THE HYPOTHESIS OF ELECTROMAGNETIC QUANTUM OF KINETIC ENERGY AND ITS APPLICATION

Hu Changwei
Room 54, No.2, Tian Shan Wu Cun, 200336, Shanghai China， huchangwei5@yahoo.com.cn

Abstract: It is considered generally that there is no inevitable relation between the kinetic energy and electromagnetism, while this paper assumes that the quantum of kinetic energy is possessed of electromagnetism as photon, and their arrangement are influenced by outside field of electricity or magnetism. Applying this hypothesis can explain simply for Lorentz force, the effect of single polarity and Wilson-Wilson experiment, moreover probe into the mechanism of lightning electrization and the cause of elemental magnetic field of heavenly body.

Key words: Quantum of kinetic energy, Electromagnetism, Vector relation.

Generally, it is considered that there are no inevitable relation between the kinetic energy and electromagnetism, and yet the circumstances are unlikely so.

1, The hypothesis of electromagnetic quantum of kinetic energy

The energy of photon is pure kinetic energy as well as pure electromagnetic energy, whose vector of energy current density:

$S = E \times H$ **(**E is the intensity of electric field, H is the intensity of magnetic field.) （1）

As everyone knows, the wave-particle duality relation of photon applies to general object (the matter with static mass). Then, can the vector relation (1) of photon apply to general object? It seems that this question is random a few, but is worth to make a penetrating inquiry. Actually many phenomena show that the energy current of kinetic energy conforms to the vector relation (1): When the wire cuts the magnetic field, there are perpendicular each other among the direction of wire moving, magnetic field and induced electromotive force; when a water drop fall into the water, the face of water will produce an upward efflux vertically, and the existence of horizontal electric field can increase the highness of this efflux; the electrokinetic effect shows that there is potential difference between the two face of porous plug while the fluid run through porous plug etc. thus a hypothesis is proposed below.

The hypothesis of electromagnetic quantum of kinetic energy: the vector relation（1）of photon applies to the kinetic energy quantum of general object, that is to say, every kinetic energy quantum is satisfied the formula $S_0 = E_0 \times H_0$, and the direction of S_0 are identical, whose sum of vector is the vector S of energy current density of object. The distribution of E_0 and H_0 are isotropy and without obvious electromagnetism on the plane which is vertical with S, and their arrangement will be influenced by outside field of electricity or magnetism. Then the kinetic energy of object is veiled electromagnetic energy.

Why the kinetic energy of object is the veiled electromagnetic energy? This should be explored from the essence of vacuum. The vacuum is not void, which is showed fully by modern physics. The theory of quantum field believes that the physical vacuum is the basic state of quantum field, the particle of object can be regarded as the product that the physical vacuum is stimulated. The starting energy which the photon is stimulated is lowest among all object particles, so the electromagnetic stimulation is the best basic stimulation of vacuum. Once the physical vacuum is disturbed, the electromagnetic stimulation will be produced. If the disturbing body is the electric or magnetic field, it will shoot the pure electromagnetic

energy, namely the electromagnetic wave; if that is non-electromagnetic body, it will form the veiled electromagnetic energy, namely the kinetic energy; generally, when a object with electricity or magnetism moves, it will produce electromagnetic wave as well as kinetic energy.

2. The analyses of relevant effects

Above hypothesis can explain some electromagnetic effects well. The following are some examples.

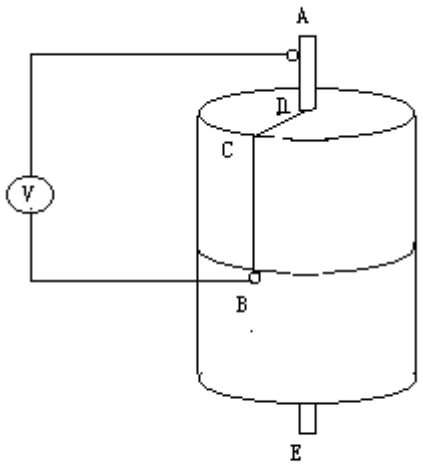
2.1 The cause of Lorentz force

The cause of Lorentz force is: when a particle, which carries electric charge q, moves with velocity v, there are any amount of kinetic energy quanta, every quantum contended the equation $S_0 = E_0 \times H_0$. All the direction of S_0 are identical and their vector's sum is the S, namely the density vector of energy current of the particle; the directional distribution of E_0 or H_0 are homogeneous and isotropy on the plane that is perpendicular to S, and their sum of vectors are all zero. When there is outside magnetic field H, these H_0 direction will redistribute and make the vector's sum is –H. then there is electric field E on the direction that is perpendicular to S and H, $E \times (-H) = S'$ （$S' \le S$， and only the photons can be the sign of equality）, according to the known result, obtaining:

$$E = S' \times H = v \times B \qquad (2)$$

The Lorentz force $F = qE = qv \times B$. The （2）can be regarded as the macroscopic formula of kinetic energy quantum hypothesis. When the v is light's velocity C, we will be able to get the equation of electromagnetic wave: $\sqrt{\varepsilon_0} E = \sqrt{\mu_0} H$.

2.2, The effect of single pole



PICTURE ONE
The sketch map of single pole effect

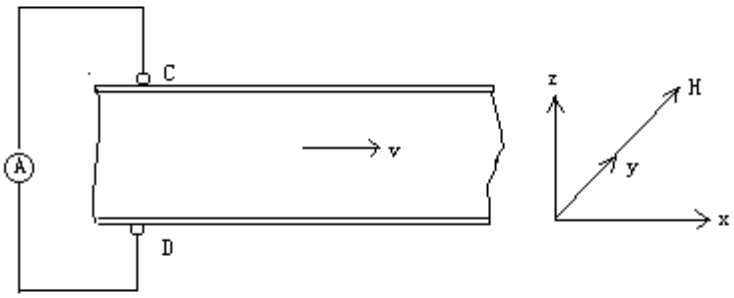
As the picture one, A and E are the two poles of conductance magnet, which circles the axis AE with constant angular velocity, and there are slip connecters on the points of A and B. The experiment shows that

there is a stable current in the return circuit AVBCDA.

Historically the effect of single pole had been disputed: the Faraday considered that the magnetic line of force do not rotate along with the magnet, so the BCDA cuts the magnetic line of force, which creates the current; while the Weber considered that the magnetic line of force can rotate along with the magnet, so the AVB cuts the magnetic line of force, which creates the current; both of them are short of evidence. Generally, the effect of single pole is considered that can be not elucidated by classical electrodynamics. But it can be elucidated by the hypothesis of electromagnetic quantum of kinetic energy: when the installation is revolving, there will be E on radial CD , it is perpendicular to H and S, whether the wire cuts or do not cuts the magnetic line of force. Therefore the principle is identical between the effect of single pole and the Faraday's disc, the current of AVBCDA is depends on the induced electromotive force between C and D: $U_{CD} = \frac{1}{2} B\omega r^2$.

Actually, the earth himself is a huge installation of single pole effect: there are perpendicular vector relation among the earth's magnetic field, rotational direction and vertical electric field on the ground.

2.3, The experiment of Wilson-Wilson



PICTURE TWO
The sketch map of Wilson-Wilson's experiment

M. Wilson and H. A. Wilson had made a experiment in 1913. As the picture two, there is a infinite plane capacitor, and full of electromagnetic medium（ε, μ）in it; whole capacitor moves with velocity v along the positive direction of axis x; there are slip touch between the plank of capacitor and impact ammeter A; there exists a homogeneous magnetic field which is facing the positive direction of axis y; when the direction of magnetic field turn back, the ammeter shows that the electric current occurs.

Generally, the experiment should be analysed that used the Maxwell- Minkowski's electrodynamics, whose result is that the current value is directly proportional to the factor $(\varepsilon\mu - 1)$. Here, using the hypothesis of electromagnetic quantum of kinetic energy make a computation: because whole capacitor moves with velocity v along the positive direction of axis x, and there exists a homogeneous magnetic field which is facing the positive direction of axis y, so there must be induced electric field in the direction of axis z within the capacitor, by the （2）, $E = v \times B$,then $D = \varepsilon E = \varepsilon\mu v \times H$, it charges the capacitor. When the H' direction is turned back, there is a impacted current in CAD, its value will be directly proportional to

the factor $\varepsilon\mu$. In the experiment, the factor $\varepsilon\mu$ (18) is more close to the experimental value (24) than the factor $(\varepsilon\mu-1)$ (17).

3， Discussion

Since the kinetic energy is covert electromagnetic energy, then non-electromagnetic body also will be able to produce obvious electromagnetism through special moving way, which will be used to explain the phenomena of the lightning, basic magnetic field of heavenly body and so on.

About the mechanism of lightning electrification, formerly, the people used the hypotheses, which descending drops of rain separate the electric charge or the convection of atmosphere transports the electric charge from outside cloud layer and so on, to explain it, but all of them are not satisfying. In this paper, the mechanism of lightning electrification can be thought that part of kinetic energy which the atmosphere is moving violently turn into obvious electric energy. How is the motional fashion that the electromagnetism of atmospheric kinetic energy turns from covertness to obviousness? What has the existence of cloud layer action? And so on, these problems are waited to study further. Here an opinion is: the mechanism of lightning electrification has relevance to movement of the atmosphere churns upward, which is like a huge and complex system of the electrokinetic effect (there are certain potential difference between the two faces of porous plug while the fluid run through porous plug), and the cloud layer, which is like the porous plug of moving, variety and uncountable layer, provides proper condition for lightning.

About the cause of magnetic field of heavenly body, generally, it is considered that results from self-excitative electric current of the rotational heavenly body. But this assumed self-excitative mechanism needs to satisfy certain condition, which is quite complexity and in contradiction with the universality of magnetic field of heavenly body.

Perhaps, the magnetic field of heavenly body is relevance to the form of movement itself. For this, we have made some analyses and compare about relevant physical quantity of known six planets as following table. (the data from [3])

Physical quantity	Mercury	Venus	Earth	Mars	Jupiter	saturn
The average velocity of orbital motion v	1.6076	1.176	1	0.81	0.4384	0.3236
Mass m	0.0558	0.8150	1	0.1074	317.893	95.147
Period of rotation t	58.81	243.675	1	1.03	0.41	0.43
Magnetic moment p	$<5\times10^{-5}$	$<5\times10^{-5}$	1	0.004	19000	550
$\left(\frac{mv^2}{t}\right)^2$	6×10^{-6}	2×10^{-5}	1	0.0047	22206.31	536.89

It can know from above table: $p\approx\left(\frac{mv^2}{t}\right)^2$.

The magnetic moment of planet is influenced by many factors. There are the outside factors such as the solar wind, the distribution of satellite; there are the inside factors such as the angle between rotational vector and orbital velocity or magnetic moment, the distribution of the residual magnet, the self-excitative electric current. Therefore the above approximate equation is considered that reflects the cause of basic

magnetic field of the heavenly body: $p = k\left(\frac{mv^2}{t}\right)^2$ (k is the constant).

Above opinions are able to be designed experiment inspected and will be expected.

References

[1]、Zhang Yuan Zhong, The Experimental Fundament Of Special Theory Of Relativity, Beijing, The Publishing House Of Science, 1979, P99-101 (in Chinese).

[2]、Zhang Yuan Zhong, The Experimental Fundament Of Special Theory Of Relativity, Beijing, The Publishing House Of Science, 1979, P103-105 (in Chinese).

[3]、R. H. Golde, LIGHTNING Volume 1 Physics Of Lightning, Beijing, The Electric Power Industry Press 1982 P34-39, (in Chinese).

[4]、C. Sagan and others, The New Solar System, Shanghai, The Publishing House Of Science and Technology, 1987, P41-48, (in Chinese).