The elementary unit of mass, the ratio between dark matter and dark energy, thermal energy

Abstract

This article refers to and is at the same time a supplement to the work *The Cold Big Bang Model*, hereafter called MBBR or the basic work, which was printed by the Tribuna Economică publishing house, in the year 2021, with ISBN 987-973-688-429 -0; work is also listed at: https://bigbangdigitalmodel.com/en/

We propose to calculate:

I. Elementary unit of mass;

II. The relationship between dark matter and dark energy;

III. The elementary unit of temperature.

1. INTRODUCTION

In the basic work *(*MBBR*)* we showed that the highest speed in the Universe is 1 $\frac{Psu}{Ptu}$(v. (MBBR) The first quantification). Extrapolating this result, we could say that the speed of light has a unit value in accordance with the concepts and units of measurement defined in (MBBR).

To perform the calculations, see here the conversion formulas between the Planck and SI coordinate systems as well as the constants used in all articles as defined in the MBBR.

2. CONTENTS

I. Let $E_0 = m_0 \cdot c^2 = h \cdot 1s^{-1}$ the energy corresponding to the value of 1 Peu related to an elementary mass m_0; result:

$m_0 \cdot 299.787.989{,}40^{\,2} \left[\frac{m^2}{s^2}\right] = 6.626075\ 10^{-34}\,J = 6.626075\ 10^{-34}\ [kg] \left[\frac{m^2}{s^2}\right]$

in the Planck system of measurement this relation is written:

$m_0 \cdot 1 \left[\frac{Psu^2}{Pt1^2}\right] = 6.626075\ 10^{-34} \cdot 299.787.989{,}40^{-2}\ [kg] \left[\frac{Psu^2}{Pt1^2}\right]$ from which it follows that:

$m_0 = 7.37272 \cdot 10^{-51}\ [kg]$, this being the value of the elementary unit of mass which, as can be seen, **does not depend on the system chosen for the units of measure.**

Considering the above and the relationship $\lambda = \frac{c}{\nu}$ between the wavelength, frequency and speed of light, it follows that, in the movement of dark matter, with the maximum speed, from one cell to another of the quantum space, as a result of the gravitational action (v. MBBR *Dynamics mass energy*), the wavelength of undulatory motion is numerically equal to the inverse of the frequency,

That is, in Planck units:

(1) $\lambda \cdot \nu = 1.$

II. Denote with ȸ_i the amount of *energy-mass* produced by inflation with no. i. According to (MBBR), for a Universe with the definition C|I|S (C no. of iterations, I no. of inflations and S no. of stages - see (MBBR) *Definition 14*)

$$i = c_2 \frac{F_C F_{C+1}}{C+1} T_i = c_2 4^{i+1} F_C F_{C+1} (C+1)^i$$

where T_i is the time when inflation i occurs, $c_2 = 1\frac{Peu}{Psu^2 Ptu}$ is a constant and F_C and F_{C+1} are the Fibonacci numbers associated with indices C and C+1.

Denote with by φ_k the amount of dark energy generated during all stages, up to and including stage k (v. – (MBB) § Dark energy).

Note EMT_k the total *energy-mass* of the Universe at the end of stage k. we remind (v. (MBBR) § Dark energy) that this total energy includes dark matter, i.e. *the energy-mass* created during the basic construction of the Universe and inflations added with the dark energy generated during the developmental stages of the Universe[1], up to and including inflation I.

Summarizing what we have defined so far, we can write:

$$EMT_k = \varphi_k + \sum_{i=0}^{Inf} \text{ȸ}_i$$

where Inf is the number of inflations occurring during the k stages. Returning to the definition of the Universe considered above: $I \geq Inf$, $S \geq k$.

For each individual stage it is important to define the percentage represented by dark energy $\varphi_{k\%}$ of the total *energy-mass* of the Universe, since we can propose that the digital model forces another inflation to run before dark matter exceeds n% of *the energy-mass* generated by the basic construction of the Universe added with *the energy-mass* generated by all other inflations, that is:

$$\varphi_{k\%} = \frac{\varphi_k \cdot 100}{\sum_{i=0}^{Inf} \text{ȸ}_i} \leq n$$

III. Let us adopt the following formula for thermal energy: $Ec = \frac{3}{2} k \cdot T$

where $k = 1.380650 \cdot 10\text{-}23\ J\ K^{-1}$ is Boltzmann's constant and T is the absolute temperature.

If we convert the SI constant k into Planck units, we get:

$$k_p = 1.380650 \cdot 10^{-23}\ J\ K^{-1} = 1.380650 \cdot 10^{-23} \cdot \frac{1}{6{,}626075} \cdot 10^{34}\ Peu\ K^{-1} = 2.083661 \cdot 10^{10}\ Peu\ K^{-1}$$

[1] This work studies the universe at its earliest stages, so the amount of dark matter is measured in units of energy. Having the same unit of measure, the amounts of dark matter and dark energy can add up or down.

Assuming that the minimum temperature T_{min} corresponds to a thermal energy of 1 Peu, it follows:

$$1 \text{ Peu} = h \cdot 1\ s^{-1} = \frac{3}{2} k \cdot T_{min}$$

so $$T_{min} = \frac{2\,h}{3\,k} = \frac{2\ \cdot 6{,}626075 \cdot 10^{-34}}{3 \cdot 1{,}380650 \cdot 10^{-23}} = 3.19949540 \cdot 10^{-11}\ K$$

Then, assuming that the temperature of a protoparticle is directly proportional to *the energy-mass* of the protoparticle, it follows:

(2) $$T = p \cdot E_{\text{of the protoparticle}} \cdot T_{min}, \text{ where } p = 1 \text{ Peu}^{-1};$$

Let us apply this result to the case of font radiation, characterized by the following data:

λ = 1.87 mm,

the maximum of radiated energy occurs at the frequency of:

ν= 160.4 GHz.

Transforming the data into the Planck system it results:

$$\lambda = 1.87 \text{ mm} = 1.87\ 10^{-3} \text{ m} = 1.87 \cdot 10^{-3} \cdot \frac{10^{35}}{1{,}616229} \text{ Psu} = 1{,}157 \cdot 10^{32} \text{ Psu}$$

$$\nu = 160.4 \text{ GHz} = 160.4\ 10^{9} \text{ Hz} = 160.4\ 10^{9}\ s^{-1} = 160.4 \cdot 10^{9} \cdot \frac{5{,}39124}{10^{44}} \text{ Ptu}^{-1} = 864.7549 \cdot 10^{-35} \text{ Ptu}^{-1}.$$

$\lambda \cdot \nu$=1.000,5214193 · 10^{-3} Psu/Ptu = 1,0005214193 Psu/Ptu that is, with very good precision, the speed of light in Planck units, revalidating thus formula (1) above.

According to formula (2):

$$T = 1 \text{ Peu}^{-1} \cdot 160.4 \cdot 10^{9} \text{ Peu} \cdot T_{min} = 160.4 \cdot 10^{9} \cdot 3.19949540 \cdot 10^{-11} = 5.132 \text{ K}$$

This value being the maximum background radiation temperature.