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Formula for the Temperature of Microwave Background Radiation

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In the kinetic theory of gases, molecular collisions in a closed container are considered. Similarly, the Universe can be viewed as a closed system, although, instead of physical walls, it is bounded by natural laws, which act as a sort of "boundary." Logarithmic functions form the key mathematical framework that naturally limits phenomena in the Universe, including the number of collisions, which is important for determining temperature.

What follows are the results of applying my earlier perspective: that individual parts depend on the whole (the Universe) and are also integral to the Whole and the ***Philosophy of Nature*** of Ruđer Bošković [1].

In the table, ***2π, cy=e$^{2\pi}$*** are mathematical constants, ***ά, μ*** – the inverse constant of the fine structure, and the mass ratio of the proton and electron. Additionally, we use ***Δp*** and ***q*** according to the formulas in the table from previous constants for shorthand notation. Also, ***m$_{pr}$*** and ***c*** represent the mass of the proton and the speed of light.

Table of Input Data for T_{bg} – Temperature

2π, cy=e$^{2\pi}$	***6,28318530718***	***535,4916555248***
ά, μ =	***137,035999084***	***1.836,152673430***
Δp=2-1/(μ/ά+2), q=3cy/4+3*lg$_2$(2π)/2-Δp/2	***1,9350609435***	***404,6284553660***
m$_{pr}$, [kg], c [m s^{-1}]	***1,67262192369E-27***	***2,99792458E+08***
k$_B$[m^{2}kgs^{-2}K^{-1}], T$_{bg}$[K] f(1)	***1,380649E-23***	***2,725717***

The final formula for the temperature of the microwave background radiation, according to (***1***), may seem complex at first glance, but it is routinely obtained in a similar manner to all other values of phenomena defined in my previous articles on this platform. The result obtained from formula (***1***) based on the input data is shown in the last row of the table and specifically in formula (***1***):

$$T_{bg} = m_{pr} * c^2 * 2^{cy/2-\Delta p-3q/4-\lg_2\left[(2\pi)^{1/4}*(q/3)^{1/2}\right]} / k_B = 2.725717\ K \qquad (1)$$

A simpler aproach to achieve the same result is by using the Planck temperature, T_{pl} = ***1.4168335*10^32 K***, which leads to an identical result using formula (***2***):

$$T_{bg} = 2\pi * T_{pl} * 2^{cy/2-\Delta p/3-11q/12-\lg_2((2\pi)^{1/4}*(q/3)^{1/2})} = 2.725717\ K \qquad (2)$$

The process of deriving temperatures is not shown, and the conclusions are as follows:

- The Planck temperature represents the upper limit of the number of simultaneous collisions in the Universe.
- The temperature of the cosmic microwave background radiation (***CMB***) is not a relic from the past but rather represents the geometric mean of all temperatures. It can also be understood as the threshold that separates temperatures lower than T_{bg} in the voids of the Universe from those higher than T_{bg} in regions where matter exists.
- There is no absolute zero temperature, meaning there is no complete absence of collisions or motion. Instead, all temperatures exist within a range, bounded by upper and lower limits, with the lower limit referred to as the hypothetical quantum of temperature, T_{hq}:

$$T_{hq} = T_{bg}^2 / T_{pl} = 5.243758 * 10^{-32} K \qquad (3)$$

The above results would be more simply presented if the temperature scale were set such that $T_{bg} = 1$ by definition. In that case, the numerous values of the Planck temperature and the hypothetical quantum of temperature would only differ by the sign of the exponent.

References

[1] Boscovich, R.: 1758, *Philosophiae naturalis theoria redacta ad unicam legem virium in natura existentium*, Beč (prvo izdanje; 1763, Venecija, (drugo izdranje); 1922 i 1966, A Theory of natural philosophy, Open Court, London i The Massachusetts Institute of Technology, M.I.T. Press, Cambridge (redom); 1974, *Teorija prirodne filozofije svedena na jedan jedini zakon sila koje postoje u prirodi*, (dvojezično: latinski i hrvatski), Liber, Zagreb.