

The “Scattering of the Results of Measurements” of Processes of Diverse Nature is Determined by the Earth’s Motion in the Inhomogeneous Space-Time Continuum. The Effect of “Half-Year Palindromes”

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As obtained in this experimental research, the sequence of the shapes of histograms (the spectra of the amplitudes of fluctuations), measured during an astronomical day from 6 h to 18 h of the local time, is very similar (with high precision of probability) to the sequence of the histogram shapes obtained during an astronomical night from 18 h to 6 h of the local time a half of year later in exact. We call the effect that the sequences of the histogram shapes in the same half of day measured a half of year later are similar after inversion the “effect of half-year palindromes”. This means that the shapes of histograms are stable characteristics of a given region of space.

In the previous work [32], we considered the phenomenon of “palindromes”, which stands for a high probability of similar histograms to be found upon comparison of two data series: first, representing the results of measurements of ^{239}Pu α -decay over astronomical day (since 6 to 18 h by local, longitude, time) and, second, measured over astronomical night (since 18 to 6 h, in continuation of the first series) and *inverted*. “Inverted” means that the order of histograms in the second series is reversed. The palindrome effect implies that (1) the shape of histograms depends on the spatial region passed by the axially rotating Earth over the period of measurements, and (2) the properties of this spatial region are not shielded by the Earth: whether in the daytime or nighttime, the histograms corresponding to the same spatial region are similar. In the course of the Earth’s motion along the circumsolar orbit, i.e., upon its translocation into new spatial regions, histogram shapes change; the effect of palindromes, however, will manifest itself every new day.

A remark *It should be stressed that the shape of histograms depends on many factors: rotation of the Earth about its axis; motion of the Earth along the circumsolar orbit; relative positions of the Earth, Moon and Sun; axial rotation of the Sun; motion of the Moon along the circumterrestrial orbit. In the past years, we revealed and described, more or less, most of these factors. It seems there is an hierarchy of causes (factors) that determine histogram shape. Among them, the axial rotation of the Earth and, correspondingly, the near-day periods in the change of histogram shapes are of primary importance. Because of such a multifactoriness, the number of histogram shapes related to the effect of any single factor may amount to only a part of the total. In the case of palindrome effects, for example, this number is about 15–20% of the total possible shapes.*

As supposed by M. N. Kondrashova, the palindrome effect should also be revealed upon comparing histograms that

have a half-year interval between them, i.e., histograms that correspond to the measurements made when the Earth was at the opposite ends of a diameter of the circumsolar orbit [33]. This supposition agrees with our earlier observation on similarity between the series of daytime histograms obtained on the days of vernal equinox and the series of nighttime histograms taken in the periods of autumnal equinox. However, in those experiments the “daytime” and “nighttime” terms were not associated with the rotational and translational motion of the Earth about its axis and along the circumsolar orbit, so the results were poorly reproducible. With the terms “daytime” and “nighttime” strictly defined (since 6 to 18 h and since 18 to 6 h by local time, respectively), the supposition was proved for different seasons, equinoctial periods and solstices. The daytime series of vernal equinox, for example, are highly similar to the inverse daytime and noninverse nighttime series of autumnal equinox.

Thus, there are “half-day” and “half-year” palindrome effects. This is illustrated in Figure 1.

The effect of “half-day” palindromes consists in the high probability of a series of nighttime histograms to be similar to the *inverse* series of daytime histograms measured on the same day (equally, noninverse daytime series are similar to the inverse nighttime ones). For example, the sequence “1-2-3-4-5” of the series of nighttime histograms is similar to the sequence “5-4-3-2-1” of the series of daytime histograms.

The effect of “half-year” palindromes results from the Earth’s motion at two opposite points of the circumsolar orbit being directed oppositely during the same half of the day. This effect consists in the high probability of a series of nighttime histograms at a certain point of the circumsolar orbit to be similar to the *noninverse* series of daytime histograms at the opposite point of the orbit (the same holds true upon comparing a nighttime (daytime) series to the inverse nighttime (daytime) series at the opposite point of the orbit).

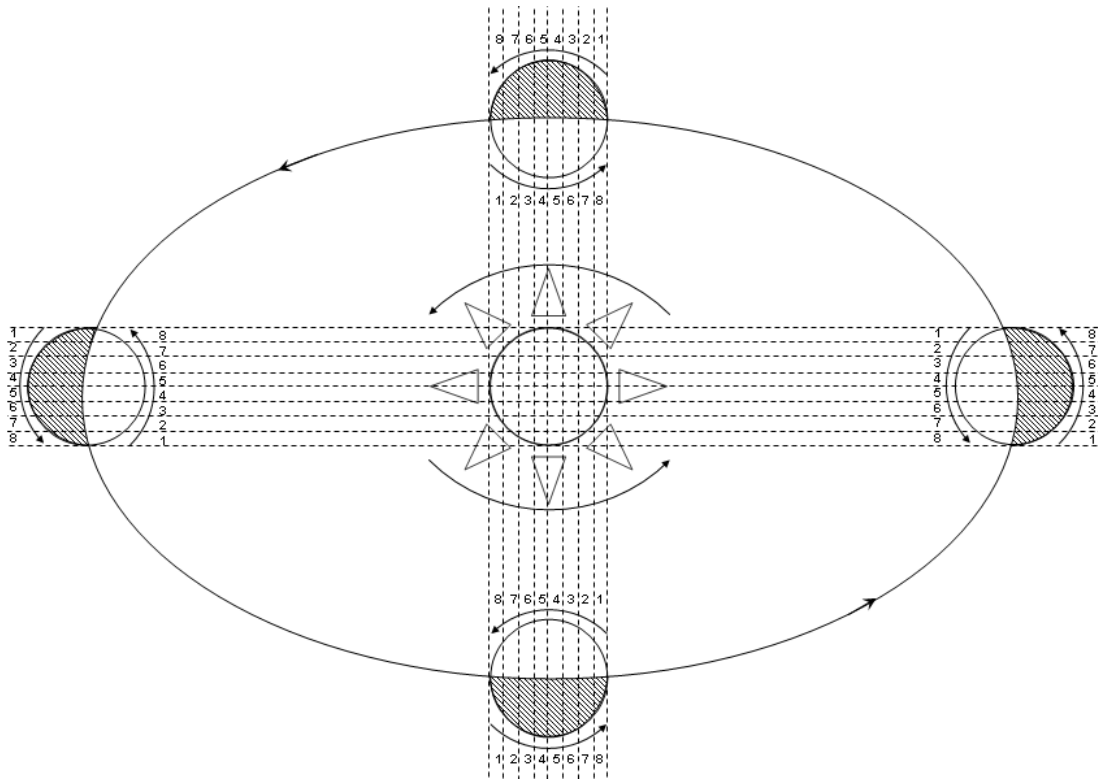


Fig. 1: A scheme illustrating “palindrome effects”. With the Sun in the centre, the scheme shows four positions of the Earth on the circumsolar orbit. Both the Earth and the Sun are rotating counterclockwise; motion of the Earth along the circumsolar orbit is counterclockwise as well. As seen in the Figure, the Earth’s rotational motion in the nighttime is co-directional to its motion along the circumsolar orbit and to rotation of the Sun. In the daytime, the direction of these motions is opposite. Hence, in the case of “backward” motion (in the daytime), the object measured passes in the inverse order the same spatial regions that it has passed in the direct order in the nighttime.

The half-year palindromes indicate, first of all, that certain features of the space continuum keep for a long time: after half a year we observe similar histograms. Obviously, a daytime picture of the stellar sky will correspond to the nighttime one after six months. The daytime series resembling the nighttime ones after half a year also means that the factors determining the shape of histograms are not shielded by the Earth.

As follows from these effects,

- (1) the shape of histograms does not depend on the direction that a spatial region is scanned in during the Earth’s motion (from right to left or vice versa);
- (2) factors that determine histogram shape are not shielded by the Earth: both in the day- and nighttime, series of histograms turn out similar and dependent only on the region (vector) of space passed by the object measured at that moment;
- (3) the shape of histograms is determined by the spatial regions being scanned in the course of rotational and translational motion of the Earth; in other words, the shape of histograms is a specific characteristic, which reflects peculiarities of the spatial region scanned during the measurement.

The fine structure of histograms resembles interferential pictures [3–5, 15–17, 25]. This analogy may have a real significance: every spatial region is a result of interference of many gravitational waves, and the interferential picture emerging can be reflected somehow in the shape of histograms.

Discovering the half-year palindromes, in addition to the half-day ones, allows us to consolidate all the previous findings and unify our views on the phenomenon of “macroscopic fluctuations”, which stands for regular changes in the fine structure of sampling distributions (histograms) calculated from the results of measurements of processes of diverse (any) nature [2–16].

Now there is a good explanation for the high probability of a certain histogram shape to appear regularly, on a daily and yearly basis. The similarity of histograms obtained at different geographical points at the same local time becomes evident too.

As follows from all the data collected, our old conclusion — that alterations in the histogram shape are caused by the motion of the object studied along with the rotating and translocating Earth relatively to the “sphere of fixed stars” (“sidereal day” and “sidereal year” periods) and the Sun (“solar day” and “near-27-day” periods) — is correct. The shape

of histograms also depends on motion of the Moon about the Earth and changes in the relational positions of the Earth, Moon and Sun [10, 23–29]. Supplemented with the results of experiments, in which α -activity was measured with a collimator-based setup [24, 26–28], these data indicate, on the one hand, a sharp anisotropy of our world and, on the other hand, a relative stability of characteristics of the space continuum.

Discussion

In some way, the data presented above can be considered as a completion of the series of experiments that was started more than 50 years ago (the first paper was published in 1958 [1]). Over this period, the results obtained have been reviewed several times, and all the necessary references are provided in the correspondent reviews [3, 4, 12, 14, 15, 17, 25, 31]. Nevertheless, a brief consideration of the course of those studies would not be out of place.

The subject of this series of experiments was, basically, the “scatter of results”, which will inevitably accompany any measurements. For most scientific and practical purposes, this “scatter” is a hindrance, impeding accurate evaluation of the parameters measured. To overcome undesirable influence of data scattering, researchers use a well-known and widely approved apparatus of statistical analysis, specifically designed to process the results of measurements. Different processes (of different nature) will be characterized by their own specific amplitude of data scattering, and they have even been classified according to this attribute. In biological processes, for example, the scatter (its mean-square estimate) can reach tens percent of the value measured. In chemical reactions, the scatter — if not resulted from trivial causes — would be smaller and amounts to several percent. In purely physical measurements, the scatter can be as small as several tenth or hundredth percent. There is a saying, popular in the scientific circles, that “biologists measure ‘bad’ processes with ‘bad’ devices, chemists measure ‘bad’ processes with ‘good’ devices, and physicists measure ‘good’ processes with ‘good’ devices”. In fact, the relative amplitude of this unavoidable scatter of results is determined by deep causes, and among them is the subjection of the quantities (objects) measured to cosmophysical regularities. In this sense, the figurative “bad-good” assessment of natural processes changes its sign: the “best” (most sensitive) are biological processes; chemical processes are “somewhat worse”; and “much worse” (least sensitive) are processes like quantum generation or natural oscillations of piezoelectric quartz. From this viewpoint, a valuable and important process to study is radioactive decay, in which relative dispersion is equal, according to Poisson statistics, to \sqrt{N} , where N is the quantity measured.

Free of trivial errors, the scatter of the results of measurements has, usually, a purely stochastic character and, hence, will be described by a smooth, monotonously decreasing at

both ends distribution, like Gaussian or Poisson functions. In reality, however, never do experimenters obtain such a smooth distribution. Whether the experimental distribution fits a theoretical one is decided by applying fitting criteria based on central limit theorems. These criteria are integral; they neglect the fine structure of distributions, which is considered casual.

The main result of our works consists in proving non-randomness of the fine structure of sample distributions (i.e., histograms) constructed with the highest possible resolution. The proof is based on the following facts:

1. There is a high probability that at the same place and time, the fine structure of distributions obtained for different, independent processes will be similar;
2. The phenomenon is universal and independent of the nature of the process studied. Whether biochemical reactions or radioactive decay — if measured at the place and time, they will show similar histograms;
3. There exists a “near-zone effect”, meaning that neighbour histograms calculated for non-overlapping segments of a time series of the results of measurements would be more similar than random far-apart histograms;
4. In the course of time, the shape of histograms changes regularly: similar histograms appear with periods equal to the sidereal and solar days, “calendar” and “sidereal” years [21];
5. At the same local time, similar histograms will appear at different geographical points: this is a so-called “effect of local time”. This phenomenon was observed at both large and small distances between the objects measured. “Large distances” means that the measurements were carried out in different countries, in the Arctic and Antarctic, and on the board of ships sailing round the world. “Small distances” can be as short as 10 cm, as in V. A. Pancheluga’s experiments with noise generators [27–30];
6. The “palindrome effects” discussed here and in the previous work [32] round off the set of proofs.

All these pieces of evidence were collected in the experiments with quite stochastic, according to the accepted criteria, processes.

The high quality of the apparatus for continuous, 24-hour measurements of α -activity constructed by I. A. Rubinstein enables us to collect long, non-non-interrupted data series for many years. On the basis of these data, accurate evaluation of the yearly periods has been made. A key step was conducting long-term measurements with I. A. Rubinstein’s collimator-equipped detectors, which isolated beams of α -particles emitted in certain directions. Those experiments gave evidence that the shape of histograms depends on the spatial vector of the process. The sharpness of this dependence implies a sharp

anisotropy of the space continuum [20, 22, 25].

In addition to the effects listed above, we have also found regularities that have been attributed to the relative positions of the Earth, Moon and Sun [10, 23, 26, 28, 32].

The whole set of these results is in agreement with the scheme in Figure 1.

Thus, the regularities found in the “scatter of results” of various measurements reflect important features of our world. The fine structure of histograms — spectra of amplitudes of fluctuations of the results of measurements of processes of diverse nature — is the characteristic of the inhomogeneous, anisotropic space-time continuum.

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