Review Article   **Open Access**

After all: What is the Physical meaning of Dark Energy and Dark Matter?

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Article Info

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Abstract

Unfortunately, the law of conservation of the mass and energy is still poorly understood and therefore misunderstood in the midst of the twenty-first-century, hindering the understanding of dark energy and dark matter.

Keywords: Dark energy; Dark matter; Newtonian mechanics; Dias' Equation; Fifth dimension; Electro-magnetic-photon effect; Quasar in formation.

Introduction

The Newtonian mechanics [1] is said to be traditional and outdated, because it was established 302 years ago, only in 1687. However, the concept of gravity, which stems from Newtonian mechanics [1], finds no difficulty in quantifying it, allowing its mathematical link with electromagnetism, in the unified field's theory, according to Dias [2-4].

With the establishment of the electro-magnetic-photon effect of light from Dias' Equation [3,4] it is possible that the questioning between dark energy and dark matter can be definitively terminated.

According to Einstein [5], space and time are interconnected in the fourth dimension and the gravimetric potential equates to orbital squared velocity of moving bodies.

The Einstein's Equation (1905) is more than just a simple equivalence between mass and energy [6]. It represents the physical law, primordial of the universe, of the conservation of dark energy and dark matter, according to Dias [2-4].

About Newtonian Mechanics in the Third Dimension

From Newton [1], the concept of gravity ($\bar{g}$) emerged from less gradient ($-\bar{\nabla}$), in the third dimension [$s(x, y, z)$], of the gravimetric potential (U) (Figure 1).
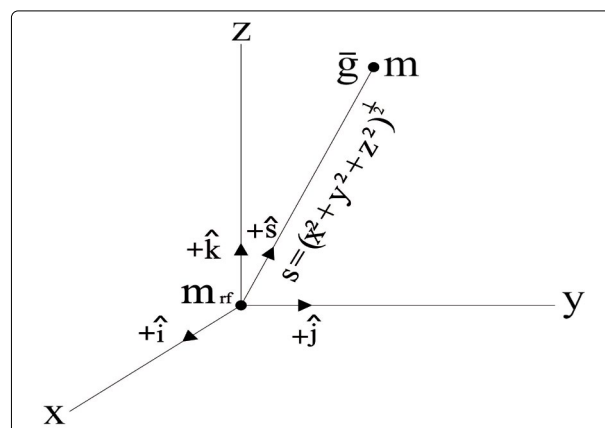
Figure 1. Graphical representation of gravity acceleration ($\bar{g}$) at three dimensions of space (x, y, z) according to Newton's conception (1687). By illustration, (m) represents the mass of the apple that fell on the head of Newton and (m_{rf}) represents the mass taken as referece in the gravitational center of the Earth.

$$U = G\frac{m}{s} \tag{1}$$

$$\overline{\nabla} = +\hat{i}\frac{\partial}{\partial x} + \hat{j}\frac{\partial}{\partial y} + \hat{k}\frac{\partial}{\partial z} = +\hat{s}\frac{\partial}{\partial s} \tag{2}$$

$$\overline{g} = -\overline{\nabla}U = -\hat{s}\frac{\partial}{\partial s}\left(G\frac{m}{s}\right) = \frac{Gm}{s^2}\hat{s} = \frac{\overline{F_a}}{m_{rf}} \tag{3}$$

About Newtonian Mechanics in the Fourth Dimension

According to Einstein [5], space (s) and time (t) are interconnected in the fourth dimension [$s(x, y, z), t$] and the gravimetric potential (U) equates to the orbital squared velocity of moving bodies (v^2). Thus, the equation of gravity ($\overline{g}$), which stems from Newtonian mechanics, can be extended to the fourth dimension.

$$G\frac{m}{s} = v^2 \tag{4}$$

$$\overline{\nabla} = +\hat{s}\frac{\partial}{\partial s} + \hat{t}\frac{\partial}{\partial t} \tag{5}$$

$$\overline{g} = -\hat{s}\frac{\partial}{\partial s}\left(G\frac{m}{s}\right) - \hat{t}\frac{\partial}{\partial t}\left(v^2\right) \tag{6}$$

$$\overline{g} = v^2\left(\frac{\hat{s}}{s} + \frac{\hat{t}}{t}\right) = \frac{\overline{F_a}}{m_f} \tag{7}$$

About Newtonian Mechanics in the Fifth Dimension

Dias [2-4] showed that space (s), time (t) and mass (m) are interconnected, thus establishing the Dias' Equation of gravity ($\overline{g}$) in the fifth dimension [$s(x, y, z), t, m$] [3].

$$\overline{\nabla} = +\hat{s}\frac{\partial}{\partial s} + \hat{t}\frac{\partial}{\partial t} - \hat{m}\frac{\partial}{\partial m} \tag{8}$$

$$\overline{g} = -\hat{s}\frac{\partial}{\partial s}\left(G\frac{m}{s}\right) - \hat{t}\frac{\partial}{\partial t}\left(v^2\right) + \hat{m}\frac{G}{s} \tag{9}$$

$$\overline{g} = v^2\left(\frac{\hat{s}}{s} + \frac{\hat{t}}{t} + \frac{\hat{m}}{m}\right) = \frac{\overline{F_a}}{m_d} \tag{10}$$

The Dias' Equation (10), which stems from Newtonian mechanics [1], is the mathematical representation of the figure of a hyperboloid of revolution (Figure 2), showing the galaxies gravitating around the black hole, which unifies the universe from its gravitational center filled with dark matter (m_d).
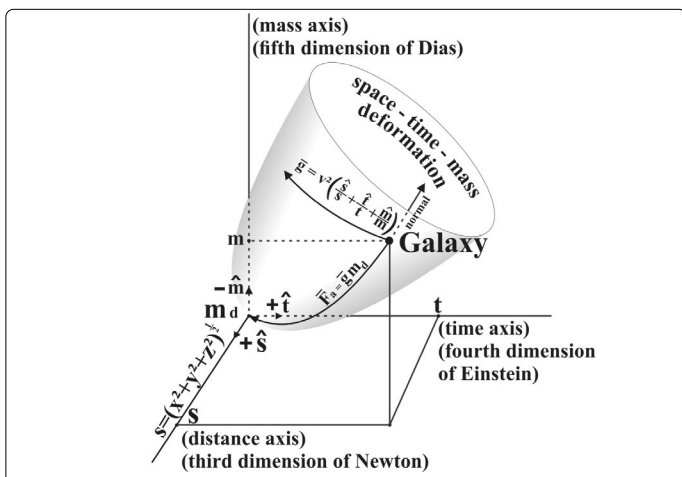
Figure 2. The Figure of the universe is that of a hyperboloid of revolution at the fifth dimension.

The Electro-Magnetic-Photon Effect

In the light photons limit $\left(v \rightarrow c, m \rightarrow m_p\right)$, Dias' Equation (11) represents, for unified field's theory, the mathematical link of quantum mechanics between gravity and electromagnetism [3].

$$\Im = \left(\frac{\overline{F_a}}{\overline{I_p}}\right) = m_d c^2 \tag{11}$$

Where:

$$\Im = \iiint \frac{1}{2}\left(\overline{E} \cdot \overline{D} + \overline{H} \cdot \overline{B}\right) d_s d_t d_{m_p} \tag{12}$$

$$\overline{I_p} = \iiint \left(\frac{\hat{s}}{s} + \frac{\hat{t}}{t} + \frac{\hat{m}}{m_p}\right) d_s d_t d_{m_p} \tag{13}$$

$$\overline{F_a} = -\overline{\nabla}\Im = \Im\overline{I_p} \tag{14}$$

Taking (12) and (13) in (14):

$$\frac{-\overline{\nabla}\left(\overline{E} \cdot \overline{D} + \overline{H} \cdot \overline{B}\right)}{\left(\overline{E} \cdot \overline{D} + \overline{H} \cdot \overline{B}\right)} = \left(\frac{\hat{s}}{s} + \frac{\hat{t}}{t} + \frac{\hat{m}}{m_p}\right) \tag{15}$$

The Physical meaning of Dark Energy and Dark Matter

The equation (15) represents the electro-magnetic-photon effect of light [4], which clarifies the physical meaning of dark energy ($\Im$) and dark matter (m_d). It is important to note that, without the fifth dimension, which is the mass, there would be no electro-magnetic-photon effect. Thus, the electro-magnetic-photon effect (equation 15) manifests itself when the light, which is at the same time electro-magnetic wave and particle, is plucked from the stars, on the cosmic scale, by the attraction power of the black hole, being transported by the dark energy ($\Im$) there is at speed of light squared (c^2) to the aforementioned black hole that exists in the gravitational center of the galaxy (Figure 3), where the light is definitively stored as dark matter (m_d), according to the equations (16 and 17).
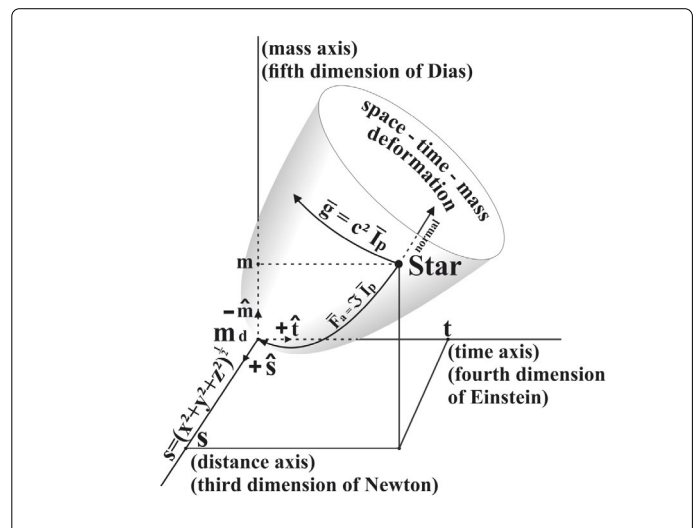
Figure 3. Galaxy at the fifth dimension.

$$\Im = m_d c^2 \tag{16}$$

$$\lim_{vol \to 0} \frac{m_d}{vol} = \lim_{d \to \infty} d \tag{17}$$

The Einstein's Equation (16) is more than just a simple equivalence between mass and energy [6]. It represents the physical law, primordial of the universe, of the conservation of dark energy ($\Im$) and dark matter (m_d).

The equation (17) is a contribution of Dias [2-4], showing that dark matter (m_d) independent of the volume (vol) tending to zero and the density (d) tending to plus infinity. According to equation (17), dark matter (m_d) can correspond to a single photon or to the whole matter of the universe accumulated in a simple point of singularity.

Consequences

The arrival of light in the black hole, coming from the stars on the cosmic scale, creates a clear cloud in the central part of the galaxy (Figure 4), interpreted by Dias [4] as being quasar in formation.

Figure 4. The Milky Way (obtained by internet).

The equation (15) of the electro-magnetic-photon effect also shows that light in motion creates gravitational waves.

Appendix

Symbols used in this Work and its Meanings

$\overline{g}$ = Gravitational field

$\overline{\nabla}$ = Vector mathematical operator and differential called gradient

U = Gravimetric potential

G = Constant of universal gravitation

x, y, z = Space coordinates axis representing the Newton's third dimension

$s = \left(x^2 + y^2 + z^2\right)^{\frac{1}{2}}$ = The smallest straight distance representing space implosively accelerated

Conclusion

1. The concept of gravity, which stems from Newtonian mechanics, finds no difficult in quantifying it, allowing its mathematical link with electromagnetism, in the unified field's theory.

2. The electro-magnetic-photon effect manifests itself when the light, which is at the same time electro-magnetic wave and particle, is plucked from stars on the cosmic scale, by the attraction power of the black hole, being transported by the dark energy there is at speed of light squared to the aforementioned black hole that exists in the gravitational center of a galaxy, where the light is definitively stored as dark matter.

3. The dark matter independent of the volume tending to zero and the density tending to plus infinity and may correspond to a single photon or to the whole matter of the universe accumulated in a simple point of singularity.

4. The arrival of photons of light in the black hole, coming from the stars on the cosmic scale, creates a clear cloud in the central part of a galaxy interpreted as being quasar in formation.

5. The equation of the electro-magnetic-photon effect also shows that light in motion creates gravitational waves.

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$+\hat{i}, +\hat{j}, +\hat{k}$ = Unit vectors in the directions of the x, y, z, respectively

$+\hat{s}, +\hat{t}, -\hat{m}$ = Unit vectors in the directions of the straight axis s, t, m, respectively

t = Time regressively accelerated representing the Einstein's fourth dimension

m = Attracted mass cumulatively accelerated representing the Dias' fifth dimension

m_f = Attraction mass of the material point, in the center of mass of reference

$\overline{F}_a$ = Force vector of gravitational attraction

v^2 = Orbital squared velocity of moving bodies

$\Im$ = Dark energy

m_d = Dark matter

$\bar{I}_p$ = Way back travelled in the space implosively accelerated and in the time regressively accelerated by the photon of light, in its trajectory that goes from a star to the black hole in the interior of a galaxy;

m_p = Photon of light

c^2 = Speed of light squared

$\overline{E}$ = Electric field

$\overline{D}$ = Electric field displacement

$\overline{H}$ = Magnetic field intensity

$\overline{B}$ = Magnetic field induction

vol = Volume

d = Density

Int J Cosmol Astron Astrophys.
ISSN: 2641-886X

Volume 1 • Issue 3 • 1000118

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