THE UNIVERSE IS A PERFECT SPHERE

Theoretical calculation of the TCMBR

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$$T_{CMBR}=(\frac{72Gc^{11}h^3\varepsilon_0^4m_e^6}{\pi^2e^8k^4})^{1/4}=2{,}72846K$$

Abstract: in this paper I show that the universe is a perfect sphere and provide a theoretical calculation of the TCMBR.

Let's remind two equations about the Planck's Blackbody Radiation, from which we can get the Stefan-Boltzmann's Law and also a similar one, we will call alternative:

1) $\varepsilon(v)dv=\frac{2\pi v^2}{c^2}\frac{hv}{e^{hv/kT}-1}dv \qquad [W/m^2]$

$\varepsilon=\sigma T^4\,[W/m^2]$ (Stefan-Boltzmann's Law), (1.1)

where $\sigma=\frac{2\pi^5k^4}{15c^2h^3}=5{,}670\cdot10^{-8}\frac{W}{m^2K^4}$ (Stefan-Boltzmann's Constant)

2) $f(v)dv=\frac{8\pi v^2}{c^3}\frac{hv}{e^{hv/kT}-1}dv \qquad [J/m^3]$

$u=aT^4\,[J/m^3]$ (alternative of the Stefan-Boltzmann's Law), (1.2)

where $a=\frac{4\sigma}{c}=\frac{8\pi^5k^4}{15c^3h^3}=7{,}566\cdot10^{-16}\frac{J}{m^3K^4}$ (alternative of the Stefan-Boltzmann's Constant)

Those two formulas ((1.1) and (1.2), with their relevant constants σ and a) can be found on the book:

(C. Rossetti) ISTITUZIONI DI FISICA TEORICA, 2nd Ed. – Levrotto & Bella (Torino)
(equations (2.22) and (2.23), Chapter 1, page 24)

or also in the link:

http://scienzaufficialeattendibilita.weebly.com/uploads/1/3/9/1/13910584/the_origins_of_quantization_in_the_universe.pdf

With a spherical universe (for reasons of symmetry) and as the universe cannot have a traslational movement (because it would need a bigger universe in which to translate), its movement is just rotational, with an energy:

$E=\frac{1}{2}I\omega^2$, where I is the moment of inertia and, for a sphere, we know that: $I=\frac{2}{5}MR^2$

and ω, from physics, is: $\omega=\frac{2\pi}{T_U}$, where $T_U=\frac{2\pi R}{c}$.

Now, we have: $\omega=\frac{2\pi}{\frac{2\pi R}{c}}=\frac{c}{R}$, from which: $E=\frac{1}{2}\frac{2}{5}MR^2(\frac{c}{R})^2=\frac{1}{5}Mc^2$, and, for the (1.2):

$$u[J/m^3]=\frac{E}{V}=\frac{\frac{1}{5}Mc^2}{\frac{4}{3}\pi R^3}=\frac{3}{20}\frac{Mc^2}{\pi R^3}=aT_{CMBR}^4$$, frow which: $$T_{CMBR}=(\frac{3}{20}\frac{Mc^2}{a\pi R^3})^{1/4}=(\frac{9c^5h^3}{32\pi^6k^4}\frac{M}{R^3})^{1/4}$$

Now, with reference to my universe you can read, for instance, at the following link:
https://scienzaufficialeattendibilita.weebly.com/uploads/1/3/9/1/13910584/universo_elettrico-la_prova_numerica-ita_eng.pdf

we have that the ratio $\frac{M}{R^3}$ between the mass of the universe and its radius to the power three can be written as a function of $\frac{m_e}{r_e^3}$ (mass and classic radius of the electron).

From this link you can see that $\frac{M}{R^3}=\frac{m_e}{r_e^3}\frac{1}{\sqrt{N}}$, where N, number of electrons (and positrons) in which the universe can be held made of, is given by the square of the ratio between the electric force and the gravitational one:

$$N=\left(\frac{\frac{1}{4\pi\varepsilon_0}\frac{e^2}{r_e^2}}{\frac{Gm_e^2}{r_e^2}}\right)^2=\left(\frac{1}{4\pi\varepsilon_0}\frac{e^2}{Gm_e^2}\right)^2, \text{ from which: } \frac{M}{R^3}=\frac{m_e}{r_e^3}\frac{1}{\sqrt{N}}=\frac{m_e}{r_e^3}\frac{4\pi\varepsilon_0 Gm_e^2}{e^2}=\frac{4\pi\varepsilon_0 Gm_e^3}{e^2 r_e^3}$$

Moreover, we know from physics that: $r_e=\frac{e^2}{4\pi\varepsilon_0 m_e c^2}$, classic radius of the electron.

Therefore: $\frac{M}{R^3}=\frac{256\pi^4\varepsilon_0^4 Gm_e^6c^6}{e^8}$ and so:

$$T_{CMBR}=\left(\frac{3}{20}\frac{Mc^2}{a\pi R^3}\right)^{1/4}=\left(\frac{9c^5h^3}{32\pi^6k^4}\frac{M}{R^3}\right)^{1/4}=\left(\frac{72Gc^{11}h^3\varepsilon_0^4m_e^6}{\pi^2e^8k^4}\right)^{1/4}$$

$$T_{CMBR}=\left(\frac{72Gc^{11}h^3\varepsilon_0^4m_e^6}{\pi^2e^8k^4}\right)^{1/4}=2{,}72846(02218319896)K\cong 2{,}72846K$$

The official value of the TCMBR is: $T_{CMBR}=2{,}72548K$, so we are in the 0,1%!!!(3rd decimal!)

We have used the following official values for the physical constants:

Boltzmann's Constant k: $1{,}38064852\cdot 10^{-23}J/K$

Charge of the electron e: $-1{,}602176565\cdot 10^{-19}C$

Mass of the electron me: $9{,}1093835611\cdot 10^{-31}kg$

Universal Gravitational Constant G: $6{,}67408\cdot 10^{-11}Nm^2/kg^2$

Planck's Constant h: $6{,}62606957\cdot 10^{-34}J\cdot s$

Speed of light in vacuum c: $2{,}99792458\cdot 10^{8}m/s$

Electric permittivity in vacuum ε_0: $8{,}85418781762\cdot 10^{-12}F/m$

pi: 3,141592653589793

Regarding the large consideration shown in favour of the electron (and of the positron, its dual), let's not forget that the electron is very stable, while the neutron is not at all and perhaps the proton as well. Moreover, the dimensions of atoms are due to the atomic shell, which is represented by the electrons.

By-products from the reasonings just carried out:

$$M_{Univ}=Nm_e=1{,}59486\cdot 10^{55}kg$$

$$R_{Univ}=\sqrt{N}r_e=1{,}17908\cdot 10^{28}m\ .$$

$$T_{Univ}=\frac{2\pi R_{Univ}}{c}=2{,}47118\cdot 10^{20}s$$

-Unification formula: $m_e c^2 = \frac{1}{4\pi\varepsilon_0}\frac{e^2}{r_e} = G\frac{m_e M_{Univ}}{R_{Univ}}$,

-Here is the Stefan-Boltzmann's Law**:** $\frac{P_{[W]}}{4\pi R^2} = \sigma T^4$ [W/m^2], where $\sigma = 5{,}67\cdot 10^{-8} W/m^2K^4$ is the Stefan-Boltzmann's Constant. Here is also the cosmic microwave background radiation: $T_{CMBR} \cong 2{,}7K$.

You can see that:

$$T = (\frac{P_{[W]}}{4\pi R^2 \sigma})^{1/4} = (\frac{\frac{M_{Univ}c^2}{T_{Univ}}}{4\pi R_{Univ}^2 \sigma})^{1/4} = 2{,}7K \text{ !! (temperature of the universe)}$$

-I want to make a comparison (a ratio) between two energies: the potential energy related to an electron and that of a photon:

$\frac{E_e}{E_f} = \frac{\frac{Gm_e^2}{r_e}}{h\nu}$; now, if the frequency is that obtained by taking the inverse of the period of the universe, that is: $\nu = \nu_{Univ} = \frac{1}{T_{Univ}}$, then:

$$\frac{\frac{Gm_e^2}{r_e}}{h\nu_{Univ}} = \frac{\frac{Gm_e^2}{r_e}}{h\frac{1}{T_{Univ}}} = \alpha = \frac{1}{137}$$

!!, which is exactly the Fine Structure Constant.

-I want to irradiate all the energy of a couple electron-positron in the time of the universe; well, the corresponding power is (numerically) exactly the Planck's Constant:

$$\frac{2m_e c^2}{T_{Univ}} = h = 6{,}626\cdot 10^{-34} \text{ !!}$$

-The centrifugal acceleration is given by the square speed divided by the radius; therefore, in our universe: $a_{Univ} = \frac{c^2}{R_{Univ}} = 7{,}62\cdot 10^{-12} m/s^2$. Now, I ask myself if there exist a "celestial body" whose gravitational acceleration is exactly a_{Univ}. Well, it exists and it is the electron! In fact, if in a classic sense I see it as a small planet and a small test mass m_x is on its "surface", then: $m_x \cdot g_e = G\frac{m_x \cdot m_e}{r_e^2}$,

so: $g_e = G\frac{m_e}{r_e^2} = a_{Univ} = 7{,}62\cdot 10^{-12} m/s^2$!!

-We can say T_{CMBR} is not only the temperature of the universe, but also that of the electron; in fact:

$$T_e = T_{CMBR} = (\frac{\frac{1}{2}h}{4\pi r_e^2 \sigma})^{1/4} = 2{,}7K \text{ !}$$

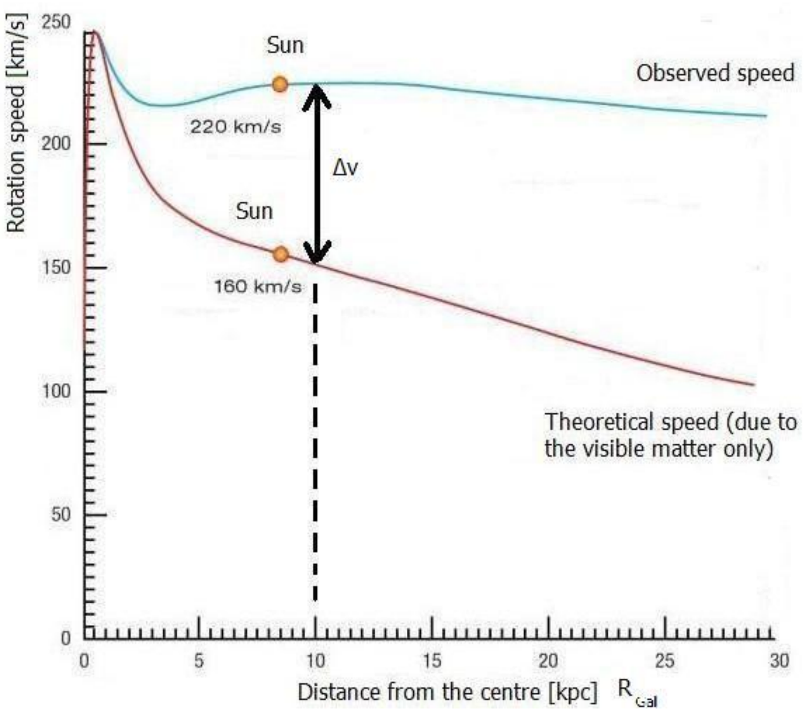
-Incidentally, we also notice the following equation holds:

$$h = m_e c\frac{a_{Univ}}{\pi} = 6{,}626\cdot 10^{-34} \text{ (only numerically, not dimensionally)}$$

which is the proof of the agreement between the universe and the Indetermination Principle, as it can be easily shown.

-The density of the universe is in agreement with that evaluated by the astrophysicists:
$\rho = M_{Univ} / (\frac{4}{3}\pi \cdot R_{Univ}^3) = 2.32273 \cdot 10^{-30} kg/m^3$

-The universe and the rotation curves of galaxies (the death of the mysterious dark matter):
in our galaxy (the Milky Way), the Sun, being at something like ten kpc from the center, (1kpc=1000pc ; 1pc=1 Parsec= $3{,}26\_l.y. = 3{,}08 \cdot 10^{16} m$; 1 light year l.y.= $9{,}46 \cdot 10^{15} m$), should have a rotation speed of 160 km/s, if it were due to the mere baryonic matter of the galaxy itself, i.e. that of the stars and of all the potentially visible matter (the only one which is real, in my opinion). On the contrary, they measure a speed of 220 km/s, i.e. bigger.



Rotation curve of the stars in the Milky Way.

The choice of the official science (which is, besides, the same of the embarrassing superluminal neutrinos, of the ultrafunded divine boson, of the cosmic ether, of the dark energy etc) has been that of supposing such a discrepancy is due to the existence of invisible matter all around galaxies; and not so little. Enormously more than that visible; unbelievable. And such a matter, they say, is invisible, indeed, as it's not emitting photons; but it must be transparent, as it is all around the galaxy, so preventing us from seeing the galaxy by telescopes; but we can see galaxies very well…Uhm, never mind…

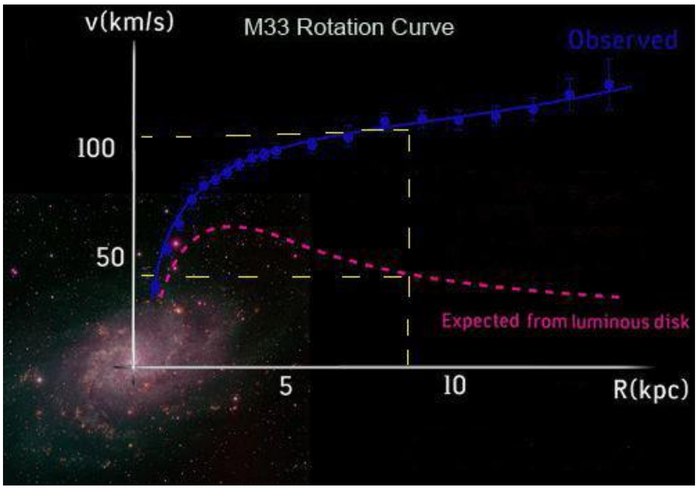
But, with reference to the graph above reported, let's carry out some rough calculations, just to evaluate the size of the problem.

The universe is collapsing by a cosmic acceleration $a_{Univ} = 7{,}62 \cdot 10^{-12} m/s^2$.

Now, we all know that an object which falls from a height h, as it is undergoing the gravitational acceleration ($g = 9{,}81 m/s^2$), will reach the ground with the final speed v_f : $v_f = \sqrt{2gh}$; Newton taught us all that. Well then; for the Sun, the cosmic acceleration of the Universe, important only at great distances (great R, as such an acceleration is small; from which comes the anomaly of the speeds mostly at the outer side of the galaxies…….) determines a Δv, of itself, as big as follows:
($R_{Gal} \cong 8{,}5 kpc = 27{,}71 \cdot 10^3 \_l.y. = 2{,}62 \cdot 10^{20} m$ is roughly the distance of the Sun from the centre of the Milky Way)

$$\Delta v = \sqrt{2a_{Univ}R_{Gal}} = \sqrt{2 \cdot 7{,}62 \cdot 10^{-12} \cdot 2{,}62 \cdot 10^{20}} = 63{,}2 \cdot 10^3 m/s = 63{,}2 km/s \quad ,$$

which are really those 220-160=60km/s of Δv of discrepancy, in the graph above reported! And the exactness of such a formula holds on all the curve; for instance, at 25kpc, you have a Δv=100km/s! But, I repeat, all this is about rough calculations! Only God knows exactly as things work. For sure, not the gentlemen (and ladies) of the mysterious dark matter.

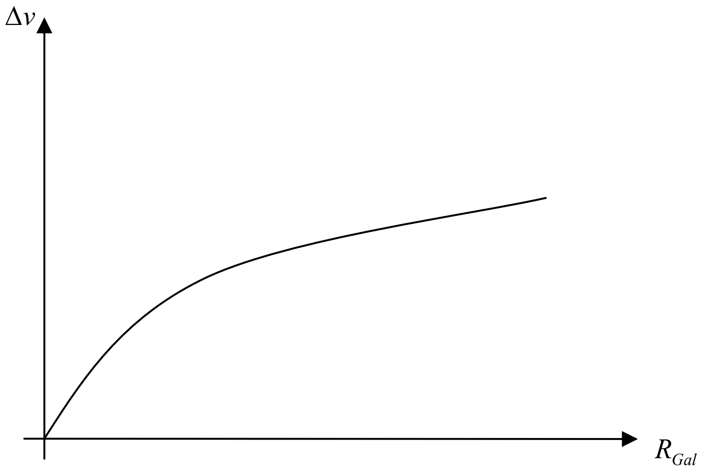


Rotation curve of stars in galaxy M33.

Also about the rotation curve of another galaxy, for instance the M33, above reported, we can see my formula works very well. But this is not the main thing I'm interested in. What I care is that the size of the tidal force of the Universe all around is really the same as that of the mysterious force which gives the stars a higher speed, in galaxies.

Anyway, it seems the distance from the centre of the galaxy and the delta speeds measured by astrophysicists are one proportional to the square root of the other; and the square root is is the opposite operation of the power two, which is typical for the Newton's law.

$$\Delta v \propto \sqrt{kR_{Gal}}$$



where $k = 2a_{Univ}$ From the above figures we can see, by calculating, for each point of the curves, the ratio $(\Delta v)^2$ - R_{Gal} , that: $(\Delta v)^2 / R_{Gal} = 2a_{Univ} = k = 2 \cdot 7{,}62 \cdot 10^{-12} = 15{,}24 \cdot 10^{-12} m/s^2$

Thank you for your attention.
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