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Realization of the Relationship between Quantum Mechanics and Relativity

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Abstract

Relativity and quantum mechanics remain two very binding things and are both separating either by method or by physical experience. In this section we will make an approach to better facilitate a connection between quantum mechanics and relativity that gives us a new vision on the fact that the two concepts can be related theoretically and experimentally to give birth to the new principles in the physical theory and to better improve theoretical and experimental research. The new conception of this principle develops scientific and technical research better.

Keywords: Energy volume; Energy mass; Energy density; Matter; Quantum mechanics; Speed of the light; Mass

Abbreviations: M: The Mass of Matter; v: The Volume; ρ: Density; Ψ: Wave Function; Em: Enery of Mass; Eρ: Energy Density; EV: Energy Volume; c: Speed of Light; TF: Final Time of the Universe

Commentary

In this section we will have the design of a central energy model based on the energy of the light E this model has three forms of energy: the energy of the mass E_m which is based deep on the mass m in relation with the wave function Ψ and the density density energy E_ρ which is based on the density density ρ in relation to the wave function Ψ and the volume energy E_V which is based on the volume V in relation with the wave function Ψ. This approximation gives us access to the last very important paragraph in this research is the relationship between quantum mechanics and relativity.

Realization of the relationship between quantum mechanics and relativity

I) Relationship building for the model (E_m,E_ρ,E_V): We have

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

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

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

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

Model design (E_m,E_ρ,E_V):

We have

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

For E_m we have,

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_r we have

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

So,

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

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

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

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

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

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

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

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

So

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

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

$$E_V \quad E_m$$

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_ρ, E_V. This relationship represents a link between quantum mechanics and relativity [1-5].

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

$$E_\rho = E_m = E$$

So we will have

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

So the final equation is this

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

This equation is the link between relativity and quantum mechanics shows that energy $E = mc^2\sqrt{T_F}$ is linked with the wave function Ψ according to density ρ in a volumic energy present E_V. This result is final for this link.

Physical interpretation of the results exploited: Energy $E = mc^2\sqrt{T_F}$ is an exact correction of the classical light equation: $E=mc^2$; the first equation shows that the photon, the light, the geo matter as the planets the galaxies, the stars the black holes all depend on the spatial time parameter T_F and consequently their energy produced depends on the matter of the mass and the speed of the light produced at the level of this body or this system means that the wave function Ψ is depends on quantum mechanics and e relativity at the same time it's an essential parameter in the equation: $E = \frac{\rho E_V}{\Psi^2}$.

The density ρ and energy E_V represents the complex state of matter that has energy density E_V and a density ρ.

This equation is a proper state of the presence of relativity and quantum mechanics at the same time in any system on the universe or far from the universe.

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