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Special Solution of the Schrödinger Equation: Realizations of the Solution of the Total Schrödinger Equation from the Link between Relativity and Quantum Mechanics

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Abstract

This work is due for the solution of the big problem which is the solution of the Schrödinger equation to have a new model or system that can have other consequences on the whole matter which leads to a resolution of all the quantum problems to link to physics, which makes theories in quantum physics easier to answer on major and complex questions. The solution of the Schrödinger equation is based on the connection between quantum mechanics and relativity. It is a drift of this connection so we have this system is completely solved and gives a great interpretation of all the particles and waves and all macroscopic or microscopic systems e.g. galaxies; the planets; the moons etc. for example, particles, waves, electrons, protons, etc. will be noted.

Keywords: Schrödinger equation; Variable; Wave function; Energy

Nomenclature: ρ: Density; E: Energy of Light, ψ: Wave Function, T_F: Final Time, H: Own Operator, E_V: Volume Energy, C: Speed of Light, D(ψ): Function of the Function Variable of Wave

Commentary

The solution of the Schrödinger equation that we exploit is based on the connection between quantum mechanics and relativity that we already exploit in another subject that gives us a new equation that is a function of the function of It is at this level that we have tried to derive this solution because this link is the basis of all practical solutions and systems. We have tried to calculate the function of the solution which is continuous normal and according to the wave function it allows a global study and localization of the solution to allow passing to other more important and more complex level [1-4].

Relationship building for the model (E_m,E_ρ,E_V)

We have:

$$E = \psi C^2\sqrt{T_F}; m = \frac{E}{C^2\sqrt{T_F}} = \frac{\Psi C^2\sqrt{T_F}}{\sqrt{P}} \times \frac{1}{C^2\sqrt{T_F}} = \frac{\Psi}{\sqrt{P}}$$

And we know that: $m = \frac{\Psi}{\sqrt{\rho}}$

So: $= \frac{\Psi^2}{m^2}; V = \frac{m}{\rho} = \frac{\Psi}{\sqrt{\rho}} = \frac{m^2}{\Psi^2} = \frac{m^2}{\sqrt{\rho}\,\Psi}$

$$m = \frac{\Psi}{\sqrt{\rho}};$$

$$\rho = \frac{\Psi^2}{m^2};$$

$$V = \frac{m^2}{\sqrt{\rho}\,\Psi};$$

- Model design (E_m,E_ρ,E_V):

We have,

$$m = \frac{E}{C^2\sqrt{T_F}} = \frac{\Psi}{\sqrt{\rho}}; \rho = \left(\frac{\Psi c^2}{E}\right)^2 \times T_F = \frac{\Psi^2}{m^2}; V = \frac{E}{c^2\Psi^2\sqrt{T_F}} = \frac{m^2}{\sqrt{\rho}\,\Psi}$$

For E_m we have,

$$\frac{E}{C^2\sqrt{T_F}} = \frac{\Psi}{\sqrt{\rho}}$$

So:

$$E = \frac{\Psi c^2\sqrt{T_F}}{\sqrt{\rho}}$$

$$E_m = \Psi c^2\left(\frac{T_F}{\rho}\right)^{\frac{1}{2}}$$

For E_ρ we have,

$$\left(\frac{\Psi c^2}{E}\right)^2 \times T_F = \frac{\Psi^2}{m^2}$$

So,

$$\frac{\Psi C^4}{E^2} \times T_F = \frac{\Psi^2}{m^2}$$

$$E_\rho = mc^2\sqrt{T_F}$$

So,

$$E_\rho = \frac{\Psi}{\sqrt{\rho}}c^2\sqrt{T_F} = \Psi c^2\left(\frac{T_F}{\rho}\right)^{\frac{1}{2}}$$

$$E_\rho = \Psi c^2\left(\frac{T_F}{\rho}\right)^{\frac{1}{2}}$$

For E_v we have,

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$$V = \frac{E}{c^2\Psi^2\sqrt{T_F}} = \frac{m^2}{\sqrt{\rho}\,\Psi}$$

So: $E = m^2c^2\Psi\left(\frac{T_F}{\rho}\right)^{\frac{1}{2}}$

So: $E_V = m^2c^2\Psi\left(\frac{T_F}{\rho}\right)^{\frac{1}{2}}$

So the 3 final results are:

$$E_m = \Psi c^2\left(\frac{T_F}{\rho}\right)^{\frac{1}{2}};$$

$$E_\rho = \Psi c^2\left(\frac{T_F}{\rho}\right)^{\frac{1}{2}};$$

$$E_V = m^2c^2\Psi\left(\frac{T_F}{\rho}\right)^{\frac{1}{2}};$$

We can deduce that: $E_m = E_\rho = \Psi c^2\left(\frac{T_F}{\rho}\right)^{\frac{1}{2}}$

So we have: $E_V = E_\rho m^2 = E_m m^2$

• These results show that volume-related energy E_V is very large compared to the energy related to the mass energy E_m or density E_ρ which are identical.

We have: $\rho = \frac{\Psi^2}{m^2}$

so: $m^2 = \frac{\Psi^2}{\rho}$

So we will have the new relationship:

$$E_V = m^2c^2\Psi\left(\frac{T_F}{\rho}\right)^{\frac{1}{2}} = \frac{\Psi^3c^2}{\rho}\left(\frac{T_F}{\rho}\right)^{\frac{1}{2}}$$

So: $E_V = \frac{\Psi^3c^2\sqrt{T_F}}{(\rho)^{\frac{3}{2}}}$.

So we have: $E_V = E_\rho m^2 = E_m m^2$

So,

$$E_V = E_\rho\frac{\Psi^2}{\rho} = E_m\frac{\Psi^2}{\rho}$$

So we have the stability of the total matter

$$\rho E_V = E_\rho\Psi^2$$

And we have,

$$\rho E_V = E_m\Psi^2$$

So we have the density of matter is exist in two forms of energy: mass energy and energy density. In a global form of energy, which is the energy density, we have:

$$\rho = \frac{E_\rho\Psi^2}{E_V} = \frac{E_m\Psi^2}{E_V}$$

• This relation is the total stable energy equilibrium relation of matter or of a body; system; universe... that has an energy $E_m;E_\rho;E_V$.

This relationship represents a link between quantum mechanics and relativity.

The final equation of the connection between relativity and quantum mechanics is:

We suppose,

$$E_\rho = E_m = E$$

So we will have,

$$\rho = \frac{E\Psi^2}{E_V}$$

So the final equation is this:

$$E = \frac{\rho E_V}{\Psi^2}$$

From the equation linking relativity and quantum mechanics we have:

$$E = \frac{\rho E_V}{\Psi^2}$$

We have the Schrödinger equation:

$H\Psi=E\Psi$

So we have,

$$E = \frac{\rho E_V}{\Psi^2}$$

So,

$$E\Psi = \frac{\rho E_V}{\Psi}$$

We know that,

$$E\Psi = H\Psi$$

So,

$$E\Psi = H\Psi = \frac{\rho E_V}{\Psi}$$

We know that,

$$\rho = \frac{\Psi^2}{m^2}$$

So,

$$E\Psi = H\Psi = \frac{\Psi E_V}{m^2}$$

So we will have a consequence of

$$E\Psi = H\Psi = \frac{\Psi E_V}{m^2}$$

So the exact solution is,

$$E\Psi = H\Psi = \frac{E_V}{m^2}\Psi$$

Other result,

We know that,

$$E_V = m^2c^2\,\Psi\left(\frac{T_F}{\rho}\right)^{1/2}$$

So,

$$E\Psi = H\Psi = \frac{m^2c^2\Psi^2}{m^2}\left(\frac{T_F}{\rho}\right)^{1/2}$$

So we have,

$$E\Psi = H\Psi = \left[c^2 \left(\frac{T_F}{\rho} \right)^{1/2} \right] \Psi^2$$

We put the function:

$D(\Psi)$: Function of the wave function variable: (Ψ)

We have,

$$E\Psi = H\Psi = \frac{\rho\, E_V}{\Psi} = \frac{\Psi\, E_V}{m^2}$$

So,

$$E\Psi = H\Psi = D(\Psi)$$

With $D(\Psi)$ Function of the wave function variable: (Ψ)

$$D(\Psi) = \frac{\rho E_V}{\Psi} = \frac{\Psi E_V}{m^2}$$

$D(\Psi)$: This is the exact solution of the Schrödinger equation. It is a function of the wave function variable (Ψ) that allows us to simply exploit another horizon in wave and particle physics and physics quantum. This solution is a special solution of the Schrödinger equation in the state and quantum conditions of particles and quanta.

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