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Plato' polyhedra as shapes of small icy satellites

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A polyhedron as a form of a celestial body was firstly observed during the Galileo mission to Jupiter. Amalthea has shown its unusual shape of a "diamond" and this was not explained. From some points of view other small bodies as Phobos, Mathilde, Eros also show outlines with several faces. But a real collection of cosmic polyhedra present small icy saturnian satellites. The wave planetology [1-5 & others] states that "orbits make structures". Elliptical keplerian orbits with periodically changing accelerations stimulate in bodies warping waves having 4 interfering directions (ortho- and diagonal) in rotating bodies(but they all rotate !). These inertia-gravity waves in closed spheres have a standing character and various lengths. The fundamental wave 1 is always present producing ubiquitous tectonic dichotomy – segmentation (2πR-structure, R-a body radius). Its first overtone wave 2 produces tectonic sectoring (πR-structure), then go smaller blocks. It was shown [4] that 2πR-structuring tends to attach to a body a shape of tetrahedron, πR-structuring – shape of octahedron, πR/2-structuring – shape of a cube. All these geometric figures can exist in one body simultaneously and be revealed at different points of view. Certainly, they are more or less clearly seen only in rather small bodies (less than 400 to 500 km in diameter) where gravity allows keep peculiar shapes. In larger bodies mighty gravity rounds them off and only geology, geophysics and geomorphology can distinguish on "perfect" spheres traces of polyhedron's vertices, edges and faces. The saturnian system has many small icy bodies which can demonstrate their geometric shapes. Tectonic dichotomy is most clearly revealed in a bean or banana convexo-concave shapes, but sometimes flattened (concave) side is opposed to sharply protruding convex side by such a way that tetrahedron shape appears (Hyperion, PIA08904, PIA06645; Telesto, PIA07546; Amalthea, PIA01074). An octahedron is manifested in classic Amalthea (PIA01074), in Yanus (PIA08192), Prometheus (PIA07549). A cube is clearly seen

in Epimetheus (PIA07531) and Helene (PIA07547) [5]. It is essential to note that the convexo-concave shape so typical for small bodies (satellites, asteroids, comets) is characteristic for small bodies of various sizes. In the asteroid belt between Mars and Jupiter flattened and dichotomous is even the largest asteroid Ceres as well as millions of other bodies of various sizes. And this is understandable as the fundamental wave 1 affects all bodies notwithstanding their sizes. A liaison between dichotomy and the tetrahedron structure can be understood if one mentally cuts any of 4 axes of this figure. At one end always will be a vertex – point to which narrow three faces (contraction). At another end always will be a face to which expand this three faces (expansion). The tectonic dichotomy in celestial bodies is an opposition of contracted and expanded segments (hemispheres). **References:**

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