Electricity and Magnetism

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Abstract

In the text “Electricity and Magnetism”, I propose a hypothesis about the whole mechanism for electricity and magnetism and their interactions, including the discussions about followings:
1, the possible existence of magnetic charges in protons and electrons where the positive and negative electric charges locate exactly;
2, the mechanism of the activation and deactivation of magnetic charges with in protons and electrons;
3, how electricity, magnetism and Lorentz effect interact with each other within hydrogen atom;
The whole mechanism can provide a framework for hydrogen atom and solve the atomic stability issue.

Keywords

Electric charge, magnetic charge, lorentz effect, coulomb force

1. Introduction

It is generally accepted that electrostatic force is generated by electrons and protons. However, what are the particles that generated magnetic force (or magneton) and how it is generated are not well explained at present times. And another very common electromagnetic phenomenon that electric charges will receive a lateral force (Lorentz force) when moving in a magnetic field, is too not explained. Moreover, its relationship with electricity and magnetism is not clarified, or discussed. We know many electromagnetic phenomena, but we don't know why. In the text below, I will propose a hypothesis of mechanism for electricity and magnetism and their relationships with each other.

2. Deficiencies in Existing Electromagnetic Theories

First, let's look at the flaws or fallacies of existing theories:
(1) The existing theory believes that the electric current can generate magnetism, that is, the movement or flow of the electric charges will generate magnetism, but we do not detect any magnetism near the moving gas or fluid that shall be regarded as the movement or flow of electric charges.
(2) If we let an object to carry some galvanostatic, and then let the charged object move, which shall also be regarded as movement of electric charges. We can make the object move at high speed or low speed, or in straight line or circle, and then do we detect magnetism around this object? The answer, of course, is no, we did not detect any magnetism.
(3) Let's see whether or not the electron or proton beam will generate magnetism nearby? Is there a magnetic field around the electron beam in the cathode picture tube? The electron beam can be said to be the purest electric current, and what other currents can be compared with the electron beam? Many experiments have shown that electrons (or protons, omitted below) do not generate magnetism when they move, and electrons do not have magnetism when they are relatively stationary. Therefore, it can be said beyond doubt that a single electron does not have magnetism. A single electron in motion or at rest does not have magnetism and multiple electrons moving together (or called an electric current) do not generate magnetism. So when an electric charge exists as a single particle, that is, as an electron or a proton, such motion does not generate magnetism.
(4) The existing theories believe that the spin of electrons generates magnetism. However, up to present days, the spin of electrons or particles has not been explained clearly. The reason why spin is needed is because people still believe that the movement of the electric charges will generate magnetism. But the existing theories simply avoid explaining or even talking about the mechanism behind this.
(5) The electrostatic, magnetism and Lorentz effects are not joined together to provide a unified mechanism behind all the electromagnetic phenomena. Furthermore, the existing theories fail to incorporate them into the atomic range to provide a unified mechanism of the electromagnetic and Lorentz effects at subatomic level. How do electrons and protons in atoms behave under their own magnetic fields? How is the Lorentz effect of electrons and protons in atoms?

2. Hypothetical Discussions

If the existing theories of electric charge motion are abandoned, I find that the so-called electric charge motion will generate magnetism only when the electric charges are in matter. Is it possible that the motion of electric charges causes some changes in matter, and such changes generate magnetism? Such changes are the cause of magnetism, not the movement of electric charges. So let's take a look at what happens when the electric charges do not exist in the form of individual particles (electrons or protons), but exists in matter? This answer is actually very simple, that is, when the electric charges exist in the form of atoms in matter, the so-called charge motion can generate magnetism, but if the atoms are taken apart or separated, the individual protons or electrons will not generate magnetism, regardless of in motion or at rest. There are a large number of phenomena and experiments to support this conjecture. The most typical one is the Stern-Gerlach experiment, which directly proves that silver atoms have magnetic force. Of course, other atoms also have magnetic force.

In summary, I have come to the conclusion that electrons and protons have no magnetism when they exist alone, but they have magnetism when they form atoms. Then what changes have occurred between the state when the electrons and protons exist alone and the state when they have formed atoms? The answer is the distance between them. It is conceivable that an electron and a proton are far apart. At this time, both of them have no magnetism, and then moving towards each other causes the distance between the two to become narrower, and finally a hydrogen atom is formed. At this time, the hydrogen atom has magnetism. Following this direction of thinking, if the distance between electron and proton reach a certain critical level, the electron and proton each will have a magnetic charge activated. For example, a south magnetic charge appears on the proton and a north magnetic charge appears on the electron, and the two attract each other. Observing the hydrogen atom composed of an electron and a proton from the outside, we can find that this atom has a magnetism (or called a magnetic moment). This can explain why single electrons and protons do not have magnetism, but atoms do. At the same time, it can explain why the energized wire can have magnetic force, because the electrostatic forces cause the number of magnetic charges and the orientation of the magnetic force in the wire to change.

Another very common electromagnetic phenomenon is that electric charges will receive a lateral force (Lorentz force) when moving in a magnetic field. This is very strange, because we all know that the direction of force and the direction of motion shall be the same. If this lateral motion is caused by magnetic force, it shall be in the same direction as the magnetic field. If it is caused by motion, it shall be in the same direction as the direction of motion, but this force is perpendicular to both the direction of the magnetic field and the direction of motion. A small magnetic needle will not receive this kind of lateral force in the magnetic field, or the magnetic charge will not receive this kind of lateral force in the magnetic field. So further suppose, is it possible that the magnetic charge will receive similar lateral force in the electric field? Unfortunately, I have not found phenomena or experiments to support this hypothesis.

Now I apply above hypothesis to the hydrogen atom, namely, protons and electrons have opposite electric and magnetic charges respectively. For example, protons have positive electric charge and south magnetic charge, and electrons have negative electric charge and north magnetic charge. In this way, the electrons and protons are in the electric and magnetic fields generated by themselves. The electric charge will receive the electrostatic force in the same direction as the electric field, and the magnetic charge will receive the magnetic force in the same direction as the magnetic field. At the same time, the electric charge will also receive a lateral force perpendicular to the direction of the magnetic field, and the magnetic charge will also receive a lateral force perpendicular to the direction of the electric field. Following this direction of thinking, let us see what will happen to the electron and proton under the actions of these forces. The answer is a hydrogen atom. The electron will move around the proton due to lateral forces and attracting forces, maintaining a relatively stable motion pattern.

Now, based on the phenomena in the real world and my above assumptions, I propose the following hypothesis of the mechanism of the interaction between electricity and magnetism.

1. Suppose that the electric charges carried by protons and electrons have always been there since the existence of protons and electrons, and always emit electrostatic force. While the magnetic charges carried by protons and electrons have always been there too, but they are not always activated and emit magnetic force. If the distance between the protons and electrons reaches a certain critical value, the magnetic charges will be activated and emit magnetic force, and the magnetic charge and the electric charge occupy the same position in the space. As shown Figure 1 below.

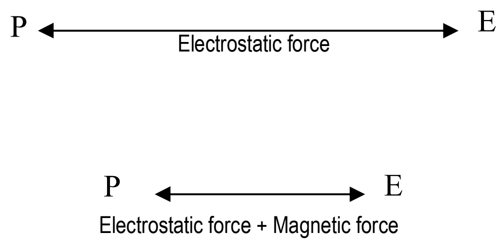

Figure 1: Magnetic charge activated in proton and electron due to their distance narrowing

2. Due to the movement of protons and electrons towards each other, the magnetic charges emit magnetic force (that is, it starts to emit magnetons) when the distance between them reaches a critical distance. When the electric charge carried by the electron meets the magneton emitted by the opposing proton or when the electric charge carried by the proton meets the magnetron emitted by the opposing electron, the electric charges will move in a direction perpendicular to the direction of movement of the magneton, it is the effect or phenomenon of Lorentz Force. It can be visualized that when the magnetic charge meets the magnetron, the magnetic charge is affected by the magnetron, and the magnetic charge moves in the direction of the magnetron propagation, but when the electric charge meets the magnetron (the electric charge and the magnetic charge are located at the same position at the same time), the electric charge moves in the direction perpendicular to the direction of the magneton propagation. Further suppose that if the electric charge meets the magneton and moves sideways, then the magnetic charge will also move sideways when it meets the electrostaton, and the two lateral movements are perpendicular to each other. As shown Figure 2 below.

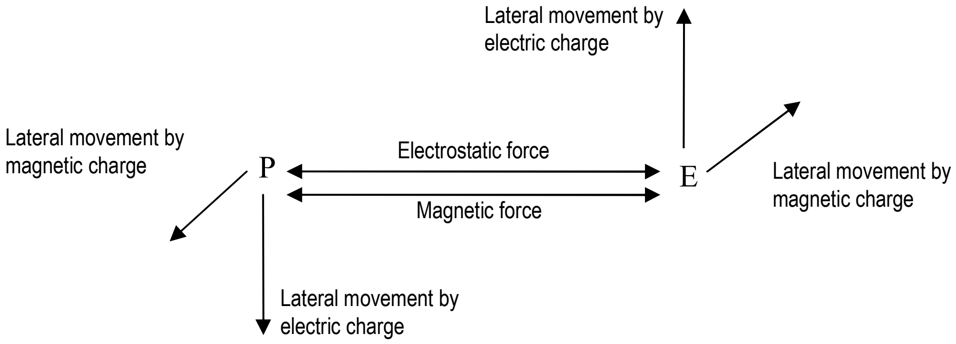

Figure 2: Proton and electron under four forces

3. Suppose that the distance of lateral movement is proportional to the distance that proton P and electron E move towards or away from each other, or the distance of lateral movement is proportional to the magnitude of force carried by the electrostaton and magneton that meet the magnetic charge and electric charge. If the distance between proton P and electron E increases beyond the critical distance, the magnetic charges will be deactivated, following by the disappearance of the magnetic force and all lateral movement, and leaving only the electrostatic force between the proton and the electron. As shown in Figure 3 below:

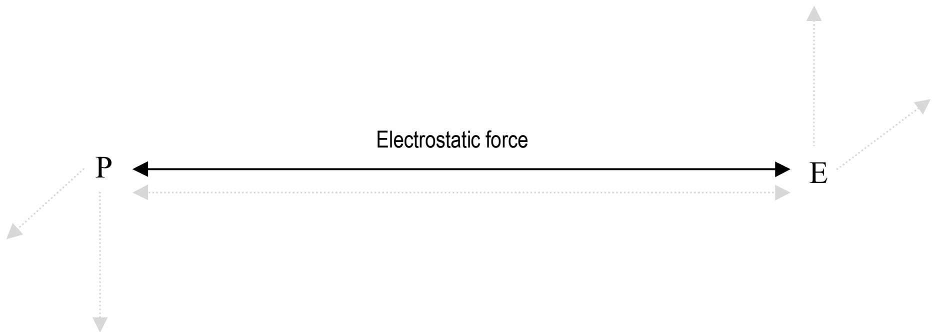

Figure 3: Magnetic charge deactivated in proton and electron due to their distance widening

5. Conclusions

The above hypothesis can provide an explanation of the entire mechanism of electricity, magnetism and Lorentz effect. It can also be used to establish atomic models and solve the problem of atomic stability. For a long time, why do protons and electrons not attract each other and eventually collide with each other, but keep relative motion within a certain relative distance, neither colliding nor departing. This problem has not been solved, and the above electromagnetic mechanism hypothesis can perfectly solve this problem.

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Huan Liang wrote the original draft and final version of above paper.

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Data Availability Statement

All data, models, and code generated or used during the study appear in the submitted article.

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