

Unification of Gravitation and Electromagnetic Force (Third Portion) Nature Foundation-Force Origin

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Abstract

According to new discover law of moving photon does create force, we can know the reason why moving photon become electron-positron pair and can get that the elementary particle in Nature is photon, from this we can know the Nature foundation: First the matter of producing gravitation and electromagnetic force is based on the same matter: photon; Second the interaction force in the Nature follow into the one rule: according to one formula to do work. Humanity has known Gravitation, Coulomb force, Magnetic force, Van der Waals force etc., but unable to describe accurately the interaction between atoms, or particles until today, here applying new discoveries to describe the interaction between atoms show the nature foundation of interaction. Meanwhile this paper also show that the Millikan's elementary charge is not natural phenomenon, reveal the essence of matter wave is also due to force.

Keywords: *Fundamental Law; Force; Nature foundation*

Introduction

The elementary particle in nature

The moving photon create force: The Origin of Gravitation, Unification of gravitation and electromagnetic force [1, 2].we know two experiments unequivocal indicating that moving photons create force. For test the universality of this conclusion that from have done experiments: and to test the validity of this conclusion is the fundamental law in nature, I do below experiment 1 in which I decrease the intensity of light beam to test the above conclusion. (This is shown in below **FIG. 1**)

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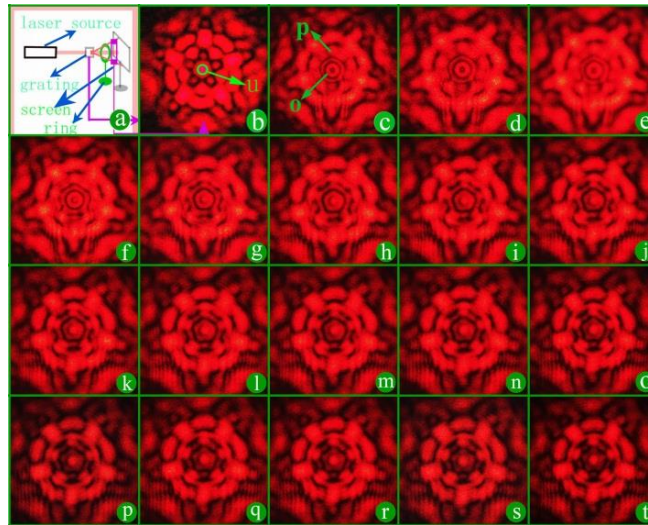


FIG.1. Picture a shows the device of the experiment. Pictures d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s and t are photographs of showing light beam O's form has been changed from a circular shape to a pentagon shape by force which generated with the moving forward light beam in figure1. Picture c shows the site of ring in light beam O.

In this experiment we get unequivocal conclusion that light beam O change circular shape to the pentagon shape is due to moving photons generate force in the moving forward light beam. See picture d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t of **FIG. 1**.

Similarly, I do experiment 2 to test the reason of this phenomenon that light beam O is changed from circular shape to pentagon shape is due to force which moving photons created, but isn't other reasons. (See below **FIG. 2**)

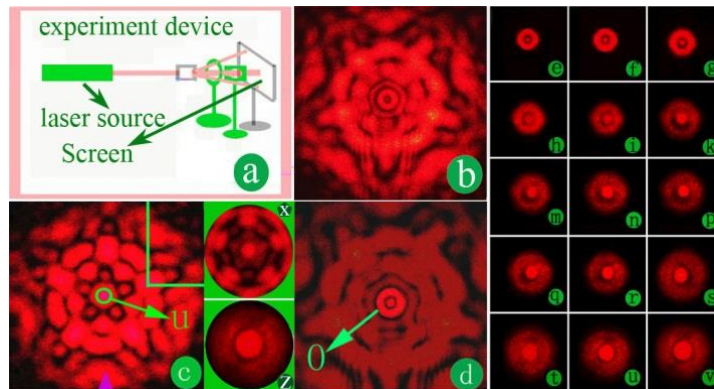


FIG. 2. Picture a shows the device of the experiment, pictures e, f, g, h, i, k, m, n, p, q, r, s, t, u, and v show that the light beam O does not change its circular shape form when there is no other light beam moving forward.

From above experiments, we can get a validation conclusion that moving photons do generate force.

The Origin of Gravitation, we get below formula [1]:

$$\vec{F}_a = \frac{m_1 m_2 \times \vec{v}_1 \times (\vec{v}_2 \times \vec{r}_{12})}{4\pi\theta r_{12}^3} G_a$$

About describing of this effect, see The Origin of Gravitation [2], here do not repeat it.

The constitute of electron

When positron and electron collide, it emits and produces photon: $e^- + e^+ \rightarrow \gamma$.

When cathode and anode are closing, between them appear spark and produce photons.

These two phenomena obviously show that the constitute of electron is photon, or other word below: the photon combine the electron. See below **FIG. 3**



FIG. 3. This figure shows when cathode and anode are closing, between them appear spark and produce photons.

The elementary particle is photon

We know that if a photon is sufficiently energetic, it may produce an electromagnetic shower; this show photon can turn into an electron–positron pair. According to above discovery that moving photon creates force, here clearly show the reason why photon becomes electron, because there is force between photons, thus the photon which possess sufficiently energy become electron, meanwhile we know that the electron and positron can become hadron see below: or see below **FIG. 4.**

$$e^+ + e^- \rightarrow Hadron$$

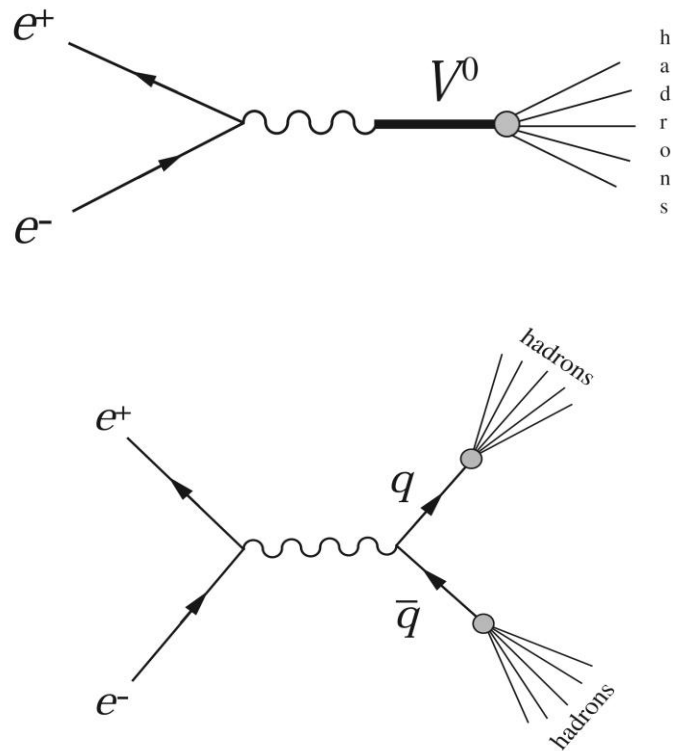


FIG. 4 The electron and positron become quark and so on hadron.

Here, we know that photon produce electron, electron produce quark, the quark is constituted of proton and neutron, so the elementary particle in Nature is photon.

Millikan's Elementary Charge cannot Describe Ionization Potential

In currently physical knowledge, we are told that the electric charge would be quantized, and the fundamental electric charge is constantly. Because we have used to define the attraction between electrons and nuclear in atom is an attraction of electric charge, the potential ionization is due to attraction of electric charge. According to above discovery and demonstrate: it show that electromagnetic force is as same as the gravitation in essence, this show that it maybe do not exist fundamental charge of electron [2]. The electric charge is a continuous variable, so the charge is quantized is wrong that does not exist fundamental charge of electron? Which is right above discovery and fundamental charge of electron? This only can be tested by experiment and fact. In physical history: Millikan worked on an oil-drop experiment in which he measured the charge on a single electron. The elementary electric charge is one of the fundamental physical constants. His experiment measured the force on tiny charged droplets of oil suspended against gravity between two metal electrodes. Millikan selection the data of experiment showed that the results could be explained as integer multiples of a common value (1.592×10^{-19} coulomb), the charge on a single electron. Millikan's selection data also provided a demonstration that charge is actually quantized. Here I use below way to test above two thought: first I deduce a formula that can calculate the ionization potential when the element only has one electron in its out nuclear, the process of deduce is below:

$$f = \frac{Q_1 Q_2}{r^2} k = \frac{Ze^2}{r^2} K = m \frac{v^2}{r}$$

$$n \frac{h}{2\pi} = mvr$$

$$mv^2 = \frac{Q_1 Q_2}{r} k = \frac{Ze^2}{r} K$$

$$E_k = \frac{1}{2} mv^2 = \frac{Q_1 Q_2}{r} k = \frac{Ze^2}{r} K$$

$$E_k = \frac{2\pi m v Z e^2 k}{nh}$$

$$v = \frac{2\pi m v Z e^2 k}{nh}$$

$$E_k = \frac{4\pi^2 m Z^2 e^4 k^2}{n^2 h^2} z^2 k = 13.6 Z^2$$

In the end we can get a formula that calculate ionization potential when only one electron in out of nuclear. See below: $E_k = 13.6Z^2$ Where Z is the charge number of element. If the elementary electric charge is one of the fundamental physical constants and the electric charge is actually quantized and Millikan oil-drop experiment is right, the value according to this formula calculated would compatible with the experimental value. See below **TABLE 1** and **TABLE 2**.

TABLE 1. Value according to the formula calculated compatible with the experimental value.

Z	Element	Value of Theory	Experimental Value
1	H	13.6	13.598
2	He	54.4	54.417
3	Li	122.4	122.454
4	Be	217.6	217.718
5	Be	340.1	340.225
6	C	489.6	489.993
7	N	666.4	667.046
8	O	870.4	871.411
9	F	1101.6	1103.117
10	Ne	1360	1362.199
11	Na	1645.6	1648.702
12	Mg	1958.4	1962.665
13	Al	2298.4	2304.141
14	Si	2665.6	2673.182
15	P	3060	3069.842

TABLE 2. Value according to the formula calculated compatible with the experimental value.

Z	Element	Value of Theory	Experimental Value
16	Si	3481.6	3494.189
17	Cl	3930.4	3946.296
18	Ar	4406.4	4426.229
19	K	4909.6	4934.046
20	Ca	5440	5469.864
21	Sc	5997.6	6033.712
22	Ti	6582.4	6625.84
23	V	7194.4	7246.12
24	Cr	7833.6	7894.81
25	Mn	8500	8571.94
26	Fe	9193.4	9277.69
27	Co	9914.4	10012.12
28	Ni	10662.4	10775.41
29	Cu	11437.6	11567.617

From above calculate and test, we can see that the value of according to this formula incompatible with the experimental value. So the quantized electric charge and Millikan oil-drop experiment are wrong hypothesis, it cannot describe the potential ionization, electromagnetic force is as same as the gravitation in essence. In article: Unification of gravitation and electromagnetic force, we have known the essence of electric charge, this clear show that the origin of electromagnetic force is moving photons [2].

The Essence of Matter Wave

The meaning of wavelength in optics

In the article: the essence of light, we know that light wave does not actually exist. Now we will discuss the meaning of wavelength in light wave theory [3]. See FIG. 4 [1]:

In the article: the essence of light, we know that light wave does not actually exist. Now we will discuss the meaning of wavelength in light wave theory [3]. See FIG. 4 [1]: $\Delta x = d_1/(n - 1)$ compare $\Delta x = D\lambda/d_2$ can get: $d_1 \times d_2 = D\lambda \times (n - 1)$, Consider $D = v \times t$ In the end, can get a formula: $\lambda \times v = d_1 \times d_2(n - 1)t$, On the one hand: because $\Delta x = d_1/(n - 1)$, $d = \frac{n-1}{2p} (\frac{n+1}{n+3} + \frac{n+3}{n+1})$, So in the specific numerical value of d_1 , the n is specified; on the other hand, the $\Delta x = D\lambda/d_2$. These meaning is that n, d_1, d_2, t are all can be controlled by man. In experiment, we can use the size of n, d_1, d_2, t in the constant data. In the end, we can get a formula: $\lambda v = k_\lambda$, (in this formula: k_λ is a constant). This formula indicates the relationship between wavelength and the state of moving photons, and reveals the nature of wavelength in wave optics.

The meaning of frequency in the optics

According to formula: $v = \frac{c}{\lambda}$, $\lambda v = k_\lambda$ can get $v = cvk_2$, in spectrum because the photon movement speed $v \approx c$ so $v = c^2k_2 = v^2k_2$. In 1896 W. Wien proposed that $v = v^2k_2$ and then got a formula: $u_T(v) = \frac{av^3}{c^2} e^{-\beta v/T}$ that can describe the short wavelength region.

Now we know why the W. Wien formula fits the short wavelength region, but does not fit long wavelength regions. Because in the short wavelength region, $v \approx c$ the formula $v = c^2k_2 = v^2k_2$ is right; so, the W. Wien formula is right, but in the long wavelength region, the formula $v \approx c$ is not right. Therefore, W. Wien formula does not fit the experiments.

The meaning of matter wave

In 1923, De Broglie imitated light wave theory to suppose that any particle like light have wave characteristics. L.de Broglie supposed that any moving body follows the ray of its “phase wave”, this is his matter wave thought [4]. We have known that the light is not wave-particle duality, so we will think the matter wave maybe not exist at all too. If this thought is right, the matter wave will possess the same meaning as preceding light wave. Now we test this. According to above discoveries: $\lambda v = k$. We know that the wavelength is only an incarnation of status of matter moving; namely the matter wave is only representing moving status of matter. Now we test this conclusion in experiment:

First test it in C. Davission and L.H Germer experiment: In 1927 C. Davission and L.H Germer had published their experiment of electron diffraction: Now use their experimental data to test above conclusion, see below **TABLE 3**. Because there is systemic error, so I calculate two values: X-ray bunch got, and electron bunch got [5]. The results see below **TABLE 3** and **TABLE 4**.

TABLE 3. Results of two values: X-ray bunch got, and electron bunch got.

Azimuth	Bomb pot volts	$\lambda \times 10^{-8}$ cm	$v \times 10^{-8}$ cm/sec	k_λ
{111}	54	2.03	4.36	8.8508
	100	1.49	5.94	8.8506
	174	1.13	7.84	8.8592
	174	1.01	7.84	7.9184
{100}	65	1.84	4.79	8.8136
	126	1.35	9.67	9.0045
	190	1.04	8.19	8.5176
	159	1.05	7.49	7.8645
{110}	138	1.22	6.98	8.5156
	170	1.04	7.75	8.06
{111}	110		6.23	
{100}	110		6.23	
{110}	110		6.23	

TABLE 4. Results of two values: X-ray bunch got, and electron bunch got.

Azimuth	Bomb pot volts	$\lambda \times 10^{-8}$ cm	$v \times 10^{-8}$ cm/sec	k_λ
{111}	54	1.65	4.36	7.194

	100	1.11	5.94	6.5934
	174	0.77	7.84	6.0386
	174	1.76	7.84	6.8992
{100}	65	1.49	4.79	7.1375
	126	1.04	6.67	6.9368
	190	0.74	8.19	6.0606
	159	1.88	7.49	7.0406
{110}	138	1.06	6.98	7.3988
	170	0.89	7.75	6.8975
{111}	110	1.82		
{100}	110	1.82		
{110}	110	1.05		

From these tests we can know that above conclusion or is in good agreement with experiments. These tested results tell us that are right. For further test this conclusion in the generally condition, I calculate it use below experiment, see **TABLE 5** and **TABLE 6**, in **TABLE 5** the wavelength is considered the theory of relativity to get, the wavelength in **TABLE 6** do not consider relative theory to get [6]. These tests confirm the correctness of above conclusion. Note: that it differed with the different grating, and with the different incident matter. This meaning is that only using the same grating to measure wavelength of specific matter, the will be constant. For example, using one grating to measure the wavelength of electron, that is constant in the variable speed.

TABLE 5. Wavelength is considered the theory of relativity.

Accelerating voltage (kV)	$\lambda(A)$	$v = \sqrt{\frac{2qV}{m}}$	$k_{\lambda} = v \times \lambda$
10	0.122	1.875	0.2287
20	0.0859	2.651	0.2278
30	0.0698	3.247	0.2267
40	0.0602	3.751	0.2258
50	0.0536	4.193	0.2247
60	0.0487	4.593	0.2237
70	0.0448	4.961	0.2227
80	0.0418	5.304	0.2217
90	0.0392	5.626	0.2205
100	0.037	5.931	0.2199
200	0.0251	8.386	0.2151

TABLE 6. Wavelength is do not consider the theory of relativity.

Accelerating voltage (kV)	$\lambda(A)$	$v = \sqrt{\frac{2qV}{m}}$	$k_{\lambda} = v \times \lambda$
10	0.3885	1.875	0.7285

20	0.2748	2.651	0.7285
30	0.2243	3.247	0.7285
40	0.1942	3.751	0.7285
50	0.1738	4.193	0.7285
60	0.1586	4.593	0.7285
70	0.1468	4.961	0.7285
80	0.1373	5.304	0.7285
90	0.1295	5.626	0.7285
100	0.1228	5.931	0.7285
200	0.0869	8.386	0.7285

From above demonstrated, we have known that the matter wave is the reciprocal value of speed of moving matter.

The essence of matter wave

According to formula: $\lambda v = k$, we can know the essence of matter wave is only describing of phenomenon of interaction between moving matters. From this we can know the essence of matter wave is that it indicates the interaction effect of moving matter, and show the status of moving matter.

The light is not electromagnetic wave

Preceding experiment validated that the light wave is brought on by gravitation which moving photons created, the essence of light is particle. The essence of wave is the effect of force, electromagnetic wave is also an effect of force, electromagnetic wave can be transmitted in any matter, it can be also transmitted in night without light, etc. Although light can transmit electromagnetic wave as same as other matter, it is unequivocal that light is not electromagnetic wave.

Nature Foundation-Force Origin

From before article The Origin of Gravitation, Unification of gravitation and electromagnetic force, we know that the origin of electromagnetic force and gravitational force are all moving photons [1, 2]. This clear shows that in Nature the force origin is moving photons. Their interaction play in one rule, this rule has been shown by interaction between light beams, and has been tested in the interaction between electrons, atoms, photons, here for show its universality, we can show this in the chemical reaction to calculate the interaction between atoms, see below example:

Reveal mechanism of chemical reaction

The interaction force between atoms implies the reason of chemical reaction phenomena. The size of this force between atoms can

be got by according to below formula: $\vec{F}_a = \frac{m_1 m_2 \times \vec{v}_1 \times (\vec{v}_2 \times \vec{r}_{12})}{4\pi\theta r_{12}^3} G_a$ to calculate.

On the other hand:

$$f(v) = 4\pi v^2 \left(\frac{m}{2\pi K_B T} \right)^{\frac{3}{2}} e^{-\frac{mv^2 - mv_0^2}{2K_B T}}$$

$$f_a = \frac{m_1 m_2 v_1 v_2}{4\pi r^2} G_a$$

$$f_a = \left[4\pi v^2 \left(\frac{m}{2\pi K_B T} \right)^{\frac{3}{2}} e^{-\frac{mv^2 - mv_0^2}{2K_B T}} \times 4\pi v^2 \left(\frac{m}{2\pi K_B T} \right)^{\frac{3}{2}} e^{-\frac{mv^2 - mv_0^2}{2K_B T}} v \times v G_a^2 \right] \div r^2 ;$$

$$f = 16\pi^2 v^6 \left(\frac{m}{2\pi K_B T} \right)^3 e^{-\frac{mv^2 - mv_0^2}{2K_B T}} \frac{G_a^2}{r^2}$$

$$f = 16\pi^2 v^6 \left(\frac{m}{2\pi K_B T} \right)^3 e^{-\frac{mv^2 - mv_0^2}{2K_B T}} \frac{G_a^2}{r^2} = 16\pi^2 \frac{G_a^2}{r^2} \left(\frac{nmv^2}{2\pi n K_B T} \right)^3 e^{-\frac{mv^2 - mv_0^2}{2K_B T}}$$

$$f = 16\pi^2 \frac{G_a^2}{r^2} \frac{n^3 m^3 v^6}{(n2\pi)^3 (K_B T)^3} e^{-\frac{mv^2 - mv_0^2}{2K_B T}}$$

Consider

$$\frac{1}{2} nmv^2 = \frac{3}{2} k_B T, \quad G_a = \frac{k_s K_\lambda^2}{2R} \bullet N_A ;$$

$$f = 16\pi^2 \frac{k_\lambda^4 k_s^2 N_A^2 G_a^2}{4R^2 r^2} \frac{27n^3 m^3 v^6}{(n2\pi)^3 (3K_B T)^3} e^{-\frac{mv^2 - mv_0^2}{2K_B T}} ;$$

$$f = \frac{27k_\lambda^4 k_s^2}{2\pi R^2 r^2 N_A} e^{-\frac{mv^2 - mv_0^2}{2K_B T}} = \frac{27k_\lambda^4 k_s^2}{2\pi R^2 r^2 N_A} e^{-\frac{N_A m v_i^2 - N_A m v_0^2}{RT}} = \frac{27k_\lambda^4 k_s^2}{2\pi R^2 r^2 N_A} e^{-\frac{\Delta E}{RT}} ;$$

$$f = k = \frac{27k_\lambda^4 k_s^2}{2\pi R^2 r^2 N_A} e^{-\frac{\Delta E}{RT}} ;$$

Namely $k = Ae^{-\frac{\Delta E}{RT}}$, $A = \frac{27k_\lambda^4 k_s^2}{2\pi R^2 r^2 N_A}$ this formula is identical with Arrhenius equation or empirical formula. From this we can know the reason why Arrhenius equation or empirical formula can describe some chemical reactions, and know the reason why the chemical reaction rate will be changed when temperature is changing without the electric charge changed. Thus this formula reveals the mechanism of chemical reaction. We know the Newtonian universal law of gravitation cannot describe the chemical reaction; the coulomb law also cannot describe this. Hence this example shows the Nature foundation: Nature works follow one rule [7].

Prove chemical equilibrium constant

The electron configurations in outermost electron shell are identical, the value is equal of occupation of electron shell outermost

electron shell atom in below chemical reaction $A + B = C + D$ according to follow formula: $\vec{F}_a = \frac{m_1 m_2 \times \vec{v}_1 \times (\vec{v}_2 \times \vec{r}_{12})}{4\pi\theta r_{12}^3} G_a$ in the

equilibrium status:

$$f_a = \frac{m_a m_b v_a v_b}{r^2} G_a = \frac{m_c m_d v_c v_d}{r^2} G_a$$

$$\frac{m_a^2 m_b^2 v_a^2 v_b^2}{r^4} G_a^2 = \frac{m_c^2 m_d^2 v_c^2 v_d^2}{r^4} G_a^2$$

$$\frac{m_a m_b T_a T_b}{Vr} G_a^2 = \frac{m_c m_d T_c T_d}{Vr} G_a^2$$

$\frac{m_a m_b}{m_c m_d} = \frac{T_c T_d}{T_a T_b}$ If the T keeping unchanged, then

$\frac{m_a m_b}{m_c m_d} = \frac{T_c T_d}{T_a T_b} = k$ This is the equilibrium constant of Chemical reaction in equilibrium status.

Conclusion

From above, I come to the conclusion that the fundamental law in nature is that moving photons produce force. This is the nature foundation. The validity of this fundamental law has been tested by five experiments in several papers, meanwhile the validity of

formula: $\vec{F}_a = \frac{m_1 m_2 \times \vec{v}_1 \times (\vec{v}_2 \times \vec{r}_{12})}{4\pi\theta r_{12}^3} G_a$ has been tested by applying in calculated experimental data: applying in spectrum, in

thermoelectricity, in bending light, and by demonstrate the Maxwell distribution formula, demonstrate the Newton law of universal gravitation, the Kepler third law, the Bohr formula etc. theory deduce. The further evidences and the more details please waiting to see come new paper for this.

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