

Elucidation of the mystery of the number resulting from the ratio of the gravitational force to the electrical force between two electrons.

riadboudel@gmail.com

In this letter I present an unprecedented numeric result in fundamental physics which is very easy to verify. This result was obtained by developing a new approach in physics. It is the elucidation of the mystery of the number resulting from the ratio of the gravitational force to the electrical force between two electrons.

To present this result I take a passage from the book "The character of physical law" (PP 31-32) written by Professor Richard Feynman, in which he questioned the origin and the meaning of the number resulting from the ratio of the gravitational force to the electrical force between two electrons.

Begin of citation:

“One thing is particularly interesting. The inverse square law appears again – in the electrical laws, for instance. Electricity also exerts forces inversely as the square of the distance, this time between charges, and one thinks perhaps that the inverse square of the distance has some deep significance. No one has ever succeeded in making electricity and gravity different aspects of the same thing. Today our theories of physics, the laws of physics, are a multitude of different parts and pieces that do not fit together very well. We do not have one structure from which all is deduced; we have several pieces that do not quite fit exactly yet. That is the reason why in these lectures instead of having the ability to tell you what the law of physics is, I have to talk about the things that are common to the various laws; we do not understand the connection between them. But what is very strange is that there are certain things which are the same in both. Now let us look again at the law of electricity.

The force goes inversely as the square of the distance, but the thing that is remarkable is the tremendous difference in the strength of the electrical and gravitational forces. People who want to make electricity and gravitation out of the same thing will find that electricity is so much more powerful than gravity, it is hard to believe they could both have the same origin. How can I say one thing is more powerful than another? It depends upon how much charge you have, and how much mass you have. You cannot talk about how strong gravity is by saying: ‘I take a lump of such a size’, because you chose the size. If we try to get something that Nature produces – her own pure number that has nothing to do with inches or years or anything to do with our own dimensions – we can do it this way. If we take a fundamental particle such as an electron – any different one will give a different number, but to give an idea say electrons – two electrons are two fundamental particles, and they repel each other inversely as the square of the distance due to electricity, and they attract each other inversely as the square of the distance due to gravitation.

Question: What is the ratio of the gravitational force to the electrical force? That is illustrated in equation figure 7. The ratio

Between two electrons

$$\frac{\text{Gravitational attraction}}{\text{Electrical repulsion}} = \frac{Gm_e^2}{K_e e^2} = \left(\frac{\frac{1}{2}a_0}{d_{M-S}} \right)^2 = \left(\frac{a_0}{d_{V-S}} \right)^2 = \left(\frac{\frac{3}{2}a_0}{d_{T-S}} \right)^2 = \left(\frac{2a_0}{d_{Mars-S}} \right)^2$$

According to the simplest form, the ratio of the gravitational attraction and electrical repulsion between two electrons is equal to the square of the ratio of the Bohr radius to the distance of Venus from the Sun, such as:

$$\frac{\text{Gravitational attraction}}{\text{Electrical repulsion}} = \frac{Gm_e^2}{K_e e^2} = \left(\frac{a_0}{d_{V-S}} \right)^2$$

With:

$$a_0 : \text{Bohr radius} = 0.529 \times 10^{-10} m$$

$$d_{V-S} : \text{Distance of Venus to the Sun} = 108 \times 10^9 m$$

By calculating the square of the ratio of the Bohr radius to the distance of Venus from the Sun, we find:

$$\left(\frac{a_0}{d_{V-S}} \right)^2 = \left(\frac{0.529 \times 10^{-10}}{108 \times 10^9} \right)^2 = \frac{1}{4.168 \times 10^{42}}$$

We know that the ratio of the gravitational attraction to the electric repulsion between two electrons is:

$$\frac{\text{Gravitational attraction}}{\text{Electrical repulsion}} = \frac{Gm_e^2}{K_e e^2} = \frac{1}{4.17 \times 10^{42}}$$

We find that the square of the ratio of the Bohr radius to the distance of Venus from the Sun gives the same number as that given by the ratio of the gravitational attraction to the electric repulsion between electrons.

From where we obtain the following equation:

$$\frac{Gm_e^2}{K_e e^2} = \frac{\text{Gravitational attraction}}{\text{Electrical repulsion}} = \left(\frac{a_0}{d_{V-S}} \right)^2 = \frac{1}{4.17 \times 10^{42}}$$

The ratio of the gravitational attraction to the electric repulsion between two electrons is exactly equal to the square of the ratio of the Bohr radius to the distance of Venus from the Sun.

The ratio of the half of Bohr radius at the distance of Mercury from the Sun, the square of the ratio of Bohr radius at the distance from Venus to the Sun, the square of the ratio of three half of Bohr radius at the distance from Earth to the Sun, the square of the ratio of the double of Bohr radius at the distance from Mars to the sun are actually representing the ratio of the dimensions of the atom to those of the solar system.

$$\frac{\text{Gravitational attraction}}{\text{Electrical repulsion}} = \left(\frac{\text{Dimensions of the atom}}{\text{Dimensions of the solar system}} \right)^2$$

$$\frac{Gm_e^2}{K_e e^2} = \left(\frac{\frac{1}{2}a_0}{d_{M-S}} \right)^2 = \left(\frac{a_0}{d_{V-S}} \right)^2 = \left(\frac{\frac{3}{2}a_0}{d_{T-S}} \right)^2 = \left(\frac{2a_0}{d_{Mars-S}} \right)^2 = \frac{1}{4.17 \times 10^{42}}$$

Indeed, this original approach in fundamental physics allows, among other, the unification of the gravitational force and the electric force, and consequently leads to show that the tremendous number which resulting from the ratio of the electric force to the gravitational force is none other than the square of the ratio of the size of the solar system to the size of the atom.

If you find this result interesting and if you want to know more about this new approach, you can contact me at this mail address:
riadboudel@gmail.com