



The nature and mechanism of the Solar System bodies creation, separation, and orbiting

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It is known that the mean orbital velocity of all the Solar System bodies (planets, their satellites, small planets (asteroids), comets, as well as the Sun itself) is equal to the first cosmic velocity of their 'protoparent'. This means that any protoplanetary body was created from the upper shell of the Protosun and separated while its matter became weightless and the protosolar radius became equal to the semi-major axis of the present-day planet. The creation and separation of any protosatellite from the corresponding planet and the Protosun from the Galaxy follows the same mechanism. The first cosmic velocity v of a protobody and its period T of oscillation of the corresponding outer shell were calculated by the formulae from which, in fact, the third Kepler's law follows: $v = \omega R$; $T = 2\pi/\omega$, $\omega^2 = Gm/R^3$, T^2 is proportional to R^3 , where ω is the frequency of virial oscillation of the outer shell, which appears to be the angular velocity of the orbital motion, and R is the semi-major axis. Note the frequency of virial oscillation of the outer weighty shell is not equal to its angular velocity because frequency is the parameter of the outer force field. And the weightless outer shell's angular momentum is much more higher of the weighty shell due to the friction. The accuracy of the calculated and observed values of the first cosmic velocities and the periods are very high. For example, for the Earth: $v = 29.78$ km/sec, $T = 1$ yr, and for the Moon: $v = 1.01$ km/sec and $T = 27.44$ days. The obtained results mean that all the planets and satellites were launched by the self-gravitating Protosun and protoplanets with the first cosmic velocity after a part of their outer shell matter had acquired weightlessness as a result of the energy emission and corresponding redistribution and differentiation of the body's matter density. The discovered effect of the Solar System planets' and satellites' creation and separation appears to be valid for the Protosun itself and the other protostars for their separation from the Protogalaxy. This statement is proved by calculation.

The conclusions are as follows: (1) the Solar system has been formed from a single non-homogeneous self-gravitating protosolar body as a result of differentiation of its shells matter; (2) the separation of the small planets of the asteroid belt from the Protosun's body follows the same law; (3) axial rotation of the Sun, planets and satellites has never been as an inertial rotation of a rigid body; (4) the mechanism of creation and separation of the Solar System bodies explains the observed distribution of the planets' orbital and the Sun's moments of momentum; (5) the energy conservation law appears to be the basis for assumption that the Universe is a pulsating and perpetually moving system.

References: Ferronsky V.I. and Ferronsky S.V. (2010), *Dynamics of the Earth*, Springer, Dordrecht/Heidelberg; Ferronsky V.I., Denisik S.A. and Ferronsky S.V. (2011), *Jacobi Dynamics* (2nd edition), Springer, Dordrecht/Heidelberg (in press).