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Further Mathematical Exploration of Newton's Gravity Law and Coulomb's Electrostatic Law

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Opinion

Mathematical exploration reveals new features of Newton's gravity law and Coulomb's electrostatic law with new applications in perspective.

"Newton, excuses moi…" Albert Einstein

Newton's Gravity Law

The equal forces of attraction between two masses *M* and *m* are determined by the distance d separating them and the factor Mm and the constant G. Athough there is no value limitations for *M*, *m* and *d*; they cannot be negative or equal to zero. I have shown previously that the two pair of masses (100 and 1) and (10 and 10) separated by the same distance generate same gravity forces because of the factor *Mm* [1]. However mathematically it is possible to make the following statement: $Mm = M + m$. Newton's gravity law known as $F_M = F_m = G \times Mm / d^2$ becomes $F_M = F_m = G(M + m) / d^2$. A simple solution is $M = m = 2$, other solutions are possible as well. The statement $Mm = M + m$ can be developed as $m = M / M - 1$ and $M = m / m - 1$. This new formulation of Newton's gravity law mandates new limitations: M and m must be superior to 1. In addition it shows the amount of mass $(M + m)$ is a determining factor in some known or unknown real situations.

Coulomb's Electrostatic Law

It is mathematically similar to Newton's gravity law. There are differences. The electric charges can be positive (protons) and negative (electrons). Attraction between opposite charges and repulsion between similar charges. At the atomic level gavity is very weak and cannot influence events. For Coulomb's law it was established by Edward M. Purcell and David J. Morin its validity in distances between 10^8 m and 10^{-16} m. With that in mind, let's consider the condition in which $q_1 = q_2 = d$. An electron and a proton separated by a distance equal to 1.6×10^{-19} m [2].

The analysis of this experimental condition tells:

1. The gravity force is very weak

2. The electrostatic force is huge 8.9×10^{9} N, and equal to the constant k. In a hydrogen atom, the proton and the electron are separated by 5.3×10^{-11} m and the electrostatic force is 8.2×10^{-8} N. Therefore at the distance 1.6×10^{-19} m, the electrostatic force is 1.06×10^{17} m stronger, hydrogen atoms cannot exist in this condition.
3. If the two charges are protons separated by 1.6×10^{-19} m, the electrostatic force will be the same 8.9×10^{9} N. Two protons in a helium nucleus are separated by 1.2×10^{-15} m. The electrostatic force between the two protons is 160 N. So at the distance 1.6×10^{-19}m the electrostatic force is 5.56×10^{6} m stronger than in a helium atom nucleus.
4. Since the weak nuclear force is at the 10^{-18} m distance, I am pleased to extend the Purcell and Morin lower limit from 10^{-16} m to 1.6×10^{-19} m, which is below the weak nuclear force.
5. We are completely in the dark, the situation is mathematically sound and the Coulomb law still working. I don't know if at 1.6×10^{-19} m an electron capture by a proton can happen. The lightning bolt phenomenon in which free proton can interact with high energetic electrons from cosmic rays and the production of gamma rays for which there is no explanation right now. The possibility of free protons fusion may explain the huge energy production in lightning bolt. It is amazing the Coulomb law is still working beyond what was its considered reach. In nature there is no electric charge below the electron and the proton, therefore this another argument that at the singularity level there is no gravity at all and the very strong Coulomb force is maintaining all, what ever they may be together, waiting for the Big B Bang to happen [1].

The Coulomb Law can Work at the 10^{-15} m Distance

The combined charges of 6240 electrons or protons makes 10^{-15} value and we are back in the condition $q_1 = q_2 = d$ and the Coulomb electrostatic force is huge 8.9×10^{9} N. This kind of titanic events can happen in lightning bolt with dramatic conseqences. The Coulomb's law, unlike Newton's law, work for an electron or a proton or a group of electrons or protons and predict many effects. Newton's law still works for two masses separated by a distance but cannot work for a group of masses together like the solar system or a galaxy.

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References

1. Alileche A. Newton and the big bang. J Phys Astron. 2021;9(8):1-3.
2. Purcell EM, Morin DJ. Electricity and magnetism. Cambridge University Press; 2013.