THEORY OF ELECTRON

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ABSTRACT. The solution with no singularity of wave equation for E-M fields is solved not to Bessel function, which's geometrical size is little enough to explain all effects in matter's structure: strong, weak effect or even other new ones. The mathematic calculation leaded by quantum theory reveals the weak or strong decay and static properties of elementary particles, all coincide with experimental data, and a covariant equation comprising bent space is proposed to explain mass. In the end that the conformation elementarily between this theory and QED and weak theory is proven, except some bias in some analysis.

CONTENTS

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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

$$Velocity: c = 1$$

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 in time-space. 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

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

it's discussed that plat and straight space.

Try equation for the free E-M field

$$A^{i,j}_{,j} - A^{j,i}_{,j} = \frac{1}{4}(-iA^*_\nu \cdot \partial^i A^\nu + iA^\nu \cdot \partial^i A^*_\nu), Q_e = 1 \tag{3.1}$$

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

The equation 3.1 have symmetries

$$CPT, cc.PT$$

If the gauge is

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

the continuous charge current meets

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

This means the exponent decay rate, and decay life is reciprocal of energy difference.

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 the solution 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

$$\partial_\mu \partial^\mu A^\nu = J_x, \partial_\mu \partial^\mu A^\nu_i - \partial^\nu \partial_\mu A^\mu_i = J_i$$
$$J_x = \frac{1}{2}(-iA^*_\nu \cdot \partial^i A^\nu - cc.)$$
$$J_i = -\partial^\nu \partial_\mu A^\mu_i = \partial^\nu \partial_t V$$

It has the properties

$$\partial \cdot J_i = 0$$

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

The static fields E_0, H_0

$$\nabla \cdot E_0 = (iA^*_{1\nu} \cdot \partial_t A^\nu_1 + cc.)/4 = \rho_0 \tag{4.1}$$
$$\nabla \times H_0 = -(iA^*_{1\nu} \cdot \nabla A^\nu_1 + cc.)/4 = J_0$$

In the first round of substitution

$$4J_1 = -i(A_{0\nu *} \cdot \partial' A_1^{\nu}) + i(\partial' A_{0\nu} \cdot A_1^{\nu^*}) + cc.$$

We calls the fields correction with frequency nk the n-th order correction. calls the n-th re-substitution in same order the n-th rank correction.

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

$$(A^i_{,j} - A^j_{,i})^*(A^i_{,j} - A^j_{,i})$$

$$= 2A^{i*}_{,j}A^i_{,j} - A^{i*}_{,j}A^j_{,i} - A^{j*}_{,i}A^i_{,j}$$

$$= 2A^{i*}_{,j}A^i_{,j} - (A^{i*}_{,j}A^j)_{,i} + A^{i*}_{,ji}A^j - (A^{j*}A^i_{,j})_{,i} + A^{j*}A^i_{,ij}$$

under integration

$$\int dV(A^i_{,j} - A^j_{,i})^*(A^i_{,j} - A^j_{,i}) = 4\varepsilon = 2 < A^i_{,j}|A^i_{,j} >$$

ε is energy of the field.

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

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

$$R \to rR'$$

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

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

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

$$r \to r/k$$

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

$F()$ is the Fourier transform

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

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

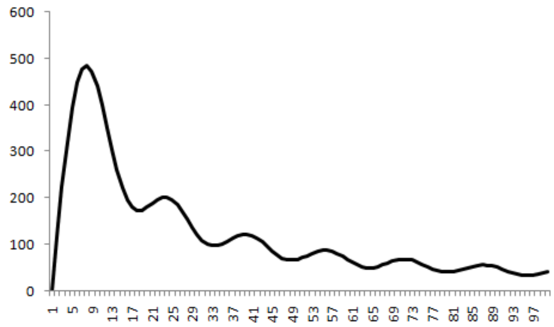

FIGURE 1. the shape of radium function R_1 by DFT

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 $Q = e$.

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

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.

$$e_r^+ : NR_1(-kr)Y_{1,1}e^{-ikt},$$
$$e_r^- : NR_1(kr)Y_{1,1}e^{ikt}, (CPT)$$
$$e_l^+ = NR_{-z}(e_r^+) : R_1(-kr)Y_{1,-1}e^{-ikt}$$
$$e_l^- = NR_{-z}(e_l^-) : R_1(kr)Y_{1,-1}e^{ikt}$$
$$R_{-z} : Rotation : z \to -z, x \to x, y \to -y$$

We use these symbols e-s to express the complete field (E, M).

Energy of static E-field crossing.

In the zero rank of correction ie. the static field is

$$(e(-i\partial')e + cc.)/4 = J_e \cdot Q_e$$

Because the equation of charge

$$4Q_e\rho_0 = (e(i\partial_t)e + cc.)$$

is used to normalization of electron function, The normalization of electron is

$$< e|e >= 2/(-k_e Q_e)$$

The static energy of electric field is

$$\varepsilon_e = -\int dV DV' \rho(\mathbf{r})\rho(\mathbf{r'})/|4\pi(\mathbf{r}-\mathbf{r'})|$$

$$\approx -e_{/\sigma}\int dV \rho(\mathbf{r})/(4\pi r) = -\frac{1}{6.4\times 10^{-16}s}$$

Energy of the static M-field crossing

$$\varepsilon_m = \varepsilon_e$$

It's easy to prove by calculating in real functions.

$$4\varepsilon_m - 4\varepsilon_e = \frac{1}{2}\int dV (A^*_\mu(\mathbf{r_1})\partial' A^\mu(\mathbf{r_1}) - cc.)^* \cdot (A^*_\mu(\mathbf{r_1}-\mathbf{r_2})\partial A^\mu(\mathbf{r_1}-\mathbf{r_2}) - cc.)/|\mathbf{r_1}-\mathbf{r_2}| = 0$$

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

$2\varepsilon_e$	e_r^+	e_r^-	e_l^+	e_l^-
e_r^+	$+$	0	0	$-$
e_r^-	0	$+$	$-$	0
e_l^+	0	$-$	$+$	0
e_l^-	$-$	0	0	$+$

Calculating the crossing part between e_r^+, e_r^-. In a electron e_r^+ has two parts of first rank correction

$$J_1 = -i(-V_0 \cdot \partial' V + V_0 \cdot \partial' V^*)/4 \rightarrow A_1$$

$$J_1' = -i(-V^* \cdot \partial' V_0 + V \cdot \partial' V_0)/4 \rightarrow A_1'$$

Between e_r^+, e_r^- the crossing part is zero in this rank. They coupling with V

$$J_2 = -i((-V_1 \cdot \partial' V + V_1 \cdot \partial' V^* - V^* \cdot \partial' V_1 + V \cdot \partial' V_1))/4$$

Its electrical part is

$$= -(G(V_0 \cdot V_t^*) \cdot V_t + G(V_0 V_t) \cdot V_t^*)/8$$

$G(J)$ is the potential caused by current J. As the magnetic part interaction with static fields their crossing part is zero.

$$J_2' = -i(-V_1' \cdot \partial' V + V_1' \cdot \partial' V^* - V^* \cdot \partial' V_1' + V \cdot \partial' V_1')/4 = 0$$

J_2 interacts with static field (zero rank). By violent computation and sampling the radium function at 10 points with clear shape of it, the results of crossing between e_r^+, e_r^- approaches

$$2\varepsilon_x \approx -\frac{1}{1.6\times 10^{-8}s}$$

The value of this crossing term generated between electrons are

$2\varepsilon_x$	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

As two electrons meet and effect each other, their phases of the vibrations are also key, but the effect of phase is not observed. Considering two electrons with the same phase start from the same place and meet at the other one, the relative theory give a result that their phase are the same as they meet. If one defines unitary and orthogonal frame field P_i

$$DP_i = 0, P_i(O) \cdot P_j(O) = 0, |P_i| = 1$$

And the frame

$$g^i_{,i} dx_i = P_i$$

and the free and orthogonal harmonic waves

$$e^{i \sum_i p_i g^i}$$

In fact *under this base P_i all differential is good as covariant and can be operated like in straight and flat space.* More over we have the covariant spectrum indexed by p.

One can guess that all the electrons in this cosmos are generated in the same place and the same time.

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

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

$$e^2_{/\sigma} T_{ij} = F^{k*}_i F_{kj} - \delta_{ij} F_{\mu\nu} F^{\mu\nu^*}/4$$

All tensors are expressed in base P_i. 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.

The Einstein's Theory of space and gravity is compatible with this theory and explains the energy of space and the looking mass k (generated by moving coordinate system) of particle.

for the group of electrons, its fields F is constructed by convolution:

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

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. The complete coupling electrons is

$$f * \sum_i \partial e_i$$

When the mechanical physical is discussed, the un-normalized dense of probability is A. because the coupling current or momentum is

$$p = \frac{1}{4}(-iA^*_\nu \cdot \partial^i A^\nu + iA^\nu \cdot \partial^i A^*_\nu)$$

It 's reasonable to presume the current has the same distribution of momentum.

The spin of electron is calculated as

$$S_e = \int dV \frac{1}{4}(-iA^*_\nu \cdot \partial_\phi A^\nu + iA^\nu \cdot \partial_\phi A^*_\nu) = 1/2$$

$$< A_\mu | A^\mu >= 1$$

Because the coupling current is made for self-coupling

9. Propagation and Movement

Define symbols

$$e_{xr} := N \cdot R_1(k_x r) Y(1,1) e^{iK_x t},$$

$$e_{xx} := (e_{xl} + e_{xr})/\sqrt{2}$$

The following are also (stable) classical propagations.

particle	*electron*	*photon*	*neutino*
notation	e_r^+	γ_r	ν_r
structure	e_r^+	$(e_r^+ + e_l^-)$	$(e_r^+ + e_r^-)$

We have results by mathematic

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

meets

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

$$\lim_{r_o = r_y \to 0} \int_{I - \sum C_i} dV \varsigma_{k,l,m}(x) \varsigma^*_{k,l,m}(x-y) = 0, y \neq O$$

$$\int dV \varsigma_{k,l,m}(x) \varsigma_{k',l',m'}(x) = 0, k \neq k' \text{ or } l \neq l' \text{ or } m \neq m'$$

Proof. Use the limit

$$\lim_{k' \to k} \lim_{r_o = r_y \to 0} (\int_{I - \sum C_i} dV \varsigma_{k,l,m}(x) - \varsigma_{k',l,m}(x-y))$$

□

Theorem 9.2. *if $e^{i\mathbf{pr}}, \varsigma_{k,l,m}$ is normalized to 1,*

$$e^{i\mathbf{pr}} * \varsigma_{k,l,m} = e^{i\mathbf{pr}}$$

Proof. because

$$\int dV e^{i\mathbf{pr}} * \varsigma_{k,l,m} \cdot (e^{i\mathbf{pr}} * \varsigma_{k,l,m})^*$$

$$= \int dV e^{i\mathbf{pr}} (e^{i\mathbf{pr}})^* \cdot \int dV \varsigma_{k,l,m} (\varsigma_{k,l,m})^* = 1$$

□

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, for example

$$e^{i\mathbf{pr} - ikt} * \delta(\mathbf{r}) * e$$

Theorem 9.3.

$$\nabla(e_x * e) = (\nabla e_x) * e + e_x * (\nabla e)$$

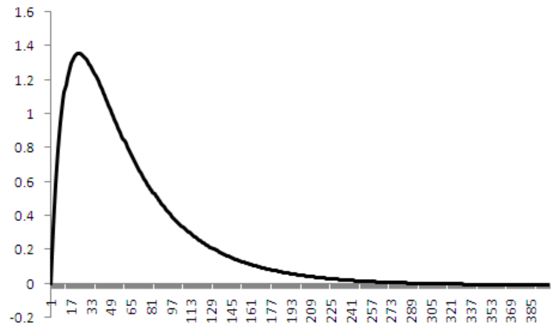

FIGURE 2. the shape of distribution of momenta of electron fields in one direction, calculated through spherical Bessel functions

Proof. Calculate

$$\nabla_t \int dV_y \delta(t-y) \int dV_x dV_{x'} (e_x(y-x)e(x) \cdot (e_x(y-x')e(x'))^*)$$

$$= \int dV_{y'} dV_x \delta'(t-y'-x)(e_x(x)e(x)^* \cdot e_x(y')e(y')^*)$$

$$= \int dV_{y'} \nabla_t (e_x(t-y')e(t-y')^*) \cdot (e_x(y')e(y')^*) + \int dV_x (e_x(x)e(x)^* \cdot \nabla_t (e_x(t-x)e(t-x)^*)$$

□

Theorem 9.4.

$$(\partial_{x_i} e^{ipx}) * e = e^{ipx} * (\partial_{x_i} e)$$

Proof. Because for value caused by the breaking point

$$h(x_i) * e^{ipx} = 0$$

□

Theorem 9.5.

$$k_e^2 (\nabla e_x) * e \cdot ((\nabla e_x) * e)^* = k_x^2 (\nabla e) * e_x \cdot ((\nabla e) * e_x)^*$$

Definition 9.6.

$$< f_1(x_1) + f_2(x_2))|O(x)|f_1(x_1) + f_2(x_2) >$$

$$= \lim_{V \to I} (\int_V dV_1 \int_V dV_2 \cdot (f_1(x_1) + f_2(x_2))^* (O(x_1) + O(x_2))(f_1(x_1) + f_2(x_2)))/V$$

The field of two decoupling system

$$F = F_1 + F_2$$

$$F_1 = \sum_i f_i * \partial e_i(x), F_2 = \sum_i g_i * \partial e_i(x')$$

The additive physical of Einstein tensor is adopted to express mechanics, Energy is coupling at its elementary property.

Its static MDM (magnetic dipole moment) for wave F_1

$$\int dx \cdot \sum_i f_i * \partial e_i = \frac{k_{e_i}}{k_x} \sum_i f_i * e_i$$

$$\mu =< \sum_i f_i * e_i(x_i)| - i\mathbf{r} \times \nabla | \sum_i f_i * e_i(x_i) > \frac{k_{e_i}^2}{4k_x^2}, Q_e = 1$$

$$=< \sum_i f_i * e_i(x_i)| - i\mathbf{r} \times | \sum_i f_i * \nabla e_i(x_i) > \frac{k_{e_i}^2}{4k_x}$$

$$\mu_z =< \sum_i f_i * e_i(x_i)| \sum_i f_i * (-i\partial_\phi e_i(x_i)) > \frac{k_{e_i}^2}{4k_x}$$

Electrons is decoupled, the interaction of electron that causes collapse of the system. Its spin (decoupling) is

$$S_z =< \sum_i \int dx \cdot f_i * \partial e_i(x_i)| - i\partial_\phi | \sum_i \int dx \cdot f_i * \partial e_i(x_i)) > \frac{k_x}{2k_{e_i}}, Q_e = 1$$

$$=< \sum_i f_i * e_i(x_i)| \sum_i f_i * (-i\partial_\phi e_i(x_i)) > k_e/4$$

For a coupling electrons system x

$$F = f * \sum_i \partial e_i, < f|f >= 1$$

Set

$$f = U(\mathbf{r})e^{-iKt}$$

Substitute this into

$$\partial' \cdot \partial A = 0, A = \int dx \cdot F$$

It's solved to

$$f = R_1(k_x r)Y e^{-iKt}, K^2 + k_e^2 + 2k_e KQ/(Q_e) = k_x^2$$

10. Antiparticle and Radiation

The radiation of photon is derive from this reaction

$$e^{ip_1 x} * e_r^+ + e^{ip_2 x} * e_l^- \to e^{ip_3 x} * \gamma_r$$

The emission (of E-M fields), that's the reason to react forward but is not the all energy variation related, is

$$2\varepsilon_e = \frac{1}{3.2 \times 10^{-16} s}$$

this energy marks the intension of electromagnet effect.

The wave of photon

$$e^{i\mathbf{pr}+ikt} * (e_r^+ + e_l^-)$$

has a mechanic field that describes a movement of a mass

$$k_e - k_e = 0$$

The equivalent reaction is like

$$e^{ip_1 x} * e_r^+ \to e^{-ip_2 x} * \overline{e_l^-} + e^{ip_3 x} * \gamma_r$$

$\overline{e_l^-}$ is just the equivalent for the equilibrium after the particle e_l^- is shifted to the other side of the reaction. In fact the shift is a transform of conjugation

$$\overline{e_r^-} = (e_r^-)^*$$

The normal matter is called positive matter and this kind above is called antiparticle conventionally. (this term is different from the one derived by CPT)

Antimatter happens by reversing the world's line, with the same map of the event.

The radiation of neutrino depends the reaction

$$e_r^+ + e_r^- \to \nu_r$$

This reaction is with emission of an energy

$$2\varepsilon_x = \frac{1}{1.6 \times 10^{-8} s}$$

this energy marks the intension of weak effect (of this kind). As a testifying one can have

$$2\varepsilon_e : 2\varepsilon_x = 0.65 \times 10^8$$

This is the difference of the intension between electromagnetic effect and weak effect.

The antiparticle is the particles under the operation PT, comes from the inner-product probabilities. It meets

$$A^{i,j}_{,j} - A^{j,i}_{,j} = -\frac{1}{2}(-iA^*_\nu \cdot \partial^i A^\nu + iA^\nu \cdot \partial^i A^*_\nu), Q_e = 1 \tag{10.1}$$

With the current becomes negative. For example A is antimatter

$$A + P_1 \to P_2$$

The arrow "$\to$" from left to right is the time direction.

$$P_1 \to P_2 + A^*$$

This two formula have the same scene of events. If the movement of particles is drawn the anti-operator is to reverse the world line.

11. Conservation Law and Balance Formula

No matter in E-M fields (the elementary) 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

$$\mu_r^+ : e_{\mu x} * (e_r^+ + \overline{\gamma_r})$$

μ is with mass $3k_e/e_{/\sigma} = 3 \times 64 k_e$, $(k_\mu \approx m_\mu/3)$ spin 1/2, MDM $\mu_B k_e/k_\mu$.

The main channel of decay

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

is with balance formula

$$e_{\mu x} * e_r^+ + e^{-ip_1 x} * e_l^- + e^{-ip_3 x} * \nu_l \to e^{ip_2 x} * \gamma_r + e^{ip_3 x} * \nu_l$$

It's balances approximately unless

$$e_{\mu x} * e_r^+ + e^{-ip_1 x} * e_l^- \to e^{ip_2 x} * \gamma_r$$

The energy gap

$$< e_{\mu x,\nu} * \partial e_r^+ | e^{-ip_1 x} * \partial' e_l^{-\nu} >_4 - < \partial e_{r,\nu}^+ | \partial' e_l^{-\nu} >_4$$

The difference exists in this term

$$=< e_{\mu x,\nu} * \partial_t e_r^+ | e^{-ip_1 x} * \partial_t e_l^{-\nu} >_4 - \frac{k_e^2}{k_\mu^2} < \partial_t (e_{\mu x,\nu} * e_r^+) | \partial_t (e^{-ip_1 x} * e_l^{-\nu}) >_4$$

$$\approx -\frac{2k_e}{k_\mu} < e_{r1}^+ | e_{l1}^- >_4$$

e_{r1}^+ means the first order correction. This interaction is between J_1.

$$= -T \frac{4k_e \varepsilon_x}{k_\mu}$$

It's

$$2\varepsilon_t = \frac{1}{1.6 \times 10^{-6} s} \quad [2.1970 \times 10^{-6} s][1]$$

The data in square bracket is experimental data of the full width.

13. Pion Positive

Pion positive is

$$\pi_r^+ : e_{\pi x} * \overline{e_r^+} + e_{\pi y} * \overline{\gamma_r}$$

It's with mass $3 \times 64 k_e$, spin 1/2 and MDM $\mu_B k_e / k_{\pi^+}$.

Decay Channels:

$$\pi^+ \to \mu_r^- + \overline{\nu_r}$$

It's with balance formula

$$e^{-ip_1 x} * e_{\mu x} * \gamma_r + e^{-ip_3 x} * \nu_r \to e_{\pi x}^* * e_r^+ + + e^{ip_1 x} * e_{\mu x} * e_r^- + e_{\pi y}^* * \gamma_r$$

The emission of energy is weak interaction

$$2\varepsilon_x = \frac{1}{1.6 \times 10^{-8} s} \quad [(2.603 \times 10^{-8} s][1]$$

The referenced data is the full width.

14. Pion Neutral

Pion neutral is atom-like particle

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

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 from static field

$$4\varepsilon_e = \frac{1}{16 \times 10^{-17} s} \quad [8.4 \times 10^{-17} s][1]$$

It's a great difference with lab's data. Maybe the two parts has coupling.

15. tau

τ maybe that

$$\tau^- : 5e_r^+ + 5\overline{e_r^+} + e_l^-$$

Its mass $51 \times 64k_e$, spin 1/2, MDM $50\mu_B/k_\mu$. It has decay mode

$$\tau^- \to \overline{\mu_r^+} + \nu_r + \overline{\nu_r}$$

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

The loss of energy is the difference of the static fields

$$e_{\tau x} * (5e_r^+ + e_l^-) \to (5e_r^+ + e_l^-)$$

Calculating the difference between $X = \tau$ and $X = \delta$ we can find the emission of static E-M fields

$$\Gamma_1 =^\cdot \frac{5\varepsilon_e}{k_\tau/k_e}$$

$$= \frac{1}{2.23 \times 10^{-13}s} \quad [2.9 \times 10^{-13}s, BR.0.17][1]$$

From the shape of momentum distribution I can find many experimental data has a shift of initial velocity of mass center, I judge many resonance states is evaluated with larger mass than the real. With zero initial velocity of mass center the momentum distribution is like the figure 2, with the steep edge crosses grid origin directly.

16. Proton

Proton may be like

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

The mass is $27 \times 64k_e$ 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.

17. Magic Numbers

We define an unit: Mass-number Unite

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

And we presume the Mass-number (in fact relates theoretical electron number) in a particle for the four kinds of electrons are

$$e_r^+ : i, e_r^- : j, e_l^+ : k, e_l^- : l$$

The the designation of a particle is an equation

$$\begin{cases} i^2 + j^2 + k^2 + l^2 = M_{/m} \\ i - j + k - l = Q \\ \pm i \pm j \pm k \pm l = 2S \end{cases}$$

According to Lagrange's four Square theorem, Any integer can be sum of some four square of integers. But after adding the constraints of charge number or spin number the conditions are not so simple as the Lagrange's theorem.

If consider more complicated design like

$$i'e_r^+, \bar{i}\overline{e_l^-}, i' + \bar{i} = i$$

The equations for mass, charge and spin are

$$\begin{cases} i^2+j^2+k^2+l^2=M_{/m} \\ i-j+k-l=Q \\ i+j-k-l=2S \end{cases}$$

18. Weak Fields and Quantization

Because the reaction

$$e_r^+ + e_r^- \to (e_r^+ + e_r^- + ne_l^+ + n\overline{e_l^+})$$

is the cause of weak interaction. the weak particle with the rank n

$$Z_n = (e_r^+ + e_r^- + ne_l^+ + n\overline{e_l^+})$$

In the same way the other weak interaction particle is

$$W_n = (e_r^+ + ne_l^+ + n\overline{e_l^+})$$

Join the interaction

$$e_r^- + W_n \to \nu_r$$

They are easily produced in collision by one step. This reaction is not replacement (quantization) of the E-M fields but coexists with the fields. Quantization of fields is not correct words for this.

From the equation 3.1

$$\partial_\nu\partial^\nu A^\mu = -i(A_\nu^*\partial^\mu A^\nu - A^\nu\partial^\mu A_\nu^*)/4 = j^\mu$$

The decay of Z_n is analyzed. The zero rank correction (only the crossing wave $e^{i(p_1-p_2)x}, e^{-i(p_1-p_2)x}$ is considered) is

$$(\partial_\nu\partial^\nu A_a^\mu)e^{-i(p_1-p_2)x+ik_et} = C_a\frac{2\varepsilon_x}{-k_eQ_e}(p_1+p_2)^\mu/(p_1+p_2)^2/2$$

$$(\partial_\nu\partial^\nu A_b^\mu)e^{-i(p_1-p_2)x-ik_et} = C_b\frac{2\varepsilon_x}{-k_eQ_e}(p_1+p_2)^\mu/(p_1+p_2)^2/2$$

$$A_1 = \int dx\cdot e^{ip_1x} * \partial e_r^+, A_2 = \int dx\cdot e^{ip_2x} * \partial e_l^-$$

$$A^\mu = \int dx\cdot(C_1e^{i(p_1-p_2)x+ik_ex} + C_2e^{i(p_1-p_2)x+ik_ex}) * \partial e_{W_nx} * (e_r^+ + e_l^-)$$

in detailed form

$$A^\mu e^{-i(p_1-p_2)x} = \frac{\varepsilon_x}{-k_eQ_e}(p_1+p_2)^\mu/(p^2-k_{Z_n}^2)$$

Similarly the electromagnetic interaction

$$e_r^+ + e_l^- \to \gamma_r$$

and

$$A^\mu e^{-i(p_1-p_2)x} = \frac{e^2\cdot\varepsilon_e}{-k_eQ_e^3}(p_1+p_2)^\mu/p^2$$

we can verify

$$k_ee_{/\sigma}^3 = \frac{1}{3.4\times10^{-16}s}$$

$$2\varepsilon_e = \frac{1}{3.2\times10^{-16}s}$$

Using this equal parameters the charge of electron can be settled theoretically.

19. Scattering and decay life

Scattering is reverse of decay, two particle interact with middle object carrying force. Foe example

$$F_1 + F_2 \to F \to F_1 + F_2$$

This course can be explained the initial two e interact with the final two e, by current interact. The crossing current is

$$J(F) = (-i(F_i^+ + F_f^+)^* \partial'(F_i^+ + F_f^+) + iF_i^{+*}\partial' F_i^+ + iF_f^{+*}\partial' F_f^+ + cc.)/4$$

$$-(-i(F_i^- + F_f^-)^* \partial'(F_i^- + F_f^-) + iF_i^{-*}\partial' F_i^- + iF_f^{-*}\partial' F_f^{-*} + cc.)/4$$

F_i^+, F_f^+ is potential field of positive matter. F_i^-, F_f^- is potential field of anti-matter. The antimatter has the same crossing current to its positive matter.

$$J(F) = J(\overline{F})$$

The first rank of correction is calculated like

$$\partial_\nu \partial^\nu A_1^\mu = (-i(\int dx \cdot e^{ip_1 x} * \partial F_1)^* \partial'(\int dx \cdot e^{ip_2 x} * \partial F_2) + cc.)/2 = J^\mu$$

$$J^\mu e^{-i(p_1 - p_2)x} = \frac{\varepsilon}{-k_e Q_e}(p_1 + p_2)^\mu$$

ε is one self energy difference of the reaction $F_1 + F_2 \to F$. A_1 is the field of the middle object F.

$$A_1 = (C_1 e^{i(p_1 - p_2)x + ik_e t} + C_2 e^{i(p_1 - p_2)x - ik_e t}) * F$$

A_1 has two effective beams. The second rank of correction is

$$A_1^\mu J'_\mu, J'_\mu = (-i(\int dx \cdot e^{ip_3 x} * \partial F_1)^* \partial(\int dx \cdot e^{ip_4 x} * \partial F_2) + cc.)/2$$

p_3, p_4 is the momenta of the final particles. The energy transferred is

$$2 < J'_\mu | A_1^\mu >$$

The higher rank of correction is creates by re-substitution, and is the similar to Freymann diagram.

In this way we can calculate the decay

$$C \to P_1 + P_2$$

$$J'_\mu A_1^{\mu *} = C_\mu^* \frac{\varepsilon}{-k_e Q_e}(p_1 + p_2)^\mu$$

C is static. In fact J'_μ has two beams.

$$= C_\mu^* \frac{\varepsilon}{-k_e Q_e}(k_1 + k_2)^\mu$$

Setting the propagation of C is e_{Cx}

$$= C_\mu^* \frac{\varepsilon}{-k_e Q_e}(k_C)^\mu$$

It's integrated to

$$\varepsilon$$

The decay width is 2ε. In fact the potential function of particles has been normalized with the mechanical energy value 1

$$< e^{ip_1 x} * P_1 + e^{ip_2 x} * P_2 | i\partial_t | e^{ip_1 x} * P_1 + e^{ip_2 x} * P_2 > \approx < C | i\partial_t | C > = \frac{-k_C}{|k_C|}$$

This formula means many symmetries. The calculated effective $J \cdot P\Delta t$ is the mechanical energy transferred.

20. η

Eta is in fact different particles that have mass number $10m$. Their decay or scattering modes are

- 2γ (mass $8m$)
$$(\nu_r + \nu_l) + (\nu_l + \overline{\nu_l}) \to \gamma_r + \gamma_l$$
- $3\pi^0$
$$(\overline{\gamma_r + \gamma_l} + e + \overline{e}) \to 2\overline{\pi^0} + \pi^0$$
- $\pi^+ + \pi^- + \pi^0$
$$(\overline{\gamma_r + \gamma_l} + e + \overline{e}) \to \pi^+ + \overline{\pi^+} + \overline{\pi^0}$$
- $\pi^+ + \pi^- + \gamma$ (mass $8m$)
$$(\overline{\gamma_r + \gamma_l}) + (\gamma_l + \overline{\gamma_r})$$
$$\to \pi_r^+ + \pi_l^- + \gamma_l$$

All have decay width at the range of times of ε_e. The decay channel of leptons with width of range ε_x is like

$$(2e + 2\overline{e} + \overline{e_r^+ + e_r^-}) \to \overline{e_r^+} + \overline{e_r^-}$$

Its mass is $14m$. This is a weak particle participating weak interaction.

$$\overline{2\gamma_r + \nu_r} \to \overline{\mu_r^+} + \overline{\mu_r^-}$$

Its mass $10m$.

21. Conclusion

The relative theory is applied to electromagnetic wave to give the looking mass of the fields which does expresses mass, for example the solved electron function in this article. In my view point the sum-up of the grains (as electrons) of electromagnetic field is a mechanic movement with diverse effect. Fortunately this model will explain 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 space, this stands for the philosophical with the point of that unified world from unique source. All depend on a simple fact: the gross momentum in a system is time-invariant, and we can devise the E-M momentum to analysis current.

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.

The energy of matter would happen in this process, the hot matter distilled to protons as got cold with their wave functions dependent each others. the harmony between bent space and electromagnetic fields explain them all.

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 precision. 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.

I found these presumptions on some days of 1994-1995 and soon I grossly testify this theory the year. At that time a few people studied in HUST China knew of it. But in the following teen years I nearly forgot of it except now and several years ago a round of submission of it.

References

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