

# Derived Functions from the Hubble-Lemaitre Equation and Some Related Methaphysical Especulations

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## Abstract

Since the Hubble-Lemaitre equation

$$\mathbf{v} = H\mathbf{r} \quad (1)$$

proposes the expansion velocity of the Space (International Astrophysical Union, 2018), the equation  $H^2r^2$  has been assumed as the squared of velocity (Cassé, 2001). Therefore, it may be proposed, logically, the equation

$$\Gamma_H = H^2\mathbf{r} \quad (2)$$

to correspond to the Space acceleration expansion, which was demonstrated to be a constant in reference (Lartigue, 2016). On this assumption, the expression for the Hubble parameter results as (Lartigue, 2018a)

$$H = \sqrt{2/t} \quad (3).$$

In this paper it is revised the concept of the Hubble potential to substitute the dark energy. The present values of some Space parameters are also obtained. In ref. (Lartigue, 2018b) they were discussed the two main theories about the origin of the Universe: the Big Bang and the Quantum Fluctuation, arriving to the conclusion that the Big Bang (creation ex-nihilo) was the most probable option; besides, they were mentioned two metaphysical conditions in the creation of human beings: transcendence and ethics. This paper reviews those conditions and proposes some metaphysical subjects related to probable steps in the creational task.

**Keywords:** Big Bang, Space, Hubble Potential, Metaphysics

## 1. The Hubble Parameters

Substitution of  $\mathbf{r}$  in equation (2), for an accelerated movement, gives equation (3). So, if the age of the Universe is  $t_0 \sim 4.4 \times 10^{17}$  (s) it results a present value of the Hubble parameter  $H_0 = 3.18 \times 10^{-18}$  (s<sup>-1</sup>). This apparently high value corresponds to that already reported of 100 km/s.Mparsec (Medidas de la Constante de Hubble, 2010). So, the radius of the Space would be  $r_0 \sim 2 \times 10^{26}$  (m) and its present expansion velocity results  $v_0 = 3c$ . Consequently, the value of the constant Space acceleration is  $\Gamma = 4.4 \times 10^{-9}$  (m.s<sup>-2</sup>) (Note 1). In that concerning the Hubble potential it was stated in reference (Lartigue, 2016) that, if the deep Hubble flow exists (The Hubble Deep Fields, 1995), it must be there a potential that obliges the Space to expand, so pulling along the Physical Universe. Radial integration of equation (2) gives an expression of the Hubble potential:

$$V_H = \Gamma \cdot r^2/2 \quad (4)$$

From this equation it could be possible to define another one for the Hubble potential energy of a mass placed in the free Space. Anyway, these concepts seem to be enough to give an idea of cosmic acceleration, in the meanwhile Dark Energy could reach a formal physical expression.

In reference (Lartigue, 2018a) the author has proposed a photonic model for the Big Bang, with various conclusions: the total energy liberated was  $\sim 2 \times 10^{97}$  (erg); a fraction of only  $10^{-20}$  of it was devoted to form and to expand the Physical Universe; in the total energy figure it was included the original energy of the CMB. It was assumed that the Big Bang meant the starting of time, space, energy and physical laws. It was also obtained a photonic equation of continuity.

Otherwise, since the entanglement of new pairs of leptons may be detected at very long distances (Yin et al., 2017) it has not sense to assume the coherence as a physical factor exceeding  $c$  in a gravitational world. Rather, it may be assumed as a special type of creation, i. e., equivalent to the one previously occurred in the free Space,

without any speed limit.

## 2. The Need for Metaphysics

In the French version of the P. Davies book “The Spirit of God” (Davies, 1995) he wrote: “...si on désire une explication rationnelle de la nature, nous n’avons d’autre chose que de chercher une explication...qui transcende le monde physique...quelque chose de métaphysique...parce qu’un univers physique contingent ne peut pas renfermer en soi sa propre explication. Quelle sorte d’agent métaphysique serait capable de créer un Universe?”. Otherwise, if God would be a spirit it could be assumed as a person, an idea refused by the deists. They prefer to assume God as the creative force of the Universe. Even more, it is feasible that the spirits and forces were not the only entities able to create. J. Leslie has proposed an ethical necessity in the creation, rather as a condition than a cause. This ethical condition appears, necessarily, in several steps of the creation. So, in this work it is assumed that God (eternal, omnipresent, omniscient and omnipotent) was the creative force of the Universe with an auto-imposed ethical condition. Otherwise, Davies asked also: “Si Dieu était satisfait d’être de toute éternité sans Universe, pourquoi a-t-il soudain décidé d’en créer un?”. It would be even more difficult to understand the God’s decisions to create the angels realm and the human kind since He should have foresaw their future ethics fails. Anyway, the metaphysical point of view looks indispensable to try to understand some realities such as the existence of the Universe and the human life.

According to reference (Gleiser, 2017), it may be used the term “physical Metaphysics” to distinguish this orientation of Metaphysics from others such as “moral and philosophical Metaphysics”.

## 3. Some Steps of the Creation

The Bible makes no mention about the instant when the angels were created. However, due to the relevant original characteristics of the angels, it is possible that their creation had been occurred before the 6<sup>th</sup> day of the Creation, when the animal realm had been created with a mortal soul. So, when the rebel angels were expelled from the Heaven, they could seize any animal soul, such as that of the snake.

As mentioned in the Bible, God created the Universe (The Bible, Genesis, chapter 1) in 6 days (periods) and later created the first couple of the human kind, imprinting them an ethics code that was immediately violated, with terrible consequences for the Humanity. Later He tried again to impose the ethics code by the 10 commandments and, finally, He sent his Son to attempt an ethical redemption of Humanity, a grace not conceded to the fallen angels.

Of course, most religions are also based on divine entities, some kind of ethics as well as on their own Philosophy.

## 4. Additional Reflections

If God was aware of the future fails of his creations (angels and humans), why has He created them anyway? Such a question could only have an explanation: the transcendence and the ethical code have been conceived by God, forever, as intrinsic qualities of Him and, consequently, transferable to His creations.

So, the transcendence condition was granted by God to the human beings by means of their immortal soul; and the ethical condition was offered by means of the free will.

As it was not forbidden to savour the fruit of the Tree of Life in the Paradise<sub>2</sub> it could be assumed that such a privilege was rather impressed as an ideal in the human conscience, which has been devoted, since the beginning, to the search and control of the Nature, a task without a foreseeable end.

## 5. Conclusions

They have been proposed several functions derived from the Hubble-Lemaitre equation, such as: the Hubble potential ( $V_H$ ), the Space expansion acceleration ( $\Gamma_H$ ) and velocity ( $v_H$ ); the classical relationship between time and the Hubble parameter ( $H = 1/t$ ) was modified in this paper by that of ( $H = \sqrt{2}/t$ ) which implies that the present Hubble parameter has a value of 100 km/sec·Mparsec; the present space expansion velocity is  $\sim 3c$ .

Given the minuscule fraction ( $\sim 10^{-20}$ ) of the Big Bang energy devoted to create the Physical Universe, it may be possible to assume that there was available energy enough to create others, even bigger Universes, as well as some Higgs bossons.

In the Metaphysical aspect, several speculations are made on two of the probable characteristics of the Creator of the Space (transcendence and ethics) that could have been transmitted, initially<sub>2</sub> to two of his creations (the Angels and the Humanity). Besides, it must be considered the possibility that the search for knowledge had also been impressed in the human conscience.

## Notes

Note 1. This figure results higher than that of reference (Lartigue, 2018b) due to the higher value assumed for  $H_0$ .

## Conflict of interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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