

434(1) : Structure of the Energy Equation of n Theory

From UFT 417 the m force is:

$$F_1 = - \frac{1}{2m(r_1)} \frac{dm(r_1)}{dr_1} E_1 \quad - (1)$$

i frame (r_1, ϕ) . In frame (r, ϕ) :

$$F_1 = - \frac{dm(r)}{dr} \left(\frac{m(r)^{1/2}}{2m(r) - r \frac{dm(r)}{dr}} \right) E_1 \quad - (2)$$

where:

$$E_1^2 = m(r) (p_1^2 c^2 + m^2 c^4) \quad - (3)$$

The total energy of n theory is:

$$E_1 = \gamma_1 m(r_1) m c^2 \quad - (4)$$

and its relativistic momentum is:

$$p_1 = \gamma_1 m v_1 \quad - (5)$$

The γ_1 factor of n theory is obtained from

UFT 415 and the infinitesimal line element:

$$c^2 d\tau^2 = m(r) c^2 dt^2 - v^2 dt^2 \quad - (6)$$

$$\text{so } \gamma_1 = \frac{dt}{d\tau} = \left(m(r) - \frac{v^2}{c^2} \right)^{-1/2} \quad - (7)$$

In these equations:

$$v_1^2 = \frac{v^2}{m(r)} \quad - (8)$$

$$\text{so: } \gamma_1 = \left(m(r) - \frac{v_1^2}{m(r) c^2} \right)^{-1/2} \quad - (9)$$

It follows that:

$$P_1^2 = \gamma_1^2 m^2 v^2 \quad - (10)$$

So

$$\begin{aligned} E_1^2 &= \gamma_1^2 m^2 v^2 c^2 + m(r_1) m^2 c^4 \quad - (11) \\ &= \left(\frac{\gamma_1}{\gamma}\right)^2 \gamma^2 m^2 v^2 c^2 + m(r_1) m^2 c^4 \\ &= \left(\frac{\gamma_1}{\gamma}\right)^2 p^2 c^2 + m(r_1) m^2 c^4 \end{aligned}$$

where

$$p = \gamma m v \quad - (12)$$

Here:

$$\frac{\gamma_1}{\gamma} = \left(\frac{1 - \frac{v^2}{c^2}}{1 - \frac{v^2}{c^2}} \right)^{1/2} \quad - (13)$$

In the approximation:

$$m(r) \rightarrow 1 \quad - (14)$$

Eq. (11) becomes:

$$E_1^2 \sim p^2 c^2 + m(r_1) m^2 c^4 \quad - (15)$$

This approximation was used in the previous two papers.

More accurately, Eq. (3) must be used, so the rest energy of any elementary particle is given by:

$$3) \quad m^2 c^4 = \frac{E_1^2}{m(r_1)} - p_1^2 c^2 \quad - (16)$$

Eq. (16) quantizes to give expectation value:

$$m^2 c^4 = \langle m^2 c^4 \rangle = \left\langle \frac{E_1^2}{m(r_1)} \right\rangle - \langle p_1^2 c^2 \rangle \quad - (17)$$

The quantization method used by Dirac was:

$$E = \gamma m c^2, \quad E \psi = i \hbar \frac{\partial \psi}{\partial t} \quad - (18)$$

and

$$p \psi = -i \hbar \nabla \psi, \quad \underline{p} = \gamma m \underline{v}. \quad - (19)$$

However, in m space it is necessary to define the quantization of E_1 and p_1 .

There is no precedent for this procedure, and the simplest choice is:

$$E_1 \psi = i \hbar \frac{\partial \psi}{\partial t} \quad - (20)$$

and

$$p_1 \psi = -i \hbar \nabla \psi \quad - (21)$$

This was the choice used in the previous paper, in the approximation (14). Using the more accurate

eq. (17):

$$\langle m^2 c^4 \rangle = - \hbar^2 \int \psi^* \frac{\partial^2}{\partial t^2} \left(\frac{\psi}{m(r_1)} \right) d\tau - \hbar^2 c^2 \int \psi^* \nabla^2 \psi d\tau \quad - (22)$$

4) The rest energies are given by:

$$\langle m^2 c^4 \rangle = -\hbar^2 \int \psi^* \frac{d^2}{dt^2} \left(\frac{\psi}{m(r_1)} \right) d\tau \quad - (23)$$

However it is possible to postulate a quantization procedure:

$$p_1 \psi = -i\hbar \nabla_1 \psi \quad - (24)$$

which has not been used before in physics.

This gives

$$p_1^2 \psi = -\hbar^2 \nabla_1^2 \psi \quad - (25)$$

where:

$$\nabla_1^2 \psi = \frac{1}{r_1^2} \frac{d}{dr_1} \left(r_1^2 \frac{d\psi}{dr_1} \right) \quad - (26)$$

This can be transformed to $\nabla^2 \psi$ by using:

$$r_1 = \frac{r}{m(r)^{1/2}} \quad - (27)$$

In this case:

$$\langle m^2 c^4 \rangle = -\hbar^2 \int \psi^* \frac{d^2}{dt^2} \left(\frac{\psi}{m(r_1)} \right) d\tau \quad - (28)$$

$$- \hbar^2 c^2 \int \psi^* \nabla_1^2 \psi d\tau$$

and a lot of extra structure and energy levels will appear in $\langle m^2 c^4 \rangle$. These are all particles of the observed elementary particle zoo.