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Extended Abstract

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Extending Coulombs law for gravitation and radiation

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The law enunciated by Charles Coulomb, in 1784, giving force of repulsion or attraction between two electric charges, is the most important principle in physics. However, this law is not complete as it does not include force of gravity between charged particles and does not incorporate radiation from accelerated charged particles. This paper extends Coulombs law by adding a term for gravitation and invoking aberration of electric field to make speed in an electric field a factor for radiation. In the extended law, accelerating force on a particle of mass m and charge q moving in an electric field E, depends on the speed v, reducing to zero at the speed of light c as a maximum, with emission of radiation and mass remaining constant as the rest mass. This is in contrast to special relativity where accelerating force is qE, independent of speed but mass increases with speed to become infinitely large at the speed of light as a limit. This paper queries the relativistic mass-velocity formula as an infinite mass is not tenable in nature. An important outcome of the paper is that Lorentz factor has nothing to do with mass m but it is the result of motion of a charged particle perpendicular to an electric field. It is shown that Rutherford's nuclear model of the hydrogen atom is stable outside quantum mechanics. Balanced electric fields from charges in matter are identified to constitute aether as the medium for gravitation and electromagnetic radiation.

The law enunciated by Charles Coulomb, in 1784, giving force of repulsion or attraction between two charges, is the most important principle in physics. However, this law is notcomplete as it does not include force of gravity between charged particles and does notincorporate radiation from accelerated charged particles. This paper proposes an extensionof Coulomb's law by adding a term for gravitation and invoking aberration of electric fieldto incorporate radiation. It gives an extended law where accelerating force depends onvelocity in an electric field. The law is applicable to a charged particle, accelerated by anelectric field, to the speed of light, with emission of radiation and constant mass, contrary tothe theory of special relativity. It is found the relativistic mass-velocity formula is correct incircular motion and Lorentz factor is the result of a charged particle moving perpendicularto an electric field. It is shown that relativistic mass is not a physical quantity but the ratio ofelectrostatic force to acceleration, in circular motion, which becomes infinitely large formotion in a straight line. An important outcome of the paper is showing that Rutherford'snuclear model of the hydrogen atom is stable outside quantum mechanics. The property ofaether, as a balanced electric field medium for gravitation and radiation, is identified.

ince forces can be derived from potentials, it is convenient to work with potentials instead, since they are forms of energy. The electrostatic potential is also called the *Coulomb potential*. Because the electrostatic potential has the same form as the gravitational potential, according to classical mechanics, the equations of motion should be similar, with the electron moving around the nucleus in circular or elliptical orbits (hence the label "planetary" model of the atom). Potentials of the form $V(r)$ that depend only on the radial distance rr are known as central potentials. Central potentials have spherical symmetry, and so rather than specifying the position of the electron in the usual Cartesian coordinates (x, y, z), it is more convenient to use polar spherical coordinates centered at the nucleus, consisting of a linear coordinate r and two angular coordinates, usually specified by the Greek letters theta (θ) and phi (Φ). These coordinates are similar to the ones used in GPS devices and most smart phones that track positions on our (nearly) spherical earth, with the two angular coordinates specified by the latitude and longitude, and the linear coordinate specified by sea-level elevation. Because of the spherical symmetry of central potentials, the energy and angular momentum of the classical hydrogen atom are constants, and the orbits are constrained to lie in a plane like the planets orbiting the sun. This classical mechanics description of the atom is incomplete, however, since an electron moving in an elliptical orbit would be accelerating (by changing direction) and, according to classical electromagnetism, it should continuously emit electromagnetic radiation. This loss in orbital energy should result in the electron's orbit getting continually smaller until it spirals into the nucleus, implying that atoms are inherently unstable.
This Coulomb force is extremely basic, since most charges are due to point-like particles. It is responsible for all electrostatic effects and underlies most macroscopic forces. The Coulomb force is extraordinarily strong compared with the gravitational force, another basic force—but unlike gravitational force it can cancel, since it can be either attractive or repulsive. The electrostatic force between two subatomic particles is far greater than the gravitational force between the same two particle.

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