Identification of Major Misconception in The Standard Cosmological Thermodynamics

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Abstract

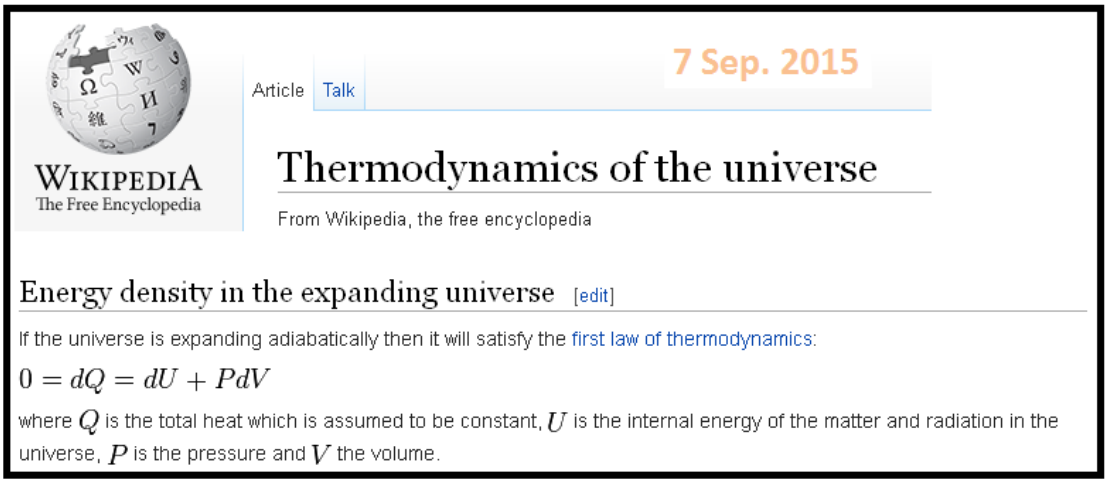
It is shown that there is an essential difference between the expansion of the universe and the expansion of the ordinary systems and they cannot be handled by the same laws.

Introduction

Unfortunately and strangely , it seems that it is easier for our modern cosmologists to spend much time searching for explanation to the problems of global cosmology than to doubt about the applicability of the equations which generate them until we arrived at this situation of standard theoretical cosmology in which the number of dark quantities and unsolved problems is more than the number of meaningful quantities and explained facts.

Here is a clear example of the ignorance of the infirmity of application of what is considered a source of basic equations of global cosmology in the standard model.

The Universe is Not a Piston



WIKIPEDIA
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Article Talk

Thermodynamics of the universe

From Wikipedia, the free encyclopedia

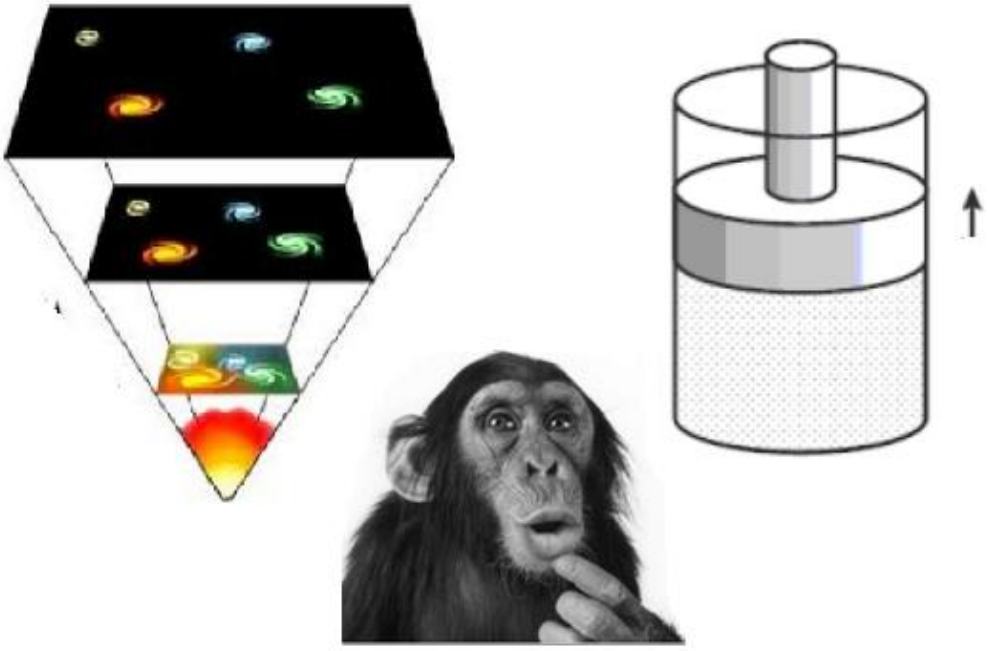
Energy density in the expanding universe [edit]

If the universe is expanding adiabatically then it will satisfy the first law of thermodynamics:

$$0 = dQ = dU + PdV$$

where Q is the total heat which is assumed to be constant, U is the internal energy of the matter and radiation in the universe, P is the pressure and V the volume.

This is what is said in Wikipedia , the spokesperson for the standard physics of today . It could be said that the laws of thermodynamics are applicable in all macroscopic (and cosmological systems) regardless of their shape and size ..



but is the difference between the expansion of the universe and the expansion of the piston only a question of shape and size ?

The Answer Is No

There is an essential difference between the two processes .. because in the case of the expansion of a piston (or a balloon) the expansion occurs in the direction of the force of the pressure on the expanding boundary of the system , it is on this boundary only the pressure has a specific direction (outwards from the system). Also we should notice that we have a three-dimensional system with two-dimensional well-defined boundary.

But take for example an expanding universe with a density parameter greater than one which is , according to the standard cosmological model , positively curved and can be thought of as a three-dimensional hyper-sphere . We can easily notice many of essential differences . firstly, we are faced with the child-like yet important question " what are the boundaries of this system ?" but for the spherical shape ,the answer must be either " there is no boundary" which represents an essential difference from our first system or " the boundary is the system itself " which also leads to essential differences because on one side it can be seen that there is no force of pressure on the direction of the expansion of this boundary because all these forces lies on the 3-hyper-surface of this boundary while the direction of the expansion of this boundary is radial , on the other side the unification of the system and the boundary means that they have the same number of dimensions which is also essentially different from what is said about the ordinary system of the piston or the balloon .

Conclusion

The laws of thermodynamics , which summarize our experience with the macroscopic three-dimensional systems with boundaries which are subjected to the forces of pressure to the outside direction , cannot be applied on to the universe as a whole because of essential differences between the two systems regarding the concept of the boundary and the relation of the boundary to the pressure in addition to the meaninglessness of the concept of outside direction in the 3-hyper-space .