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Le Sage Push-Gravitation Revisited With Modern Knowledge of The Cosmic Background Radiation

Christian Opdal Eid

Norwegian University of Science and Technology, Department of Electronics and Telecommunications
Hellerudveien 22 B, 0672 Oslo, Norway

christian@opdaleid.no

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ABSTRACT

Push-gravity is an alternative theory to General Relativity, which originates back to the time of Newton when scientists Fatio and later Le Sage proposed that gravity was due to an imbalance of continuous and uniform particle streams we cannot see. Today, we know that there exists such a uniform field-the cosmic background radiation. Thus, in this article, the imbalance push force due to cosmic radiation shielding between objects is derived using antenna theory, i.e. the Friis equation. The push force is tested as the source of gravitation arriving at a condition that must be equal for orbiting planets for the theory to hold, which is in accordance with Kepler´s third law, i.e. $v^2r \approx 1.3\times10^{11}(km^3/s)$ for all planets. Based on this result, the cosmic radiation push should be further investigated as the source of gravitation.

Keywords: Gravity, LeSage, Fatio, Friis

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INTRODUCTION

Georges-Louis Le Sage, a French scientist in the 18th century, claimed that gravitation is due to a steady stream of particles we cannot see that affect all objects from all directions, and that two objects will shield these particles from each other to give an imbalance in the pressure they are subjected to. The imbalance (shadow) causes the two objects to be pressed against each other as we see it with gravitation Fig (1). Le Sage´s theory was based on Nicolas Fatio de Duillier´s theory. Fatio lived at the same time as Isaac Newton who told Fatio that if gravity had a mechanical cause, then the mechanism must be the one Fatio had described (Arp, 2002; HENTSCHEL, 2004; "Historical Assessments of the Fatio-Lesage Theory,"). Fatio and Le Sage's particles were hypothetical, and they did not know about the cosmic radiation that has been detected in modern times, which is the basis for the theory presented in this paper, e.g. the Cosmic Microwave Background (CMB), the Cosmic Infrared Background (CIB), and the Cosmic Ultraviolet Background (COUVB) (Bowyer, 1991).

Considering a planet with no other objects in proximity, the radiation can be considered as a uniform field, i.e. the radiation is isotropic (Wright, 2003), (Bowyer, 1991). For a spherical object like a planet, the net zero effect of such a field is zero, i.e. it is not pushed in any direction.

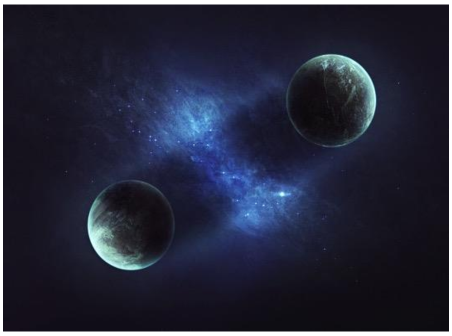

Figure 1. Artistic illustration of the cosmic radiation shadow between two planets.

METHOD

The non-uniform cosmic radiation field due to shadows causes a net push on the first object towards the second object because the radiation is then stronger from one side (the opposite side of the "shadow" between them). This radiation push force on a planet towards the sun as the sun is blocking the cosmic radiation is the gravitational force if it equals the sum of the centripetal force keeping a planet in orbit, and the radiation push from the sun working in the opposite direction. The cosmic radiation push force due to cosmic radiation shielding between planets is derived in this article using the Friis equation. The push force is tested as the gravitational force by showing under what condition it equals the gravitational force.

RESULTS

In order for the planet to stay in orbit at distance r, the cosmic radiation push (F_R) must be equal to the radiation pressure from the sun (F_S) and the centripetal force (F_C) in order to represent the gravitational force,

$$F_R = F_S + F_C \qquad (1)$$

The cosmic radiation push at a given wavelength can be expressed by Friis equation,

$$F_R = F_{R0}\frac{e_{a1}A_1e_{a2}A_2}{\lambda^2 r^2} \qquad (2)$$

F_{R0} is the force blocked by the sun, and $e_{a1}$is the aperture efficiency of the planet experiencing the radiation force with A_1 as its physical aperture. r is the distance between the sun and the planet, and λ is wavelength. The aperture efficiency of a planet will depend on its area density. The less dense the planet is, the attenuation length will be longer and thus the push force will be reduced. The aperture efficiency can be expressed as,

$$e_{a1} = \frac{\rho_{A_1}}{\rho_{Aideal}} \qquad (3)$$

Where here ρ_{Aideal} is the area density where the radiation would be maximally attenuated and thus exerting the maximum force on a planet, and $\rho_{A_1}$is the actual area density the planet. Thus, Equ (2) can be written as,

$$F_R = F_{R0}\frac{\rho_{A_1}A_1e_{a2}A_2}{\rho_{Aideal}\lambda^2 r^2} \qquad (4)$$

The radiation from the sun can be expressed as,

$$F_S = F_{S0}\frac{\rho_{A_1}A_1e_{a2}A_2}{\rho_{Aideal}\lambda^2 r^2} \qquad (5)$$

Substituting in Equ (1), we get:

$$F_{R0}\frac{\rho_{A_1}A_1e_{a2}A_2}{\rho_{Aideal}\lambda^2 r^2} = F_{S0}\frac{\rho_{A_1}A_1e_{a2}A_2}{\rho_{Aideal}\lambda^2 r^2} + \frac{m_1\cdot {v_1}^2}{r}$$
$$\Rightarrow \frac{F_{R0}}{\rho_{Aideal}\lambda^2} = \frac{m_1{v_1}^2 r}{\rho_{A_1}A_1e_{a2}A_2} + \frac{F_{S0}}{\rho_{Aideal}\lambda^2}$$
$$\Rightarrow R_{R0} = \frac{m_1{v_1}^2 r}{\rho_{A_1}A_1e_{a2}A_2} + R_{S0} \qquad (6)$$

The terms R_{R0} and R_{S0} can be assumed constant for all planets. Hence, we have a set of equations with only two unknowns, and arrive at the following relationship between planet *i* and *j*,

$$\frac{m_i{v_i}^2r_i}{\rho_{A_i}A_ie_{a2}A_2} = \frac{m_j{v_j}^2r_j}{\rho_{A_j}A_je_{a2}A_2} \Rightarrow \frac{m_i{v_i}^2r_i}{\rho_{A_i}A_i} = \frac{m_j{v_j}^2r_j}{\rho_{A_j}A_j} \qquad (7)$$

Now, the area density can be expressed as $\rho_{A_i} = \rho_i 2x_i$ where ρ_i is the average density of the planet and the $2x_i$ is the average thickness of a planet with radius x_i. We then arrive at a simplification of the final condition,

$$\frac{m_i{v_i}^2r_i}{\rho_i 2x_i A_i} = \frac{m_j{v_j}^2r_j}{\rho_j 2x_j A_j} \Rightarrow \frac{V_i{v_i}^2r_i}{V_i} = \frac{V_j{v_j}^2r_j}{V_j} \Rightarrow {v_i}^2r_i = {v_j}^2r_j \qquad (8)$$

Applying the ("NASA´S PLANETARY", 2015), the final condition is calculated in Table 1.

Table 1. Calculating $v^2 r$

	SI Unit	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune
v	*(km/s)*	47.4	35.0	29.8	24.1	13.1	9.7	6.8	5.4
r	10^6 *(km)*	57.9	108.2	149,6	227.9	778.6	1433.5	2872.5	4495.1
$v^2 r$	10^{11} *(km^3/s)*	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3

DISCUSSION

The result is interesting as the final condition confirms with empirical values of the planetary motions, i.e. it is in accordance with Kepler´s third law of planetary motions. Based on this result, further evaluation of the cosmic radiation push force should be carried out. It is seen that Equ (4) could be expressed on the form of $G_R(m_1m_2)/r^2$ by expressing the area by $3m/2p$. The value of G_R should be further evaluated, but it is beyond the scope of this article to discuss this further.

CONCLUSION

The cosmic radiation push at a given wavelength can be expressed by Friis equation (2) and testing it in our solar system gives a positive result as the final condition agrees with observation, i.e. the final condition is Kepler´s third law of planetary motion.

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