If Space and Time are the Necessary Conditions for Sustaining the Universe, then, Mass and Energy are the Sufficient Conditions for the Universe. One Condition can be Smoothly Transformed into the Other Conditions and Vice Versa

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Abstract

Space and time are the necessary conditions for sustaining the Universe whereas mass and energy are the sufficient conditions for sustaining the Universe. All conditions are in almost balanced state but not in absolute balanced state. Little imbalance is maintained by the Universe to sustain the Universe as the way it is now. That is why, the Universe is almost peaceful, but not absolute peaceful. Only we can attain an absolute peaceful Universe by stopping the time in the forward direction (positive direction, the way it is now). The rate of change of anything in time is called evolution. If time stops running, everything will be at absolute rest without any evolution. This is a theoretical abstract idea only because it has no practicality or feasibility in the present state of the Universe. Speed is a function of space and time. It can be easily shown that time is a sinusoid and it loses its frequency of oscillations with the interaction with mass which increases time period, which can be termed as time dilation. The time period is extremely large of time, and the peak of the temporal magnitude is extremely low. Thus, frequency is extremely low. This is the reason, there are hardly any differences of time on Earth compare to free space. Even the astronomical body has very negligible effect on the time period or frequency of time. But time period gets larger with effect of mass, thus, time slows down (due to time dilation), which implies that frequency decreases little bit due to the effect of mass on time. Due to the slight variation in magnitude in a very low frequency sinusoid (time), time runs in the forward direction, as it is now in the present Universe. Thus, space and time are the necessary conditions for sustaining the Universe whereas mass and energy are only sufficient conditions for sustaining the Universe, the way it is now. All these four entities are the key for the Universe to get the present shape, the way it is now. Any change in one condition can lead the Universe to entire different shape with compare to the present shape. Thus, the Universe is at knife edge accuracy but not at absolute accuracy. Any one condition can be smoothly transformed into the others and vice versa.

Keywords: The space and time, The mass and energy, Time dilation, Low frequency sinusoid, The necessary and sufficient conditions, The knife edge accuracy.

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I. Introduction

Theory1: Without any external influences, the time is a perfect sinusoid. The temporal sinusoid is always positive and has extremely low magnitude and enormously large time period.

Theory2: Due to the slight variation in magnitude in a very low frequency sinusoid (time), time runs in the forward direction, as it is now in the present Universe.

Theory3: There is very gradual change in magnitude of time, so hardly any noticeable effect of mass on time, because the mass hardly effects the magnitude (too low originally) and time period of time (too large originally) but time gets slowed down with the effect of mass, time dilation.

Theory4: Extremely gradual change in magnitude of time is the cause that time runs in positive direction without much change in shape with the effect of masses.

Theory5: Out of all variables, space, time, mass and energy, one can be smoothly transformed into the other variables and vice versa.

There are four fundamental state variables of the Universe; these are space, mass, energy and the physical time. Any one state variable can be smoothly transformed into other one or more than one of these other three fundamental state variables of the Universe. Given minimal information of one state variable, other three state variables can be found out completely with proper mathematical relationship among all four fundamental state variables. So, there exist at least three fundamental transformation constants for each state variable if not more to relate one state variable with the other three state variables. Let’s take, space is $S$, mass is $m$, energy is $E$, the physical time is $T$, the speed of light is $C$. Then, according to the Einstein’s mass-energy equivalence famous equation [I] –

$$E = mc^2$$  \hspace{1cm} (1)

Similarly, the relationships of state variable space ($S$) with other three states are as follows,

$$S = K_{sm}m$$  \hspace{1cm} (2)

$$S = K_{se}E$$  \hspace{1cm} (3)

$$S = K_{st}T$$  \hspace{1cm} (4)

The state variable mass ($m$) can be related with the other three state variables as follows,

$$m = K_{ms}S$$  \hspace{1cm} (5)

$$m = K_{me}E$$  \hspace{1cm} (6)

$$m = K_{mt}T$$  \hspace{1cm} (7)
The state variable energy \( (E) \) can be related with the other three state variable as follows,

\[
E = K_{ES} S \quad (8)
\]
\[
E = K_{Em} m \quad (9)
\]
\[
E = K_{ET} T \quad (10)
\]

The state variable physical time \( (T) \) can be related with the three other state variable as follows,

\[
T = K_{TS} S \quad (11)
\]
\[
T = K_{Tm} m \quad (12)
\]
\[
T = K_{TE} E \quad (13)
\]

By combining equations, 2, 3, 4, we can write,

\[
3S = K_{Sm} m + K_{SE} E + K_{ST} T \quad (14)
\]

By combining equations, 5, 6, 7, we can write,

\[
3m = K_{mS} S + K_{mE} E + K_{mT} T \quad (15)
\]

By combining equations, 8, 9, 10, we can write,

\[
3E = K_{ES} S + K_{Em} m + K_{ET} T \quad (16)
\]

By combining equations, 11, 12, 13, we can write,

\[
3T = K_{TS} S + K_{Tm} m + K_{TE} E \quad (17)
\]

With \( K_{SS} = K_{mm} = K_{EE} = K_{TT} = 0 \) and \( K_{Em} = C^2, K_{mE} = \frac{1}{C^2} \), we get all four state variables in matrix form with a state matrix \( S_M \ 4 \times 4 \) dimension.

\[
\begin{bmatrix}
K_{SS} & K_{Sm} & K_{SE} & K_{ST} \\
K_{mS} & K_{mm} & K_{mE} & K_{mT} \\
K_{ES} & K_{Em} & K_{EE} & K_{ET} \\
K_{TS} & K_{Tm} & K_{TE} & K_{TT}
\end{bmatrix}
\begin{bmatrix}
S \\
m \\
E \\
T
\end{bmatrix}
= 3
\begin{bmatrix}
S \\
m \\
E \\
T
\end{bmatrix} \quad (18)
\]

Or,
Again, \( K_{Sm} = \frac{1}{K_{mS}} \), \( K_{SE} = \frac{1}{K_{ES}} \), \( K_{ST} = \frac{1}{K_{TS}} \), \( K_{mT} = \frac{1}{K_{mT}} \), \( K_{ET} = \frac{1}{K_{TE}} \), then, state matrix can be reduced to 5 unknown transformation constants,

\[
\begin{bmatrix}
0 & K_{Sm} & K_{SE} & K_{ST} \\
\frac{1}{K_{Sm}} & 0 & \frac{1}{C^2} & K_{mT} \\
\frac{1}{K_{SE}} & C^2 & 0 & K_{ET} \\
\frac{1}{K_{ST}} & \frac{1}{K_{mT}} & \frac{1}{K_{ET}} & 0
\end{bmatrix}
\begin{bmatrix}
S \\
m \\
T
\end{bmatrix}
= \begin{bmatrix}
S \\
m \\
T
\end{bmatrix}
\]  

(19)

Thus, we need to find five transformation constants, \( K_{Sm}, K_{SE}, K_{ST}, K_{mT}, K_{ET} \) to solve state matrix, and hence, the total solution of the Universe. The unknown transformation constants evaluation is subjected to experimental and theoretical analysis of the Universe to term them in terms of known transformation constants of physics.

II. The Theoretical Analysis of Physical Time

![Time as a Sinusoid](image)

**Fig 1. Time as a Sinusoid**
Without any external influences, the time is a perfect sinusoid. The temporal sinusoid has extremely low magnitude and enormously large time period. Let $T$ be the normal time period and $T_G$ is the time period under the influence of gravity. $T_D$ is the time dilation. $m$ is the mass of the body. $M$ is the peak magnitude of the temporal sinusoid without gravity and $M_1$ is the peak magnitude of the temporal sinusoid with gravity.

$$T_D = T_G - T$$  \tag{21}

Where, $T_G > T$ is always under positive mass.

$$T_G \propto m$$  \tag{22}

If $T$ is constant in a local area of isolation in the Universe (Free Space),

$$T_D \propto m$$  \tag{23}

$$T >> M$$  \tag{24}

$$T_G >> M_1$$  \tag{25}

$$T_D \rightarrow 0$$  \tag{26}

$$M_1 - M \rightarrow 0$$  \tag{27}

Thus, time does have insignificant change in magnitude and in time period makes time almost same on Earth and free space too [II, III]. Due to the slight variation in magnitude in a very low frequency sinusoid (time), time runs in the forward direction, as it is now in the present Universe. Space is filled with Higgs field [IV, V]. Higgs field provide resistance to the astronomical objects to have masses [VI, VII]. Higgs Boson is responsible for Higgs field [VIII, IX]. Similarly, graviton is responsible for gravity [IX]. Similarly, there exists extremely low magnitude with enormously large time period, temporal sinusoid field. The temporal sinusoid field interacts with space and mass and energy to provide motion (more deeply evolution). Time is responsible for no absolute rest condition in the Universe. Time makes everything in motion, thus evolution exists in the Universe. All and everything change with time which introduce the concept that space and time are necessary conditions in the architecture of the Universe while mass and energy are the sufficient (or optional) conditions of the Universe.

### III. Conclusion

Without any external influences, the time is a perfect sinusoid. The temporal sinusoid is always positive and has extremely low magnitude and enormously large time period. The theory one is established. Due to the slight variation in magnitude in a very low frequency sinusoid (time), time runs in the forward direction, as it is now in the present Universe. Theory two is established with the time model. There is very gradual change in magnitude of time, so hardly any noticeable effect of mass on time, because the mass hardly effects the magnitude (too low originally) and time period of time (too large originally) but time gets slowed down with the effect of mass, time.
dilation. Thus, theory three is also established. Extremely gradual change in magnitude of time is the cause that time runs in positive direction without much change in shape with the effect of masses. Out of all variables, space, time, mass and energy, one can be smoothly transformed into the other variables and vice versa. Thus, theory four and five are also established too. The temporal sinusoid field interacts with space and mass as well as energy to set everything in motion (more profoundly evolution). Time is responsible for no absolute rest condition in the Universe. Time sets everything in motion, thus, evolution does exist in the Universe. And everything changes with time which makes space and time necessary conditions for the design of the Universe. And mass and energy are the sufficient (or optional) conditions in the architecture of the Universe.

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