THE PROBLEM OF THE ELECTRIC DIPOLE MOMENT OF NEUTRON

In the hydrogen atom, the distance of electron from proton calculated on the basis of the Coulomb's law

$$r = \frac{k_e e^2}{E_p}$$

is 1.059 x 10^{-10} m.

Thus, we can calculate the force with which electron and proton attract each other in the hydrogen atom.

$$F = k_e \times \frac{x_1}{r} \times \frac{x_2}{r}$$

F – the attraction force between electron and proton,

x_1, = e^-, x_2 = e^+ – number of elementary charges in the hydrogen atom,

r – distance between the objects,

k_e = 2,31 x 10^{-28} Nm^2 – the electric constant,

E_p = 13,6 eV – the ionization energy

The force is

$$F = 2{,}31 \times 10^{-28} Nm^2 \times \frac{1}{1.059 \times 10^{-10}\ m} \times \frac{1}{1.059 \times 10^{-10}\ m} = 2{,}59 \times 10^{-8} N$$

In the neutron, the distance of electron from proton is smaller than 1.059 x 10^{-10} m, but the exact value is still undetermined. Physicists have been concerned about this topic for years. There are a lot of theories in which this value is estimated at 10^{-21} – 10^{-34} m.

Let us then calculate the force with which charges in neutron will attract each other (according to the modern physics).

For the distance of 1 x 10^{-21} m the force will be

$$F = 2{,}31 \times 10^{-28} Nm^2 \times \frac{1}{1 \times 10^{-21}\ m} \times \frac{1}{1 \times 10^{-21}\ m} = 2{,}31 \times 10^{14}\ N$$

For the distance of 1 x 10^{-34} m the force will be

$$F = 2{,}31 \times 10^{-28} Nm^2 \times \frac{1}{1 \times 10^{-34}\ m} \times \frac{1}{1 \times 10^{-34}\ m} = 2{,}31 \times 10^{40}\ N$$

As it is apparent from the above, the physicists' estimates are obviously overestimated; they are unreal. Neutron should be the most durable particle in the Universe. Neutron is durable only in an atomic nucleus. Having left the nucleus, it disintegrates almost immediately.