Entropy Space、Time-Space with Energy and Unified Field Theory

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Abstract
In this paper, we get a Space characteristic equation with a 1/2 fixed point and an entropy form. Base on this Space, We setup a model to describe a photon with the velocity of light C pushed by one unit energy $h$. and we find that it is interesting when considering the intensity of field $1/\alpha_F$ as the curvature of the Quantum Time-Space with energy, then we get a Unified Field Equation. We hope to throw a little bit light on the big picture of uniting the quantum mechanics and General relative theory.

Keywords
L$^{1/2}_{(0,1/2,1)}$ Space Quantum Time-Space Unified Field Equation

Time is a basic concept in physics. But till now, we have no idea to use mathematical model to describe the structure of “Time” till now. In Newton’s system, Time is an independent existence with space. In Einstein’s system, Time and Space are bonded together just considering the Velocity of Light is a constant $C(m/s)$. And then for a Quantum system, we consider the energy is discrete and then the “Time contentiousness” disappeared in this system. But It is that the Dimension of Plank’s constant $h(J.s)$ is also including the unit of Time. So we think that if we may construct a Dimension system of Time-Space with energy based on two priori conditions: the velocity of light is a constant $C$ and the unit of energy with Time is a constant $h$, Plank constant. And if we can quantized this Time-Space with energy system, Maybe we can get a mathematical model to describe more physics details of the basic structure of Time-space with energy and get a Unified Field Theory.
1. \( L^{1/2}(0 \ 1/2 \ 1) \) Entropy Space

![Figure 1](image.png)

**Figure 1.** \( L^{1/2}_{(0 \ 1/2 \ 1)} \) Uniting space

1.1/2 Fixed Point

\[
\begin{align*}
1/2 &= 1/2 \quad 0 = 1/2 - 1/2 \quad 1 = 1/2 + 1/2 \\
1/2 &= (1/2 + 1/2 \cdot i)(1/2 - 1/2 \cdot i) \\
1/2 &= \frac{1}{2^2} + \frac{1}{2^3} + \cdots + \frac{1}{2^n} = \sum_{n=2}^{\infty} \frac{1}{2^n} \\
1/2 &= \lim_{N \to \infty} \sum_{i=1}^{N} \ln(1 + \frac{i}{N^2})
\end{align*}
\]

The basic space of this system is:

\[
\begin{pmatrix}
0 & 1 & 0 \\
0 & 1/2 & 1 \\
1 & 0 & 0
\end{pmatrix}
\]

This is an space with a 1/2 fixed point.

And we have:

\[
\tau \in N \begin{bmatrix} 0 & 1/2 & 1 \end{bmatrix} N \mod(2N)
\]

\[
T \in \left[ e^{2 \sigma_0} = 1, e = \lim_{n \to \infty} \left(1 + \frac{1}{N}\right)^N \right]
\]
\[
\begin{align*}
t & \in \left[ \frac{e^{i2\pi} + e^{i\pi}}{2}, \frac{e^{i2\pi} - e^{i\pi}}{2} = 0, \frac{e^{i2\pi} - e^{i\pi}}{2} = 1 \right] \\
<T>_{[0,1]} &= <\tau>_{[0,1/2,1]} + <t>_{[0,1]} \\
\mathbb{L}nT &= N + \frac{1}{2\pi Ni}
\end{align*}
\]

So we have a space:

\[
[\mathbb{L}nT \mathbb{L}nT]^{-1} + \begin{bmatrix}
0 & 1 & 0 \\
0 & 1/2 & 1 \\
1 & 0 & 0
\end{bmatrix}
\begin{bmatrix}
\frac{1}{2} & \frac{1}{2} - \frac{1}{4\pi} \\
\frac{1}{2} + \frac{1}{4\pi} & \frac{1}{2} \\
\frac{1}{2}N + \frac{1}{4\pi Ni} & \frac{1}{2}
\end{bmatrix}
\begin{bmatrix}
\frac{1}{2} & \frac{1}{2} - \frac{1}{4\pi} \\
\frac{1}{2} + \frac{1}{4\pi} & \frac{1}{2} \\
\frac{1}{2}N + \frac{1}{4\pi Ni} & \frac{1}{2}
\end{bmatrix}
= 0
\]

[\mathbb{L}nT \mathbb{L}nT]^{-1} = 1

2. Time-Space with one unit of energy

![Diagram](image)

Fig. 2. Times definition in a space with energy

We will define a time space with energy as:

\[S \sim E \cdot L^* t \quad (J.m.s)\]
We will define $C$ as the velocity of Light (m/s), $h$ is Planck constant (J.s) and $a_F$ is the strength of field (m/s$^2$).

\[
S_L \sim ct \\
S_L' \sim \frac{1}{2} a_F t^2 \\
So \ t \sim \frac{2c}{a_F}
\]

and we define $\tau$ only at the points 1, 2, 3, ..., have the value the Plank constant $h$.

\[
\tau \sim Nh(0, 1, 2, 3, ...)
\]

So we got a time with energy coordinate system as follow:

![Fig. 3. A Time-Space with energy coordinate system](image)

with the Unit as

\[
<h> \sim \frac{1}{C} \sim \frac{C}{a_F}
\]

We can see in Fig.3, a unit $\ln T - 1/N <h> - 2\pi N <1/C>$ with a 1/2 Symmetry connects the Time-Space and Energy together. $C$ as the velocity of Light, $h$ is Planck constant and $a_F$ is Acceleration or the Intensity of field (m/s$^2$).
Figure 4. A Unit of space-time with energy

We can see in Fig. 4, a unit with a 1/2 Symmetry connects the Space and Energy together. And then we obtain as:

\[ \begin{pmatrix} 0 & 1 & 0 \\ 0 & \frac{1}{2} & 1 \\ 1 & 0 & 0 \end{pmatrix} \begin{pmatrix} \frac{1}{2} & \frac{1}{2} - \frac{1}{4\pi i} & \cdots & \frac{1}{2} - \frac{1}{4\pi i} \\ \frac{1}{2} + \frac{1}{4\pi i} & \frac{1}{2} & \cdots & \frac{1}{2} \\ \frac{1}{2} + \frac{1}{4\pi i} & \cdots & \frac{1}{2} \end{pmatrix} = 0 \]

And

\[ <h> \sim \frac{1}{C} \sim \frac{C}{2a_F} \rightarrow 1 \]

So

\[ \begin{pmatrix} 1/C & 0 & 1/2 \\ C/a_F & 1 & 0 \end{pmatrix} \begin{pmatrix} 1/C & 0 & 0 \\ 1/N & 1/2 & N \\ 1+\frac{1}{8\pi i} & \frac{1}{2} + \frac{1}{4\pi i} & \frac{1}{2} \end{pmatrix} = 0 \]

(One Quantum Space)

\[ [LnT][LnT]^{-1} + \begin{pmatrix} 1/C & 0 & 1/C \end{pmatrix} \begin{pmatrix} \frac{1}{2} & \frac{1}{2} - \frac{1}{4\pi i} & \cdots & \frac{1}{2} - \frac{1}{4\pi i} \\ \frac{1}{2} + \frac{1}{4\pi i} & \frac{1}{2} & \cdots & \frac{1}{2} \\ \frac{1}{2} + \frac{1}{4\pi i} & \cdots & \frac{1}{2} \end{pmatrix} = 0 \]

(N-Quantum space)
And then

\[ L_nT = Nh + \frac{C}{4\pi N\alpha_F} \]

So we have the following equations as:

\[ 1 + B(S) = 0 \]

\[ L_nT = Nh + \frac{C}{4\pi N\alpha_F} \]

\[ S_LnT = \frac{NhC}{2\pi\alpha_F} \]

\[ \frac{1}{\alpha_F} = 4\pi N^2 \frac{h}{C} \]

The basic unit of the Space-Time with Energy in our model is:

\[ S_{r0} \sim \frac{hc}{2\pi} \]

\[ \frac{1}{\alpha_F} \sim \frac{h}{C} \]

\( 1/\alpha_F \) can be considered as the curvature of the Space-Time with Energy.

3. The Geometry Structure of Time-Space with energy

We can make \( 1/N=1 \) then we have a coupling number set:

\[
\left[ \begin{array}{cccc}
0 & 1/3 & 2/5 & 3/7 \\
1/2 & 1 & 2 & 3 & 4 \\
4/7 & 3/5 & 2/3 & 1 \\
7 & 5 & 3 & 2 \\
\end{array} \right] \]

Fig.5 shows the structure of the time-space with energy.
Fig. 5 The Geometry Structure of time-space with energy in one Quantum Space

The strength of strong interaction $a_s$ and the strength of electromagnetic field $a_{em}$ and weak interaction $a_w$ has a ratio:

$$a_s : a_w : a_{em} : a_s = e^{32, s^2, \gamma^2}$$

Fig. 6 shows the picture uniting the gravitation and Electric-Magnetics field in the Quantum Time space with energy. The strength of gravitation $a_s$ and the strength of electromagnetic field $a_{em}$ has a ratio:

$$a_s / a_{em} \sim e^{2\times\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}} \sim e^{128}$$
Figure 7. Mass and Magnet in the Uniting gravitation and Electric-Magnetics field

Figure 7 shows the meaning of mass and magnet in the $L^{1/2}_{[0,1/2,1]}$ Entropy space. Mass and Magnet can be considered as the fields between the gravitation and Electric-Magnetics field decided by the ratio of the $a_{em}/a_g$. So in this model, there is no **mass gap** and the magnetic poles should be pairing and **no monopole**!

**Discussion**

Galilei said that he can creative the Universal only using **Space**, **Time** and **Logarithm**. Einstein thanked that a Unified Field Theory should be a geometrization one. And Roger Penrose pointed out that if we want to get the uniting of the Mass and Time-Space, we need the help of Complex Number[1]. The paper [2] discusses that a Unified field theory should be a model with Plank constant, gravitation and the velocity of Light.

In Our model

$$SLnT = \frac{NhC}{2\pi a_f}$$

$$LnT = Nh + \frac{C}{4\pi N_i a_f}$$

This model has an **geometry space (complex)** with **entropy form (logarithm)** and just provide a probability to combine the **Gravitation** and **Electric-Magnetics field** under a basic structure of quantum Time-Space with energy.

Wilczek [3] want to use a concept called **Quantum Time Crystals** to define the **Time space with energy**. Our Model actually give a **definition of Quantum Time Space as**
In this paper, we constructed a Time-Space with energy model just considering the velocity of the light \( C \) and the Plank constant \( h \). It is interesting in this system, Gravitation and electromagnetic force can be combined together only if we consider that the \( 1/a_f \) considered as the curvature of the Space-Time with Energy!

\[
S_{\epsilon_0} \sim \frac{hc}{2\pi} \sim 10^{26}
\]

\[
1/a_f \sim \frac{h}{C} \sim 10^{42}
\]

References