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Research paper

Dark matter, deep space frequencies and new era of space communication

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Abstract

Dark matter is the cosmological link that stayed universe to multiuniverse. All universal parameters directly or indirectly show that the dark matter is the universe hidden energy or soul. We have no confusion about the existence of Dark matter. As it is the universe linker we can make a communication through it. May be higher intelligence out of universe(Alien) are working on it as every time we are receiving unidentified signal from outer space. Previous paper had shown that how the dark matter is established and expanded on the universe. This paper is showing about deep space frequencies, energy distribution with quantum fluctuation and dark matter communication. And at last is discussed for making a quantum mechanical signal for long distance like galaxy to galaxy communication. By dark matter communication we can make stronger of our deep space communication that can lead of our future space communication.

Keywords: *Dark matter; Dark wave; Dark mass; Deep Space frequencies; Space Communication.*

1. Introduction

There is strong evidence for the existence of dark matter based on various astrophysical observations. These include galaxy rotation curves, gravitational lensing, cosmic microwave background radiation, and large-scale structure formation in the universe. Dark matter interacts primarily through gravity, exerting gravitational forces on visible matter (like galaxies) and influencing their motion and distribution on large scales. Understanding dark matter is crucial for comprehending the large-scale structure of the universe, galaxy formation, and the evolution of cosmic structures.

Albert Einstein was the first person proved that empty space is not nothing. Space has amazing properties, many of which are just beginning to be understood.

And also the dark energy is the Supreme hidden energy which is growing and expending along the long horizon of our universe. Though it cannot be touched or detected but must be feel on quantum level. Dark energy is more stronger than the ether hypothesis. So we can do high deep space communication through it.

2. Dark matter frequencies

Now have to find how dark energy is arranged through the universe We got the dark mass equation at previous research paper that

$$=B\frac{<\varepsilon>}{u}\frac{P_x^3}{h^3}[\Psi_c(x,t)]$$

Where B=black mass =8.3265*10 −33J Three dimensional dark matter oscillations

$$F_x= -k_{\varepsilon_1}\varepsilon_1= - B\frac{<\varepsilon>}{u}\frac{P_x^3}{h^3}[\Psi_c(x,t)]\ \omega_{\varepsilon_1}^2\varepsilon_1$$

$$F_y= -k_{\varepsilon_2}\varepsilon_2=-B\frac{<\varepsilon>}{u}\frac{P_x^3}{h^3}[\Psi_c(x,t)]\omega_{\varepsilon_2}^2\varepsilon_2$$

$$F_z= -k_{\varepsilon_3}\varepsilon_3=-B\frac{<\varepsilon>}{u}\frac{P_x^3}{h^3}[\Psi_c(x,t)]\omega_{\varepsilon_3}^2\varepsilon_3$$

Along the x,y,z components of the displacements $\vec{r}$ from the origin .Hance k_{ε_1},k_{ε_2},k_{ε_3} are the force constant and $\omega^2_{\varepsilon_1}$, $\omega^2_{\varepsilon_2}$,$\omega^2_{\varepsilon_3}$ are the regular frequencies along x-axis respectively .Such a system is called a three dimensional harmonic oscillation.

$F_x= -\frac{\partial v}{\partial x}$,$F_y=-\frac{\partial v}{\partial y}$ and $F_z= -\frac{\partial v}{\partial z}$

Where v is the potential energy of oscillation

$V(x,y,z) =\frac{1}{2}(k_{\varepsilon_1}\varepsilon_1^2 + k_{\varepsilon_2}\varepsilon_2^2+-k_{\varepsilon_3}\epsilon_3^2)$

Now using time dependent three dimensional Schrödinger equation –

$$\frac{\hbar^2}{2m}\Delta^2\Psi(x,t)+\frac{1}{2}(k_{\varepsilon_1}\varepsilon_1^2 + k_{\varepsilon_2}\varepsilon_2^2+-k_{\varepsilon_3}\epsilon_3^2)\,\Psi(x,t) = E\,\Psi(x,t)$$

$$\frac{d^2}{d\varepsilon_1^2}\Psi(x,t)+\frac{d^2}{d\varepsilon_2^2}\Psi(x,t)+\frac{d^2}{d\varepsilon_3^2}\Psi(x,t)+[\gamma-(\alpha^2{}_{\varepsilon_1}\varepsilon_1^2 + \alpha^2{}_{\varepsilon_2}\varepsilon_2^2+\alpha^2{}_{\varepsilon_3}\varepsilon_3^2)]\,\Psi(x,t)=0 \quad (1)$$

$$\gamma = \frac{2mE}{\hbar^2},\ \alpha_{\varepsilon_1}=\sqrt{\frac{mk_{\varepsilon_1}}{\hbar^2}},\ \alpha_{\varepsilon_2}=\sqrt{\frac{mk_{\varepsilon_2}}{\hbar^2}},\ \alpha_{\varepsilon_3}=\sqrt{\frac{mk_{\varepsilon_3}}{\hbar^2}}$$

This equation can be solved by the method separation of variables ,let us try with the solution,

$$\Psi(x,t) = \varepsilon_1(\varepsilon_1)\ \varepsilon_2(\varepsilon_2)\varepsilon_3(\varepsilon_3) \quad (2)$$

Using equation 1and 2 we get

$$\varepsilon_1\varepsilon_2\frac{d^2\varepsilon_3}{d\varepsilon_3^2}+\varepsilon_2\varepsilon_3\frac{d^2\varepsilon_1}{d\varepsilon_1^2}+\varepsilon_1\varepsilon_3\frac{d^2\varepsilon_2}{d\varepsilon_2^2}+[\gamma-(\alpha^2{}_{\varepsilon_1}\varepsilon_1^2 + \alpha^2{}_{\varepsilon_2}\varepsilon_2^2+\alpha^2{}_{\varepsilon_3}\varepsilon_3^2)]\varepsilon_1\varepsilon_2\varepsilon_3=0 \quad (3)$$

Dividing by $\varepsilon_1\varepsilon_2\varepsilon_3$ we get,

$$\frac{1}{\varepsilon_3}\frac{d^2\varepsilon_3}{d\varepsilon_3^2}+\frac{1}{\varepsilon_1}\frac{d^2\varepsilon_1}{d\varepsilon_1^2}+\frac{1}{\varepsilon_2}\frac{d^2\varepsilon_2}{d\varepsilon_2^2}+[\gamma-(\alpha^2{}_{\varepsilon_1}\varepsilon_1^2 + \alpha^2{}_{\varepsilon_2}\varepsilon_2^2+\alpha^2{}_{\varepsilon_3}\varepsilon_3^2)] = 0$$

$$[\frac{1}{\varepsilon_1}\frac{d^2\varepsilon_1}{d\varepsilon_1^2}-\alpha^2{}_{\varepsilon_1}\varepsilon_1^2]+[\frac{1}{\varepsilon_2}\frac{d^2\varepsilon_2}{d\varepsilon_2^2}-\alpha^2{}_{\varepsilon_2}\varepsilon_2^2]+[\frac{1}{\varepsilon_3}\frac{d^2\varepsilon_3}{d\varepsilon_3^2}-\alpha^2{}_{\varepsilon_3}\varepsilon_3^2)]+\gamma=0 \quad (4)$$

In this above equation, each term of left side is equal to zero

$$[\frac{1}{\varepsilon_1}\frac{d^2\varepsilon_1}{d\varepsilon_1^2}-\alpha^2{}_{\varepsilon_1}\varepsilon_1^2]+\gamma_{\varepsilon_1}=0 \quad (5)$$

$$[\frac{1}{\varepsilon_2}\frac{d^2\varepsilon_2}{d\varepsilon_2^2}-\alpha^2{}_{\varepsilon_2}\varepsilon_2^2]+\gamma_{\varepsilon_2}=0 \quad (6)$$

$$[\frac{1}{\varepsilon_3}\frac{d^2\varepsilon_3}{d\varepsilon_3^2}+\alpha^2{}_{\varepsilon_3}\varepsilon_3^2] + \gamma_{\varepsilon_3}=0 \quad (7)$$

Or

$$\frac{d^2\varepsilon_1}{d\varepsilon_1^2}+(\gamma_{\varepsilon_1} - \alpha^2{}_{\varepsilon_1}\varepsilon_1^2)\varepsilon_1=0 \quad (8)$$

$$\frac{d^2\varepsilon_2}{d\varepsilon_2^2}+(\gamma_{\varepsilon_2} - \alpha^2{}_{\varepsilon_2}\varepsilon_2^2)\varepsilon_2=0 \quad (9)$$

$$\frac{d^2\varepsilon_3}{d\varepsilon_3^2}+(\gamma_{\varepsilon_3} - \alpha^2{}_{\varepsilon_3}\varepsilon_3^2)\varepsilon_3=0 \quad (10)$$

Comparing with Schrödinger three dimensional wave equation, the energy Eigen value and Eigen function will be

$$E_{\varepsilon_1}= (n_{\varepsilon_1}+\frac{1}{2})\hbar\omega_{\varepsilon_1}=0 \quad (11)$$

$$E_{\varepsilon_2}= (n_{\varepsilon_2}+\frac{1}{2})\hbar\omega_{\varepsilon_2}=0 \quad (12)$$

$$E_{\varepsilon_3}= (n_{\varepsilon_3}+\frac{1}{2})\hbar\omega_{\varepsilon_3}=0 \quad (13)$$

Where (n_{ε_1}, n_{ε_2},n_{ε_3}) are the integer and n_{ε_1}, n_{ε_2},$n_{\varepsilon_3} = (1,2,3, \ldots)$

$$\varepsilon_1(\varepsilon_1)=N_{n_{\varepsilon_1}}e^{-\frac{\alpha^2_{\varepsilon_1}\varepsilon_1^2}{2}}.H\ n_{\varepsilon_1}(\sqrt{\alpha_{\varepsilon_1}\varepsilon_1}) \quad (14)$$

$$\varepsilon_2(\varepsilon_2)=N_{n_{\varepsilon_2}} e^{-\frac{\alpha_{\varepsilon_2}^2 \varepsilon_2^2}{2}}.H\ n_{\varepsilon_2}(\sqrt{\alpha_{\varepsilon_2}\varepsilon_2}) \quad (15)$$

$$\varepsilon_3(\varepsilon_3)=N_{n_{\varepsilon_3}} e^{-\frac{\alpha_{\varepsilon_3}^2 \varepsilon_3^2}{2}}.H\ n_{\varepsilon_3}(\sqrt{\alpha_{\varepsilon_3}\varepsilon_3}) \quad (16)$$

So the complete dark matter waveform is

$$\Psi(x,t)=N_{n_{\varepsilon_1}}N_{n_{\varepsilon_2}}N_{n_{\varepsilon_3}}\ \exp[-\tfrac{1}{2}(\alpha_{\varepsilon_1}^2\varepsilon_1^2+\alpha_{\varepsilon_2}^2\varepsilon_2^2+\alpha_{\varepsilon_3}^2\varepsilon_3^2)]\ H\ n_{\varepsilon_1}(\sqrt{\alpha_{\varepsilon_1}\varepsilon_1})\ H\ n_{\varepsilon_2}(\sqrt{\alpha_{\varepsilon_2}\varepsilon_2})\ .H\ n_{\varepsilon_3}(\sqrt{\alpha_{\varepsilon_3}\varepsilon_3}) \quad (17)$$

Where $N_{n_{\varepsilon_1}}N_{n_{\varepsilon_2}}N_{n_{\varepsilon_3}}$

$$N_{n_{\varepsilon_1}}N_{n_{\varepsilon_2}}N_{n_{\varepsilon_3}}=[\ \frac{\sqrt{\alpha_{\varepsilon_1}\alpha_{\varepsilon_2}\alpha_{\varepsilon_3}}}{\pi^{(\frac{3}{2})}2^{(n_{\varepsilon_1}+n_{\varepsilon_2}+n_{\varepsilon_3})}n_{\varepsilon_1}!n_{\varepsilon_2}n_{\varepsilon_3}!}]^{\frac{1}{2}} \quad (18)$$

And Dark Energy oscillation

$$E_{n_{\varepsilon_1}}E_{n_{\varepsilon_2}}E_{n_{\varepsilon_3}}=\hbar[(n_{\varepsilon_1}+\tfrac{1}{2})\omega_{\varepsilon_1}+[(n_{\varepsilon_2}+\tfrac{1}{2})\omega_{\varepsilon_2}+[(n_{\varepsilon_3}+\tfrac{1}{2})\omega_{\varepsilon_3} \quad (19)$$

For the isotropic oscillation $\hbar_{\varepsilon_1}=\omega_{\varepsilon_2}=\omega_{\varepsilon_3}=\omega$ and $\alpha_{\varepsilon_1}=\alpha_{\varepsilon_2}=\alpha_{\varepsilon_3}$

$$E_{total}\ =E_{n_{\varepsilon_1}n_{\varepsilon_2}n_{\varepsilon_3}}=[n_{\varepsilon_1}+n_{\varepsilon_2}+n_{\varepsilon_3}+\tfrac{3}{2}]\hbar\omega \quad (20)$$

Dark mater holds energy mass density that makes a network by dark mater energy-mass curve density in space-time.
So the continuity equation with space time

$$E_v^{ut}=\frac{\delta E^t}{\delta t}+\frac{\delta E^x}{\delta t}+\frac{\delta E^y}{\delta t}+\frac{\delta E^z}{\delta t} \quad (21)$$

$$=\frac{\delta E^t}{\delta t}+\Delta E^i \quad (22)$$

So the dark mater space-time density in a normal unit,

$$\rho=\frac{m}{v}=\frac{m_d}{E_v^{ut}} \quad .(23)$$

3. Dark energy distribution and quantum fluctuation

As dark matter-energy has the weak interaction on field and deeply related the local space-time curvature.
The Einstein's equation is given by

$$G_v^\mu=R_v^\mu-\tfrac{1}{2}\delta_v^\mu R=8\pi G T_v^\mu \quad (24,i)$$

Where, T_v^μ is the energy-momentum tensor of Universe. Einstein tensor, R_v^μ is the Ricci tensor, R is the Ricci scalar, G_v^μ is the Einstein tensor.
perfect fluid to be the source of T_v^μ ,

$$T_v^\mu=(\rho+p)U^\mu U^v+Pg_v^\mu \quad (24.ii)$$

Here $U^\mu U^v$ is the four-velocity of the fluid, P is the isotropic pressure and ρ *is* the energy densities. Now using dark matter energy densities and get the equation

$$T_v^\mu=(\frac{m_d}{E_v^{ut}}+p)U^\mu U^v+Pg_v^\mu \quad (24.iii)$$

Where V is the dark matter mass and E_v^{ut} is the dark mater energy volume.
Other components of the Ricci tensor are given by

$$R_{\mu v}=\frac{\delta\Gamma_{\mu v}^\gamma}{\delta x^\gamma}-=\frac{\delta\Gamma_{\mu\gamma}^\gamma}{\delta x^v}+\Gamma_{\gamma\lambda}^\gamma\Gamma_{\mu v}^\lambda-\Gamma_{v\gamma}^\gamma\Gamma_{\gamma v}^\lambda \quad (24.iv)$$

Where $\Gamma_{\gamma v}^\alpha$ is called the Christoffel symbol or affine connection and is given by

$$\Gamma_{\gamma v}^\alpha=\tfrac{1}{2}g^{\alpha\beta}(\delta_\mu g_{\beta v}+\delta_v g_{\mu\beta}-\delta_\beta g_{\mu v}) \quad (24.v)$$

The Ricci scalars are constructed as R = $g^{\alpha\beta}R_{\mu v}$
Ricci tensors (and also Ricci scalars) are directly related to Einstein's equation
The components of the Ricci tensor and the
Ricci scalar are written as follows

$R_o^o = \frac{3\ddot{a}}{a(t)}(t)$ (24.vi)

$R_j^i = (\frac{\ddot{a}}{a} + \frac{2\dot{a}}{a^2} + \frac{2k}{a^2})\delta_j^i$ (24.vii)

$R = 6(\frac{\ddot{a}}{a} + \frac{\dot{a}}{a^2} + \frac{k}{a^2})$ (24.viii)

So universe is considered as the ideal perfect fluid of space-time that is expanded as a perfect space-time fluid .The dark matter energy momentum tensor of universe will be.

$T_v^\mu = \frac{m_d}{E_v^{ut}} \dots$ ….(24.ix)

So the final equation,

$\frac{3\ddot{a}}{a} - 3(\frac{\ddot{a}}{a} + \frac{\dot{a}^2}{a^2} + \frac{k}{a^2}) = 8\pi G \frac{m_d}{E_v^{ut}}$ (25)

Or,

$(\frac{\dot{a}}{a})^2 = \frac{8\pi G}{3}\frac{m_d}{E_v^{ut}} - \frac{k}{a^2}$ (26)

For the equation (24.i) we get final pressure gradient of space-time.

For μ = i,ν = j,

We get $R_j^i - \frac{1}{2}\delta_j^i = 8\pi G\delta_j^i$

Substituting R_j^i , R from above equation with $T_j^i = p\delta_j^i$

$(\frac{\ddot{a}}{a} + 2\frac{\dot{a}^2}{a^2} + \frac{2k}{a^2})\delta_j^i - 3(\frac{\ddot{a}}{a} + \frac{\dot{a}^2}{a^2} + \frac{K}{a^2}) = 8\pi G p\delta_j^i$

Or

$2\frac{\ddot{a}}{a} - (\frac{\dot{a}}{a})^2 - \frac{k}{a^2} = 8\pi Gp$

Or

$2\frac{\ddot{a}}{a} = 8\pi Gp + (\frac{\dot{a}}{a})^2 + \frac{k}{a^2}$

Putting the value of from the equation

$2\frac{\ddot{a}}{a} = 8\pi Gp + \frac{8\pi G}{3}\frac{m_d}{E_v^{ut}} - \frac{k}{a^2} + \frac{k}{a^2}$

Or

$2\frac{\ddot{a}}{a} = 8\pi G\,(p + \frac{1}{3}\frac{m_d}{E_v^{ut}})$ (27)

Or

$\frac{\ddot{a}}{a} = 4\pi G\,(p + \frac{1}{3}\frac{m_d}{E_v^{ut}})$ (28)

We know the basic equation for acceleration and angular frequency is that

$a = -\omega^2$ x

Comparing with above equation we get ,

ω^2 x $= 4\pi G\,(p + \frac{1}{3}\frac{m_d}{E_v^{ut}})$ (29)

$X = (p + \frac{1}{3}\frac{m_d}{E_v^{ut}})$ (30)

This equation is implies the dark matter distribution on space-time

And

ω^2 =4πG (31)

Which is deep space frequencies and responsible for dark energy distribution and quantum fluctuation on space-time.

Hubble constant for dark matter and relation between dark matter expansions,

H=$\frac{\dot{a}t}{at}$

Or

H=$\frac{\ddot{a}}{a}$ -$\frac{\dot{a^2}}{a^2}$

=4πG (p+$\frac{1}{3}\frac{m_d}{E_v^{ut}}$)-$\frac{8\pi G}{3}\frac{m_d}{E_v^{ut}}$-$\frac{k}{a^2}$ (32)

= -4πG ($\frac{m_d}{E_v^{ut}} + p$) +$\frac{k}{a^2}$ (33)

4. Dark matter-energy fluctuations on seven dimension space time

If we want to understand the real mystery of our universe, we must have to think about our seven dimensional space and seven dimensional dark matter-energy fluctuations.
Now we are assuming that the seven dimensional coordination and dark energy fluctuations are ($\varepsilon_1\varepsilon_{2,}\varepsilon_3\varepsilon_{4,}\varepsilon_5\varepsilon_{6,}$).
Which is indicates the time projection of component on seven dimensional energy quantum fields which is stayed with electromagnetic field
We know that all the energy is distributed by Maxwell's field equation.
Where

Curl B=$\nabla \times (B_{\varepsilon_{1,}\varepsilon_2},\ldots\ldots{}_{\varepsilon_6})$= j+$\frac{\partial}{\partial t}(E_{\varepsilon_{1,}\varepsilon_2},\ldots\ldots{}_{\varepsilon_6})$

And

Curl=$\nabla \times (E_{\varepsilon_{1,}\varepsilon_2},\ldots\ldots{}_{\varepsilon_6})$= j+$\frac{\partial}{\partial t}(B_{\varepsilon_{1,}\varepsilon_2},\ldots\ldots{}_{\varepsilon_6})$

Div B= $\nabla.B$=0 Div E= $\nabla.E$=ρ

Matrix that shows dark matter energy fluctuations in different field.

$$\begin{bmatrix} 0 & -\varepsilon_1 & -\varepsilon_2 & -\varepsilon_3 & 0 & \varepsilon_5 & -\varepsilon_6 & -\varepsilon_7 \\ \varepsilon_1 & 0 & -\varepsilon_3 & \varepsilon_2 & -\varepsilon_5 & 0 & \varepsilon_7 & -\varepsilon_6 \\ \varepsilon_2 & \varepsilon_3 & 0 & -\varepsilon_1 & -\varepsilon_6 & -\varepsilon_7 & 0 & \varepsilon_5 \\ \varepsilon_3 & -\varepsilon_2 & \varepsilon_1 & 0 & -\varepsilon_7 & \varepsilon_6 & \varepsilon_5 & 0 \\ 0 & \varepsilon_5 & \varepsilon_6 & \varepsilon_7 & 0 & \varepsilon_1 & -\varepsilon_2 & -\varepsilon_3 \\ \varepsilon_5 & 0 & \varepsilon_7 & \varepsilon_6 & \varepsilon_1 & 0 & -\varepsilon_3 & -\varepsilon_2 \\ \varepsilon_6 & \varepsilon_7 & 0 & \varepsilon_5 & \varepsilon_2 & \varepsilon_3 & 0 & \varepsilon_1 \\ \varepsilon_7 & \varepsilon_6 & \varepsilon_5 & 0 & \varepsilon_3 & \varepsilon_2 & -\varepsilon_1 & 0 \end{bmatrix}$$

=($\rho, -j_{\varepsilon_1\varepsilon_2}, -j_{\varepsilon_3\varepsilon_4}, -j_{\varepsilon_5\varepsilon_6}, \rho, -j_{\varepsilon_1\varepsilon_2}, -j_{\varepsilon_3\varepsilon_4} -j_{\varepsilon_5\varepsilon_6})^T$ (34)

That is equivalent of Maxell's equation.

Or

$-\nabla.E - \nabla.B = -\rho$

Or

$\frac{\partial B}{\partial t}$+$\nabla \times E - \frac{\partial E}{\partial T} - \nabla \times B$=$-j$

And

$\nabla.E - \nabla.B = \rho$

$\frac{\partial B}{\partial t}$+$\nabla \times E - \frac{\partial E}{\partial T} - \nabla \times B$=$-j$

5. Dark matter amplitude on finite boundary condition

Assuming, we are going to observe natural phenomenon of dark matter property in a deep space boundary condition .if a state s prepared with the dark mater mass state α and turning a quantum state. If it is founded to have the waveform energy fluctuation contains.
Then the probabilistic amplitude for the transition $(\alpha \rightarrow \beta)$ from is thus the scalar product.

$S_{\beta\alpha}=(\Psi_{\beta}^{-},\Psi_{\alpha}^{+})$

$S_{\beta\alpha}$ is the array of complex amplitude is known as the S- matrix.
And, It is often convenient instead of dealing with the s-matrix to work with operator S. Defined the matrix element between two waveform boundary state $\emptyset_{\alpha}$ and a high waveform boundary state$\emptyset_{\beta}$.
So corresponding element of the s-matrix,

$S_{\beta\alpha} \equiv (\emptyset_{\beta},S\emptyset_{\alpha})$

Using the Born approximation, we get the final vale

$$S_{\beta\alpha} \cong \delta(\beta-\alpha)-2\pi i\delta(E_{\alpha}-E_{\beta})(\emptyset_{\beta}.V\emptyset_{\alpha}) \quad (35)$$

Here v is the very small potential occurs on the weak interaction.
$(E_{\alpha}-E_{\beta})$is the small energy shifting according to boundary condition. It has a $2\pi i\delta(E_{\alpha}-E_{\beta})$ or some discrete energy that must founded on matter energy expansion. This is possible for component of energy momentum shift on n^{th} state fluctuation on bust of energy in n-dimensional compact state.
This state is convenient and the normalized function will be

$$(\emptyset_{E_{\alpha}P_{\alpha}N_{\alpha}},\emptyset_{E_{\beta}P_{\beta}N_{\beta}})=\delta(E_{\alpha}-E_{\beta})\delta(P_{\alpha}-P_{\beta})\delta N_{\alpha}N_{\beta} \quad (36)$$

Where $\delta N_{\alpha,}N_{\beta}$ is the fluctuation or energy bust of the state ,
The S-operator with the matrix element in the bust

$$(\emptyset_{E_{\alpha}P_{\alpha}N_{\alpha}},S\emptyset_{E_{\beta}P_{\beta}N_{\beta}})=\delta(E_{\alpha}-E_{\beta})\delta^{3}(P_{\alpha}-P_{\beta})\delta SN_{\alpha}N_{\beta} \quad (37)$$

$\delta SN_{\alpha}N_{\beta}$ is the unitary matrix.
Then T-operator whose free fluctuation on the state $\alpha\ and\beta$on the matrix elements $(\emptyset_{\beta},ST)$
are defined to be quantities $T_{\alpha\beta}^{+}$ which is the expression for the total fluctuation on the boundary.

$$(\emptyset_{E_{\alpha}P_{\alpha}N_{\alpha}},T_{\alpha_{\beta}P_{\alpha\beta}N_{\alpha\beta}},\emptyset_{E_{\beta}P_{\beta}N_{\beta}})=\delta^{3}(P_{\alpha}-P_{\beta})M_{(\alpha,\beta)} \quad (38)$$

$M_{(\alpha,\beta)}$ is defined as the delta function of free matrix element.
So now the ordinary final equation for finite amplitude for dark matter

$$S_{N_{\alpha}N_{\beta}}(E,P)=\delta_{N_{\alpha}N_{\beta}}-2\pi iM_{(\alpha,\beta)}(E,P) \quad (39)$$

6. Dark matter signal

There are four type of interaction in nature that is electromagnetic, strong, weak and gravitational interaction. But deep space of universe also follows another type of interaction that is called gauge interaction. Dark matter is the post simulation interaction that stayed on middle of gravitational and gauge interaction. Though it is not followed the superposition principle of two signal. But mostly is followed by superselection rules of two signal which is characterized by direct sum decomposition on the state of Hilbert space.

$H=\emptyset_{l\in l'\,superselection}H_{l}$

The following properties

$\Psi_{l},\Psi_{l'}=\partial_{ll'}\,\|\Psi l\|.^{2}\ \ \Psi_{1}\in H_{1}$

$$\Psi_{l},H\Psi_{l'}=\partial_{ll'}(\Psi_{1},H_{1}\Psi_{1}) \quad (40)$$

Where H is the Hamiltonian.
With the constant quantum jump theory, the direct sum of energy continuity rules

$H=\emptyset_{l\in l'}H_{l}$ curl$\ll x_{0}$

Where x_{0} is the the cordiality of the set of all positive integers.
For the basic signal for continuous time hermonicals are ..

$$S_{k}(t)=e^{-jk\omega_{0}t}=e^{j2\pi kF_{0}t} \quad (41)$$

Where k=0,$\pm$1,$\pm$2,….

The fundamental frequencies is
For dark matter communication, we have to optimized of the fundamental frequency kF_0 .Previously we saw that the value of fundamental frequencies for dark matter communication is 10^{-34}
This value is directly calculated by the equation of dark matter mass

B$\frac{<\varepsilon>}{u}\frac{P_x^3}{h^3}[\Psi_c$(x, t)]

Now we are going to establish and represent a quantum signal for dark matter and deep space communication using quantum jump theory. Form the state vector of schrodinger picture,

Ψ= (t)

Ψ= {$\Psi_l \in H_l$: l$\in L$

The quantum jump is describe

At t=t_{jamp}

$\Psi \xrightarrow{jamp} \Psi_l$

Quantum probability

Ψ_l = $\|\Psi l\|.^2$

(t_{jamp})= $\sum_{l\in L}\|\Psi_l(t_{jump}\|\Psi_l\ t_{jump})$ (42)

Ψ_l=|$(\Psi_l(t_{jump}|\Psi_l t_{jamp})$ (43)

$and\ rest\ probability$

Ψ_l=|$(\Psi_l(t_{jump}|\Psi_l t_{jamp})$|2 (44)

The average energy is continuous under jump

[$(\Psi t_{jump,}\ H\Psi t_{jump})$]=$\sum_{l\in L}\Psi_l[\Psi_l(t_{jump})$,H$\Psi_l(t_{jamp})$] .(45)

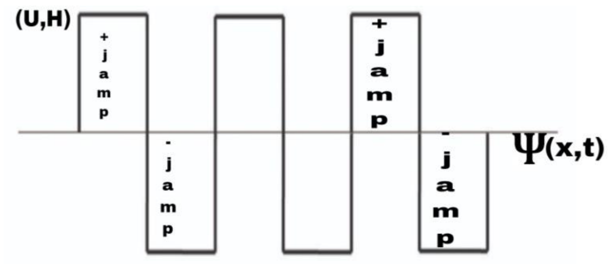
If $\Psi_l(t_{jump})$,H$\Psi_{l'}(t_{jump}) = \partial_{ll'}\ (t_{jump})$,H$\Psi_l(t_{jamp})$] (46)

So the virtual jump less dynamics is

$\Psi_l(t)$=U(t, t_{jump}) $\Psi_l\left(t_{jump}\right)$ (47)

$[U,H]$=0

U^+U=UU^+=1 (48)



So the probability of first jump is

Ψ_{ε_1}=$\|\Psi_{\varepsilon_1}^{out}\|.^2$

Conditional probability of 2nd jump,

$\Psi_{\varepsilon_1/\varepsilon_2}$=$\|\Psi_{\varepsilon_1}^{out}\|.^2\|\Psi_{\varepsilon_2}^{out}\|.^2$ (49)

The chain impulse signal train for final equation,

$$\left\|\Psi_{\varepsilon_1}^{out}\right\|.^2 \xrightarrow{jamp} \left\|\Psi_{\varepsilon_2}^{out}\right\|.^2 \overrightarrow{jamp} \left\|\Psi_{\varepsilon_3}^{out}\right\|.^2 \xrightarrow{jamp} \quad (50)$$

When the quantum particle's (frequencies) will tends to 10^{-34} or the range of $10^{-25} - 10^{-36}$ then it would work as the dark matter signal particle(frequencies).

7. Conclusion

This paper is discussed about new era of space communication. Firstly, On the discussion about the arrangement of dark energy and dark mass evolution. Secondly, deep space frequencies and it's space boundary. Thirdly, Dark matter amplitude on finite boundary condition. Fourthly, the fluctuation or energy bust of the state space. Fifthly, the range of frequency on deep space communication and lastly the quantum mechanical signal for deep space communication

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