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The experiment to Negate Maxwell's Theory

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【Abstrcts】Maxwell brought forward the viewpoint that "time variable magnetic field generates electric field", according to Faraday's law. At the mean time, he also thought that conductive current was successive in the free space (ether space), so the time variable electric field in the capacity (ether displacement current) generated magnetic field the same as conductive current. Therefore, it was derived the mutual generation theory [1, 2] that "magnetic field generates electric field and electric field generates magnetic field. But since more than one hundred years, nobody performed the direct experiment of mutual generation field theory. This article introduces the experimental method to verify the theory, and directly verify whether the displacement current in the vaccum really generates magnetic field. This article analyzes through "experiment", and derives: displacement current of vaccum (ether) does not generate magnetic field, the physical essence of electromagnetic induction is Lorentz force, and not the displacement current, which means that it needs to reconsider whether Maxwell Curl Field Theory is correct.

【Key words】mutual generation field, electric field generates magnetic field, magnetic field generates electric field, ether displacement current

1 Introduction

The usual opinion is, that great Hertz experiment is the theoretical proof to Maxwell Curl Field (mutual generation field) Theory, but actually not, it should say that great Hertz experiment verifies the existence of electric field wave and magnetic field wave. When we carefully study the deduction logic of great Hertz experiment, it will be discovered that it is just the experimental proof of the independent radiation between electric field wave and magnetic field wave, which is just as what Hertz said, "the motion of electrons is the root of all electromagnetic field", in other words, field can not generates field. Article one points out: first, the uneven polar magnetic field formed by both poles of the earth moves with the earth, and there does not generate inductive electric field in the free space. Second, Maxwell used Stokes formula to modify $\nabla \times \boldsymbol{H} = \boldsymbol{J}$ to the curl performed by Ampere's loop law, which is only applicable to the inside of the conductor, and not applicable to the free space outside the conductor. Third, Maxwell applied Green theorem in a capacity circuit, and modified Ampere's loop law into the curved surface integral including the electric field of capacity, therefore he thought the time variable electric field in the capacity generates magnetic field. But the

application condition of Green theorem is that "the integrated function has the first order successive partial derivative on the integral surface and boundary line", so such surface modification does not satisfy the condition of the formula. Furthermore, if it is thought $I_D = I$, it is equivalent to the short circuit of the capacity, and it is conflict with the objective fact the charges have been accumulated. Fourth, Maxwell spatially modified the current successive theorem to the circuit $\nabla \bullet \boldsymbol{J} = -\frac{\partial \rho}{\partial t}$, and thought "current lapses to all the directions of free space, and current is also successive in the free space". But Kirchhoff's law is only applicable to the inside of the conductor, and not applicable to the free space outside the conductor. Fifth, according to Hertz experimental logic, we can think that the time variable electric field in the capacity radiates independently, the time variable magnetic field in the inductance radiates independently, the time variable electric field of the antenna radiation is generated by the time variable charges on the dipole, the time variable magnetic field of the antenna radiation is generated by the time variable current on the dipole, the independent radiation field obeys distance inverse square law. So, there exists disagreement between independent radiation vector field and Maxwell's mutual generation field, the only experiment to distinguish is directly checking the magnetic field to the displacement current in the free space, experimentally proving the general Lorentz magnetic force. There has not directly proved the experiment of Maxwell mutual generation field since more than one hundred years. Based on the above viewpoints, this article introduces the experimental method to directly check whether Maxwell Theory is true or false, the experimental result indicates that there exists error in Maxwell Curl Theory.

In 1905, Einstein published Relativity to emphasize, "according to Maxwell electrodynamics, when the magnet moves, there generates inductive electric field in the space, so there exists current in the coil, when the coil moves, there does not generate inductive electric field, but there still exists current in the coil, so it can see that the space should not have been symmetrical", which is, his relativity principle. So the research of this article points out that there exists error in Maxwell's electrodynamics, therefore it shakes the argument of relativity principle.

2 Technical route of the experiment

2.1 The Lorentz magnetic force when metal electrons cut static magnetic lines (basic physics review)

According to what figure 1 shows, based on the absolute space time view, even static magnetic field is still, the conductor moves to the right at the speed V_q （$\boldsymbol{V}_q = \boldsymbol{V}_x$）,according to the Lorentz magnetic force that everyone knows

$$\boldsymbol{F} = q\boldsymbol{V}_q \times \boldsymbol{B} \qquad (1)$$

So, electrons' drift generates inductive current. Because the electric quantity of electrons is negative, according to Lentz's right hand rule, the metal electrons on the conductor move along the y direction, positive charges move along the $-y$ direction, so the direction of current is

$-y$ direction, or, $-z$ direction shown in the figure. As for this experiment, it is the generally acknowledged truth by everyone. The key problem is the below experimental analysis result.

2.2 Lorentz magnetic force when even magnetic lines cut static metal electrons (The experimental prove to General Lorentz magnetic force)

According to what figure 2 shows. Please notice, at this time $\mu\frac{\partial H}{\partial t}=0$, there is no Maxwell's displacement current. The conductor is still, the even static magnetic field moves to the left at the speed V_B, referring to $\boldsymbol{V}_x=\boldsymbol{V}_q$ in the figure 1, it can derive $\boldsymbol{V}_B=-\boldsymbol{V}_x$, which is $\boldsymbol{V}_q=-\boldsymbol{V}_B$. Substitute such formula into Lorentz magnetic force $\boldsymbol{F}=q\boldsymbol{V}_q\times\boldsymbol{B}$, there is $\boldsymbol{F}=q(-\boldsymbol{V}_B)\times\boldsymbol{B}$, the negative sign here is not added randomly, it is because the moving direction of magnetic field is opposite to the moving direction of the conductor. So

$$\boldsymbol{F}=q(-\boldsymbol{V}_B)\times\boldsymbol{B} \qquad (2)$$

So the metal electrons in both figures drift to the same direction. Please note here, even and constant magnetic lines cut metal electrons, which is Lorentz magnetic force. Because "magnetic lines still, while the conductor moves to the right" and "the conductor stills, while magnetic lines move to the left", there two are equivalent, which both belong to metal electrons cutting magnetic lines.

So, the metal electrons on the conductor move to the y direction (or the positive charges move to the $-y$ direction), so the direction of current is $-z$ direction shown in the figure. Comparing these two figures, "the conductor moves to the right" and "magnetic lines move to the left", these two cases are equivalent,

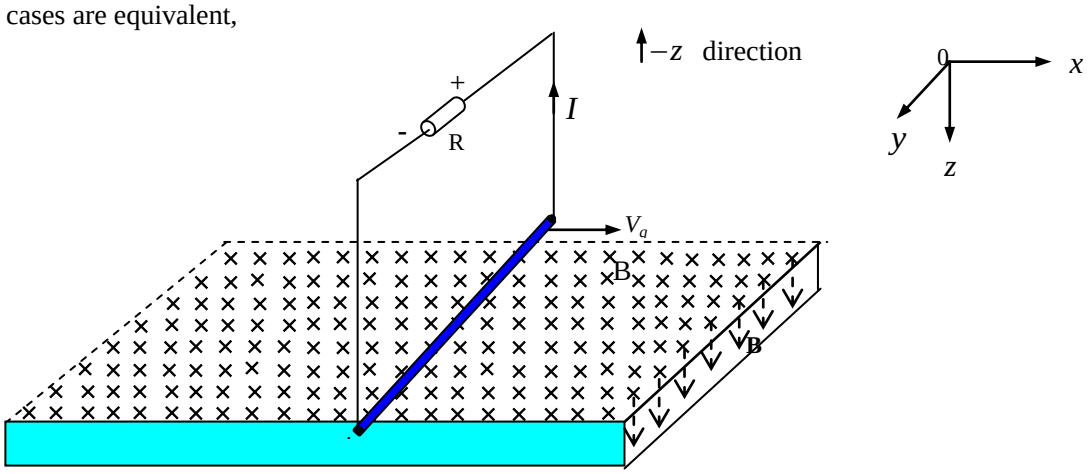

Figure 1 Magnetic lines still, while the conductor moves to the right

Lorentz magnetic force acts on both of them. Please note, at this time $\mu\frac{\partial H}{\partial t}=0$, there is no Maxwell's displacement current. So we call

$$\boldsymbol{F}=q\boldsymbol{V}_q\times\boldsymbol{B}\oplus q(-\boldsymbol{V}_B)\times\boldsymbol{B} \qquad (3)$$

as general Lorentz magnetic force. Initial experiments demonstrated that the current

directions in both figures above are the same. The sign ⊕ denotes "or" operation.

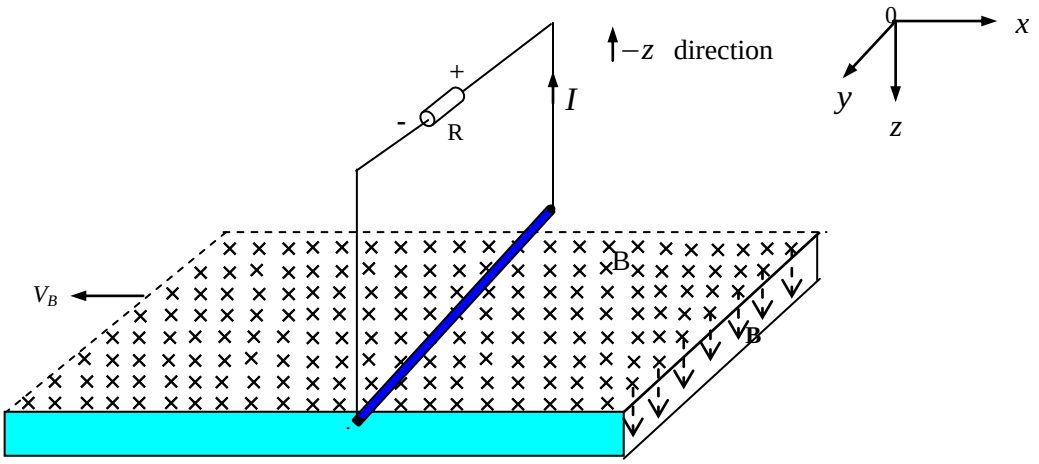

Figure 2 The conductor stills, while the magnetic lines move to the lef

2.3 The case when coil cuts bent magnetic lines (The experimental prove to General Lorentz magnetic force)

Suppose the magnet (magnetic lines resemble the shape of trumpet flower) stills, the coil moves from left to right at the speed $\boldsymbol{V}_e$, according to what figure 3 shows. Coil cutting magnetic lines is actually the metal electrons on the coil L having cut the magnetic lines, so after the metal electrons are forced by Lorentz magnetic force,

$$\boldsymbol{F} = e\boldsymbol{V}_e \times \boldsymbol{B} \qquad (4)$$

they will drift along the coil and generate the inductive current $I = snev$ (which is just the direction of Lentz's law). The s in the formula is the sectional area of coil conductor, n is the density of metal electrons, e is the electric quantity of electrons, v is the speed when metal electrons drift along the coil. Together with the differential form of Ohm's Law, so its inductive electromotive force $\mathrm{d}U = -\frac{I}{\sigma s}\mathrm{d}l$ is just Faraday electromotive force, the σ in the formula is conductivity, dl is the differential variable of the coil length, which is also the famous electromagnetic induction. Please note, the inductive current in Lentz's Law and the inductive electromotive force in Faraday's Law only describe the physical phenomenon, and not the physical essence. This article thinks that Lorentz magnetic force is the physical essence of electromagnetic induction.

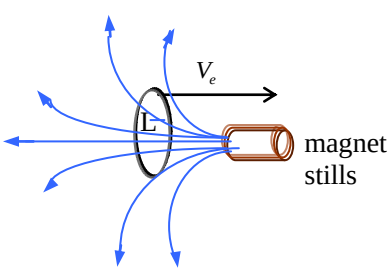

Figure 3 coil moves

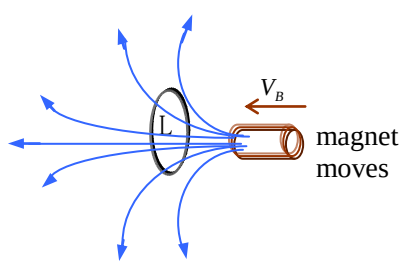

Figure 4 magnet moves and coil stills

2.4 Lorentz magnetic force when bent magnetic lines cut coil (the experimental prove to general Lorentz magnetic force)

Suppose the coil stills, magnet (magnetic lines resemble the shape of trumpet flower) moves from right to left at the speed $\boldsymbol{V}_B$, according to what is shown in the figure 4. It can be known by comparing figure 4 and figure three, the coil moves from left to right at the speed $\boldsymbol{V}_e$, and magnetic lines move from right to left at the speed $\boldsymbol{V}_B$, the physical actions of both cases are the same, which is, in the figure four, static coil cuts the moving magnetic lines. Because $\boldsymbol{V}_e = -\boldsymbol{V}_B$, substitute this formula into formula (4), so the metal electrons on the static coil are forced by General Lorentz magnetic force:

$$\boldsymbol{F} = e(-\boldsymbol{V}_B)\times\boldsymbol{B} \qquad (5)$$

Which makes metal electrons drift along the coil under $\boldsymbol{F}$, and then generates inductive current $I = snev$ (it is just the direction of Lentz's Law), in the formula s is the sectional area of coil conductor, n is the density of metal electrons, e is the electric quantity of electrons, lower case v is the speed when metal electrons drift along the coil conductor. Together with the differential form of Ohm's Law, its inductive electromotive force is $\mathrm{d}U = -\frac{I}{\sigma s}\mathrm{d}l$ (it is just Faraday electromotive force), in the formula σ is the conductivity, dl is the differential variable of the coil length. This is also the famous electromagnetic induction, and its essence is Lorentz magnetic force. In fact, if it only admits $\boldsymbol{F} = e(\boldsymbol{v}_q)\times\boldsymbol{B}$ is correct, $\boldsymbol{F} = e(-\boldsymbol{v}_B)\times\boldsymbol{B}$ will necessarily be admitted to be correct.

The conclusion of experimental feasibility is: no matter whether metal electrons cut magnetic lines or magnetic lines cut meal electrons, the physical essence are both that charges are forced by Lorentz magnetic force $\boldsymbol{F} = q\boldsymbol{V}\times\boldsymbol{B}$. Especially when magnet moves and coil stills, the moving magnetic lines have cut the static metal electrons, the forced magnetic force is $\boldsymbol{F} = e(-\boldsymbol{v}_B)\times\boldsymbol{B}$, the "-" sign here is not randomly added in this book, but because the space is still, under the condition that determining who is moving, who is stilling, the moving direction of $\boldsymbol{B}$ is opposite to the moving direction of coil. So this chapter calls $\boldsymbol{F} = e\boldsymbol{v}_e\times\boldsymbol{B}\oplus e(-\boldsymbol{V}_B)\times\boldsymbol{B}$ as General Lorentz magnetic force, in other words, it doesn't matter whether coil moves or magnet moves, metal electrons both have cut magnetic lines, under the General Lorentz magnetic force, metal electrons drift along the conductor to generate the inductive current I, it is just because of the drift of the electrons, there founded inductive electromotive force $\mathrm{d}U = \frac{-I}{\sigma s}\mathrm{d}l$ (by Ohm's Law) and inductive electric field $E = \frac{\mathrm{d}U}{\mathrm{d}L}$ (by the definition of electric field). In other words, in the electromagnetic

induction, $\boldsymbol{F}$ is the cause, I 、 dU and E in the conductor are phenomena.

In fact, the time variable magnetic field generated by the time variable conductive current has been measured by the modern gauss meter, which directly proves "time variable magnetic field radiates independently", but not generated alternatively.

In particular, a linear time variable magnetic field $H = k_2 t$ generated by a linear time variable current $i = k_1 t$, because $\frac{\partial H}{\partial t} = \text{constant}$, so the linear time variable magnetic field $H(t)$ independently radiates to the free space, and does not need Maxwell's mutual generation field to act as a "bridge". It is just like what Lorentz pointed out: "it is completely correct for Hertz to eradicate the power in Maxwell equations, but it still can not explain the motion of electrics, Maxwell never believed charges entity, and always replaced charges by his electric displacement, it is also very difficult for people to understand what the charges that he mentioned are, he never cared about how electromagnetic field was generated, in his theory, it seems that electromagnetic field comes from an infinite far place, a field that does not need source". "The motion of charges is the root to generate all electromagnetic fields", which means, one field does not generate another field.

2.5 The direct experiment to negate 'time variable magnetic field generates electric field'

It will perform two comparative experiments here, the first is the electromagnetic induction experiment based on General Lorentz magnetic force, the second is the experiment of "displacement current generates electric field" based on Maxwell, according to what figure 5 and figure 6 show, measure the magnetic field intensity of moving magnet, compare the result measured by gauss meter, and then it can be distinguished. Here, the "loop" in figure five is the conductor loop, the "loop" in figure six only refers to the fictitious loop in the free space.

(1) As for figure 5, according to General Lorentz magnetic force, when the magnet moves, the moving magnetic lines B cut metal electrons, so the metal electrons are forced by General Lorentz magnetic force $\boldsymbol{F} = e(-\boldsymbol{v}_B) \times \boldsymbol{B}$ to generate inductive current, the current in such conductor coil generates new magnetic field $B_L^{'}$ again, and its direction is opposite to the original magnetic field B of the magnet, after being counteracted, the field intensity measured in gauss meter will be weakened a lot.

(2) As for the figure 6, if it is according to Maxwell mutual generation field theory, when the magnet moves, there generates eddy-like displacement current in the free space (contour), while such displacement current generates new magnetic field $B_M^{'}$ again, its new magnetic field direction is opposite to the original magnetic field direction, after being counteracted, the field intensity measured in the gauss meter will also be weakened a lot.

Now let us compare the results of these two experiments, if the results of figure 5 and figure 6 these two experiments are the same, it indicates that it is difficult to identify Lorentz magnetic force and Maxwell mutual generation, if the magnetic field in the figure 5 is weaker, and the magnetic field in the figure 6 is stronger, it indicates that time variable magnetic field does not generate time variable electric field, therefore it directly negates Maxwell's conclusion that variable magnetic field

generates electric field. Please note:

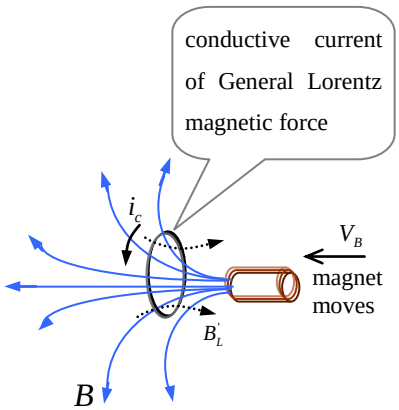

Figure 5, bent moving magnetic lines cut metal electrons, which generates inductive current i_c under General Lorentz magnetic force, and i_c generates the opposite direction magnetic field $B_L^{'}$

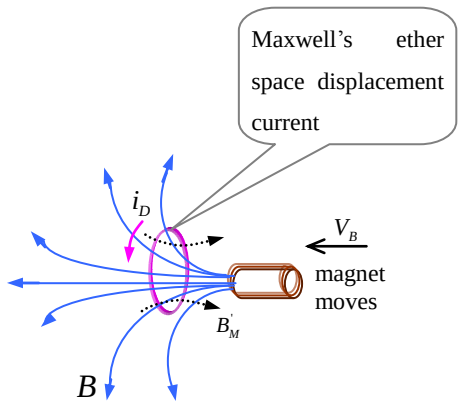

Figure 6, time variable magnetic field generates time variable electric field, which is generating time variable displacement current i_D, i_D generates opposite direction magnetic field $B_M^{'}$

The i_c in the figure 5 is the conductive current when the conductor is forced by General Lorentz magnetic force, the conductive current generates opposite direction magnetic field $B_L^{'}$.

The i_D in the figure 6 is Maxwell's ether space displacement current, ether displacement current generates opposite direction magnetic field $B_M^{'}$.

Actually these two figures identify the physical essence issue of back electromotive force: whether it is because metal electrons are forced by Lorentz magnetic force? Or it is because of the Maxwell's spatial eddy electric field (displacement current)? The above two figures can directly identify. Faraday, Lentz and Lorentz all thought that electromagnetic induction happened on the conductor, but Maxwell's mutual generation field thought that electromagnetic induction happened in the free space (which is called ether space at that time). Now let's analyze:

If it is according to Maxwell mutual generation field theory: so the variable magnetic field generates variable electric field (displacement current), variable electric field generates variable magnetic field again, if it is in this case, there should also be new $B_M^{'}$ in the figure 6. But we can predict the result of such experiment: there is no Maxwell's $B_M^{'}$ in the figure 6, there exists Lorentz's $B_L^{'}$ in the figure 5. Because when the magnet moves in the vacuum, it is impossible to generate opposite direction magnetic field $B_M^{'}$, which is, now that there exists no $B_M^{'}$, it indicates that the variable magnetic field in the vacuum does not generate displacement current (time variable electric field). These two experiments are the direct experiments which directly negate Maxwell

Theory. Just as what Lorentz said: the motion of charges is the root to generate all electromagnetic fields [2]. One field does not generate another field.

3 The technical approach of the experiment to negate vacuum displacement current

The essence of Maxwell Theory is mutual generation field theory: variable magnetic field generates variable electric field, variable electric field generates variable magnetic field again. The second proof is that after modifying ampere loop theorem into a curved surface in the capacity circuit, it thinks that the conductive current that enters into the integral surface equals the displacement current that flows out of the integral surface, so the displacement current $\varepsilon_0 \frac{\partial E}{\partial t}$ generates inductive magnetic field. This experiment is to identify its correctness.

This experiment is easy to prove that time variable electric field does not generate magnetic field, see figure 7. Place the plate capacity in the vaccum tube, the both ends of capacity are corrected to time variable voltage source or time variable current source through wire, most parts of the wire is shielded, and use gauss meter to measure the alternative magnetic field. If there is magnetic field at b section's conductive current, and no magnetic field at a section's displacement current, it directly negates Maxwell's mutual generation field according to the experiment. So suppose

$\text{Capacity } C = \frac{\varepsilon_0 s}{d} = \frac{8.8542\times10^{-12} s}{d} = \frac{8.8542\times10^{-12}\times0.01}{0.01}$, the distance unit is meter, the area unit is square meters. So the applied voltage source $v_s = v_m \sin(\omega t)$, and ignoring the stable response of the internal resistance of the wire, it is

$$
\begin{aligned}
i &= \frac{v_s}{1/\omega c} = v_m \sin(\omega t)\square(\omega c) \\
&= 10000\sin(\omega t)\cdot\left(2\pi\times3\times10^4 \frac{8.8542\times10^{-12}\times0.01}{0.01}\right) \qquad (6) \\
&= 1.65\times10^{-2}\cdot\sin(\omega t)(A)
\end{aligned}
$$

Of which $f = 30kHz$, $v_m = 10000$伏 (volt). This is an experimental method to directly negate, it is shown in the figure 7

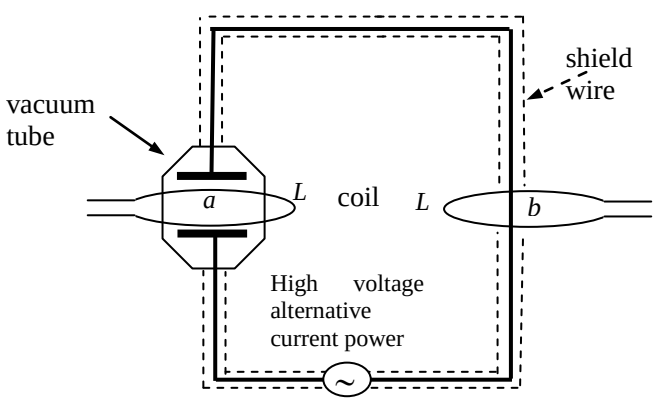

Figure 7 displacement current does not exist

Figure 7 is the experimental principle figure. But, according to the investigation of technique market, it can be known that the present measuring technical level of gauss meter is the alternative magnetic field below $30kHz$, the accuracy is 0.1 gauss (1 gauss=80 ampere/meter), so if it wants to use gauss meter to measure the magnetic field in the figure, its voltage source needs to be increased by ten times, and then it can identify. It also can be known by investigating the technical fee, producing the alternative power with one hundred thousand volts will cost 120,000 Yuan RMB, in other words, if it uses gauss meter to directly measure the magnetic field intensity generated at a section and b section respectively for the coil L in the figure 7, and plus the previous several experimental fees and their instrumental fees, it needs three million Yuan RMB in total, I am just a poor professor, so I don't have enough money to support such experiment, so I sincerely request the scientists in the developed countries to perform such experiment. I strongly believe that it must succeed.

Another method to measure is applying General Lorentz magnetic force, and not directly measuring the magnetic field, but measure the alternative signal. Such experiment is also reliable. If both ends of coil L at a section have no alternative signal, which is that $s_a = 0$, and there is alternative signal $s_b \neq 0$ at both ends of coil L at b section, this will prove two points: first, the time variable electric field at a section does not generate magnetic field, second, the time variable magnetic field at b section is an independent radiation shear wave, which radiates to the outside at the light speed c_0, so the moving magnetic lines have cut metal electrons, and the metal electrons generate the signal current under General Lorentz magnetic force $\boldsymbol{F} = q(-\boldsymbol{c}_0) \times \boldsymbol{B}$.

Of course, there is error in the measurement, because the edge time variable electric field in the vacuum tube can also activate medium glass, and the medium glass can also generates the molecule current with up and down directions under the electric field, and the molecule current also belongs to the motion of charges, will also generate magnetic field. But, by comparing the signal value at a section and b section, it can identify whether mutual field is right or wrong, because Maxwell theory is (displacement current) $I_D = I_C$ (conductive current), which is, according to Maxwell Theory: the signal intensity at a section equals the signal intensity at b section, if the result is $s_a \neq s_b$, it indicates that the displacement current in the vaccum does not generate magnetic field. It can also directly identify Maxwell's mutual generation field theory issue, to the contrary, it directly verifies mutual generation field. I strongly believe, the time variable electric field in the vacuum tube will never generate magnetic field, because if $I_D = I_C$, the capacity will be equivalent to short circuit, which does not comply with the objective fact.

In fact, now that gauss meter is able to measure the intensity of time variable magnetic field generated by time variable current, it just indicates that time variable magnetic field radiates independently to the free space, and there is no need for the mutual generation field to "bridge".

Because what the gauss meter measures is magnetic field, not the electric field. It is worthwhile to mention that, successfully receiving the electric wave does not mean Maxwell Curl Theory (mutual generation theory) is necessarily correct. Because time variable current itself radiates time variable magnetic field, time variable charges itself radiates time variable electric field. It is just the same as that Hertz used inductance and capacity vibration circuit as the deduction: time variable magnetic field is generated by the time variable current in the inductance, time variable electric field is generated by the time variable charges in the capacity, after the inductance and capacity are open, it is the dipole antenna-the antenna that radiates to the free space. And its radiation electric field intensity is inversely proportional to the distance square, the relative receiving electric field intensity is inversely proportional to the distance square, the received time variable electric field acts on the metal electrons on the receiving antenna to generate signal intensity, which is also inversely proportional to the distance square. Only in this way, independent field coincides with the engineering fact. But mutual generation field theory does not coincide with the engineering fact, because it disobeys the distance square inversely proportional law.

Figure 5, 6 six and figure 7 are the direct experiments that directly verify Maxwell mutual generation field theory, nobody has performed such a direct experiment since more than one hundred years. It should say that, it does not matter whether such experiment is to verify truth or false (zero result), both have very high academic value. I believe that, the accurate result is: time variable electric field does not generate time variable magnetic field, time variable magnetic field does not generate time variable electric field, especially when comparing figure 5 with figure 6, it is easy to derive the above experimental conclusion. If it is really so, General Lorentz magnetic force is the physical essence of electromagnetic induction, the rest theorems are phenomena or the rest theories are false theories. Its academic value is huge. Once the curl theory of Maxwell is untenable, Einstein's relativity principle will be questioned.

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[1]Disputes Existing in the Physical Natural of Electromagnetic Induction

[2]Verification of General Lorentz Magnetic Force

[3]Experimental Method to Negate Maxwell Theory

[4].Mathematical Model of Independent Radiation Magnetic Field

[5]The Essence of Electric Wave Is not Energy

[6] About the Physical Essence of Michelson-Morley Experiment

[7] Light Velocity Obeys Galileo's Relativity Principle

[8] Compton's Scattering Experiment of Roentgen Rays Obeys Newton's Law

[9] Clock Becoming Slower Is the Necessity of Newton's Law

[10] Einstein's Lorentz Transformation Is a Math Game.