QUANTUM THEORY DEPENDING ON MAXWELL EQUATIONS

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ABSTRACT. This article try to unified the three basic forces by Maxwell equations, the only experimental theory. Self-consistent Maxwell equation with the current from electromagnetic field is proposed. and is solved to four kinds of electrons and the structures of particles. The static properties and decay and scattering are reasoned, all meet experimental data. The momentum-energy tensor of the electromagnetic field coming to the equation of general relativity is discussed. In the end that the conformation elementarily between this theory and QED and weak theory is discussed compatible, except some bias in some analysis.

CONTENTS

1. UNIT DIMENSION OF sch

A rebuilding of units and physical dimensions is needed. Time s is fundamental. The velocity of light is set to 1

$$Velocity : c = 1$$

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Hence the dimension of length is

$$L : c(s)$$

The $\hbar$ is set to 1

$$Energy : \hbar(s^{-1})$$

In Maxwell equations the following is set

$$c\epsilon = 1, c\mu = 1$$

One can have

$$\epsilon : \frac{Q^2}{\varepsilon L};$$
$$\mu : \frac{\varepsilon L}{c^2 Q^2}$$
$$UnitiveElectricalCharge : \sigma = \sqrt{\hbar}$$

It's very strange that the charge is analyzed as space and mass. Charge Q is then defined as Q/σ here, without unit.

$$\sigma = 1.03 \times 10^{-17} C = 64e, e_{/\sigma} = e/\sigma = 1/64 = 1.56 \times 10^{-2}$$
$$H : Q/(LT) : \sqrt{\hbar}/c(s^{-2})$$
$$E : \varepsilon/(LQ) : \sqrt{\hbar}/c(s^{-2})$$

If $\hbar, c$ is taken as a number instead of unit, then all physical units is described as the powers of the second: s^n.

The unit of charge can be reset by *linear variation of charge-unit*

$$Q \to CQ, Q : \sigma/C$$

We will use it without detailed explanation.

2. Quantization

All discussion base on a explanation of quantization, or *real* probability explanation for quantum theory, which bases on a Transfer Probability Matrix (TPM)

$$P_i(x)M = P_f(x)$$

As a fact, that a particle appears in a point at rate 1 is independent with appearing at anther point at rate 1. There still another pairs of independent states

$$S_1 = e^{ipx}, S_2 = e^{ip'x}$$

because

$$< s_1, s_2 >_4 = \int dV s_1 s_2^* = N\delta(p - p')$$

$< s_1, s_2 >_4$ means make product integrated in time-space. Similarly the symbol

$$< s_1, s_2 >$$

is the product integrated in space and *always means its branch of zero frequency.* In fact in the TPM formulation, it's been accepted for granted that the Hermitian inner-product is the measure of the dependence of two states, and it is also implied by the formula

$$P_1 M P_2^*$$

Depending on this view point one can constructs a wave

$$e^{ipx}$$

and gifts it with the momentum explanation p, Then all quantum theory is set up.

3. Self-consistent Electrical-magnetic Fields

The Maxwell equations are

$$\frac{\partial H}{\partial t} + \nabla \times E = 0$$
$$\frac{\partial E}{\partial t} - \nabla \times H + \mathbf{j} = 0$$

Try equation for the free E-M field

$$A^{i,j}_{,j} - A^{j,i}_{,j} = iA^*_\nu \cdot \partial^i A^\nu/2 + cc. = J, Q_e = 1 \tag{3.1}$$

It's deduced by using momentum to express current.

$$(A^i) := (V, \mathbf{A}), (J^i) = (\rho, J)$$
$$\partial := (\partial_i) := (\partial_t, \partial_{x_1}, \partial_{x_2}, \partial_{x_3})$$
$$\partial' := (\partial^i) := (\partial_t, -\partial_{x_1}, -\partial_{x_2}, -\partial_{x_3})$$

The equation 3.1 have symmetry

$$CPT, cc.PT$$

If the gauge is

$$\partial_\mu A^\mu = 0$$

the continuous charge current meets

$$\partial_\mu \cdot j^\mu = 0$$

The energy of field A is $\varepsilon = \int dV(E^2 + H^2)/2$

$$\varepsilon =< A^i_{,j} - A^j_{,i} | A^i_{,j} - A^j_{,i} > /4$$
$$=< \partial A^\mu | \partial A^\mu >=< \partial' A_\mu | \partial A^\mu > /2 = - < A|J > /2$$

4. Stable Particle

All particles are elementarily E-M fields is presumed. It's trying to find stable solution of the Maxwell equations *in complex domain*. One can write down a function initially and correct it by re-substitution. Here is the initial state

$$V = V_i e^{-ikt}, A_i = V$$

Substituting into equation 3.1

$$\partial_\mu \partial^\mu A^\nu_i - \partial^\nu \partial_\mu A^\mu_i = 2J_i$$
$$2J_i = -\partial^\nu \partial_\mu A^\mu_i = -\partial^\nu \partial_t V$$

It has the properties

$$\partial \cdot J_i = 0$$

J_i causes the initial fields V, so that it is the real seed of recursive algorithm.

The static fields E_0, H_0

$$\nabla \cdot E_0 = iA^*_{i\nu} \cdot \partial_t A^\nu_i/2 + cc. = \rho_0 \tag{4.1}$$
$$\nabla \times H_0 = -iA^*_{i\nu} \cdot \nabla A^\nu_i/2 + cc. = J_0$$

We calls the fields' correction with n times of crossing is called the n-th order correction.

5. Radium Function

Firstly

$$\nabla^2 A = -k^2 A$$

is solved. Exactly, it's solved in spherical coordinate

$$0 = r^2\nabla^2 f + k^2 f = (r^2 f_r)_r + k^2 r^2 f + \frac{1}{\sin\theta}(\sin\theta f_\theta)_\theta + \frac{1}{\sin^2\theta}(f_\phi)_\phi$$

Its solution is

$$f = R\Theta\Phi = R_l Y_{lm}$$

$$\Theta = P_l^m(\cos\theta), \Phi = \cos(\alpha + m\phi)$$

$$R_l = N\eta_l(kr), \eta_l(r) = r^l \int_0^\infty \frac{(1-\lambda)^l}{(1+\lambda)^{l+2}} \cos(\lambda r) d\lambda$$

$$\int_0^\infty dr \cdot r^2 R^2 = 1$$

R is solved like

$$(r^2 R_r)_r = -k^2 r^2 R + l(l+1)R, l \geq 0$$

$$R \to rR'$$

$$(r^2 R')_{rr} = -k^2 r^2 R' + l(l+1)R'$$

$$R' \to r^{l-1} R'$$

$$rR'_{rr} + 2(l+1)R'_r + k^2 r R' = 0$$

$$r \to r/k$$

$$(s^2 F)' + 2(l+1)F + F' = 0, F = F(R')$$

$F()$ is the Fourier transform

$$R' = \int_0^\infty \frac{(1-\lambda)^l}{(1+\lambda)^{l+2}} \cos(\lambda r) d\lambda$$

The function R_1 has zero derivative at $r = 0$ and is zero as $r \to \infty$.

6. Solution

The derivatives of the function of electron has a strange breaking point in coordinate origin hence without normal convenience of Fourier transform. The following are some proximation of the first rank. The solution of $l = 1, m = 1, Q = e_{/\sigma}$ is calculated or tested for electron.

$$A_1 = NR_1(kr)Y_{1,1},$$

The curve of R_1 is like the one in the figure 1.

The magnetic dipole moment μ_z is calculated as the first rank of proximation

$$\mu_z =< A_\nu | - i\partial_\phi | A^\nu > /2$$

$$= 1/2, k_e = 1$$

The power of unit of charge is not equal, but it's valid for unit $Q = e$.

$$\frac{Q}{2k} = \mu_B$$

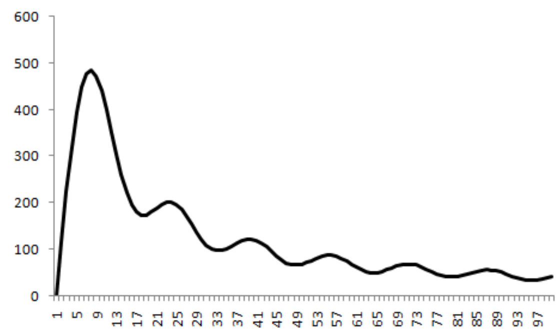

FIGURE 1. the shape of radium function R_1 by DFT

7. Electrons and Their Symmetries

Some states of electrical field A are defined as the core of the electron, it's the initial function $A_1 = V$ for the re-substitution to get the whole electron function.

$$e_r^+ : NR_1(kr)Y_{1,1}e^{-ikt}$$

$$e_l^+ : NR_1(kr)Y_{1,-1}e^{-ikt}$$

$$e_l^- : -R_1(kr)Y_{1,1}e^{ikt}$$

$$e_r^- : -R_1(kr)Y_{1,-1}e^{ikt}$$

$$k = k_e = m_e/e_{/\sigma}$$

r, l is the direction of the spin. We use these symbols e to express the complete potential field A or the abstract particle.

Energy of static E-field crossing is discussed. In the zero rank of correction ie. the static field is

$$e^*(-i\partial')e = J_e, Q_e = 1$$

The equation of charge

$$\rho_0 = e^*(i\partial_t)e, Q_e = 1$$

is used to normalize electron function that's the same with the normalization of electron to energy and charge

$$< \partial e|\partial e > /2 = k_e e_{/\sigma} = m_e$$

$$< e| - i\partial_t|e >= e$$

The static energy of electric field between A_0 is

$$\varepsilon_q = -e_{/\sigma}^3 k_e/2 = -\frac{1}{6.7 \times 10^{-16}s}$$

Energy of the static M-field crossing

$$\varepsilon'_m = \varepsilon_e$$

Hence the gross energy is

$$\varepsilon_e = 2\varepsilon_q = -\frac{1}{3.355 \times 10^{-16}s}$$

The value of crossing term generated by static fields between electrons are

ε_e	e_r^+	e_r^-	e_l^+	e_l^-
e_r^+	$+$	$-$	0	0
e_r^-	$-$	$+$	0	0
e_l^+	0	0	$+$	$-$
e_l^-	0	0	$-$	$+$

The field of four kinds of electrons has symmetries

$$e_r^+ : E_n + M_n)$$
$$e_l^+ : E_n - M_n$$
$$e_r^- : (-1)^{n-1}E_n + (-1)^{n/2-1}M_n$$
$$e_l^- : (-1)^{n-1}E_n - (-1)^{n/2-1}M_n$$

E is electrical field, M is magnetic field. n is the order of the correction. The non zero crossing in re-substitution is the crossing with A_i. The higher absolute frequency than k_e is also zero.

Calculating the crossing part between e_r^+, e_l^-. the non zero results of crossing is between A_2 and A_6 or between A_4.

$$\varepsilon_x \approx -e^7_{/\sigma}k_e/4 \approx -\frac{1}{2.18 \times 10^{-8}s}$$

The theorem 9.6 is used. The value of this crossing term generated between electrons are

ε_x	e_r^+	e_r^-	e_l^+	e_l^-
e_r^+	$+$	0	0	$-$
e_r^-	0	$+$	$-$	0
e_l^+	0	$-$	$+$	0
e_l^-	$-$	0	0	$+$

8. Mechanic Feature

If the equation that connects space and E-M fields is written down for cosmos of electrons, it's the following:

$$R_{ij} - \frac{1}{2}Rg_{ij} = 8\pi G T_{ij} \tag{8.1}$$

$$e^2_{/\sigma}T_{ij} = F_i^{k*}F_{kj} - g_{ij}F_{\mu\nu}F^{\mu\nu^*}/4, Q_e = 1$$

F is the electromagnetic tensor. This equation give mass because the space is decided by E-M fields instantly. the factor $e^2_{/\sigma}$ is to balances the physical unit.

Because fields F is additive, the group of electrons are express by:

$$\sum_i f_i * \nabla e_i, < f_i|f_i >= 1$$

The convolution is made only in space:

$$f * g = \int dV f(t, y - x)g(t, x)$$

It's called *propagation*. Each f_i is normalized to 1. We always use

$$\sum_i f_i * e_i, \sum_i f_i * \nabla e_i$$

to express its abstract construction and the field. The reason is that

$$f_i * (\partial e_i - (e_i \partial))$$

is the potential field F Its potential and strength fields is

$$A = \int dx \sum_i f_i * \nabla e_i, , \partial A - A\partial$$

When the mechanical physical is discussed, observing the Energy-Momentum tensor T we have the momentum is

$$p^\mu = T_0^\mu$$

The spin of electron is calculated as

$$S_e =< A|\partial_\phi \cdot \partial_t|A > /2 = 1/2$$

The MDM (magnetic Dipole moment) of electron is calculated as

$$\mu_e = \frac{1}{2} < A|\partial_\phi|A >= 1/(2k_e), Q_e = 1$$

9. Propagation and Movement

Define symbols for particle x

$$e^+_{xr} := N \cdot R_1(k_x r)Y(1,1)e^{-ik_x t},$$
$$e^+_{xx} := (e^+_{xl} + e^+_{xr})/\sqrt{2}$$
$$< e_x|e_x >= 1$$

The following are also (stable) classical propagations.

particle	*electron*	*photon*	*neutino*
notation	e^+_r	γ_r	ν_r
structure	e^+_r	$(e^+_r + e^-_r)$	$(e^+_r + e^-_l)$

Not all EM field is explained as photon, but photon is explained as EM fields.

By mathematic

$$\varsigma_{k,l,m}(x) := R_l(kr)Y_{l,m}, \varsigma_k(x) := \varsigma_{k,1,\pm 1}(x)$$

meets the following results

Theorem 9.1. *C_A is a global area with its center in A and its diameter is r_A*

$$\lim_{r_o = r_y \to 0} \int_{I - \sum C_i} dV \varsigma_k(x)\varsigma^*_k(x-y) = 0, y \neq O$$

Proof. Use the limit

$$\lim_{k' \to k} \lim_{r_o = r_y \to 0} (\int_{I - \sum C_i} dV \varsigma_k(x)\varsigma^*_{k'}(x-y))$$

□

We have of course:

$$\varsigma_k(\mathbf{r}) = \int d\mathbf{p} C_p e^{i\mathbf{pr}}, \mathbf{p}^2 = k^2$$

Theorem 9.2.

$$< f(x) * \varsigma_k|g(x) * \varsigma_k >=< f(x)|g(x) >$$

$|f|^2, |g|^2$ is integrable.

It's proved by

$$< \sum_i a_i \varsigma_k(x-x_i) | \sum_i b_i \varsigma_k(x-x_i) >= \sum_i a_i^* b_i$$

Theorem 9.3. *if $e^{i\mathbf{pr}}, \varsigma_k$ is normalized to 1,*

$$e^{i\mathbf{pr}} * \varsigma_k = \omega e^{i\mathbf{pr}}, |\omega| = 1$$

Theorem 9.4.

$$\nabla(\varsigma_k * \varsigma_{k'}) = (\nabla \varsigma_k) * \varsigma_{k'} + \varsigma_k * \nabla(\varsigma_{k'})$$

$$\begin{aligned} -\partial_y \int dV_x I(y-x) \varsigma_k(x-y) \varsigma_{k'}(x) \\ = -\int dV_x I'(y-x) \varsigma_k(x) \varsigma_{k'}(x) \\ = \int dV_x I(x-y) (\varsigma_k(x-y) \varsigma_{k'}(x))_x \\ = \int dV_z I(z) (\varsigma_k(z) \varsigma_{k'}(z+y))_z, z = x-y \\ = \int dV_z (\varsigma_k'(-z) \varsigma_{k'}(z+y) + \varsigma_k(-z) \varsigma_{k'}'(z+y)) \\ = \int dV_z (\varsigma_k'(z) \varsigma_{k'}(-z+y) + \varsigma_k(z) \varsigma_{k'}'(-z+y)) \end{aligned}$$

$$I(y-x) := \{ \begin{array}{l} 0, x \neq O \\ 1, x = O \end{array}$$

Theorem 9.5.

$$(\nabla \varsigma_k) * \varsigma_1 = k \varsigma_k * \nabla \varsigma_1$$

Theorem 9.6.

$$\varsigma_1 * \frac{1}{r} = \varsigma_1$$

C is relative to the measure of sampling dense of integration. It's because

$$\begin{aligned} \int dV \varsigma_1 \cdot \varsigma_1^* \cdot \varsigma_1 \cdot \varsigma_1^* \\ = C \int dP \cdot F(\varsigma_1) * F(\varsigma_1^*) * F(\varsigma_1) * F(\varsigma_1^*) \\ = \int dP \omega * \omega^* * \omega * \omega^* * = 1 \end{aligned}$$

The figure 2 is the shape of distribution of momenta of electron function e_x.

The movement of the propagation is called *Movement*, ie. the third level wave, harmonic wave. The moment and field is determined by the grid shift. The harmonic wave for static particle x is

$$e^{i\mathbf{pr}} * e_x * (\sum_i e_i)$$

The general fields is obtained by the shift of grid in which real electron is

$$\int dx \cdot e^{i\mathbf{pr} + ikt + ik_e t} * \partial e, \mathbf{p^2} = k^2$$

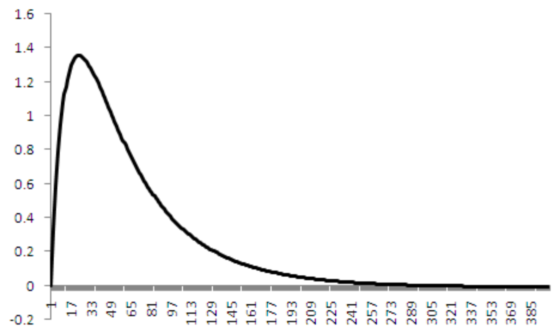

FIGURE 2. the shape of distribution of radioactive momenta of electron fields in one direction: $k/(1+k)^4 - 4k/(1+k)^5$, calculated through spherical Bessel functions

The static MDM (magnetic dipole moment) is decoupled for coupling system, it is

$$\mu =< \sum_i \int dx_i \cdot e_x * \nabla e_i(x_i)| - i\mathbf{r} \times \nabla | \sum_i \int dx_i \cdot e_x * \nabla e_i(x_i) > /4 + cc., Q_e = 1$$

$$\mathbf{r} \times \nabla = \sum_i \mathbf{r_i} \times \nabla_i$$

$$=< \sum_i e_x * e_i(x_i)| - i\mathbf{r} \times | \sum_i e_x * \nabla e_i(x_i) > \frac{k_e}{4k_x} + cc.$$

$$\mu_z =< \sum_i e_x * e_i(x_i)| \sum_i e_x * (-i\partial_\phi e_i(x_i)) > \frac{k_e}{4k_x} + cc.$$

The MDM couples between electrons. Its spin (decoupled) is

$$S_z =< \sum_i \int dx \cdot e_x * \nabla e_i(x_i)| - \partial_\phi \partial_t | \sum_i \int dx \cdot e_x * \nabla e_i(x_i))/4 + cc., Q_e = 1$$

$$=< \sum_i e_x * e_i(x_i)| \sum_i e_x * (-i\partial_\phi e_i(x_i)) > k_e/4 + cc.$$

Mechanical spin decouples between electrons.

Calculating the following for coupling system for the initial fields:

$$A = \int dx \cdot e_x * \sum_i \partial e_i$$

we find $e_x * e$ meets the wave equation

$$\partial \cdot \partial' A \approx 0$$

Hence it's real particle, its mechanical feature

$$e^2_{/\sigma} < A| - i\partial_t |A > / < A|A >=< \partial A|\partial A >$$

10. Antiparticle

Antimatter is the positive matter reverse world-line, so that it meets

$$\partial_\nu \partial^\nu A^i = -iA_\nu^* \cdot \partial^i A_\nu/2 + cc.$$

$$\partial_\nu \partial^\nu (A^i(-x) + B) = i(A_\nu(-x) + B)^* \cdot \partial^i (A_\nu(-x) + B)/2 + cc.$$

The right part is negative in accordance to positive matter. B is outer field the particle is in. If $A(x)$ describes positive matter, $A(-x))$ is describes antimatter, we define

$$\overline{A(x)} := A(-x)$$

We have the reaction

$$p \to, A(-x) \to \bullet \to p$$

equivalent to

$$p \to \bullet \to A(x), \to p$$

and

$$\overline{e_r^+} \approx e_l^-$$

11. Conservation Law and Balance Formula

No matter in E-M fields level or in movement (the third) level, the conservation law is *conservation of momentum and conservation of angular momentum.* A *balance formula* for a reaction is the equivalent formula in positive matter, ie. after all anti-matter is shifted to the other side of the reaction formula. Balance formula is suitable for the analysis of the energy transition of E-M fields in the reaction. The *invariance of electron itself* in reaction is also a conservation law.

12. Muon

μ is composed of

$$\mu_+^r : e_\mu * (e_r^+ + \overline{\nu_r})$$

μ is with mass $3k_e/e^2_{/\sigma} = 3 \times 64k_e$, spin 1/2, MDM $\mu_B k_e/k_\mu$.

The main channel of decay

$$\mu_r^+ \to M_l^+ + \overline{\nu_l}$$

$$M_r^+ = e_M * (\overline{e_l^-} + \nu_l)$$

$$e_\mu * e_r^+ + e^{-ip_1x} * e_M^* * e_l^- + \overline{e^{ip_2x}} * \nu_l \to \overline{e_\mu} * \nu_r + \overline{e^{ip_1x}} * \overline{e_M} \nu_l$$

There are kinds of energy increase.

Weak coupling

$$W :< e_r^+, e_l^- >$$

Light coupling

$$L :< e_r^+, e_r^- >$$

Weak side coupling

$$Ws :< e_r^+, e_l^- > - < e_x * e_r^+, e^{ipx} * e_l^- >$$

Light side coupling

$$Ls :< e_r^+, e_r^- > - < e_x * e_r^+, e^{ipx} * e_r^- >$$

Strong coupling

$$S :< e_r^+, e_r^+ >$$

The outer waves e_μ and $e^{-ip_1x} * e_M^*$, $e^{-ip_1x} * e_M^*$ and e^{-ip_2x}, e_μ and e^{-ip_2x} are coupling. The energy difference is kind of Ws, the interacting field is E that between A_2, A_6.

$$< \overline{e_\mu} * \partial e_r^+ | \overline{e_\mu} * \partial * e_l^- > - < \overline{e_\mu} * \partial e_r^+ | (e^{i\mathbf{p_1}\mathbf{r} + ik_\mu t} * \partial e_l^- > /2$$

$$\mathbf{p_1}^2 = (k_\mu + k_e)^2$$

$$(1 - \frac{k_\mu - k_e}{k_\mu + k_e}) < \overline{e_\mu} * \partial e_l^+ | (e^{i\mathbf{p_1}\mathbf{r} + ik_\mu t} * \partial e_r^- > /2/2$$

sum up in spectrum of p_1

$$= \frac{2k_e \varepsilon_x}{k_\mu}$$

The emission of decay is

$$= -\frac{1}{2.1 \times 10^{-6} s} \quad [2.1970 \times 10^{-6} s][1]$$

The data in square bracket is experimental data of the full width. The decay of particle M is like a scattering with no energy emission

$$M_r^+ \to \overline{e_l^-} + \nu_l$$

13. Pion Positive

Pion positive is

$$\pi_l^- : e_\pi * (\overline{e_r^+} + e_l^-) + e_\pi^* * e_r^+$$

It's with mass $5 \times 64 k_e$, spin 1/2 and MDM $\mu_B k_e / k_{\pi^+}$.

Decay Channels:

$$\pi_l^- \to \mu_l^- + \nu_r$$

It's with balance formula

$$e_\pi^* * e_r^+ + e_\pi * e_l^- + \overline{e^{ip_1x}} * \overline{e_\mu} * \nu_r \to \overline{e_\pi} * e_r^+ + e^{ip_1x} * e_\mu * e_l^- + e^{ip_2x} * \nu_r$$

The emission of energy is kind of W

$$\varepsilon_x = -\frac{1}{2.18 \times 10^{-8} s} \quad [(2.603 \times 10^{-8} s][1]$$

The referenced data is the full width.

14. Pion Neutral

Pion neutral is atom-like particle

$$\pi^0 : e_{\pi^0} + \nu_r + e_{\pi^0}^* * \nu_l$$

It has mass $4 \times 64 k_e$, zero spin and zero MDM. Its decay modes are

$$\pi^0 \to \gamma_r + \gamma_l$$

The loss of energy is kind of L

$$4\varepsilon_e = -\frac{1}{8.39 \times 10^{-17} s} \quad [8.4 \times 10^{-17} s][1]$$

15. TAU

τ maybe that

$$\tau_l^+ : e_\tau * (5e_r^+ + \overline{5e_r^+ + e_r^-})$$

Its mass $51 \times 64k_e$, spin 1/2, MDM μ_B/k_μ. It has decay mode

$$\tau_l^+ \to \overline{\mu_l^-} + \nu_l + \overline{\nu_l}$$

$$e_\tau * 5e_r^+ + \overline{e^{ip_1x}} * \overline{e_\mu} * \nu_r + \overline{e^{ip_2x}} * \nu_l \to \overline{e_\tau} * 5e_r^+ + \overline{e_\tau} * e_r^- + e^{ip_1x} * e_\mu * e_l^- + e^{ip_3x} * \nu_l$$

The energy gap is kind of Ls, $E = J_2$

$$5 < \overline{e_\tau} * \partial E_r^+ | \overline{e_\tau} * \partial E_r^- > /2$$

$$-5 < \overline{e_\tau} * \partial E_r^+ | e^{i\mathbf{p_1 r} - ik_\tau t} * \partial E_r^- > /2$$

$$e_\tau = e_{\tau l}^-, p_1^2 = (k_\tau t + k_e)^2$$

$$= 5(1 - \frac{k_\tau - k_e}{k_\tau + k_e}) < \overline{e_\tau} * E_r^+ | \nabla^2 e^{i\mathbf{p_1 r} - ik_\tau t - ik_e t} * E_r^- > /2$$

$$= \frac{10\varepsilon_e}{k_\tau/k_e}$$

$$= -\frac{1}{1.2 \times 10^{-13}s} \quad [2.9 \times 10^{-13}s, BR.0.17][1]$$

16. Proton

Proton may be like

$$p^+ : e_p * (4\overline{e_r^+} + 3e_r^+ + 2\overline{e_l^-})$$

The mass is $30 \times 64k_e$ that's very close to the real mass. The MDM is calculated as $3\mu_N$, spin is 1/2. The proton thus designed is eternal because even if decay to the finest small parts the emission is negative.

We define an unit: Mass-number Unit

$$m := m_e\sigma/e \approx 64k_e$$

17. Scattering and decay life

The scattering can be calculated as dynamic electromagnetic mechanical theory, ie. the magnitude scattered is

$$-ie^{\int dV_4 \hat{j}^\mu \hat{A}_\mu}$$

From the equation 3.1 the operator of current is

$$4\hat{j}A^\mu = iA_\mu^* \partial A^\mu - iA^\mu \partial A_\mu^*$$

The reaction is like

$$\sum_i f_i * e_i \to \sum_i f_i' * e_i$$

e_i are positive matter all. The interaction between electrons

$$I(, e_i,) = I(, J(e_i),)$$

is the *cross interaction*. At little scale of interaction it's

$$I(j_1, j_2) = \int dV_4 A_1 J_2,$$

$$A_{1i} = \int dx \cdot f_{1i} * \partial e_i, A_{1f} = \int dx \cdot f_{1f} * \partial e_i$$

$$2J = iA_i^* \partial A_f - iA_f \partial A_i^*$$

For example the scattering

$$e^{ip_1x} * e_r^+ + e^{ip_2x} * e_r^- \to e^{ip_3x} * e_r^+ + e^{ip_4x} * e_r^-$$

The transfer is

$$i\mu \approx \frac{C(p_1' + p_3')^\nu (p_2' + p_4')_\nu}{(p_1' - p_3')^2}$$

The p_i' is the *cap momentum* relative to p_i. The number of particle of wave is normalized by the following covariant term

$$dV_3 \sqrt{k/k_e} e^{ipx} * \partial e_r^+$$

And we have

$$\int \prod_i dV_{4,i} I(, J(e_i),) = \varepsilon_e$$

this calculation must conform to classical theory

$$iC = e^2 = \frac{\varepsilon_e}{k_e e}$$

The interaction is between A_0. In the mean effect rate of transfer for the scattering of one to one particles is

$$\frac{|\mu|^2}{2k_1 \cdot 2k_2 \cdot 2k_3 \cdot 2k_4}$$

The energy gap in fact is part of interaction for example

$$e^{p_1x} * e + e^{p_2x} * e \to e^{p_3x} * e + e^{p_4x} * e$$

e is the same electron of the four kind and of the same polarization. In fact the final state includes

$$s := e_s * (e + e)$$

The interaction in the reaction is

$$I = I(j_{13}, j_{24}) = \int dV_4 A_{13} J_{24}^* \delta(x - G)$$

The domain G is the domain meeting Clain-Golden equation and momentum conservations, for all emitted matter. Taking the mass center system, the part generating s is

$$e + e \to s = e^{-ikt} e_{-ik_s t} \varsigma_{k_s} * (e + e)$$

$$k + k_s = k_1$$

Using

$$\varsigma_{k_s} = \int d\mathbf{p} C_p e^{i\mathbf{pr}}, \mathbf{p}^2 = k_s^2$$

the invariable magnitude is

$$i\mu \approx C \int d\mathbf{p} C_p \frac{-(\mathbf{p} + \mathbf{p_1})^2 + 4k_1^2}{(\mathbf{p} - \mathbf{p_1})^2}, \mathbf{p}^2 = k_s$$

For a decay with two particles emission, the first order term of the scattering effect is identity of the calculation of energy difference between the initial and final state, which a easy analysis can prove.

18. Conclusion

The relative theory is applied to electromagnetic wave to give the mass of the fields, by energy-momentum tensor. In my view point the sum-up of the grains (as electrons) of electromagnetic field is express of mechanic movement. Fortunately this model explained all the effects in the known world: strong, weak and electromagnetic effects, and even subclassify them further if not add new ones. In this model the only field is electromagnetic field except gravity, and this stands for the philosophical with the point of that unified world from unique source. All depend on a simple fact: the current of matter in a system is time-invariant zero in mass-center frame, and we can devise current of matter to analysis the E-M current. So that all effects is explained with diffusion process.

The inertial mass is deduced by mechanical operator $i\partial_t$. But the gravitational mass (by the equation of 8.1) of the naked electron is 64 time of the inertial and mechanical mass, the photon and neutrino has zero mechanical mass but their gravitational mass is not zero obviously. this is hard problem unsettled by this article. For atom the inertial mass less then gravitational mass by 1/50 approximately.

Except electron function my description of particles in fact has the same form with Quantum Electromagnetic Mechanics, and they two should reach the same result except for some little bias. But my theory isn't compatible to the theory of quarks, the upper part of standard model, if not it is calculated in the style of Quantum Electromagnetic Mechanics. In fact, The electron function is a good promotion for the experimental model of proton that went up very early.

References

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