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Journal of Physical Chemistry & Biophysics

ISSN: 2161-0398

Perspective

About Gravitation of the Earth and Other Bodies

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ABSTRACT

In this article we offer a new approach to description of the earth attraction. We develop the analogy between the gravitational forces in inertial system of coordinates and the centrifugal forces in non-inertial system of coordinates, and introduce the definitions of density of space ρ_s and density of time ρ_t, between wich the closest relation exists. Also we do an assumption that centrifugal forces appear due to the change of space component of the spacetime, and gravitational forces appear due to the change of time component of the spacetime.

Keywords: Space; Gravitational force; Earth; Density

INTRODUCTION

Usually there is a representation that the earth attracts objects which are on it, including people. However, it's known that gravitational interaction is weak enough, and it becomes appreciable only if the mass of body acquires very large value. Moreover, in Einstein's general theory of relativity the appearance of gravitation is explained by geometric effect of curvature of space-time. That's why in this article we do assumption that the earth itself takes no part in the process of objects attraction, and directly the attraction itself is explained by other reasons.

We consider two situations. First, a man, standing on the ground, jump up, and afterward the gravitational force immediately returns him back. Second, a man stands on the disk to which the torque is applied, and the centrifugal force immediately carries him over the edge of the disk. It's easy to understand that the nature of forces in these situations is similar, although in the second situation no massive objects like our earth appear. That's why it's reasonable to assume that the Earth itself takes no part in the process of objects attraction.

DESCRIPTION

In order to understand the reason of appearance of gravitational force we consider more in detail the condition of the man which stand on the rotating disk. From point of view of other man, standing still on the ground, the man on rotating disk passes many times through the same points of space. Whence, we can conclude that the density of space ρ_s for the man on rotating disk increase. The change of the density of space ρ_s inevitably leads to the change of the density of time ρ_t, as definitive relation exists between these two quantities. In this article we assume that this relation mathematically has such form:

$$\rho_s \times \rho_t^2 = const \quad \text{.............} (1)$$

where ρ_s is the density of space; and ρ_t is the density of time.

From (1) we can see that increase of the density of space leads to decrease of the density of time and vice versa.

The density of time ρ_t is larger, the time goes faster and vice versa.

We assume that the process of increasing of the density of space for the man on rotating disk is defined by multiplying it on factor $\frac{1}{1-\frac{a_1}{a_2}}$ where a_1 is centripetal acceleration, a_2 is normalization acceleration.

We know that $a_1 = \frac{v^2}{r}$, where v is a linear velocity of point on the disk; and r is a radius of point on the disk.

As a normalization acceleration we take $a_2 = \frac{c^2}{r}$, where c is a velocity of light.

Now we equalize the product (1) for the man on rotating disk and the man, standing still on the ground:

$$\frac{\rho_s}{1-\left(\frac{v^2/r}{c^2/r}\right)} \times \rho_t'^2 = \rho_s \times \rho_t^2 = const \quad \text{..............} (2)$$

Whence $$\rho_t' = \rho_t \sqrt{1-\frac{v^2}{c^{2'}}} = const \quad \text{.............} (3)$$

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Received: 24-Mar-2023, Manuscript No. JPCB-23-22542; **Editor assigned:** 27-Mar-2022, PreQC No. JPCB-23-22542 (PQ); **Reviewed:** 10-Apr-2023, QC No. JPCB-23-22542; **Revised:** 17-Apr-2023, Manuscript No. JPCB-23-22542 (R); **Published:** 24-Apr-2023, DOI: 10.35248/2161-0398.23.13.346

Citation: Shvydkyi OG (2023) About Gravitation of the Earth and Other Bodies. J Phys Chem Biophys. 13:346.

where ρ_t' is density of time for the man on rotating disk; ρ_t is the density of time for the man, standing still on the ground.

If we in (3) substitute the density of time by just the time t than we obtain the well-known school formula from the special theory of relativity, from which it follows that the time for the man on rotating disk goes slower than for the man, standing still on the ground.

So, the density of space for the man on rotating disk increase, resulting to the appearance of centrifugal force, which, likely force of Archimedes, pushes the man out of edge of the disk to the area with lower density of space.

Therefore, we conclude that centrifugal forces appear due namely to the space component of the space-time.

Unlike centrifugal forces, the gravitational forces appear due to the change of time component of the space-time. The field of the density of time can "diffract" on space objects like our earth (Figure 1). This "diffraction" leads to decrease of density of time near the earth, the time starts to go slower. So, when, for instance, a man jumps up from the surface of earth he enters in the area of higher density of time what immediately leads to the appearance of force, now gravitational force, which returns the man back. We assume that the earth itself takes no part in this process. The distribution of the density of time around the earth should have a form in order to the gravitational forces allow a description with the aid of potential.

If the density of time disappears fully as, for instance, in the area of black hole, then the gravitational forces can reach enormous values. It follows from (1) that the density of space in the area of black hole must considerably increase. This might be made in two ways-either the points of space become closer each other or black hole should start to rotate. The former case corresponds to the collapsing of space.

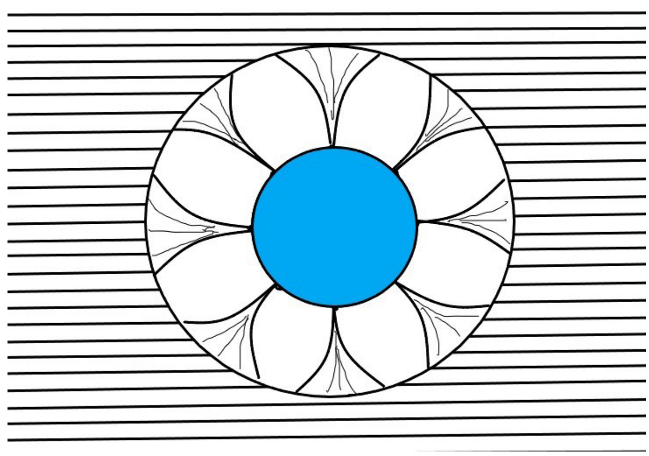

Figure 1: Approximate pattern of "diffraction" of the field of the density of time on our earth.

CONCLUSION

The qualitative assessment of appearance of gravitational and centrifugal forces was given in the article. Again the closest relation between the space and the time was highlighted. We introduced the definitions of the density of space and the density of time and gave their approximate mathematical ratio. Namely this ratio mainly determines the forces acting in the universe.