

Experimental Discovery of the Particle Properties of Gravity and Gravitons by Theoretical Investigation of the Bent Point of Space Time

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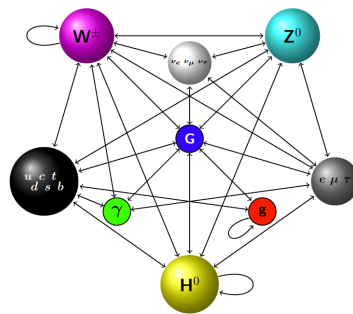
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Abstract

As, it is known having more challenged on the wave or particle nature of light, from the theory of Newton to proof of its being wave by Huygens and also Young's Double-slit experiment, more important, Maxwell equations, all showed the nature of being wave of the light till Heinrich Hertz discovered photoelectric phenomenon and after that Einstein talked about the mathematic and quantum characteristics of this phenomenon, his explanations about this phenomenon showed failure of the characteristic of being wave of light in photoelectric explanation so double wave-particle characteristic failed in the scientific society. We all know that many of mass and energy fundamental systems have the same double characteristic of the light. The Photoelectric is the action of light and matter interactions that can prove the double light-particle nature because of inability of being wave principals of the light. Another one of the nature fundamental forces which many believed on its double wave-particle nature is gravity.

In this essay we try to interpret the inability of wave nature of gravity in explanation of dark matter and we will see how the concept of invisible masses of the matter is the only action of the graviton interaction and proof of existence of constituent packs of gravity energy i.e. gravitons. Discovering this innovation is wonderful.



In the name of God who knows proportion of graviton interruption with density and compression and curvature of space-time

Inconsistency of available gravity and galaxy objects with its mass

As we know gravity is one of the nature fundamental forces that serious and scientific studies about this were carried out after the Renaissance in the West and Galileo di Vincenzo Bonaiuti de' Galilei as one of the scientists who studied its gravity and characteristics presented his theory of relativity, Kepler and Copernicus and other scientists also talked about gravity so far as Newton finally presented the gravity mathematics nature and presented modern framework about this important and effective forces of the nature. For many years Newton's principles constituted physics framework and many

technologies were created based on it and improved human society. All definitions were based on Newton principles and interpretations until Albert Einstein asked about reason of gravity action instead of study about gravity actions and for the first time showed that why there is gravity of an attractor force in the nature while presenting relative theory and how we can study it as a geometric property of space and time.

So far, the society has always used the results of general relativity and studies and discovers them in turn. Today's, one of the important questions about gravity in the scientific society is the wave-particle

duality of the gravity. This question that does the gravity like other fundamental forces such as electromagnetic has the wave-particle duality? Wave nature of gravity which predicted by general relativity about one century ago, recently, we could discover it experimentally. Therefore we are sure that gravity nature is being -wave. In this easy it was tried to prove the existence of particles carried gravity force i.e. graviton.

In 1930s, a group of astronomers found a contradiction with studying some of the galaxies and the relation between mass and gravity available in their objects. The mass available in some galaxies was not enough that create a gravity field to keep the objects matter component near each other.

Having Studied mass of the constituents (objects) of some galaxies, predictions indicated generally galaxy due not to enjoy suitable mass and enough gravity could not keep some of its objects like stars and planets. But surprisingly and unbelievably some galaxies had this capability in cluster cloud that act unlike the above prediction. From that time on, the scientific researches focused on this issue and in short time many examples were found in different kinds of galaxy some of the astronomers and physicians initiated to solve it to observe this issue and presented a hypothesis named dark matter in the galaxy explained necessary mass for needed gravity for action of some of huge objects in the sky. Dark matter hypothesis explains a special kind of matter that produce gravity and curve space and time also not reflect the light and no specification of its constituents is there, is distributed in the galaxy disparately and masses of it is the factor of formation of many galaxies and curving optic wave in the space-time pack.

We give up the specifications of dark matter which before were explained and inform that we do not need to remember unnatural hypothesis at all to justify additional curvature and gravity available in the galaxy because of little mass available in it and try to show the result of a weak hypothesis scientific and universal. Whereas a hypothesis of inconsistency of mass known in the galaxies with available gravity between their objects is a property of gravity actions that of course gravitation wave nature is not able to explain it but we can interpret and justify that phenomenon correctly by particle property- producing gravity and graviton interaction justify that phenomenon and explain that this fact, finally, causes rejection of dark matter hypothesis and proof of graviton existence and gravity particle nature because gravity wave property is disabled to justify the additional gravity phenomenon between galaxies objects and the gravity particle nature is capable to justify and being consistence with that phenomenon.

Graviton interactions and explaining the phenomenon of additional gravity between the basic components of galaxies by it. Particle justification for inconsistency phenomenon of mass and gravity resulted from it.

From the viewpoint of the particle model of gravity, the reason for hyper gravity between the components of galaxies is graviton interaction and increase in energy density of gravitational system (galaxy) and amplification of the space-time curvature resulted from it.

Imagine that there is a mass of matter in a part of one galaxy. This

mass of matter has bent the space-time background by its own nature; therefore, it exerts gravity and gravitons mediates this force of gravity and they propagate through space-time to exert gravitational attraction with other gravitational systems.

Let's suppose, there are other gravitational systems in that galaxy which in turn each propagates gravitons to mediate the gravitational energy in space-time for its part. The most important point in this graviton propagation which is done on a large scale and a lot is that many of these gravitons scattered in space-time interact with gravitons propagate by other gravitational systems in many parts of that galaxy and it creates points in the space-time background in such a way that their spatial compression are intense and their energy density is very high due to aggregation of interacted gravitons.

Eventually, the gravity of that area and the curvature slope of that area increase. This way of justifying the phenomenon of mass mismatch and the resulting gravity is directly due to the existence of gravitons and the reason for its interaction in the space-time background. In other words, this method of justification is a bridge between the nature of the gravitational wave resulted from the geometric property of space-time and the explanation of the general relationship with the particle nature of gravity, which is directly due to the density of different areas of space-time and intensification of gravity in those areas.

This beautiful generalization of the particle model of gravity can explain and justify all the observations made about the mismatch between mass and gravity of a gravitational system.

According to the proof of the existence of gravitons in the phenomenon, gravitons exist as gravitational energy quantum in the universe. If gravitons, like photons, are particles that carry gravitational energy, then:

The energy of a gravitons: $E_g = \varphi \lambda^{-1}$

The energy of gravitational wave with (n) gravitons:

$$\sum_n^1 E_g = \varphi n \lambda^{-1} = \hbar c n \lambda^{-1} \Rightarrow \varphi = \hbar c$$

From the above relation, it can be concluded that the energy of each graviton is directly related to its frequency and inversely related to its wavelength.

$$E_g \propto f = \frac{V_g}{\lambda_g} \Rightarrow V_g = V_{ph} \Rightarrow E_g \propto \frac{c}{\lambda_g}, E_g \propto \frac{1}{\lambda_g}$$

As mentioned earlier, gravitons compact different areas of the space-time background by interacting with each other and increase the energy density in those areas, which this issue increases the intensity of gravity and, with general relativity interpretation, increases the curvature slope of space-time in that area. With this justification, we no longer need invisible masses of matter and hypotheses incompatible with scientific principles such as dark matter, to provide mass and the gravity of that region of the universe. It is clear that Einstein's general relativity has the most modern and complete definitions of gravity.

It is clear that Einstein's general relativity has the most modern and perfect definition of the gravity. The General relativity considers gravity as a geometric property of space-time and considers the

mass and mass density of a system in proportion to the curvature of space-time and interprets it as gravity.

Einstein's field equations are ten differential equations that ultimately derive the value of space-time curvature in that region from the mass-energy density in a system. Thus:

$$R_{\mu} - \frac{1}{2}Rg_{\mu} + \Lambda = \frac{8\pi G}{C^4}T_{\mu}$$

The above sentence is the final statement of Einstein's field equations. Now if we want to give a mathematical –geometrical concept to gravitation interaction concept we should express the issue before that. Since 1930 which the concept of dark matter hypothesis was expressed, the goal of hypothesis processor and astronomers of the explanation of dark matter hypothesis was to compensate deficit of mass which its gravity was found in many galaxy areas but there is no effect from mass of gravity matter.

Now, we justify this gravity intensity based on gravity particle model and graviton interactions and prove that we need particles to carry gravity and also reject the dark matter hypothesis we present the relation based on relativity field equations which specify for us how much we need energy density increase resulted from gravity density to enough our in- question gravity.

$$R_{\mu} - \frac{1}{2}Rg_{\mu} + \Lambda = \frac{8\pi G}{C^4}T_{\mu}$$

$$R_{\mu} - \frac{1}{2}Rg_{\mu} = G_{\mu} \Rightarrow G_{\mu} - \frac{1}{2}Rg_{\mu} + \Lambda = \frac{8\pi G}{C^4}T_{\mu}$$

In the above relation ($R_{\mu} - 1/2 Rg_{\mu} = G$) indicates space- time curvature resulted from T_{μ} Stress –Energy) energy mass tensor. Tensor.

$$\text{If: } T = (\rho + P)u^{\alpha}u^{\beta} + Pg^{\alpha\beta}, gu^{\alpha}u^{\beta} = -c^2$$

$$\text{Then: } u^{\alpha}u^{\beta} = \frac{-c^2}{g}$$

$$\Rightarrow T_{\mu} = (\rho + P) - c^2g^{-1} + pg$$

By factorizing we have:

$$T_{\mu} = -C^2g^{-2}(\rho + P) + P$$

Now, we want to compensate deficit of energy-mass tensor for space-time curvature with increasing energy density by graviton density resulted from collision between each other and compress space-time background and increase space time curvature.

We should add a parameter i.e. (ρ') to the tensor sentence in the relation i.e.

$$T_{\mu} = -(\rho' + \rho + P)c^2g^{-1} + Pg$$

P: Hydraulic pressure density P: energy density T: energy- collision tensor

ρ' : indicates added energy density resulted from graviton density in different regions

If in the above relation

$$(\rho + P = S)$$

Then

$$T_{\mu} = -c^2g^{-2}(\rho' + s)$$

Therefore with placing new relation of mass energy tensor with added parameter (P0) resulted from collision of gravity background (graviton) and their density in different points, we make equation of Einstein field:

$$\Lambda + G = \frac{8\pi G}{C^4}[(-C^2(S + \rho') + P)g^{-2}]$$

We can get resultant of energy density resulted from graviton density in different points from this relation:

$$\rho' = \frac{g^{-2}(G_{\mu} + \Lambda)}{-8\pi Gc^2} - (P + s)$$

And because the resultant of energy density as $\sum \frac{E_g}{V}$ then we have

$$\sum_n \frac{E_g}{V} = \frac{g^{-2}(G_{\mu} + \Lambda)}{-8\pi Gc^2} - (P + s)$$

With respect to the above relation we can calculate the resultant of the added energy density resultant from density and graviton collision [1-8].

Conclusions

1. Hypothesis of Dark Matter is rejected. There is no need to use the hypothesis of dark matter in order to compensate the required mass for amplification of gravity between galaxy components. By presenting the particle model of gravity, this phenomenon can be explained only with graviton interactions.
2. Gravitons exist and justifying the phenomenon of the amplification of gravity and the space-time curvature resulted from increase in energy density which occurs by collision between compressed gravitons, is a reason for confirmation of the existence of gravitons directly.
3. Energy of gravitons as energy packs which mediates the force of gravity is calculated with the following formula: $E_g = \phi\lambda^{-1}$ And for a wave of gravitational waves with energy (E_g) is the following formula: $E_g = \phi n\lambda^{-1}$
4. We use the concept of increase in energy density resulted from the compressed gravitons to justify the amplification of gravity inconsistent with the gravitational system (mass of matter).
5. The explanation that explains the resultant of increase in energy density resulted from the collision and compression of gravitons regarding to amplification of the space-time curvature and gravitational force of that part is as follows:

$$\sum_n \frac{E_g}{V} = \frac{g^{-2}(G_{\mu} + \Lambda)}{-8\pi Gc^2} - (P + s)$$

6. The inconsistency phenomenon of the mass of system with its gravity is justified by particle property of gravity, i.e. gravitons based on principles of relativity but justification of this phenomenon is not possible with the wave property of gravity. Therefore, gravity in this phenomenon acts according to its own particle property.

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