OBSERVABLE UNIVERSE CURIOSITIES (I)

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Abstract

The standard cosmological model defines the *Observable Universe* as the region of the Universe observed from the earth at the present time ; all the signals that have arrived to the earth since the beginning of the cosmological expansion .We could imagine a spherical volumen centered on the observer , whose radius is about r$\sim 10^{26} m$ .This article is the introduction to other developments concerning the numerical reality of the observable universe .

Keywords . *Observable Universe , Heisenberg principle .*

Method and results .

Let's define a dimensionless number

$(N_{\dots}) = \frac{1}{2\beta e}\frac{a_0}{L_P} = 6.02214 \, x \, 10^{23}$

$\beta = 1.0000706$

$a_0 = 5.291772 \, x \, 10^{-11} m$

$L_P = 1.6162 \, x \, 10^{-35} \, m$

$e = 2.7182818 \dots$

The dimensionless number $(N_{\dots})$ will be useful in the analysis of various topics of the physical reality .

Heisenberg's uncertainty principle states a fundamental limit of precision with which a pair of observable physical properties of a particle can be known .For example , when you confines to the minimum the time interval in the measurement , the energy of the particle take a broad range of possible values. From a statistical point of view we must apply the method of typical deviation. Heisenberg's formula reads

$\Delta t\ x\ \Delta E\ \geq \frac{\hbar}{2}$

$\hbar = 1.05457\ x\ 10^{-34}\ Js$ is the quantum of action or reduced Planck constant

Could introduce a slight addendum in the above equation

$\Delta t\ x\ \Delta E\ \frac{1}{U_A} \cong \frac{\hbar}{2}\frac{1}{P_A}$

Will relate ΔE and $\hbar$ to surface's areas

$U_A \sim 9.87\ x\ 10^{52}\ m^2$ refers to the surface's area of the observable universe

$P_A = L_P^2 = 2.612\ x\ 10^{-70}\ m^2$ refers to Planck's Surface

Assign observational values

$\Delta t \sim 4.4\ x\ 10^{17} s$ time since the cosmological expansion , i.e the *observational interval of time* during wich will estimate the energy's data dispersion

$\Delta E \sim \frac{1}{2}\ (N_{...}) M\ C^2$

$(N_{...}) = 6.02214\ x\ 10^{23}$

$M = N\ m_p$

$N = 10^{57}$ approximate number of hydrogen atoms to ignite a star

$m_p = 1.67262\ x\ 10^{-27}\ kg$ the mass of a proton

$C = 299792458\ ms^{-1}$, speed of light in vacuum .

Let's write the calculations

$$[4.4\ x\ 10^{17} s]\frac{1}{2}[(6.02214x10^{23})(10^{57})(1.6726x10^{-27}kg)(299792458\ ms^{-1})^2]\frac{1}{9.87x10^{52}m^2} \cong$$
$$\cong \frac{\hbar}{2}\frac{1}{2.612\ x\ 10^{-70}\ m^2}$$

When divide the orders of magnitude of the surface's areas

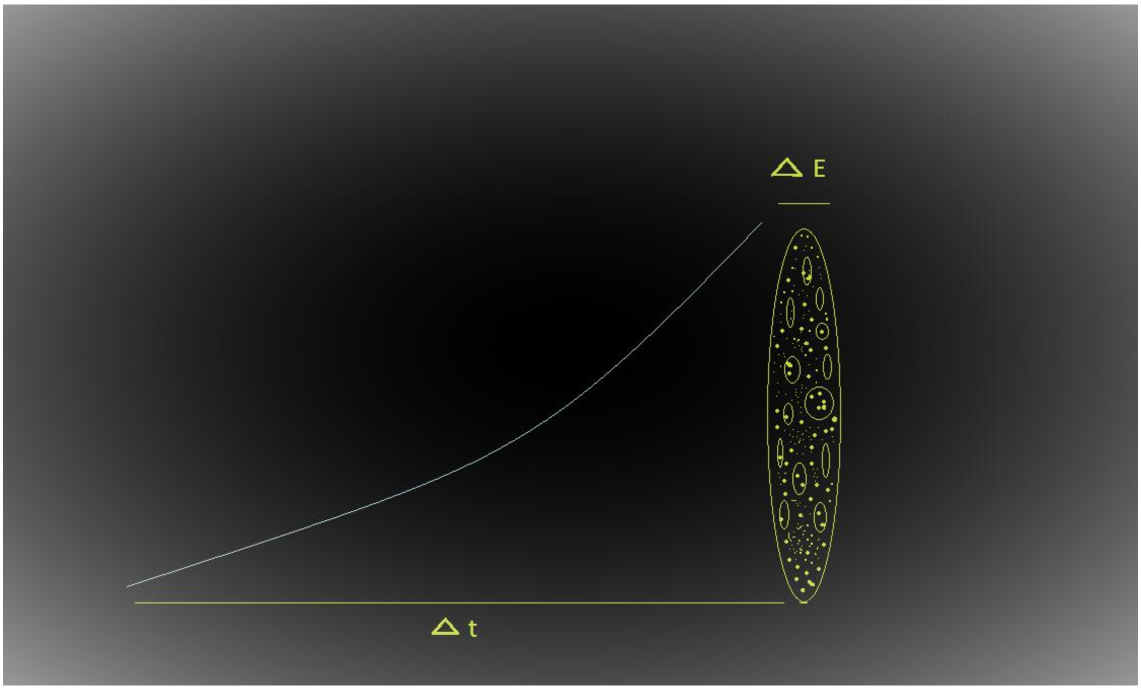
$\frac{P_A}{U_A} \sim \frac{2.65}{10^{123}}$

We have obtain a value that matches the estimated value for cosmological constant given in dimensionless Planck units

$$\Lambda \sim \frac{2.65}{10^{123}}$$

Therefore could write

$$\Delta t \ x \ \Lambda\Delta E \ \cong \frac{\hbar}{2}$$



Observable Universe