MATTER THEORY ON EM FIELD

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ABSTRACT. This article try to unified the four basic forces by Maxwell equations, the only experimental theory. Self-consistent Maxwell equations with the e-current coming from matter current is proposed, and is solved to electrons and the structures of particles and atomic nucleus. 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.

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1. BOUND DIMENSIONS

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)

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The unit of energy: $\hbar/s$ (h is Plank constant)

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

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

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

C is charge's SI unit Coulomb.

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

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

then the units are reduced.

Define

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

$$\sigma=1.027\times 10^{-17}C\approx 64e$$

$$e_{/\sigma}=e/\sigma=1.5602\times 10^{-2}\approx 1/64$$

It's defined that

$$\beta:=m/e=1,\quad m:=m_e$$

Then all units are power σ^n. This unit system is called *bound dimension* or *bound unit*. We always take the definition latter in this article

$$\beta=1,\qquad \sigma=1$$

In this *measure* the unit seems disappear. We always take them as a standard unit, in case of which σ^n are all the same.

Define a *measure* σ/z, $\quad [z]=1$:

$$\sigma=z\qquad \sigma/z=1$$

2. Inner Field of Electron

Try the self-consistent Maxwell equation for the inner electromagnetic (EM) field of electrons

$$\partial^l\partial_l A^\nu=iA^*_\mu\partial_\nu A^\mu/2+cc.=\mu J^\nu\qquad m=1 \tag{2.1}$$

$$\partial^\nu\cdot A_\nu=0$$

with definition

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

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

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

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

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

This equation has the symmetry CPT that transfers electron to its negative.

3. General Electromagnetic Field

We find

$$(x', t') := (x, t - r)$$
$$\partial_x^2 - \partial_t^2 = \partial_{x'}^2 =: \nabla'^2$$

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

$$\varepsilon := \frac{1}{2}(< E, D > + < H, B >) \tag{3.1}$$

The time-variant part is neglected, as a convention for energy calculation. If the field has Fourier transformation then the *field energy* becomes

$$\varepsilon = \frac{1}{2} < A_\nu | \partial_t^2 - \nabla^2 | A^\nu > \tag{3.2}$$

4. Solution of Electron

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 RRS of the equation 2.1. Here is the start state

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

The fields' correction A_n with n degrees of A_i is called the n degrees correction.

Firstly

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

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

$$-k^2 = \nabla^2 = \frac{1}{r^2}\partial_r(r^2 \partial_r) + \frac{1}{r^2 \sin\theta}\partial_\theta(\sin\theta \partial_\theta) + \frac{1}{r^2 \sin^2\theta}(\partial_\varphi)^2$$

Its solution is

$$\Omega_k := \Omega_{klm} = k j_l(kr) Y_{lm}(\theta, \varphi) e^{-ikt}$$
$$\phi_k := k\phi_{klm} e^{-ikt} := k h_l(kr) Y_{lm}(\theta, \varphi) e^{-ikt}$$
$$\omega_k := k j_1(kr) Y_{11}(\theta, \varphi) e^{-ikt}$$

After normalization it's in effect

$$h = \frac{e^{\pm ir}}{r}, \quad j = \frac{\cos r, \sin r}{r}$$

In fact, it has to be re-defined in the *smooth truncation* and in process of limit

$$\Omega^\beta(x) = \frac{\Omega(x) e^{-\beta r}}{< \Omega(x) e^{-\beta r} | \Omega(x) e^{-\beta r} >^{1/2}}, \quad \beta \to 0^+$$

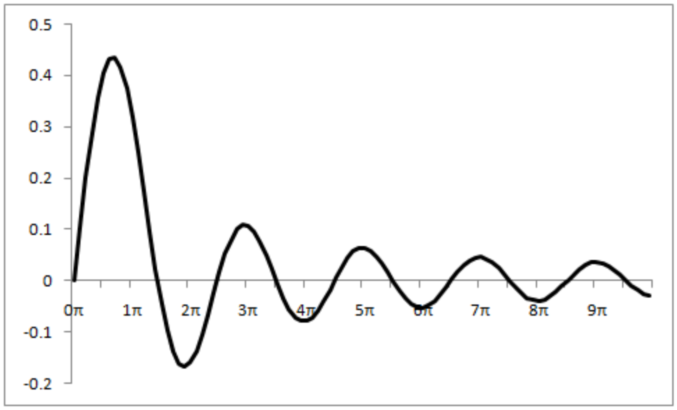

FIGURE 1. The function of j_1

The similar is for ϕ.

We use the following definition

$$\omega_k := n_1(kr)ke^{-ikt} = \sum_{\widehat{\mathbf{k}}} \mathtt{F}(\widehat{\mathbf{k}})e^{i\mathbf{k}x-ikt}, \quad \widehat{\mathbf{k}} = \frac{\mathbf{k}}{|\mathbf{k}|}, \quad |\mathbf{k}| = k$$

$$\sigma < \nabla_\nu \Omega_k(x)|\nabla_\nu \Omega_k(x) >= 1$$

$$\sigma < \nabla_\nu \omega_k(x)|\nabla_\nu \omega_k(x) >= e\delta^3(0)$$

The smooth truncation is applied.

There are calculations:

$$(\partial_t^2 - \nabla^2)u = -\nabla'^2 u = \delta(x')\delta(t') = \delta(x)\delta(t),$$

$$u := \frac{\delta(t-r)}{4\pi r} = \frac{\delta(t')}{4\pi r'},$$

$$\nabla^2 = \sum_{\mathbf{k}} -\mathbf{k}^2 e^{i\mathbf{k}x} *$$

$$\sigma(k\Omega_k(x)| * |k\Omega_k(-x)) = \sigma k^2 \frac{\delta^3(kx)}{\sigma^3\delta^3(0)} \tag{4.1}$$

$$\delta(0) := \delta(\sigma t)|_{t=0}$$

The smooth truncation is concerned.

$$\int_I dx(\Omega(x)^*\Omega(x))^n = (\int_I dx\Omega(x)^*\Omega(x))^n$$

In the frequencies of $\Omega(x) \cdot \Omega(x)$ the zero frequency is with the highest degrees of infinity. This principle is quite extent in fact.

To avoid singularity it's calculated like

$$(e^{ir}| * \nabla^2|e^{ir}) = (\nabla_\nu e^{ir}| * |\nabla_\nu e^{ir})$$

in Fourier space.

It's found that

$$< e^{-\beta r}\frac{e^{i(r+\varphi)}}{r}\sin\theta| * |e^{-\beta r}\frac{e^{i(r+\varphi)}}{r}\sin\theta >$$

$$= - < e^{-\beta r}\frac{e^{i(r-\varphi)}}{r}\sin\theta| * |e^{-\beta r}\frac{e^{i(r-\varphi)}}{r}\sin\theta >$$
$$= - < e^{-\beta r}\frac{e^{i(-r+\varphi)}}{r}\sin\theta| * |e^{-\beta r}\frac{e^{i(-r+\varphi)}}{r}\sin\theta >$$
$$< e^{-\beta r}\frac{\cos r e^{i\varphi}}{r}\sin\theta| * |e^{-\beta r}\frac{\cos r e^{i\varphi}}{r}\sin\theta >$$
$$= - < e^{-\beta r}\frac{\cos r e^{-i\varphi}}{r}\sin\theta| * |e^{-\beta r}\frac{\cos r e^{-i\varphi}}{r}\sin\theta >$$

These also can be proved in Fourier space. The law of conjugation is not well sound:

$$\int_{-T}^{T} h(t)e^{it}dt = \int_{0}^{T} e^{it}dt$$

There is a problem of their forms, we best rely on real function.

5. Electrons

It's the start electron function for the RRS of the equation 2.1:

$$A_i^\nu := i\sigma^{1/2}\lambda\partial^\nu\omega_k(x,t)/\sqrt{2}, \lambda \approx 1$$

Some states are defined as the core of the electron, which's the start function $A_i(x,t)$ for the RRS of the equation 2.1 to get the whole electron function of field A: e

$$e_r^+ : \omega_m(\varphi, t), \quad e_l^- : \omega_m(-\varphi, -t)$$
$$e_l^+ : \omega_m(-\varphi, t), \quad e_r^- : \omega_m(\varphi, -t)$$
$$e_r^+ \to e_l^+ : (x,y,z) \to (x,-y,-z)$$

The electron function is normalized with mass as

$$m_e =< A^\mu|\frac{1}{2}\partial^\nu\partial_\nu|A_\mu > /2 + cc.$$
$$Q_e =< A^\mu|i\partial_t|A_\mu > /2 + cc.$$
$$|k_e| = m_e$$

The MDM of electron is calculated as the second degree proximation

$$\mu_z =< A_{i\nu}| - i\partial_\varphi|A_i^\nu > \cdot\hat{z}/4 + cc.$$
$$= \frac{e}{2m}$$

The spin is

$$S_z = \mu_z k_e/e = \widehat{k_e}/2$$

The correction in RRS of the equation 2.1 is calculated as

$$A - A_i = \frac{(A_i^* \cdot i\partial A_i/2 + cc.) *_4 u}{1 - \cdot i\partial(A_i - A_i^*)/2 *_4 u}$$

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

$$< (e_r^+)^\nu|i\partial_t|(e_l^+)_\nu > /2 + < (e_l^+)^\nu|i\partial_t|(e_r^+)_\nu > /2 + cc. = 0$$

The following is the increment of the energy ε on the coupling of e_r^+, e_r^-, mainly between A_1 and A_3

$$\varepsilon_e =< (e_r^+)^\nu|i\partial_t|(e_r^-)_\nu > /2 + < (e_r^-)^\nu|i\partial_t|(e_r^+)_\nu > /2 + cc. \qquad m = 1$$
$$\approx -2e^3_{/\sigma}m = -\frac{1}{1.66 \times 10^{-16}s}$$

Its algorithm is

$$-\frac{2}{2}\cdot\frac{2\cdot 2^2}{2^2}$$

The following is the increment of the energy ε on the coupling of e_r^+, e_l^-, mainly between A_1 and A_7.

$$\varepsilon_x =< (e_r^+)^\nu|i\partial_t|(e_l^-)_\nu > /2+ < (e_l^-)^\nu|i\partial_t|(e_r^+)_\nu > /2 + cc. \qquad m = 1$$

$$\approx -\frac{1}{2}e^7_{/\sigma}m = -\frac{1}{1.145\times 10^{-8}s}$$

Its algorithm is

$$-\frac{2}{\cdot 4\cdot 4}\cdot\frac{2\cdot 2^7}{2^6}$$

and

$$< \cos^5(r-\phi)|\cos(r+\phi) >, \quad \phi = t-\varphi$$
$$=< \cos(2r)\cos^2\phi(\cos^4 r\cos^4\phi - \sin^4 r\sin^4\phi) >$$
$$= -\frac{1}{4}\cdot\frac{1}{4}\cdot N$$

These calculations of the integral product are applied:

$$\phi = Y_{11}\frac{e^{ir}}{r}, \quad -i\nabla\phi = Y_{11}\frac{e^{ir}}{r}\hat{r} \tag{5.1}$$

Normalization is concerned.

6. System and TSS of Electrons

The movement of electron makes an EM field denoted by A, the unit of which is verified by interactions:

$$A := f *_3 \sum_i e_i = N\sum_X f(X,T)\delta(x-X,t-T) *_4 \sum_i e_i(x,t)|_{T=t} \tag{6.1}$$

with the particle number normalization:

$$< f|f >= 1$$

The following are naked stable particles:

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

The following is the system of particle x with the initial state

$$A_0 := e_x\sum_c e_c, \quad e'_x := e_x^*(-t)$$

$$e_c := \pm e, \quad d := (r,l)$$
$$e_x * -e := e_x(-x,-t) * e(-x,-t)$$
$$\Phi * e_x * -e := \Phi(-x,-t) * e_x(-x,-t) * e(-x,-t)$$

This transfers an incoming wave to an outgoing wave, with which we can shift a particle from the left to the right in the reaction formula, with its meaning (decay energy, charge) unchanged.

e, e_x meet normalization:

$$< e_x * e|e_x * e >= e, \quad < e_x|e_x >= 1 \tag{6.2}$$

The functions e_x, e here aren't using smooth truncation but using the *steep truncation*:

$$(e, e_x)_l = \frac{h_l(e, e_x)}{< h_l(e, e_x)|h_l(e, e_x) >^{1/2}}, \quad l \to \infty, \quad h_l := h(r) - h(r - l)$$

Its static charge is

$$\rho = (e_{xc} * (e_c)^\mu | e_{xc} * i\partial_t (e_c)_\mu)/2 + cc. \tag{6.3}$$

Its wave function of motion (the quantum principle) is

$$J_{ijk} = i\partial_i (e_{xc} * i\partial_j (e_c)_k)$$

Try the action of isolated system:

$$I =< e_{xc} * (e_c)^\mu | \frac{1}{2}\partial_\nu \partial^\nu | e_{xc} * (e_c)_\mu >_4 + < e_{xc} * (e_c)^\mu | i\partial_t | e_{xc} * i\partial_t (e_c)_\mu >_4 + cc.$$

By the border (including time axis) conditions,

$$\delta I = 0$$

$$-\frac{1}{2}\partial_\nu \partial^\nu (e_{xc} * (e_c)_\mu) = i\partial_t (e_{xc} * i\partial_t (e_c)_\mu) \tag{6.4}$$

The initial A_0 is found that

$$(\partial_t^2 - \nabla^2) e_x = 0$$

Because of the normalization (6.2), the singularity is neglected.

$$e_x := k_x \Omega_{k_x}(x)$$

This state A_0 is a (Transient) Steady State (TSS).

With the charge conservation, after all electrons off-couple and become isolated electrons,

$$< e_x * \sum_c (e_c)^\mu | e_x * i\partial_t \sum_c (e_c)_\mu > /2 + cc.$$

$$= \sum_\nu < \phi_{k_\nu} * (e_c)^\mu | \phi_{k_\nu} * i\partial_t (e_c)_\mu > /2 + cc.$$

Make the parities to conserve the charge of electron,

$$P(d_\phi) = P(d_e), \quad P(k_\phi) = P(c)$$

then it's found that

$$|k_x| = |\frac{n_x}{Q_x/e}| \qquad \sigma = 1, \quad n_x :=< \sum_c e_{xc} | \sum_c e_{xc} >$$

It's right at least for proton and muon. $P(d_x)$ is also chosen according to the conservation of charge.

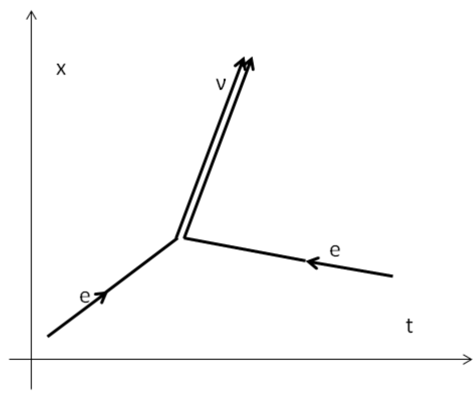

FIGURE 2. neutrino radiation

7. MUON

The initial of muon is

$$\mu^- : e_{\mu l} * (e_l^- - e_r^- - e_l^+), \quad e_\mu = e_x(k_x = -m_\mu)$$

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

The main channel of decay is

$$\mu^- \to e_l^- - \nu_l, \quad e_l^- \to -e_r^+ + \nu_r$$

$$e_\mu * e_l^- - e_\mu * \nu_l \to e_\mu * e_l^- - \phi_k * \nu_l$$

Its main life is

$$\varepsilon_\mu :=< (e_\mu^*(-x,-t) *_4 e_\mu) \cdot ((e_l^+)^{\mu *}(-x,-t) *_4 im\partial_t(e_r^-)_\mu) > |_{t=0} + cc. \qquad m = 1$$

$$= -\frac{m\varepsilon_x}{k_\mu} = -\frac{1}{2.2015 \times 10^{-6}s} \quad [2.1970 \times 10^{-6}s]$$

Smooth truncation is applied.

8. PION

The initial of pion perhaps is

$$\pi^- : e'_\pi * (e_l^+ - e_l^+) + e_\pi * e_r^-$$

It's approximately with EM energy 3σ [4.2][1]. spin S_e, MDM $\mu_B m/k_{\pi^-}$.

Decay Channels:

$$\pi^- \to -e_l^+ + \nu_l, \quad e_l^+ \to -e_r^- + \nu_l$$

The mean life approximately is

$$-\varepsilon_x/2 = \frac{1}{2.3 \times 10^{-8}s} \quad [(2.603 \times 10^{-8}s][1]$$

The precise result is calculated with successive decays.

9. Pion Neutral

The initial of pion neutral is perhaps like an atom

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

It's the main decay mode as

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

The mean life is

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

10. Proton

The initial of proton may be like

$$p^+ : e_{pr} * (4e_l^- - 2e_l^+) + e_{pl} * -3e_r^+, \quad e_p = e_x(k_x = m_p)$$

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

11. Neutron

Neutron is the atom of a proton and a muon

$$n = (p^+, \mu^-)$$

The muon take the first track, with the decay process

$$\Phi * \mu^- = \Phi * e_\mu * (e_l^- - e_r^- - e_l^+) \to \Phi * e_\mu * e_l^- - \nu_l$$

Make some normalization to fit 6.2. Calculate the variation of the action of the open system, the energy of system subtracting the affection,

$$i\partial_t \Phi + \frac{1}{2}\nabla^2 \Phi = -\frac{\alpha}{r}\Phi \qquad m_\mu = 1 \tag{11.1}$$

$$\alpha = \frac{e^2}{4\pi\epsilon\hbar c} \approx 1/137$$

One of the terms of EM energy are neglected, and its domain is cut off O. It's resolved to

$$\Phi = Ne^{-r/r_0}e^{-iE_1 t}$$

$$E_1 = E_B \frac{\sigma^2}{m_\mu^2} \cdot \frac{m_\mu}{m}$$

$$E_B = -13.6eV$$

It's approximately the decay life of muon in the track that

$$\varepsilon_n = -\frac{\sigma^2}{m_\mu^2} \cdot \frac{E_B}{m} e^3_{/\sigma} \varepsilon_x = -\frac{1}{1019s}$$

12. Atomic Nucleus

We can find the equation for the fields of Z' ones of proton: Φ_i, and the fields of n ones of muon: $\phi_j = \Phi_i, i > Z'$:

$$\Phi := \sum_{i:i\le Z'} \Phi_i, \quad \phi := \sum_j \phi_j$$
$$\varphi := \sum_i \Phi_i * (p_i/\mu_i)$$
$$\varphi_\nu := \Phi_\nu * (p_\nu/\mu_\nu), \quad \varphi'_\nu := \Phi_\nu * (p'_\nu/\mu'_\nu)$$
$$p' := e_p * i\partial_t \sum_c e_{pc}, \quad \mu' := e_\mu * i\partial_t \sum_c e_{\mu c}$$

We have

$$I = < \varphi^\mu | \frac{1}{2}\partial^\nu\partial_\nu|\varphi_\mu >_4 /2 - \sum_\nu < \varphi^*_\nu\varphi'_\nu|\frac{\alpha}{r} * |\sum_{i\ne\nu}\varphi^*_i\varphi'_i >_4 /4 + cc.$$

It's using smooth truncation. The second term is calculated like

$$(\Phi| * |\Phi)\delta(x) = (\Phi'| * |\Phi')\delta(x) = \delta(x)$$
$$(\Phi * \mu|\Phi * \mu) = (\Phi * p|\Phi * p)$$
$$(\Phi * \mu|\Phi * \mu') = -(\Phi * p|\Phi * p')$$

Make the variation of this action on Φ_i, ϕ_i

$$\delta I = 0$$

to find

$$\frac{1}{2}\partial_t^2\Phi - ik_p\partial_t\Phi + \frac{1}{2}\nabla^2\Phi = (Z'+2)\frac{\alpha\sigma^4}{r} * \Phi - n\frac{\alpha\sigma^4}{r} * \phi$$
$$\frac{1}{2}\partial_t^2\phi - ik\partial_t\phi + \frac{1}{2}\nabla^2\phi = -Z'\frac{\alpha\sigma^4}{r} * \Phi + (n-2)\frac{\alpha\sigma^4}{r} * \phi$$

If E is known, the second equation is rendered to

$$\frac{1}{2}\partial_t^2\phi - ik_p\partial_t\phi + \frac{1}{2}\nabla^2\phi = -Z'\frac{\alpha\sigma^4}{r} * \Phi + (n-2)\frac{\alpha\sigma^4}{r} * \phi$$

Define

$$\Phi' e^{-iEt} = \Phi$$

In the similar way for ϕ,

$$\zeta = \Phi' + \phi'\eta$$
$$(Z'+2) - \eta Z' = -n/\eta + (n-2) =: N$$
$$\eta = \frac{(Z'-n+4) \pm \sqrt{(Z'-n+4)^2 + 4Z'n}}{2Z'}$$

then

$$-(E^2/2 + Ek_p)\nabla^2\zeta + \frac{1}{2}\nabla^4\zeta + 4\pi\alpha\sigma^4 N\zeta = 0$$
$$\zeta e^{-ikt} = \sum C_{lm}\Omega klm$$

So that the first approximation from $\nabla^2(=-k^2) = -k_p^2$:

$$E = -k_p - \sqrt{8\pi\alpha\sigma^2 N}$$

$$N(Z', n) = \frac{1}{2}(Z' + n - \sqrt{(Z'+n)^2 + 8(Z'-n) + 16}) \tag{12.1}$$

$$\approx -2\chi \qquad \chi := \frac{Z' - n}{Z' + n}$$

$$E \approx -k_p - E_g, \quad E_g =: 10MeV, \quad \chi = 1/3$$

Every single muon or proton has third-level wave

$$\Phi_i = \sum C'_{lm} \Omega klm, \qquad \phi_i = \sum C''_{lm} \Omega klm$$

and they must catch different independent track for protons and in same way for muons, or involve in strong effects.

The equations implies $|k| = |E|$, hence

$$E^4 + E^3 + 8\pi\alpha\sigma^2 N = 0 \qquad k_p = 1$$

12.1. **Decay Energy.** Make some normalization to fit 6.2. The life-involved energy of proton or muon under the solved wave Φ_i is

$$\varepsilon =< \Phi_i * (p,\mu)^l | im\partial_t | \Phi_i * (p,\mu)_l > /2 + cc. \qquad m = 1$$

$$= (1 - \frac{2}{|E|}, \quad 1/3 + \frac{4}{|E|}) e^{11}_{/\sigma}$$

The measure change the calculation a few.

$$\Delta_E \varepsilon = E_\Delta (2, -4) \qquad m = 1$$

$$E_\Delta \approx \frac{1}{4s}, \qquad \Delta E = E_g$$

The decay

$$_{14}C \to {}_{14}N + \mu_C$$

is with zero energy decrease unless the neglected weak crossing is considered.

12.2. **β-stable and Neutron Hide.** In nucleus exists positive strong track-spin (precisely MDM) coupling for per particle.

In the solutions when a proton combine with a muon

$$\Phi_\mu = \phi_\mu$$

then this terms will quit from the interactional terms of the previous equations, which change to

$$(Z'_x, n_x) \to (Z'_x - 1, n_x - 1)$$

This will change the *flag energy* ΔE. If a β-decay can't happen then a dismiss of this *neutron hide* will help. Out of the hidden nucleons ($\geq 2z$), the ratio $2:1 = Z':n$ between protons and muons causes the most stable state. So that if

$$-N(Z' + \max(z) + z, n + \max(z) + z) \leq -N(Z' - z, n)$$

$$\frac{Z + \kappa - h}{3(Z+\kappa) + 2\max(z) + 2z} \leq \frac{Z + \kappa - h - z}{3(Z+\kappa) - z}, \qquad 8h := 3\kappa^2 + 8\kappa - 16 \tag{12.2}$$

then β-decay wouldn't happen for the reversed process can happen. The sign of the coefficient (minus here) of the gross decay energy is also noticed.

It's found a critic point

$$\kappa \approx -8: \quad h \approx 14$$

and

$$Z \approx 29$$

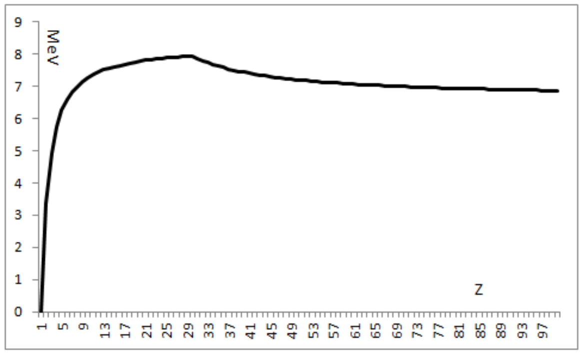

FIGURE 3. $\varepsilon_M(0) - \varepsilon_M(Z)$

hence N of $\max(z) = 0$ is calculated near to $-2/3$ through parameter κ. By the following result 12.3, conditions $\chi = 1/3$ and $\max(z) = 0$ are specific for this critical point, for the other Z or κ, the both of which are incompatible.

The condition 12.2 is solved to

$$2(z + \max(z))z < 2\max(z)(Z + \kappa) - (2\max(z) + z)h$$

hence as

$$\frac{1}{4} < \chi \leq \frac{1}{3}, \quad z \leq \max(z) = ((Z + \kappa) - 1.5h)/2 \tag{12.3}$$

The reaction is very weak.

It's the *Average Binding EM Energy Per Nucleon* according to charge number that

$$\varepsilon_M(Z) = X \cdot \sigma\Delta_0^Z\sqrt{-8\pi\alpha N}$$
$$X = (Z \leq 29) + (Z > 29)\frac{2.0}{2.5 - 10.5/(Z - 8)}$$

$\pm M$ is the EM energy that's gravitational mass by the discussions in the section 14,

$$\pm M^2 \approx p^2 - E^2, \quad E = p + k_x$$

As a result in the case of proton in nucleus

$$M \approx -p$$

Smooth truncation is applied.

13. Basic Results for Interaction

For decay

$$W(t) = \Gamma e^{-\Gamma t} \tag{13.1}$$
$$\Gamma =< A_\nu|im\partial_t|A^\nu >_\infty^{t=0} /2 + cc., \quad m = 1$$
$$\int_0^\infty W(t)dt = 1$$

Γ is massive motive energy. It leads to the result between decay life and the mechanical emission. To prove this result with the condition 2.1, vary the measure from $\sigma = 1$ to set this equation, at last $m = 1$. As varying every unit of atomic term is affected.

The distribution shape of decay can be explain as

$$A_0 e^{-\Gamma t/2 - ik_x t}, 0 < t < \Delta$$

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

$$\approx \sum_k \frac{Ce^{-ikt}}{k - k_x - i\Gamma/2}$$

14. Grand Unification

The General Theory of Relativity is

$$R_{ij} - \frac{1}{2} R g_{ij} = -8\pi G T_{ij}/c^4 \tag{14.1}$$

Firstly the unit second is redefined as S to simplify the equation 14.1

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

Then

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

We observe that the co-variant curvature is

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

15. 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 the hypothesis: in electron the movements of charge and mass are the same.

My description of particles is compatible with QED elementarily and depends on momentum quantification formula, 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 electrons have the same phase (electrons consonance), 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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