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Antigravity phenomenon of physical bodies[1]

The subject of this article is research of physical body motion in plane that is perpendicular gravity. There are demonstrated four variants of proof anti gravity rise. There are obtained quantity relations between anti gravity and body mass, velocity, motion orientation, scale. There is demonstrated applicability domain of quantum and classic description of appearance. It's conclude, that the body, possessing anti gravity, has negative mass. It's analyzed series of effects; those are known from micro and macro physics.

The subject of research concerns mechanic field, and more exactly, gravity mechanic. The purpose of research is proof that any physical body, which oscillates or rotates in plane that is perpendicular gravity, in particular, fast revolving flywheel possesses antigravity. Such flywheel (inert body) may be used for construction unsupporting means of transport, as alternative reactive ones.

The proof is built on space and time models.

If space satellite moves in near-earth circular orbit it's subjected to influence of the earth gravity and, centrifugal force, which equalizes the first one. The last one is equal to

$$\overline{G} = mV^2 / R, \qquad (1)$$

where $\overline{G}$ - centrifugal force, m - satellite mass, V - its linear velocity, R - distance from the Earth centre.

But centrifugal force $\overline{G}$, which further call antigravity, can be excited otherwise.

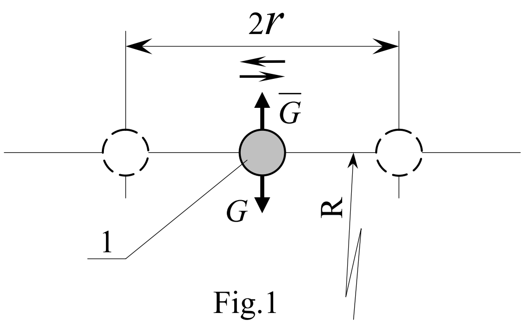

Fig.1

Imagine, that body 1 (fig.1) oscillates over the Earth surface, perpendicular gravity action G. Since we shall examine principle aspects of the subject, then secondary details (oscillations reduction, energy source, e. t. c.) conditionally are not shown.

The body 1 may be represented by any one - substance's atom detail of arbitrary form. Let frequency **f** and amplitude **r** of oscillation don't change in time. Gravity G tends to deviate horizontally moving body to the Earth centre, but it means, that antigravity $\overline{G}$ has to appear. Mean of oscillation velocity in one cycle is equal to

$$*V = 4\,\mathbf{r}\cdot\mathbf{f}$$

This velocity has direction, which is perpendicular G, and so numerical mean of antigravity is

$$\overline{G} = m\,(*V)^2 / R\ , \qquad (2)$$

Where m - body mass, R - distance from the Earth centre. Hence, if $*V \approx 8$ km/s (the first space velocity), then gravity G is balanced by antigravity $\overline{G}$, and body 1 doesn't drop on the Earth surface.

From mathematics it is known, that rotation of a point on radius **r** with frequency **f** is geometrical addition of its two mutually perpendicular fluctuations with amplitude **r** and frequency **f** everyone, therefore and on horizontally rotating body antigravitation also will operate, and its size is numerically equal

$$\overline{G} = mV^2 / R,$$

where V - linear velocity of body rotation in radius **r**.

Note, that the last formula checks with (1).

The second justification variant. Let examine two charts: fig.2 and fig.3 – view on fig.2 in **A**. Body 1 is shown on them, it rotates in horizontal track 2 with radius **r** < R in the Earth gravity field 3.

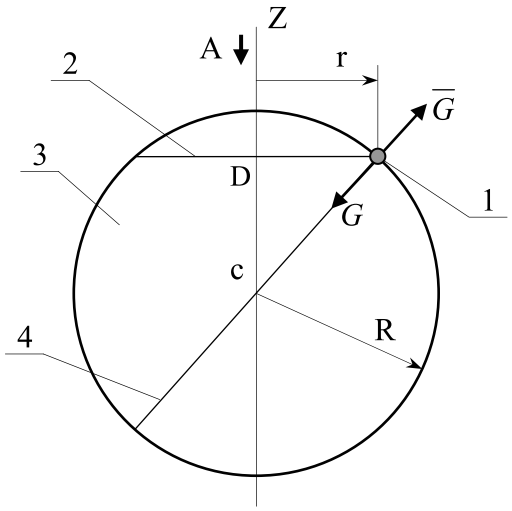

Fig.2

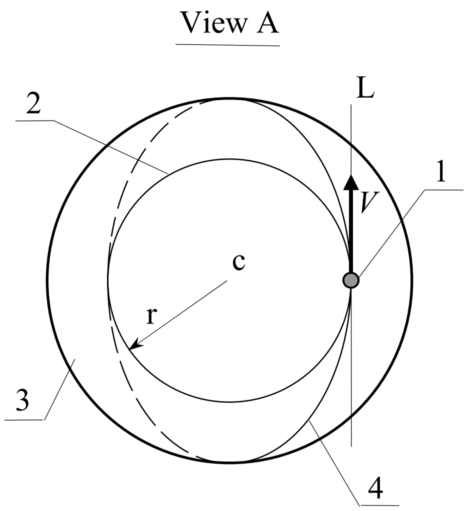

Fig.3

It's obvious well on fig.2 and fig.3, that vector of linear velocity V on body 1 rotation in radius **r** in every point of track 2 at any moment of time is simultaneously vector of linear velocity relatively the Earth 3 centre **c** (vector V at any moment of time coincides with line **L** of intersection track 2 plane and track 4 diametral plane): it may be explained by body 1 motion in diametral track 4, which in turn, wobbles around vertical axis **Z**.

It's clearly, that body 1 antigravity, in this case, is equal to

$$\overline{G} = mV^2 / R, \text{ too.}$$

The third justification variant. Let examine figures 4 and 5. On fig.4 it's show body 1, which is connected with vertical axis **Z**, moreover, it's subjected to influence of centrifugal force along filament 5 and gravity G, which has direction in the Earth 3 centre **c**. Centrifugal force, which acts along filament 5, is not interested us, and under G acting body 1 will deviate from horizontal plane in the Earth centre **c** direction, but it means, that antigravity

$$\overline{G} = mV^2 / R \quad \text{will appear.}$$

The more initial velocity V of body 1, the more $\overline{G}$, go further it will drop on the Earth surface from point A. On fig.5 shown lateral surface AÁC evolvent of cone ABC, which is coincided with diametral surface of the Earth 3. On fig.5 shown on the evolvent several body 1 motion tracks (it's shown by one turn around axis **Z**) with different initial velocities, moreover, track 6 and 7 belong respectively, to initial velocities $V_6 < V_7$. It's clearly, that if V is equal to the first space one,

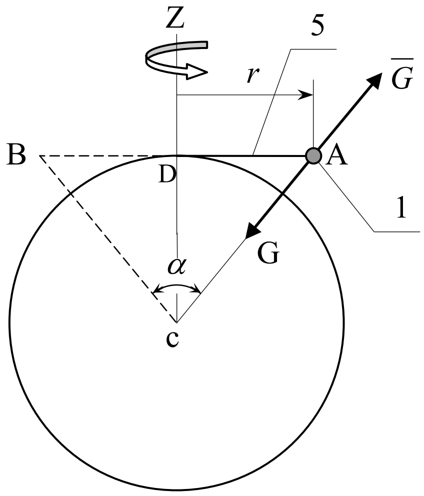

Fig.4

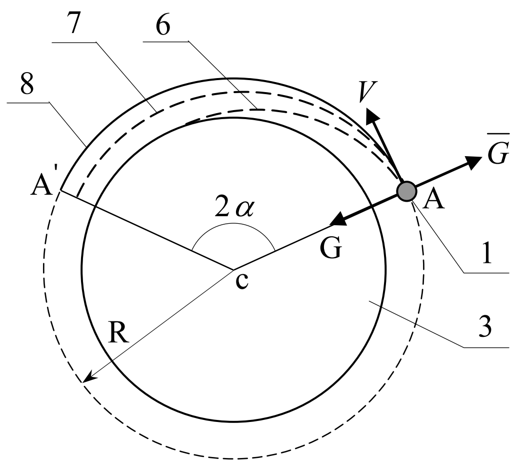

Fig.5

then $\overline{G} = G$, and body 1 did complete turn around axis **Z**, will return to A (a point of start). To this case on fig.5 there corresponds a trajectory 8, which is a bit 2π **r** in length of diametral circle $2\pi R$ in length.

Thus, it's turned out, that if $V \approx 8$ km/s, then $\overline{G} = G$ and body 1 in one turn around axis **Z** will return in initial point A. But it's only the decision one-half of task. Let condition $\overline{G} = G$ is fulfilled. Imagine, that two the same bodies 1 begin to move in track 8 from initial point A simultaneously. One of them, passed distance 2π **r** in length returns in point A (rotation in radius **r**) and begins motion again; and the second one will move further in radius R.

The question: In what case do these two bodies coincide in one in point A? It's clearly from scheme, that it can take place if

$\omega_0 = \omega \cdot n$ and $R = \mathbf{r} \cdot n$, where ω_0 – circular rotational frequency in radius **r**, ω – circular rotational frequency in radius R, n – integer.

Such body motion in gravity field call stationary one, and stationary condition write as:

$$\begin{cases} \overline{G} = G \\ \dfrac{R}{r} = \dfrac{\omega_0}{\omega} = n \end{cases}, \quad \text{where} \quad n = 1,2,3,\ldots,\infty . \qquad (3)$$

We got stationary condition for point body, which revolves in radius **r**, but it's correct for ring flywheel (in hoop form) with radius **r**, in this case m is equal to complete flywheel mass.

The fourth justification variant.

It's known, that body weight on the Earth depends on width. It's connected with centrifugal force of daily rotation body action on every body on the Earth surface. This force has component, which has direction opposite weight [1]. Because of angular velocity of the Earth rotation is small, this component is too little, but let examine following scheme (fig.6). Let ring flywheel with radius **r** < R lies on the Earth sphere. Untwine it in horizontal plane P around axis **Z**. Let consider, that it's no friction. Centrifugal force F, perpendicular **Z**, action every flywheel 2 element.

Decompose it on two components; one of them has direction opposite gravity G and it's called antigravity $\overline{G}$. It's value is equal to

$$\overline{G}/F = r/R, \quad \overline{G} = F \cdot r/R = mV^2/R,$$

where V - linear velocity of flywheel 2 rotation. It's obvious, that obtained formula still coincides with (1). It's not difficult to find from scheme on fig.6 antigravity $\overline{G}'$ component, which in more precise physical sense is flywheel 2 antigravity:

$$\overline{G}' = \frac{mV^2 l}{R^2}.$$

With calculation stationary condition (3) let transform the last formula to more suitable form

$$\overline{G}' = m\frac{V^2}{R}\sqrt{1-\frac{1}{n^2}} \qquad (4).$$

Ratios (3) and (4) give quantum description of appearance. For example, l and **r** are commensurable with R for micro scales (atoms, molecules) and so

$$\overline{G} \neq \overline{G}'.$$

$l \approx R$ for macro scales (for globe $\mathbf{r} \ll R$), and so $\overline{G} \approx \overline{G}'$ and one can, in

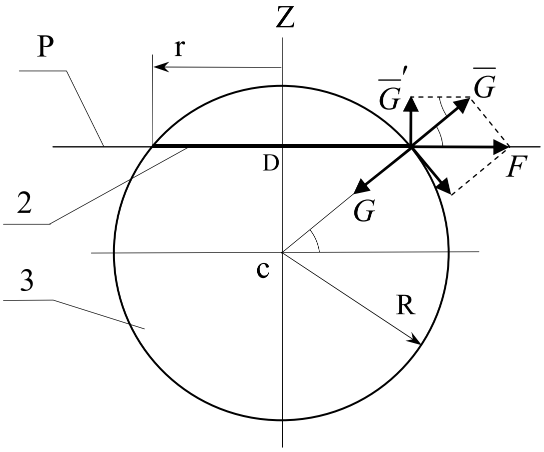

Fig.6

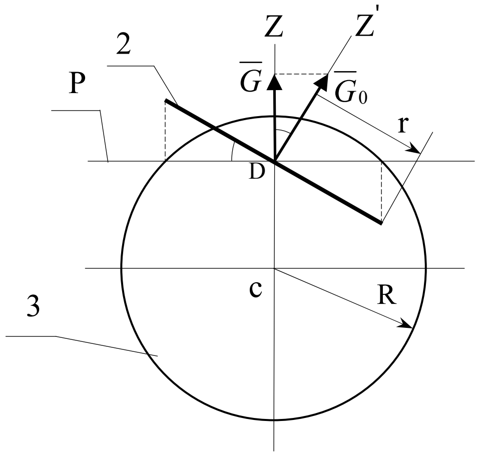

Fig.7

particular, use formulas (1) and (2). Let advise working hypothesis physical sense of examined appearance.

Use fig.6 for explaining. Let flywheel 2 is in rest condition. In this connection mass centre of system «The Earth-flywheel» is on the axis **Z** almost in the Earth 3 centre **c**. If external force is applied at this point, then examined system conducts oneself as unit, that is point **c**, with respect to external action, conduct oneself so, as there are concentrated in it inert mass of the Earth 3 and, emphasize, inert mass of flywheel 2. Let call point D flywheel's 2 gravity mass centre. Let begin to untwist flywheel 2 around vertical axis **Z**. As rotation velocity increases, its inert mass centre, which was in point **c**, begin to transfer along the axis **Z**, moreover one's concrete situation on the axis **Z** corresponds to every frequency **f** of flywheel 2 rotation. When rotation velocity will be equal to the first space one, its inert and gravity mass centres coincide in point D. In this case, as it was shown, $\overline{G}$

$= G$. Flywheel 2 potential energy W is equal to force's $\overline{G}'$ work on segment CD $= l$:

$$W = \overline{G}' \cdot l = mV^2(1 - 1/n^2), \qquad (5)$$

where m - flywheel mass, V - its linear velocity.

Now find antigravity $\overline{G}$ of ring flywheel with arbitrary orientation in the Earth gravity field. For explaining let use fig.7; the Earth globe 3 and flywheel 2 are shown on it. Flywheel's rotation plane bends forward to horizontal one P at an angle φ. Flywheel's own radius is equal to r_0, its rotation axis Z'. Antigravity numerically is equal to

$$\overline{G} = \frac{m\omega^2 r_0 \cdot r_0 \cdot \cos\varphi}{R}.$$

Let multiply and divide the right part of equality by π:

$$\overline{G} = \frac{m\omega^2 \pi \cdot r_0^2 \cos\varphi}{\pi \cdot R}.$$

The expression $\pi \cdot r_0^2 \cdot \cos\varphi$ is projection area of flywheel 2 area on horizontal plane P. The area can't be negative and so independently on rotation direction of flywheel 2 and the angle φ, it's can be written for antigravity

$$\overline{G} = \frac{mV^2}{R}|\cos\varphi|. \qquad (6)$$

Note, that from ratio $r = r_0 \cdot \cos\varphi$, with calculation stationary condition (3), it's followed – φ angles of flywheel's orientation in gravity field are quantum.

Certain mass with specific properties must corresponds to flywheel's antigravity; let call this mass antigravity one and write $\overline{m}$ for it. Nearly 10 years ago, when the idea of antigravity control method had been born by the author of this article, he, unfortunately, didn't know other papers in this sphere. I examined first paper [2] in summer 1990 year. There are researched conservation of energy – impulse laws for negative mass in conformity with rocket engine.

Antigravity mass $\overline{m}$ or body is negative one for observer, which is on the Earth. This mass is particular case of more general expression for body's mass which can be finded in the following way. Force F, which acts on horizontally revolving flywheel with mass m_0 in the Earth gravity g_0 field:

$$F = m \cdot a = m_0 \cdot g_0 - \frac{m_0 \cdot V^2}{R_0},$$

where m and a, respectively, are flywheel's mass and acceleration relatively the observer, which is on the Earth. Multiply both parts of the last ratio by R_0 (the Earth radius) and then divide by $V_0^2 = g_0 R_0$ (quadratic acceleration) in order to separate mass

$$m\frac{a}{g_0} = m_0 - m_0\frac{V^2}{V_0^2}.$$

Designate $m^* = m\frac{a}{g_0}$ and rewrite the previous formula

$$m^* = m_0 - m_0 \frac{V^2}{V_0^2}. \qquad (7)$$

It's obvious hence, that mass m^* of horizontally revolving flywheel can be any size and sign,

and value $\overline{m} = m_0 \frac{V^2}{V_0^2}$ (8)

is none other than negative mass of flywheel relatively the observer, which is on the Earth.

Below the author still uses his own terminology, but a reader must remember, that antigravity mass, inert mass and negative mass of body – is the same one.

It's necessary to note, that negative mass always appears of gravity bodies, if they have relative motion on micro or macro level. As it was already note, negative mass's properties are researched in detail in paper [2], it saves the author from routine proof conservation – impulse laws for inert body in stationary condition.

Not go into disputed questions about ether, absolute coordinate system and e. t. c., let simplificationally explain the Earth's revolving influence on antigravity value. Locate flywheel on North Pole of the Earth one. Imagine by abstraction, that flywheel revolves and the earth globe doesn't. At certain moment of time begin to untwist the earth globe, pushing off flywheel in opposite direction. If in these connections their directions were coincided, then it's clear, that at the end of process flywheel's rotation velocity will become less than initial one. If their directions were opposite, then at the end of process flywheel's velocity will become more than initial one. It's known like analog of this appearance – Doppler's effect: the frequency increases by contrary motion of radiate source and receiver; by opposite one the frequency decreases. The author proposes following formula for weight force F of single horizontally revolving flywheel, which it's taken into account the Earth rotation:

$$F = m \cdot g - \frac{m}{R}(V^2 \pm V_3^{\,2}), \qquad (9)$$ [2]

where $V_3^{\,2} = \omega_0^{\,2}(r \cdot \sin\alpha + \sqrt{R^2 - r^2} \cdot \cos\alpha)^2 \cdot \sin\alpha$, (10)

where α - latitude of flywheel's position in degrees, in brackets of formula (9) it's taken sign «+» in northern hemisphere, if flywheel revolves clockwise (towards the Earth one), and sign « – », if flywheel revolves counter-clockwise (coincides with the Earth rotation). In southern hemisphere signs «+» and « – » change places. For easing space perception of interaction flywheel and the Earth let represent it as interaction of three independent elements: own flywheel; the Earth globe; gravity medium, in which there are flywheel and the earth globe. For an example, we shall find the maximal change of weight of a rotor under the formula (6). Initial data: rotor's mass is m= 1,3 kg, weight is G= 12,75 N, rotation's frequency is **f** = 500 Hz, average radius is **r** = 0,03 m, rotation axis is vertical one (φ = 0°)

$$\overline{G} = \frac{1{,}3(2\pi \cdot 500 \cdot 0{,}03)^2}{6378140} = 1{,}8 \cdot 10^{-3} \text{ N}$$

As it's obvious, $\overline{G}$ is very insignificant. Relative decrease rotor's weight is ≈ 0,01 %. In order to antigravity become essentially significant, it's necessary essentially to increase rotor's linear velocity. For example, for full compensation rotor's own weight (independently its mass) it's necessary its linear velocity by average radius has reached the first space one ≈ $8 \cdot 10^3$ m/s. In known systems, those are created by person up till now, it's not reachable. Restriction is the material strength. Rotor, which is made of the very strength material, that is created on the Earth (carbon fibre) is already destroyed on velocity – 1,6 ÷ 1,8 km/s.

Nevertheless, the author developed rotor's constructions, those bear velocities even more than the first space one. Ring flywheel (rotor) or inert body is suitable and obvious object for theoretical researches of antigravity appearances in macro and micro universe, but in practical production in the first place will be created photon, gas, water, solid inert bodies. In the author mind, it's necessary to call any construction or element, which is intended for antigravity excitation – «inerter». The author has technical proposals by all these constructions and methods of their preparation.

Let use given information for checking certain results, which are know from microphysics. Bohr's model of hydrogen atom gives precise numerical value of ionization's energy, but obvious picture of this appearance is absolutely not clearly. The calculation show, that electron tears off atom on Bohr's radius R_b distance, but from model's logic it must be on more large distance, that is Bohr's radiuses are descript by formula $R = R_b n^2$. Calculate potential energy of electron in hydrogen atom, using formula (5), and for explanations use fig.6. Let 3 on fig.6 is on sphere of Bohr's radius R_b, 2 – electron (or, it's the same one certain particle's track, which is called electron). By stationary condition (3) electron's 2 radiuses can be only $r = \frac{R_b}{n}$, and work done by the field on inert mass to move it from point **c** to Bohr's sphere is equal to $W = mV_b(1 - \frac{1}{n^2})$, by n ⟶ ∞, where m is the mass of rest electron, $V_b = 2{,}18769 \cdot 10^6$ - velocity on Bohr's sphere. Ionization's energy W_i is equal to half of potential one $W_i = W/2$. If substitute numerical values, then $W_i = 2{,}17991 \cdot 10^{-18}$ **J** is precisely reference one [3] (In our model electron takes off it (is radiated) at $R = R_b$).

It's known, that electron's spin on the lowest energy condition has only two possible orientations, distinguishing on 180°. Let consider 3 is sphere of Bohr's radius R_b, flywheel 2 – electron, which is on the lowest energy condition. By stationary condition (3) electron's 2 radius on the lowest condition is equal to $r = R_b/2$. Let imagine electron's 2 plane even if a little unperpendicular vertical axis, then average velocity's of electron's 2 rotation projection per revolution on horizontal plane P is less than V_b (area's projection of electron 2 on horizontal plane P is less than $\pi \cdot r^2$) and such electron some time or other drop on nucleus.

It's clear from this why for two directions of electron's 2 revolution why for two directions of electron's 2 revolution on the lowest condition there are possible only two opposite orientations (in other cases of orientation electron can't exist).

It's known VU Cz. experiment by research $\beta^{=}$ decay of cobalt ${}^{60}_{27}Co$, fulfilled in 1957 year (experimental proof of parity unconservation). Result of experiment can be simply explained in the following way – electron, flying out opposite nucleus's spin (opposite outer field) is in influence of atom's antigravity, which in magnitude is more, than atom's one, which acts on electron, flying out in spin's direction (in field's one). Quality analog of this effect is examined above the example with flywheel on the North Pole of the Earth.

For macro scales the author has significantly less examples, nevertheless, let indicate them. It's known, the earth globe in the North Pole region is pressed. It can be explained by decrease of the Earth matter's linear velocity nearly to rotation axis, and by antigravity decrease in this region, which means that weight increases. During geological history of the Earth present relief was shaped.

It's known astronomical object SS433 [8], which is notable by following – along its rotation axis in opposite direction it's outflow of matter's streams. It's not a success to explain this phenomenon at preset time. By PbaP (Physical body's antigravity appearance) point of view, this effect can be easy explained. It's obvious, that rotation velocity in centre of the object SS433 is so great, that antigravity, which considerable exceeds star's gravity, acts on the matter, which involves in revolution near the axis.

Application of physical body's antigravity appearance.

Physical body's antigravity appearance theory can be used as additional method in fundamental researches.

In practical activities of person physical body's antigravity appearance can be used for creation technologies of antigravity matter's production (dates – year or two); for construction unsupporting means of transport; for production principally new methods of motion in space-time; for construction converters gravity energy – electric one; for construction new methods of information exchange.

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Comments:

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[2] The note can be used the Formula only for estimations if $V > V_3$.

Precise the formula look in work: Linevich E. " The geometrical substantiation of experiment Hayasaka - Takeuchi with rotating rotors " (www.dlinevitch.narod.ru).