

# Physical-Mathematical Foundations for the Compilation of a Dynamic Interplanetary Map of Meteoroids and Plasmoids

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## Abstract

A joint review of works on asteroid-comet and vacuum-plasmoid threats is presented. Physical-mathematical evaluations of plasmoid explosion power and meteoroid attacks on the Earth's magnetosphere are given. Methods of mapping meteoroids and plasmoids in the solar system are proposed.

## Introduction

On the basis of the properties of previously unknown X-matter the concept of the "Earth's vacuum domain" is formulated. Two types of resolving effect on it by means of thermal transformation of the kinetic and nuclear energies of meteoroids and plasmoids are distinguished. The foundation of scientific research for the formation of the geocosmic problem of asteroid-comet and vacuum-plasmoid dangers for the civilization is substantiated. Methods and tools for meteoroid and plasmoid detection and compilation of dynamic maps of them inside the solar system and the Earth's magnetosphere are grounded. The problem of passive and active antiplasmoid defense in parallel to antiasteroid protection of the Earth is raised.

### The Earth's vacuum domain and X-matter

The examination of a very large number of anomalous

phenomena that cannot be explained within the knowledge established by modern science leads one to stating that on the Earth there exists a certain almost invisible matter, X-matter that forms the Earth's vacuum domain and links the processes on the Earth with processes in space, in particular, the processes in the sun. This matter is called by A.L. Chizhevskiy [6] 'Z - radiation' or a 'Z -factor; S.E. Shnol [33] called this same matter a 'cosmophysical factor'.

In the problem of Earth protection from meteoroid and plasmoid impacts the most importance is attached to that knowledge about 'the Earth's vacuum domain' or 'the Earth's magnetosphere', as well as about X-matter, which comes from geophysicists and geologists rather than the biophysicists Chizhevskiy and Shnol and many others even though it was biophysicists who were the first to notice the existence of X-matter.

The surface of the Earth's mainland and ocean bed is covered with fractures. It is exactly in the concentration places of active, abyssal fractures, that X-matter becomes visible even from Earth satellites. In his work academician F.A. Letnikov [22] shows that above active fractures the walls of unknown matter stand, which affect cloudiness: 'diffuse' clouds during continuous cloudiness and prevent cumulus clouds driven by the wind from passing over a fracture. These fractures also screen the returned signal of radar stations. It is exactly in the region of these walls of X-matter that surfacing plasmoids are often observed - large self-luminous formations (Fig. 1).

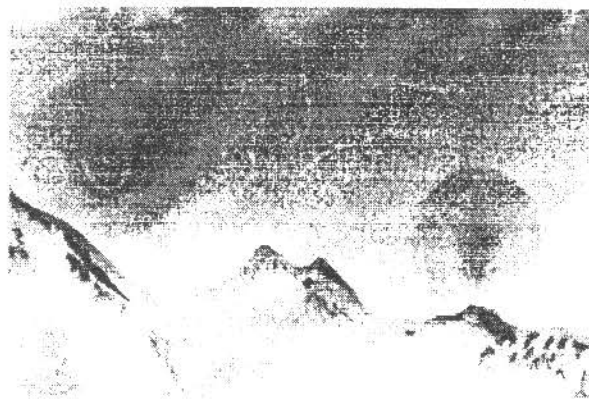


Figure 1: Large scale NSLF above the Katun's mountain ridge. The image was made aboard a helicopter on Aug. 19, 1972 at 11:40 of local time. The observer's attention was drawn by "whitish shining spots in the direction mountain Belukha summits". The disk and oval shapes, so distinctly visible on the photo were not observed visually. An estimate of the objects using topographic charts of the region, gives more than 1.5 km in diameter. (photo of A.V. Semeshin, camera "Kiev", exposure 1/250 s.)

V.A. Rudnik [26] bears witness to similar observations. Above some of the fractures the clouds are constantly formed, even in those cases when the weather in the surrounding terrain is cloudless. Along with that, the well-known geophysicist I.N. Yanitskiy told sensational information on the topic of active fractures. In his interview in connection with the powerful floods in Western Europe in 2001 to the "Sovetskaya Sibir" paper, Novosibirsk, he presented very important data. It appears that cyclones are formed above those regions of the Earth where a dense network of active abyssal fractures is encountered. Those places (barocenters) where the cyclones that pass through the territory of Russia are most frequently formed are related to the Baffin sea to the northwest of Greenland, the Alps, the Caucasus mountains, and western Mongolia, which is essentially a stony desert. It is seen that of the four barocenters three are located in the mountains and above waterless places of the Earth. Thus, it only remains for us to suppose that the unknown matter of active fractures – X-matter has the property of influencing drop formation, and it, when separating from the fractures, forms cyclones.

A.N. Dmitriev [9, 10] systematically studied the so called 'natural self-luminous formations' in the places of active fractures. His works allowed one to establish that the walls of X-matter during magnetic storms began to shine forming the so called low-latitude "auroras". In particular, he established that in the places of active fractures ball lightnings and plasmoids were encountered most frequently. It was assumed based on Dmitriev's works that 'natural self-luminous formations' were coagulums of the most concentrated X-matter that began to shine by itself. "Self-luminous formations" in the form of ball lightnings, plasmoids, tornado columns are the formations of the same most concentrated X-matter. Numerous attempts to find an explanation of X-matter on the basis of knowledge in the area of matter gave no results [9]. Therefore, Dmitriev supposed that X-matter referred to ether coagulums, i.e. formations of non-homogeneous physical vacuum [14] with their properties [6]. According to Shnol's observations [27] one should suppose that inside X-matter bodies the parameters of physical processes should have not continual but discrete spectrum.

Based on the results of Dmitriev's and his colleagues' works [9, 10] as well as other authors' [14] one can suggest a number of hypotheses concerning the movement of X-matter on the Earth.

First of all, it should be admitted that X-matter fills not only the space outside the Earth's surface but also its interior. Then one can suppose that certain difficult issues of geophysics can be explained on the basis of X-matter manifestations inside the Earth. The movement of plasmoids inside the Earth can explain some kinds of explosions and fires in mines, the formation of explosion pipes and diatremes – underwater volcano channels [11]. Plasmoids can be said to burn those channels. It is exactly by the movement of plasmoids inside the Earth that one can explain earthquakes with disseminated foci as well as inexplicable beviies of earthquakes. Note that during volcano eruptions and big earthquakes large

(hundreds of meters) surfacing plasmoids are often observed.

We suppose that X-matter is embedded in the Earth's magnetosphere, i.e. it goes far beyond the Earth's surface and is contained in gas-plasma shells. Thus in work [21] an assumption is made, according to which on the basis of the polarization model of non-homogeneous physical vacuum [14] created based on the results of Dmitriev's observations an explanation can be found for the rotation of Earth satellites around the axes of inertia and the deviation from the calculated orbits of Earth satellites on the day and night sides of the Earth in opposite directions.

An utterly important example of large-scale processes of plasma character is the relaxation of a plasma train on Jupiter in July 1994 [7, 8]. The luminous formations in the form of a 'string of pearls' relaxed in upper and middle atmosphere from 17th to 21st of July. In the world's information this event is known as 'the Shoemaker—Levy comet'. We propose a plasmoid version of this event as most fully explaining the specifics of the movement, luminescence, fragmentation and integration of the fragments, the character of entry into upper atmosphere, and the huge energy consumption of the fragments relaxation processes (plasma individualities) of the 'pearl string'. The vast importance of these processes should also be emphasized for the state of Jupiter's atmosphere and electric and magnetic fields. This injection of additional energy and substance into planetary-physical processes led to the expansion and acceleration of climatic changes on the entire planet. It is natural to suppose that an invasion of the Earth's magnetosphere by similar cosmophysical formations can completely change the planetary-physical characteristics. Let us remind that magnetic field sign inversion is now in progress on Uranus and Neptune [34] as a direct sign of the excitation state of the heliosphere.

### Plasmoid explosions and meteoroid action

From the polarization model of non-homogeneous physical vacuum [14] it follows that plasmoids are the carriers of energy on a thermonuclear scale and they present danger for life on the planet Earth. The model is based on the idea of the Terletskiy quadrigue [32], the basic cell of the Absolute Physical Vacuum (APV), i.e. the basic vacuum that fills all the space of the Universe. This cell contains the full set of such parameters of elementary particles as the signs of electrical charges (+ – q) and masses (+ – m) and the directions of spins (+ – s) and magnetic moments (+ –  $\mu$ ). The Terletskiy quadrigue (APV) is displayed in Fig. 2 in the middle. The main physical property of the physical vacuum is its neutrality. Thus, in the Terletskiy quadrigue the sums of electrical charges, masses, spins, and magnetic moments are equal to zero. The Terletskiy quadrigue reflects the fact that the vacuum is a certain medium formed by dipoles as distinct from matter that is formed by elementary particles. The Terletskiy quadrigue is also characterized by the fact that the physical vacuum is simultaneously an electrical and gravitational dipole medium. Notewor

thy, the Terletskiy quadrigue shows why in the absolute physical vacuum the dipole excitation of the electrical part of the medium absolutely does not depend on the excitation of the gravitational part of this medium.

It can be seen from the diagram in Fig. 2. that according to the feature of neutrality the three vacuums can exist: the vacuum from the Terletskiy quadrigue (APV) and the two vacuums from the dyads: the vacuum of 'matter', PVM and the vacuum of 'antimatter',

PVA. In the vacuums from the dyads the dipole excitation of the PV electrical part leads to the excitation of the gravitational part of PV dipole medium and vice versa. It is precisely the relations of PV electrical and gravitational properties that present the essence of the non-homogeneous PV polarization model. In the model the physical properties of 'vacuum domains' – a mixture of APV with PVM and, separately, a mixture of APV with PVA are considered.

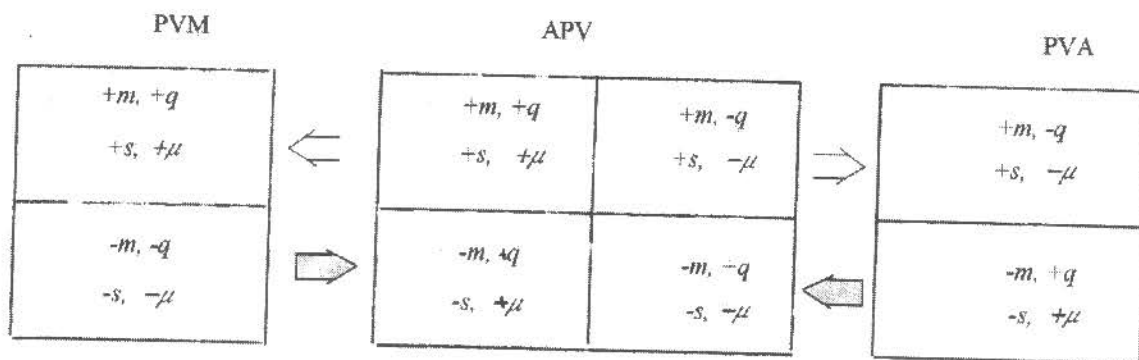
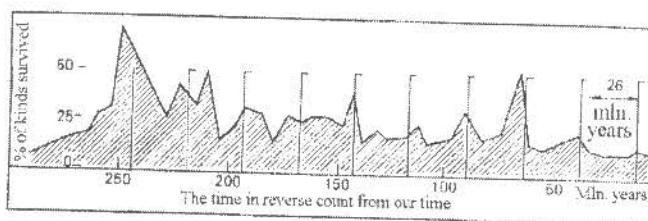
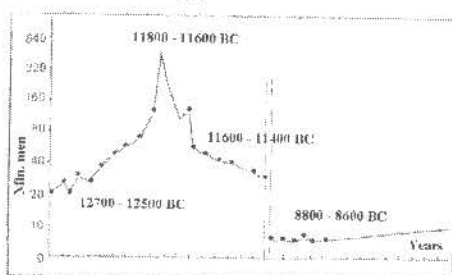


Figure 2: The Terletskiy quadrigue (APV) and its subdivision into dyads of the physical vacuum of matter (PVM) and antimatter (PVA)



(a)



(b)

Figure 3: The periodicity of mass extinction of living organisms (a) and people (b)

Thus, there should exist two types of 'vacuum domains' and, consequently, two types of 'plasmoids', plasmoids of APV and PVM mixture, let us call them 'type B plasmoids' and plasmoids of APV and PVA mixture, let us call them 'type A plasmoids'.

Within the framework of the non-homogeneous PV polarization model [14] a hypothesis was proposed that in the sun and, maybe, inside the planets under the thermodynamic conditions of high temperatures from APV the mixtures were formed separately of APV with PVM, and APV with PVA; 'plasmoids' are formed of types B and A. These plasmoids of highly penetrating vacuum matter issue from the sun and probably, from the planets and spread across the voids of the Universe. As long as plasmoids of types A and B do not encounter

each other they have unlimited time of existence. However, if plasmoids of types A and B (or a wall of the Earth's X-matter and a solar-comet plasmoid) contact under thermodynamic conditions differing from those under which they are formed explosions occur and the energy that was captured as the result of APV division into PVM and PVA is released. APV is formed anew. In the diagram in Fig. 2. the division of APV into PVM and PVA is shown by arrows ( $\rightarrow$ ), and the joining of PVM and PVA into APV is shown by arrows ( $\Rightarrow$ ).

The discussed hypothesis on the origination of plasmoids and their explosions will probably allow one to understand the mechanism of the "Tunguska phenomenon", the explosion on the 30<sup>th</sup> of June 1908 in the region of the Middle Siberian plateau of a "meteorite",

described in two books: the eyewitness evidence reflects the movement of multiple "shining balls" to the explosion area. The event had been preceded by a 'long preparation' in the form of earthquake precursors and the event itself was accompanied by many explosions, among which one was of the power of several dozen million tons in TNT equivalent. The features of the explosion had characteristic peculiarities appropriate to plasmoid appearance – self-luminescence of the atmosphere, a magnetic storm of regional type [12].

Research into the 'Tunguska phenomenon', which is a precursor of Halley's comet were conducted on an independent basis and remained unfinished, which testifies to the indifference of the state and scientific organizations to the most important event in the Earth's history, especially so in light of the importance of the problem of Earth protection from meteoroid and plasmoid impacts.

Within the framework of Earth defense from meteoroids and in connection with the above described properties and peculiarities of X-matter one should especially underline that the danger consists not only in meteoroids hitting the Earth's body or its atmosphere but also in meteoroids passing through the Earth's magnetosphere.

In this case a strong change in the gravitational field of the Earth will occur, which will undoubtedly excite X-matter inside the Earth thus resulting in earthquake and volcano eruption initiation. If modern science is still unable to forecast encounters with large meteoroids, then in respect to Halley's comet and its orbital satellites the matters stand more favorably Brochure [34] refers in detail to the accompanying facts of the recent (1986) approach of Halley's comet to the Earth.

Analysis of earthquakes in the territory of Armenia from the beginning of our era to the present time bears evidence to that more than a quarter of them (26%) have occurred in the period of the Earth's approaching Halley's comet that according to the 1960 version of academician B.P. Konstantinov is in plasma and consists of antimatter. It cannot be excluded that the Chulym bolide that exploded Feb 26, 1984 at an altitude of 100 km was a fragment of the hypothetical antimatter of Halley's comet and for this reason possessed unique qualities. It was accompanied by flashes of blue light with greenish hue. Above the Chulym river without reaching the Earth the bolide exploding turned into a bright cloud of sparkles. The singularity of the 'Chulym phenomenon' is further confirmed by the fact that it possessed clearly pronounced electrophone properties. In the settlements, above which the bolide flew stable television interference was noted, in many houses the electric lamps burned out. Besides the mentioned explosions in Siberia plasmoids exploded in Krakow (14 Jan, 1994, Poland), Santiago-de-Compostella (18 Jan., 1994, Spain) and in Australia (28 May, 1993).

The history and physics of space catastrophes on the Earth is presented in detail in publications [4,16,36]. According to work [13] beginning with late palaeozoic significant 'breaks' are revealed in the evolution of living organisms. Paleontologists have discovered that 247, 220, and 65 million years ago around 95% of all

life forms on the Earth perished. Another seven cases of mass extinction are known – from 20 to 50% of species.

On the horizontal scale in Fig.3, (a) time is marked in million years in countdown from our epoch, on the vertical one the percentage of the surviving species. Regular intervals of 26 million years equal to the orbital period of the stellar counterpart of Nemesis around the sun are evident. According to the information of R. Rampino, R. Stosers, and R. Maller the number of terrestrial craters of more than 10 km in diameter with an age from 5 to 250 million years turned to be 13. The periodicity of comets falling on the Earth by these scientists' estimation is 28.4 million years.

In Fig.3, (b) a diagram is presented of the Earth's human population at the time of Halley's comet maximum approach it. All the diagrams have a comet nature related to Oort's cloud and re-polarization of the Earth's magnetic field [29,23,1,35]. Asteroids and meteorites being smaller in size threaten life on the Earth considerably more often. Rough estimations show that every million years on average three asteroids of about 1 km in diameter fall on our planet. According to the academician T.M. Eneyev's data smaller asteroids cross the Earth's orbit once every five years [15]. The crossing of Earth's magnetosphere by similar objects occurs with a period of one time every 10 years [35]. Analysis of the data on meteorites falling on the Earth beginning with 1800 and up to present has shown the periodicity of these events. The maximum number of impacts as it turns out changes with periods close to or divisible by the 11 year cycles of solar activity [34].

The authors of article [3] estimate the impacting periods of objects of the Tunguska phenomenon type at 19 and 76 years. Every year about 1,000 meteorites fall on the geosurface with an overall mass of 1,500-2,000 tons (5-6 tons per 24 hours). That is, the falling of some heavenly bodies on the others is a most ordinary phenomenon in the solar system [36], that is subject to mapping by modern geocosmic observation means.

The well-known magnetologist Yu.D. Kalinin also emphasized the great geophysical role of impacts of huge asteroids [17]. In particular, he supported and developed the assumption of Cox (1968) and Parker (1969) on the autoinversion of the geomagnetic field. As early as 1972 works appeared, in which the appearance of the geomagnetic field (within the framework of the hydromagnetic theory) was connected with asteroid impacts. And already in 1986 in our country and abroad works appeared on the generation of geomagnetic inversions as a result of asteroid impacts. Yu.D. Kalinin sees this possible general planetary role of asteroids in the processes of 'massaging of the Earth's core' by the impacts of huge asteroids.

### Mapping meteoroids and plasmoids in the solar system

In monograph [29] in addition to the establishment of the frequency of asteroids and comets falling on the Earth's surface data are related on the possibility of detection of heavenly bodies of different sizes by means of

ground astronomy. Information is reported on observatories that work most efficiently in tracing asteroids approaching the Earth (AAE). The most frequent discoveries of new AAE have been recently performed by the observatories of the USA, equipped with medium size telescopes and financed by NASA. These American observatories will have discovered 90% of AAE of more than 1 km in size by 2010-2015 (the Spaceguard Survey program).

Within one year these observatories discover over 200 asteroids and the total number of AAE had reached 1100 by the beginning of 2001. The single program 'Linear' in New Mexico with one meter telescopes contributes 70% of all astronomical discoveries. European observatories do not receive financial support for AAE observation programs from their governments. In Europe's observatories there are up to 10 telescopes of about 0.5m in diameter but almost all of them are not equipped with CCD-matrices. It is difficult to perform survey observations and AAE search with them because of small fields of vision.

The recently put into service Crimean 64-centimeter CCD-telescope allows one to register asteroids up to 20.5 stellar magnitudes and has a field of vision of 0.5 quadratic degree [5]. It occupies a significant place among the world's telescopes and is the only one in the stretch from Japan to Western Europe. However, that is sufficient to fulfil by half the program 'Spaceguard' at the beginning of the third millennium. At present the European Space Agency (ESA) is preparing three rocket launchings for compiling the dynamic map of asteroids and plasmoids in the solar system with possible participation of the authors of this paper. It is supposed to launch along with the rockets space telescopes that are analogous to American 'Hubble' and 'Spitzer'. It is with the help of them that the USA discovered the 10<sup>th</sup> planet 'Sedna' of the asteroid type. Its diameter is about 2,000km and it is 10 milliard km away from the Earth.

The telescope 'Hubble' with a mass of 11.5 tons was designed according to the joint program of the National Aeronautic and Space Agency (NASA) and the European Space Agency (ESA). This telescope was put into an orbit of 600km on board of the spacecraft 'Discovery' on the 24<sup>th</sup> of April, 1990. 'Hubble' is a reflector telescope with the diameter of the main mirror 2.4m. To date 'Hubble' has performed 200 thousand observations having completed 120 thousand revolutions around the Earth and transmitted 600 thousand images to the Scientific Institute of the Space Telescope at the Johns Hopkins University in Baltimore (USA). After 'Hubble' several more telescopes have been put into near earth orbit.

It has up to now been considered that in our solar system there are two asteroid belts. One of them is located between Mars and Jupiter, the other one (Keuper's belt) beyond the orbit of Neptune. At the very end of the previous century an experiment was started during which tens of supercomputers were performing special calculations for a period of four months. As a result, it became evident that there may be thousands of small

asteroids-volcanoids in the area between the sun and Mercury. According to the calculators' opinion the third asteroid belt should consist of only small fragments. The NASA and ESA specialists intend to continue searching for volcanoids using a new space telescope and methods [2]

Asteroids and comets in a plasma cloud are of special interest. The presence of the cloud restricts the usability of the telescopic method of detecting dangerous space objects because of obscured visibility [38]. Astronomers have already lost track of thousands of comets and cannot explain the reason for their disappearance. However, space bodies in electromagnetic field apparently become electrical dipoles. Therefore, between them not only gravitational forces inverse to the square of distances should act but also electrical forces inverse to the cube of distance. Thus, forces that are neglected in modern calculations of cosmic bodies movement in the solar system can act on comets.

One of the central problems of ascertaining the existence of X-matter is connected with the methods of experimental observation and monitoring of X-matter. In connection with this it is noteworthy that as early as 1895 Bauer [28] suggested measuring electric current related to the Earth's electrical field on the basis of one of the basic Maxwell equations under the quasistatic conditions)  $\oint \vec{H}dl = \vec{J}$ , i.e. by measuring the Earth's magnetic field at a certain closed contour  $l$ . The result turned out to be quite unexpected. The measured current proved to be four orders(!) greater than expected. Bauer expected to obtain a current of the order of  $10^{-12}$  A/m<sup>2</sup> and got a current of the order of  $10^{-8}$  A/m<sup>2</sup>. Of course, the method of measuring the Earth's current in question proved to be unusable with the stated purpose. But Bauer undoubtedly found a method of determining X-matter on the Earth. In Bauer's time it was supposed that induction  $\vec{B} = \mu_0 \vec{H}$ . At present we suppose that  $\vec{B} = \mu_0 \vec{H} + \mu_0 \vec{M}$ . Thus, at the present by using the Bauer method we could define a certain current  $\vec{J} = \text{rot } \vec{M}$ . It is precisely  $\vec{M}$ , the magnetization, which in our case is the magnetization of X-matter. Later on, the current  $\vec{J} = \text{rot } \vec{M}$  became known as the Schmidt—Bauer current [28]. Subsequently, Schmidt in 1920s successfully reproduced Bauer's experiments on a large scale. Thus, by measuring the Schmidt—Bauer currents at present one can perform the monitoring of X-matter. Of course, organizing work on the monitoring of X-matter by the Schmidt—Bauer method will require conducting certain scientific and organizational activity. From the presented consideration of the issues of the Earth's vacuum domains it is evident that plasmoids can be detected by means of radars and X-matter by means of magnetometers.

To determine the distribution of X-matter in the upper and lower hemispheres of the Earth we need instrumental methods of determining its presence. The availability of X-matter is reflected in the anomalies of the electrical, magnetic, and gravitational fields of the

Earth. These anomalies have long been known in the form of spaces, in which such anomalies of the specified fields appear. Based on the polarization model of non-homogeneous physical vacuum we can reduce multiple field anomalies to the definition of clouds of four polarizations: electrical, magnetic, gravitational, and spin, i.e. the definition of spheres of the distributed moment of momentum. Such a problem can be solved by mathematical processing of measurement data of electrical, magnetic, and gravitational variations of the fields as well as by measuring certain gas blowouts

from the Earth's interior.

In order to determine anomalous fields on the Earth the known methods of measuring the specified fields can be used and programs for additional measuring of these fields using the Earth's satellites can be outlined. To date, many peculiarities of measuring these fields are known and they can be used in practice. From the model of polarization of physical vacuum we will obtain methods to determine polarizations from the field measurement data. Having determined polarizations we will be able to forecast those disastrous processes that will be related to the disturbances of the Earth's cosmic space resulting from the appearance of plasmoids and meteoroids.

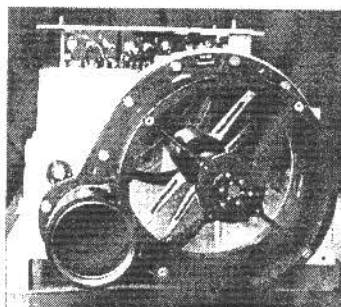


Figure 4: The space locator "BALKAN"

In parallel with X-matter structure research since the end of 1980s works started on the investigation of tectonic aerosols for forecasting natural disasters [25]. One can detect the growing concentration of aerosols using instruments near Earth fractures several days prior to earthquakes and volcanic eruptions. The change in aerosol composition and related electromagnetic characteristics became the true signs for a number of forthcoming destructive events.

For field research into aerosol composition a portable laser locator (lidar) with a range of 2 km was used and a nephelometer device for the observation of particle concentration in an aerosol cloud. In the spring of 1995 the space locator 'BALKAN' (onboard aerosol lidar complex of the Academy of Sciences) was created and successfully put into near-earth orbit, which is presented in Fig. 4.

During a period of 2 years it was being tested on the orbital station "Mir". One year later the Russian-French lidar "ALISSA" was launched there. The space measurements of both lidars were accompanied by sessions of synchronous ground and aircraft probing into X-matter using this unique equipment.

This technology should be coordinated with long-term computer forecasting of large-scale Earth disasters related to the planet alignment in the solar system [24]. The computer capabilities of a Russian system called "Ekoprognoz" can be used for early detection of concentrations of visible and invisible asteroids and plasmoids. This system is based on the method of geospace analogies. It is realized in the form of a retro-prediction

informational-computational complex. The method of geospace analogies makes it possible to justify the relations between the processes of various scales in a unified world and to construct prediction models of multi-parametric dependencies between series of astronomic factors-predictors.

## Conclusions

The energy of an individual plasmoid can reach up to  $10^{22}$  ergs while the diameter of some of plasma formations of natural origin up to 5km. One cannot but point out the role of plasmoids in the process of modification of the world's foci of earthquakes, thunder storms and plasmoid contribution to the generation of beavies of tornados. Thus, plasmoids are a significant component in the list of processes of sun-earth relations. And naturally, vacuum-plasmoid danger needs to be considered in parallel to the asteroid-comet threat. Note that it is appropriate that the detection and mapping of meteoroids and plasmoids in the solar system be conducted conjointly involving the corresponding program of the European Space Agency.

In order to preserve more human lives and to enhance the durability of flying objects and orbital stations one needs to form a geocosmic defense program. Its title may be as follows: "The program of basic and applied research on the development and creation of methods and means to provide protection for air- and spacecraft and orbital stations under exposure to meteoroids and plasmoids of natural and artificial origin". This program

should become dominant in the future activities of the International Academy of Geocosmic Intellectual Systems under the aegis of the UN.

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