Noname manuscript No.
(will be inserted by the editor)

Gedanken Support for Newton's Classical Gravity over Einstein's Geometric Gravity: The mass Induction by a Black Hole

Received: 2019 / Accepted:

Abstract Gravity has become a subject of debate. Till 1915 with the Einstein's general theory of relativity, gravity has been considered as an interaction force between massive objects according to Newton's classical gravity theory. After Einstein's general relativity, gravity has been considered as a measure of the curvature of space where the matter is inside. In this study, we introduce a philosophical insight for the deflection of light by a black hole in order to support the classical description of Newtonian gravity. We propose a mass creation mechanism by a black hole instead of the gravitational space-time curvature mechanism for gravitationally deflecting massless light. The proposal in the study is a new approach to explain the gravitational reaction of the massless light particles to a massive object that we firstly call it as the mass induction on a pair of photon in the influence of very large gravitational potentials.

Keywords Newtonian Gravity · Einstei's Gravity · Pair Creation · Black Holes · Mass Induction

Mass Induction by a Black Hole

While Gravity, one of the four fundamental forces of nature, had been described as an interaction force between massive objects by Newton, it was described as a measure of curvature of space-time due to the mass of source objects in Einstein's general theory of relativity (Einstein, 1915; Cohen, 1999). In this study, we try to advocate the classical Newtonian definition for the gravitational force, which does not assume it as a geometrical manifestation of space-time as in the case of Einstein's general relativity theory. In order to describe the gravity in a non-geometrical model, we proceed by Newtonian concepts and formalism as in the studies of Friedman (Friedman, 2016a,b,c, 2017). Therefore, we begin with the Newtonian gravitational lensing of an incident light due to a black hole.

In classical electrostatics, we know that a charged body can induce a local charge on an electrically neutral body. In fact, the electrically neutral objects are not assumed to have uncharged. Instead, they are known as they are formed by equal amount of positive and negative charges. In a similar way, a light particle is known to be massless. This is of course true, but by making analogy with the electrical property of neutral objects, a light can be considered as it is formed by a particle and its corresponding anti-particle having exact masses (Griffiths, 1987). Therefore, the light may in fact carry some inductive mass which is originated by the particle and corresponding anti-particle, forming the light together.

We know that, a particle and a corresponding anti-particle can come together to form a light with an energy proportional to their masses, and from the fact that these are reversible reactions, these two light particles can turn into a particle and a corresponding anti-particle by a reversal reaction. Consequently, under suitable conditions two photons can form two particle pairs

having masses. For instance, an electron and positron can form two gamma photons (Griffiths, 1987). Their all masses turn into the energy of gamma light. If the necessary conditions are satisfied, these two photons can undergo the reversal reaction, and form their constituents an electron and a positron. Here the necessary condition for massless photons to create a pair of massive particle and corresponding anti-particle is the energy of the photons. If the photons are exposed to sufficient energy, they can reform their constituent particles and anti-particles.

According to the Einsteins general theory of relativity, the gravitation is the curvature of space-time due to the present mass-energy inside the space-time (Einstein, 1915). Therefore, a black hole having an extra-large mass and zero-like volume forms a curved singularity on space-time that can attract anything in the event-horizon of the black hole, into itself. This critical region is known as the beginning region of the curvature of space-time. Such that, even if the massless photons can get this critical region, they are also attracted by the gravitational attraction of the black hole. In fact, the gravitational force is classically known as to act on the massive bodies. However, because the gravitational field of a black hole is extremely large, it is assumed that the light follows the path which is curved by this extremely high gravitational field of the black hole.

In this paper, we make a philosophical proposition that is analogous to charging an electrically neutral object by another charged object with induction. We know that the massless photons can be considered as they are formed from a pair of massive particle and corresponding anti-particle. Then, the necessary requirement to create the mass and to reform this pair of massive particle and corresponding anti-particle from the massless photons is providing sufficient energy for the photons, which must be as same as the rest mass energy of the particle and anti-particle which are going to be reformed. We

know that a black hole produces a very large gravitational potential field, and this field can be accepted to provide necessary requirement for supplying enough energy on photons to create mass, and then to reform two massive particles. After the creation of two massive particles, the photons are considered to be induced with mass by the black hole. Then, there exist a massive particle and its corresponding massive anti-particle which can classically be considered that the black hole will perform a gravitational interaction force on these massive particles, as of the Newton's universal gravitational force between massive bodies. Because of this attractive force, the light is attracted by the black hole. The reason that deflects the massless light by a gravitational force is the mass creation by induction on massless photons due to very large masses with high gravitational potential energy increasing the photons energy to create massive particle and corresponding anti-particle pairs from massless photons.

If the mechanism proposed above is true, the deflection of massless photons by gravitational force of the massive black holes will be assumed to occur by the classical way of Newton's gravitational interaction forces which arise between two massive bodies. Therefore, we do not need Einstein's curved space-time model for which the light will follow along the curvature, and be deflected. If we are able to construct the mathematical description of the philosophical proposal in this paper, this will allow us to assume the deflection of light by black holes as a classical gravitational interaction mechanism. We will not have to consider the light follows a curved space-time formed by the black hole, as a reason of that the light is deflected by a black hole. Therefore, we can claim that light is turned into a pair of massive particle and anti-particle, and these massive particles are attracted by the black hole with Newtons classical gravitational interaction force between massive objects.

Conflict of interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

References

Cohen I.B. and Whitman A., (1999). Isaac Newton, The Principia: Mathematical Principles of Natural Philosophy. University of California Press, California

Einstein, A., (1915). The Field Equations of Gravitation. Kniglich Preussische Akademie der Wissenschaften, 1915, 844847

Friedman Y., (2016). Europhysics Letters, 116 19001.

Friedman Y. and Steiner J.M., (2016). Europhysics Letters, 113, 39001.

Friedman Y., Livshitz S. and Steiner J.M., (2016) Europhysics Letters, 116, 59001.

Friedman Y. and Steiner J.M., (2017). Europhysics Letters, 117, 59001.

Griffiths, D., (1987). Introduction to elementary particles. USA: John Wiley Sons, Inc.