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Experimental Investigation of New Long-Range Actions.

Analytical Review

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In this article the experimental results obtained by various researchers in the period 1950-1990 are discussed. Since all experimental results under consideration could not be explained in the framework of existing theories, these results were placed under the category of "experimentally-observed phenomena." It is shown that all of the experiments considered here have demonstrated a manifestation of spin-torsion interactions.

Over the course of the XX century, various investigations in different countries, representing a variety of professional interests, repeatedly reported the discovery of unusual phenomena that could not be explained in the framework of existing theories. Since these authors could not understand the physics of the observed phenomena, they were forced to give their own names to the fields, emanations and energies responsible for the creation of these phenomena. For instance, N.A.Kozyrev's "time emanation" [1-4], W.Reich's "O-emanation" or "orgone" [5], M.R.Blondlot's "N-emanation" [6], I.M.Shakhparonov's "Mon-emanation", A.G.Gurvich's "mitogenetic emanation" [7], A.L.Chizhevsky's "Z-emanation", A.I.Veinik's "chronal field" [8,9], "M-field" [10], A.A.Deev's "D-field", Yu.V.Tszyan Kanchzhen's "biofield", H.Moriyama's "X-agent" [11], V.V.Lensky's "multipolar energy" [12], "radiesthesiatic emanation" [13], "shape power", "empty waves" [19], "pseudomagnetism" [20], H.A.Nieper's "gravity field energy" [21], T.T.Brown's "electrogravitation" [22], "fifth force" [23], "antigravitation" [24], "free energy". This list can be easily continued.

As the result of the theoretical and experimental investigations conducted beginning in the mid 60s, for instance by the V.G.Baryshevsky [25-28] group and G.V.Skrotsky [20] in the USSR, by the A.Abragam and M.Goldman group in France [29-31] and others, spin-spin interactions of spin-polarized particles with spin-polarized nuclei targets, and the distant correlations of nuclei spins' states were discovered and investigated. These interactions were called "pseudomagnetism" [20]. In one case, the "pseudomagnetic field" was interpreted as

exchange Coulomb interaction, and in other cases, as nucleus interactions. During this period, an opinion existed that known spin-spin interactions had another nature [31]. Thus a clear understanding of the mechanism of spin-spin interactions was absent. Later, major investigations of spin-spin interactions of ensembles of particles were conducted [34-38]. Distant spin-spin interactions were theoretically and experimentally examined in the investigations of nuclear spin waves and nuclear magnetic resonance [34-40].

In 1977 A.C.Tam and W.Happer showed experimentally that two circularly-polarized laser beams attract or repel depending on mutual orientation of their circular polarization. If the direction of rotation of polarization of the two laser beams is similar, then these beams attract, and if the rotation of polarization is opposite, then they repel [41]. These results collided with quantum electrodynamics and could not be explained.

In the mid 80s the A.D.Krisch group was experimentally investigating the interaction process between spin-polarized protons and a spin-polarized proton target [32,33]. It was found that the observed process of spin-spin interaction could not be described in the framework of the quark model. The obtained results collided with quantum chromodynamics and could not be explained. Analogous results were observed in the USSR in experiments conducted at Dubna and Protvino [42].

During this time, theoretical results were obtained that let spin-spin interactions be considered as the manifestation of an independent fundamental characteristic of matter. These investigations showed that numerous phenomena which were hard or impossible to explain, had a rigorous theoretical interpretation in the framework of torsion field theory. The convincing theoretical results which allowed understanding of the mechanism of Tam-Happer effect were first obtained by P.C.Naik and T.Pradhan in the USA [43] and then by P.I.Pronin, Yu.N.Obukhov and I.V.Yakushin in the USSR. Later De Sabbata and C.Sivaram in Italy [44] and then E.A.Gubarev, A.N.Sidorov and G.I.Shipov in Russia [45] with the use of torsion theories, gave a theoretical interpretation of experimental results obtained by A.D.Krish [32,33] and others [42].

It is useful to note experiments demonstrating effects which were usually interpreted as the manifestation of the so called "fifth force" [23]. Probably the first researcher to encounter the "fifth force" in the end of XIX century was a professor of Russian physical-chemical society N.P.Myshkin [46]. In 1990, De Sabbata and C.Sivaram demonstrated that phenomena connected with the "fifth force" can be interpreted as manifestation of torsion [47].

It is also important to note the experiments which demonstrate anomalies connected with gyroscopes and gyroscopic systems. Probably the first researcher to establish that the behaviour of gyroscopic systems cannot be explained in the frame work of Newton's mechanics was Russian astrophysicist N.A.Kozyrev. In the 50s, N.A.Kozyrev conducted a large series of experiments with gyroscopes and found that variations of the gyroscope's weight exists depending on the angular velocity and the direction of rotation [1,2]. Later, Kozyrev's results were completely confirmed by a member of the Belarus Academy of Sciences A.I.Veinik, who in the 60s - 80s conducted a major research of the anomalies demonstrated by gyroscopic systems [8]. In 1989 H.Hayasaka and S. Takeuchi published results of their experiments in which the fall-time of freely falling spinning gyroscope was measured. These experiments showed that the fall-time varies depending on the angular velocity and the direction of rotation [48]. The unusual behaviour of spinning gyroscopes was observed by S.M.Polyakov in the USSR [24] and many others, and basically was interpreted as a manifestation of antigravitation. In 1991, G.I.Shipov showed that the violation of

Newton's mechanics demonstrated by gyroscopic systems was caused by the appearance of torsion fields generated by spinning masses [49].

From the mid-50s to the late 70s, N.A.Kozyrev (with V.V.Nasonov) conducted astronomical observations using a receiving system of a new type. When the telescope was directed at a certain star, the detector (designed by N.A.Kozyrev and V. V.Nasonov) positioned within the telescope registered the incoming signal even if the main mirror of the telescope was shielded by metal screens. This fact indicated that electromagnetic waves (light) had some component that could not be shielded by metal screens. When the telescope was directed not at the visible position but at the *true* position of a star, the detector then registered an incoming signal that was much stronger. The detection of the true positions of different stars could be interpreted only as detection of star radiation that had velocities billions of times greater than the speed of light. N.A.Kozyrev also found that the detector registered an incoming signal when the telescope was directed at a position symmetrical to the visible position of a star relative to its true position. This fact was interpreted as a detection of the *future* positions of stars [3,4].

In the late 80s to early 90s, astronomical observations using the Kozyrev-type detector were successfully conducted by a group of academicians at the Russian Academy of Sciences M.M.Lavrentiev. While the sky was scanned by the shielded telescope with the detector inside, it registered signals coming from the visible position of each star, the true position, and also a position symmetrical to the visible position of a star relative to its true position. M.M.Lavrentiev could not give a theoretical interpretation to these facts [50-52]. In 1992 these experiments were successfully repeated by the A.E.Akimov group at the Main astronomical observatory of the Ukraine Academy of Sciences (Kiev) and at the Crimean astrophysical observatory (Nauchnyi). The obtained results were interpreted as detection of torsion waves. (As is well known, stars are objects with large angular momentum.) [53-54]. It should be noted that the fact of detection of future star positions has also been given a rigorous theoretical interpretation. In the framework of G.I.Shipov's "Physical vacuum theory" it is shown that torsion fields can propagate not only in the future but in the past as well [55]. There exists a fundamental (theoretical and experimental) reason to suppose that various psychophysical phenomena (e.g. precognition) are connected with certain manifestations of torsion fields. (The connection of psychophysics phenomena with torsion fields' manifestations was discussed in [56,57].)

The concept of torsion fields is not new. Torsion field theory is a trend in theoretical physics dating back to 1913. As is well known in GR, A.Einstein showed the existence of a close interconnection between gravitation and the curvature of space-time. About then E.Cartan showed that a connection may exist between some physical values and another geometric abstraction - torsion [67]. E.Cartan performed the first theoretical works devoted to a theory of gravitation containing torsion, but at the early stages, Cartan's gravitation theory never obtained support, since spin was not yet discovered at that time. Cartan was the first to point to the possibility of the existence of fields generated by the spin angular momentum density.

In the late 50s - late 60s, attempts to complement Einstein's gravitation theory with torsion were made. The first such attempts were made by T.W.Kibble [58] and D.W.Sciama [59]. But the explosive rise of publications devoted to torsion only occurred after the first (and sensational) torsion effect was calculated. In the works of A.Trautman and W.Kopczynski, it was persuasively demonstrated that the torsion of space-time can eliminate the cosmological singularities in non-stationary models of the Universe [60-62]. After the works of Trautman and Kopczynski, hundreds of works devoted to the theory of gravitation with torsion were published in a short period of time. The so called Einstein-Cartan theory (ECT) (sometimes -

Sciama-Kibble is added) became the best known [63-65].

In the framework of ECT, spin-torsion interaction is practically a contact spin-spin interaction, and the torsion of space-time does not propagate in this theory. In ECT, the constant of spin-torsion interactions is proportionate to the product of the gravitational constant G and Planck's constant h . Thus in ECT the constant of spin-torsion interactions is approximately 27 orders of magnitude weaker than the constant of gravitation interactions. Owing to the above, many authors have repeatedly stated that experimentally observed phenomena cannot be explained by torsion theories, since torsion effects cannot be observed. But as is well known to the experts, this conclusion holds true only for those theories which consider the torsion field to be a static field which cannot propagate (e.g. ECT). After ECT, which describes torsion fields generated by spinning objects without propagation, a large number of non-linear torsion theories appeared. These theories operated with spinning sources having radiation. It was demonstrated that the Lagrangian of a spinning source having radiation can contain a large number of terms with constants that do not depend on G or h . Thus the constant of spin-torsion interactions can be a significant value according to these theories. For instance, according to G.I.Shipov's torsion theory [55,66] the constant of spin-torsion interactions is valued at no less than 10^{-5} - 10^{-6} . It should be noted that the correctness of this evaluation has been confirmed in various experiments (e.g.[1-4,8,9]).

As was already mentioned, E.Cartan was the first to theoretically investigate the physical properties of fields generated by the spin angular momentum density. The phenomena presented in the experimental investigations of gyroscopic systems appeared to be the natural manifestation of torsion fields. Probably the first researchers to interpret the observed "anomalous" variations in gyroscope weight as a manifestation of torsion fields generated by spinning gyroscope, were H.Hayasaka and S.Takeuchi [48]. It is important to note the fact that in order to obtain the effect, the gyroscope must be subjected to non-stationary rotation [49]. For instance, N.A.Kozyrev [2] and A.I.Veinik [8] employed special vibrations of the gyroscope, and in H.Hayasaka's experiments, free-falling gyroscopes were used [48]. This important condition was not taken into consideration by those researchers who declared the absence of any weight variation in their experiments.

Torsion fields are generated by the classical spin [73,74] or by the spin angular momentum density (on a macroscopic level). Torsion fields' characteristics differ substantially from the characteristics of electromagnetic and gravitation fields. Torsion fields have axial symmetry, unlike electromagnetic and gravitation fields that have central symmetry. There exist both right and left torsion fields (depending on the classical spin orientation or rotational orientation). Fig.1 depicts a diagram of the torsion field generated by a mechanically rotated object (e.g. gyroscope) (*at present fig.1 is unavailable*). If the rotation (including classical spin) is stationary (i.e. the angular velocity is constant; the rotating mass is distributed uniformly relative to the rotation axis; the precession and nutation are absent, etc.), then this object generates a static torsion field. The static torsion field exists in the region of space within a certain distance from the source. If rotation is non-stationary, then this object generates propagating torsion radiation (torsion waves).

Torsion fields transmit information without transmitting energy, and they propagate through physical media without interacting (in traditional sense) with this media. But propagating torsion fields alter the spin state of physical media. Thus torsion fields can be detected by various types of detector. Torsion fields cannot be shielded by most materials, but they can be shielded by materials having certain spin-structures [55,75]. The lower bound of torsion signal velocity is estimated at $10^9 c$, where c is the velocity of light. This is due to the fact that

torsion fields are identical to the transverse spin polarization of the physical vacuum [75].

It should be noted that the spatial configuration of the torsion field generated by a spinning particle differs from the spatial structure of an "artificially" rotated object (e.g. gyroscope). A diagram of the torsion field generated by a spinning particle is presented on fig.2 (*at present fig.2 is unavailable*).

Torsion fields are generated not only by a single spinning particle, but also by an ensemble of particles as well. This situation is similar to electricity, where we often encounter the collective electric fields generated by the ensembles of electric charges (nuclei, atoms, charged bodies, etc.). Thus any nuclear spin-polarized target is a source of a torsion field. As was mentioned already, this fact was repeatedly observed in many experiments, and since analogous spins attract, while opposite spins repel [55], then the interaction of a spin-polarized particle with a spin-polarized target nucleus results in the appearance of "anomalous" forces which depend on mutual spin orientation of the particle and the target (e.g. A.D.Krisch experiments [32,33]).

Since all substances (except amorphous materials) have their own stereochemistry which determines not only the location of atoms in molecules, but also determines their mutual spin orientation, then the superposition of the torsion fields generated by the atomic and nuclear spins of each molecule determines the intensity of the torsion field in the space surrounding each molecule. The superposition of all these torsion fields determines the intensity and spatial configuration of the characteristic torsion field for that substance. Thus each substance possess its own characteristic torsion field. Each physical object in living or non-living nature possesses its own characteristic torsion field. The torsion fields of any object can be detected by various methods [1-4,8,9]. Torsion fields can be observed visually by the Kirlian method [17]. (It should be noted that the torsion fields of various objects also can be visually observed by "psychics". This is usually interpreted as "aura" observation.)

The property which is open to influence by torsion fields is spin. Thus the structure of the torsion field of every physical object can be altered by the influence of an external torsion field. As a result of such an influence, the new configuration of the torsion field will be fixed as a metastable state (as a transverse spin polarization state,) and will remain intact even after the source of the external torsion field is moved to another region of space. Thus torsion fields of certain spatial configurations can be "recorded" on any physical object. This fact was repeatedly observed by many researchers (e.g. [1,8,9,14,76]).

The magnetization of ferromagnets results in the appearance of a collective magnetic field. But as a matter of fact, the sequencing of the orientation of magnetic moments automatically results in a sequencing of classical spins which are generated by the motion of electrons in circular molecular currents. So, the magnetization of ferromagnets results not only in the appearance of a collective magnetic field, but in appearance of a collective torsion field as well. Thus any permanent magnet possesses its own torsion field. This fact was first experimentally discovered by A.I.Veinik [8,9]. Fig.3 is a diagram of the torsion field of permanent magnet.

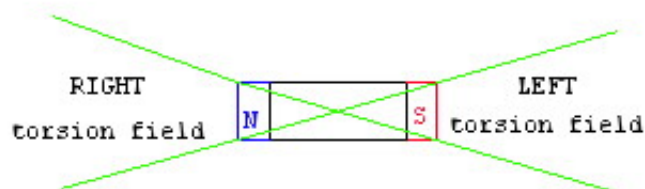


Figure 3.

Since any physical object possess its own torsion field, then the torsion field of permanent magnet is able to affect any physical object. Understanding this important property of magnetic fields allows us to understand a variety of phenomena, for instance the phenomenon known as "magnetization of water," which consists of changing the biological activity of water (including distilled water) by subjecting it to the influence of a magnet. Since the distilled water is diamagnetic, then the process of influencing it with a magnetic field lacks sense from a traditional point of view. But the "magnetization of water" effect can be clearly detected by various methods [8]. In this case the effect is caused not by a magnetic field but by a torsion field which affects the torsion field of water.

The following fundamentally important fact should be emphasized. In the framework of the theory of electro-torsion interactions [66], it is shown that if an electrostatic or electromagnetic field exists in some region of space, then there *always* exists a torsion field in that region of space. Electrostatic or electromagnetic fields without a torsion component do not exist. This was shown rigorously by G.I.Shipov [55,66]. Strong torsion fields are generated by high electrical potentials and by devices having organized circular or spiral electromagnetic processes. (Probably the first researcher to investigate the torsion fields created by these types of generators was Nikola Tesla. In Russia, similar results were obtained by S.V.Avramenko, G.F.Ignatjev and others.)

The principles considered above allow us to classify three types of torsion generators. The first type employs materials (objects) having specially organized spin polarization (e.g. permanent magnets). In the second type of torsion generator, the torsion component of electromagnetic or electrostatic field is employed (e.g. generators created by S.V.Avramenko, G.F.Ignatjev, G.A.Sergejev, S.N.Tarakhtiy and many others). The third type of torsion generator employs a specially organized rotation of a material substance: e.g. a variety of generators created by A.I.Veinik [8]; K.N.Perebeinos' generators with mechanically rotating masses [68]; and V.M.Yurovitsky's generators created based upon the rotation of magnetic fields (magnets). V.M.Yurovitsky was the first to point out that many phenomena could be explained as a result of a manifestation of long-range fields generated by classical spin or spin angular momentum density [69]. Later generators based on mechanically rotating magnets were developed by V.V.Bobyry and many others. As a result of a series of experiments conducted in the Institute of Material Research ("Institut problem materialovedeniya" in russian) (Kiev, Ukraine) it was established that torsion radiation produced by this sort of generator is able to alter the inner structure of any substance (it's spin structure). It was also established that an identical alteration of the structure of various substances can be achieved by "sensitives" ("psychics,") and could not be achieved by the use of other known technologies [70].

There exists a fourth type of torsion generator. Torsion fields can be generated as the result of a distortion of the geometry of the physical vacuum. Every object having a certain surface geometry will simultaneously generate left and right torsion fields of a certain configuration depending on the geometry of the object. This fact can be detected by various types of physical, chemical and biological indicators. The unusual effects demonstrated by pyramids, cones, cylinders, flat triangles, etc. were repeatedly observed by many researchers in different countries. Different researchers usually have given their own names to the observed effects: for instance, "radiesthesiometric radiation" [13], "cellular and hollow structures effect" [14], "shape power", "pyramid power", etc. In the USSR, the effects demonstrated by objects with various geometry have been investigated by A.I.Veinik [8], V.S.Grebennikov [14], Yu.V.Tszyan Kanchzhen, I.M.Shakhparonov, A.A.Beridze-Stakhovsky and others.

In the mid 80s, V.S.Grebennikov found that the empty honeycomb of certain bees could have an influence upon any biological object: from microorganisms to human beings. The affected person basically felt sickness, illusions of falling, flying, etc [14]. The observed influence could not be shielded. As the result of the conducted experiments, it was determined that the effect was caused by the shape (form) of bee honeycomb. The understanding of this fact allowed the development of various types of devices having certain geometric proportions that demonstrated the same effects. V.S.Grebennikov has interpreted the discovered effect as "resonance interactions" between an organism and the objects of a special shape.

In the late 80s, an experimental investigation of the torsion fields generated by objects having various surface geometries was conducted by the A.E.Akimov group at the Physics Institute of the Ukraine Academy of Sciences and at Chernovitsky University. In particular, the influence of torsion fields generated by cones of different sizes and proportions upon various processes was investigated. It was experimentally established that objects having geometrical sizes that obey the rule of "golden section" (1:0,618) can be considered as passive torsion generators [71]. Fig.4 depicts the diagram of the torsion field generated by a cone. The points that divide the cone's height in 3 equal parts (points B and C on fig.4) correspond to the maximum strength of a left torsion field inside the cone.

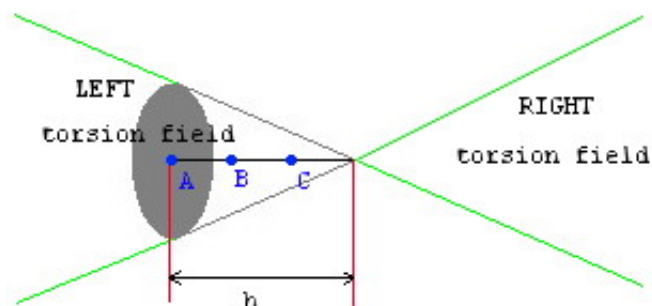


Figure 4.

As is well known to experts in meditation, the shape of the building plays an important role in the process of meditation. Thus the spires and domes of churches and temples (as well as pyramids in Egypt and other countries) should be considered as so called passive torsion generators. The torsion fields of a meditating person can be significantly magnified if the meditation takes place in a building having particular geometric proportions. This fact is employed in the generators developed by A.A.Beridze-Stakhovsky. Over the course of the latter 30 years, torsion generators based upon the shape effect were developed by many specialists.

Yu.V.Tszyan Kanchzhen's torsion generator

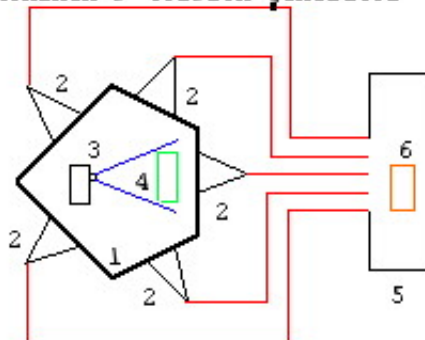


Figure 5.

The fifth type of torsion generator employs a combination of the principles described above. For instance, a combination of high-frequency electromagnetic oscillations and topological effect (shape effect) is used in the generators developed by Yu.V.Tszyan Kanchzhen. (The operation of his devices was interpreted as "high-frequency bio-communication".) Fig.5 shows the diagram of Tszyan Kanchzhen's torsion generator. The object 6 (e.g. a hen) is placed into the receiver-enclosure 5. Another object 4 (e.g. a duck) is placed into the transmitter-enclosure. The transmitter-enclosure is a three-dimensional shape consisting of pentagon 1. Cones 2 are placed on the sides of these pentagons. The object 4 is subjected to the influence of a generator of high-frequency (~ 11 GHz) electromagnetic oscillations 3. The torsion component of these EM oscillations excites the torsion field of object 4. This torsion field is also intensified by the topological effect of 1,2. The excited torsion field is concentrated at the tops of the cones 2 and then is directed to the receiver-enclosure 5. As a rule, a several-day stay of objects 4 and 6 in them resulted in following. If a hen is placed in the receiver-enclosure and a duck is placed in the transmitter-enclosure, then a hen gradually starts to look like a duck. (For instance, a hen gained duck webs and etc.)

An analogous effect was discovered in the 60s by the V.P.Kaznacheev group. Their research was connected with theoretical and experimental investigations that were conducted in the 20s by A.G.Gurvich. As is well known to biophysics experts, in the 20s A.G.Gurvich experimentally discovered the super-weak radiation of cells that has been called "mitogenetic radiation". A.G.Gurvich has found that mitogenetic radiation of one cellular culture was able to stimulate or to suppress the vital activity of another cellular culture [7]. In the 60s, the V.P.Kaznacheev group conducted a series of experiments using the following scheme [15]. An infected cellular culture was encapsulated in an airtight enclosure. Another cellular culture that was intact (not infected) was encapsulated in another sealed enclosure. Then the two enclosures were attached together so that optical contact alone (e.g. a glass or quartz plate) could exist between the two enclosures. The airtight seals of both enclosures remained intact. The degradation of the infected cellular culture was observed. After a certain period of time, the analogous process started in the other enclosure (i.e. the cells in the intact enclosure became infected in spite of the sealing of both enclosures). Many different cell types were used in various experiments, including cells of the human organism. In 1973 this effect was announced as the discovery of "remote intercellular interactions in the system of two cultures" [16].

V.P.Kaznacheev has used an electromagnetic concept for the interpretation of the observed phenomenon (as well as A.G.Gurvich and Yu.V.Tszyan Kanchzhen). But in other experiments conducted by several research groups, it was established that the main factor in Kaznacheev's effect (as well as in A.G.Gurvich's "mitogenetic radiation" and in Yu.V.Tszyan Kanchzhen's effect) is the intercellular interactions created by means of the torsion fields of

cells. In particular, this conclusion was confirmed in the experiments conducted by the L.N.Lupichev group in the late 80s [72]. In these experiments, the distant influence of various chemical substances on different cells was investigated. It was established that it is possible to create conditions where the influence can be detected even if the chemical substance is shielded by metal screens. Thus the main factor in the observed effect had a non-electromagnetic nature. The second important confirmation of the torsion nature of the detected interactions was the fact that screening by aluminum was efficient (while others were not). (It should be noted that torsion fields in some cases can be screened by aluminum.) This fact was first discovered by N.A.Kozyrev [1] and later it was confirmed repeatedly by many researchers. The possibility of reflecting torsion waves by a mirror with aluminum coating is responsible for the possibility of reflecting torsion waves by the mirrors of telescope (even if those mirrors are shielded by various screens) [3, 50-54].)

Over the course of the latter 30 years, various devices that could be seen as torsion generators were patented in many countries (e.g.[77-81]). As a rule no theoretical interpretation of their work was given. For example, devices which employ a combination of topological effects (fourth type of torsion generator) and an intense electric field (second type of torsion generator) is described in the French patent [77]. The construction of the described devices is similar to Yu.V. Tszyan Kanchzhen's generator. According to [77], 2 pairs of electrodes having a voltage between 60-300 kV are connected to a 16-sided prism. On one part of its sides the cones are placed. As the authors of [77] claim, this generator reduces gravitation, accelerates the speed of chemical reactions, etc. Since the generation of static torsion fields results in transverse spin polarization of the physical vacuum that can be retained as metastable state, then many effects were observed up to four days after the generator was turned off. The analogous principle is employed in one of A.I.Veinik's generators [8]. The developed device has demonstrated various physiological effects. The influence remained even when the generator was turned off and moved to another area of space. A number of generators using the combination of topological effects and electromagnetic fields were developed by I.M.Shakhparonov and others.

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