Experiments on Verification of Models of the Universe Based on the Measurement Standards Variability

VITALY O. GROPPEN, ALEXANDR PROSKURIN

Research Institute of Computer Science
North-Caucasian Institute of Mining and Metallurgy (State Technological University)
Nikolaev str. 44, Vladikavkaz 362021
RUSSIA
groppen@mail.ru Alex@skgmi-gtu.ru http://www.skgmi-gtu.ru

*Abstract***: -** The paper describes the statement and results of experiments in a low pressure environment, which are based on the use of charged deployed capacitors and high voltage for verification of two models of the universe based on the measurement standards variability. Results of the experiments convince us of some predictions providing an opportunity to create a new type of engine for space vehicles. Verification of these predictions gives birth to the next series of experiments.

Keywords: - interaction forces control, deployed capacitor, high voltage, mass loss, reaction forces, space vehicles.

1 Introduction

The evolution of ideas about the state and structure of the Universe can be interpreted as a gradual drift from naive combinations of "obvious" concepts to the mathematical models with progressively increasing complexity. This can be demonstrated by a consecutive substitution of the geocentric model by the heliocentric one, which was replaced by proposed in 1927 by George Lemaitre idea of an expanding Universe, as a result of the Big Bang. This theory is the basis of the adopted today Standard Model due to the experimental law discovered by Edwin Hubble in 1929 and originally presented in [1], which was based on the red shift of galaxies spectra explanation by the Doppler Effect.

In parallel with the evolution of models of the Universe related models describing the gravitational forces were also developed. One of the first efforts to create a mathematical model of gravitational interaction goes back to Sir Isaac Newton, who early as 1667 published his famous Universal Law of Gravitation [2]. In 1748 Le Sage proposed a theory describing forces of gravity as a result of motion of tiny particles moving with high speeds in all directions across the Universe [3]. This theory has not been confirmed and in 1915 Albert Einstein demonstrated a new theory of gravitation based on the theory of relativity and on the idea of a stable Universe [4]. As mentioned above works of George Lemaitre and Edwin Powell Hubble supported the ideas of the Universe expansion and in 1931 Albert Einstein had to correct his theory noting, that it is possible, only if Hubble's explanation of the galaxies red shift by the Doppler Effect is true [5]. This sequence of events resulted in the development of the mentioned above Standard Model which is not free of some contradictions [6-10]. The latter results in the alternative approaches [10-14, 16], one of which being based on the theory of measurement standards variability [10, 12, 16]. One of the aspects of this theory is the exponential loss of mass by all physical bodies. [15, 16]. This mass loss gives rise to reactive force, but «spanning» any physical body in the isotropic medium into a single point it is easy to see that for any reaction force vector there is a similar force in value and opposite in direction, i.e. resultant of reaction forces in this case is equal to zero [12]. In 1921 Townsend Brown discovered movement of physical objects under the influence of high voltage [20], but this effect cannot be considered as control of gravitational forces because this phenomenon is known to be caused by ionization of air near sharp edges. The experiments described below are a continuation of the experiments presented in [10, 12, 17-18]. Their objective is to refine the parameters of used samples that enhance the lifting force. They are also based on the use of high voltage and charged deployed capacitors for gravity control. These experiments are based on the model using substitution of the energy distributed in the neighborhood above the upper surface of the deployed capacitor by the material point with equivalent mass: force of the gravitational interaction of the plate with this point is directed opposite to the direction of the force of gravitational interaction of this plate with the Earth therefore reducing weight of a body, installed under capacitor. As it is shown in [15 - 18], such a weight reduction is proportional to the energy stored by a deployed capacitor.

2 Modeling of the forces of interaction of gravity with high voltage charged deployed capacitors

Further we assume that:

1. Spontaneous emission of mass intensity $\left.\frac{dm_A}{dt}\right|_{\varphi}$ by a physical body "A" with mass m_A, density ρ_A in the direction φ, depends on the m_A value, density ρ_A and density ρ_φ of the surrounding body "A" medium in the direction φ.

2. True are the following two conditions:

$$\begin{cases} \lim\limits_{\rho_\varphi \to \rho_A} \left.\frac{dm_A}{dt}\right|_{\varphi} = 0; \\ \lim\limits_{\rho_\varphi \to 0} \left.\frac{dm_A}{dt}\right|_{\varphi} = \frac{1}{4\pi} \cdot \frac{dm_A}{dt}. \end{cases} \quad (1)$$

Taking into account the Meschersky's equation [19] of reaction force F_φ value resulting mass emission by body "A" in the opposite direction -φ which is equal to the product of mass loss intensity in this direction and its relative velocity V, this force can be determined as follows:

$$F_{-\varphi} = V \left.\frac{dm_A}{dt}\right|_{\varphi} \quad (2)$$

The difference of opposite directional forces F-φ and Fφ applied to the body "A", is denoted as F_A:

$$F_A = F_\varphi - F_{-\varphi} = V\left[\left.\frac{dm_A}{dt}\right|_{-\varphi} - \left.\frac{dm_A}{dt}\right|_{\varphi} \right]. \quad (3)$$

In the described below experiments as bodies "A" we used thin rectangular glass plates (see Table 1 below), and as body "B" - located closely above each such plate deployed capacitor; its working surface coinciding with the area of one side of the plate (Fig. 1). Further we study two types of models satisfying equation (3), system (1) and simulating the results of experiments. In the first case we use a kind of model: $F_A = \varphi_1[1-\exp(-\varphi_2 U)]$, (4)
where φ_1 and φ_2 are empirical relationships in a first approximation representing linear dependences on the mass m_A, whereas U is the voltage applied to the deployed capacitor. Using these relationships, as well as the belief that $\varphi_2 \cdot U \ll 1$, (5)
equation (4) can be replaced by the following one:

$$F_A \approx (a_0 + a_1 m_A)(b_0 + b_1 m_A)U, \quad (6)$$

where a_0, a_1, b_0, b_1 are coefficients.

As the tool of this equation verification is determination of voltage U^* value, which allows to obtain a lifting force F_A equal to the weight of the body A, combination of equation (6) and inequality (5) results in the following system:

$$\begin{cases} U^* = \dfrac{g}{(\frac{a_0}{m_A} + a_1)(b_0 + b_1 m_A)}; \\ U^* \ll \dfrac{1}{b_0 + b_1 m_A}, \end{cases} \quad (7)$$

where "g" is equal to the acceleration of gravity ($g = 9.8\ m/s^2$).

The second approach is based on the verification of possibility of the Newton's equation of gravitational interaction usage for this process modeling: if ρ_φ value is determined by the mass loss intensity of body "B", located at a distance R from the body "A", then further we believe that F_A reflects Newton's gravitational interaction between these two bodies:

$$F_A = \gamma \frac{m_A m_B}{R^2}, \quad (8)$$

where γ is the gravitational constant.

The energy E_B of used deployed capacitor is equal to:

$$E_B = \frac{C_B U_B^2}{2}, \quad (9)$$

where C_B is its capacity, and U_B – voltage of its power supply.

Equivalent mass m_B of this energy is determined by the following equation:

$$m_B = \frac{C_B U_B^2}{2c^2}, \quad (10)$$

where "c" is velocity of light. Substituting (10) in (8), we get:

$$F_A = \gamma \frac{m_A C_B U_B^2}{2c^2 R^2}. \qquad (11)$$

Equation (11) permits to determine during the experiments the set of R values:

$$R = \frac{U_B}{c}\sqrt{\frac{\gamma \cdot m_A \cdot C_B}{2 \cdot F_A}} \qquad (12)$$

As in the previous case the aim of experiments below was in determination and experimental verification of conditions, permitting to compensate the weight of body "A.

3 The procedure of the experiments and the results obtained

To prevent sparks in the work area of the capacitor at voltages up to 20 kV, the latter designed sealed, all conductive elements are made of copper, the material of the other components was Teflon (Fig. 1). The equipment used guarantied the accuracy of lifting force F value determination equal to 5 mg.

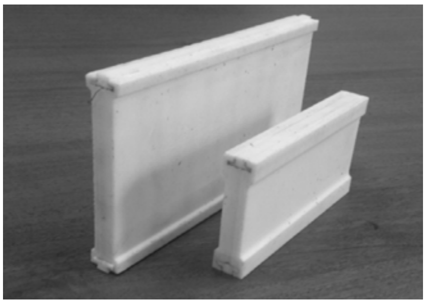

Fig. 1. Hermetic deployed capacitors

During the experiments, a payload (body "A") was attached at the bottom right up to the installed on the scales horizontally deployed capacitor which had weight of 0.168 kg. and capacity of 18.2 pF (Fig. 2).

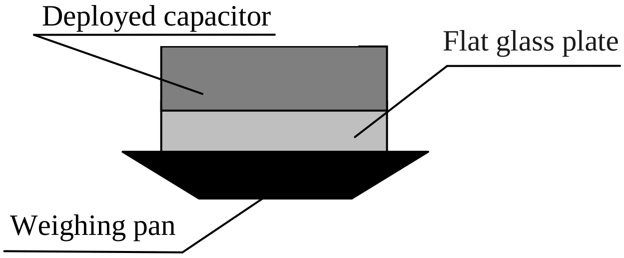

Fig. 2. The relative positions of the deployed capacitor, payload and bowl of scales.

As payloads we used seven flat glass rectangles with mass ranging from 0.019 to 0.128 kg., tightly adjacent to the bottom of deployed capacitor (Table 1).

Table 1

#	Mass (g)	Length (m)	Width (m)	Thickness (m)
1	2	3	4	5
1	19	0.1	0.04	0.002
2	36	0.1	0.04	0.004
3	57	0.1	0.04	0.006
4	71	0.1	0.04	0.008
5	93	0.1	0.04	0.01
6	110	0.1	0.04	0.012
7	128	0.1	0.04	0.014

Geometrical parameters of plates (columns 3-5) are given in meters

The voltage adjustment range was 0 - 20 kV. with increments of 5 kV., whereas the pressure in the experiment area varied in the range of 0.07 ÷ 755 millimeters of mercury.

During experiments for each fixed combination of voltage - pressure values were fixed ten lifting force F values with an interval of 3 ÷ 5 seconds between each pair of measurements. As during experiments F value changed at a constant voltage and variable pressure, we used mean values F, exponential model and least squares method for prediction of lifting force value in vacuum denoted below as $F_{A\ max}$ for each fixed combination of voltage value and body "A" mass.

These dependences are shown in Fig. 3 below.

These results allowed us to determine the experimental values of the coefficients used in equation (6) and in system (7):

$a_0 =$ $2.458225 \cdot 10^{-4}$;

$a_1 =$ $6.009174 \cdot 10^{-3}$;

$b_0 =$ 2.7855·10^-5^;
$b_1 =$ 1.73926·10^-4^;

Absolute value of maximum relative deviation of F_A in equation (6) does not accede 36%, whereas the absolute value of minimum relative deviation is equal to 2.06%.

The corresponding values of m_A and U* satisfying the system (7), are presented in Table 2 below.

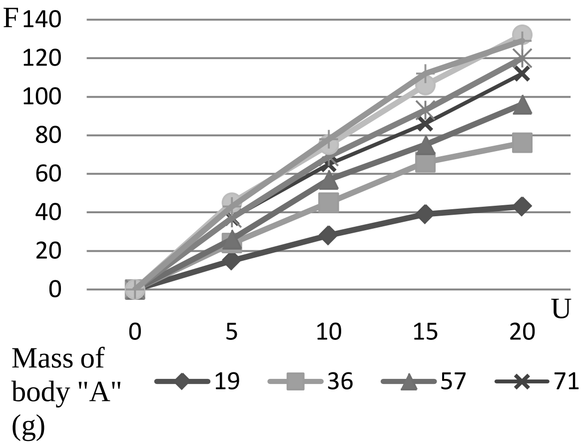

Fig. 3. The dependencies of predicted values of lifting force F (in milligrams) on voltage U (in kV) in vacuum as applied to the samples described in Table 1.

Table 2

#	m_A (kg.)	U* (kV.)
1	$1\cdot10^{-5}$	14.307
2	$2\cdot10^{-5}$	28.606
3	$3\cdot10^{-5}$	42.896
4	$4\cdot10^{-5}$	57.177
5	$5\cdot10^{-5}$	71.44977
6	$6\cdot10^{-5}$	85.71344
7	$7\cdot10^{-5}$	99.96836

As in the approach based on the equation (11) experimental dependence of “R” value on voltage U is close to the linear one for each sample (see Fig. 4 below), equation (11) can be substituted by the following:

$$F_A = \gamma \frac{m_A C_B U_B^2}{2c^2[a(m_A) + b(m_A)U_B]^2}, \qquad (13)$$

where experimental dependences $a(m_A)$ and $b(m_A)$ are presented as square polynomials ($0.019 \le m_A \le 0.128$ (kg.)):

$a(m_A) \approx 4.93\cdot10^{-16} + 3.25\cdot10^{-14}\, m_A - 1.79\cdot10^{-16}\, m_A^2$;
$b(m_A) \approx 2.05\cdot10^{-19} - 6.0\cdot10^{-19}\, m_A - 1.17\cdot10^{-17}\, m_A^2$.

Maximum relative deviation for $a(m_A)$ dependence does not accede 30%, the upper bound of a minimum relative deviation is equal to 2.5%. Corresponding data for $b(m_A)$ dependence are 6% and 0.886%.

During the control series of experiments for the second model verification, the product of “g” and “m_A” was used instead of F_A value in (13) resulting in conditions, permitting to determine voltage U_B^* compensating weight of sample. A pity, but this series of experiments brought negative results: experimental lifting force F_A for some fixed m_A and U_B^* values was about 10^3 times less, than predicted according to (13). The latter means that wrong is either the approach based on the Newton's equation of gravitational interaction usage for this process modeling or used model reflecting value R dependence on voltage U and mass value m_A. In the last case equation (13) has to be modified before the next series of experiments.

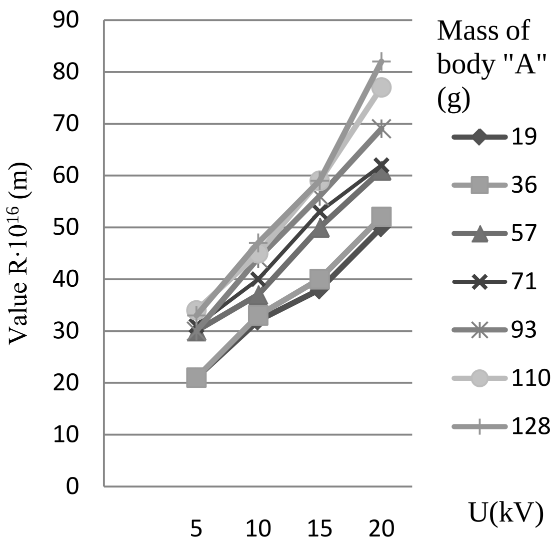

Fig. 4. Corresponding to (12) dependencies of R values on voltage U in vacuum as applied to the samples described in Table 1.

4 Conclusions

Results of this series of experiments minimize chances that they reflect the gravitational interaction. Due to vacuum in the experiment area these results also cannot be connected with the Biefeld-Brown effect [20], but they are close with the effects described in [21], confirming the idea, that “the capaciforce could potentially work in a vacuum”. That is why the next series of experiments is reasonably to concentrate on the verification of the presented above approach based on the use of Meschersky's equation [19] and (3) describing lifting force as an imbalance of reaction forces F_{φ} and $F_{-\varphi}$. At the same time it is already possible to say that results of the experiments convince us of some predictions providing an opportunity to create a new type of engine for space vehicles: their shells being coated by deployed capacitors are able to work simultaneously as a control device and as an engine without any mass loss.

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