

Review of: "Evidence-based cosmology and galactic rotation curves"

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Potential competing interests: No potential competing interests to declare.

Comments for paper entitled :

[Bijective analysis of space expansion and comeback of stationary cosmology](#)

By : Amirt Srecko Sorli

At first I should thank Dr. Alberto Bedogni (Peer Review Team, Qeios) that invited me to review this very exciting article. I handled to review this paper because it pays to some essential open problems in the cosmology which not solved now and they are challenging for every thinking person. From this point of view I recommend study of this paper for everybody which like to know about the cosmos. As an suggestion to improve the manuscript I recommend to add a short history for steady state cosmological models in the paper by referring to references [1,2,3,4] pointed at below comments because Bondi, Gold, Hoyle and particularly the Einstein himself are builders and creators of the quasi-steady state cosmological models at a first time at duration of the years 1931-1948.

One of essential questions about the cosmos is that did it born at an expectable initial time? In other words does the Big Bang model of cosmology is correct? Because there is another alternative cosmological model called as `quasi-steady-state cosmologies` where the density of cosmic matter remains as constant at every time and everywhere. In other words the latter models follow the `perfect cosmological principle` while the Big Bang model does not follow this. Usually the steady state cosmological models which presented at the first time by researchers Hermann Bondi, Thomas Gold, and Fred Hoyle [1,2] (see also Einstein`s steady state model [3,4]) call creative models which by exponentially expanding of a flat spacetime the matter should be created so that its density to be constant always and everywhere from point of view of arbitrary observer. In other words the universe as a whole is time independent and so it seems that the cosmos has not a born-time. However this is in fact based on the cosmic philosophical `perfect cosmological principle` where one assume that the spacetime has homogeneity and isotropy properties in both of time and spatial directions while in the standard Big Bang model the homogeneity and the isotropy properties of the spacetime was accepted just in the spatial direction and not in the time direction. This Big bang model predicts naked singularity (at the classical regime of the fields and not in the quantum regimes of the fields [5]) with infinite value for cosmic matter density at origin of the time where the cosmos was born at this beginning time. By its expanding the density of matter is vanishing. The nucleosynthesis is caused by interaction between the elementary particles and radiations to produces large scale structures of cosmic matter throughout the expansion after reheating and inflation phases. Although several advantages of the steady state

cosmology compared to the Big Bang model are stated in this article by the author and this is very significant in my opinion. We should remember that both of steady state models and the standard Big Bang model are based on the different philosophical principles. In fact keep of each of these alternative cosmological models is depended to beliefs, faith, and the worldview of every thinking person, which can be affected by the surrounding environment. But common sense says that any of these models which have more correspondence with real world then should be preferred. The ups and downs of the history of progress physics show that both mentioned models should be challenged forever, the next choice depends on the next developments in the science and technology. In my opinion the steady state models in cosmology have present restriction on the matter density as to be constant. My second criticize is about the bijective models which are poor in description of complex systems. In fact we have many complex systems in the real world in which we can not understand all details in the process of phenomena. For example, the hidden variables proposed by Einstein and his colleagues for the `theory of measurement` in quantum systems and the treatment of lost information when measuring the Schrödinger wave of quantum particles interacting with potentials. This ultimately reads to an alternative deterministic Bohemian model of quantum mechanics which is applicable instead of the standard Copenhagen quantum mechanics [6] (as an application in Robertson walker cosmology with Bohimain quantum gravity perspective one can see [7]). Although the hidden variables which are not observed in an experiment of a quantum phenomenon but they are assumed as facts that keep the causality in the deterministic Bohmian QM. Now one can have a question that what say the bijective models about the lost of information in the quantum system measurements?. By regarding this we should not restrict ourselves to the bijective models where phenomena which are just observed should be accepted as real world. This is a mandatory forcible restriction which a common sense does not accept. Consideration of constant density matter for cosmos is a restriction too which is produced from steady state cosmologies. If steady state models give out some understandable results but are not enough for other phenomena for instance properties of the cosmic microwave background, radio sources and cosmological helium abundance and or even anisotropy in the CMB called as `Axis of evil` of our universe which are more readily explained in a Big Bang model than in a steady state. What is say the steady state models and particularly bijective methodology about the `anthropic cosmological principle` [8] which in fact has a real cognitive value not the tautology? Also I should point that the driving force in the steady state models not creates the particles but rather the vacuum energy of a scalar quantum field with effective constant potential which is applied for definition of constant Hubble parameter in the steady state models. In other words the steady state models can not describes as correctly that how matter-energy is injected into the spacetime such that the density remain as constant and now we have large scale cosmic structure in our universe. Where is it coming from to support? What can say the bijective methodology of set theory about the gravitational lensing and number of formed images?. Particularly when we have strong gravitational lensing where one cosmic object is observed as infinite number of formed images. Now by according to the bijective theory one can have a question that form point of observer what is physical reality? One unobserved cosmic object? Or multiple observed images? So it seems that the basis and principle of knowing the world should not be limited only to everything that is observed, maybe there are phenomena in the mysterious world that are far from the reach of our measuring tools.

Other my criticize is as follows: The author refers to results of the Hartel and Hawking's work ` (see Refs. [5,6] given in the paper), that their model does not give a correct definition to the ground state energy of a closed universe. I can say

that this problem in fact can be solved by using alternative gravity theories instead of the Einstein equation (geometrical approach of gravity) without to need to use bijective methodology or steady state cosmology (see for instance [7] and references therein) The Wheeler Dewitt approach of quantum cosmology has several essential problems which in my opinion one of them is that we have not know wave function of the our Universe as whole so that we can not determine coefficients of series expansion. In this approach we can just determine eign functions of the WD equation for our universe which say just all its permissible states. While in the subatomic systems we have not such as problems. It seems that to obtain wave functional of our universe correctly containing all information of it we must transit (probably through the spirit or supreme consciousness or psychic forces not physical body) to a `super universe` to measure this mysterious world with new clock and ruler, similar to a child which after born from the mother's womb who is understand value of his/her hands and feet after try to walk (means doing of experiment). While his/her hands and feet are not usable in the mother`s womb!!. By according to set theory and bijective methodology there is the set of X but not the set of Y inside of mother`s womb (a baby universe). X means hands and feet but Y are discover of walking and handling of a thing by hands and understanding the truth of the existence of hands and feet.

I must admit that this view is completely different from the steady state cosmology and the Big Bang cosmology from philosophical point of view. In the latter view, some of measurement and observation tools for discover of facts and unknown of universe will be applicable and meaningful just in possible other super universes and not in the universe which we lives in. This measurement and observation tools should be experiences of intuitive understanding of Educated human soul not its physical body which is disappeared after dead.

In the last words, I should say that I did not express these opinions and suggestions in order to reduce the value of the article. As i said previously the paper has strength and written as professional, I just wanted to say that different worldview and philosophical attitudes can create other models of cosmology and encourage other thinkers to try to prepare suitable tools for discover the secrets of nature.

i should say that we must leave the mind and thought free so that it can delve into the world of the unknown, so that it can conquer the world of the unreached, because the history of physics shows this. It shows that if the mind was made restricted to some just observational things then the science and technology was not have progressed so much we see. Theoretical physics approach thinking's at least improve the human reason about the universe which live in and so provide scientific theories that are very useful for human culture and civilization. Although they should be verified via experiments or observations at duration of time. It is not necessary to pay little respect to the growth rate of different theories and their experimental confirmations, even if one of them have a little growth, maybe has more growth in the passage of time.

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