Large Number Hypothesis and Weizaecker's Ur-Theory

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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:

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

2 The Gravitational constant G

As calculated before the Gravitational constant is given by:

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

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

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

The product of MR is given by the adiabatic equation:

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

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