THEORY OF ELECTRON

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ABSTRACT. This article try to unified the four basic forces by Maxwell equations, the only experimental theory. Self-consistent Maxwell equation with the e-current from matter current is proposed, and is solved to four kinds of electrons and the structures of particles. The static properties and decay are reasoned, all meet experimental data. The equation of general relativity sheerly with electromagnetic field is discussed as the base of this theory. In the end the conformation elementarily between this theory and QED and weak theory is discussed.

CONTENTS

1. UNIT DIMENSION OF *sch*

A rebuilding of units and physical dimensions is needed. Time s is fundamental. We can define:
The unit of time: s (second)
The unit of length: cs (c is the velocity of light)
The unit of energy: $\hbar/s$ (h is Plank constant)

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The unit dielectric constant ϵ is

$$[\epsilon] = \frac{[Q]^2}{[E][L]} = \frac{[Q]^2}{\hbar c}$$

The unit of magnetic permeability μ is

$$[\mu] = \frac{[E][T]^2}{[Q]^2[L]} = \frac{\hbar}{c[Q]^2}$$

The unit of Q (charge) is defined as

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

then

$$[Q] = \sqrt{\hbar}$$

$$[H] = [Q]/[L]^2 = [cD] = [E]$$

Then

$$\sqrt{\hbar} : C = (1.0546 \times 10^{-34})^{1/2}$$

C is charge SI unit Coulomb.

For convenience, new base units by unit-free constants are defined,

$$c = 1, \hbar = 1, [Q] = \sqrt{\hbar}$$

then all physical units are power of second s^n, the units are reduced.

Define

$$UnitiveElectricalCharge : \sigma = \sqrt{\hbar}$$

$$\sigma = 1.03 \times 10^{-17} C \approx 64e$$

$$e_{/\sigma} = e/\sigma = 1.57 \times 10^{-2} \approx 1/64$$

The system is redefined and rebuilt as:

$$s \to Cs : 1 = m_e/e =: \beta = 1$$

$s \to Cs$ means the value of the redefined second becomes c seconds. We always use this units system.

2. Self-consistent Electrical-magnetic Fields

Try so-called expanded Maxwell equation for the free E-M field in the previously defined units

$$\partial' \cdot \partial A_\nu = iA^{\mu *}\partial_\nu A_\mu/2 + cc. = J_\nu \tag{2.1}$$

$$\partial_\nu \cdot A^\nu = 0$$

with definition

$$(A^i) := (V, \mathbf{A}), (A_i) := (V, -\mathbf{A})$$

$$(J^i) = (\rho, \mathbf{J}), (J_i) = (\rho, -\mathbf{J})$$

$$\partial := (\partial_i) := (\partial_t, \partial_{x_1}, \partial_{x_2}, \partial_{x_3})$$

$$\partial' := (\partial^i) := (\partial_t, -\partial_{x_1}, -\partial_{x_2}, -\partial_{x_3})$$

$$g_{ij} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{bmatrix}$$

It's deduced by using momentum to express e-current in a electron: the mass and charge have the same movement in electron. The equation 2.1 have symmetry

$$CPT, cc.PT$$

The following is the energy of a piece of field A:

$$\varepsilon := \frac{1}{2}(< E, E > + < H, H >) \tag{2.2}$$

The EM emission for decay is

$$\varepsilon|_{\infty}^{t} = \frac{1}{2}(< V|\partial \cdot \partial'|V > - < \mathbf{A}|\partial \cdot \partial'|\mathbf{A} >)|_{\infty}^{t} \tag{2.3}$$

The time-variant part is neglected, as a convention.

3. Calculation of Recursive Re-substitution

The solution by recursive re-substitution (RRS) for the two sides of the equation is proposed. For the equation

$$\hat{P}'B = \hat{P}B$$

Its algorithm is that (It's approximate, the exact solution needs a rate on the start state in the re-substitution for the normalization condition)

$$\hat{P}'(\sum_{k \le n} B_k + B_{n+1}) = \hat{P} \sum_{k \le n} B_k$$

A function is initially set and is corrected by re-substitution. Here is the initial state

$$V = V_i e^{-ikt}, A_i = V, \partial_\mu \partial^\mu A_i = 0$$

It's substituted into equation 2.1. The fields' correction A_n with n degrees of A_i is called the n degrees correction.

4. Solution

Firstly

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

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

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

We use this term to replace the former. Its solution is

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

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

$$R_l = N j_l(kr)$$

$j_l(r)$ is spherical Bessel function.

$$j_1(r) = \frac{\sin(r)}{r^2} - \frac{\cos r}{r}$$

$$j_1(0) = 0$$

$$\int_0^\infty dr \cdot r^2 j_1(kr) j_1(k'r) = Ck^{-2}\delta(k - k')$$

Define

$$F(x) := N R_1(r) Y_{1,1}(\theta, \varphi)$$

$$F^*(x) * F(x) = \frac{\delta(r)}{4\pi r^2}$$

with consideration

$$\nabla^2(F^*(x) * F(kx)) \tag{4.1}$$

$F^*(x) * F(kx)$ have singularity at grid origin O.

$$F^*(x) * F(x) = \frac{1}{4\pi}\int_I \sin\theta' d\theta' d\varphi' dr' \cdot r'F^*(x') \cdot r'F(x-x')$$

$$\lim_{r'\to\infty} r'F^*(x') \cdot r'F(x-x')$$

$$= C(\theta,\varphi,\theta',\varphi')(\frac{\sin(r')}{r'} - \cos(r'))((1+C')\frac{\sin(r')}{r'} - \cos(r')) + O(r'^{-2})$$

$$k^{3/2}F^*(kx) * k^{3/2}F(kx)$$

$$= \frac{1}{4\pi}\int_I \sin\theta' d\theta' d\varphi' d(kr') \cdot kr'F^*(kx') \cdot kr'F(kx-kx') = \frac{k\delta(kr)}{4\pi k^2 r^2}$$

$\sin(r')/r'$ has fourier transform on variable r'.

Because the function F hasn't Fourier transform, and $< F, F >$ is infinite, the limit of its forms truncated is then considered. It's defined as

$$\Omega_k(x) := NR_1(kx)Y, < \Omega_k(x)|\Omega_k(x) >= 1$$

These set the following valid

$$< \Omega(x)|\nabla|\Omega_k(x) >= \lim_{l\to\infty} < \Omega^l(x)|\nabla|\Omega_k^l(x) >$$

$$\Omega_k^l(x) := \frac{\Omega_k(x)(h(x+l) - h(x-l))}{< \Omega_k(x)(h(x+l) - h(x-l))|\Omega_k(x) >^{1/2}}$$

and also through the limits

$$\nabla(\Omega(x) * \Omega_k(x)) = \lim_{l\to\infty} \nabla(\Omega^l(x) * \Omega_k^l(x)) = (\nabla\Omega(x)) * \Omega_k(x)$$

with the definitions

$$f(t) * g(t) := \int_{-\infty}^{\infty} f(t-t')g(t')dt'$$

$$f(t) *' g(t) := \int_{-\infty}^{\infty} f(t+t')g(t')dt'$$

and so on.

We have the calculation

$$< \nabla\Omega_k * \Omega_1|\nabla\Omega_k * \Omega_1 >=< \nabla\Omega_k * \nabla\Omega_k^*(-x)|\Omega_1^*(-x) * \Omega_1 >$$

$$=< \nabla\Omega_k * \nabla\Omega_k^*(-x)| < \Omega_1|\Omega_1 >>=< (\nabla^2\Omega_k) * \Omega_k^*(-x)| < \Omega_1|\Omega_1 >>$$

The solution of $l = 1, m = 1, Q = e_{/\sigma}$ is calculated or tested for electron,

$$V = NR_1(-k_e r)Y_{1,-1}e^{ik_e t}$$

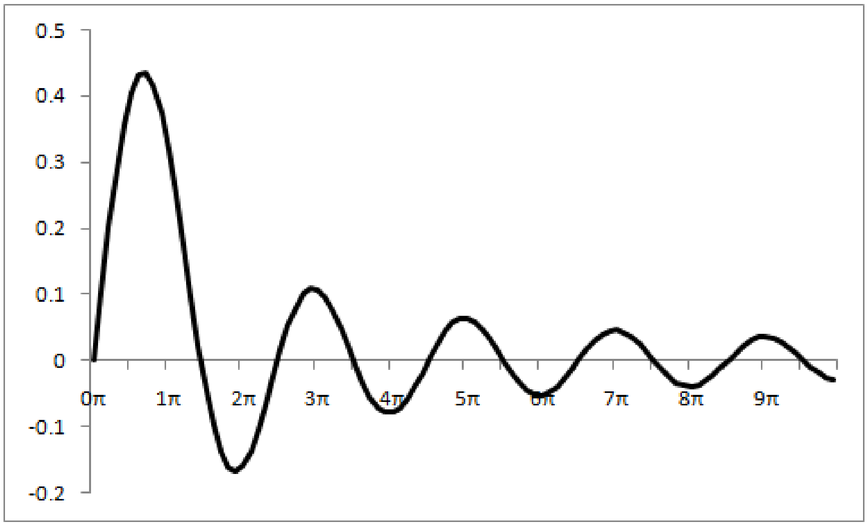

FIGURE 1. The function of j_1

5. Electrons and Their Symmetries

Some states of electrical field A are defined as the core of the electron, which's the start function $A_i = V$ that is electrical, for the RRS to get the whole electron function e:

$$e_r^+ : NR_1(k_e r)Y_{1,1}e^{-ik_e t},$$
$$e_l^+ : NR_1(k_e r)Y_{1,-1}e^{-ik_e t}$$
$$e_r^- : NR_1(-k_e r)Y_{1,-1}e^{ik_e t}$$
$$e_l^- : NR_1(-k_e r)Y_{1,1}e^{ik_e t}$$

and the negative electrons

$$-e_r^+ : -NR_1(k_e r)Y_{1,1}e^{-ik_e t},$$
$$-e_l^+ : -NR_1(k_e r)Y_{1,-1}e^{-ik_e t}$$
$$-e_r^- : -NR_1(-k_e r)Y_{1,-1}e^{ik_e t}$$
$$-e_l^- : -NR_1(-k_e r)Y_{1,1}e^{ik_e t}$$

r, l is the direction of the spin. e_c is the general electron with c differing in charge, spin, and being negative or positive:

$$c = (r, l)(+, -)(p, n)$$

The electron function with charge and mass is normalized, using the equation 2.1

$$| < A^{\mu}_{ic} | i\partial_t | A_{i\mu c} > | = 1, e = 1$$
$$< \nabla A^{\mu}_{ic} | \nabla A_{i\mu c} > = m_e, \sigma = 1$$

Then

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

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

$$\mathbf{r} \times i\partial \cdot \partial' A/4 + cc.$$

$$\mu_z =< A_i^\nu | i\partial_\varphi | A_{i\nu} > /4 + cc.$$

$$= \frac{Q_e}{2m_e}$$

By the discussion in the section 2 the spin is

$$S_z = \mu_z k_e / e = 1/2$$

The correction in RRS of the equation 2.1 is calculated as

$$A_n = A_{n-1} i\partial(A_i - A_i^*)/2 *_4 u \tag{5.1}$$

$$= (A_i^*(i\partial_t A_i)) * u \cdot (i\partial_t(A_i - A_i^*)/2 * u\cdot)^{n-3} i\partial(A_i - A_i^*)/2 * u$$

$$u := \frac{\delta(t-r)}{4\pi r}$$

with

$$(x', t') := (x, t-r), r'^2 = x' \cdot x'$$

$$\partial_x \cdot \partial_x - \partial_t^2 = \partial_{x'} \cdot \partial_{x'}$$

$$\frac{1}{4\pi r} * \frac{1}{4\pi r} = \frac{1}{4\pi r}$$

The first degree term of electron function is corrected with magnetic part

$$A_1^\nu = (\Omega_k(x) e^{-ikt}, -i\nabla\Omega_k(x) e^{-ikt}/k)$$

then

$$< e^\nu | \partial \cdot \partial' | e_\nu >= 0 \tag{5.2}$$

$$\partial_\nu \cdot e^\nu = 0$$

$$\partial_\nu \cdot J_e^\nu = 0$$

These are Lorentz gauge and current constraint.

The function of e_r^+ is decoupled with e_l^+

$$< (e_r^+)^\nu | \partial \cdot \partial' | (e_l^+)_\nu >= 0$$

The following is the increment of field energy ε on the coupling of e_r^+, e_r^- mainly between A_2

$$\varepsilon_e =< (e_r^+)^\nu | \partial \cdot \partial' | (e_r^-)_\nu > \approx -e_{/\sigma}^3 m_e = -\frac{1}{1.66 \times 10^{-16} s}$$

The conditions 2.2, 2.3 is used. The following are the value of increments on the coupling of electrons

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 following is the increment of field energy ε on the coupling of e_r^+, e_l^- mainly between A_4

$$\varepsilon_x =< (e_r^+)^\nu | \partial \cdot \partial' | (e_l^-)_\nu > \approx -\frac{1}{2} e_{/\sigma}^7 m_e = -\frac{1}{1.09 \times 10^{-8} s}$$

The following are the value of increments on the coupling of electrons

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	$+$

We also have

$$< e_p|\partial \cdot \partial'|e'_n >= 0$$

by calculating

$$\begin{aligned} &< e_n + e_p|\partial \cdot \partial'|e_n + e_p > + < e_n - e_p|\partial \cdot \partial'|e_n - e_p > \\ &= \pm(< e_n - e_p|\partial \cdot \partial'|e_n + e_p > + < e_n + e_p|\partial \cdot \partial'|e_n - e_p >) \end{aligned}$$

then

$$< e_p|\partial \cdot \partial'|e_n >= 0$$

similarly use the symmetry between e_p, e'_n to prove the result.

This transform is called *negative transform*

$$f(t) * e_n(t) \to -f(-t) * e_n(-t) \tag{5.3}$$
$$-e_r^+ \to e_l^-$$

6. Propagation and Movement

The propagation is:

$$f *_3 \sum_i e_i$$

The convolution is on space. The particle number normalization is:

$$< f, f >= 1$$

The following are stable propagation:

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

With the condition 5.2, their static mass is zero except the couplings.

The movement of the propagation is called *Movement*, ie. the third level wave:

$$f * \sum f_i * e_{ij}$$

The following coupling system of particle x is calculated

$$A_x = \sum_i e_i = \sum_c n_c e_c$$

It's the initial and start state for RRS

$$A_i = e_x * \sum_i e_i$$

$$e_x := \Omega_{k_x} e^{-ig(t)}, g(t) \in \mathbf{R}$$

h is chosen to obtain:

$$A^*_{i\nu} *'_4 \partial \cdot \partial' A_{i\nu} = 0$$

then

$$g(t) \approx k_x t$$

$$A_i \approx \Omega_{k_x} e^{-ik_x t} *_3 \sum_i e_i$$

The normalization of charge is

$$< A_i^\nu | i\partial_t | A_{i\nu} >= Q_x$$

then

$$k_x \approx m_e n / Q_x, n := m_e \sum_c n_c^2$$

The initial EM energy is

$$\varepsilon_i =< A_i^\nu | \partial \cdot \partial' | A_{i\nu} > /2 \approx m_e n / e_{/\sigma}$$

The initial MDM is

$$\mu_z \approx< A_i^\nu | -(\mathbf{x} + \mathbf{y}) \times i\nabla | A_{i\nu} > /4 + cc. \approx \frac{1}{2|k_x|} \sum_c Q_c n_c^2$$

The main part is generated from the crossing between the second degree correction and the first degree term of the naked electron. And the current moment

$$|\mathbf{L}| \approx | < A_i^\nu | i\nabla | A_{i\nu} > /2 + cc.| \approx |\frac{k_e}{k_x} \sum_c Q_c n_c^2|$$

The main current is generated from the crossing between the second degree correction and the first degree term of the naked electron.

The corrected field A meets the equation 2.1 with

$$A = A_i + \sum_{n=2}^{\infty} A_n$$

We notice that the terms in this equation are all delta functions of space, with electrons and their propagations coupled wholly in grid origin, so that the interaction between the decayed blocks are released suddenly all at once, but this decaying process doesn't appear in the solution.

The following are the second degree correction of the equation 2.1:

$$\partial \cdot \partial' A = A^{\mu *} i\partial A_\mu / 2 + cc. = -I_s - I_{cp} - I_{cn}$$

For the light decay the self-effect is

$$-I_{sc} := (e_x * n_c e_c)^{\nu *} \cdot i\partial (e_x * n_c e_c)_\nu / 2 + cc.$$

$$I_s = \sum_c I_{sc}$$

The following is the crossing effects

$$-I_{cp} := cc.$$

$$+n_{r+p} n_{r-p} (e_x * e_r^+)^{\nu *} \cdot i\partial (e_x * e_r^-)_\nu + n_{l+p} n_{l-p} (e_x * e_l^+)^{\nu *} \cdot i\partial (e_x * e_l^-)_\nu$$

$$+n_{r+p} n_{l-p} (e_x * e_r^+)^{\nu *} \cdot i\partial (e_x * e_l^-)_\nu + n_{l+p} n_{r-p} (e_x * e_l^+)^{\nu *} \cdot i\partial (e_x * e_r^-)_\nu$$

$$-I_{cn} := cc.$$

$$+n_{r+n} n_{r-n} (e_x * (-e_r^+))^{\nu *} \cdot i\partial (e_x * (-e_r^-)_\nu + n_{l+n} n_{l-n} (e_x * (-e_l^+))^{\nu *} \cdot i\partial (e_x * (-e_l^-))_\nu$$

$$+n_{r+n} n_{l-n} (e_x * (-e_r^+))^{\nu *} \cdot i\partial (e_x * (-e_l^-))_\nu + n_{l+n} n_{r-n} (e_x * (-e_l^+))^{\nu *} \cdot i\partial (e_x * (-e_r^-))_\nu$$

It's easy to use the coupling of the currents to calculate the emission of a decay mode. It's similar to calculate of strong interaction.

7. Muon

The core of muon is

$$\mu_r^- : e_\mu * (e_r^- - e_r^+ - e_l^-)$$

With the equation 14.1, μ is approximately with mass $3m_e/e_{/\sigma} = 3 \times 64m_e$ [3.2][1] (The data in bracket is experimental by the referenced lab), spin S_e (electron spin), MDM $\mu_B k_e/k_\mu$.

The main channel of decay is

$$\mu_r^- \to e_r^- - \nu_r, \quad e_r^- \to -e_r^- + \nu_l$$

With the negative transform 5.3 for all negative matter, which keeps EM emission (including momentum and angular momentum and spins sum of electrons) the same.

$$e_\mu * e_r^- + \delta^{1/2}(x + v_2 t) * \nu_r$$
$$\to \delta^{1/2}(x - v_1 t) * e_r^- + e_\mu(-t) * \nu_r$$

The reaction keeps the electrons and their momentum and angular momentum and spins sum of electrons conservative. The main EM emission is

$$\frac{\varepsilon_x m_e}{k_\mu} = -\frac{1}{2.18 \times 10^{-6} s} \quad [2.1970 \times 10^{-6} s][1]$$

Reference to the discussion in the section 6.

8. Pion

The core of pion is

$$\pi_l^+ : e_\pi(\varphi) * (e_r^+ \pm e_l^+) + e_\pi(-\varphi) * e_l^-$$

It's approximately with mass $3 \times 64m_e$ [4.2][1], spin S_e and MDM $\mu_B k_e/k_{\pi^+}$.

Decay Channels:

$$\pi_l^+ \to e_l^+ + \nu_r, \quad e_l^+ \to -e_l^+ + \nu_l$$

The mean life approximately is

$$-\varepsilon_x/2 = \frac{1}{2.2 \times 10^{-8} s} \quad [(2.603 \times 10^{-8} s][1]$$

The precise result is calculated with successive decays.

9. Pion Neutral

The core of pion neutral is like a atom

$$\pi^0 : ((e_r^+ + e_l^+), (e_r^- + e_l^-))$$

It's with mass approximately $4 \times 64m_e$ [4.2][1], zero spin, and zero MDM. It's the main decay mode as

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

The loss of energy is

$$-2\varepsilon_e = \frac{1}{8.3 \times 10^{-17} s} \quad [8.4 \times 10^{-17} s][1]$$

The following particle is similar to π^0

$$(e_x(-\varphi) * (ne_r^+ - n'e_l^-) + e_x * (e_r^+ + e_l^+),$$
$$e_x(-\varphi) * (-ne_l^- + n'e_r^+) + e_x * (e_r^- + e_l^-))$$

10. Tauon

The core of tauon maybe

$$\tau_r^- : e_\tau(-\varphi) * (ne_r^+ - ne_l^-) + e_\tau * (e_r^- - e_l^- - e_l^+)$$

Its mass approximately $53 \times 64 m_e$ [54][1] ($n = 5$), spin S_e and MDM $\mu_B m_e / k_\tau$. It has decay mode with a couple of neutrinos counteracted

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

$$e_\tau * e_r^- + \delta^{1/2}(x + v_2 t) * \gamma_l \to \delta^{1/2}(x - v_1 t) * e_r^- + e_\tau(-t) * \gamma_l$$

The main EM emission is

$$\frac{\varepsilon_e m_e}{k_\tau} = -\frac{1}{5.5 \times 10^{-13} s} \quad [2.91 \times 10^{-13} s; BR. \quad 0.17][1]$$

Perhaps, it's a mixture with distinct coefficients n. The following particle is similar to τ

$$e_\tau(-\varphi) * (-ne_r^+ - e_l^+ - e_l^- + e_r^-) + e_\tau * (ne_l^- - e_r^+ - e_r^- - e_l^+ - e_l^-)$$

11. Proton

The core of proton may be like

$$p_r^- : e_p * (-4e_r^+ - 3e_r^- - 2e_l^-)$$

The mass is $29 \times 64 m_e$ [29][1] that's very close to the real mass. The MDM is calculated as $3\mu_N$, spin is S_e. The proton thus designed is eternal.

12. Neutron

Neutron is the atom of a proton and a electron and a neutrino,

$$n = (p_r^+, -\nu_l, e_l^-)$$

Neutrino circles around proton with

$$m_\nu \omega r^2 = 1$$

The interaction is between their (proton and neutrino) magnetic fields of A_2 (gross current)

$$m_\nu \omega^2 r = -\frac{1}{4\pi} \cdot 3 \cdot 2 \cdot e_\sigma^2 k_e / (m_p r^2)$$

$$m_\nu = -e_{/\sigma}^7 m_e$$

The system's energy emitted by neutrino is approximately

$$\frac{1}{2} \cdot (\frac{6}{4\pi})^2 e_{/\sigma}^{7+2\cdot 2} m_e^3 / (m_p^2 e_{/\sigma}^2) = \frac{1}{673 s}$$

13. Mesons

We can define kinds of energy decreases of decay

interaction	EM	side EM	weak	side weak	strong
abbrevation	L	LS	W	WS	S
emission unit	$-\varepsilon_e$	$-\varepsilon_e m_e/\lvert k_x\rvert$	$-\varepsilon_x$	$-\varepsilon_x m_e/\lvert k_x\rvert$	m_e

We analyze the mesons [1] as the following

name	mass(MeV)	emission	type	ratio	construction
η	547	$1.3keV$	L	–	$\pi^0 - class,$ perhaps
$K^{\pm}$	493	$1.24\times 10^{-8}s$	W	0.88	$e_x(\varphi)*(ne_r^+ - e_l^- + e_l^+)$
					$+e_x(-\varphi)*(-ne_l^- + e_r^-)$
K_S^0	–	$10^{-10}s$	–	–	unclear
K_L^0	–	$5\times 10^{-8}s$	–	–	unclear
D^0	1865	$4100\times 10^{-16}s$	LS	1.5	$((-ne_r^+ + n'e_r^- - e_l^+ - e_l^-)$
B^0	5279	$1.52\times 10^{-12}s$	LS	1	$,(ne_l^- - n'e_l^+ - e_r^+ - e_r^-))$
$D_S^{\pm}$	1968	$5000\times 10^{-16}s$	LS	1.3	$\tau - class$
$D^{\pm}$	1869	$10400\times 10^{-16}s$	LS	0.6	τ
$B_S^{\pm}$	5279	$1.6\times 10^{-12}s$	LS	1	$\tau - class$
Υ	9460	$54keV$	–	–	unclear
J/φ	3096	$93keV$	–	–	unclear
others	–	–	S	–	–

14. Mechanical Quantification

It's the mechanic feature of the electromagnet fields meeting the Maxwell equations as

$$-T_{ij} = F_{i\mu}^* F_j{}^{\mu} - g_{ij} F_{\mu\nu}^* F^{\mu\nu}/4$$

$$T_{ij} = m u_i u_j$$

$$u_i = dx_i/d\tau$$

then

$$-m u_i u_j = (\partial \wedge A_i)^* \cdot (\partial' \wedge A_j) - g_{ij}(\partial \wedge A_k)^* \cdot (\partial' \wedge A^k)/4$$

$$-2m u_i *' u_j = (\partial \wedge A_i)^* *' (\partial' \wedge A_j) - g_{ij}(\partial \wedge A_k)^* *' (\partial' \wedge A^k)/4 + cc.$$

$$= -(\partial \cdot \partial')(A_i^* *' A_j - g_{ij} A_k^* *' A^k/4) + cc.$$

$$2m u_i *' u^j = (\partial \cdot \partial')(A_i^* *' A^j - g_i^j A_k^* *' A^k/4) + cc.$$

hence

$$A^{\nu *} i\partial A_\nu/2 + cc. = C_c m u$$

$C_c = \pm 1$ relates to charge of electron.

The observed mass in mass-center frame is

$$M = \varepsilon \tag{14.1}$$

It's obtained by moving the frame and then the energy is checked.

The decayed part is independent (uncoupled) of the undecayed part in the equation 2.1, hence the part A' meets the same condition

$$\partial' \cdot \partial A'_\nu = A'^{\mu *} i\partial_\nu A'_\mu/2 + cc.$$

In principle, we can solve this equation to find the decay process. For the partial field A'_n with the initial n uncoupled particles decaying to stable state,

$$F_n = 2n\Gamma e^{-C\Gamma t} = F'_n$$

$$F_n := < A'^{\nu}|\partial' \cdot \partial|A'_{\nu} >$$

$$F'_n := < A'^{\nu}|A'^{\mu *} i\partial_{\nu} A'_{\mu}/2 + cc. >$$

The conditions 2.2, 2.3 are used. For some number n and charge Q

$$1 = \int_0^{\infty} dt F_1 = \frac{Q}{\sigma}(\int_0^{\infty} dt F'_1), Q = 1 \tag{14.2}$$

$$1 = \int_0^{\infty} dt F_n = \int_0^{\infty} dt F'_n, \sigma = 1$$

then

$$1 = (\int_0^{\infty} dt F_n)^3 = (\int_0^{\infty} dt F'_n)^2$$

$$1 = n^3(\int_0^{\infty} dt F_1)^3 = n^2(\int_0^{\infty} dt F'_1)^2$$

$$(\int_0^{\infty} dt F_1)^3 = (\int_0^{\infty} dt F'_1)^2$$

$$\frac{Q}{\sigma} = n^{-1/2}$$

They are substituted into the equation 14.2 to lead to

$$n = 1$$

hence

$$1 = \int_0^{\infty} dt < A^{\nu}|\partial \cdot \partial'|A_{\nu} > /2 \tag{14.3}$$

It's the normalization of one decaying particle, and it leads to the result between decay life and EM emission (also the interaction potential):

$$C = 1$$

The distribution shape of decay can be explain as

$$e^{-\Gamma t/2} e_x * \sum_i e_i \approx \Omega_x * \sum_i e_i \cdot e^{-\Gamma t/2 - ik_x t}, 0 < t < \Delta$$

It's the real wave of the particle x near the initial time and expanded in that time span

$$\approx \Omega_x * \sum_i e_i \cdot \int_{-\infty}^{\infty} dk \frac{C e^{-ikt}}{k - k_x - i\Gamma/2}$$

15. Great Unification

The General Theory of Relativity is

$$R_{ij} - \frac{1}{2}Rg_{ij} = -8\pi GT_{ij}/c^4 \tag{15.1}$$

Firstly the unit second is redefined as S to simplify the equation 15.1

$$R_{ij} - \frac{1}{2}Rg_{ij} = -T_{ij}$$

Then

$$R_{ij} - \frac{1}{2}Rg_{ij} = F^*_{i\mu}F_j{}^{\mu} - g_{ij}F^*_{\mu\nu}F^{\mu\nu}/4$$

We observe that the co-variant curvature is

$$R_{ij} = F^*_{i\mu}F_j{}^{\mu} + g_{ij}F^*_{\mu\nu}F^{\mu\nu}/8$$

16. Conclusion

Fortunately, this model explained all the effects in the known world: strong, weak and electromagnetic effects, and even subclassify them further if not being to add new ones. In this model the only field is electromagnetic field, and this stands for the philosophical that the unified world is from an unique source, all that depend on a simple hypothesis: the current of matter in a system can be devised to analysis the e-charge current.

My description of particles is compatible with QED elementarily, and only contributes to it with theory of consonance state in fact. In some way, the electron function is a good promotion for the experimental models of proton and electron that went up very early.

Underlining my calculations a fact is that the electron has the same phase (electron resonance), which the BIG BANG theory would explain, all electrons are generated in the same time and place, the same source.

References

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