

Phenomena by magnetic coupling of high-speed charged particles in the solar wind

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1. Why does the solar wind maintain the state of ions and reach the edge of the solar system?

High-speed charged particles are accompanied by magnetism. There is a magnetic coupling between particles in which the same charged particles move in parallel, however there is a magnetic repulsive reaction between particles when electrons and H^+ move in parallel. Since a hydrogen ion (H^+) is 1836 times larger in mass than an electron (e^-), the charged particle motion in the plasma depends on the motion of H^+ . The Sun rotates counterclockwise, and releases H^+ at escape velocity of 617.5km/s or more. The charged particles are spread around the plane perpendicular to the Sun's rotation axis due to their magnetic action. H^+ with a large momentum component become mainstream by collisions, and the charged particles remain in the ion state, and spread in a disk shape, reaching the edge of the solar system.

2. Principle of the magnetic coupling between in moving charged particles

Aharonov-Baume effect is a quantum phenomenon in which a charged particle is affected by vector (**A**), instead of the magnetic field (**B**). In case of a current ($i=nqv$) is passed through in the solenoid coil, and electron beam in the direction perpendicular to the coil axis are flowed above and below outside of the coil, interference fringes are observed. If we consider the magnetic field at first, the magnetic field outside the solenoid is offset to zero. The interference fringes cannot be explained by the concept of magnetic field **B**. This is evidence that the motion of electrons pathing through outside of a solenoid coil without a magnetic field shows that, the case of parallel is different from anti-parallel case. The relation between **A** and **i** is similar expressions to Poisson equation that is relation between electric potential V ($E=\text{grad } V$) and charge density (ρ). From this equation, **A** is parallel to the direction of **i**, and its value decreases as it moves away. According to Ampere's law, a line integration of **H** is the area integration of **i**. The static magnetic field **H** is the result of the superimpose the magnetic action of individual electrons those are constantly changing direction. **H** is a virtual indication to be acted on when a moving charged substance receives from the other moving charged substance. Magnetic coupling of moving charged particles forms geomagnetism of planet.

3. The magnetosphere formed by the magnetic coupling between chained moving charged particles

It is said that movement of liquid metal in the outer shell inside the Earth generate geomagnetism. As the way of conventional theory, when the geomagnetism is set at first, even if we consider the motion of charged particles after, the geomagnetism does not change. However, geomagnetism forms a tail in the backside of the Sun side. Then, it is necessary we consider the magnetic coupling among the moving charged particles at first. So, we can explain the geomagnetism by a chaining the magnetic coupling of the moving charged particles. The chain of magnetic coupling of charged particles is possible to explain issue of "The rotation curve of galaxies is flat". The gravitational bond of "dark matter" is not the definitive answer.

4. Formation of rings by magnetic coupling of charged substances orbiting the outer planets

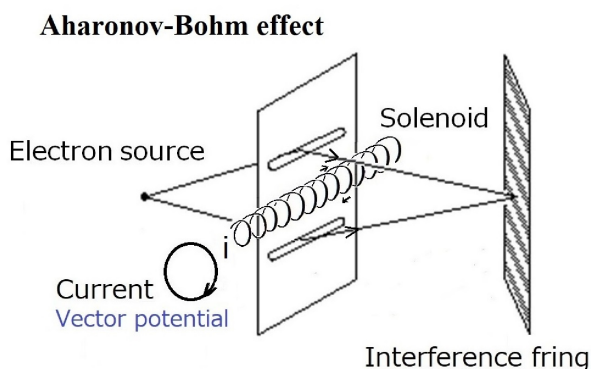
The charged particles of solar wind and the charged particles inside the planet form the geomagnetic of the planet by magnetic coupling. Interstellar materials orbiting around the planet's geostationary orbit are ionized by the collision of H^+ in the solar wind. Since the charged particles rotates synchronously by magnetic coupling with charged moving particles inside the outer planet, its rotation speed like a wheel, is proportional to the distance from the center of the planet. The velocity of particles was accelerated by

collisions between the solar wind. On the other hand, according to Kepler's third law ($mv^2/r=GM_m/r^2$) the speed is inversely proportional to the distance from the center. The orbital rotational speed offsets by the change in axle rotational speed at near geostationary orbit (R_0). Here, $R_0=[G_{Mplanet}(T_{orbit}/2\pi)^2]^{1/3}$. So, the charged particles of ring orbits without being absorbed by the planet at the center of gravity.

5. Conclusion

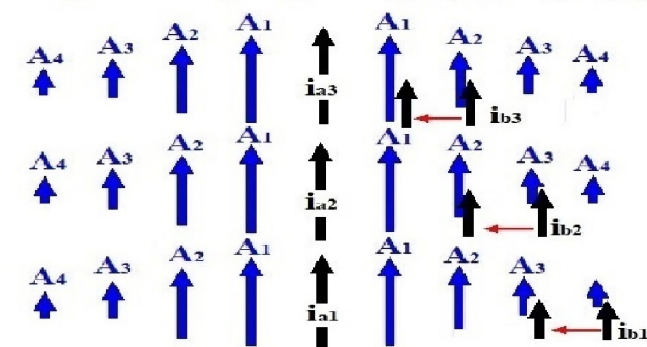
It was described that moving charged particles are interacted with the other charged particles via vector potential as effects of magnetic energy of E_m ($E_m = -q\mathbf{v}\mathbf{A}$). In the future, it is expected that understanding will be deepened in various fields by examining the theory related to magnetic fields considering vector potential \mathbf{A} .

Keywords: Solar wind, Geomagnetism, Aharonov-Bohm effect, Vector potential, Ring of planet



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Magnetic coupling energy [$E_m = -\mathbf{i}_b \cdot \mathbf{A}_a$]



Magnetic coupling force works between \mathbf{i}_a and \mathbf{i}_b through vector potential \mathbf{A}