

**LIMITATIONS ON THE DETECTION OF POSSIBLE 9TH PLANET.** A. P. Vidmachenko, Main Astronomical Observatory of National Academy of Sciences of Ukraine, Str. Ak. Zabolotnogo, 27, Kyiv, 03143, vida@mao.kiev.ua.

Numerous observation, carried out since the mid-1990s, showed that the Kuiper Belt is dynamically stable system. The source of cometary nuclei can be the scattered disc [2-6, 23]. It is a dynamically active region, which has been created, by the outwardly directed by gravitational perturbations of outer giant planets [9, 13, 14, 18, 19] more than 4 billion years ago. Objects of scattered disk are similar to the Kuiper Belt objects. But they go away on their orbits at distances of several hundred astronomical units (AU) [7, 20].

In January 2016 M. Brown and K. Batygin reported [1] about indirect evidence of the existence of still unknown ninth planet in the Solar System. Their conclusions about the planet were based on computer calculations of orbits of several currently known trans-Neptunian objects (TNO). Among them – Sedna, 2012VP113, 2010GB174, and some others [10-12, 16]. M. Brown and K. Batygin assume that the orbits of these objects are oriented so that they must be influenced by a large but still unknown body with a mass of about 10 Earth masses. We draw attention to the fact, that all these 6 objects at the moments close to their discoveries [21], were located in orbit close to perihelion. Then they had the maximum brightness for the observer on Earth [7, 8, 22]. But 50-100 years after that, they will move from such a convenient place in space for their possible detection. And after that, these objects for many thousands of years will migrate to remote regions of their orbits [15, 17]. Therefore, it can be assumed, that several orders of magnitude more trans-Neptunian objects, should be in remote parts of orbits.

For an initial assessment of possible visibility of the possible 9th planet, we used the observation data, obtained from the launched in 2009 for study of sky in infrared light, a space telescope «WISE» (Wide-Field Infrared Survey Explorer). With its help it was found, that the telescope could not “see” the analog of Saturn giant-planet at a distance of up to 30 000 AU [15, 17]. This circumstance allowed us to calculate that at distances up to 1 000 AU it would be clearly visible planetary body with a radius of more than 11 000 km; that is, a planet of the same size as proposed in [1] with a possible mass of about 10 Earth masses and an “earth” density (5.52 t/m<sup>3</sup>). If we take into account that the density of the “average” TNO differs little from 2 t/m<sup>3</sup>, then the radius of such planetary body will increase to

19 200 km. Then the limit of detection of a possible planet will increase by almost 4 times: up to 4 000 AU (!) [19].

And since the telescope “WISE” did not “see” even Saturn, then either unknown 9th planet is now even further away, or our results cannot be directly scaled to the planet “Super-Earth”, which at such large distance can have a disproportionately small source of internal heat. From the foregoing, there is an unambiguous conclusion that at a distance of up to 1 000 AU in Solar System of the “Super-Earth” there is no.

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