Major Shortcomings of Modern Cosmology- A Review

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Abstract: In this letter an attempt is made to emphasize the major short comings of modern or standard cosmology.

Major Shortcomings of Modern Cosmology

1. It may be noted that, increased redshifts and increased distances forced Edwin Hubble to propose the Hubble's law. In fact there is no chance or scope or place for 'galaxy receding'. Its only our belief in its 'given' (Doppler shift based) interpretation. Even then, merely by estimating galaxy distance and without measuring galaxy receding speed, one cannot verify its acceleration. Clearly speaking: two mistakes are happening here. A) Assumed galaxy receding speed is not being measured and not being confirmed. B) Without measuring and confirming the galaxy receding speed, how can one say and confirm that it (galaxy) is accelerating. If it is possible to show that, (from the observer) older galaxy's distance increases with its 'age', then the concepts 'galaxy receding' and 'accelerating universe' can be put for a revision at fundamental level.

2. With reference to our laboratory or our galaxy, the possible definitions of redshift (z) seem to be:

$$z \cong \frac{E_0 - E_G}{E_0} \cong \frac{\lambda_G - \lambda_0}{\lambda_G} \cong z_x(\text{say}) \le 1 \tag{1}$$

$$z \cong \frac{E_0 - E_G}{E_G} \cong \frac{\lambda_G - \lambda_0}{\lambda_0} \cong z_y \text{ (say).} \tag{2}$$

$$z_x \cong \frac{z_y}{1 + z_y} \tag{3}$$

Here $E_0 \cong (hc/\lambda_0)$ is the energy of photon at our galaxy/laboratory and $E_G \cong (hc/\lambda_G)$ is the energy of photon at the observed galaxy when it was emitted. Similarly λ_G is the wave length of light received from observed galaxy and λ_0 is the wave length of light in laboratory. Very interesting thing is that, when redshift is very small (up to $z \approx 0.01$), both relations almost all will give the same result. Important point to be noticed is that, by Hubble's time the maximum redshift noticed was 0.003 and was less than 0.01. Another interesting point to be noted is that, by Hubble's time, estimated value of H_0 was close to 530 (km/sec)/Mpc and its present value is close to 70 (km/sec)/Mpc. With these errors, certainly it is possible to replace relation (2) by relation (1). Now the fundamental question to be answered is: which relation is correct: either relation (1) or relation (2)?

3. During cosmic expansion, assuming past and present galaxies (which actually found to have gigantic structures) as 'points' and guessing photons coming from that galactic point particles seem to be ad-hoc. If light is coming from the atomic matter of the gigantic galaxy, then redshift can be interpreted as an index of the galactic atomic 'light emission mechanism'. In no way it seems to be connected with 'galaxy receding' .

4. If cosmic expansion is continuous and accelerating and redshift is a measure of cosmic expansion, then 'rate of increase in redshift' can be considered as a measure of cosmic 'rate of expansion'. Then there is no possibility to observe a 'constant' red shift. More over the current definition of red shift seems to be ad-hoc and not absolute hence one may not be able to understand or confirm the actual cosmic rate of expansion.

5. According to the modern cosmological approach, bound systems like 'atoms' which found to be the major constituents of galactic matter - will not expand with cosmic expansion/acceleration. As per the present observational

data this may be true. It might be the result of ending stage of expansion also. In this regard, without considering and without analysing the past data, one can not come to a conclusion. If it is not possible to collect the past data, theoretically it may be possible to proceed further in this new direction.

6. Even though it was having strong footing, Mach's principle was not implemented successfully. One of the main motivations behind formulating the general theory of relativity was to provide a mathematical description to the Mach's principle. However, soon after its formulation, it was realized that the theory does not follow Mach's principle. As the theoretical predictions were matching with the observations, Einstein believed that the theory was correct and did not make any farther attempt to reformulate the theory to explain Mach's principle. Later on, several attempts were made by different researchers to formulate the theory of gravity based on Mach's principle. However most of these theories remain unsuccessful to explain different physical phenomena.

7. Even though the whole physics strictly follow the 'constancy of speed of light', cosmic acceleration seems to violate it. This is really doubtful.

8. There is no scientific evidence for the Friedmann's second assumption. As suggested by S.W. Hawking, we believe it only on the grounds of modesty .

9. Drop in 'cosmic temperature' can be considered as a measure of cosmic expansion and 'rate of decrease in cosmic temperature' can be considered as a measure of cosmic 'rate of expansion'. But if rate of decrease in temperature is very small and is beyond the scope of current experimental verification, then the two possible states are: a) cosmic temperature is decreasing at a very slow rate and universe is expanding at a very slow rate and b) there is no 'observable' thermal expansion and there is no 'observable' cosmic expansion.

10. The evidence for dark energy is only indirect and many things about the nature of dark energy remain matters of speculation. If 'Dark energy' is the major outcome of the 'accelerating universe', it is very important to note that so far no ground based experiment confirmed the existence of dark energy. How to identify its existence ?– is also a big answerless question.

11. There is no single clue or definition or evidence to any of the natural physical properties of (the assumed) dark energy. Without knowing its any basic physical property, it is impossible to implement 'Dark energy' in other areas of physics. In understanding the basic concepts of unification or other fundamental areas of physics, role of dark energy is very insignificant.

12. Some cosmologists use the term 'Hubble volume' to refer to the volume of the observable universe. At any given time, the product of 'critical density' and 'Hubble volume' gives a characteristic cosmic mass and it can be called as the 'Hubble mass'. Interesting thing is that, Schwarzschild radius of the Hubble mass again matches with the Hubble length. Most of the cosmologists believe that this is merely a coincidence. If one is able to show the applications of 'Hubble volume' and 'Hubble mass' in different areas of fundamental physics, certainly it can be given more significance and superiority compared to the mysterious 'dark energy'. Not only that, Mach's principle can successfully be implemented in atomic, nuclear and quantum physics.

13. Dimensionally it is perfectly possible to show that, the dimensions of Hubble's constant and angular velocity are same. If so considering Hubble's constant merely as an expansion parameter may not be correct. Galaxies spin, stars spin, and planets spin. So, why not the whole universe? The consequences of a spinning universe seem to be profound, natural and 'cosmic collapse' can be prevented. Clearly speaking, 'cosmic rotation' can be considered as an alternative to the famous 'repulsive gravity' concept.

14. From unification point of view, synthesis of elementary physical constants seem to be more fundamental than the 'cosmological nucleosynthesis'.

If one is willing to think in this new direction, certainly other hidden things can also be surfaced out.