

## Quantum Torsion Field Theory

The Quantum Torsion Field Equation should describe all the characteristics of the spinning moving particle into the space coordinate and temporal determination (in fact all of the particle are spinning). We demonstrate the equation (1) where  $f_1(r,t)$  the Effective Wave Function which is the value of particle into the space-time at instant  $t$  and spherical cords with  $U(r) = -e^2/r$  and total orbital angular magnetic moment  $L^2$  we have :

$$\frac{2m}{\hbar^2} \left( E + \frac{e^2}{r} + \frac{L^2}{2mr^2} \right) f_1(r, t) + \frac{R}{r^2} \frac{\partial^2(r \cdot f_1(r, t))}{\partial r^2} = \frac{1}{v^2} \frac{\partial^2 f_1(r, t)}{\partial t^2} \quad (1)$$

$$\frac{2m}{\hbar^2} \left( E + \frac{e^2}{r} + \frac{l(l+1)\hbar^2}{2mr^2} \right) f_1(r, t) + \frac{R}{r^2} \frac{\partial^2(r \cdot f_1(r, t))}{\partial r^2} = \frac{1}{v^2} \frac{\partial^2 f_1(r, t)}{\partial t^2} \quad (2)$$

Or with  $E = E_0 \cdot E_R$  where Rydberg energy  $E_R$  is:  $E_R = \frac{me^4}{32\pi^2 \epsilon^2 \hbar^2}$  and  $L^2 = l \cdot (l+1) \cdot \hbar^2$  azimuthal magnetic number  $l$  we have:

$$\frac{2m}{\hbar^2} \left( E_0 + \frac{8 \cdot \pi \cdot \epsilon}{r} + \frac{l \cdot (l+1)}{2m \cdot r^2} \right) f_1(r, t) + \frac{R}{r^2} \frac{\partial^2(r \cdot f_1(r, t))}{\partial r^2} = \frac{1}{v^2} \frac{\partial^2 f_1(r, t)}{\partial t^2} \quad (3)$$

Now starting from (1) we have:

$$\frac{2m}{\hbar^2} \left( E + \frac{e^2}{r} + \frac{L^2}{2mr^2} \right) u(t)g(r) + \frac{u(t)R}{r^2} \frac{\partial^2(r \cdot g(r))}{\partial r^2} = \frac{g(r)}{v^2} \frac{\partial^2 u(t)}{\partial t^2} \quad \text{Dividing by } u(t) \cdot g(r) \quad (5)$$

$$\frac{2m}{\hbar^2} \left( E + \frac{e^2}{r} + \frac{L^2}{2mr^2} \right) + \frac{R}{g(r)r^2} \frac{\partial^2(r \cdot g(r))}{\partial r^2} = \frac{1}{u(t) \cdot v^2} \frac{\partial^2 u(t)}{\partial t^2} \quad (6)$$

Equation with separate variables:

$$\frac{1}{u(t) \cdot v^2} \frac{\partial^2 u(t)}{\partial t^2} = k^2 \quad \text{with the solution: } u(t) = \sinh(V \cdot k \cdot t) \quad (7)$$

$$\frac{2m}{\hbar^2} \left( E + \frac{e^2}{r} + \frac{L^2}{2mr^2} \right) + \frac{R}{g(r)r^2} \frac{\partial^2(r \cdot g(r))}{\partial r^2} = k^2 \quad (8)$$

$$\frac{2m}{\hbar^2} \left[ \left( E + \frac{e^2}{r} + \frac{L^2}{2mr^2} \right) - \frac{\hbar^2}{2m} k^2 \right] \cdot g(r) + \frac{R}{r^2} \frac{\partial^2(r \cdot g(r))}{\partial r^2} = 0 \quad (9)$$

Considering electron into the potential field  $U(r) = -\frac{e^2}{r}$  and  $E_{\text{Rydberg}}$  energy  $E_{\text{Rydberg}}$

$$E_R = \frac{me^4}{32\pi^2 \epsilon_0^2 \hbar^2} = 13,6\text{eV or } 2.179 \cdot 10^{-18} \text{ J and } rb = \frac{4\pi \epsilon_0 \hbar^2}{me^2} \quad \text{radius } r_{\text{Bohr}} = 0,529 \text{ Angstrom}$$

$$\frac{2m}{\hbar^2} \left[ \left( E + \frac{e^2}{r} + \frac{L^2}{2mr^2} \right) - \frac{h^2}{2m} k^2 \right] \cdot g(r) + \frac{R}{r^2} \frac{\partial^2(r \cdot g(r))}{\partial r^2} = 0 \quad (10)$$

We demonstrate that for the change of variable  $r = r_b \rho$  and  $h(\rho) = g(r) \frac{2R - r \cdot rb}{2R}$  That for the interval of  $r$  between  $[0, 2R]$  and  $\rho > 0$  for  $r$  and  $\rho$  small the function  $f(r)$  and  $h(\rho)$  are equal and the equation equivalent is in the file OndSLP.mw and the change of variable change also the sign of member depending azimuthal quantum number because the minus into variable change  $(-\rho \cdot rb)$  the equation (9) onducular equation is approximately equal to:

$$\frac{1}{\rho} \frac{d^2}{d\rho^2} (\rho h(\rho)) + \frac{2m}{\hbar^2} \left( E + \frac{e^2}{\rho} \right) h(\rho) \quad (12)$$

This is similar to the Schrodinger without the angular magnetic dependence equation (4) is also equation (19.8) in Feynman's article.

This equation is approximately the Schrodinger equation for the radius small. That is for  $\sim$  Bohr radius there is a linear transformation that for a certain R (a simple combination of constants equal to  $R = 3.566 \cdot 10^{22}$  m) the equation (1) and  $r \ll R$  there is a linear transformation that for the change of variable  $r = r_{\text{Bohr}} \rho$  and  $h(r) = g(\rho) \frac{2R - \rho \cdot rb}{2R}$  That for the interval of r between  $[0, 2R]$  and  $\rho > 0$  for r and  $\rho$  small the function f(r) and h( $\rho$ ) are equal and the equation equivalent is in the file OndSLP.mw and the change of variable change also the sign of member depending azimuthal quantum number because the minus into variable change  $(-\rho \cdot rb)$ ;

$$\frac{1}{\rho} \frac{d^2}{d\rho^2} (\rho h(\rho)) + \frac{2m}{\hbar^2} \left( E + \frac{e^2}{\rho} \right) h(\rho) \quad (4)$$

The Schrodinger without angular magnetic dependence equation (8) is also equation (19.8) in Feynman's article. Thus, the QTFT includes all the classical Schrodinger equation and the calculus of the orbital of the atoms with angular dependence which is for the general solution. Thus equation (1) is a Quantum Torsion Field Equation.

And we have the Feynman formula for the electron of a hydrogen atom (8) we change notation:

$$\frac{1}{\rho} \frac{d^2}{d\rho^2} (\rho g(\rho)) + \frac{2m}{\hbar^2} \left( E + \frac{e^2}{\rho} \right) g(\rho) \quad (11)$$

We try to demonstrate that (10) and (11) are equivalent for a small radius of the stationary state  $t_0$  in the first stage of resolving the equivalence so R is equal to:

$$R = \frac{L^2 \cdot m \cdot e^2 + 4 \cdot \pi \cdot \varepsilon \cdot \hbar^4}{32 \cdot \pi^2 \cdot \varepsilon^2 \cdot \hbar^2} = \frac{rb \cdot \hbar^2 + L^2}{8 \cdot \pi \cdot \varepsilon \cdot rb \cdot \hbar^2}$$

Thus R equal to  $R = 3.566211884 \cdot 10^{22}$  m.

Thus equation (1) is for a massless particle that travels with the speed of light, for electronic neutrino that is for graviton and other neutrino massless particles that travel with the speed of light.:

$$\frac{R}{r^2} \frac{\partial^2 (r \cdot f_1(r, t))}{\partial r^2} = \frac{1}{c^2} \frac{\partial^2 f_1(r, t)}{\partial t^2} \quad (12)$$

Thus, we can notate  $f(r, t) = r \cdot f_1(r, t)$  the equation (4) from the article "GRAVITATIONAL EXPERIMENT AND EQUATION" that is:

$$\frac{R}{r} \frac{\partial^2 (f(r, t))}{\partial r^2} = \frac{1}{c^2} \frac{\partial^2 f(r, t)}{\partial t^2} \quad (13)$$

For photon that is particles that travel with the speed of light we have equation (12) in cylindrical cords, magnetic and light (cylindrical cords), and gravitational (spherical cords) quantic field and for the microscopic world and thus we have Quantic Torsion Field Equation (1) as a general form.

$$eq2 := (1.135135135 \cdot 10^{-20} + 6.014324624 \cdot 10^{-33} r + 7 \cdot 10^{-44} r^2) \cdot g(r) + 2 \frac{d}{dr} g(r) + r \left( \frac{d^2}{dr^2} g(r) \right); \#Onduscular \text{ equation.} \quad (14)$$

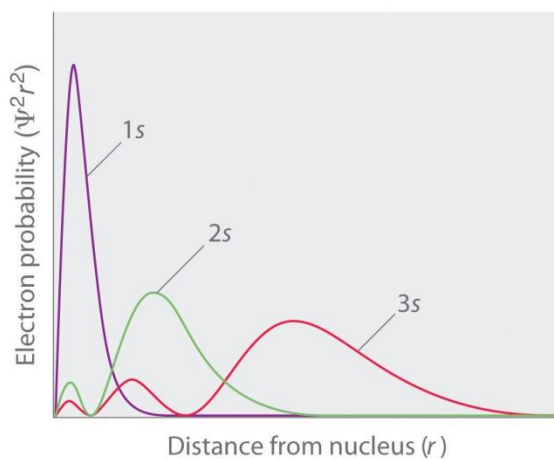
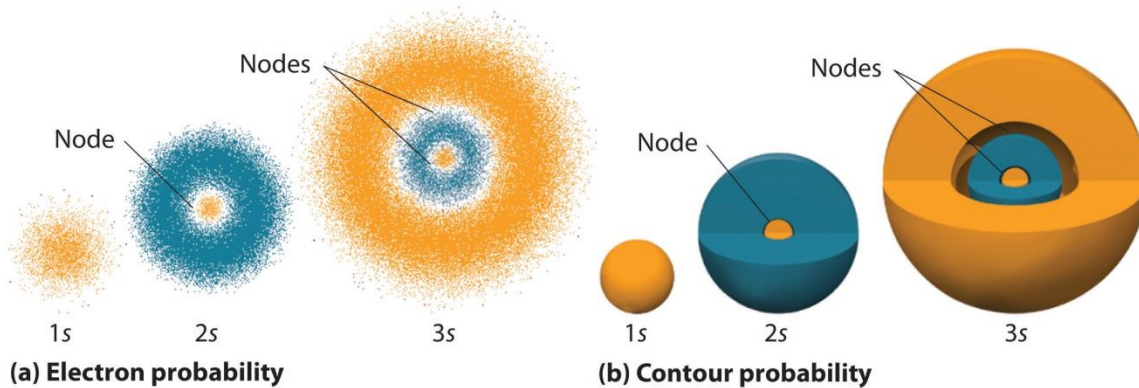
$$eq3 := (1.177720263 \cdot 10^{-20} + 6.014324627 \cdot 10^{-33} r + 2.145571999 \cdot 10^{-75} r^2) \cdot g(r) + 2 \frac{d}{dr} g(r) + r \left( \frac{d^2}{dr^2} g(r) \right); \#Schrodinger \text{ scaled approximation;} \quad (15)$$

As you can see the difference are insignificant for radius Bohr order of  $10^{-64}$  m far less than the precision of  $r_b = 5.29241 \cdot 10^{-11}$  m. Thus the equation (15) and (14) with the true coefficient value are similar.

The electron equation is in file `ElectR.mw`

And the second stage is to demonstrate that equation (16) [which is equation (19.46) in Feynman article] and (3) are equivalent for a small radius of stationary state  $t_0$  and so that onduscular theory includes all the classical Schrodinger equation and the calculus of the orbital of the atoms with angular dependence which is f the or general solution for hydrogen.

$$\frac{1}{\rho} \frac{d^2}{d\rho^2} (\rho g(\rho)) + \frac{2m}{\hbar^2} \left( E + \frac{e^2}{\rho} - \frac{L^2}{2m\rho^2} \right) g(\rho) \quad (16)$$



**(c) Radial probability**