Gravity – When Push Comes to Shove?

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Since first proposed by Fatio in 1690 and allegedly enhanced by Le Sage in 1748, one possible explanation for gravity is that it is a pushing force theory that involves ‘shadowing’ of omnidirectional gravity particles that impinge on all matter so as to make gravity appear as an attractive phenomenon. At least for a special case (large distance between spheres), a mathematical model that assumes gravity to be a pushing force, with shadowing and including the possibility of acting throughout the shadowed corridor of the sphere with attenuation effects, suggests a possible alignment with one of the known effects of gravity, namely that it is inversely proportional to the square of the distance between the spheres’ centers. This hopefully lends some credence to the theories first proposed by Fatio and Le Sage, and since supported by many dissident physicists, including Schroeder, et al., and members of the Gravity Group of the John Chappell Natural Philosophy Society. It is offered as one small contribution to furthering examination of this possible explanation.

1. Introduction

Since first proposed by Fatio in 1690 before the Royal Society in London, and submitted poetically in 1731 to the Paris Academy of Science, the concept of gravity as a pushing force has existed (and been roundly discredited by mainstream physicists). Popularized and allegedly enhanced by Le Sage in 1748 (and equally dismissed as Fatio’s), this theory involves ‘shadowing’ of omnidirectional gravity particles that impinge on all matter so as to make gravity appear as an attractive phenomenon (Figure 1). [1]

Despite its repeated rejection, this theory has survived and even been revived by dissident physicists as mainstream physicists continue to struggle with an explanation for gravity and search for the elusive ‘gravity waves’ or ‘gravitons’ implied by their theories. Of especial note is the work of Schroeder, et al., and members of the Gravity Group of the John Chappell Natural Philosophy Society (formerly the Natural Philosophy Alliance). [2] This paper builds on some of these efforts and offers one possible mechanism by which gravity can be viewed as ‘pushing’ rather than ‘pulling.’

2. Shadowing

Although proposed in connection with gravity as a four-dimensional wave phenomenon, the concept of shadowing is inherent to explanations of gravity as a pushing force. Simply said, as shown in Figure 2, “[i]f a force is transmitted to a body from ‘something’ pushing on it from all directions, the body would remain stationary as all the forces would cancel out {Figure 2.a]. However, if a second body is brought close to the first one, part of the impinging force on body 1 would be blocked out and cause a net push towards body 2 {Figure 2.b]. Similarly, body 1 would cause a push on body 2 towards body 1, resulting in what would appear to an observer to be an attraction between the two bodies.” [3]

With this concept in mind, I examine a potential mathematical model that at least bears the appearance of aligning with one of the known effects of gravity, namely that it is inversely proportional to the square of the distance between the spheres’ centers.

3. A Mathematical Model?

Figure 3 is a more detailed extension of Figure 2 where the shadowing from two bodies on one another is shown as the area between them enclosed by the dashed lines. The spheres are separated by a distance ‘d’ between their centers and have respective radii and masses of ‘R’ (larger), ‘r’ (smaller), 4πR^3/3 (larger) and 4πr^3/3 (smaller), assuming densities of ‘ρ’ (capital rho) and ‘ρ’, respectively, for the larger and smaller spheres. The grey arrows represent the omnidirectional pushing forces (be they particles, waves or some combination) that remain ‘unshadowed’ and exhibit ‘shadowing’ angles of 2ϕ and 20 on the smaller and larger sphere, respectively, due to the larger and smaller sphere, respectively.

The net pushing force on each sphere results from the area over which the pushing forces are not offset by equal and opposite pushing forces diametrically opposed, i.e., the cones of radii R and r with solid angles ϕ and 0, respectively. Considering the case where the spheres are far apart, i.e., d >> R (and since R ≥ r, d >> r), the geometry simplifies as shown in Figure 4 (relative lengths of r and R vs. d greatly exaggerated for clarity). Effectively, both triangles become right, such that \(\sin(2\phi) = \sin(\phi + \phi) = \sin(\phi)\cos(\phi) + \cos(\phi)\sin(\phi)\) and \(\cos(\phi) = \frac{d}{d'} = 1\).

The net pushing force on each sphere will be proportional to the cross-sectional area subtended by the cones of radii R and r, i.e., \(\pi(R\sin(\phi))^2\) and \(\pi(r\sin(0))^2\), respectively, for the larger and smaller sphere. Effectively the pushing force acts along a vector parallel to that between the centers of the two spheres. With d >> R (and r), these each simplify to \(\pi(Rr/d)^2\). Each sphere also has inertia proportional to its mass, such that each pushing force will be resisted. Accelerating each sphere will be proportional to the exerted force divided by the mass, such that the accelerations become \(\frac{\pi(Rr/d)^2}{4\pi R^3/3} = 3R^2/4\pi d^2\) for the larger sphere and \(\frac{\pi(Rr/d)^2}{4\pi r^3/3} = 3R^2/4\pi d^2\) for the smaller sphere. Both can be seen to be inversely proportional to the square of the distance between their centers (1/d^2).
on the inverse square of the separation distance is evident, but now without the inverse dependence on the radius of the sphere itself (the dependence on the square of the radius of the other sphere, that is the one that ‘shadows,’ remains).

Proponents of gravity as a pushing force sometimes assume that, in addition to the shadowing effect, the force itself may be somewhat attenuated as it passes through the sphere. Attenuation over a linear distance ‘x,’ such as passing along the axis of the interaction cylinder, is usually modeled as an exponential decrease, such as \(1/\exp(\mu x)\), where ‘\(\mu\)’ is some form of attenuation coefficient. For our example, it would seem reasonable to assume that any attenuation coefficient should be some function of the density, i.e., \(F(P)\) for the larger sphere and \(f(p)\) for the smaller. Including this additional factor in the acceleration as another multiplier yields the following: 
\[
3r^2 \Delta \{2p^2 \exp(2RF[P])\} \quad \text{for the larger sphere and}
\[
3R^2 \Delta \{2p^2 \exp(2rf[p])\} \quad \text{for the smaller.}
\]
Once again, the dependence on the inverse square of the separation distance is evident, but now with some reduction due to attenuation.

### 3.2 Comparison

A ratio of the accelerations (larger to smaller) on the two spheres yields the following:
\[
\frac{|3r^2 \Delta \{2p^2 \exp(2RF[P])\}|}{|3R^2 \Delta \{2p^2 \exp(2rf[p])\}|} = \frac{\rho}{r^2 - R^2} \frac{\rho}{R^2} \exp(2RF[p] - RF[P])
\]
Since \(R \geq r\), the squared first term likely dominates, unless \(P \gg \rho\) (e.g., comparing a neutron star to a typical star) or \(F(P) \gg f(p)\). Therefore, the acceleration on the larger sphere should most often be less than that on the smaller, implying less movement toward their mutual barycenter on the part of the larger sphere when compared to the smaller. This is consistent with what is observed.

### 4. Summary

At least for a special case (large distance between spheres), a mathematical model that assumes gravity to be a pushing force, with shadowing and including the possibility of acting throughout the shadowed corridor of the sphere with attenuation effects, suggests a possible alignment with one of the known effects of gravity, namely that it is inversely proportional to the square of the distance between the spheres’ centers. This hopefully lends some credence to the theories first proposed by Fatio and Le Sage, and since supported by many dissident physicists, including Schroeder, et al., and members of the Gravity Group of the John Chappell Natural Philosophy Society (formerly the Natural Philosophy Alliance). It is offered as one small contribution to furthering examination of this possible explanation.\(^1\)

### 5. References


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\(^1\) Subsequent to composing this article, I discovered a sophisticated derivation of Newton’s gravitational equation from LeSage’s attenuation concept which addresses not only the inverse proportionality to the distance between two objects but also the direct proportionality to the product of their masses (Mingst and Stowe, “Derivation of Newtonian Gravitation from LeSage’s Attenuation Concept,” http://www.mountainman.com.au/le_sage.htm).