# The Near Giant Planet in the Solar System.

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After the discovery of Neptune in 1846, there was an opinion that beyond its orbit exist another planet. This opinion was not groundless. In move gas giants - Uranus and Neptune observed deviations. Their presence testified in favor of the fact that beyond the orbit of Neptune (as expected)

there is another planet. To fully explain the movement of even Uranus by the presence only one cosmic body was impossible, therefore it was assumed that over of the orbit of Uranus has two more planets. Well, since Neptune was found, had to find another planet. So began the hunt for unknown Planet X. Searches then stopped, then resumed again.

Let us consider this situation: we will put questions, we will denote the problems.

So, the main questions to be answered:

1. The inclinations of the orbital planes of asteroids;

2. The Kirkwood's gaps or dips in the asteroid belt. Orbital characteristics of "The fifth giant planet";

3. The inclinations of the axes of the daily rotation of the main planets of the Solar system;

4. Anomaly of the Pioneers, its causes;

5. Conditions for the visibility of the "Near Giant Planet" and the reasons for the failures in search for the "Near Giant Planet" when scanning the celestial sphere in Infra Red and visible ranges by space and terrestrial observatories.

6. Non-symmetry of the heliosphere.

## 1. The inclinations of the orbital planes of asteroids.

In 1961, Mikhail Lidov and in 1962 Yoshihide Kozai, independently of each over, found the following statistical law that the orbital eccentricity can be "exchanged" on inclination and vice versa. And with reaching an inclination angle of the asteroid's orbit plane of 39.2 degrees, the apses line becomes perpendicular to the nodes line. This phenomenon is called resonance of Kozai -Lidov.

Apsis are aphelion and perihelion in this case, maximally distance and the minimum distance to the Sun accordingly. The orbit nodes are the intersection points of the asteroid's orbit and ecliptic plane. There are an ascending node and a descending node.

The question arises: What is the mechanical reason of this statistical law?

Given that the famous giant planets gravity are changed inclination of orbit of any asteroid to an insignificant angle with respect to the plane of the ecliptic, about 1.6 degrees. So, their gravity will have a greater influence on the orbital eccentricity. Wise logic suggests, only a massive body having a significant angle of inclination of the plane of its orbit relative to the plane of the ecliptic should lead to an angle of inclination of the asteroid orbital plane at 39.2 degrees. Otherwise, there is a contradiction with the postulates of classical mechanics.

An example for understanding this phenomenon is quite simple.

We arrange the rubber ring on a horizontal surface and imagine that it is the orbit of the asteroid, and the horizontal surface is the plane of the ecliptic. We believe that the planes of the orbits of the giant planets coincide with the plane of the ecliptic.

We will give an ellipticity to the rubber ring, that is, increase the eccentricity by expanding the ring in different directions. This effect is denoted as the gravity of known giant planets. The increase in eccentricity is all that famous giant planets can.

But in order for the plane of the rubber ellipse to has inclination to a horizontal surface, it is required to apply additional force - to raise the ellipse by the edge. This effect can be in accordance with the gravity of the giant planet, which has a significant angle of inclination of the plane of its orbit relative to the plane of the ecliptic.

The question arises: what angle of inclination of the orbital plane should an unknown giant planet have, in which the line of apses becomes perpendicular to the line of nodes in the orbit of the asteroid, reaching an inclination angle of 39.2 degrees and how can it be reliably determined?

The answer is determined by solution "Three bodies problem" (private solution was found in 2012) and this angle is 20.8 degrees. A statistical dependence of the exchange of eccentricity on the angle of inclination and vice versa is mechanically achieved by the equality of inertia forces at the nodes of the asteroid's orbit. This solution "Three bodies problem" is the Sixth exact particular solution.

Note. The forces of inertia are: the centrifugal force and the force of Coriolis. The Coriolis force or the Coriolis acceleration was named after the discoverer. Coriolis itself gave this force the name "complex centrifugal forces." However, this name did not take root. And "Coriolis force" has become generally accepted.

"Three bodies problem" is one of the tasks of celestial mechanics. Only a few exact solutions are known. The first three solutions were found by Euler in 1767 (the so-called "collinear or linear libration points"). Two more solutions were found by Lagrange in 1772 (the so-called "triangular points of libration").

## 2. Kirkwood gaps in the asteroid belt. Orbital characteristics.

The explanation, that the Kirkwood gaps formed by the resonance with the orbital motion of Jupiter - is unconvincing. Reasonable to believe, that the Kirkwood gaps result of gravitational capture asteroids by massive body. Logically, the all Kirkwood gaps are considered nodes of the orbit of Near giant planet.

Based on the Kirkwood Gaps in 1.9 AU, 2.06 AU, 2.5 AU, 2.82 AU, 3.0 AU, 3.28 AU it can be determined that the unknown giant planet has the following orbital parameters:

- the semi major axis a = 4.2 AU;

- eccentricity e = 0.54;

- inclination of the orbit plane i = 20.8 °;

- orbital period P = 8.7 years;

- the total precession (precession of nodes + abnormal precession of perihelion) for one such period will be about 22.5 degrees.

The main thing is the synchronization of the movement of the Nearest Giant Planet with all the planets of the Solar System.

In a simple sense, "precession" is a displacement. "Precession of nodes" is the displacement of the nodes of the planet's orbit "clockwise". "Anomalous perihelion precession" is the displacement of the nearest distance to the Sun (perihelion) "counterclockwise".

## 3. Inclinations of Daily rotate axes of the main planets of the Solar system.

Consider the values of the inclination of Daily rotate axes to the plane of the orbit in the main planets of the Solar System in degrees: Mercury 0.035, Venus 177.4, Earth 23.44, Mars 25.19, Jupiter 3.13, Saturn 26.73, Uranus - 97.7, Neptune - 28.32.

There are questions:

1. What could make Venus rotate in the opposite direction?

2. Why does Uranus lie on its side?

3. Why do several planets have a slope of the diurnal axes to the plane of the orbit more than 20 degrees?

Presumably, Venus initially was at a distance of 3 AU (astronomical units, 1 AU is equal to the distance from the Sun to the Earth). As a result of the cosmic catastrophe, the collision of the

satellite of the Near Giant Planet and Venus, orbital characteristics of Venus have acquired modern meanings. In other words, Venus shifted to its modern location, and we have Asteroid Belt. Accordingly, crossing with an enviable regularity of the Asteroid Belt, the Near Giant Planet captured some asteroids by its gravity. As a consequence, we have the so-called Kirkwood Gaps in the Asteroid Belt, orbits that do not have asteroids.

The orbit of the Near Giant planet is unstable. This planet acts as one of the balancing factor of the Solar system. As a result of the maximum approach to Uranus, this planet , by its gravity, was to change the inclination of the Uranus's daily rotate axis. In addition, the eccentricity of the orbit of the planet Neptune is less than the eccentricity of the orbit of the planet Uranus, and the missing giant planet must be sought in the inside part of the Solar system.

Given the inclinations of the daily rotate axes of of known planets, we can say that the mass of the Near Giant planet is less than the mass of Jupiter, larger than the mass of Uranus and is quite commensurate with the mass of Saturn. And the existing inclinations of the daily rotate axes of the Earth and Mars, in addition to the influence of gravity of the Near Giant Planet, can be explained by the gravitation of the Sun.

## 4. Anomaly of the Pioneers, its causes.

In 1972, the automatic interplanetary station Pioneer-10 was launched, in 1973 Pioneer-11 was launched. The main tasks of these automatic interplanetary stations were the study of Jupiter and Saturn.

Both "Pioneers" slow down under the joint action of the force of gravity of the Sun and the gravity of the famous planets of the solar system. However, with a more accurate determination of the deceleration of the apparatus and its comparison with the theoretically calculated ones, an additional very weak force of unknown nature is found that differs from all other known forces affecting the apparatus.

Several hypotheses have been put forward. The most probable was the version of the thermal nature of the deceleration caused by the intensity of the thermal radiation of the automatic interplanetary station energy elements.

But in nature this phenomenon exists. This phenomenon was discovered in 1900 by Ivan Yarkovsky. By the name of the discoverer, this phenomenon was called "The Yarkovsky effect". As a consequence of heating the surface of the asteroid, an additional reactive moment is created and in the future acceleration that deflects the asteroid from its orbit.

Knowing the proportions of the accelerations, you can determine to what temperature the radiator should be has heated in order to give out the corresponding acceleration. Calculations have shown that to create a so-called. "Anomalies of the Pioneers", the radiator should be has heated up to 2004K or 1731 ° C, but not less than 1335K or 1062 ° C at the time of the " Anomaly of the Pioneers" measurement. But at the time of the launch of the Pioneers, the radiator should be has heated, and even more, about 2350K-2400K or 2077 ° C-2127 ° C. In this

case, all the heat should go to create a reactive moment and then accelerate (slow down) move of the station.

Therefore, we can make a very simple conclusion about the failure of the version, that the true cause of the "Anomaly of the Pioneers" was the heat of the energy elements of the station.

The most likely cause of the "Anomaly of the Pioneers" is the gravity of the massive celestial body. Based on the magnitude of the "Anomaly of the Pioneers", the mass of the celestial body was determined, approximately 100 Earth masses.

Based on the stability condition, the mass of the "Near Giant Planet" is 103.3 Earth masses.

Note: Of course, the real mass can be determined on the basis of further observations.

**5. Conditions of visibility of the "Near Giant Planet" and the reasons for failures in the search for the "Near Giant Planet" when scanning the celestial sphere in Infra Red and visible ranges by space and ground observatories.**

The conditions of visibility, or rather of invisibility, can be explained by the presence of a massive satellite.

Due to the strong tidal acceleration, the dust does not settle on the surface of the planet and its satellite, but is always in a suspended state. On Earth, similar tidal phenomena are also observed when changes in the level of the ocean or the sea are observed. Something similar is observed on the surface of the Near Giant planet and its satellite, but only with dust.

In order to reduce the visible gloss by an additional + 25m, the dust concentration must be at least 160,000 particles per cubic meter in a volume comparable to the object's volume. Approximately, in order to create a similar situation for the Near Giant Planet (to make the "invisible"), it is necessary to crush asteroid in dust in diameter about 400 meters. With an enviable regularity crossing the Belt of the asteroid, the Near Giant planet and its companion could easily capture such a quantity of dust by their gravity.

The celestial sphere was scanned by space observatories, incl. in Infra Red range. However, by coincidence, the Near Giant Planet was at a remote distance from the Sun and Earth. Unfortunately, the Near Giant Planet had a shine lower than the permeability of space telescopes. The circumstances, nothing more.

Even after the launch of the NEOWISE program, again, by coincidence, the Near Giant Planet had a brightness lower than the permeability of the space telescope. Although Near Giant Planet was at close range to the Sun and Earth.

Given the above situation: observation, search and astro photo shooting used the transit method-reducing the brightness and eclipse of the star. To determine whether we have an eclipse of a star or a star variable is very simple. Look in the catalogs.

For the first time the object (the Near Giant Planet) was seen on the night of October 1, 2016.

**6. The asymmetry of the heliosphere**.

The heliosphere is a region of the near-solar space in which the solar wind plasma moves relative to the Sun at supersonic speed.

Voyager-1 crossed the boundary of the shock wave in December 2004, when it was 94 AU from the Sun. Such a conclusion was made on the change in the magnetic field indices obtained from the apparatus. Voyager-2, in turn, crossed the boundary of the shock wave at a distance of 76 AU in May 2006.

This indicates a somewhat asymmetric form of the heliosphere, the northern half of which is greater than the southern half.

The more massive a star, the more extended its star sphere, similar to the heliosphere of the Sun. Undoubtedly this comparison is not entirely correct, but sufficient for understanding. Taking into account the asymmetry of the heliosphere, the displacement of the center of mass of the Sun was determined. This displacement also plays an important role in the stability of the Solar system and is one of the balancing factors.

**7. General conclusions. Practical application of this discovery.**

Several unsolved problems in physics have been solved, in particular:

-The missing planet of the solar system is found, which is the true cause of the "Anomaly of the Pioneers";

-The problem of the stability of the Solar system is solved. All the balancing factors of the Solar system are found. The stability condition of the Solar system as a rotating system is closed. The search for another additional massive celestial body is doomed to failure, in particular, the so-called Planet Nine.

- The problem of determining the mechanical causes of the Kozai-Lidov resonance is solved.

Practical and applied nature:

-The motion of the planets of the solar system is synchronized;

-The above listed open phenomena require corrections and should be used in determining the trajectory near terrestrial and potentially dangerous objects for the Earth, respectively, the NEO and PHO programs;

- Further development of the physics of the Sun and the dynamics of the objects of the Solar system.

**8. References.**


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