# Decreasing Total Energy of Gravitational Wave with Time Course: Limited Galaxy Sizes Related to Celestial Bodies are a Proof that Newton's and Einstein's Gravitational Equations are Insufficient.

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*Abstract:* - It was reported that the velocity of each celestial body revolving on outer edge of the galaxy exceeded that predicted by Einstein's and Newton's gravitational equations. Therefore, it was considered that the mass at the center of each galaxy must have been larger than that observed. It was named Dark Matter because its mass was never observed. In this report, a relation between both equations and area of the sphere's surface is calculated. And it is shown that a constant total energy of the gravitational waves is a precondition for both equations.

Here, all galaxy sizes related to celestial bodies are limited. However, the limited size of a galaxy cannot be explained by the Dark Matter theory, Newton's gravitational equation, or Einstein's gravitational equations. It is a proof that their equations are insufficient. If the total energy of a gravitational wave decreases with time course, the extinguished energy is ignored in both equations. And a sudden change of gravitation can be explained because it is associated with the surface area of the sphere. Therefore, the contradiction of them to limited galaxy sizes can be resolved with a hypothesis that total energy of gravitational wave decreases. Furthermore, this hypothesis mathematically proves that the Big Bang theory, Dark Matter theory, and Dark Energy theory are wrong.

*Key-Words:* Galaxy size, Stress cosmology, Dark matter, Dark energy, Big Bang theory, Gravitational equation, Gravitational wave

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## 1 Introduction

A precondition of Newton's gravitational equation [1] and Einstein's gravitational equation [2-5] is the constant total energy of the gravitational waves. This is equal to a precondition of the Big Bang theory [6-8] that the ejected energy of light never changes. Both are based on the first law of thermodynamics [5, 9, 10]. And it was reported that the velocity of each celestial body revolving on outer edge of the galaxy exceeded that predicted by Einstein's and Newton's gravitational equations [11]. Therefore, it was considered that the mass at the center of each galaxy must have been larger than that observed. It was named Dark Matter because its mass was never observed [12-20]. And the Dark Matter theory was explained using Einstein's gravitational equation [21].

However, all galaxy sizes with celestial bodies are limited, and the limitation of galaxy size is never explained by the Dark Matter theory, Newton's gravitational equation, or Einstein's gravitational equation. It is a proof that their equations are insufficient. For explaining the limitation of galaxy size, a sudden change of gravitation is required in the new gravitational equation. And their contradictions can be resolved with a hypothesis that total energy of gravitational wave decreases with time course. It was ignored with Newton's and Einstein's gravitational equations. Limited galaxy sizes can be mathematically explained with the stress cosmology [22-24], taking into consideration the ignored energy and spherical diffusion.

## 2 Method

### 2.1 Constant Total Energy of Gravitational Wave in Newton's and Einstein's Gravitational Equations

So far, Newton [1] and Einstein [2-5] reported each gravitational equation. In this report, the Newton's gravitational equation is simply used. Newton's gravitational equation is

$$\mathrm{F} = \mathrm{G}\frac{Mm}{r^2} \tag{1}$$

Here, F, G and r are respectively force, gravitational constant, and distance. And, M and m are two masses. In Figure 1, a relation between r, m and M is shown.

However, a relation between energy (E) force (F) and the length of movement (*l*) is

$$\mathrm{E} = \mathrm{F}l \tag{2}$$

From Equations (1) and (2),

$$\mathrm{E} = \mathrm{G}\frac{Mm}{r^2}l \tag{3}$$

Here, the force between the mass (m) and the gravitational wave is shown in Equation (1). The gravitational wave was radiated from the mass (M). Therefore, energy in Equation (3) is equal to energy between the mass and energy (Eg) of its gravitational wave.

$$Eg = G\frac{M}{r^2} \tag{4}$$

Here, the area (S) of the sphere's surface with the radius (r) is

$$\mathrm{S} = 4\pi r^2 \tag{5}$$

From Equations (4) and (5), the sum total energy (tEg) of the gravitational wave on the sphere's surface is

$$tEg = E_M S = G\frac{M}{r^2} \times 4\pi r^2 = 4\pi GM \tag{6}$$

From Equation (6), the total energy of the gravitational wave by the mass (M) is unrelated to the distance, constantly. This result is equal to a mistake of the Big Bang theory that energy of light is no change with time course.

### 2.2 Dark Matter Theory

Zwicky [11] was trying to estimate the masses of large clusters of galaxies. The velocity of each celestial body revolving on outer edge of the galaxy exceeded that predicted by Einstein's and Newton's gravitational equations. Many scientists believed the relation between gravity and Einstein's (Newton's) gravitational equations to be absolute. Therefore, they considered that the mass at the center of each galaxy must have been larger than that observed. It was named the Dark Matter because the mass was never observed [12-20]. When a mass (m) revolves around a circle of the radius (r) with a speed (v), the centrifugal force (Fc) is

$$\mathrm{Fc} = \frac{mv^2}{r} \tag{7}$$

Therefore, the mass (m) must be pulled to the center by the attractive force between it and a center mass (M). When the centrifugal force (Fc) is equal to the attractive force (F) caused by the gravitational force, the mass (m) can continuously revolve around the center mass (M). From Equations (1) and (7),

$$\mathrm{F} = \mathrm{G}\frac{Mm}{r^2} = Fc = \frac{mv^2}{r} \tag{8}$$

From Equation (8),

$$\mathrm{M} = \frac{rv^2}{G} \tag{9}$$

Figure 2 shows the relationship between the revolving mass (m), the speed (v1), the central mass (M1) and the radius (r) are shown from Equation (9).

$$\mathrm{M1} = \frac{r(v1)^2}{G} \tag{10}$$

However, the revolving speeds of the masses around each galaxy were faster than it was predicted by Newton's and Einstein's equations. In Figure 3, the revolving speed (v2) is faster than it (v1) of Figure 2.

$$\mathrm{v2} > \mathrm{v1} \tag{11}$$

From Equation (9),

$$\mathrm{M2} = \frac{r(v2)^2}{G} \tag{12}$$

From Equations (10), (11) and (12), a central mass (M2) must be larger than the mass (M1).

$$\mathrm{M2} > \mathrm{M1} \tag{13}$$

Therefore, Dark Matter was considered as the cause of the difference between the mass (M2) and the mass (M1). However, this is only correct if the relation between the gravity and Einstein's and Newton's equations are correct.

### 2.3 Limited Galaxy Size

A faster speed of the celestial bodies at the outer edge of the galaxy may be explained if the central mass is larger. However, all the galaxy sizes are limited, and a limited galaxy size may never be explained with the Dark Matter theory, Newton's gravitational equation and Einstein's gravitational equation [1, 2-5]. For that explanation to hold, a sudden change of gravitation is required in the new gravitational equation [22-24].

A schema of the limited galaxy size is shown in Figure 4. According to Newton's and Einstein's gravitational equations, the celestial bodies revolving around the galaxy center may exist at an infinite distance, such as in Figure 5. A schema of the unlimited galaxy size is shown in Figure 5.

### 2.4 Explanation of Limited Galaxy Size with the Stress Cosmology

It is a precondition of the stress cosmology that the ejected energy of light and the total energy of the gravitational wave decrease.

#### 2.4.1 Stress Cosmology

The author believed that stress is proportional to the amount of energy based on his clinical experiences [22-24].

$$\frac{dE}{dt} = kE \tag{14}$$

Here, each E, t and k are energy, time and constant. The stress cosmology is based on this Equation (14). From Equation (14),

$$\frac{dE(t)}{dt} = kE(t). \tag{15}$$

Here, E (t), and E (0) represent the amount of energy at time (t), the quantity of energy before, respectively. If the absolute value of k is large, our universe will be destroyed. Therefore,

$$0 > \mathrm{k} \gg -1 \tag{16}$$

From Equation (15),

$$\mathrm{E(t)} = \mathrm{E(0)}e^{kt} \tag{17}$$

From Equation (16),

$$e^{k} = 1 - \alpha \qquad (0 < \alpha \ll 1) \tag{18}$$

From Equations (17) and (18),

$$\mathrm{E(t)} = \mathrm{E(0)}(1-\alpha)^{t} \tag{19}$$

Here,

$$(1-\alpha)^{t} \cong 1 - \alpha t \tag{20}$$

From Equations (19) and (20),

$$\mathrm{E(t)} = \mathrm{E(0)}(1-\alpha)^{t} \cong E(0)(1-\alpha\mathrm{t}) \tag{21}$$

$$\mathrm{E(t)} = E(0)(1-\alpha\mathrm{t}) \tag{22}$$

The Big Bang theory is shown as Equation (22). The Big Bang occurred before the time (t1). Therefore,

$$\mathrm{ti} = 13.8 \text{ billion years} \tag{23}$$

From Equation (22) and (23),

$$\alpha = \frac{1}{13.8\ billion\ years} \tag{24}$$

If the Big Bang theory is correct, the old Earth of 3.5 billion years ago had revolved near the current position of Mercury according to the Big Bang theory. Did Cyanobacteria of 3.5 billion years ago live near the current position of Mercury? Therefore, the Big Bang theory is contradicted by Cyanobacteria [23]. Furthermore, they can never become a complete proof of the Big Bang theory because three problems (Time Dilation of High Redshift Quasars, Surface Brightness and 2.7K Cosmic Microwave Background) can be explained with the stress cosmology [24].

#### 2.4.2 Ignored Energy by Newton's and Einstein's Gravitational Equations

The relation between Newton's gravitational equation and gravity was corrected with Einstein's gravitational theory. However, both were insufficient because decreasing the energy with the gravitational wave was ignored when formulating them. In Figure 6, the energy of the gravitational wave radiated from the mass (M) is observed as a gravitational force related to the mass (m) after the time (tA). Here, the vertical axis represents the quantity of energy at time (t) or E (t), whereas the horizontal axis represents time (t). The quantity of energy at time (tA) is E (tA). In the Dark Matter and Dark Energy theories, the total energy (tEg) of the gravitational wave does not change as shown in Equation (3). Therefore, the immediate energy before radiation is E (tA), too.

However, the energy of the gravitational wave decreases in the stress cosmology [22-24]. In Figure 6, a relation between Equation (19), E (0) and E (tA) is shown. The dotted curve is Equation (19). Here, the vertical axis represents the quantity of energy at time (t) or E (t), whereas the horizontal axis represents time (t). According to the stress cosmology, the immediate energy after the radiation is E (0). From Equation (19), the difference in energy between the stress cosmology and Einstein's and Newton's gravitational equations lies in the aspect of time (tA).

$$\mathrm{E}(0) - \mathrm{E}(\mathrm{tA}) = \mathrm{E}(0)(1 - e^{ktA}) \tag{25}$$

This initial energy difference changes with time course according to Equation (17).

$$\mathrm{E}(\mathrm{t}) = \mathrm{E}(0)(1 - e^{kt})e^{kt} \tag{26}$$

This is the energy ignored (iEt) by Einstein and Newton.

$$\mathrm{iE}(\mathrm{t}) = \mathrm{E}(0)(1 - e^{kt})e^{kt} \tag{27}$$

It is shown as a dotted curve in Figure 7. Here, the vertical axis represents the quantity of energy at time (t) or E (t), whereas the horizontal axis represents time (t). In a similar way, gravity was insufficiently explained with Newton's and Einstein's gravitational theories.

### 2.4.3 Ignored Energy added to Newton's and Einstein's Gravitational Equations

Next, the cause of the limited galaxy size is explained. The ignored energy must be added to Newton's and Einstein's theories. Here, the force to the mass (m) is not the total energy (tEg) but rather a part of it based on the galaxy size. From Equations (5) and (27), the partial ignored energy (pEg) of the gravitational wave is

$$\mathrm{pEg}(\mathrm{t}) = \frac{Eg(t)}{S} = \frac{E(0)\left(1-e^{kt}\right)e^{kt}}{4\pi r^2} \tag{28}$$

The relation between time, distance, and the speed of light is given as:

$$r = \mathrm{ct} \tag{29}$$

Here, each length, time, and the constant speed of light are r, t, and c, respectively.

From Equations (28) and (29),

$$\mathrm{pEg}(\mathrm{r}) = \frac{E(0)}{4\pi} \times \frac{(1-e^{k\frac{r}{c}})e^{k\frac{r}{c}}}{r^2} \tag{30}$$

In Figure 8, Equation (30) shows the relation between the partial ignored energy of the gravitational wave and radius. The vertical axis represents the quantity of partial energy with gravitational wave or pEg (r), whereas the horizontal axis represents distance (r). Here, pEg (r) rapidly decreases at the neighborhood of the distance (r1). And, the correct energy (cEg) of the gravitational wave is added pEg to Newton's gravitational equation. From Equation (4) and (30),

$$\mathrm{cEg}(\mathrm{r}) = \frac{GM}{r^2} + \frac{E(0)(1-e^{k\frac{r}{c}})e^{k\frac{r}{c}}}{4\pi r^2} \tag{31}$$

In Figure 9, a relationship between the partial energy (pEg) of the gravitational wave and the distance (r) is shown. Here, the vertical axis represents the quantity of partial energy with gravitational wave or pEg (r), whereas the horizontal axis represents distance (r). Equation (4) is a dotted curve based on Newton's gravitational equation. And, Equation (31) adding the ignored energy to Newton's gravitational equation is a solid curve.

$$\mathrm{r1} > \frac{-c}{k} \tag{32}$$

And c is the speed of light.

$$\mathrm{c} = 299{,}792{,}458\ \mathrm{m/sec.} \tag{33}$$

From Equations (18), (24), (32) and (33),

$$\mathrm{r1} > \frac{-c}{\log(1-\alpha)} = \frac{-299{,}792{,}458\ \mathrm{m}}{\log(1-\frac{1}{13.8\times10^{17}billion\ years})} \tag{34}$$

The distance (r1) that cEg(r) rapidly decreases is a radius of the galaxy with the celestial bodies. A stronger force than the one predicted by Newton's gravitational equation acts on the celestial bodies revolving near the distance (r1). It can be explained by the fact that each velocity of all the celestial bodies revolving around a galaxy at the circumference is faster than the velocity predicted by Newton's and Einstein's gravitational equations. And, the heavenly bodies outside the distance (r1) will leave its galaxy because of the stronger centrifugal force. Therefore, the galaxy size with the

celestial bodies is limited to the space within the near radius (r1). However, gases may exist outside the radius (r1) because something with a very small mass may exist within various revolving speeds.

Here, various sizes of the galaxy are explained. In Figure 10, the relationship between the masses (m, 2M) and the distance (r1) are shown. However, only the relationship between the masses (m, M and M) and the distance (r1) is shown. The two masses (M and M) are separate, at a distance (r1), shown in Figure 11. The diameter of the galaxy is 2r1 in Figure 10, and it is 3r1 in Figure 11. That way, the position of all the central masses is calculated. Therefore, the size of an oval galaxy is larger than that of the circle galaxy [28, 29].

## 3 Results

The velocity of each celestial body revolving on the outer edge of the galaxy at the circumference can be explained by the Dark Matter theory using Newton's and Einstein's gravitational equations. However, the limited sizes of galaxies related to their celestial bodies cannot be explained by treating their equations as a constant total energy of gravitational waves. The total energy of the gravitational waves decreases with time course and diffuses spherically. And limited galaxy sizes can be mathematically explained by the stress cosmology, taking into consideration the ignored energy and spherical diffusion. Dark Matter is not required.

## 4 Discussion

"The ejected energy of light and the total energy of the gravitational wave never change." The Big Bang theory, the Dark Matter theory, and the Dark Energy theory were considered in relation to this hypothesis. The redshift emitted by distant celestial bodies toward the red end of the visible light spectrum was explained by the Doppler effect [27]. Therefore, the Big Bang theory was considered [7]. And the Dark Matter theory and the Dark Energy theory were explained using Einstein's gravitational equation [21].

However, many contradictions to them were reported [22-24, 28-31]. For example, Cyanobacteria of 3.5 billion years ago lived near the current position of Mercury according to the Big Bang theory. And according to the Dark Matter theory, the celestial bodies revolving around the galaxy center must exist at an infinite distance. However, galaxy sizes related to celestial bodies are limited. The limited sizes of galaxies related to celestial bodies can never be explained by Newton's and Einstein's gravitational equations. "The energy ejected by light and the total energy of the gravitational wave decrease with course time." According to this hypothesis, limited galaxy sizes can be explained by the energy that is ignored in their equations diffusing spherically with the celestial bodies. And some relations between Danr Matter and Dark Energy were reported [32, 33].

However, the turning point between both can be calculated with only the stress cosmology [22]. In addition, the redshift can be explained without the Doppler effect. Therefore, the Big Bang, Dark Matter and Dark Energy are ghosts. According to this stress cosmology, each galaxy sizes are decided with not the total quantity of the celestial bodies but their positions. And the velocity of each celestial body revolving on the outer edge of the galaxy is determined by both its total quantity and ignored energy. They will be confirmed through numerous future astronomical research studies.

## 5 Conclusions

A precondition of Newton's gravitational equation and Einstein's gravitational equation is the constant total energy of the gravitational waves.

However, limited galaxy sizes can never be explained with them. If the total energy of a gravitational wave decreases with time course, the contradiction between them and the limited size of galaxies and celestial bodies can be solved. It has been mathematically proven by this hypothesis that the Big Bang theory, the Dark Matter theory, and the Dark Energy theory are incorrect.

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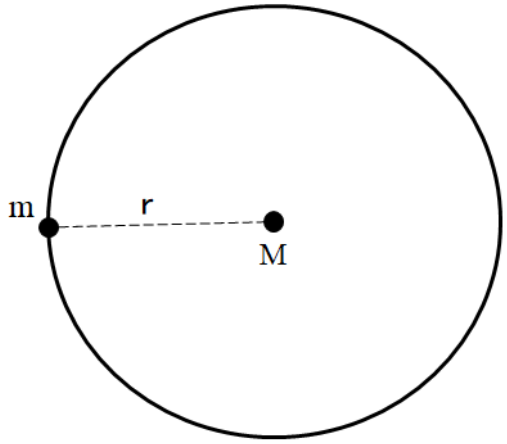


Figure 1: Relation between a distance (r), masses (m) and (M)

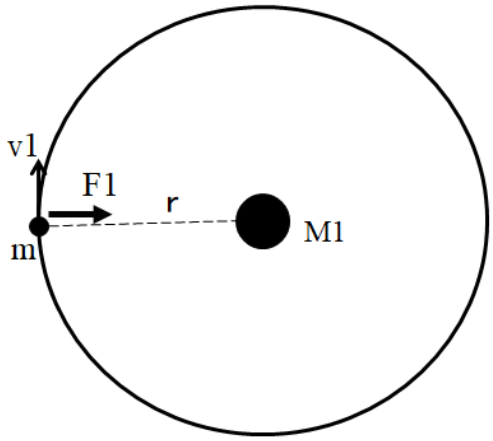


Figure 2: Relation between the revolving mass (m), the speed (v1), the central mass (M1), the radius (r) and the gravitational force (F1)

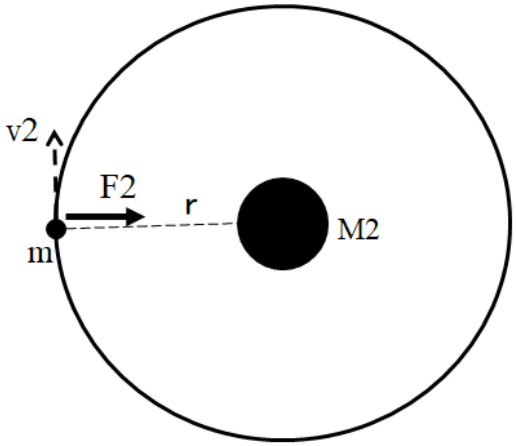


Figure 3: Relation between the revolving mass (m), the speed (v2), the central mass (M2), the radius (r) and the gravitational force (F2)

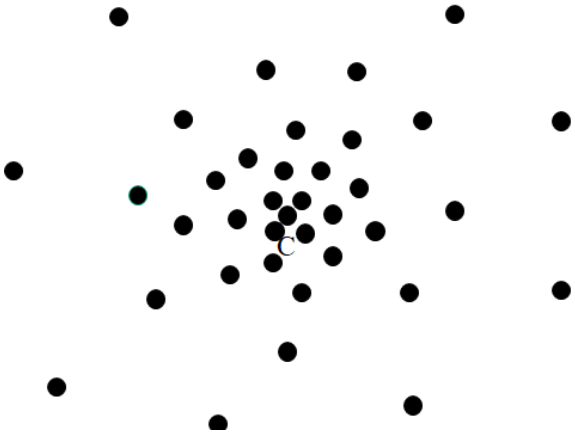


Figure 5: Schema of the unlimited galaxy size

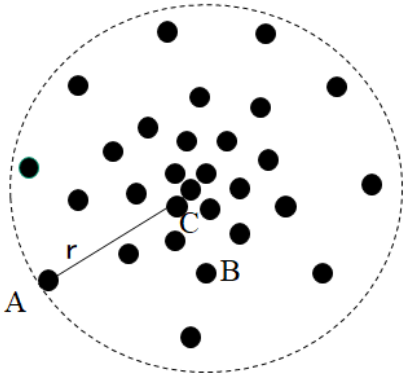


Figure 4: Schema of the limited galaxy size

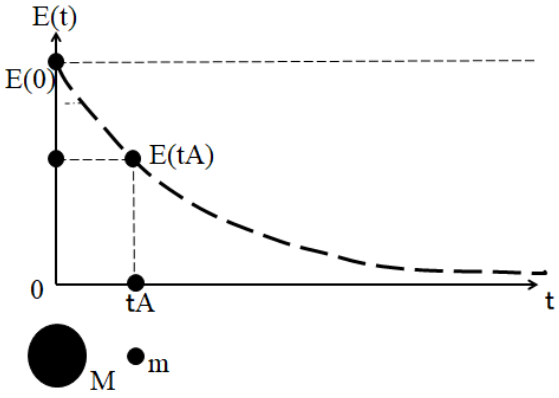


Figure 6: Decreasing energy of a gravitational wave radiated from the mass (M)

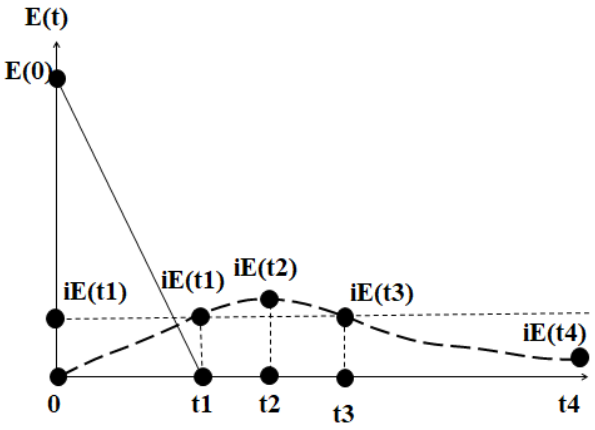


Figure 7: Relation between the Hubble's redshift law and ignored energy

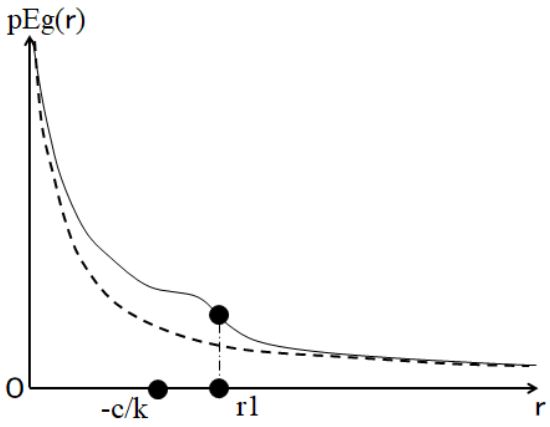


Figure 9: Relation between a partial energy of gravitational wave and distance

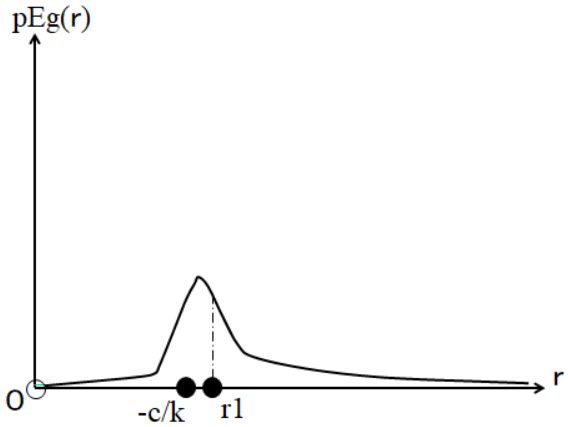


Figure 8: Relation between the partial ignored energy of gravitational wave and radius

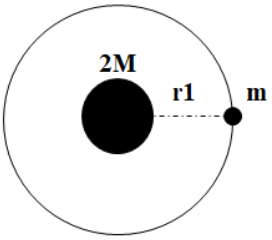


Figure 10: Relation between the masses (m, 2M) and distance (r1)

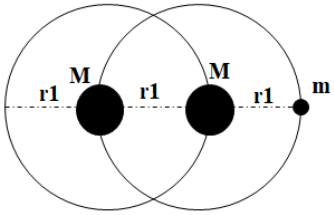


Figure 11: Relation between the masses (m, M and M) and distance (r1)