EPSC Abstracts
Vol. 6, EPSC-DPS2011-113, 2011
EPSC-DPS Joint Meeting 2011

Dichotomous Vesta – one more brilliant example of the universal shaping pattern of celestial bodies.

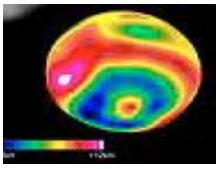
G.G. Kochemasov

Expected detailed images of Vesta sent by DAWN spacecraft certainly will show a prominent tectonic (must be also compositional) dichotomy of this large asteroid. The assuredness is based on some mainly the HST photos and the wave planetology fundamental conception: Theorem 1 – "Celestial bodies are dichotomous". Available images confirm that Vesta has two sides: one concave, another convex (Fig. 1-3). (4) Vesta, about 525 km across, has a deep dark depression from one side opposed to a bulging shining hemisphere [1] (Fig.1) The image of Fig. 1 hints that the dichotomy is complicated by sectoring (Theorem 2: " Celestial bodies are sectoral").

The principal dichotomous shape of (4) Vesta is characteristic also for (1) Ceres. The oblong body of Ceres (major/minor axes of 898/788 km [3] and 970/ 930 km,[Parker & Stern]) according to HST (J.Parker & Stern) has a prominent dusky dark spot (Piazzi) from one side. It occupies a significant part of the asteroid (about 250 km, more than a quarter the size of Ceres) and probably might be assigned to a depression. Tectonically one may compare this depression with the Pacific basin hollow on Earth. One may state that the wave planetology is a science that can predict

It seems that a smaller natural shape model of Vesta could be a nucleus of icy comet Tempel (Fig. 4).
A geometrical model of sector and dichotomy formation due to a warping action of inertia-gravity waves is in Fig. 5. These warping interfering waves are due to non-circular keplerian orbits causing changing alternating accelerations [2, 4 & others].

1


2

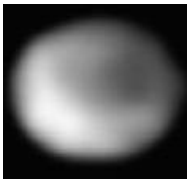

3

Fig. 1. Vesta. May14, 2007. HST WFPC2
180401main_vesta_1.jpg. [5].
Fig. 2. Large depression on Vesta (Asteroid-vesta-three-views-bg.jpg).
Fig. 3. (4)Vesta. A dichotomous celestial body [6].

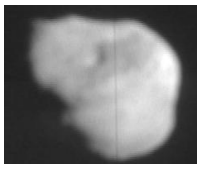


Fig. 4. Tempel 1 comet nucleus (Deep Impact Mission), PIA02119. Example of an oblong convexo-concave shape typical for small bodies. Credit: NASA/JPL – Caltech/ UMD.

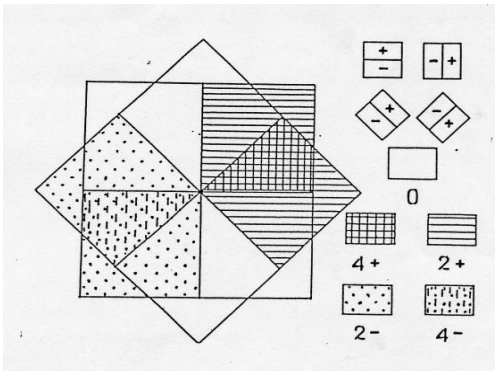


Fig. 5. Graphical presentation of sectors and dichotomy formation by interference of quantum-mechanical waves (+ or -) of 4 directions.

References:

[1] Jian-Yang Li et al. (2008) 39th LPSC, Abstract 2253 pdf.
[2] Kochemasov G.G. (1999) Theorems of wave planetary tectonics // Geophys. Res. Abstr., v.1, #3, 700;
[3] McCarthy D.W.,Jr., Freeman J.D., Drummond J.D. (1994) High resolution images of Vesta at 1.65 micron // Icarus,v.108, #2, pt.1, 285-297.
[4] Kochemasov G.G. Piazzi on Ceres and Pacific on Earth are tectonically comparable features // Geophysical Research Abstracts, Vol. 4, 2002. CD-ROM
[5] Parker J. (Southwest Research Institute), and I. McFadden (University of Maryland). STScI-PRC07-27a.
[6] Press release #: STScI – PR95-20. Asteroid or mini-planet? A portion of HST.WFPC2, B. Zellner, NASA, April 19, 1995.