# Discrete structure of the space-time

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We argue that due to anthropic limitation of the observer, $\Im T(\vec{r}, t) = 0$, where $T(\vec{r}, t)$ is the absolute temperature. From this condition the discretization of space time radius $R$, velocity of the Universe expansion $v$, Hubble parameter $H$ and acceleration of the expansion $a$ are calculated:

$$R(M, N) = \pi^{\frac{1}{2}} M^{\frac{1}{2}} \left( N + \frac{3}{4} \right)^{\frac{1}{2}} \left( \frac{\hbar G}{c^3} \right)^{\frac{1}{2}} \tag{1}$$

$$v = \left( \frac{\pi}{4} \right)^{\frac{1}{2}} \left( \frac{N + \frac{3}{4}}{M} \right)^{\frac{1}{2}} c \tag{2}$$

$$a = -\frac{1}{2} \left( \frac{\pi}{4} \right)^{\frac{1}{2}} \frac{\left( N + \frac{3}{4} \right)^{\frac{1}{2}}}{M^{\frac{3}{2}}} \left( \frac{c^7}{\hbar G} \right)^{\frac{1}{2}} \tag{3}$$

where $N, M = 1, 2, \ldots$

In formulae(1–3) $c$ is the velocity of light, $G$ – gravitation constant and $\hbar$ – Planck constant.

For $N = M = 10^{60}$ (Dirac number), $R \cong 10^{25}$ m, $H \cong 10^{-18} \text{s}^{-1}$, $v = 0.88c$ [1] and $a \cong 10^{-10} \text{m/s}^2$ [2] in a good agreement with experimental data.

The detailed discussion of the properties of the small Universes, with $N < 60$, will elucidate why life evolve only for the world with $N = 60$.

# References

[1] D. N. Spergel et al., *Proc. Natl. Acad. Sci*, **94**, (1997), p. 6579.

[2] J. D. Anderson et al., *Phys. Rev. Lett.*, **81**, (1998), p. 2858.