STUDYING OF INFLUENCE COSMOPHYSICAL FACTORS ON THE PERIOD OF DELAY OF THE GAS DISCHARGE

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ABSTRACT

In the given publication the theories of consideration of influence of external factors to the various kinds of processes, including laboratorial processes, having essentially distinguished methodological bases are submitted. Installation and a measurement technique for studying cosmophysical phenomena, a background of electromagnetic radiation and its rejection from norm, and also the software are described. Also the measures, undertaken for full elimination of artefacts are described.

The given method can be applied for studying aperiodic cosmophysical processes (magnetic storms, flashes on the sun), and also a background of electromagnetic radiation and its deviation from norm.

Keywords: fluctuation, delay, near zone, correlation

I. INTRODUCTION

For the phenomena concerning to various sections of a science, was received a series of statistically established facts about dependences of some observed regularities which are difficult to explain by feedforward and mediate connection on the basis of known local interactions, for example, dependence of speed of some physical and chemical reactions and solar activity, dependence of variations of a stream of the high-energy heavy electrons of the space beams and a natural radio-activity of rocks, etc. [1-6]. The various critical phenomena arising by transfer high energy, also necessary to consider within the framework of influence external cosmophysical influences.

Especially it's necessary to note correlations of some physical processes with solar activity.

Lately in works the original results showing a non-randomness of recurrences of measurements with cosmophysical periodicity are submitted and also high probability of similarity for processes of the different nature among which it is possible to allocate:

a) Speeds of latex particles movement in an electric field,

b) The discharge waiting time of in the RC-generator on a neon lamp,

c) Time of a cross-section relaxation of $\tau 2$ protons of water by spin-echo method,

d) Measurement of amplitudes of fluctuation of concentration of reagents in Belousov-Jabotinsky reaction (pulsing oxidation-reduction reaction),

e) Intensity of radioactive disintegration of various isotopes,

f) The cytoplasm movement's speed measurements,

g) The temporary variation of intensity of space radiation (neutrons and ionizing components)

h) Biochemical reactions with macromolecules of the proteins participation,

i) Homogeneous chemical reactions with participation of low-molecular connections.

The various theories having essentially distinguished methodological bases are constructed. Attempts of an explanation of an occurring phenomenon are made.

It is necessary to note the researches spent by S.E. Shnol with employees, widely described in works [4, 7, 8]. Briefly the essence of their researches can be characterized as follows. During of anyone consecutive in time measurements of processes of any nature owing to fluctuation receive sequence of discrete magnitudes. Some of these magnitudes meets essentially more often others - the "allowed" and "forbidden" conditions of the measured parameters of proceeding processes of macroscopical objects are observed. The form of a spectrums of the allowed and forbidden conditions (are relative magnitudes of distances between levels and a degree of their population) is similar during each given moment for processes of the different nature and changes with high probability simultaneously in different processes, including that cases, when we have a big distances between laboratories. The repeatability also has a high probability for well-known cosmophysical periods. The discontinuity of distribution of results of measurements shouldn’t cause surprise as it's caused by only arithmetic reasons - algorithms of interaction of "reagents" in investigated processes. However, natural change of thin structure of histograms in time, similarity of this structure under independent measurements of processes of the different nature is not explained by only mathematical laws and it's present of fundamental physical properties of our world. The criterion of

similarity is not chosen here, and the visual method causes many questions, also as object of research the phenomenon α-decay was chosen, not subject, as is known, to external influence.

Now influence of variable wave corpuscular solar radiation on a condition of the upper atmosphere and all complex of electromagnetic geophysical processes is deeply investigated. The explanation of correlations of solar activity with not electromagnetic processes is extremely problematic in the lower atmosphere, in the ocean and lithosphere, and even with some laboratory processes. In due time were offered various models of transfer of influence of solar activity from the upper atmosphere to lower atmosphere and further to the firm Earth, but at a quantitative level they was found unpersuasive. As the last researches shown, the causal influence of atmospheric variability caused by solar activity, is distributed from bottom to top. Hence, solar activity's influence to not electromagnetic processes in the lower and the underlying to Earth atmosphere have direct character. N.A. Kozyrev [6] offers such interpretation of the facts within the framework of the new physical direction advanced by him - the causal mechanics, based on recognition of fundamental irreversibility of time and new type of physical interaction following from here between anyone dissipative processes. The concept of causal mechanics based on numerous laboratory experiments, but in due time has caused negative reaction, first, because of use in theoretical constructions of such uncertain concepts as "reason", "consequence", " durability of a causal relationship " as operational, second, because of doubts in purity of experiments. Last years the situation has changed. The initial theoretical positions of causal mechanics were successfully mathematically formulated [9]. Some geophysical phenomena were quantitatively explained on the basis of development of the N.A. Kozyrev's theory. Kozyrev's experiments have been successfully reproduced by D. Sevidzh [10].

The fact of the matter is that installations are placed in different apartments is confirms, that the phenomena are not subject to trivial influence of external temperature. Influences of the common fluctuations of atmospheric pressure also it is not essential for the phenomenon.

Particularly, time of delay of discharges can be used for detecting effect of not local interaction. Though as trial process in the detector can be used anyone dissipative process.

Therefore for an estimation we have made well controllable laboratory experiment on measurement of time of delay of the category in protected from known kinds of classical influences a discharge gap. We investigated reaction to various kinds of external macro-influences, including reaction on sudden ionospheric disturbance and solar activity, and the strengthening of storm activity.

II. ARTIFACTS AVAILABILITY AND THEIR ELIMINATION

During the experiment should be excluded or stabilized all known local factors influencing to the duration of time of delay of the discharge: temperature, pressure, chemism, light exposure, effect of ageing of an electrode, an electric field. At last, the general air temperature in laboratory to within 0,1 K was continuously registered.

In experiment the neon lamp of a serial factory design with metal plane-parallel electrodes and the cold cathode was used, than was achieved the prevalence of volumetric processes above superficial, absence of change of height of a potential barrier and thermionic issue, and also other additional factors promoting faster ignition of the discharge.

The research of influence of difference of a mains voltage, also the screening from external disturbance-generated factors was the important preliminary stage .

The period of occurrence of consecutive discharges exceeded theoretically designed value necessary for full deionization of a discharge gap and absence of heating of electrodes [11].

$T=\rho_c\varepsilon_c\varepsilon_0$,

t-time of a charge running-off over the dielectric's surface, ρ_c-specific resistance of dielectric, ε_c-permittivity of dielectric, ε_0=8.85̧10-12 F/m – an electric constant.

As a source of sample pulses the quartz generator was applied to achievement of accuracy. For the measurements inter-control two methods of measurements of the investigated parameter were used: a method of a power failure on consecutive resistance with a discharge gap and by means of a photo cell.

Electrodes contain ferromagnetic materials, therefore are subject to influence of a magnetic field [12-14].

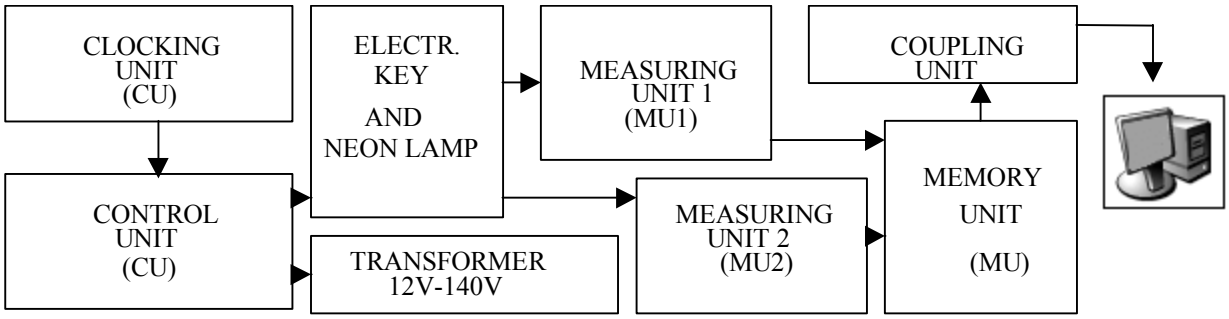

Fig.

III. EXPERIMENTAL SETTING

In experiment the devises past by present time extensive experimental check was used.

Measuring complex (MC), shown on Fig, allows independently, by means of the accumulator, in an automatic mode at the same time measure the time of delay of ignition of a neon lamp by two methods: a) a method of a power failure on consecutive resistance with a discharge gap; b) by means of a photo cell. The constant voltage, submitted from the accumulator, equals to 12V. Also a power supply of device from the electric system has been stipulated.

In a measuring complex was provided memorization of these measurements in the internal block memories (RAM). With help of the special program the given installation by means of LPT-port allows to enter all collected information into a computer for the subsequent processing measured dates by mathematical methods. An interval between the adjacent measurements was 60 sec. A memory size of the RAM - 2ķ8 (204ᵾ8), that's equal 2 kB.

The principle of operation of a measuring complex will consist in the following rectangular components. The period of measurements was set in the block of synchronization. Pulses generated here moved in the block of control where in the beginning of each period the pulse by duration 5 sec was given out., with which help the converter of a voltage raising a potential difference from 12V up to 140V was started. After 2 sec., that it is enough for full stabilization of a voltage, after switch on the converter, the block of control gave out a signal to switch on an electronic key. In the first type of measurements the compeared pulses were taken before and after a discharge interval, in the second type of measurements - the pulses taken up to a discharge interval and from a photo cell. As result turned out the pulse, determining the shear between compared pulses - a pulse of delay of the discharge.

Pulses of known frequency, developed the quartz generator, were located in a pulse of delay, than the numerical size of time of delay of the discharge gap was defined. Results of two methods of measurements were located into the memory block. After filling all memory size, a measuring complex was connected to a computer through the block of coupling by means of LPT - port [15].

IV. SOFTWARE

By means of program Borland Delphi we had been created a product test.exe allowing to write down and read out the data from the LPT port of a computer (parallel port), and also to work with some control signals. For correct work it's necessary to switch an operating mode of port in mode EPP (Enhanced Parallel Port - a mode of bidirectional data transmission), and also address space of port in a range &H378 - &H37F.

V. TECHNIQUE OF THE MEASUREMENTS

In experiment various methods of processing of results are used. In part techniques are described in works [12 - 14, 16]

Measurements were carried out in a continuous mode from March, 02, till October, 11, 2005. During the period of measurements step-type behavior of measurements has been elected in 60 seconds. The data were processed by methods of the correlation analysis.

At present time the technique of processing of results, has been expanded as follows. By means of experimental installations (Fig), a series of measurements is carried out. Periodicity, as well as in earlier published works makes 1 minute. The received series of measurements are broken into not overlapping rows for each of which there is an average size is calculated. It's naturally that used the average measurements as less than 1 minute time interval cannot be sensitive to external influence. Fluctuations in macrosystems have cosmophysical nature, that is the big sizes and inertial systems take place. Thus, we have the rows of the average sizes which are in turn broken into not overlapped rows of required duration. The factor of correlation between two rows of values is calculated, it can be results of one experiment, and two different not connected series of measurements. The received results are sorted by a principle of a sign on correlation and numerical value more than 0.6 by the module, values with factor of correlation from 0.5 up to 0.6 also are fixed.

Also the factor of correlation between a row of the average values of time of delay of the discharge for a day and the dates, taken from a web-site of the center of a space noaa.gov, namely radio by a stream, Woolf's numbers and the area of solar spots was calculated.

The technique allows comparing daily correlations of the different phenomena.

VI. CONCLUSION

Thus, results of the long experiments executed at a comprehensible level of severity, allow making the positive conclusion about validity of a hypothesis of not local interaction of the solar-ionospheric dissipative processes.

On the one hand, it opens prospect for understanding of the nature of set of strange correlations of different processes. On the other hand, on the basis of the described technical equipment the new method of research of the various phenomena can be advanced.

The technique offered in the given publication and the device can be applied to studying aperiodic cosmophysical processes (magnetic storms, flashes on the sun), and also a background of electromagnetic radiation and its deviation from norm.

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