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Dichotomy of some satellites of the outer Solar system

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Recently acquired by the Casasini' CIR a temperature map (11-16 microns radiation) of small satellite Mimas caused a perplexity among the Cassini scientists (an interpretation of PIA12867). They expected to have a regular temperature map characteristic of a homogeneous spherical body heated by Sun. Instead, the bizarre map with two sharply divided temperature fields was produced (Fig. 1). The temperature difference between two fields is about 15 Kelvin that is rather remarkable. The warm part has typical temperature near 92 Kelvin, the cold part -about 77 Kelvin. Obviously there are two icy substances with different conductivity of heat composing two planetary segments (hemispheres).

But in this result there is nothing new for explorers insisting for many years that all celestial bodies are tectonically dichotomous [1, 2, 3]. However, this new beautiful confirmation of the wave planetology theorem 1 ("Celestial bodies are dichotomous") is not superfluous, as many scientists, especially in the USA, are not acquainted with the wave planetology. The fundamental wave 1 long $2\pi R$ warping any body arises in them because they move in elliptical keplerian orbits with periodically changing acceleration. Having in rotating bodies (but all bodies rotate!) a stationary character and four interfering directions (ortho- and diagonal) these waves inevitably produce uplifting (+), subsiding (-), and neutral (0) tectonic blocks (Fig. 7). The uplifts and subsidences are in an opposition (the best examples are the terrestrial Eastern (+) and Western (-) segments-hemispheres and martian Northern (-) and Southern (+) ones) [3].

The small icy Mimas (396 km in diameter) is no exclusion (Fig. 1). Its dichotomy is well pronounced in two temperature fields obviously reflecting slightly different in composition icy materials composing two segments. Presence of two kinds of surface materials is also revealed by spectrometry under combination of the UV, green and IR emissions (Fig. 4). Around Herschel Crater material is more bluish than more greenish elsewhere (artificial colors). Presence of dark streaks on walls of some craters also indicates at another than pure ice substance. The deep Herschel Crater on the cooler segment is somewhat warmer than surrounding terrains (Fig. 1). Thus, one may suppose that the warmer segment exposes deeper layers and is uplifted (+), the cooler segment is subsided (-). Important confirmations of Mimas' dichotomy are similar geometric patterns observed on Iapetus (black & white) (Fig. 2) and on Titania (Fig. 3). Such pattern can be caught under specific viewing points of dichotomous structure. Figures 5 and 6 show dichotomies of Rhea and Dione. Fig. 7 gives a geometrical scheme of getting dichotomies by wave interference.

References: [1] Kochemasov G.G. (1997) Tectonic dichotomy and sectoring of the Galilean satellites in comparison with some other celestial bodies // 26th microsymposium on comparative planetology (Vernadsky-brown microsymp. 26), Abstracts, Moscow, Vernadsky Inst (GEOKHI), 56-57. **[2]** Kochemasov G. G. (1998) Tectonic dichotomy, sectoring and granulation of Earth and other celestial bodies // Proceedings of international symposium on new concepts in global tectonics ('98 TSUKUBA)", Tsukuba, Japan, Nov. 1998, p.144-147. **[3]** Kochemasov G. G. (2004) Mars and Earth: two dichotomies – one cause // In Workshop on "Hemispheres apart: the origin and modification of the martian crustal dichotomy", LPI Contribution # 1203, Lunar and Planetary Institute, Houston, p. 37.
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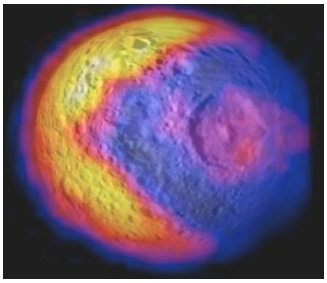

Fig. 1. Mimas, PIA12867. Temperature map.

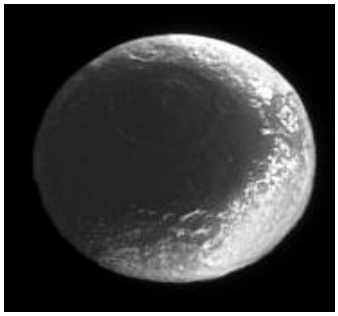

Fig. 2. Iapetus, PIA08234.

Fig. 3. Titania, PIA01975.

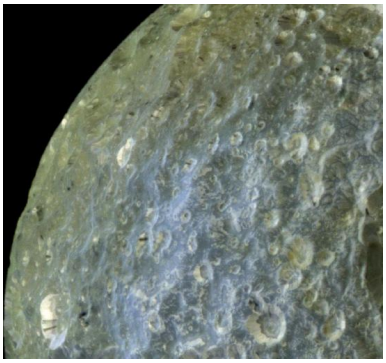

Fig. 4. Mimas, PIA 12571

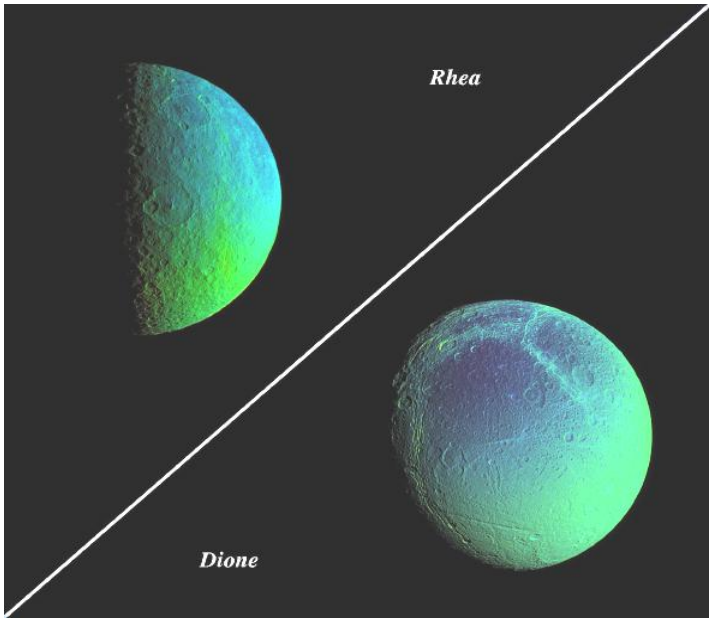

Fig. 5. Dichotomy of Rhea and Dione, PIA 07769

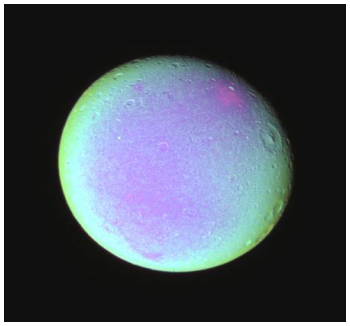

Fig. 6. Dichotomy of Dione, PIA 07688.

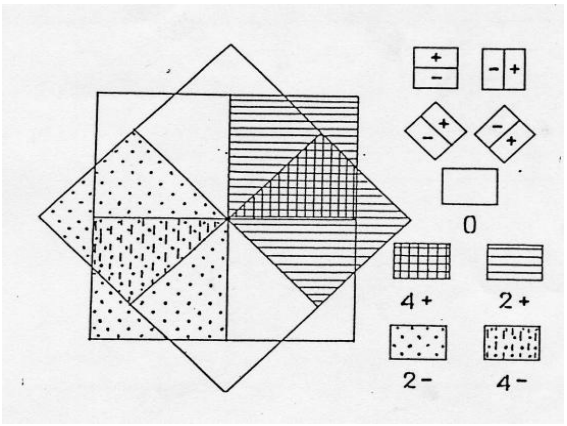

Fig. 7. Graphical presentation of dichotomy formation by interference of quantum-mechanical waves (+ or -) of 4 directions.