Unification of the physics laws since new theory of the transformations relativistic of micro-world

Efrain Pantaleón Matamoros.

School of Science and Technology,
Federal University of Rio Grande do Norte,
Natal, RN, CEP: 59072-900, Brasil.
epantaleon@ect.ufrn.br

ABSTRACT:

The unification of the laws that govern the physical phenomena, it has been research topic for different scientist generations. These investigations have been accomplished by different methods, but mainly in this century with the application of the quantum mechanics which governs the phenomena of the microworld and tends to assume the laws of the macroworld. The function proposed for the unification of the physical processes, is achieved modifying the interpretation that gives origin to the equation of Einstein-Kolmogorov, extrapolating it from the infinitely small to the infinitely large; making possible the obtainment of a unique function that contains the physical laws, taking into account the parameter existence time for each physical state.

1. Introduction

Currently, the image that is presented of our Universe is of a heap of galaxies that are separated mutually, this means that a long time ago, around $1.5\text{x}10^{11}$ years[1], the matter and energy were concentrated in a single point, that exploted and was expanded. This explosion is known by the name of the **Big Bang**.

Einstein and Kolmogorov worked on the diffusion of a gas in certain (Brownian movement), finding out the function, of puntual source, that corresponds to the particle concentration this function equals $\psi(m,t,m_0,t_0)$; for moment t where m_0 it is the starting point for t_0, what corresponds to the unitary mass, them:

$$\int \psi(m,t,m_0,t_o)d\mathrm{V}_m = 1 \qquad (1)$$

in case $t > t_0$

The initial particles concentration in t_0 equals $\varphi(m)$ and the particles concentration for $t>t_0$ equals $\varphi(m,t)$

$$u(m,t) = \int \psi(m,t,P,t_o)\varphi(P)d\mathrm{V}_p \qquad (2)$$

this equation is valid for $t_0<\theta<t$. This function solves the Einstein-Kolmogorov equation

$$\psi(m,t,m_0,t_0) = \int \psi(m,t,P,\theta)\psi(P,\theta,m_0,t_0)d\mathrm{V} \qquad (3)$$

The solution of this equation satisfies a partial derivatives equation of the parabolic type, which can be generalized to other phenomena.

The fundamental motivation to relate both problems is to generalize an equation conceived for the microworld and to try to extend it to the phenomenon of the Big Bang, similar result should be obtained for both problems due to their characteristics, in both phenomena it is clear that for t_0 these an energy and an initial mass concentration in a point x_0

The principal objective of this paper is to find a function that could explain the phenomenon that gave origin to our Universe, and if possible the one that could generate the physical laws that exist.

2. Model and solution of the equation.

The function (3) satisfies an quasilineal equation of the parabolic type, which contains an equation of the type [2]

$$\frac{\partial\psi}{\partial t} = A\frac{\partial^2\psi}{\partial x^2} - B\frac{\partial\psi}{\partial x} \qquad (4)$$

considering *A=A(x,t)* and *B=B(x,t)* the equation is converted into quasilineal, the solutions of this type of equation are achieved by the method of the finite differences. In this occasion the solution in a analytical way is sought, using as condition that the function contains the laws that govern the of the macro and microworld phenomena and that the relationships are obtained from the Relativity Theory, which would demonstrate that it is an unique function for the solution of the physical phenomena.

2.1 Physical model and mathematics conditions

2.1.1 Denomination:

W: External work.

$\varphi = \varphi(\vec{r}, t)$: Initial State.

$\psi = \psi(\vec{r}, t)$: Final State.

E_0: Kinetic energy of the particles or bodies in the initial state ($E_0 = \frac{1}{2}\sum_k^m m_k \vec{v}_k^2$)

E : Kinetic energy of the particles or bodies in the final state ($E = \frac{1}{2}\sum_k^m m_k \vec{V}_k^2$)

τ: Own existence time of each state.

2.1.2 Model and physics conditions.

1- Every isolated system in thermodynamic equilibrium do not separated of it spontaneously, therefore as a condition for transformation in a physical system (Universe) these must be an external work (If W=0 then ψ=0, if $W \to \infty$ $\psi = \varphi$))

2- Every system or physical state presents an own existence time during which it maintains its properties (If $\tau > t$ macroworld: The transformations occur slowly; if τ=t then ψ=0; if $\tau < t$ microworld: The transformations occur very fast .)

3- Each state is in constant transformation in its own space because its submitted to internal and external forces.

2.2 Solution.

Using the following function as a possible solution

$$\psi = A_0 \exp\left[\frac{i}{\hbar}\left(\vec{P}\cdot\vec{r} - Et\right)\right] \qquad (5)$$

which corresponds to a function that characterizes the flat waves, and is used as the solution of the Schrödinger equation to simulates the electromagnetic waves.

Obtainment of the equation that governs the state in partial derivatives.

Considering:

$$\psi = \varphi_0 \exp\left[\frac{i}{\hbar}\left(\vec{\mathbb{P}}\cdot\vec{r} - Et\right)\right] \qquad (6)$$

derivating with respect to time obtain

$$\frac{\partial\psi}{\partial t} = \frac{i}{\hbar}\psi\left(\frac{\partial\vec{\mathbb{P}}}{\partial t}\cdot\vec{r} - E\right) \qquad (7)$$

derivating with respect to the coordinate one can obtain

$$\frac{\partial\psi}{\partial\vec{r}} = \frac{i}{\hbar}\psi\left(\frac{\partial\vec{\mathbb{P}}}{\partial\vec{r}}\cdot\vec{r} + \vec{\mathbb{P}}\right) \qquad (8)$$

seeking 2nd derivative with respect to $\vec{r}$

$$\frac{\partial^2\psi}{\partial\vec{r}^{\,2}} = \frac{i}{\hbar}\left[\frac{\partial\psi}{\partial\vec{r}}\left(\frac{\partial\vec{\mathbb{P}}}{\partial\vec{r}}\cdot\vec{r} + \vec{\mathbb{P}}\right) + \psi\left(\frac{\partial^2\vec{\mathbb{P}}}{\partial\vec{r}^{\,2}}\cdot\vec{r} + 2\frac{\partial\vec{\mathbb{P}}}{\partial\vec{r}}\right)\right] \qquad (9)$$

having : $A_{11} = \frac{\partial\vec{\mathbb{P}}}{\partial\vec{r}}\cdot\vec{r} + \vec{\mathbb{P}}$, $A_{12} = \frac{\partial^2\vec{\mathbb{P}}}{\partial\vec{r}^{\,2}}\cdot\vec{r} + 2\frac{\partial\vec{\mathbb{P}}}{\partial\vec{r}}$ and $A_{13} = \frac{\partial\vec{\mathbb{P}}}{\partial t}\cdot\vec{r} - E$ to fulfill (4) $\vec{\mathbb{P}} = \vec{\mathbb{P}}(\vec{r}, t)$ then accomplishing mathematical arrangements between the equation (7) and (9) one can write the following equation

$$\frac{\partial\psi}{\partial t} = A_{22}\frac{\partial^2\psi}{\partial\vec{r}^{\,2}} - A_{33}\frac{\partial\psi}{\partial\vec{r}} \qquad (10)$$

$A_{22} = \frac{A_{13}}{A_{12}}$ and $A_{33} = \frac{iA_{11}A_{13}}{\hbar A_{12}}$ quasilineal equation of the parabolic type.

Considering: $\vec{\mathbb{P}} = \frac{iE_0^2\tau}{\left|\sqrt{\tau^2 - t^2}\right| W\vec{v}}$ .where $\vec{v}$ is the particles or bodies speed in the initial state.

If one considers that W depends of $\vec{r}$ and t, derivating $\vec{\mathbb{P}}$ in: $\frac{\partial^2\vec{\mathbb{P}}}{\partial\vec{r}^{\,2}}$, $\frac{\partial\vec{\mathbb{P}}}{\partial\vec{r}}$ and $\frac{\partial\vec{\mathbb{P}}}{\partial t}$

then $A_{11} = \vec{\mathbb{P}}\left(1 - \frac{1}{W}\frac{\partial W}{\partial\vec{r}}\cdot\vec{r}\right)$, $A_{12} = \vec{\mathbb{P}}\left(\frac{1}{W^2}\frac{\partial^2 W}{\partial\vec{r}^{\,2}}(2 - W)\cdot\vec{r} - \frac{2}{W}\frac{\partial W}{\partial\vec{r}}\right)$ and

$A_{13} = \dfrac{\vec{\mathbb{P}}\tau}{\tau^2 - t^2} \cdot \vec{r} - E$. If the coefficients A_{22} and A_{33} are not constant. If $A_{33} \to 0$ and A_{22} is constant then the equation takes the easiest form of heat conduction, phase transformations, etc.

$$\frac{\partial \psi}{\partial t} = A_{22} \frac{\partial^2 \psi}{\partial \vec{r}^2} \qquad (11).$$

2.3 Analysis of the principal function.

2.3.1 Correspondence with condition # 1.

The function fulfills: $W \to 0 \quad \psi(\vec{r}, t) = 0$, $W \to \infty \quad \psi(\vec{r}, t) = \varphi_0(\vec{r}_0, t_0)$

$$\psi = \varphi_0 \exp\left[\frac{i}{\hbar}\left(\frac{iE_0^2 \tau}{\left|\sqrt{\tau^2 - t^2}\right| W\vec{v}} \cdot \vec{r} - Et\right)\right] \qquad (12)$$

2.3.2 Correspondence with condition # 2.

Macroworld: : $\tau >> t$, then $\left|\sqrt{\tau^2 - t^2}\right| \approx \tau$

$$\psi = \varphi_0 \exp\left[-\frac{E_0^2}{\hbar W\vec{v}} \cdot \vec{r}\right] \exp\left[-\frac{i}{\hbar} Et\right] \qquad (13)$$

considering the real part,

$$\psi = \varphi_0 \exp\left[-\frac{E_0^2}{\hbar W\vec{v}} \cdot \vec{r}\right] \cos\left(\frac{Et}{\hbar}\right) \qquad (14)$$

If $\tau = t$, $\psi(\vec{r}, t) = 0$..

Microworld: if $\tau << t$ $\left|\sqrt{\tau^2 - t^2}\right| \approx it$ then

$$\psi = \varphi_0 \exp\left[\frac{i}{\hbar}\left(\frac{E_0^2 \tau}{tW\vec{v}} \cdot \vec{r} - Et\right)\right] \qquad (15)$$

where $\dfrac{E_0^2 \tau}{tW\vec{v}}$ is expressed in $Kgms^{-1}$.

2.3.3 Correspondence with condition # 3.

The function (12) represents the state transitions. According to the model all the states are in constant transformation, and as a consequence takes the form

$$\psi_{j+1} = \varphi_j \prod_{j=0}^{n} \exp\left[\frac{i}{\hbar}\sum_{k=1}^{m}\left(\frac{iE_{kj}^2\tau_j}{\left|\sqrt{\tau_j^2 - t^2}\right| W_j \vec{v}_{kj}} \cdot \vec{r}_j - E_{kj+1}t\right)\right] \qquad (16)$$

where k is the number of particles or the bodies of the state j, this function is correct if a closed system is considered, in case it is open the state overlapping should be considered, and then

$$\psi_{j+1} = \sum_{j=0}^{n} \varphi_j \exp\left[\frac{i}{\hbar}\sum_{k=1}^{m}\left(\frac{iE_{kj}^2\tau_j}{\left|\sqrt{\tau_j^2 - t^2}\right| W_j \vec{v}_{kj}} \cdot \vec{r}_j - E_{kj+1}t\right)\right] \quad (17)$$

the functions (12), (16) and (17) have its practical application in the phase transitions, for all type of material, W represents the temperature or the deformation load to which it is submitted [3].

3. Relationship to other physics laws.

3.1 Deduction of the Newton law.

Departing from function (13) and considering its real part for a body, the relationship: $\cos\left(\frac{Et}{\hbar}\right) = C$, can be considered for $E \to 0$

$$\psi = \varphi_0 C \exp\left[-\frac{E_0^2}{\hbar W \vec{v}} \cdot \vec{r}\right] \qquad (18)$$

knowing that $E_0^2 = \frac{1}{2} E_0 \vec{P} \cdot \vec{v}$ then

$$Ln\left(\frac{\psi}{\varphi_0 C}\right) = -\frac{E_0 \vec{P} \cdot \vec{r}}{2\hbar W} \qquad (19)$$

a) Inducing that $\vec{P} \cdot \vec{r} = I$ (Escalate independent of time)

b) According to the quantum mechanics, for the quasiclasic case [6] Bohr-Somerfield, propose $\int_a^b P \cdot dx = n\pi\hbar$ where for values of a and b $\vec{P} \cdot \vec{r} = n\pi\hbar$ is fulfilled.

For that case $\vec{P} \cdot \vec{r} = constant$ then:

$$Ln\left(\frac{\varphi_0 C}{\psi}\right) = \frac{E_0 C_0}{2W} \qquad (20)$$

considering the external work as $W = \vec{F} \cdot \Delta\vec{r}$ and $\dfrac{C_0}{Ln\left(\dfrac{\varphi_0 C}{\psi}\right)} = C_1$ then

$\vec{F} \cdot \Delta\vec{r} = \frac{1}{2} C_1 E_0$ derivating with respect to time in both members

$$\frac{d}{dt}\left(\vec{F} \cdot \Delta\vec{r}\right) = \frac{d}{dt}\left(\tfrac{1}{2} C_1 E_0\right) \qquad (21)$$

if $\vec{F}$ does not depend of time

$$\vec{F} = C_1 m \frac{d\vec{v}}{dt} \qquad (22).$$

Considering in (20) $W=C_1E_0$, $E=n\hbar\nu$ and $U(r)=e\phi$ where ϕ is the electrical potential and $\dfrac{W}{C_1} = W_1$ then $e\phi=n\hbar\nu-W_1$, which is the **Photoelectric effect law**.

3.2- Deduction of the equation of Schrödinger.

Considering in the function (15) its real part and Eo>W then

$$\psi = \varphi_0 \cos\left[\frac{1}{\hbar}\left(\frac{\tau}{t}\vec{P} \cdot \vec{r} - Et\right)\right] \qquad (23)$$

making mathematics operations the following expression is obtained

$$\frac{\partial^2 \psi}{\partial \vec{r}^{\,2}} = -\frac{\tau^2 \vec{P}^2}{\hbar^2 t^2} \psi \qquad (24)$$

which represents a quasilineal equation for the microworld.

If the function (24) is taken considering $\vec{P} = \mu\vec{v}$, $E_0 = \frac{1}{2}\mu\vec{v}^{\,2}$ and knowing that the electron does not change during the test time, (argument used in the existing theories) then $t=\tau$ and $E=E$o therefore E=$E+U$. Replacing in (24) the equation from Schrödinger is obtained

$$\frac{\partial^2 \psi}{\partial \vec{r}^{\,2}} - \frac{2\mu}{\hbar^2}\left[\mathrm{E} - U(\vec{r})\right]\psi = 0 \qquad (25).$$

This can be demonstrated taking as a starting point the finding of a general equation which contains the Klein-Gordon equation and tends to obtain the Schrödinger equation.

We consider of the function (12) a particle that is not transformed during the measuring time, therefore the function can contain only the energy term in time: $\psi \approx \exp\left[-\left(\dfrac{iEt}{\hbar}\right)\right]$ considering $E = mc^2$ one can obtain:

$$\nabla^2 \psi - \left(\frac{1}{c^2}\right)\partial_{tt}\psi - \left(\frac{m^2c^2}{\hbar^2}\right)\psi = 0 \quad (26)$$

nevertheless the equation can be even more general considering the exposed function in this paper being of the type: $\psi = \varphi(\vec{r},t)\exp\left[\frac{i}{\hbar}\left(\vec{\mathbf{P}}(\vec{r},t) - Et\right)\right]$ consequently $\Phi(\vec{r},t) = \varphi(\vec{r},t)\exp\left[\frac{i}{\hbar}\vec{\mathbf{P}}(\vec{r},t)\right]$ substituting $\psi = \Phi(\vec{r},t)\exp\left[-\left(\frac{iEt}{\hbar}\right)\right]$ in the previous equation (26) one can obtain:

$$\nabla^2\Phi - \frac{1}{c^2}\left[-2i\frac{mc^2}{\hbar}\partial_t - \left(\frac{mc^2}{\hbar}\right)^2 + \partial_{tt}\right]\Phi - \frac{m^2c^2}{\hbar^2}\Phi = 0 \qquad (27)$$

which represents a general equation for Φ considering $\Phi \approx \exp[i(kx - \omega t)]$ where $k = \frac{2\pi}{\lambda}$ and λ is the wavelength. Working in low-frequency solutions where the condition $\omega << \frac{mc^2}{\hbar}$ is fulfilled the term ∂_{tt} in the general equation is made negligible [4] and is obtained the Schrödinger equation for the particle free.

$$i\hbar\partial_t\Phi = -\left(\frac{\hbar^2}{2m}\right)\nabla^2\Phi \qquad (28)$$

the previous demonstration it is clear that the function is also a solution of the Klein-Gordon and Dirac equation.

3.3- Deduction of the theory of the relativity, and relativist correction of the energy.

The Theory of the Relativity does not take into account the existence of structures in the elemental particles. Any extension of the particle in the space, contradicts this theory. At present there are direct experimental results that demonstrate the presence of structures in the particles and there are different procedures elaborated in these studies [7].

Using the function (15), that takes into account different systems, with different times and considering its real part:

$$\psi = \varphi_0 \cos\left[\frac{1}{\hbar}\left(\frac{\tau E_0^2}{tW\bar{v}}\cdot\vec{r} - Et\right)\right] \qquad (29)$$

if the whole state passed to another $\frac{\psi}{\varphi_0} = 1$, cos(z)=1 if z=2nπ then

$$\frac{1}{\hbar}\left(\frac{\tau E_0^2}{tW\vec{v}} \cdot \vec{r} - Et\right) = 2n\pi \qquad (30)$$

knowing that $E_0^2 = \frac{1}{2}\vec{P} \cdot \vec{v} E_0, \quad E_0 = \frac{1}{2} m\vec{v}^2$

$$\frac{mc^2 \vec{P} \cdot \vec{r}\,\tau}{W} = 2n\hbar\pi t + Et^2 \qquad (31)$$

differentiating with the time and considering according to what was established previously $\vec{P} \cdot \vec{r} \approx \hbar$

$$\frac{mc^2 \vec{P} \cdot \vec{r} d\tau}{W} = 2n\hbar\pi dt + 2Etdt \qquad (32)$$

imposing the mass as invariable and $\vec{\mathrm{V}}$ as the final state speed one can obtain:

$$\frac{\hbar d\tau}{W\left(\frac{2n\hbar\pi}{m\vec{v}^2} + \frac{\vec{\mathrm{V}}^2}{\vec{v}^2} t\right)} = dt \qquad (33)$$

according to Bohr-Somerfield $\Delta\vec{P} \cdot \Delta\vec{r} = 2n\pi\hbar, \quad m\vec{v}^2 t = 2n\hbar\pi$

$$\frac{\hbar d\tau}{Wt\left(1 + \frac{\vec{\mathrm{V}}^2}{\vec{v}^2}\right)} = dt \qquad (34)$$

assuming the external work as

$$\vec{F} \cdot \Delta\vec{r} = m\frac{\Delta\vec{v}}{\Delta t} \cdot \Delta\vec{r} \qquad (35)$$

$$\frac{\hbar d\tau}{m\Delta\vec{v} \cdot \Delta\vec{r}\left(1 + \frac{\vec{\mathrm{V}}^2}{\vec{v}^2}\right)} = dt \qquad (36)$$

if the initial state speed is $\vec{v} = c$ then according to [6]:

$$\left(1 + \frac{\vec{\mathrm{V}}^2}{c^2}\right) \approx \sqrt{1 - \frac{\vec{\mathrm{V}}^2}{c^2}} \qquad (37)$$

which is valid, according to the postulate of the relativity about the speed of light, where $\mathrm{c} >>> \vec{\mathrm{V}}$ for all the cases $\beta = \frac{\vec{\mathrm{V}}}{\mathrm{c}} \to 0$ therefore $\lim_{\beta \to 0} \sqrt{1-\beta^2} \approx 1$ or $\lim_{\beta \to 0} \left(1+\beta^2\right) \approx 1$

$$\frac{d\tau}{\sqrt{1-\frac{\vec{\mathrm{V}}^2}{c^2}}}=dt \qquad (38).$$

For the demonstration of the energy equation we will assume that the particle does not change during the measurement time, then $\tau \approx$ t.

From the function (12) the equation (30) is obtained, calculating E_0^2 from (30) for the case of the electron:

$$E_0=\pm\sqrt{2n\pi\hbar\frac{W\vec{v}}{\vec{r}}+Et\frac{W\vec{v}}{\vec{r}}} \qquad (39)$$

$$E_0=\pm\sqrt{\vec{P}\cdot\vec{r}\frac{\vec{F}\cdot\Delta\vec{r}\vec{v}}{\vec{r}}+Et\frac{\vec{F}\cdot\Delta\vec{r}\vec{v}}{\vec{r}}} \qquad (40)$$

taking $\vec{v}=c$, considering the point where is fulfilled: $\Delta\vec{r}=\vec{r}$, $\Delta\vec{v}=c$ and $\Delta t=t$.

Knowing that $E=mc^2$, $\vec{P}\cdot\vec{r}\approx 2n\pi\hbar$ and $W=m\frac{\Delta\vec{v}}{\Delta t}\cdot\Delta\vec{r}$, and grouping terms

$$E_0=\pm\sqrt{c^2P^2+m^2c^4} \qquad (41)$$

$$\mathrm{E_T}=\pm\sqrt{c^2P^2+m^2c^4}+mc^2 \qquad (42)$$

results evident that the kinetic energy presents negative and positive values

4. Summary and discussion.

According to the proposed model, the different stages of our Universe occurred due to the existence of the external work (1st postulate of the thermodynamic), existing for each one an own existence time exposed in the work of Bakulin, Kononóvic and Moroz. The laws known until the moment do not describe the processes for $t=t_0$ where $t_o<10^{-43}$ seconds, and in the era of Planck where emerge the gravitation quantum (gravitons).

With the reported values by [8], [9] one can calculate approximately the existing work during each stages, for different existence or evolution times of the Universe. This can be calculated using the following expression deduced from (36)

$$\tau_j=\int_a^b\left(1+\frac{\vec{\mathrm{V}}_{\mathrm{j+1}}^2}{\vec{v}_j^2}\right)dt \qquad (43)$$

supposing for the era of Planck that the speed of the gravitons is c, i.e., the same for the era of the GUTs inflation and leptons; and taking the speed for the radiation as 0.91c and 0.651c for the era of the matter (proposed in the work of Silverman). To simplify the calculation it of W one can consider the function (18), taking C=1 where $\cos\left(\frac{Et}{\hbar}\right) = \cos(2n\pi)$ and $\vec{P}\cdot\vec{r} \approx \hbar$; extrapolating for all the stages

$$W_j = \frac{E_{kj}}{2\ln\left[\frac{\varphi_j}{\psi_{j+1}}\right]} \qquad (44)$$

where φ_j and ψ_{j+1} represents the densities of the states $E_{kj} = kT_j$, to facilitate the calculation it. For the era of Planck it can be considered that $E_0 = kT_0 = 1.38\text{x}10^9$ J, supposing that the internal energy does not vary in the first seconds of the explosion, the results can be observed in table 1.

Table 1 Principal stages of the evolution of the Universe.

Era	τ(sec.)	t(sec.)	T_0(K)	T_f(K)	φ_j(gcm^{-3})	ψ_{j+1}(gcm^{-3})	W_j(J)
Planck	2x10^{-43}	0	1x10^{32}*	1x10^{32}	1x10^{95}*	1x10^{94}*	3x10^{8}
GUTs	2x10^{-35}	1x10^{-43}	1x10^{32}	1x10^{28}	1x10^{94}	1x10^{78}	2x10^{7}
inflations	2x10^{-5}	1x10^{-35}	1x10^{28}	3x10^{12}	1x10^{78}	1x10^{16}	5x10^{2}
	1.8x10^{-4}	1x10^{-5}	3x10^{12}	1x10^{12}	1x10^{16}	1x10^{14}	4.5x10^{-12}
Leptons	1.8x10^{-3}	1x10^{-4}	1x10^{12}	3x10^{11}	1x10^{14}	1x10^{12}	1.5x10^{-12}
	0.39	1x10^{-3}	3x10^{11}	2x10^{10}	1x10^{12}	1x10^{7}	1.8x10^{-13}
	19.8	0.2	2x10^{10}	1x10^{10}	1x10^{7}	1x10^{4}	2x10^{-14}
Radiation	180	10	1x10^{10}	1x10^{9}	1x10^{4}	1x10^{2}	1.5x10^{-14}
	5.4x10^{13}	1x10^{2}	1x10^{9}	4x10^{3}	1x102	1x10^{-21}	1.3x10^{-16}
Matter	1.8x10^{15}	3x10^{13}	4x10^{3}	30	1x10^{-21}	1x10^{-27}	1x10^{-21}

The values marked by (*) were assumed to facilitate the calculation.

Using function (16) one can calculate the initial dimensions of our Universe considering $t \to 0$:

$$\psi_{j+1} = \lim_{t\to 0} \varphi_j \prod_{j=0}^{n} \exp\left[\frac{i}{\hbar}\sum_{k=1}^{m}\left(\frac{iE_{kj}^2\tau_j}{\left|\sqrt{\tau_j^2 - t^2}\right| W_j \vec{v}_{kj}} \cdot \vec{r}_j - E_{kj+1}t\right)\right] \qquad (45).$$

Accomplishing the mathematical arrangements and considering $\mathfrak{M} = \sum_k^m m_k$ the total mass of the Universe we have:

$$\vec{R}_0 = \frac{4\hbar W_0 \ln\left(\frac{\varphi_0}{\psi}\right)}{\left(2kT_0\right)^{\frac{3}{2}}\sqrt{\mathfrak{M}}} \qquad (46)$$

this function indicates that the dimensions are $\vec{R}_0 \approx \left(\mathfrak{M}\right)^{-\frac{1}{2}} Ln(z)x10^{-36}\mathrm{m}$, which is insignificant, but one observer being out of the Universe system, would observe the polarisation of the vacuum for $t>t_0$, a topic of investigation at present [16].

Using equation (16) again the law of movement of our Universe can be found and that for t being $t>>>\tau$ then $\left|\sqrt{\tau^2 - t^2}\right| = \left|\sqrt{-1\left(t^2 - \tau^2\right)}\right| = i\left|\sqrt{t^2 - \tau^2}\right|$ using the expression of $\vec{\mathbf{P}} \cdot \vec{r} = \mathbf{P}r\cos\vartheta$ and assuming for simplification $\cos\vartheta = 1$, from the expression (45)

$$r_k = \frac{\left|\sqrt{t^2 - \tau^2}\right|}{E_k^2 \tau} W_k v_k \left(2n\pi\hbar + E_{k+1}t\right) \qquad (47)$$

one can find the life time of our universe if a relationship as $\frac{dr}{dt} = 0$ is obtained:

$$t^2 + \frac{n\pi\hbar}{E_{k+1}} t - \frac{1}{2}\tau^2 = 0 \qquad (48)$$

considering $t = \gamma\tau$ one can obtain $t = \frac{2n\pi\hbar\gamma^2}{E_{k+1}\left(1-2\gamma^2\right)}$ and $t = 0$ from where is deduced that for time being always positive the condition fulfilled $1-2\gamma^2 \geq 0$ should be having that for this work $\gamma = \frac{\vec{v}^2}{\vec{v}^2 + \vec{\mathrm{V}}^2}$ then from the inequality is obtained that the speed of the initial state (V) must fulfill $\mathrm{V} \geq 0.2v$ so that the transformation occurs, substituting the value of time in the expression that denotes the dimensions of the universe then:

$$r = 4n\pi\hbar \frac{W}{PE_0}\left[\left(\left|\sqrt{\gamma^2 - 1}\right|\right)\frac{1-\gamma^2}{1-2\gamma^2}\right] \qquad (49)$$

where for $\mathrm{V} = 0$, $r \to \infty$ from the previous expression is also possible to deduce the undetermination equations of Heisenberg, those which gave origin to the quantum mechanics.

The equations of the General Theory of the Relativity can be written as [15]:

$$R_{\mu\nu}^{(GR)} = -2k\left(T_{\mu\nu} - \frac{1}{2} g_{\mu\nu} T\right) - \Lambda g_{\mu\nu} \qquad (50)$$

Making use of the following expression

$$r = \frac{\left|\sqrt{t^2 - \tau^2}\right|}{E_0^2 \tau} Wv(2n\pi\hbar + Et) \qquad (51)$$

and considering $t = \gamma\tau$ then $\frac{\left|\sqrt{t^2 - \tau^2}\right|}{\tau} = \left|\sqrt{\gamma^2 - 1}\right|$ making $Et = 2n\pi\hbar F(\gamma)$ and r^2:

$$r^2 = 16 n^2 \pi^2 \hbar^2 \frac{W^2 v^2}{E_0^4} \left(\left|\gamma^2 - 1\right|\right) f^2(\gamma) \qquad (52)$$

where $f^2(\gamma) = [1 + F(\gamma)]^2$ pass to a four-dimensional space of the Minkowski type where is valid that: $r^2 = c^2 t^2 - r_\alpha^2$, $v^2 = \gamma^2 u_\alpha^2 + c^2$ where r_α is the 4-vector of position and u_α of speed then one can obtain:

$$r_\alpha^2 = c^2 t^2 - 16 n^2 \pi^2 \hbar^2 \frac{W^2}{E_0^4} \left(\left|\gamma^2 - 1\right|\right) f^2(\gamma) \left(\gamma^2 u_\alpha^2 + c^2\right) \qquad (53)$$

it is fulfilled that $u_\alpha^2 = -c^2$, multiplying the second term by $\frac{t^2}{t^2}$ and applying again an expression of the type $E_0 t \approx 2n\pi\hbar F(\gamma *)$,

$$r_\alpha^2 = c^2 t^2 + 4 \frac{W^2}{E_0^2} \left(\gamma^2 - 1\right)^2 \frac{f^2(\gamma)}{F^2(\gamma *)} c^2 t^2 \qquad (54)$$

therefore as $c^2 t^2 =$ invariant, $R_{\beta\beta}^{(GR)} = c^2 t^2$, $a_{\alpha\mu} a_{\alpha\nu} = g_{\mu\nu}$ y $a_{\beta\mu} a_{\beta\nu} = g_{\mu\nu}$

$$\mathbb{R}_{\mu\nu}^{(\mathrm{GU})} = R_{\mu\nu}^{(GR)} + 4 \frac{W^2}{E_0^2} \left(\gamma^2 - 1\right)^2 \frac{f^2(\gamma)}{F^2(\gamma *)} R_{\mu\nu}^{(GR)} \qquad (55)$$

$\mathbb{R}_{\mu\nu}^{(GU)} = R_{\mu\nu}^{(GR)}$, then $\gamma^2 - 1 = 0$ and this is fulfilled if $\beta^2 \to 0$ consequently $c >> \mathrm{V}$, that is the postulate of the Relativity Theory.

From this function it can be induced that the expansion or compression of our Universe is given by the kinetic energy of the bodies. To simplify the expression it can be described in the following form:

$$\vec{r}_j = C_1\left(W_j, E_{kj}, \tau_j, \vec{v}_{kj}\right) t + C_2\left(W_j, E_{kj}, \tau_j, \vec{v}_{kj}, E_{kj+1}\right) t^2 \qquad (56)$$

if $E_{kj+1} t = 2n\pi\hbar$ then

$$\vec{r}_j = C_1\left(W_j, E_{kj}, \tau_j, \vec{v}_{kj}\right)t \qquad (57).$$

Figure 1 shows the law of movement from t=0sec(R(0)=3,12x10-^{32}m) to t=1x10^{15}sec(R(t)= 3,51x10^{21}m) era of the radiation, considering the reported values in table 1 and using (47).

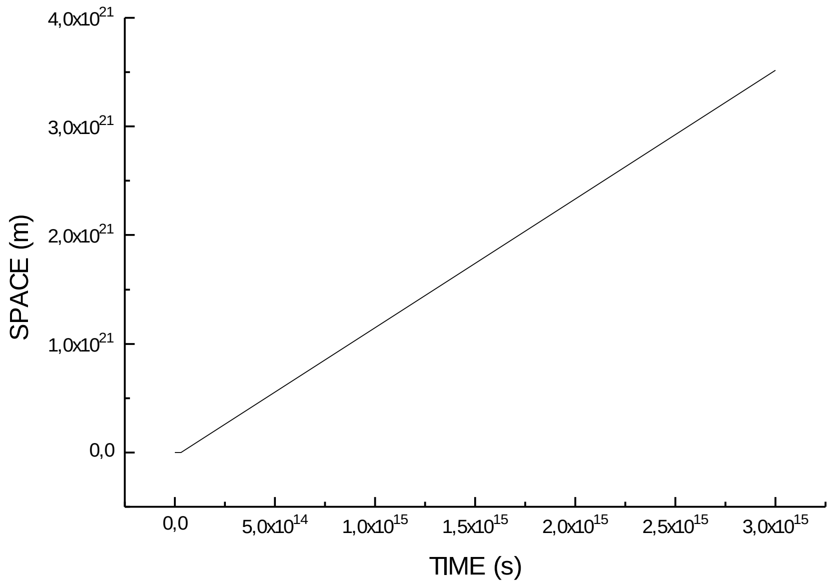

Figure 1. Evolution of the Universe

The function (47) can be used to obtain the initial density of our Universe, calculating the radio for t=0 sec, and knowing an estimate as exact as possible of the total mass. Accomplishing mathematical arrangements and knowing the real space, the time elapsed from its origin can also be calculated.

Considering $t >>> \tau$ for all t then making $t \to 0$ in (47) is obtained

$$\vec{P} \cdot \vec{r} \approx 2n\pi\hbar\left(\frac{W_j}{E_{kj}}\right) \qquad (58)$$

hence it can be induced that $\Delta\vec{P} \cdot \Delta\vec{r} \geq \frac{\hbar}{2}$, Heisenberg´s equations that permit us to say that the laws that govern the microworld, do not take in consideration the term $2n\pi\left(\frac{W_j}{E_{kj}}\right)$, that it denotes the interactions of the particles with external agents as the devises used in quantum mechanics measurements or vacuum polarizations[3].

5. Conclusions.

The functions proposed, does not correspond to a wave. They are state functions, that tend to unify the known physical laws. The model and the induced expressions do not contradict the practical results, due to the fact that they contain the equations that govern these results, and for its deduction have not been created new concepts. The functions proposed can be deduced (be induced) starting from other phenomena, in which the arriving forces for the transformations of a physical state, be internal energy and the external work. The state functions permit deduce the interactions between states of the matter that they can be transformed one into another if the initial and final parameters of each state are known.

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