Comment to Bhandari and Bhandari: Fundamental forces are not fundamental as our 3-D Universe is driven by an external energy source.

Hans Hermann Otto

Materials Science and Crystallography, Clausthal University of Technology, Clausthal-Zellerfeld, Lower Saxony, Germany

E-mail: hhermann.otto@web.de

Abstract

The new gravity approach of *Bhandari* and *Bhandari* was examined and a simplified formula is presented to describe quite well the results of the *Newtonian* gravity formula. We got for the gravitational force the relation $F = 16 \cdot G \cdot M_1 \cdot M_2 \cdot \frac{R^2}{r_1^2 \cdot r_2^2}\ (N)$, where G is the established *Newtonian* gravity constant, R is the distance between two bodies of radii r_1 respectively r_2, and M_1 respectively M_2 are the masses of spherical cutouts as external energy shadow regions (vacuum of energy lines of an external energy source assumed to power our universe).

Keywords: Gravity Force, Newtonian Formula, New Gravity Formula, External Energy Source.

1. Comment

The contribution of *Bhandari* and *Bhandari* [1] represents a very well thought out new holistic approach to solving unexplained phenomena in physics and cosmology. It introduces an external energy source that is supposed to drive our Universe without a big bang at the beginning. The gravitational force is due to matter deprived for this external energy. Moreover, the approach shows, what nature and life has told us again and again. Whereas fundamental forces are considered to be not fundamental, effective evolutionary numbers of the golden ratio and its fifth power as well as the circle constant remain fundamental numbers of nature. However, this should be stated unequivocally in the commented contribution and possibly quantitatively evidenced, when dealing with dark constituents of the universe, where these constituents are related to the fifth power of the golden mean [2] [3]. The entanglement of quantum physics has got a new interpretation, which supports the instantaneousness of information teleportation, thereby not violating the principle of locality.
However, when presenting the results for gravitational force with exaggerated accuracy and many decimals as given in reference [1], then the exact formula for the spherical cutout shadow (matter deprived for external energy) should be applied. With the aid of **Figure 1** and **Figure 2** (see also the **Appendix**) one can verify the volume of the shadow region as

$$V_2 = \frac{2}{3}\pi r_2^3 \left(1 - \sqrt{1 - \left(\frac{r_1}{R}\right)^2}\right) \tag{1}$$

$$V_1 = \frac{2}{3}\pi r_1^3\left(1 - \sqrt{1 - (\frac{r_2}{R})^2}\right) \tag{2}$$

Dividing by the volume of each sphere gives us simpler relative volume expression V_i'

$$V_2' = \frac{1}{2}\left(1 - \sqrt{1 - (\frac{r_1}{R})^2}\right) = \frac{1}{2}(1 - \cos(\delta_1)) \tag{3}$$

$$V_1' = \frac{1}{2}\left(1 - \sqrt{1 - (\frac{r_2}{R})^2}\right) = \frac{1}{2}(1 - \cos(\delta_2)) \tag{4}$$

where δ_i are the respective half-cone angles. The shadow is not a cone but a spherical cutout, a cone capped by a spherical section. The cone base radius a is equal for both bodies, because

$$a = \frac{r_1 \cdot r_2}{R} \tag{5}$$

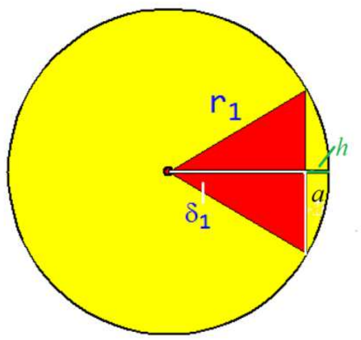

Figure 1. Explanation of the variables used. Red: The projected cone with a base radius a, completed by a spherical cap of height h to give the spherical cutout.

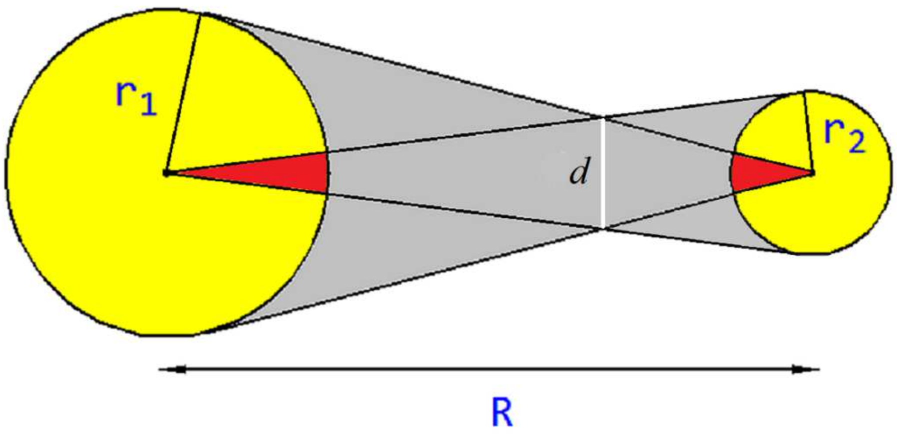

Figure 2. Illustration of the spherical cutoff shadow between two spherical bodies of radii r_1 respectively r_2 with a separation of R. Red: Projected shadow volumes as spherical cutouts. In the grey region energy lines are devoid.

The diameter d in ***Figure 2*** can be approximated by

$$d \approx 2 \cdot \frac{r_1 \cdot r_2}{r_1 + r_2} \tag{6}$$

giving a circular area of

$$A \approx \pi \cdot \left(\frac{r_1 \cdot r_2}{r_1 + r_2}\right)^2 = \pi \cdot \left(\frac{a \cdot R}{r_1 + r_2}\right)^2 \tag{7}$$

For the volume of the grey cones we derive the following approximate relation

$$(V_{cone} - V_{sphsec})_1 - V_2 \approx \frac{1}{3}\pi r_1 R \left(1 - \frac{r_1}{R}\right)^2 - V_2 \tag{8a}$$

$$(V_{cone} - V_{sphsec})_2 - V_1 \approx \frac{1}{3}\pi r_2 R \left(1 - \frac{r_2}{R}\right)^2 - V_1 \tag{8b}$$

If exemplifying the calculation with the gravitational force between Sun and Earth, we get the following result for F_G

$$F_G = G\frac{m_1 m_2}{R^2} = 3.5424 \cdot 10^{22}(N) \tag{9}$$

where $G = 6.67430(15) \cdot 10^{-11} m^3 kg^{-1} s^{-2}$ is the *Newtonian* constant of gravitation, $R = 1.496 \cdot 10^{11} m$ is the distance between Sun and Earth, and the masses are $m_{Sun} = 1.989 \cdot 10^{30} kg$ respectively $m_{Earth} = 5.972 \cdot 10^{24} kg$.

The approach of *Bhandari* and *Bhandari* delivers for the shadow volumes and respective masses

$$V_1 = 6.412 \cdot 10^{17} m^3, \qquad M_1 = 9.042 \cdot 10^{20} kg \tag{10}$$

$$V_2 = 5.867 \cdot 10^{15} m^3, \qquad M_2 = 3.233 \cdot 10^{19} kg \tag{11}$$

and

$$(M_1 + M_2) \cdot c^2 = 8.4171 \cdot 10^{37} N \cdot m \tag{12}$$

The needed body densities are $D_{Sun} = 1410\ kg \cdot m^{-3}$ respectively $D_{Earth} = 5510\ kg \cdot m^{-3}$. Finally, we use the formula for the gravitational force F with the new gravitational constant K according to [1] but in a recast form

$$F = K \cdot (M_1 + M_2) \cdot c^2 \cdot M_2 \cdot \frac{r_1 + r_2}{a^2} = 3.5973 \cdot 10^{22}(N) \tag{13}$$

where $K = 1.65441 \cdot 10^{-35} kg^{-1}$, $r_1 = 6.9634 \cdot 10^8 m$, $r_2 = 6.371 \cdot 10^6 m$. The result matches that for the *Newtonian* approach quite well

$$\frac{F}{F_G} = 1.0155 \tag{14}$$

The respective result by *Bhandari* and *Bhandari* was $F/F_G = 0.941945$ [1].

The new gravitational constant *K* may be numerically compared with the following relation between *Sommerfeld*'s structure constant α [4], *Preston Gyunn*'s galactic velocity v_g [5] and *G*

$$K = \frac{2}{3}\frac{\alpha}{|v_g|}\frac{G}{c^2} = 1.62973 \cdot 10^{-35}(\frac{s}{kg}) \tag{15}$$

where $\alpha = 0.0072973525693(11)$ [6] and $v_g = -221677.924988(\frac{m}{s})$ [5].
It matches the constant *K* sufficiently well, aside from the different dimension. We multiply equation (15) with c^2 (see equation (13)) and get a modified gravitational constant

$$K_1 = \frac{2}{3}\frac{\alpha}{|v_g|}G = 1.46473 \cdot 10^{-18}(\frac{m^2}{kg \cdot s}) \tag{16}$$

When we change the dimension of $K_1(\frac{m^2}{kg \cdot s})$ to $K_2(\frac{m^2}{kg \cdot s^2})$, we can recast equation(13) yielding

$$F = K_2 \cdot (M_1 + M_2) \cdot M_2 \cdot \frac{r_1 + r_2}{a^2} = 3.54360 \cdot 10^{22}(N) \tag{17}$$

and then
$$\frac{F}{F_G} = 1.0003 \tag{18}$$

However, one can simply replace the term $\frac{\alpha}{|v_g|} = \frac{\alpha}{|\beta_g| \cdot c}$ by $\frac{\pi^2}{c}$ according to the reciprocity relation given in reference [2]

$$\frac{\alpha}{\pi} \approx \pi \cdot \beta_g \tag{19}$$

We have exemplarily determined for the Mars $F = 1.7488 \cdot 10^{21}$ (N), $F/F_G = 0.970$, and for the Jupiter $F = 5.091 \cdot 10^{23}(N)$ and $F/F_G = 1.115$ instead of 1.22.

2. An Altered Gravity Formula

The remarkable deviation of Jupiter's *F* in comparison to the F_G value indicates an as yet not considered additional relation to the dimension of the planets. The *Bhandari* approach cannot map exactly the *Newtonian* gravitation force due to the term (M_1+M_2) in relation (17).
We will tackle this problem by a very simple approximation to the *Newtonian* gravitation formula using the constant *G*

$$F = 16 \cdot G \cdot M_1 \cdot M_2 \cdot a^{-2} = 16 \cdot G \cdot M_1 \cdot M_2 \cdot \frac{R^2}{r_1^2 \cdot r_2^2} \tag{20}$$

Then we calculated gravitational forces between the Sun and the following planets in full glory

Earth $\quad F = 3.5496 \cdot 10^{22}(N), \quad F_G = 3.5424 \cdot 10^{22}(N), \quad \frac{F}{F_G} = 1.0020 \qquad$ (21a)

Mars $\quad F = 1.7977 \cdot 10^{21}(N), \quad F_G = 1.7934 \cdot 10^{21}(N), \quad \frac{F}{F_G} = 1.0024 \qquad$ (21b)

Jupiter $\quad F = 4.4343 \cdot 10^{23}(N), \quad F_G = 4.5659 \cdot 10^{23}(N), \quad \frac{F}{F_G} = 0.9712 \qquad$ (21c)

The remaining small deviation between the F and F_G values for Jupiter may be due to a not well adapted mean radius of the planet. The gravitational force between Earth and Moon is calculated to be

$$F = 1.979 \cdot 10^{20}(N),\ \ F_G = 1.981 \cdot 10^{20}(N),\ \ \frac{F}{F_G} = 0.9990 \qquad (22)$$

Remarkably, in relation (20) the squared distance between the interacting masses is shown in the nominator, whereas in the *Newtonian* gravity formula this dependence is given in the denominator. For other reciprocity relations see a contribution by the present author [7].

3. Conclusion

This short examination shows the excellence of the new gravity approach of the recommended authors *Bhandari* and *Bhandari*. However, we have presented a new simplified gravity formula, using still the established gravity constant G. Remarkably, the dependence of the squared distance between the interacting masses of the planets is reciprocal in both the old and the new formulas. The present author hopes that his own contribution is a further piece that can be inserted into the puzzle of our universe.

Conflicts of Interest

The author declares no conflict of interests regarding the publication of this paper.

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Appendix

Volume of a cone $$V_{cone} = \frac{1}{3}\pi a^2(r-h) \qquad (22)$$

Volume of a sphere section $$V_{sec} = \frac{\pi}{6} \cdot h(3a^2 + h^2) \qquad (23)$$

Volume of a sphere cutout $V_{cutout} = \frac{2}{3}\pi r^2 h$ (24)

$$h = r - \sqrt{r^2 - a^2} \quad (25)$$

$$V_2 = \frac{2}{3}\pi r_2^2 \left(r_2 - \sqrt{r_2^2 - \frac{r_1^2}{R^2} r_2^2} \right) \quad (26)$$

$$V_2 = \frac{2}{3}\pi r_2^3 \left(1 - \sqrt{1 - \left(\frac{r_1}{R}\right)^2} \right) = \frac{2}{3}\pi r_2^3 (1 - \cos(\delta_1)) \quad (27)$$