

## TWO-LOBED SHAPE AND CLEAR “NECK” OF ASTEROIDS 2014JO25 AND 1999JD6 AS AN INDICATION OF THEIR SIMILAR DEFORMATION BY THE FUNDAMENTAL WAVE RISING ONE HEMISPHERE AND PRESSING IN THE OPPOSITE ONE.

G.G. Kochemasov,

IGEM of the Russian Academy of Sciences, 119017 Moscow, Staromonetny 35,  
kochem.36@mail.ru

The wave warping of celestial bodies due to their movement in non-circular keplerian orbits with periodically changing accelerations is especially notable in shapes of small bodies (asteroids, comet cores, satellites). They are often bent by the fundamental wave 1 and acquire shapes of “dumb-bells”, “bean”, “peanut” and often are disintegrated into two or several peaces moving in an original or slightly different orbits. The disintegration is provoked by nearing deep fissures of the convex hemisphere with diminishing distance of the concave one to the fissures. Thus a “neck” develops (Fig. 1-3).

Distribution patterns of “impact traces” – craters in many cases are surprisingly regular. They show alignments, regular grids not related to random hits expected from impacts but rather require more regular and ubiquitous structuring force. It was shown earlier [1-3] that such regular patterns appear due to warping action of inertia-gravity waves affecting all bodies moving in keplerian elliptical orbits. Periodically changing accelerations of celestial bodies cause their wave warping having in rotating bodies (but all bodies rotate!) four ortho- and diagonal directions. An interference of 4 directions of standing waves brings about a regular net of uprising, subsiding and neutral tectonic blocks. Naturally polygonal in details they appear as rings in cosmic images. A fundamental nature of the wave woven nets of evenly sized round “craters” (granules) is dependence of their sizes on orbital frequencies of bodies. The lower frequency the larger sizes, the higher frequency the smaller granule sizes.

The correspondence between orbital frequencies and tectonic granulations proving the structuring role of orbital energy was earlier noted in comparative planetology of the terrestrial planets. The row of Mercury, Venus, Earth, Mars, asteroids with decreasing orbital frequencies is remarkable by increasing relative sizes of tectonic granules, relief ranges, iron content in lowland basalts and decreasing atmospheric masses from Venus to Mars.

In this spectacular row the position of asteroids is especially remarkable. The strongest amplitude fundamental wave 1 embraces an asteroid body making it strongly bent. Its extended convex hemisphere is deeply cracked and the concave one from the opposite site approaches the deepest fissures (Fig. 3). As a result the body tends to disintegrate and two or several pieces move as binaries, polycomponent asteroids, and asteroids with satellites. Two-lobed dumb-bells shapes often are observed also among comet cores and small satellites. Images of small cosmic bodies presented here (fig. 1 to 3) show characteristic bends producing thin parts – “necks” in the middle parts of the bodies and thickenings in their ends (two-lobed forms). Thus, necks are a result of breaking of a whole body [2-3]. In some rare cases an assemblage of alien fragments also is possible. In future, cosmic robots placed at “neck” regions of various small bodies should resolve this question by measuring composition and structure of small pieces around [3]. If they are uniform, they are fragments of one body, if not, two different bodies possibly are assembled. Asteroid 2014JO25 shows typical forms of a small body deformed (warped, bent and deeply cut) by the inertia-gravity waves (wave 1 and shorter ones) due to moving in an elliptical orbit. External orbital energy is a main energetic source structuring cosmic bodies [1-3].

**References:** [1] Kochemasov, G.G. Tectonic dichotomy, sectoring and granulation of Earth and other celestial bodies // Proceedings of the International Symposium on New Concepts in Global Tectonics, “NCGT-98 TSUKUBA”, Geological Survey of Japan, Tsukuba, Nov 20-23, 1998, p. 144-147. [2] Kochemasov G.G. “Diamond” and “dumb-bells”-like shapes of celestial bodies induced by inertia-gravity waves // The 30<sup>th</sup> Vernadsky-Brown microsposium on comparative planetology, Abstracts, Moscow, GEOKHI, 1999, 49-50. [3] Kochemasov G.G. Characteristic “necks” of small cosmic bodies: formation in process of breaking or smooth impact (sticking together) of two fragments // 48<sup>th</sup> LPSC (2017), Abstract # 1092;



1, 2- Asteroid 2014JO25, dimension ~870 m, Arecibo Observatory Planetary Radar System, 17-20 April 2017; 3- Asteroid 1999JD6, PIA19647; 3- Asteroid (433)Eros. 33 km long. NEAR image & a model of body bending, destruction and two-lobed shape formation