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Distance to Turning Point Between Dark Matter's Attractive Force and Dark Energy's Repulsive Force

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Abstract

There is no report that a turning point between dark matter and dark energy is shown by an equation. A distance to the turning point has never been made clear by the old gravitational equations, mathematically. A relationship between dark matter's attractive force and dark energy's repulsive force is complete opposite. Therefore, the distance to the turning point must be shown by any equation if the existence of dark matter and dark energy is recognized. Author had reported a new gravitational equation with energy ignored by Newton and Einstein. Ignored energy with over time is

$$"ignored" E(t) = E(0)(1-e^{kt})e^{kt}$$

According to this equation, "ignored" energy is observed as dark matter's attractive force at near universe or as dark energy's repulsive force at distant universe. The distance (r) to the turning point is

$$r = \frac{c}{\log(1-\frac{1}{4.32\times10^{17}})}\log[1-e^{4.32\times10^{17}\log(1-\frac{1}{4.32\times10^{17}})} - 4.32\times10^{17}\log(1-\frac{1}{4.32\times10^{17}})]$$

Dark matter and dark energy are not required when "ignored" energy is considered.

Key words: *Big Bang, gravitational wave, dark matter, dark energy, ignored energy.*

Abbreviations

E(t)	*= quantity of energy at time (t)*
E(0)	*= quantity of energy at time zero*
Stress(t)	*= quantity of stress at time (t)*
M	*= central mass*
t	*= time*
t_c	*= time after Big Bang*
c	*= speed of light*
r	*= distance*
r_3	= distance to the turning point between dark matter and dark energy
δ , *k*	*= fixed numbers*

I. Introduction

There is no report that the problem of dark energy's repulsive force [1] was explained mathematically. Dark matter was reported as energy ignored by Newton and Einstein [2, 3]. According to my new gravitational equation, the mistake to dark matter and dark energy is made clear, mathematically. "Ignored" energy is observed as dark matter's attractive force at near universe or as dark energy's repulsive force at distant universe. The distance (r) to the turning point from dark matter to dark energy is reported.

II. Methods

Energy ignored by Newton and Einstein was reported [2, 3]. The outline is in below.

Hypothesis

The quantity of all stress is in direct proportion to the quantity of energy at time (t). Stress is the changed degree of energy per time.

$$Stress(t) = \frac{dE(t)}{dt} = kE(t) \tag{1}$$

Calculation

From Equation (1)

$$E(t) = E(0)e^{kt} \tag{2}$$

If k is less than 0,

$$e^{kt} = 1 - \delta \qquad 0 < \delta << 1 \tag{3}$$

From Equations (2) and (3)

$$E(t) = E(0)(1-\delta)^t \tag{4}$$

$$E(t) \approx E(0)(1-\delta t) \tag{5}$$

$$E(t) = E(0)(1-\delta t) \tag{6}$$

When Hubble's red shift is explained by Equation (6), the Big Bang theory [4] is required. However, Equation (6) is an approximation of Equation (4). The Big Bang theory is shown to be an approximation of my theory [5]. By the Big Bang theory, the time t_c after Big Bang is 13.7 billion years.

$$t_c = 13.7 billion \cdot years \tag{7}$$

From Equations (6) and (7)

$$1-\delta t_c = 0 \tag{8}$$

$$\delta = \frac{1}{13.7 billion \cdot years} = \frac{1}{4.32\times10^{17}} \text{sec.}^{-1} \tag{9}$$

From Equations (3) and (9)

$$k = \log(1-\frac{1}{4.32\times10^{17}\ \text{sec.}}) \tag{10}$$

And energy ignored by Newton and Einstein is with over time

$$"ignored" E(t) = E(0)(1-e^{kt})e^{kt} \tag{11}$$

Therefore, a new gravitational equation is

$$E(t) \approx \frac{c^4}{8G}(G_{\mu\nu} + \Lambda g_{\mu\nu}) + E(0)(1-e^{kt})e^{kt} \tag{12}$$

A mistake of the Big Bang theory is proved by Equations (4) and (6). However, the Big Bang theory is believed by many scientists. Therefore, a relation of "ignored" E(t) to the Big Bang theory is explained in below.

The existence of a central mass (M) is possible in the Big Bang theory. It is supposed that the mass (M) existed just after Big Bang. Gravitational wave was made by the mass (M), too. According to my theory, a relationship between redshift equation and equation of "ignored" E(t) are shown in Figure 1. The longitude axis is quantity of energy. The horizontal axis is time. Equation (4) is a dotted curve to pass the point F_2 from the point F_1. Equation (6) is a solid straight line from the point F_1 to the point t_1. Equation (11) is a solid curve to pass from 0 to the point F_6. The energy quantity of the point F_1 is E(0). According to the Big Bang theory, the point t_1 is the time that the energy quantity E(t) becomes zero. The point F_3 is the energy quantity at the point t_1 by Equation (11). The point F_4 is a turning point of Equation (11). And the point t_2 is the time of it. The point F_2 is the energy quantity at the t_2 by Equation (4). The energy quantity of the point F_5 is equal to it of the F_3. The point t_3 is the time at the point F_5. The point F_6 is the energy quantity by equation (11) at more passed time.

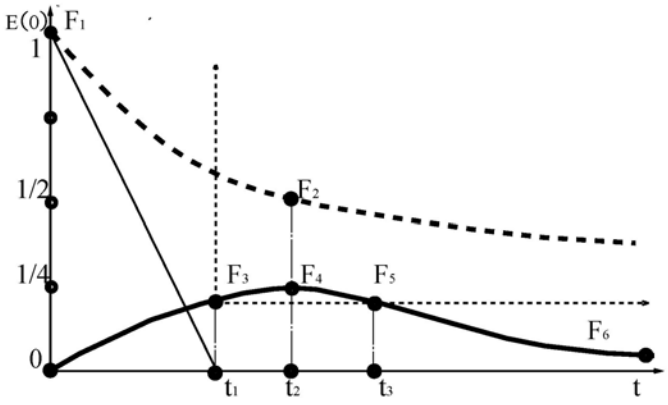

Figure 1: Relationship between redshift and ignored energy

Here is

$$ct = r \tag{13}$$

From Equation (13), passed time is equal to distance. The point t_1 is the time till now after Big Bang. Energy of gravitational wave is similar to it of electromagnetic wave. There is no energy of electromagnetic wave at the point t_1 in the Big Bang theory. Therefore, there is no energy of gravitational wave at the point t_1, too. It is meaning that there was no energy of gravitational or electromagnetic wave before Big Bang.

From equation (7)

$$t_1 = t_c = 13.7 billion \cdot years \tag{14}$$

Here is

$$t_2 = -\frac{\log 2}{k} \tag{15}$$

$$Energy \cdot at \cdot the \cdot point \cdot F_2 = \frac{E(0)}{2} \tag{16}$$

$$Energy \cdot at \cdot the \cdot point \cdot F_4 = \frac{E(0)}{4} \tag{17}$$

$$Energy \cdot at \cdot the \cdot point \cdot F_3 = "ignored" \; E(t_1) = E(0)(1 - e^{kt_1})e^{kt_1} \tag{18}$$

If we obey the Big Bang theory, gravitational energy by mass (M) is zero in the point t_1. There is no gravitational force at a distant place from the point t_1. In the Big Bang theory, there is no influence by the mass (M) on time t_1. It is the same meaning as no dark matter's attractive force and no dark energy's repulsive force by the mass (M). However, attractive force and repulsive force are observed to all directions in the present earth.

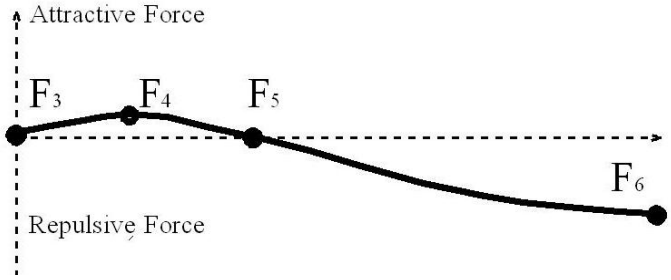

Figure 2: Undestanding to "ignored" E(t) in the old gravitational equations

In my theory, the mass (M) could exist before Big Bang. And because gravitational energy by the mass (M) always exists according to the Equation (4), their forces can be observed at the point t_1, t_2, t_3 and more passed time. At the point t_1, scientists believing the Big Bang theory cannot recognize the "ignored" $E(t_1)$ being the point F_3. Therefore, a present state is recognized as an energy base. It is the same as changing a basic point to the point F_3. And they consider the observed results as dark matter's attractive force or dark energy's repulsive force.

In Figure 2, the new longitude axis and the new horizontal axis are shown as two straight dotted lines with arrow. The "ignored" E(t) is observed as a solid curve from the point F_3 to the point F_6. The point F_4 is a peak of the curve. The upper area to the horizontal axis is observed as attractive force, and the under area to it is observed as repulsive force. Therefore, dark matter is shown as the part from the point F_3 to the point F_5, and dark energy is shown as the part from the point F_5 to the point F_6. A turning point between dark matter and dark energy is shown as the point F_4 in Figure 2. The quantity of energy at the point F_5 is equal to it of the F_3.

$$"ignored" \; E(t_1) = "ignored" \; E(t_3) \tag{19}$$

From equations (11) and (19)

$$t_3 = \frac{\log(1 - e^{kt_1})}{k} \tag{20}$$

From equation (20)

$$t_3 - t_1 = \frac{\log(1 - e^{kt_1})}{k} - t_1 \tag{21}$$

From equations (13) and (21), a distance (r_3) to the turning point is.

$$r_3 = c(t_3 - t_1) = c[\frac{\log(1-e^{kt_1})}{k} - t_1] \quad (22)$$

From equations (10) and (22), a distance (r_3) to the turning point is.

$$r_3 = \frac{c}{\log(1-\frac{1}{4.32\times10^{17}})}\log[1-e^{4.32\times10^{17}\log(1-\frac{1}{4.32\times10^{17}})} - 4.32\times10^{17}\log(1-\frac{1}{4.32\times10^{17}})] \quad (23)$$

III. Discussions

If "ignored" energy is considered by only the old theories, two kinds of opposite forces such as dark matter and dark energy are required. When "ignored" energy is observed at near universe, it is understood as dark matter's attractive force. When "ignored" energy is observed at distant universe, it is understood as dark energy's repulsive force. They are different from true attractive or repulsive force between masses [6]. In dark matter and energy, the turning point from attractive force to repulsive force cannot be calculated by the old theories, mathematically. The calculated distance to the turning point is shown as equation (23) by my theory. Big Bang, dark matter and dark energy are not required in the new gravitational equation.

IV. Conclusions

"Ignored" energy is observed as attractive or repulsive force in the old gravitational equations. For the purpose of explaining each force, dark matter at near universe and dark energy at distant universe were considered. The distance to the turning point was calculated according to my new gravitational equation. Big Bang, dark matter and dark energy are not required.

Acknowledgements

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