

# Large Number Hypothesis and Weizaecker's Ur-Theory

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November 19, 2015

**Abstract:** According to Weizaecker's Ur-Theory there are  $N$  so called 'urs' that form each object in the universe. Each 'ur' is one bit of information, so the entropy  $S$  of the universe in natural units is:  $S = 4\pi M^2 = 4\pi N$ .

## 1 The number $N$ of urs in the universe

The number  $N$  of urs in the universe are given by radius  $R$  or mass  $M$  of the universe, with the Planck-length  $l_P$  or Planck-mass  $m_P$ , we can write as follows (see [1]):

$$N = \frac{R^2}{l_P^2} = \frac{M^2}{m_P^2} \approx 10^{120}$$

With  $l_P = \sqrt{\frac{hG}{c^3}}$  or  $m_P = \sqrt{\frac{hc}{G}}$  we can write:

$$\frac{G}{R^2} = \frac{c^3}{Nh} = \text{constant}$$

## 2 The Gravitational constant G

As calculated before the Gravitational constant is given by:

$$\frac{G}{R^2} = \frac{c^3}{Nh} = \text{constant}$$

If we assume  $R = ct$  we can rewrite:

$$\frac{G}{t^2} = \frac{c^5}{Nh} = \text{constant}$$

The product of  $MR$  is given by the adiabatic equation:

$$MR = N \frac{h}{c} = N l_P m_P$$

## 3 References

1. Thomas Goernitz, Abstract Quantum Theory and Space-Time Structure, International Journal of Theoretical Physics. Vol. 27, Nr.5, 1988
2. Holger Lyre, C. F. von Weizsaecker's Reconstruction of Physics: Yesterday, Today, Tomorrow, arXiv:quant-ph/0309183
3. Peter H. Michalicka, About the Gravitation, viXra.org, Relativity and Cosmology, viXra:1410.0091