

# Newton Einstein Relation on Gravity

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## Abstract

*Our present concept about gravity is related with the mass and distance of the object. Still we are following the Newtonian concepts of gravity to measure the gravity of objects. Albert Einstein has made a great work on the concept of gravity, after Newton. But still we are trying to know more about gravity. According to me gravity is the property of energy. One must have to explain gravity on the basis of energy and it should be agree with the Newtonian theory of Gravity and law of conservation of Energy. I am agreeing that mass is also a form of energy. But I prefer to find gravity in accordance with the total energy of a system. I am going to find a relation to Newton's theory of Gravity and Einstein's Equivalency principle ( $E = mc^2$ ). Here I am making an attempt on this field. I am sure that I am on the right track. I am not placing any new equations here. I am using the existing equations in physics to find the gravity through my thoughts. The way which I am using these equations are may be strange. Sometimes I am thinking in reverse order, first I have found the gravity with the concept of energy. For that I am applying a constant "A" to relate Newtonian concepts to Einstein's Equation.*

## Introduction

To bring classical physics and Quantum theory in a same line we have to bring them under a same reference frame with certain measurements. We have to bring Classical Physics into microscopic level or Quantum Mechanics into macroscopic level or these two under a same reference frame. For that we have to think only with the concept of energy. I strongly believe that *mas just as a property of energy*. According to me microscopic or macroscopic dimensions are influencing the reference frames of the observer. Here I am trying to bring them under a same dimension in two different frames of an observer in a single frame. I think that it is possible if we bring Gravity as a main component in these two branches of physics. So I am trying to insert gravity in these two. Gravity is already described in Classical physics. So we can start from it.

Gravity of an independent system

We know that every object has its own gravity. Gravity was mentioned clearly in Sir Isaac Newton's theory of universal gravitation. So here I am going to start from Newton and his theory of Gravity. We know that.....

$$F = G \frac{m_1 m_2}{r^2}$$

(1)

Here F stands for force. This equation describe us the gravitational attraction between two systems (objects).

All we know that every objects with mass (Energy) show its own gravity. Now imagine an object at space. We can calculate its gravity by the equation

$$g = \frac{Gm}{r^2} \quad (2)$$

Here we can find the gravity of an independent system.

Now we can bring this object into Earth's surface. At this time the gravitational attraction between earth and the system will be equation (1). But at the same time the object's own gravity will be equation (2). Anyhow we can work with the concept that the object is in space for more clarity and the equation (2) as its gravity. So equation (2) states  $g = Gm/r^2$ . By this we can bring out mass {m} and write as

$$m = \frac{g r^2}{G} \quad (3)$$

It is the time to think about the total energy of the object at rest. For that we can use mass energy equivalence principle by Einstein. We can bring out the same equation (3), if we go through eq (4).

$$E = mc^2 \quad (4)$$

We can hide the mass from equation (4) and insert equation (3) instead of mass. So we can write it as

$$E = \frac{g r^2}{G} c^2 \quad (5)$$

This equation always states that  $E = mc^2$ . I just replace mass here.

We bring gravity, universal gravitational constant and radius of the object in equation (5) instead of mass. While we are bringing gravitational constant "G", the object is being a part of universal gravity. So it can be macroscopic or microscopic according to the distance between the object and the observer. The important thing is that the object is just become a part of the total gravity of the universe. Here the reference frame of the object and the observer is the total energy of the universe and its gravity at the whole volume of the universe.

Now we will go through Quantum Theory and try to insert gravity and universal constant of gravity in it. We can use Planck Einstein relation to combine these two theories.

$$f = \frac{E}{h} \quad (6)$$

Here f stands for frequency, E is the energy and h is the Planck's constant.

By using Special Relativity, the equation (6) can be written as

$$f = \frac{\gamma m_0 c^2}{h} = \frac{m_0 c^2}{h} \sqrt{1 - \frac{v^2}{c^2}}$$

(7)

Here  $m_0$  is the rest mass of the object.

Now we can bring equation (5) to equation (7) and it can be written as

$$f = \frac{\frac{g r^2}{G} c^2}{h} \sqrt{1 - \frac{v^2}{c^2}}$$

(8)

And we can say simply as

$$f = \frac{g r^2}{G} c^2 / h$$

(9)

By this we can bring the classical and quantum physics under a same preference frame.

*According to me the fundamental of universe is the energy. It has its own properties and will not change even if it is macroscopic or microscopic object. And laws of motion is also unchangeable, I think that still we have to know more about the laws of motions. Our understanding about the laws of motion is incomplete.*

## Quantum Gravity

According to me *gravity is the fundamental property of energy*. We already know how to calculate the gravity of an object with its mass (2). An object with mass  $m$  has the total energy in it is  $mc^2$ . So I would like to bring out gravity in the equations of energy and my logics leads me to the equation  $E / A = g$ . I was worked so far with this equation and I found something is missing there to coincide everything. Then eq (22) gives me the idea that, *any amount of energy at any stage, it has a volume. According to the difference in volume its gravity also varies. It is also stated in Newton's theory of gravity as distance square. For me decrease of volume will increase the strength of gravity and it can stop even radioactive decay*. So I have rearranged the equation as.....

$$\frac{E}{A r^2} = g$$

(10)

Here  $A$  is a constant,  $E$  is energy  $r$  is the distance from the center of the object and  $g$  is the gravity. The value of " $A$ " can calculate easily as  $A = E / gr^2$ . Equation (10) is to describe the gravity of energy which can have at  $mc^2$  amount of energy at a volume.

We can write the eq (10) as this way, but still we have to find the value of A from another equation.

$$A = \frac{E}{g r^2} \text{ or } \frac{c^2}{G} \quad (11)$$

We can calculate the value of A as  $c^2 / G$ , eq(26) will explain it. Here  $c$  is the velocity of light and  $G$  is the universal gravitational constant. This equation leads us to.....

$$A g r^2 = m c^2 \quad (12)$$

Now we will go through Quantum mechanics. The equation for the energy of a photon is,

$$E = h f \quad (13)$$

E is the energy, h is planks constant and f is the frequency.

Here also we can bring the equation (10) because a *massless photon also show its own gravity*. This leads me to create this idea. *Even a photon doesn't show mass, it has its own energy. And that energy shows gravity*. So we can write as.....

$$A g r^2 = h f \quad (14)$$

Now we can bring energy of a photon as the measurement of energy. *Even it doesn't show the mass, the energy of a photon can add some mass if it is absorbed by a particle or a system*. Imagine that photoelectric effect is occurring in a plate. Here we can imagine that 1000 electrons are absorbing 1000 photons at the same time. So an energy or a mass is going to add to the plate by the photons. So the total energy E of the plate at this time is.....

$$E = m_0 c^2 + m_1 c^2 \quad (15)$$

Here the added mass or energy of the system is.....

$$n (h f) = m_1 c^2 \quad (16)$$

$n$  is the number of photons.

Now we can calculate the additional gravity gained on the system by the photons.

$$\frac{n(hf)}{Ar^2} = g = \frac{m_1 c^2}{Ar^2} \quad (17)$$

While bringing equation (3) here, we can write it as....

$$\frac{n(hf)}{Ar^2} = \frac{Gm}{r^2} = \frac{m_1 c^2}{Ar^2} \quad (18)$$

We can find the gravity on the quantum concepts as.....

$$\frac{n(hf)}{Ar^2} = \frac{mc^2}{Ar^2} = g \quad (19)$$

Total energy of a particle or an object we can write as.....

$$n(hf) = mc^2 \quad (20)$$

Here  $n(hf) = mc^2$ ,  $n$  number of photons can occupy in  $mc^2$  amount of energy at any volume. The arrangement of photons (particles) depends upon the system requirements.

### Gravity of a System

Now eq (20) is the gravity of any energy ie; the gravity of " $n(hf)$ " amount of energy or " $mc^2$ " amount of energy. Here we can see that  $n(hf) = mc^2$ . At this time these two equations will not mention any physical systems. It only represents the amount of energy. We all knows that gravity is directly proportional to mass and inversely proportional to the square of its distance from the center. If we follow the above stated equations, we can never reach with this concept. For that we can imagine an experiment. Imagine that we have two balloons (A & B) with us. Balloon "A" is more elastic than "B". Now we can imagine that we are filling these two balloons with 10 Kg of gas on each. Naturally the balloon "A" will expand more and what will be the gravity of each balloons. Here we can think about the energy density on each balloons.

$$\rho = \frac{m}{V} , m = \rho V \quad (21)$$

Here  $\rho$  is the mass per unit volume,  $V$  is the volume of the mass itself and  $m$  is the mass

So in this system (Balloons) we can write

$$n(hf) = mc^2 = \rho V c^2 \quad (22)$$

So gravity of any system at any volume is

$$g = \frac{\rho V c^2}{A r^2} \quad (23)$$

Here we can notice that when we are measuring the gravity while increasing the volume,

$$\frac{n(hf)}{A r^2} = \frac{m c^2}{A r^2} = \frac{\rho V c^2}{A r^2} \quad (24)$$

$n(hf) / A r^2$  or  $m c^2 / A r^2$  are equal to  $\rho V c^2 / A r^2$ , because gravity is varying according to the distance from the center. Increasing volume will increase the distance from the center  $r$ .

Now only we can define the value of the constant A because still we don't have any idea about the gravity of energy. Up to now we only know to define the gravity with the newton's equations {eq (2)}.

So we can write

$$\frac{Gm}{r^2} = \frac{\rho V c^2}{A r^2} \quad (25)$$

Here  $Gm / r^2$  is the gravity of the independent system at  $\rho V c^2$  volume.

The value of A we can define as.....

$$A = \frac{\rho V c^2 r^2}{Gm r^2} = \frac{c^2}{G} \quad (26)$$

Here we can see that the value A becomes  $c^2 / G$ , as I said in eq (11).

We must have to check with the above equations are right or wrong. According to Newton's theory of gravity, mass we can define as  $m = g r^2 / G$  eq (3). So we must have to get the same answer here too. For that we can take the eq (12 or 23) here and it leads us to.....

$$m = \frac{A g r^2}{c^2} = \frac{\frac{c^2}{G} g r^2}{c^2} = \frac{g r^2}{G} \quad (27)$$

Now I have to get the eq (1)  $F = G m_1 m_2 / r^2$ , according to my concept of gravity and it must have to equal with the eq (1). So.....

$$F = \frac{(m_1 m_2) c^2}{A r^2} = G \frac{m_1 m_2}{r^2} \quad (28)$$

By eq (11),  $A = c^2 / G$  and we will get the same results.

### Conclusions

*Any form of energy (even with mass or without mass) has its own gravity. Gravity is the basic property of energy. Energy can add a mass to any system when it is absorbed by the system and mass is also a property of energy. At any volume the amount of Energy remains as the same or Energy is conserved and gravity is changing according to the systems volume.*

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### References

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This work leads me to think more about gravity and the concepts of gravity to relate with the energy.
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- [3] Max Plank, theory of blackbody radiation and the energy of a photon. Many other articles related to this theory.
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