About the Universe

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Abstract: A time scale of the Universe will be shown in all details. It starts with the existence of the first information (0/1) Bit and the probability of God or the Creator of the Universe. Step by step are comming dimensions within the Universe until the 4-dimensionsal Universe of General Relativity Theory (GRT) is created.

1 The Planck 'constants'

Planck length $\Delta x = \sqrt{\frac{Gh}{c^3}}$

Planck time $\Delta t = \sqrt{\frac{Gh}{c^5}}$

Planck mass $\Delta m = \sqrt{\frac{hc}{G}}$

Planck acceleration $\Delta a = \frac{c}{\Delta t} = \sqrt{\frac{c^7}{hG}}$

Planck Energy $\Delta E = \Delta mc^2 = \sqrt{\frac{hc^5}{G}}$

2 The beginning of the Universe

First comes the information in the Universe (1 Bit = 0/1) so first we calculate the:
Planck Entropy $\Delta S = -k\ ln(p_i)$ and with $p_i = 1/2 \implies ln(0.5) = -0.69314718$ we get $\Delta S = +k\ 0.69314718 = 9.5699393e^{-24}[\frac{J}{K}]$.
The 0.Dimension comes into universe (one Dot with $M = \infty$, $G = 0 \wedge R = 0$).
The 1.Dimension comes into universe (one Line with $Lenght = \Delta x$).
The 2.Dimension comes into universe (one Circel with $Radius = \Delta x$).
The 3.Dimension comes into universe (one Sphere with $Volume\ \Delta V = 4 * \pi * \Delta x^3/3$).
The 4.Dimension comes into universe ($Time > 0$) $\implies$ the GRT is complete.

3 Thermodynamic calculation

Within Termodynamics is $\Delta E = T\Delta S - p\Delta V$ within adiabatic processes is; $T\Delta S = 0$ It follows $d(\epsilon V) = (d\epsilon V + \epsilon dV) = -pdV$ with $d\epsilon = -(\epsilon + p)\frac{dV}{V}$ and the relation $p = \epsilon/3$ gives:

$$\frac{d\epsilon}{\epsilon} = \frac{4dV}{3V}$$

or

$$\epsilon \sim V^{\frac{-4}{3}} \sim R^{-4}$$

4 Cosmic Microwave Background Radiation

We know the energydensity within Planck-Era is $\rho c^2 = \tilde{a}\Delta T^4 = \frac{3c^7}{8\pi hG}(\tilde{a} = Radiationconstant = 7.5657e^{-16})$ and now we can set $c = h = G = k_B = 1$ and receive follows:

$$\frac{3}{8\pi} = \tilde{a}\Delta T^4 = \frac{8\pi^5}{15}T^4\ oder\ T^4 = \frac{45}{64\pi^6}$$

So follows for the Planck-Temperature $\Delta T = (\frac{45}{64\pi^6})^{1/4} = \frac{1}{6.08088337383}$

The Planck Temperature is $\Delta T = (\frac{3c^7}{8\pi h G^2 \tilde{a}})^{1/4} = 5.8404e^{31}\ [K]$

The Planck Energy $\Delta E = \Delta m c^2 = 6.08088\ k\Delta T = \sqrt{\frac{hc^5}{G}}$

5 Gravitation as curvature of space

The (Entropyconstant is: $\zeta = \frac{\Delta T}{T_{CMB}} = 2.1432e^{31}$)

$M\ R = \zeta^4 \frac{h}{c}$ the Universe starts with $M = \infty \wedge R = 0$ and reaches the maximum with $M = \zeta^2 \Delta m \wedge R = \zeta^2 \Delta x$ at $t = \zeta^2 \Delta t$

$M\ t = \zeta^4 \frac{h}{c^2}$ the Time for the maximum Radius is: $t = \zeta^2\ \Delta t$

$\frac{M}{a} = \zeta^4 \frac{h}{c^3}$ defines the Planck accelleration $a = \frac{Mc^3}{\zeta^4 h}$

$\frac{M}{R} = \frac{c^2}{G}$ Black Hole condition

$\frac{M}{t} = \frac{c^3}{G}$ Mass ist time dependent

$\Delta F = M\ a = \frac{c^4}{G}$ Planck-Force

With $a = \frac{G\ M}{R^2} = \frac{M\ c^3}{\zeta^4 h}$ follows:

$$\frac{G}{R^2} = \frac{c^3}{\zeta^4 h} = 1.9273e^{-67}$$

Now we become from new GRT:

$$R = \zeta^2 \, \Delta x => Radius\ of\ Universe\ R = 1.861e^{28} m$$
$$\frac{M}{R} = \frac{c^2}{G} => Mass\ of\ Universe\ M = 2.506e^{55} kg$$
$$\frac{M}{t} = \frac{c^3}{G} => Age\ of\ Universe\ t = 6.207e^{19} s$$

The new FRW-Equations follows:

$$\frac{c^2}{R^2} = \frac{8\pi G\rho}{3}$$

or with $\frac{G}{R^2} = \frac{c^3}{\zeta^4 h}$

$$\frac{1}{R^4} = \frac{8\pi\rho c^2}{3\zeta^4 hc}$$

We receive the R^4 responsibility of an adiabatic process as follows:

$$\frac{3\zeta^4 hc}{8\pi R^4} = \rho c^2 = \tilde{a} T_{CMB}^4$$

6 References

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