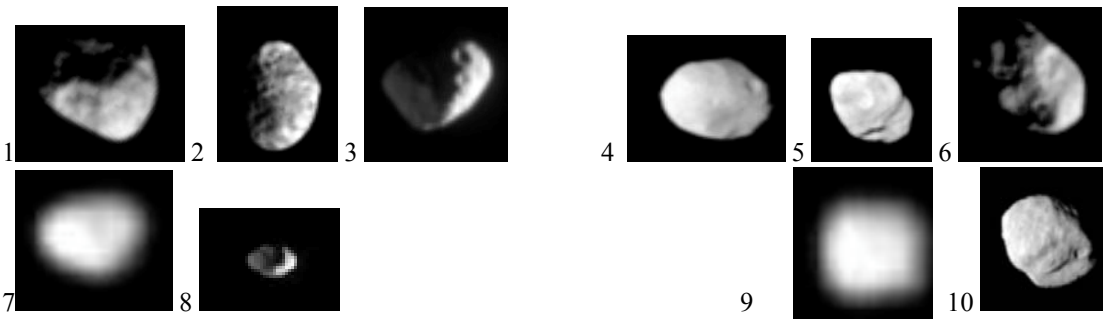
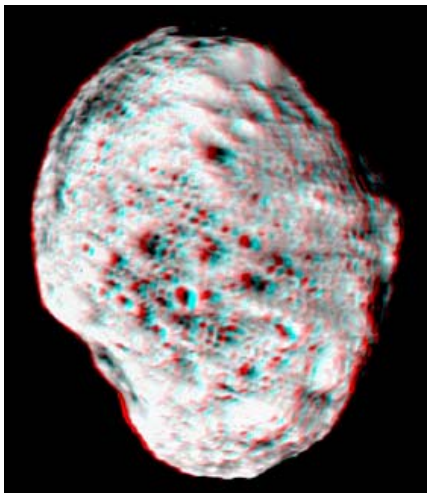
CASSINI' LESSON: SQUARE CRATERS, SHOULDER-TO-SHOULDER EVEN-SIZE ALIGNED AND IN GRIDS CRATERS HAVING WAVE INTERFERENCE NATURE MUST BE TAKEN OUT OF AN IMPACT CRATERS STATISTICS TO MAKE IT REAL. G.G. Kochemasov, IGEM RAS, 35 Staromonetny, 110017 Moscow, Russia, kochem@igem.ru

At Vernadsky-Brown symposium and other planetological meetings we have given many examples of round features on surfaces of celestial bodies (not only solid but gaseous as well) that are not of an impact origin but appears due to crossing standing waves warping planetary spheres [1 & others]. It was expected that such planetary waves caused by movements of celestial bodies in non-round keplerian orbits with periodically changing accelerations will be seen on numerous bodies (and rings) of the complex saturnian system [2] . These expectations and predictions were well paid. Virtually, all its satellites and rings are affected by crossing wave warpings producing regular nets of round features (craters). Some craters have very effective square or hexagonal shapes (by the way, this shape was marked out on the Eros' surface but not adequately explained). Already the first images of Phoebe a year ago shown that shapes and structures due to waves are there [1]. The 4 theorems of the wave planetary tectonics were confirmed: 1. Celestial bodies are dichotomic; 2. –"- are sectoral; 3. –"- are granular; 4. Angular momenta of different level blocks tend to be equal. Darkish lowlands (floors) presumably filled with denser material than icy surroundings were observed in many cases but the most outstanding one is the double-face Iapetus. Its dark half (more precisely 1/3) is compared with basalt filled basins of Pacific and Vastitas Borealis [3]- different materials but the same law.

The wave shaping naturally is sharper in smaller bodies. Hyperion, Pandora, Yanus, Telesto attest this all showing a bean shape (2πR-structure) and longing acquire together with this diamond shape (πR-structure) better seen in Phoebe, Pandora, Epimetheus, Helene. Waves, very spectacular in rings, are prominent on satellites surfaces (more or less clear depending on a viewing situation – the phase angle). Regular round (or square and hexagon!) craters are very typical for all of them (Fig.11-14). Craters (granula) sizes or groove-ridge spacings are an another characteristics showing the wave action and the dependence on orbits. Higher orbital frequency – smaller crater size and v.v. The scale is Earth with its orb. fr. 1/1year and the corresponding granula size πR/4. But satellites have 2 orb. fr. : around Saturn & Sun. Thus one expects 2 corresponding them main granula sizes and 2 sizes corresponding to side frequencies (modulation of the higher fr. by the lower one: division & multiplication of the first by the second). Craters corresponding to an interaction of wave harmonics also can be seen. In table are listed expected and already observed (**bold**) crater sizes (groove-ridge spacings).

Satellite	Radius, km	Orb. period	Main granula size, km		Side granula size, km	
Pandora	55x43x33	0.6285	0.07-0.04	1295-777	0.6-0.3	0.01-0.006
Epimetheus	70x58x50	0.6943	0.10-0.07	1648-1178	0.8-0.6	0.014-0.010
Yanus	110x95x80	0.6947	0.16-0.12	2590-1884	1.2-0.9	0.022-0.016
Mimas	197	0.9420	0.4	4639	**3.0**	0.05
Enceladus	251	1.3702	0.7	5911	**5.5**	**0.1**
Tethys	524	1.8878	**2.1**	12340	**16**	0.28
Diona	559	2.7370	3.3	13164	25	0.44
Rhea	765	4.5180	**7.4**	18016	**56**	1.0
Titan	2575	15.945	88	60641	**662**	12
Hyperion	175x120x100	21.2767	**8.0-4.6**	4121-2355	**60-34**	1.1-0.6
Iapet	718	79.331	**122**	16909	918	**16**
Phoebe	115x110x105	-550.45	136-124	2708-2473	1021-932	**18-17**





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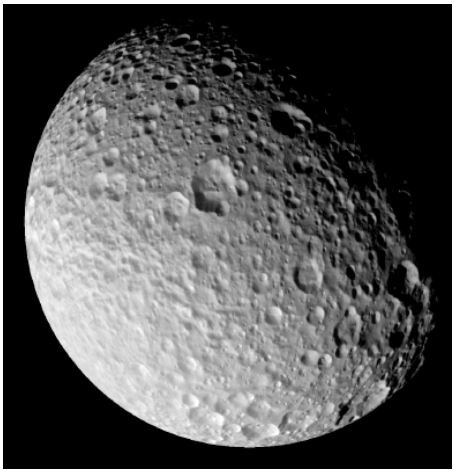

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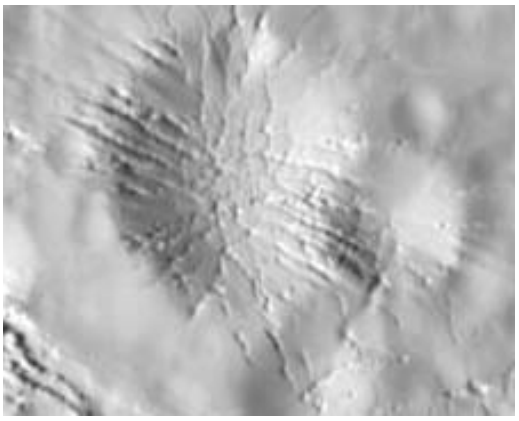

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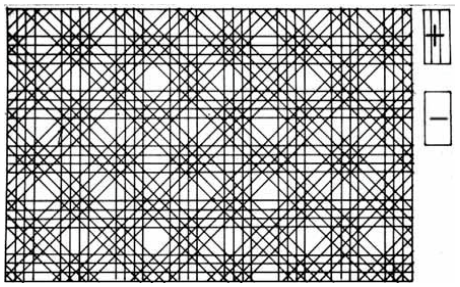

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References: **[1]** Kochemasov G.G. (2004). Vernadsky-Brown Microsymp. 40: "Topics in comparative planetology", Oct. 11-13, 2004, Abstr., Vernadsky Inst., Moscow, Russia, CD-ROM; **[2]** Kochemasov G.G. (2004) 35th COSPAR Sci. Assembly, 18-25 July 2004, Paris, France. Abstr.# COSPAR04-A-00909, CD-ROM; **[3]** Kochemasov G.G. (2005) Asia-Oceania conf., Singapur, Abstr. CD-ROM;

Fig.1-3, 7-8. Dichotomy (wave1, 2πR-structure, bean-shape):**1**-Hyperion, image NASA/JPL/Space Sci. Inst.PIA06608; **2**-Hyperion, 06645; **3**-Yanus, 06613; **7**-Telesto, 07546; **8**-Pandora, 07523. **Fig.4-6, 9-10**. Polygonal sectoral octahedron shaping (wave2, πR-structure, diamond-shape): **4**-Pandora, 07530; **5**-Prometheus, 07549; **6**-Hyperion, 06608; **9**-Helene, 07547; **10**-Epimetheus, 07531. **11**-Hyperion, 06244 (intersecting wave traces of 3 directions corresponding to 3 symmetry planes of structural octahedron which include 12 octahedron edges; note structural and size control of craters having wave origin. Four more or less blackish and whitish sectors converge in the center of the image); **12**-Mimas, 06256, intersecting wave traces producing square craters, chains of craters over the whole surface ; **13**-Enceladus, 06252, wave woven chess-board terrain, aligned "boulders"~100 m across being tectonic granulas predicted in the table above; **14**- Enceladus, a portion of image 06248, intersecting wrinkles-waves of 3-4 directions producing crater chains; **15**- Graphical model of intersecting quantum-mechanical (alternation of + and -) waves producing lines and grids of even-sized rounded (polygonal) craters ; this picture imitates the real wave structurization seen on surfaces of all saturnian satellites and rings and characteristic for all celestial bodies [1-3 & earlier publications].