Velocity among Extra-Galactic Nebulae,” *Proceedings of National Acadamy of Science*, vol. 15, no. 3, pp. 168–173, 1929. [CrossRef] [Google Scholar] [Publisher Link]