Experimental Investigation of New Method of Energy Generation in Plasma Devices caused by Existence of Physical Space Global Anisotropy.

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ABSTRACT

An experimental investigation of a new interaction connected with the existence of the cosmological vectorial potential, has been carried out. On its basis, a new method of energy generation with the use of a plasma generator, has been studied. The experimental results are presented.

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1. Introduction

In Refs. [1-8], a new interaction of the objects in nature, different from four known interactions (the strong, weak, electromagnetic, and gravitational ones), has been predicted. The new force is caused by the existence of the cosmological vectorial potential $A_g$, a new fundamental vectorial constant appearing in the definition of byuons, new discrete objects (physical dimension of byuons are as of the electrical charge, magnetic flux, Dirac’s monopole - the same in CGSE system). According to the hypothesis suggested in Refs. [1,7,8], in minimization of the potential energy of interaction between the byuons in the one-dimensional space formed by them, the observable physical space as well as the world of elementary particles together with their properties, are arising. In this model, the masses of the particles are proportional to the modulus of the summary potential $A_\Sigma$, consisting of $A_g$ and the vectorial potentials of various magnetic sources as of natural origin (the Earth’s and Sun’s potentials, etc.) so artificial ones (for example, the vectorial potentials $A$ of magnetic fields of solenoids, plasma generators, etc.). The magnitude $|A_\Sigma|$ is always lesser then $|A_g| \approx 1.95 \times 10^{11} Gs \cdot cm$ [1-8].

In distinction to the gauge theory (for example, the classic and quantum field theory), in the model of Refs. [1,7,8] the values of potentials acquire a physical meaning in tune with the known Aharonov’s-Bohm’s effect [9,10] being a special case of the space quantum properties described in Ref. [8].

The magnitude of the new force is $F \sim N\Delta A \frac{\partial \Delta A}{\partial x}$, where $\Delta A$ is the difference in changes of $A_\Sigma$ between the points at which the sensor and test body are placed [1,7,8], $x$ is the coordinate in space, $N$ is the number of stable massive elementary particles (electrons, protons, neutrons) in the region of changing $A_\Sigma$. According to the ground-based experiments with high-current magnets [2-5], with a gravimeter and a magnet attached to it [11,12], the experiments on investigating the changes in $\beta$-decay rate of radioactive elements [13,14], and the astrophysical observations [15-17], $A_g$ has the following estimated coordinates in the second equatorial system: the right ascension $\alpha \approx 270^\circ$, the declination $\delta \approx 34^\circ$.

The new force ejects any substance from the region of diminished $|A_\Sigma|$ mainly in direction of $A_g$. The most effective angle between the vector $A$ of a current system and the vector $A_g$ is $150 \div 140^\circ$ [8].

In the investigations with high-current magnets (magnetic flux density
up to 15T), the magnitude of the new force was equal to $\sim (0.01 \div 0.08)g$ at the $30g$ mass of the test body. It was shown in experiments with rotating magnetic discs and an engine-generator [18-20] that the magnitude of the force $F$ can be considerably increased when to phase the motion of the body with the process of formation of the physical space from the byuons (i.e. the working body is bound to change $A_\Sigma$ by its potential $A$ and move in the direction of the vector $A_g$. Therewith its particles are to rotate in the proper side). In this case the energy will be extracted from the physical space through the elementary particles of the working body. The low of energy conservation in the system ”working body-physical space” will be obeyed. It is known that the main part ($\sim 98\%$) of energy in the Universe is determined by the ”dark” (virtual) matter [21]. The model of Refs. [1,7,8] describes the phenomenon of the ”dark matter” quite satisfactorily.

2. The experimental installation and technique.

To test the above said, a special stationary plasma generator with linear discharge (see Fig.1) has been manufactured at the Central Research Institute of Machinery. The plasma generator (1) (power $\sim 60kW$, current $I \sim 300A$, voltage $U \sim 220V$) is arranged on a rotatable base and can be turned together with the whole instrumentation through 320 degrees $\varphi$ around the vertical axis (2) and through 90° around horizontal axis. The plasma generator is water-cooled (3). As a working medium air (4) admixed with argon ($\sim 1\%$) was used. A measuring tube from copper (6) of internal diameter 0.8cm was fastened to the plasma generator by means of a holder (5) at 8cm from the nozzle exit section. The temperature of water drawing through the tube was $\sim 16^{\circ}C$. The arrangement of the measuring tube relative to the plume (7) of the plasma generator is shown in Fig.1. In the center of the section of the measuring tube at the inlet of water and in the region of the jet, the junctions of Chromel-Alumel thermocouples (8) 0.2mm in diameter were mounted. The thermocouples used in the experiments were industrially manufactured and corresponded to the standard GOST 3044-61 [22]. The calibration of thermocouples was tested when immersing them into boiling distilled water ($100^{\circ}C$). The percent change in temperature of junctions of thermocouples $\Delta T$ was fixed by a recorder with the accuracy class $\sim 0.4\%$. The tape advance of 25cm corresponded to 1mV of thermo-electrical voltage, i.e. to $\Delta T \approx 25^{\circ}$. The more thermocouples at point (8) gave a growth in sensitivity of the device but in the value of random error,
The plasma generator current and voltage were read with an accuracy of 1.5% of the limiting values for the instruments used (750A and 500V, respectively). The flow rate of water through the cooled measuring tube was fixed to within 3% (≈ 60g/s). The mass velocity $V$ of particles in the plasma generator jet was equal to 120$m/s$. The ionization coefficient in the jet was ≈ 0.1%. The initial experiments were performed in the following manner. First, a point in time was chosen at which the vector $A_g$ was close to the horizontal plane. Further, the starting direction of plasma generator jet was set up at an arbitrary angle to the presumed direction of $A_g$. When the plasma generator was in the operating conditions and the readings from the thermocouples corresponded to a stationary regime ($\Delta T = Const$), one began to turn the plasma generator in the horizontal plane together with the whole instruments around the vertical axis at < 5° a second. At this instant, the recorder fixed the value of the angle and the corresponding $\Delta T$.

When investigating, a hypothesis that the indications of the thermocouples $\Delta T$ were independent on the angle of rotation $\varphi$, was assumed. The deflections of $\Delta T$ during the experiment from its stationary value found before rotation, which are not explicable in the context of the traditional physics were considered as manifestations of the new force action. To analyze a result, the experimental values of $\Delta T$ were averaged over 10°-sectors of rotation, and the stationary value of $\Delta T$ (before rotation) was checked during ≈ 2min before each experiment, i.e. nearly for an assumed time of rotation of the plasma generator in the process of the experiment. The plasma generator used was able to operate in the stationary mode during ≈ 30min.

It should be noted that when rotating the plasma generator, the turning radius of the hose conducting water to the measuring tube was fixed near the latter and did not exceed 20 cm. The system of all water hoses and the power cables was untwisted in the process of the plasma generator rotation, i.e. the radii of their curvature increased and tended to infinity.

3. The results of experiments.

In Figs. 2 and 3 the results of two experiments carried out in February 10,1998, at 9:50, and in March 20, 1998, at 7:45 (Moscow time), are shown. In the first of them the plasma generator was turned counterclockwise from some arbitrary angle. As is seen from Fig.2, a considerable increase in $\Delta T$
reaching 40% of the stationary condition was observed close to an angle of 225°. In Fig.3 we also see a substantial rise in $\Delta T$ ($\sim 35\%$) nearby 120° ± 150° when turning the plasma generator clockwise beginning from another arbitrary angle. In the first experiment, the turn angle of the plasma generator equal to 225° corresponded to the angle $\alpha \sim 340°$ of the maximum action of the new force. In the second experiment this maximum action corresponded to the average value $\alpha \sim 260°$. Because the angles of maximum action of the new force lie on the left and on the right of the vector $A_g$, and the force along the direction of $A_g$ itself is zero [8], the initial experiments have given the direction of $A_\Sigma$ with the coordinates $\alpha \sim 300°, \delta \sim 34°$ (the vectors $A_g$ and $A_\Sigma$ are almost parallel). Therewith the angle between the vector $A$ of the current in the plasma generator discharge and the vector $A_g$ for maximum action of the new force was 140° for the first and 130° for the second experiments, respectively.

In the second run of experiments carried out by day since June 29, till July 02, 1998, the optimum angle $\beta$ the jet made to the horizontal plane, was sought because at that period the vector $A_g$ was nearly horizontal only by nights. At $\beta = 0$ and when turning the plasma generator around the vertical axis through 320°, the new force did not manifest itself at all. As the angle $\beta$ was spaced at 15° intervals, at $\beta = 30°$ the maximum inflection of the $\Delta T$ - curve during rotation of the plasma generator around the vertical line was observed. In various experiments these inflections corresponded to the following coordinates of the maximum action of the new force: $\alpha \approx 255°,$
\( \alpha \approx 340^\circ \), and \( \beta \approx 30^\circ \) \((\beta \approx \delta)\). That is, the coordinates of the vector \( \mathbf{A}_g \) practically had not changed and were equal to \( \alpha \approx 297^\circ \) and \( \beta \approx 30^\circ \) \((\beta \approx \delta)\).

Altogether there were carried out more than 20 experiments in 1998. All of them revealed (with an accuracy of \( \sim 20^\circ \)) only two directions in space relative to the vector \( \mathbf{A}_g \) corresponding to maximum \( \Delta T \) (see above). The summary statistic error including also random non-controllable processes (in the discharge of the plasma generator, in the flow of water nearly the thermocouples in the measuring tube etc.) was no more then \( \pm 12\% \) in each individual experiment on determining \( \Delta T \). The latter is clearly seen in Fig. 2. It is necessary to note that this result was obtained not only in the experiments with rotation of the plasma generator from an arbitrary angle but five months later as well (when the Earth turned through \( \sim 150^\circ \) about the Sun). In the course of the experiments, the bendings of water and gas hoses were insignificant and did not influence the experimental result. The action of the Coriolis force was unimportant, too. It is interesting to note that the results of experiments carried out in February 1998 and 1999 at the same days and hours, are qualitatively coincident (with an accuracy of \( \sim 20\% \) and with some common turn of the whole field of directions of the new force through \( \sim 20^\circ \)). As in 1998, in 1999 also two directions of this
force with a difference in $\alpha$ - coordinate equal to $\sim 90^\circ$, were prominent. For the experiments of February 1999, the coordinates of the vector $A_g$ calculated by the same procedure are $\alpha \approx 280^\circ$ and $\beta \approx 30^\circ$. It should be pointed out that the manifestation of the new force on the left or the right of $A_g$ was accidental, i.e. we could not precisely predict when this force will be fixed by us in the process of turning the plasma generator: before or after the passage of jet direction through the presumed direction of $A_g$. In roughly 30 experiments performed by us the force manifested itself after that passage approximately twice as frequently as before.

It is also interesting to note that in some experiments, an increase in $\Delta T$ at some angles $\varphi$ was immediately followed by one third as many decrease in its amplitude, - see Fig.1, $\varphi \approx 270^\circ$).

In Fig.4 shown are (in the projection onto the plane of celestial equator, $\delta = 0$) the direction of action of the new force $F$ and that of the vector $A_g$, determined from $\Delta T$ change in the plasma generator jet, for typical experiments performed in various day times and months of the year (the direction of the new force for other experiments are within the range of its direction shown in Fig. 4). As is seen, the new force directions in space are obviously not accidental, two of them (indicated above) are prominent. In the following section a detailed analysis of experimental errors is given.
Fig. 4. The direction of action of the new force $\vec{F}$ and that of the vector $\vec{A}_g$,
determined from $\Delta T$ change in the plasma generator jet:

- the direction of rotation of the plasma generator;
- the building where the plasma generator is positioned;
- $b$ - the direction of the plasma generator jet before its rotation;
- $e$ - the direction of jet at the end of rotation of the plasma generator;
- 10.02.98; 9h25m - date and day time of the experiment;
- 21.12 - the characteristic time points during Earth's motion around the Sun.
4. Analysis of errors in the experiment

The errors in determining the extremum of $\Delta T$ versus $\varphi$ are classed as systematic $\sigma_{syst}$ and random (statistic) $\sigma_{stat}$ ones. The systematic errors could be caused by the curvature of hoses, wrong position of thermocouples relative to the jet, Coriolis force, zero drift in readings of thermocouples, their calibration.

The statistic error $\sigma_{stat}$ was caused by the random processes in the discharge of the plasma generator in the measuring tube (when flowing around thermocouple junctions by water filaments with different temperature), finite accuracy of measuring devices (ammeter ($\sigma_{stat}^A$), voltmeter ($\sigma_{stat}^V$), flowmeters of water in the measuring tube ($\sigma_{stat}^W_1$) and in the plasma generator cooling system ($\sigma_{stat}^W_2$), flowmeters of air and argon ($\sigma_{stat}^{Ar}$) and of recorders ($\sigma_{stat}^R$) as well as by the experimental conditions (background): uncontrollable convective processes (wind), electromagnetic situation in the room.

Consider the systematic errors.

Preliminary investigations on the importance of bend radii of the hoses conducting water to the measuring tube and for cooling the plasma generator, have shown the following. If the radii of the water hoses close to the measuring tube were fixed at the value of 20 cm, and the remainder of the ”measuring” and ”cooling” hoses were untwisted in the process of rotation so that their bend radii tended to $\infty$, then the change in the pressure loss owing to bending of the hoses did not tell on the value of the summary error in determining $\Delta T$ during the rotation with an accuracy better that $\pm 3\%$($\sigma_{syst}^H$).

A dramatic effect on the valid signal to noise ratio was made by the position of thermocouple junctions relative to the jet. The maximum signal was obtained when one thermocouple was in the vicinity of the jet and the other was at the inlet of the measuring tube. When the thermocouples were placed symmetrically relative to the jet (at a distance of 30 cm between them), the effect became considerably weaker.

The above said is easily seen from Table 1 where the summary error and the valid signal are given. In the experiments 11 and 12, an old measuring tube was used. To prevent it from burn-out, we removed the thermocouple from the jet zone for a distance of 5 cm. The valid signal was weaker in that case. The effect in question was studied and reduced to some corrections to experimental results.
The Coriolis force also had a great effect on the deflection of $\Delta T$ from the stationary value. We observed an increase in $\Delta T$ owing to this force during anticlockwise rotation and a decrease in $\Delta T$ during clockwise rotation (see Fig. 3, $\varphi \approx 50^\circ$). The investigation of this influence led to a limitation on the plasma generator rotation velocity around its axis. A value of the maximum angular velocity was found ($\sim 5$ degrees per second) at which the deflections of $\Delta T$-curve owing to the Coriolis force at clockwise and anticlockwise rotation were no more than 3% (if the flow rate kept constant). The action of the Coriolis force was thoroughly studied, too, and gave the above-mentioned correction to the final result.

In some experiments (Table 1, experiments 11-16), an insignificant ($\sim 7\%$) pure linear zero drift in the readings of thermocouples was observed. The drift was caused by heating of water in the closed tank from which the intake for the measuring system was made. The said drift was also taken into account as a correction in the analysis of the final result. Thus $\sigma_{syst} \approx \sigma_{syst}^H \approx -3\%$.

Let us estimate random error.

For the above indicated parameters of the discharge, the random errors were equal to $\pm 3,5\%$ in current ($\sigma_{stat}^A$) and $\pm 3,2\%$ in voltage $\sigma_{stat}^V$. As they were not independent, the summary error of the power system were $\sigma_{stat}^W = \pm 6,7\%$. The further random errors were those of calibration of thermocouples ($\sigma_{stat}^T \approx \pm 0,3\%$), of the water flowmeter in the measuring tube ($\sigma_{stat}^W_1 \approx \pm 1\%$) and in the cooling system of the plasma generator ($\sigma_{stat}^W_2 \approx \pm 3\%$), of the flowmeters of air and argon in common ($\sigma_{stat}^A_r \approx \pm 4\%$), of the recorder ($\sigma_{stat}^R \approx \pm 0,4\%$).

Consider experimental conditions. The experiments were carried out in a great room $30 \times 40m$ in area and $15m$ in height with controllable temperature, which remained constant in the course of experiments in spite of operation of the plasma generator. In the vicinity of the latter there were no objects acting on the character of plasma jet. The room was free from a noticeable wind. The convective flows initiated by the plasma generator were not monitored. In the neighboring rooms as well as in the experimental room one did no works with electromagnetic devices which could influence on the results of experiments with the plasma generator. The possible effect of magnetic storms changing the magnetic field in the room by $\sim 10^{-3}Oe$ could be neglected for the experiments in consideration. Based on data of IZMIRAN institute for the Earth’s magnetic surrounding, it were not...
marked any magnetic storms per the days the investigation was carried out, specified in Table 1.

In connection with the independence of the above-listed factors giving random errors, the total mean-root-square error was equal to

$$\sigma^\Sigma_{\text{stat}} = \sqrt{(\sigma^W_{\text{stat}})^2 + (\sigma^T_{\text{stat}})^2 + (\sigma^W_1_{\text{stat}})^2 + (\sigma^A_{\text{stat}})^2 + (\sigma^R_{\text{stat}})^2} \approx \pm 8\%.$$ 

In the course of experiments we had the summary error including all errors, as systematic so random ones, except only $\sigma^R_{\text{stat}}$ which was very small. The analysis of data in Table 1 and the value of $\sigma^\Sigma_{\text{stat}}$ shows that in some experiments $\sigma^\Sigma_{\text{stat}} > \sigma^\Sigma$, which can be probably explicated by compensation of errors when determining $\sigma^\Sigma_{\text{stat}}$.

The errors connected with determining the vector $A_g$ and caused by averaging the extremum values of the curve $\Delta T(\varphi)$ and by construction of vectors of the new force, added up to no more than $\pm 10\%$.

**Table 1.** The values of the summary error $\sigma^\Sigma$ in 20 experiments, 1998-99.

| N  | Date and time of the experiment | Angle $\beta^\circ$ | Summary error $\sigma^\Sigma$ | Deflection of $\Delta T$ by the new force $F$ |
|----|-------------------------------|----------------------|-------------------------------|----------------------------------|
| 1  | 10.02.1998 9h 50min            | 0                    | $\pm 12\%$                   | 40%                              |
| 2  | 3.03.1998 8h 30min             | 0                    | $\pm 3\%$                    | 10%                              |
| 3  | 3.03.1998 9h 00min             | 0                    | $\pm 3.5\%$                  | 13%                              |
| 4  | 3.03.1998 9h 30min             | 0                    | $\pm 5\%$                    | 15%                              |
| 5  | 20.03.1998 7h 45min            | 0                    | $\pm 9\%$                    | 35%                              |
| 6  | 20.03.1998 8h 45min            | 0                    | $\pm 10\%$                   | 30%                              |
| 7  | 24.03.1998 8h 30min            | 0                    | $\pm 5\%$                    | 21%                              |
| 8  | 24.03.1998 9h 15min            | 0                    | $\pm 5\%$                    | 18%                              |
| 9  | 4.04.1998 7h 45min             | 0                    | $\pm 5.5\%$                  | 14%                              |
| 10 | 8.04.1998 8h 15min             | 0                    | $\pm 5.5\%$                  | 12%                              |
| 11 | 22.06.1998 7h 10min            | 15                   | $\pm 5\%$                    | 10%                              |
| 12 | 22.06.1998 7h 50min            | 15                   | $\pm 5\%$                    | 8%                               |
| 13 | 29.06.1998 7h 03min            | 30                   | $\pm 6.5\%$                  | 17%                              |
| 14 | 29.06.1998 7h 45min            | 30                   | $\pm 5\%$                    | 12%                              |
| 15 | 2.07.1998 7h 10min             | 30                   | $\pm 11\%$                   | 27%                              |
| 16 | 2.07.1998 8h 15min             | 30                   | $\pm 10\%$                   | 28%                              |
| 17 | 10.02.1999 9h 15min            | 0                    | $\pm 3\%$                    | 10%                              |
| 18 | 15.02.1999 9h 50min            | 0                    | $\pm 6\%$                    | 14%                              |
| 19 | 16.02.1999 9h 10min            | 0                    | $\pm 2.5\%$                  | 8%                               |
| 20 | 16.02.1999 10h 15min           | 0                    | $\pm 2.5\%$                  | 10%                              |
5. Addendum

In the Central Research Institute of Machinery, the thermophysical properties of constructional materials in the jet of a plasma generator with linear discharge 1MW in power, were investigated for more than ten years. In some instances, while estimating the heat content of the jet with the aid of a local calorimeter, a considerable excess of energy released in the jet above the energy taken from the power source, was observed at fixed operating parameters of the plasma generator \((I = (500 \div 1800)A; V = (3000 \div 3500)m/s)\). The results of estimation of the total energy at the output of the plasma generator were obtained by way of computations.

In three last experiments (two of them were carried out in Oct. 22, 1992, at 1430, 1500, and one was in Apr. 22, 1994, at 1500), integral calorimetric measurements in the jet of the 1MW plasma generator were fulfilled by means of a non-stationary calorimeter crossing the jet in a matter of 0.2 second. The duration of stationary operation of the plasma generator was equal to 30 – 40s, the error of measurements was \(\sim \pm 20\%\). The ratio of energy output \(W_1\) to input \(W_0\) equaled \(\sim 1\) in the experiments of 1992 but the measurements in 1994 have given \(W_1/W_0 \approx 2\) which was much more than the error of the experimental technique used. The latter fact also lent an impetus to conducting the above described experiments with plasma generator. An analysis of spatial arrangement of the axis of plasma generator relative to the vector \(A_g\) has shown that in the experiments of 1992, the effect of increasing energy in the jet was to be totally absent but in the experiment carried out in 1994, by contrast, the plasma generator jet was just at the most efficient angle \(\sim 30^\circ\) to \(A_g\). Therewith the angle between the vector \(A\) of the current of the plasma generator and the vector \(A_g\) was equal to \(\sim 150^\circ\).

Since 1976 till 1982 in the Research Center of High-Voltage Equipment (Moscow), a run of experiments was performed by V.P.Ignatko and others on investigation of alternating high current electric arc in the closed volume of transformer oil in a unique experimental set-up having no analogues in the world. The root-mean-square current was varied through a range of 20 – 130kA with the amplitude values no more than 200kA. The period of current oscillations was equal to 0.02s, the duration of arc discharge was \(\sim 1s\). The electric set-up was made up of two shock-exited electric machine oscillators of TI-100-2 type in a double transformation circuit, and deliv-
ered up to 12\(kV\) of r.m.s. no-load voltage. The oil of volume \((0.6 \div 1)m^3\) was inclosed in a vertical cylindrical tank from steel \(\sim 3m\) in height and \(\sim 1m\) in diameter weighing about 7t. The arc burned in oil between hemispheric copper electrodes 7\(cm\) in diameter initially placed \((0.5 \div 5)cm\) apart in the middle plane of the cylinder between its bottom and cover. The current, voltage, power and energy of the arc, pressure at various points of the experimental model, and deformations of the whole construction investigated, were measured. The process was filmed. More than 100 experiments were carried out. In some of them \((\sim 8)\) anomalous phenomena were observed - a tendency to current suppression without apparent reasons for that. So, in an experiment in Oct. 7, 1976, at 22\(^{20}\), the current at its third and fifth half-periods decreased from 186\(kA\) to 8.7\(kA\) and 3.3\(kA\) (i.e. tens times) until the arc decayed 0.05 second after. In a time of 0.05s, 5.55\(MJ\) of energy were transferred to the arc. That experiment was finished by an accident. Uncontrollable energy release in the arc took place, and the pressure in the vertical direction was built up to 120\(atm\) which terminated in deflection of the cover of the cylinder \((8cm\) in thickness) by 1\(cm\) and emergence of a crack of width up to 0.2\(cm\). An analysis of the process have shown that the energy released in the arc turned out to be about an order higher than the expenditure of energy. The experiment performed in June 10, 1982, at 20\(^{35}\), in which the arc current equaled 38.5\(kA\), the energy imparted accounted for 31.2\(MJ\), the initial gap between the electrodes was equal to \(\sim 2cm\) (these are common, far from limiting parameters for the set up in question), led to an explosion. The seven-tonne cylinder broke away from screw anchors and rose up having destroyed the ceiling. Examination of deformations occurred and estimation, on their basis, of arc energy by a joint commission have shown that there were released in the arc 10-100 times more energy than was communicated to it. The government commission could not find reasons for the accident in the limits of existing physical and chemical knowledge. Analysis of spatial arrangement of the center line of the set-up electrodes has led to a conclusion that in the latter case it made the most efficient angle with the vector \(A_g\) (for the action of the new force), and in the experiments of 07.10.76 the angle between that line and \(A_g\) was very close to the most efficient. The above mentioned phenomenon of abnormal suppression of current, inexplicable on the basis of the existing electrical engineering and physics, also can be explained by the action of the new force.
The last of 1999, we have been acquainted with the works of R.M. Santilli in which, on the basis of a new model of unstable hadrons developed by him ("the hadronic mechanics"), a Santilli’s reactor was proposed using an arc discharge in a special liquid. The power output in experiments with the reactor turned to be much more than the energy taken from the power source.

In the present paper we shall not consider distinctions between two physical models ("the hadronic mechanics" and the new interaction connected with the existence of $A_g$). We note only that the arc discharge in a special liquid can lead to formation of vector-potential lines of thoroidal type, in which case the new interaction will manifest itself in no dependence upon the day time since in the thoroid there are always the lines of the vectorial potential directed towards the vector $A_g$.

Therefore our experiments and those of R.M. Santilli have possibly the same physical base.

Thus the material of the present paper and the whole complex of investigations of properties and characteristics of the new force as well as of the global anisotropy of space due to existence of the vector $A_g$, testify that we have detected a new source of energy connected to the energy of the physical space. This energy can be used with the aid of various current-carrying systems acting by potentials on elementary particles through which the energy comes to us.

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