The interaction mechanism of forces is discussed for the second time

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Abstr: I clearly pointed out in the article "a Preliminary Study of the Interaction Mechanism of Forces" (https://www.toutiao.com/article/7526518366140678697/) that the Coulomb force only exists between charged particles should be transferred by two Coulombs with completely different properties. In this paper, the idea is further discussed, and some known physical phenomena and experimental results related to Coulomb force and mass/universal gravitation are discussed qualitatively. Hope to get the attention and advice of interested experts, scholars and physics enthusiasts.

First, it is impossible for a single medium to undertake the transmission task of Coulomb force interaction

The velocity of Coulomb force interaction between two charged particles is not only related to the velocity of Coulomb force interaction between relatively static charged particles in vacuum, but also to the relative motion state of two charged particles. This is the law that I have found in the process of calculating the theoretical value of vacuum permeability (for details, see my article "The accurate calculation method of vacuum permeability and the physical meaning of simplified calculation results" (https://www.toutiao.com/article/7477025901063209509/)): two zones must be assumed The speed of electric force/Coulomb force interaction between electric particles is related to their relative motion speed, so the phenomenon that the difference between the theoretical value and the actual value is the smallest can be deduced. On the one hand, this phenomenon supports that the speed of electric/Coulomb force interaction is basically equal to the speed of light of a static light source in vacuum, and on the other hand, it supports that the speed of electric interaction between charged particles in relative motion is directly related to the magnitude and direction of their relative motion speed, rather than constant. Therefore, it is impossible for a single medium (such as ether, electric field or/and magnetic field, etc.) To undertake the transmission task of Coulomb force interaction. As shown in Figure 1 below, when there are two groups of protons, electrons and neutrons with different motion States at points A and B, there are as many as 36 Coulomb force interaction speeds between them (without considering the Coulomb force interaction between six particles at each point, otherwise more), which determines that no matter what kind of medium exists between points A and B, It is impossible to simultaneously perform the task of transmitting forces at up to 36 (or 72 if reaction forces are considered) different interaction speeds.

Figure 1: Schematic of Coulomb force interaction between two groups of charged particles with different electrical properties

Second, at least two Coulombs with different properties are needed to complete the task of Coulomb force transfer

There are three kinds of charged particles: electrons, protons, and neutrons (with zero charge). The magnitude and direction of the Coulomb force between them are different. Therefore, it is impossible for a Coulomb to complete the transfer task of Coulomb force interaction. It must be assumed that the Coulombs ejected by each electron and proton without interruption at the speed of a stationary light source in a vacuum are different in nature: when the same number of electron Coulombs ("e" for short) and proton Coulombs ("p" for short) are absorbed by a charged particle at the same time, their effects exactly cancel each other out. The electron will change its state of motion along the direction of motion of the electron after absorbing the electron, and the proton will change its state of motion along the opposite direction of the direction of motion of the electron after absorbing the electron; the change of the state of motion of the electron and the proton after absorbing the electron is just opposite to the absorption of the electron. Neutrons do not change their state of motion, whether they absorb e or p. This is because the neutron is composed of an electron and a proton, and whether the electron and the proton absorb the electron or the proton, their effects are just the opposite, and they just cancel each other out.

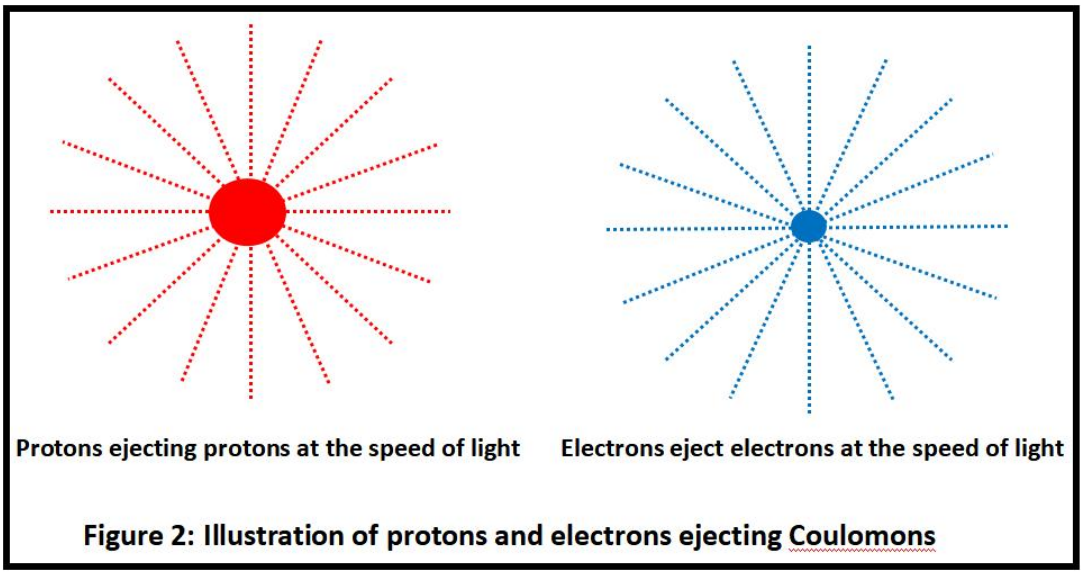

Figure 2: Illustration of protons and electrons ejecting Coulomons

Third, several typical physical phenomena and experimental results are explained qualitatively by using two kinds of Coulombs

1、Electron-electron repulsion

There is no doubt that when an electron absorbs an electron produced by another electron, the kinetic energy and momentum carried by the electron will change its state of motion along the direction of the electron's motion. This presents a mutually exclusive phenomenon.

2、The phenomenon of mutual absorption between electrons and protons

After the proton absorbs the e, the ability to eject the p on the absorption side will be reduced, so that the state of the proton ejecting the p outward is no longer spherically symmetrical, and the proton will change its state of motion towards the side where the p is ejected less. This shows the phenomenon of mutual absorption.

3、Proton-proton repulsion

It is the same as the mechanism of mutual repulsion between electrons.

4、The phenomenon of mutual absorption between protons and electrons

The mechanism is exactly the same as the attraction between electrons and protons.

5、An object with mass has inertia

Objects with mass are composed of electrons and protons, and the fundamental reason why electrons and protons have inertia should be that when they are at rest or moving in a straight line at a uniform speed, the electrons or protons they eject are spherically symmetrical, and the vector superposition result of their reaction force is 0. Therefore, it will remain static or uniform linear motion for a long time. When an external force changes the motion state of the electron or proton, the ejected e or p will no longer be spherically symmetrical (when the electron or proton ejects the e or p, its speed is always constant relative to the electron or proton itself), and the ejection speed along the forward direction will be greater than that in the opposite direction, so the vector superposition result of the reaction force generated by the e or p will no longer be 0. But in the opposite direction of the change of the state of motion, so that there is a force to prevent the change of the state of motion, which is the so-called inertial force.

6、It is likely that the nature of the mass is related to the amount of ejection per unit time of the E- or/and P-subs

If we comprehensively analyze the relationship between the mass and geometric size of electrons and protons, we may conclude that the number of electrons ejected or absorbed per unit time is much less than number of protons ejected or absorbed per unit time. As a result, the inertia of electrons and protons is different, and the mass is naturally different.

7、The nature of gravitation is probably related to the Coulomb force

Because most of the substances in nature exist in the form of atoms, and the electrons in atoms move around the nucleus (to be exact, around the center of mass of atoms) at a high speed. That is to say, electrons usually move much faster than protons or nuclei. Therefore, although atoms are electrically neutral as a whole, the interaction velocity due to Coulomb force is not only related to the speed of light of a static light source in vacuum, but also to the state of motion of charged particles themselves. Therefore, the vector superposition result of the interaction of Coulomb force between atoms and other atoms at any specific time can not be zero, but may be equal to the universal gravitation. That is to say, the essence of gravitation is probably a part of Coulomb force.

The above is only a qualitative explanation of several common physical phenomena and experimental results. Subsequent articles will further explore this issue at a quantitative level.

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Due to my lack of English ability, the Chinese to English translation was achieved through common software. Therefore, the English version is likely to have more inaccurate and not easily understood parts. In order to facilitate the review of the manuscript by experts, the original Chinese version is attached. Please accept my apologies for any inconvenience.

二探力的相互作用机理

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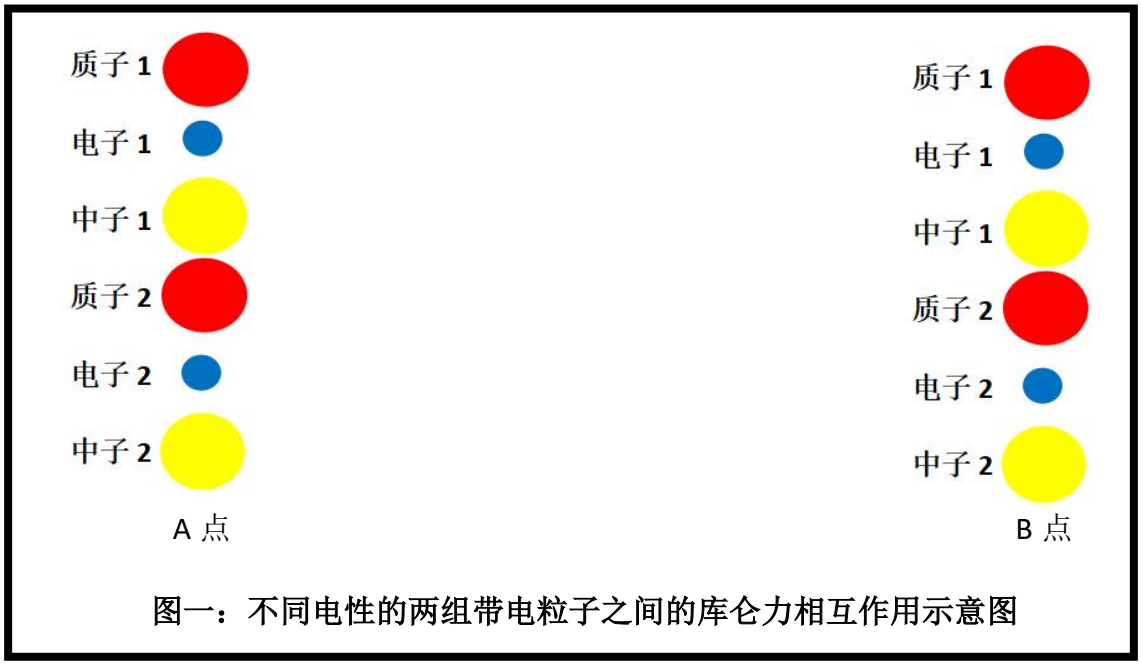
[文章摘要]：本人在《力的相互作用机理初探》（https://www.toutiao.com/article/7526518366140678697/）一文中明确指出：带电粒子之间才存在的库仑力应该是由两种性质完全不同的库仑子负责传递的。本文在此基础上，进一步探讨该设想，并据此对目前已知的一些与库仑力和质量/万有引力有关的物理现象与实验结果进行定性层次的讨论。希望得到有兴趣的专家学者和物理爱好者的关注与指教。

一、单一介质不可能承担得起库仑力相互作用的传递任务简述

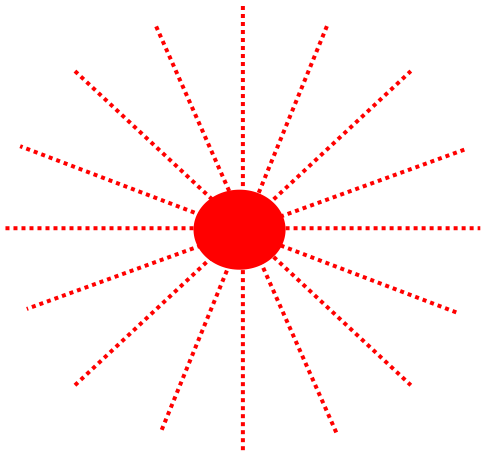
由于两个带电粒子之间才存在的库仑力相互作用的速度不仅与真空中相对静止的带电粒子间的库仑力相互作用速度有关，还与两个带电粒子的相对运动状态有关。这是本人在计算真空磁导率理论值过程中发现的规律（详见本人的《真空磁导率的精确计算方法及简化计算结果的物理意义》（https://www.toutiao.com/article/7477025901063209509/）一文）：必须假设两个带电粒子间的电力/库仑力相互作用速度与其相对运动速度有关，这时才能推导出理论值与实际值的差距最小的现象。这一现象一方面支持电力/库仑力的相互作用速度与真空中静止光源的光速基本相等，另一方面支持相对运动的带电粒子间的电力相互作用速度与其相对运动速度的大小与方向直接相关，而不是恒定的。由此决定了单一介质（如以太、电场或/和磁场等）不可能承担得了库仑力相互作用的传递任务。如下图一所示：当 A、B 两点处各有二组运动状态不同的质子、电子和中子时，它们之间的库仑力相互作用速度有 36 种之多（在未考虑每处 6 个粒子间的库仑力相互作用，否则更多），由此决定了无论 A、B 两点之间存在哪种介质，都不可能同时完成多达 36 种（若考虑反作用力，则共有多达 72 种）不同相互作用速度的力的传递任务。



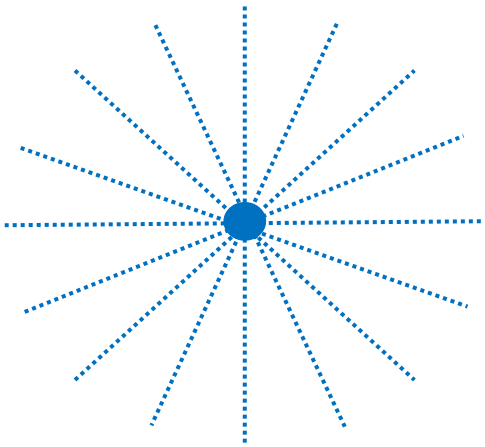
图一：不同电性的两组带电粒子之间的库仑力相互作用示意图

二、至少需要两种性质不同的库仑子才能完成库仑力的传递任务简述

由于带电粒子共有三种：电子、质子和中子（带 0 电荷）。它们之间的库仑力的大小与方向均有所不同。因此，一种库仑子是不可能完成库仑力相互作用的传递任务的。必须假设：每个电子和质子不间断地、以真空中静止光源之光速喷射出的库仑子是性质不同的：同等数量的电子库仑子（简称为“e 子”）和质子库仑子（简称为“p 子”）同时被一个带电粒子吸收时，它们的作用正好相互抵消。而电子吸收 e 子后会沿 e 子运动方向改变运动状态，质子吸收 e 子后会沿 e 子运动方向的反向改变运动状态；电子和质子吸收 p 子后的运动状态改变情况正好与吸收 e 子相反。而中子无论吸收 e 子或是 p 子，都不会改变运动状态。这是因为中子是由一个电子和质子组成的，电子和质子无论吸收 e 子或是 p 子，它们的作用效应正好相反，也就正好相互抵消了。



质子以光速向外喷射 p 子



电子以光速向外喷射 e 子

图二：质子和电子向外喷射库仑子示意图

三、用两种库仑子定性解释几个典型的物理现象与实验结果

1、电子与电子之间的相互排斥现象

电子吸收另一个电子产生的 e 子后，e 子携带的动能和动量将使其沿 e 子的运动方向改变运动状态，这是勿容置疑的事情。这就呈现出相互排斥现象了。

2、电子与质子之间的相互吸收现象

质子吸收 e 子后，会导致吸收侧的 p 子喷射能力降低，从而导致质子向外喷射 p 子的状态不再球对称了，质子会朝喷射 p 子少的一侧改变运动状态。这就呈现出了相互吸收现象了。

3、质子与质子之间的相互排斥现象

与电子与电子之间的相互排斥现象的机理完全相同。

4、质子与电子之间的相互吸收现象

与电子与质子之间的相互吸引现象的机理完全相同。

5、有质量的物体存在惯性现象

由于有质量的物体均是由电子和质子组成的，而电子和质子具有惯性的根本原因应该是：当其静止或匀速直线运动时，它们喷射出去的 e 子或 p 子是球对称的，其反作用力的矢量叠加结果为 0。所以会长时间保持静止或匀速直线运动状态。当有外力改变电子或质子的运动状态时，其喷射出去的 e 子或 p 子就不会再是球对称的了（电子或质子喷射 e 子或 p 子时，其速度总是相对电子或质子本身恒定），沿前进方向的喷射速度会大于其反方向，从而 e 子或 p 子产生的反作用力的矢量叠加结果不再为 0，而是朝改变运动状态的反方向，从而就有了阻止运动状态改变的力，也就是所谓的惯性力。

6、质量的本质很可能与 e 子或/和 p 子的单位时间内的喷射量有关

如果我们全面分析电子和质子的质量与几何尺寸间的关系，就可能得出：电子单位时间内喷射或吸收的 e 子远少于质子单位时间内喷射或吸收的 p 子。这样就会导致电子与质子的惯性不同，质量自然也就不同了。

7、引力的本质很可能与库仑力有关

由于大自然中的物质多以原子的形式存在，而原子中的电子均以高速绕原子核（准确地说是绕原子的质心）作近似圆周运动。也就是说：通常情况下，电子的运动速度远大于质子或原子核。因此，虽然原子总体上为电中性，但因库仑力相互作用速度不仅与真空中静止光源的光速有关，还与带电粒子本身的运动状态有关。由此决定了原子在任意特定时刻与其它原子间的库仑力相互作用的矢量叠加结果不可能为 0，而很可能等于万有引力。也就是说：万有引力的本质很可能是库仑力的一部分。

以上只是定性层次地解释了几种常见的物理现象与实验结果。随后的文章将进一步以定量的层次来探讨这方面的问题。

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